



AGENDA

ORDINARY COUNCIL MEETING

9 DECEMBER 2019

MEMBERSHIP: Councillors J Diffey, V Etheridge, D Grant, D Gumley, A Jones, S Lawrence, G Mohr, K Parker, J Ryan and B Shields.

The meeting is scheduled to commence at 5.30pm.

PRAYER:

O God, Grant that by the knowledge of thy will, all we may resolve shall work together for good, we pray through Jesus Christ our Lord. Amen!

ACKNOWLEDGEMENT OF COUNTRY:

"I would like to acknowledge the Wiradjuri People who are the Traditional Custodians of the Land. I would also like to pay respect to the Elders both past and present of the Wiradjuri Nation and extend that respect to other Aboriginal peoples from other nations who are present".

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Confirmation of Minutes

Confirmation of the minutes of the proceedings of the Ordinary Council meeting held on 25 November 2019.

RECOMMENDATION

That the minutes of the proceedings of the Dubbo Regional Council at the Ordinary Council meeting held on 25 November 2019 comprising pages 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 of the series be taken as read, confirmed as correct minutes and signed by the Mayor and the Chief Executive Officer.

Appendices:

- 1 [↓](#) Confirmation of Minutes Ordinary Council Meeting - 25 November 2019



REPORT ORDINARY COUNCIL MEETING 25 NOVEMBER 2019

PRESENT: Councillors V Etheridge, D Grant, D Gumley, G Mohr, K Parker, J Ryan and B Shields.

ALSO IN ATTENDANCE:

The Chief Executive Officer, the Executive Manager People, Culture and Safety, the Manager Governance Operations, the Administration Officer Governance, the Community Support Officer, the Communications Partner, the Director Organisational Performance (J Bassingthwaite), the Director Culture and Economy, the Director Infrastructure, the Director Development and Environment, the Manager Growth Planning, the Growth Planner, and the Director Liveability.

Councillor B Shields assumed chairmanship of the meeting.

The proceedings of the meeting commenced at 5.30pm at the Dubbo Civic Administration Building, Council Chamber, with a prayer for Divine Guidance to the Council in its deliberations and activities. The acknowledgement of country was also read by Councillor K Parker.

CCL19/206 CONFIRMATION OF MINUTES (ID19/1543)

Confirmation of the minutes of the proceedings of the Ordinary Council meeting held on 4 November 2019.

Moved by Councillor G Mohr and seconded by Councillor K Parker

MOTION

That the minutes of the proceedings of the Dubbo Regional Council at the Ordinary Council meeting held on 4 November 2019 comprising pages 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 of the series and Extraordinary Council meeting held on 14 November 2019 comprising pages 16 and 17 of the series be taken as read, confirmed as correct minutes and signed by the Mayor and the Chief Executive Officer.

CARRIED

CCL19/207 LEAVE OF ABSENCE (ID19/1544)

Requests for leave of absence were received from Councillors J Diffey, A Jones and S Lawrence who were absent from the meeting due to personal reasons.

Moved by Councillor D Gumley and seconded by Councillor V Etheridge

MOTION

That such requests for leave of absence be accepted and Councillors J Diffey A Jones and S Lawrence be granted leave of absence from this meeting.

CARRIED

CCL19/208 PUBLIC FORUM (ID19/1545)

The council reports having met with the following persons during Public Forum:

- Karina McLaughlin - regarding CCL19/224 – Draft Community Participation Plan – Results of Public Exhibition.
- Della Burns – regarding CCL19/224 – Draft Community Participation Plan – Results of Public Exhibition.
- Natalie Burns - regarding CCL19/224 – Draft Community Participation Plan – Results of Public Exhibition.
- Greg Smyth – regarding 5G towers – associated health risks

MAYORAL MINUTE

CCL219/208A PARTNERSHIP WITH TEAM RUBICON, CLUBS NSW AND DUBBO REGIONAL COUNCIL

The Council had before it the Mayoral Minute regarding Partnership with Team Rubicon, Clubs NSW and Dubbo Regional Council to deliver water supplies to farmers in the Local Government Area.

Moved by Councillor B Shields

MOTION

1. **That Council provide the supply of potable water via Council's standpipes to Team Rubicon for the delivery of potable water to drought stricken farmers in the Local Government Area.**
2. **That Council promote this wonderful initiative through Council's Corporate Image and Communications branch, Council's Website and other media channels that Council has access to.**

CARRIED

MATTERS CONSIDERED BY COMMITTEES:

**CCL19/209 REPORT OF THE DEVELOPMENT AND ENVIRONMENT COMMITTEE - MEETING
11 NOVEMBER 2019 (ID19/1546)**

The Council had before it the report of the Development and Environment Committee meeting held 11 November 2019.

Moved by Councillor G Mohr and seconded by Councillor V Etheridge

MOTION

That the report of the Development and Environment Committee meeting held on 11 November 2019, be noted.

CARRIED

**CCL19/210 REPORT OF THE INFRASTRUCTURE AND LIVEABILITY COMMITTEE - MEETING
11 NOVEMBER 2019 (ID19/1547)**

The Council had before it the report of the Infrastructure and Liveability Committee meeting held 11 November 2019.

Moved by Councillor G Mohr and seconded by Councillor V Etheridge

MOTION

That the report of the Infrastructure and Liveability Committee meeting held on 11 November 2019, be noted.

CARRIED

**CCL19/211 REPORT OF THE CULTURE, ECONOMY AND CORPORATE COMMITTEE-
MEETING 11 NOVEMBER 2019 (ID19/1548)**

The Council had before it the report of the Culture, Economy and Corporate Committee meeting held 11 November 2019.

Moved by Councillor D Gumley and seconded by Councillor V Etheridge

MOTION

That the report of the Culture, Economy and Corporate Committee meeting held on 11 November 2019, be noted.

CARRIED

**CCL19/212 REPORT OF THE DUBBO REGIONAL AIRPORTS COMMITTEE - MEETING 14
NOVEMBER 2019 (ID19/1567)**

The Council had before it the report of the Dubbo Regional Airports Committee meeting held 14 November 2019.

Moved by Councillor G Mohr and seconded by Councillor J Ryan

MOTION

That the report of the Dubbo Regional Airports Committee meeting held on 14 November 2019, be adopted.

CARRIED

**CCL19/213 REPORT OF THE AUDIT AND RISK MANAGEMENT COMMITTEE - MEETING 18
NOVEMBER 2019 (ID19/1568)**

The Council had before it the report of the Audit and Risk Management Committee meeting held 18 November 2019.

Moved by Councillor K Parker and seconded by Councillor G Mohr

MOTION

That the report of the Audit and Risk Management Committee meeting held on 18 November 2019, be adopted.

CARRIED

NOTICES OF MOTION:

CCL19/214 TEMPORARY ACCOMMODATION WELLINGTON (ID19/1570)

Council had before it a Notice of Motion dated 19 November 2019 from Councillor D Grant regarding the Temporary Accommodation Wellington.

Moved by Councillor D Grant and seconded by Councillor G Mohr

MOTION

- 1. That the Chief Executive Officer investigate the possibilities of making land available in the Wellington township to help facilitate the construction of temporary accommodation with a report to be presented at the February 2020 Council meeting.**
- 2. That such land that council sees suitable for this type of accommodation arrangement**
- 3. That any such construction on this council owned or managed land would be of a temporary nature and not be undertaken by council.**

CARRIED

CCL19/215 EXTENSION OF BUSHRANGERS CREEK ROAD WALKING PATH (ID19/1571)

Council had before it a Notice of Motion dated 19 November 2019 from Councillor D Grant regarding the Extension of Bushrangers Creek Road Walking Path.

Moved by Councillor D Grant and seconded by Councillor G Mohr

MOTION

1. That the Chief Executive Officer provide a report to the April 2020 Council meeting on the extension of the Bush Rangers Creek Road walking path from Brennan's Way to the start of Scenic Drive at the base of Mount Arthur (Stage 2).
2. That the report include full costings, concept plan and potential funding avenues to see this project achieved.

CARRIED

CCL19/216 CASINO LICENCE FOR DUBBO (ID19/1573)

Council had before it a Notice of Motion dated 19 November 2019 from Councillor J Ryan regarding the Casino Licence for Dubbo.

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Moved by Councillor J Ryan and seconded by Councillor V Etheridge

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MOTION

1. That the Chief Executive Officer be requested to advocate to the State Government to change the current regulations to permit a restricted gaming licence in Dubbo.
- 2. That council note its immediate preference that any third casino not contain poker machines.
- 3. That the report be included for consideration for the April 2020 meeting of Dubbo Regional Council. "

CARRIED

REPORTS FROM STAFF:

CCL19/217 WATER STRATEGY - NOVEMBER 2019 (ID19/1542)

The Council had before it the report dated 13 November 2019 from the Chief Executive Officer regarding Water Strategy - November 2019.

Moved by Councillor D Gumley and seconded by Councillor J Ryan

MOTION

1. That report of the Chief Executive Officer dated 13 November 2019, be noted.
2. That Council develop a suite of local water supply initiatives across the LGA based on an integrated water supply system which effectively addresses the immediate water supply needs during the current drought as well as providing long term resilience for future droughts. These initiatives include, but are not limited to:

- a. The development of additional groundwater sources in Dubbo and Wellington and the re-establishment of groundwater sources in Geurie.
 - b. The targeted use of recycled water as replacement water for existing surface or groundwater supplies, where these existing supplies can then be used to augment town water supplies.
 - c. Development of urban stormwater harvesting schemes.
 - d. The re-use of backwash water at the Dubbo Water Filtration Plant.
 - e. Securing additional groundwater for town water use through either temporary trading or permanent purchase.
 - f. Investigating the development of a Managed Aquifer Recharge Scheme.
3. That Council proceed with necessary infrastructure works to deliver these initiatives including:
 - a. Investigation of new groundwater sources in Wellington, with development of new bores if suitable groundwater supplies are found.
 - b. Re-establishment of bores in Geurie.
 - c. Development of an integrated groundwater supply network in Dubbo which optimises the effectiveness of individual bores and maximises the efficiency of the entire network, without long term adverse impact on the groundwater resource.
 - d. Construction of a pipe network in Dubbo which:
 - i. Connects existing recreational bores in the City to the Water Filtration Plant to enable groundwater extractions from these bores to be used to augment the City's water supply; and
 - ii. Enables high quality recycled water to be piped from the Sewage Treatment Plant to appropriate locations across the City for re-use as a replacement water source, including key open space areas, Taronga Western Plains Zoo and other identified locations where recycled water use offers the highest value outcome to Council.
 - e. Construction of a backwash re-use system at Dubbo Water Filtration Plant.
 - f. Development of Stage 1 of the Dubbo Stormwater Harvesting Scheme.
4. That Council develop a Recycled Water Management Plan to identify the necessary levels of additional treatment required to ensure recycled water use is of an appropriate quality standard for its intended re-use, and deliver these additional treatment processes as part of the implementation of the Plan.
5. That Council review its current use of recycled water at Greengrove, and the supply of recycled water to existing commercial operators, with a further confidential report on this issue to be prepared for Council early in the New Year.
6. That Council consider the outcomes of the current Expression of Interest process to secure additional temporary or permanent water through the water market, with responses used to develop agreements which offer the greatest benefit to Council and authorise the Chief Executive Officer to enter into water trading purchase agreements on behalf of Council.
7. That Council support, in principle, the development of a Regional Water Supply Pipe Network to enhance the long term security of urban water to all communities currently supplied by the Macquarie River downstream of Burrendong Dam.
8. That Council authorise the Chief Executive Officer to finalise and sign the Dubbo Drought and Groundwater Infrastructure Project Funding Deed with Department Planning Industry and Environment.

9. That Council jointly seek funding assistance from the NSW Government, as a matter of urgency, in conjunction with Narromine Shire, Bogan Shire, Warren Shire and Cobar Shire councils to:
 - a. Undertake a comprehensive business case assessment of the Regional Water Supply Pipe Network project.
 - b. Develop a long term financial model for the project which is sustainable for Council.
 - c. Develop a governance model for the development and operation of the pipeline project based on regional collaboration amongst associated Councils; and
 - d. Progress the technical development of the project to a 'shovel ready' stage by April 2020.
 - e. Engage a suitably qualified consultant to act for the group of councils in developing each stage of the project planning process.
10. That Council examine options, in collaboration with Department Planning Industry and Environment Water and Water NSW, to extend critical urban water supplies in the lower Macquarie River catchment and fast-track delivery of the Regional Water Supply Pipe Network project, including staged construction options, with the aim of ensuring a continued supply of water to all urban centres supplied by the Macquarie River downstream of Burrendong Dam.

CARRIED

CCL19/218 2018/2019 ANNUAL REPORT (INCLUDING STATUTORY REPORTING REQUIREMENTS) (ID19/1436)

The Council had before it the report dated 12 November 2019 from the Chief Executive Officer regarding 2018/2019 Annual Report (including Statutory Reporting Requirements).

Moved by Councillor D Grant and seconded by Councillor V Etheridge

MOTION

1. That the 2018/2019 Annual Report as attached Appendix 1 to the report of the Chief Executive Officer dated 12 November 2019 be adopted.
2. That the 2018/2019 Annual Report be published on Council's website.
3. That the 2018/2019 Annual Report be forwarded to the Office of Local Government.

CARRIED

CCL19/219 SEPTEMBER 2019 QUARTERLY BUDGET REVIEW STATEMENTS (ID19/1492)

The Council had before it the report dated 4 November 2019 from the Chief Executive Officer regarding September 2019 Quarterly Budget Review Statements.

Moved by Councillor D Gumley and seconded by Councillor V Etheridge

MOTION

- 1. That the Quarterly Budget Review Statements as at 30 September 2019, as attached to the report of the Chief Executive Officer dated 4 November 2019, be adopted and such sums voted for such purpose.**
- 2. That the Statement of the Responsible Accounting Officer that Council is in a satisfactory financial position having regard to the changes herewith to the original budget, be noted.**

CARRIED

**CCL19/220 PRESENTATION OF COUNCIL'S 2018/2019 FINANCIAL STATEMENTS
(ID19/1558)**

The Council had before it the report dated 14 November 2019 from the Chief Financial Officer regarding Presentation of Council's 2018/2019 Financial Statements.

Moved by Councillor G Mohr and seconded by Councillor V Etheridge

MOTION

That the General Purpose Financial Statements and the Special Purpose Financial Statements for the year ended 30 June 2019 be accepted by Council.

CARRIED

**CCL19/221 'DESTINATION DUBBO': INTERNATIONAL READY - PROJECT OVERVIEW
(ID19/1458)**

The Council had before it the report dated 14 November 2019 from the Director Culture and Economy regarding 'Destination Dubbo': International Ready - Project Overview.

Moved by Councillor J Ryan and seconded by Councillor V Etheridge

MOTION

- 1. That the information in the report by the Director Culture and Economy dated 14 November 2019 be noted.**
- 2. That to progress with construction of the Old Dubbo Gaol Heritage Plaza, that the CEO be authorised to undertake the required acquisition of 92 Macquarie Street, Dubbo.**
- 3. That the CEO be authorised to undertake an Expressions of Interest process and make subsequent appointments to the Wiradjuri Technical Advisory Panel that will provide advice to Council on the development of the Dubbo Wiradjuri Tourism Centre and Aboriginal interpretation across the other 'Destination Dubbo' projects.**

CARRIED

CCL19/222 INITIATIVES TO BUILD LOCAL BUSINESS CONFIDENCE AND SUPPORT LOCAL SPEND. (ID19/1540)

The Council had before it the report dated 12 November 2019 from the Manager Economic Development and Marketing regarding Initiatives to build local business confidence and support local spend.

Moved by Councillor V Etheridge and seconded by Councillor D Grant

MOTION

That the report from Manager Economic Development and Marketing dated 12 November 2019 be adopted.

CARRIED

CCL19/223 WESTERN PLAINS CULTURAL CENTRE - DRAFT FEES AND CHARGES - 2019/2020 (ID19/1414)

The Council had before it the report dated 14 November 2019 from the Manager Regional Experiences regarding Western Plains Cultural Centre - Draft Fees and Charges - 2019/2020.

Moved by Councillor V Etheridge and seconded by Councillor D Gumley

MOTION

1. That the report from the Manager Regional Experiences dated 14 November 2019 be noted.
2. That the proposed changes to the Western Plains Cultural Centre Fees and Charges 2019/2020 as amended and included here in Appendix 1, be adopted by Council and commence operation on 1 January 2020.
3. That the proposed fee for "(community) Annual Hire Fee – Licence Agreement – Per Room \$2,500.00 " as included here in Appendix 1, be adopted by Council, commence operation on 1 January 2020 and be carried through to the adoption of the 2020/2021 Revenue Policy.
4. That all existing Permanent Hire Agreements currently held with Community Groups remain in affect until the expiry date of the agreement.
5. That any Community Group that does not have an Annual Hire Fee – Licence Agreement must vacate the Western Plains Cultural Centre by 31 December 2019.

CARRIED

**CCL19/224 DRAFT COMMUNITY PARTICIPATION PLAN - RESULTS OF PUBLIC EXHIBITION
(ID19/1480)**

The Council had before it the report dated 8 November 2019 from the Growth Planner regarding Draft Community Participation Plan - Results of Public Exhibition.

Moved by Councillor D Gumley and seconded by Councillor V Etheridge

MOTION

1. That Council adopt the Community Participation Plan as attached to the report of the Growth Planner dated 8 November 2019,
2. That the following sections of the Dubbo and Wellington Development Control Plans be repealed:
 - a) Chapter 2.1 Notification of Development within the Dubbo Development Control Plan 2013; and
 - b) Chapter A11 Notification and advertising of Development Applications within the Wellington Development Control Plan 2013.
3. That those who made a written submission be acknowledged and advised of Council's determination in this matter.
4. That Council submit the Community Participation Plan to the Department of Planning Industry and Environment, for the purpose of notation.

CARRIED

**CCL19/225 30TH ANNIVERSARY VISIT TO MINOKAMO BY DUBBO DELEGATION
(ID19/1537)**

The Council had before it the report dated 11 November 2019 from the Sister Cities Officer regarding 30th Anniversary Visit to Minokamo by Dubbo Delegation.

Moved by Councillor G Mohr and seconded by Councillor D Gumley

MOTION

That Council continue to support the sister city partnership with Minokamo and investigate ways of increasing cooperation in the areas of youth exchange, tourism, health and wellbeing.

CARRIED

CCL19/226 COMMENTS AND MATTERS OF URGENCY (ID19/1569)

There were no matters recorded under this clause.

The meeting closed at 6.29pm.

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CHAIRMAN



MAYORAL MINUTE: Fletcher International Exports

AUTHOR: Mayor
REPORT DATE: 2 December 2019
TRIM REFERENCE: ID19/1610

To the Council
Ladies and Gentlemen

Office of the Mayor
Civic Administration Building
Church Street, Dubbo

I would like to bring to Council's attention another milestone in the Roger Fletcher story, 30 years' operation of the company's abattoir in Dubbo; 30 years' employing local people in this great Australian company, run by a great Australian. In bringing this milestone to Council's attention, I propose this place both recognises and celebrate Roger Fletcher's achievements.

Fletcher International Exports (FIE) is one of Australia's most integrated processors and exporters of lamb and sheep meat products.

A private, family-owned company, Fletcher International operates two highly efficient, world-class processing facilities: one located here in Dubbo; and the other near Albany in Western Australia.

These two plants have a combined processing capacity of more than 90,000 sheep and lambs per week, which equates to over 4.5 million head per year.

Meat and Meat Product manufacturing represents a major portion of the overall economic output generated by manufacturing in the Dubbo Region. Manufacturing has a total industry output of \$888m and is the second largest Industry sector in Dubbo of which FIE is a significant contributor to.

The Fletcher meat processing philosophy has always been to utilise as much of each animal as possible. Consequently, in addition to lamb and sheep meat products, wool and sheep skins, the company markets a diverse range of high quality co-products.

The expansion of the company's farming interests have strengthened the livestock supply chain, while providing a source of quality cross-bred lambs consistently throughout the year. Secondly, the grain produced at the company's properties is sold directly to end users in export markets.

To further complement the company's degree of vertical integration across the business, in 2015 the company-owned Fletcher train was introduced. This train, operating from the Fletcher Intermodal freight and logistics facility adjacent to the Dubbo processing plant, enables the company to maintain total cargo control from production through to delivery direct to Port Botany in Sydney. Likewise, cargo from the Western Australian plant is

transported by a unique, efficient road-train fleet direct to the port of Fremantle near Perth.

This has not been an overnight success story. This is a story of great innovation, hard work, ongoing investment in people and infrastructure, and a proud history in agriculture – the backbone of Australia’s global success. From humble beginnings, the company has evolved into one of Australia’s great agribusiness success stories.

- 1967 Roger Fletcher purchased mobs of sheep from various sale yards and went droving. Stock is then sold by auction in various locations throughout New South Wales and Southern Queensland.
- 1972 – 1980 Moree Abattoir - Slaughtering sheep through the service works. Sold carcasses to wholesalers such as Woolworths and Coles, also sold to export boning rooms.
- 1974 – 1980 Moree - Sold frozen bagged carcasses to Japan and Korea. Predominantly sold indirectly (through export brokers).
- 1975 Operated boning room in Chullora (Sydney). Closed in the same year.
- 1978 Commenced packing sheep skins for export. Export License acquired and started trading under International Prime Food Exports Pty Ltd.
- 1982 – 1988 Operated boning room in Mudgee, NSW. Packing chilled and frozen mutton and lamb cuts.
- 1982 – 1994 Operated boning room in Gunnedah, NSW. Packing chilled and frozen mutton and lamb cuts.
- 1986 Incorporation on change of company name to Fletcher International Exports Pty Ltd.
- 1988 Commissions Greenfield site at Dubbo, NSW abattoir (Est #2309).
- 1990 Fellmongery operation commences at Dubbo plant
- 1995 Commissions Wool Scouring and Top-making plant at Dubbo plant – the first example of a wool processing plant being incorporated with an abattoir.
- 1997 Roger Fletcher awarded “Distinguished Australian of the Year” at Australian Meat Industry Council National Conference.
- 1998 Commissions Greenfield site Narrikup abattoir, near Albany, Western Australia (Est #8).
- 2001 Purchase of farm holdings near Lightning Ridge, NSW
- 2005 Purchase of iconic property “Kiargathur” on the banks of the Lachlan River near Condobolin, NSW. Ideally located and suited for production of prime lambs and large-scale agricultural production.
- 2007 Expansion of Dubbo plant livestock holding facilities,
- 2007 Major upgrade to processing facilities in Dubbo plant.
- 2007 Major upgrade to processing facilities in Narrikup plant.
- 2007 Roger Fletcher awarded Honorary Doctorate of Business – Charles Sturt University
- 2008 Construction of Fletcher rail freight terminal
- 2009 Expansion of rail terminal to include grain handling facilities, becoming Fletcher Grain and Intermodal Freight Terminal
- 2013 Expansion of Dubbo carton freezing and cold storage facilities.
- 2014 Construction and commission of purpose built cement powder blending plant using imported products.

- 2015 Commencement of Fletcher-owned freight train service direct from Dubbo facility into Sydney's major export container terminal in Port Botany, NSW.
- 2015 Major renewable energy initiative introduced at Narrikup plant (wood chip boiler system).
- 2015 – 2016 Design and implementation of a new computer system for the commodity trading division.
- 2016 Expansion of grain and intermodal facility with a second AB triple length weighbridge, 3 new high capacity bunker unloading machines and new high capacity quad container packing machine.

RECOMMENDATION

1. That Council formally acknowledge Roger Fletcher, his success as a businessman and success as a captain of industry in our region through the ongoing success of Fletcher International Exports.
2. That Council formally recognise Roger Fletcher's 30 years' operations and investment in Dubbo and the Dubbo Region by way of a formal Mayoral reception.

Councillor Ben Shields
Mayor



MAYORAL MINUTE: Sponsorship of Dubbo Farmers Markets

AUTHOR: Mayor
REPORT DATE: 3 December 2019
TRIM REFERENCE: ID19/1612

To the Council
Ladies and Gentlemen

Office of the Mayor
Civic Administration Building
Church Street, Dubbo

I am proposing a Council sponsorship package to support the Dubbo Farmers market allowing local growers and producers to sell their products and maintain important social and economic activation in our community. This package would involve a \$10,000 sponsorship of the Dubbo Farmers Markets each year for the next two years.

The Dubbo Farmers Markets are a fantastic way for the region's growers and producers to market their product directly to customers. The variety of produce, from fruit and vegetables to meats and condiments, has made it very popular and helped the trend of getting food from the farm gate to customer's table. The markets have also become a social constant for thousands of people on the first and third Saturdays of every month.

The Macquarie Valley Food and Wine Inc. who run the Dubbo Farmers Markets have placed a focus on the Dubbo and neighbouring regions to market their unique offerings.

I propose Council provide this sponsorship package to Macquarie Valley Food and Wine Inc. to assist with costs associated with the running of the Dubbo Farmers Markets. This package would include the reduction of Council hire fees for this locally run market by \$10,000. Over a 12-month period the Farmers Markets contribute \$12,857 in fees, including a per market contribution of \$264 for venue, \$110 for access to the Visitor Information Centre for toilets and \$185 for waste collection, so this will be a significant saving for them. This sponsorship is currently unbudgeted however it can be reviewed in the December quarterly review.

In particular I would like to see the Macquarie Valley Food and Wine Inc. be able to increase their promotion of this fantastic event to attract an even larger attendance.

The variety of stallholders has helped attract a big following, with people coming from all over the Central West to get their fresh produce, while weekend tourists also often find themselves at the market. There is also a good synergy between what the Farmers Markets offer and Council's Regional Platters promotion.

Unfortunately as we know the drought is taking a toll on the agriculture industry and this makes it harder for growers and producers to be able to participate in activities such as Farmers Markets. While this creates challenges, it is important that those who do still have produce are able to market to the public. It is just as important that residents have access to social events during this difficult and stressful time.

It is also critical that events that provide a boost to our economy such as the Farmers Markets do not fail during this drought, because they will play an important role once the drought is over. It is hoped Council's sponsorship would enable that to occur.

RECOMMENDATION

- 1. Council sponsor the Dubbo Farmers Markets through a reduction in Council hire fees, to the value of \$10,000 a year for a two-year period, including 2020 and 2021.**

Councillor Ben Shields
Mayor



REPORT: Quarterly Report on Documents Executed Under the Power of Attorney

AUTHOR: Manager Governance Operations
REPORT DATE: 25 November 2019
TRIM REFERENCE: ID19/1592

EXECUTIVE SUMMARY

At the February 2018 Ordinary meeting of Council held 26 February 2018, Council resolved:

1. *That Council delegate to Michael Gerard McMahon, General Manager, a prescribed power of attorney in accordance with the General Power of Attorney attached to the report as Appendix 1.*
2. *That Council authorise the Mayor and Deputy Mayor to execute the General Power of Attorney under the Common Seal of the Council.*
3. *That the General Manager report to Council every three (3) months on all documents signed under the prescribed Power of Attorney.*

In accordance with point 3 of this resolution, this report provides a listing of documents signed under the Power of Attorney delegated to the Chief Executive Officer from 1 September 2019 to 29 November 2019.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

That the information contained within the report of the Manager Governance Operations dated 2 December 2019 be noted.

Susan Wade
Manager Governance Operations

REPORT

In accordance with point 3 of the resolution, provided below is a listing of documents signed under the Power of Attorney delegated to the Chief Executive Officer for your information from 1 September 2019 to 29 November 2019.

Date Sealed	Details of Document
18/09/2019	Sale contact - Deposited Plan administration Sheet - Lot 184 DP 754321 - Gonnoo Street Wongarbonto Ben Braithwaite
18/09/2019	Lease - Sub lease from Royal Flying Doctors Services to Western NSW Local Health District
18/09/2019	Sale contact - Lot 314 Keswick Estate Stage 4 Release 3B to Bruno Patriarca and Tarsilla De Luca - DP1241303
20/09/2019	Lease - Hanger site 18 - Dubbo City Regional Airport - DP 1235260 - Period 02/09/2019 to 01/09/2024 to Rowan Molar
20/09/2019	Lease - Hanger site 18 - Dubbo City Regional Airport - DP 1235260 - Period 02/09/2024 to 01/09/2029 to Rowan Molar
20/09/2019	Lease - Hanger site 18 - Dubbo City Regional Airport - DP 1235260 - Period 02/09/2024 to 01/09/2034 to Rowan Molar
20/09/2019	Lease - Hanger site 18 - Dubbo City Regional Airport - DP 1235260 - Period 02/09/2034 to 01/09/2039 to Rowan Molar
4/10/2019	Contract - Closure of Walkway - Transfer of Lot 1 DP 1250507 into lot 1 DP 1256621 - between 36 and 38 Twickenham Drive Dubbo - David Berry and Christine Berry
4/10/2019	Contract - Closure of Walkway - Transfer of Lot 1 DP 1250437 into Lot 1 DP 1256619 - Kookaburra Close - Council to Garry Taylor and Vicki Taylor
28/10/2019	Plan of subdivision n- Deposited Plan Administration Sheet - Lot 10 DP 830226 - 68 Swift Street, Wellington - Purchase of land from PAPA Committee
28/10/2019	Plan of subdivision - Deposited Plan Administration Sheet - Closure of King Street, Montefiores Wellington to Hamish MacDonald Creswell and Mallory Jane Creswell
30/10/2019	Deed of Surrender and Lease - Dubbo Racecourse - Dubbo Turf Club - 01/05/2019 to 31/12/2027
5/11/2019	Sub-lease for external café area at the Dubbo City Regional Airport Precinct - Royal Flying Doctors Service and BRSK Pty Ltd



REPORT: Investments Under Section 625 of the Local Government Act - November 2019

AUTHOR: Director Organisational Performance
REPORT DATE: 3 December 2019
TRIM REFERENCE: ID19/1611

EXECUTIVE SUMMARY

As required by Clause 212 of the Local Government (General) Regulation 2005, set out below are the details of all monies that Council has invested under Section 625 of the Local Government Act as at 30 November 2019.

Investments when placed have been done so in accordance with the Local Government Act, Local Government Regulations and Council's Investment Policy and Strategy. Interest on investments for the month of November 2019 has been accounted for on an accrual basis. This report details investments and annualised returns for the month of November 2019.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

FINANCIAL IMPLICATIONS

Interest earned on investments has been included within Council's 2019/2020 Operational Plan, with total income generated from the Investment Portfolio forecast to be in excess of \$4,500,000.

RECOMMENDATION

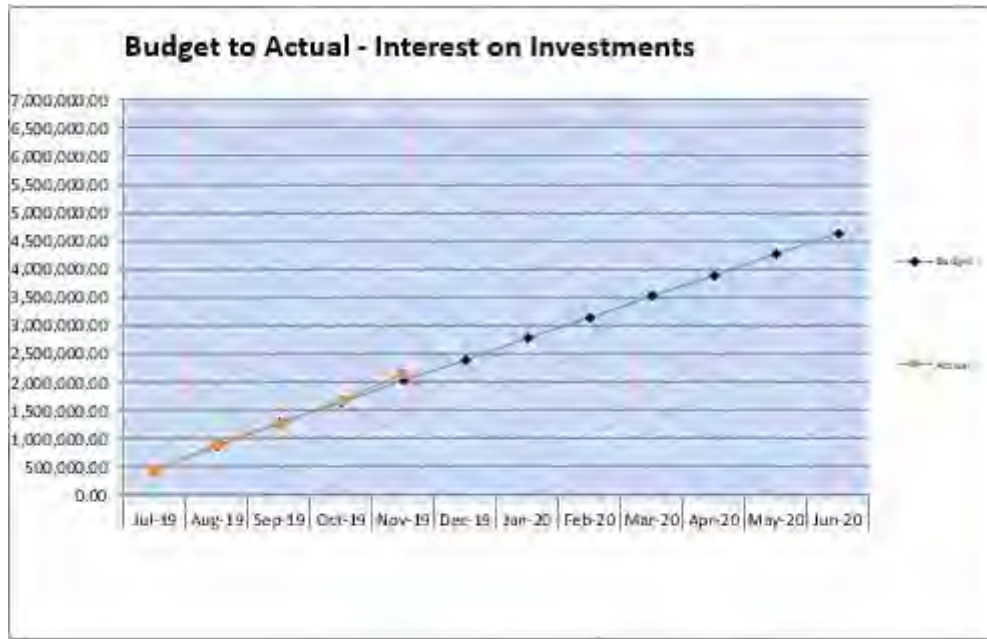
That the report from the Director Organisational Performance dated 3 December, 2019 be noted.

Craig Giffin

Director Organisational Performance

November 2019				
	2020	2020	2020	2020
Investments	Total	Current	Non-Current	Total
	30/06/2019	Maturity By 30/06/2020	Maturity After 30/06/2020	30/11/2019
Cash & Cash Equivalents				
Cash on Hand and at Bank	\$28,700.00	\$28,700.00	\$0.00	\$28,700.00
Cash-Equivalent Assets (1)				
- Deposits At Call	\$47,102,168.31	\$20,892,886.61	\$0.00	\$20,892,886.61
Total Cash & Cash Equivalents	\$47,130,868.31	\$20,921,586.61	\$0.00	\$20,921,586.61
Investments (Note 6b)				
- Long Term Deposits > 3 Months	\$171,330,281.25	\$46,500,000.00	\$146,500,000.00	\$193,000,000.00
- NCD's and FRN's > 3 Months	\$14,000,599.09	\$500,000.00	\$10,500,599.09	\$11,000,599.09
- CDO's	\$0.00	\$0.00	\$0.00	\$0.00
Total Investments	\$185,330,880.34	\$47,000,000.00	\$157,000,599.09	\$204,000,599.09
TOTAL CASH ASSETS, CASH EQUIVALENTS & INVESTMENTS	\$232,461,748.65	\$67,921,586.61	\$157,000,599.09	\$224,922,185.70
(1) Those Investments where time to maturity (from date of purchase) is < 3 months				





Investment - H&A Asset Council Policy			
Institution	Invested	Invested Allowable	Allowable
Cash held at Bank	\$ 2,000,000	0.00%	
Equity Investments			
NAB - Sweep Account	\$ 20,000,000	0.00%	\$ 20,000,000
Fixed Investments			
AMP	\$ 15,000,000	2.00%	\$ 15,000,000
Bank of Queensland	\$ 20,000,000	0.00%	\$ 20,000,000
Bank of Adelaide	\$ 17,500,000	0.00%	\$ 17,500,000
CSA	\$ 3,000,000	0.00%	\$ 3,000,000
Macquarie Credit Union	\$ 1,000,000	0.00%	\$ 1,000,000
NAB	\$ 15,000,000	0.00%	\$ 15,000,000
St George	\$ 20,000,000	0.00%	\$ 20,000,000
Union	\$ 3,000,000	0.00%	\$ 3,000,000
Westpac	\$ 17,500,000	0.00%	\$ 17,500,000
TOTAL DIRECT INVESTMENTS	\$ 201,800,000	0.00%	
Grandfathered Investments			
Newcastle Permanent Building Society	\$ 5,000,000	0.00%	\$ 5,000,000
TOTAL GRANDFATHERED INVE	\$ 5,000,000	0.00%	
TOTAL CASH ASSETS - CASH EQUIVALENTS & INVESTMENTS	\$ 206,800,000	0.00%	

SUMMARY

Council outperformed the 11am Official Cash Rate market benchmark for 1 month annualised return of 1.00%, with a return of 1.15% for its At Call investments for the month of November 2019. Council also outperformed the 1 month annualised Bloomberg AusBond Bank Bill Index of 1.00% for the month, with an average annualised return of 2.46% for its overall portfolio return, including an average on Term Deposits and Floating Rate Notes of 2.62%.



**DUBBO REGIONAL
COUNCIL**

Report of the Floodplain Management Committee - meeting 22 November 2019

AUTHOR: Manager Governance Operations
REPORT DATE: 26 November 2019

The Committee had before it the report of the Floodplain Management Committee meeting held 22 November 2019.

RECOMMENDATION

That the report of the Floodplain Management Committee meeting held on 22 November 2019, be adopted.

Appendices:

1 [!\[\]\(cf531ed27e91483460120fcc057b3901_img.jpg\)](#) Floodplain Management Committee - 22/11/2019 - Reports



REPORT FLOODPLAIN MANAGEMENT COMMITTEE 22 NOVEMBER 2019

PRESENT: Councillors, B Shields, G Mohr, the Director Infrastructure, the Director Development and Environment, D Monk Zone Commander State Emergency Services and I Rivas Acosta Department of Planning, Industry and Environment.

ALSO IN ATTENDANCE:

The Manager Infrastructure Strategy and Design, the Building Services Team Leader, the Building and Development Certifier, Erika Taylor (HydroSpatial), and Jamie Brooks (HydroSpatial).

Councillor B Shields assumed chairmanship of the meeting.

The proceedings of the meeting commenced at 2.00pm.

**FPM19/1 GEURIE VILLAGE FLOOD STUDY UPDATE, FLOOD RISK MANAGEMENT STUDY
AND PLAN (ID19/1491)**

The Committee had before it the report dated 4 November 2019 from the Manager Infrastructure Strategy and Design regarding Geurie Village Flood Study Update, Flood Risk Management Study and Plan.

RECOMMENDATION

- 1. That the report of the Manager Infrastructure Strategy and Design dated 1 November 2019 be noted.**
- 2. That the Committee endorse the findings of the Stage 3 Report, and a report be presented to the December 2019 Ordinary meeting of Council.**
- 3. That the Report be placed on public exhibition from 13 January 2020 to 14 March 2020.**

FPM19/02 LEAVE OF ABSENCE

A request for leave of absence was received from Councillor J Diffey who was absent from the meeting due to personal reasons.

The meeting closed at 2.34pm.

CHAIRMAN

FLOODPLAIN MANAGEMENT COMMITTEE
22 NOVEMBER 2019

FPM19/1



REPORT: Geurie Village Flood Study Update, Flood Risk Management Study and Plan

AUTHOR: Manager Infrastructure Strategy and Design
REPORT DATE: 4 November 2019
TRIM REFERENCE: ID19/1491

EXECUTIVE SUMMARY

In late 2017, Dubbo Regional Council received funding under the NSW Government Floodplain Management Program to undertake an updated Flood Study for the village of Geurie.

In October 2019, HydroSpatial provided Council with a Stage 3 Flood Study (**Appendix 1**), which has been reviewed by Council staff in consultation with HydroSpatial.

Hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs. Hydraulic model development was undertaken to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs.

Due to the lack of available data, the 1999 historical event was modelled to verify the models and an extensive sensitivity analysis was undertaken. Following this, the design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically based rainfall events. These events ranged from the 20% AEP event to the 0.2% AEP event and the PMF event.

It is proposed that following the Committee meeting, the Stage 3 Flood Study be presented to the December 2019 Ordinary meeting of Council. Following resolution of Council, it is proposed that the Flood Study be placed on public exhibition in January 2020 and closing in February 2020.

A further report will be presented to the Floodplain Management Committee following the consideration of public feedback.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

FLOODPLAIN MANAGEMENT COMMITTEE

Page 2

FLOODPLAIN MANAGEMENT COMMITTEE
22 NOVEMBER 2019

FPM19/1

RECOMMENDATION

1. That the report of the Manager Infrastructure Strategy and Design dated 1 November 2019 be noted.
2. That the Committee endorse the findings of the Stage 3 Report, and a report be presented to the December 2019 Ordinary meeting of Council.
3. That the Report be placed on public exhibition from 13 January 2020 to 14 February 2020.

Stephen Howlett
Manager Infrastructure Strategy and Design

FLOODPLAIN MANAGEMENT COMMITTEE
22 NOVEMBER 2019

FPM19/1

BACKGROUND

The NSW Government's Flood Prone Land Policy provides a framework for managing development on the floodplain. The primary objective of the Policy is to develop sustainable strategies for managing human occupation and use of the floodplain using risk management principles. Under the Policy, the management of flood liable land remains the responsibility of local government.

Geurie, as part of the former Wellington local government area, has an existing Flood Study which was completed in 2006, however was not calibrated to historical events. Due to increased development within the village it was identified that an updated Flood Study would be beneficial.

In late 2017, Council successfully secured funding to carry out a Floodplain Risk Management Study and Plan for the village of Geurie and as part of the NSW Government Floodplain Management Programme. Council engaged consultants HydroSpatial to carry out the flood modelling and reporting process.

The Geurie Flood Study constitutes the first stage of the Floodplain Risk Management process and assesses the risk of flooding from Geurie Creek, Boori Creek, Limestone Creek, Heatherbrae Creek and the local catchments.

The results of the Flood Study will be used to formulate a Floodplain Risk Management Study and Plan for the village, which will look at a range of flood mitigation works and measures to address the flood risk identified in the Flood Study. Results will also enable emergency services to review and update local flood planning for the village.

The current Study has been undertaken in accordance with the aforementioned legislation, policies and guidelines.

REPORT

In October 2019, HydroSpatial provided Council with a Stage 3 Flood Study (**Appendix 1**). The Flood Study consists of a data collection phase, hydrologic model development, hydraulic model development, historical flood simulations and design flood simulations. A data collection process was carried out to gather flood-related information that is used to inform the model development process.

The hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs using the Watershed Bounded Network Model (WBNM) software.

The hydraulic model development was undertaken using TUFLOW software to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs.

**FLOODPLAIN MANAGEMENT COMMITTEE
22 NOVEMBER 2019**

FPM19/1

Due to the lack of available data, the 1999 historical event was modelled to verify the models and an extensive sensitivity analysis was undertaken. Following this, the design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically based rainfall events. These events ranged from the 20% AEP event to the 0.2% AEP event and the PMF event.

Staff from Council's Infrastructure Division have reviewed the draft Flood Study in consultation with HydroSpatial. Any additional comments from the Committee will be added to the draft report prior to public exhibition.

It is proposed that following the Committee meeting, the Stage 3 Flood Study be presented to the December 2019 Ordinary meeting of Council. Following resolution of Council, it is proposed that the Flood Study be placed on public exhibition in January 2020 and closing in February 2020.

A further report will be presented to the Floodplain Management Committee following the consideration of public feedback.

SUMMARY

HydroSpatial have provided their Stage 3 Flood Study report for the Committee's consideration. It is proposed that following the Committee meeting, the report be presented to the December 2019 Ordinary meeting of Council and subsequently placed on public exhibition from 13 January 2020 to 14 February 2020.

Appendices:

- 1** [↓](#) Stage 3 Report - HydroSpatial - October 2019
- 2** [↓](#) Geurie Flood Study - Draft - October 2019



Geurie Flood Study

Stage 3 Report

Prepared For
Dubbo Regional Council
October 2019



HYDRO
SPATIAL

HydroSpatial Pty Ltd
ABN: 23 624 304 070
Suite 10, Level 14, 70 Pitt Street, Sydney NSW 2000

Contact: Erika Taylor
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Mobile: 0423 624 696



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Client	Dubbo Regional Council
Author	Erika Taylor
Job Number	18020
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Document Approval	
Erika Taylor	Signature
Director	

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Table of Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AAD	Average Annual Damage
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff
DEM	Digital Elevation Model
EY	Exceedances per Year
FMC	Floodplain Management Committee
FPA	Flood Planning Area
FPL	Flood Planning Level
LGA	Local Government Area
LIDAR	Light Detection and Ranging
NSW	New South Wales
OEI	Office of Environment and Heritage
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
SES	State Emergency Services

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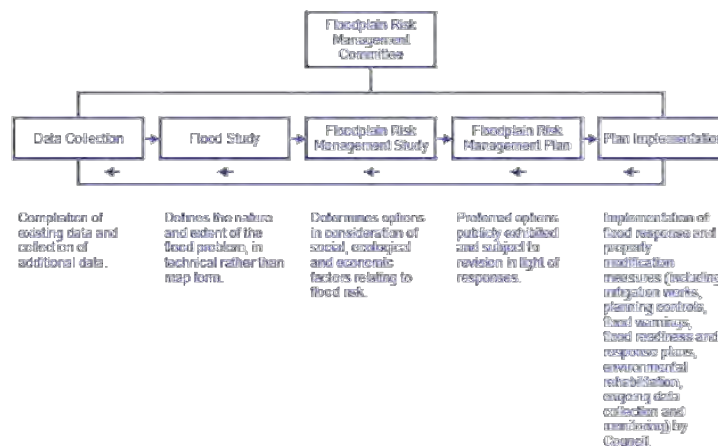


Forward

Flood-Related Legislation, Policies and Guidelines

The New South Wales (NSW) State Government's *Flood Prone Land Policy* places the primary responsibility for floodplain risk management with Councils and the *Local Government Act 1993 - Section 733* indemnifies Council from liability if the Council has acted in "good faith" in relation to floodplain risk management. Additionally, the State Government, through the Department of Planning, Industry and Environment (DPIE) (formerly the Office of Environment and Heritage (OEH)), provides financial and technical support to Council in meeting its floodplain risk management obligations.

The NSW *Floodplain Development Manual* (2005) supports the NSW *Flood Prone Land Policy*. The manual provides direction on the floodplain risk management process, as detailed below.



There are a number of industry guidelines that provide technical guidance through the floodplain risk management process. This includes the *Australian Emergency Management Series* (particularly *Handbook 7: Managing the Floodplain Best Practice in Flood Risk Management in Australia*), and *Australia Rainfall and Runoff (ARR)*. ARR has undergone several revisions since its inception; with the first publication in 1958, the second publication in 1977, the third publication in 1987 and the fourth (and latest) publication in 2019 (with an earlier draft version in 2016).

The current study has been undertaken in accordance with the aforementioned legislation, policies and guidelines.



Terminology

ARR 2019 has standardised the design flood terminology used in the industry. Very frequent events are expressed as Exceedances per Year (EY), frequent to very rare events are expressed as Annual Exceedance Probability (AEP) as a percentage, and very rare to extreme events are expressed as a 1 in x AEP. This is detailed in Table 0-1, which has been extracted from Section 2.2.5., Chapter 2, Book 1 of ARR 2019.

Table 0-1: Design Event Terminology

Frequency Descriptor	EY	AEP (%)	AEP (1 in x)	ARI
Very Frequent	12			
	5	99.75	1.002	0.17
	4	98.17	1.02	0.25
	3	95.02	1.05	0.33
	2	86.47	1.16	0.5
Frequent	1	63.21	1.58	1
	0.69	50	2	1.44
	0.5	39.35	2.54	2
	0.22	20	5	4.48
	0.2	18.13	5.52	5
Rare	0.11	10	10	9.49
	0.05	5	20	20
	0.02	2	50	50
	0.01	1	100	100
	0.005	0.5	200	200
Very Rare	0.002	0.2	500	500
	0.001	0.1	1000	1000
	0.0005	0.05	2000	2000
Extreme	0.0002	0.02	5000	5000
			PMP	



Executive Summary

The NSW State Government, through the Department of Planning, Industry and Environment (DPIE), oversee the Floodplain Management Program. The program provides support to local councils in the implementation of the NSW Government's Flood Prone Land Policy as outlined in the NSW Government's Floodplain Development Manual. The primary objective of the policy and manual is to reduce the impacts of flooding and flood liability on individual owners and occupiers. As part of this program Dubbo Regional Council, with the support of the NSW OEH, has commissioned HydroSpatial Pty Ltd to prepare the following Geurie Flood Study.

Geurie is located in the Dubbo Regional Council Local Government Area (LGA) in Central West NSW. The town is located on the Mitchell Highway and the Wellington - Dubbo railway line. Geurie Creek is located to the east of the town and is aligned north to south, discharging into the Macquarie River to the south. Boori Creek is a tributary to Geurie Creek and runs west to east through the town.

The following Flood Study consists of a data collection phase, hydrologic model development, hydraulic model development, historical flood simulations and design flood simulations. A data collection process was carried out to gather flood-related information that is used to inform the model development process. The hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs. The hydrologic model developed for this study used the Watershed Bounded Network Model (WBNM) software. The hydraulic model development was undertaken to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs. The hydraulic model developed for this study used the TUFLOW software.

Due to the scarcity of data, the 1999 historical event was modelled to verify the models and an extensive sensitivity analysis was undertaken. Following this, the design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically-based rainfall events. These events ranged from the 20% AEP event to the 0.2% AEP event and the PMF event.



1 Introduction

1.1 Overview

Dubbo Regional Council, with the support of the NSW OEH, has commissioned HydroSpatial Pty Ltd to prepare the following Geurie Flood Study.

1.2 Study Objectives

The objectives of the Flood Study are to develop a hydrologic and hydraulic model to:

- Identify existing flood risks and consequences;
- Inform the community and key stakeholders of the flood risk;
- Provide input into relevant government information systems;
- Provide input into government and strategic decision making on flood risk;
- Provide information for land-use planning and infrastructure planning;
- Provide information to emergency management agencies;
- Prepare tools suitable for use in the Floodplain Risk Management Study and Plan (FRMS&P), in which practical, feasible and economic measures will be investigated for mitigating flood risk.

1.3 Study Area Description

Geurie is located in the Dubbo Regional Council Local Government Area (LGA) in Central West NSW. The town is located on the Mitchell Highway and the Wellington – Dubbo railway line. The town is a limited service town for the local area, with a post office, a primary school and some shopping facilities. The suburb of Geurie has a population of 755 people and the urban centre of Geurie has a population of 477 people, according to the 2016 Australian Bureau of Statistics Census.

Geurie Creek is located to the east of the town and is aligned north to south, discharging into the Macquarie River to the south. Boori Creek is a tributary to Geurie Creek and runs west to east through the town. A small portion of Boori Creek is concrete-lined between Douglas Street and Wellington Street. The remainder of the creek system is naturally channelised and grass-lined.

There is limited underground stormwater drainage in and around the town. As such, stormwater is primarily conveyed through table drains adjacent to the roadways and discharging into the creeks.



2 Study Methodology

The following tasks were undertaken as part of Stage 3 of the Geurie Flood Study Project:

- Stakeholder consultation;
- Data collection;
- Hydrologic analysis;
- Hydraulic model development;
- Historical flood simulation; and
- Design flood simulation.

Stakeholder consultation was undertaken to gather local information on historical flood levels and flood behaviour. Further details on the stakeholder consultation are discussed in Section 3.

A data collection process was carried out to gather flood-related information from a number of sources. This included collating topographic data, infrastructure data, field trips, historical flood level data, historical rainfall data, and design rainfall data etc. Further details on the data collection are discussed in Section 3 and 4.

The hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs. Further details on the hydrologic model development are discussed in Section 5.

The hydraulic model development was undertaken to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs (the latter of which was calculated in the hydrologic model). Further details on the hydraulic model development are discussed in Section 6.

Historical flood simulations were carried out to calibrate and validate the models' performance in representing flood behaviour in historical flood events. Further details on the historic simulations are discussed in Section 7.

Design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically-based rainfall events. Further details on the design simulations are discussed in Section 8.



3 Consultation

As part of this study, consultation has been undertaken with a number of stakeholders, as discussed within the following.

3.1 Community Consultation

3.1.1 First Round

A community consultation process was undertaken during the data collection stage of the study through the October 2018 period. The purpose of this community consultation work was to gather data from the community on historical flood events in the study area. This was achieved by conducting a "drop-in" style community information desk.

The community information desk was held at the Geurie General Store on the 31 October 2018 between 9am to 5pm. The information desk was occupied by representatives from HydroSpatial, Council and OEH. Twelve community members attended the information desk throughout the day.

The key issues raised and data provided during this community consultation process were:

- The issues raised were predominantly related to local drainage, rather than mainstream flooding.
- Other residents who did not raise specific issues indicated that the town did not have a significant flooding issue and that no flooding had been observed in recent years.



4 Available Data

Data is an important component of every study. As such, the first stage within a flood study is to collect and review the available data.

The data available for the study area included:

- Previous studies;
- Aerial-based survey data;
- Ground-based survey data;
- Historic flood data;
- Historic rainfall data; and
- Design rainfall data.

The data available was found to be of sufficient quantity and quality to enable the establishment of the hydrologic and hydraulic models used in the study.

4.1 Previous Studies

4.1.1 Geurie Flood Study (Ref 10)

The Geurie Flood Study was undertaken by Webb, McKeown and Associates on behalf of the former Wellington Council. The study was completed in October 2006. The aim of the study was to define the design flood behaviour for the Boon, Geurie, Heatherbrae and Limestone Creek Catchments.

The data collected as part of and used within this study included:

- Topographic contours at 10m intervals across the broader catchment and 0.5m intervals across the township area;
- Ground-based survey of the creeks and structures;
- Anecdotal data provided by the community, via a questionnaire and face-to-face interviews;
- Historical rainfall data from the daily read rainfall gauge at Geurie Post Office (station number 065018); and the pluviometer rainfall gauges at Wellington Research Centre (station number 065035), Dubbo Airport (station number 65070), and Jaymark Road Dubbo (station number 65092);
- Design rainfall data from ARR 1987.

From the anecdotal data provided by the community, it was reported that:

- In April 1990, significant amounts of surface water flowed over Geurie and Wellington Street;
- In February 1955, Geurie Creek flooded when the Macquarie River flooded;
- In 1999 some flooding was experienced, however exact dates and/or flood levels were not able to be recalled.
 - The railway line was reportedly being upgraded when floodwaters reached the underside of the western culvert, however contacting the Rail Infrastructure Corporation did not yield any further information on the flood event and/or details of the upgrade works.
 - Floodwater ponded in low lying areas upstream of the railway line, over Comabella Road near Fitzroy Street.

Additionally, photographs of flooding in 1999 were provided by a resident and have been re-published here in Photo 4-1 and Photo 4-2.



Photo 4-1: Comabella Road near Fitzroy Street during flooding in 1999 (Extracted from the 2006 Geurie Flood Study)



Photo 4-2: Corner of Fitzroy Street on left and Comabella Road in background during flooding in 1999 (Extracted from the 2006 Geurie Flood Study)

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The hydrologic model was established using the Watershed Bounded Network Model (WBNNM) package and the hydraulic model was established using the 1D MIKE11 software package. However, analysis of the historic rainfall data undertaken as part of this study found there to be insufficient data to carry out historic flood modelling and calibration of the models. To compensate for the lack of calibration, the hydrologic model was validated against the Probabilistic Rational Method and the hydraulic model underwent a rigorous sensitivity analysis.

Although the study was fit-for-purpose and used the modelling approaches that were available at the time, the following advances have been made since this study:

- Collection of Aerial Laser Survey (ALS) provided greater detail on ground elevations compared to the cross-section survey previously available.
- Advances to two-dimensional (2D) hydraulic modelling packages (coupled with the availability of ALS) has resulted in this technique being more widely used than previously.
- Updated intensity-frequency-duration (IFD) data published by the Bureau of Meteorology (2016) includes an additional 30 years of rainfall record to determine the statistical probability of rainfall events.
- The publication of ARR 2019 has updated many of the techniques and data used to estimate rainfall runoff.

4.2 Field Trip

A field trip on the 27 July 2018 was undertaken to gain an understanding of the study area. The main areas inspected were structures over Geurie Creek and Boori Creek, the railway and roadway embankments, rural features to the south of Geurie, and the urban areas of Geurie. A selection of photographs from the field trip are presented in Photo 4-3 to Photo 4-16.



Photo 4-3: Rural creek beds to the south of Geurie



Photo 4-4: Rural levee to the south of Geurie



Photo 4-5: Detention basin to the south of Geurie



Photo 4-6: Indicative urban conditions, looking east along Hill St



Photo 4-7: Railway embankment, north-side looking west



Photo 4-8: Culvert under the railway near the intersection of Narragal St and Douglas St



Photo 4-9: Culvert under Narragal St near the intersection with Chambers St



Photo 4-10: Culvert under the railway near the intersection of Narragal St and Chambers St

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Photo 4-11: Railway culverts over Geurie Creek, looking south from The Old Road



Photo 4-12: Mitchell Highway culverts over Geurie Creek, looking north



Photo 4-13: Jennings St Causeway over Boori Creek



Photo 4-14: Boori Creek between Jennings St and Wellington St, looking north



Photo 4-15: Mitchell St culvert over Boori Creek, looking south



Photo 4-16: Boori Creek to the east of Chambers St

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4.3 Topographic Data

4.3.1 Aerial-based Survey Data

A range of aerial-based topographic datasets were available across the study area, known as Aerial Laser Survey (ALS) data. Council provided ALS data that was collected in 2015 with a 1 m resolution and covered the majority of the town. Additional ALS data was sourced from the NSW Government Spatial Services to cover the area surrounding the town, which was collected in 2013 and had a 5 m resolution. The aerial-based topographic data extents and levels across the study area are shown on Figure 2.

Aerial-based topographic data (such as ALS) is a very efficient way to collect ground level data across a large area. However, there are some limitations to this collection method such as the inability to penetrate heavy vegetation or water-bodies, and solid structures (such as bridges or culverts over open channels). As such, details of these local features were collected via ground-based surveying.

4.3.2 Ground-based Survey Data

Council provided ground-based survey data of the stormwater-related infrastructure within the study area. This included bridges and culverts along Geurie Creek and Boori Creek. The data was collected by Council staff in 2019. The location of this data is shown on Figure 3.

4.3.3 Verification of Aerial-based Survey Data with Ground-based Survey Data

The aerial-based survey data was verified against state survey marks within the study area. These survey marks were filtered to exclude those whose ground level height accuracy was unknown, resulting in a sample set of 16 survey marks. From this assessment, the average difference between the aerial-based survey data and the state survey mark data was found to be 0.09 m. As the average difference was within the range of the vertical accuracy of the given LiDAR data (i.e. 0.3 m), the data was deemed fit-for-use for this study.

4.4 Historic Rainfall Data

4.4.1 Rainfall Gauges

Official rainfall gauges within a 100 km radius of the Geurie Town Centre that were active at any time between 1990 to date were sourced from the Bureau of Meteorology (BoM), shown in Table 4-1. The location of these rainfall gauges is shown on Figure 4.

Table 4-1: Rainfall Stations within 100 km of Geurie Town Centre

Distance	Station	Station name	First	Last	Type
0.92	65018	Geurie Post Office	1910 Jun	2015 Jan	Daily
4.59	65099	Geurie (Kurrabri)	2003 Jan	2018 Jun	Daily
13.93	65000	Arthurville (Cramond)	1888 Dec	2018 Jul	Daily
18.51	65035	Wellington Research Centre	1946 Jan	2005 Feb	Daily
18.51	65035	Wellington Research Centre	1961 Feb	2005 Feb	Continuous
18.92	65008	Dubbo (Jemaluang)	1999 Dec	2010 Dec	Daily
21.88	65092	Dubbo (Jaymark Road)	1984 Jan	1997 Jul	Daily
21.88	65092	Dubbo (Jaymark Road)	1986 Dec	1998 Aug	Continuous
22.32	65034	Wellington (D&J Rural)	1881 Nov	2018 Aug	Daily
22.32	65034	Wellington (D&J Rural)	2005 Mar	2015 Mar	Continuous
23.53	65082	Dubbo (Wilbertree)	1885 Feb	2014 May	Daily
26.43	65012	Dubbo (Darling Street)	1870 Sep	2009 Oct	Daily
27.7	65107	Dubbo (Muronbung)	1995 Jan	2011 Nov	Daily

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		(Bridgeview))			
30.12	65070	Dubbo Airport Aws	1994 Jun	2018 Aug	Daily
30.12	65070	Dubbo Airport Aws	2000 Apr	2015 Apr	Continuous
30.68	51091	Dubbo Airport (Old Tower)	2010 Jan	2018 Jul	Daily
32.13	65030	Dubbo (Mentone)	1894 Sep	2018 Jul	Daily
32.44	62079	Dripstone (Gernarl)	1968 Sep	2003 Nov	Daily
33.45	65098	Neurea (Fernfield)	2000 Dec	2018 Aug	Daily
36.28	64010	Elong Elong (Bendeels St)	1926 Jan	2018 Jul	Daily
39.76	62003	Mumbil (Burrendong Dam)	1951 Mar	2018 Jul	Daily
42.39	65106	Dubbo (Mogriguy (Kyarra))	2003 Oct	2018 May	Daily
42.85	62028	Goolma (Brooklyn)	1919 Jan	2018 Jul	Daily
43.52	65036	Yeoval Post Office	1895 Mar	2017 Dec	Daily
47.96	65105	Wellington (Cundumbul (Mehrudal))	1952 Jan	2017 Dec	Daily
49.64	50139	Tomingley (Gundongs)	1966 Jan	2018 Jul	Daily

4.4.2 Analysis of Daily Rainfall Data

Daily rainfall gauges typically collect data for the 24 hours prior to 9:00 am on the day the data is recorded. For instance, the data recorded on the 2nd January 2018 covers the period from 9:00 am on the 1st January 2018 to 9:00 am on the 2nd January 2018.

Table 4-2 details the highest daily rainfall values recorded at Geurie, Arthurville, Wellington and Dubbo. The gauge at Geurie Post Office was the closest gauge to the town centre and had the second longest period of record of the proximate gauges.

There were some dates that appeared to have relatively large rainfall values across multiple gauges, such as 24 February 1955, 9 February 1971, 20 April 1990, and 11 March 2000.

Table 4-2: Top 15 Daily Records at Geurie, Arthurville, Wellington and Dubbo

Geurie Post Office (65018) Jun 1910 - Jan 2015			Arthurville (65000) Dec 1886 - To Date		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	24/02/1955	170.4	1	24/02/1955	164.8
2	24/01/1930	116.3	2	20/04/1894	125.2
3	10/02/1992 (3 days)	113.4	3	26/12/2009	117.2
4	25/03/1926	102.9	4	12/01/1898	97.5
5	9/02/1971	102.9	5	15/05/1915	95.3
6	6/02/1950	100.3	6	25/03/1926	95.0
7	11/02/1973	93.2	7	12/01/1892	91.4
8	11/03/2000	92.0	8	20/04/1990	91.2
9	20/04/1990	91.0	9	24/01/1976	86.8
10	15/05/1915	90.7	10	9/02/1971	85.1
11	20/01/1950	88.9	11	7/12/1922	84.3
12	3/04/1989 (3 days)	87.0	12	1/03/2013	84.0

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13	5/03/1979	85.4	13	8/02/1973	80.5
14	6/11/1969	84.3	14	19/01/1950	79.2
15	1/03/2013	81.6	15	11/03/2000	78.4

Dubbo (65008) Dec 1990 - Dec 2010			Dubbo (65092) Jan 1984 - Jul 1997		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	28/12/2009	82.4	1	20/04/1990	89.8
2	8/02/2010	77.0	2	26/01/1993	78.4
3	4/02/2002	73.0	3	25/10/1989	60.4
4	2/12/2010	72.0	4	8/12/1986	58.0
5	22/12/2007	67.0	5	17/12/1992	53.0
6	24/08/2003	63.4	6	6/08/1984	51.4
7	11/03/2000	60.2	7	12/02/1997	51.0
8	19/11/2000	60.0	8	13/10/1985 (2 days)	48.6
9	26/12/2009	58.0	9	7/02/1988	48.6
10	28/12/2008	57.0	10	20/04/1984	48.2
11	7/11/2001	53.4	11	4/10/1993	47.6
12	31/01/2008	53.0	12	9/02/1992	46.8
13	4/12/2010	52.2	13	24/01/1991 (2 days)	45.6
14	2/04/2000	51.6	14	5/06/1988	45.2
15	18/05/2007	49.6	15	25/07/1990	44.8

Wellington Research Centre (65035) Jan 1946 - Feb 2005		
Rank	Date	Rainfall (mm)
1	24/02/1955	179.8
2	20/04/1990	96.0
3	11/03/2000	95.0
4	19/01/1950	89.9
5	8/02/1971	73.7
6	24/02/1982	69.8
7	6/11/1969	67.1
8	20/01/1956	66.3
9	9/02/1971	66.0
10	10/02/1954	64.5
11	5/03/1979	63.0
12	25/07/1990	61.0
13	10/02/1969	60.5
14	13/01/1984	60.2
15	12/02/1997	59.8

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4.4.3 Analysis of Pluviometer Rainfall Data

Pluviometer (or continuous) rainfall gauges typically collect data per increment of rainfall rather than per increment of time, thereby returning data at sub-daily intervals. In such a way, pluviometer gauges are ideal for analysing the short-duration, high-intensity storm bursts.

Table 4-3 details the highest hourly rainfall values for the pluviometer gauges located at Wellington and Dubbo; with Geurie roughly equidistant from these two locations.

Table 4-3: Top 15 Hourly Records at Wellington and Dubbo

Wellington Research Centre (65035) Feb 1961 - Feb 2005			Wellington D&J Rural (65034) Mar 2006 - Mar 2016		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	23/02/1982 12:00	39.45	1	26/01/2013 23:00	32.8
2	12/01/1984 18:00	34.09	2	28/02/2013 23:00	32
3	13/05/1995 23:00	31.69	3	15/02/2006 18:00	27.4
4	10/12/1983 16:00	31.28	4	5/02/2010 19:00	24.2
5	22/01/1986 17:00	31.17	5	15/02/2006 17:00	22.8
6	24/02/1976 19:00	30.1	6	21/12/2007 23:00	20.6
7	20/03/1968 22:00	29.79	7	14/03/2014 21:00	19.6
8	7/02/1971 18:00	28.98	8	28/11/2012 18:00	18.6
9	12/01/1964 20:00	27.13	9	26/01/2013 22:00	18.6
10	7/02/1971 0:00	27.03	10	13/02/2010 19:00	18.4
11	1/12/1965 21:00	26.39	11	8/11/2005 1:00	17.2
12	16/12/1992 7:00	26.07	12	26/10/2007 16:00	17.2
13	19/11/1989 16:00	25.63	13	16/07/2013 15:00	17.2
14	28/01/1995 21:00	25.53	14	21/02/2007 21:00	16.4
15	14/12/1961 18:00	23.9	15	6/02/2011 9:00	16.2



Dubbie Airport AWS (86070) Mar 2006 - Mar 2018		
Rank	Date	Rainfall (mm)
1	8/02/2012 17:00	55.8
2	16/12/2016 23:00	46.2
3	26/01/2013 21:00	39.6
4	14/01/2012 21:00	29.2
5	24/03/2017 2:00	28.6
6	20/03/2017 16:00	25.2
7	13/03/2017 12:00	20
8	28/09/2011 23:00	17.8
9	24/12/2016 1:00	17.6
10	16/07/2014 5:00	17.4
11	3/04/2014 22:00	17
12	28/02/2013 20:00	16.8
13	16/09/2013 18:00	16.8
14	27/01/2016 16:00	16.8
15	13/03/2017 13:00	16.6

From this it can be seen that the period since the year 2000 has been characterised by relatively low intensity rainfall bursts compared to the period preceding the year 2000. This corresponds with the anecdotal data provided by Council and the community that no significant flood events have occurred in recent years within the study area.

4.4.4 Analysis of Specific Events

The continuous rainfall data for a number of specific events are analysed below based upon dates of known flooding provided by Council and the community. However, as there is no continuous rainfall gauge within Geurie, this analysis was undertaken on the gauge located in Wellington. From this, the dates of known flooding within Geurie were found to have recorded relatively low rainfall depths at the Wellington gauge; all being less than a 1 Exceedance per Year (EY) event. This indicates that the rainfall events that have caused flooding in the past may have been highly localised to the Geurie area, and therefore the rainfall data may not have been sufficiently captured at the gauges outside the study area.



Table 4-4: Analysis of Specific Events - Wellington Research Centre (65035) Pluviometer

	Storm Burst Rainfall Totals Recorded (mm)	Rainfall IFD Estimation
1999 Event (4.5hrs preceding 02:00pm on the 01/03/1999)	14.2	12 EY - 6 EY
1999 Event (12hrs preceding 03:00pm on the 03/10/1999)	27	4 EY - 3 EY
1990 Event (14hrs preceding 12:00am on the 20/04/1990)	60.72	0.5 EY - 0.2 EY
1971 Event (5hrs preceding 09:00pm on the 07/02/1971)	40.1	0.5 EY - 0.2 EY



5 Hydrologic Model Development

5.1 Overview

The hydrologic model developed for this study used the Watershed Bounded Network Model (WBNM) software (Ref 4). WBNM requires minimal model parameter assumptions as the software uses established relationships between catchment geomorphology and hydrology to calculate the rainfall runoff hydrographs. The software has been updated to include built-in functionality to estimate design floods using the ARR 2019 design flood estimation procedures; whilst retaining the software's built-in functionality to use the ARR 1987 design flood estimation procedures, should comparison or backward compatibility be necessary. For these reasons, WBNM was considered suitable for use in this study; with the WBNM version used being 2017_V001.

5.2 Sub-catchment Delineation

The hydrologic catchment area covered a region of 46 km². This area was defined by the topographical ridges that form the upper bounds of the watershed area.

A total of 143 sub-catchments were delineated across the total hydrologic catchment area. The sub-catchments along creeks covered a larger individual area than those within the town, corresponding to the relative difference in size of the hydrologic features defining each area. All of the sub-catchment extents are shown in Figure 5.

5.3 Model Parameters

A range of model parameters are used in the hydrologic model calculations undertaken within WBNM. These include:

- Lag Parameter;
- Routing Parameter;
- Impervious Area; and
- Rainfall Losses.

The selection of these parameters are discussed within the following sections.

5.3.1 Lag Parameter

The time difference between the centroids of the rainfall hyetograph and the runoff hyetograph is a function of catchment characteristics (such as area, shape and slope) and a specified lag parameter within WBNM. A lag parameter value of 1.6 was used for this study and corresponds to the recommendations provided in the WBNM documentation.

5.3.2 Routing Parameter

Routing of flows from upstream to downstream through the sub-catchments can be calculated by a number of different methods within WBNM, including the nonlinear routing, time-delay routing and Muskingum routing methods. The nonlinear routing method with a parameter value of 1.0 was used for this study. This parameter value corresponds with the WBNM recommended value for natural channels.

5.3.3 Impervious Area

The proportion of pervious to impervious surface area across a region will influence the rate at which runoff will occur from the region. The percentage of impervious surface area within individual sub-catchments was based on the proportion and type of land uses within the sub-catchments (corresponding to the hydraulic roughness extents, discussed in Section 6.3). The impervious percentage per land use type is summarised in Table 5-1.



Table 5-1: Impervious Percentage per Land Use Type

Land Use Type	Impervious Percentage
Roads/Pavements	50%
Low Density Residential Properties	40%
Vegetation (Light, Medium, and Heavy)	0%

5.3.4 Rainfall Losses

Rainfall losses represent the amount of rainfall that does not contribute to runoff due to interception by vegetation, infiltration into the soil, retention on the surface (depression storage), and transmission loss through stream beds and banks. Rainfall losses can be calculated through empirical models, simple models or process models. Empirical models include the Initial Loss - Continuing Loss (IL/CL) Method; the Initial Loss - Proportional Loss Method; the Variable Continuing Loss Method; the SCS Curve Number Method; the Probability Distribution Storage Capacity Models; and the Soil Water Balance Model (SWMOD). Simple models include the Horton Model; the Green-Ampt Model; and the Australian Representative Basin Model (ARBM). Process models involve a complex method with "a large number of parameters that makes them difficult to apply to estimate design floods" (ARR 2019).

ARR 2019 cites a number of studies that show the IL/CL method is suitable for design flood estimation over a range of event probabilities (AEP). As such, the IL/CL method was adopted for this study.

In applying the IL/CL method, the ARR Data Hub provides values on storm continuing losses, storm initial losses, pre-burst depths (of varying probability) and probability neutral burst initial losses. Chart 5-1 shows the distinction between the storm, the pre-burst, the storm initial loss and the burst initial loss. Earlier versions of ARR 2019 (i.e. ARR 2016) recommended that the burst initial losses be determined by subtracting the pre-burst depths from the storm initial losses. However with the release of ARR 2019 and the accompanying release of the NSW OEH Floodplain Risk Management Guide: Incorporating 2016 Australian Rainfall and Runoff in Studies (Ref 9) (herein referred to as the NSW OEH ARR 2016 Guidelines), further guidance was provided for catchments in the NSW region including the provision of the probability neutral storm initial losses values.

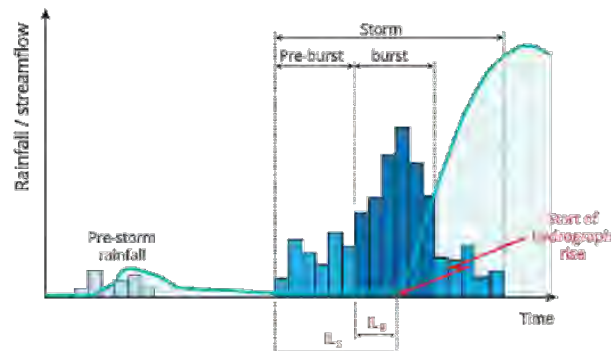


Chart 5-1: Distinction between storm and burst initial loss (Extracted from ARR 2019)

From the NSW OEH ARR 2016 Guidelines it is recommended that a hierarchical approach to loss estimation be used, provided below in order of preference (with 1 being the most preferred):

1. Use the average of calibration losses from the actual study on the catchment if available.
2. Use the average calibration losses from other studies in the catchment, if available and appropriate for the study.
3. Use the average calibration losses from other studies in similar adjacent catchments, if available and appropriate for the study.
4. Use the NSW FFA-reconciled losses available through the ARR Data Hub. These losses may be used within the catchment in which they were derived (available through the ARR Data Hub) or similar adjacent catchments with appropriate scrutiny. This is used with the unmodified ARR Data Hub initial losses which requires the application of additional scrutiny to the balance between initial loss and pre-burst to ensure it is reflective of flood history and observations for the catchment being investigated in the lead-up to events. This is particularly important in catchments of 100 km² or less.
5. Use default ARR data hub continuing losses for a location with a multiplication factor of 0.4. This is used with the unmodified ARR Data Hub initial losses which requires the application of additional scrutiny to the balance between initial loss and pre-burst to ensure it is reflective of flood history and observations for the catchment being investigated in the lead-up to events. This is particularly important in catchments of 100km² or less.

As calibration data was limited for the study area (discussed in Section 7), approach 1 could not be used. Previous studies undertaken for the study area (discussed in Section 4.1) were similarly restricted by lack of calibration data, therefore approach 2 and 3 could not be used. Furthermore, no stream gauge data was available for the study area, therefore an at-site Flood Frequency Analysis (FFA) could not be undertaken and approach 4 (which requires an at-site FFA to adjust the losses) could not be used. As such, approach 5 was adopted to calculate the initial and continuing losses for the study area (discussed in Section 8.2.1).



6 Hydraulic Model Development

6.1 Overview

The hydraulic model developed for this study used the TUFLOW software (Ref 3). The TUFLOW version used was 2018-03-AB with double precision.

6.2 Digital Elevation Model

The data used to generate the Digital Elevation Model (DEM) and the grid cell resolution are important components to the 2D domain definition used by TUFLOW.

The data used to generate the DEM is often dependent on:

- The degree of vertical accuracy;
- The horizontal resolution; and
- The date of collection (as older datasets may not entirely represent the current catchment conditions, if changes have occurred).

And the factors that influence the model grid cell resolution are:

- The purpose of the study;
- A balance between model resolution and model runtimes - with higher resolution models requiring longer computation runtimes; and
- The resolution of the available data - as very little is gained from modelling at a finer resolution than the input data.

Taking these factors into consideration, the LIDAR data (discussed in Section 4.3.1) was used to derive the DEM and establish a hydraulic model with a 3 m grid resolution across the study area.

6.3 Hydraulic Roughness

The hydraulic roughness (Manning's 'n') represents the hydraulic efficiency of the flow paths within the TUFLOW model. Various industry references provide guidelines for acceptable hydraulic roughness ranges for varying land use types including Chow (Ref 5), Henderson (Ref 6), and the ARR Revision Project 15. Field inspections were undertaken and the ARR Revision Project 15 guidelines were used to determine the Manning's 'n' values for varying land use types within the study area, detailed in Table 6-1.

Table 6-1: Roughness Values Adopted

Land Use Type	Adopted Manning's 'n' Value	Range of Acceptable Manning's 'n' Values
Roads	0.02	0.02 - 0.03
Concrete Open Channels	0.02	0.015 - 0.02
Urban	0.04	N/A *
Light Vegetation	0.03	0.03 - 0.05
Medium Vegetation	0.06	0.05 - 0.07

* Note: the Manning's 'n' values for residential and industrial/commercial areas within the guidelines are for use within the building extents not the urban area surrounding the building extents.

The aerial photography was used to delineate the spatial extents of the land use types (and thus the hydraulic roughness) throughout the study area, shown on Figure 6.



6.4 Hydraulic Structures

6.4.1 Bridges and Culverts

The bridges and culverts along Geurie Creek and Boori Creek were modelled as 1D features as the dimensions of the bridges and culverts were often smaller than the 2D grid cell size. The bridge and culvert details were obtained from the ground-based survey commissioned by Council (discussed in Section 4.3.2). The locations of the bridge and culvert structures modelled are shown in Figure 6.

6.4.2 Buildings

Buildings were simulated in the hydraulic model for the town as an absolute flow obstructions within the 2D domain. The building extents were determined from analysis of the aerial photography. This is shown in Figure 6.

6.5 Hydraulic Boundary Conditions

The hydraulic model requires inflow and boundary conditions to be specified. The runoff generated from upstream and outside of the study area was modelled as time-varying boundary conditions. The runoff generated from within the study area was modelled as time-varying local source-area inflows. These time-varying flows were derived from the routed hydrologic model. As the hydrologic model routes flow to the downstream end of the sub-catchments, the TUFLOW inflows were located at the downstream end of the sub-catchments so as not to duplicate routing calculations.

The downstream boundaries were modelled as water level versus flow boundary conditions, with the relationship between the two automatically calculated in TUFLOW using a specified slope. Within the study area, this slope was estimated to be 1.4 m over 100 m (i.e. 0.014 m/m).



7 Historical Flood Simulations

7.1 Overview

It is important to calibrate and validate the model's performance in representing flood behaviour in historical flood events prior to investigating design flood events. However, the degree of calibration is dependent upon the amount and type of calibration data available, such as:

- Rainfall records, in either daily or sub-daily (pluviograph) intervals;
- Stream flow gauges;
- Water level gauges;
- Historical catchment conditions (records of any changes to structures, land-forms, etc.);
- Photographs or videos recording historical flood events;
- Records of flood mark levels or extents from debris marks or watermarks etc.; and/or
- Anecdotal evidence

Where data is available, the models would ideally be calibrated to one historical event and validated to two historical events. Model calibration involves running the model with initial parameter estimates, then adjusting these parameter estimates (within the industry acceptable range) to produce model results that more closely correspond to the observed flood information. Model validation follows model calibration and involves running the models with other historical rainfall events and no additional refinement of the parameter values.

7.2 Historic Event Selection

Due to the scarcity of data, a full model calibration and validation process could not be undertaken for the study area. To compensate for this, a model verification process (detailed in the following Section) and extensive sensitivity analysis (detailed in Section 8.3) was undertaken.

The model verification process involved hydrologic and hydraulic modelling of the October 1999 event. This was based upon the community consultation process undertaken in the previous flood study (discussed in Section 4.1.1) that described 1999 as the last period of known flooding, though it was described as affecting low lying land with no buildings affected by flooding. Therefore a "reverse-calibration" method was used, whereby model results showing no flooding of property was considered to be a qualitative verification of the models.

7.3 Historic Parameters

The pluviometer data from the Wellington Research Centre (65035) gauge was applied to the hydrologic model. The initial rainfall losses corresponding with a 720 minute storm duration for a 50% AEP event was used; as the 720 minute cumulative rainfall depths recorded for the 1999 event at the Wellington pluviometer was found to be less than a 50% AEP event. As no specific details were available regarding the prevailing catchment conditions (such as the dimensions of the previous culverts through the Railway Embankment or details on the exact dates of this culvert upgrade), the current catchment conditions were assumed.

7.4 Historic Flood Simulation Results

Figure 8 shows the hydraulic model's peak flood depth for the October 1999 event. From this, the peak flood depth was found to be less than 0.15 m across the majority of the Geurie township area. As such, the results were considered to approximately verify the hydraulic model.



8 Design Flood Simulations

8.1 Overview

A design event is a statistically-based estimate of the probability of a certain rainfall depth being recorded at a certain location over a defined duration. The various magnitudes of these statistically-based estimates are usually discussed in terms of the Annual Exceedance Probability (AEP); such as the 1% AEP event, which is an event that has a 1% chance of occurring in any given year. The terminology for design events is discussed in the Forward.

8.2 Design Parameters

8.2.1 Rainfall Losses

As discussed in Section 5.3.4, approach 5 of the NSW OEH ARR 2016 Guidelines were used to estimate the initial and continuing losses. From this, the continuing loss was estimated to be 0.6 mm/hr (from 1.5 mm/hr multiplied by 0.4). Whereas, the burst initial loss varied per event probability and event duration; as detailed in Appendix C for all probabilities and durations.

8.2.2 Areal Reduction Factors

Areal Reduction Factors (ARF) are a ratio between the design values of areal average rainfall and the point rainfall; to account for the fact that larger catchments are less likely than smaller catchments to experience high intensity storms concurrently across the total catchment area. The ARR 2019 procedure for calculating the ARF for catchments between 10 and 1000 km² was applied to the 46 km² study area. The results of this calculation for all event probabilities and event durations are detailed in Appendix C.

8.2.3 Rainfall Depths

The design rainfall depths were extracted from the BoM's 2016 Rainfall IFD Data System for the centroid of each of the sub-catchments. An example of this data is shown in Appendix B for the Geurie Post Office location.

8.2.4 Rainfall Spatial Patterns

The rainfall spatial patterns were derived using the methodology recommended in ARR 2019. This entailed:

1. Extracting the design rainfall depths for each of the sub-catchment centroids from the BoM website.
2. Multiplying the design rainfall depths by the sub-catchment area for each individual sub-catchment.
3. Calculating the weighted average design rainfall depth for the study area by summing the values calculated in Step 2 above and dividing by the total catchment area.
4. Calculating the catchment average design rainfall depth by multiplying the ARF values (discussed in Section 8.2.2) by the weighted average values (calculated in Step 3 above).
5. Calculating the design spatial pattern for each individual sub-catchment by taking the point rainfall values (calculated in Step 1 above), dividing by the weighted average values (calculated in Step 3 above) and multiplying by the catchment average values (calculated in Step 4 above).

The minimum and maximum range of the design rainfall spatial patterns calculated for all event probabilities and event durations are detailed in Appendix C.

8.2.5 Rainfall Temporal Patterns

As the study area is less than 75 km², the point temporal patterns were applied to design storm durations. The point temporal patterns for the Central Slopes region encompassed the total catchment area, and therefore these were exclusively applied.

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8.2.6 Critical Temporal Pattern and Storm Duration

8.2.6.1 Hydrology

In areas of riverine flooding, the "ensemble" approach from ARR 2019 determines the critical duration and critical pattern as being that which produced the peak discharge one higher than the highest average and/or median peak discharge (via the hydrologic modelling).

To determine this, box and whisker plots were analysed for each design storm event for the four main external inflows upstream of Geurie; namely GEU_301, GEU_401, GEU_501, and GEU_601. Appendix C presents the table and plots for each of these inflow locations for the 20% AEP, 5% AEP, and 1% AEP event.

For the 20% AEP event, three of the four inflow locations produced the same critical duration and temporal pattern; namely the 540 minute storm duration with temporal pattern 6 (Event ID 2413). In the one instance where the critical temporal pattern differed from this, the critical duration remained the 540 minute storm duration and temporal pattern 6 was ranked 4th highest (as in two higher than the average and median peak discharge). As such, for the 20% AEP event the 540 minute storm duration with temporal pattern 6 was adopted.

For the 10% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 360 minute storm duration with temporal pattern 7 (Event ID 2373).

For the 5% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 360 minute storm duration with temporal pattern 7 (Event ID 2373).

For the 2% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 270 minute storm duration with temporal pattern 9 (Event ID 2333).

For the 1% AEP event, two of the inflow locations produced a critical duration of 180 minutes and the remaining two inflow locations produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for both. For the inflow locations that produced a critical duration of 270 minutes, temporal pattern 9 (Event ID 2282) was critical. As such, both the 180 minute and 270 minute storm durations (with their respective critical temporal patterns) were adopted for the 1% AEP event.

For the 0.5% AEP event, three of the inflow locations produced a critical duration of 180 minutes and the remaining inflow location produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for two locations. Where the critical duration was the 180 minute but temporal pattern 7 was not critical, temporal pattern 7 was ranked 6th highest (as in one lower than the median peak discharge) with a peak discharge of 0.08 m³/s below the median peak discharge. Therefore, the 180 minute storm duration with temporal pattern 7 was adopted for the 0.5% AEP event.

For the 0.2% AEP event, three of the inflow locations produced a critical duration of 180 minutes and the remaining inflow location produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for two locations. Where the critical duration was the 180 minute but temporal pattern 7 was not critical, temporal pattern 7 was ranked 7th highest (as in two lower than the median peak discharge) with a peak discharge of 0.61 m³/s below the median peak discharge. Therefore, the 180 minute storm duration with temporal pattern 7 was adopted for the 0.2% AEP event.



8.2.6.2 Hydraulics

In urban overland flow areas, where flooding is less directionally constrained, the "ensemble" approach from ARR 2019 determines the critical duration and critical pattern as being that which produced the peak flood level one higher than the highest average peak flood level (via the hydraulic modelling).

To determine this, box and whisker plots were analysed for the 20% AEP, 5% AEP and the 1% AEP peak flood levels; so as to represent each of the temporal pattern ranges i.e. the frequent temporal pattern range (events that are more frequent than the 14.4% AEP event), the intermediate temporal pattern range (events that are between a 3.2% AEP event and a 14.4% AEP event), and the rare temporal pattern range (events that are rarer than a 3.2% AEP event).

For the 20% AEP event, two of the locations produced a critical duration of 540 minutes and the remaining two inflow locations produced a critical duration of 360 minutes. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 540 minute with temporal pattern 6 (Event ID 2413), which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 360 minutes with temporal pattern 3 (Event ID 2380). As such, both the 360 minute and 540 minute storm durations (with their respective critical temporal patterns) were adopted for the frequent temporal pattern range.

For the 5% AEP event, the four locations produced the three critical duration and temporal patterns. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 360 minute with temporal pattern 2 (Event ID 2379). However, the 360 minute storm duration with temporal pattern 7 (which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1) was found to be ranked 3rd highest at these locations; hence this latter duration and temporal pattern were adopted. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 120 minutes, with temporal pattern 7 (Event ID 2274) and temporal pattern 1 (Event ID 2268) respectively. However, where temporal pattern 7 was critical the next highest ranked temporal pattern was temporal pattern 1 (ranked 4th). And where temporal pattern 1 was critical the 3rd ranked temporal pattern was temporal pattern 7. The difference in flood level between these two temporal patterns was 0.006 m at each of the two locations where the 120 minute storm duration was critical. Therefore, the 120 minute storm duration with temporal pattern 1 and the 360 minute storm duration with temporal pattern 7 were adopted for the intermediate temporal pattern range.

For the 1% AEP event, two of the locations produced a critical duration of 270 minutes and the remaining two inflow locations produced a critical duration of 90 minutes. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 270 minute with temporal pattern 9 (Event ID 2282), which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 90 minutes with temporal pattern 8 (Event ID 2222). As such, both the 270 minute and 90 minute storm durations (with their respective critical temporal patterns) were adopted for the rare temporal pattern range.

8.2.6.3 Summary

Table 8-1 summarises the critical storm duration and temporal pattern adopted for each event probability based upon both the hydrologic and hydraulic model analysis (discussed in Section 8.2.6.1 and 8.2.6.2, respectively).



Table 8-1: Critical duration and temporal pattern for each event probability

Event Probability	Critical Duration and Temporal Pattern
20% AEP	360 minute TP03 540 minute TP06
10% AEP	120 minute TP01 360 minute TP07
5% AEP	120 minute TP01 360 minute TP07
2% AEP	90 minute TP08 270 minute TP09
1% AEP	90 minute TP08 180 minute TP07 270 minute TP09
0.5% AEP	90 minute TP08 180 minute TP07
0.2% AEP	90 minute TP08 180 minute TP07
PMF	60 minute 120 minute

8.3 Design Parameter Sensitivity Analysis

A sensitivity analysis process was undertaken on the parameters selected for the design events to estimate the variation in peak flood levels possible under an alternate parameter scenario. The following sections detail the methodology and results from this process.

8.3.1 Rainfall Temporal Patterns

As discussed in Section 8.2.6.1, the temporal pattern selected for the design events were the ones that produced the peak discharge one higher than the highest average peak discharge. To assess the sensitivity of peak flood levels to the temporal pattern selected, the temporal patterns that produced the highest and lowest peak discharge for the selected critical storm duration was analysed. The results of this analysis are provided in Appendix D (Section D.1.)

From this it was found that the models were highly sensitivity to variations in rainfall temporal patterns. The temporal pattern that produced the lowest discharge produced lower peak flood levels and vice versa.

8.3.2 Rainfall Losses

The sensitivity of the models to variations in rainfall losses (either continuing loss or initial loss) was analysed. The sensitivity to continuing losses were assessed by modelling the unadjusted ARR Data Hub values and by modelling the 60% adjusted ARR Data Hub values; and comparing to the results to the adopted 40% adjusted ARR Data Hub values (discussed in Section 5.3.4 and 8.2.1). The sensitivity to initial losses were assessed by modelling the ARR 2016 method of calculating the burst initial losses (by subtracting the pre-burst depths

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from the storm initial losses) using the median, the 75% and the 90% pre-burst depths. The results of this analysis are provided in Appendix D (Section D.2.)

From this it was found that the peak flow and peak flood level was relatively insensitive to variations in continuing rainfall losses. Generally, the peak flood level difference was less than 0.05 m across the town; however slightly higher differences were seen in the downstream portion of Geurie Creek.

By comparison, the models were found to be highly sensitive to variations in initial rainfall losses. The results detailed in Appendix D show a large variation in peak flow and peak flood level when the rainfall initial loss is varied for the selected storm duration and temporal pattern. However, it was also found that varying the initial rainfall losses resulted in a variation in critical storm duration and temporal pattern; with the median pre-burst depths producing longer critical durations compared to the base case, and the 90% pre-burst depths producing slightly shorter critical durations compared to the base case.

8.3.3 Hydrologic Lag and Routing

The sensitivity of the models to variations in hydrologic lag and hydrologic routing was analysed. This was undertaken by varying the lag parameter by $\pm 6\%$ of the adopted values and decreasing the routing parameter to correspond with excavated earth instead of the base case of natural channels. The results of this analysis are provided in Appendix D (Section D.3.).

From this it was found that Geurie Creek was more sensitive to variations in hydrologic lag and routing, whereas Boori Creek through town was less sensitive. Generally, increasing the hydrologic lag values resulted in a decrease in peak flood levels and vice versa.

8.3.4 Hydraulic Roughness

The sensitivity of the peak flood levels to the hydraulic roughness parameters selected was analysed by varying the hydraulic roughness parameters by $\pm 20\%$ of the adopted values. The results of this analysis are provided in Appendix D (Section D.4.).

From this it was found that Geurie Creek was more sensitive to variations in hydraulic roughness, whereas Boori Creek through town was less sensitive. Generally, increasing the hydraulic roughness values resulted in a decrease in peak flood levels and vice versa.

8.3.5 Blockage of Hydraulic Structures

The sensitivity of the peak flood levels to blockage of bridges and culverts was analysed by comparing the peak flood levels from the base case to a 25% blockage scenario and a 50% blockage scenario. The results of this analysis are provided in Appendix D (Section D.5.).

Generally, this scenario resulted in increased flood levels upstream of the blocked structure and decreased flood levels downstream of the structure. However, where structures were located in close proximity, these structures were found to be influenced by the cumulative effects of multiple upstream blockages as well.

8.4 Design Flood Simulation Results

8.4.1 Post Processing Methodology

Hydraulic modelling defines flood behaviour in terms of peak flood levels, peak flood depths and flood velocities. Flood categories are further defined as functions of these flood metrics, as discussed in the following.

8.4.1.1 Hazard Categories

There are two standard industry methods for determining flood hazard categories as defined by the Floodplain Development Manual (2005) and Australian Rainfall and Runoff (2019). Both methods use the depth and velocity product, however they differ in the thresholds applied and the categories denoted.

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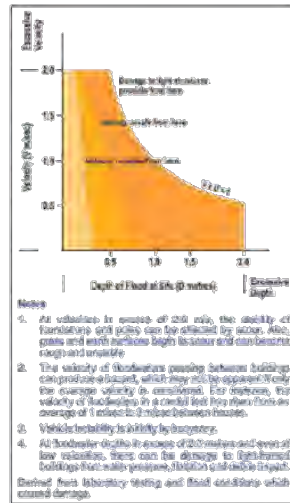


FIGURE 8.1 - Velocity & Depth Relationship

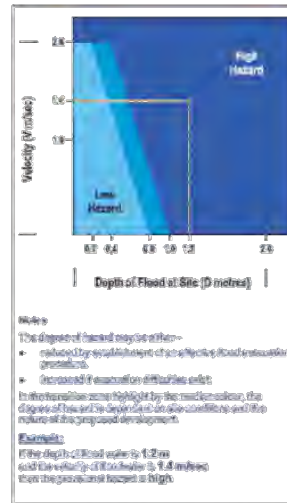
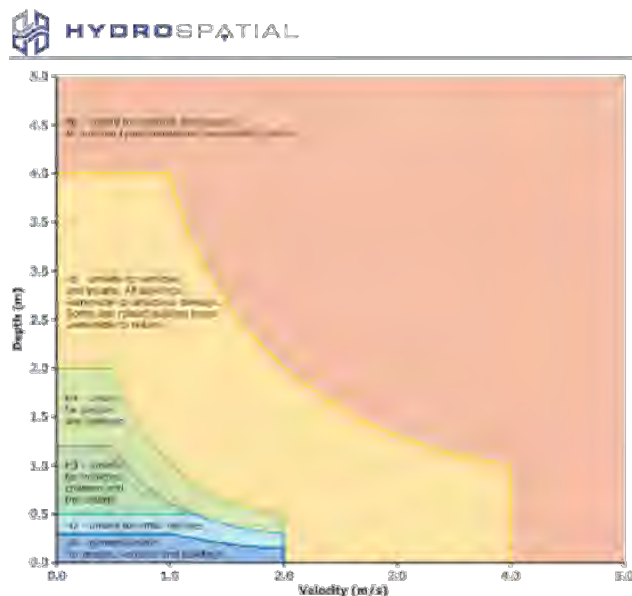


FIGURE 8.2 - Provisional Hydraulic Hazard Categories

Chart 8-1: Flood Hazard Thresholds (FDM, 2005)

The FDM (2005) method denotes hazard categories as 'low hazard' or 'high hazard' based upon the thresholds, shown in Chart 8-1. The high hazard category is particularly significant as it is a criterion in regulating complying development as per the State Environmental Planning Policy (SEPP) (Exempt and Complying Development Codes) 2008. Until such a time as the SEPP Codes are updated to correspond to ARR (2019) method it remains important to define flood hazard as per the FDM (2005) method.



The ARR (2019) method is defined in both the Australian Rainfall and Runoff Guidelines (Ref 2) and also in the AEM Handbook 7 Guidelines (Ref 1). This method denotes hazard categories as H1, H2, H3, H4, H5 and H6; with the greater risk attributed to the highest category (i.e. H6), shown in Chart 8-2. These hazard categories are described as follows:

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people.
- H5 - Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
- H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

The results of this process are discussed in Section 8.4.2.

8.4.1.2 Flood Function (formerly Flood Hydraulic Categories)

The Floodplain Development Manual (2005) identifies three hydraulic categories: floodways, flood storage, and flood fringe. Floodway is described as those areas where a significant portion of the flood flow is conveyed and where partial blockage will negatively affect flood behaviour to a substantial extent. Flood storage is described as those areas where the temporary storage of floodwaters during the passage of a flood is important. Flood fringe is



described as the remaining area affected by flooding, excluding the floodway and flood storage areas.

Although a description is given for each, a technical method to define these hydraulic categories is not provided by the Manual. A number of different methods are available for use, including the Howells et al (2003) method, the Thomas et al (2012) method, and the 5% AEP extent coupled with the encroachment method. The latter two methods are best suited to estimating hydraulic categories where mainstream flood behaviour is being investigated, however the methods are less suited to overland flood behaviour. As such, the Howells et al (2003) method was used as it is well suited to both the mainstream and the overland flood behaviour being investigated in the study area.

From the Howells et al (2003) method, the hydraulic categories were defined as follows:

- Floodway where:
 - the peak velocity-depth product ($V \times D$) $> 0.25 \text{ m}^2/\text{s}$ AND the peak velocity $> 0.25 \text{ m/s}$; OR
 - the peak velocity $> 1.0 \text{ m/s}$ AND the peak depth $> 0.15 \text{ m}$.
- Flood Storage where:
 - the area is outside of the Floodway; AND
 - the peak flood depth $> 0.5 \text{ m}$.
- Flood Fringe where:
 - the area is outside the Floodway; AND
 - the peak flood depth $< 0.5 \text{ m}$.

The results of this process are discussed in Section 8.4.2.

8.4.1.3 Emergency Response Classification of Communities

The AEMI Handbook 7 Guidelines (Ref 1) provides national guidance on flood emergency response and presents six classifications that are described in Table 8-2, with the flow chart to determine these classifications shown in Chart 8-3.

The results of this process are discussed in Section 8.4.2.

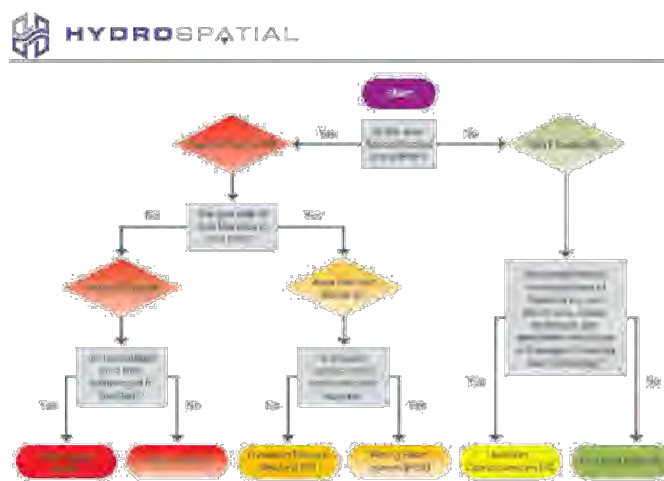


Table 8-2: Flood Emergency Response Classification Table (Extracted from the AEM Handbook 7 Guidelines 2017)

Primary Category	Primary Description	Secondary Category	Secondary Description	Tertiary Category	Tertiary Description	Category
Flooded (F)	The area is flooded in the PMF	Isolated (I)	Areas that are isolated from community evacuation facilities (located on flood-free land) by floodwater and/or impossible terrain as waters rise during a flood event up to and including the PMF. These areas are likely to lose electricity, gas, water, sewerage and telecommunications during a flood.	Submerged (S)	Where all the land in the isolated area will be fully submerged in a PMF after becoming isolated.	FIS
				Elevated (E)	Where there is a substantial amount of land in isolated areas elevated above the PMF.	FIE
		Exit Route (E)	Areas that are not isolated in the PMF and have an exit route to community evacuation facilities (located on flood-free land).	Overland Escape (O)	Evacuation from the area relies upon overland escape routes that rise out of the floodplain.	FEO
				Rising Road (R)	Evacuation routes from the area follow roads that rise out of the floodplain.	FER



Not Flooded (N)	The area is not flooded in the PMF.			Indirect Consequences (IC)	Areas that are not flooded but may lose electricity, gas, water, sewerage, telecommunications and transport links due to flooding.	N/C
				Flood Free	Areas that are not flood affected and are not affected by indirect consequences of flooding.	



8.4.2 Results Summary

Figure 9 shows the placement of key locations used within the following to discuss the results of various flooding metrics.

Figure 10 to Figure 17 shows the peak flood depth across the study area for events ranging from the 20% AEP event to the PMF event. The peak flood depths for these same events at key locations is provided in Table 8-3.



Table 8-3: Peak Flood Depth (m) for Key Locations

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	2.33	2.55	2.87	3.06	3.26	3.48	3.77	8.55
H02	Geurie Ck - Upstream of Mitchell Hwy	0.98	1.12	1.21	1.23	1.29	1.39	1.48	2.81
H03	Geurie Ck - Upstream of Railway Tracks (east)	1.38	1.65	1.95	2.08	2.24	2.40	2.49	3.82
H04	Geurie Ck - Upstream of Railway Tracks (west)	1.59	1.91	2.22	2.35	2.50	2.63	2.71	3.96
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.65	0.76	0.85	0.89	0.97	1.04	1.14	2.74
H06	Jennings St (south-east of Mitchell St)	0.49	0.53	0.56	0.60	0.69	0.79	0.89	2.38
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.52	0.57	0.60	0.62	0.65	0.69	0.71	1.37
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.36	0.53	0.67	0.71	0.74	0.79	0.82	1.21
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.90	1.04	1.12	1.15	1.17	1.15	1.18	1.98
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.34	0.39	0.42	0.47	0.51	0.55	0.58	1.24
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.54	0.56	0.58	0.60	0.61	0.63	0.64	1.30
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	1.08	1.14	1.24	1.35	1.40	1.44	1.49	2.16
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.59	0.63	0.66	0.69	0.71	0.74	0.77	1.37
H14	Boori Ck (north of Railway Tracks)	0.31	0.38	0.43	0.47	0.51	0.57	0.62	1.18



Figure 18 to Figure 25 shows the peak flood velocity across the study area for events ranging from the 20% AEP event to the PMF event. In events of a smaller magnitude (such as the 5% AEP event), the high velocity flows greater than 1.5 m/s were predominantly confined to the concrete-lined open channels through the town, along Geurie Creek and the upstream tributaries. However, in events of a larger magnitude (such as the 1% AEP event), the high velocity flows also encroached upon the roadways (particularly the Mitchell Highway) and the railway embankment.

Figure 26 to Figure 33 shows the flood hazard categories across the study area for events ranging from the 20% AEP event to the PMF event. In events of a smaller magnitude (such as the 5% AEP event), the H1 category covered the majority of the town, however the hazard categories were more severe along Geurie Creek (up to the H5-H6 category). In events of a larger magnitude (such as the 1% AEP event), slightly more severe hazard categories occurred through some properties between Arthurville Road and the Mitchell Highway.

Figure 34 to Figure 41 shows the flood function categories across the study area for events ranging from the 20% AEP event to the PMF event. Generally, floodways corresponded to Geurie Creek and Boori Creek; however in larger magnitude events (such as the 1% AEP event) the floodway extents encroached upon some properties between Arthurville Road and the Mitchell Highway. Across all events investigated, the flood storage areas were confined to areas upstream of the Mitchell Highway embankment and the railway embankment.

Figure 42 shows the flood emergency response classification of communities as per the methodology discussed in Section 8.4.1.3. The predominant classifications across the study area were Flood - Isolated - Submerged (FIS) and Flood - Isolated - Elevated (FIE). In the areas classified as FIS, the area is isolated and then fully inundated in the PMF event. Whereas in areas classified as FIE, the area is isolated but not inundated in the PMF event. The remainder of the study area either had an exit route or was indirectly affected by flooding.



9 References

- Ref 1: Australian Emergency Management Institute (2017), *Australian Emergency Management Handbook 7: Managing the Floodplain Best Practice in Flood Risk Management in Australia*, AEMI, Canberra
- Ref 2: Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) (2016), *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia
- Ref 3: BMT WBM (2016), *TUFLOW User Manual*
- Ref 4: Boyd, M., Rigby, E., VanDrie, R. (2017), *Watershed Bounded Network Model (WBNM) User Guide*
- Ref 5: Chow, V.T. (1959), *Open Channel Hydraulics*, McGraw-Hill, New York
- Ref 6: Henderson, F.M. (1966), *Open Channel Flow*, MacMillan, New York
- Ref 7: Institute of Engineers, Australia (1987), *Australian Rainfall and Runoff: A Guide to Flood Estimation, Vol. 1*, Editor-in-chief D.H. Pilgrim, Revised Edition 1987 (Reprinted 1998), Barton, ACT
- Ref 8: NSW Government (2005), *Floodplain Development Manual: The management of flood liable land*, Department of Infrastructure, Planning and Natural Resources, NSW Government, Sydney
- Ref 9: NSW Office of Environment and Heritage (2019), *Floodplain Risk Management Guide: Incorporating 2016 Australian Rainfall and Runoff in Studies*, NSW Government
- Ref 10: Webb, McKeown and Associates Pty Ltd (2006), *Geurie Flood Study*, Wellington Council



APPENDIX A
GLOSSARY



The following glossary has been extracted from the Australian Emergency Management Handbook 7 (Ref 1).

Annual Exceedance Probability (AEP)	The likelihood of the occurrence of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood flow of 500 m ³ /s has an AEP of 5%, it means that there is a 5% chance (that is, a one-in-20 chance) of a flow of 500 m ³ /s or larger occurring in any one year (see also average recurrence interval, flood risk, likelihood of occurrence, probability).
Astronomical tide	The variation in sea level caused by the gravitational effects of (principally) the moon and sun. It includes highest and lowest astronomical tides (HAT and LAT) occur when relative alignment and distance of the sun and moon from the earth are 'optimal'. Water levels approach to within 20 cm of HAT and LAT twice per year around mid-summer and mid-winter 'king tides'.
Australian Height Datum (AHD)	A common national survey height datum as a reference level for defining reduced levels; 0.0 m AHD corresponds approximately to sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood-prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time. If the damage associated with various annual events is plotted against their probability of occurrence, the AAD is equal to the area under the consequence-probability curve. AAD provides a basis for comparing the economic effectiveness of different management measures (i.e. their ability to reduce the AAD).
Average Recurrence Interval (ARI)	A statistical estimate of the average number of years between the occurrence of a flood of a given size or larger than the selected event. For example, floods with a flow as great as or greater than the 20-year ARI (5% AEP) flood event will occur, on average, once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event (see also annual exceedance probability).
Catchment	The area of land draining to a particular site. It is related to a specific location, and includes the catchment of the main waterway as well as any tributary streams.
Catchment flooding	Flooding due to prolonged or intense rainfall (e.g. severe thunderstorms, monsoonal rains in the tropics, tropical cyclones). Types of catchment flooding include riverine, local overland and groundwater flooding.
Chance	The likelihood of something happening that will have beneficial consequences (e.g. the chance of a win in a lottery). Chance is often thought of as the 'upside of a gamble' (Rowe 1990) (see also risk).
Coastal flooding	Flooding due to tidal or storm-driven coastal events, including storm surges in lower coastal waterways. This can

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	be exacerbated by wind-wave generation from storm events.
Consent authority	The authority or agency with the legislative power to determine the outcome of development and building applications.
Consequence	The outcome of an event or situation affecting objectives, expressed qualitatively or quantitatively. Consequences can be adverse (e.g. death or injury to people, damage to property and disruption of the community) or beneficial.
Defined Flood Event (DFE)	The flood event selected for the management of flood hazard to new development. This is generally determined in floodplain management studies and incorporated in floodplain management plans. Selection of DFEs should be based on an understanding of flood behaviour, and the associated likelihood and consequences of flooding. It should also take into account the social, economic, environmental and cultural consequences associated with floods of different severities. Different DFEs may be chosen for the basis for reducing flood risk to different types of development. DFEs do not define the extent of the floodplain, which is defined by the PMF (see also design flood, floodplain and probable maximum flood).
Design flood	The flood event selected for the treatment of existing risk through the implementation of structural mitigation works such as levees. It is the flood event for which the impacts on the community are designed to be limited by the mitigation work. For example, a levee may be designed to exclude a 2% AEP flood, which means that floods rarer than this may breach the structure and impact upon the protected area. In this case, the 2% AEP flood would not equate to the crest level of the levee, because this generally has a freeboard allowance, but it may be the level of the spillway to allow for controlled levee overtopping (see also annual exceedance probability, defined flood event, floodplain, freeboard and probable maximum flood).
Development	<p>Development may be defined in jurisdictional legislation or regulation. This may include erecting a building or carrying out of work, including the placement of fill; the use of land, or a building or work, or the subdivision of land.</p> <p>Infill development refers to the development of vacant blocks of land within an existing subdivision that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development.</p> <p>New development is intensification of use with development of a completely different nature to that associated with the former land use or zoning (e.g. the urban subdivision of an area previously used for rural purposes). New developments generally involve rezoning, and associated consents and approvals. It may require major extensions of existing urban services, such as roads, water supply, sewerage and electric power.</p>

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	Redevelopment refers to rebuilding in an existing developed area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major extensions to urban services.
Ecologically sustainable development	Using, conserving and improving natural resources so that ecological processes on which life depends are maintained, and the total quality of life - now and in the future - can be maintained or increased.
Effective warning time	The effective warning time available to a floodprone community is equal to the time between the delivery of an official warning to prepare for imminent flooding and the loss of evacuation routes due to flooding. The effective warning time is typically used for people to self-evacuate, to move farm equipment, move stock, raise furniture, and transport their possessions.
Existing flood risk	The risk a community is exposed to as a result of its location on the floodplain.
Flash flood	Flood that is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. It is generally not possible to issue detailed flood warnings for flash flooding. However, generalised warnings may be possible. It is often defined as flooding that peaks within six hours of the causative rain.
Flood	Flooding is a natural phenomenon that occurs when water covers land that is normally dry. It may result from coastal or catchment flooding, or a combination of both (see also catchment flooding and coastal flooding).
Flood awareness	An appreciation of the likely effects of flooding, and a knowledge of the relevant flood warning, response and evacuation procedures. In communities with a high degree of flood awareness, the response to flood warnings is prompt and effective. In communities with a low degree of flood awareness, flood warnings are liable to be ignored or misunderstood, and residents are often confused about what they should do, when to evacuate, what to take with them and where it should be taken.
Flood damage	The tangible (direct and indirect) and intangible costs (financial, opportunity costs, clean-up) of flooding. Tangible costs are quantified in monetary terms (e.g. damage to goods and possessions, loss of income or services in the flood aftermath). Intangible damages are difficult to quantify in monetary terms and include the increased levels of physical, emotional and psychological health problems suffered by flood-affected people that are attributed to a flooding episode.
Flood education	Education that raises awareness of the flood problem, to help individuals understand how to manage themselves and their property in response to flood warnings and in a flood.

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	event, it invokes a state of flood readiness.
Flood emergency response plan	A step-by-step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of connected emergency operations. The objective is to ensure a coordinated response by all agencies having responsibilities and functions in emergencies.
Flood emergency management	Emergency management is a range of measures to manage risks to communities and the environment. In the flood context, it may include measures to prevent, prepare for, respond to and recover from flooding.
Flood fringe areas	The part of the floodplain where development could be permitted, provided the development is compatible with flood hazard and appropriate building measures to provide an adequate level of flood protection to the development. This is the remaining area affected by flooding after flow conveyance paths and flood storage areas have been defined for a particular event (see also flow conveyance areas and flood storage areas).
Flood hazard	Potential loss of life, injury and economic loss caused by future flood events. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.
Floodplain	An area of land that is subject to inundation by floods up to and including the probable maximum flood event - that is, flood-prone land.
Floodplain management entity (FME)	The authority or agency with the primary responsibility for directly managing flood risk at a local level.
Floodplain management plan	<p>A management plan developed in accordance with the principles and guidelines in this handbook, usually includes both written and diagrammatic information describing how particular areas of flood-prone land are to be used and managed to achieve defined objectives. It outlines the recommended ways to manage the flood risk associated with the use of the floodplain for various purposes. It represents the considered opinion of the local community and the floodplain management entity on how best to manage the floodplain, including consideration of flood risk in strategic land-use planning to facilitate development of the community.</p> <p>It fosters flood warning, response, evacuation, clean-up and recovery in the onset and aftermath of a flood, and suggests an organisational structure for the integrated management for existing, future and residual flood risks. Plans need to be reviewed regularly to assess progress and to consider the consequences of any changed circumstances that have arisen since the last review.</p>
Flood Planning Area (FPA)	The area of land below the flood planning level, and is thus subject to flood-related development controls.

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Flood Planning Level (FPL)	The FPL is a combination of the defined flood levels (derived from significant historical flood events or floods of specific annual exceedance probabilities) and freeboards selected for floodplain management purposes, as determined in management studies and incorporated in management plans.
Flood-prone land	Land susceptible to flooding by the probably maximum flood event. Flood-prone land is synonymous with the floodplain. Floodplain management plans should encompass all flood-prone land rather than being restricted to areas affected by defined flood events.
Flood proofing of buildings	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures that are subject to flooding, to reduce structural damage and potentially, in some cases, reduce contents damage.
Flood readiness	An ability to react within the effective warning time (see also flood awareness and flood education).
Flood risk	The potential risk of flooding to people, their social setting, and their built and natural environment. The degree of risk varies with circumstances across the full range of floods. Flood risk is divided into three types - existing, future and residual.
Flood severity	A qualitative indication of the 'size' of a flood and its hazard potential. Severity varies inversely with likelihood of occurrence (i.e. the greater the likelihood of occurrence, the more frequently an event will occur, but the less severe it will be). Reference is often made to major, moderate and minor flooding (see also minor, moderate and major flooding).
Flood storage areas	The parts of the floodplain that are important for temporary storage of floodwaters during a flood passage. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas (see also flow conveyance areas and flood fringe areas).
Flood study	A comprehensive technical investigation of flood behaviour. It defines the nature of flood hazard across the floodplain by providing information on the extent, level and velocity of floodwaters, and on the distribution of flood flows. The flood study forms the basis for subsequent management studies and needs to take into account a full range of flood events up to and including the probable maximum flood.
Flow	The rate of flow of water measured in volume per unit time - for example, cubic metres per second (m ³ /s). Flow is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
Flow conveyance areas	Those areas of the floodplain where a significant flow of

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	<p>water occurs during floods. They are often aligned with naturally defined channels. Flow conveyance paths are areas that, even if only partially blocked, would cause a significant redistribution of flood flow or a significant increase in flood levels. They are often, but not necessarily, areas of deeper flow or areas where higher velocities occur, and can also include areas where significant storage of floodwater occurs.</p> <p>Each flood has a flow conveyance area, and the extent and flood behaviour within flow conveyance areas may change with flood severity. This is because areas that are benign for small floods may experience much greater and more hazardous flows during larger floods (see also flood fringe areas and flood storage areas).</p>
Freeboard	<p>The height above the DFE or design flood used, in consideration of local and design factors, to provide reasonable certainty that the risk exposure selected in deciding on a particular DFE or design flood is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels and so on. Freeboard compensates for a range of factors, including wave action, localised hydraulic behaviour and levee settlement, all of which increase water levels or reduce the level of protection provided by levees. Freeboard should not be relied upon to provide protection for flood events larger than the relevant defined flood event of a design flood.</p> <p>Freeboard is included in the flood planning level and therefore used in the derivation of the flood planning area (see also defined flood event, design flood, flood planning area and flood planning level).</p>
Frequency	<p>The measure of likelihood expressed as the number of occurrences of a specified event in a given time. For example, the frequency of occurrence of a 20% annual exceedance probability or five-year average recurrence interval flood event is once every five years on average (see also annual exceedance probability, annual recurrence interval, likelihood and probability).</p>
Future flood risk	<p>The risk that new development within a community is exposed to as a result of developing on the floodplain.</p>
Gauge height	<p>The height of a flood level at a particular gauge site related to a specified datum. The datum may or may not be the AHD (see also Australian height datum).</p>
Habitable room	<p>In a residential situation, a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. In an industrial or commercial situation, it refers to an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.</p>
Hazard	<p>A source of potential harm or a situation with a potential to cause loss. In relation to this handbook, the hazard is flooding, which has the potential to cause damage to the community.</p>

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Hydraulics	The study of water flow in waterways; in particular, the evaluation of flow parameters such as water level, extent and velocity.
Hydrograph	A graph that shows how the flow or stage (flood level) at any particular location varies with time during a flood.
Hydrologic analysis	The study of the rainfall and runoff process, including the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
Intolerable risk	A risk that, following understanding of the likelihood and consequences of flooding, is so high that it requires consideration of implementation of treatments or actions to improve understanding, avoid, transfer or reduce the risk.
Life-cycle costing	All of the costs associated with the project from the cradle to the grave. This usually includes investigation, design, construction, monitoring, maintenance, asset and performance management and, in some cases, decommissioning of a management measure.
Likelihood	A qualitative description of probability and frequency (see also frequency and probability).
Likelihood of occurrence	The likelihood that a specified event will occur. (With respect to flooding, see also annual exceedance probability and average recurrence interval).
Local overland flooding	Inundation by local runoff on its way to a waterway, rather than overbank flow from a stream, river, estuary, lake or dam. Can be considered synonymous with stormwater flooding.
Loss	Any negative consequence or adverse effect, financial or otherwise.
Mathematical and computer models	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
Merit approach	The merit approach weighs social, economic, ecological and cultural impacts of land-use options for different flood-prone areas, together with flood damage, hazard and behaviour implications, and environmental protection and wellbeing of rivers and floodplains. This approach operates at two levels. At the strategic level, it allows for the consideration of flood hazard and associated social, economic, ecological and cultural issues in formulating statutory planning instruments, and development control plans and policies. At a site specific level, it involves consideration of the best way of developing land in consideration of the zonings in a statutory planning instruments, and development control plans and policies.
Minor, moderate and major flooding	These terms are often used in flood warnings to give a general indication of the types of problems expected with a flood.

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Probability	<p>A statistical measure of the expected chance of flooding. It is the likelihood of a specific outcome, as measured by the ratio of specific outcomes to the total number of possible outcomes.</p> <p>Probability is expressed as a number between zero and unity, zero indicating an impossible outcome and unity indicating an outcome that is certain. Probabilities are commonly expressed in terms of percentage. For example, the probability of 'throwing a six' on a single roll of a die is one in six, or 0.167 or 16.7% (see also annual exceedance probability).</p>
Probable Maximum Flood (PMF)	<p>The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from PMP and, where applicable, snow melt, coupled with the worst flood-producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood-prone land - that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event, should be addressed in a floodplain risk management study.</p>
Probable Maximum Precipitation (PMP)	<p>The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (VMO 1985). It is the primary input to probable maximum flood estimation.</p>
Rainfall intensity	<p>The rate at which rain falls, typically measured in millimetres per hour (mm/h). Rainfall intensity varies throughout a storm in accordance with the temporal pattern of the storm (see also temporal pattern).</p>
Residual flood risk	<p>The risk a community is exposed to that is not being remedied through established risk treatment processes. In simple terms, for a community, it is the total risk to that community, less any measure in place to reduce that risk.</p> <p>The risk a community is exposed to after treatment measures have been implemented. For a town protected by a levee, the residual flood risk is the consequences of the levee being overtopped by floods larger than the design flood. For an area where flood risk is managed by land-use planning controls, the residual flood risk is the risk associated with the consequences of floods larger than the DFE on the community.</p>
Risk	<p>'The effect of uncertainty on objectives' (ISO31000:2009). NOTE 4 of the definition in ISO31000:2009 also states that 'risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence'. Risk is based upon the consideration of the consequences of the full range of flood behaviour on communities and their</p>

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	social settings, and the natural and built environment (see also likelihood and consequence).
Risk analysis	The systematic use of available information to determine how often specified (flood) events occur and the magnitude of their likely consequences. Flood risk analysis is normally undertaken as part of a floodplain management study, and involves an assessment of flood levels and hazard associated with a range of flood events (see also flood study).
Risk management	The systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring flood risk. Flood risk management is undertaken as part of a floodplain management plan. The floodplain management plan reflects the adopted means of managing flood risk (see also floodplain management plan).
Riverine flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam. Riverine flooding generally excludes watercourses constructed with pipes or artificial channels considered as stormwater channels.
Runoff	The amount of rainfall that drains into the surface drainage network to become stream flow, also known as rainfall excess.
Stage	Equivalent to water level. Both stage and water level are measured with reference to a specified datum (e.g. the Australian height datum).
Storm surge	The increases in coastal water levels above predicted astronomical tide level (i.e. tidal anomaly) resulting from a range of location dependent factors including the inverted barometer effect, wind and wave setup and astronomical tidal waves, together with any other factors that increase tidal water level (see also astronomical tide, wind set-up and wave set-up).
Stormwater flooding	Is inundation by local runoff caused by heavier than usual rainfall. It can be caused by local runoff exceeding the capacity of an urban stormwater drainage systems, flow overland on the way to waterways or by the backwater effects of mainstream flooding causing urban stormwater drainage systems to overflow (see also local overland flooding).
Temporal pattern	The variation of rainfall intensity with time during a rainfall event.
Tidal anomaly	The difference between recorded storm surge levels and predicted astronomical tide level.
Treatment options	The measures that might be feasible for the treatment of existing, future and residual flood risk at particular locations within the floodplain. Preparation of a treatment plan requires a detailed evaluation of floodplain management options (see

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also floodplain management plan).	
Velocity of floodwater	The speed of floodwaters, measured in metres per second (m/s).
Vulnerability	The degree of susceptibility and resilience of a community, its social setting, and the natural and built environments to flood hazards. Vulnerability is assessed in terms of ability of the community and environment to anticipate, cope and recover from flood events. Flood awareness is an important indicator of vulnerability (see also flood awareness).
Wave set-up	The increase in water levels in coastal waters (within the breaker zone) caused by waves transporting water shorewards. The zone of wave set-up against the shore is balanced by a zone of wave 'set-down' (i.e. reduced water levels) seawards of the breaker zone. Wave setups of 2-4 m could occur during tropical cyclones.
Wind set-up	The increase in water levels in coastal waters caused by the wind driving the water shorewards and 'piling it up' against the shore. Wind set-up can be as high as 10 m in an extreme case, and often exceeds 2-3 m in typical tropical cyclones.



APPENDIX B
ARR DATA HUB

APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.arr-software.org/>

ATTENTION: This site was updated recently, changing some of the functionality. Please see the changelog (/changelog) for further information

Australian Rainfall & Runoff Data Hub - Results

Input Data

Longitude	149.457
Latitude	-32.303
Selected Regions (clear)	
River Region	show
ARR Parameters	show
Storm Losses	show
Temporal Patterns	show
Areal Temporal Patterns	show
BOM IFDs	show
Median Proburst Depths and Ratios	show
10% Proburst Depths	show
25% Proburst Depths	show
75% Proburst Depths	show
90% Proburst Depths	show
Interim Climate Change Factors	show
Probability Neutral Burst Initial Loss (nsw specific)	show
Baseflow Factors	show



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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

Results | ARR Data Hub

ITEM NO: FPM19/1

<http://data.arr-software.org/>

Data

River Region

Division	Murray-Darling Basin
River Number	22
River Name	Macquarie-Bogan Rivers
Shape Intersection (%)	100.0

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2016 v1

ARF Parameters

$$ARF = \min \left\{ 1, \left[1 - a \left(Area^b - c \log_{10} Duration \right) Duration^d + e Area^f Duration^g (0.3 + \log_{10} AEP) + h 10^{\left(\frac{Area \cdot Duration}{100} \right)} (0.3 + \log_{10} AEP) \right] \right\}$$

Zone	a	b	c	d	e	f	g	h	i	Shape Intersection (%)
Central NSW	0.265	0.241	0.505	0.321	0.00058	0.414	-0.921	0.015	-0.00033	100.0

Short Duration ARF

$$ARF = \min \left[1, 1 - 0.287 \left(Area^{0.205} - 0.436 \log_{10} (Duration) \right) \cdot Duration^{-0.38} + 2.26 \times 10^{-3} \times Area^{0.226} \cdot Duration^{0.125} (0.3 + \log_{10} AEP) + 0.0141 \times Area^{0.213} \times 10^{-\left(\frac{0.029 \cdot Duration \cdot AEP^2}{180} \right)} (0.3 + \log_{10} AEP) \right]$$

Layer Info

Time Accessed	20 May 2019 10:21AM
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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.arr-software.org/>

Version 2016_v1

Storm Losses

Note: Burst Loss = Storm Loss - Preburst

Note: These losses are only for rural use and are **NOT FOR DIRECT USE** in urban areas

Note: As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (/nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. The continuing storm loss information from the ARR Datahub provided below should only be used where relevant under the loss hierarchy (level 5) and where used is to be multiplied by the factor of 0.4.

Storm Initial Losses (mm)	39.0
Storm Continuing Losses (mm/h)	1.5

Layer Info

Time Accessed 20 May 2019 10:21AM

Version 2016_v1

Temporal Patterns | Download (.zip) (/static/temporal_patterns/TP/CS.zip)

code	CS
Label	Central Slopes
Shape Intersection (%)	100.0

Layer Info

Time Accessed 20 May 2019 10:21AM

Version 2016_v2

Areal Temporal Patterns | Download (.zip) (/static/temporal_patterns/Areal/Areal_CS.zip)

code	CS
arealabel	Central Slopes
Shape Intersection (%)	100.0

Layer Info

Time Accessed 20 May 2019 10:21AM

Version 2016_v2

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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.arr-software.org/>

BOM IFDs

Click here (http://www.bom.gov.au/water/designRainfalls/revised-ifs/?year=2016&coordinate_type=ddd&latitude=-32.3826713754&longitude=148.856953501&admin=true&sdm=true&day=true&user_label=-) to obtain the IFD depths for catchment centroid from the Bom website

Layer Info

Time Accessed 20 May 2019 10:21AM

Median Preburst Depths and Ratios

Values are of the format depth (ratio) with depth in mm

min (h)/AEP(%)	50	20	10	5	2	1
60 (1.0)	1.4 (0.061)	1.1 (0.035)	0.9 (0.024)	0.7 (0.016)	0.6 (0.011)	0.5 (0.005)
90 (1.5)	0.7 (0.025)	1.2 (0.034)	1.8 (0.037)	1.9 (0.039)	0.9 (0.016)	0.1 (0.002)
120 (2.0)	0.8 (0.026)	0.9 (0.024)	1.1 (0.023)	1.2 (0.023)	1.0 (0.016)	0.9 (0.013)
180 (3.0)	0.7 (0.022)	0.7 (0.016)	0.7 (0.014)	0.7 (0.012)	1.3 (0.016)	1.7 (0.021)
360 (6.0)	1.1 (0.023)	2.1 (0.040)	2.8 (0.045)	3.5 (0.049)	5.5 (0.065)	7.0 (0.075)
720 (12.0)	0.0 (0.000)	2.5 (0.038)	4.1 (0.054)	5.8 (0.065)	8.4 (0.082)	10.5 (0.091)
1080 (18.0)	0.0 (0.000)	0.7 (0.010)	1.2 (0.014)	1.7 (0.017)	4.7 (0.040)	7.0 (0.058)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	3.1 (0.024)	5.4 (0.037)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.8 (0.005)	0.8 (0.005)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed 20 May 2019 10:21AM

Version 2018_v1

Note Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.ams-software.org/>

10% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)/AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.ams-software.org/>

25% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Peburst interpolation methods for catchment wide peburst has been slightly altered. Point values remain unchanged.

APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

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Results | ARR Data Hub

<http://data.arr-software.org/>

75% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)AEP(%)	50	20	10	5	2	1
60 (1.0)	12.8 (0.541)	9.1 (0.288)	6.8 (0.183)	4.6 (0.108)	7.1 (0.139)	8.8 (0.168)
80 (1.5)	11.7 (0.444)	12.7 (0.386)	13.4 (0.318)	14.1 (0.289)	13.1 (0.229)	12.3 (0.183)
120 (2.0)	13.9 (0.488)	15.1 (0.388)	15.8 (0.345)	16.6 (0.314)	16.5 (0.267)	16.5 (0.239)
180 (3.0)	10.6 (0.330)	11.9 (0.274)	12.8 (0.249)	13.6 (0.231)	13.3 (0.265)	21.8 (0.284)
360 (5.0)	12.2 (0.311)	10.8 (0.376)	24.8 (0.389)	29.7 (0.415)	37.0 (0.452)	44.2 (0.472)
720 (12.0)	6.1 (0.128)	15.9 (0.247)	22.4 (0.295)	28.6 (0.326)	37.1 (0.360)	43.5 (0.376)
1080 (18.0)	3.5 (0.064)	10.4 (0.144)	15.0 (0.176)	19.4 (0.198)	27.4 (0.234)	33.3 (0.252)
1440 (24.0)	6.4 (0.007)	3.4 (0.043)	5.3 (0.058)	7.2 (0.067)	17.2 (0.135)	24.8 (0.171)
2160 (36.0)	0.0 (0.009)	2.8 (0.032)	4.8 (0.045)	6.3 (0.058)	10.2 (0.071)	13.1 (0.080)
2880 (48.0)	0.0 (0.008)	1.6 (0.017)	2.5 (0.024)	3.7 (0.028)	8.3 (0.058)	11.6 (0.068)
4320 (72.0)	0.0 (0.008)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	1.4 (0.006)	2.4 (0.012)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide prebust has been slightly altered. Point values remain unchanged.

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Results | ARR Data Hub

<http://data.arr-software.org/>

90% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)AEP(%)	50	20	10	5	2	1
60 (1.0)	34.3 (1.473)	27.8 (0.879)	23.5 (0.627)	18.3 (0.448)	26.9 (0.566)	36.1 (0.835)
90 (1.5)	27.5 (1.045)	40.5 (1.136)	49.3 (1.167)	57.6 (1.184)	48.5 (0.848)	41.7 (0.884)
120 (2.0)	30.0 (1.049)	39.1 (1.008)	45.1 (0.985)	50.9 (0.968)	57.9 (0.935)	63.1 (0.915)
180 (3.0)	42.9 (1.335)	40.5 (0.832)	39.0 (0.780)	37.5 (0.836)	43.9 (0.722)	59.1 (0.789)
360 (5.0)	24.3 (0.833)	40.9 (0.774)	51.6 (0.828)	61.8 (0.885)	71.8 (0.885)	79.2 (0.846)
720 (12.0)	22.0 (0.457)	43.5 (0.676)	57.9 (0.764)	71.6 (0.822)	73.9 (0.716)	75.6 (0.652)
1080 (18.0)	16.0 (0.296)	30.5 (0.423)	40.3 (0.473)	43.5 (0.505)	59.8 (0.512)	67.4 (0.511)
1440 (24.0)	5.3 (0.091)	13.9 (0.177)	19.5 (0.212)	25.0 (0.234)	51.6 (0.405)	71.6 (0.484)
2160 (36.0)	6.0 (0.093)	13.7 (0.157)	18.8 (0.192)	23.6 (0.198)	30.4 (0.253)	46.0 (0.200)
2880 (48.0)	3.4 (0.058)	10.9 (0.117)	15.9 (0.144)	20.7 (0.161)	36.5 (0.234)	48.3 (0.270)
4320 (72.0)	0.1 (0.001)	4.3 (0.043)	7.2 (0.058)	9.9 (0.088)	17.3 (0.160)	22.9 (0.115)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

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Results | ARR Data Hub

<http://data.arr-software.org/>

Interim Climate Change Factors

	RCP 4.5	RCP6	RCP 8.5
2030	0.972 (4.9%)	0.847 (4.2%)	1.052 (5.3%)
2040	1.225 (6.2%)	1.127 (5.7%)	1.495 (7.5%)
2050	1.452 (7.3%)	1.406 (7.1%)	1.971 (10.1%)
2060	1.653 (8.4%)	1.635 (8.6%)	2.480 (12.9%)
2070	1.827 (9.3%)	1.863 (10.1%)	3.023 (15.9%)
2080	1.974 (10.1%)	2.241 (11.5%)	3.599 (19.2%)
2090	2.095 (10.8%)	2.518 (13.1%)	4.208 (22.8%)

Layer Info

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Version	2019_v1
Note	ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.

Probability Neutral Burst Initial Loss

min (h) AEP(%)	50	20	10	5	2	1
60 (1.0)	23.4	18.3	16.6	16.9	17.1	16.1
90 (1.5)	26.4	19.9	18.9	18.3	18.6	18.7
120 (2.0)	28.7	19.9	18.3	18.9	18.7	18.2
180 (3.0)	32.2	19.7	17.5	17.9	18.9	18.1
360 (6.0)	32.7	20.7	17.1	16.6	19.5	18.8
720 (12.0)	34.3	23.2	18.8	17.5	18.8	19.1
1080 (18.0)	35.2	26.2	23.4	21.9	19.5	18.2
1440 (24.0)	39.3	30.7	29.3	28.7	23.9	19.0
2160 (36.0)	39.6	31.4	30.7	31.1	29.2	19.0
2880 (48.0)	40.5	33.0	32.5	33.2	30.3	19.8
4320 (72.0)	41.6	34.8	35.7	36.7	34.4	20.2

Layer Info

Time Accessed	20 May 2019 10:21AM
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Results | ARR Data Hub

<http://data.arr-software.org/>

Version 2018_v1

Note As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (*new_spacelln*) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probability neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

Baseflow Factors

Downstream	9653
Area (km2)	16172.463224
Catchment Number	9665
Volume Factor	0.201522
Peak Factor	0.034516
Shape Intersection (%)	88.3

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1

Download TXT (downloads/6e27428d-144b-4c49-a2b1-02e5618ede79.txt)

Download JSON (downloads/ee8d05d7-a824-4332-8222-ee31a783000.json)

Generating PDF... (downloads/4612122c-d028-48a4-adb6-7ee11b6c7267.pdf)

APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/revised-ifd/design-ver...>



Location

Label: Geurie Post Office (Gauge 65016)

Latitude: -32.3927 [Nearest grid cell: 32.3875 (S)]

Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

Very Frequent Design Rainfall Depth (mm)

Issued: 24 April 2019

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New AEP probability terminology](#)

Duration	Exceedance per Year (EY)							
	12EY	6EY	4EY	3EY	2EY	1EY	0.5EY*	0.2EY*
1 min	0.687	0.808	1.02	1.19	1.42	1.86	2.32	2.69
2 min	1.19	1.40	1.75	2.01	2.41	3.15	3.95	4.95
3 min	1.64	1.93	2.43	2.80	3.35	4.38	5.45	6.81
4 min	2.04	2.40	3.04	3.51	4.19	5.42	6.78	8.46
5 min	2.39	2.82	3.58	4.14	4.94	6.37	7.96	9.92
10 min	3.72	4.41	5.63	6.49	7.73	9.89	12.3	15.3
15 min	4.65	5.50	7.00	8.06	9.58	12.2	15.2	19.0
20 min	5.35	6.32	8.02	9.22	10.9	13.9	17.4	21.6
25 min	5.93	6.99	8.83	10.1	12.0	15.3	19.1	23.8
30 min	6.42	7.54	9.50	10.9	12.9	16.4	20.5	25.5
45 min	7.56	8.82	11.0	12.6	14.9	18.9	23.6	29.5
1 hour	8.42	9.78	12.1	13.9	16.3	20.7	25.9	32.3
1.5 hour	9.70	11.2	13.8	15.7	18.5	23.4	29.2	36.5
2 hour	10.7	12.3	15.1	17.1	20.1	25.4	31.7	39.6
3 hour	12.2	13.9	17.1	19.4	22.6	28.5	35.6	44.3
4.5 hour	13.8	15.8	19.3	21.8	25.5	32.0	39.9	49.5
6 hour	15.0	17.2	21.0	23.8	27.8	34.7	43.3	53.6
9 hour	16.9	19.4	23.7	26.9	31.4	39.1	48.7	60.0
12 hour	18.3	21.0	25.8	29.2	34.1	42.5	52.9	65.0
18 hour	20.3	23.4	28.8	32.7	38.3	47.8	59.3	72.8
24 hour	21.6	25.1	31.0	35.3	41.3	51.7	64.1	79.7
30 hour	22.7	26.3	32.7	37.2	43.6	54.9	67.9	83.5
36 hour	23.5	27.3	33.9	38.7	45.5	57.4	71.1	87.5
48 hour	24.6	28.7	35.8	40.9	46.3	61.4	76.0	93.9
72 hour	25.9	30.3	38.0	43.7	51.9	66.6	82.7	103
96 hour	26.5	31.1	39.3	45.3	54.1	70.0	87.1	109
120 hour	26.8	31.5	40.1	46.5	55.8	72.5	90.4	114

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Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfall/indexed-ifd/design-ver...>

144 hour	26.9	31.6	40.8	47.4	57.1	74.4	93.0	117
168 hour	27.0	31.7	41.3	48.2	58.2	75.9	95.1	121

Note:

The 0.5 EY design rainfall corresponds to the 2 year Average Recurrence Interval (ARI) IFD **not** the 50% AEP IFD.

* The 0.2 EY design rainfall corresponds to the 5 year Average Recurrence Interval (ARI) IFD **not** the 20% AEP IFD.

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Rainfall IFD Data System: Water Information: Bureau of Meteorology

<http://www.bom.gov.au/water/designRainfalls/revised-ifd/coordinates...>



Location

Label: Geurie Post Office (Gauge 65016)

Latitude: -32.3527 [Nearest grid cell: 32.3875 (S)]

Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

IFD Design Rainfall Depth (mm)

Issued: 24 April 2019

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New AEP probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	1.86	2.09	2.84	3.35	3.87	4.56	5.13
2 min	3.15	3.56	4.65	5.74	6.62	7.74	8.59
3 min	4.35	4.91	6.68	7.99	9.11	10.7	11.9
4 min	5.42	6.11	8.29	9.80	11.3	13.3	14.8
5 min	6.37	7.17	9.72	11.5	13.3	15.6	17.4
10 min	9.89	11.1	15.0	17.8	20.5	24.2	27.3
15 min	12.2	13.7	18.6	22.0	25.4	30.1	33.9
20 min	13.9	15.7	21.2	25.1	29.0	34.4	38.7
25 min	15.3	17.2	23.3	27.6	31.9	37.8	42.4
30 min	16.4	18.4	25.0	29.6	34.2	40.5	45.5
45 min	18.9	21.3	28.9	34.2	39.5	46.6	52.2
1 hour	20.7	23.3	31.7	37.5	43.3	51.0	57.0
1.5 hour	23.4	26.3	35.8	42.3	48.7	57.3	63.9
2 hour	25.4	28.6	38.8	45.8	52.8	61.9	69.0
3 hour	28.5	32.0	43.4	51.2	58.9	69.0	76.8
4.5 hour	32.0	35.9	48.5	57.1	65.6	77.0	85.8
6 hour	34.7	39.0	52.5	61.8	70.9	83.4	93.0
9 hour	39.1	43.8	58.8	69.2	79.4	93.6	105
12 hour	42.5	47.5	63.8	75.0	86.1	102	115
18 hour	47.8	53.4	71.4	84.0	96.6	115	130
24 hour	51.7	57.7	77.2	91.0	105	126	143
30 hour	54.9	61.2	81.9	96.5	112	134	153
36 hour	57.4	64.0	85.8	101	117	142	162
48 hour	61.4	68.5	92.0	109	127	154	176
72 hour	66.6	74.5	101	120	140	171	196
96 hour	70.0	78.5	107	128	150	182	209
120 hour	72.5	81.4	111	134	157	191	219

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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/reviced-ifd/coordinates...>

144 hour	74.4	83.8	115	138	162	197	225
168 hour	75.9	85.7	118	142	166	202	230

Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology

<http://www.bom.gov.au/water/designRainfall/revised-ifd/design-rar...>



Location

Label: Geurie Post Office (Gauge 65016)

Latitude: -32.3927 [Nearest grid cell: 32.3875 (S)]

Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

Rare Design Rainfall Depth (mm)

Issued: 24 April 2010

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New ABS probability terminology](#)

Duration	Annual Exceedance Probability (1 in x)				
	1 in 100	1 in 200	1 in 500	1 in 1000	1 in 2000
1 min	5.13	5.94	7.00	7.89	8.86
2 min	8.59	9.87	11.6	13.1	14.8
3 min	11.9	13.7	16.1	18.2	20.4
4 min	14.8	17.1	20.2	22.7	25.5
5 min	17.4	20.2	23.8	26.8	30.1
10 min	27.3	31.7	37.3	42.0	47.2
15 min	33.9	39.3	46.3	52.1	58.5
20 min	38.7	44.8	52.8	59.5	66.8
25 min	42.4	49.1	57.9	65.2	73.3
30 min	45.5	52.7	62.0	69.9	78.5
45 min	52.2	60.4	71.2	80.2	90.1
1 hour	57.0	65.9	77.7	87.5	98.4
1.5 hour	63.9	73.8	87.0	98.1	110
2 hour	69.0	79.8	94.0	106	119
3 hour	76.8	89.0	105	118	133
4.5 hour	85.8	99.5	117	132	148
6 hour	93.0	108	127	143	161
9 hour	105	122	144	162	182
12 hour	115	133	157	177	198
18 hour	130	151	178	201	225
24 hour	143	165	195	219	246
30 hour	153	176	208	234	264
36 hour	162	186	219	247	278
48 hour	176	201	237	268	302
72 hour	196	223	263	296	333
96 hour	209	237	280	315	354

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Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/revised-ifd/design-rar...>

120 hour	219	248	292	328	368
144 hour	225	256	301	338	378
168 hour	230	262	308	345	385

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APPENDIX C
DESIGN PARAMETER CALCULATIONS



The design parameter calculations for all event probabilities and durations are provided below.

C.1 Rainfall Losses

The rainfall burst initial losses calculated for the full range of event probabilities and durations are detailed in Table 9-1.

Table 9-1: All Event Probabilities and Durations - Design Rainfall Burst Initial Loss

Storm Duration (minutes)	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP
15 *	18.3	16.6	16.9	17.1	16.1
20 *	18.3	16.6	16.9	17.1	16.1
25 *	18.3	16.6	16.9	17.1	16.1
30 *	18.3	16.6	16.9	17.1	16.1
45 *	18.3	16.6	16.9	17.1	16.1
60	18.3	16.6	16.9	17.1	16.1
90	18.9	15.9	15.3	14.6	13.7
120	18.9	16.3	15.8	14.7	12.2
180	18.7	17.5	17.9	15.9	13.1
270 #	19.7	17.3	16.75	14.7	10.95
360	20.7	17.1	15.6	13.5	8.8
540 #	21.95	17.95	16.55	14.15	8.95
720	23.2	18.8	17.5	14.8	9.1
1440	30.7	29.3	28.7	23	15
2880	33	32.5	33.2	30.3	19.6
4320	34.8	35.7	36.7	34.4	28.2

Note:

* ARR 2019 does not provide probability neutral burst initial losses for durations less than the 60 minute storm duration. Therefore, the probability neutral burst initial losses for the 60 minute storm duration were applied to all shorter storm durations.

ARR 2019 does not provide probability neutral burst initial losses for the 270 and 540 minute storm duration. Therefore, the probability neutral burst initial losses were linearly interpolated from the values given for the two nearest storm durations.

C.2 Areal Reduction Factors

The Areal Reduction Factors (ARF) calculated for the full range of event probabilities and durations are detailed in Table 9-2.



Table 9-2: All Event Probabilities and Durations - Design Storm ARF

Duration	20% AEP	10% AEP	5% AEP	3% AEP	1% AEP	0.8% AEP	0.2% AEP
15 min	0.748	0.742	0.736	0.727	0.721	0.715	0.707
20 min	0.777	0.770	0.764	0.755	0.749	0.743	0.734
25 min	0.797	0.790	0.783	0.774	0.768	0.761	0.752
30 min	0.812	0.805	0.798	0.788	0.781	0.774	0.765
45 min	0.841	0.833	0.825	0.815	0.807	0.799	0.789
1 hour	0.858	0.849	0.840	0.829	0.820	0.812	0.800
1.5 hour	0.878	0.868	0.858	0.844	0.834	0.824	0.810
2 hour	0.890	0.878	0.867	0.852	0.840	0.829	0.813
3 hour	0.904	0.892	0.879	0.862	0.849	0.837	0.820
4.5 hour	0.921	0.910	0.900	0.885	0.875	0.864	0.850
6 hour	0.934	0.928	0.921	0.912	0.906	0.899	0.890
9 hour	0.948	0.945	0.941	0.936	0.932	0.929	0.924
12 hour	0.954	0.951	0.947	0.942	0.938	0.935	0.930
24 hour	0.969	0.964	0.959	0.953	0.947	0.942	0.936
30 hour	0.972	0.967	0.962	0.956	0.951	0.946	0.939
36 hour	0.974	0.969	0.964	0.958	0.953	0.948	0.941
48 hour	0.977	0.973	0.968	0.961	0.956	0.951	0.945
72 hour	0.981	0.976	0.972	0.965	0.961	0.956	0.950
96 hour	0.984	0.979	0.974	0.968	0.964	0.959	0.953
120 hour	0.985	0.981	0.976	0.970	0.966	0.961	0.956
144 hour	0.986	0.982	0.978	0.972	0.968	0.963	0.958
168 hour	0.987	0.983	0.979	0.974	0.969	0.965	0.960

C.3 Rainfall Spatial Patterns

The minimum and maximum range of the design rainfall spatial patterns calculated for the full range of event probabilities and durations are detailed in Table 9-3.

Table 9-3: All Event Probabilities and Durations - Design Rainfall Spatial Pattern Range

Event Probability	Event Duration (minutes)	Design Rainfall (mm) - Minimum	Design Rainfall (mm) - Maximum
20% AEP	15	13.84	13.98
20% AEP	20	15.39	16.55
20% AEP	25	18.41	18.65
20% AEP	30	20.13	20.37
20% AEP	45	24.04	24.38

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20% AEP	60	26.53	27.28
20% AEP	90	31.16	31.60
20% AEP	120	34.34	34.79
20% AEP	180	39.16	39.61
20% AEP	270	44.66	45.21
20% AEP	360	49.06	49.80
20% AEP	540	55.67	56.90
20% AEP	720	60.70	62.42
20% AEP	1440	74.64	77.36
20% AEP	2880	89.73	92.96
20% AEP	4320	99.11	102.05
20% AEP	5760	105.24	108.19
20% AEP	7200	109.36	113.30
10% AEP	15	16.17	16.39
10% AEP	20	19.18	19.49
10% AEP	25	21.57	21.89
10% AEP	30	23.58	23.98
10% AEP	45	28.15	28.65
10% AEP	60	31.50	32.01
10% AEP	90	36.36	36.96
10% AEP	120	40.04	40.57
10% AEP	180	45.47	46.10
10% AEP	270	51.88	52.70
10% AEP	360	57.24	58.26
10% AEP	540	65.18	66.69
10% AEP	720	71.11	73.11
10% AEP	1440	87.46	90.84
10% AEP	2880	106.01	109.90
10% AEP	4320	117.18	121.09
10% AEP	5760	124.33	129.22
10% AEP	7200	130.44	135.34
5% AEP	15	18.54	18.83
5% AEP	20	22.00	22.31
5% AEP	25	24.75	25.15
5% AEP	30	27.04	27.44
5% AEP	45	32.25	32.75

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5% AEP	60	35.97	36.65
5% AEP	90	41.42	42.10
5% AEP	120	45.41	46.11
5% AEP	180	51.50	52.29
5% AEP	270	58.92	59.82
5% AEP	360	65.22	66.41
5% AEP	540	74.52	76.31
5% AEP	720	81.35	83.81
5% AEP	1440	100.72	104.56
5% AEP	2880	121.93	127.73
5% AEP	4320	136.04	141.87
5% AEP	5760	145.18	151.03
5% AEP	7200	152.30	158.16
2% AEP	15	21.75	22.11
2% AEP	20	25.76	26.21
2% AEP	25	28.97	29.43
2% AEP	30	31.62	32.17
2% AEP	45	37.55	38.28
2% AEP	60	41.78	42.61
2% AEP	90	47.86	48.79
2% AEP	120	52.37	53.22
2% AEP	180	59.22	60.17
2% AEP	270	68.10	69.17
2% AEP	360	75.91	77.28
2% AEP	540	87.43	89.49
2% AEP	720	96.10	98.92
2% AEP	1440	119.07	123.83
2% AEP	2880	147.06	153.79
2% AEP	4320	164.13	170.89
2% AEP	5760	175.26	183.00
2% AEP	7200	184.37	191.17
1% AEP	15	24.24	24.67
1% AEP	20	28.69	29.21
1% AEP	25	32.25	32.86
1% AEP	30	35.17	35.79
1% AEP	45	41.63	42.43

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1% AEP	60	46.27	47.17
1% AEP	90	52.78	53.79
1% AEP	120	57.54	58.55
1% AEP	180	64.97	66.08
1% AEP	270	74.90	76.21
1% AEP	360	84.14	85.68
1% AEP	540	97.50	99.76
1% AEP	720	106.98	110.73
1% AEP	1440	134.54	140.23
1% AEP	2880	167.35	175.00
1% AEP	4320	187.34	195.02
1% AEP	5760	200.44	209.12
1% AEP	7200	210.57	218.30
0.5% AEP	15	27.68	28.39
0.5% AEP	20	32.75	33.64
0.5% AEP	25	36.76	37.75
0.5% AEP	30	40.04	41.12
0.5% AEP	45	47.37	48.73
0.5% AEP	60	52.52	53.98
0.5% AEP	90	59.80	61.45
0.5% AEP	120	65.21	66.86
0.5% AEP	180	73.70	75.46
0.5% AEP	270	85.49	87.30
0.5% AEP	360	97.10	98.90
0.5% AEP	540	113.30	116.09
0.5% AEP	720	124.32	127.12
0.5% AEP	1440	154.55	160.21
0.5% AEP	2880	190.28	197.89
0.5% AEP	4320	211.27	220.82
0.5% AEP	5760	226.34	235.93
0.5% AEP	7200	237.48	247.09
0.2% AEP	15	32.10	33.02
0.2% AEP	20	37.95	39.13
0.2% AEP	25	42.65	44.00
0.2% AEP	30	46.45	47.90
0.2% AEP	45	54.88	56.70

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0.2% AEP	60	60.75	62.75
0.2% AEP	90	69.03	71.30
0.2% AEP	120	75.07	77.43
0.2% AEP	180	84.43	86.89
0.2% AEP	270	98.65	101.20
0.2% AEP	360	112.18	115.74
0.2% AEP	540	132.11	135.80
0.2% AEP	720	145.06	149.70
0.2% AEP	1440	180.59	186.21
0.2% AEP	2880	222.99	232.44
0.2% AEP	4320	247.86	258.31
0.2% AEP	5760	264.92	275.41
0.2% AEP	7200	277.11	288.87

C.4 Critical Temporal Pattern and Storm Duration

C.4.1 Hydrology

Table 9-4: Design Storm Critical Duration and Pattern for Key Locations in the Hydrologic Model

Event Probability	Duration and Temporal Pattern (TP) with the peak discharge one higher than the average/median peak discharge				Critical Duration and Temporal Pattern
	Inflow GEU_301	Inflow GEU_401	Inflow GEU_501	Inflow GEU_601	
20% AEP	540 minute TP05	540 minute TP05	540 minute TP03	540 minute TP05	540 minute TP05
10% AEP	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07
5% AEP	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07
2% AEP	270 minute TP09	270 minute TP09	270 minute TP09	270 minute TP09	270 minute TP09
1% AEP	180 minute TP07	270 minute TP09	270 minute TP09	180 minute TP07	180 minute TP07 270 minute TP09
0.5% AEP	180 minute TP07	180 minute TP07	270 minute TP09	180 minute TP04	180 minute TP07
0.2% AEP	180 minute TP07	180 minute TP07	270 minute TP08	180 minute TP05	180 minute TP07

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C.4.1.1 20% AEP Event

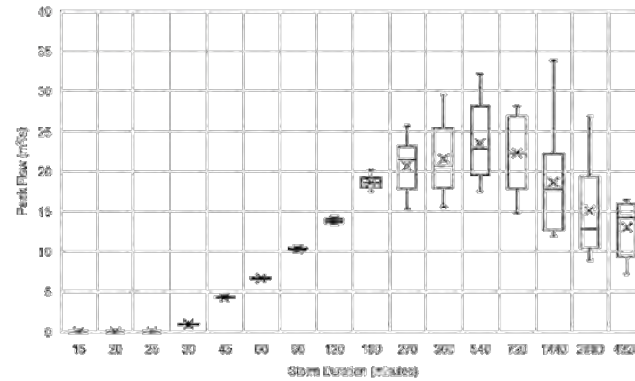


Chart 9-1: Box and Whisker Plot - 20% AEP Event - Inflow GEU_301

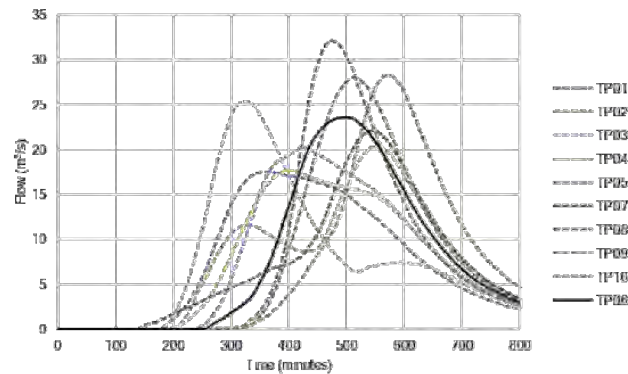


Chart 9-2: Hydrographs - 20% AEP 540 minute storm duration - Inflow GEU_301



C.4.1.2 5% AEP Event

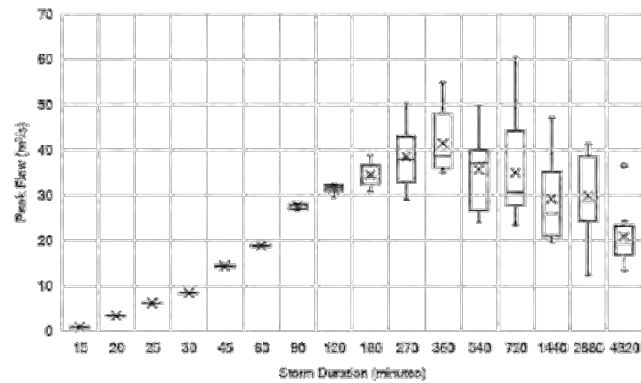


Chart 9-3: Box and Whisker Plot - 5% AEP Event - Inflow GEU_301

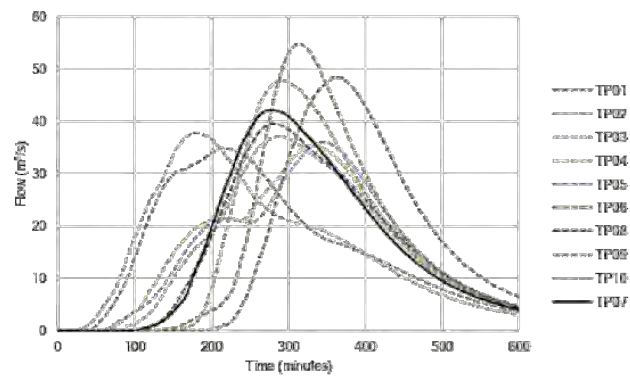


Chart 9-4: Hydrograph - 5% AEP 360 minute storm duration - Inflow GEU_301



C.4.1.3 1% AEP Event

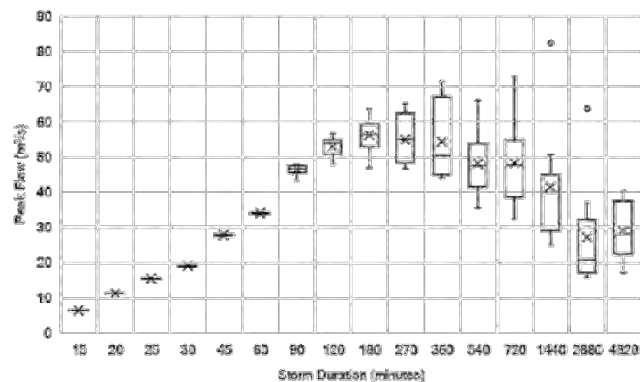


Chart 9-5: Box and Whisker Plot - 1% AEP Event - Inflow GEU_301

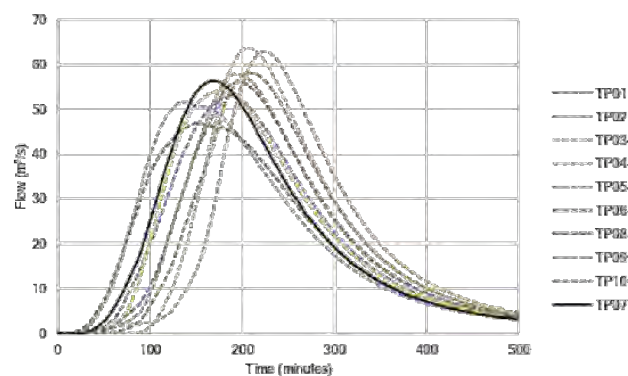


Chart 9-6: Hydrograph - 1% AEP 180 minute storm event - Inflow GEU_301

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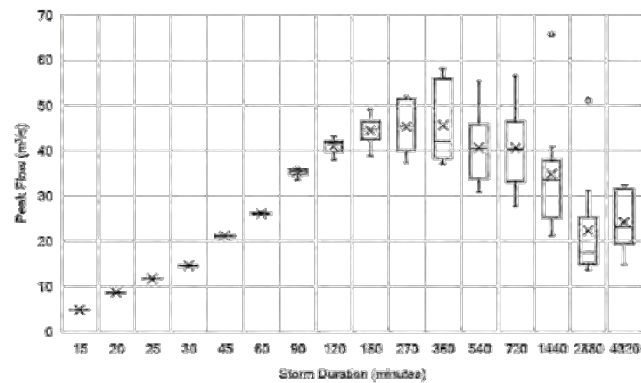


Chart 9-7: Box and Whisker Plot - 1% AEP Event - Inflow GEU 401

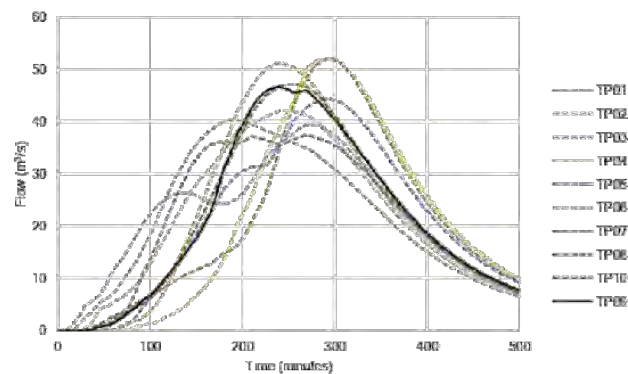


Chart 9-8: Hydrology - 1% AEP 270 minute storm event - Inflow GEU 401

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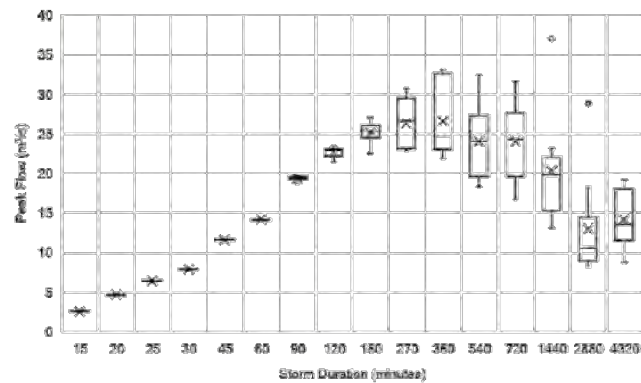


Chart 9-9: Box and Whisker Plot - 1% AEP Event - Inflow GEU_501

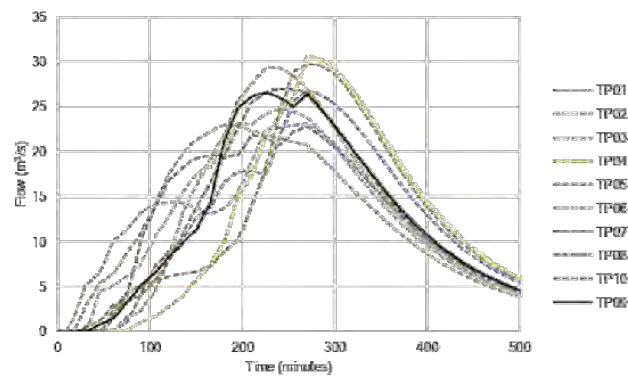


Chart 9-10: Hydrograph - 1% AEP 270 minute storm event - Inflow GEU_501

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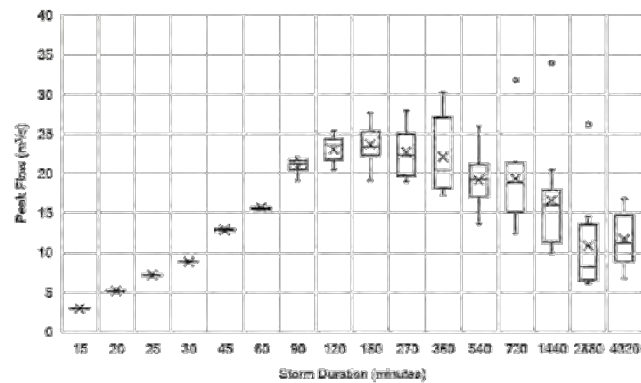


Chart 9-11: Box and Whisker Plot - 1% AEP Event - Inflow GEU_601

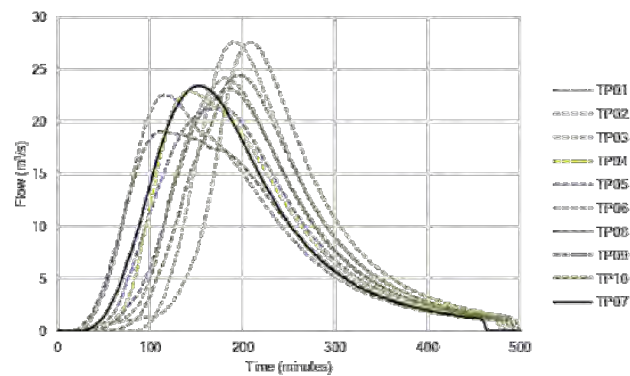


Chart 9-12: Hydrograph - 1% AEP 180 minute storm event - Inflow GEU_601



C.4.2 Hydraulics

Table 9-5: Design Storm Critical Duration and Pattern for Key Locations in the Hydraulic Model

Event Probability	Duration and Temporal Pattern (TP) with the peak flood level one higher than the average peak flood level				Critical Duration and Temporal Pattern
	H03	H16	H30	H33	
20% AEP	540 minute TP06	540 minute TP06	360 minute TP03	360 minute TP03	360 minute TP03 540 minute TP06
5% AEP	360 minute TP02	360 minute TP02	120 minute TP07	120 minute TP01	120 minute TP01 360 minute TP07
1% AEP	270 minute TP09	270 minute TP09	90 minute TP08	90 minute TP08	90 minute TP08 270 minute TP09

C.4.2.1 20% AEP Event

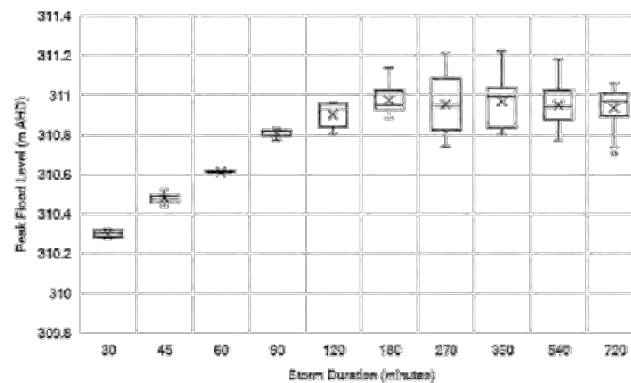


Chart 9-13: Box and Whisker Plot - 20% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)



C.4.2.2 5% AEP Event

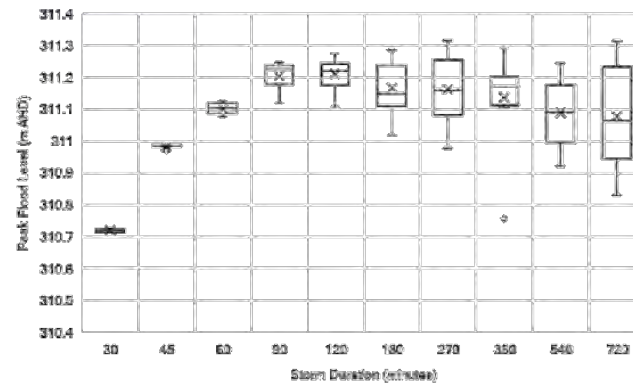


Chart 9-14: Box and Whisker Plot - 5% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)

C.4.2.3 1% AEP Event

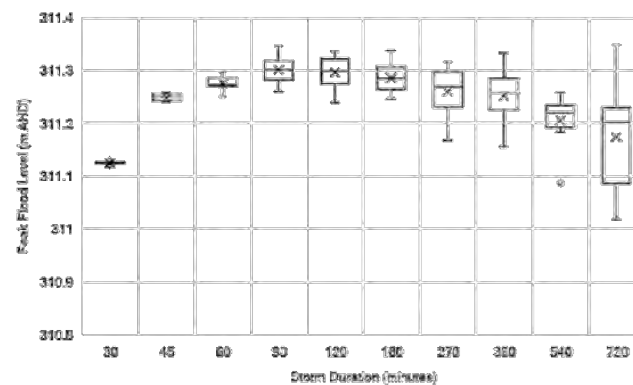


Chart 9-15: Box and Whisker Plot - 1% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)



APPENDIX D
DESIGN PARAMETER SENSITIVITY



D.1 Rainfall Temporal Patterns

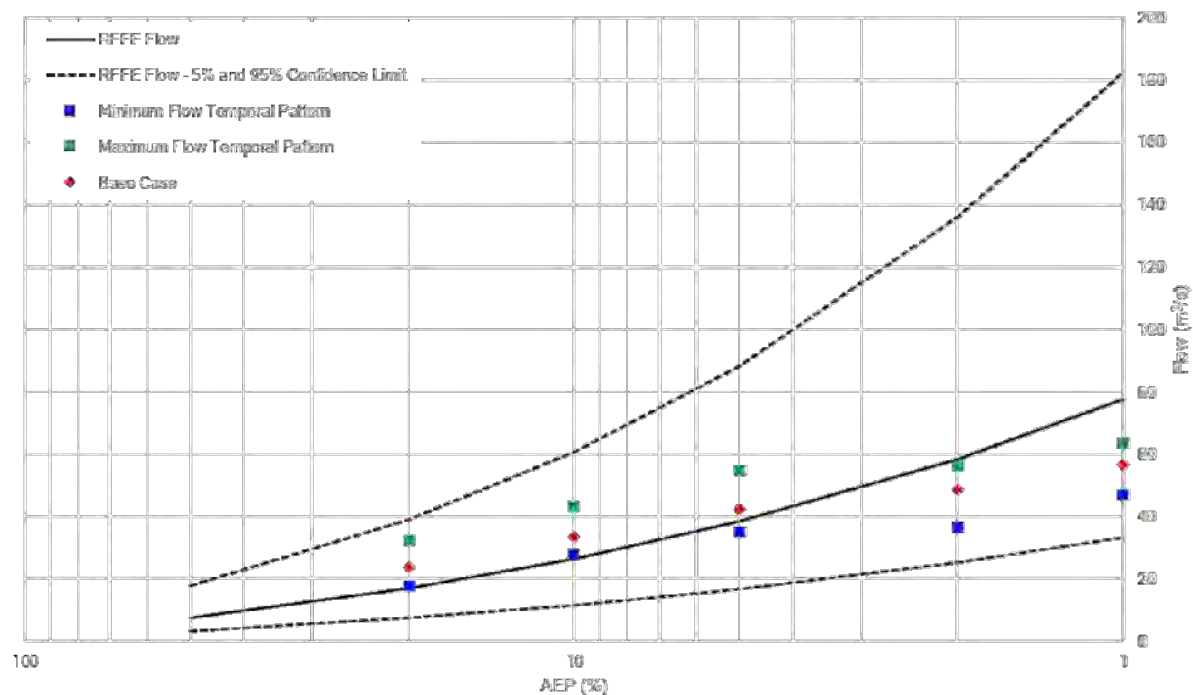


Chart 9-16: RFFE Comparison - Inflow GEU_301 - Temporal Patterns

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Table 9-6: Peak Flood Level Difference (m) - Minimum Flow Temporal Pattern

ID	Location	20% AEP	5% AEP	1% AEP
H01	Confluence of Geurie Ck and Boori Ck	-0.24	-0.14	-0.17
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.07	-0.05	-0.05
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.21	-0.22	-0.14
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.24	-0.22	-0.13
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.08	-0.06	-0.07
H06	Jennings St (south-east of Mitchell St)	-0.03	-0.01	-0.06
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.01	0.00	-0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.02	-0.01	0.02
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.13	-0.01	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	0.00	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	-0.02	0.00	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.16	-0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.04	-0.01	0.01
H14	Boori Ck (north of Railway Tracks)	-0.04	0.00	0.01

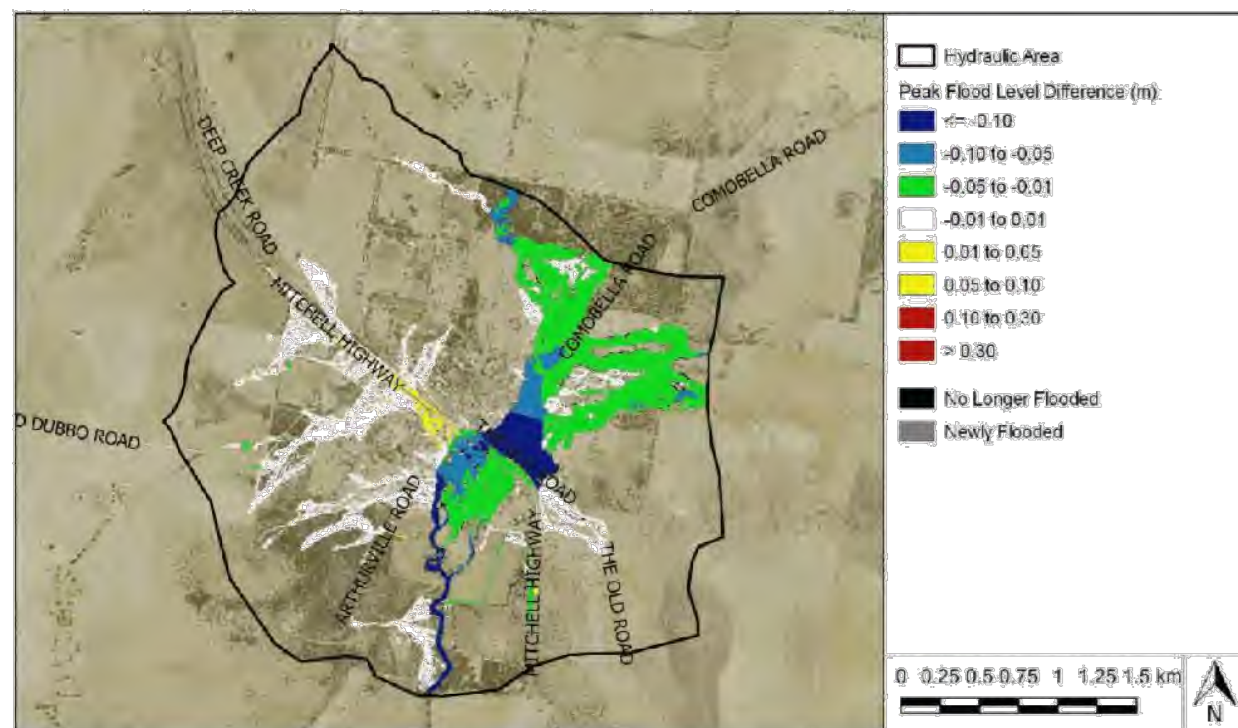


Image 9-1: 1% AEP Peak Flood Level Difference (m) - Minimum Flow Temporal Pattern

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Table 9-7: Peak Flood Level Difference (m) - Maximum Flow Temporal Pattern

ID	Location	20% AEP	5% AEP	1% AEP
H01	Confluence of Geurie Ck and Boori Ck	0.41	-1.35	0.24
H02	Geurie Ck - Upstream of Mitchell Hwy	0.18	-0.68	0.13
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.42	-1.20	0.25
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.50	-1.37	0.21
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.17	-0.37	0.11
H06	Jennings St (south-east of Mitchell St)	0.09	-0.11	0.11
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.09	-0.07	0.04
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.26	-0.22	0.03
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.38	-0.41	0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.16	-0.16	0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.06	-0.02	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.29	-0.27	0.05
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.11	-0.10	0.02
H14	Boori Ck (north of Railway Tracks)	0.16	-0.10	0.05

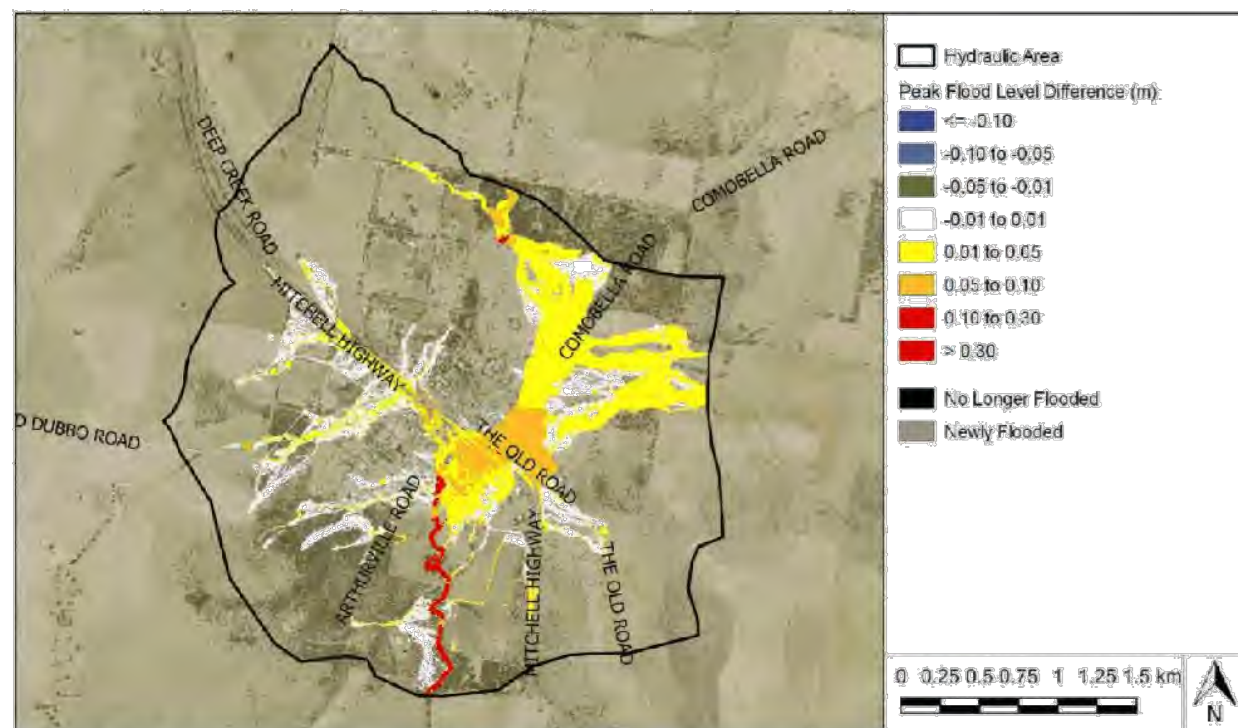


Image 9-2: 1% AEP Peak Flood Level Difference (m) - Maximum Flow Temporal Pattern

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D.2 Rainfall Losses

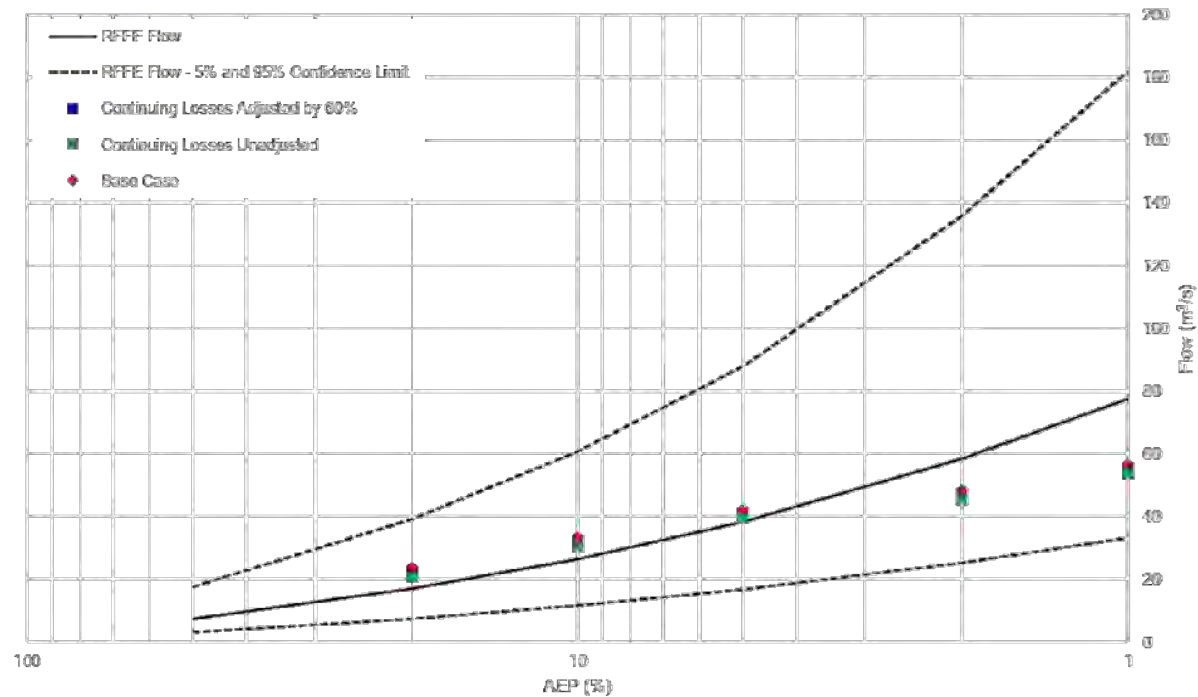


Chart 9-17: RFFE Comparison - Inflow GEU 301 - Continuing Losses

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Table 9-8: Peak Flood Level Difference (m) - Rainfall Continuing Losses Adjusted by 60%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.04	-0.01	-0.04	-0.02	-0.02	-0.03	-0.02	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.02	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	0.00
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.04	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	0.00
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.06	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	0.00
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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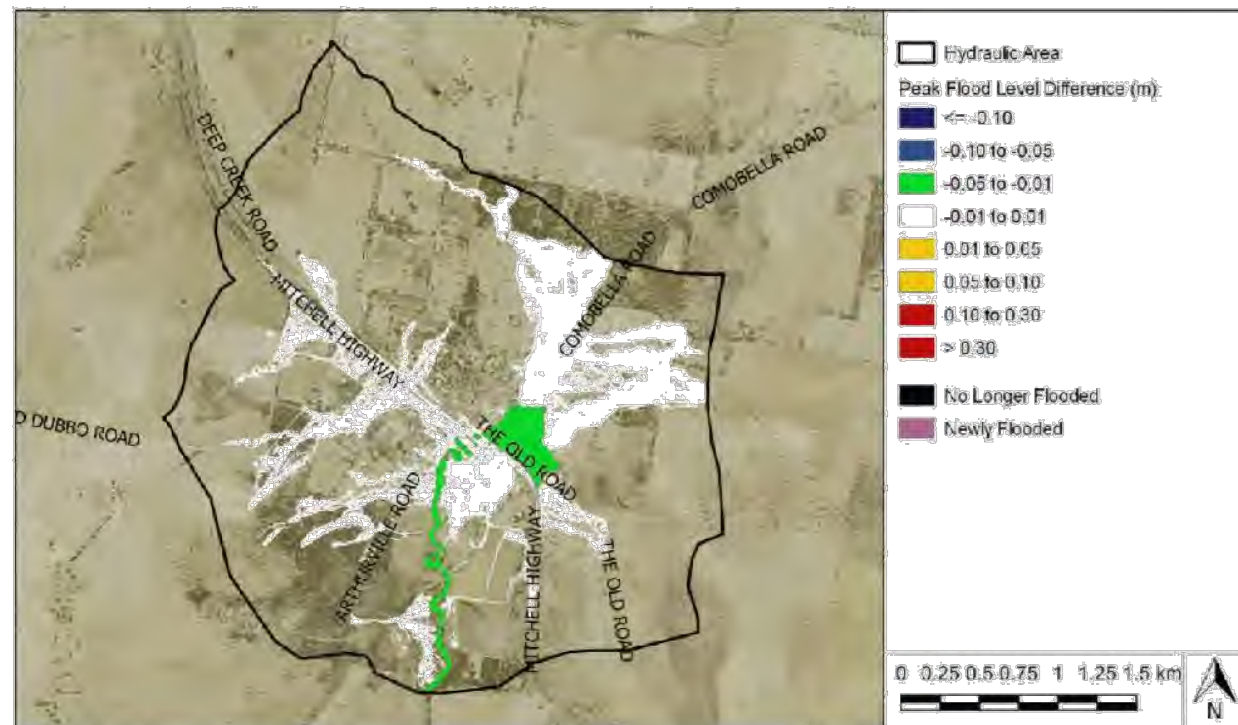


Image 9-3: 1% AEP Peak Flood Level Difference (m) – Rainfall Continuing Losses Adjusted by 60%

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Table 9-9: Peak Flood Level Difference (m) - Rainfall Continuing Losses Unadjusted

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.33	-0.08	-0.07	-0.07	-0.04	-0.07	-0.06	-0.01
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.15	-0.04	-0.03	-0.02	-0.01	-0.01	-0.02	0.00
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.36	-0.09	-0.10	-0.08	-0.05	-0.02	-0.02	-0.01
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.41	-0.10	-0.10	-0.08	-0.04	-0.02	-0.01	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.12	-0.03	-0.03	-0.03	-0.03	-0.02	-0.02	-0.01
H06	Jennings St (south-east of Mitchell St)	-0.01	-0.01	0.00	-0.01	-0.04	-0.02	-0.02	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.01	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.02	0.00	-0.01	-0.01	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.03	-0.02	-0.01	-0.01	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.02	0.00	-0.02	0.00	0.00	-0.01	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.00	0.00

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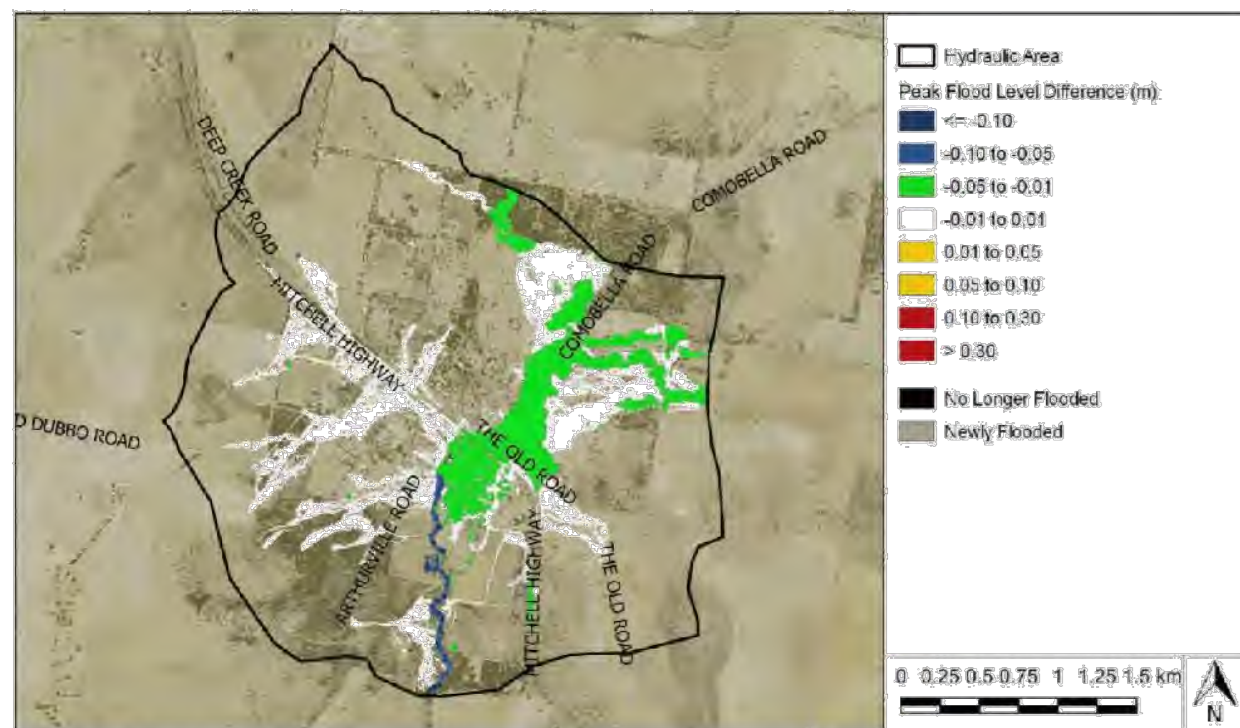


Image 9-4: 1% AEP Peak Flood Level Difference (m) - Rainfall Continuing Losses Unadjusted

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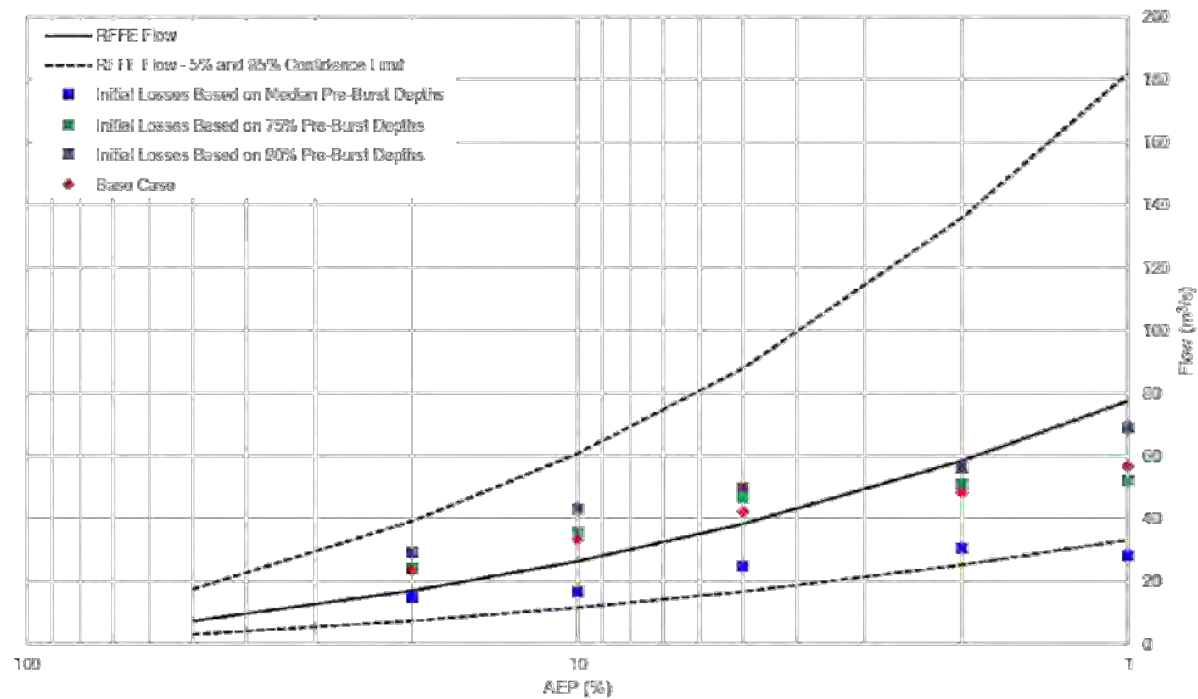


Chart 9-18: RFFE Comparison - Inflow GEU_301 - Initial Losses

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Table 9-10: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on Median Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.33	-0.51	-0.54	-0.58	-0.48	-0.74	-0.60	-0.10
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.15	-0.24	-0.22	-0.15	-0.12	-0.19	-0.19	-0.06
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.36	-0.54	-0.55	-0.52	-0.43	-0.51	-0.27	-0.07
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.41	-0.62	-0.60	-0.54	-0.41	-0.47	-0.23	-0.06
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.12	-0.20	-0.18	-0.17	-0.16	-0.23	-0.20	-0.08
H06	Jennings St (south-east of Mitchell St)	-0.06	-0.07	-0.07	-0.05	-0.10	-0.23	-0.23	-0.07
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.03	-0.08	-0.07	-0.03	-0.03	-0.09	-0.08	-0.05
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.04	-0.20	-0.29	-0.11	-0.04	-0.12	-0.09	-0.02
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.28	-0.30	-0.24	-0.06	-0.04	-0.08	-0.07	-0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.12	-0.15	-0.08	-0.06	-0.04	-0.13	-0.09	-0.03
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	-0.03	-0.04	-0.05	-0.01	-0.01	-0.04	-0.03	-0.03
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.27	-0.21	-0.16	-0.14	-0.05	-0.21	-0.10	-0.03
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.08	-0.08	-0.07	-0.03	-0.02	-0.08	-0.07	-0.02
H14	Boori Ck (north of Railway Tracks)	-0.10	-0.12	-0.11	-0.06	-0.05	-0.13	-0.11	-0.02

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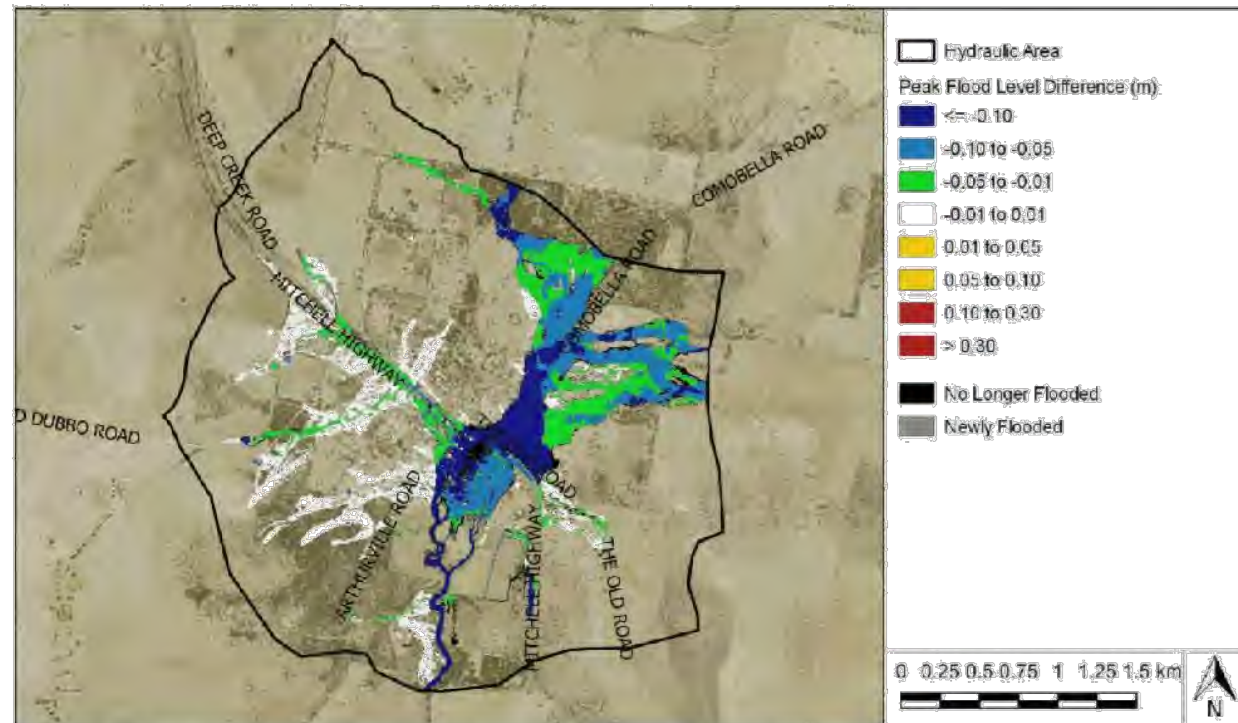


Image 9-5: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on Median Pre-Burst Depths

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Table 9-11: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 75% Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.02	0.15	0.17	0.07	0.05	-0.10	-0.09	-0.04
H02	Geurie Ck - Upstream of Mitchell Hwy	0.01	0.03	0.02	0.02	0.07	-0.01	-0.03	-0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.01	0.07	0.12	0.06	0.09	-0.03	-0.02	-0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.01	0.07	0.12	0.05	0.06	-0.03	-0.02	-0.03
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.03	0.04	0.02	0.02	-0.03	-0.03	-0.03
H06	Jennings St (south-east of Mitchell St)	0.01	-0.01	0.01	0.01	0.04	-0.03	-0.03	-0.03
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.01	-0.01	0.00	0.00	0.02	-0.01	-0.01	-0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.03	-0.03	-0.07	0.00	-0.01	-0.05	-0.03	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.04	-0.04	-0.02	0.00	-0.01	-0.03	-0.03	-0.02
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.01	-0.01	-0.01	0.00	-0.01	-0.05	-0.03	-0.02
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.01	0.00	-0.01	0.00	0.00	-0.02	-0.01	-0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.02	-0.01	-0.03	0.00	0.00	-0.05	-0.04	-0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.01	-0.01	-0.01	0.00	-0.01	-0.04	-0.03	-0.01
H14	Boori Ck (north of Railway Tracks)	0.02	-0.02	-0.01	0.00	-0.01	-0.05	-0.06	-0.02

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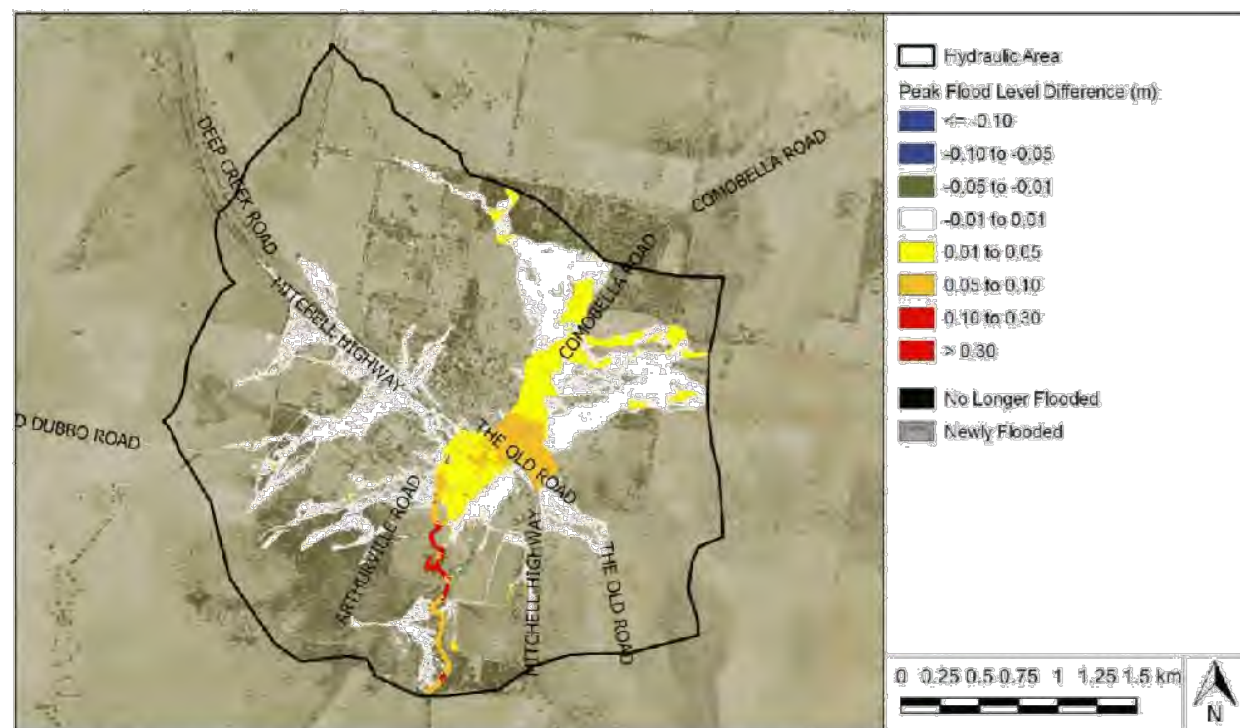


Image 9-6: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 75% Pre-Burst Depths

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Table 9-12: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 90% Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.45	0.42	0.32	0.20	0.27	0.27	0.23	0.04
H02	Geurie Ck - Upstream of Mitchell Hwy	0.19	0.09	0.05	0.05	0.08	0.08	0.09	0.03
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.41	0.35	0.20	0.15	0.15	0.08	0.07	0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.47	0.35	0.20	0.14	0.12	0.08	0.06	0.03
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.16	0.10	0.08	0.07	0.08	0.08	0.07	0.03
H06	Jennings St (south-east of Mitchell St)	0.06	0.06	0.07	0.09	0.11	0.09	0.08	0.03
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.06	0.04	0.03	0.03	0.04	0.02	0.02	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.21	0.16	0.05	0.04	0.04	0.02	0.01	0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.18	0.12	0.05	0.03	0.02	0.02	0.02	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.06	0.07	0.06	0.04	0.03	0.03	0.02	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.02	0.03	0.02	0.01	0.01	0.00	0.00	0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.07	0.20	0.15	0.05	0.03	0.04	0.03	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.05	0.05	0.04	0.03	0.02	0.02	0.01	0.01
H14	Boori Ck (north of Railway Tracks)	0.09	0.08	0.06	0.05	0.04	0.04	0.02	0.00

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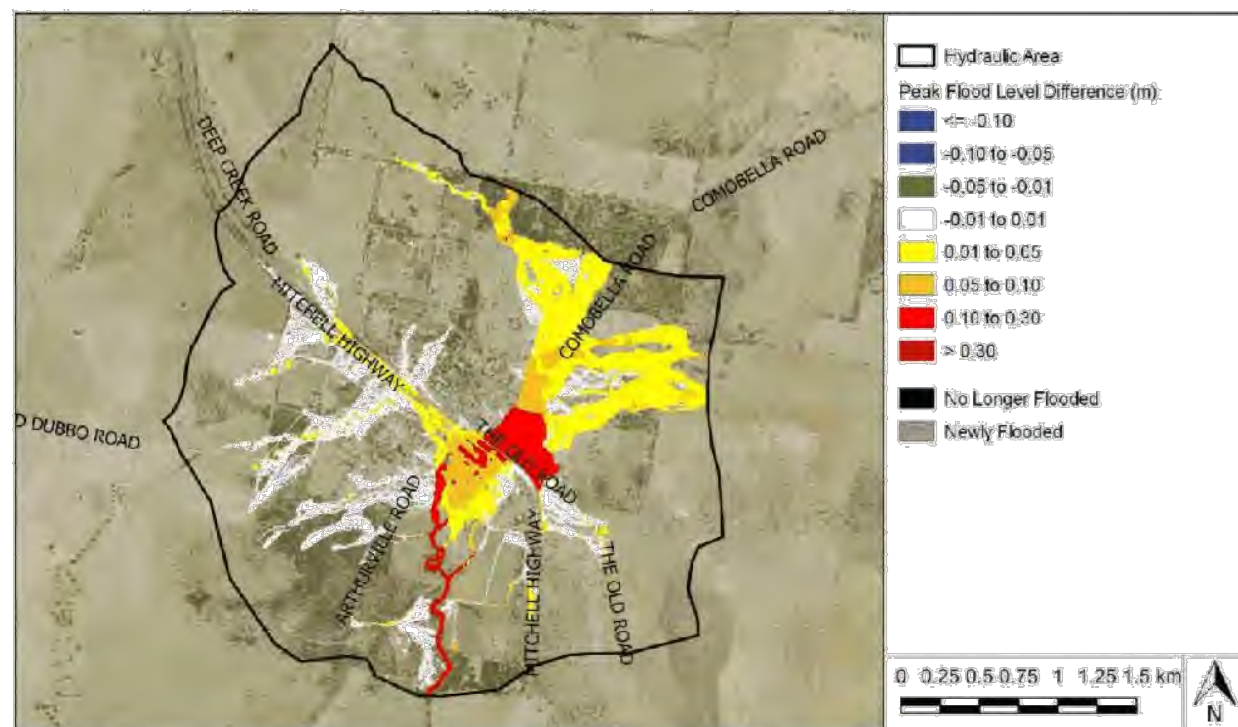


Image 9-7: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 90% Pre-Burst Depths

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D.3 Hydrologic Lag and Routing

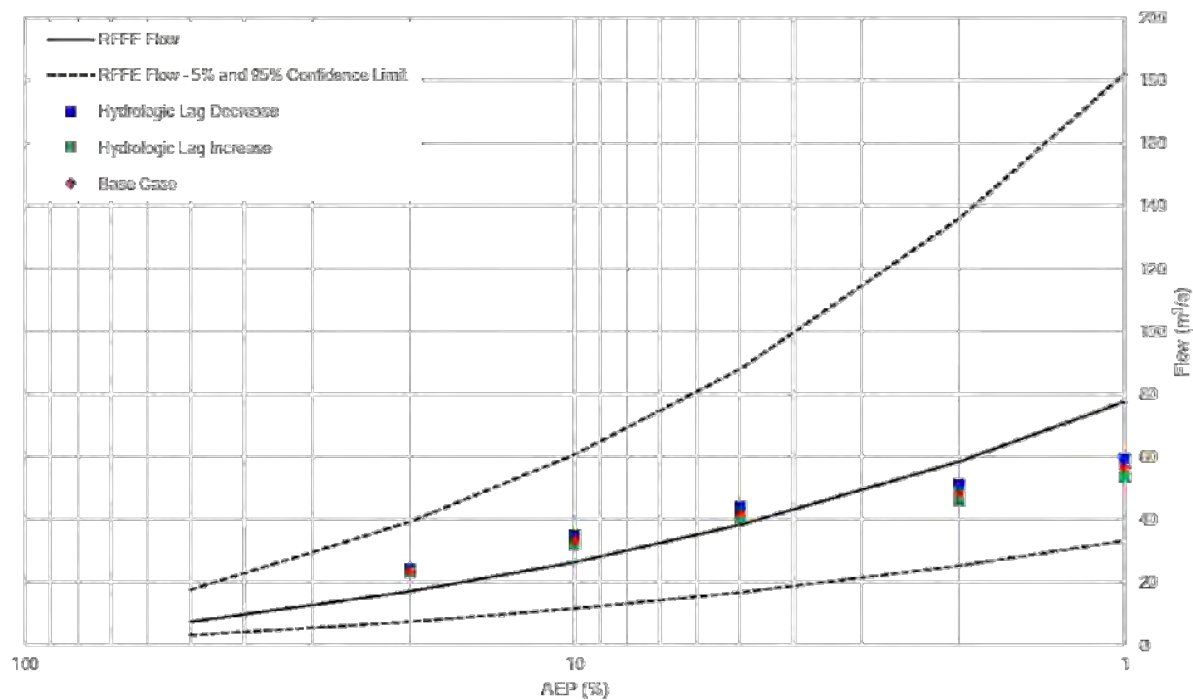


Chart 9-19: RFFE Comparison - Inflow GEU 301 - Hydrologic Lag

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Table 9-13: Peak Flood Level Difference (m) - Hydrologic Lag Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.02	0.12	0.11	0.09	0.04	0.09	-0.15	0.07
H02	Geurie Ck - Upstream of Mitchell Hwy	0.01	0.02	0.00	0.02	0.07	0.02	-0.04	0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.02	0.05	0.05	0.05	0.08	0.02	-0.03	0.05
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.03	0.05	0.05	0.05	0.06	0.02	-0.03	0.04
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.01	0.02	0.02	0.02	0.02	0.02	-0.04	0.05
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	0.02	0.03	0.02	-0.05	0.05
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.01	0.01	-0.01	0.04
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.02	0.02	0.00	0.00	0.01	0.01	0.00	0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.01	0.00	0.07	0.00	0.01	0.01	0.00	0.01
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
H14	Boori Ck (north of Railway Tracks)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00

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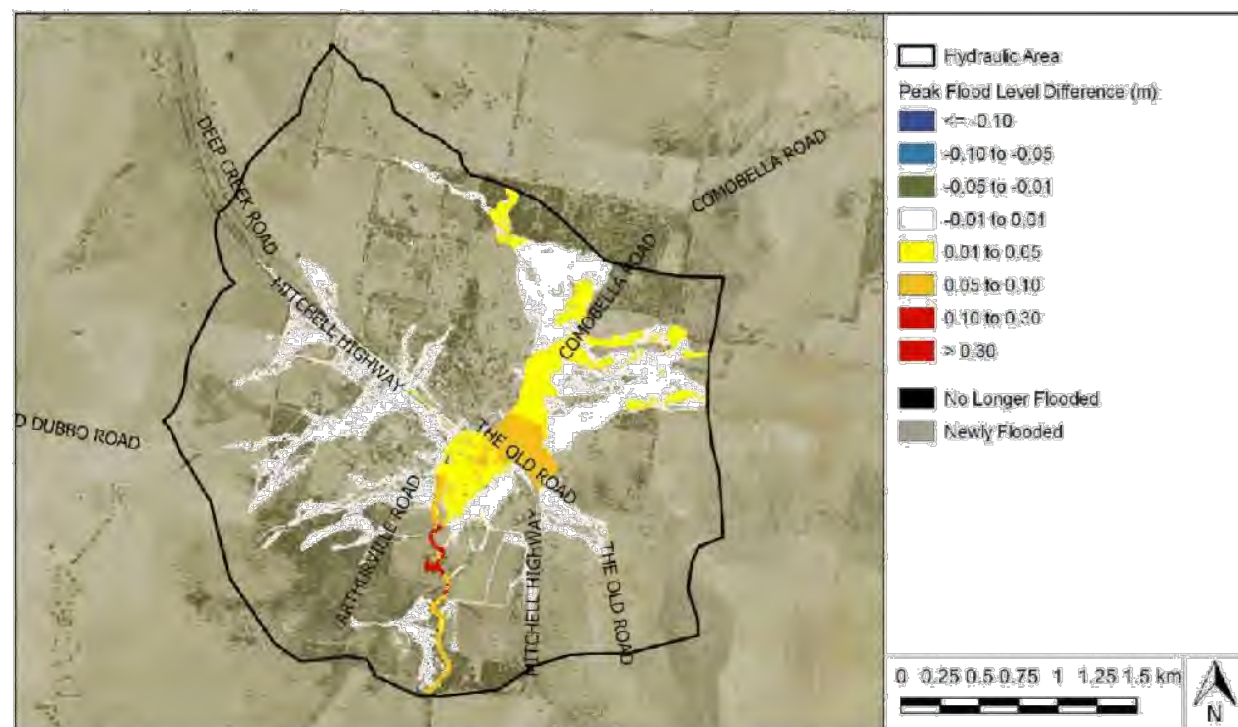


Image 9-8: 1% AEP Peak Flood Level Difference (m) - Hydrologic Lag Decrease

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Table 9-14: Peak Flood Level Difference (m) - Hydrologic Lag Increase

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.02	-0.03	-0.05	-0.04	-0.04	-0.08	-0.07	-0.06
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.03	-0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.03	-0.05	-0.06	-0.04	-0.04	-0.03	-0.02	-0.05
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.04	-0.05	-0.06	-0.04	-0.03	-0.02	-0.02	-0.04
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.05
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	-0.01	-0.03	-0.02	-0.03	-0.05
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.03
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	0.00	-0.01	-0.01	0.00	0.00	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.01	-0.01	-0.01	0.00	0.00	0.00	-0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	-0.02	0.00	0.00	-0.01	-0.01	-0.01
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.01	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01

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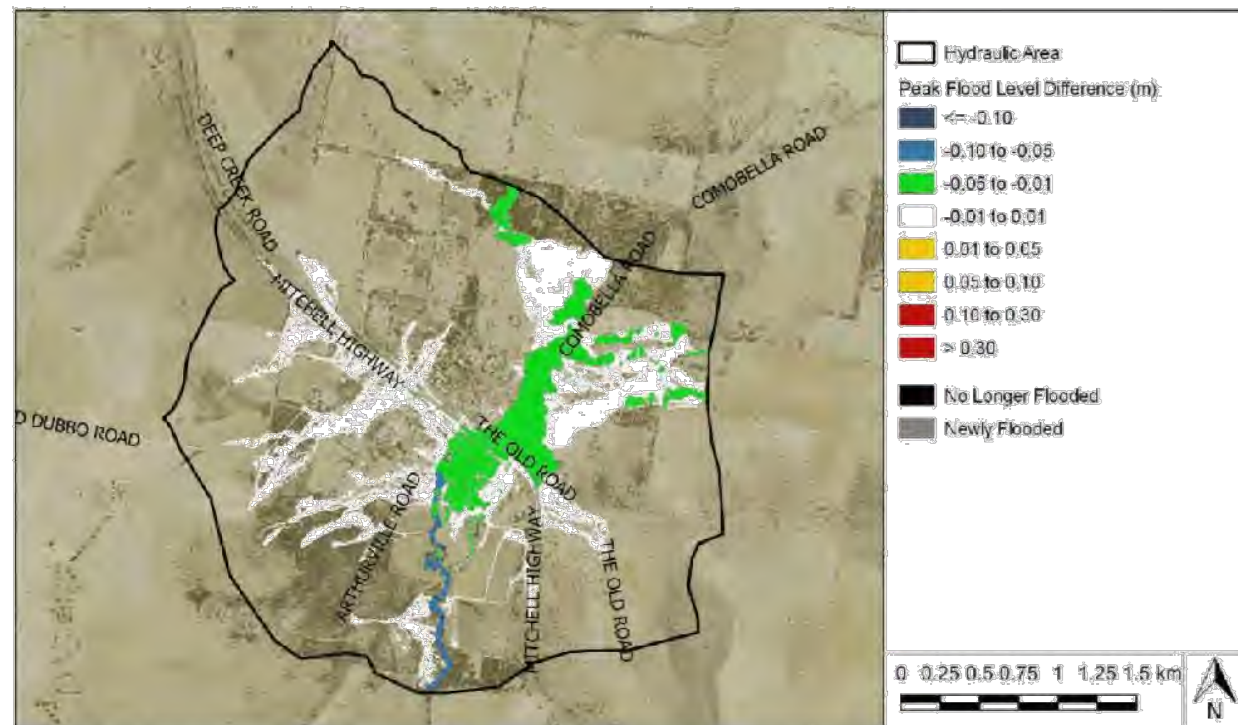


Image 9-9: 1% AEP Peak Flood Level Difference (m) - Hydrologic Lag Increase

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Table 9-15: Peak Flood Level Difference (m) - Hydrologic Routing Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.09	0.29	0.29	0.26	0.33	0.30	0.35	0.31
H02	Geurie Ck - Upstream of Mitchell Hwy	0.07	0.07	0.04	0.13	0.10	0.09	0.14	0.19
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.11	0.25	0.18	0.25	0.18	0.09	0.10	0.23
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.14	0.25	0.18	0.21	0.14	0.09	0.09	0.21
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.05	0.07	0.07	0.11	0.11	0.10	0.11	0.28
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.06	0.13	0.13	0.10	0.13	0.24
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.02	0.04	0.04	0.03	0.03	0.23
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

18020 Geurie FS Stage3 H05.docx

D23

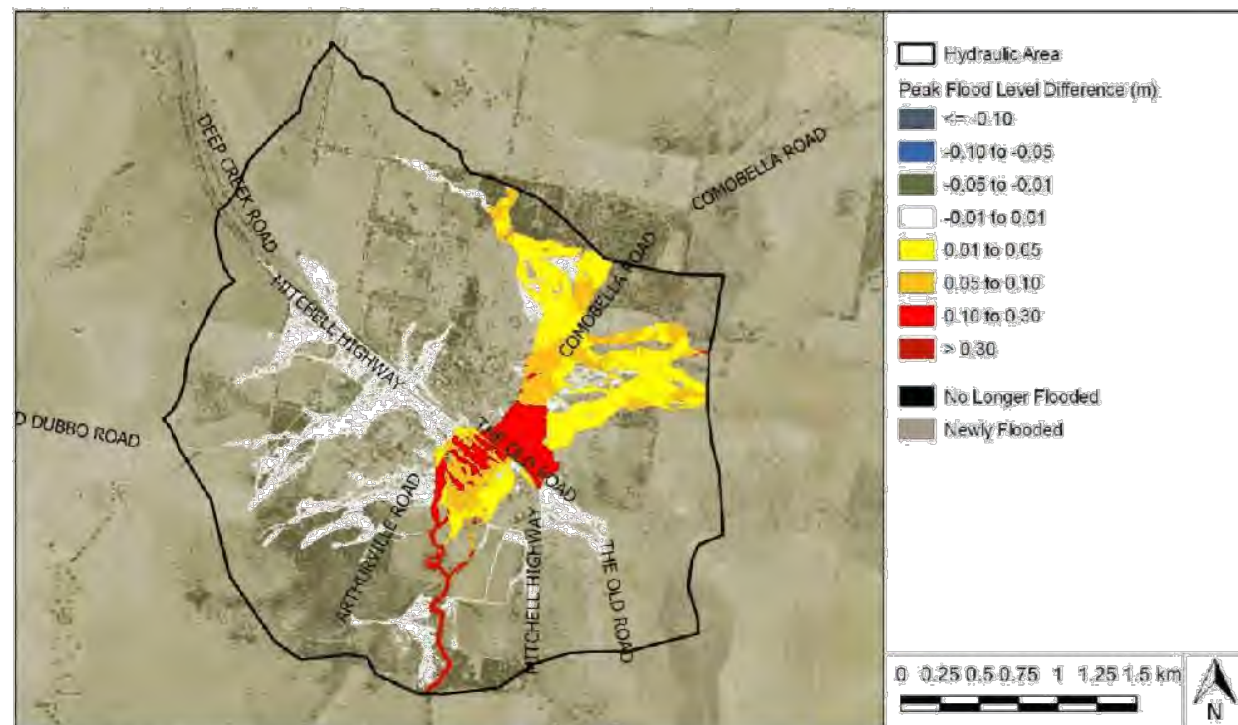


Image 9-10: 1% AEP Peak Flood Level Difference (m) - Hydrologic Routing Decrease

18020 Geurie FS Stage3 R03.docx

024



D.4 Hydraulic Roughness

Table 9-16: Peak Flood Level Difference (m) - Hydraulic Roughness Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.03	0.14	0.11	0.09	0.11	0.08	-0.01	-0.18
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.01	-0.04	-0.03	-0.04	-0.03	-0.01	-0.03	-0.03
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.01	-0.03	-0.03	-0.02	-0.02	-0.01	-0.01	0.02
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.04	-0.03	-0.03	-0.02	-0.01	-0.01	0.00	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.05	-0.06	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08
H06	Jennings St (south-east of Mitchell St)	-0.01	-0.02	-0.01	-0.01	-0.03	-0.03	-0.04	-0.14
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.02	0.01	0.00	0.00	-0.01	-0.01	-0.01	-0.05
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.02	-0.02	-0.02	-0.03	-0.03	-0.02	-0.02	-0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.03
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	-0.01	0.07	0.02	0.00	0.00	0.00	-0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	-0.02	-0.01	-0.05

18020 Geurie FS Stage3 R03.docx

025

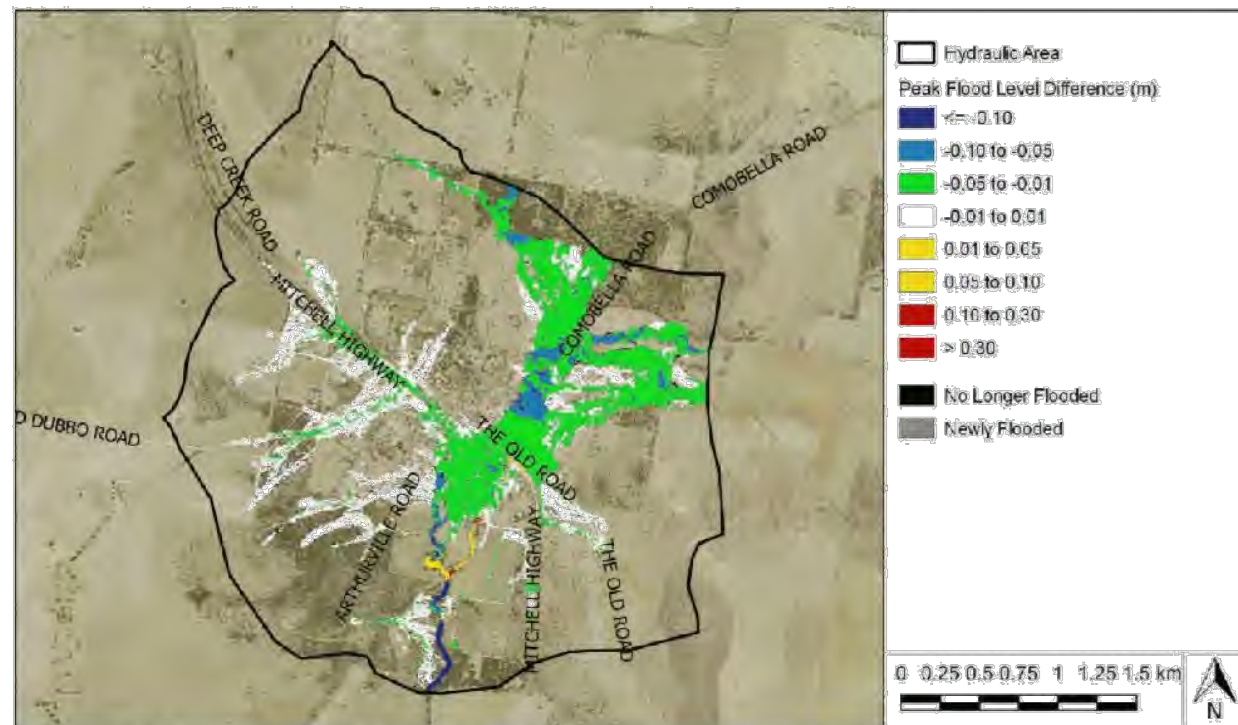


Image 9-11: 1% AEP Peak Flood Level Difference (m) - Hydraulic Roughness Decrease

10020 Geurie FS Stage3 R00.docx

025



Table 9-17: Peak Flood Level Difference (m) - Hydraulic Roughness Increase

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.00	0.04	0.07	0.01	0.07	0.12	0.19	0.17
H02	Geurie Ck - Upstream of Mitchell Hwy	0.03	0.02	0.02	0.03	0.08	0.02	0.03	0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.02	0.03	0.02	0.02	0.06	0.01	0.01	0.00
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.04	0.03	0.02	0.02	0.03	0.01	0.01	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.05	0.06	0.06	0.06	0.06	0.05	0.06	0.10
H06	Jennings St (south-east of Mitchell St)	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.12
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.02	0.02	0.00	0.01	0.00	0.00	-0.01	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.02	-0.01	0.00	0.00	0.01	0.01	0.05
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02
H14	Boori Ck (north of Railway Tracks)	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.06

18020 Geurie FS Stage3 H03.docx

D27

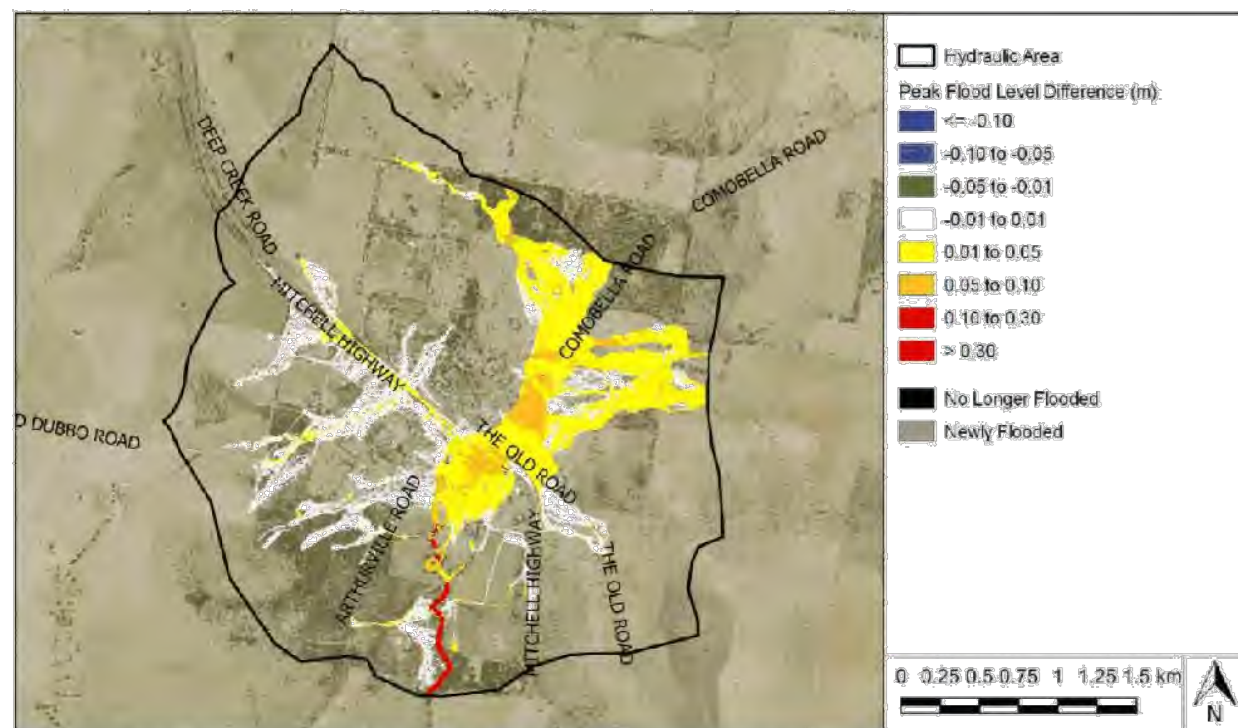


Image 9-12: 1% AEP Peak Flood Level Difference (m) - Hydraulic Roughness Increase

10020 Geurie FS Stage3 R00.docx

0.25



D.5 Blockage of Hydraulic Structures

Table 9-18: Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 25%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	0.11	0.11	0.09	0.08	0.13	0.08	0.10	0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.10	0.21	0.20	0.15	0.13	0.04	0.04	0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.13	0.20	0.17	0.13	0.10	0.04	0.03	0.02
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H06	Jennings St (south-east of Mitchell St)	0.00	-0.01	0.02	0.04	0.06	0.02	0.02	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.01	0.03	0.01	0.01	0.01	0.01	0.00	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.06	-0.12	-0.14	-0.14	-0.09	-0.09	-0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.03	0.04	0.04	0.04	0.04	0.03	0.02	0.02

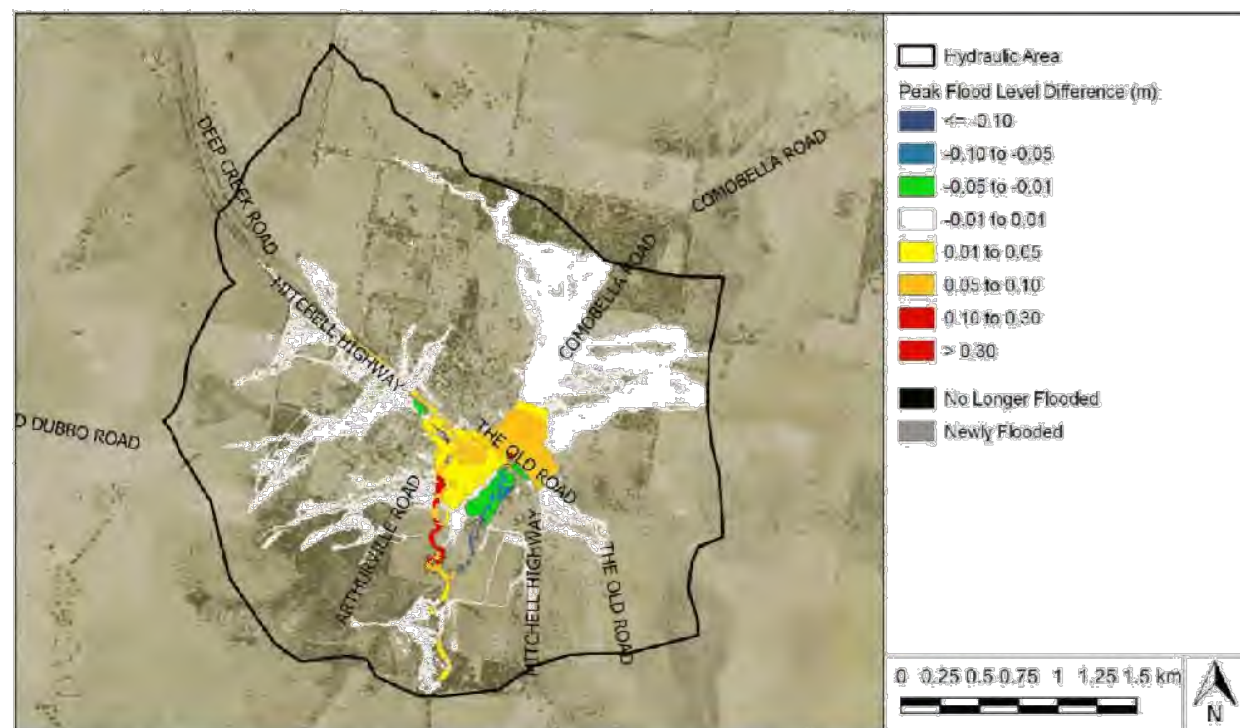


Image 9-13: 1% AEP Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 25%

18020 Geurie FS Stage3 R08.docx

030



Table 9-19: Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 50%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.01	0.09	0.03	0.01	0.02	0.01	0.01	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	0.32	0.24	0.25	0.26	0.27	0.23	0.23	0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.48	0.56	0.39	0.31	0.22	0.12	0.11	0.09
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.51	0.52	0.33	0.25	0.18	0.11	0.09	0.07
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H06	Jennings St (south-east of Mitchell St)	-0.01	0.04	0.12	0.12	0.11	0.06	0.06	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.05	0.04	0.05	0.05	0.06	0.03	0.02	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.13	0.13	0.03	0.02	0.02	0.02	0.01	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.11	-0.22	-0.29	-0.31	-0.33	-0.28	-0.18	-0.06
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.01	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.15	0.12	0.06	0.03	0.03	0.03	0.04
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00
H14	Boori Ck (north of Railway Tracks)	0.08	0.10	0.09	0.10	0.10	0.08	0.08	0.05

18020 Geurie FS Stage3 R03.docx

031

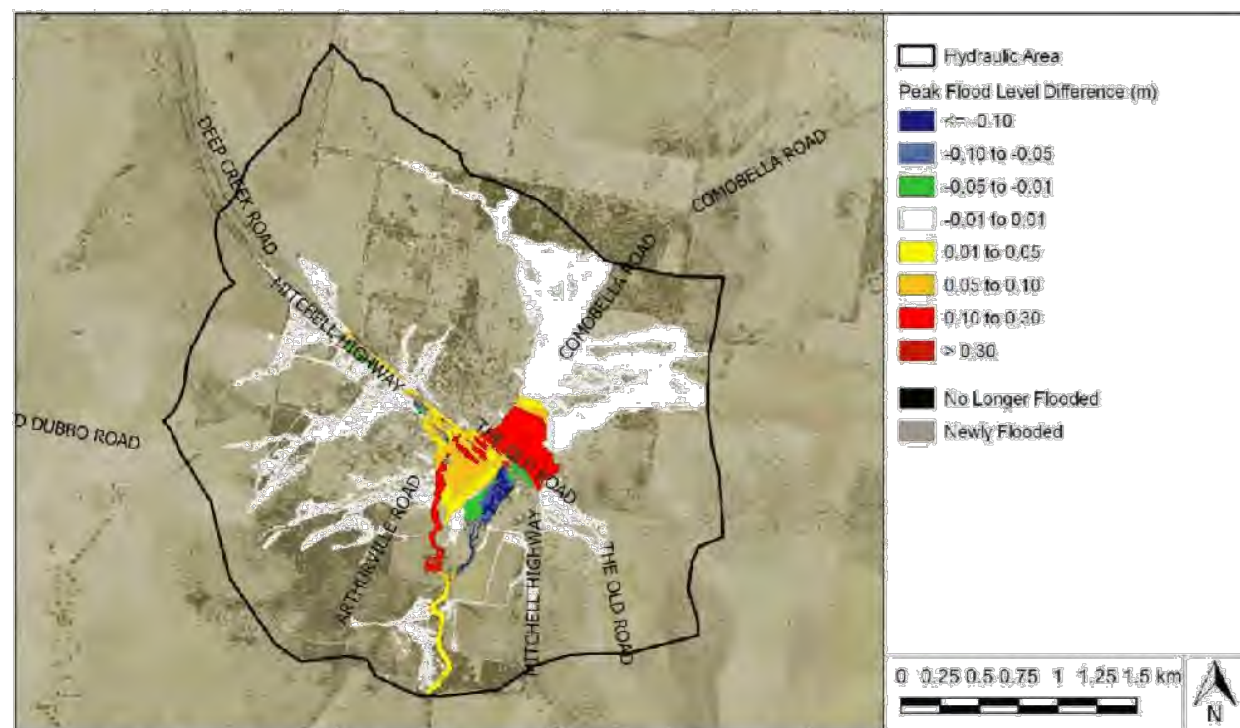


Image 9-14: 1% AEP Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 50%

18020 Geurie FS Stage3 R08.docx

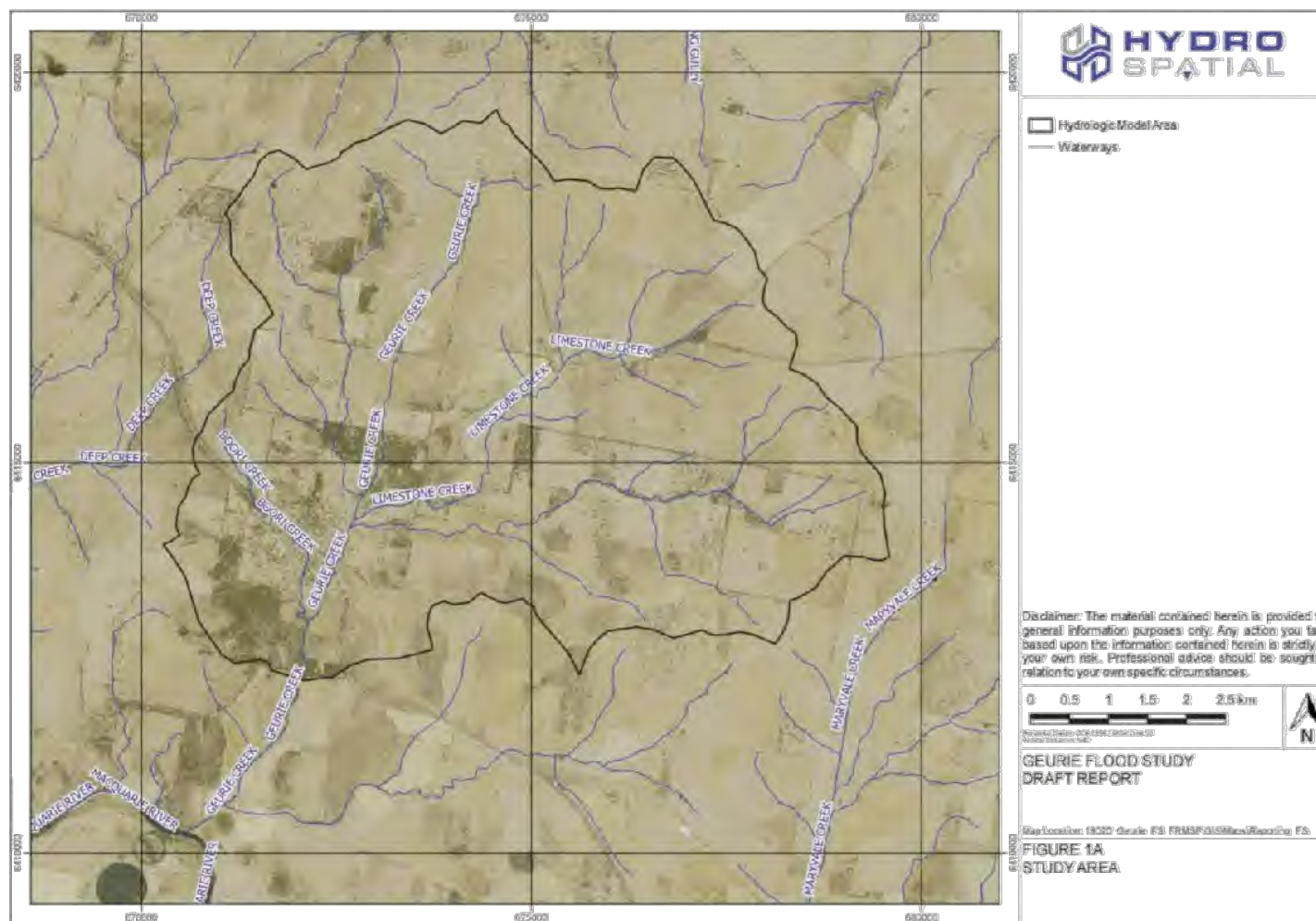
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FIGURES

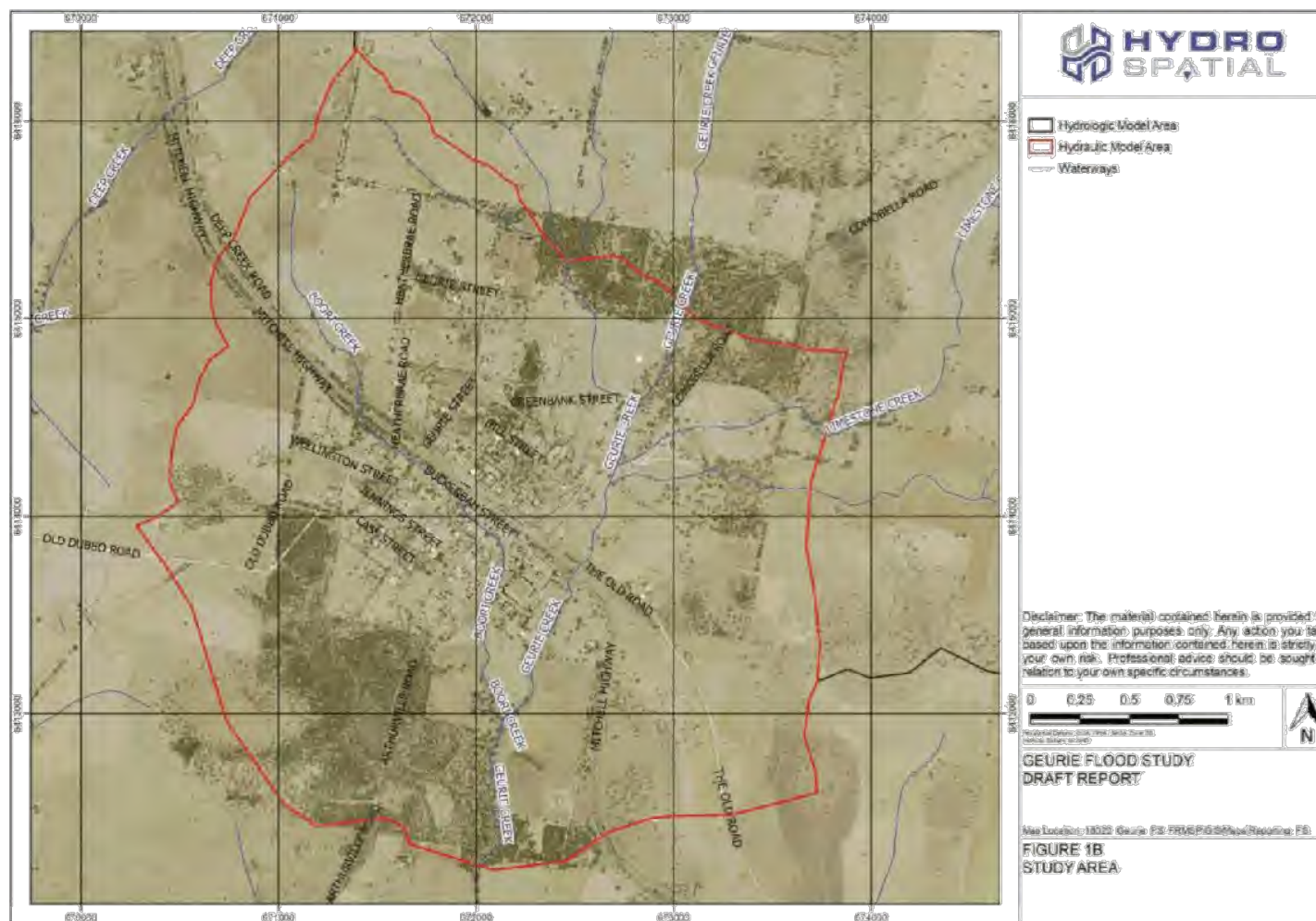
APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

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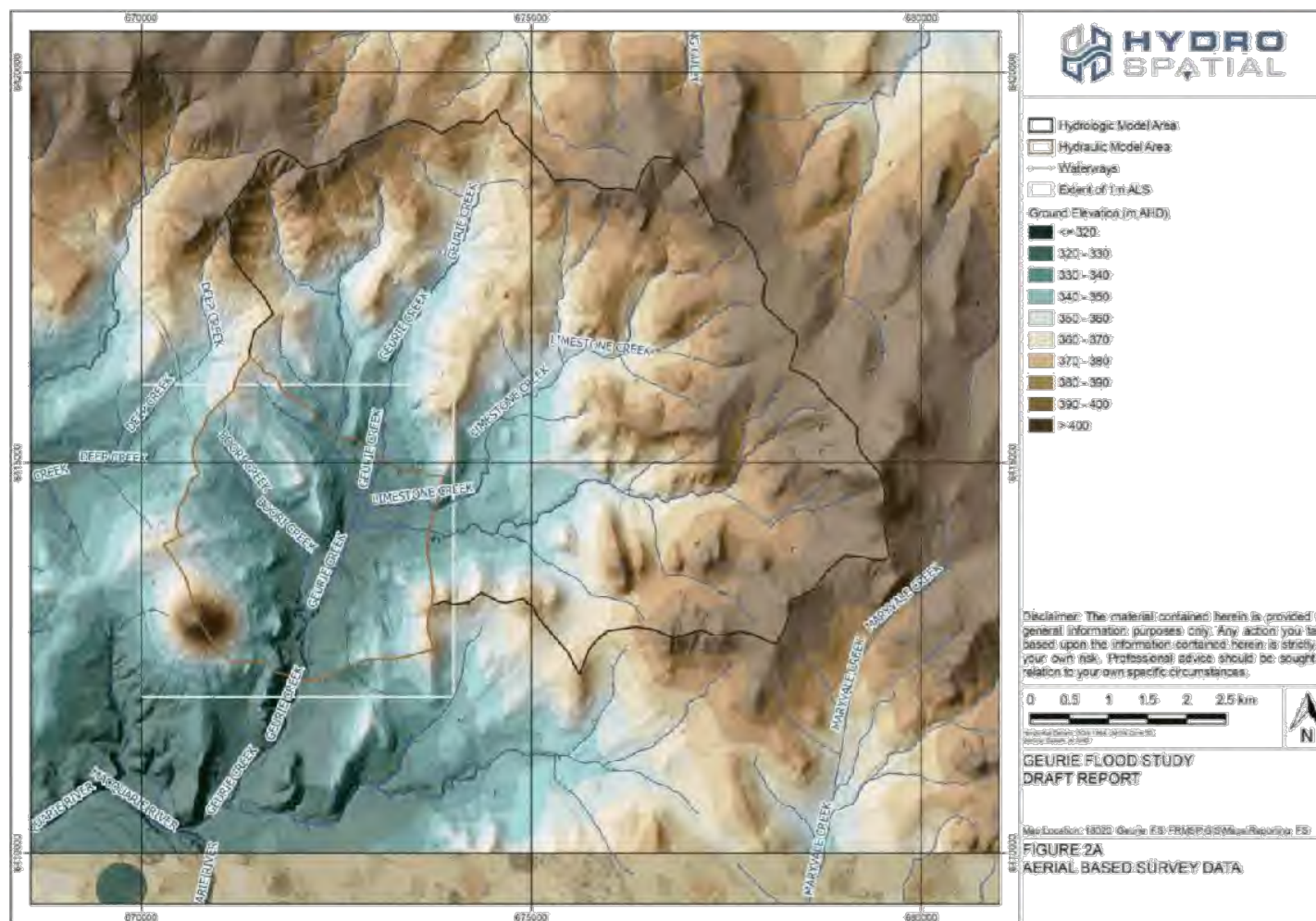
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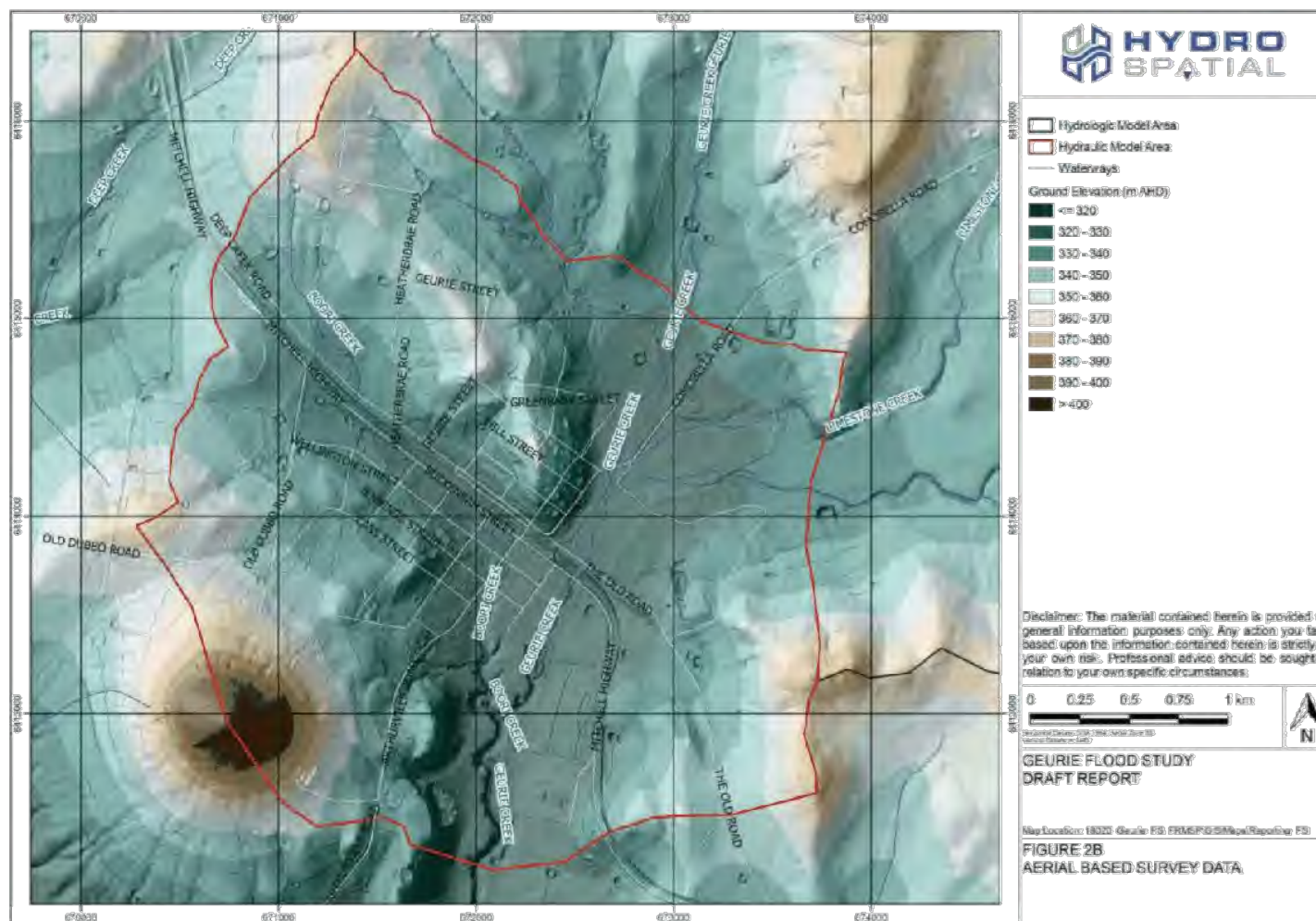
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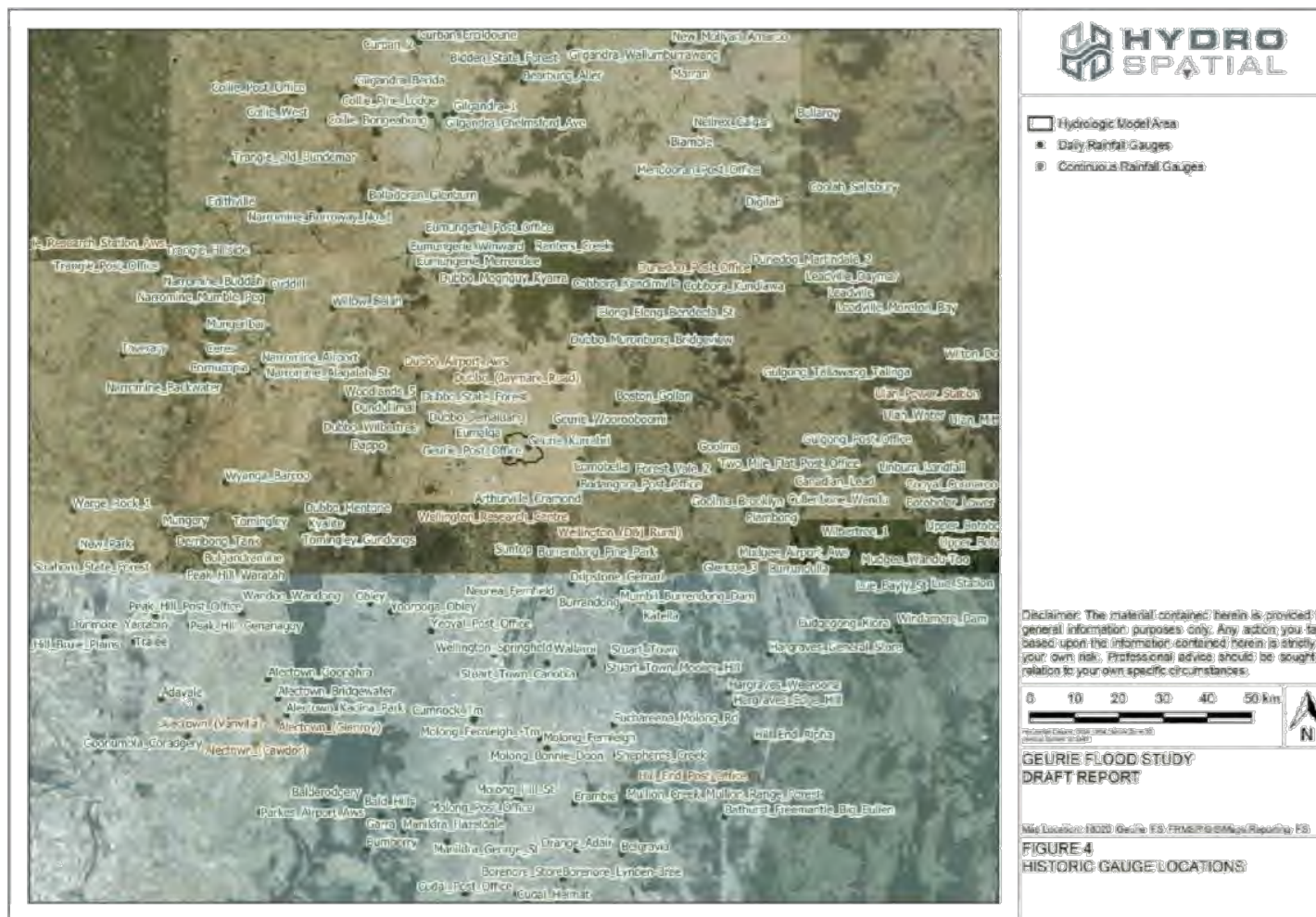
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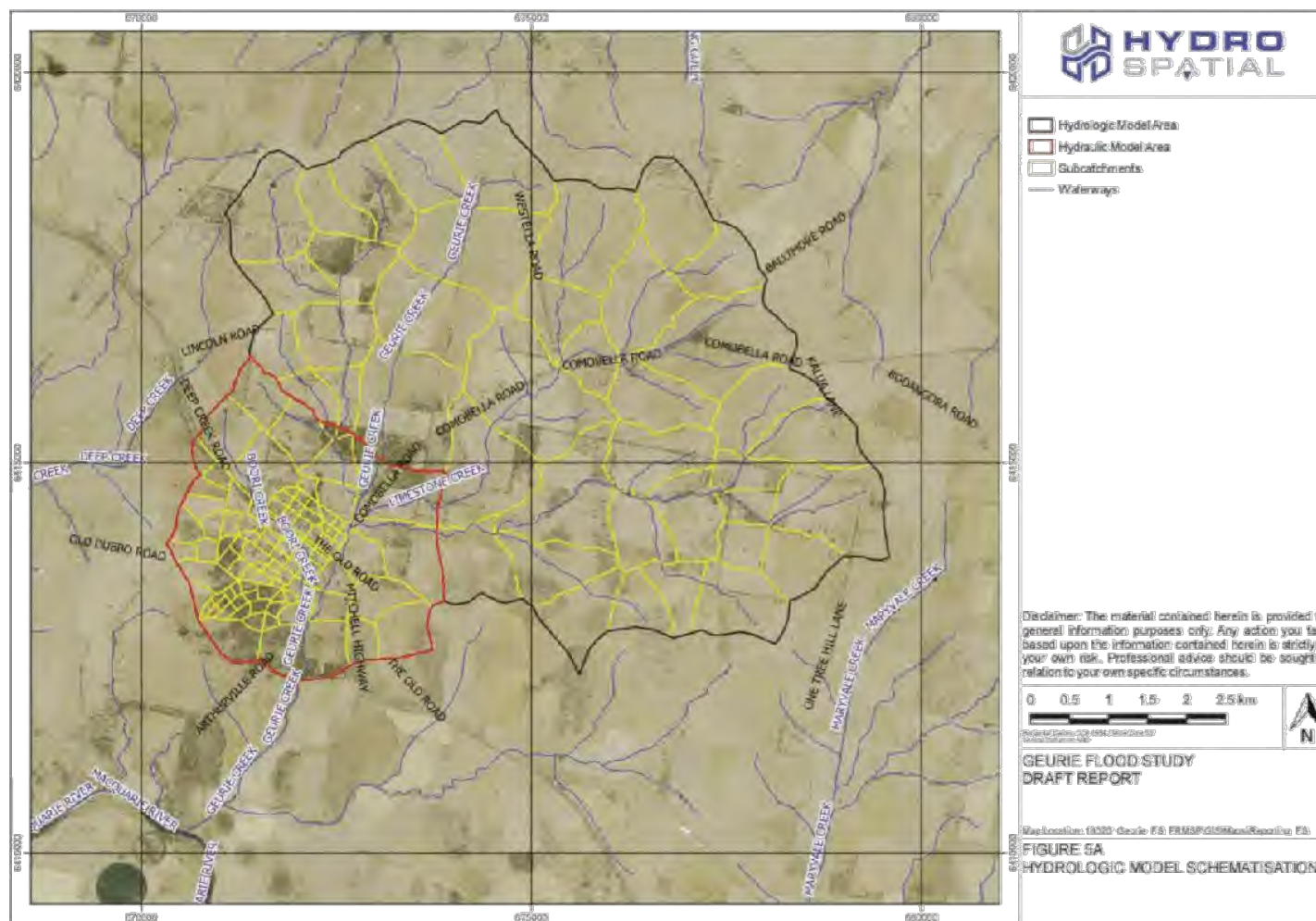
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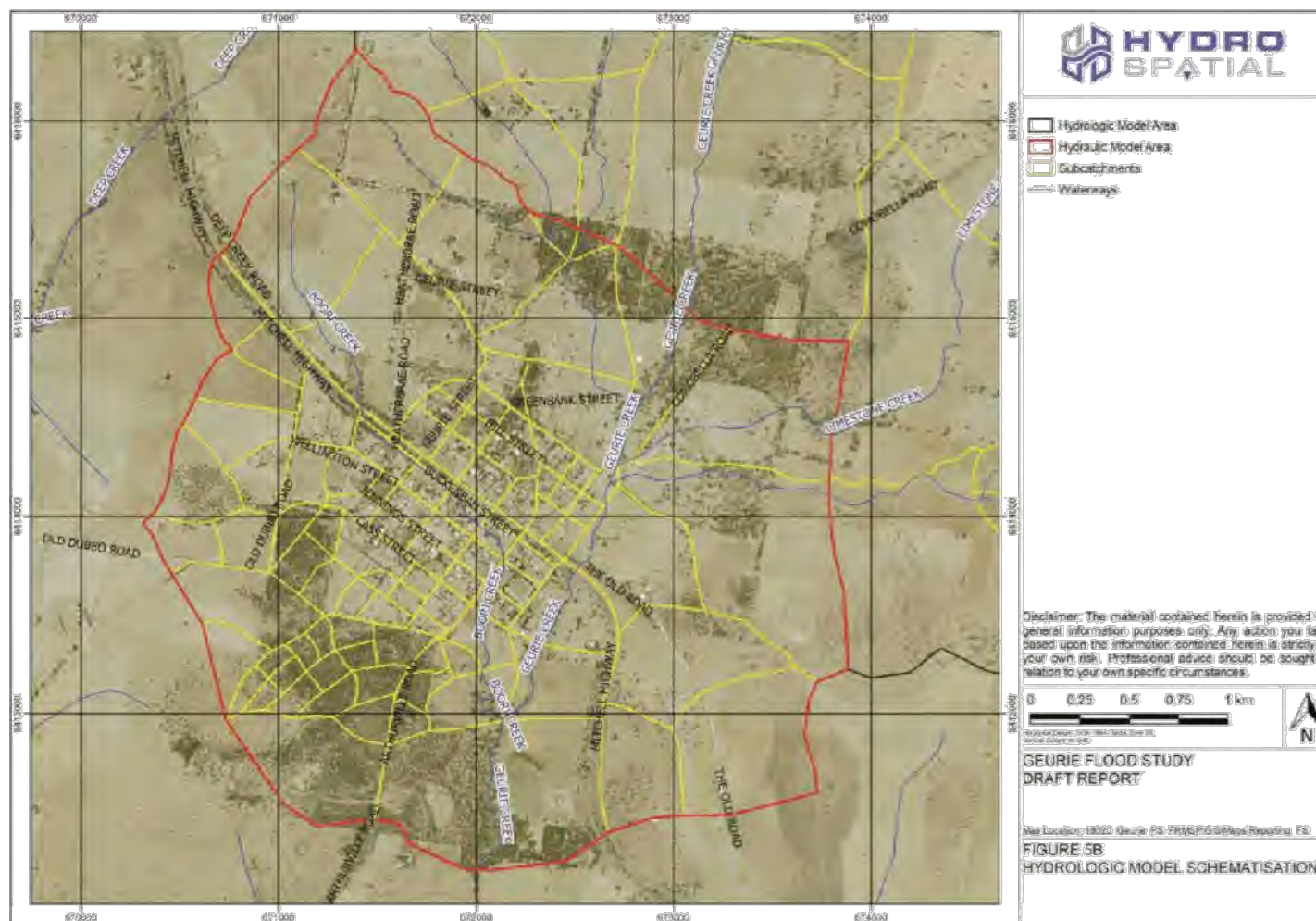
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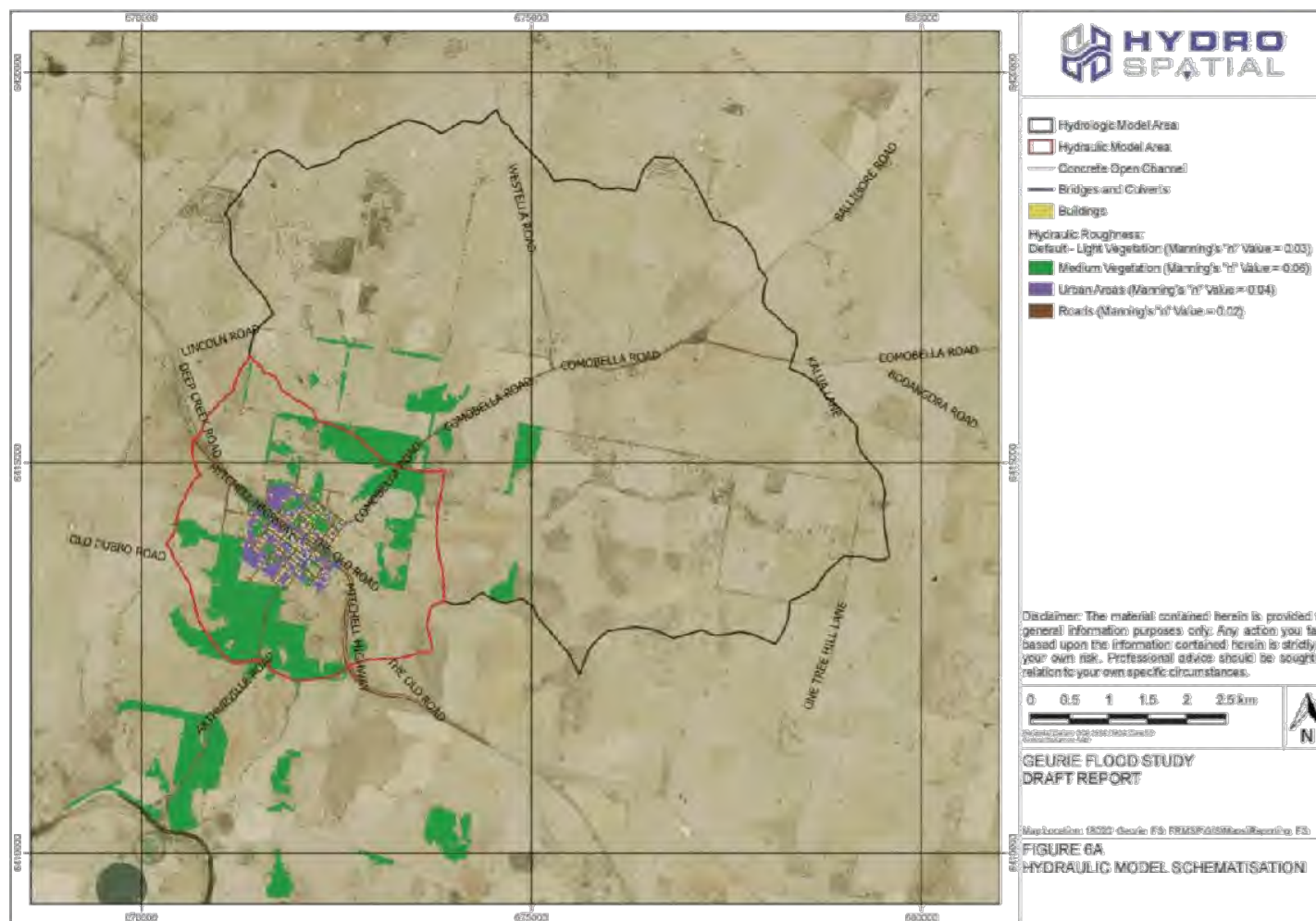
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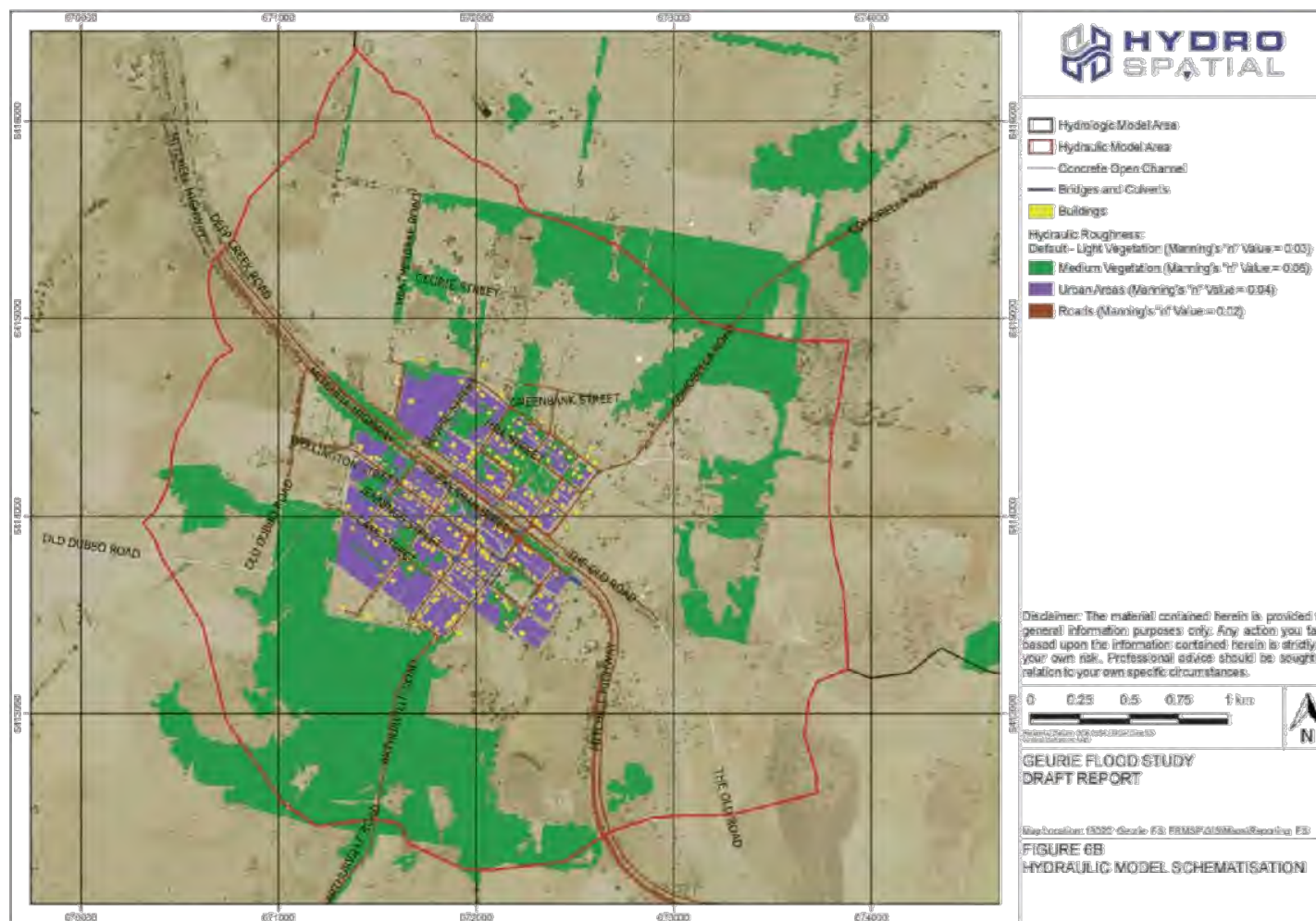
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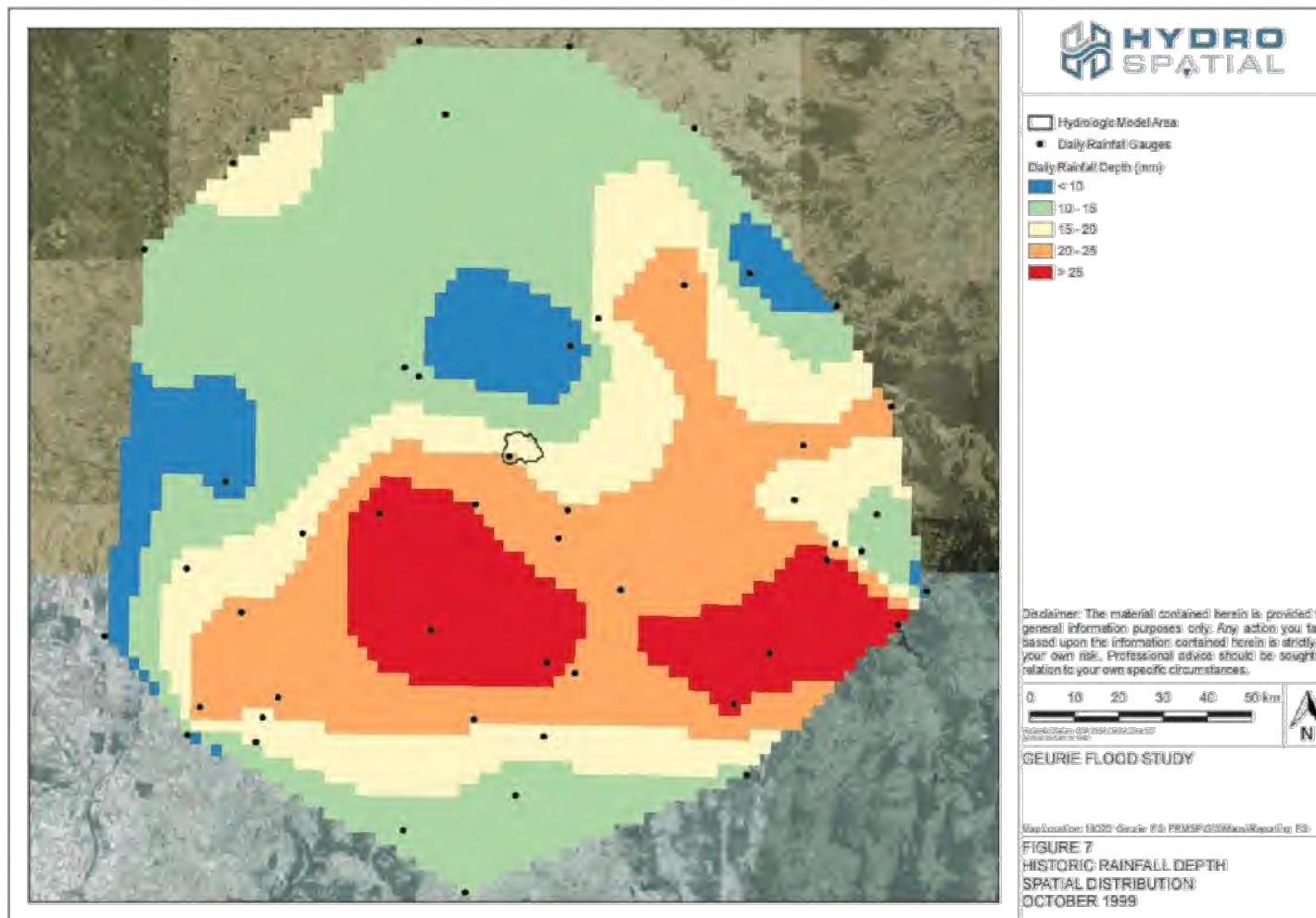
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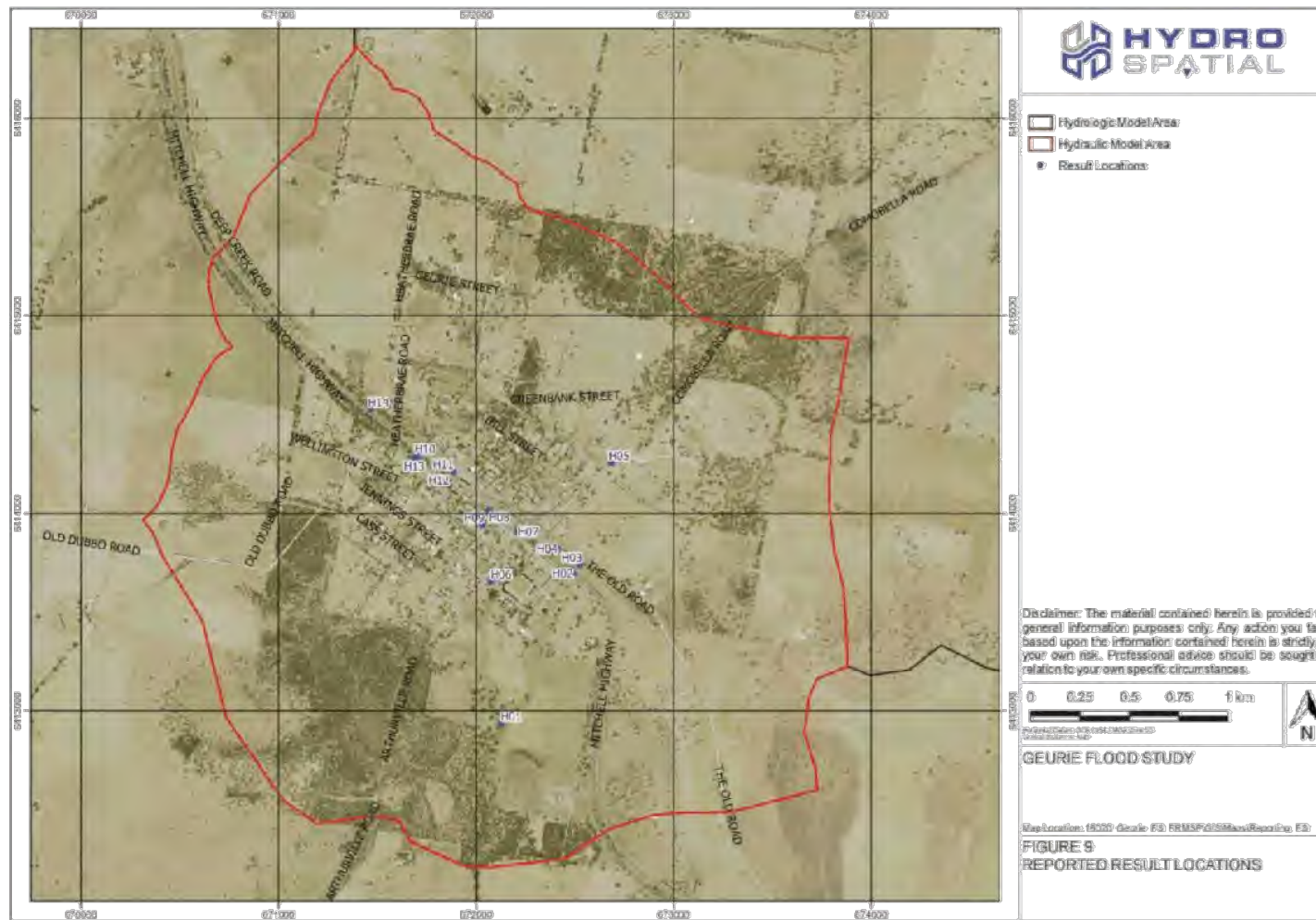
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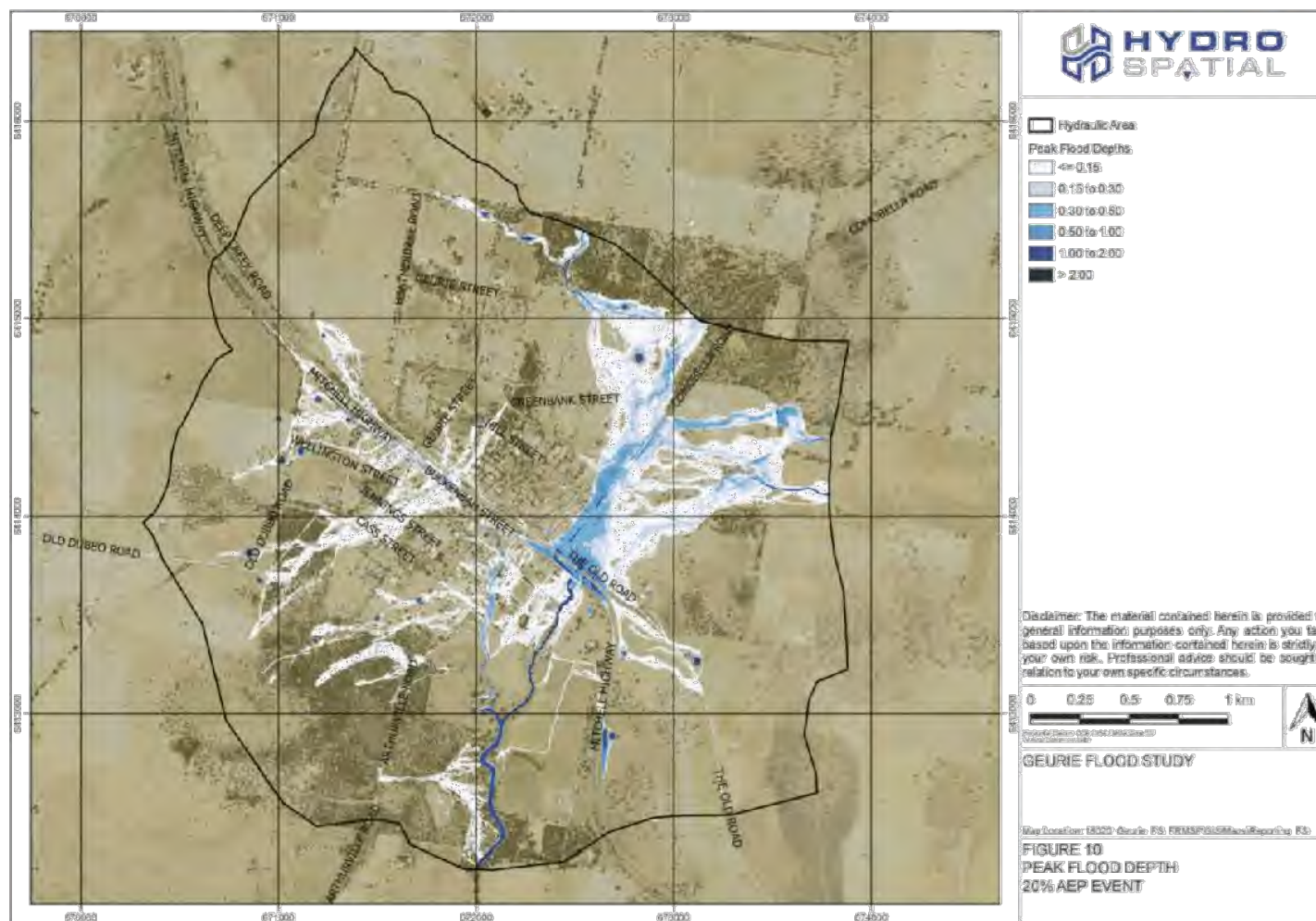
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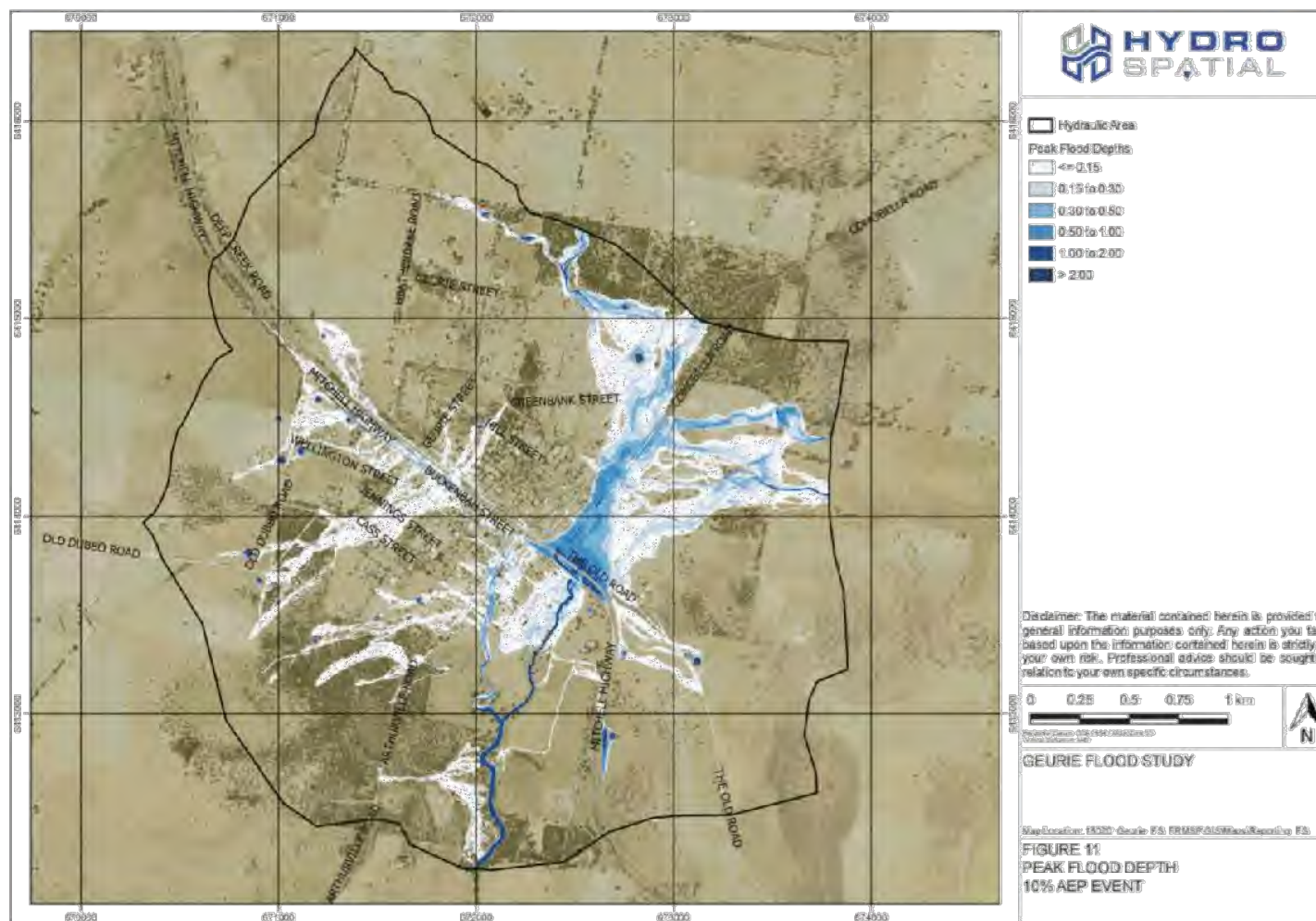
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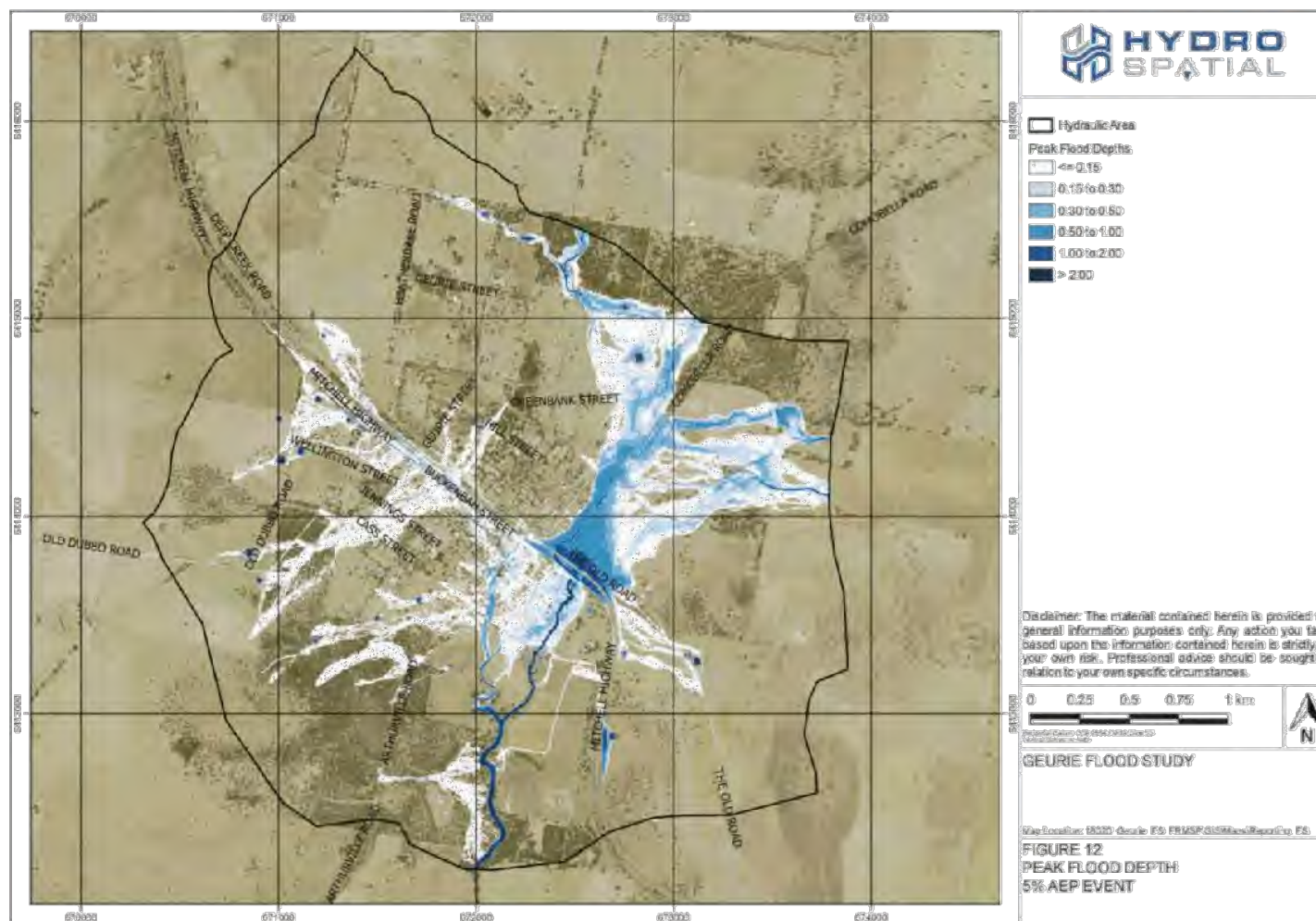
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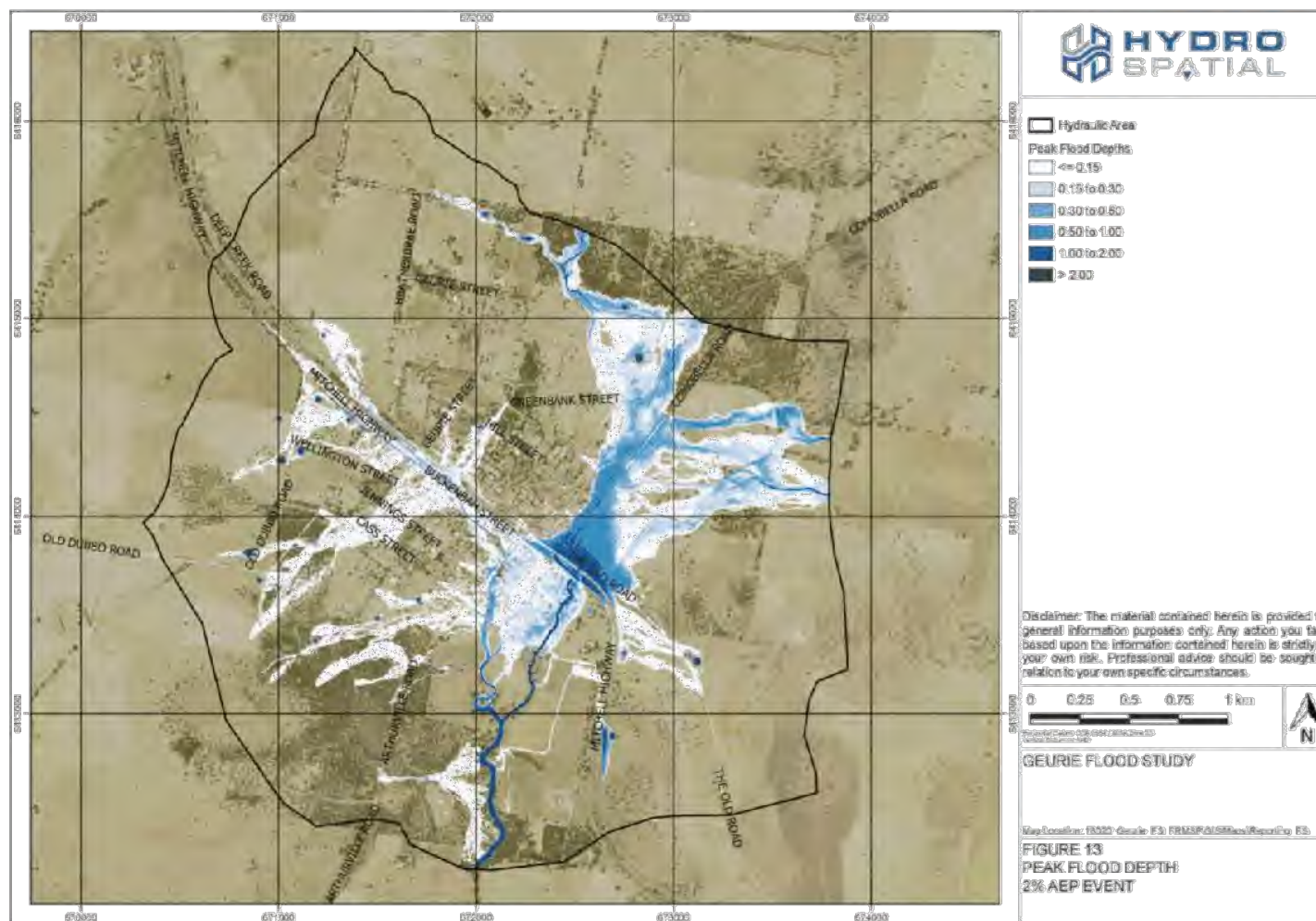
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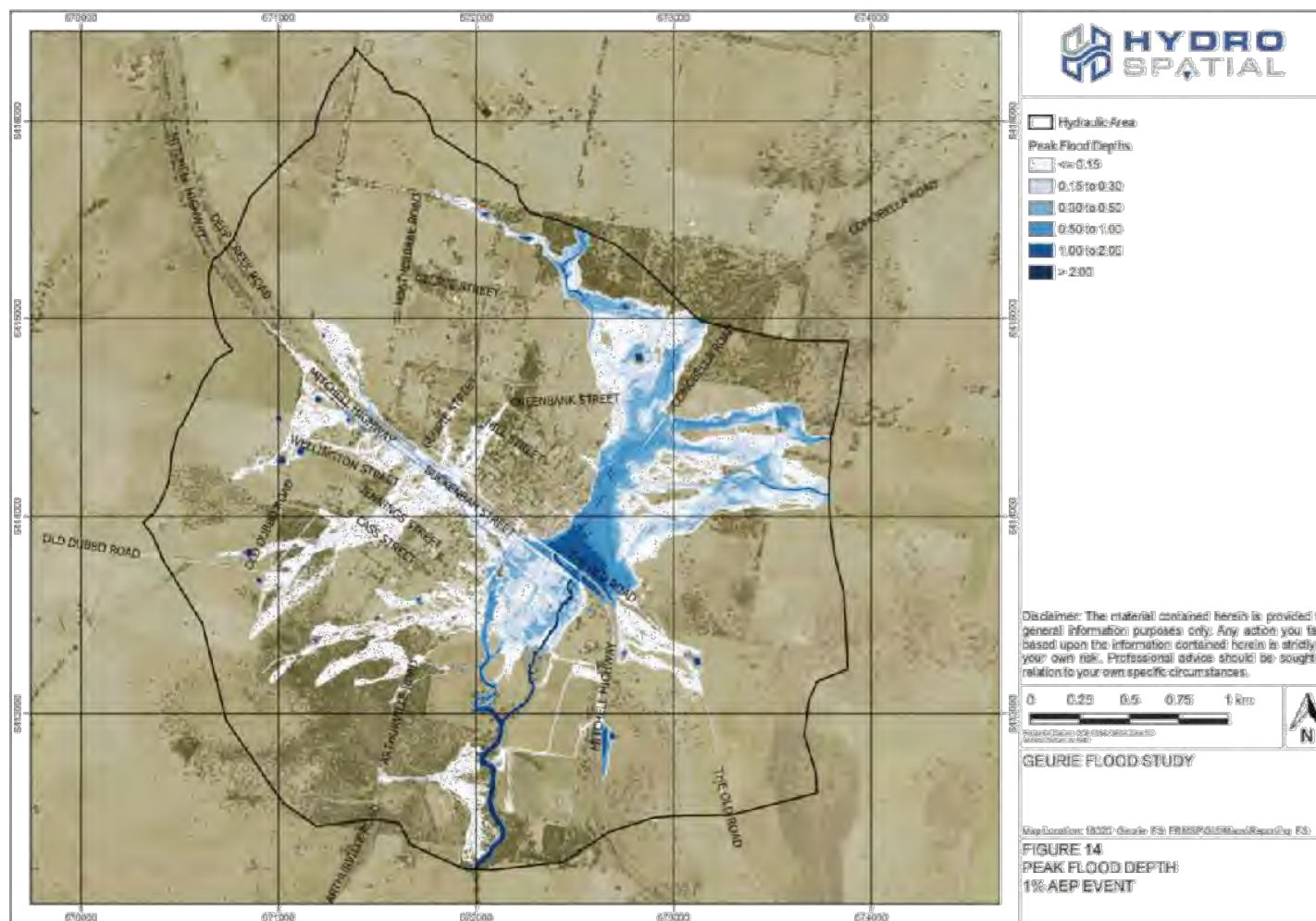
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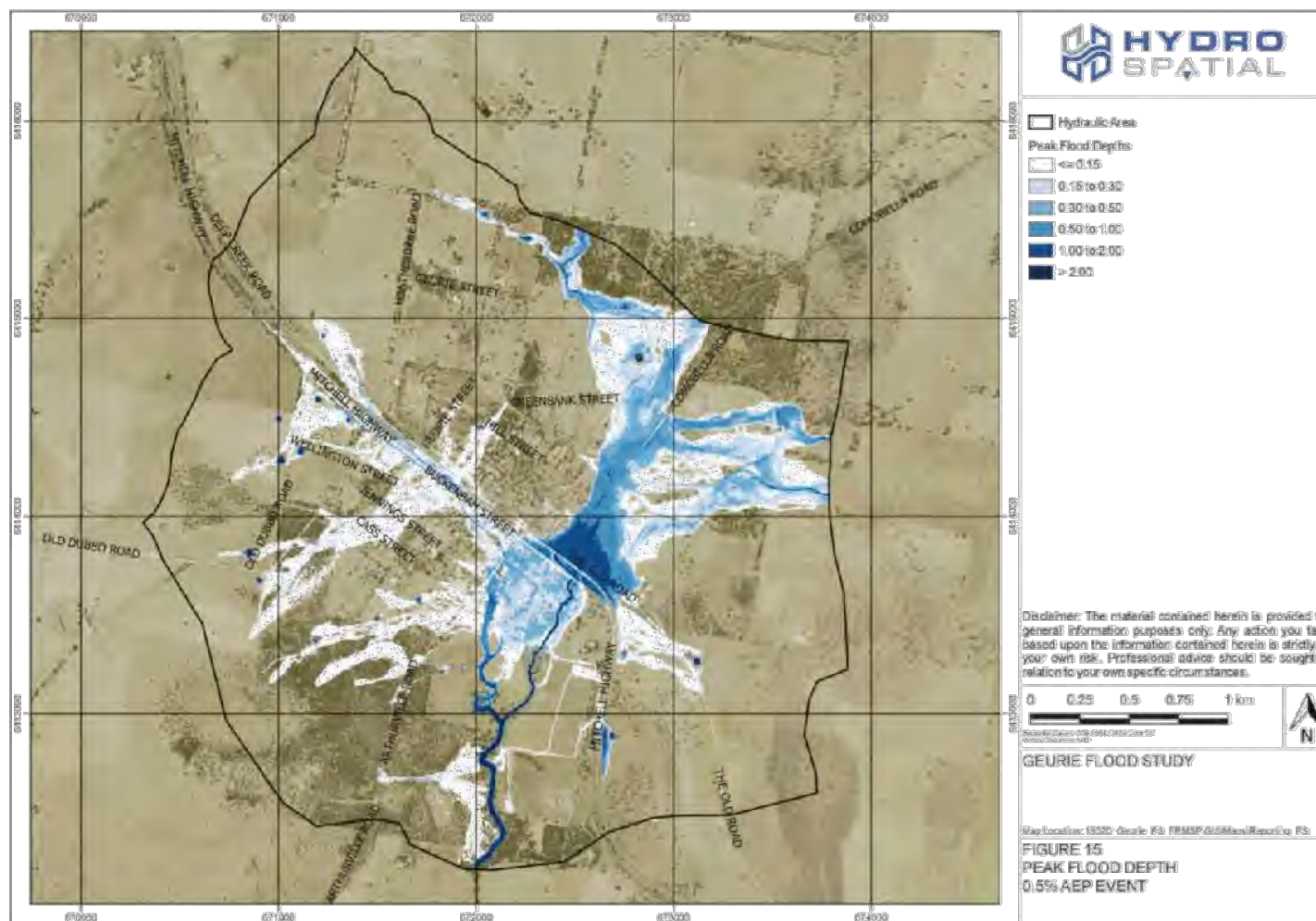
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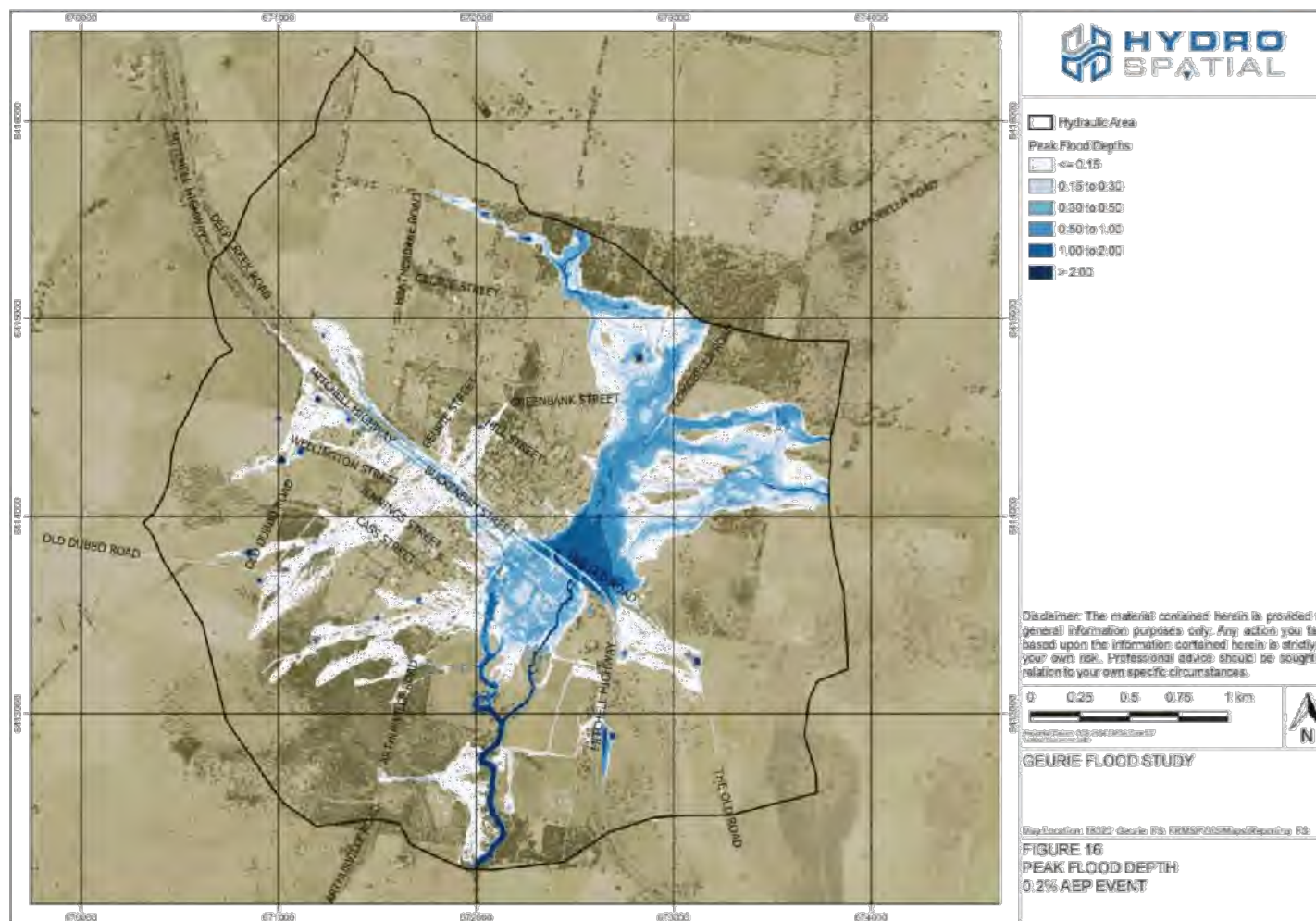
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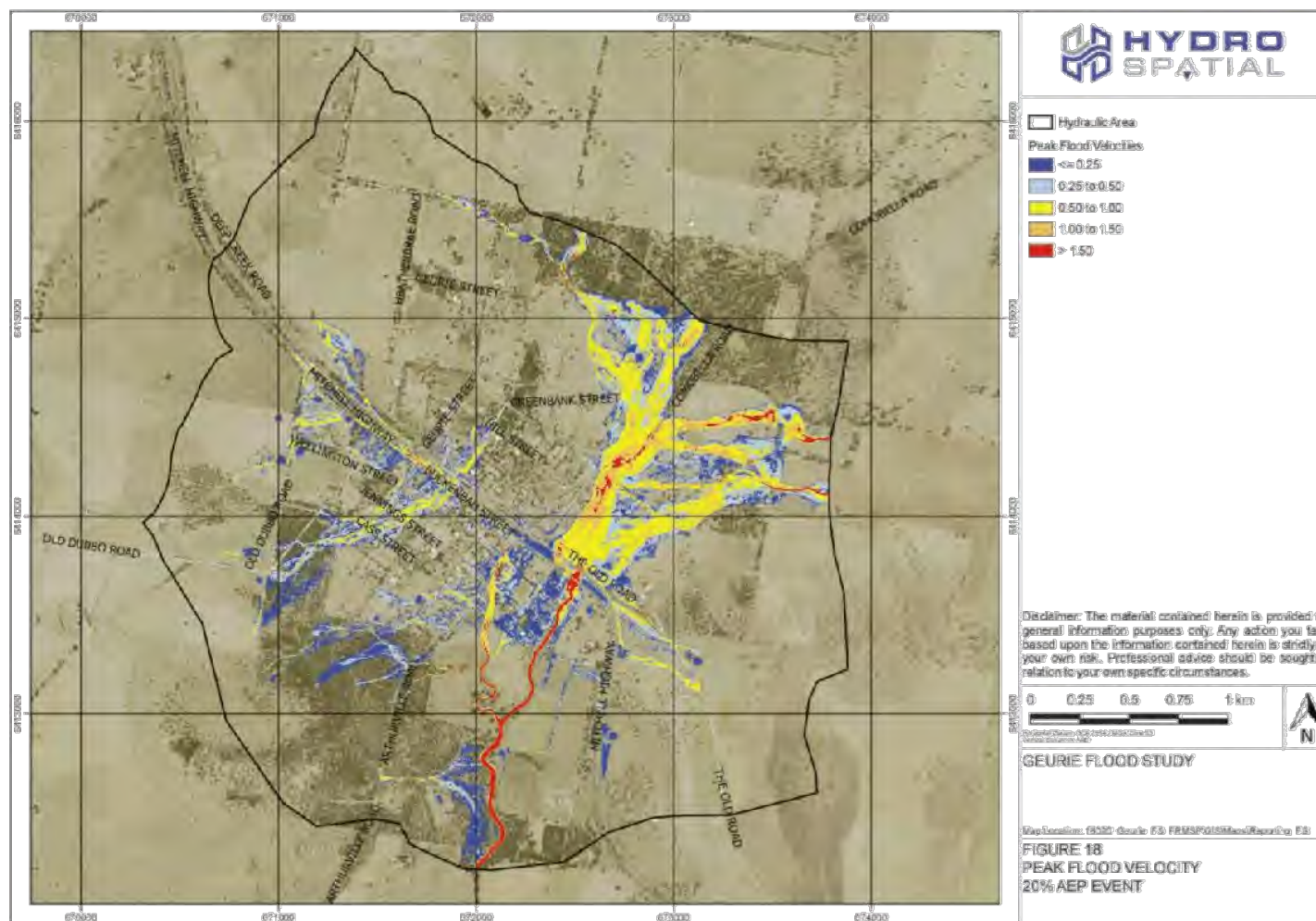
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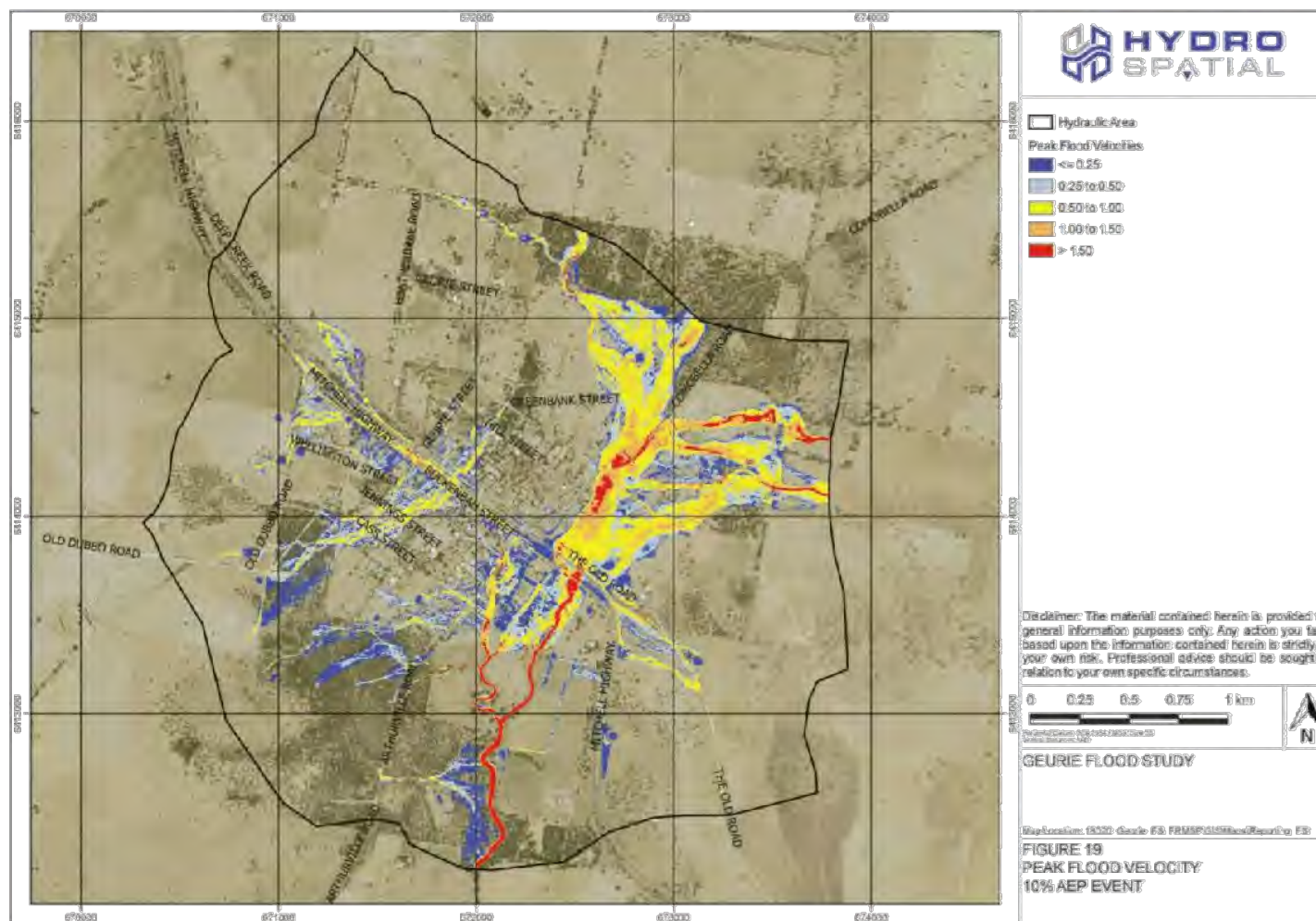
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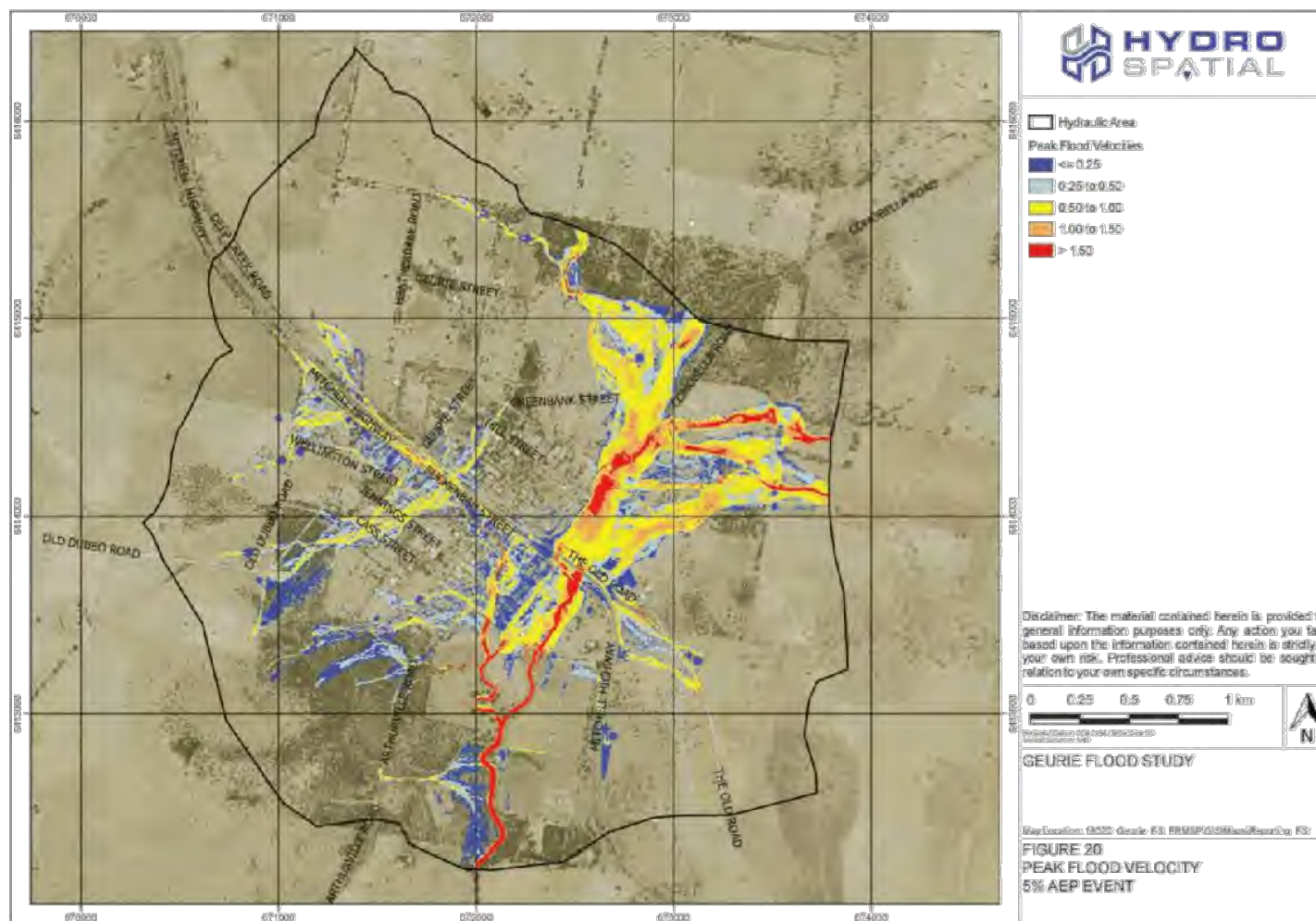
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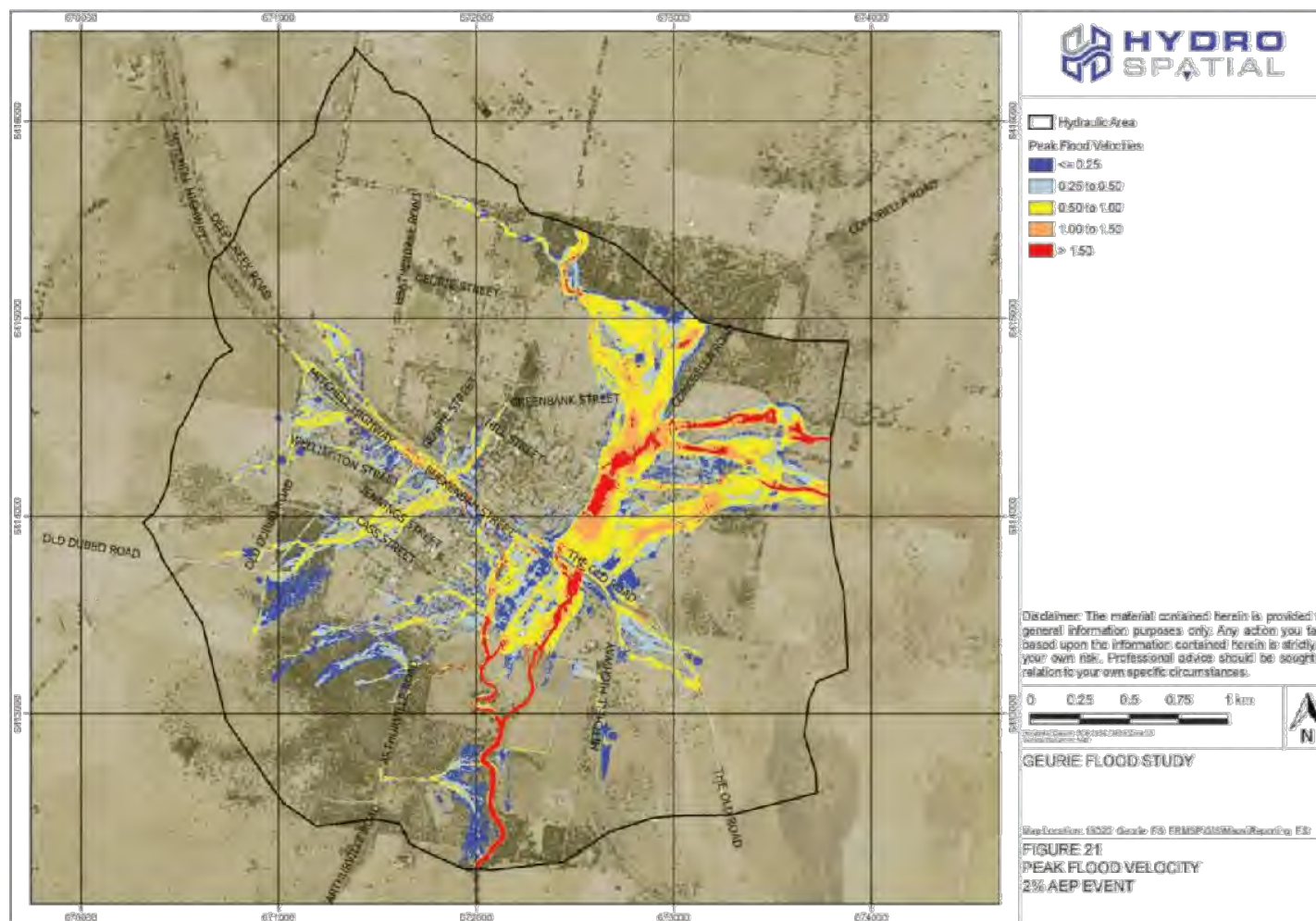
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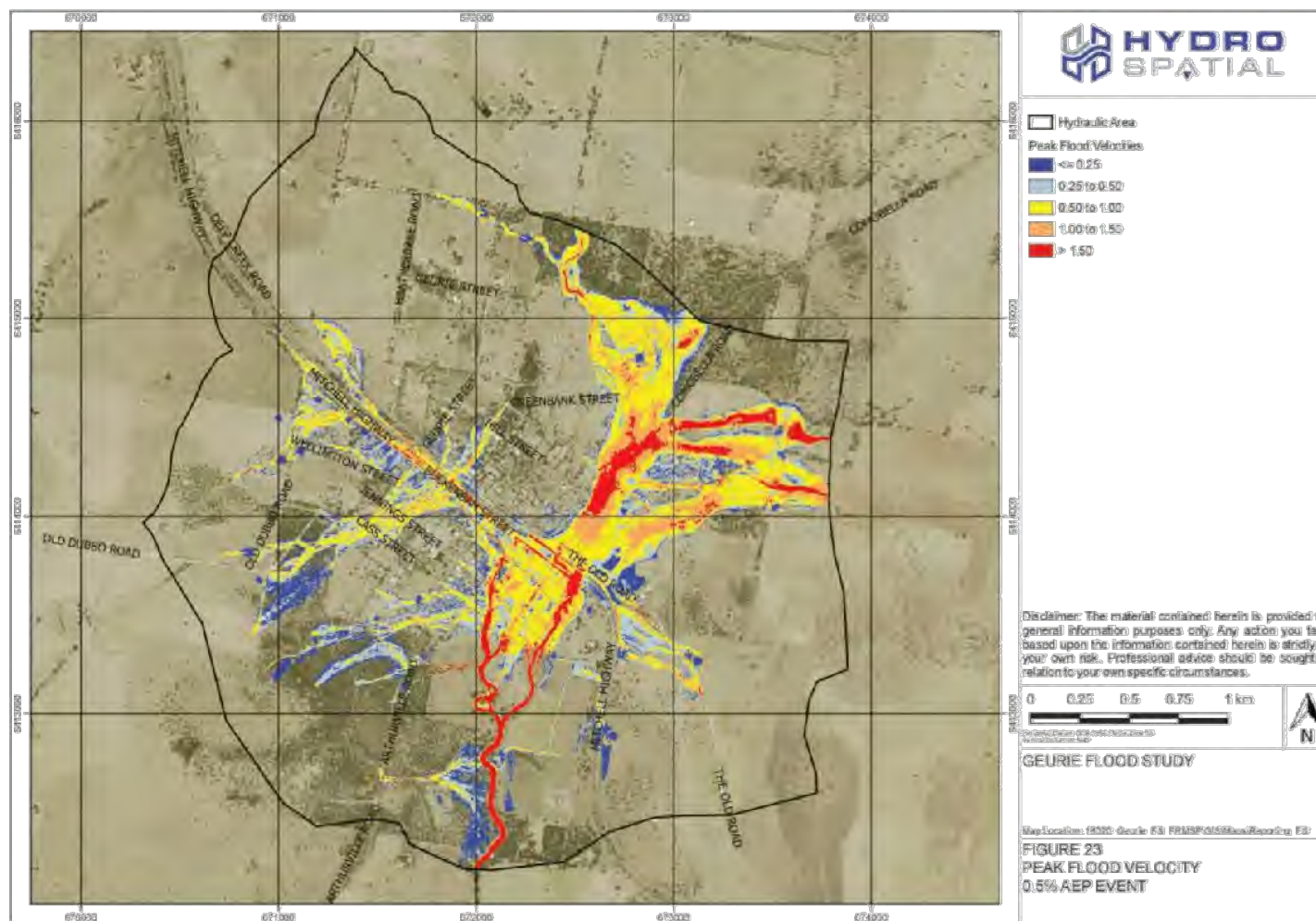
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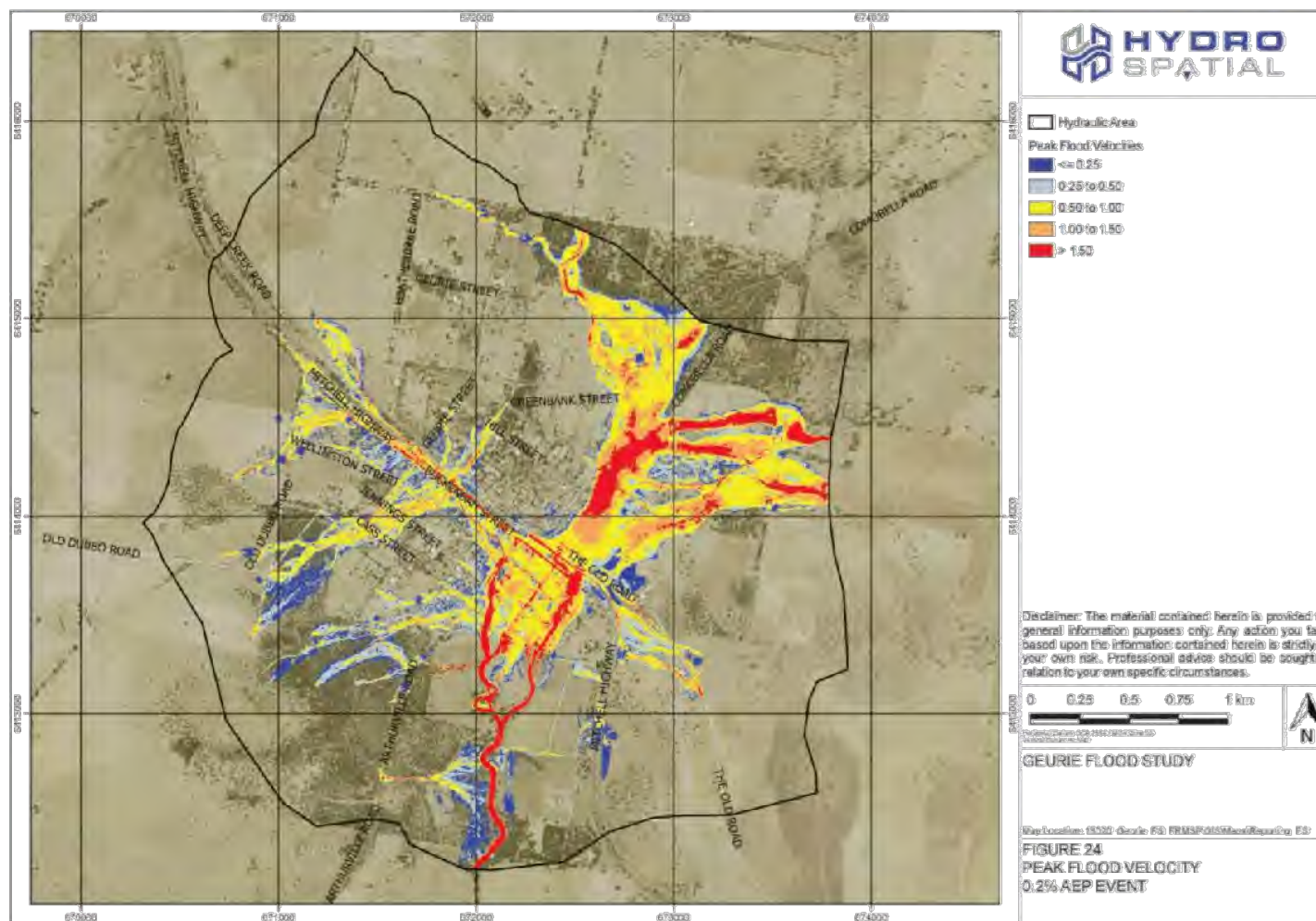
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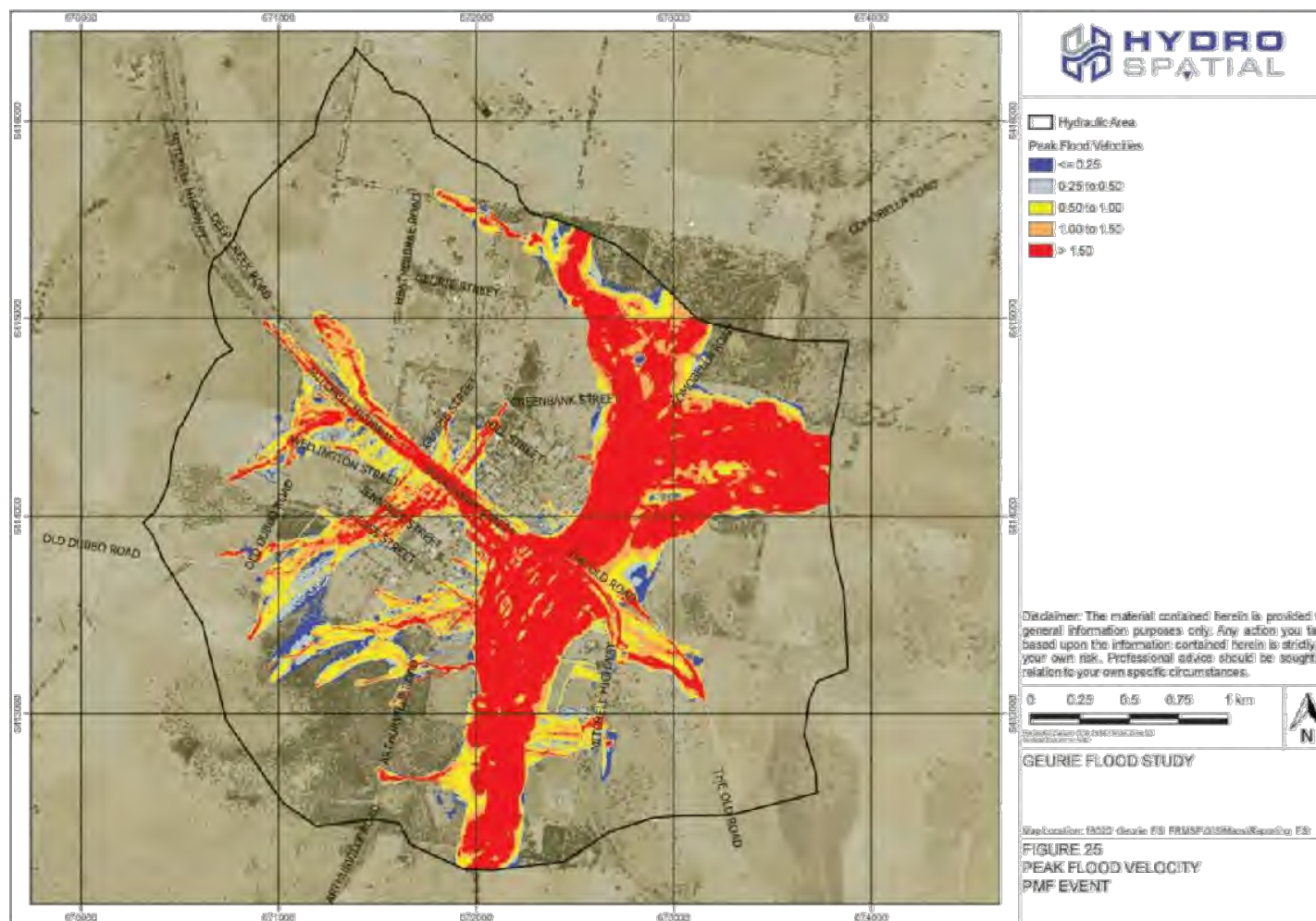
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APPENDIX NO: 1 - STAGE 3 REPORT - HYDROSPATIAL - OCTOBER 2019

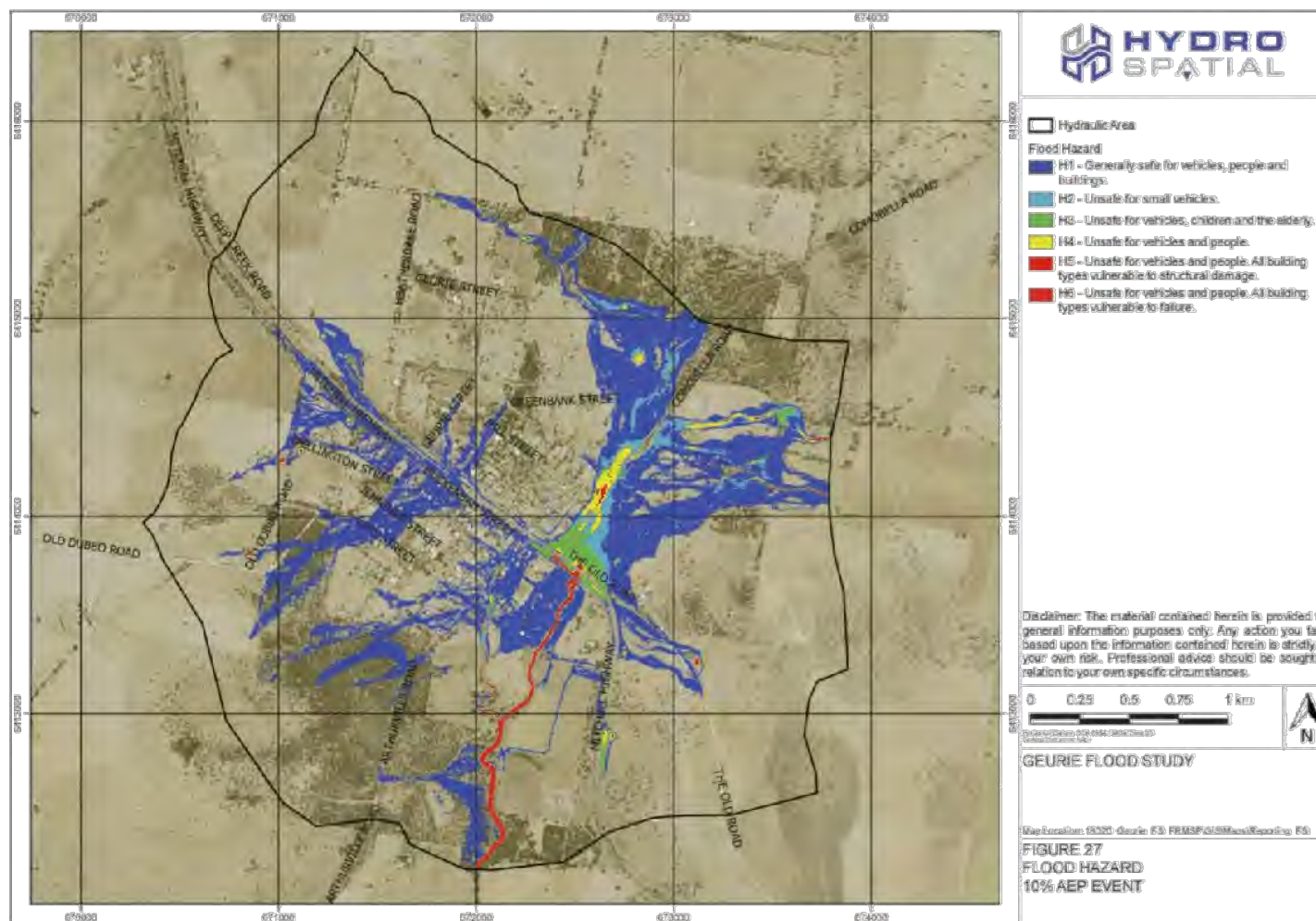
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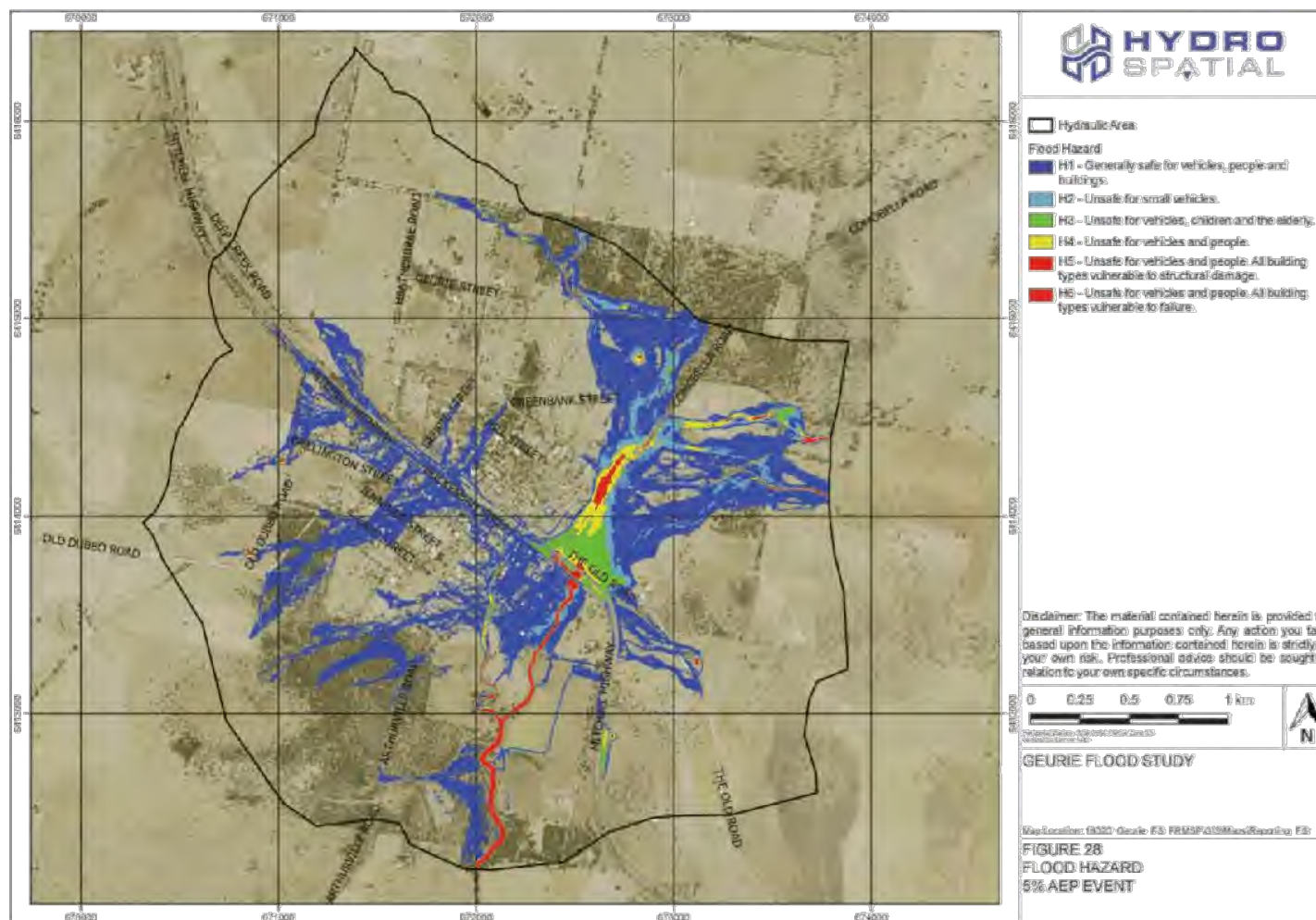
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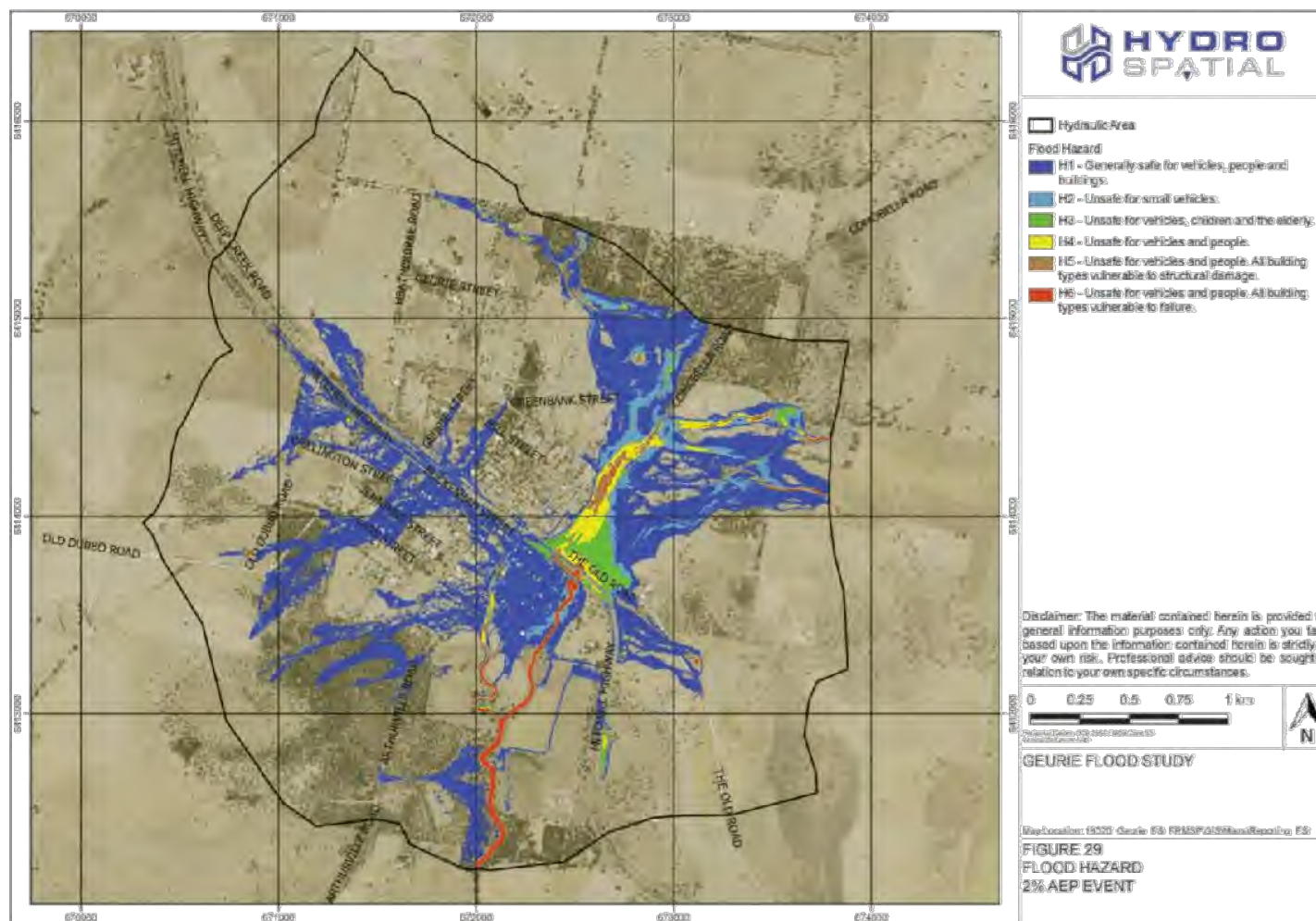
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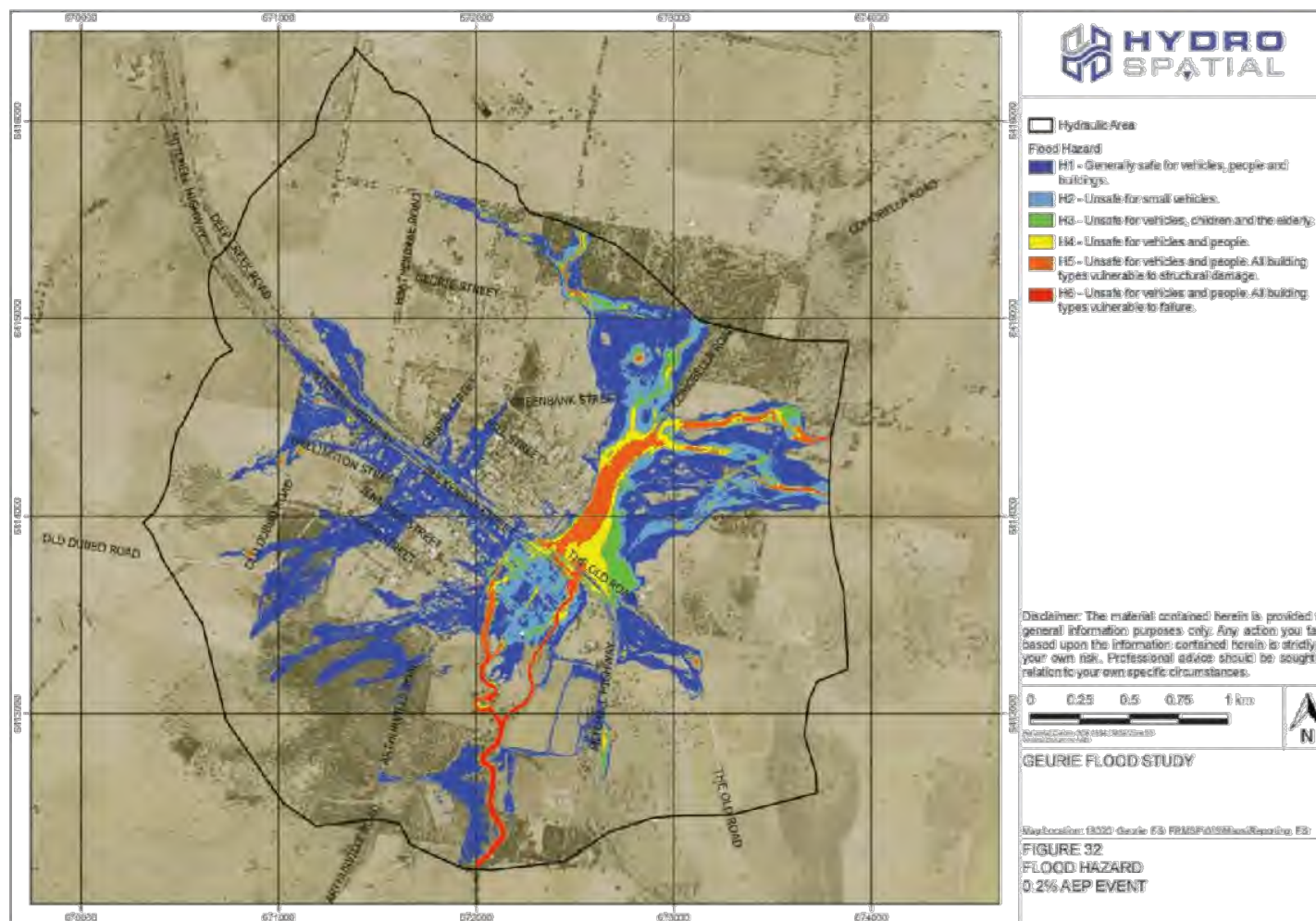






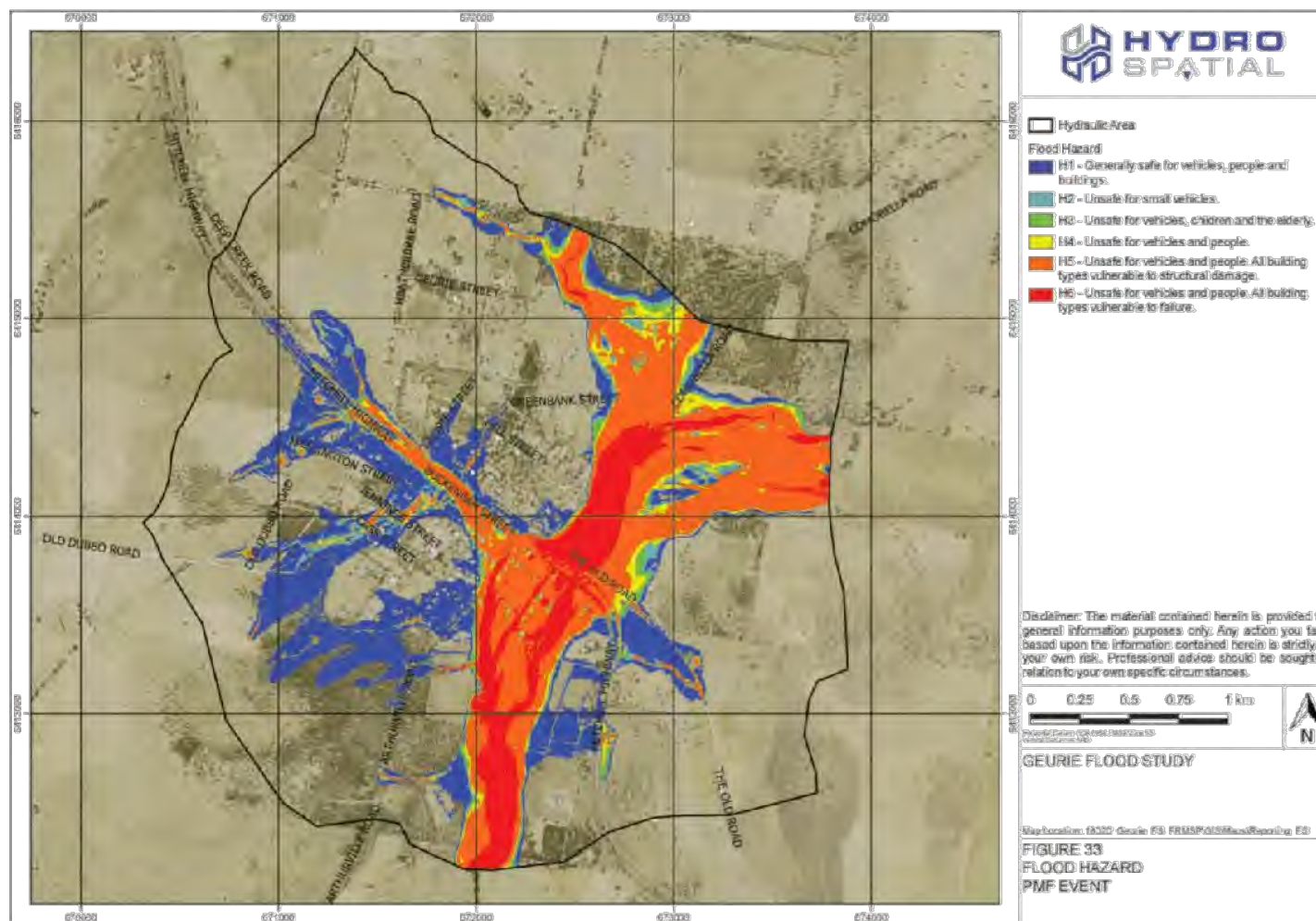
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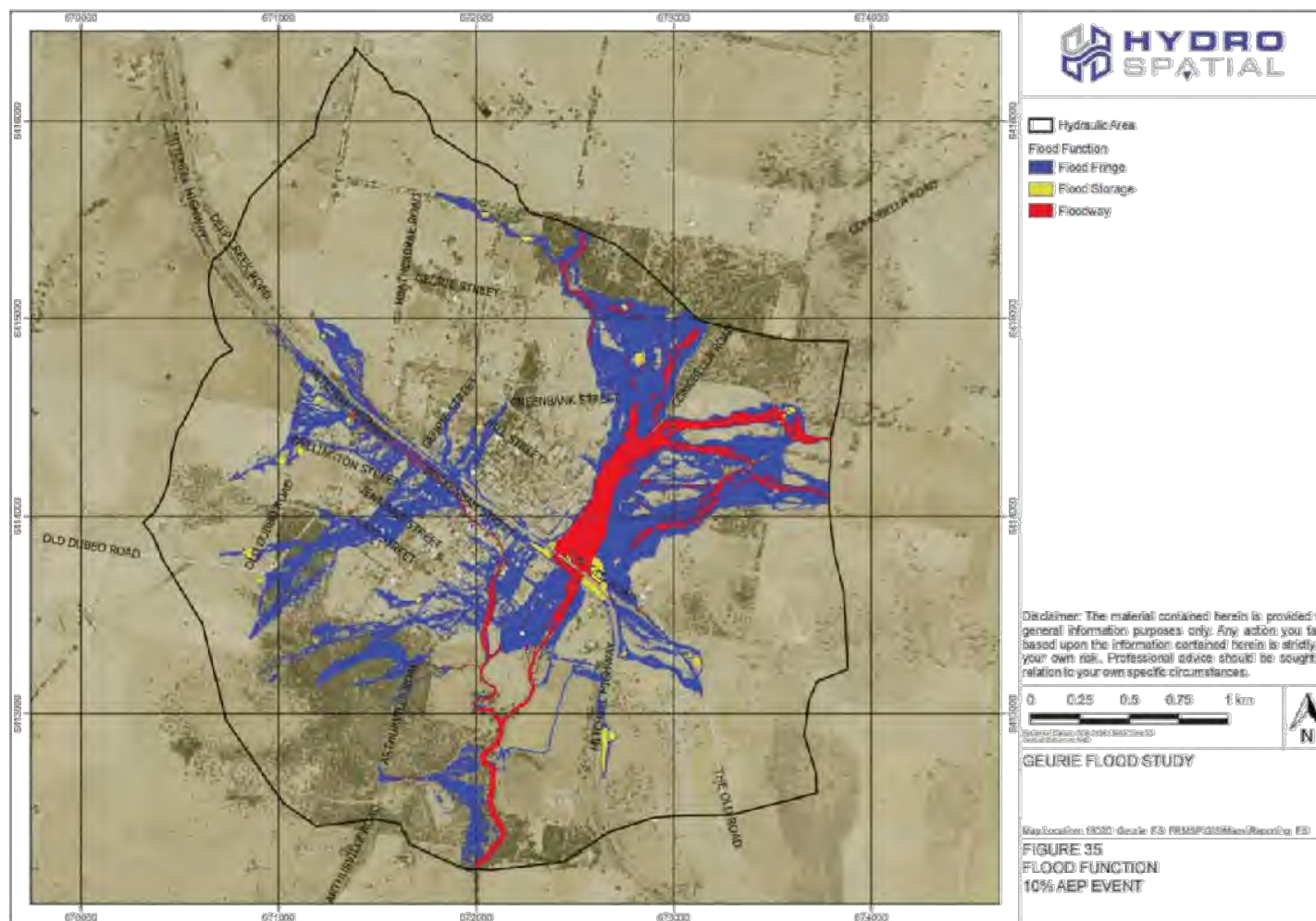
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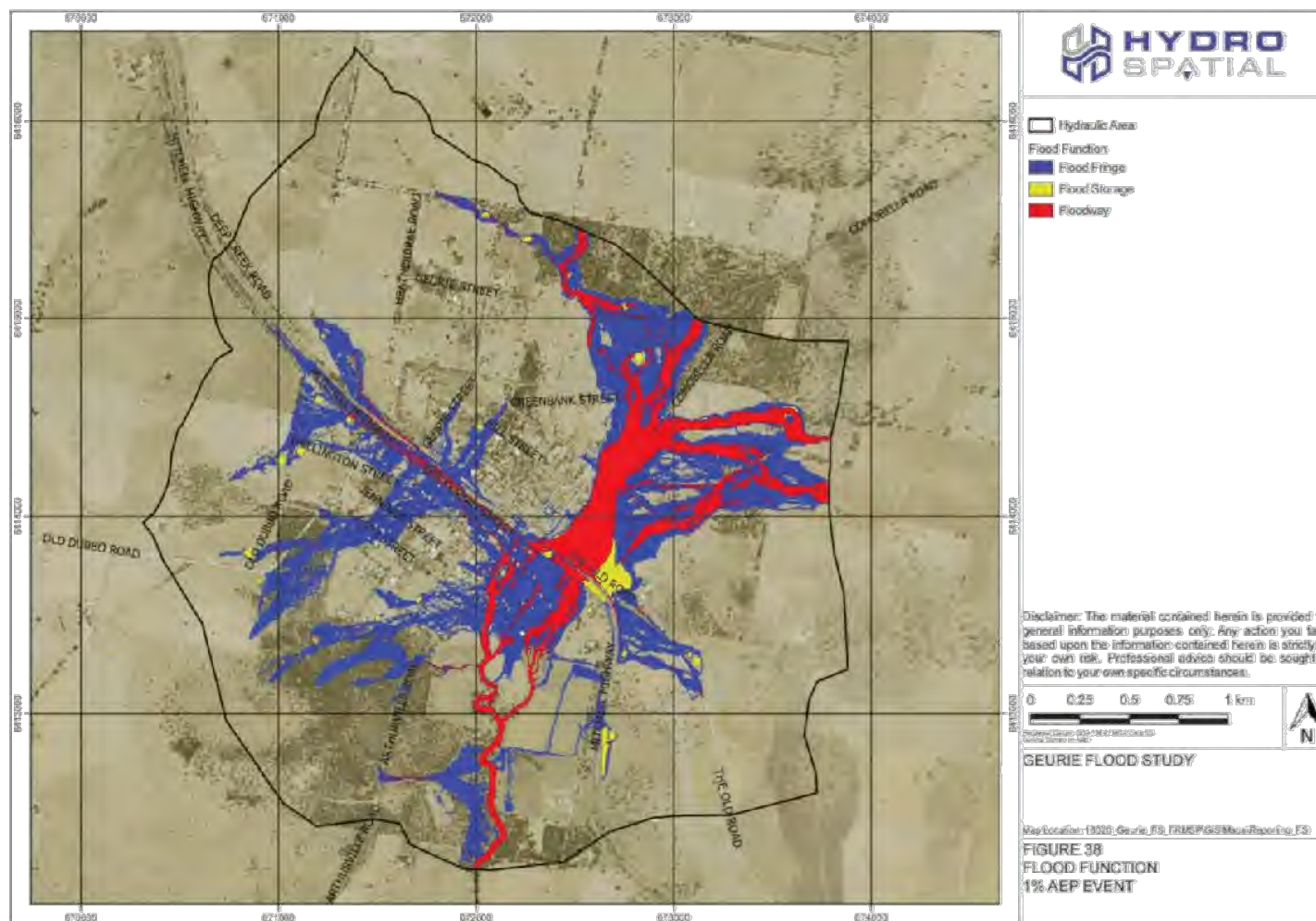






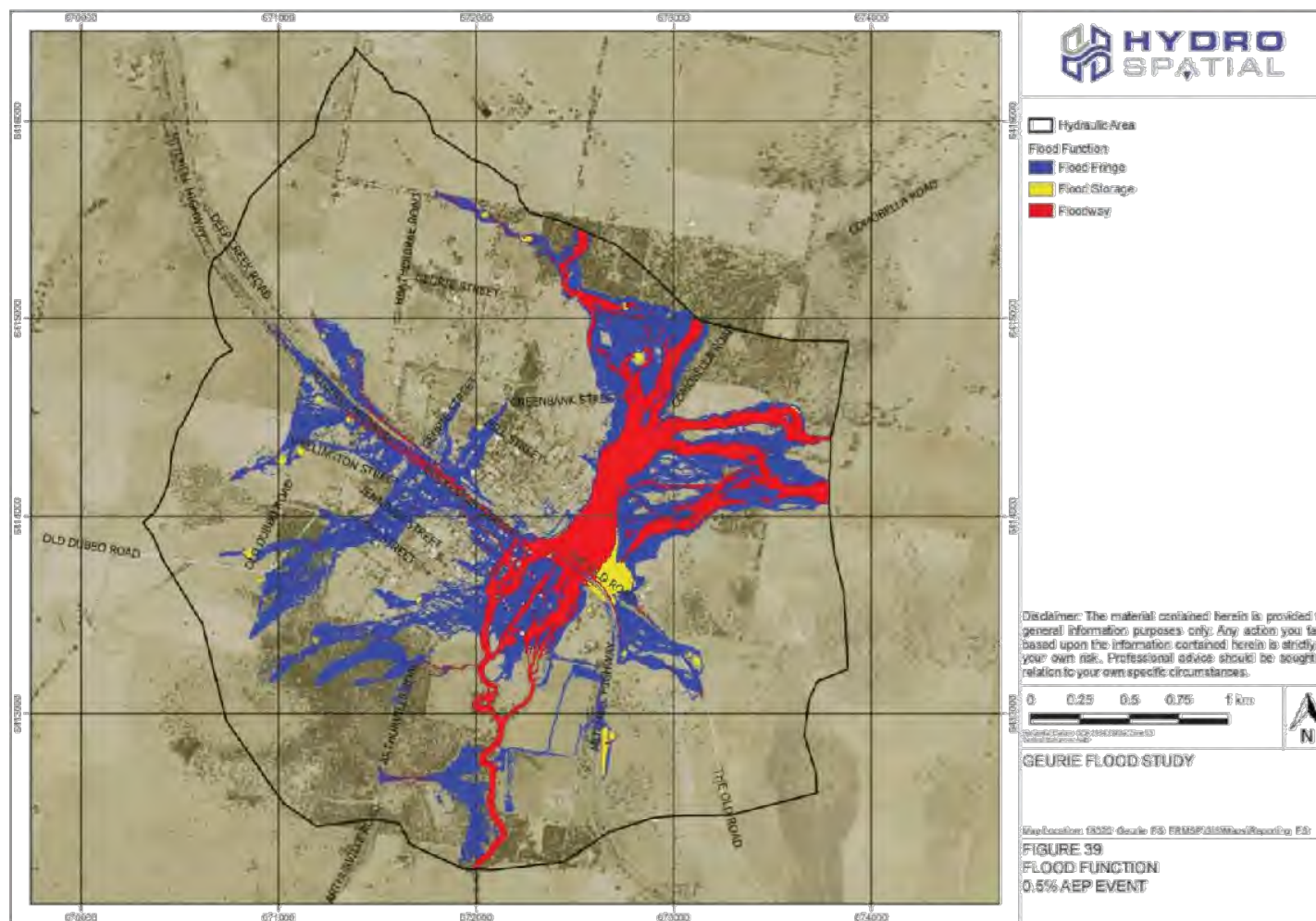
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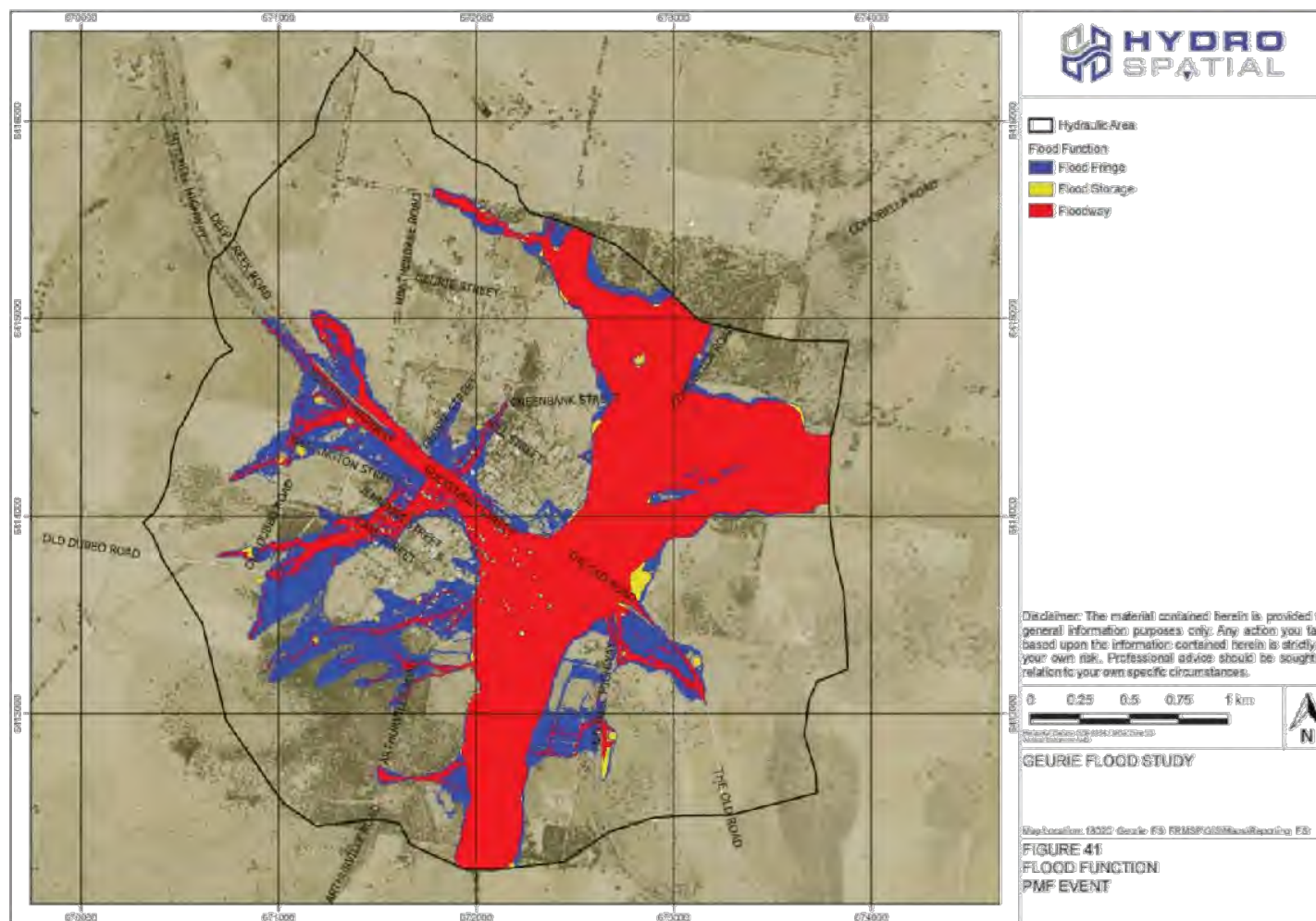
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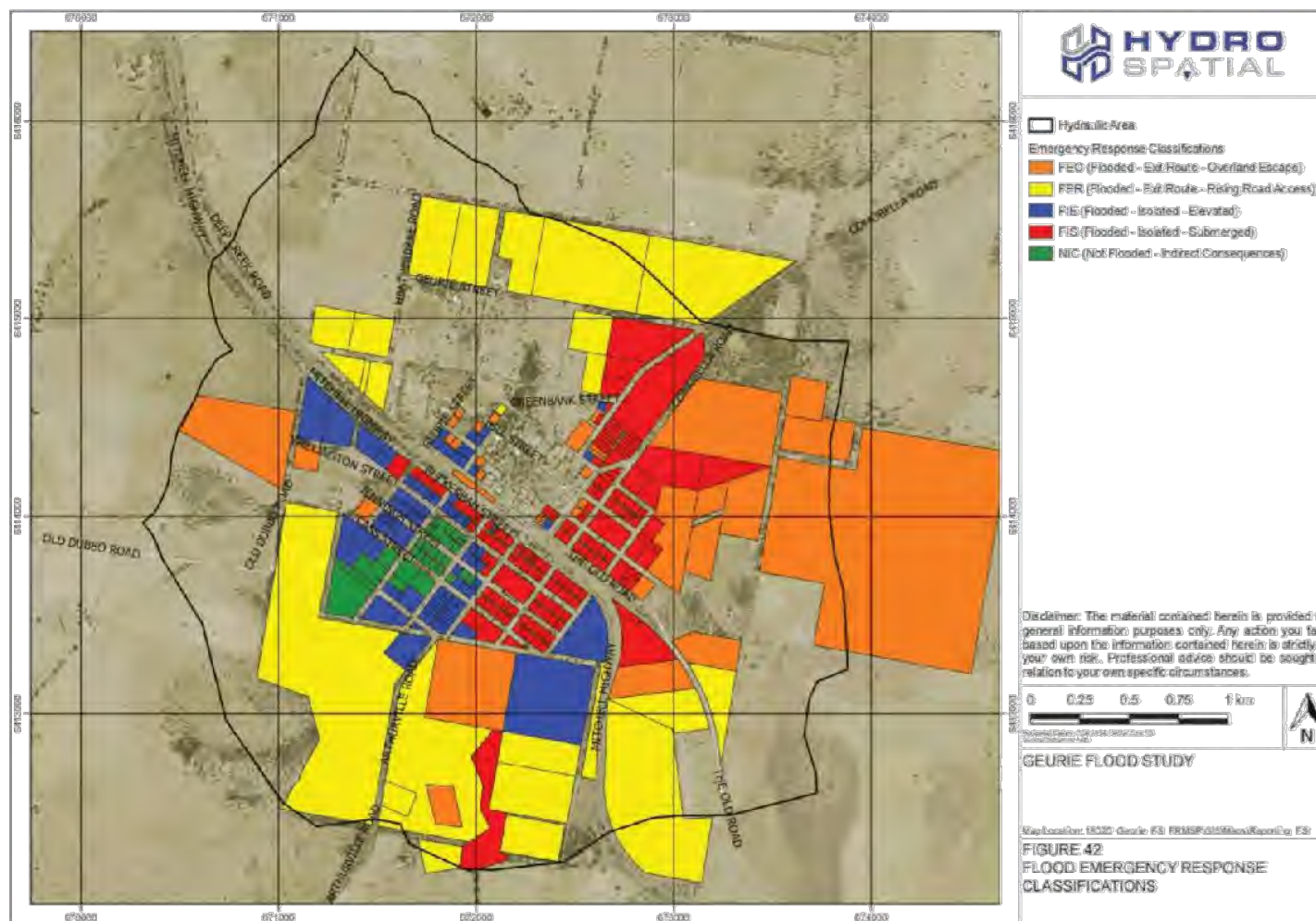
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Geurie Flood Study

Stage 3 Report

Prepared For
Dubbo Regional Council
October 2019



HYDRO
SPATIAL

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Table of Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AAD	Average Annual Damage
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff
DEM	Digital Elevation Model
EY	Exceedances per Year
FMC	Floodplain Management Committee
FPA	Flood Planning Area
FPL	Flood Planning Level
LGA	Local Government Area
LIDAR	Light Detection and Ranging
NSW	New South Wales
OEI	Office of Environment and Heritage
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
SES	State Emergency Services

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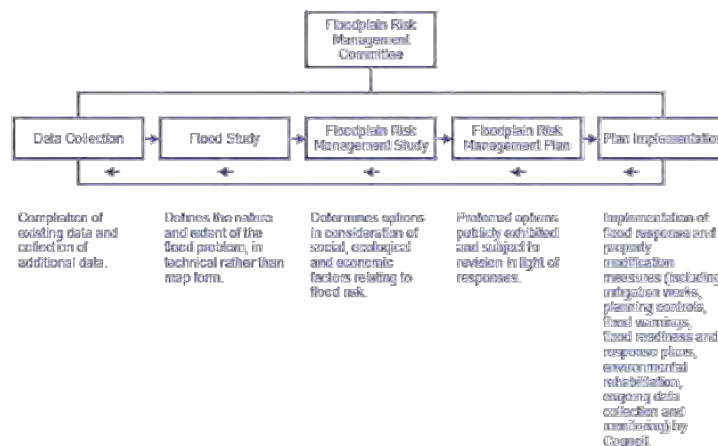


Forward

Flood-Related Legislation, Policies and Guidelines

The New South Wales (NSW) State Government's *Flood Prone Land Policy* places the primary responsibility for floodplain risk management with Councils and the *Local Government Act 1993 - Section 733* indemnifies Council from liability if the Council has acted in "good faith" in relation to floodplain risk management. Additionally, the State Government, through the Department of Planning, Industry and Environment (DPIE) (formerly the Office of Environment and Heritage (OEH)), provides financial and technical support to Council in meeting its floodplain risk management obligations.

The NSW *Floodplain Development Manual* (2005) supports the NSW *Flood Prone Land Policy*. The manual provides direction on the floodplain risk management process, as detailed below.



There are a number of industry guidelines that provide technical guidance through the floodplain risk management process. This includes the *Australian Emergency Management Series* (particularly *Handbook 7: Managing the Floodplain Best Practice in Flood Risk Management in Australia*), and *Australia Rainfall and Runoff (ARR)*. ARR has undergone several revisions since its inception; with the first publication in 1958, the second publication in 1977, the third publication in 1987 and the fourth (and latest) publication in 2019 (with an earlier draft version in 2016).

The current study has been undertaken in accordance with the aforementioned legislation, policies and guidelines.



Terminology

ARR 2019 has standardised the design flood terminology used in the industry. Very frequent events are expressed as Exceedances per Year (EY), frequent to very rare events are expressed as Annual Exceedance Probability (AEP) as a percentage, and very rare to extreme events are expressed as a 1 in x AEP. This is detailed in Table 0-1, which has been extracted from Section 2.2.5., Chapter 2, Book 1 of ARR 2019.

Table 0-1: Design Event Terminology

Frequency Descriptor	EY	AEP (%)	AEP (1 in x)	ARI
Very Frequent	12			
	5	99.75	1.002	0.17
	4	98.17	1.02	0.25
	3	95.02	1.05	0.33
	2	86.47	1.16	0.5
Frequent	1	63.21	1.58	1
	0.69	50	2	1.44
	0.5	39.35	2.54	2
	0.22	20	5	4.48
	0.2	18.13	5.52	5
Rare	0.11	10	10	9.49
	0.05	5	20	20
	0.02	2	50	50
	0.01	1	100	100
Very Rare	0.005	0.5	200	200
	0.002	0.2	500	500
	0.001	0.1	1000	1000
	0.0005	0.05	2000	2000
Extreme	0.0002	0.02	5000	5000
			PMP	



Executive Summary

The NSW State Government, through the Department of Planning, Industry and Environment (DPIE), oversee the Floodplain Management Program. The program provides support to local councils in the implementation of the NSW Government's Flood Prone Land Policy as outlined in the NSW Government's Floodplain Development Manual. The primary objective of the policy and manual is to reduce the impacts of flooding and flood liability on individual owners and occupiers. As part of this program Dubbo Regional Council, with the support of the NSW OEH, has commissioned HydroSpatial Pty Ltd to prepare the following Geurie Flood Study.

Geurie is located in the Dubbo Regional Council Local Government Area (LGA) in Central West NSW. The town is located on the Mitchell Highway and the Wellington - Dubbo railway line. Geurie Creek is located to the east of the town and is aligned north to south, discharging into the Macquarie River to the south. Boori Creek is a tributary to Geurie Creek and runs west to east through the town.

The following Flood Study consists of a data collection phase, hydrologic model development, hydraulic model development, historical flood simulations and design flood simulations. A data collection process was carried out to gather flood-related information that is used to inform the model development process. The hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs. The hydrologic model developed for this study used the Watershed Bounded Network Model (WBNM) software. The hydraulic model development was undertaken to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs. The hydraulic model developed for this study used the TUFLOW software.

Due to the scarcity of data, the 1999 historical event was modelled to verify the models and an extensive sensitivity analysis was undertaken. Following this, the design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically-based rainfall events. These events ranged from the 20% AEP event to the 0.2% AEP event and the PMF event.



1 Introduction

1.1 Overview

Dubbo Regional Council, with the support of the NSW OEH, has commissioned HydroSpatial Pty Ltd to prepare the following Geurie Flood Study.

1.2 Study Objectives

The objectives of the Flood Study are to develop a hydrologic and hydraulic model to:

- Identify existing flood risks and consequences;
- Inform the community and key stakeholders of the flood risk;
- Provide input into relevant government information systems;
- Provide input into government and strategic decision making on flood risk;
- Provide information for land-use planning and infrastructure planning;
- Provide information to emergency management agencies;
- Prepare tools suitable for use in the Floodplain Risk Management Study and Plan (FRMS&P), in which practical, feasible and economic measures will be investigated for mitigating flood risk.

1.3 Study Area Description

Geurie is located in the Dubbo Regional Council Local Government Area (LGA) in Central West NSW. The town is located on the Mitchell Highway and the Wellington – Dubbo railway line. The town is a limited service town for the local area, with a post office, a primary school and some shopping facilities. The suburb of Geurie has a population of 755 people and the urban centre of Geurie has a population of 477 people, according to the 2016 Australian Bureau of Statistics Census.

Geurie Creek is located to the east of the town and is aligned north to south, discharging into the Macquarie River to the south. Boori Creek is a tributary to Geurie Creek and runs west to east through the town. A small portion of Boori Creek is concrete-lined between Douglas Street and Wellington Street. The remainder of the creek system is naturally channelised and grass-lined.

There is limited underground stormwater drainage in and around the town. As such, stormwater is primarily conveyed through table drains adjacent to the roadways and discharging into the creeks.



2 Study Methodology

The following tasks were undertaken as part of Stage 3 of the Geurie Flood Study Project:

- Stakeholder consultation;
- Data collection;
- Hydrologic analysis;
- Hydraulic model development;
- Historical flood simulation; and
- Design flood simulation.

Stakeholder consultation was undertaken to gather local information on historical flood levels and flood behaviour. Further details on the stakeholder consultation are discussed in Section 3.

A data collection process was carried out to gather flood-related information from a number of sources. This included collating topographic data, infrastructure data, field trips, historical flood level data, historical rainfall data, and design rainfall data etc. Further details on the data collection are discussed in Section 3 and 4.

The hydrologic model development was carried out to calculate the runoff hydrographs as a function of the catchment conditions and the rainfall hyetographs. Further details on the hydrologic model development are discussed in Section 5.

The hydraulic model development was undertaken to estimate the flood levels, depths, velocities and extents generated from the catchment conditions and the runoff hydrographs (the latter of which was calculated in the hydrologic model). Further details on the hydraulic model development are discussed in Section 6.

Historical flood simulations were carried out to calibrate and validate the models' performance in representing flood behaviour in historical flood events. Further details on the historic simulations are discussed in Section 7.

Design flood simulations were carried out to determine the flood behaviour across the study area through a range of statistically-based rainfall events. Further details on the design simulations are discussed in Section 8.



3 Consultation

As part of this study, consultation has been undertaken with a number of stakeholders, as discussed within the following.

3.1 Community Consultation

3.1.1 First Round

A community consultation process was undertaken during the data collection stage of the study through the October 2018 period. The purpose of this community consultation work was to gather data from the community on historical flood events in the study area. This was achieved by conducting a "drop-in" style community information desk.

The community information desk was held at the Geurie General Store on the 31 October 2018 between 9am to 5pm. The information desk was occupied by representatives from HydroSpatial, Council and OEH. Twelve community members attended the information desk throughout the day.

The key issues raised and data provided during this community consultation process were:

- The issues raised were predominantly related to local drainage, rather than mainstream flooding.
- Other residents who did not raise specific issues indicated that the town did not have a significant flooding issue and that no flooding had been observed in recent years.



4 Available Data

Data is an important component of every study. As such, the first stage within a flood study is to collect and review the available data.

The data available for the study area included:

- Previous studies;
- Aerial-based survey data;
- Ground-based survey data;
- Historic flood data;
- Historic rainfall data; and
- Design rainfall data.

The data available was found to be of sufficient quantity and quality to enable the establishment of the hydrologic and hydraulic models used in the study.

4.1 Previous Studies

4.1.1 Geurie Flood Study (Ref 10)

The Geurie Flood Study was undertaken by Webb, McKeown and Associates on behalf of the former Wellington Council. The study was completed in October 2006. The aim of the study was to define the design flood behaviour for the Boon, Geurie, Heatherbrae and Limestone Creek Catchments.

The data collected as part of and used within this study included:

- Topographic contours at 10m intervals across the broader catchment and 0.5m intervals across the township area;
- Ground-based survey of the creeks and structures;
- Anecdotal data provided by the community, via a questionnaire and face-to-face interviews;
- Historical rainfall data from the daily read rainfall gauge at Geurie Post Office (station number 065018); and the pluviometer rainfall gauges at Wellington Research Centre (station number 065035), Dubbo Airport (station number 65070), and Jaymark Road Dubbo (station number 65092);
- Design rainfall data from ARR 1987.

From the anecdotal data provided by the community, it was reported that:

- In April 1990, significant amounts of surface water flowed over Geurie and Wellington Street;
- In February 1955, Geurie Creek flooded when the Macquarie River flooded;
- In 1999 some flooding was experienced, however exact dates and/or flood levels were not able to be recalled.
 - The railway line was reportedly being upgraded when floodwaters reached the underside of the western culvert, however contacting the Rail Infrastructure Corporation did not yield any further information on the flood event and/or details of the upgrade works.
 - Floodwater ponded in low lying areas upstream of the railway line, over Comabella Road near Fitzroy Street.

Additionally, photographs of flooding in 1999 were provided by a resident and have been re-published here in Photo 4-1 and Photo 4-2.



Photo 4-1: Comabella Road near Fitzroy Street during flooding in 1999 (Extracted from the 2006 Geurie Flood Study)



Photo 4-2: Corner of Fitzroy Street on left and Comabella Road in background during flooding in 1999 (Extracted from the 2006 Geurie Flood Study)

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The hydrologic model was established using the Watershed Bounded Network Model (WBNNM) package and the hydraulic model was established using the 1D MIKE11 software package. However, analysis of the historic rainfall data undertaken as part of this study found there to be insufficient data to carry out historic flood modelling and calibration of the models. To compensate for the lack of calibration, the hydrologic model was validated against the Probabilistic Rational Method and the hydraulic model underwent a rigorous sensitivity analysis.

Although the study was fit-for-purpose and used the modelling approaches that were available at the time, the following advances have been made since this study:

- Collection of Aerial Laser Survey (ALS) provided greater detail on ground elevations compared to the cross-section survey previously available.
- Advances to two-dimensional (2D) hydraulic modelling packages (coupled with the availability of ALS) has resulted in this technique being more widely used than previously.
- Updated intensity-frequency-duration (IFD) data published by the Bureau of Meteorology (2016) includes an additional 30 years of rainfall record to determine the statistical probability of rainfall events.
- The publication of ARR 2019 has updated many of the techniques and data used to estimate rainfall runoff.

4.2 Field Trip

A field trip on the 27 July 2018 was undertaken to gain an understanding of the study area. The main areas inspected were structures over Geurie Creek and Boori Creek, the railway and roadway embankments, rural features to the south of Geurie, and the urban areas of Geurie. A selection of photographs from the field trip are presented in Photo 4-3 to Photo 4-16.



Photo 4-3: Rural creek beds to the south of Geurie



Photo 4-4: Rural levee to the south of Geurie



Photo 4-5: Detention basin to the south of Geurie



Photo 4-6: Indicative urban conditions, looking east along Hill St



Photo 4-7: Railway embankment, north-side looking west



Photo 4-8: Culvert under the railway near the intersection of Narragal St and Douglas St



Photo 4-9: Culvert under Narragal St near the intersection with Chambers St



Photo 4-10: Culvert under the railway near the intersection of Narragal St and Chambers St

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Photo 4-11: Railway culverts over Geurie Creek, looking south from The Old Road



Photo 4-12: Mitchell Highway culverts over Geurie Creek, looking north



Photo 4-13: Jennings St Causeway over Boori Creek



Photo 4-14: Boori Creek between Jennings St and Wellington St, looking north



Photo 4-15: Mitchell St culvert over Boori Creek, looking south



Photo 4-16: Boori Creek to the east of Chambers St

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4.3 Topographic Data

4.3.1 Aerial-based Survey Data

A range of aerial-based topographic datasets were available across the study area, known as Aerial Laser Survey (ALS) data. Council provided ALS data that was collected in 2015 with a 1 m resolution and covered the majority of the town. Additional ALS data was sourced from the NSW Government Spatial Services to cover the area surrounding the town, which was collected in 2013 and had a 5 m resolution. The aerial-based topographic data extents and levels across the study area are shown on Figure 2.

Aerial-based topographic data (such as ALS) is a very efficient way to collect ground level data across a large area. However, there are some limitations to this collection method such as the inability to penetrate heavy vegetation or water-bodies, and solid structures (such as bridges or culverts over open channels). As such, details of these local features were collected via ground-based surveying.

4.3.2 Ground-based Survey Data

Council provided ground-based survey data of the stormwater-related infrastructure within the study area. This included bridges and culverts along Geurie Creek and Boori Creek. The data was collected by Council staff in 2019. The location of this data is shown on Figure 3.

4.3.3 Verification of Aerial-based Survey Data with Ground-based Survey Data

The aerial-based survey data was verified against state survey marks within the study area. These survey marks were filtered to exclude those whose ground level height accuracy was unknown, resulting in a sample set of 16 survey marks. From this assessment, the average difference between the aerial-based survey data and the state survey mark data was found to be 0.09 m. As the average difference was within the range of the vertical accuracy of the given LiDAR data (i.e. 0.3 m), the data was deemed fit-for-use for this study.

4.4 Historic Rainfall Data

4.4.1 Rainfall Gauges

Official rainfall gauges within a 100 km radius of the Geurie Town Centre that were active at any time between 1990 to date were sourced from the Bureau of Meteorology (BoM), shown in Table 4-1. The location of these rainfall gauges is shown on Figure 4.

Table 4-1: Rainfall Stations within 100 km of Geurie Town Centre

Distance	Station	Station name	First	Last	Type
0.92	65018	Geurie Post Office	1910 Jun	2015 Jan	Daily
4.59	65099	Geurie (Kurrabri)	2003 Jan	2018 Jun	Daily
13.93	65000	Arthurville (Cramond)	1888 Dec	2018 Jul	Daily
18.51	65035	Wellington Research Centre	1946 Jan	2005 Feb	Daily
18.51	65035	Wellington Research Centre	1961 Feb	2005 Feb	Continuous
18.92	65008	Dubbo (Jemaluang)	1995 Dec	2010 Dec	Daily
21.88	65092	Dubbo (Jaymark Road)	1984 Jan	1997 Jul	Daily
21.88	65092	Dubbo (Jaymark Road)	1986 Dec	1998 Aug	Continuous
22.32	65034	Wellington (D&J Rural)	1881 Nov	2018 Aug	Daily
22.32	65034	Wellington (D&J Rural)	2005 Mar	2015 Mar	Continuous
23.53	65082	Dubbo (Wilbertree)	1885 Feb	2014 May	Daily
26.43	65012	Dubbo (Darling Street)	1870 Sep	2009 Oct	Daily
27.7	65107	Dubbo (Muronbung)	1995 Jan	2011 Nov	Daily

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		(Bridgeview))			
30.12	65070	Dubbo Airport Aws	1994 Jun	2018 Aug	Daily
30.12	65070	Dubbo Airport Aws	2000 Apr	2015 Apr	Continuous
30.68	51091	Dubbo Airport (Old Tower)	2010 Jan	2018 Jul	Daily
32.13	65030	Dubbo (Mentone)	1894 Sep	2018 Jul	Daily
32.44	62079	Dripstone (Gernarl)	1968 Sep	2003 Nov	Daily
33.45	65098	Neurea (Fernfield)	2000 Dec	2018 Aug	Daily
36.28	64010	Elong Elong (Bendeels St)	1926 Jan	2018 Jul	Daily
39.76	62003	Mumbil (Burrendong Dam)	1951 Mar	2018 Jul	Daily
42.39	65106	Dubbo (Mogniguy (Kyarra))	2003 Oct	2018 May	Daily
42.85	62028	Goolma (Brooklyn)	1919 Jan	2018 Jul	Daily
43.52	65036	Yeoval Post Office	1895 Mar	2017 Dec	Daily
47.96	65105	Wellington (Cundumbul (Mehrudal))	1952 Jan	2017 Dec	Daily
49.64	50139	Tomingley (Gundonga)	1966 Jan	2018 Jul	Daily

4.4.2 Analysis of Daily Rainfall Data

Daily rainfall gauges typically collect data for the 24 hours prior to 9:00 am on the day the data is recorded. For instance, the data recorded on the 2nd January 2018 covers the period from 9:00 am on the 1st January 2018 to 9:00 am on the 2nd January 2018.

Table 4-2 details the highest daily rainfall values recorded at Geurie, Arthurville, Wellington and Dubbo. The gauge at Geurie Post Office was the closest gauge to the town centre and had the second longest period of record of the proximate gauges.

There were some dates that appeared to have relatively large rainfall values across multiple gauges, such as 24 February 1955, 9 February 1971, 20 April 1990, and 11 March 2000.

Table 4-2: Top 15 Daily Records at Geurie, Arthurville, Wellington and Dubbo

Geurie Post Office (65018) Jun 1910 - Jan 2015			Arthurville (65000) Dec 1886 - To Date		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	24/02/1955	170.4	1	24/02/1955	164.8
2	24/01/1930	116.3	2	20/04/1894	125.2
3	10/02/1992 (3 days)	113.4	3	26/12/2009	117.2
4	25/03/1926	102.9	4	12/01/1898	97.5
5	9/02/1971	102.9	5	15/05/1915	95.3
6	6/02/1950	100.3	6	25/03/1926	95.0
7	11/02/1973	93.2	7	12/01/1892	91.4
8	11/03/2000	92.0	8	20/04/1990	91.2
9	20/04/1990	91.0	9	24/01/1976	86.8
10	15/05/1915	90.7	10	9/02/1971	85.1
11	20/01/1950	88.9	11	7/12/1922	84.3
12	3/04/1989 (3 days)	87.0	12	1/03/2013	84.0

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13	5/03/1979	85.4	13	8/02/1973	80.5
14	6/11/1969	84.3	14	19/01/1950	79.2
15	1/03/2013	81.6	15	11/03/2000	78.4

Dubbo (65008) Dec 1990 - Dec 2010			Dubbo (65092) Jan 1984 - Jul 1997		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	28/12/2009	82.4	1	20/04/1990	89.8
2	8/02/2010	77.0	2	26/01/1993	78.4
3	4/02/2002	73.0	3	25/10/1989	60.4
4	2/12/2010	72.0	4	8/12/1986	58.0
5	22/12/2007	67.0	5	17/12/1992	53.0
6	24/08/2003	63.4	6	6/08/1984	51.4
7	11/03/2000	60.2	7	12/02/1997	51.0
8	19/11/2000	60.0	8	13/10/1985 (2 days)	48.6
9	26/12/2009	58.0	9	7/02/1988	48.6
10	28/12/2008	57.0	10	20/04/1984	48.2
11	7/11/2001	53.4	11	4/10/1993	47.6
12	31/01/2008	53.0	12	9/02/1992	46.8
13	4/12/2010	52.2	13	24/01/1991 (2 days)	45.6
14	2/04/2000	51.6	14	5/06/1988	45.2
15	18/05/2007	49.6	15	25/07/1990	44.8

Wellington Research Centre (65035) Jan 1946 - Feb 2005		
Rank	Date	Rainfall (mm)
1	24/02/1955	179.8
2	20/04/1990	96.0
3	11/03/2000	95.0
4	19/01/1950	89.9
5	8/02/1971	73.7
6	24/02/1982	69.8
7	6/11/1969	67.1
8	20/01/1956	66.3
9	9/02/1971	66.0
10	10/02/1954	64.5
11	5/03/1979	63.0
12	25/07/1990	61.0
13	10/02/1969	60.5
14	13/01/1984	60.2
15	12/02/1997	59.8

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4.4.3 Analysis of Pluviometer Rainfall Data

Pluviometer (or continuous) rainfall gauges typically collect data per increment of rainfall rather than per increment of time, thereby returning data at sub-daily intervals. In such a way, pluviometer gauges are ideal for analysing the short-duration, high-intensity storm bursts.

Table 4-3 details the highest hourly rainfall values for the pluviometer gauges located at Wellington and Dubbo; with Geurie roughly equidistant from these two locations.

Table 4-3: Top 15 Hourly Records at Wellington and Dubbo

Wellington Research Centre (85035) Feb 1961 - Feb 2005			Wellington D&J Rural (65034) Mar 2006 - Mar 2016		
Rank	Date	Rainfall (mm)	Rank	Date	Rainfall (mm)
1	23/02/1982 12:00	39.45	1	26/01/2013 23:00	32.8
2	12/01/1984 18:00	34.09	2	28/02/2013 23:00	32
3	13/05/1995 23:00	31.69	3	15/02/2006 18:00	27.4
4	10/12/1983 16:00	31.28	4	5/02/2010 19:00	24.2
5	22/01/1986 17:00	31.17	5	15/02/2006 17:00	22.8
6	24/02/1976 19:00	30.1	6	21/12/2007 23:00	20.6
7	20/03/1968 22:00	29.79	7	14/03/2014 21:00	19.6
8	7/02/1971 18:00	28.98	8	28/11/2012 18:00	18.6
9	12/01/1964 20:00	27.13	9	26/01/2013 22:00	18.6
10	7/02/1971 0:00	27.03	10	13/02/2010 19:00	18.4
11	1/12/1965 21:00	26.39	11	8/11/2005 1:00	17.2
12	16/12/1992 7:00	26.07	12	26/10/2007 16:00	17.2
13	19/11/1989 16:00	25.63	13	16/07/2013 15:00	17.2
14	28/01/1995 21:00	25.53	14	21/02/2007 21:00	16.4
15	14/12/1961 18:00	23.9	15	6/02/2011 9:00	16.2



Dubbie Airport AWS (86070) Mar 2006 - Mar 2018		
Rank	Date	Rainfall (mm)
1	8/02/2012 17:00	55.8
2	16/12/2016 23:00	46.2
3	26/01/2013 21:00	39.6
4	14/01/2012 21:00	29.2
5	24/03/2017 2:00	28.6
6	20/03/2017 16:00	25.2
7	13/03/2017 12:00	20
8	28/09/2011 23:00	17.8
9	24/12/2016 1:00	17.6
10	16/07/2014 5:00	17.4
11	3/04/2014 22:00	17
12	28/02/2013 20:00	16.8
13	16/09/2013 18:00	16.8
14	27/01/2016 16:00	16.8
15	13/03/2017 13:00	16.6

From this it can be seen that the period since the year 2000 has been characterised by relatively low intensity rainfall bursts compared to the period preceding the year 2000. This corresponds with the anecdotal data provided by Council and the community that no significant flood events have occurred in recent years within the study area.

4.4.4 Analysis of Specific Events

The continuous rainfall data for a number of specific events are analysed below based upon dates of known flooding provided by Council and the community. However, as there is no continuous rainfall gauge within Geurie, this analysis was undertaken on the gauge located in Wellington. From this, the dates of known flooding within Geurie were found to have recorded relatively low rainfall depths at the Wellington gauge; all being less than a 1 Exceedance per Year (EY) event. This indicates that the rainfall events that have caused flooding in the past may have been highly localised to the Geurie area, and therefore the rainfall data may not have been sufficiently captured at the gauges outside the study area.



Table 4-4: Analysis of Specific Events - Wellington Research Centre (65035) Pluviometer

	Storm Burst Rainfall Totals Recorded (mm)	Rainfall IFD Estimation
1999 Event (4.5hrs preceding 02:00pm on the 01/03/1999)	14.2	12 EY - 6 EY
1999 Event (12hrs preceding 03:00pm on the 03/10/1999)	27	4 EY - 3 EY
1990 Event (14hrs preceding 12:00am on the 20/04/1990)	60.72	0.5 EY - 0.2 EY
1971 Event (5hrs preceding 09:00pm on the 07/02/1971)	40.1	0.5 EY - 0.2 EY



5 Hydrologic Model Development

5.1 Overview

The hydrologic model developed for this study used the Watershed Bounded Network Model (WBNM) software (Ref 4). WBNM requires minimal model parameter assumptions as the software uses established relationships between catchment geomorphology and hydrology to calculate the rainfall runoff hydrographs. The software has been updated to include built-in functionality to estimate design floods using the ARR 2019 design flood estimation procedures; whilst retaining the software's built-in functionality to use the ARR 1987 design flood estimation procedures, should comparison or backward compatibility be necessary. For these reasons, WBNM was considered suitable for use in this study; with the WBNM version used being 2017_V001.

5.2 Sub-catchment Delineation

The hydrologic catchment area covered a region of 46 km². This area was defined by the topographical ridges that form the upper bounds of the watershed area.

A total of 143 sub-catchments were delineated across the total hydrologic catchment area. The sub-catchments along creeks covered a larger individual area than those within the town, corresponding to the relative difference in size of the hydrologic features defining each area. All of the sub-catchment extents are shown in Figure 5.

5.3 Model Parameters

A range of model parameters are used in the hydrologic model calculations undertaken within WBNM. These include:

- Lag Parameter;
- Routing Parameter;
- Impervious Area; and
- Rainfall Losses.

The selection of these parameters are discussed within the following sections.

5.3.1 Lag Parameter

The time difference between the centroids of the rainfall hyetograph and the runoff hyetograph is a function of catchment characteristics (such as area, shape and slope) and a specified lag parameter within WBNM. A lag parameter value of 1.6 was used for this study and corresponds to the recommendations provided in the WBNM documentation.

5.3.2 Routing Parameter

Routing of flows from upstream to downstream through the sub-catchments can be calculated by a number of different methods within WBNM, including the nonlinear routing, time-delay routing and Muskingum routing methods. The nonlinear routing method with a parameter value of 1.0 was used for this study. This parameter value corresponds with the WBNM recommended value for natural channels.

5.3.3 Impervious Area

The proportion of pervious to impervious surface area across a region will influence the rate at which runoff will occur from the region. The percentage of impervious surface area within individual sub-catchments was based on the proportion and type of land uses within the sub-catchments (corresponding to the hydraulic roughness extents, discussed in Section 6.3). The impervious percentage per land use type is summarised in Table 5-1.



Table 5-1: Impervious Percentage per Land Use Type

Land Use Type	Impervious Percentage
Roads/Pavements	50%
Low Density Residential Properties	40%
Vegetation (Light, Medium, and Heavy)	0%

5.3.4 Rainfall Losses

Rainfall losses represent the amount of rainfall that does not contribute to runoff due to interception by vegetation, infiltration into the soil, retention on the surface (depression storage), and transmission loss through stream beds and banks. Rainfall losses can be calculated through empirical models, simple models or process models. Empirical models include the Initial Loss – Continuing Loss (IL/CL) Method; the Initial Loss – Proportional Loss Method; the Variable Continuing Loss Method; the SCS Curve Number Method; the Probability Distribution Storage Capacity Models; and the Soil Water Balance Model (SWMOD). Simple models include the Horton Model; the Green-Ampt Model; and the Australian Representative Basin Model (ARBM). Process models involve a complex method with “a large number of parameters that makes them difficult to apply to estimate design floods” (ARR 2019).

ARR 2019 cites a number of studies that show the IL/CL method is suitable for design flood estimation over a range of event probabilities (AEP). As such, the IL/CL method was adopted for this study.

In applying the IL/CL method, the ARR Data Hub provides values on storm continuing losses, storm initial losses, pre-burst depths (of varying probability) and probability neutral burst initial losses. Chart 5-1 shows the distinction between the storm, the pre-burst, the storm initial loss and the burst initial loss. Earlier versions of ARR 2019 (i.e. ARR 2016) recommended that the burst initial losses be determined by subtracting the pre-burst depths from the storm initial losses. However with the release of ARR 2019 and the accompanying release of the NSW OEH Floodplain Risk Management Guide: Incorporating 2016 Australian Rainfall and Runoff in Studies (Ref 9) (herein referred to as the NSW OEH ARR 2016 Guidelines), further guidance was provided for catchments in the NSW region including the provision of the probability neutral storm initial losses values.

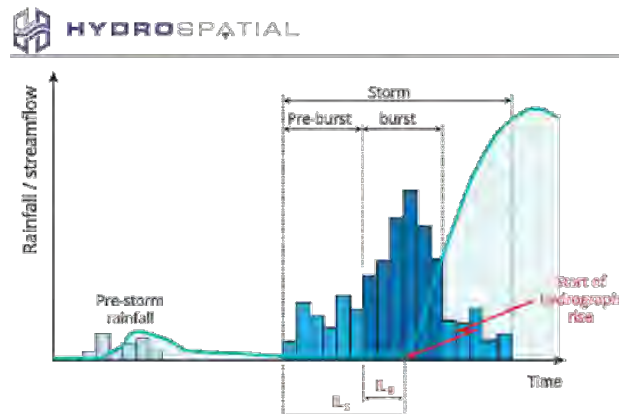


Chart 5-1: Distinction between storm and burst initial loss (Extracted from ARR 2019)

From the NSW OEH ARR 2016 Guidelines it is recommended that a hierarchical approach to loss estimation be used, provided below in order of preference (with 1 being the most preferred):

1. Use the average of calibration losses from the actual study on the catchment if available.
2. Use the average calibration losses from other studies in the catchment, if available and appropriate for the study.
3. Use the average calibration losses from other studies in similar adjacent catchments, if available and appropriate for the study.
4. Use the NSW FFA-reconciled losses available through the ARR Data Hub. These losses may be used within the catchment in which they were derived (available through the ARR Data Hub) or similar adjacent catchments with appropriate scrutiny. This is used with the unmodified ARR Data Hub initial losses which requires the application of additional scrutiny to the balance between initial loss and pre-burst to ensure it is reflective of flood history and observations for the catchment being investigated in the lead-up to events. This is particularly important in catchments of 100 km² or less.
5. Use default ARR data hub continuing losses for a location with a multiplication factor of 0.4. This is used with the unmodified ARR Data Hub initial losses which requires the application of additional scrutiny to the balance between initial loss and pre-burst to ensure it is reflective of flood history and observations for the catchment being investigated in the lead-up to events. This is particularly important in catchments of 100km² or less.

As calibration data was limited for the study area (discussed in Section 7), approach 1 could not be used. Previous studies undertaken for the study area (discussed in Section 4.1) were similarly restricted by lack of calibration data, therefore approach 2 and 3 could not be used. Furthermore, no stream gauge data was available for the study area, therefore an at-site Flood Frequency Analysis (FFA) could not be undertaken and approach 4 (which requires an at-site FFA to adjust the losses) could not be used. As such, approach 5 was adopted to calculate the initial and continuing losses for the study area (discussed in Section 8.2.1).



6 Hydraulic Model Development

6.1 Overview

The hydraulic model developed for this study used the TUFLOW software (Ref 3). The TUFLOW version used was 2018-03-AB with double precision.

6.2 Digital Elevation Model

The data used to generate the Digital Elevation Model (DEM) and the grid cell resolution are important components to the 2D domain definition used by TUFLOW.

The data used to generate the DEM is often dependent on:

- The degree of vertical accuracy;
- The horizontal resolution; and
- The date of collection (as older datasets may not entirely represent the current catchment conditions, if changes have occurred).

And the factors that influence the model grid cell resolution are:

- The purpose of the study;
- A balance between model resolution and model runtimes - with higher resolution models requiring longer computation runtimes; and
- The resolution of the available data - as very little is gained from modelling at a finer resolution than the input data.

Taking these factors into consideration, the LIDAR data (discussed in Section 4.3.1) was used to derive the DEM and establish a hydraulic model with a 3 m grid resolution across the study area.

6.3 Hydraulic Roughness

The hydraulic roughness (Manning's 'n') represents the hydraulic efficiency of the flow paths within the TUFLOW model. Various industry references provide guidelines for acceptable hydraulic roughness ranges for varying land use types including Chow (Ref 5), Henderson (Ref 6), and the ARR Revision Project 15. Field inspections were undertaken and the ARR Revision Project 15 guidelines were used to determine the Manning's 'n' values for varying land use types within the study area, detailed in Table 6-1.

Table 6-1: Roughness Values Adopted

Land Use Type	Adopted Manning's 'n' Value	Range of Acceptable Manning's 'n' Values
Roads	0.02	0.02 - 0.03
Concrete Open Channels	0.02	0.015 - 0.02
Urban	0.04	N/A *
Light Vegetation	0.03	0.03 - 0.05
Medium Vegetation	0.06	0.05 - 0.07

* Note: the Manning's 'n' values for residential and industrial/commercial areas within the guidelines are for use within the building extents not the urban area surrounding the building extents.

The aerial photography was used to delineate the spatial extents of the land use types (and thus the hydraulic roughness) throughout the study area, shown on Figure 6.



6.4 Hydraulic Structures

6.4.1 Bridges and Culverts

The bridges and culverts along Geurie Creek and Boori Creek were modelled as 1D features as the dimensions of the bridges and culverts were often smaller than the 2D grid cell size. The bridge and culvert details were obtained from the ground-based survey commissioned by Council (discussed in Section 4.3.2). The locations of the bridge and culvert structures modelled are shown in Figure 6.

6.4.2 Buildings

Buildings were simulated in the hydraulic model for the town as an absolute flow obstructions within the 2D domain. The building extents were determined from analysis of the aerial photography. This is shown in Figure 6.

6.5 Hydraulic Boundary Conditions

The hydraulic model requires inflow and boundary conditions to be specified. The runoff generated from upstream and outside of the study area was modelled as time-varying boundary conditions. The runoff generated from within the study area was modelled as time-varying local source-area inflows. These time-varying flows were derived from the routed hydrologic model. As the hydrologic model routes flow to the downstream end of the sub-catchments, the TUFLOW inflows were located at the downstream end of the sub-catchments so as not to duplicate routing calculations.

The downstream boundaries were modelled as water level versus flow boundary conditions, with the relationship between the two automatically calculated in TUFLOW using a specified slope. Within the study area, this slope was estimated to be 1.4 m over 100 m (i.e. 0.014 m/m).



7 Historical Flood Simulations

7.1 Overview

It is important to calibrate and validate the model's performance in representing flood behaviour in historical flood events prior to investigating design flood events. However, the degree of calibration is dependent upon the amount and type of calibration data available, such as:

- Rainfall records, in either daily or sub-daily (pluviograph) intervals;
- Stream flow gauges;
- Water level gauges;
- Historical catchment conditions (records of any changes to structures, land-forms, etc.);
- Photographs or videos recording historical flood events;
- Records of flood mark levels or extents from debris marks or watermarks etc.; and/or
- Anecdotal evidence

Where data is available, the models would ideally be calibrated to one historical event and validated to two historical events. Model calibration involves running the model with initial parameter estimates, then adjusting these parameter estimates (within the industry acceptable range) to produce model results that more closely correspond to the observed flood information. Model validation follows model calibration and involves running the models with other historical rainfall events and no additional refinement of the parameter values.

7.2 Historic Event Selection

Due to the scarcity of data, a full model calibration and validation process could not be undertaken for the study area. To compensate for this, a model verification process (detailed in the following Section) and extensive sensitivity analysis (detailed in Section 8.3) was undertaken.

The model verification process involved hydrologic and hydraulic modelling of the October 1999 event. This was based upon the community consultation process undertaken in the previous flood study (discussed in Section 4.1.1) that described 1999 as the last period of known flooding, though it was described as affecting low lying land with no buildings affected by flooding. Therefore a "reverse-calibration" method was used, whereby model results showing no flooding of property was considered to be a qualitative verification of the models.

7.3 Historic Parameters

The pluviometer data from the Wellington Research Centre (65035) gauge was applied to the hydrologic model. The initial rainfall losses corresponding with a 720 minute storm duration for a 50% AEP event was used; as the 720 minute cumulative rainfall depths recorded for the 1999 event at the Wellington pluviometer was found to be less than a 50% AEP event. As no specific details were available regarding the prevailing catchment conditions (such as the dimensions of the previous culverts through the Railway Embankment or details on the exact dates of this culvert upgrade), the current catchment conditions were assumed.

7.4 Historic Flood Simulation Results

Figure 8 shows the hydraulic model's peak flood depth for the October 1999 event. From this, the peak flood depth was found to be less than 0.15 m across the majority of the Geurie township area. As such, the results were considered to approximately verify the hydraulic model.



8 Design Flood Simulations

8.1 Overview

A design event is a statistically-based estimate of the probability of a certain rainfall depth being recorded at a certain location over a defined duration. The various magnitudes of these statistically-based estimates are usually discussed in terms of the Annual Exceedance Probability (AEP); such as the 1% AEP event, which is an event that has a 1% chance of occurring in any given year. The terminology for design events is discussed in the Forward.

8.2 Design Parameters

8.2.1 Rainfall Losses

As discussed in Section 5.3.4, approach 5 of the NSW OEH ARR 2016 Guidelines were used to estimate the initial and continuing losses. From this, the continuing loss was estimated to be 0.6 mm/hr (from 1.5 mm/hr multiplied by 0.4). Whereas, the burst initial loss varied per event probability and event duration; as detailed in Appendix C for all probabilities and durations.

8.2.2 Areal Reduction Factors

Areal Reduction Factors (ARF) are a ratio between the design values of areal average rainfall and the point rainfall; to account for the fact that larger catchments are less likely than smaller catchments to experience high intensity storms concurrently across the total catchment area. The ARR 2019 procedure for calculating the ARF for catchments between 10 and 1000 km² was applied to the 46 km² study area. The results of this calculation for all event probabilities and event durations are detailed in Appendix C.

8.2.3 Rainfall Depths

The design rainfall depths were extracted from the BoM's 2016 Rainfall IFD Data System for the centroid of each of the sub-catchments. An example of this data is shown in Appendix B for the Geurie Post Office location.

8.2.4 Rainfall Spatial Patterns

The rainfall spatial patterns were derived using the methodology recommended in ARR 2019. This entailed:

1. Extracting the design rainfall depths for each of the sub-catchment centroids from the BoM website.
2. Multiplying the design rainfall depths by the sub-catchment area for each individual sub-catchment.
3. Calculating the weighted average design rainfall depth for the study area by summing the values calculated in Step 2 above and dividing by the total catchment area.
4. Calculating the catchment average design rainfall depth by multiplying the ARF values (discussed in Section 8.2.2) by the weighted average values (calculated in Step 3 above).
5. Calculating the design spatial pattern for each individual sub-catchment by taking the point rainfall values (calculated in Step 1 above), dividing by the weighted average values (calculated in Step 3 above) and multiplying by the catchment average values (calculated in Step 4 above).

The minimum and maximum range of the design rainfall spatial patterns calculated for all event probabilities and event durations are detailed in Appendix C.

8.2.5 Rainfall Temporal Patterns

As the study area is less than 75 km², the point temporal patterns were applied to design storm durations. The point temporal patterns for the Central Slopes region encompassed the total catchment area, and therefore these were exclusively applied.

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8.2.6 Critical Temporal Pattern and Storm Duration

8.2.6.1 Hydrology

In areas of riverine flooding, the "ensemble" approach from ARR 2019 determines the critical duration and critical pattern as being that which produced the peak discharge one higher than the highest average and/or median peak discharge (via the hydrologic modelling).

To determine this, box and whisker plots were analysed for each design storm event for the four main external inflows upstream of Geurie; namely GEU_301, GEU_401, GEU_501, and GEU_601. Appendix C presents the table and plots for each of these inflow locations for the 20% AEP, 5% AEP, and 1% AEP event.

For the 20% AEP event, three of the four inflow locations produced the same critical duration and temporal pattern; namely the 540 minute storm duration with temporal pattern 6 (Event ID 2413). In the one instance where the critical temporal pattern differed from this, the critical duration remained the 540 minute storm duration and temporal pattern 6 was ranked 4th highest (as in two higher than the average and median peak discharge). As such, for the 20% AEP event the 540 minute storm duration with temporal pattern 6 was adopted.

For the 10% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 360 minute storm duration with temporal pattern 7 (Event ID 2373).

For the 5% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 360 minute storm duration with temporal pattern 7 (Event ID 2373).

For the 2% AEP event, the four inflow locations produced the same critical duration and temporal pattern; namely the 270 minute storm duration with temporal pattern 9 (Event ID 2333).

For the 1% AEP event, two of the inflow locations produced a critical duration of 180 minutes and the remaining two inflow locations produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for both. For the inflow locations that produced a critical duration of 270 minutes, temporal pattern 9 (Event ID 2282) was critical. As such, both the 180 minute and 270 minute storm durations (with their respective critical temporal patterns) were adopted for the 1% AEP event.

For the 0.5% AEP event, three of the inflow locations produced a critical duration of 180 minutes and the remaining inflow location produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for two locations. Where the critical duration was the 180 minute but temporal pattern 7 was not critical, temporal pattern 7 was ranked 6th highest (as in one lower than the median peak discharge) with a peak discharge of 0.08 m³/s below the median peak discharge. Therefore, the 180 minute storm duration with temporal pattern 7 was adopted for the 0.5% AEP event.

For the 0.2% AEP event, three of the inflow locations produced a critical duration of 180 minutes and the remaining inflow location produced a critical duration of 270 minutes. For the inflow locations that produced a critical duration of 180 minutes, temporal pattern 7 (Event ID 2279) was critical for two locations. Where the critical duration was the 180 minute but temporal pattern 7 was not critical, temporal pattern 7 was ranked 7th highest (as in two lower than the median peak discharge) with a peak discharge of 0.61 m³/s below the median peak discharge. Therefore, the 180 minute storm duration with temporal pattern 7 was adopted for the 0.2% AEP event.



8.2.6.2 Hydraulics

In urban overland flow areas, where flooding is less directionally constrained, the "ensemble" approach from ARR 2019 determines the critical duration and critical pattern as being that which produced the peak flood level one higher than the highest average peak flood level (via the hydraulic modelling).

To determine this, box and whisker plots were analysed for the 20% AEP, 5% AEP and the 1% AEP peak flood levels; so as to represent each of the temporal pattern ranges i.e. the frequent temporal pattern range (events that are more frequent than the 14.4% AEP event), the intermediate temporal pattern range (events that are between a 3.2% AEP event and a 14.4% AEP event), and the rare temporal pattern range (events that are rarer than a 3.2% AEP event).

For the 20% AEP event, two of the locations produced a critical duration of 540 minutes and the remaining two inflow locations produced a critical duration of 360 minutes. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 540 minute with temporal pattern 6 (Event ID 2413), which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 360 minutes with temporal pattern 3 (Event ID 2380). As such, both the 360 minute and 540 minute storm durations (with their respective critical temporal patterns) were adopted for the frequent temporal pattern range.

For the 5% AEP event, the four locations produced the three critical duration and temporal patterns. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 360 minute with temporal pattern 2 (Event ID 2379). However, the 360 minute storm duration with temporal pattern 7 (which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1) was found to be ranked 3rd highest at these locations; hence this latter duration and temporal pattern were adopted. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 120 minutes, with temporal pattern 7 (Event ID 2274) and temporal pattern 1 (Event ID 2268) respectively. However, where temporal pattern 7 was critical the next highest ranked temporal pattern was temporal pattern 1 (ranked 4th). And where temporal pattern 1 was critical the 3rd ranked temporal pattern was temporal pattern 7. The difference in flood level between these two temporal patterns was 0.006 m at each of the two locations where the 120 minute storm duration was critical. Therefore, the 120 minute storm duration with temporal pattern 1 and the 360 minute storm duration with temporal pattern 7 were adopted for the intermediate temporal pattern range.

For the 1% AEP event, two of the locations produced a critical duration of 270 minutes and the remaining two inflow locations produced a critical duration of 90 minutes. The locations on Geurie Creek (with Location ID H03 and H16) had a critical duration of 270 minute with temporal pattern 9 (Event ID 2282), which corresponded with the critical duration and temporal pattern of the inflows, discussed in Section 8.2.6.1. The locations on Boori Creek (with Location ID H030 and H033) had a critical duration of 90 minutes with temporal pattern 8 (Event ID 2222). As such, both the 270 minute and 90 minute storm durations (with their respective critical temporal patterns) were adopted for the rare temporal pattern range.

8.2.6.3 Summary

Table 8-1 summarises the critical storm duration and temporal pattern adopted for each event probability based upon both the hydrologic and hydraulic model analysis (discussed in Section 8.2.6.1 and 8.2.6.2, respectively).



Table 8-1: Critical duration and temporal pattern for each event probability

Event Probability	Critical Duration and Temporal Pattern
20% AEP	360 minute TP03 540 minute TP06
10% AEP	120 minute TP01 360 minute TP07
5% AEP	120 minute TP01 360 minute TP07
2% AEP	90 minute TP08 270 minute TP09
1% AEP	90 minute TP08 180 minute TP07 270 minute TP09
0.5% AEP	90 minute TP08 180 minute TP07
0.2% AEP	90 minute TP08 180 minute TP07
PMF	60 minute 120 minute

8.3 Design Parameter Sensitivity Analysis

A sensitivity analysis process was undertaken on the parameters selected for the design events to estimate the variation in peak flood levels possible under an alternate parameter scenario. The following sections detail the methodology and results from this process.

8.3.1 Rainfall Temporal Patterns

As discussed in Section 8.2.6.1, the temporal pattern selected for the design events were the ones that produced the peak discharge one higher than the highest average peak discharge. To assess the sensitivity of peak flood levels to the temporal pattern selected, the temporal patterns that produced the highest and lowest peak discharge for the selected critical storm duration was analysed. The results of this analysis are provided in Appendix D (Section D.1.)

From this it was found that the models were highly sensitivity to variations in rainfall temporal patterns. The temporal pattern that produced the lowest discharge produced lower peak flood levels and vice versa.

8.3.2 Rainfall Losses

The sensitivity of the models to variations in rainfall losses (either continuing loss or initial loss) was analysed. The sensitivity to continuing losses were assessed by modelling the unadjusted ARR Data Hub values and by modelling the 60% adjusted ARR Data Hub values; and comparing to the results to the adopted 40% adjusted ARR Data Hub values (discussed in Section 5.3.4 and 8.2.1). The sensitivity to initial losses were assessed by modelling the ARR 2016 method of calculating the burst initial losses (by subtracting the pre-burst depths

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from the storm initial losses) using the median, the 75% and the 90% pre-burst depths. The results of this analysis are provided in Appendix D (Section D.2.)

From this it was found that the peak flow and peak flood level was relatively insensitive to variations in continuing rainfall losses. Generally, the peak flood level difference was less than 0.05 m across the town; however slightly higher differences were seen in the downstream portion of Geurie Creek.

By comparison, the models were found to be highly sensitive to variations in initial rainfall losses. The results detailed in Appendix D show a large variation in peak flow and peak flood level when the rainfall initial loss is varied for the selected storm duration and temporal pattern. However, it was also found that varying the initial rainfall losses resulted in a variation in critical storm duration and temporal pattern; with the median pre-burst depths producing longer critical durations compared to the base case, and the 90% pre-burst depths producing slightly shorter critical durations compared to the base case.

8.3.3 Hydrologic Lag and Routing

The sensitivity of the models to variations in hydrologic lag and hydrologic routing was analysed. This was undertaken by varying the lag parameter by $\pm 6\%$ of the adopted values and decreasing the routing parameter to correspond with excavated earth instead of the base case of natural channels. The results of this analysis are provided in Appendix D (Section D.3.).

From this it was found that Geurie Creek was more sensitive to variations in hydrologic lag and routing, whereas Boori Creek through town was less sensitive. Generally, increasing the hydrologic lag values resulted in a decrease in peak flood levels and vice versa.

8.3.4 Hydraulic Roughness

The sensitivity of the peak flood levels to the hydraulic roughness parameters selected was analysed by varying the hydraulic roughness parameters by $\pm 20\%$ of the adopted values. The results of this analysis are provided in Appendix D (Section D.4.).

From this it was found that Geurie Creek was more sensitive to variations in hydraulic roughness, whereas Boori Creek through town was less sensitive. Generally, increasing the hydraulic roughness values resulted in a decrease in peak flood levels and vice versa.

8.3.5 Blockage of Hydraulic Structures

The sensitivity of the peak flood levels to blockage of bridges and culverts was analysed by comparing the peak flood levels from the base case to a 25% blockage scenario and a 50% blockage scenario. The results of this analysis are provided in Appendix D (Section D.5.).

Generally, this scenario resulted in increased flood levels upstream of the blocked structure and decreased flood levels downstream of the structure. However, where structures were located in close proximity, these structures were found to be influenced by the cumulative effects of multiple upstream blockages as well.

8.4 Design Flood Simulation Results

8.4.1 Post Processing Methodology

Hydraulic modelling defines flood behaviour in terms of peak flood levels, peak flood depths and flood velocities. Flood categories are further defined as functions of these flood metrics, as discussed in the following.

8.4.1.1 Hazard Categories

There are two standard industry methods for determining flood hazard categories as defined by the Floodplain Development Manual (2005) and Australian Rainfall and Runoff (2019). Both methods use the depth and velocity product, however they differ in the thresholds applied and the categories denoted.

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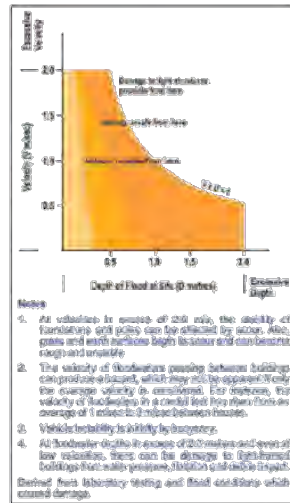


FIGURE 8.1 - Velocity & Depth Relationship

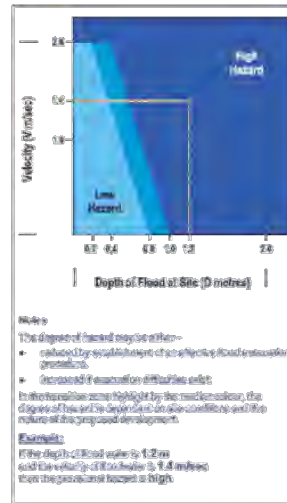
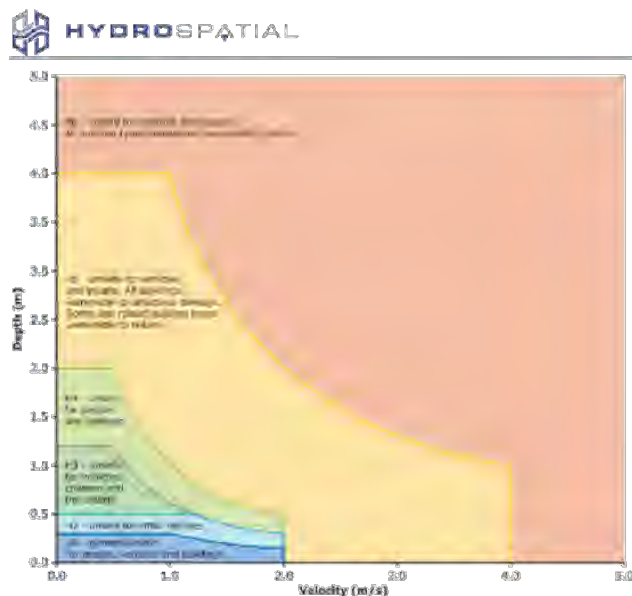


FIGURE 8.2 - Provisional Hydraulic Hazard Categories

Chart 8-1: Flood Hazard Thresholds (FDM, 2005)

The FDM (2005) method denotes hazard categories as 'low hazard' or 'high hazard' based upon the thresholds, shown in Chart 8-1. The high hazard category is particularly significant as it is a criterion in regulating complying development as per the State Environmental Planning Policy (SEPP) (Exempt and Complying Development Codes) 2008. Until such a time as the SEPP Codes are updated to correspond to ARR (2019) method it remains important to define flood hazard as per the FDM (2005) method.



The ARR (2019) method is defined in both the Australian Rainfall and Runoff Guidelines (Ref 2) and also in the AEM Handbook 7 Guidelines (Ref 1). This method denotes hazard categories as H1, H2, H3, H4, H5 and H6; with the greater risk attributed to the highest category (i.e. H6), shown in Chart 8-2. These hazard categories are described as follows:

- H1 - Generally safe for vehicles, people and buildings.
- H2 - Unsafe for small vehicles.
- H3 - Unsafe for vehicles, children and the elderly.
- H4 - Unsafe for vehicles and people.
- H5 - Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
- H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

The results of this process are discussed in Section 8.4.2.

8.4.1.2 Flood Function (formerly Flood Hydraulic Categories)

The Floodplain Development Manual (2005) identifies three hydraulic categories: floodways, flood storage, and flood fringe. Floodway is described as those areas where a significant portion of the flood flow is conveyed and where partial blockage will negatively affect flood behaviour to a substantial extent. Flood storage is described as those areas where the temporary storage of floodwaters during the passage of a flood is important. Flood fringe is



described as the remaining area affected by flooding, excluding the floodway and flood storage areas.

Although a description is given for each, a technical method to define these hydraulic categories is not provided by the Manual. A number of different methods are available for use, including the Howells et al (2003) method, the Thomas et al (2012) method, and the 5% AEP extent coupled with the encroachment method. The latter two methods are best suited to estimating hydraulic categories where mainstream flood behaviour is being investigated, however the methods are less suited to overland flood behaviour. As such, the Howells et al (2003) method was used as it is well suited to both the mainstream and the overland flood behaviour being investigated in the study area.

From the Howells et al (2003) method, the hydraulic categories were defined as follows:

- Floodway where:
 - the peak velocity-depth product ($V \times D$) $> 0.25 \text{ m}^2/\text{s}$ AND the peak velocity $> 0.25 \text{ m/s}$; OR
 - the peak velocity $> 1.0 \text{ m/s}$ AND the peak depth $> 0.15 \text{ m}$.
- Flood Storage where:
 - the area is outside of the Floodway; AND
 - the peak flood depth $> 0.5 \text{ m}$.
- Flood Fringe where:
 - the area is outside the Floodway; AND
 - the peak flood depth $< 0.5 \text{ m}$.

The results of this process are discussed in Section 8.4.2.

8.4.1.3 Emergency Response Classification of Communities

The AEMI Handbook 7 Guidelines (Ref 1) provides national guidance on flood emergency response and presents six classifications that are described in Table 8-2, with the flow chart to determine these classifications shown in Chart 8-3.

The results of this process are discussed in Section 8.4.2.



Table 8-2: Flood Emergency Response Classification Table (Extracted from the AEM Handbook 7 Guidelines 2017)

Primary Category	Primary Description	Secondary Category	Secondary Description	Tertiary Category	Tertiary Description	Category
Flooded (F)	The area is flooded in the PMF	Isolated (I)	Areas that are isolated from community evacuation facilities (located on flood-free land) by floodwater and/or impossible terrain as waters rise during a flood event up to and including the PMF. These areas are likely to lose electricity, gas, water, sewerage and telecommunications during a flood.	Submerged (S)	Where all the land in the isolated area will be fully submerged in a PMF after becoming isolated.	FIS
				Elevated (E)	Where there is a substantial amount of land in isolated areas elevated above the PMF.	FIE
		Exit Route (E)	Areas that are not isolated in the PMF and have an exit route to community evacuation facilities (located on flood-free land).	Overland Escape (O)	Evacuation from the area relies upon overland escape routes that rise out of the floodplain.	FEO
				Rising Road (R)	Evacuation routes from the area follow roads that rise out of the floodplain.	FER



Not Flooded (N)	The area is not flooded in the PMF.			Indirect Consequences (IC)	Areas that are not flooded but may lose electricity, gas, water, sewerage, telecommunications and transport links due to flooding.	N/C
				Flood Free	Areas that are not flood affected and are not affected by indirect consequences of flooding.	



Table 8-3: Peak Flood Depth (m) for Key Locations

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	2.33	2.55	2.87	3.06	3.26	3.48	3.77	8.55
H02	Geurie Ck - Upstream of Mitchell Hwy	0.98	1.12	1.21	1.23	1.29	1.39	1.48	2.81
H03	Geurie Ck - Upstream of Railway Tracks (east)	1.38	1.65	1.95	2.08	2.24	2.40	2.49	3.82
H04	Geurie Ck - Upstream of Railway Tracks (west)	1.59	1.91	2.22	2.35	2.50	2.63	2.71	3.96
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.65	0.76	0.85	0.89	0.97	1.04	1.14	2.74
H06	Jennings St (south-east of Mitchell St)	0.49	0.53	0.56	0.60	0.69	0.79	0.89	2.38
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.52	0.57	0.60	0.62	0.65	0.69	0.71	1.37
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.36	0.53	0.67	0.71	0.74	0.79	0.82	1.21
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.90	1.04	1.12	1.15	1.17	1.15	1.18	1.98
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.34	0.39	0.42	0.47	0.51	0.55	0.58	1.24
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.54	0.56	0.58	0.60	0.61	0.63	0.64	1.30
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	1.08	1.14	1.24	1.35	1.40	1.44	1.49	2.16
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.59	0.63	0.66	0.69	0.71	0.74	0.77	1.37
H14	Boori Ck (north of Railway Tracks)	0.31	0.38	0.43	0.47	0.51	0.57	0.62	1.18



Figure 18 to Figure 25 shows the peak flood velocity across the study area for events ranging from the 20% AEP event to the PMF event. In events of a smaller magnitude (such as the 5% AEP event), the high velocity flows greater than 1.5 m/s were predominantly confined to the concrete-lined open channels through the town, along Geurie Creek and the upstream tributaries. However, in events of a larger magnitude (such as the 1% AEP event), the high velocity flows also encroached upon the roadways (particularly the Mitchell Highway) and the railway embankment.

Figure 26 to Figure 33 shows the flood hazard categories across the study area for events ranging from the 20% AEP event to the PMF event. In events of a smaller magnitude (such as the 5% AEP event), the H1 category covered the majority of the town, however the hazard categories were more severe along Geurie Creek (up to the H5-H6 category). In events of a larger magnitude (such as the 1% AEP event), slightly more severe hazard categories occurred through some properties between Arthurville Road and the Mitchell Highway.

Figure 34 to Figure 41 shows the flood function categories across the study area for events ranging from the 20% AEP event to the PMF event. Generally, floodways corresponded to Geurie Creek and Boori Creek; however in larger magnitude events (such as the 1% AEP event) the floodway extents encroached upon some properties between Arthurville Road and the Mitchell Highway. Across all events investigated, the flood storage areas were confined to areas upstream of the Mitchell Highway embankment and the railway embankment.

Figure 42 shows the flood emergency response classification of communities as per the methodology discussed in Section 8.4.1.3. The predominant classifications across the study area were Flood - Isolated - Submerged (FIS) and Flood - Isolated - Elevated (FIE). In the areas classified as FIS, the area is isolated and then fully inundated in the PMF event. Whereas in areas classified as FIE, the area is isolated but not inundated in the PMF event. The remainder of the study area either had an exit route or was indirectly affected by flooding.



9 References

- Ref 1: Australian Emergency Management Institute (2017), *Australian Emergency Management Handbook 7: Managing the Floodplain Best Practice in Flood Risk Management in Australia*, AEMI, Canberra
- Ref 2: Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) (2016), *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia
- Ref 3: BMT WBM (2016), *TUFLOW User Manual*
- Ref 4: Boyd, M., Rigby, E., VanDrie, R. (2017), *Watershed Bounded Network Model (WBNN) User Guide*
- Ref 5: Chow, V.T. (1959), *Open Channel Hydraulics*, McGraw-Hill, New York
- Ref 6: Henderson, F.M. (1966), *Open Channel Flow*, MacMillan, New York
- Ref 7: Institute of Engineers, Australia (1987), *Australian Rainfall and Runoff: A Guide to Flood Estimation, Vol. 1*, Editor-in-chief D.H. Pilgrim, Revised Edition 1987 (Reprinted 1998), Barton, ACT
- Ref 8: NSW Government (2005), *Floodplain Development Manual: The management of flood liable land*, Department of Infrastructure, Planning and Natural Resources, NSW Government, Sydney
- Ref 9: NSW Office of Environment and Heritage (2019), *Floodplain Risk Management Guide: Incorporating 2016 Australian Rainfall and Runoff in Studies*, NSW Government
- Ref 10: Webb, McKeown and Associates Pty Ltd (2006), *Geurie Flood Study*, Wellington Council



APPENDIX A GLOSSARY



The following glossary has been extracted from the Australian Emergency Management Handbook 7 (Ref 1).

Annual Exceedance Probability (AEP)	The likelihood of the occurrence of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood flow of 500 m ³ /s has an AEP of 5%, it means that there is a 5% chance (that is, a one-in-20 chance) of a flow of 500 m ³ /s or larger occurring in any one year (see also average recurrence interval, flood risk, likelihood of occurrence, probability).
Astronomical tide	The variation in sea level caused by the gravitational effects of (principally) the moon and sun. It includes highest and lowest astronomical tides (HAT and LAT) occur when relative alignment and distance of the sun and moon from the earth are 'optimal'. Water levels approach to within 20 cm of HAT and LAT twice per year around mid-summer and mid-winter 'king tides'.
Australian Height Datum (AHD)	A common national survey height datum as a reference level for defining reduced levels; 0.0 m AHD corresponds approximately to sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood-prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time. If the damage associated with various annual events is plotted against their probability of occurrence, the AAD is equal to the area under the consequence-probability curve. AAD provides a basis for comparing the economic effectiveness of different management measures (i.e. their ability to reduce the AAD).
Average Recurrence Interval (ARI)	A statistical estimate of the average number of years between the occurrence of a flood of a given size or larger than the selected event. For example, floods with a flow as great as or greater than the 20-year ARI (5% AEP) flood event will occur, on average, once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event (see also annual exceedance probability).
Catchment	The area of land draining to a particular site. It is related to a specific location, and includes the catchment of the main waterway as well as any tributary streams.
Catchment flooding	Flooding due to prolonged or intense rainfall (e.g. severe thunderstorms, monsoonal rains in the tropics, tropical cyclones). Types of catchment flooding include riverine, local overland and groundwater flooding.
Chance	The likelihood of something happening that will have beneficial consequences (e.g. the chance of a win in a lottery). Chance is often thought of as the 'upside of a gamble' (Rowe 1990) (see also risk).
Coastal flooding	Flooding due to tidal or storm-driven coastal events, including storm surges in lower coastal waterways. This can

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	be exacerbated by wind-wave generation from storm events.
Consent authority	The authority or agency with the legislative power to determine the outcome of development and building applications.
Consequence	The outcome of an event or situation affecting objectives, expressed qualitatively or quantitatively. Consequences can be adverse (e.g. death or injury to people, damage to property and disruption of the community) or beneficial.
Defined Flood Event (DFE)	The flood event selected for the management of flood hazard to new development. This is generally determined in floodplain management studies and incorporated in floodplain management plans. Selection of DFEs should be based on an understanding of flood behaviour, and the associated likelihood and consequences of flooding. It should also take into account the social, economic, environmental and cultural consequences associated with floods of different severities. Different DFEs may be chosen for the basis for reducing flood risk to different types of development. DFEs do not define the extent of the floodplain, which is defined by the PMF (see also design flood, floodplain and probable maximum flood).
Design flood	The flood event selected for the treatment of existing risk through the implementation of structural mitigation works such as levees. It is the flood event for which the impacts on the community are designed to be limited by the mitigation work. For example, a levee may be designed to exclude a 2% AEP flood, which means that floods rarer than this may breach the structure and impact upon the protected area. In this case, the 2% AEP flood would not equate to the crest level of the levee, because this generally has a freeboard allowance, but it may be the level of the spillway to allow for controlled levee overtopping (see also annual exceedance probability, defined flood event, floodplain, freeboard and probable maximum flood).
Development	<p>Development may be defined in jurisdictional legislation or regulation. This may include erecting a building or carrying out of work, including the placement of fill; the use of land, or a building or work, or the subdivision of land.</p> <p>Infill development refers to the development of vacant blocks of land within an existing subdivision that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development.</p> <p>New development is intensification of use with development of a completely different nature to that associated with the former land use or zoning (e.g. the urban subdivision of an area previously used for rural purposes). New developments generally involve rezoning, and associated consents and approvals. It may require major extensions of existing urban services, such as roads, water supply, sewerage and electric power.</p>

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	Redevelopment refers to rebuilding in an existing developed area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major extensions to urban services.
Ecologically sustainable development	Using, conserving and improving natural resources so that ecological processes on which life depends are maintained, and the total quality of life - now and in the future - can be maintained or increased.
Effective warning time	The effective warning time available to a floodprone community is equal to the time between the delivery of an official warning to prepare for imminent flooding and the loss of evacuation routes due to flooding. The effective warning time is typically used for people to self-evacuate, to move farm equipment, move stock, raise furniture, and transport their possessions.
Existing flood risk	The risk a community is exposed to as a result of its location on the floodplain.
Flash flood	Flood that is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. It is generally not possible to issue detailed flood warnings for flash flooding. However, generalised warnings may be possible. It is often defined as flooding that peaks within six hours of the causative rain.
Flood	Flooding is a natural phenomenon that occurs when water covers land that is normally dry. It may result from coastal or catchment flooding, or a combination of both (see also catchment flooding and coastal flooding).
Flood awareness	An appreciation of the likely effects of flooding, and a knowledge of the relevant flood warning, response and evacuation procedures. In communities with a high degree of flood awareness, the response to flood warnings is prompt and effective. In communities with a low degree of flood awareness, flood warnings are liable to be ignored or misunderstood, and residents are often confused about what they should do, when to evacuate, what to take with them and where it should be taken.
Flood damage	The tangible (direct and indirect) and intangible costs (financial, opportunity costs, clean-up) of flooding. Tangible costs are quantified in monetary terms (e.g. damage to goods and possessions, loss of income or services in the flood aftermath). Intangible damages are difficult to quantify in monetary terms and include the increased levels of physical, emotional and psychological health problems suffered by flood-affected people that are attributed to a flooding episode.
Flood education	Education that raises awareness of the flood problem, to help individuals understand how to manage themselves and their property in response to flood warnings and in a flood.

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	event. It invokes a state of flood readiness.
Flood emergency response plan	A step-by-step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of connected emergency operations. The objective is to ensure a coordinated response by all agencies having responsibilities and functions in emergencies.
Flood emergency management	Emergency management is a range of measures to manage risks to communities and the environment. In the flood context, it may include measures to prevent, prepare for, respond to and recover from flooding.
Flood fringe areas	The part of the floodplain where development could be permitted, provided the development is compatible with flood hazard and appropriate building measures to provide an adequate level of flood protection to the development. This is the remaining area affected by flooding after flow conveyance paths and flood storage areas have been defined for a particular event (see also flow conveyance areas and flood storage areas).
Flood hazard	Potential loss of life, injury and economic loss caused by future flood events. The degree of hazard varies with the severity of flooding and is affected by flood behaviour (extent, depth, velocity, isolation, rate of rise of floodwaters, duration), topography and emergency management.
Floodplain	An area of land that is subject to inundation by floods up to and including the probable maximum flood event - that is, flood-prone land.
Floodplain management entity (FME)	The authority or agency with the primary responsibility for directly managing flood risk at a local level.
Floodplain management plan	<p>A management plan developed in accordance with the principles and guidelines in this handbook, usually includes both written and diagrammatic information describing how particular areas of flood-prone land are to be used and managed to achieve defined objectives. It outlines the recommended ways to manage the flood risk associated with the use of the floodplain for various purposes. It represents the considered opinion of the local community and the floodplain management entity on how best to manage the floodplain, including consideration of flood risk in strategic land-use planning to facilitate development of the community.</p> <p>It fosters flood warning, response, evacuation, clean-up and recovery in the onset and aftermath of a flood, and suggests an organisational structure for the integrated management for existing, future and residual flood risks. Plans need to be reviewed regularly to assess progress and to consider the consequences of any changed circumstances that have arisen since the last review.</p>
Flood Planning Area (FPA)	The area of land below the flood planning level, and is thus subject to flood-related development controls.

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Flood Planning Level (FPL)	The FPL is a combination of the defined flood levels (derived from significant historical flood events or floods of specific annual exceedance probabilities) and freeboards selected for floodplain management purposes, as determined in management studies and incorporated in management plans.
Flood-prone land	Land susceptible to flooding by the probably maximum flood event. Flood-prone land is synonymous with the floodplain. Floodplain management plans should encompass all flood-prone land rather than being restricted to areas affected by defined flood events.
Flood proofing of buildings	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures that are subject to flooding, to reduce structural damage and potentially, in some cases, reduce contents damage.
Flood readiness	An ability to react within the effective warning time (see also flood awareness and flood education).
Flood risk	The potential risk of flooding to people, their social setting, and their built and natural environment. The degree of risk varies with circumstances across the full range of floods. Flood risk is divided into three types - existing, future and residual.
Flood severity	A qualitative indication of the 'size' of a flood and its hazard potential. Severity varies inversely with likelihood of occurrence (i.e. the greater the likelihood of occurrence, the more frequently an event will occur, but the less severe it will be). Reference is often made to major, moderate and minor flooding (see also minor, moderate and major flooding).
Flood storage areas	The parts of the floodplain that are important for temporary storage of floodwaters during a flood passage. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas (see also flow conveyance areas and flood fringe areas).
Flood study	A comprehensive technical investigation of flood behaviour. It defines the nature of flood hazard across the floodplain by providing information on the extent, level and velocity of floodwaters, and on the distribution of flood flows. The flood study forms the basis for subsequent management studies and needs to take into account a full range of flood events up to and including the probable maximum flood.
Flow	The rate of flow of water measured in volume per unit time - for example, cubic metres per second (m ³ /s). Flow is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
Flow conveyance areas	Those areas of the floodplain where a significant flow of

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	<p>water occurs during floods. They are often aligned with naturally defined channels. Flow conveyance paths are areas that, even if only partially blocked, would cause a significant redistribution of flood flow or a significant increase in flood levels. They are often, but not necessarily, areas of deeper flow or areas where higher velocities occur, and can also include areas where significant storage of floodwater occurs.</p> <p>Each flood has a flow conveyance area, and the extent and flood behaviour within flow conveyance areas may change with flood severity. This is because areas that are benign for small floods may experience much greater and more hazardous flows during larger floods (see also flood fringe areas and flood storage areas).</p>
Freeboard	<p>The height above the DFE or design flood used, in consideration of local and design factors, to provide reasonable certainty that the risk exposure selected in deciding on a particular DFE or design flood is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels and so on. Freeboard compensates for a range of factors, including wave action, localised hydraulic behaviour and levee settlement, all of which increase water levels or reduce the level of protection provided by levees. Freeboard should not be relied upon to provide protection for flood events larger than the relevant defined flood event of a design flood.</p> <p>Freeboard is included in the flood planning level and therefore used in the derivation of the flood planning area (see also defined flood event, design flood, flood planning area and flood planning level).</p>
Frequency	<p>The measure of likelihood expressed as the number of occurrences of a specified event in a given time. For example, the frequency of occurrence of a 20% annual exceedance probability or five-year average recurrence interval flood event is once every five years on average (see also annual exceedance probability, annual recurrence interval, likelihood and probability).</p>
Future flood risk	<p>The risk that new development within a community is exposed to as a result of developing on the floodplain.</p>
Gauge height	<p>The height of a flood level at a particular gauge site related to a specified datum. The datum may or may not be the AHD (see also Australian height datum).</p>
Habitable room	<p>In a residential situation, a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. In an industrial or commercial situation, it refers to an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.</p>
Hazard	<p>A source of potential harm or a situation with a potential to cause loss. In relation to this handbook, the hazard is flooding, which has the potential to cause damage to the community.</p>

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Hydraulics	The study of water flow in waterways; in particular, the evaluation of flow parameters such as water level, extent and velocity.
Hydrograph	A graph that shows how the flow or stage (flood level) at any particular location varies with time during a flood.
Hydrologic analysis	The study of the rainfall and runoff process, including the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
Intolerable risk	A risk that, following understanding of the likelihood and consequences of flooding, is so high that it requires consideration of implementation of treatments or actions to improve understanding, avoid, transfer or reduce the risk.
Life-cycle costing	All of the costs associated with the project from the cradle to the grave. This usually includes investigation, design, construction, monitoring, maintenance, asset and performance management and, in some cases, decommissioning of a management measure.
Likelihood	A qualitative description of probability and frequency (see also frequency and probability).
Likelihood of occurrence	The likelihood that a specified event will occur. (With respect to flooding, see also annual exceedance probability and average recurrence interval).
Local overland flooding	Inundation by local runoff on its way to a waterway, rather than overbank flow from a stream, river, estuary, lake or dam. Can be considered synonymous with stormwater flooding.
Loss	Any negative consequence or adverse effect, financial or otherwise.
Mathematical and computer models	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
Merit approach	The merit approach weighs social, economic, ecological and cultural impacts of land-use options for different flood-prone areas, together with flood damage, hazard and behaviour implications, and environmental protection and wellbeing of rivers and floodplains. This approach operates at two levels. At the strategic level, it allows for the consideration of flood hazard and associated social, economic, ecological and cultural issues in formulating statutory planning instruments, and development control plans and policies. At a site specific level, it involves consideration of the best way of developing land in consideration of the zonings in a statutory planning instruments, and development control plans and policies.
Minor, moderate and major flooding	These terms are often used in flood warnings to give a general indication of the types of problems expected with a flood.

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Probability	<p>A statistical measure of the expected chance of flooding. It is the likelihood of a specific outcome, as measured by the ratio of specific outcomes to the total number of possible outcomes.</p> <p>Probability is expressed as a number between zero and unity, zero indicating an impossible outcome and unity indicating an outcome that is certain. Probabilities are commonly expressed in terms of percentage. For example, the probability of 'throwing a six' on a single roll of a die is one in six, or 0.167 or 16.7% (see also annual exceedance probability).</p>
Probable Maximum Flood (PMF)	<p>The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from PMP and, where applicable, snow melt, coupled with the worst flood-producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood-prone land - that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event, should be addressed in a floodplain risk management study.</p>
Probable Maximum Precipitation (PMP)	<p>The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (VMO 1985). It is the primary input to probable maximum flood estimation.</p>
Rainfall intensity	<p>The rate at which rain falls, typically measured in millimetres per hour (mm/h). Rainfall intensity varies throughout a storm in accordance with the temporal pattern of the storm (see also temporal pattern).</p>
Residual flood risk	<p>The risk a community is exposed to that is not being remedied through established risk treatment processes. In simple terms, for a community, it is the total risk to that community, less any measure in place to reduce that risk.</p> <p>The risk a community is exposed to after treatment measures have been implemented. For a town protected by a levee, the residual flood risk is the consequences of the levee being overtopped by floods larger than the design flood. For an area where flood risk is managed by land-use planning controls, the residual flood risk is the risk associated with the consequences of floods larger than the DFE on the community.</p>
Risk	<p>'The effect of uncertainty on objectives' (ISO31000:2009). NOTE 4 of the definition in ISO31000:2009 also states that 'risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence'. Risk is based upon the consideration of the consequences of the full range of flood behaviour on communities and their</p>

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	social settings, and the natural and built environment (see also likelihood and consequence).
Risk analysis	The systematic use of available information to determine how often specified (flood) events occur and the magnitude of their likely consequences. Flood risk analysis is normally undertaken as part of a floodplain management study, and involves an assessment of flood levels and hazard associated with a range of flood events (see also flood study).
Risk management	The systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring flood risk. Flood risk management is undertaken as part of a floodplain management plan. The floodplain management plan reflects the adopted means of managing flood risk (see also floodplain management plan).
Riverine flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam. Riverine flooding generally excludes watercourses constructed with pipes or artificial channels considered as stormwater channels.
Runoff	The amount of rainfall that drains into the surface drainage network to become stream flow, also known as rainfall excess.
Stage	Equivalent to water level. Both stage and water level are measured with reference to a specified datum (e.g. the Australian height datum).
Storm surge	The increases in coastal water levels above predicted astronomical tide level (i.e. tidal anomaly) resulting from a range of location dependent factors including the inverted barometer effect, wind and wave setup and astronomical tidal waves, together with any other factors that increase tidal water level (see also astronomical tide, wind set-up and wave set-up).
Stormwater flooding	Is inundation by local runoff caused by heavier than usual rainfall. It can be caused by local runoff exceeding the capacity of an urban stormwater drainage systems, flow overland on the way to waterways or by the backwater effects of mainstream flooding causing urban stormwater drainage systems to overflow (see also local overland flooding).
Temporal pattern	The variation of rainfall intensity with time during a rainfall event.
Tidal anomaly	The difference between recorded storm surge levels and predicted astronomical tide level.
Treatment options	The measures that might be feasible for the treatment of existing, future and residual flood risk at particular locations within the floodplain. Preparation of a treatment plan requires a detailed evaluation of floodplain management options (see

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also floodplain management plan).	
Velocity of floodwater	The speed of floodwaters, measured in metres per second (m/s).
Vulnerability	The degree of susceptibility and resilience of a community, its social setting, and the natural and built environments to flood hazards. Vulnerability is assessed in terms of ability of the community and environment to anticipate, cope and recover from flood events. Flood awareness is an important indicator of vulnerability (see also flood awareness).
Wave set-up	The increase in water levels in coastal waters (within the breaker zone) caused by waves transporting water shorewards. The zone of wave set-up against the shore is balanced by a zone of wave 'set-down' (i.e. reduced water levels) seawards of the breaker zone. Wave setups of 2-4 m could occur during tropical cyclones.
Wind set-up	The increase in water levels in coastal waters caused by the wind driving the water shorewards and 'piling it up' against the shore. Wind set-up can be as high as 10 m in an extreme case, and often exceeds 2-3 m in typical tropical cyclones.



APPENDIX B
ARR DATA HUB

APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

Results | ARR Data Hub

ITEM NO: FPM19/1

<http://data.arr-software.org/>

ATTENTION: This site was updated recently, changing some of the functionality. Please see the changelog (/changelog) for further information

Australian Rainfall & Runoff Data Hub - Results

Input Data

Longitude	149.457
Latitude	-32.303
Selected Regions (clear)	
River Region	show
ARR Parameters	show
Storm Losses	show
Temporal Patterns	show
Areal Temporal Patterns	show
BOM IFDs	show
Median Proburst Depths and Ratios	show
10% Proburst Depths	show
25% Proburst Depths	show
75% Proburst Depths	show
90% Proburst Depths	show
Interim Climate Change Factors	show
Probability Neutral Burst Initial Loss (hsw specific)	show
Baseflow Factors	show



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Results | ARR Data Hub

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<http://data.arr-software.org/>

Data

River Region

Division	Murray-Darling Basin
River Number	22
River Name	Macquarie-Bogan Rivers
Shape Intersection (%)	100.0

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2016 v1

ARF Parameters

$$ARF = Min \left\{ 1, \left[1 - a (Area^b - c \log_{10} Duration) Duration^d \right. \right. \\ \left. \left. + e Area^f Duration^g (0.3 + \log_{10} AEP) \right. \right. \\ \left. \left. + h 10^{(Area^{0.001})} (0.3 + \log_{10} AEP) \right] \right\}$$

Zone	a	b	c	d	e	f	g	h	i	Shape Intersection (%)
Central NSW	0.265	0.241	0.505	0.321	0.00058	0.414	-0.921	0.016	-0.00033	100.0

Short Duration ARF

$$ARF = Min \left[1, 1 - 0.287 (Area^{0.205} - 0.436 \log_{10} (Duration)) \cdot Duration^{-0.38} \right. \\ \left. + 2.26 \times 10^{-3} \times Area^{0.226} \cdot Duration^{0.125} (0.3 + \log_{10} (AEP)) \right. \\ \left. + 0.0141 \times Area^{0.213} \times 10^{-\frac{(0.029 \cdot Duration^{0.001})}{1895}} (0.3 + \log_{10} (AEP)) \right]$$

Layer Info

Time Accessed	20 May 2019 10:21AM
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APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

ITEM NO: FPM19/1

Results | ARR Data Hub

<http://data.arr-software.org/>

Version 2016_v1

Storm Losses

Note: Burst Loss = Storm Loss - Preburst

Note: These losses are only for rural use and are **NOT FOR DIRECT USE** in urban areas

Note: As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (/nsw_specific) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. The continuing storm loss information from the ARR Datahub provided below should only be used where relevant under the loss hierarchy (level 5) and where used is to be multiplied by the factor of 0.4.

Storm Initial Losses (mm)	39.0
Storm Continuing Losses (mm/h)	1.5

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2016_v1

Temporal Patterns | Download (.zip) (/static/temporal_patterns/TP/CS.zip)

code	CS
Label	Central Slopes
Shape Intersection (%)	100.0

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2016_v2

Areal Temporal Patterns | Download (.zip) (/static/temporal_patterns/Areal/Areal_CS.zip)

code	CS
arealabel	Central Slopes
Shape Intersection (%)	100.0

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2016_v2

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APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

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Results | ARR Data Hub

<http://data.arr-software.org/>

BOM IFDs

Click here (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016&coordinate_type=dd&latitude=-32.3826713754&longitude=148.856953501&admin=true&sdm=true&day=true&user_label=-) to obtain the IFD depths for catchment centroid from the BOM website

Layer Info

Time Accessed 20 May 2019 10:21AM

Median Preburst Depths and Ratios

Values are of the format depth (ratio) with depth in mm

min (h)/AEP(%)	50	20	10	5	2	1
60 (1.0)	1.4 (0.061)	1.1 (0.035)	0.9 (0.024)	0.7 (0.016)	0.6 (0.011)	0.5 (0.005)
90 (1.5)	0.7 (0.025)	1.2 (0.034)	1.8 (0.037)	1.9 (0.039)	0.9 (0.016)	0.1 (0.002)
120 (2.0)	0.8 (0.026)	0.9 (0.024)	1.1 (0.023)	1.2 (0.023)	1.0 (0.016)	0.9 (0.013)
180 (3.0)	0.7 (0.022)	0.7 (0.016)	0.7 (0.014)	0.7 (0.012)	1.3 (0.016)	1.7 (0.021)
360 (6.0)	1.1 (0.023)	2.1 (0.040)	2.8 (0.045)	3.5 (0.049)	5.5 (0.065)	7.0 (0.075)
720 (12.0)	0.0 (0.000)	2.5 (0.038)	4.1 (0.054)	5.8 (0.065)	8.4 (0.082)	10.5 (0.091)
1080 (18.0)	0.0 (0.000)	0.7 (0.010)	1.2 (0.014)	1.7 (0.017)	4.7 (0.040)	7.0 (0.058)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	3.1 (0.024)	5.4 (0.037)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.8 (0.005)	0.8 (0.005)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed 20 May 2019 10:21AM

Version 2018_v1

Note Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

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Results | ARR Data Hub

<http://data.arr-software.org/>

10% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)/AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide prebust has been slightly altered. Point values remain unchanged.

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Results | ARR Data Hub

<http://data.arr-software.org/>

25% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h)/AEP(%)	50	20	10	5	2	1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide prebust has been slightly altered. Point values remain unchanged.

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Results | ARR Data Hub

<http://data.arr-software.org/>

75% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h) AEP(%)	50	20	10	5	2	1
60 (1.0)	12.8 (0.541)	9.1 (0.288)	6.8 (0.183)	4.6 (0.108)	7.1 (0.139)	8.8 (0.158)
80 (1.5)	11.7 (0.444)	12.7 (0.386)	13.4 (0.318)	14.1 (0.289)	13.1 (0.229)	12.3 (0.183)
120 (2.0)	13.9 (0.488)	15.1 (0.388)	15.8 (0.345)	16.6 (0.314)	16.5 (0.267)	16.5 (0.239)
180 (3.0)	10.5 (0.330)	11.9 (0.274)	12.8 (0.249)	13.6 (0.231)	13.3 (0.265)	21.8 (0.284)
360 (5.0)	12.2 (0.311)	10.8 (0.376)	24.8 (0.389)	29.7 (0.415)	37.9 (0.452)	44.2 (0.472)
720 (12.0)	6.1 (0.128)	15.9 (0.247)	22.4 (0.295)	28.6 (0.326)	37.1 (0.360)	43.5 (0.376)
1080 (18.0)	3.5 (0.064)	10.4 (0.144)	15.0 (0.176)	19.4 (0.198)	27.4 (0.234)	33.3 (0.252)
1440 (24.0)	6.4 (0.007)	3.4 (0.043)	5.3 (0.058)	7.2 (0.067)	17.2 (0.135)	24.8 (0.171)
2160 (36.0)	0.0 (0.009)	2.8 (0.032)	4.8 (0.045)	6.3 (0.058)	10.2 (0.071)	13.1 (0.080)
2880 (48.0)	0.0 (0.008)	1.6 (0.017)	2.5 (0.024)	3.7 (0.028)	8.3 (0.058)	11.6 (0.068)
4320 (72.0)	0.0 (0.008)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	1.4 (0.006)	2.4 (0.012)

Layer Info

Time Accessed	20 May 2018 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

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90% Preburst Depths

Values are of the format depth (ratio) with depth in mm

min (h) AEP(%)	50	20	10	5	2	1
60 (1.0)	34.3 (1.473)	27.8 (0.879)	23.5 (0.627)	19.3 (0.448)	26.9 (0.566)	36.1 (0.835)
90 (1.5)	27.5 (1.045)	40.5 (1.136)	49.3 (1.167)	57.6 (1.184)	48.5 (0.848)	41.7 (0.884)
120 (2.0)	30.0 (1.049)	39.1 (1.005)	45.1 (0.985)	50.9 (0.965)	57.9 (0.935)	63.1 (0.915)
180 (3.0)	42.9 (1.335)	40.5 (0.832)	39.0 (0.780)	37.5 (0.836)	43.9 (0.722)	59.1 (0.789)
360 (5.0)	24.9 (0.833)	40.9 (0.774)	51.6 (0.828)	61.8 (0.865)	71.8 (0.885)	79.2 (0.846)
720 (12.0)	22.0 (0.457)	43.5 (0.676)	57.9 (0.764)	71.6 (0.822)	73.9 (0.716)	75.6 (0.652)
1080 (18.0)	16.0 (0.296)	30.5 (0.423)	40.3 (0.473)	49.5 (0.505)	59.8 (0.512)	67.4 (0.511)
1440 (24.0)	5.3 (0.091)	13.9 (0.177)	19.5 (0.212)	25.0 (0.234)	51.6 (0.405)	71.6 (0.484)
2160 (36.0)	6.0 (0.093)	13.7 (0.157)	18.8 (0.192)	23.6 (0.198)	30.4 (0.253)	46.0 (0.200)
2880 (48.0)	3.4 (0.057)	10.9 (0.117)	15.9 (0.144)	20.7 (0.161)	36.5 (0.234)	48.3 (0.270)
4320 (72.0)	0.1 (0.001)	4.3 (0.043)	7.2 (0.058)	9.9 (0.088)	17.3 (0.160)	22.9 (0.115)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1
Note	Prebust interpolation methods for catchment wide prebust has been slightly altered. Point values remain unchanged.

APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

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Results | ARR Data Hub

<http://data.arr-software.org/>

Interim Climate Change Factors

	RCP 4.5	RCP6	RCP 8.5
2030	0.972 (4.9%)	0.847 (4.2%)	1.052 (5.3%)
2040	1.225 (6.2%)	1.127 (5.7%)	1.495 (7.5%)
2050	1.452 (7.3%)	1.406 (7.1%)	1.971 (10.1%)
2060	1.653 (8.4%)	1.635 (8.6%)	2.480 (12.9%)
2070	1.827 (9.3%)	1.853 (10.1%)	3.023 (15.9%)
2080	1.974 (10.1%)	2.241 (11.5%)	3.599 (19.2%)
2090	2.095 (10.8%)	2.518 (13.1%)	4.208 (22.8%)

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2019_v1
Note	ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia website.

Probability Neutral Burst Initial Loss

min (h) AEP(%)	50	20	10	5	2	1
60 (1.0)	23.4	18.3	16.6	16.9	17.1	16.1
90 (1.5)	26.4	19.9	15.9	15.3	14.6	13.7
120 (2.0)	28.7	18.9	16.3	15.8	14.7	12.2
180 (3.0)	32.2	18.7	17.5	17.9	15.9	13.1
360 (5.0)	32.7	20.7	17.1	15.6	13.5	8.8
720 (12.0)	34.3	23.2	18.8	17.5	14.8	9.1
1080 (18.0)	35.2	26.2	23.4	21.9	19.5	13.2
1440 (24.0)	39.3	30.7	29.3	28.7	23.8	15.0
2160 (36.0)	39.6	31.4	30.7	31.1	28.2	19.0
2880 (48.0)	40.5	33.0	32.5	33.2	30.3	19.6
4320 (72.0)	41.6	34.8	35.7	36.7	34.4	28.2

Layer Info

Time Accessed	20 May 2019 10:21AM
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Results | ARR Data Hub

<http://data.arr-software.org/>

Version 2018_v1

Note As this point is in NSW the advice provided on losses and pre-burst on the NSW Specific Tab of the ARR Data Hub (*new_spreadin*) is to be considered. In NSW losses are derived considering a hierarchy of approaches depending on the available loss information. Probably neutral burst initial loss values for NSW are to be used in place of the standard initial loss and pre-burst as per the losses hierarchy.

Baseflow Factors

Downstream	9653
Area (km2)	16172.463224
Catchment Number	9665
Volume Factor	0.201522
Peak Factor	0.034516
Shape Intersection (%)	88.3

Layer Info

Time Accessed	20 May 2019 10:21AM
Version	2018_v1

Download TXT (downloads/0e27428d-144b-4c49-a2b1-02e5618ede79.txt)

Download JSON (downloads/0e8d05d7-a824-4388-8202-ee31a7830f0.json)

Generating PDF... (downloads/4612122c-d028-48a4-adb6-7ee11b6c7267.pdf)

APPENDIX NO: 2 - GEURIE FLOOD STUDY - DRAFT - OCTOBER 2019

ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/revised-ifd/design-ver...>



Location

Label: Geurie Post Office (Gauge 65016)
Latitude: -32.3927 [Nearest grid cell: 32.3875 (S)]
Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

Very Frequent Design Rainfall Depth (mm)

Issued: 24 April 2019

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New AEP probability terminology](#)

Duration	Exceedance per Year (EY)							
	12EY	6EY	4EY	3EY	2EY	1EY	0.5EY*	0.2EY*
1 min	0.687	0.808	1.02	1.19	1.42	1.86	2.32	2.69
2 min	1.19	1.40	1.75	2.01	2.41	3.15	3.95	4.95
3 min	1.64	1.93	2.43	2.80	3.35	4.38	5.45	6.81
4 min	2.04	2.40	3.04	3.51	4.19	5.42	6.78	8.46
5 min	2.39	2.82	3.58	4.14	4.94	6.37	7.96	9.92
10 min	3.72	4.41	5.63	6.49	7.73	9.89	12.3	15.3
15 min	4.65	5.50	7.00	8.06	9.58	12.2	15.2	19.0
20 min	5.35	6.32	8.02	9.22	10.9	13.9	17.4	21.6
25 min	5.93	6.99	8.83	10.1	12.0	15.3	19.1	23.8
30 min	6.42	7.54	9.50	10.9	12.9	16.4	20.5	25.5
45 min	7.56	8.82	11.0	12.6	14.9	18.9	23.6	29.5
1 hour	8.42	9.78	12.1	13.9	16.3	20.7	25.9	32.3
1.5 hour	9.70	11.2	13.8	15.7	18.5	23.4	29.2	36.5
2 hour	10.7	12.3	15.1	17.1	20.1	25.4	31.7	39.6
3 hour	12.2	13.9	17.1	19.4	22.6	28.5	35.6	44.3
4.5 hour	13.8	15.8	19.3	21.8	25.5	32.0	39.9	49.5
6 hour	15.0	17.2	21.0	23.8	27.8	34.7	43.3	53.6
9 hour	16.9	19.4	23.7	26.9	31.4	39.1	48.7	60.0
12 hour	18.3	21.0	25.8	29.2	34.1	42.5	52.9	65.0
18 hour	20.3	23.4	28.8	32.7	38.3	47.8	59.3	72.8
24 hour	21.6	25.1	31.0	35.3	41.3	51.7	64.1	79.7
30 hour	22.7	26.3	32.7	37.2	43.6	54.9	67.9	83.5
36 hour	23.5	27.3	33.9	38.7	45.5	57.4	71.1	87.5
48 hour	24.6	28.7	35.8	40.9	48.3	61.4	76.0	93.9
72 hour	25.9	30.3	38.0	43.7	51.9	66.6	82.7	103
96 hour	26.5	31.1	39.3	45.3	54.1	70.0	87.1	109
120 hour	26.8	31.5	40.1	46.5	55.8	72.5	90.4	114

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Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfall/indexed-ifd/design-ver...>

144 hour	26.9	31.6	40.8	47.4	57.1	74.4	93.0	117
168 hour	27.0	31.7	41.3	48.2	58.2	75.9	95.1	121

Note:

The 0.5 EY design rainfall corresponds to the 2 year Average Recurrence Interval (ARI) IFD **not** the 50% AEP IFD.

* The 0.2 EY design rainfall corresponds to the 5 year Average Recurrence Interval (ARI) IFD **not** the 20% AEP IFD.

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ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology

<http://www.bom.gov.au/water/designRainfalls/design-ifd/coordinates...>



Location

Label: Geurie Post Office (Gauge 65016)

Latitude: -32.3527 [Nearest grid cell: 32.3875 (S)]

Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

IFD Design Rainfall Depth (mm)

Issued: 24 April 2019

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New AEP probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	1.86	2.09	2.84	3.35	3.87	4.56	5.13
2 min	3.15	3.56	4.65	5.74	6.62	7.74	8.59
3 min	4.35	4.91	6.68	7.99	9.11	10.7	11.9
4 min	5.42	6.11	8.29	9.80	11.3	13.3	14.8
5 min	6.37	7.17	9.72	11.5	13.3	15.6	17.4
10 min	9.89	11.1	15.0	17.8	20.5	24.2	27.3
15 min	12.2	13.7	18.6	22.0	25.4	30.1	33.9
20 min	13.9	15.7	21.2	25.1	29.0	34.4	38.7
25 min	15.3	17.2	23.3	27.6	31.9	37.8	42.4
30 min	16.4	18.4	25.0	29.6	34.2	40.5	45.5
45 min	18.9	21.3	28.9	34.2	39.5	46.6	52.2
1 hour	20.7	23.3	31.7	37.5	43.3	51.0	57.0
1.5 hour	23.4	26.3	35.8	42.3	48.7	57.3	63.9
2 hour	25.4	28.6	38.8	45.8	52.8	61.9	69.0
3 hour	28.5	32.0	43.4	51.2	58.9	69.0	76.8
4.5 hour	32.0	35.9	48.5	57.1	65.6	77.0	85.8
6 hour	34.7	39.0	52.5	61.8	70.9	83.4	93.0
9 hour	39.1	43.8	58.8	69.2	79.4	93.6	105
12 hour	42.5	47.5	63.8	75.0	86.1	102	115
18 hour	47.8	53.4	71.4	84.0	96.6	115	130
24 hour	51.7	57.7	77.2	91.0	105	126	143
30 hour	54.9	61.2	81.9	96.5	112	134	153
36 hour	57.4	64.0	85.8	101	117	142	162
48 hour	61.4	68.5	92.0	109	127	154	176
72 hour	66.6	74.5	101	120	140	171	196
96 hour	70.0	78.5	107	128	150	182	209
120 hour	72.5	81.4	111	134	157	191	219

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Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/index.cfm?coordinat...>

144 hour	74.4	83.8	115	138	162	197	225
168 hour	75.9	85.7	118	142	166	202	230

Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

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ITEM NO: FPM19/1

Rainfall IFD Data System: Water Information: Bureau of Meteorology

<http://www.bom.gov.au/water/design/RainfallRevised-IFD/Design-rar...>



Location

Label: Geurie Post Office (Gauge 65016)

Latitude: -32.3927 [Nearest grid cell: 32.3875 (S)]

Longitude: 148.8281 [Nearest grid cell: 148.8375 (E)]

Rare Design Rainfall Depth (mm)

Issued: 24 April 2010

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New ABS probability terminology](#)

Duration	Annual Exceedance Probability (1 in x)				
	1 in 100	1 in 200	1 in 500	1 in 1000	1 in 2000
1 min	5.13	5.94	7.00	7.89	8.86
2 min	8.59	9.87	11.6	13.1	14.8
3 min	11.9	13.7	16.1	18.2	20.4
4 min	14.8	17.1	20.2	22.7	25.5
5 min	17.4	20.2	23.8	26.8	30.1
10 min	27.3	31.7	37.3	42.0	47.2
15 min	33.9	39.3	46.3	52.1	58.5
20 min	38.7	44.8	52.8	59.5	66.8
25 min	42.4	49.1	57.9	65.2	73.3
30 min	45.5	52.7	62.0	69.9	78.5
45 min	52.2	60.4	71.2	80.2	90.1
1 hour	57.0	65.9	77.7	87.5	98.4
1.5 hour	63.9	73.8	87.0	98.1	110
2 hour	69.0	79.8	94.0	106	119
3 hour	76.8	89.0	105	118	133
4.5 hour	85.8	99.5	117	132	148
6 hour	93.0	108	127	143	161
9 hour	105	122	144	162	182
12 hour	115	133	157	177	198
18 hour	130	151	178	201	225
24 hour	143	165	195	219	246
30 hour	153	176	208	234	264
36 hour	162	186	219	247	278
48 hour	176	201	237	268	302
72 hour	196	223	263	296	333
96 hour	209	237	280	315	354

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Rainfall IFD Data System: Water Information: Bureau of Meteorology <http://www.bom.gov.au/water/designRainfalls/index.shtml/design-rar...>

120 hour	219	248	292	328	368
144 hour	225	256	301	338	378
168 hour	230	262	308	345	385

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APPENDIX C
DESIGN PARAMETER CALCULATIONS



The design parameter calculations for all event probabilities and durations are provided below.

C.1 Rainfall Losses

The rainfall burst initial losses calculated for the full range of event probabilities and durations are detailed in Table 9-1.

Table 9-1: All Event Probabilities and Durations - Design Rainfall Burst Initial Loss

Storm Duration (minutes)	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP
15 *	18.3	16.6	16.9	17.1	16.1
20 *	18.3	16.6	16.9	17.1	16.1
25 *	18.3	16.6	16.9	17.1	16.1
30 *	18.3	16.6	16.9	17.1	16.1
45 *	18.3	16.6	16.9	17.1	16.1
60	18.3	16.6	16.9	17.1	16.1
90	18.9	15.9	15.3	14.6	13.7
120	18.9	16.3	15.8	14.7	12.2
180	18.7	17.5	17.9	15.9	13.1
270 #	19.7	17.3	16.75	14.7	10.95
360	20.7	17.1	15.6	13.5	8.8
540 #	21.95	17.95	16.55	14.15	8.95
720	23.2	18.8	17.5	14.8	9.1
1440	30.7	29.3	28.7	23	15
2880	33	32.5	33.2	30.3	19.6
4320	34.8	35.7	36.7	34.4	28.2

Note:

* ARR 2019 does not provide probability neutral burst initial losses for durations less than the 60 minute storm duration. Therefore, the probability neutral burst initial losses for the 60 minute storm duration were applied to all shorter storm durations.

ARR 2019 does not provide probability neutral burst initial losses for the 270 and 540 minute storm duration. Therefore, the probability neutral burst initial losses were linearly interpolated from the values given for the two nearest storm durations.

C.2 Areal Reduction Factors

The Areal Reduction Factors (ARF) calculated for the full range of event probabilities and durations are detailed in Table 9-2.



Table 9-2: All Event Probabilities and Durations - Design Storm ARF

Duration	20% AEP	10% AEP	5% AEP	3% AEP	1% AEP	0.8% AEP	0.2% AEP
15 min	0.748	0.742	0.736	0.727	0.721	0.715	0.707
20 min	0.777	0.770	0.764	0.755	0.749	0.743	0.734
25 min	0.797	0.790	0.783	0.774	0.768	0.761	0.752
30 min	0.812	0.805	0.798	0.788	0.781	0.774	0.765
45 min	0.841	0.833	0.825	0.815	0.807	0.799	0.789
1 hour	0.858	0.849	0.840	0.829	0.820	0.812	0.800
1.5 hour	0.878	0.868	0.858	0.844	0.834	0.824	0.810
2 hour	0.890	0.878	0.867	0.852	0.840	0.829	0.813
3 hour	0.904	0.892	0.879	0.862	0.849	0.837	0.820
4.5 hour	0.921	0.910	0.900	0.885	0.875	0.864	0.850
6 hour	0.934	0.928	0.921	0.912	0.906	0.899	0.890
9 hour	0.948	0.945	0.941	0.936	0.932	0.929	0.924
12 hour	0.954	0.951	0.947	0.942	0.938	0.935	0.930
24 hour	0.969	0.964	0.959	0.953	0.947	0.942	0.936
30 hour	0.972	0.967	0.962	0.956	0.951	0.946	0.939
36 hour	0.974	0.969	0.964	0.958	0.953	0.948	0.941
48 hour	0.977	0.973	0.968	0.961	0.956	0.951	0.945
72 hour	0.981	0.976	0.972	0.965	0.961	0.956	0.950
96 hour	0.984	0.979	0.974	0.968	0.964	0.959	0.953
120 hour	0.985	0.981	0.976	0.970	0.966	0.961	0.956
144 hour	0.986	0.982	0.978	0.972	0.968	0.963	0.958
168 hour	0.987	0.983	0.979	0.974	0.969	0.965	0.960

C.3 Rainfall Spatial Patterns

The minimum and maximum range of the design rainfall spatial patterns calculated for the full range of event probabilities and durations are detailed in Table 9-3.

Table 9-3: All Event Probabilities and Durations - Design Rainfall Spatial Pattern Range

Event Probability	Event Duration (minutes)	Design Rainfall (mm) - Minimum	Design Rainfall (mm) - Maximum
20% AEP	15	13.84	13.98
20% AEP	20	15.39	16.55
20% AEP	25	18.41	18.65
20% AEP	30	20.13	20.37
20% AEP	45	24.04	24.38

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20% AEP	60	26.53	27.28
20% AEP	90	31.16	31.60
20% AEP	120	34.34	34.79
20% AEP	180	39.16	39.61
20% AEP	270	44.66	45.21
20% AEP	360	49.06	49.80
20% AEP	540	55.67	56.90
20% AEP	720	60.70	62.42
20% AEP	1440	74.64	77.36
20% AEP	2880	89.73	92.96
20% AEP	4320	99.11	102.05
20% AEP	5760	105.24	108.19
20% AEP	7200	109.36	113.30
10% AEP	15	16.17	16.39
10% AEP	20	19.18	19.49
10% AEP	25	21.57	21.89
10% AEP	30	23.58	23.98
10% AEP	45	28.15	28.65
10% AEP	60	31.50	32.01
10% AEP	90	36.36	36.96
10% AEP	120	40.04	40.57
10% AEP	180	45.47	46.10
10% AEP	270	51.88	52.70
10% AEP	360	57.24	58.26
10% AEP	540	65.18	66.69
10% AEP	720	71.11	73.11
10% AEP	1440	87.46	90.84
10% AEP	2880	106.01	109.90
10% AEP	4320	117.18	121.09
10% AEP	5760	124.33	129.22
10% AEP	7200	130.44	135.34
5% AEP	15	18.54	18.83
5% AEP	20	22.00	22.31
5% AEP	25	24.75	25.15
5% AEP	30	27.04	27.44
5% AEP	45	32.25	32.75

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5% AEP	60	35.97	36.65
5% AEP	90	41.42	42.10
5% AEP	120	45.41	46.11
5% AEP	180	51.50	52.29
5% AEP	270	58.92	59.82
5% AEP	360	65.22	66.41
5% AEP	540	74.52	76.31
5% AEP	720	81.35	83.81
5% AEP	1440	100.72	104.56
5% AEP	2880	121.93	127.73
5% AEP	4320	136.04	141.87
5% AEP	5760	145.18	151.03
5% AEP	7200	152.30	158.16
2% AEP	15	21.75	22.11
2% AEP	20	25.76	26.21
2% AEP	25	28.97	29.43
2% AEP	30	31.62	32.17
2% AEP	45	37.55	38.28
2% AEP	60	41.78	42.61
2% AEP	90	47.86	48.79
2% AEP	120	52.37	53.22
2% AEP	180	59.22	60.17
2% AEP	270	68.10	69.17
2% AEP	360	75.91	77.28
2% AEP	540	87.43	89.49
2% AEP	720	96.10	98.92
2% AEP	1440	119.07	123.83
2% AEP	2880	147.06	153.79
2% AEP	4320	164.13	170.89
2% AEP	5760	175.26	183.00
2% AEP	7200	184.37	191.17
1% AEP	15	24.24	24.67
1% AEP	20	28.69	29.21
1% AEP	25	32.25	32.86
1% AEP	30	35.17	35.79
1% AEP	45	41.63	42.43

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1% AEP	60	46.27	47.17
1% AEP	90	52.78	53.79
1% AEP	120	57.54	58.66
1% AEP	180	64.97	66.08
1% AEP	270	74.90	76.21
1% AEP	360	84.14	85.68
1% AEP	540	97.50	99.76
1% AEP	720	106.98	110.73
1% AEP	1440	134.54	140.23
1% AEP	2880	167.35	175.00
1% AEP	4320	187.34	195.02
1% AEP	5760	200.44	209.12
1% AEP	7200	210.57	218.30
0.5% AEP	15	27.68	28.39
0.5% AEP	20	32.75	33.64
0.5% AEP	25	36.76	37.75
0.5% AEP	30	40.04	41.12
0.5% AEP	45	47.37	48.73
0.5% AEP	60	52.52	53.98
0.5% AEP	90	59.80	61.45
0.5% AEP	120	65.21	66.86
0.5% AEP	180	73.70	75.46
0.5% AEP	270	85.49	87.30
0.5% AEP	360	97.10	98.90
0.5% AEP	540	113.30	116.09
0.5% AEP	720	124.32	127.12
0.5% AEP	1440	154.55	160.21
0.5% AEP	2880	190.28	197.89
0.5% AEP	4320	211.27	220.82
0.5% AEP	5760	226.34	235.93
0.5% AEP	7200	237.48	247.09
0.2% AEP	15	32.10	33.02
0.2% AEP	20	37.95	39.13
0.2% AEP	25	42.65	44.00
0.2% AEP	30	46.45	47.90
0.2% AEP	45	54.88	56.70

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0.2% AEP	60	60.75	62.75
0.2% AEP	90	69.03	71.30
0.2% AEP	120	75.07	77.43
0.2% AEP	180	84.43	86.89
0.2% AEP	270	98.65	101.20
0.2% AEP	360	112.18	115.74
0.2% AEP	540	132.11	135.80
0.2% AEP	720	145.06	149.70
0.2% AEP	1440	180.59	186.21
0.2% AEP	2880	222.99	232.44
0.2% AEP	4320	247.86	258.31
0.2% AEP	5760	264.92	275.41
0.2% AEP	7200	277.11	288.57

C.4 Critical Temporal Pattern and Storm Duration

C.4.1 Hydrology

Table 9-4: Design Storm Critical Duration and Pattern for Key Locations in the Hydrologic Model

Event Probability	Duration and Temporal Pattern (TP) with the peak discharge one higher than the average/median peak discharge				Critical Duration and Temporal Pattern
	Inflow GEU_301	Inflow GEU_401	Inflow GEU_501	Inflow GEU_601	
20% AEP	540 minute TP05	540 minute TP05	540 minute TP03	540 minute TP05	540 minute TP05
10% AEP	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07
5% AEP	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07	360 minute TP07
2% AEP	270 minute TP09	270 minute TP09	270 minute TP09	270 minute TP09	270 minute TP09
1% AEP	180 minute TP07	270 minute TP09	270 minute TP09	180 minute TP07	180 minute TP07 270 minute TP09
0.5% AEP	180 minute TP07	180 minute TP07	270 minute TP09	180 minute TP04	180 minute TP07
0.2% AEP	180 minute TP07	180 minute TP07	270 minute TP08	180 minute TP05	180 minute TP07



C.4.1.1 20% AEP Event

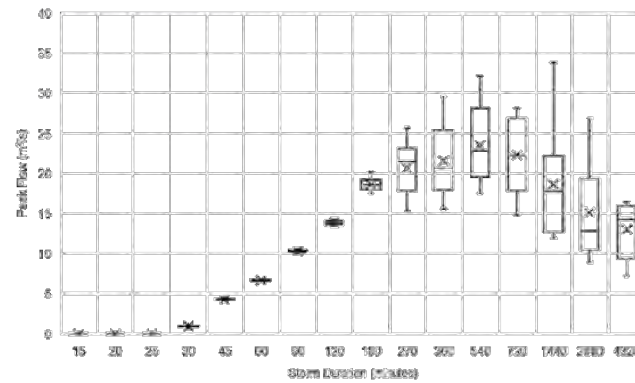


Chart 9-1: Box and Whisker Plot - 20% AEP Event - Inflow GEU_301

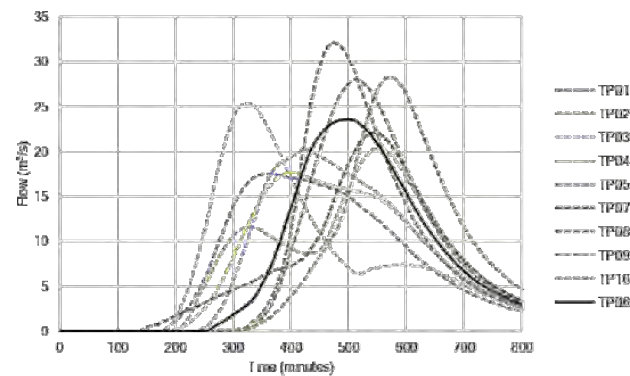


Chart 9-2: Hydrographs - 20% AEP 540 minute storm duration - Inflow GEU_301



C.4.1.2 5% AEP Event

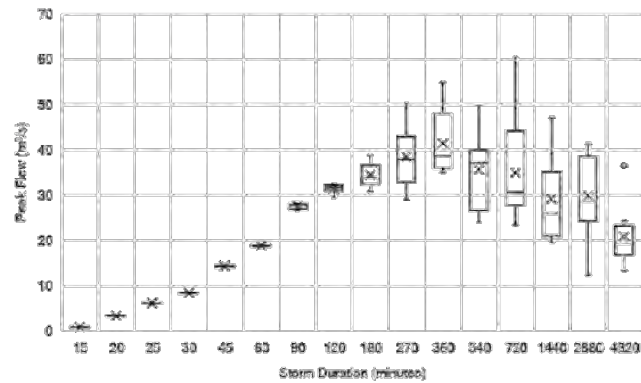


Chart 9-3: Box and Whisker Plot - 5% AEP Event - Inflow GEU_301

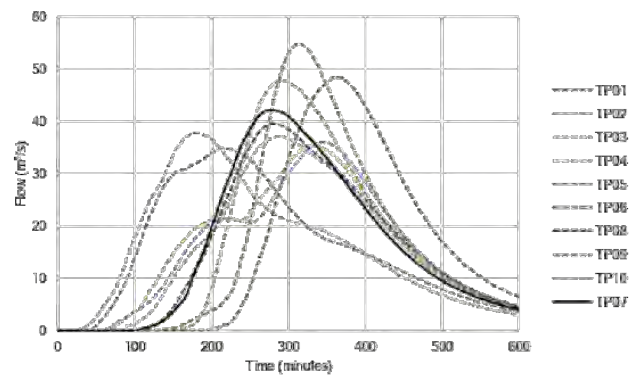


Chart 9-4: Hydrograph - 5% AEP 360 minute storm duration - Inflow GEU_301



C.4.1.3 1% AEP Event

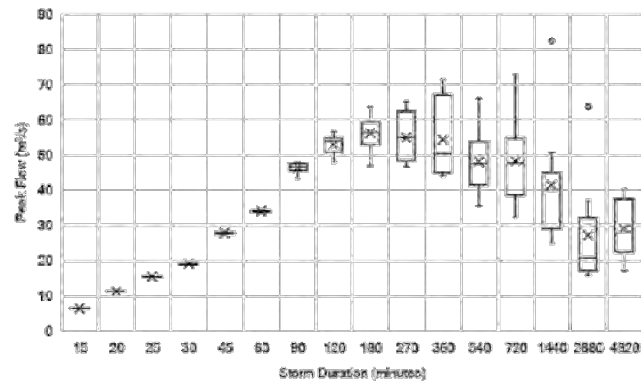


Chart 9-5: Box and Whisker Plot - 1% AEP Event - Inflow GEU_301

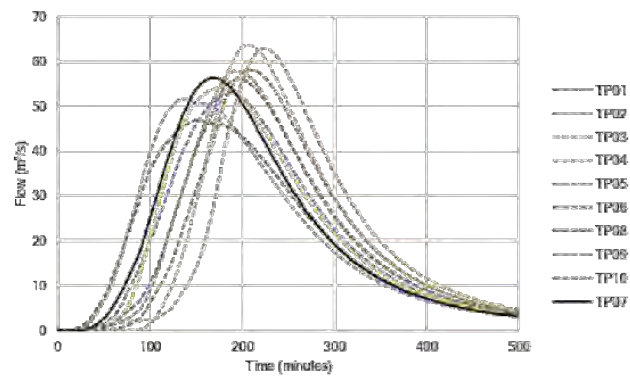


Chart 9-6: Hydrograph - 1% AEP 180 minute storm event - Inflow GEU_301

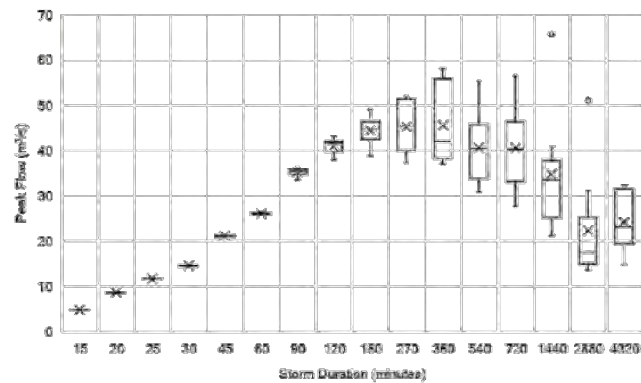


Chart 9-7: Box and Whisker Plot - 1% AEP Event - Inflow GEU 401

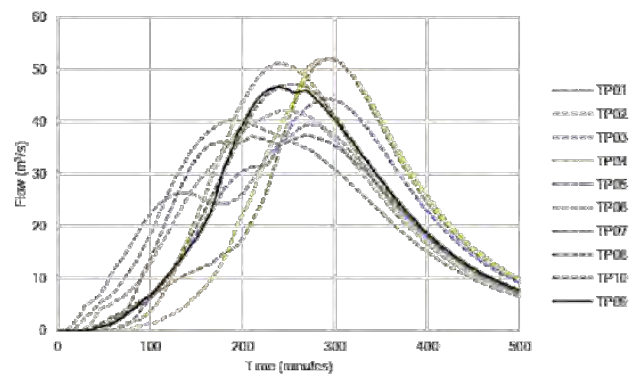


Chart 9-8: Hydrology - 1% AEP 270 minute storm event - Inflow GEU 401

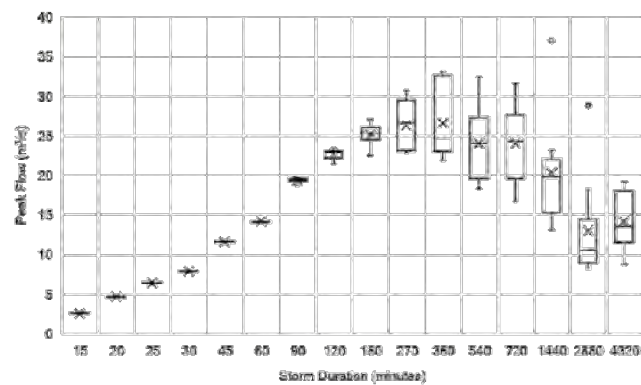


Chart 9-9: Box and Whisker Plot - 1% AEP Event - Inflow GEU_501

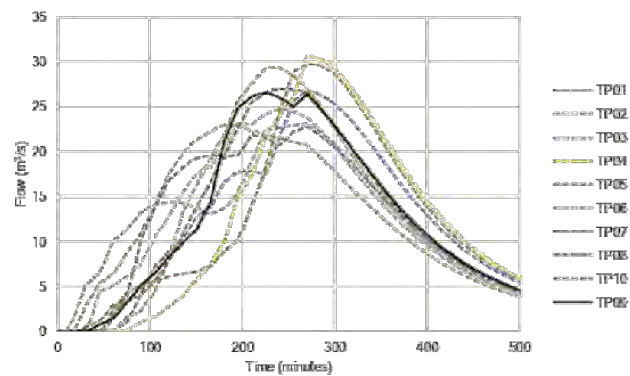


Chart 9-10: Hydrograph - 1% AEP 270 minute storm event - Inflow GEU_501

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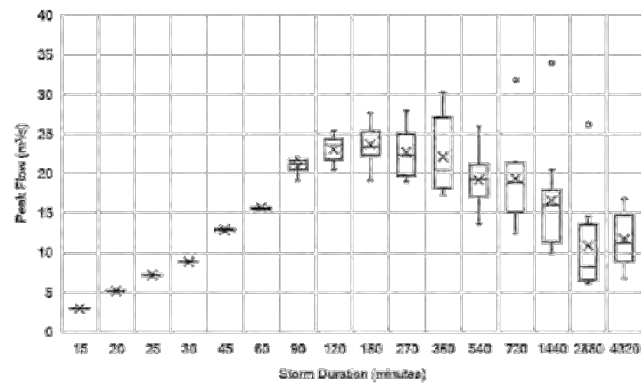


Chart 9-11: Box and Whisker Plot - 1% AEP Event - Inflow GEU_601

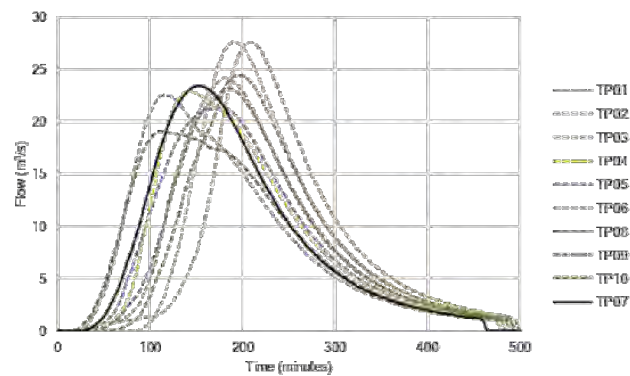


Chart 9-12: Hydrograph - 1% AEP 180 minute storm event - Inflow GEU_601



C.4.2 Hydraulics

Table 9-5: Design Storm Critical Duration and Pattern for Key Locations in the Hydraulic Model

Event Probability	Duration and Temporal Pattern (TP) with the peak flood level one higher than the average peak flood level				Critical Duration and Temporal Pattern
	H03	H16	H30	H33	
20% AEP	540 minute TP06	540 minute TP06	360 minute TP03	360 minute TP03	360 minute TP03 540 minute TP06
5% AEP	360 minute TP02	360 minute TP02	120 minute TP07	120 minute TP01	120 minute TP01 360 minute TP07
1% AEP	270 minute TP09	270 minute TP09	90 minute TP08	90 minute TP08	90 minute TP08 270 minute TP09

C.4.2.1 20% AEP Event

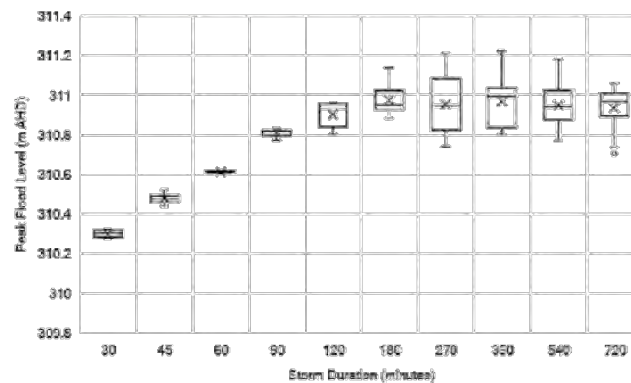


Chart 9-13: Box and Whisker Plot - 20% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)



C.4.2.2 5% AEP Event

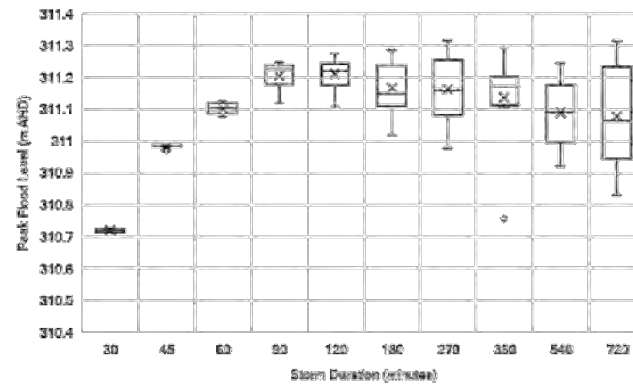


Chart 9-14: Box and Whisker Plot - 5% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)

C.4.2.3 1% AEP Event

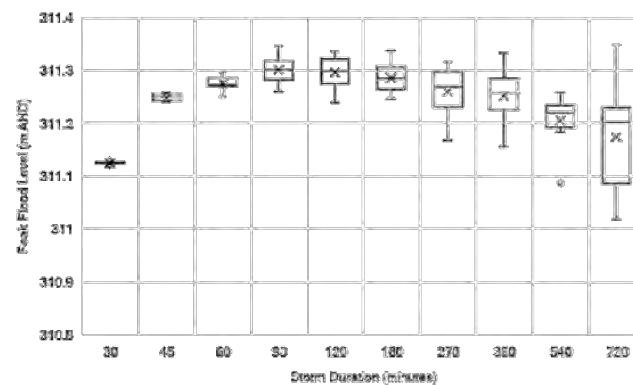


Chart 9-15: Box and Whisker Plot - 1% AEP Event - Boori Creek (Chambers Street between Mitchell Highway and Wellington Street)



APPENDIX D DESIGN PARAMETER SENSITIVITY



D.1 Rainfall Temporal Patterns

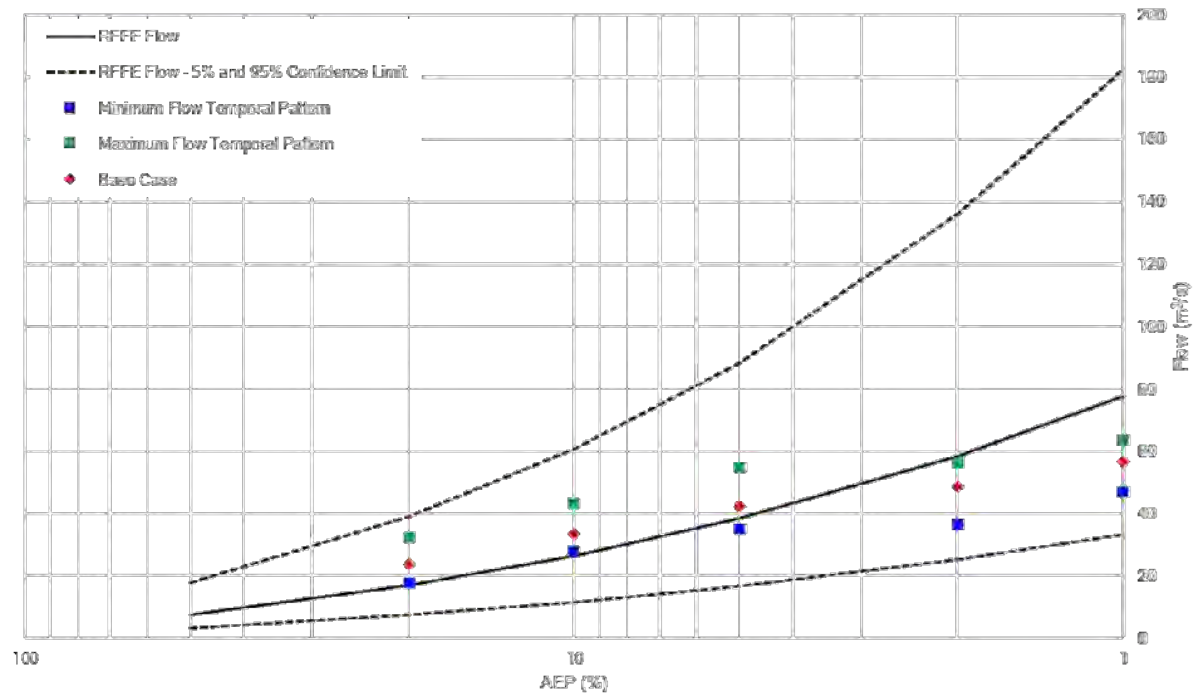


Chart 9-16: RFFE Comparison - Inflow GEU_301 - Temporal Patterns

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Table 9-6: Peak Flood Level Difference (m) - Minimum Flow Temporal Pattern

ID	Location	20% AEP	5% AEP	1% AEP
H01	Confluence of Geurie Ck and Boori Ck	-0.24	-0.14	-0.17
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.07	-0.05	-0.05
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.21	-0.22	-0.14
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.24	-0.22	-0.13
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.08	-0.06	-0.07
H06	Jennings St (south-east of Mitchell St)	-0.03	-0.01	-0.06
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.01	0.00	-0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.02	-0.01	0.02
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.13	-0.01	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	0.00	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	-0.02	0.00	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.15	-0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.04	-0.01	0.01
H14	Boori Ck (north of Railway Tracks)	-0.04	0.00	0.01

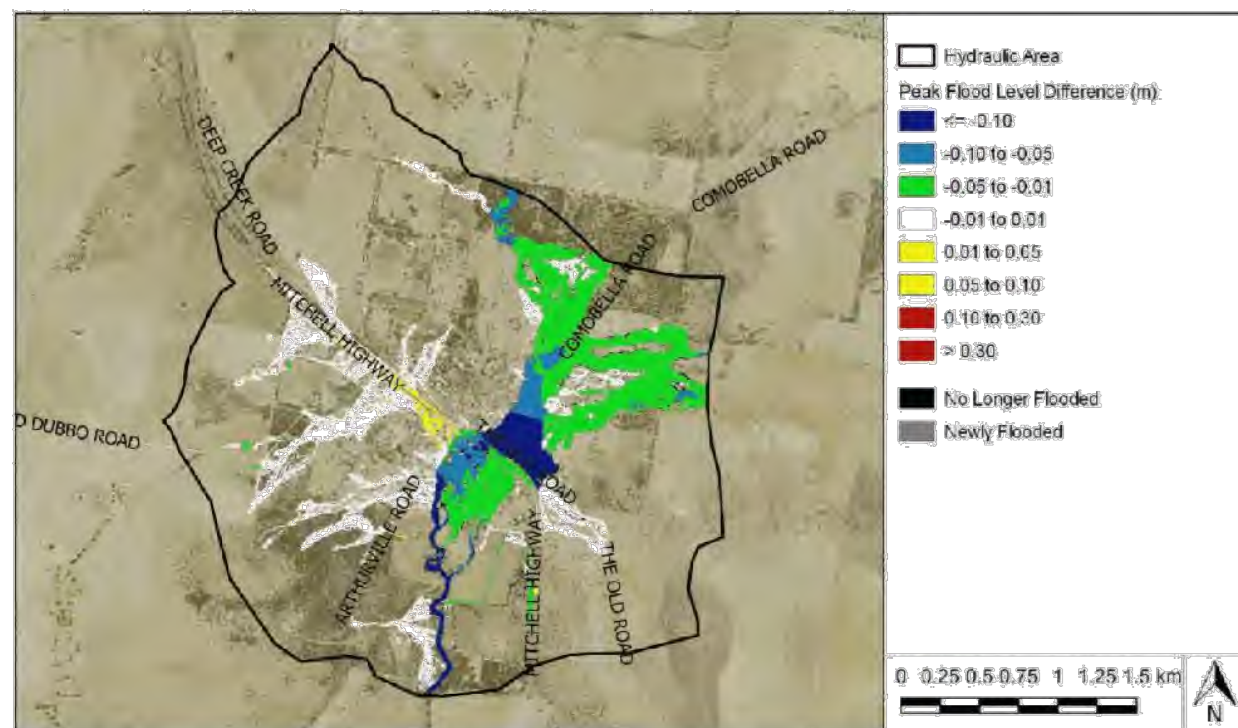


Image 9-1: 1% AEP Peak Flood Level Difference (m) - Minimum Flow Temporal Pattern

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Table 9-7: Peak Flood Level Difference (m) - Maximum Flow Temporal Pattern

ID	Location	20% AEP	5% AEP	1% AEP
H01	Confluence of Geurie Ck and Boori Ck	0.41	-1.35	0.24
H02	Geurie Ck - Upstream of Mitchell Hwy	0.18	-0.68	0.13
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.42	-1.20	0.25
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.50	-1.37	0.21
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.17	-0.37	0.11
H06	Jennings St (south-east of Mitchell St)	0.09	-0.11	0.11
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.09	-0.07	0.04
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.26	-0.22	0.03
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.38	-0.41	0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.16	-0.16	0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.06	-0.02	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.29	-0.27	0.05
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.11	-0.10	0.02
H14	Boori Ck (north of Railway Tracks)	0.16	-0.10	0.05

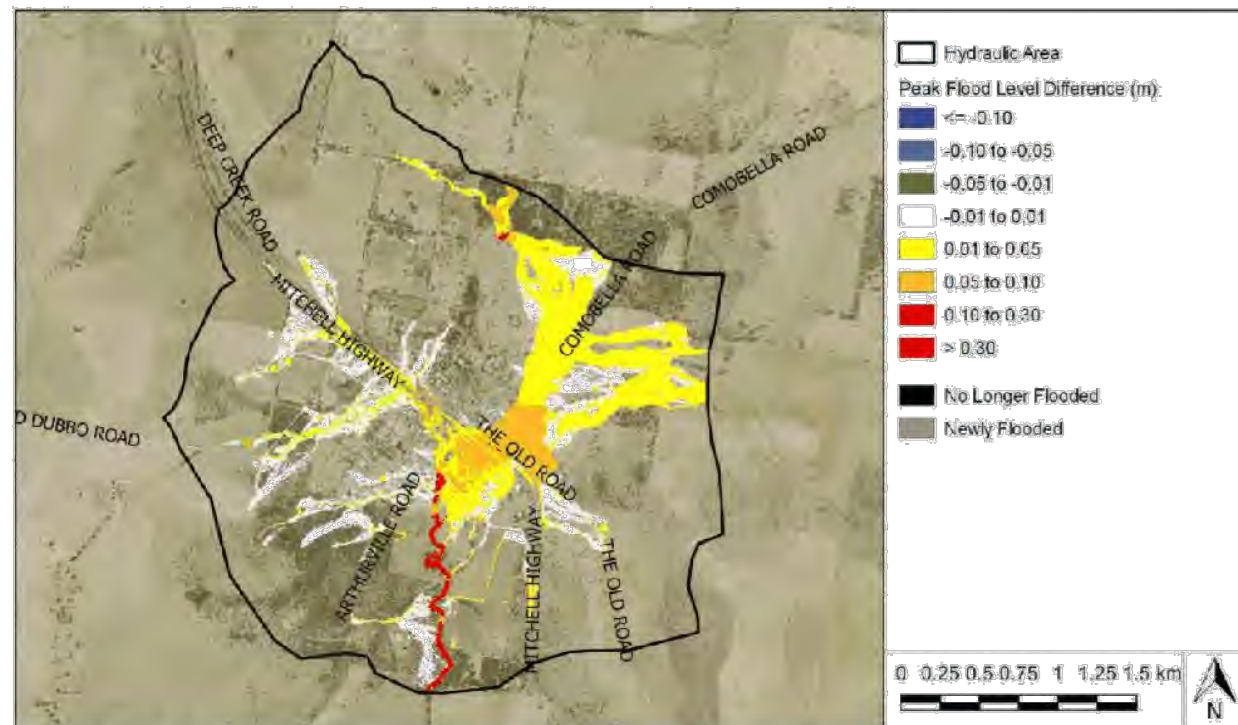


Image 9-2: 1% AEP Peak Flood Level Difference (m) - Maximum Flow Temporal Pattern

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D.2 Rainfall Losses

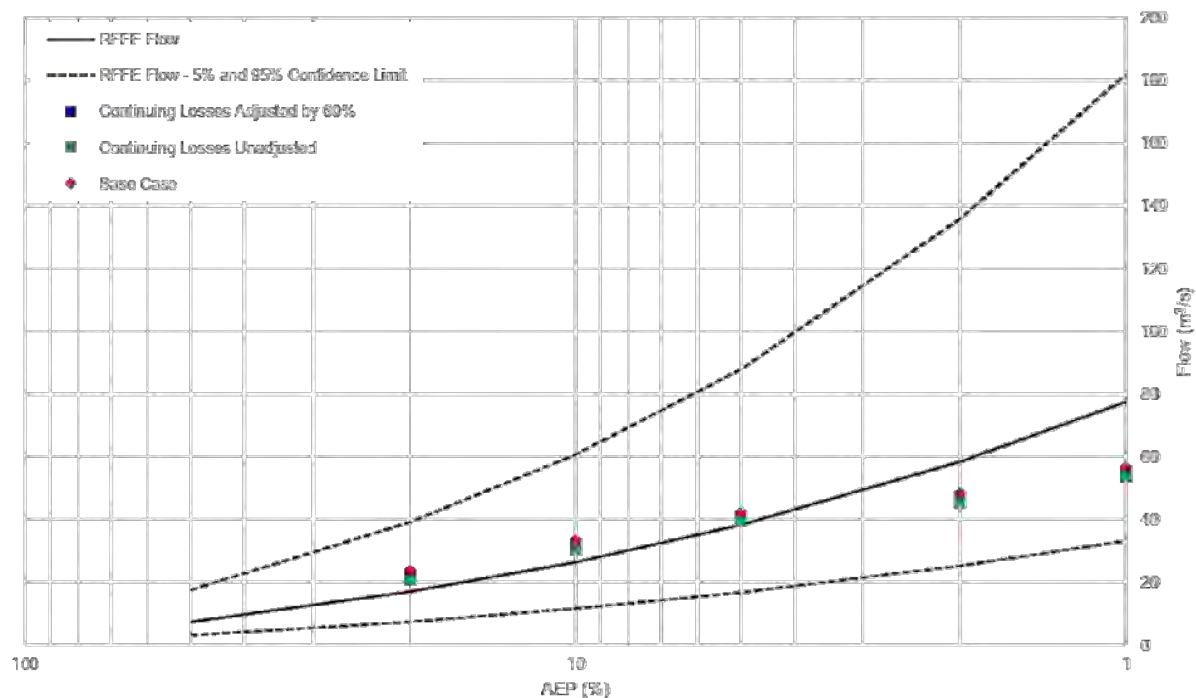


Chart 9-17: RFFE Comparison - Inflow GEU 301 - Continuing Losses

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Table 9-8: Peak Flood Level Difference (m) - Rainfall Continuing Losses Adjusted by 60%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.04	-0.01	-0.04	-0.02	-0.02	-0.03	-0.02	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.02	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	0.00
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.04	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	0.00
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.06	-0.03	-0.03	-0.02	-0.01	-0.01	-0.01	0.00
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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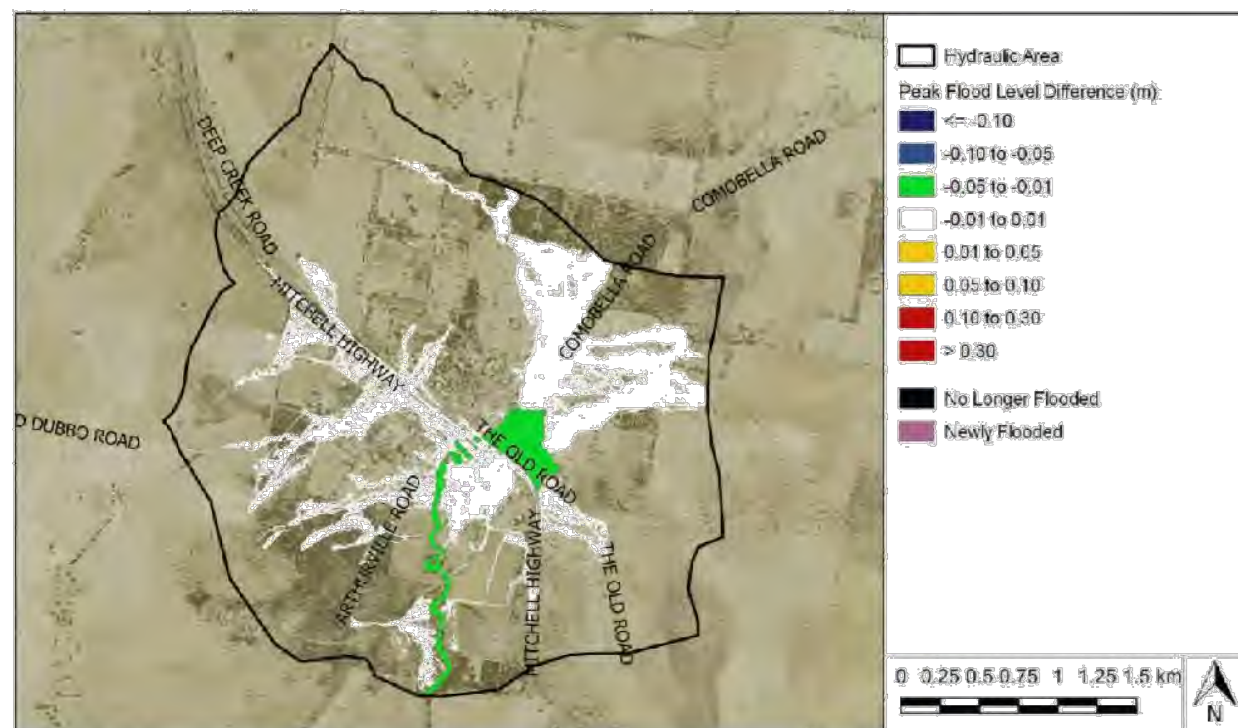


Image 9-3: 1% AEP Peak Flood Level Difference (m) – Rainfall Continuing Losses Adjusted by 60%

10020 Geurie FS Stage5 R08.docx

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Table 9-9: Peak Flood Level Difference (m) - Rainfall Continuing Losses Unadjusted

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.33	-0.08	-0.07	-0.07	-0.04	-0.07	-0.06	-0.01
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.15	-0.04	-0.03	-0.02	-0.01	-0.01	-0.02	0.00
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.36	-0.09	-0.10	-0.08	-0.05	-0.02	-0.02	-0.01
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.41	-0.10	-0.10	-0.08	-0.04	-0.02	-0.01	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.12	-0.03	-0.03	-0.03	-0.03	-0.02	-0.02	-0.01
H06	Jennings St (south-east of Mitchell St)	-0.01	-0.01	0.00	-0.01	-0.04	-0.02	-0.02	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.01	0.00	0.00	0.00	-0.01	-0.01	-0.01	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.02	0.00	-0.01	-0.01	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.03	-0.02	-0.01	-0.01	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.02	0.00	-0.02	0.00	0.00	-0.01	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.00	0.00

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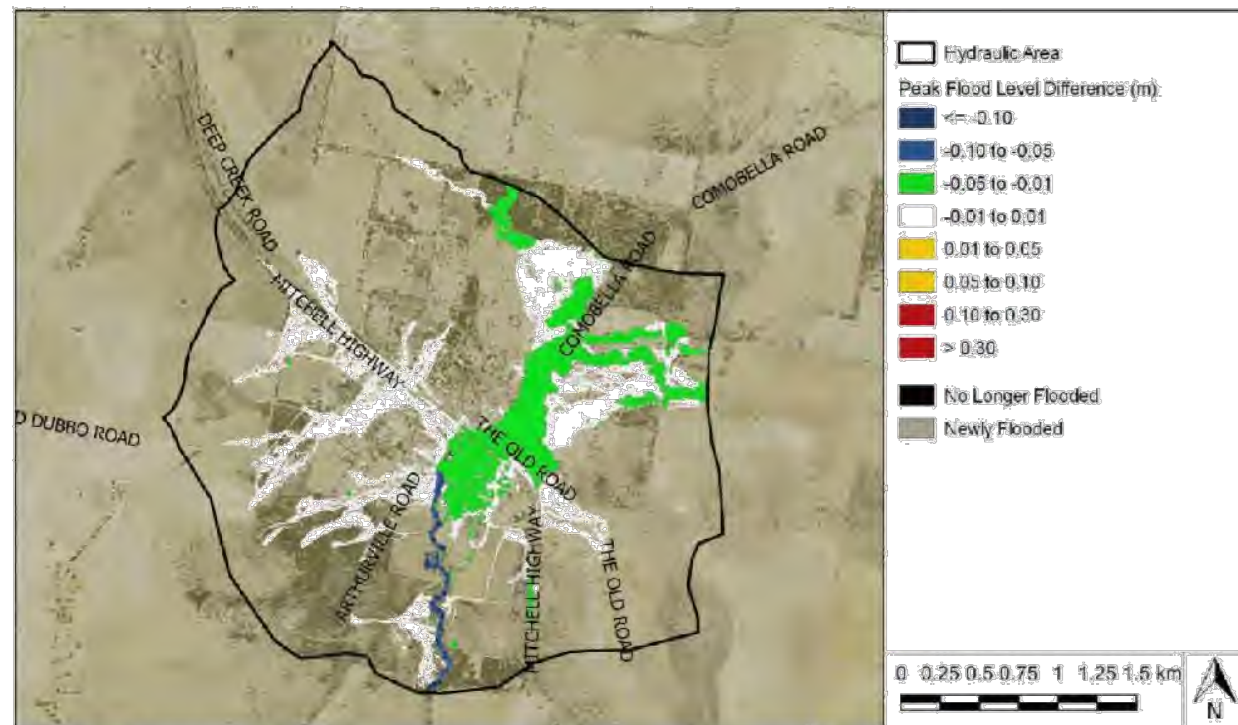


Image 9-4: 1% AEP Peak Flood Level Difference (m) - Rainfall Continuing Losses Unadjusted

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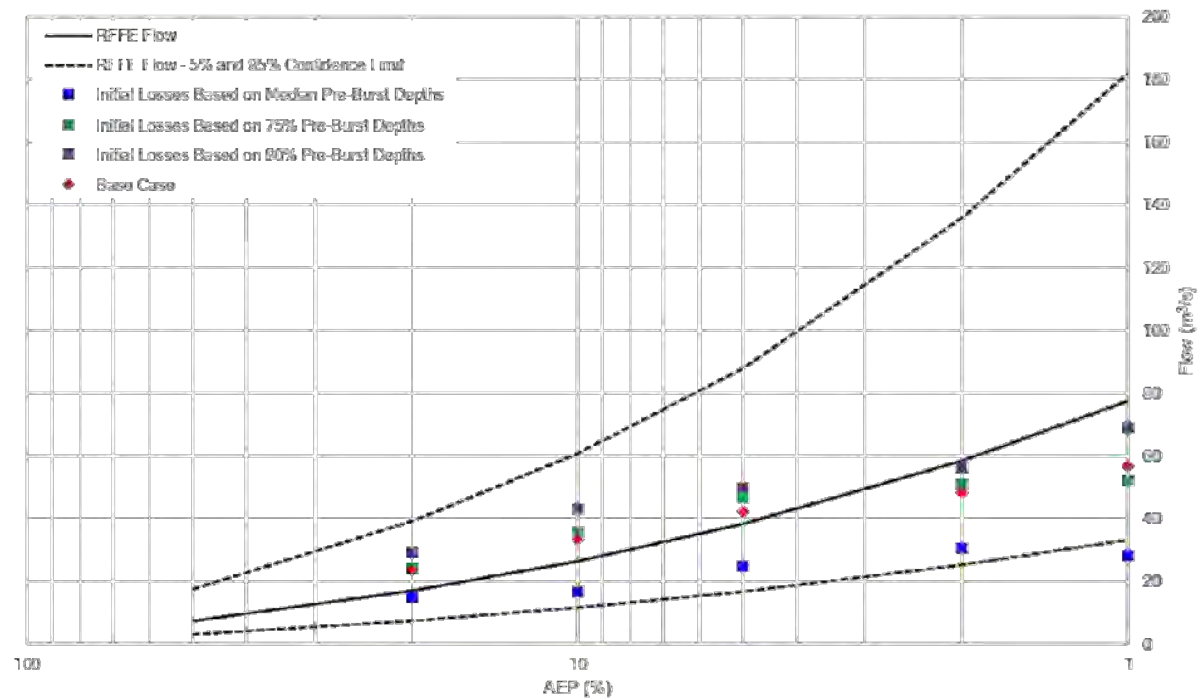


Chart 9-18: RFFE Comparison - Inflow GEU_301 - Initial Losses

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Table 9-10: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on Median Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.33	-0.51	-0.54	-0.58	-0.48	-0.74	-0.60	-0.10
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.15	-0.24	-0.22	-0.15	-0.12	-0.19	-0.19	-0.06
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.36	-0.54	-0.55	-0.52	-0.43	-0.51	-0.27	-0.07
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.41	-0.62	-0.60	-0.54	-0.41	-0.47	-0.23	-0.06
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.12	-0.20	-0.18	-0.17	-0.16	-0.23	-0.20	-0.08
H06	Jennings St (south-east of Mitchell St)	-0.06	-0.07	-0.07	-0.05	-0.10	-0.23	-0.23	-0.07
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	-0.03	-0.08	-0.07	-0.03	-0.03	-0.09	-0.08	-0.05
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.04	-0.20	-0.29	-0.11	-0.04	-0.12	-0.09	-0.02
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.28	-0.30	-0.24	-0.06	-0.04	-0.08	-0.07	-0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.12	-0.15	-0.08	-0.06	-0.04	-0.13	-0.09	-0.03
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	-0.03	-0.04	-0.05	-0.01	-0.01	-0.04	-0.03	-0.03
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.27	-0.21	-0.16	-0.14	-0.05	-0.21	-0.10	-0.03
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.08	-0.08	-0.07	-0.03	-0.02	-0.08	-0.07	-0.02
H14	Boori Ck (north of Railway Tracks)	-0.10	-0.12	-0.11	-0.06	-0.05	-0.13	-0.11	-0.02

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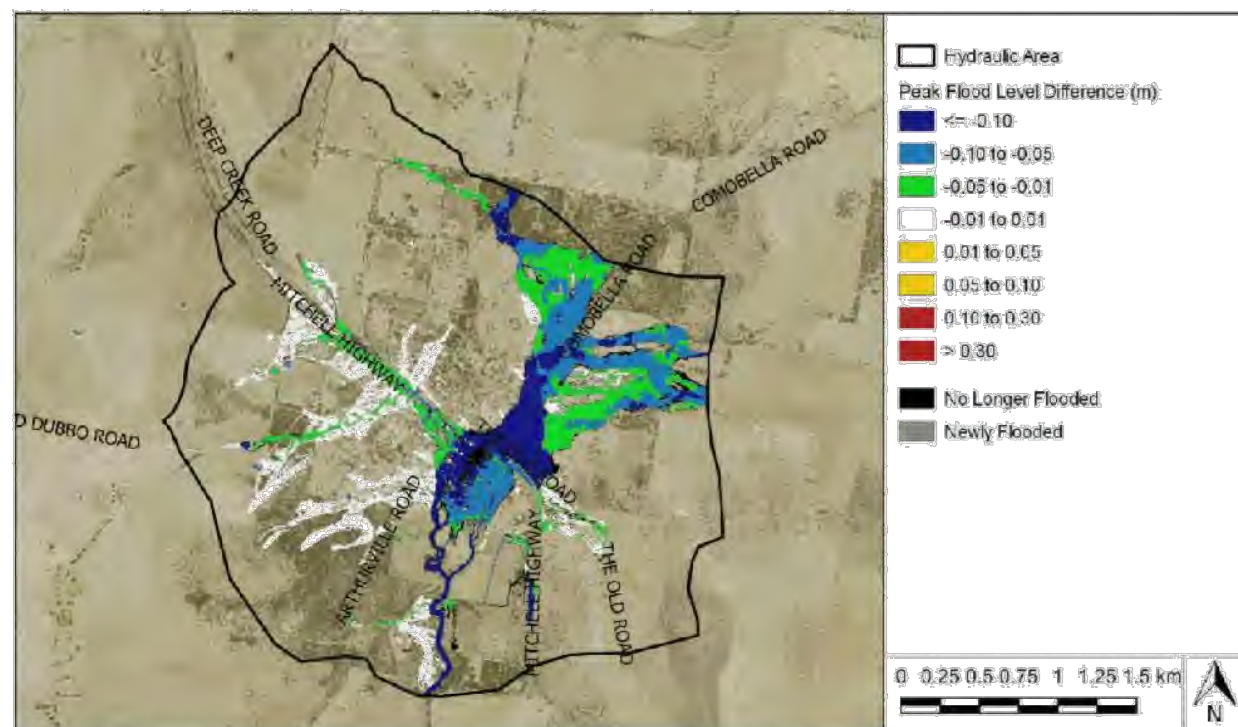


Image 9-5: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on Median Pre-Burst Depths

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Table 9-11: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 75% Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.02	0.15	0.17	0.07	0.05	-0.10	-0.09	-0.04
H02	Geurie Ck - Upstream of Mitchell Hwy	0.01	0.03	0.02	0.02	0.07	-0.01	-0.03	-0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.01	0.07	0.12	0.06	0.09	-0.03	-0.02	-0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.01	0.07	0.12	0.05	0.06	-0.03	-0.02	-0.03
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.03	0.04	0.02	0.02	-0.03	-0.03	-0.03
H06	Jennings St (south-east of Mitchell St)	0.01	-0.01	0.01	0.01	0.04	-0.03	-0.03	-0.03
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.01	-0.01	0.00	0.00	0.02	-0.01	-0.01	-0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.03	-0.03	-0.07	0.00	-0.01	-0.05	-0.03	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.04	-0.04	-0.02	0.00	-0.01	-0.03	-0.03	-0.02
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.01	-0.01	-0.01	0.00	-0.01	-0.05	-0.03	-0.02
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.01	0.00	-0.01	0.00	0.00	-0.02	-0.01	-0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.02	-0.01	-0.03	0.00	0.00	-0.05	-0.04	-0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.01	-0.01	-0.01	0.00	-0.01	-0.04	-0.03	-0.01
H14	Boori Ck (north of Railway Tracks)	0.02	-0.02	-0.01	0.00	-0.01	-0.05	-0.06	-0.02

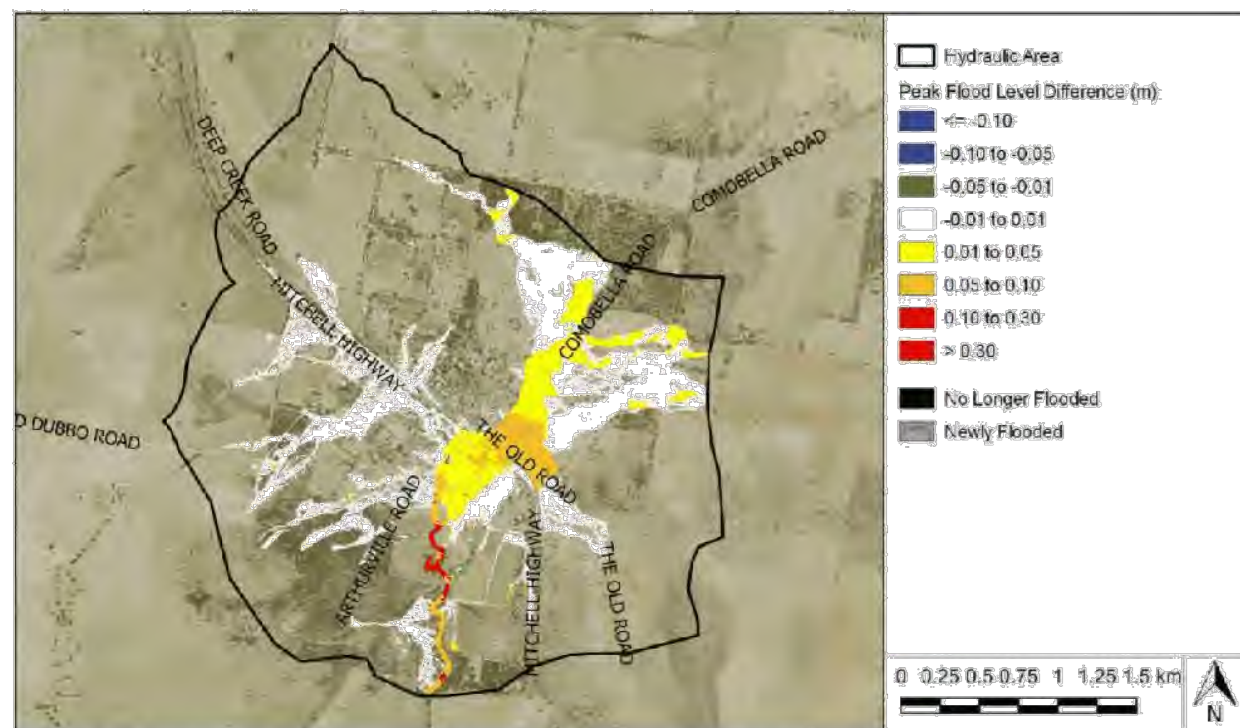


Image 9-6: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 75% Pre-Burst Depths

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Table 9-12: Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 90% Pre-Burst Depths

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.45	0.42	0.32	0.20	0.27	0.27	0.23	0.04
H02	Geurie Ck - Upstream of Mitchell Hwy	0.19	0.09	0.05	0.05	0.08	0.08	0.09	0.03
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.41	0.35	0.20	0.15	0.15	0.08	0.07	0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.47	0.35	0.20	0.14	0.12	0.08	0.06	0.03
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.16	0.10	0.08	0.07	0.08	0.08	0.07	0.03
H06	Jennings St (south-east of Mitchell St)	0.06	0.06	0.07	0.09	0.11	0.09	0.08	0.03
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.06	0.04	0.03	0.03	0.04	0.02	0.02	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.21	0.16	0.05	0.04	0.04	0.02	0.01	0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.18	0.12	0.05	0.03	0.02	0.02	0.02	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.06	0.07	0.06	0.04	0.03	0.03	0.02	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.02	0.03	0.02	0.01	0.01	0.00	0.00	0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.07	0.20	0.15	0.05	0.03	0.04	0.03	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.05	0.05	0.04	0.03	0.02	0.02	0.01	0.01
H14	Boori Ck (north of Railway Tracks)	0.09	0.08	0.06	0.05	0.04	0.04	0.02	0.00

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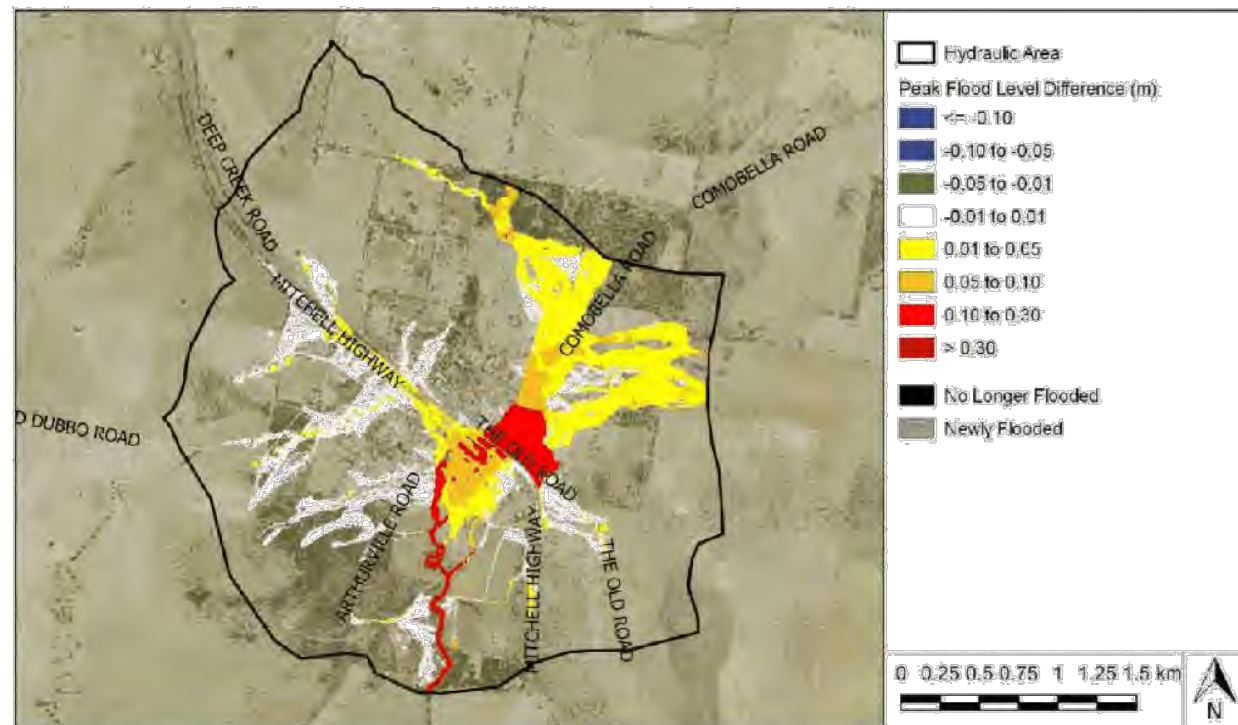


Image 9-7: 1% AEP Peak Flood Level Difference (m) - Rainfall Initial Losses Based on 90% Pre-Burst Depths

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D17



D.3 Hydrologic Lag and Routing

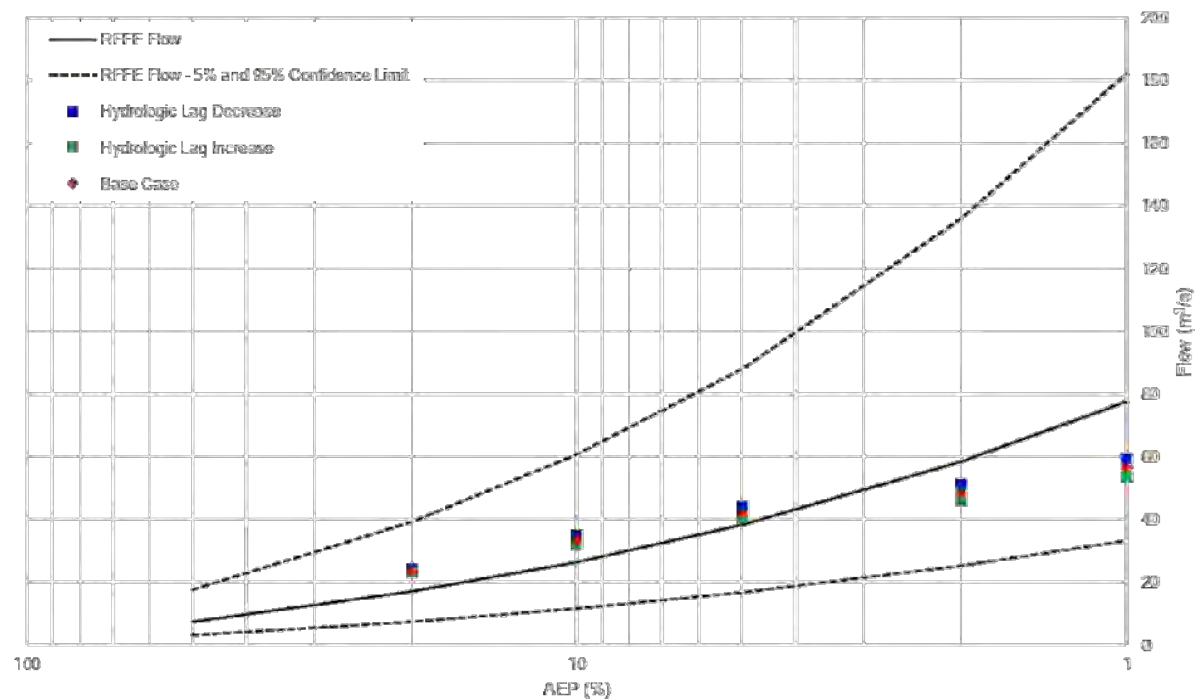


Chart 9-19: RFFE Comparison - Inflow GEU 301 - Hydrologic Lag

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D18



Table 9-13: Peak Flood Level Difference (m) - Hydrologic Lag Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.02	0.12	0.11	0.09	0.04	0.09	-0.15	0.07
H02	Geurie Ck - Upstream of Mitchell Hwy	0.01	0.02	0.00	0.02	0.07	0.02	-0.04	0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.02	0.05	0.05	0.05	0.08	0.02	-0.03	0.05
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.03	0.05	0.05	0.05	0.06	0.02	-0.03	0.04
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.01	0.02	0.02	0.02	0.02	0.02	-0.04	0.05
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	0.02	0.03	0.02	-0.05	0.05
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.01	0.01	-0.01	0.04
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.02	0.02	0.00	0.00	0.01	0.01	0.00	0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.01	0.00	0.07	0.00	0.01	0.01	0.00	0.01
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
H14	Boori Ck (north of Railway Tracks)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00

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D19

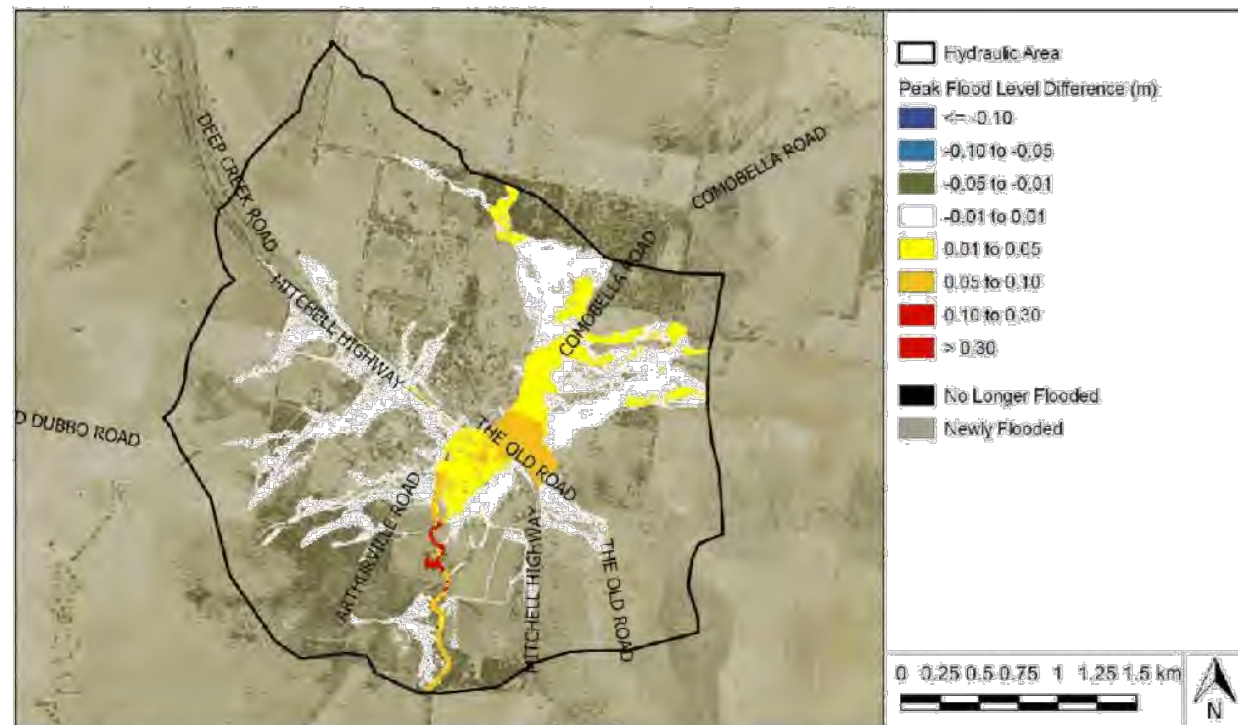


Image 9-8: 1% AEP Peak Flood Level Difference (m) - Hydrologic Lag Decrease

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022



Table 9-14: Peak Flood Level Difference (m) - Hydrologic Lag Increase

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.02	-0.03	-0.05	-0.04	-0.04	-0.08	-0.07	-0.06
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.03	-0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.03	-0.05	-0.06	-0.04	-0.04	-0.03	-0.02	-0.05
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.04	-0.05	-0.06	-0.04	-0.03	-0.02	-0.02	-0.04
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.05
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.00	-0.01	-0.03	-0.02	-0.03	-0.05
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.03
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	0.00	-0.01	-0.01	0.00	0.00	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.01	-0.01	-0.01	0.00	0.00	0.00	-0.01
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.01
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	-0.02	0.00	0.00	-0.01	-0.01	-0.01
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	-0.01	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01

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D21

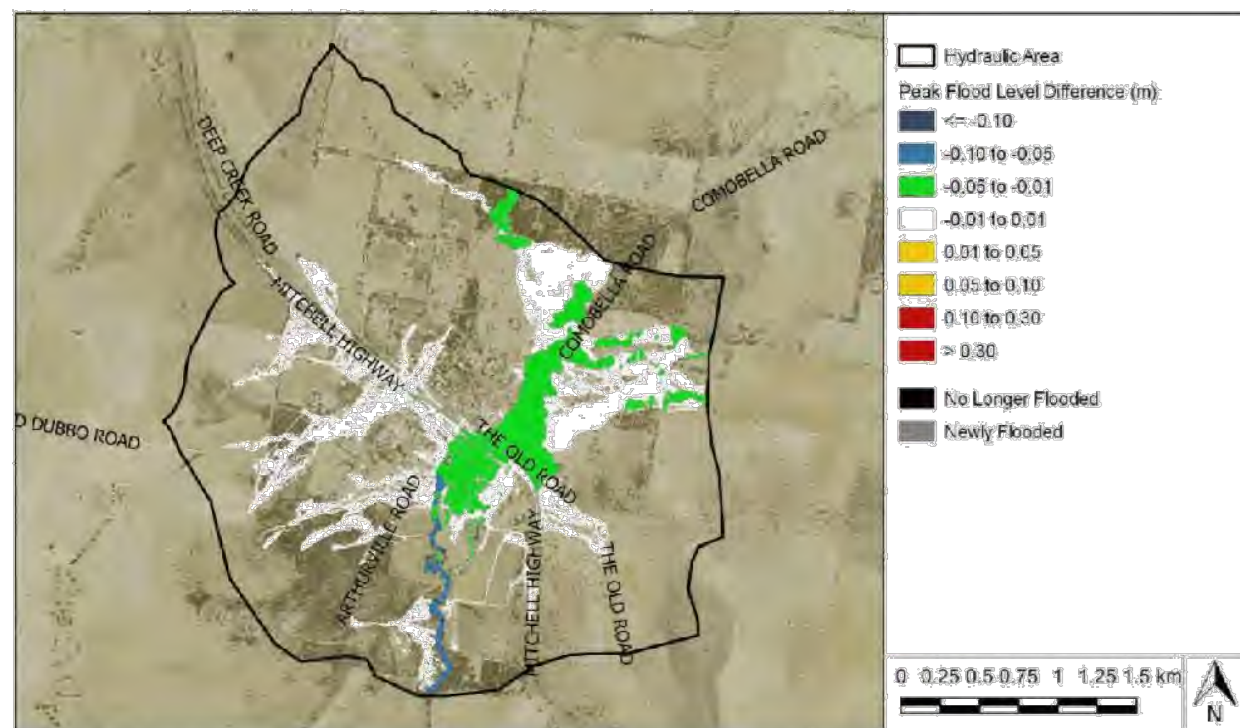


Image 9-9: 1% AEP Peak Flood Level Difference (m) - Hydrologic Lag Increase

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D22



Table 9-15: Peak Flood Level Difference (m) - Hydrologic Routing Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.09	0.29	0.29	0.26	0.33	0.30	0.35	0.31
H02	Geurie Ck - Upstream of Mitchell Hwy	0.07	0.07	0.04	0.13	0.10	0.09	0.14	0.19
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.11	0.25	0.18	0.25	0.18	0.09	0.10	0.23
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.14	0.25	0.18	0.21	0.14	0.09	0.09	0.21
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.05	0.07	0.07	0.11	0.11	0.10	0.11	0.28
H06	Jennings St (south-east of Mitchell St)	0.00	0.00	0.06	0.13	0.13	0.10	0.13	0.24
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.02	0.04	0.04	0.03	0.03	0.23
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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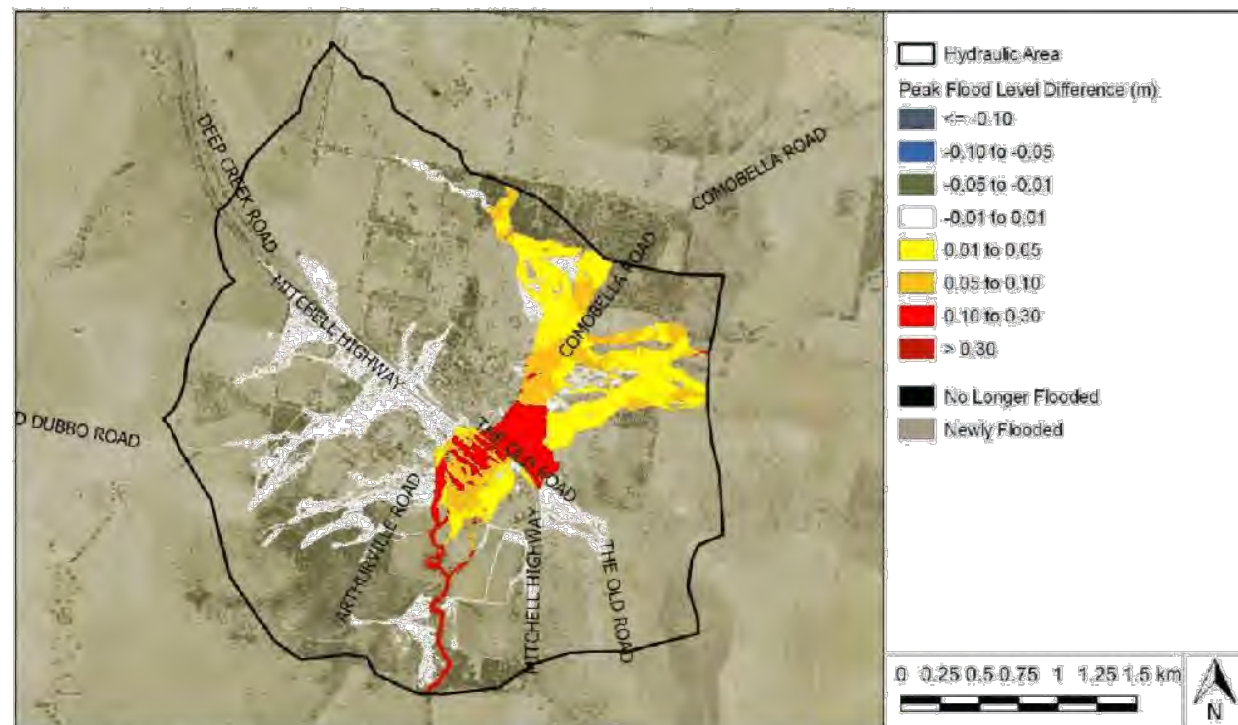


Image 9-10: 1% AEP Peak Flood Level Difference (m) - Hydrologic Routing Decrease

10020 Geurie FS Stage5 R08.docx

D24



D.4 Hydraulic Roughness

Table 9-16: Peak Flood Level Difference (m) - Hydraulic Roughness Decrease

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.03	0.14	0.11	0.09	0.11	0.08	-0.01	-0.18
H02	Geurie Ck - Upstream of Mitchell Hwy	-0.01	-0.04	-0.03	-0.04	-0.03	-0.01	-0.03	-0.03
H03	Geurie Ck - Upstream of Railway Tracks (east)	-0.01	-0.03	-0.03	-0.02	-0.02	-0.01	-0.01	0.02
H04	Geurie Ck - Upstream of Railway Tracks (west)	-0.04	-0.03	-0.03	-0.02	-0.01	-0.01	0.00	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	-0.05	-0.06	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08
H06	Jennings St (south-east of Mitchell St)	-0.01	-0.02	-0.01	-0.01	-0.03	-0.03	-0.04	-0.14
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	0.02	0.01	0.00	0.00	-0.01	-0.01	-0.01	-0.05
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.02	-0.02	-0.02	-0.03	-0.03	-0.02	-0.02	-0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.03
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	-0.01	0.07	0.02	0.00	0.00	0.00	-0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02
H14	Boori Ck (north of Railway Tracks)	-0.01	-0.02	-0.01	-0.01	-0.01	-0.02	-0.01	-0.05

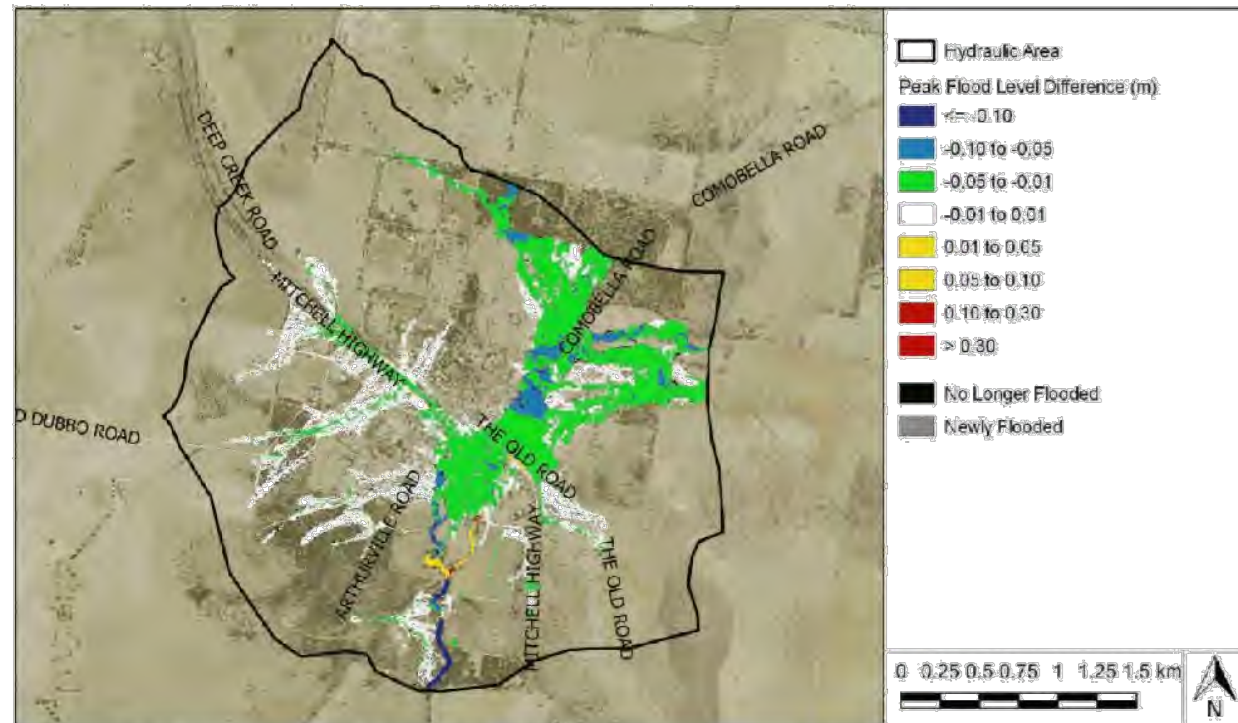


Image 9-11: 1% AEP Peak Flood Level Difference (m) - Hydraulic Roughness Decrease

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Table 9-17: Peak Flood Level Difference (m) - Hydraulic Roughness Increase

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.00	0.04	0.07	0.01	0.07	0.12	0.19	0.17
H02	Geurie Ck - Upstream of Mitchell Hwy	0.03	0.02	0.02	0.03	0.08	0.02	0.03	0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.02	0.03	0.02	0.02	0.06	0.01	0.01	0.00
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.04	0.03	0.02	0.02	0.03	0.01	0.01	-0.01
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.05	0.06	0.06	0.06	0.06	0.05	0.06	0.10
H06	Jennings St (south-east of Mitchell St)	0.01	0.01	0.02	0.02	0.03	0.04	0.05	0.12
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.02	0.02	0.00	0.01	0.00	0.00	-0.01	0.00
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.02	-0.01	0.00	0.00	0.01	0.01	0.05
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.02
H14	Boori Ck (north of Railway Tracks)	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.06

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D27

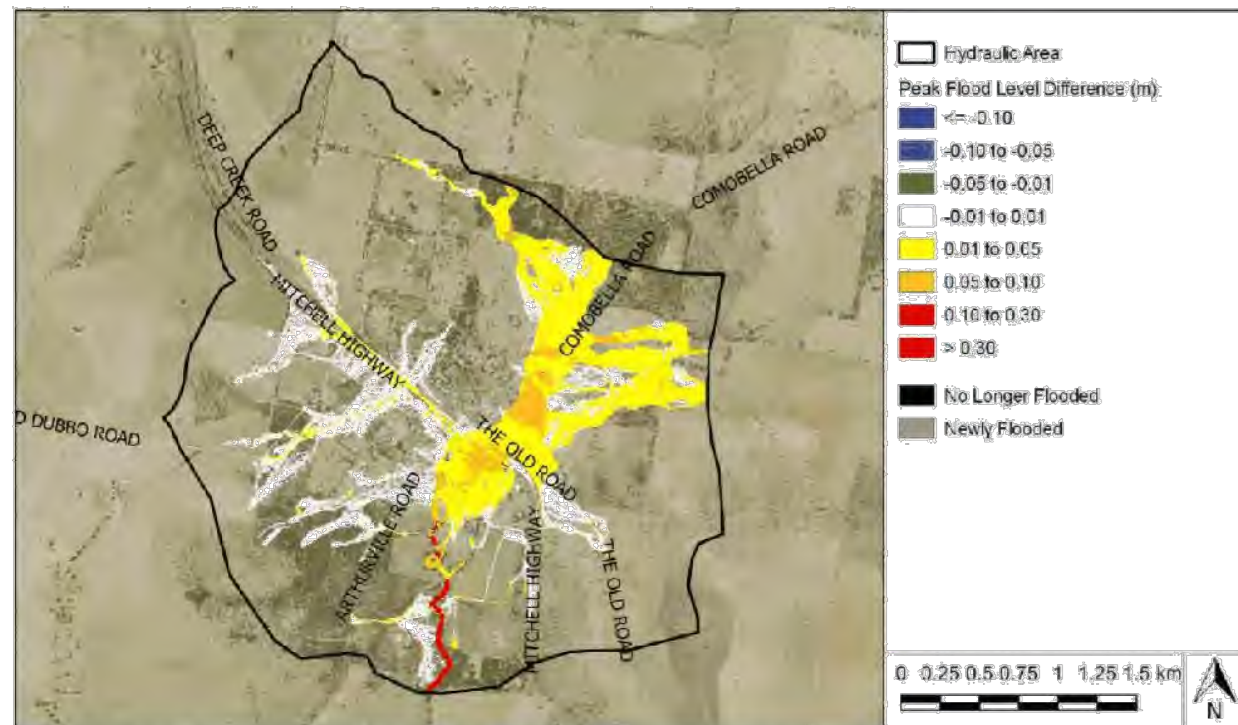


Image 9-12: 1% AEP Peak Flood Level Difference (m) - Hydraulic Roughness Increase

10020 Geurie FS Stage5 R08.docx

022



D.5 Blockage of Hydraulic Structures

Table 9-18: Peak Flood Level Difference (m) – Blockage of Hydraulic Structures by 25%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	0.11	0.11	0.09	0.08	0.13	0.08	0.10	0.02
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.10	0.21	0.20	0.15	0.13	0.04	0.04	0.03
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.13	0.20	0.17	0.13	0.10	0.04	0.03	0.02
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H06	Jennings St (south-east of Mitchell St)	0.00	-0.01	0.02	0.04	0.06	0.02	0.02	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.01	0.03	0.01	0.01	0.01	0.01	0.00	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.01	-0.06	-0.12	-0.14	-0.14	-0.09	-0.09	-0.03
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	0.00	-0.01	-0.01	0.00	0.00	-0.01	0.00	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	-0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.02
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00
H14	Boori Ck (north of Railway Tracks)	0.03	0.04	0.04	0.04	0.04	-0.03	0.02	0.02

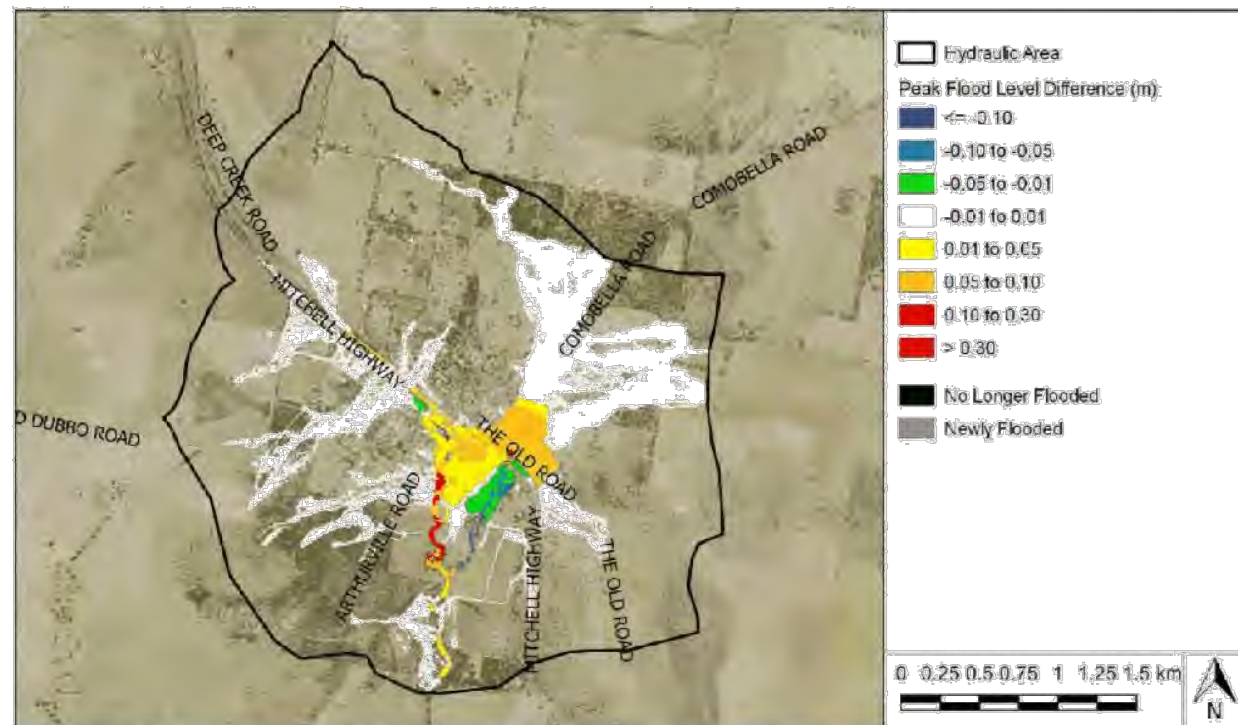


Image 9-13: 1% AEP Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 25%

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030



Table 9-19: Peak Flood Level Difference (m) - Blockage of Hydraulic Structures by 50%

ID	Location	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	0.5% AEP	0.2% AEP	PMF
H01	Confluence of Geurie Ck and Boori Ck	-0.01	0.09	0.03	0.01	0.02	0.01	0.01	0.00
H02	Geurie Ck - Upstream of Mitchell Hwy	0.32	0.24	0.25	0.26	0.27	0.23	0.23	0.04
H03	Geurie Ck - Upstream of Railway Tracks (east)	0.48	0.56	0.39	0.31	0.22	0.12	0.11	0.09
H04	Geurie Ck - Upstream of Railway Tracks (west)	0.51	0.52	0.33	0.25	0.18	0.11	0.09	0.07
H05	Geurie Ck - Upstream of Paxton St (north of Fitzroy St)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H06	Jennings St (south-east of Mitchell St)	-0.01	0.04	0.12	0.12	0.11	0.06	0.06	0.00
H07	Swale along northern edge of Mitchell Hwy (north of Mitchell St)	0.05	0.04	0.05	0.05	0.05	0.03	0.02	0.02
H08	Swale along northern edge of Mitchell Hwy (north of Chambers St)	0.13	0.13	0.03	0.02	0.02	0.02	0.01	-0.01
H09	Swale along northern edge of Mitchell Hwy (north of Douglas St)	-0.11	-0.22	-0.29	-0.31	-0.33	-0.28	-0.18	-0.06
H10	Swale along northern edge of Mitchell Hwy (north of Geurie St)	-0.01	-0.02	-0.01	-0.01	-0.01	0.00	0.01	0.00
H11	Swale along northern edge of Railway Tracks (south of Douglas St)	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.00
H12	Boori Ck (west of the intersection of Mitchell Hwy and Douglas St)	0.00	0.15	0.12	0.06	0.03	0.03	0.03	0.04
H13	Boori Ck (west of the intersection of Mitchell Hwy and Geurie St)	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	0.00
H14	Boori Ck (north of Railway Tracks)	0.08	0.10	0.09	0.10	0.10	0.08	0.08	0.05

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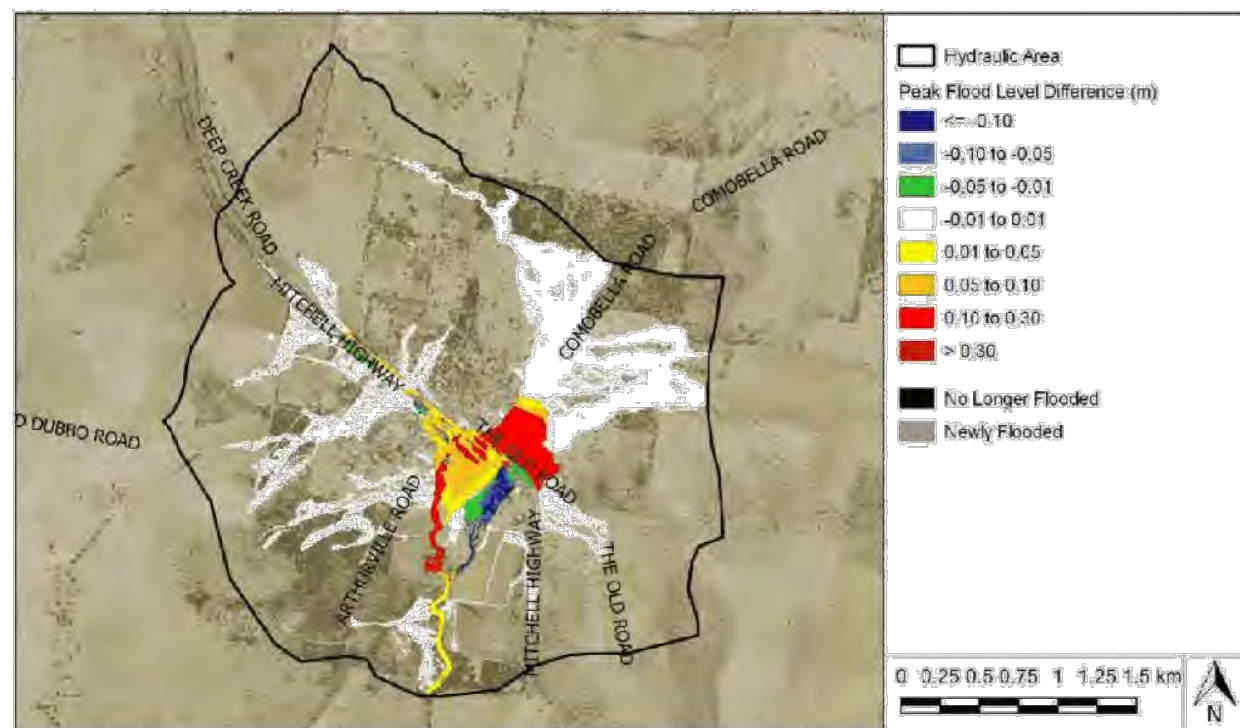


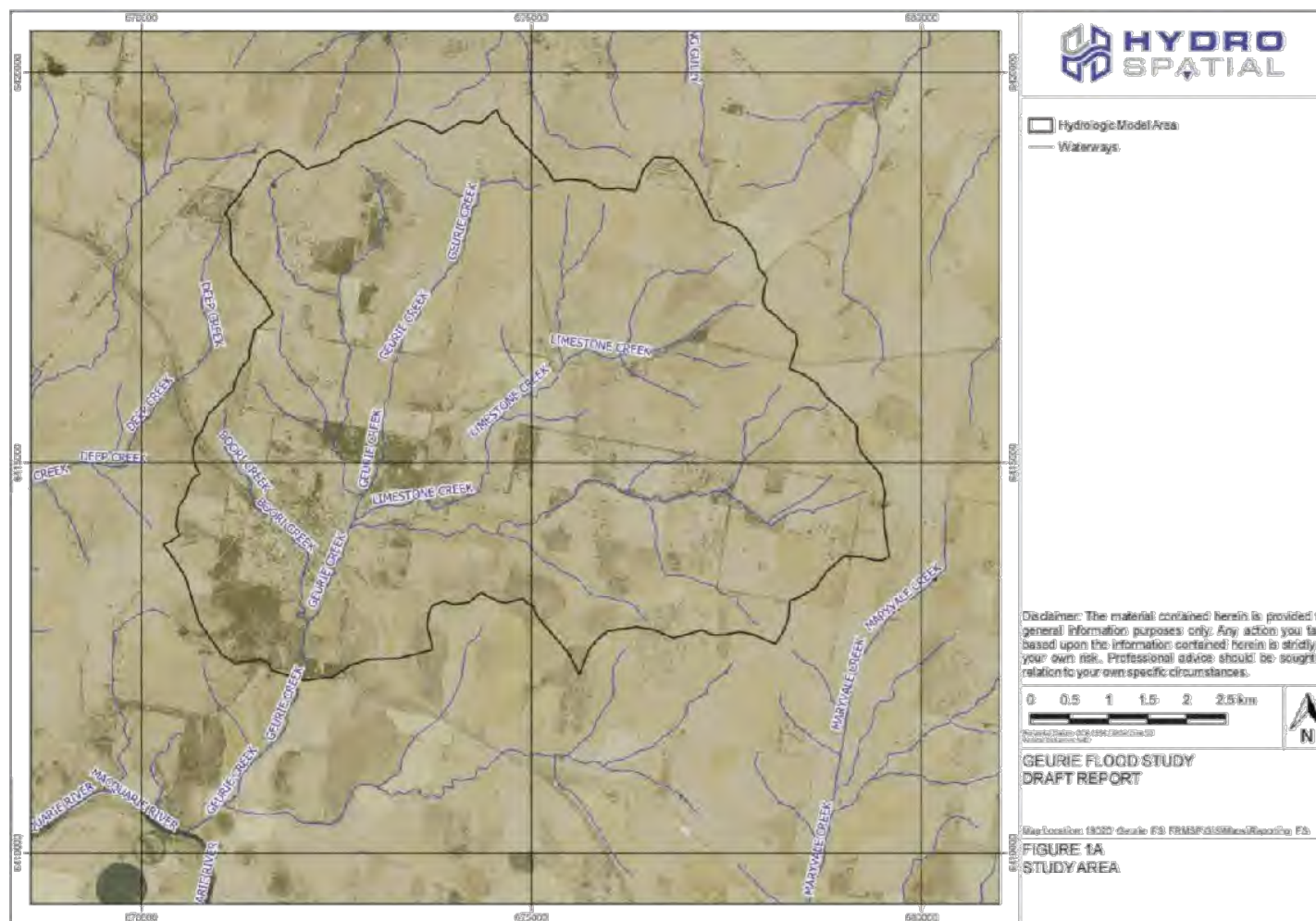
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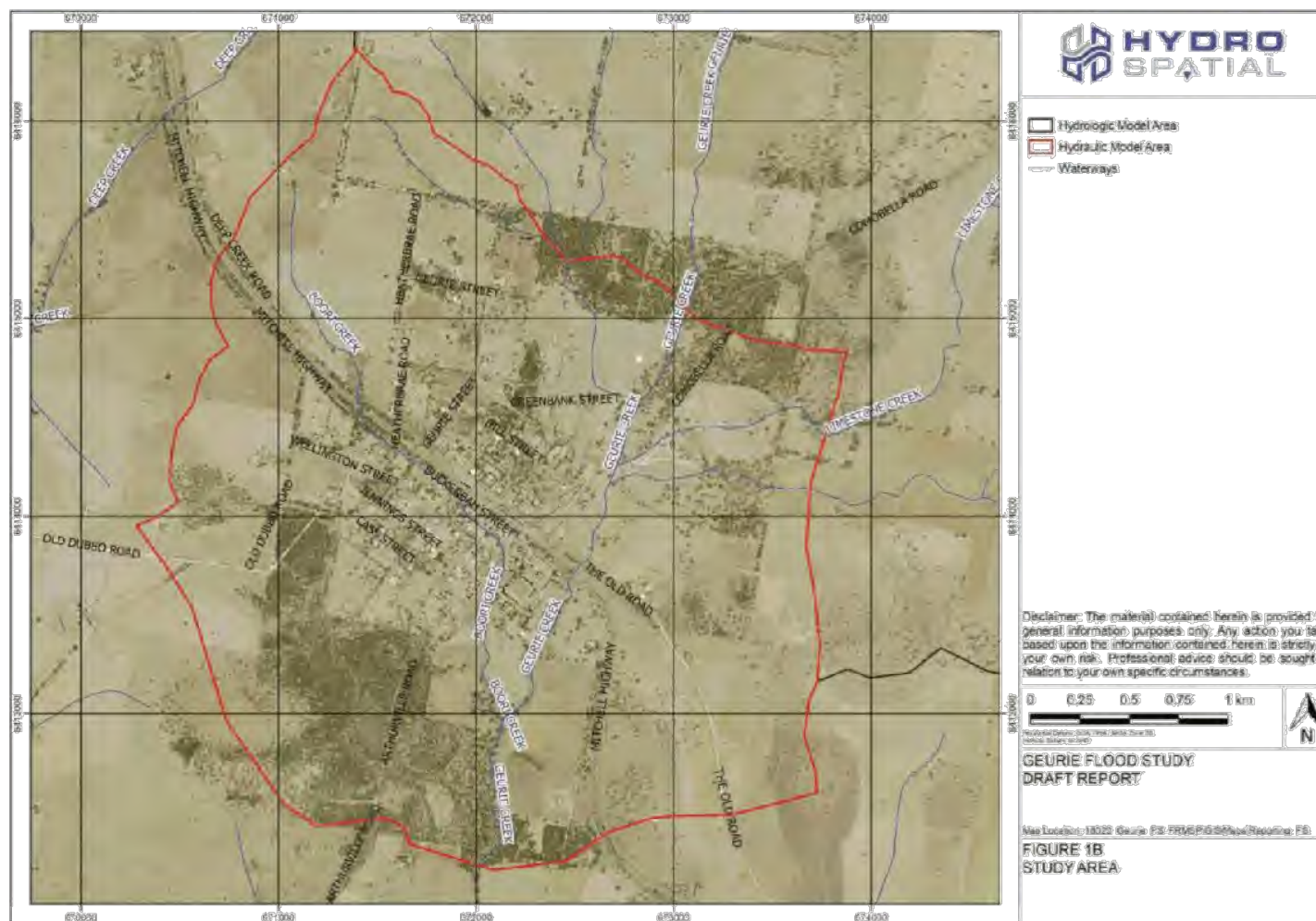
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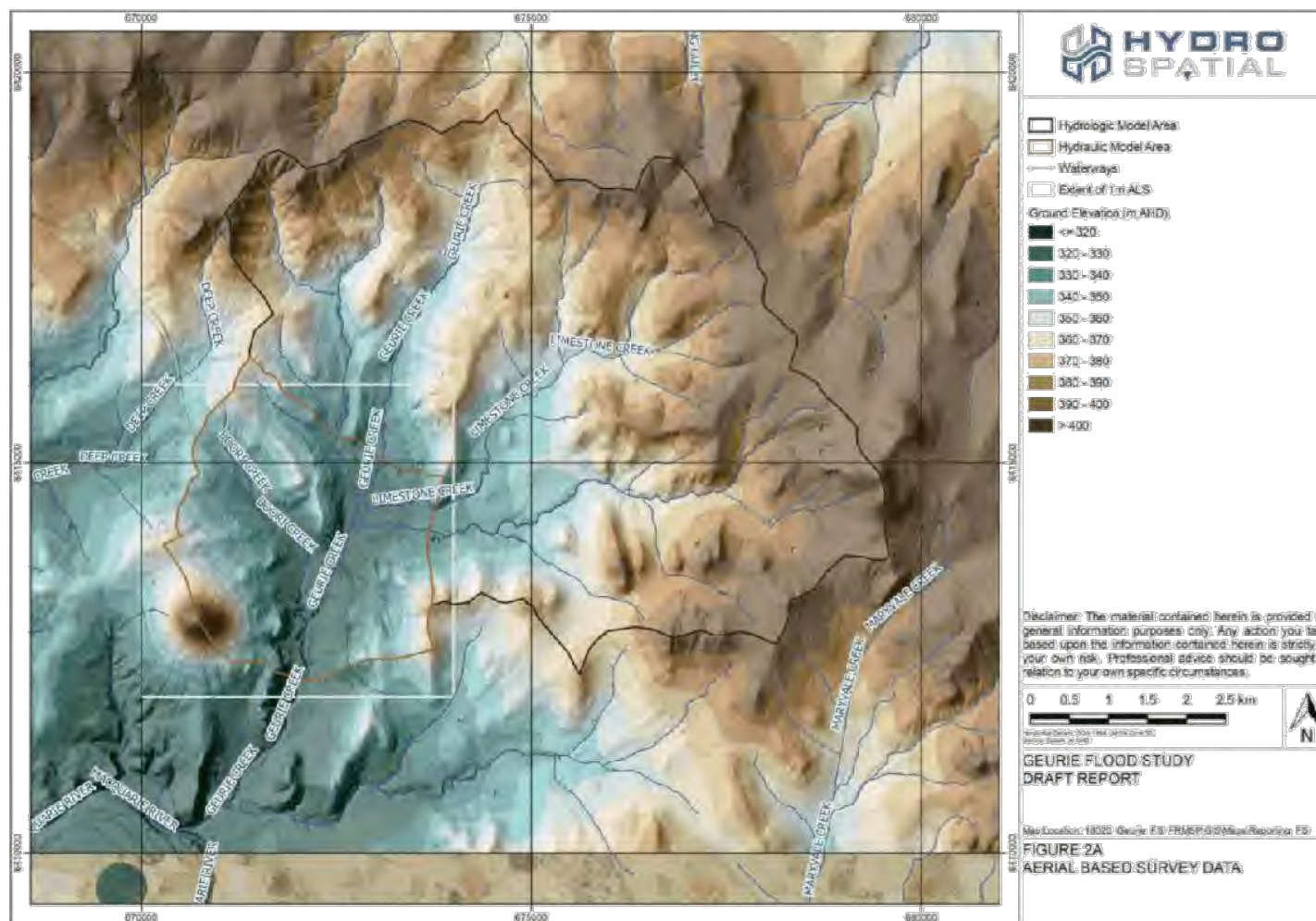
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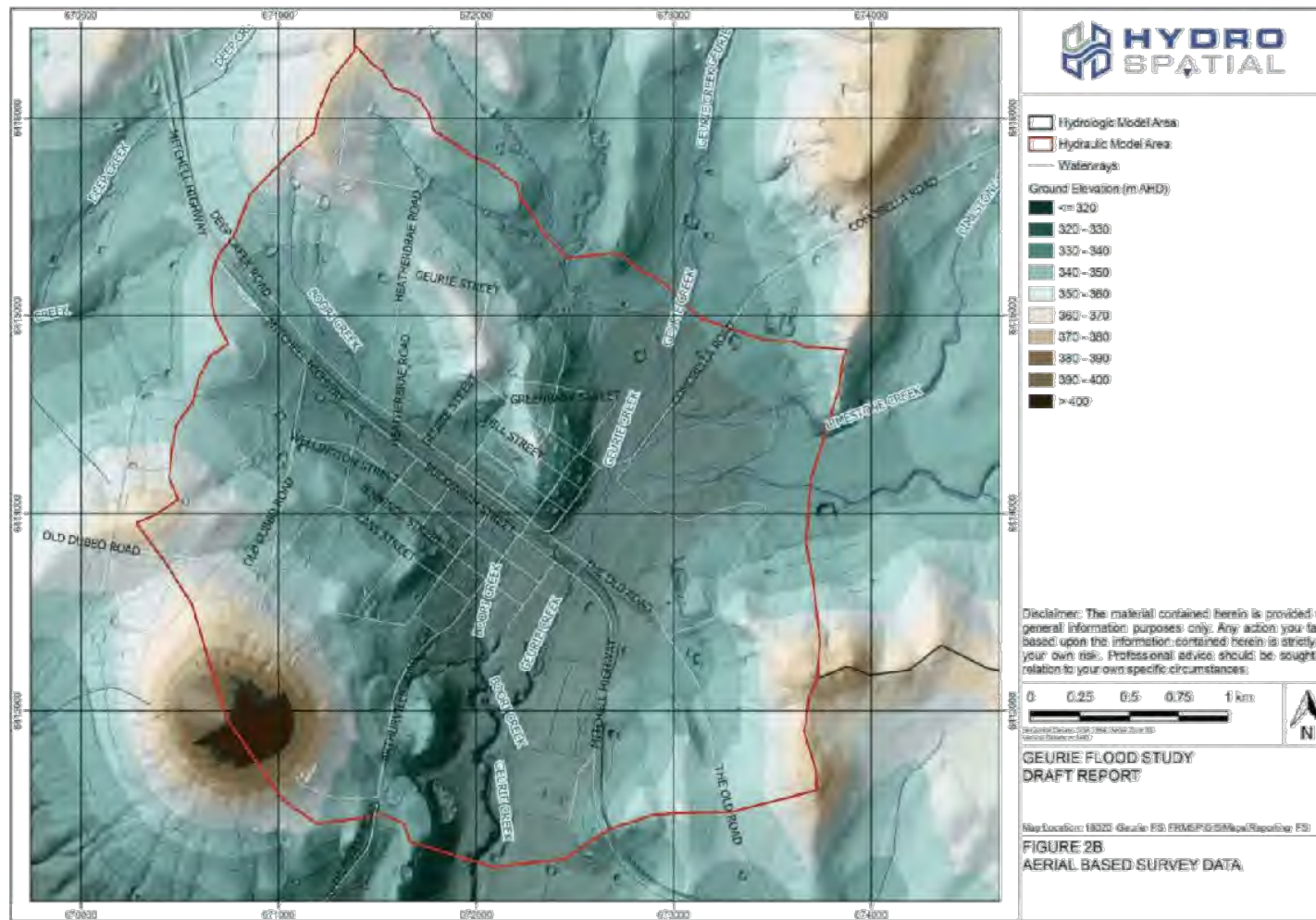






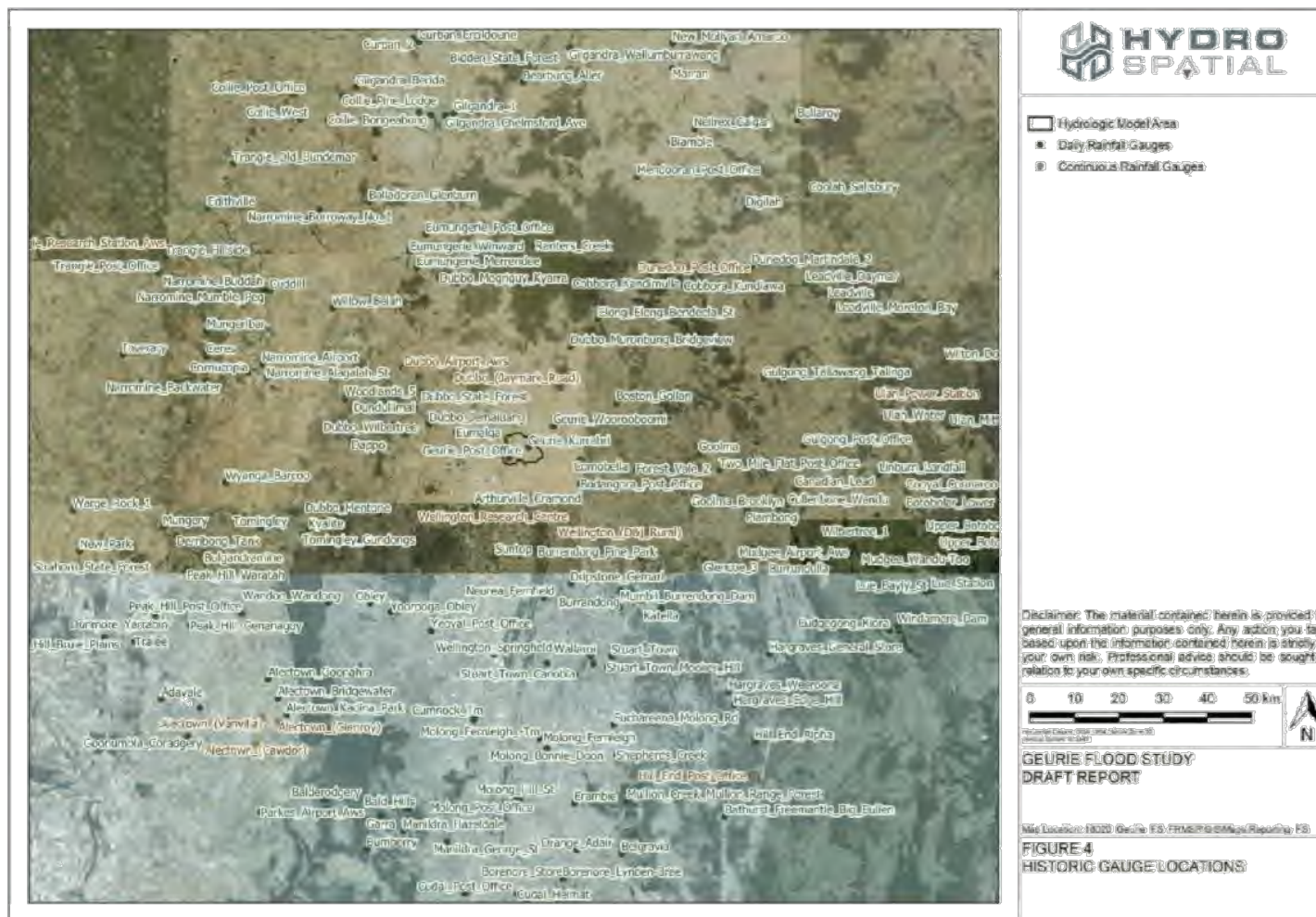
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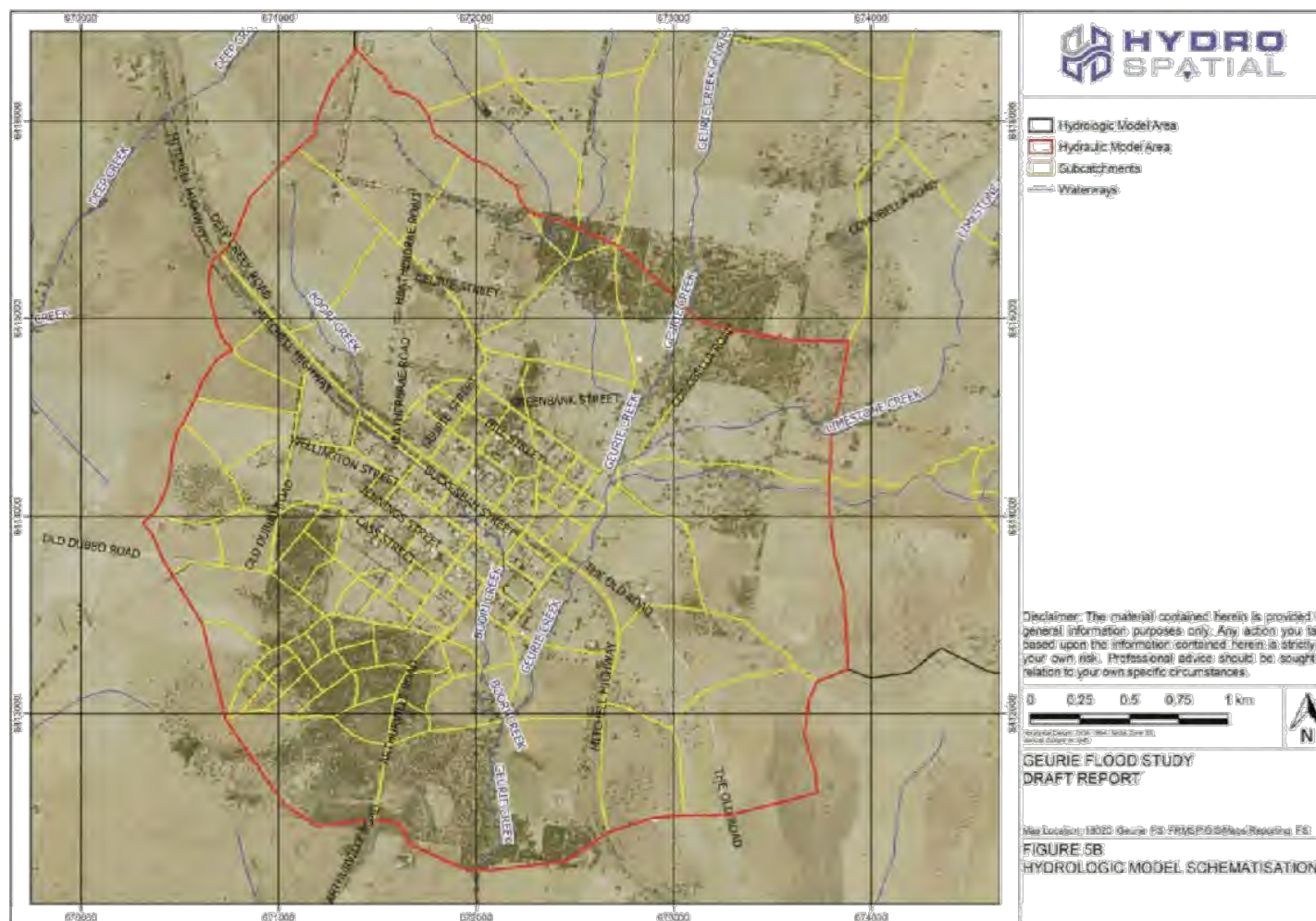


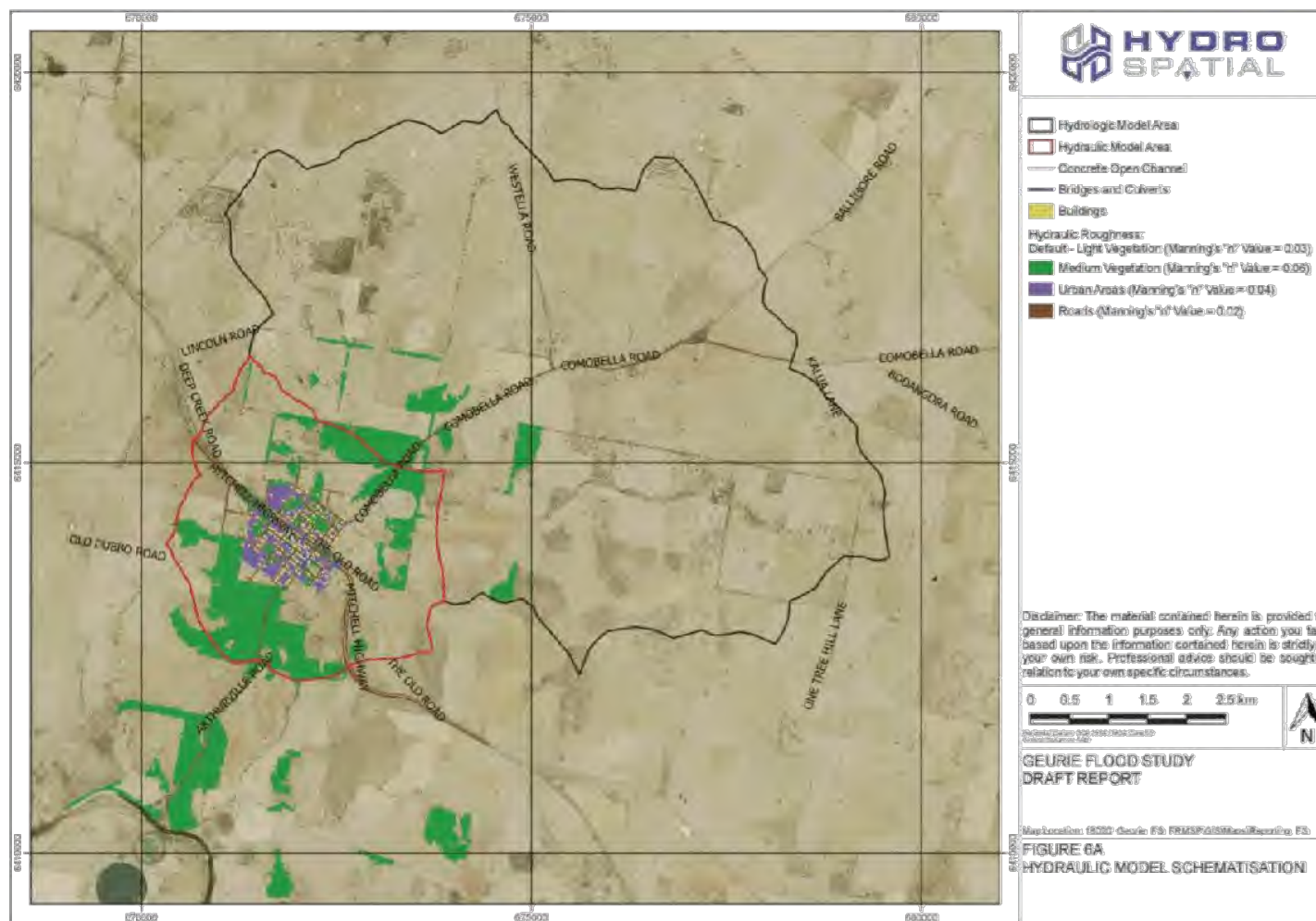
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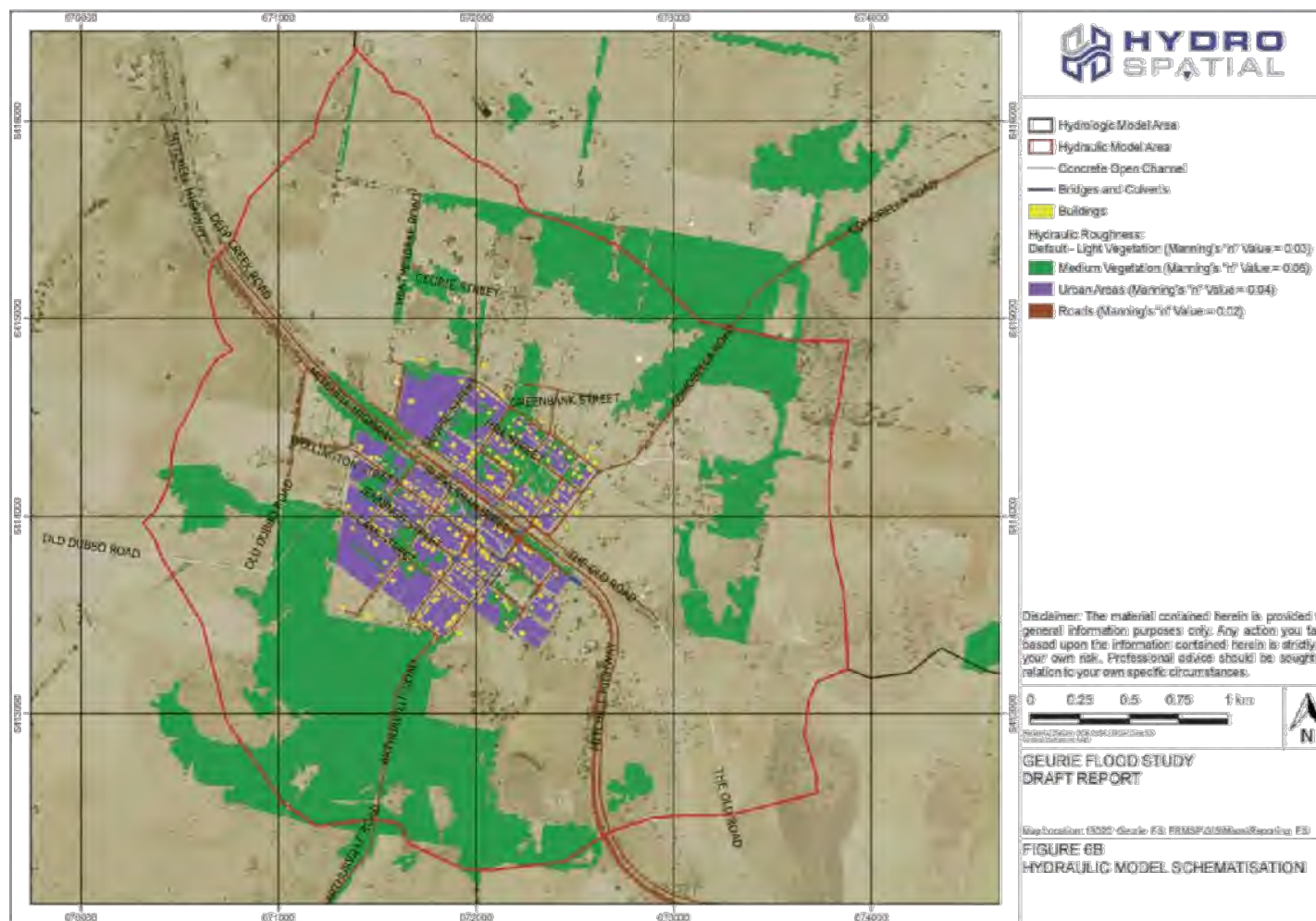
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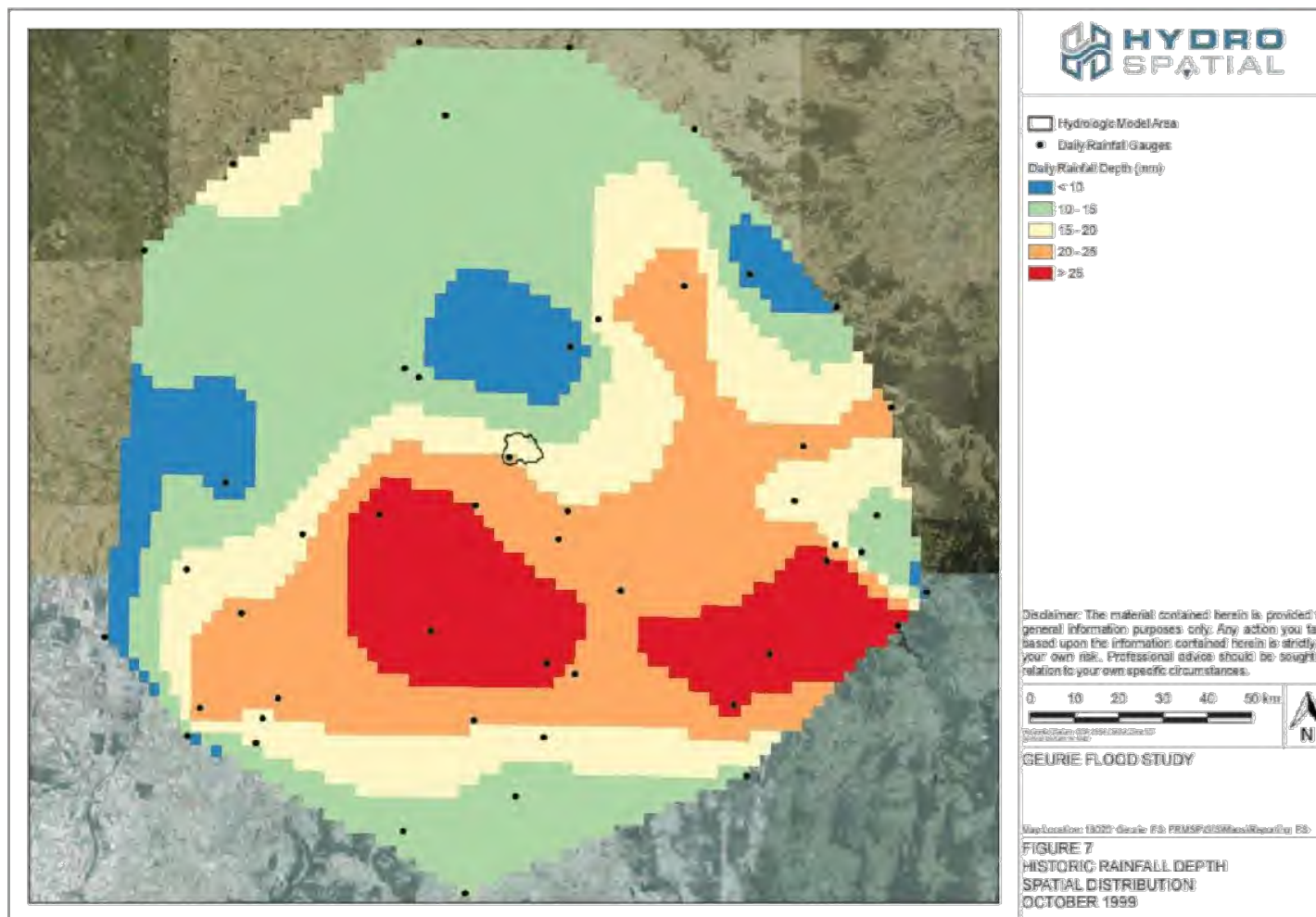








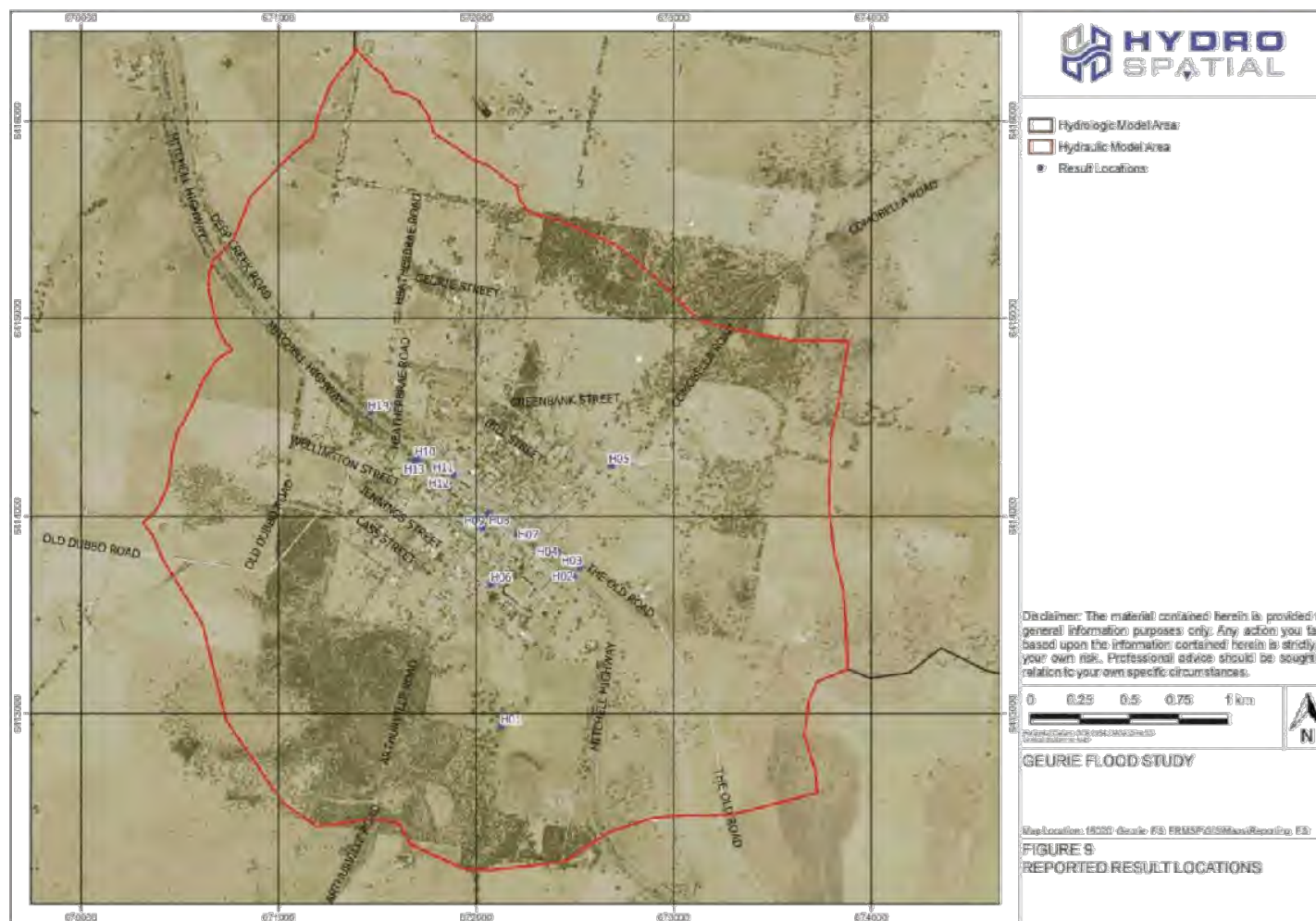


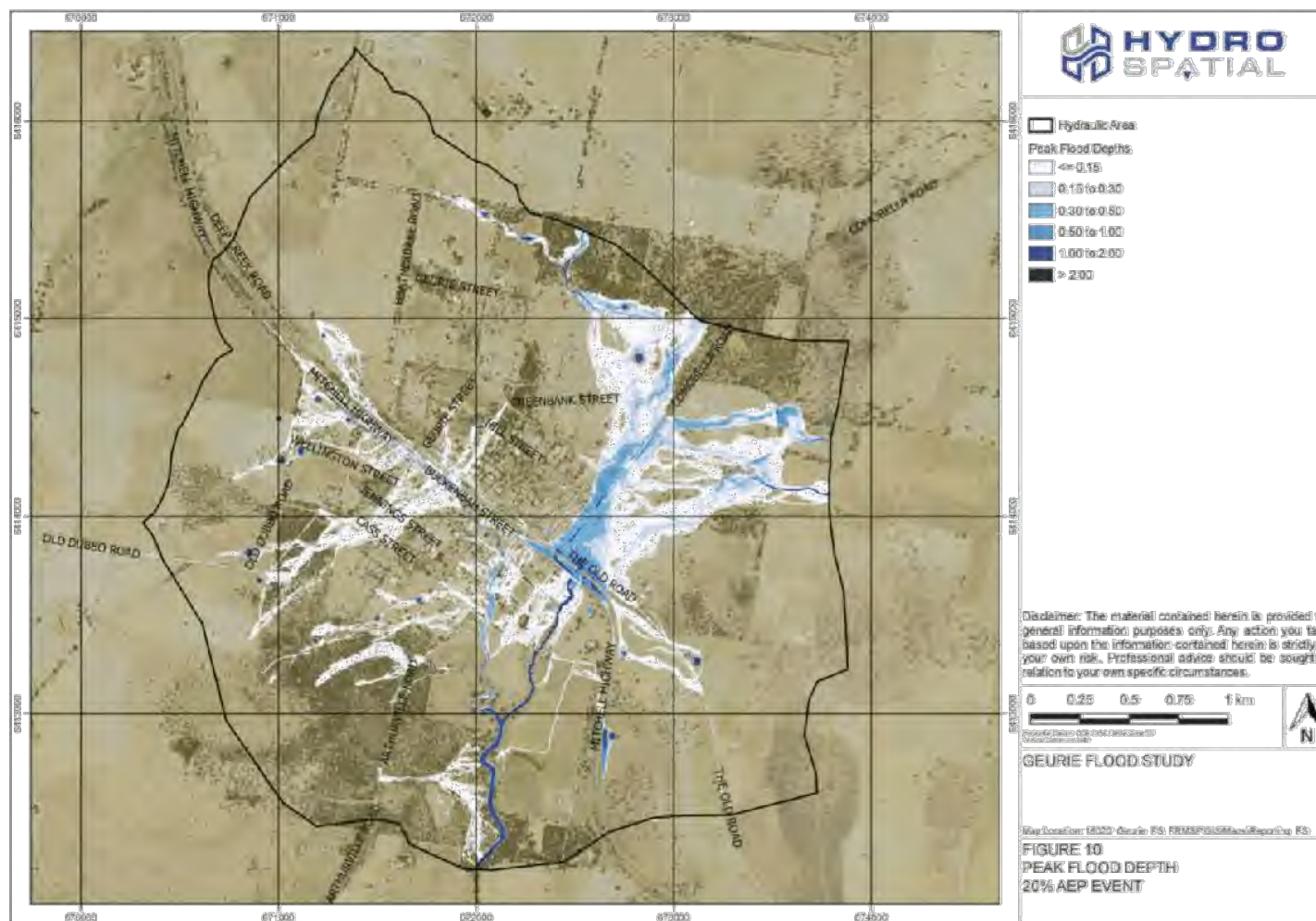




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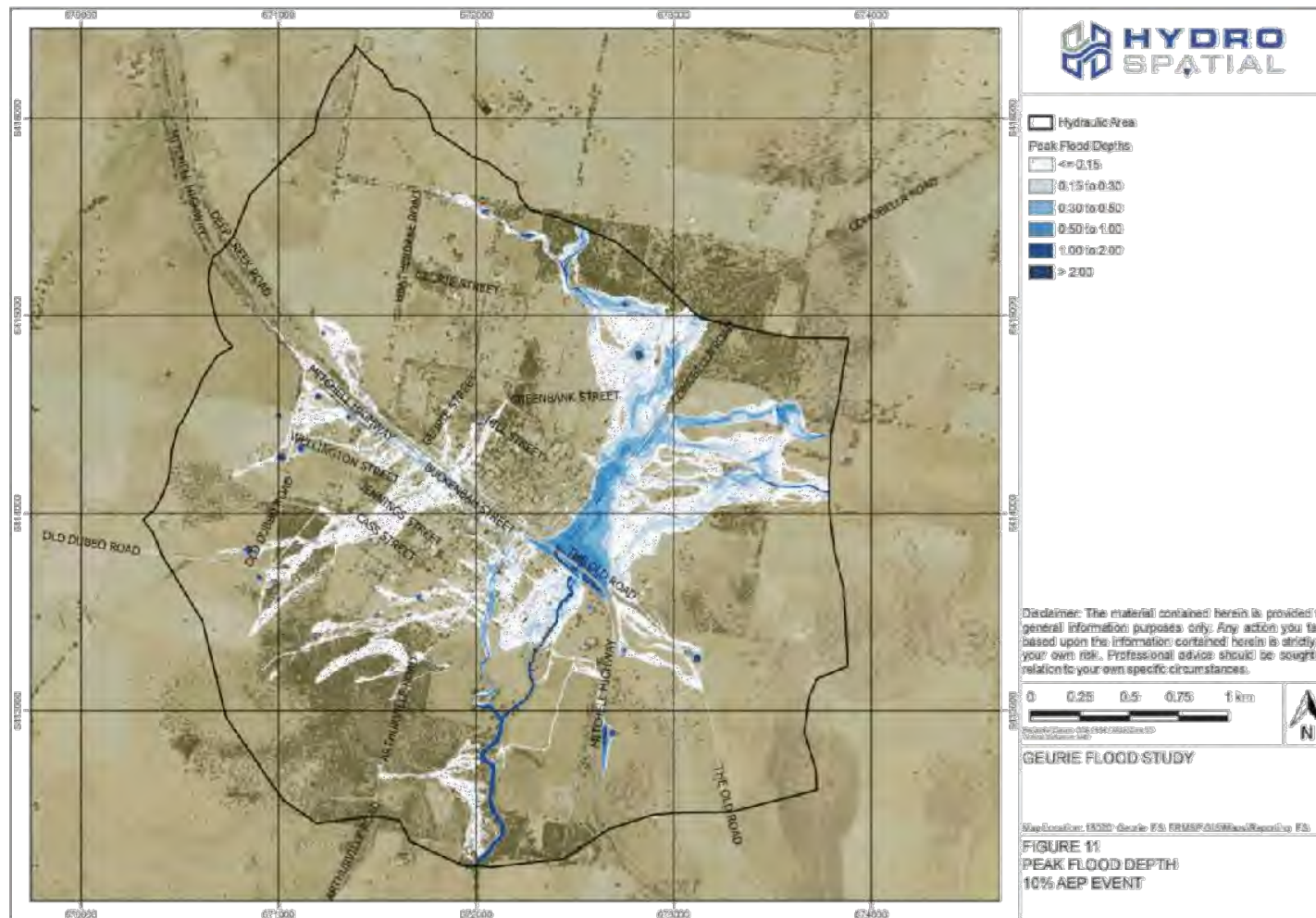
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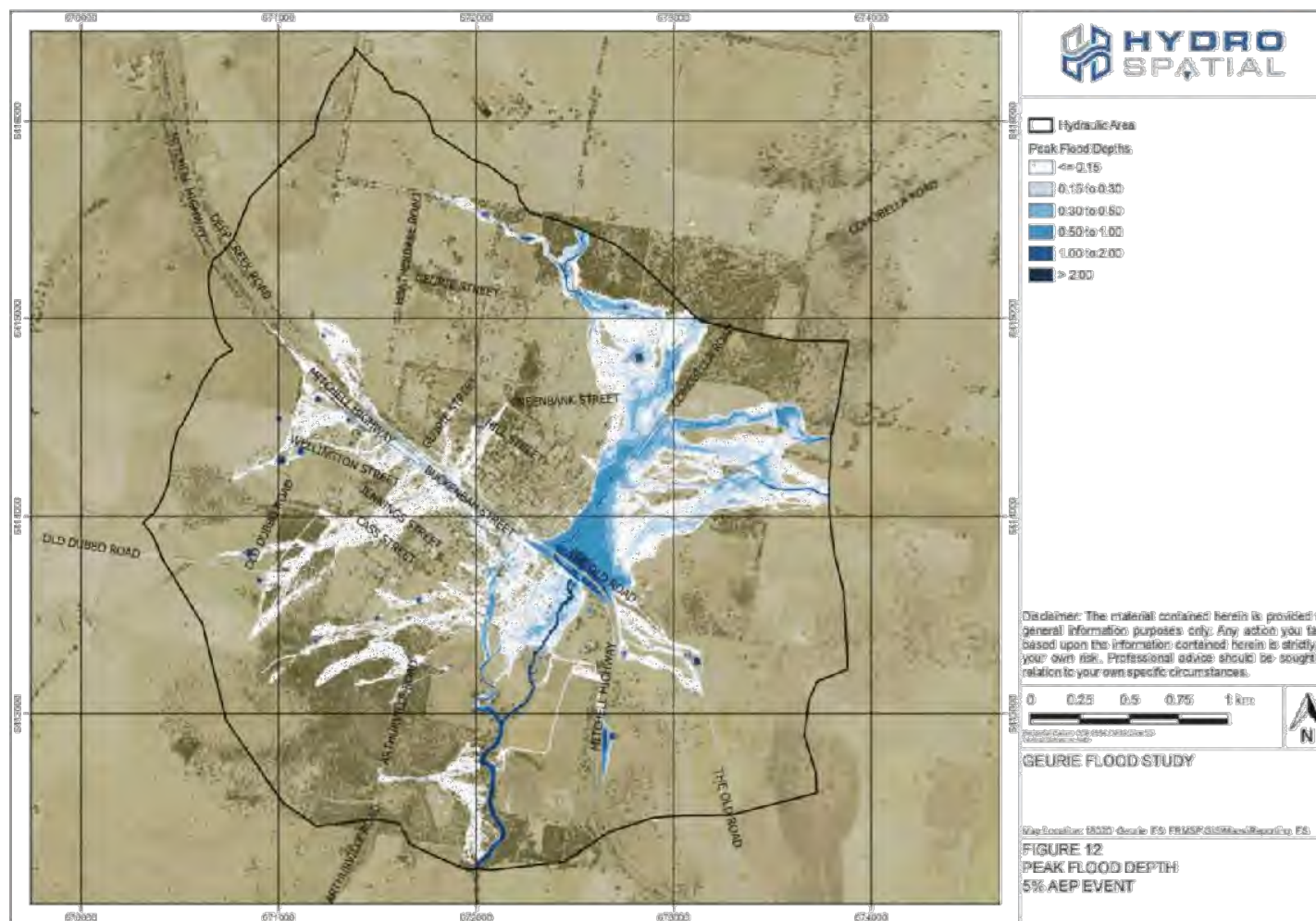
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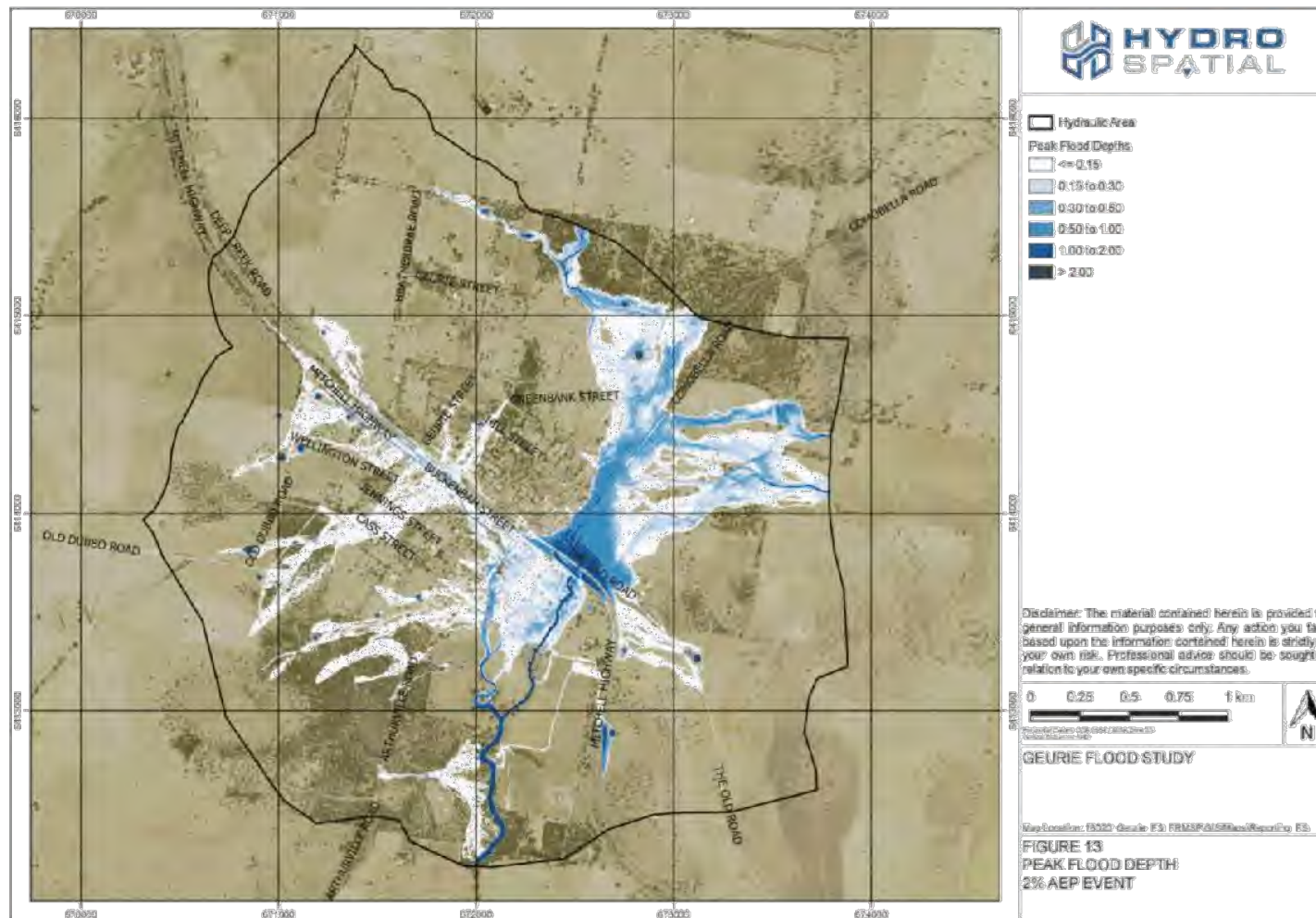
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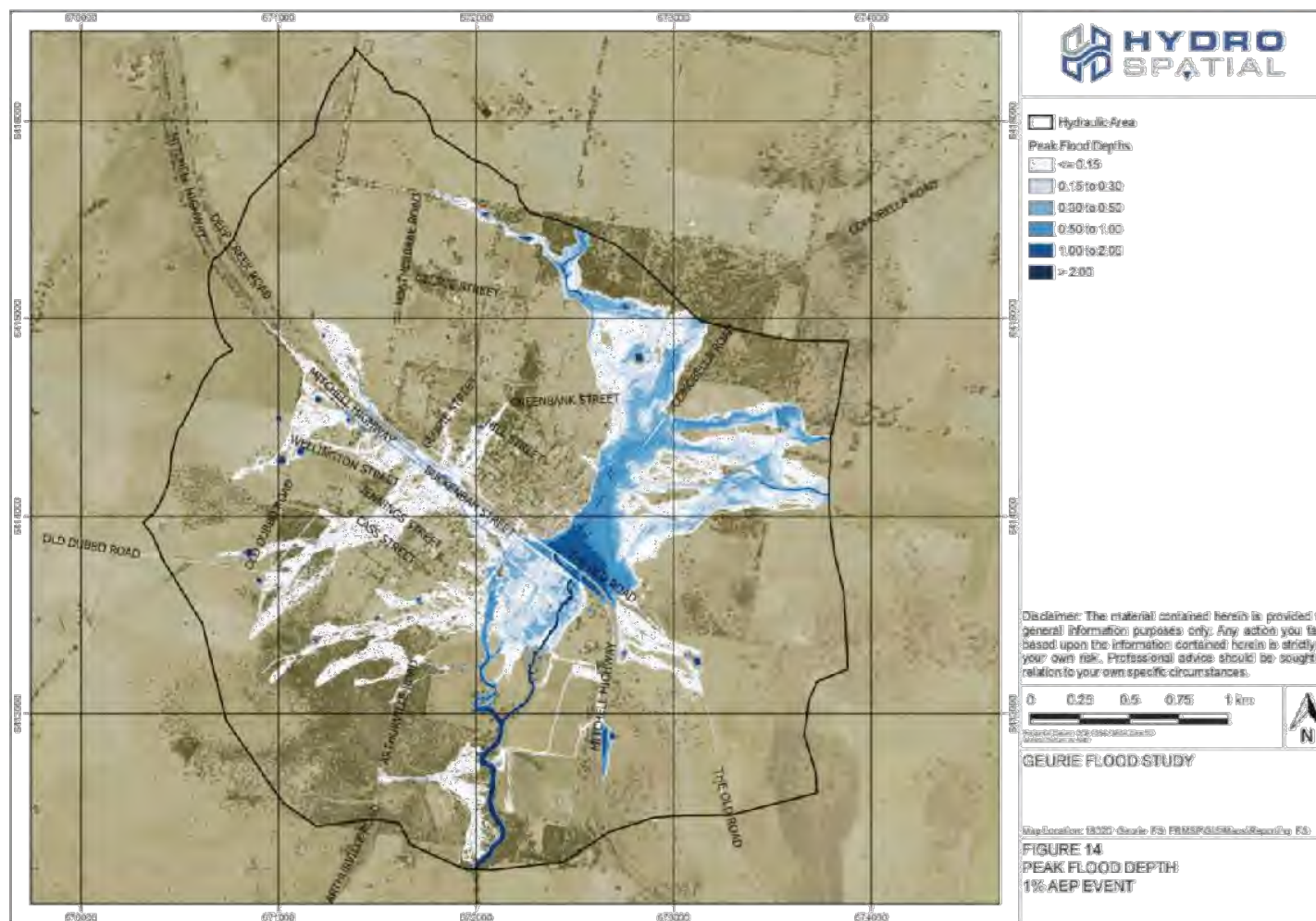
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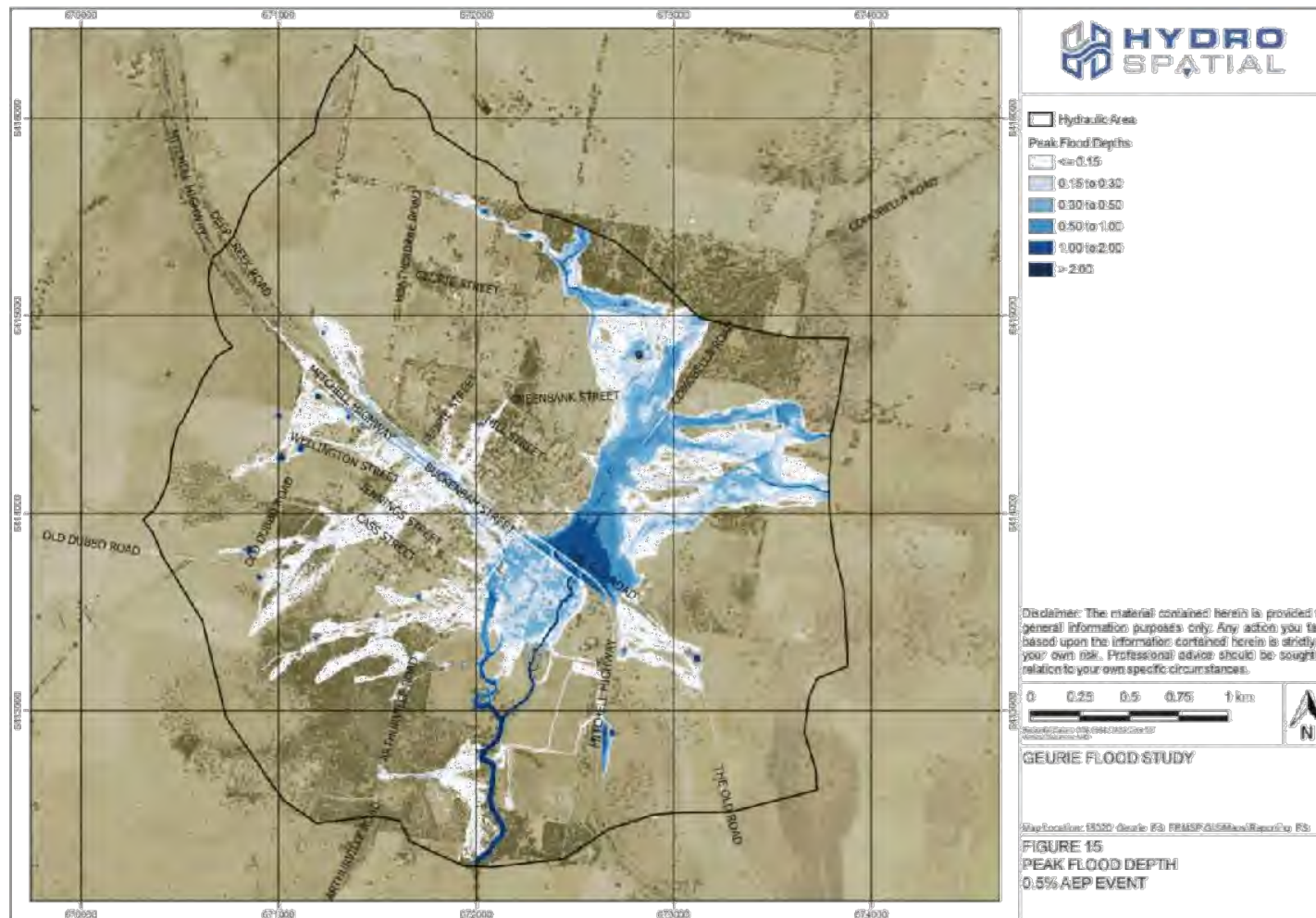


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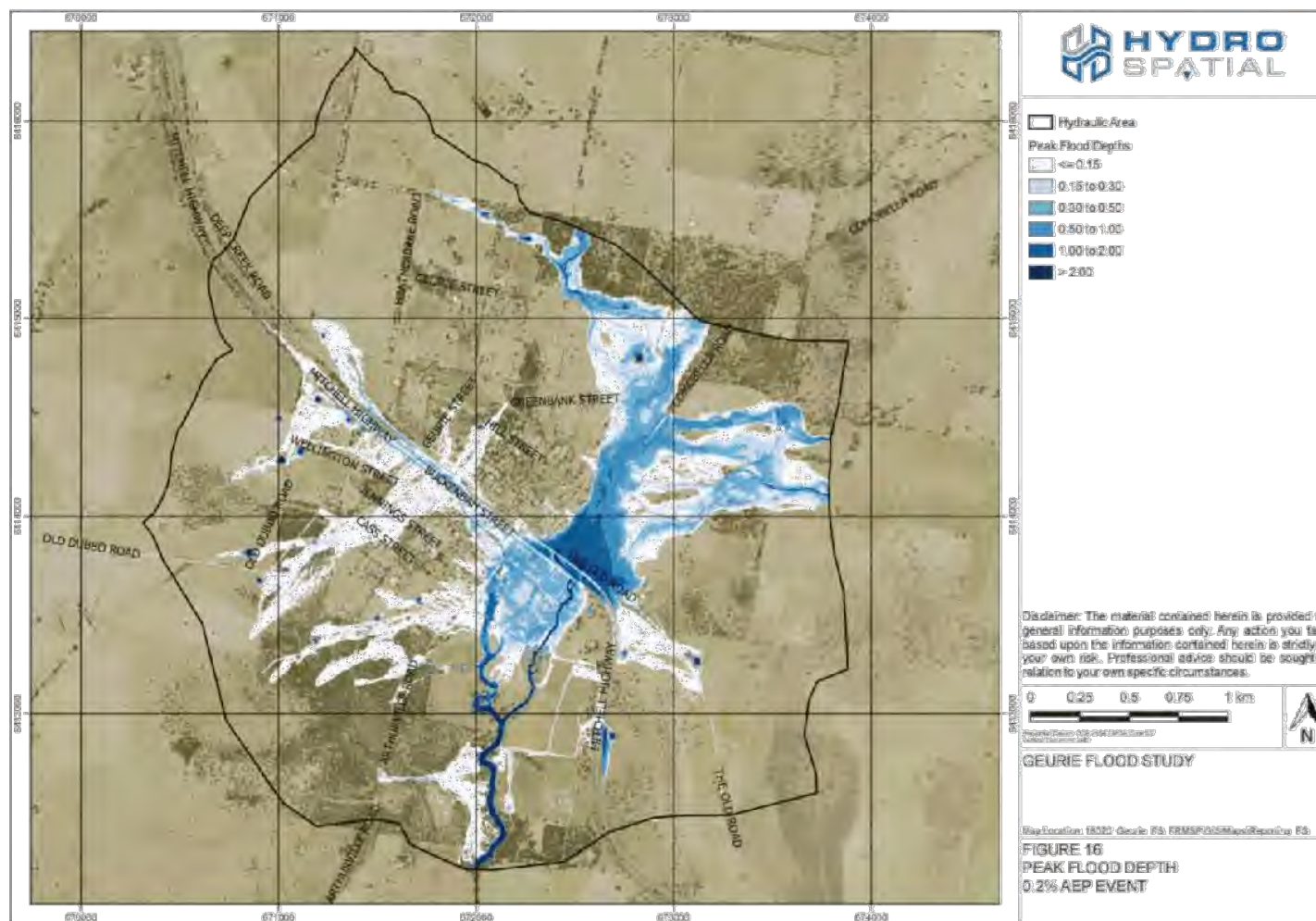






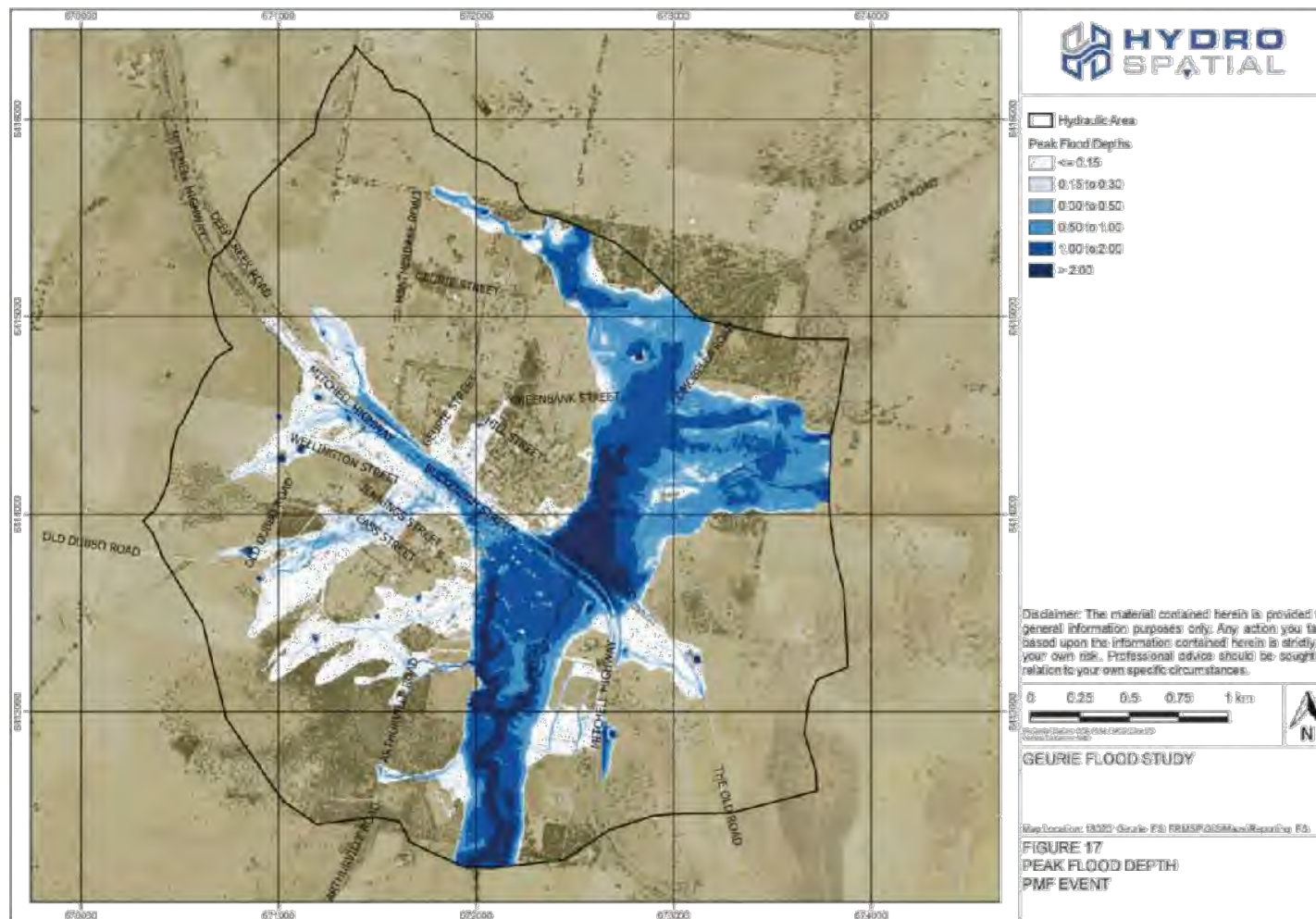
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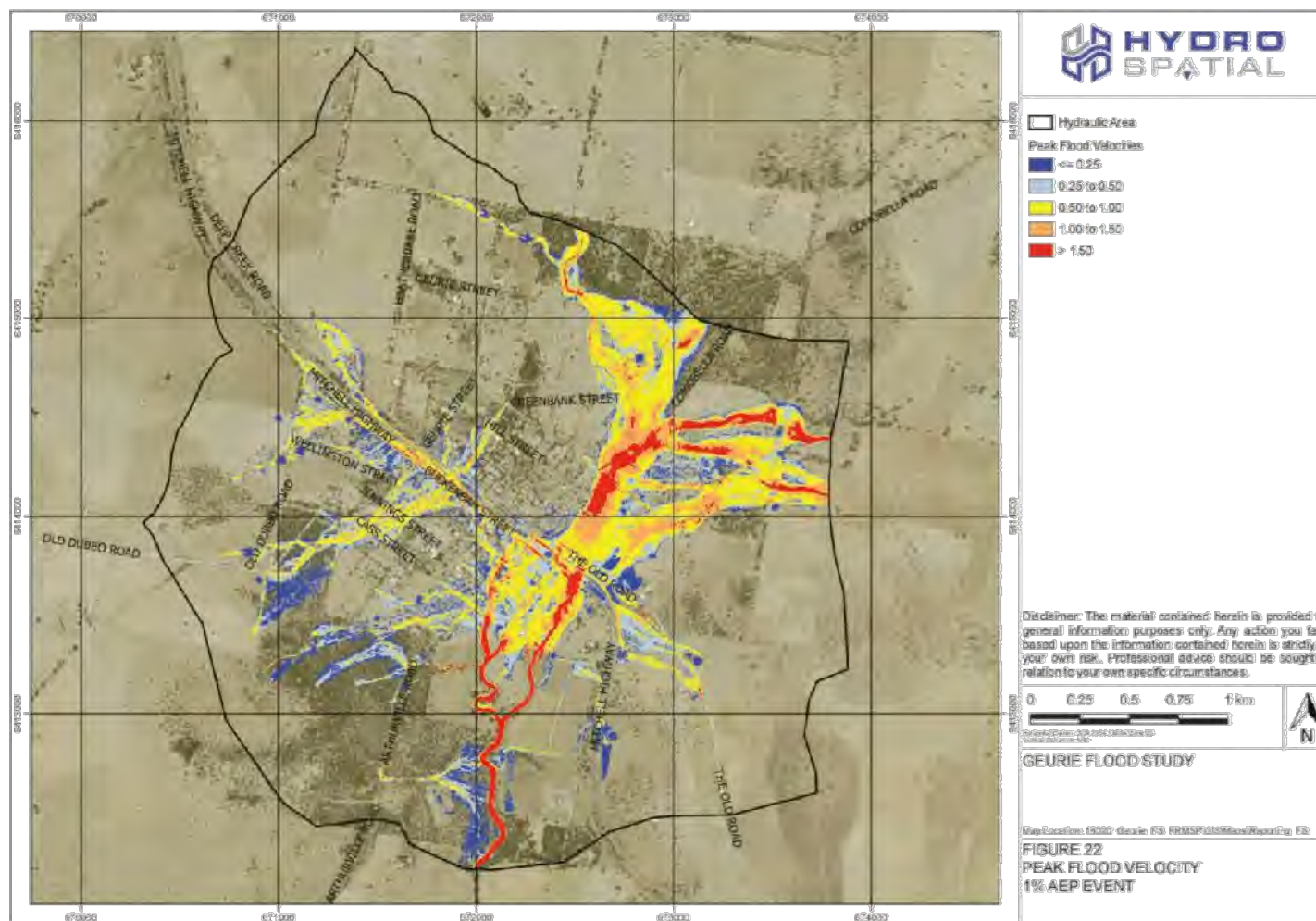






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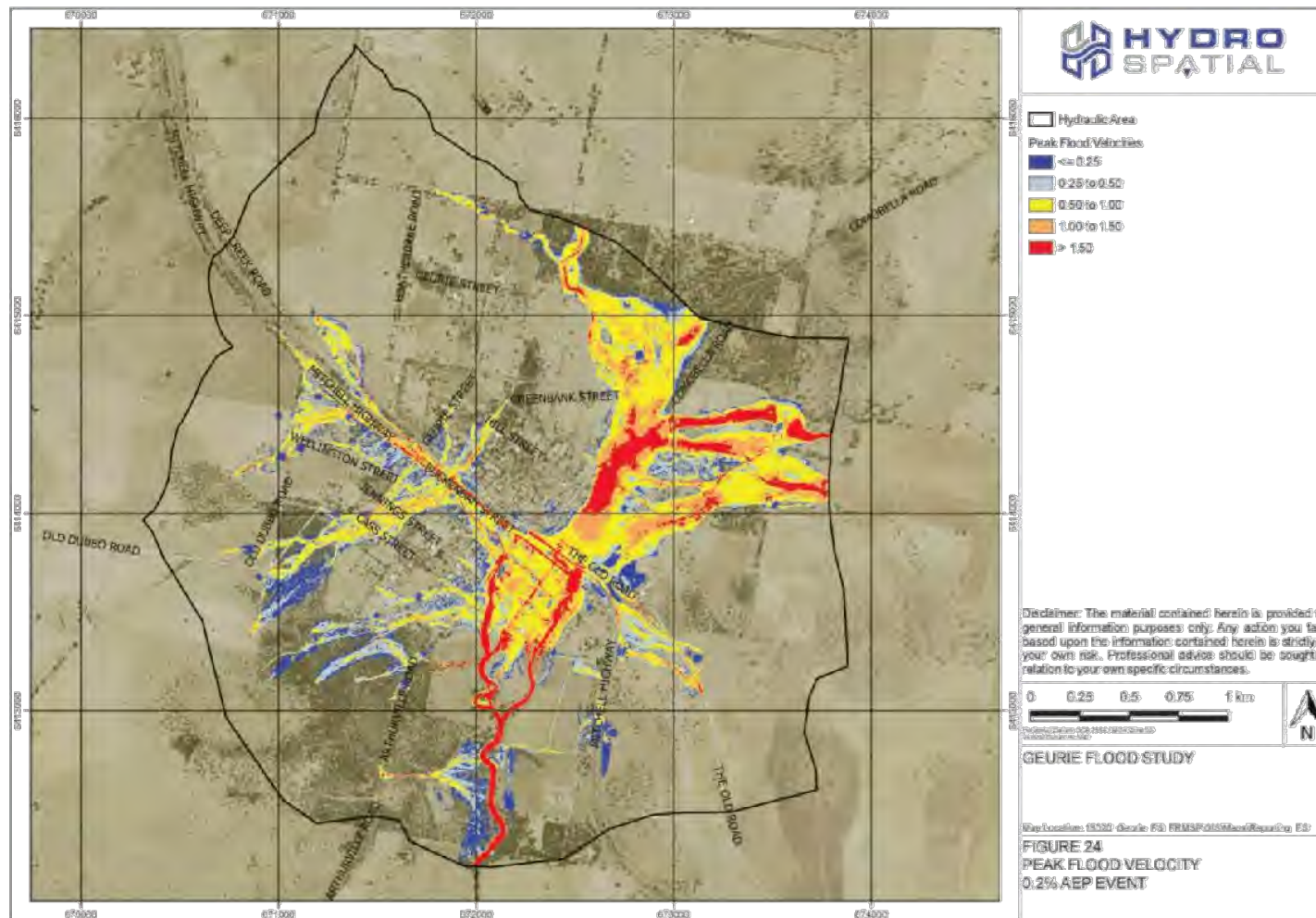
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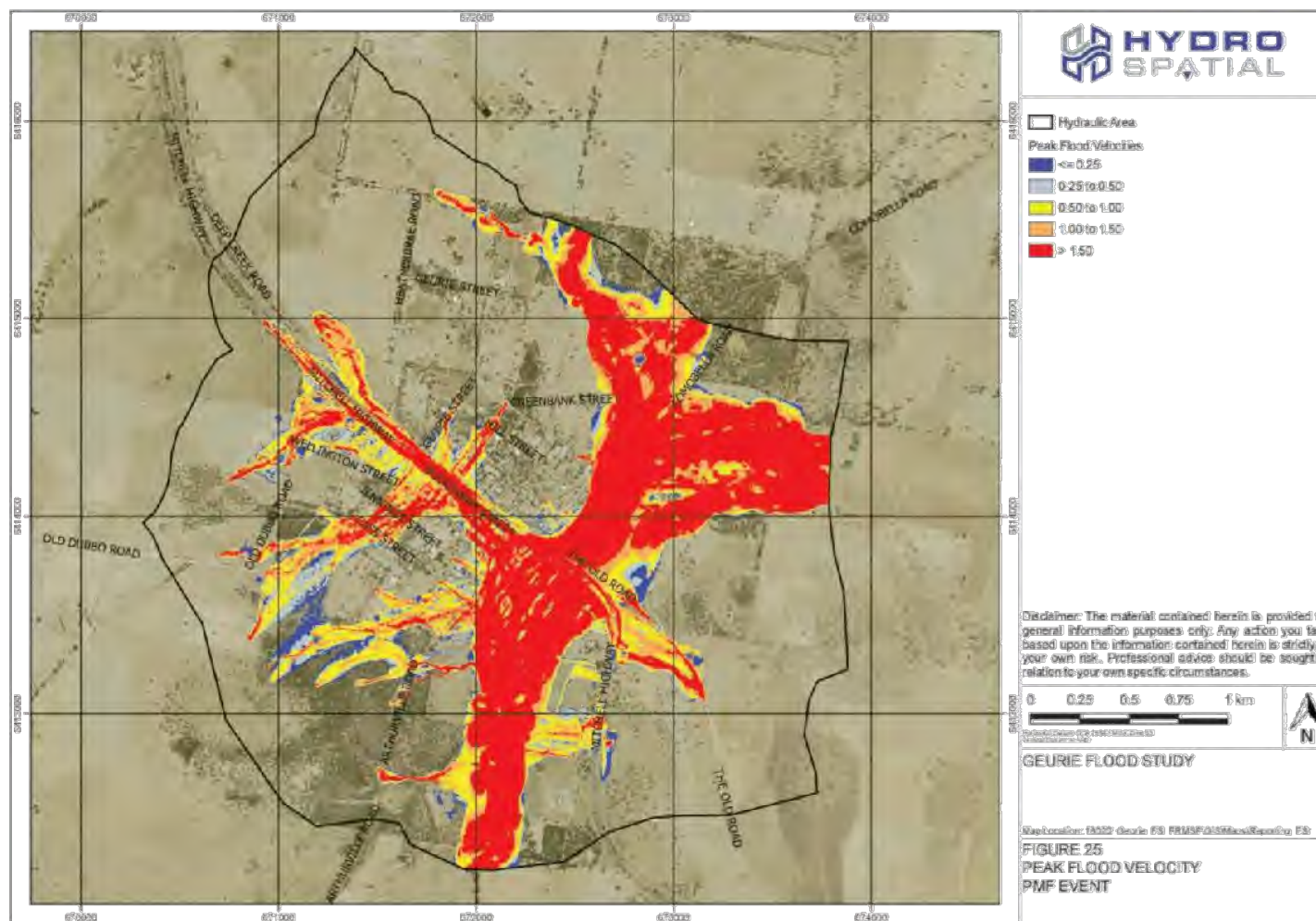
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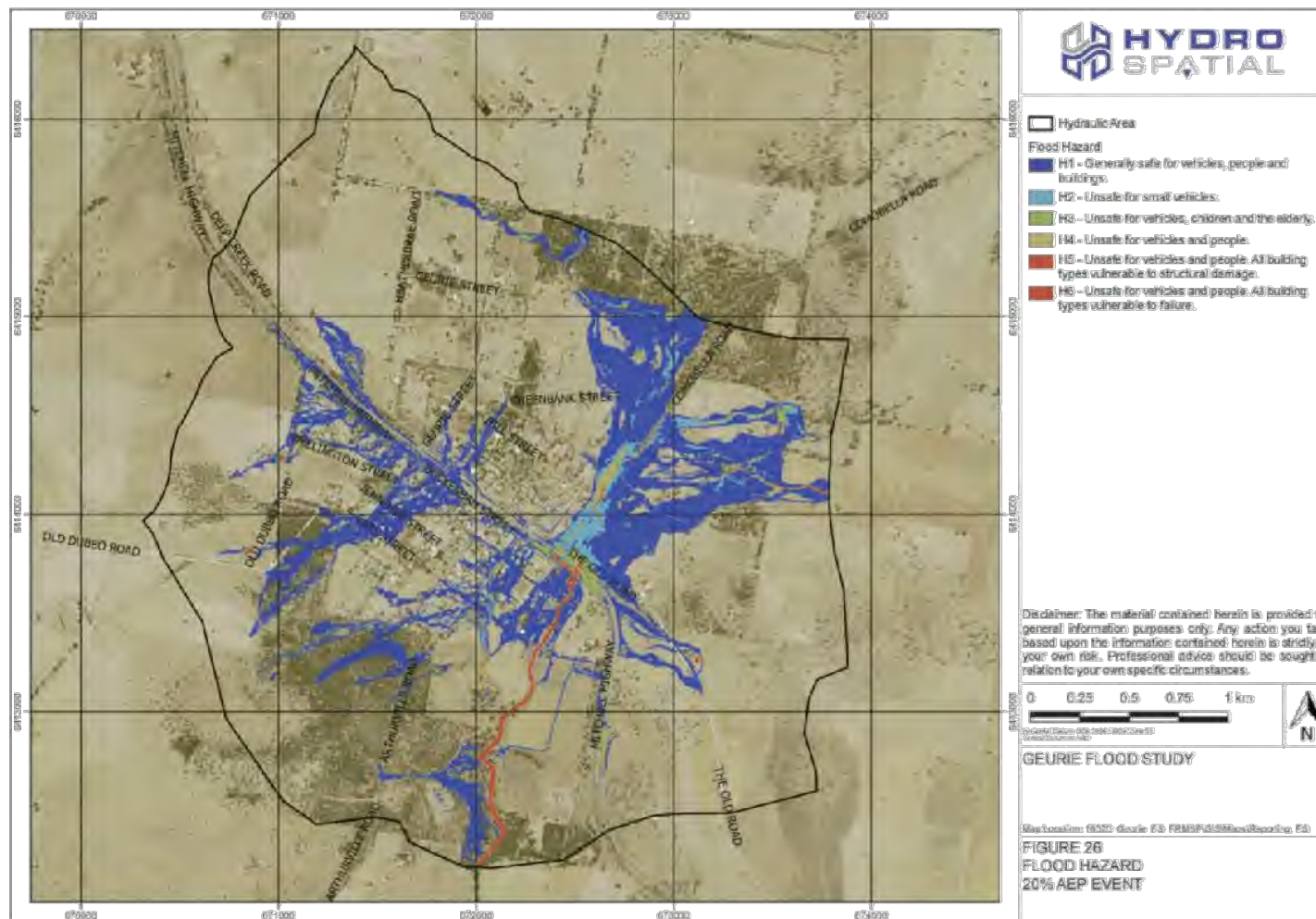
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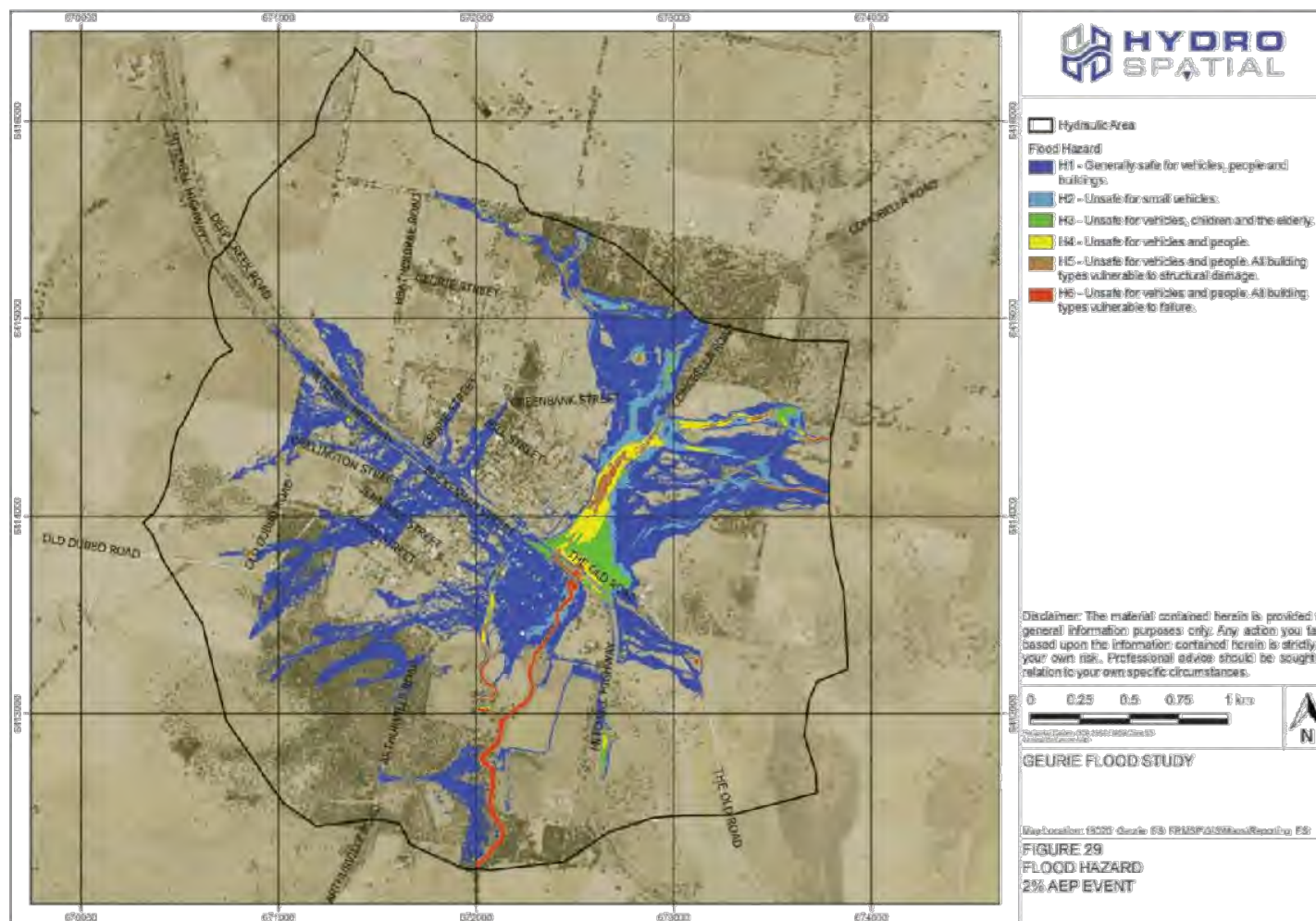






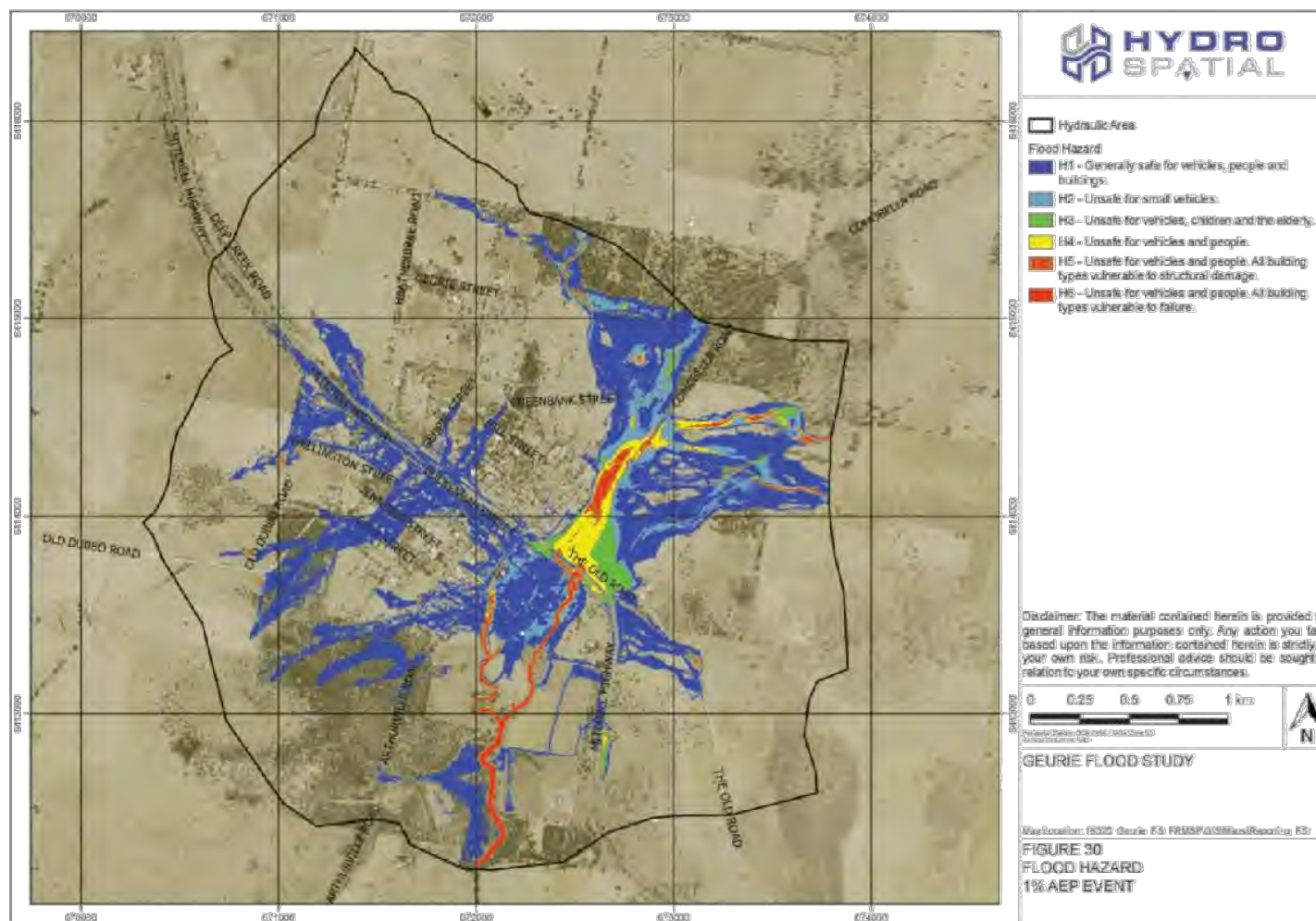
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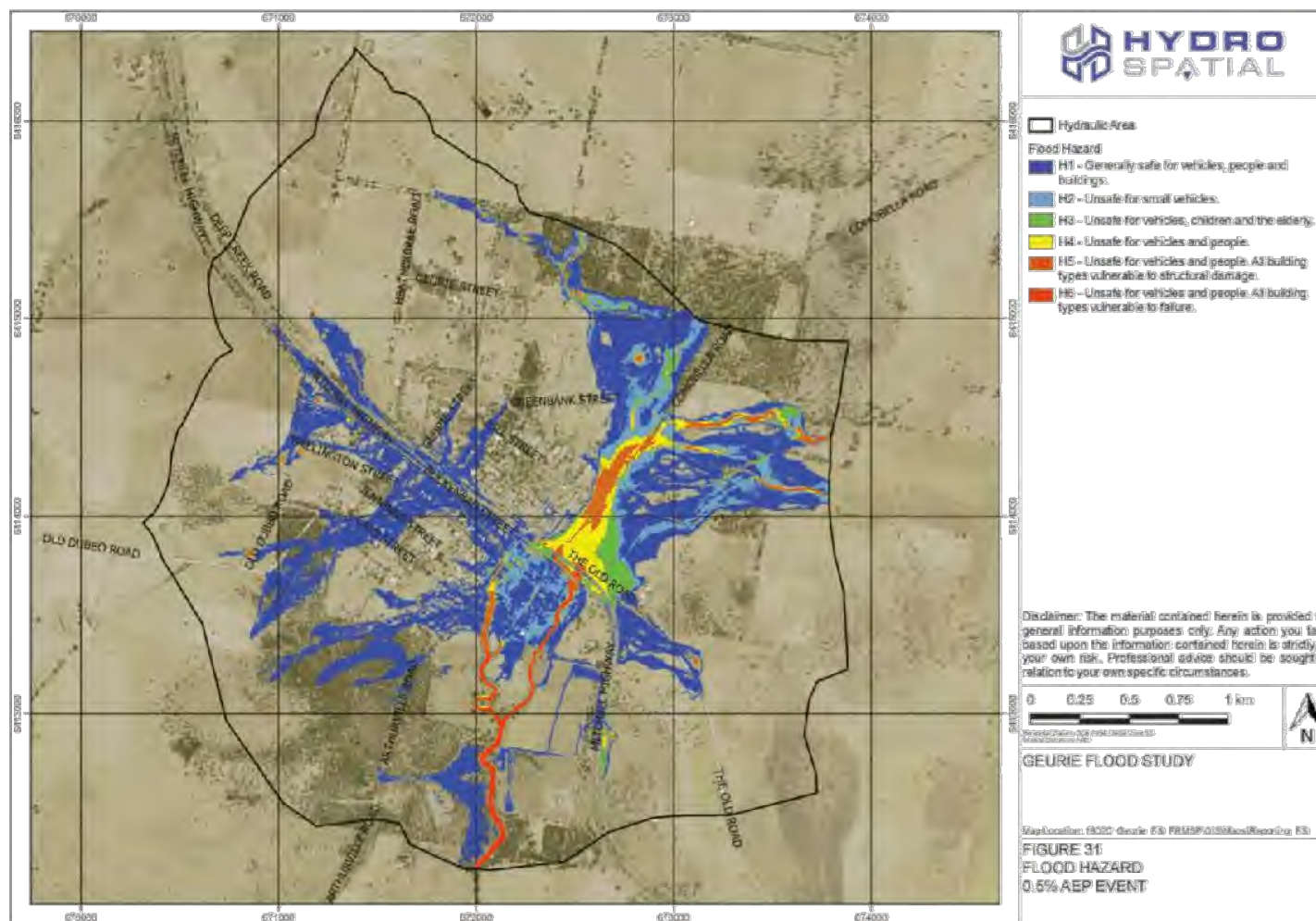
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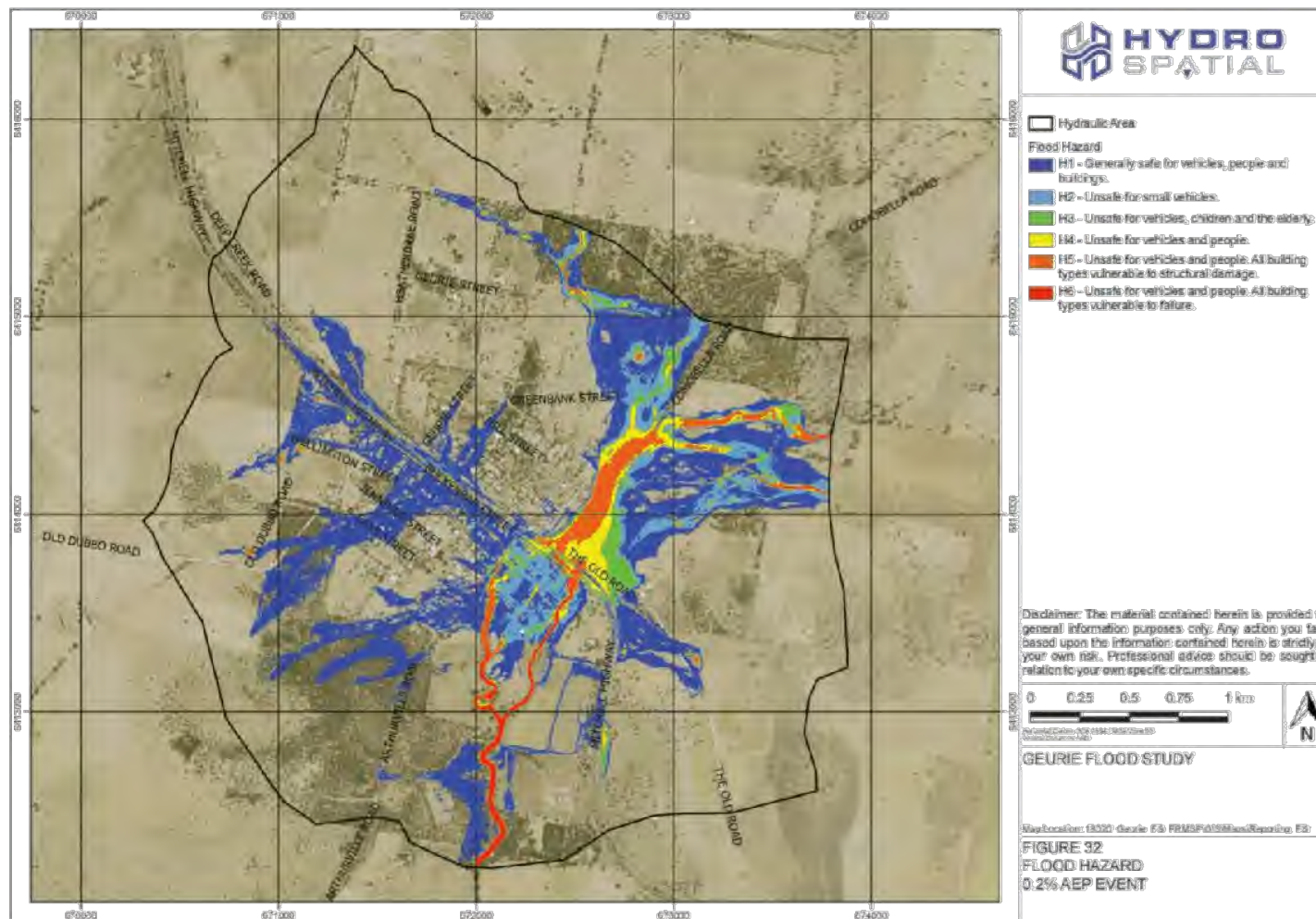
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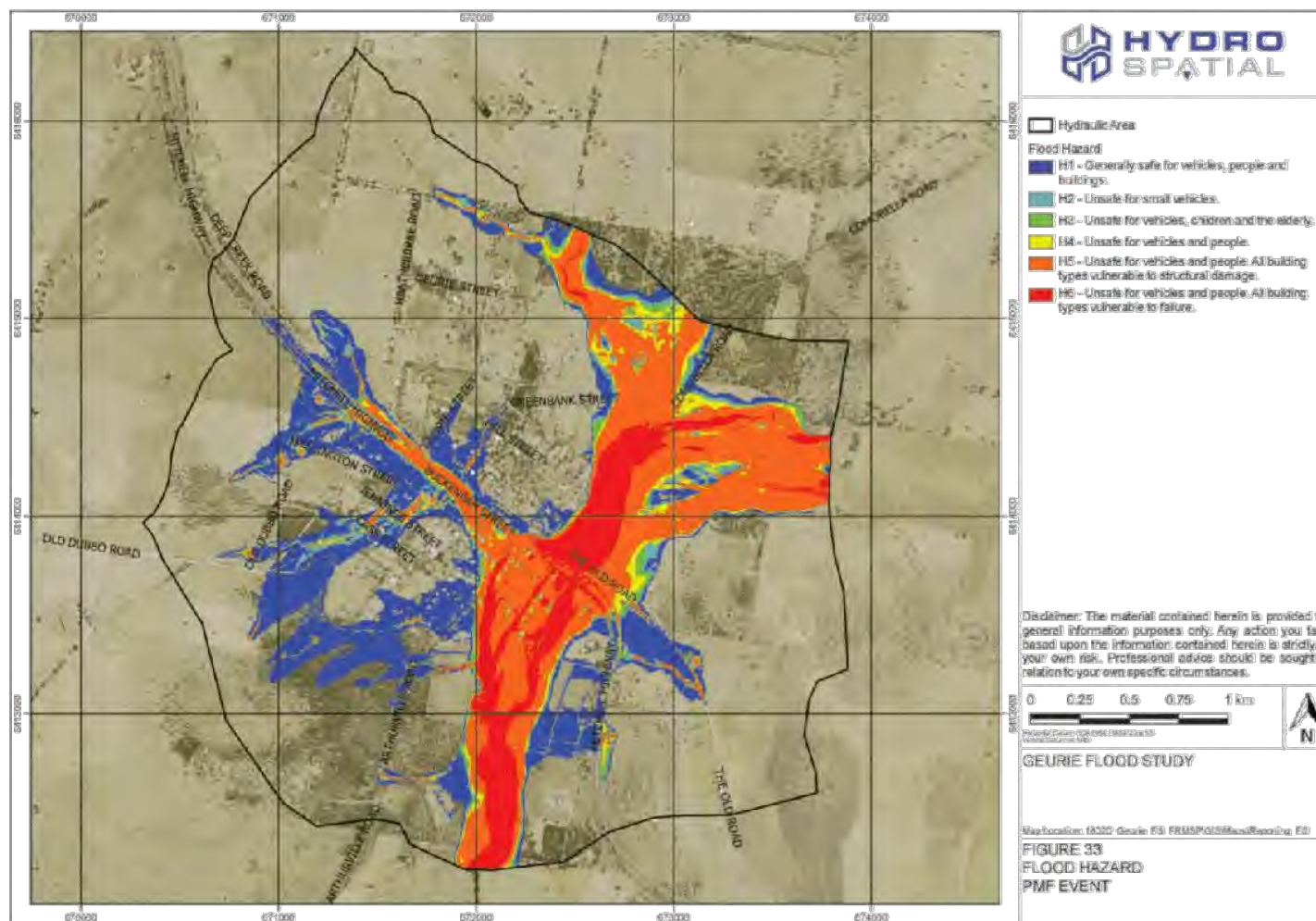
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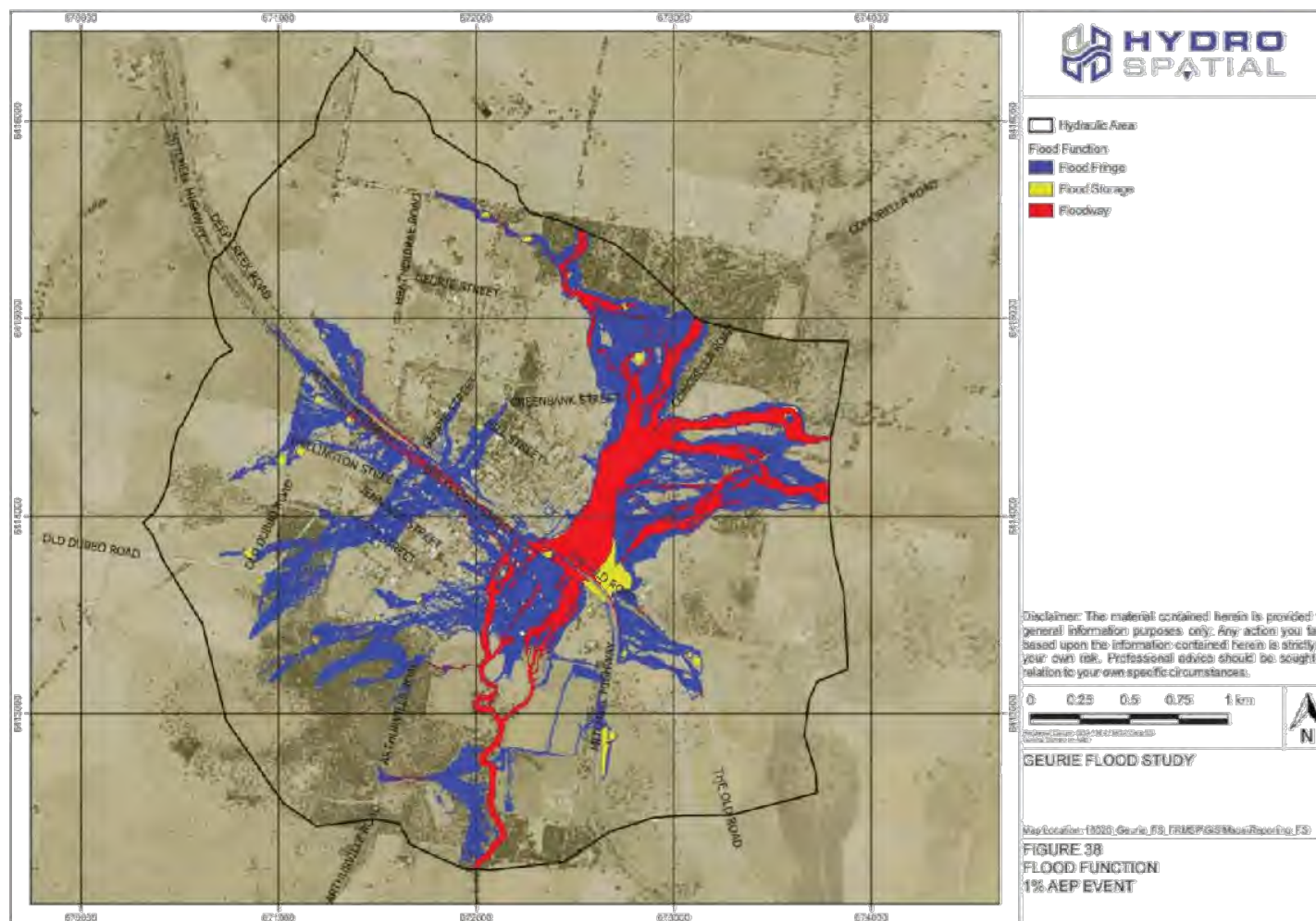


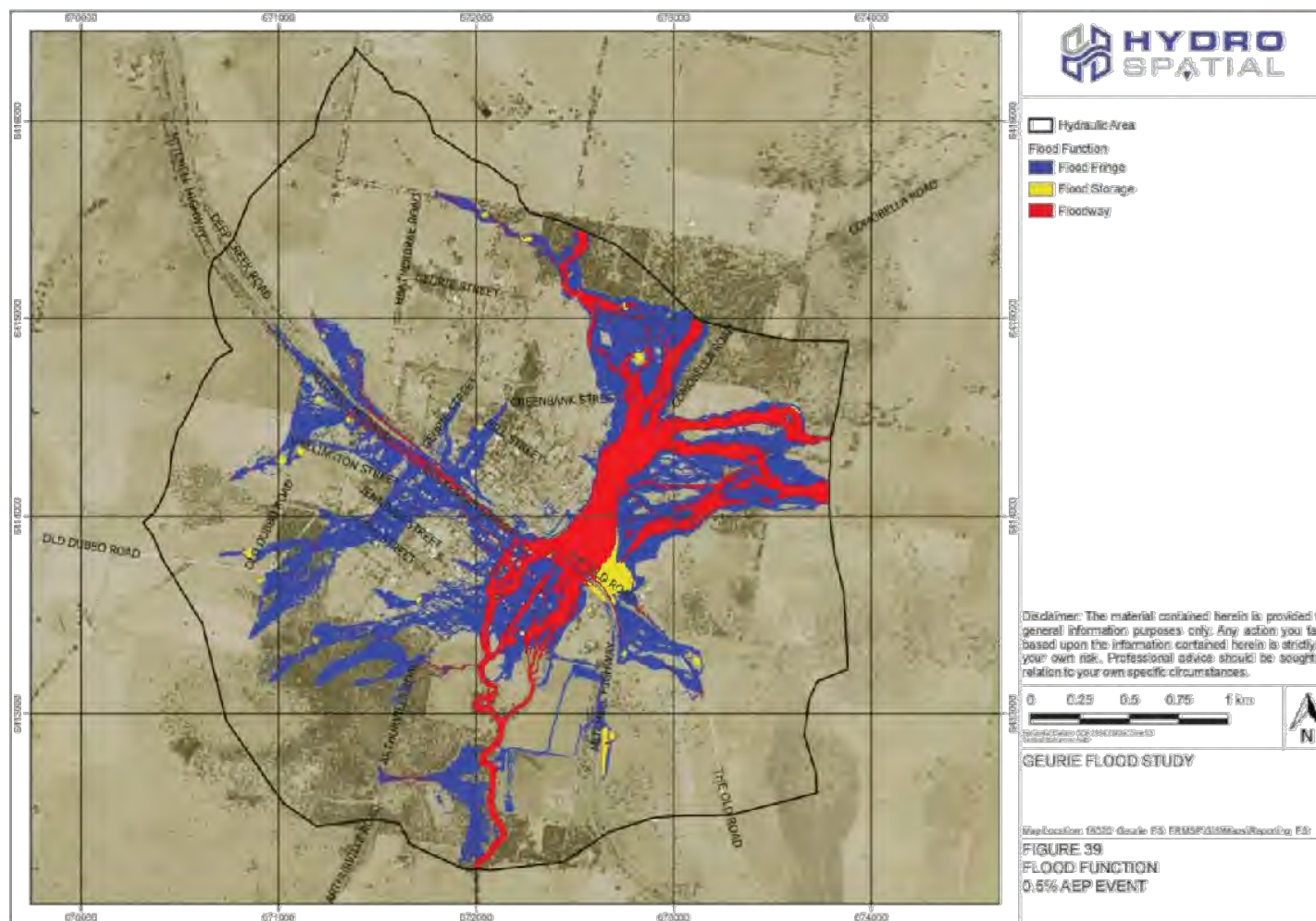






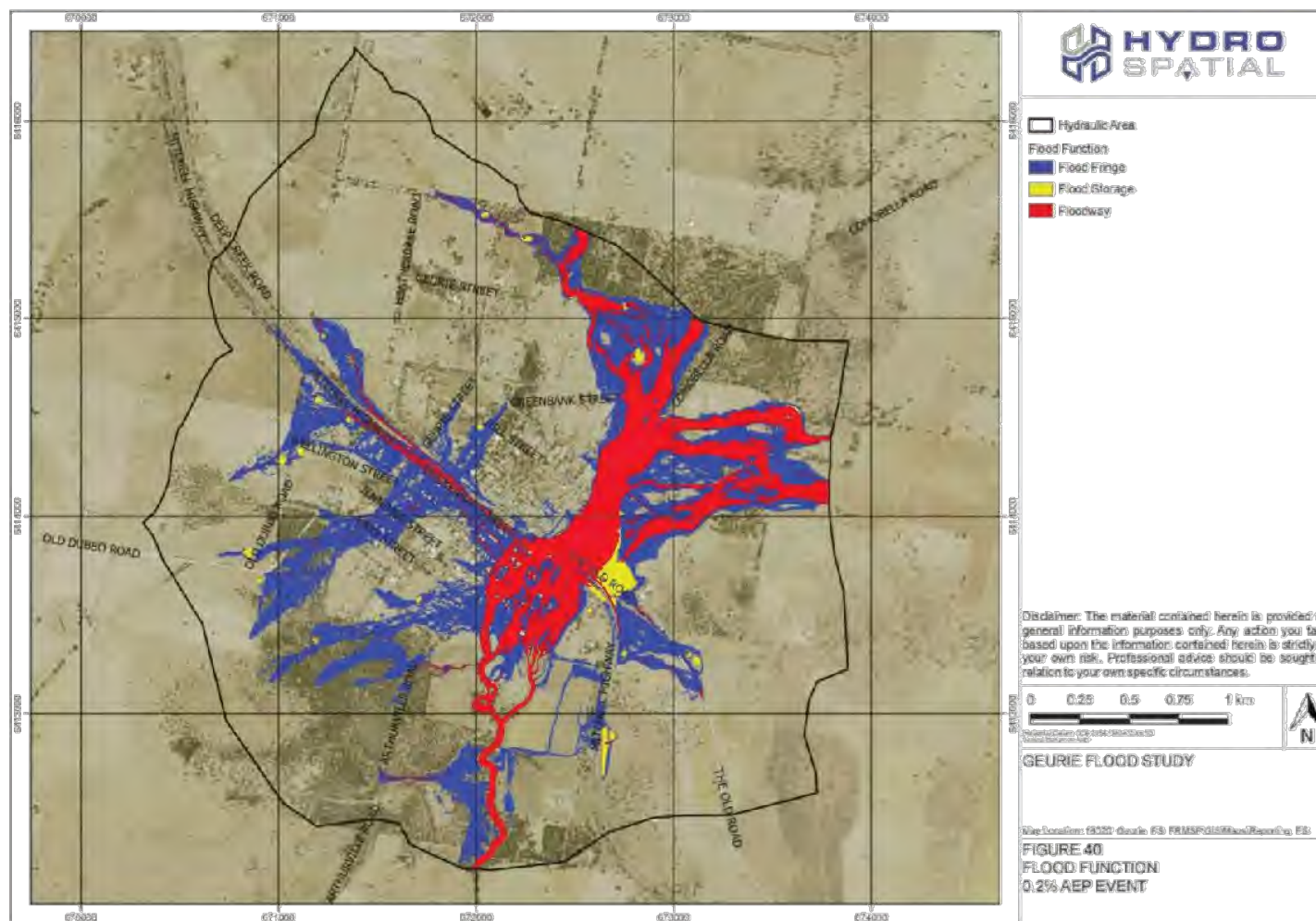






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ITEM NO: FPM19/1









REPORT: Proposed River Street Bridge

AUTHOR: Chief Executive Officer
REPORT DATE: 25 November 2019
TRIM REFERENCE: ID19/1591

EXECUTIVE SUMMARY

Council at its meeting 9 September 2019 resolved that:

- "1. That Council notes the widespread community opposition to the proposed construction of the River Street bridge.*
- 2. That Council notes the widespread community view that major highways be diverted around the city of Dubbo in a way that boosts economic activity and ensures the liveability and amenity of Dubbo.*
- 3. That Council formally express its opposition to the proposed construction of the River Street bridge.*
- 4. That the Chief Executive Officer be requested to prepare a report for the December 2019 Ordinary meeting of Council detailing any and all measures within Council's powers to stop the project.*
- 5. That Council continue to make representations to the NSW Government to provide future positive outcomes to the traffic issues currently experienced within the city of Dubbo."*

I have made contact with Council's Lawyers and sought their advice on what legal measures Council could take to stop the project.

They have been working on some suggested options but at this point in time haven't finalised their advice. Some of the options being considered are:

- Planning advice of potential challenges and remedies.
- Objections to process used by RMS Regional Environmental Factors.
- Part 5 approval pathway.

I expect to have this advice later in December 2020 and will report at the next available Council Meeting.

FINANCIAL IMPLICATIONS

The legal costs for seeking advice is being covered by Council's legal advice budget.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

- 1. That Council note the progress report of the Chief Executive Officer in respect of the River Street Bridge legal advice on the options to stop the project.**
- 2. That a further report be submitted by the Chief Executive Officer in respect of this matter at the first available Council meeting in 2020.**

Michael McMahon
Chief Executive Officer



REPORT: Dubbo City Regional Airport - Airline engagement, partnerships and incentives

AUTHOR: Chief Executive Officer
REPORT DATE: 15 November 2019
TRIM REFERENCE: ID19/1563

EXECUTIVE SUMMARY

At its Ordinary Council meeting in October a Mayoral Minute regarding Dubbo City Regional Airport Financial Sustainability requested that a further report be provided to Council to assist Council in negotiations with Regional Express (REX) Airlines.

This report includes background on discussions to date and has been provided to support and inform future negotiations, partnerships and communications with any Airlines looking to operate through Dubbo City Regional Airport.

This report summarises activities, initiatives and processes Council currently undertake to support Airline operations at Dubbo City Regional Airport. Whilst Council enjoys effective relationships with most airlines operating through the facility the process of two way engagement, negotiations and partnerships can always be reviewed and improved upon.

This report recommends the development of Memorandums of Understanding (MOU) with each of the four airlines currently operating from Dubbo City Regional Airport, and to be developed for any future Airlines operating from the facility. These MOU's would be in addition to Conditions of Use Council have in place with some Airlines, and would focus on strengthening partnership approach between Council, Airport Operations and Airlines to deliver long term sustainable business models for all parties.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

1. That the information contained within the report from the Chief Executive Officer dated 15 November 2019 be noted.
2. That the Chief Executive Officer proceed with the development of a Memorandum of Understanding with all Airlines as outlined in this report.
3. That forward operations budgets for the Airport continue to reflect a CPI only increase for the forward four years.
4. That the Chief Executive Officer write to Regional Express Airlines formally advising that security screening at Dubbo City Regional Airport will continue to be non-negotiable for any Regular Passenger Transport operator using the facility.
5. That the Chief Executive Officer further advise Regional Express Airlines given Council's stance on the security screening, that Dubbo Regional City Airport will not be entering a Community Fare Arrangement as per the requirements outlined by Regional Express Airlines, however Council remains committed to working with any Airline on a partnership approach that is directly connected with the provision of lower airfares to our community, without compromising the safety of our community.

Michael McMahon
Chief Executive Officer

BACKGROUND

At its Ordinary Council meeting in October a Mayoral Minute regarding Dubbo City Regional Airport Financial Sustainability requested that a further report be provided to Council to assist Council in negotiations with REX Airlines.

This report has been provided to support and inform future negotiations, partnerships and communications with any Airline looking to operate through Dubbo City Regional Airport. This report also aims to clearly outline to the Council and community the activities it already has in place to work effectively with Airlines, with a view to further improving upon those activities.

One of the Airlines servicing the City, Regional Express (REX), have publicly declared their desire to introduce Community Fares on 30% of seats for sale outside 30 days prior to departure and on all unsold seats within 24 hours to departure. Whilst REX has made declarations to the community they want to bring in the fare, the Council is yet to receive any formal details around such a proposal. There is limited insight as to this proposal which was included in a Rex Airline Media Release in June 2019, which provided;

- Council would need to cap any Dubbo airport head tax increases at CPI
- REX would not be imposed security screening charges.

Despite a formal proposal not being provided by REX to Council, the community fare opportunity has been considered by Council staff and the Dubbo Regional Council Airports Panel. This consideration was undertaken with limited insights as to the level of community benefit in this scheme. For example; how many seats are sold or made available outside 30 days – and therefore if 30% of those seats are sold as community fares, what the number of those tickets would be. Council was prepared to consider support in the form of a subsidy in passenger landing fees for Airlines offering cheaper airfares to our community. Council's forward operational budget for the Airport is based on CPI increases only for passenger fees.

Following Committee consideration, the Mayor and CEO made representations to the REX Airlines Board, including the Executive Chairman, at a meeting in Sydney on 26 August 2019. For an hour and a half discussions were held on proposals from both parties, and the expectations of both parties.

There has been much noise being created in the local media, largely driven by REX that has left the Council and the Community asking why now after six years of being security screened, and a legal ruling supporting Council to do so, there is an aggressive demand for the removal of the screening fees.

As an industry member Council is aware there have also been ongoing discussions within the industry regarding the future regulatory environment. Dubbo Regional Council is not in position to know what other major regional airport operators may be planning to do with their own screening of passengers. Nor is Council in the position to know the potential for any change in security legislation. However in these times of potential industry change that could

impact the operations of some Airlines and potentially their profit margins, this circumstance could provide reason as to why REX were not interested in partnering with Council to support lower airfares for our community through any incentive that did not involve the removal of security screening.

The Dubbo Regional Council Airports Panel have indicated a commitment to continue to work with all Airlines in a constructive manner to ensure best outcome for the travelling public and the community as the asset owners of the Dubbo City Regional Airport. This report recommends this be established via a more formal MOU process. Three out of five of the Airlines currently servicing the Dubbo region already have formal conditions of use agreements with Dubbo Regional Council. The development of an MOU would not replace these operational agreements, but would be created with all Airlines to support a productive, trustful and strategic partnership with existing, and any potential new Airlines utilising Dubbo City Regional Airport.

REPORT

Dubbo Regional Council is committed to working with Airlines that service our community. This is evident in the investment made relating to Regular Passenger Transport (RPT), well considered and informed pricing structures, commitment to asset management, minimising asset failure or unbudgeted renewals falling to operators to fund an effective strategic planning that support a better airport for the future and benefit for airline and passengers.

In summary, the support for RPT airline operations at Dubbo City Regional Airport include:

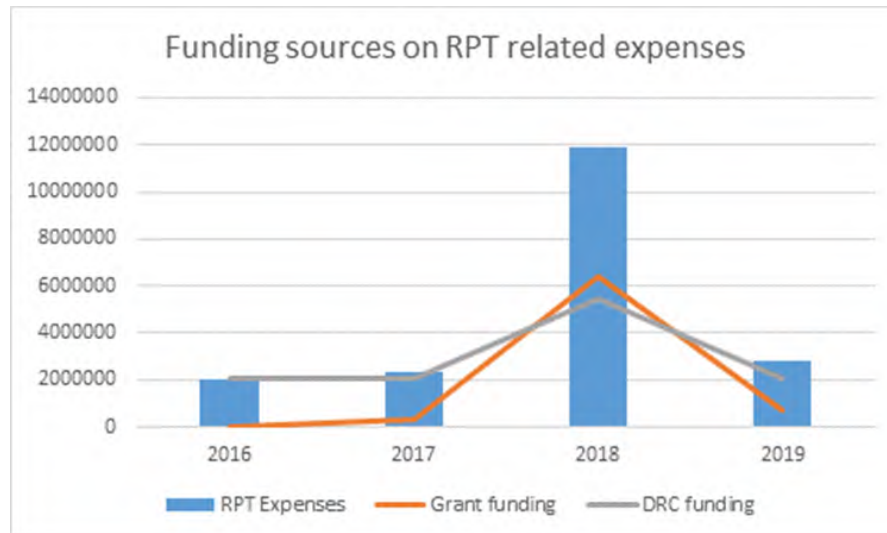
Investment

In the last 4 years to June 2019 there has been over \$12.5M invested in RPT related renewals and capital. 2016 - \$709,366, 2017 - \$924,876, 2018 - \$10,092,833, 2019 - \$821,281.

It is important that Council continues to work with Airlines, outside the long term master planning process, to outline proposed short to medium term renewals and upgrades at the Airport and discuss the RPT benefits and potential financial impacts to stakeholders.

The Airport has significant RPT related operational costs and assets that require maintenance and renewal, in addition to capital investment.

As the graph below indicates there has been significant operating and capital expense related to RPT operations at the Airport in the last four years. These expenses have been funded through Dubbo Regional Council (via RPT passenger fees, General Aviation landing fees, licenses and additional funds from Council) and Government grants. Note: the chart is essentially a cash flow in each year and does not include depreciation costs that are applicable for the total value of capital supporting RPT operations.



Fees

In the last 4 years the average increase to passenger fees was 4.38%. Passenger fees are reviewed annually by the Dubbo Regional Council Airports Panel and considered by Council as part of the annual budget process. To support airline business planning it is acknowledged that steady increases each year are preferable and this should also be Council's preferred approach, aligned with strong framework of asset management, investment prioritisation and operational efficiencies.

Council has also made a commitment to Airlines that security charges will continue to be set on cost recovery only bases to cover the third party contracted service, related equipment maintenance and consumables. Due to the variances in passenger numbers, maintenance and third party contracts, this fee will continue to be reviewed annually in line with the annual budget process. It is expected that with effective contracts in place, minimal delays and cancellations of airlines that impact contract charges and stable passenger growth, it is expected the cost of per passenger screening will not be increased significantly in future years. The process behind these calculations has been made available to airlines when requested in a manner that does not impact commercial confidentiality of any stakeholders. This open as possible process should continue in the future with all Airlines.

Asset management

Large variations of passenger fee increases from nil or minor to larger increase in the recent year is attributed to major capital works program, specifically the main runway upgrade. Nil increases were applied by Council in 2017/2018 in recognition of the disruption that Airlines would face and partnership approach during this period. When the project was completed, the resulting superior surface, which assists in minimising wear and tear on aircraft, increased the value of the runway asset. As this asset has grown in value the 'utilisation' cost of Airline using the main runway also needed to increase.

Airline subsidies and incentives

In the in the last 4 years to June 2019, \$1,798,523 in subsidies has been provided to Airlines for route development or incentive for growth in passenger numbers. The Council currently has a route subsidy program in place that provides for a 50% subsidy to passenger fees up to a 6 month period to support development of routes to new destinations.

In alignment with the above activities already taking place to support Airlines operating through Dubbo City Regional Airport, it is proposed that Council, through the Dubbo Regional Council Airport Panel, develop a formal Memorandum of Understanding (MOU) with all Airlines that structures out future engagement, decisions and support.

This MOU would reference Council's approach in regards to:

Future Increases on Passenger Fees:

Council's forward four year budget has been worked out on the basis of passenger fee income rising by no more than 2.7% (the Local Government CPI rate as imposed by IPART), therefore a commitment to CPI increases in fees only for the next three years is reasonable.

Capital and Renewal Program Engagement:

Six month face to face updates with RPT operators on projects is undertaken in addition to regular stakeholder newsletters and operational communications.

Consultation of fees, charges and budget priorities:

Meetings with RPTs in February each year to discuss proposed capital and renewal works, improvements to customer experience, fees and charges, prior to the draft budget and standard public exhibition period that occurs in April.

Security fees:

Continual commitment to annual review of security in a transparent manner which does not jeopardise security providers of Airlines. Council will continue in its commitment that the service charge is based on cost recover only.

Route Development and Passenger Growth:

Continual commitment to route development activities with individual Airlines and establishing routes, including subsidies through Council's Revenue Policy. Continue partnerships with all Airlines on collaborative marketing opportunities to support inbound and out bound passenger growth.

SUMMARY

This report has been provided to support and inform future negotiations, partnerships and communications with any Airlines looking to operate through Dubbo City Regional Airport.

The report recommends the development of Memorandums of Understanding (MOU) with each of the five airlines currently operating from Dubbo City Regional Airport, and for any future Airlines. These MOU's would be in addition to Conditions of Use Council already have in place with some Airlines, and would focus on strengthening a partnership approach between Council, Airport Operations and Airlines to deliver long term sustainable business models for all parties.



REPORT: Wellington Town Centre Progress Report

AUTHOR: Chief Executive Officer
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1584

EXECUTIVE SUMMARY

Council have been working proactively with the Wellington community to further business engagement and activation, residential and visitor amenity, functionality and beautification and asset improvements, specifically within the town centre and central business district.

Research has been conducted into derelict sites within the Wellington CBD which have not yielded a financially viable option for Council at this time, however the sites continue to be showcased to potential investors in the Region when appropriate for development enquiries.

The purpose of this report is to act as a bridging report, which details the actions and initiatives undertaken by Council in Wellington and in particular the steps and components to be undertaken towards the realisation of a Wellington Town Centre Plan or Wellington Master Plan.

In the past 12 months Council staff across all divisions of the Organisation have been working proactively with the Wellington residential and business community to be able to undertake significant infrastructure projects and planning through researched design and community consultation.

It is recommended that the report be noted and that a Councillor Workshop be held in February 2020 to discuss progression of the Wellington Town Centre Plan and Wellington Master Plan, including the results of public and stakeholder consultation and the results of consultancies as advised.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

That the information in the report of the Executive Officer dated 26 November 2019 to be noted.

Michael McMahon
Chief Executive Officer

BACKGROUND

Council at its meeting on 10 December 2018 considered a Notice of Motion from Councillor Greg Mohr in respect of the Wellington Town Centre and the need for a Wellington Master Plan. Council, in consideration of the Notice of Motion resolved as follows:

“That the Chief Executive Officer be requested to develop a Master Plan for Wellington, following appropriate community consultation, incorporating town entrances, main routes through the town, shopfronts and streetscape of the Central Business District.”

Dubbo Regional Council was successful in attaining matched funding of \$45,000 from the Federal Government Building Better Regions Fund in 2019 to develop a plan for the Wellington Town Centre or an overall Wellington Master Plan.

The purpose of this report is to act as a bridging document, which details the actions and initiatives undertaken by Council in Wellington and in particular the steps and components to be undertaken towards the realisation of a Wellington Town Centre Plan or Wellington Master Plan.

Council staff across all divisions of the Organisation have been working proactively with the Wellington residential and business community to be able to undertake significant infrastructure projects and planning through researched design and community consultation.

It is recommended that the report be noted and that a Councillor Workshop be held in February 2020 to discuss progression of the Wellington Town Centre Plan and Wellington Master Plan.

REPORT

Council have been working proactively with the Wellington community to further business engagement, residential and visitor amenity, functionality and beautification and asset improvements.

The following information is provided for the consideration of Council by way of an update of actions and initiatives in and around the Wellington Town Centre and provides a description of the process and actions Council is currently embarking on in respect of the development of a Wellington Town Centre Plan and a Wellington Master Plan.

1. Business engagement and promotion

(a) Ignite Program

- Development and delivery of Wellington specific ‘Buy Local or Bye Local’ campaign:
 - 39 Local businesses were registered participants in the program.
 - 3,368 competition entries were received.

- \$383,705.66 in total was spent locally (a tally of the value all of the competition entries).
- Average amount spent locally per entry - \$113.92.
- Four local Wellington businesses were utilised for producing and assisting with campaign collateral (print, signage, post, photography, videography and delivery).
- The prizemoney of \$5,000 (10 x \$500) will be spent locally across the 39 participating stores.
- Pop up retail stores supported.
- Jingle on the Bell Christmas activation:
 - Virtual Reality Snowman Game, located in the Wellington VIC, supporting local business through in-store promotion and prize rewards of Dubbo Region Cards.
 - Sponsorship of Rotary Christmas Markets and stall activation included in budgeted spend.
 - Local business people on CBD Flags.
 - CBD Christmas tree installed.
 - Supported Community for Children Christmas Party.

(b) Proactive support of the Wellington Business Chamber

- Support and delivery of CBD Parking.
- Partnership for #Byelocalorbyelocal campaign
- Presentations on Council Ignite Program at Wellington Business Chamber Meetings.

(c) CBD related grant applications

- Former Caltex Site Pop up Urban Garden application for the Regional Arts Fund NSW 2019 Community Grant was unsuccessful.
- Supported Wellington Arts in submitting a My Community Grants application for additional street art in Fong Lees Lane.
- Provided a Letter of Support to successful application to secure funding for the QOE Health Public Space Network Weaving, supporting stakeholders in the delivery of projects within Wellington's CBD.

(d) Other Items

- From January 2019, 29 business enquires relating to Wellington area regarding business development, expansion or diversification have been managed
- Dubbo Region shop local card extended into Wellington with 37 Wellington businesses signing up to be part of the Program.

- Cameron Park hosted Weekend Sunrise as part of Dubbo + Great Western Plains destination marketing campaign which had in excess of 300 people throughout the morning in attendance and a broadcast audience of 239,000.
- Light activation in Cameron Park, investigation occurred into Fong Lees Lane light activation.
- Support of Fong Lees Lane event development and sponsorship.
- Sponsorship of Rotary Markets to help establish fee base from stall holders.
- Actively engaged three new businesses for potential investment in the Caltex land on Nanima Crescent.
- Actively engaged out of region investor regarding the vacant block (fuel depot site) Nanima Crescent and Showground Road.
- Provided temporary fencing and clean up orders on Caltex for the vacant block of land on the Nanima Crescent Warne Street roundabout.

(e) Residential and visitor amenity

- Development and opening of Wellington Aquatic Leisure Centre.
- Development of new Wellington Visitor Information Centre adjacent to Council's Central Administration Building opening mid December.
- Implementation of the Cameron Park Master Plan works in progression;
 - Cameron Park – Play Space redevelopment.
 - Amenity Block renewal.
- Completed Cameron Park Master Plan works;
 - Tree Avenue plantings.
 - Stage 1 of the Wellington Shared pathway project within the Sunken Garden.
 - Restoration of the Cameron Park rotunda.
- Development of Wiradjuri Cultural Centre currently under construction.
- Wellington Shared Pathway project. Currently on the final stage of works.
- Preliminary design work, on the Bell River accessible pedestrian bridge crossing.

(f) Beautification, functionality and asset improvement

- Rectification works on the Western Stores building, revitalisation and installation of new local school artworks on to the building.
- Facilitate Bridge banner event promotion and CBD Flag Installations.
- Restoration works on the Old Wellington Police Facility continuing.
- The Wellington CBD beautification works focused primarily on the western/Cameron Park side of Nanima Crescent and have included;
 - Construction of asphalt pavement on the road shoulder.
 - Replacement of kerb and gutter.
 - Replacement of footpath.
 - Installation of traffic bollards on roundabout corners.
 - Tree planting.
 - Extension of underground stormwater network to remove surface water.
 - Upgrade of lighting at pedestrian crossings.
 - Structural improvements to the concrete wall along Cameron Park.

2. Wellington Town Centre Plan and Wellington Master Plan

Council staff commenced the development of a Wellington Town Centre Plan and a Wellington Master Plan on 5 December 2019. Development of the Plan has commenced with a detailed stakeholder and community consultation and engagement regime.

The overarching goals of the consultation and engagement regime are as follows:

- To allow for and hear the ‘stories of Wellington.’ This allows the public to articulate some of the stories that resulted in the creation of Wellington, its economic drivers, the early years, why did the town thrive and what could be done towards the realisation of a more positive economic outlook.
- To hear from residents, shopkeepers, people using the public realm and other stakeholders as to what they want to see change in the Wellington Town Centre. This could include a handful of items through to significant on-ground changes to the public realm, including car parking, access, signage and way-finding.
- To further understand the role heritage may play in Wellington in the future.

Following the consultation regime, development of the Plan will seek to further understand the Wellington Town Centre including, but not limited to the role heritage currently has and its role in the future, the streetscape, public realm and car parking and positive change could be enacted to assist the community and visitors. The Plan will also seek to understand more information about the Wellington economy and how the Town Centre can bring Wellington people together as a focal point of retail, dining, shopping specialist uses and activities across differential focus points in the Town Centre.

Apart from initial consultation processes, Council will be seeking the services of reputable consultants in respect of the following:

- Heritage Conservation;
- Economics;
- Streetscape, the public realm, signage, car parking, traffic and transport, way-finding, entrance signage; and
- Community consultation.

Following completion of the community and stakeholder consultation process, the next key milestone for the project will include a workshop for Councillors in February 2020. The purpose of the workshop will be for staff to present the results of the public consultation and the initial results of the consultancies undertaken on behalf of Council.

SUMMARY

The Wellington Town Centre has been engaged in a planned program of business development and engagement, visitor and residential amenity, beautification, functionality and asset improvement across the division of Dubbo Regional Council proactively throughout the 2019 calendar year.

Council has a continued commitment to the strategic development of the Wellington Town Centre and will continue to support the growth of these development themes as well as the future of the precinct through the development of the Wellington Town Centre Plan and Wellington Master Plan. Whilst there have already been significant partnerships and consultation to development of the Wellington CBD Precinct in the above sectors, this will continue as development of the Plan and further activation activities are encouraged and facilitated.



REPORT: Dubbo Regional Council Water Saving Rebate Scheme

AUTHOR: Project Coordinator - Drought
Coordinated Response Team
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1601

EXECUTIVE SUMMARY

As a community we are in an unprecedented era, living and complying with Level 4 water restrictions, as we move through the worst drought in recorded history.

To reduce demand on the potable water supply, Dubbo Regional Council implemented Level 3 water restrictions on the 1 October 2019 before moving to level 4 on 1 November 2019. The level 4 water restrictions that came into effect on 1 November 2019 were reviewed and amended by Council at the Ordinary Council Meeting on 4 November 2019. In a short amount of time, and during the current Level 3 restriction period, Council staff have worked with industry experts, business community and considered feedback and responses from the general community.

To further encourage and assist our residents in achieving the current daily usage figures under Level 4, 280 litres/resident/day, it shall be recommended that Dubbo Regional Council initiates a rebate scheme (50% of the cost of the device, up to a maximum limit of \$20.00 (inc gst) per device to offset the cost of water saving shower heads (2 per household) and outdoor irrigation timers (1 per household).

It shall also be recommended that the rebate scheme be applied retrospectively to the 1 October 2019, when Level 3 were introduced, to recognise and thank the efforts already undertaken by our residents.

As further opportunities are identified the Dubbo Regional Council Water Saving Rebate can be expanded to include further water saving devices, and extended to local businesses.

FINANCIAL IMPLICATIONS

Funding for the implementation of the Dubbo Regional Council Water Saving Rebate Scheme will come from the Drought Coordination Response Team budget allocation.

A total amount of \$100,000 has been allocated to roll out this initiative.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

1. That Council approve the introduction of a Water Saving Rebate Scheme.
2. That the level of rebate offered under the Dubbo Regional Water Saving Rebate Scheme be set at 50% of the purchase price of the water saving device (water saving showerhead or outdoor irrigation timer) up to a maximum limit of \$20.00 (inc gst) per device.
3. That the rebate scheme be applied to the purchase of the identified water saving devices purchased within the Dubbo Regional Council local government area.
4. That the Dubbo Regional Water Rebate Scheme will continue to run until 31 March 2020, or until the allocated funds for this program are exhausted.
5. That the Drought Coordination Response Team investigate other water saving devices that could be included on the Dubbo Regional Council Water Saving Rebate Scheme to further encourage and help our residents to reduce their daily water consumption.

Ian McAlister

Project Coordinator - Drought Coordinated Response Team

BACKGROUND

To reduce demand on the potable water supply, Dubbo Regional Council implemented Level 3 water restrictions on the 1 October 2019 before moving to Level 4 on the 1 November 2019.

A number of water saving strategies have been applied to ensure Council, businesses and the community reduce their consumption of the City's water supply.

REPORT

As a community we are in an unprecedented era, living and complying with Level 4 water restrictions, as we move through the worst drought in recorded history.

To reduce demand on the potable water supply, Dubbo Regional Council implemented Level 3 water restrictions on the 1 October 2019 before moving to level 4 on 1 November 2019. The level 4 water restrictions that came into effect on 1 November 2019 were reviewed and amended by Council at the Ordinary Council Meeting on 4 November 2019.

To further encourage and assist our residents in achieving the current daily usage figures under Level 4, 280 litres/resident/day, Council is looking at implementing a rebate scheme on a small number of household water saving devices. To establish the Dubbo Regional Council Water Saving Rebate Scheme it is proposed that rebates will be offered on shower heads (2 per/household) and outdoor irrigation timers (1 per household). It is proposed that the level of rebate for water saving showerheads (minimum 3 star rating) and the outdoor irrigation timer will be set at 50% to a maximum of \$20.00 (inc gst) per device. The rebate scheme for the identified devices is only applicable to purchases from businesses within the Dubbo Regional Council local government area.

To fund this initiative an amount of \$100,000 has been set aside within the Drought Coordination Response Team budget allocation.

Depending on the take up of the rebate system, and as further opportunities are identified the Dubbo Regional Council Water Saving Rebate may be expanded to include further water saving devices, and extended to local businesses.

It shall also be recommended that the rebate scheme be applied retrospectively to the 1 October 2019, Level 3, to recognised the efforts already undertaken by our residents.

Appendices:

1 [WR Rebate Application form](#)

WATER SAVING REBATE SCHEME APPLICATION FORM 2019 – 2020



Name: _____

Email: _____

Address: _____

Phone: (h) _____ (w) _____ (m) _____

It is important to read all the terms and conditions before signing and submitting your application. Council is offering rebates on water saving products installed in and around your home. To claim your Council rebate complete this form along with the terms and conditions and present in person with a copy of valid receipt to the customer experience counter in Dubbo or Wellington Council administration buildings.

Council will consider claims that meet the requirements of the rebate scheme if products were purchased and installed after 1 October 2019 (when Level 3 water restrictions began).

Attach a copy of your of paid invoices or receipt (keep the originals for your own records). Write your name on the copies of receipts or invoices. Copies of invoices/receipts and product labels must be clearly readable and Council will retain these documents.

Property address where product is installed (if same as the applicant's address please write "as above").

Address: _____

And I am:

- ☐ An owner/occupier/business operator (I own the property, and am currently living in it/operating out of it)
- ☐ A tenant or renter
- ☐ A landlord (a separate application must be made for each (property))

Rebates apply to water saving products on a per household/ business basis and only to new products

You can claim:

- 2 x Showerheads • 1 x Outdoor tap timer

Claim Details: I am installing the following water saving products in my property

Product:	Rebate:	How many?
Shower heads 3- star WELS rated or higher	50% OR up to \$20 per item	
Outdoor tap timers	50% OR up to \$20 per item	

Terms and Conditions

In applying for Dubbo Regional Council's Water Saving Rebates, I accept the following Terms and Conditions:

1. My property is connected to Dubbo Regional Council town water supply.
2. I purchased the products after 1 October 2019, and provide copies of receipts as proof of purchase. I understand these will be kept by Council.
3. The amount of the rebate paid will be 50% of the value or up to \$20 per showerhead and \$20 per outdoor tap timer.
4. My new showerhead(s) has at least a 3 star WELS rating.
5. Rebates will be paid only once for each property. The rebate scheme will run until 31 March 2020 or until Council's budget for the scheme is exhausted, whichever comes first.
6. I acknowledge that Dubbo Regional Council accepts no responsibility in respect of any claim, cause or action, loss or damage arising from, or in relation to the installation of any product.
7. Bank transfers may take up to three weeks before the amount is seen in the recipient's bank account.

VISIT WWW.DUBBOREGIONALCOUNCIL.NSW.GOV.AU/WRREBATEFORM
FOR MORE INFORMATION



DUBBO
REGIONAL
COUNCIL



BE WISE WITH
OUR WATER

WATER SAVING REBATE SCHEME APPLICATION FORM 2019 – 2020



I declare that:* - required

- ☐ I have read and agree to the Terms and Conditions
- ☐ I am the owner of the property
- ☐ I have the consent of the property owner to install these products

Signature: _____

Date: _____

REPAYMENTS

Name of Bank* - required _____

Account Name* - required _____

BSB* - required _____

Account Number* - required _____

MY CHECKLIST

- ☐ I have purchased new items eligible for a Council rebate
- ☐ I have provided copies of the receipts/invoice and evidence of shower head rating
- ☐ I have provided my bank account details
- ☐ I have signed and dated the declaration on the application

VISIT DUBBO.REGIONALCOUNCIL.NSW.GOV.AU/WRREBATEFORM
FOR MORE INFORMATION



DUBBO
REGIONAL
COUNCIL



BE WISE WITH
OUR WATER



REPORT: Draft Dubbo City Regional Airport Master Plan Review

AUTHOR: Manager Growth Planning
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1398

EXECUTIVE SUMMARY

The Dubbo Regional Airports Committee at its meeting on 13 August 2019 considered a report in respect of the review of the Master Plan for the Dubbo City Regional Airport 2019 – 2040. The report gave consideration to the existing Dubbo City Regional Airport Master Plan and the future development characteristics of the airport.

Amongst other things, the report provides an explanation of the master-planning process, aircraft movement projections, landside and airside development strategies and the expansion and internal reconfiguration of the passenger terminal building.

In consideration of the report, the Dubbo Regional Airports Committee resolved as follows:

- "1. That the report from the Manager Growth Planning dated 6 August 2019 be noted.*
- 2. That the draft Dubbo City Regional Airport Master Plan 2019-2040 (Appendix 1), be endorsed by the Dubbo City Regional Airports Committee for the purposes of consultation with stakeholders and land owners in vicinity of the Dubbo City Regional Airport.*
- 3. That the draft Dubbo City Regional Airport Master Plan 2019-2040 be placed on public exhibition for a period of no less than 28 days.*
- 4. That following completion of the public exhibition and stakeholder engagement process, a further report be prepared for the consideration of the Dubbo Regional Airports Committee."*

The former Dubbo City Council in 2016 adopted a new Master Plan for the Dubbo City Regional Airport. This Master Plan provided the overall strategic direction for the Airport and ensured Council could undertake effective and efficient planning of airside and landside areas. This Master Plan has seen in excess of \$18 million in airport investment in a relatively short space of time. This review of the Master Plan is being undertaken to ensure the Airport remains the premier Regional Airport in Australia and for Council to continue to effectively plan for the future of this important community asset.

This review was undertaken by the experienced, and highly regarded Airport Consultant firm Rehbein Airport Consulting.

The review of the Dubbo City Regional Airport Master Plan and supporting documentation

were placed on public display from Wednesday 21 August 2019 to Wednesday 18 September 2019. Copies of the draft Master Plan review and supporting documentation were made available on Council's website, at Council's Civic Administration Building, at the Dubbo Branch of the Macquarie Regional Library and the Dubbo City Regional Airport. Notice of the public exhibition for the review of the draft Plan was also placed in local print media.

Additional consultation was also undertaken with key stakeholders and airport users. A total of 31 stakeholders attended Council's workshop on 29 August 2019 at the Rural Fire Service Facility located at the Dubbo City Regional Airport.

Council received a total of eight (8) public submissions in respect of the review of the draft Dubbo City Regional Airport Master Plan. Copies of the submissions are provided here in **Appendix 1**.

The issues raised in each submission and Council's response are included in the report. As a result of a number of issues raised in the submissions, minor alterations are proposed to be made to the Master Plan review. The minor alterations proposed to be to the draft Master Plan are also included in the report.

This report also concludes that for the Airport to effectively plan and be positioned for the future, it must firstly ensure that the management of current assets – strategically, operationally and financially - are sustainably managed now to support the long term visions of the Master Plan.

It is recommended that the review of the Dubbo City Regional Airport Master Plan 2019-2040 provided as **Appendix 2**, be updated as per the recommendations in this report.

FINANCIAL IMPLICATIONS

It is considered that there are no direct financial implications arising from the information included in this report. However, the review of the Master Plan includes development regimes for the Dubbo City Regional Airport through to 2040. These development regimes include the possible provision of additional infrastructure at the Airport which would have inherent cost implications.

The Planning and provision of infrastructure including overall costs and demand for facilities, will be considered by Council through Council's budget and business planning processes.

POLICY IMPLICATIONS

This report considers the new Dubbo City Regional Airport Master Plan 2019-2040. If adopted by Council, this Master Plan Review will guide future infrastructure and development decisions for the Airport through to 2040.

RECOMMENDATION

- 1. That the Dubbo City Regional Airport Master Plan Review 2019-2040 as attached as Appendix 2 of the report of the Manager Growth Planning dated 26 November 2019 be noted.**
- 2. That the following amendments be undertaken to the final version of the Dubbo City Regional Airport Master Plan Review 2019-2040:**
 - a. The Taxiway D upgrade extending from Taxiway Alpha to be upgraded to a Code C standard;**
 - b. Identify additional expansion opportunities for the passenger terminal including the expansion of the terminal towards the public car park and towards the RPT Apron;**
 - c. Include an additional aircraft holding bay to be located on Taxiway D between Taxiway D and Taxiway E;**
 - d. Include scope for investigation of a future internal road network to link the existing and proposed general aviation areas;**
 - e. Provide an updated table of population projections;**
 - f. Provision of further sanitary facilities to service the new General Aviation area;**
 - g. That further detailed investigation be undertaken with respect to aircraft movements in the current GA Area to ensure compliance with Manual of Standards Part 139;**
 - h. Council undertake a review of the need for Blizzardfield Road as a secondary access point;**
 - i. Prepare and include in the Master Plan a tie-down strategy that is subject to annual review for best practice tie-down locations and procedures;**
 - j. Include information in the Master Plan in respect of asset maintenance and renewal of the Main Runway 05/23;**
 - k. That the Dubbo City Regional Airport Master Plan 2019-2040 be subject to a biannual review;**
 - l. That an additional helicopter stand be provided adjacent to the new General Aviation Area and the Cross Runway 11/29;**
 - m. That the Apron expansion to the south be undertaken in partnership with the Rural Fire Service to support increase RPT activity on the apron and accommodation for the RFS Large Aircraft Tankers.**
- 3. That those who made submissions be provided with an individual response detailing the consideration of the issues raised in their respective submission.**
- 4. That Council provide regular communications and undertake regular discussions with stakeholders to ensure the purpose and the various components of the Master Plan and Council's adopted work schedule for the Airport are understood.**

Steven Jennings
Manager Growth Planning

BACKGROUND

The Dubbo Regional Airports Committee at its meeting on 13 August 2019 considered a report in respect of the draft review of the Master Plan for the Dubbo City Regional Airport 2019 – 2040. The report gave consideration to the existing Dubbo City Regional Airport Master Plan, key operational development opportunities of the airport.

Amongst other things, the report provides an explanation of the master-planning process, aircraft movement projections, landside and airside development strategies and the expansion and internal reconfiguration of the passenger terminal building.

In consideration of the report, the Dubbo Regional Airports Committee resolved as follows:

- “1. That the report from the Manager Growth Planning dated 6 August 2019 be noted.*
- 2. That the draft Dubbo City Regional Airport Master Plan 2019-2040 (Appendix 1), be endorsed by the Dubbo City Regional Airports Committee for the purposes of consultation with stakeholders and land owners in vicinity of the Dubbo City Regional Airport.*
- 3. That the draft Dubbo City Regional Airport Master Plan 2019-2040 be placed on public exhibition for a period of no less than 28 days.*
- 4. That following completion of the public exhibition and stakeholder engagement process, a further report be prepared for the consideration of the Dubbo Regional Airports Committee.”*

The issues raised in each submission and Council’s response is included in the report.

REPORT

1. Airport Master Plan Process

A master plan is a long term planning document that plans for and provides for orderly future growth and development, prescribing to a pre-determined set of values and aspirations. The process for the preparation of a new Airport Master Plan generally follows the following five (5) steps:

- i. Background analysis;
- ii. Development of a vision for what functions the Airport will ultimately perform in 2040;
- iii. Regime planning based on short, medium and long term timing;
- iv. Master Plan preparation; and
- v. Public exhibition and stakeholder engagement.

In respect of the process of preparing a review of the Master Plan for the Dubbo City Regional Airport, this process was adapted to ensure compliance with Council’s internal and external systems and processes. Diagram one (1) details the major milestones included in the preparation of the review of the Airport Master Plan.



Diagram 1 – Dubbo Regional Council, Master Planning approach.

2. Public Exhibition

The draft review of the Dubbo City Regional Airport Master Plan and supporting documentation were placed on public exhibition from Wednesday 21 August 2019 to Wednesday 18 September 2019. Copies of the draft review of the Master Plan and supporting documentation were made available on Council's website, at Council's Civic Administration Building, at the Dubbo Branch of the Macquarie Regional Library and the Dubbo City Regional Airport. Notice of the public exhibition for the draft Plan was also placed in local print media.

Additional consultation was also undertaken with key stakeholders and airport users. A total of 31 stakeholders attended Council's workshop on 29 August 2019 at the Rural Fire Service Facility located at the Dubbo City Regional Airport.

Council received a total of eight (8) written submissions in respect of the draft review of the Dubbo City Regional Airport Master Plan. Copies of the submissions are provided here in **Appendix 1**.

The following information provides a summary of the issues raised in the public submissions and a relevant response where appropriate.

Submission 1 – Mr Peter Amey – Managing Director of Buramey Transport

A submission was received by Mr Amey on 21 August 2019 in respect of the draft review of the Master Plan.

A summary of the submission is provided as follows:

- *Consideration should be given to a permanent parking space on the tarmac for the purpose of toll loading and unloading; and*
- *The ideal location for dedicated toll area would be in front of hanger 9 next to the refuelling trucks and the vans would only require a small area as provided behind the refuelling shed.*

Comment

The new General Aviation (GA) area proposed in the review of the Master Plan includes a dedicated local freight processing and distribution area towards the north-west end of the existing Code B lease lots, just to the south west of the existing Rural Fire Service apron. This area is for aircraft loading/unloading and transferring freight to vehicles.

Submission 2 – Mr David Treacey

A submission was received by Mr Treacey on 29 August 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“As a General Aviation Pilot with a VH registered Jabiru J230 D light aircraft the key questions asked when deciding where to land are as follows:*
 - *Where am I going to land?*
 - *Can I refuel?*
 - *Can I park and where?*
 - *Are tie down facilities available?*
 - *How do I access the facility from where I park my plane?*
 - *Is there a toilet?*
 - *Can I access coffee/tea/food?*
 - *Can I get into town?*
 - *Is there accommodation?*
 - *Would I fly to this destination again?*
- *The three day Airventure Australia event in Parkes on 20-22 September 2019 is a popular event which fills the local motels; and*
- *We currently don’t cater well to a high level of service for GA which facilitates budding pilots, ongoing pilot education and training, tourism, transport, emergency flights and recreational flying.*

Comment

Runway 11/29 (also referred to as the cross runway) is the secondary sealed runway at the Airport. This runway is classified as a Code 2B and is typically used for the purposes of General Aviation (GA). New fuel facilities are proposed in the new GA area next to the freight and distribution area and existing fuel bowzers are located on the east end of the existing GA area.

Replacement tie-down areas are proposed in the GA expansion west of the lease lots to the north of the Emergency Services Precinct. An additional tie-down area is proposed in the future GA Precinct development north of Runway 11/29. This report recommends that a tie-down strategy be prepared in consultation with General Aviation users to examine the most optimal and practical locations for tie-downs.

The submission raises a valid point in respect of the availability of sanitary facilities in the new General Aviation area as a short term action. This report recommends that a suitable location for the provision of additional sanitary facilities be included in the Master Plan, generally in the vicinity of the new General Aviation area.

Facilities are available in the Passenger Terminal including toilets and food and drink options. In addition, the Master Plan also includes a considerable commercial precinct to allow for the future development of accommodation opportunities. Additionally, Car hire and Taxi services are available from the airport if travellers want to visit the town.

Submission 3 –Mrs Kylie Beal – Beal Aircraft Maintenance

A submission was received by Mrs Beal on 12 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *We truly appreciate the enormity of trying to plan 20 years in advance and appreciate the process, we are grateful to the airport management for involving us in these future decisions;*
- *Proposed RPT apron expansion will encroach on the already struggling for room GA. In previous meetings it was pointed out that the idea was to keep the big guys (RPT) and the little guys (GA) away from each other. This was not depicted in the Masterplan;*
- *Proposed Taxiway D is not required and expensive, access may be achieved via Taxiway A on runway 05/23. Removal of Taxiway D would create opportunity for terminal expansion;*
- *The existing terminal was designed to structurally support additional stories. This would avoid the need to demolish the already established paid secured car park and limit the apron expansion encroaching on the GA area. Additional benefits may include an undercover driveway for pickups, departures and taxi rank;*

- *The expansion of upstairs would be a wonderful addition for a café, museum and viewing platform;*
- *Taxiway C needs to remain to alleviate congestion in the existing GA area as shown in the attached image. In addition, emergency use by RFDS aircraft may be impacted;*
- *Aircraft movements in from Taxiway D from the northern end are impacted by a blind spot caused by the existing position of the RFDS hanger on the edge of Taxiway E;*
- *GA needs additional tie down points to accommodate short term users who wish to utilise the terminals facilities;*
- *New GA area will be a great new addition to the precinct, however additional consideration should be given to a fuel bowser or bathrooms;*
- *An option may be to remove all existing GA hangers from the current GA area and relocate to the new proposed GA area, thus making the current GA area an emergency-based precinct and accommodate larger RPT aircraft. Council would need to compensate existing stakeholders for the relocation;*
- *Ensure that airport infrastructure development is also reflective of GA needs not just the 'big guys';*
- *Aircraft cannot physically park out the front of hangars without encroaching on Taxiway E;*
- *The Master Plan needs to address potential pickup/drop off areas for future UBER air operations.*
- *Consideration needs to be given to the current RFS loading pad and taxiway currently used for Air Tractor 802's accommodate larger Air Tractor 1002's weighing over 8000kg; and*
- *Consideration needs to be given to vehicle access roads from the existing GA area to the new GA area for maintenance, emergency vehicles and fuel trucks.*

Comment

Expansion of the RPT Apron is anticipated to be delivered over the next three to ten years. This development will be driven by the demand for RPT services ultimately as a result of increased passenger and service numbers. The development of the additional GA area is also anticipated to occur within a similar time frame. The existing commercial pressures may be an indication for prior expansion of the GA offer before RPT services are developed.

The review of the Master Plan includes a proposal to extend Taxiway D for the proposed length of the Main Runway. The Master Plan has proposed to make Taxiway D Code C from the Taxiway Alpha threshold to the 05 end threshold. The remainder of the Taxiway is proposed to be Code D to cater for larger aircraft, including up to Boeing 737 and Coulson L100 Large Air Tankers etc. The Code C end of the Taxiway will allow the airport to market development opportunities that may require both landside and airside access, whilst still retaining and potentially utilising the former Air Traffic Control Tower Building.

Council also notes the comments made in respect of providing additional floor space above the existing passenger terminal. This report recommends that the Master Plan Review be amended accordingly to consider the most appropriate means in which to undertake construction and use of a second strategy.

In respect to the issues raised regarding Taxiway E, Council sought further information and clarification from Rehbein Airport Consulting. The following general information was provided as below:

Taxiway C needs to be removed to make way for the future expansion of the RPT Apron. The removal of the existing Taxiway C is not considered to greatly impact on the existing day to day operations of the GA area. However, if there is any accident in this area, access to the GA Apron may be rendered unusable for a period of time depending on the type of accident/aircraft involved. It is also anticipated that the proposed new GA area will assist in dispersing existing operational pressures.

This report recommends that the Master Plan review not make any further changes in respect of Taxiway C and the proposed expansion of submission of information and clarification from Rehbein Airport Consulting. The following general information was provided below:

Issues in respect of tie downs have been previously discussed in the report. The Master Plan Review includes the provision of fuel facilities in the new GA area next to the freight and distribution area and will accommodate both Code A and Code B aircraft.

Council notes the comments made in respect of removing the existing GA area to make way for additional emergency service and larger RPT aircraft. The existing GA area is not large enough to cater for Code D operations, which would include large Air Tankers.

Council also notes the parking constraints of hangars adjoining Taxiway E and anticipates that the proposed northern GA area will alleviate congestion in the existing GA area.

In response to comments made relating to Uber Air, it is considered that the technology would require additional investigations to determine the infrastructure needed to facilitate the new aircraft. It is however believed that the aircraft would have the potential to take off and land in a similar manner to a helicopter which may present opportunities for dual use of the proposed helicopter stands located in the new commercial precinct, adjacent to the Delta Taxiway.

This report recommends that an additional helicopter stand be provided adjacent to the Cross Runway.

It is understood that the design of the Air Tractor 1002 has a maximum take-off weight of nine (9) tonnes. The AT 1002 evolved from the Air Tractor 802 with the key difference being the addition of larger fuel and retardant tanks. It is proposed that the existing RFS loading pad will be upgraded as required in connection Code C.

An internal road access between the existing and proposed GA areas has not been directly included as part of this Master Plan Review. However, this report recommends that suitable landside road access will be explored by Council as part of future master planning considerations across the Airport.

Submission 4 – Mr Ron O’Brien – AirLink Airlines

A submission was received by Mr O’Brien on 13 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“The current GA area is landlocked and allows no growth/expansion prospects;*
- *Concerned that the proposed GA precinct in the northern portion of the airport will result in a reclassification of the existing GA area and the potential for financial impacts on existing owners/ tenants;*
- *Relocation of all GA to the northern precinct would create opportunity for the current GA area to be wholly dedicated to either government or government-funded operations all related to emergency services, including consolidation of business and industry to create improved land use synergies;*
- *Small and large aircraft types need to be separated and additional tie down facilities need to be provided for light aircraft traffic;*
- *There is a need to consider light pollution in respect of the Siding Springs Observatory;*
- *The proposed runways are supported and it is exciting to be considering the capacity to host larger aircraft;*
- *Hangar 1 and the parking of aircraft on its apron is restricted due to the limitations of a Code B classification. It was an unanticipated constraint on how Air Link wished to conduct its business, constraints are the same for Taxiway C;*
- *A full-length taxiway would be a tremendous operational improvement for all operators;*
- *Avgas bowzers should be located where your GA aircraft are going to have convenient access. A second GA precinct should consider an additional second bowser;*
- *On the Master Plan there appears to be no obvious service roads airside;*
- *A big tick to you for the recent opening of the rental car park, it appears to have worked a treat for the itinerant flyers who can now easily find a space in the general car park;*

- *Air link no longer operate Beech 1900 aircraft and will shortly commence RPT services between Dubbo and Bourke, Walgett and Lightning Ridge. Discussion are ongoing with Council to accommodate their operational requirements;*
- *Current shortage of parking for GA aircraft and should consider additional secure tie down area with access to fuel bowsers, toilets and protected seating facilities;*
- *Air link's consideration into future leasing of premises includes the presentation of the existing building and facilities. The facility is not fit for purpose without the ability to park aircraft, either singularly or multiple, airside at the hangar site due to the Taxiway C restrictions;*
- *Vision of having a sealed apron for aircraft parking conflicts with the restrictions of Taxiway C;*
- *Aircraft parking restricts prospect of multi-use for charter and aeromedical, as originally intended;*
- *The Master Plan vision shows Hangar 1 being absorbed within the Airport's Passenger Terminal Precinct. Air Link would prefer to maintain its current strategic location on the airport however before investing additional money it makes sense to understand the impact of any changes to its current site, and/or if there is any consideration of Council offering an attractive alternative in the new GA Precinct;*
- *Expansion of the Passenger Terminal removes Taxiway C altogether. This would greatly disrupt aircraft access into and out of the current GA designated area. Taking GA traffic elsewhere on the airport would ease that potential congestion;*
- *Need to consider covered pedestrian/passenger walkways accessed from both airside and landside areas."*

Comment

Council notes that the existing GA area is landlocked which limits opportunity for future expansion. The Master Plan review has proposed a new GA area to accommodate the future growth of GA activities at the airport and does not include a reclassification of the existing GA area. Additional tie down areas and refuelling facilities are proposed as part of the proposed new GA area to the north of the Emergency Services Precinct.

Council notes the comments raised in respect of potential light pollution and the perceived impacts on the Siding Springs Observatory. It is also noted that, Clause 5.14 under the provisions of the Dubbo Local Environmental Plan 2011 must be considered where development is considered to result in light pollution that may impact on the Siding Spring Observatory.

As mentioned earlier in this report, Council will consider the feasibility of an internal road network as part of future planning considerations for the Airport.

Additional pedestrian walkways have also been proposed by the Master Plan and include an enclosed or covered walkway from the existing departures area past the rear of the existing check-in to access the new RPT apron bays and to allow passengers from the southern RPT positions to access the arrivals facilities.

Submission 5 – Shane Kilby

A submission was received from Shane Kilby on 18 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“I own a neighbouring property south-east of the airport known as “Wandara”, 21L Bunglegumbie Road which is zoned RU2 Rural Landscape;*
- *Wandara is located on the outskirts of West Dubbo and is situated between the current urban renewal area (R2) and the Airport. It is an ideal housing site for rezoning to low density residential (R2) for the following reasons:*
 - *Close proximity to the Dubbo CBD;*
 - *Dubbo’s population is projected to increase by 4000 people by the year 2036 with REMPLAN projections reaching a population of between 48,312 and 55,178 by 2036.*
 - *Peri-urban location – The land to the immediate south of Wandara is already zoned as R2;*
 - *The area is desirable with expansive views across the Macquarie Valley giving potential blocks natural aesthetic appeal;*
 - *Most of the land has a gentle slope and easterly aspect with the airport shielded by the rise to the west;*
- *Potential for private homes and hangars would complement the development of the taxiway for the cross strip and provide a genuine multi-purpose aerodrome. This could be an economic development opportunity for Dubbo to attract affluent residents and further activity to the Dubbo Regional Airport (Temora is a successful example);*
- *Expansion of freight services including export freight from Dubbo Regional Airport has potential to value-add and diversify the primary industries of the region including mining and agriculture;*
- *There are opportunities for development and expansion of a commercial precinct at Wandara due to its location immediately adjacent to the airport. This may depend on development of road access to the Mitchell Highway as suggested in the Dubbo Transportation Strategy 2036 – November 2009;*
- *Blizzard Field Road has a dirt surface, very rough and carries surplus water when it rains making it slippery and boggy. This results in access and egress problems into the airport by emergency services and restricts use of the road by ratepayers attempting to access their properties”.*

Comment

The property at 21L Bunglegumbie Road, Dubbo is not included in the North-West Urban Release Area (URA) and is not currently considered for future residential development under the West Dubbo Residential Release Strategy 2011. It is noted that the land immediately to the south of the property is zoned R2 Low Density Residential under the provisions of the Dubbo LEP 2011 however the existing area remains largely undeveloped. Any further extension of the existing R2 zoning to the north would be considered premature.

Dubbo's Employment Lands Strategy has identified the need to investigate the rezoning of land for the purposes of B1 Neighbourhood Centre and B4 Mixed Use in the North- West Urban Release Area. Council is currently preparing the North West Structure Plan which will provide further detail on the commercial development in the precinct.

Council notes the comments raised in respect of freight services and has identified two potential locations to establish a freight precinct. These areas are identified in Figure E under the draft Dubbo City Regional Airport Master Plan.

Council notes the comments raised in respect of the condition of Blizzardfield Road. This road is listed as the Dubbo City Regional Airport secondary emergency access point for emergency service vehicles with the primary access to the site entering from the Mitchell Highway. Council periodically undertakes grading and other work activities as part of its road maintenance program. A review of the road identified as an alternative emergency access road to be undertaken by Council.

Submission 6 – Mr Warrick Lodge – Regional Express (Rex)

A submission was received by Mr Lodge on 18 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“Dubbo Airport chose to embark on unnecessary grand plans that are based on the ‘build it and they will come approach’ often in combination with a ‘cash cow approach’;*
- *Infrastructure upgrades to accommodate larger Boeing 777 aircraft should be funded by DRC or the freight operators themselves and not the current RPT providers;*
- *Upgrades to the existing infrastructure to accommodate the Rural Fire Service’s aerial operations should not be funded through increased passenger taxes and charges to RPT services;*
- *Dubbo Airport already receives occasional visits from the RAAF C-130 Hercules and RFS C-130 using existing infrastructure;*
- *Current security screening procedures need to be reconsidered and are not required in accordance with Federal Government security screening legislation;*

- *A non-screening gate should be included in future airport upgrades to provide flexibility to non-screening flights;*
- *Dubbo has seen an increase in airport charges and the imposition of unnecessary security screening charges in 2012, Rex has been forced to scale back its flight frequency to protect operating margins;*
- *The current total annual passenger numbers on the Dubbo to Sydney route is approximately 180K and are accommodated with a combined Rex and Qantas Link annual seat capacity of approximately 278K. This means that there are almost 100K annual seats currently not being sold that are available to meet significant future increases in passenger growth;*
- *The Master Plan's 3.2% annual passenger growth rate assumption is too high and a 2% growth rate is considered more realistic;*
- *At a 2% growth rate per annum, Dubbo to Sydney passengers would reach 270K by 2040;*
- *Rex disagrees with the projection of 100 seat aircraft operating by 2023-26 and larger 120 to 150 seat plus aircraft operating by 2030;*
- *Rex believes that realistically the largest aircraft operating out of the airport in the next 15-20 years will consist of the 70 seat turboprop category;*
- *Under the current management and climate at DRC, Rex may exit Dubbo and redeploy the Sydney Airport slots to other NSW regional ports;*
- *With the high loads on a Qantas monopoly route, one can be fairly certain that air fares will at least double;*
- *Expensive infrastructure upgrades are not necessary including the resultant increased costs incurred by Rex;*
- *At the commencement of the 2020 financial year, passenger head tax increased by 13% per trip, the DRC growth incentive threshold was also removed and security screening charges were increased;*
- *In Rex's experience, the cost of operating and maintaining an efficient regional airport should be around \$600K per year. This is around 18% of what is collected by Dubbo Airport which is approximately \$3M extra every year for their tickets;*

Comment

The draft review of the Master Plan is a long term planning document that identifies future development opportunities for the Airport Precinct through collaboration with existing land holders and airport stakeholders. This approach will facilitate appropriate development of infrastructure and services to the airport precinct as demand allows. This also includes any resultant demand from existing or future RPT operators.

As mentioned in the draft review of the Master Plan, the projected 3.2% annual growth rate of passenger movements is an indicative number based on historical airport data. The growth rate in passenger numbers is only one (1) indicator in determining the overall feasibility of upgrading existing infrastructure.

Council notes the suggested 2% growth rate as mentioned by Mr Lodge and considers that the timing for infrastructure delivery is ultimately determined by airport operators in conjunction with the RPT Airlines and other users. A commitment has been made by Council to undertake a Biennial review of the Master Plan to ensure it remains current and valid.

Council notes Mr Lodge's comments made in respect of a non-screening boarding option as part of future passenger terminal upgrades. This proposal is not a matter for consideration in this current Master Plan review.

With respect to REX Airlines disagreeing with the potential projection of 100 seat aircraft operating by 2023-26 and larger 120-150 seat plus aircraft operating by 2030, this aircraft mix projection has been prepared by reputable industry consultants, who have a very good understanding of Airport planning and fleet selection and management by RPT airlines in the future. Just because REX Airlines do not currently run any larger aircraft than the SAAB 340, this does not necessarily mean that all RPT operators should stick with the same plane type in the future. Again, the Master Plan Review is a Strategy for the future of the Dubbo City Regional Airport that includes information based on industry standards in respect of passenger numbers.

Submission 7 – Mr Peter Colwell

A submission was received by Mr Colwell on 19 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“This rather grand, extravagant and expensive plan appears to greatly exceed properly analysed requirements;*
- *There are currently 100K empty seats annually on the Sydney route which would imply that a significant increase in passenger numbers could be reached without additional expense;*
- *Council is currently collecting \$3.5M per year to fund upgrades that are not being requested by RPT operators;*
- *Unnecessary costs filter directly down to the flying public and ratepayers with little benefit to anyone;*
- *If Rex decided to abandon Dubbo altogether as margins are squeezed further by this Plan, the following may be at stake:*
 - *Slots at Sydney airport disappear;*
 - *Weekly flights would drop from 117 to 60;*
 - *The available seats would be less than current demand resulting in higher fares;*
 - *Rex carries 4500 passengers between Dubbo and Broken Hill, so Broken Hill would also lose out dramatically.”*

Comment

The Master Plan is a long term plan that facilitates growth and development of the Airport over the next 10 years and into the future. The timeframes and costings as outlined in the Master Plan are provided as a guide only, these estimates are dependent on future growth and investment in the Dubbo City Regional Airport. The Master Plan has however been amended to ensure that the data provided is accurate and robust. A commitment has been made by Council to undertake a Biennial review of the Master Plan to ensure it remains current and valid.

It should be noted that budgeting and revenue collected by airport users is not the subject of this report and should be addressed as part of Council's annual budget review process.

Submission 8 – Mr Phil Johnston

A submission was received by Mr Johnston on 20 September 2019 in respect of the draft Master Plan.

A summary of the submission is provided as follows:

- *“Narromine Council is very supportive of the efforts of Dubbo Regional Council and the development of the Dubbo City Regional Airport;*
- *The airport provides a vital link between eastern cities and Western NSW and is increasingly becoming an important hub for fire services, Royal Flying Doctor Services and Air Ambulance, commercial activity and general aviation;*
- *The Master Plan clearly sets out the medium and longer term priorities for the aerodrome and planning for the future expansion of regular passenger services, general aviation and increased usage by State Agencies brings positive benefits to the whole region.”*

Comment

Council notes the comments made by Mr Johnston from Narromine Council.

Results of Stakeholder Workshop

Council facilitated a workshop on 29 August 2019 in respect of the draft Dubbo City Regional Airport Master Plan 2019-2040.

A summary of the concerns raised at the workshop are provided as follows:

- *“Does growth take into account the larger projects in the region?*
- *Will there be an extension to Runway 1129?*
- *Will we move towards a controlled airspace?*
- *There is a requirement for basic facilities to park aircraft when you fly in and fly out;*

- *There is limited availability of single aircraft hangars (T Hangars) with 3-4 people currently looking for the space;*
- *Will the GA area remain as the current GA area?*
- *Have studies been undertaken on the potential for time sensitive large scale freight?*
- *Is the runway able to cope with Boeing 737s?*
- *Run off bays may cause noise concerns for sick patients;*
- *Might like to look at run off bays in the new GA apron area to take away from the current RFDS Facilities;*
- *Will road improvements be undertaken to Coreena Road to accommodate increased vehicle movements?*
- *Could an undercover drop off area be provided as part of the development of the Terminal?*
- *Is it the owner's responsibility to maintain the pits outside hangars along Judy Jakins Drive?*
- *How far east does the growth go in respect to parallel runway options?*
- *What is the reasoning behind moving 738 aircraft closer to the GA area of the airport?*
- *The GA area will become very congested if the aircraft are located towards the northern end of the apron."*

1. Proposed Amendments

Following consideration of the issues raised during the public exhibition period for the draft Master Plan Review, Council proposes the following amendments to the draft Master Plan:

1. The Taxiway D upgrade extending from Taxiway Alpha to be upgraded to a Code C standard;
2. Identify additional expansion opportunities for the passenger terminal including the expansion of the terminal towards the car park and onto the RPT Apron;
3. Include an additional aircraft holding bay to be located on Taxiway D between Taxiway D and Taxiway E;
4. Include scope for investigation of a future internal road network to link the existing and proposed general aviation areas;
5. Provide an updated table of population projections;
6. Provision of further sanitary facilities to service the new General Aviation area;
7. Prepare and include in the Master Plan a tie-down strategy that is subject to annual review for best practice tie-down locations and procedures;;

8. Include information in the Master Plan in respect of asset maintenance and renewal of the Main Runway 05/23.
9. Expansion of the RPT Apron. It is proposed to include an activity in the Master Plan, which will result in a further expansion of the RPT Apron to the south. Expansion of the apron to the south, will provide further aircraft capacity.

When the time comes to construct the remaining portion of the Taxiway D, the Apron area will revert back to a Taxiway.

Following preparation of the Master Plan review, Council has undertaken further discussions and negotiations with the NSW Rural Fire Service in respect of the proposal for certain Large Air Tankers to operate from the Airport. On Tuesday 26 November 2019 the State Government announced \$2M in funding for a LAT Base development project at the southern end of the Apron. This investment is aligned with the operational demands of the Airport and coincides with the already planned apron expansion to support growth in RPT activity on the apron.

Council will continue to liaise with the NSW Rural Fire Service and any associated users of larger aircraft on the feasibility of developing a permanent LAT Base at the Northern end of the Airport as per the master plan to ensure that relevant strategic partnerships are established and relevant funding opportunities are sought.

Long Term Master Planning and effective Asset Management

Long term master planning focuses on establishing a long term strategic approach with two main objectives. To establish sustainable management of the current assets so that they can provide the current level of service on an ongoing basis without burden to future generations, that is achieved by having current users pay for the proportion of the asset life that is being consumed each year. This provides a foundation for the second asset management objective.

Secondly to be adequately agile to embrace opportunities that enhance the asset set to new sustainable levels of service that are aligned to market needs, and the capacity and demands of the business owners and stakeholders.

For the Airport to effectively plan and be positioned for the future, it must firstly ensure that the management of current assets – strategically, operationally and financially are sustainably managed now to support the long term visions of the Master Plan.

For example, the Main runway is DCRA most significant asset. The strengthening upgrade of the runway in 2018 increased the value of the asset significantly delivering a stronger landing surface for airport users. This new runway surface is subject to scheduled landings, weathering and other influences that means the surface will need to be renewed in approximately 15 years based on use and industry practice unless the surface is damaged by excessive loading or other factors that would cause a premature failure. The simple chart below shows that each 15 years or so, DRCA will need to fund renewal of that surface.



Further information in respect of asset maintenance and asset management will also be included in the final Master Plan review to increase stakeholder understanding of this important aspect of effective airport facility management and its subsequent financial impact for all stakeholders.

SUMMARY

The Dubbo Regional Airports Committee at its meeting on 13 August 2019 considered a report in respect of the draft Master Plan for the Dubbo City Regional Airport 2019 – 2040. The report gave consideration to the existing Dubbo City Regional Airport Master Plan 2019 – 2040 and the development and operational opportunities of the airport. The report provided an explanation of the master-planning process, aircraft movement projections, landside and airside development strategies and the expansion and internal reconfiguration of the passenger terminal building.

It is recommended that the review of the Dubbo City Regional Airport Master Plan 2019-2040 provided as **Appendix 2**, be updated as per the recommendations in this report.

Appendices:

- 1 [Submissions](#)
- 2 [Dubbo City Regional Airport Master Plan](#)

Submission 1

From: Jacki Parish
Sent: Wednesday, 21 August 2019 12:27 PM
To: Peter Amey
Cc: Joanne Wallbridge; Ken Fisher; Adam Roberts
Subject: Re: parking on tarmac for Gam Air

Hi Peter

I am looking to find another area away from the ga apron as that area can become quite congested.

Now that we have the RFS academy - it's all going to get busier.

We have recently updated our masterplan and it is currently on exhibition, inviting feedback. There is an area in the proposed masterplan that is ring fenced for freight.

I have asked that you are included in the email communication requesting feedback.

I'm not in the office for the next couple of days... but will follow up next week

Thanks

Sent from my iPhone

Jacki Parish
 Manager Airport Precinct



P. 02 6801 4561 | F. 02 6801 4259

<http://www.dubboairport.com/>
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On 21 Aug 2019, at 11:15 am, Peter Amey <pburamey@ozemail.com.au> wrote:

To: 'Jacki.parish@dub.nsw.gov.au'
Subject: parking on tarmac for Gam Air

Hi Jacki We spoke some time ago before all the upgrades at Dubbo City Airport in regards to maybe a permanent parking space on the tarmac for the purpose of Toll loading and unloading the Toll Air frt mornings and afternoons which is transported by GAM AIR from Bankstown airport Monday to Friday. If this was something the council would consider the space in front of hanger 9 next to the

refuelling trucks would be ideal as the vans would only have to be in the small area behind the refuelling shed . I would appreciate the councils feedback on this matter .

**Sincerely,
Mr Peter Amey
Managing Director**

**Ph: 02 6882 6111
Buramey Transport Pty Ltd
8 Johnson Street
DUBBO NSW 2830**

Submission 2

Subject: FW: David Treacey

From: Jacki Parish <Jacki.Parish@dubbo.nsw.gov.au>
Sent: Thursday, 29 August 2019 2:05 PM
To: David Treacey <david.treacey@bigpond.com>
Cc: Steven Jennings <Steven.Jennings@dubbo.nsw.gov.au>
Subject: RE: David Treacey

Thank you David. I will forward your feedback to Steve Jennings and will let you know how we can make sure your email is reviewed as part of the feedback.

It was great to have you along and nice to see such involvement.

Appreciated

Best regards

Jacki
Jacki Parish
Manager Dubbo City Regional Airport

P. 02 6801 4561 | F. 02 6801 4259

<http://www.dubboairport.com/>

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-----Original Message-----

From: David Treacey <david.treacey@bigpond.com>
Sent: Thursday, 29 August 2019 12:58 PM
To: Jacki Parish <Jacki.Parish@dubbo.nsw.gov.au>
Subject: David Treacey

Hi Jackie,

Thank you for the opportunity to attend today's forum and to possibly have some input.

An airport exists to provide facility for aviation and all its attendant services whether that be RPT, GA or recreational. All form part of that community known as general aviation. I'm a GA pilot with a VH registered Jabiru J230 D light aircraft, predominantly engaged in recreational flying with the occasional stint in and out of controlled airspace.

When I go flying or plan a trip, there are many factors needing to be considered however the most basic is that I will need to land somewhere. The fundamental questions in making that decision are:

- 1Where am I going to land ?
- 2Can I refuel ?
- 3Can I park and where ? is there tie down facility or similar ?
- 4How do I access facility from where I may have to leave the plane?
- 5Is there a toilet ?
- 6Can I access coffee/tea/food ?
- 7Can I get into town ?
- 8Is there accommodation ?
- 9Would I do this again to this destination ?

Essentially it is like going for a trip in the car. Sooner or later you are going to need to pull up for fuel, coffee, toilet, rest break etc. Same with flying.

The easier we make addressing these fundamentals appropriately influences destination decisions for pilots. Ease of access to these facilities influences my decision to go or not go, to fly as "1 off" to a destination or to repeat the exercise.

Repeat business is what we want, and is equally as important to the development of the airport not only as a major regional hub but as a vital cog to the broader aviation community.

Recreational flying appears to be undergoing a resurgence of interest, take for example the 3 day Airventure Australia event in Parkes 20 - 22 September this year, well subscribed, lots of interest, local motels all full. Perhaps Dubbo could attract these events in the future.

I felt this morning, that appropriately catering to RPT, and we must if we are to grow our city and all its facility, we may not cater so well to that vital level of GA which facilitates budding pilots, ongoing pilot education and training, tourism other than RPT, other GA business activity such as transport and emergency as well as recreational flying and general public interest in all things aviation. The interest that drives people to simply come out to our airport to "see the planes."

I've probably bent your ear enough hear however this all is part of the point made by Troy Thomas this morning and the siting of RPT aircraft in close proximity to parking areas for lighter GA aircraft, RFDS, and taxiways.

Happy to to discuss with you at any time.

Warm Regards

David Treacey
0418417027

Sent from my iPad

Submission 3

From: comms@dubbo.nsw.gov.au
Sent: Thursday, 12 September 2019 1:44 PM
To: Dubbo Regional Council
Subject: Submission – Draft Dubbo City Regional Airport Master plan 2019-2040 BEAL
Attachments: 0_92594_12Sep2019134226_congestion.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

The following information has been submitted from the Dubbo Regional Council:

Title: Mrs
First name: KYLIE
Surname: BEAL
Contact number: 0419018024
Email address: kylie_bam@bigpond.com
Are you submitting this form on behalf of a business or organisation?: Yes

Business/organisation details

ABN/ACN:

Registered business name:

Trading name:

Are you registered for GST:

Address line 1:

Address line 2:

Suburb/City:

State: (\${Choose One}\$)

Postcode:

Is the business mailing address the same as the address above?:

Business mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Personal details

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Is your mailing address
the same as the address
above?

Mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Comments/Feedback: AIRPORT MASTERPLAN

Following are our thoughts and suggestions on the Masterplan. Quite a few points will have a direct effect on our business, Beal Aircraft Maintenance, and General Aviation (GA) in general. Our input is to not imply a negative spin on any suggestions, our response is to put forward our ideas for the smooth running of the airport and stake holders. We truly appreciate the enormity of trying to plan 20 years in advance and appreciate the process, we are grateful to the airport management for involving us in these future decisions. As a business servicing a large percentage of the GA which uses the airport, we often receive a lot of feedback.

• RPT apron expansion encroaches on the already struggling for room GA. In previous meetings it was pointed out that the idea was to keep the big guys (RPT) and the little guys (GA) away from each other. This is not depicted in the Masterplan.

• TWY D at the southern end of the terminal, what is this for? It's a great expense, all aircraft can access runway 05/23 via TWY A. In

removing this taxiway, the terminal expansion can use the land where the asbestos filled ARO building is currently without encroaching on runway 05/23.

- I believe the existing terminal was purposely designed structurally to go up. This would void the need to demolish the already established paid secured car park and limit the apron expansion invading the GA area. This could also contribute to building an undercover driveway for pickups, departures and taxi rank out of the weather. The expansion of upstairs would be a wonderful addition for a café, museum and viewing platform. Which I believe the community of Dubbo would appreciate.

- TWY C needs to remain, to much congestion for only one taxiway in the GA. Please see attached image of congested TWY C. Image taken on 29/8/19. The aircraft at the rear of photo is a RFDS aircraft, patient transport, stuck on taxi way. This was for a reasonable length of time, bit of a worry if there happened to be an ill patient on the RFDS aircraft.

- I believe aircraft taxing in from TWY D from the northern end have a blind spot, as the current RFDS hangar is on the edge of TWY E which limits vision. Accident waiting to happen if there is an aircraft currently taxing towards TWY D. This has happened on more than one occasion. This is some of the feedback we receive from pilots. Where do aircraft "go" in this situation? Removal of TWY C will leave one entry and exit point on TWY E.

- GA tie down points, we need more of. I understand there will be a new GA precinct (this is much needed, great idea) area which is great for aircraft wishing to stay for a few days, but it would be beneficial to have short term tie down area for business people or people refuelling and may wish to use the terminals facilities/café etc.

- Provisions for the new GA , this is great for GA and recreational users, is there consideration for a fuel bowser and bathrooms?

- A wild suggestion could be to remove all existing GA hangars from the current GA area and relocate to new proposed GA, thus making the current GA area an emergency-based precinct and future large RPT aircraft. Council would obviously need to compensate existing

stakeholders for the relocation,

- As a current stakeholder and the owner of a small business which at times employs up to 10 staff (and growing) and services aircraft from three states, we feel GA in general is a little forgotten. Millions of dollars being spent around us while the "little" guys who are using the airport as an airport are being forgotten. The GA brings a lot of people to our wonderful town, which in turns brings a lot of money to our economy. Would be nice to make the GA visitors welcome.

- And I quote from page three of the report " Ensure that expansion of Airport infrastructure keeps pace with community needs and aviation trends". This must include GA not just the big guys.

- RFDS apron seems to be faced with the same restrictions as AIRMED, AIRBUSH, BEAL AIRCRAFT encroaching on taxiways (TWY E). Aircraft cannot physically park out the front of hangar without encroaching on TWY E. Maybe the masterplan could work towards this not being an issue.

- Are there provisions for a pickup/drop off area for aircraft? There has been mention of UBER air.

- RFS loading pad and taxi way currently used for Air Tractor 802's, will it accommodate Air Tractor 1002's (bigger water bombing aircraft) which will weigh over 8000kg.

- Will there be vehicle access roads from the existing GA to the new GA for maintenance, emergency vehicles, fuel trucks?

Attachment/s:

0_92594_12Sep2019134226_congestion.pdf



Submission 4

From: comms@dubbo.nsw.gov.au
Sent: Friday, 13 September 2019 2:41 PM
To: Dubbo Regional Council
Subject: Submission – Draft Dubbo City Regional Airport Master plan 2019-2040 O'Brien
Attachments: 0_92594_13Sep2019143930_Air Link Response to Dubbo Airport Master Plan.docx

The following information has been submitted from the Dubbo Regional Council:

Title: Mr
First name: Ron
Surname: O'Brien
Contact number: 0268842435
Email address: ops@airlinkairlines.com.au

Are you submitting this form on behalf of a business or organisation?: Yes

Business/organisation details

ABN/ACN:

Registered business name:

Trading name:

Are you registered for GST:

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Is the business mailing address the same as the address above?:

Business mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Personal details**Address line 1:****Address line 2:****Suburb/City:****State:** (\$[Choose One]\$)**Postcode:****Is your mailing address the same as the address above?:****Mailing address****Address line 1:****Address line 2:****Suburb/City:****State:** (\$[Choose One]\$)**Postcode:****Comments/Feedback:** See Attached**Attachment/s:** 0_92594_13Sep2019143930_Air Link Response to Dubbo Airport Master Plan.docx

Can I first note Air Link's appreciation at being invited to contribute to the Master Plan Stakeholder discussion.

there are no changes to the Master Plan –

1) In your introduction you note a growing GA community. GA already provides a significant number of jobs at Dubbo Airport and its significance should not be underestimated. The current GA area is already landlocked and allows no growth/expansion prospects. You have plans for a new GA precinct in the northern portion of the airport. Is there a strategy or inducement to the owners/tenants of the current GA area to relocate should there be a complete re-classification of the existing GA area? Bearing in mind most of these are privately held and have no access to public funding. The recent huge developments have in some ways created a have / have not environment.

2) If GA was completely moved to the northern precinct, that would create the opportunity for the current GA area to be wholly dedicated to either government or government-funded operations all related in one way or another to Emergency Services. Consolidation of areas into like-minded business/industry would be beneficial from a planning point of view?

3) Keeping small and light aircraft away as much as possible from the operators of the much larger aircraft types. Wherever the GA precinct (consolidated in one area or split), more tiedown facilities should be provided to encourage more light aircraft traffic.

4) I know it is covered in the Master Plan but wasn't an issue of discussion in the Stakeholders Meeting but can I throw the following topic in to the conversation? "Light pollution" from the expanded airport facilities (I'm thinking Observatory at Coonabarabran).

5) Runways - all good and exciting to be considering the capacity to host larger aircraft.

6) Taxiways

- Air Link has some issues regarding Taxiway C. Our concerns over this Taxiway will differ greatly from the feedback you will get from other airport users. Under the current guides the facility at Hangar 1 is greatly restricted in the parking of aircraft on its apron due to the limitations of being designated a Code B Taxiway. Given Air Link was the first tenant in the GA precinct and have used the site continuously since 1974 it has been an unanticipated constraint on how Air Link wished to conduct its business. It is noted that Taxiway E has the same constraints as Taxiway C.

- With increasing amounts of traffic and RPT operations being condensed within small time frames (conflicting/multiple arrivals/departures) a full-length taxiway would be a tremendous operational improvement for ALL aircraft operators, creating great efficiencies.

7) Fuel bowers - ideally Avgas bowers should be located where your GA aircraft are going to have unfettered, but convenient access. If you have two GA precincts does that mean a bowser in each? Moving all the GA-related businesses to the Northern precinct would allow one site for bowser

installation (1 or 2 outlets?) A significant, but one-off, cost to do so, but long term may be a very beneficial investment.

8) On the Master Plan there appears to be no obvious service roads airside. With the Airport's massive expansion plans I'm sure they are in there somewhere?

9) A big tick to you for the recent opening of the Rental Car Park, it appears to have worked a treat for the itinerant flyers who can now easily find a space in the general car park.

10) Air Link no longer operates a Beech 1900 aircraft. It will shortly be commencing RPT services between Dubbo and Bourke, Walgett and Lightning Ridge. Discussions are ongoing with Council on the operational requirements of these services and how they will be incorporated into the Airport's current daily operations.

11) There appears to be a distinct shortage of parking for GA aircraft now. To attract further visitation from the GA and recreational aircraft communities there should be some consideration to how and where a greater number of aircraft can be accommodated with secure tie-down areas and facilities (near fuel bowsers) that may include toilets and shaded/protected seating.

12) Air Link considerations for long-term investment into the facility at Hangar 1 with a current 3 x 5 year lease but with desire of long-term commitment to its leased premises.

-The current building itself needs significant spend on presentation and facilities.

-Facility isn't fit-for-purpose without the ability to park aircraft, either singular or multiple, air side at the hangar site due to Taxiway C considerations.

-Vision of having sealed apron for aircraft parking doesn't fit in with the Taxiway C constraint

-Prospect of multi-use for charter and aeromedical, as originally intended, is constrained by the two points immediately above.

13) All of 12) above are all over-ridden by the Master Plan vision which encompasses the lease site of Hangar 1 being absorbed within the Airport's Passenger Terminal Precinct. Whilst Air Link would prefer to maintain its current strategic location on the airport, before investing dollars it makes sense to understand the impact of any changes to its current site, and/or if there is any consideration of Council offering an attractive alternative in the new GA Precinct should that be how the Master Plan dictates future progress?

14) The Airport Passenger Terminal expansion also takes out of play Taxiway C altogether. That has its own massive implications on aircraft access into and out of the current GA-designated area. Does it remain a functionable precinct with only one taxiway? There is potentially enough GA traffic now to create disruption with aircraft flows. Taking the GA traffic elsewhere on the airport would ease that potential congestion.

15) Terminal – Pedestrian/passenger access from both airside and landside, covered walkways considered??

Submission 5

From: comms@dubbo.nsw.gov.au
Sent: Wednesday, 18 September 2019 10:07 AM
To: Dubbo Regional Council
Subject: Submission – Draft Dubbo City Regional Airport Master plan 2019-2040 Kilby
Attachments: 0_92594_18Sep2019100520_S Kilby_response to Dubbo City Regional Airport master plan 2019.pdf

The following information has been submitted from the Dubbo Regional Council:

Title: Mrs
First name: Shane
Surname: Kilby
Contact number: 0427238204
Email address: spkilby40@gmail.com

Are you submitting this form on behalf of a business or organisation?: Yes

Business/organisation details

ABN/ACN:

Registered business name:

Trading name:

Are you registered for GST:

Address line 1:

Address line 2:

Suburb/City:

State: (\${Choose One}\$)

Postcode:

Is the business mailing address the same as the address above?:

Business mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (\${Choose One}\$)

Postcode:

Personal details

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Is your mailing address the same as the address above?

Mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Comments/Feedback:

My response is on the attached file. I am submitting this response on behalf of myself as both a sole trader and owner of a small farm adjacent to the airport.

with regards, Shane Kilby

Attachment/s:

0_92594_18Sep2019100520_S Kilby_response to Dubbo City Regional Airport master plan 2019.pdf

Dubbo City Regional Airport Master Plan 2019-2040

Shane Kilby
30 Regand Park Blvd
Dubbo NSW 2830
17TH September 2019

TO WHOM IT MAY CONCERN

Thank you for the opportunity to comment on your proposed Master Plan for Dubbo City Regional Airport 2019-2040 (The Plan). I acknowledge that the plan is pro-development and future thinking; it builds on current trends for the growth of Dubbo as a regional hub. The plan references its interface with other plans for the city including the Dubbo Community Strategic Plan (CSP), the Dubbo Urban Areas Development Strategy, the Dubbo Local Environment Plan 2011 (LEP), and the Dubbo Development Control Plan 2013 (DCP).

I own a neighbouring property south-east of the airport known as "Wandara", 21L Bunglegumbie Road which is zoned RU2 – Rural Landscape. The property consists approx. 19ha of farm land, a house and gardens plus cattle yards, bores and a large dam. Access is from the Bunglegumbie Road at the intersection of the Blizzard Field Road which is also signposted as the emergency access to the Airport. Wandara shares a common boundary with the airport which includes an exclusion fence with a locked emergency access gate.

I see the plan offers many constructive and sensible ideas for the development of the regional airport facility in conjunction with the growth and development of Dubbo. I would like to comment on these aspects as they impact on Wandara due to its strategic location for further development associated with, and immediately adjacent to, the Airport.

Scope to develop and grow Dubbo - housing

The Plan states:

The airport adjoins land zoned RU2 Rural Landscape to the north and north-east. These lands predominately each contain a dwelling house and are utilised for limited rural production purposes. It should be noted that these lands have minimal opportunities for further development of residential housing based on the large minimum allotment size for subdivision and the permissible development types afforded to the land under the provisions of the Dubbo Local Environmental Plan 2011. (Page 20).

In contrast the *Residential Areas Development Strategy* places significant emphasis on the further residential development being undertaken in West Dubbo. Wandara located on the outskirts of West Dubbo and zoned rural area (RU2) is being squeezed between the current urban renewal area (R2) and the Airport. It has a strategic location for further development for residential purposes. It is an ideal housing site for rezoning for low density residential (R2) because:

- Proximity to the main street – Wandara is only a few minutes' drive from Macquarie Street making it closer to the business hub of Dubbo than many other developments.
- The need - According to the plan, Dubbo City's projected population is expected to increase by 4000 to 46 000 by the year 2036 (p. 16). This is a very conservative figure and contradicts other projections. For example, REMPLAN projects the Dubbo City population between 48312 and 55178 by 2036. (Source: Dubbo Regional LGA Population Projections, October 2016).
- Peri-urban location – The land to the immediate south of Wandara is already zoned as R2 – low density residential so there is a precedent for expansion in this direction from Dubbo's core.

Desirability - Expansive views across the Macquarie Valley giving potential housing blocks natural aesthetic appeal.

Aspect - Most of the land has a gentle slope and easterly aspect, with the airport shielded by the rise to the west

this rural area (RU2) being squeezed between the current URA and the Airport and its strategic location for further development for both residential and uses associated with, and immediately adjacent to, the Airport.

Scope to develop and grow Dubbo – expansion of aviation services

Considerable investment already undertaken at Dubbo City Regional Airport including the Royal Flying Doctor Service, the Rural Fire Service Training Facility and the Police Training Facility makes it an attractive location for expansion of aviation services at Dubbo.

Wandara has a desirable and strategic location for further development for both residential and uses associated with, and immediately adjacent to, the Airport. A possibility which is in line with goal 6 and goal 7 (P. 33) is rezoning Wandara for homes and hangars with access to the taxiway. Private homes and hangars would complement the development of the taxiway for the cross strip and provide a genuine multi-purpose aerodrome. This could be an economic development opportunity for the City of Dubbo that could bring new affluent residents and further activity at Dubbo City Regional Airport. Think of the expansion of Temora through private investment in aviation and the aerodrome as a successful example.

<http://www.temora.nsw.gov.au/facilities-recreation/airport-aerodrome/temora-aerodrome.aspx>

Scope to develop and grow Dubbo – freight and commerce

Expansion of freight services including export freight from Dubbo City Regional Airport also has potential to value-add and diversify the primary industries of the region including mining and agriculture. Possible examples include but not limited to the export of processed meat, dairy products, live exports, rare earths. Similarly, there are opportunities for development and expansion of a commercial precinct at Wandara due to its location immediately adjacent to the airport especially if Option 1: Possible Freight Precinct were pursued. This will depend on development of road access to the Mitchell Highway which was suggested in Dubbo City Planning and Transportation Strategy 2036 – November 2009.

Concerns

I would like to raise one concern about the Emergency Access to airport via Blizzard Field Road. This road is signposted as the Emergency Access to the airport. It is also a road used by local residents to meet the school bus, to access their homes and their properties. The road has a dirt surface, is very rough and carries surplus water when it rains making it slippery and boggy. The road is not the responsibility of Dubbo Regional Council as it is designated as Unmaintained Crown Road. I suggest that the Plan should:

- Identify the issue of access and egress to the airport via the emergency access
- Ensure the road is maintained to a suitable standard to carry emergency vehicles and also meet the needs of ratepayers who use the road on a daily basis.

Congratulations to the Dubbo Regional Council on being pro-development and thinking ahead about future trends while looking for emerging opportunities as well. I hope you take my comments regarding the future development of Wandara into account with your future decisions regarding the plan.

Yours sincerely

Shane Kilby

M: 0427 238 204 E: spkilby40@gmail.com

Submission 6



18 September 2019

Mr Michael McMahon
Chief Executive Officer
Dubbo City Regional Council

Sent by email: mqm@dubbo.nsw.gov.au
council@dubbo.nsw.gov.au

Regional Express Response to the Draft Master Plan for Dubbo City Regional Airport

Dear Mr McMahon

Regional Express (Rex) would like to thank Dubbo City Regional Council (DRC) for the opportunity to provide feedback to the 2019-2040 Dubbo City Airport Master Plan.

Regional Express (Rex) was founded in 2002 as the merger of Ansett subsidiary airlines Hazelton and Kendell following the collapse of Ansett in 2001. Both Hazelton and Kendell airlines had over 30 years' experience prior to the collapse of Ansett. Rex has serviced the City of Dubbo since Rex first commenced in 2002 and prior to that through its predecessor Hazelton.

Rex is a dedicated regional airline that operates 60 Saab 340 turboprop aircraft (34 seats) to 60 destinations throughout Western Australia, South Australia, Victoria, Tasmania, New South Wales and Queensland. Rex carries around 1.3 million passengers on some 78,000 flights per year. Rex is a publicly listed company on the ASX.

Rex with its more than 45 years of experience in regional aviation, the largest number of regional routes of any operator and the winner of the most State Government tenders for regulated routes is, without doubt, the pre-eminent authority on the operation, regulation and funding of air route service delivery to rural, regional and remote communities. As a dedicated regional airline Rex is solely focused on the provision of regional air services.

Over the past 15 years Rex has been very successful in growing regional passenger numbers to record levels with Rex's annual passenger numbers growing from around 600,000 in 2002/03 to around 1.3 million currently. This has been achieved through keeping fares affordable and focusing on safety, efficiencies and on-time performance.

Regional Express Pty Ltd

ABN 25 101 325 642

Head Office

81-83 Baxter Road PO Box 807
Mascot, NSW 2020 Mascot, NSW 1460
P +61 2 9023 3555 F +61 2 9023 3599

Regional Express Group of Companies:





Rex RPT Network



Rex operates to more than 50 regional airports across Australia, with the vast majority being owned by local councils. Regional airports were vested to the local Councils at no cost (often with a large sum to offset future maintenance costs) by the Federal Government prior to 1991.

Regional airports are a vital piece of community infrastructure and form a valuable community asset and should be treated no differently than local roads and bridges as the critical local infrastructure that has broad-ranging benefits throughout the local region.

Across Rex's vast regional network there is much contrast in the approach that is adopted by Regional Airports / Councils. There are those that truly value their regional air service, while others like Dubbo airport chose to embark on unnecessary grand plans that are based on the 'build it and they will come' approach often in combination with a 'cash cow approach'.





Feedback on the Dubbo airport Master Plan 2019-2040

As a critical provider of Regular Public Transport (RPT) services to/from Dubbo, Rex will focus its Master Plan feedback on matters relating to RPT. However, Rex does have some significant concerns about airport infrastructure upgrades that are not RPT related.

The first relates to possible planned airport upgrades to accommodate larger Boeing 777 aircraft that the Masterplan has identified as a possible future aircraft for large scale freight opportunities. Such planning decisions need to be supported by facts and definitive plans that relate to such freight operations. In addition, any such infrastructure upgrade should be funded by DRC or the freight operator themselves if this was to ever materialise and current RPT operators must not be made to pay for the 'white elephant' should the project turn out to be a pie in the sky.

The RPT operators (Rex, QantasLink, Fly Corporate and FlyPalican) generate the vast majority of revenue for Dubbo airport and the RPT operators should not be responsible for funding non RPT related infrastructure requirements.

Similarly, Rex understands the critical importance of the Rural Fire Service's Aerial Operations at Dubbo airport, however, any expansion of the airport to support Large Aerial Tankers including the construction, strengthening or expansion of aprons, taxiways and runways should not be funded through increased passenger taxes and charges to the RPT services. It also is noted that Dubbo Airport already receives occasional C-130 Hercules visits from the RAAF and has previously already accommodated the RFS C-130 with the airport's existing infrastructure.

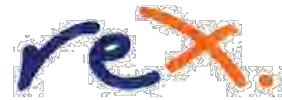
In relation to RPT, Rex is concerned with the Master Plan assumptions relating to passenger growth and future aircraft. Furthermore, Rex urges the Master Plan to reconsider the current security screening procedures for passengers on RPT flights that are not required to be screened in accordance with the Federal Government security screening legislation.

To provide some background context, Rex doubled its Dubbo to Sydney passenger numbers from 40K to 80K per year between FY04 and FY08, with passenger numbers then stagnating at around 80K through until FY11. With increased Dubbo airport charges and the imposition of unnecessary security screening charges in 2012, Rex was forced to scale back its flight frequency in order to protect its operating margins. Subsequently, Rex has averaged approximately 58k passengers per year between FY13 and FY19. Rex also carries around 4.5K passengers per year between Dubbo and Broken Hill which is an essential service.

What needs to be clearly understood by DRC is that the current total annual passenger numbers on the Dubbo to Sydney route of approximately 180K are accommodated with combined Rex and QantasLink annual seat capacity of approximately 278K. This means that there are almost 100K annual seats currently not being sold that are available to meet significant increases in passenger growth in future years.

Rex believes that the Master Plans 3.2% annual passenger growth rate assumption (based on historical compound rate) is too high and that 2% would be a more realistic growth rate due to the historical growth being skewed by the significant Rex passenger growth that took place between





FY03 and FY08. This is however somewhat of a moot point when one realises that there are over 100K seats unsold every year.

Assuming a more realistic 2% annual passenger growth assumption, the current 180k Dubbo to Sydney passengers would reach 220K by 2030 and 270K by 2040. With an 80% total market load factor, the current capacity provided by Rex and QantasLink, with an assumed 80% load factor, could accommodate this growth through until 2031. While the 80% load factor is acknowledged as being at the higher end of the scale for a regional route; it is certainly not unachievable with Rex recording 80% average load factors on numerous regional routes throughout Australia.

Rex makes this point to look more closely at the current capacity because the Master Plan estimates that Dubbo airport will likely see 100 seat aircraft (F100, CRJ900, CRJ1000) operating by 2023-26, 120 seat aircraft (B717, A220-100) by 2028-32 and 150+ sized aircraft (B737, A220-300) by 2030-2034. Rex strongly disagrees with these assumptions and believes that realistically the largest RPT aircraft to service Dubbo airport in the next 15 to 20 years will be in the 70 seat turboprop category. This includes the 74 seat Dash 8 Q400 (already operated by QantasLink) and the 68-70 seat ATR 72-600 aircraft.

It is nonsensical to assume that 100 seat jet aircraft such as the F100 and CRJ900/1000 aircraft will be operating RPT services to Dubbo by 2023-26 purely based on passenger number projections when there is already ample opportunity to grow passenger numbers within the current capacity. Furthermore the assumed aircraft types are not operating RPT services in NSW at all, with the F100 primarily being used by Alliance and Cobham airlines for either mining related Fly-In Fly-out (FIFO) services or RPT in partnership with Qantas or Virgin, mainly in QLD and WA.

What also needs to be understood is that the Dubbo to Sydney route has approximately 117 weekly flight frequencies, which is split between Rex (61) and QantasLink (56). Rex operates the 34 seat Saab 340 aircraft, and QantasLink operates with a mix of 36, 50 and 74 seat Dash 8 aircraft.

Rex has absolutely no intention of operating larger aircraft to Dubbo and indeed it is not inconceivable that under the current management and climate at DRC, Rex may even exit Dubbo altogether and redeploy the Sydney Airport slots to other NSW regional ports. If that were to happen and given that peak slots are no longer available at Sydney Airport, Dubbo will be left with only about 60 frequencies a week with a maximum capacity of 210K seats per year. This would still be sufficient seat capacity to cater to present demand but there would be no room for passenger growth. Furthermore with the high loads on a Qantas monopoly route, one can be fairly certain that air fares will most likely at least double.

This means that all of the key airport infrastructure (runways, taxiways and aprons) will not need costly upgrades associated with lengthening and strengthening. As such Rex does not see any requirement to extend Runway 05/23 beyond the existing 1,708m for the purpose of accommodating RPT services over the next 15 to 20 years, especially since such works will most likely result in greater costs for Rex and a likely exit from the route, thereby ensuring that more than half the slots to Sydney Airport disappearing with it.





Rex has noted that the Master Plans reference to Runway 05/23 being ultimately planned as a Code 4E instrument non-precision runway with 2,800m length (requires the purchase of land to the North) and 45m width with the Code 4E category being able to accommodate B777F (or similar) aircraft. Rex also notes the Master Plans reference to Runway 05/23 being extended to 2,200m long to accommodate Code 4C Narrow jet RPT operations. As previously outlined, Rex does not require any of these upgrades, and if DRC unilaterally decides to embark on these plans in future years then the cost of this should be met by DRC and not the existing airport users.

The bottom line is that DRC should be seeking advice from the current RPT providers (Rex, Qantas Link, Fly Corporate and Fly Pelican) about the future requirements for RPT as opposed to relying on such advice from a consultant. As the operator with the most frequencies to Dubbo and the most Sydney Airport slots, Rex solemnly warn the DRC that the consultant's recommendations are purely wishful thinking with no factual basis.

With reference to the important matter of airport security screening, Rex maintains its strong position that Dubbo airport should cater for RPT operators that do not legally require security screening through the provision of both screened and unscreened departures area.

Approximately two-thirds of RPT flights at Dubbo airport do not legally require security screening under the Federal Government security screening legislation and the imposition of unnecessary security screening is negatively impacting the commercial viability of regional air services to/from Dubbo airport. Given that the majority of RPT services at Dubbo do not legally require security screening, Dubbo airport should have the flexibility to facilitate unscreened departures for aircraft that do not legally require security screening. It is illogical that the 28 weekly QantasLink departures to Sydney are dictating the security screening requirements for all RPT services being operated at Dubbo airport.

Should there be any future redevelopment of the airport terminal, Rex believes that including a non-screened boarding gate for flights where screening is not legally required, would be of great benefit to Dubbo airport and its users. Rex has noted the feedback contained within the Master Plan relating to the current terminal which states that the airport would benefit from increased services and facilities within the non-screened area of the terminal. However, redesigning the airport to include a non-screened boarding gate would support the airport in addressing this feedback, as well as improving customer satisfaction at the airport. The airport would also reduce security-related costs, given the reduced requirement for the screening services.

At the commencement of FY20 Rex and all other RPT operators were hit with a 13% increase in the passenger head tax from \$14.90 to \$16.89 (Incl. GST) per arriving and departing passenger. DRC also removed a growth incentive threshold that previously seen passenger numbers in excess of 150k receiving a 50% reduction in the passenger head tax. The removal of the growth incentive equates to more than an additional \$200K per year being collected by DRC which is further to the core 13% increase in the head tax. This means that the passenger head tax revenue is now exceeding a staggering \$3.5M per annum and this excludes more than \$1M in security screening charges. Furthermore the unnecessary security screening charges also increased to \$6.60 per arriving and departing passenger.





In Rex's vast experience of servicing more than 50 regional airports throughout Australia, the cost of operating and maintaining an efficient regional airport should be around \$600K per year. This is around 18% of what is collected by Dubbo airport which means that the local Dubbo Community are paying in the region of \$3M extra every year for their air tickets.

In DRC's draft revenue plan for FY20, council's justification of the increase was *"to assist to meeting increased operational expenditure and contributing to DCRA future capital works program focused on supporting on current RPT demands and future growth"*. In the context of the Master Plan, Rex is deeply concerned about this statement because the Master Plan is focused on airport infrastructure upgrades that are not required by RPT operators and the current airport infrastructure can already support significant future RPT passenger growth.

It is outrageous that annual passenger head tax revenue of more than \$3.5M is being collected from the RPT operators by DRC in order to fund infrastructure upgrades that are not being requested by the RPT operators.

Should such infrastructure upgrades be deemed important by DRC then they should funded by DRC and not the RPT operators. Such airport infrastructure upgrades should also have the ongoing maintenance and depreciation related costs fully removed from the costs that are imposed on to the RPT operators. It is only fair that the RPT operators pay for what the RPT operators require.

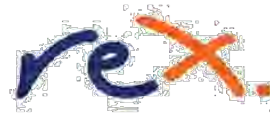
Rex is deeply concerned as to the direction that DRC is taking with with Dubbo airport. Dubbo is a regional centre that strongly relies on frequent regional air services, but unfortunately the high airport charges are negatively impacting the commercial viability and sustainability of the regional air services that the City of Dubbo and surrounding region relies upon to do business. DRC is choosing a path of not listening to the existing RPT operators, but instead embarking on a build-it-and-they-will-come approach that is designed to attract new entrants with large jet aircraft. This misguided path will be to the detriment of existing RPT operations and ultimately to the detriment of Dubbo and the vast surrounding catchment area.

Rex solemnly warns DRC that the recent imposition of ridiculous additional head tax charges and the burden of unjustified and unneeded security screening on Rex's services are seriously damaging the commercial viability of the route for Rex.

Rex puts DRC on notice that should our concerns not be addressed, Rex may start planning for the orderly redeployment of all 61 weekly frequencies to other councils that are less myopic and much more enlightened.

Thank you once again for providing yet another opportunity to provide feedback all of which were totally ignored by DRC in the past.





Regards,

Warrick J Lodge.

Warrick Lodge
General Manager Network Strategy & Sales
Regional Express (Rex)

Copy:

Hon Michael McCormack MP, Minister for Infrastructure, Transport and Regional Development
Hon Mark Coulton MP, Federal Member for Parkes
Andrew Constance MP, NSW Minister for Transport and Infrastructure
John Barilaro MP, Minister for New South Wales, Industry and Trade
Paul Toole MP, NSW Minister for Regional Transport and Roads
Dugald Saunders MP, Member for Dubbo
Productivity Commission, Economic Regulation of Airport Services
Dr Stephen Kennedy PSM, Secretary, Department of Infrastructure, Regional Development and Cities
Dubbo Chamber of Commerce
Dubbo Regional Council Ratepayers
Graeme Samuel, Chairman Airlines for Australia and New Zealand (A4ANZ)
QantasLink, Fly Corporate and Fly Pelican Airlines



Submission 7

From: comms@dubbo.nsw.gov.au
Sent: Thursday, 19 September 2019 12:14 PM
To: Dubbo Regional Council
Subject: Submission – Draft Dubbo City Regional Airport Master plan 2019-2040 Colwell
Attachments: 0_92594_19Sep2019121318_Draft Master Plan Dubbo City Airport.pdf

The following information has been submitted from the Dubbo Regional Council:

Title: Mr
First name: Peter
Surname: Colwell
Contact number: 0409927185
Email address: fastoy@ozemail.com.au

Are you submitting this form on behalf of a business or organisation?: No

Business/organisation details

ABN/ACN:

Registered business name:

Trading name:

Are you registered for GST:

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Is the business mailing address the same as the address above?:

Business mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (\$[Choose One]\$)

Postcode:

Personal details

Address line 1:

Address line 2:

Suburb/City:

State: (\$(Choose One)\$)

Postcode:

Is your mailing address the same as the address above?

Mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (\$(Choose One)\$)

Postcode:

Comments/Feedback:

Few other matters have a more direct effect on the Dubbo economy and standard of living, than air services. So it is vital to strike the best possible compromise with all parties involved.

Dubbo is extremely fortunate to have the services it does, and any short-sighted decisions that jeopardise that need to be avoided.

please see attached submission

Attachment/s:

0_92594_19Sep2019121318_Draft Master Plan Dubbo City Airport.pdf

Draft Master plan for Dubbo City airport plan;**My Submission;**

This is a rather grand, extravagant, and expensive plan that appears to greatly exceed properly analysed requirements.

Currently there are 100K empty seats annually, on the Sydney route. That would seem to imply that a significant increase in passenger numbers could be accommodated without any additional expense at all. It is unrealistic to expect that additional operators and bigger aircraft could be enticed to Dubbo for many years, while this excess capacity remains.

Dubbo Council is currently collecting \$3.5M per year to fund upgrades that are not being requested by the RPT operators. This unnecessary cost filters directly to the flying public and ratepayers, with little benefit to anyone. That would seem to negate the need for even higher costs to be imposed, with this plan. Surely, the airport users and RPT operators are the people whose experience is vital to Council making decisions on this plan.

Rex tends to be the flight of choice for passengers who pay their own way, Qantas enjoys the support of professionals who do not pay their own fares and are thus less concerned.

If Rex decided to abandon Dubbo altogether, as its margins are squeezed further by this plan, there is a great deal at stake;

1. Slots at Sydney disappear.
2. Weekly flights would drop from **117 to 60**.
3. The available seats would be less than the current demand, - guaranteeing much higher fares.
4. Rex carries 4500 passengers between Dubbo and Broken Hill, so Broken Hill would also lose out dramatically.

So in conclusion, if the plan goes ahead as it is now, Dubbo would have a grand airport, with unused facilities, a seriously shrinking economy, and degraded specialist medical FIFO services.

I urge the Council to consider the implications very carefully, in a spirit of fairness, and absent of politics or personal agendas.

Submission 8

From: comms@dubbo.nsw.gov.au
Sent: Friday, 20 September 2019 3:55 PM
To: Dubbo Regional Council
Subject: Submission – Draft Dubbo City Regional Airport Master plan 2019-2040 Johnston

The following information has been submitted from the Dubbo Regional Council:

Title: Mr
First name: Phil
Surname: Johnston
Contact number: 0268 899999
Email address: pjohnston@narromine.nsw.gov.au
Are you submitting this form on behalf of a business or organisation?: Yes

Business/organisation details

ABN/ACN:

Registered business name:

Trading name:

Are you registered for GST:

Address line 1:

Address line 2:

Suburb/City:

State: ([Choose One])

Postcode:

Is the business mailing address the same as the address above?:

Business mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Personal details

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Is your mailing address the same as the address above?

Mailing address

Address line 1:

Address line 2:

Suburb/City:

State: (Select One)

Postcode:

Comments/Feedback:

Narromine Shire Council is very supportive of the efforts of Dubbo Regional Council and the development of the Dubbo City Regional Airport. The airport is a vital link between eastern cities and Western NSW and increasingly is an important hub for fire services, Royal Flying Doctor Services and Air Ambulance, commercial activity and general aviation.

The Master Plan clearly sets out the medium and longer term priorities for the aerodrome and planning for the future expansion of regular passenger services, general aviation and increased usage by State Agencies brings positive benefits to the whole region.

Attachment/s:

Results of Stakeholder Workshop

Airport Master Plan Presentation Meeting Minutes

Location: RFS Training Facility, Cooreena Road, Dubbo NSW 2830

Time: 7.30 am

Attendance: See list scanned at back of document

Apology: Steven Jennings, Warrick Lodge, David Brooksby

Rick Stubbs introduction from Jim RFS regarding the facilities.

Natasha comber introduction from DRC.

Jacki Parish presenting on behalf of Steven Jennings who sends his apology in relation to the masterplan.

Jacki Parish provided a history of the Masterplan document and how this document assists the requirements for the airport moving forward.

Lee Griffith outlined what a Master Plan document is actually about and how it is the most productive document to assist with future planning an area. Preventing ad-hock planning for the Airport.

Constant review of the Master Plan occurs particularly for the airport and staff are quite proactive. The masterplan is an aspirational document for future progression of the airport.

Preservation of future planning for the airport to work cohesively in future operations. Master planning for the airport and having this meeting will hopefully bring ideas and solutions to the fore front for the GA area and overall airport operations.

JACKI PARISH discussed the GA Area and then looking in the new GA area, interest has already been almost exhausted even with the new area.

JACKI PARISH discussed the masterplan process and advised that the draft master plan is on review and able to be accessed by all members when they require for feedback on everything.

JACKI PARISH advised about the airport improvements since 1985 to 2017 displayed graph of flight improvements.

Projected grow and projected pax displayed within a graph and discussed by JACKI PARISH

Megan Dixon asked if the growth took into account the larger projects in the region? Natash Comber advised that they definitely relate to Dubbo, but maybe not related to greater western areas.

JACKI PARISH discussed the GA improvements and growth particularly in Helicopters have been used at the airport increase due to lack of facilities within the area.

JACKI PARISH discussed the Map on the masterplan 2015-2036 plan, advising most actions have been created and finalised.

JACKI PARISH map discussion on the new masterplan 2019-2040 new development and plans for improvements for the airport infrastructure and facilities. Discussions regarding a cost recovery operation for the facilities of the RFS at the Airport. Discussions regarding GA area, freight area, LAT Base, general Aviation, RPT apron.

Question regarding extension of Runway 1129 - JACKI PARISH advised that no extension in the current plans, but upgrade and reseal will be taking place. Talked about the staged developments off the end of runway 1129. Discussions regarding the possible locations for smaller freight companies. Locations for future planning for refuelling in the airport precinct.

The meeting room were advised to please bring your submissions to assist with the planning of the airport in future. Funding opportunities will also need to be located for the improvements for the master plan at the airport.

On page 44 in the document it talks about the timeframes of the improvements.

JACKI PARISH advised that a southern approx. expansion will be happening in September this year. New construction will be able to handle the strength of LAT in the interim. Looking into new destinations.

Cross runway will be have a complete reseal in December 2019, 5 days without access to runway.

Re-seal taxiway delta and echo advised. Redevelopment of the café area and security in the terminal building. Potential landside café options in the future planning.

Aeromedical, open air disembarking the aircraft and working for funding to assist with disembarking under a covered area. ARO compound is current in the throes of creating a facility for their operations.

Runway extension plans for 0523 in future and purchase of land to complete those plans. Heading to the northern 23 end of runway.

Rental car companies have a head office at the airport precinct, refuelling opportunities for vehicle operations, secure car parking and over flow into the new additional areas for the airport precinct.

Leigh advised that the public exhibition closed on 18th September 2019 at 5 pm, submissions to council and can speak with Jacki or Steve moving forward regarding the submission, all are considered on masterplan document may be amended based on these submissions, council will lodge a final application and adoption of the document.

David Honner – is there are likelihood for a trigger space for the movement of the airport. Will we move towards a controlled airspace, they are currently doing an trial based on digital towers and then may be looked into in future planning. 500,000 passengers. Triggers will change the needs and then they will happen due to the regulations. David Honner, simple facility to park when you fly in and fly out, is that a consideration to attract tourism. JACKI PARISH clarified in relation to Tie down parking and facilities for aircraft owners who fly in and fly out. Spoke about possible facilities for the GA pilot areas. JACKI PARISH advised Coffs harbour have a rest area facility. Link the growth and facilities options for the GA precinct for pilots.

Mick Robertson – Single aircraft hangars, 3 -4 people looking for aircraft hangar age, JACKI PARISH advised that there was nothing on agenda but a valid point to take back to the master planners for the future planning. Funding would need to found for the progression.

Cliff Swane - Proposed timeline on page 44 there is timelines attached. No allocation of delays or preparation time for movements. Plan shows a lot of upheaval in the growth and how is that going to assist with the future planning, very open ended. JACKI PARISH advised that it is an operation suggestion document on how we proceed, please provide submissions for what you required. Funding timelines will dictate the speed of the infrastructure improvements.

NATASHA COMBER and JACKI PARISH advised that there was also utilities infrastructure that requires improvements along with the overall improvements to the airport. Hopefully for future improvements there won't be such an overlay. We will work to timelines if there are funding opportunities for the airport we will need to work to their regulations. Happy to have further discussions regarding refuelling stations and operations.

Will Coady asked will the GA Area will remain as the current GA Area. Jacki Parish advised yes.

Mick Robertson – Police academy how long? NATASHA COMBER advised still in discussions.

Cliff Swane – studies on the potential for time sensitive large scale freight.

NATASHA COMBER advised that we have mainly look at the infrastructure regarding the potential RDA and State putting investments. Sight considered for possible freight precinct in Dubbo and at Airport.

Megan Dixon advised that RDA Orana have information on their website, John Walkom working on delivering freight into Asia. Complete freight study has been completed into the region. Land and Air transport are both on the website for public to read. Looking into resource rich regional, not a lot of value adding is domestic focus and looking into export focus for the regional, value added manufacturing with intended supply into Asia.

Mick Robertson – is the runway able to cope with a 737?

JACKI PARISH advised that the doctor of pavement is looking into this at the present point in time. Making sure we protect the asset that we currently have while also looking at opportunities.

Will Coady, feedback run off bays with planes doing run offs while sick patients, is the noise a concern with the patients. NATASHA COMBER Great feedback, things we need to consider.

Cliff Swan advised that they might like to look at run off bays in the new GA apron area to take away from the current RFDS Facilities.

John Brennan asked about Road improvement to Cooreena road and resealing due to increased vehicles near the facilities. NATASHA COMBER advised that she wasn't advised of anything now. More traffic coming from the rear of the property. NATASHA COMBER advised that the traffic strategy for the future planning of the airport roads and operations.

NATASHA COMBER advised that this maybe is a part of the planning that hasn't even been considered.

Cliff Swane – asked about terminal development for undercover drop off

JACKI PARISH advised that there is potential improvements that could be competed but nothing in the plans currently. Area does need to have some improvements, airside there are more important documents supporting improvements in this area.

Hangers along Judy Jenkins drive, is it the individual owners to do improvements, pits are there and the request to make the improvements and it is the responsibility of the hanger owners, you need to work together to complete operations.

David Honnor overall plan, how far east does the growth go. Parallel runway options? JACKI PARISH advised not within 20 years.

Troy Thomas asked about the reason behind the 738 closer to the airport – extending apron to the southern side. Putting the biggest aircraft plans into an area near little aircraft. JACKI PARISH advised that it is a valid question and something we may be able to make improvements to the draft plan designs. Troy advised that the GA area is going to get very congested in the aircraft continue to go towards the northern end of the apron.

Close of Meeting 8.45 am





Attendance List	
Name	Company
1. Bruce Beal	BEAL AIRCRAFT MAINT
2. KYLEE BURL	"
3. GLEN NAYLER	"
4. Steve Russell	JB RICHARDS
5. Mark Lees	"
6. Barry RITCHIE	NUMBER 11
7. Mark Williams	THOMAS AND SON
8. Tony Threlkeld	THOMAS AND SON
9. Paul Crawford	DAC
10. Nick Robinson	DAC MURDER DOGS
11. Kenneth Stewart	KPS
12. Mark Stewart	AUT LIFT
13. Robert Wilson	Auto Air Conditioning / Jiffy Lubes
14. William Ledy	GRAND AUTO CENTRE
15. Carl Swaney	Automotive Design / Detail & Protection
16. Steve Wilson	Auto Glass & Repairs
17. Matthew Jackson	Am Bp+ Cox
18. Amanda Wilson	NTL Australia Group
19. John Freeman	RFD 3
20. Matthew Smith	AMS
21. Chris Head	BUDGET
22. Nathan Morris	Hertz
23. Matt Lough	Orbbs Plumbing
24. Peter Forrester	WINKS (COMM)
25. Mr. Ledy Centre	DEC
26. David Trevelyan	Insurance 14
27. Bryson Rees	DRC
28. John McLean	USN AIRCRAFT
29. Gary Butler	FRNSW
30. Morgan Dixon	RAC Orana
31. Anna Butler	Catering Industries



DATE 29 July, 2019
CONTACT BRIDGET WOUTS
bridget.w@lar.net.au



Dubbo City Regional Airport | Master Plan 2019 – 2040 For Dubbo Regional Council



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5

APPENDIX A

MASTER PLAN FIGURES

Revision	Date	Description	Author	Verifier	Approver
0	May 2019	DRAFT	BMW	BJH	BJH
1	28 June 2019	DRAFT	BMW	BJH	BJH
2	22 July 2019	DRAFT	BMW	BJH	BJH
3	29 July 2019	DRAFT	BMW	BJH	BJH



1.0 INTRODUCTION

The Dubbo City Regional Airport is one of the leading regional airports in Australia. The Airport is located five (5) kilometres north-west of the Dubbo Central Business District on the Mitchell Highway, and is situated on an overall land holding of 358 hectares.

The Airport provides a lifeline for Central and Western New South Wales in the provision of access to Sydney, Brisbane, Melbourne and Newcastle by air. The Airport is also home to the Royal Flying Doctor Service, NSW Rural Fire Services Fire Control Centre and Training Academy and a growing General Aviation community. In addition, further development has recently been announced by the NSW State government in the form of a NSW Police Service training facility.

The Airport is operated and maintained by Dubbo Regional Council in conjunction with the Regular Public Transport (RPT) airlines and the Civil Aviation Safety Authority.

The Airport hosts direct return services from Dubbo to Sydney serviced by Qantas Link and Regional Express. Regional Express also provide services to Broken Hill. Fly Corporate provides daily services to Melbourne (Essendon) and Brisbane and Fly Pelican provides services between Dubbo and Newcastle.

The Dubbo City Regional Airport is strategically vital to the region, serving not only Western NSW but a large area of the Central West and north-west of the State. The facility is the largest airport in the Orana and Central West Regions and provides services for a catchment in excess of 200,000 persons.

The Airport in 2017 had a total of 216,489 passengers utilising 7,500 RPT services (inbound and outbound flights¹).

The Airport also has significant general aviation activity with a total of 7,941 movements² during 2017. The general aviation movements comprise all aircraft that may be operating charter, flight training, air freight and other private aviation, emergency services, military and recreational aircraft. The Airport is also used for the purposes of refuelling transiting aircraft.

The considerable land holding and investment particularly by emergency services in the Airport, the continued population and business growth in the Orana and Central West Regions, the growth of mining operations, and the potential for general growth of industry in Dubbo and the Orana Region has resulted in Dubbo Regional Council undertaking this review of the 2015-2036 Master Plan.

¹ Bureau of Infrastructure, Regional Development and Cities April 2019

² Avdata April 2019



2.0 PURPOSE

This Master Plan 2019 – 2040 is a strategic document which will guide future development decisions to achieve the sustainable growth and development of RPT and GA operations and facilities at the Airport and to ensure the Airport can capitalise on any future business and commercial development opportunities as the largest airport in the Central West, Orana and Western NSW.

Dubbo Regional Council, as the owner and operator of the Dubbo City Regional Airport, has pursued a program of planned growth and development over time with the first Master Plan prepared for the facility in 1997. Following completion of the first Master Plan in 1997, consultants, Airplan, undertook preparation of a Facilities Area Master Plan Review in 2002 as a review of the 1997 Master Plan and to ensure future projected passenger growth for the next 20 years was adequately provided for in respect of airport facilities.

Consultants Airbiz, undertook preparation of a further Facilities Area Master Plan Review in 2008. The purpose of this Review was to provide a snapshot of Airport growth and whether this was keeping track with the development regimes provided in the 2002 Facilities Area Master Plan Review. In addition, the purpose of the 2008 Review was to examine further opportunities for commercial development on the Airport lands given the size of the landholding and the design of the Airport facilities.

The 2008 Master Plan Review provided a snapshot in time of Airport operations and the general state of regional airline operations. The Review placed a strong emphasis on airlines commencing jet operations within a reasonable time period. However, this has not yet proved to be the case with the Dubbo RPT airlines and other airlines that currently provide regional services predominately operating turboprop aircraft.

This Master Plan 2019 – 2040 prepared by REHBEIN Airport Consulting on behalf of Council has undertaken a review of landside and airside development and their relationships with each other while taking into account trends and drivers associated with regional airport planning.

This Master Plan provides for the necessary strategic intent and guidance for the Airport to allow regular operations up to and including Code 4D aircraft which could allow for Large Air Tanker used for firefighting by the NSW Rural Fire Service (RFS).

The Master Plan also recognises Council's commitment to enhancing transportation links between key industrial areas and arterial roads – particularly the potential for larger scale freight opportunities. The Master Plan recognises the Boeing 777 (B777) as a possible future aircraft for freight operations and has considered the suitability of key facilities and a possible freight precinct to accommodate B777 operations and similar aircraft in the future.



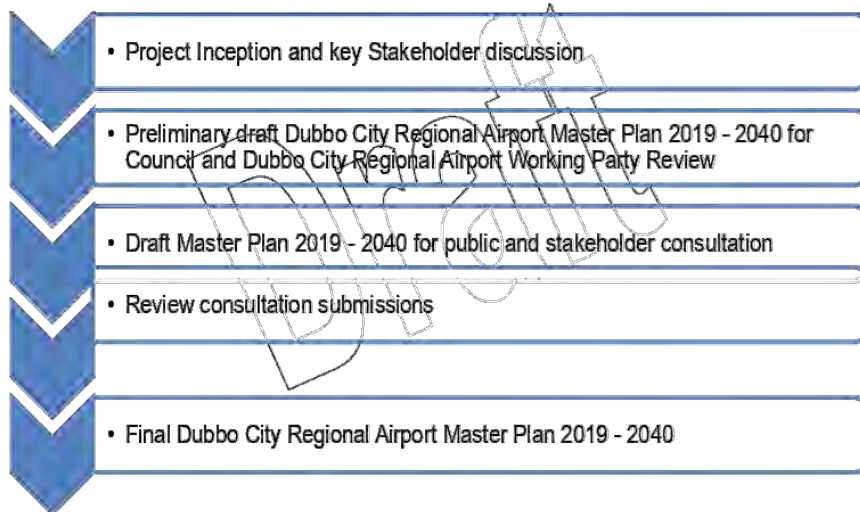
The Master Plan identifies key elements critical to positioning the progression and development of the Airport as a strategic service for the greater Western Region, supporting strategic planning for the facility to ensure Airport development keeps pace with the demands of the community.

2.1 MASTER PLANNING APPROACH

The approach adopted in the preparation of this Master Plan has included discussions with key stakeholders of the Airport.

Figure 2 shows the general approach that has been adopted in the review of this Master Plan.

Figure 1: Master Planning Approach



The specific objectives of the Dubbo City Regional Airport Master Plan 2019 – 2040 include the following:

- Undertake rational and strategic development of the Dubbo City Regional Airport which is critical to support the economy of the Central West and Orana Regions of NSW;
- Ensure the strategic significance of the Airport continues to be recognised by all levels of government;
- Ensure a sustainable and long term financial plan is in place to provide adequate funding for the maintenance and expansion of airside and landside infrastructure;
- Ensure that expansion of Airport infrastructure keeps pace with community needs and aviation trends;



- Enhancement of the existing runway and taxiway systems to remove weight limitations that currently exist and which are currently overcome by way of concessions for certain aircraft types.
- Ensure the Passenger Terminal is continually developed to accommodate the expected increase in passenger numbers and RPT movements;
- Recognition and development of commercial opportunities within the terminal precinct inherent and implied by growth projections;
- Increase take-off distance available on the main runway when required within existing airport boundaries to increase the range and payload of departing aircraft;
- To identify issues of energy supply and the influence of availability of energy in the development of the Airport;
- Develop land surplus to the needs of aviation in a manner designed to generate funding to service the massive cost of maintaining the facilities and at the same time relieve the community of that cost in part or in total; and
- Examine any future development opportunities for freight use and activity in conjunction and consultation with key industry types and groups; and
- Ensure the RPT Apron and associated infrastructure is continually developed in accordance with the future growth characteristic of the Airport.



3.0 DUBBO CITY REGIONAL AIRPORT

Dubbo City Regional Airport is situated in the Dubbo Regional Local Government Area and occupies 358 hectares of land designated as SP2 Infrastructure: Air Transport and Emergency Services Facilities. The airport is owned and operated by the Dubbo Regional Council and a brief history of the Airport is provided in **Section 3.4**.

3.1 LOCATION

Dubbo City Regional Airport is located five (5) kilometres north-west of the Dubbo Central Business District, on the Mitchell Highway. The Airport is accessed directly off Mitchell Highway via Arthur Butler Drive which runs along the western airport boundary. The Airport location is illustrated on **Figure A at Appendix A**.

The Airport Ring Road and the wider traffic movement system on airport are considered to provide adequate vehicular access to the airport based on the current traffic generation and overall activity.

3.2 EXISTING AIRSIDE FACILITIES

The existing airside facilities are shown on **Figure B at Appendix A**.

3.2.1 RUNWAYS

Dubbo City Regional Airport has two sealed runways. The main runway is oriented roughly north-east – south-west and is designated Runway 05/23, and the secondary runway is orientated roughly east – west and designated Runway 11/29.

Runway 05/23

Runway 05/23 is the main sealed runway at the Airport. Runway 05/23 has an overall length of 1,706 metres and an overall width of 45 metres. The Runway is situated within a designated 150 metre wide runway strip. Runway End Safety Areas must be provided at the end of a runway strip, to protect the aircraft in the event of undershooting or overrunning the runway.

The runway is equipped with low intensity runway lighting and a single-sided Precision Approach Path Indicator (PAPI) system at each end. The runway is classified by the Civil Aviation Safety Authority (CASA) as a Code 3 non-precision instrument runway.

The heaviest RPT aircraft currently using the runway is the Bombardier Q400 operated by Qantas Link which has a maximum take-off weight of 29 tonnes and is classified as a Code C aircraft. The Airport also hosts periodic visits from RAAF aircraft including C130 Hercules and Challenger CL 604 jets.

The length of Runway 05/23 adequately services the current range of aircraft movements.



The Aircraft Classification Number/Pavement Classification Number (ACN/PCN) system of classification of pavement load carrying capacity is a procedure whereby the loading characteristics of an aircraft are compared with the supporting capacity of a pavement.

The pavement of Runway 05/23 is rated in the Airservices Australia publication En-Route Supplement Australia (ERSA) FAC YSDU (23 May 2019) as having an overall Pavement Concession Number of 19 / F / C / 1100 (160 psi) / T. The runway pavement is flexible on a subgrade strength category of low (C). The pavement is suitable for a maximum aircraft tyre pressure of 1,100 kPa (160 psi).

The Aircraft Classification Number of typical RPT aircraft operating into the Airport are provided in Table 3 below.

Table 1: Common RPT Aircraft Classification Number (ACN)

Aircraft	Maximum Take-Off Weight (tonnes)	ACN
Bombardier Dash 8 Q200	16.5	8
Bombardier dash 8 Q300	18.6	9
Bombardier Dash 8 Q400	29.2	19
SAAB 340B	13.1	7
Embraer 135	20.1	12

Runway 11/29

Runway 11/29 (also referred to as the cross runway) is the secondary sealed runway at the Airport. Runway 11/29 has an overall length of 1,067 metres and an overall width of 18 metres. The Runway is situated inside a protected 90 metre wide runway strip. Runway 11/29 is classified as a Code 2B non-precision instrument runway.

The cross runway is predominately utilised for the purposes of General Aviation flight training and is used by the NSW Rural Fire Service during water bombing activities by Air Tractor and other associated aircraft. The overall weight limitation is eight (8) tonnes which limits its use by RPT and other larger aircraft.

3.2.2 TAXIWAYS

Taxiway Alpha

Taxiway Alpha (A) is a 23 metre wide taxiway that provides access from the RPT apron to Runway 05/23. Taxiway Alpha is suitable for use up to and including Code 3C aircraft. The taxiway also meets the minimum width for Code D aeroplanes, however is not provided with the shoulders which are required for Code D use.

Taxiway Alpha is suitable for night time operations due to the inclusion of taxiway edge lighting.



Taxiway Bravo

Taxiway Bravo (B) is a 15 metre wide, spray-sealed taxiway providing access between Runway 05/23 and the RPT apron. Taxiway Bravo is only suitable for use by up to Code 3C turboprop aircraft with a wheel base less than 18 metres. Taxiway Bravo also has taxiway edge lighting and is suitable for night time operations.

Taxiways Charlie, Delta and Echo

Taxiways Charlie is 10.5 metres wide and mostly suitable for Code B aircraft access. However, Code B access to the GA Apron via Taxiway Charlie is constrained when aircraft are parked in front of the Aimed, Airbush and/or Beal Aircraft Maintenance hangars.

Taxiways Delta and Echo are 10.5 metres wide and suitable for use by Code B aircraft with Maximum Take-off Weight (MTOW) up to 8,000 kg.

Taxiway Delta (D) runs parallel to Runway 05/23 from Taxiway Bravo (B) to the Runway 23 threshold.

Taxiway Echo (E) provides Code B access to the GA apron from Taxiway D.

Taxiways Hotel, Juliet and Kilo

Taxiways Hotel, Juliet and Kilo are not yet designated in AIP-ERSA, but have recently been constructed.

Taxiway Hotel (H) is 7.5 metres wide and provides access for Code A aircraft to the smaller private lease lots from Taxiway Delta.

Taxiway Juliet (J) is 10.5 metres wide and provides access for Code B aircraft to the commercial lease lots along the southern side of Runway 11/29 from Taxiway Delta.

Taxiway Kilo (K) is 10.5 metres wide and provides access for Code B aircraft to Runway 11/29 from the New GA Area commercial lease lots connecting to Taxiway Juliet.

3.2.3 APRONS

RPT Apron

The RPT Apron is situated adjacent to the passenger terminal and currently includes three Code C aircraft parking bays for RPT traffic in front of the terminal building. The RPT apron accommodates one Dash8Q400 and two SAAB340B simultaneously.

Two stand-off bays for smaller aircraft are provided at the southern end of the RPT Apron.

GA Apron

There is a limited number of tie down points for light aircraft to park on the grass area north-east of the RPT apron. Light aircraft parking is also provided on the western end of the GA apron. Code B access to the fuel bowser and to the Beal Aircraft Maintenance and Airbush hangars is available



via Taxiway E. However, access for Code B aeroplanes in to the GA Area via Taxiway C is restricted due to aircraft parking in front of the Aimed, Airbush and Beale hangars.

RFDS Apron

The Royal Flying Doctor Service (RFDS) has a dedicated apron within the RFDS lease area situated adjacent to Taxiway Echo. Recently, the RFDS has constructed four (4) aircraft shelters for the purposes of passenger transfer and refuelling (CASA approval pending).

3.2.4 LANDING AND NAVIGATION AIDS

VOR/DME

A VHF Omni-Directional Radio Range (VOR) and Distance Measuring Equipment (DME) south-east of the runways have recently been decommissioned by Airservices Australia.

NDB

Off airport is a Non-Directional Beacon (NDB) approximately one (1) kilometre west of Runway 05 threshold adjacent to the Mitchell Highway.

Visual Aids

A number of visual aids are provided at the Airport as listed below:

- Pilot activated low-intensity lighting on Runway 05/23;
- Precision Approach Path Indicator (PAPI) system on the left-hand side of Runway 05 and Runway 23;
- Two Illuminated Wind Director Indicators (IWDI), one located between Taxiways A and B, the other to the left of Runway 23 threshold;
- One non-illuminated wind indicator located to the left of the Runway 11 threshold;
- Edge lighting on Taxiways Alpha and Bravo;
- Pavement markings on both runways, taxiways and aprons; and
- An Automatic Weather Station (AWS) and Automated Weather Information Service (AWIS).

3.2.5 FUEL SUPPLIERS

Air BP is situated in a dedicated compound adjacent to the RFDS facility. Direct access is available to the airside apron. Landside access is available from Judy Jakins Drive (off Cooreena Road).

Air BP has one above-ground 55,000 litre tank supplying Avtur. There is further land available in this area to facilitate the construction of an additional tank.

VIVA comprises a split operation with the provision of a main storage facility fronting the western end of the GA apron and an additional storage tank and self-serve bowser located in the airside secure area at the eastern end of the GA apron. VIVA also has a dedicated office area off Judy Jakins Drive.



3.3 EXISTING LAYOUT AND USERS

Dubbo City Regional Airport consists of a passenger terminal area, general aviation (GA) area, emergency services area and privately leased lots refer **Figure C** at **Appendix A**.

Access to the passenger terminal area is via Arthur Butler Drive and the Airport Ring Road. Access to the GA area is via Cooreena Road as illustrated on **Figure B** at **Appendix A**.

3.3.1 TERMINAL AREA

The terminal area includes the passenger terminal building, car parking area, undercover security car parking, and a hire car area as illustrated on **Figure C** at **Appendix A**.

Passenger Terminal

The passenger terminal building incorporates a number of facilities, including the following:

- Check-in area providing check-in facilities for Fly Corporate, Qantas Link, Regional Express and Fly Pelican;
- Passenger screening security point;
- Secured airside departure lounge area incorporating a cafe and associated passenger facilities;
- Arrivals hall including one baggage carousel; and
- Car rentals desk area which provides facilities for five (5) car rental companies. Additionally one (1) space is being used by tourism operator Warrior War Birds.

The check-in area and security screening point operate efficiently for the range of services and passengers currently utilising the airport. The check-in area includes six (6) check-in desks, all of which are currently used by the airlines. There is space for the installation of one (1) additional desk.

Expansion of the departure lounge area was undertaken by Council in 2013 in conjunction with the implementation of passenger screening. Passenger screening facilities were introduced at the Airport in March 2013 as a result of Qantas Link commencing operation of the Dash 8 (Q400 series) aircraft. All passengers are screened, whether travelling on Qantas Link Q400 services, other Qantas Link services and /or other airlines.

The existing baggage claim unit is shared by all airlines that currently operate to Dubbo. A single unit is currently adequate for the operational requirements of the airlines and their associated schedules.

General Car Parking

The Airport provides a large vehicle parking area to the west of the passenger terminal. This parking area provides approximately 325 vehicle parking spaces. There is no parking charge for this public parking space.



Vehicle access to the parking area is directly available from Arthur Butler Drive via the Airport Ring Road. Pedestrian access to the parking area is a short walk from both the departures and arrivals areas through a pedestrian crossing across Arthur Butler Drive/Airport Ring Road.

Secure Vehicle Parking

A secure and undercover vehicle parking area is located to the north of the passenger terminal. This area has traditionally been well patronised and is utilised by both business and leisure travellers. Payment systems are situated in the arrivals area of the passenger terminal and the egress point from the parking area.

Vehicular access to the secure vehicle parking area is directly available from Arthur Butler Drive/Airport Ring Road. Pedestrian access is through a short connection to the arrivals hall area.

The technology associated with the parking payment system has been raised by stakeholders as being temperamental. Council has indicated that it will seek a further review of the current facilities and new technologies for vehicle parking.

Hire Cars

The airport has a number of hire car companies currently providing services from the airport. Thrifty, Budget, Avis and Hertz currently lease terminal space in the form of a dedicated desk area in the arrivals area and a set number of vehicle parking spaces.

Council, in June 2019, opened a new hire car parking area to the north-east of the passenger terminal. The parking area can accommodate 118 vehicles. This has resulted in hire cars being removed from the main parking areas, subsequently freeing up public spaces.

Airservices Australia

Airservices Australia currently leases an area of land south of the passenger terminal which contains the decommissioned air traffic control tower and an associated compound. Council advises the air traffic control tower is proposed to be removed in the future due to the nature of the uncontrolled airspace around Dubbo and the presence of asbestos in the building. A date for removal of the structure has not yet been confirmed however, it is anticipated that it will be removed beyond 2020. The remaining Airservices building and associated equipment is planned to be decommissioned however, if and when the facility will be removed is unknown.

3.3.2 EMERGENCY SERVICES AREA

Royal Flying Doctor Service (RFDS)

The Royal Flying Doctor Service (RFDS) operates six (6) Beechcraft Super King Air aircraft as air ambulances from its facility within the GA area. The RFDS infrastructure includes treatment rooms, associated offices, aircraft hangar and engineering facilities suitable for the storage of two (2) King Air KA350 aircraft and an associated visitor centre. The RFDS facility also includes an apron area suitable for the parking of two (2) King Air KA350 aircraft. It is understood that Western Area Health also sublets part of the RFDS facility for Administration offices.



The RFDS is expanding and building new infrastructure on site. The additions include the RFDS Visitor Experience Centre which will also attract school visits, tour groups and will be an important Airport asset. This facility allows four aircraft under cover, bays for passenger transfer and fuelling aircraft, administration centre, pilots' rest area, aeromedical nurse and a 'nurse-on-call' facility. Some 40-50 staff members are employed on site. It is also understood that the RFDS is interested in additional land for possible future extension opportunities or for the location of complementary activities.

NSW Rural Fire Service

The NSW Rural Fire Service (RFS) District Headquarters are located on the north side of the GA area west of the RFDS facility. The facility was constructed in this area in 2008 and currently consists of an office building and associated sheds which are used for the storage of vehicles and other equipment for the servicing of water bombing aircraft.

The facility was constructed in this location due to the synergies that exist between the RFS and the water bombing services provided during fire events across the Central West.

The RFS have recently expanded to include a purpose built training facility adjacent the southwest side of the GA apron. Council in 2017 partnered with the RFS to develop a 'State of the Art' Training Academy at the Airport. The facility has been recently completed and opened by the NSW State Government. The facility will provide facilities for students to stay at the facility to learn and build advanced fire-fighting skills and techniques.

Police Training Facility

A NSW police training facility is proposed to be located west of the GA Apron and is to be built for up to 40 police officers at a time for training and simulation activities.

SES/VRA Headquarters

The State Emergency Services (SES) and NSW Volunteer Rescue Association (VRA) facility provide emergency services facilities for the two organisations in the Dubbo region.

3.3.3 GENERAL AVIATION AREA

The General Aviation (GA) area consists of old and new sections.

The old GA area includes a total of 15 hangars utilised for a range of GA activities. This older GA area is now surrounded by landside operations including NSW RFS, SES/VRA, Police training and RFS training facilities, and the operations of the RFDS

Airmed Aeromedical

Airmed Aeromedical provides patient transport services by air and ground with multiple locations around NSW and their head office based at Bankstown Airport in Sydney. The Dubbo location stations two (2) fixed wing aero-medical aircraft, two (2) patient transport vehicles, two (2) full time pilots, two (2) part-time pilots, a full time senior nurse and three (3) part time nurses for non-urgent



patient transfer between Dubbo and Sydney. The business also employs three (3) administration staff and three (3) maintenance staff.

A Piper Chieftain aircraft is periodically parked the northern end of the GA apron. Loading of the aircraft is typically undertaken at the southern end of the RPT apron, adjacent to the main security gate for ambulance vehicle access. However, it is understood that the company that owns AirMed Aeromedical has recently purchased AirLink and it is unsure as to their final operating activities for the AirLink hangar and AirMed Aeromedical.

Beal Aircraft Maintenance

Beal Aircraft Maintenance is an aircraft maintenance organisation servicing remote NSW. Typically, they maintain a wide variety of GA aircraft ranging from light fixed wing to air tractor agricultural spraying/water bombing aircraft with up to 10 aircraft at any one time on airport for servicing. Beal currently employs 10 people, and an additional four to five people from Airlink also use the facility.

Beal Aircraft Maintenance currently occupies three (3) hangars on the south side of the GA apron and is in need of aircraft parking spaces for customers. It is understood that Beal Aircraft maintenance also sublets part of its facilities to Airlink engineers.

AirLink Pty Ltd

Airlink Pty Ltd, located next to the secure undercover car park, primarily provide charter services with a fleet, which generally consisted of the following:

- One (1) Beechcraft 1900D Aircraft;
- One (1) x Cessna 310R; and
- Two (2) x Piper PA-31 Piper Navajo Chieftain.

Airlink also has two (2) part-time pilots). Airlink operates in partnership with AirMed which is dedicated to patient transfer.

Other Activities

Private operators with aircraft based at the airport total approximately 15 fixed wing aircraft. The Airport is also home to Thomas Aviation who provide flight training and charter services.

In addition to operations based at Dubbo, a number of GA and military operations visit the airport periodically. The airport hosts intermittent visits from Defence aircraft, fire bombing and other aircraft such as the Beechcraft King Air, Pilatus PC9, and Challenger, Fokker 70 and Gulfstream 650 jets.

New GA Area

Additional lots have recently been made available to the north and east of the traditional GA area. Four (4) lots for Code A aeroplanes to the east of the RFDS facility are provided. One (1) of these now houses the aero club facilities and it is understood the other three (3) are leased.



Seven (7) lots for Code B aeroplanes are provided north of the RFDS with access to Runway 11/29 via Taxiway Kilo and access to Taxiway Delta via Taxiway Juliet parallel to Runway 11/29. The RFS also has water tanks located at the north-west end of this area.

There is no landside access for the purposes of refuelling aircraft on these private lots. Fuel operators have stated that their trucks do not currently have vehicle registration to drive on public roads.

3.3.4 ITINERANT USERS

There are a number of itinerant users including fixed wing aircraft and helicopters. Helicopters include military aircraft as well as air ambulance. Currently itinerant aircraft park in the aircraft tie-down parking area.

3.3.5 ITINERANT AIRCRAFT PARKING

A grass tie down area is provided east of the RPT apron and additional central parking is available on the GA apron area. These areas are operating at capacity.

3.4 HISTORY OF THE AIRPORT

As early as 1929, Australian Airways visited Dubbo looking to include the town on their schedule. Land suggested for a landing strip was outside the municipality. At this time, aircraft had already been landing in George Smith's dairy paddock.

The first flights into Dubbo were in the early 1930s, that consisted of aviation exhibition flights by people such as Charles Kingsford Smith. At this time, the landing strip was in Wheelers Lane in the vicinity of the now Orana Mall with the take-off north towards Myall Street.

Mr Tom Perry, who had been instrumental in establishing a landing strip at Narromine, purchased land close to the present Dubbo Airport and commenced 'working bees' to clear the land of trees, stumps and rocks. The official opening took place on 29 April 1935 when a Western Air Service Plane (WASP) flew in from Trangie. The ribbon to commemorate the opening was cut by Mrs Duffy, the Lady Mayoress at the time. The plane departed with a full complement of passengers. WASP flew from Nyngan-Narromine-Dubbo to Sydney twice per week.

With Australia's involvement in World War II came the RAAF Stores Depot. However, the one thing Dubbo did not have was a suitable aerodrome for freight and stores in and out of the Depot. The dirt airstrip was suitable only for small aircraft. The Commonwealth Construction Corps were brought in to build an all-weather Military Airport on land resumed from the Fitzgerald's property 'Blizzard Field'.

The Local Member of the Legislative Council (MLC) of the day appealed to the district farmers to take their tractors, trucks and anything suitable to help speed up completion of the work. Farmers responded, as did local people, who would work all day and then spend time working on the airfield construction. Stone for the foundation of the strip was carted from a property on the south



Burrabadine Road and gravel was carted from a property at Brocklehurst. The work was completed in 1942.

Captain C A Butler of Butler's Air Transport landed on the RAAF strip on a trial trip prior to inaugurating a regular service to Sydney-Dubbo-Bourke-Charleville and other routes. The service commenced in May 1946 following installation of radio equipment from No. 6 RAAF Stores Depot.

In June 1946, the Department of Civil Aviation took over the Dubbo Airport from the Military Services and improved the bitumen runways and ancillary buildings. An air radio station was also installed at this time.

On 1 July 1970, the former Dubbo City Council accepted the transfer of ownership of the Dubbo Airport from the Department of Civil Aviation under the Airport Local Ownership Plan (ALOP). Under this arrangement, Council owned, operated and maintained the aerodrome land as a licensed aerodrome open for public use. A further change was made following the decision of Council in September 1988 to accept the ownership and maintenance of the runway lighting. Whilst Council owns the land, any alteration to the use of the land and buildings without the approval of the Department of Transport at the time was not permitted.

In 1991, the Federal Government advised of its intention to divest itself fully of airport ownership, and on 30 June 1992, a Deed between the Commonwealth and the former Dubbo City Council was enacted, giving full ownership of the Airport to Council. For the City of Dubbo, this meant the following:

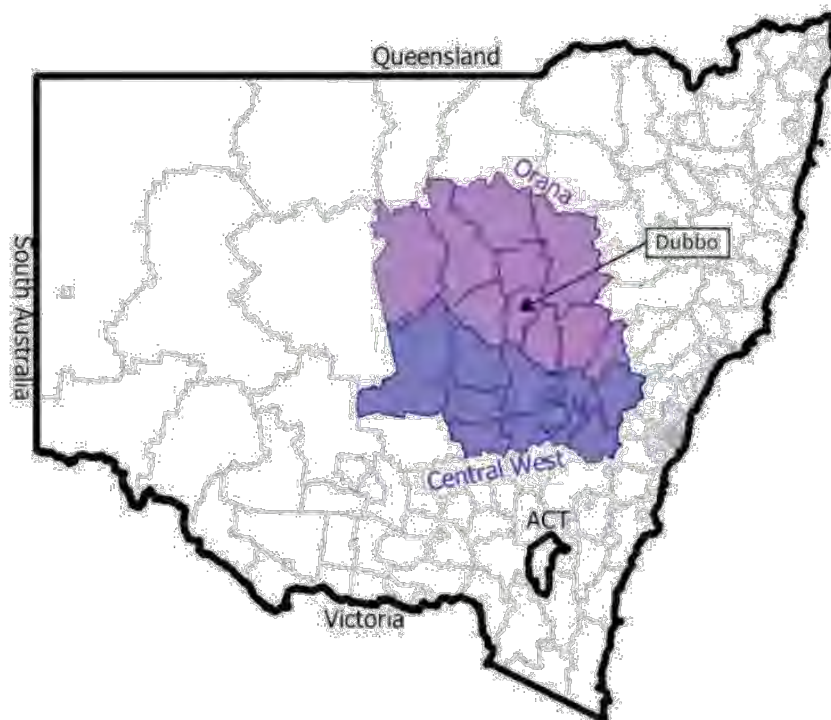
- Council to accept full responsibility for the Airport, including full funding responsibility;
- The Commonwealth to stop collecting landing charges and the Council to develop its own overall charging regime to cover operational costs of the aerodrome consistent with the standard of service demanded by the local community;
- The Commonwealth to 'write-off' any past investment in the aerodrome;
- The Government to consider funding works necessary to meet aviation industry needs by providing a once-only non-attributable grant. In this regard, the Government provided a grant of \$200,000 for specified capital works; and
- Responsibilities for all visual aids, which are site-specific, to be transferred to the Council.

4.0 PLANNING CONTEXT

4.1 REGIONAL CONTEXT

The Dubbo Regional Local Government Area (LGA) is located in the Orana Region of NSW and is the gateway to western NSW. Dubbo is one of NSW's growth centres, a hub with an increasing population as people migrate away from Sydney seeking a tree-change. The City is a provider of health, education, cultural services, business and retail services to surrounding areas.

Figure 2: Local Government Areas within the Central West and Orana Region



Dubbo has developed over time as a major service centre and is situated at the meeting point of the Newell, Mitchell and Golden highways. The City is a five-hour drive from Sydney, four hours from Newcastle and Canberra and a 10-hour drive from both Melbourne and Brisbane, being the mid-way point between the two cities.

Dubbo is also a key hub for multiple transport modes – air carriers operating in excess of 166 flights per week in March 2019 to Brisbane, Sydney Melbourne and Newcastle as well as daily rail connections to Sydney.



Approximately 80% of the Australian population can be reached within a 10-hour transport trip of Dubbo – be it by road, by rail or by air. Dubbo's strategic geographic position within NSW and its regional catchment area (Orana), as well as the wider catchment area of western and north-western NSW.

4.1.1 POPULATION

The Dubbo Regional LGA has a population of more than 52,000 people with 77% of those (approximately 42,000 people) living in Dubbo City. The remaining population is located in Wellington (8,000 people) and across its regional villages.

As a regional hub, Dubbo services a broader population of 120,000 people within the Orana region and approximately 200,000 people across Central and Western NSW.

Dubbo's economic prominence is reflected in its ongoing population growth and stable economy. Table 2 below indicates that between 2006 and 2016 Dubbo City experienced an overall population increase of 8.88 per cent compared to 3.34 per cent for the Orana region and 12.45 per cent for NSW. The annual growth rate during this period sees Dubbo City with an average annual rate of 1.78 per cent versus 2.49 per cent for NSW.

Table 2: Comparative Population Statistics for Dubbo City

	Year	Former Dubbo LGA	Dubbo Regional LGA	Orana Region	NSW
Population	2006	37,845	45,967	114,626	6,549,174
	2011	38,808	47,302	115,652	6,917,656
	2016	41,532	50,075	118,590	7,480,230
Pop. Increase	2006 - 2011	963	1,335	1,026	368,482
	2011 - 2016	2,724	2,773	2,938	562,574
	2006 - 2016	3,687	4,108	3,964	931,056
Pop. Increase (%)	2006 - 2011	2.48	2.82	0.89	5.33
	2011 - 2016	6.56	5.54	2.48	7.52
	2006 - 2016	8.88	8.20	3.34	12.45
Annual Growth Rate (%)	2006 - 2011	0.50	0.56	0.18	1.07
	2011 - 2016	1.31	1.11	0.50	1.50
	2006 - 2016	1.78	1.64	0.67	2.49

Source: Dubbo Regional Council

In line with available projections, Dubbo City's annual population growth rate is projected to continue to trend strongly over the coming years as it attracts people from smaller towns within the Orana region (for education and for employment in construction, manufacturing and in health services), but also from Sydney as families move for lifestyle purposes and prosperity based on the strength of the Dubbo economy. Dubbo City's population is expected to exceed 46,000 by 2036 while Dubbo Regional LGA's population is projected to exceed 60,000 people by 2036.



4.1.2 INDUSTRY

Dubbo and Orana both have established roles within the regional economy and have clear sectors of propulsion, or engine industries, based on their respective natural and institutional assets.

The Orana region specialises in mining and agriculture – production of raw materials which are transported for manufacturing and processing, either in Dubbo or to markets out of the region.

Dubbo, is a service centre and specialises in construction, manufacturing and services such as the provision of health care and aged care for the Orana region and wider NSW, which accounts for 16.5% of employment in Dubbo – both the largest share of jobs and the greatest contributor in value add to the Dubbo economy.

However Dubbo's construction and manufacturing sectors are strong performers as they have ready access to raw materials, livestock and other agricultural commodities as well as skilled labour from across the Orana region.

Table 3 below illustrates Dubbo is a strong contributor to the Orana Region's economy and both Dubbo and Orana boast low unemployment rates against the NSW state average.

Table 3: Comparison GRP and Employment/Unemployment Statistics

	Dubbo Regional LGA	Orana Region	NSW
Gross Regional/State Product	\$3.43 Billion	\$8.08 Billion	\$576.72 Billion
Output	\$6.6 Billion	\$16 Billion	\$1.2 Trillion
Total Employment (People/Jobs)	22,957	49,671	3,358,119
Unemployment Rate	2.5%	2.2%	4.7%

Source: REMPLAN - Economic Modelling and Planning System

Total number of jobs in the Dubbo region is approximately 23,000 (2017), with approximately 1,600 of these jobs in the tourism sector. The Dubbo region currently has an unemployment rate of 2.7%, which is almost half that of the NSW unemployment rate of 5.3% (March 2018).

4.1.3 TOURISM

Dubbo is home to the Taronga Western Plains Zoo (TWPZ), which attracted 260,000 visitors in 2017-18. Other regional attractions include: the Wellington Caves, a 40-minute trip from Dubbo, which will soon boast a new \$4.2M visitor experience centre; the historic Dundullimal Homestead, believed to be the oldest sophisticated slab house in Australia; the Dubbo Observatory offering both day and night stargazing; the Old Dubbo Gaol; and the Royal Flying Doctor Service visitor centre.



4.2 LOCAL CONTEXT

4.2.1 DUBBO COMMUNITY STRATEGIC PLAN

The Dubbo Community Strategic Plan (CSP) is the highest level of strategy that will guide and influence the actions and initiatives of Dubbo Regional Council, the community, all tiers of government and community stakeholders through to 2040. The Plan includes five principal themes and a number of strategies and outcomes.

The community, in development of the CSP, expressed a need for the *Dubbo City Regional Airport as a freight hub for our region to Asia and beyond* and to ... *continue to provide services to its current destinations* as contained within Theme 2: Infrastructure and Theme 3: Economy respectively. The requirement of the community is contained in Principal Theme 2.4 that *the community and business have convenient air access to a variety of destinations*.

4.2.2 DUBBO URBAN AREAS DEVELOPMENT STRATEGY 1996

The *Dubbo Urban Areas Development Strategy* was first adopted by Council in 1996 and is made up of the following strategies:

- Residential Areas Strategy;
- Employment Lands Strategy
- Recreational Areas Strategy; and
- Future Directions and Structure Plan (Part 1 and 2).

The Strategy forms the basis for the land use zonings and planning controls provided in the Dubbo Local Environmental Plan 2011.

Residential Areas Development Strategy

At the core of the *Residential Areas Development Strategy* is the significant emphasis of further residential development being undertaken in West Dubbo which will ensure the Dubbo Central Business District is situated at the centre of the Dubbo urban area. The Strategy also provides for further in-fill development to be undertaken in the south-east of the City.

The Strategy was reviewed by Council in 2007 as part of the review of the *Dubbo Urban Areas Development Strategy* with the preparation of the *Dubbo Urban Areas Development Strategy Discussion Paper*. The Strategy was again reviewed in 2009 in the process of preparation of the Dubbo Local Environmental Plan (LEP) 2011.

The airport is located within a reasonable proximity to the north-west Residential Urban Release Area as contained in the Dubbo LEP 2011. This area of the City will form one of the major residential development fronts over the next 30 years. This area of the City is recognised as having the potential to accommodate approximately 2,600 residential allotments or up to 10,000 persons, over time.



Employment Lands Strategy

The Employment Lands Strategy is the newest component of the Urban Areas Development Strategy that was adopted by Council in March 2019. The Strategy aims to ensure that the City of Dubbo has an appropriate level of commercial, industrial, institutional and tourist zoned land in the future which is situated in locations that can best meet the long-term requirements of Dubbo and the Region.

The Dubbo City Regional Airport is included in the Hierarchy as a Specialised Activity Centre. The Strategy identifies two Specialised Precincts of which the Airport Precinct is one that provides its own unique benefit to Dubbo and the surrounding region. The Airport is located within Industrial Candidate Area 2 – Airport Precinct which was identified as a long term industrial expansion area given its location and access to the airport and highway. Its identified role is to allow development and industries related to the airport including air freight and transport, road transport as well as compatible light industrial and agricultural services.

4.2.3 DUBBO LOCAL ENVIRONMENTAL PLAN 2011 (LEP)

The Dubbo Local Environmental Plan 2011 (LEP) provides the overall land use zoning regime for the Dubbo Local Government Area, guiding the permissibility of development and specific provisions in relation to heritage conservation and environmental management of lands.

The LEP provides a zoning of SP2 Infrastructure over the airport lands. The SP2 Infrastructure zone provides the following objectives for development:

- To provide for infrastructure and related uses; and
- To prevent development that is not compatible with or that may detract from the provision of infrastructure.

The SP2 zone provides the following in relation to the permissibility of development:

The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose.

Any development included in the Master Plan which does not have a clear and identifiable relationship with airport operations may require a rezoning or planning proposal process to be undertaken. This process can be further considered prior to the provision of infrastructure and associated development as included in the Master Plan.

4.2.4 DUBBO DEVELOPMENT CONTROL PLAN 2013

The Dubbo Development Control Plan 2013 (DCP) was prepared by the former Dubbo City Council in 2013 to further assist and explain the requirements of the Dubbo Local Environmental Plan 2011 and to include specific provisions for development proposals. The DCP commenced operation on 6 May 2013.



The DCP Section 3.6 *Dubbo City Regional Airport Controls* includes the airport operations overview, the Obstacle Limitation Surface (OLS) for the airport and the Australian Noise Exposure Forecast (ANEF) mapping. Both the OLS and ANEF requirements were included in the DCP to ensure proponents of development proposals surrounding the Airport were required to take into account the impacts of the airport on any development activities.

4.3 LAND USE

The airport is located approximately five (5) kilometres north-west of the Dubbo Central Business District and is situated on the Mitchell Highway. The general land use activities in the vicinity of the airport are shown in **Figure D at Appendix A**.

Industrial land use activities predominately adjoin the airport to the south and to the west. This includes light industrial and warehouse activities to the south and transport and logistics activities including warehousing to the west. The airport also immediately adjoins approximately 96 hectares of land zoned IN3 Heavy Industrial under the provisions of the Dubbo Local Environmental Plan to the west. At the present time, these lands have not yet been developed and currently contain single dwelling houses. Council recently purchased two (2) lots at the western end of the Runway 11/29 and assumed within the airport boundary. The land zoned for industrial development south of the airport is contained in the Dubbo Industrial Areas Development Strategy as an Industrial Candidate Area as being suitable for transport, warehousing and associated logistics.

The airport adjoins land zoned RU2 Rural Landscape to the north and north-east. These lands predominately each contain a dwelling house and are utilised for limited rural production purposes. It should be noted that these lands have minimal opportunities for further development of residential housing based on the large minimum allotment size for subdivision and the permissible development types afforded to the land under the provisions of the Dubbo Local Environmental Plan 2011.

Land zoned low density residential development to the east consists of 360 hectares and forms the north-west Residential Urban Release Area.

4.3.1 BIODIVERSITY

The Airport land holding is not known to have any threatened flora or fauna or Endangered Ecological Communities (EEC). However, two areas of remnant vegetation are immediately to the north-east and south-east of the subject site.

The LEP includes biodiversity mapping for the overall Dubbo Local Government Area (LGA). Land with biodiversity values is mapped as either having medium or high biodiversity.

Figure 5 shows the extent of biodiversity mapping in the vicinity of the airport lands. Both vegetation areas have the potential to provide habitat for kangaroos and bird life which can impact airport operations. It is considered that the area of vegetation to the south-east is unlikely to be impacted by current and future operations. However, the area of vegetation to the north-east may



be impacted. Any future development on the airport lands, where native vegetation is proposed to be removed, will require environmental assessment to be undertaken. In addition, further augmentation of Airport facilities may require assessment under the NSW state government Biodiversity Offset Methodology.

Figure 3: Airport Surrounds Biodiversity Mapping



4.3.2 GROUNDWATER

The airport land holding has a relatively high groundwater table when considered in the context of other lands in Dubbo. This high water table has impacted infrastructure works at the airport over time.

The Dubbo LEP 2011 includes groundwater vulnerability mapping for the overall Dubbo LGA. Land is either mapped as having high or medium groundwater vulnerability. The airport land is entirely within the high groundwater vulnerability mapping which means it will require detailed geotechnical assessment and the appropriate design of infrastructure including the construction of aprons, taxiways, extension of (the main) Runway 05/23 and any building works.

4.3.3 STORMWATER

Stormwater drainage for the developed component of the airport lands is carried by an open stormwater drain that traverses the site from south to north as shown below in **Figure 4**.

Additional development activities proposed in the Master Plan have required stormwater infrastructure works to accommodate the uses. Council at the time of writing adjusted the alignment of the open stormwater channel to the west closer to Cooreena Road and underground connections are provided to accommodate road and development infrastructure.

Council has also purchased neighbouring properties on the western boundary and north of the GA area for the purposes of providing additional stormwater infrastructure. Future infrastructure will need to ensure that any detention or other catchment ponds are only temporary to serve the immediate purpose of managing stormwater flows. Ponds should not hold water long term in order to avoid attracting wildlife hazards as discussed in Section 9.2.3

Figure 4: Open Stormwater Channel



4.4 AVATION REGULATORY CONTEXT

Consideration of the aviation regulatory context is integral to ensure a safe and secure environment for aviation operation. Dubbo City Regional Airport is a certified aerodrome by the Civil Aviation Safety Authority (CASA).

The *Civil Aviation Safety Regulations Part 139* (CASR Part 139) requires an operator of an aerodrome used for Regular Passenger Transport operations to have an Aerodrome Certificate. Accordingly, Dubbo City Regional Airport became a Certified Aerodrome on 5 April 2006 (Certification number 1-6EDH).



CASR Part 139 empowers the Authority to specify standards and procedures relating to airports used in air transport operations. The standards and procedures are set out in the *CASA Manual of Standards Part 139 – Aerodromes*.

The *Aviation Transport Security Act 2004* was enacted on 10 March 2005 which legislated that all RPT airports, including Dubbo City Regional Airport, be classified as security controlled airports. As a consequence of the introduction of the Qantas Link Bombardier Dash 8 Q400 aircraft, the Dubbo City Regional Airport is now classified as a Category 3 airport, for security purposes, meaning that passenger and baggage screening is in operation.

This legislation requires Council to maintain a Transport Security Program (TSP) which sets out the manner in which Council will protect the Airport from unlawful security intrusions.

Draft



5.0 STAKEHOLDER CONSULTATION

The Dubbo City Regional Airport Master Plan 2019 – 2040 has been prepared in consultation with Council and stakeholders. Consultation with stakeholders was held in two separate formats. One on-site session was held at the airport terminal building as well as telephone discussions with individuals.

5.1 ON-SITE MEETING

Stakeholders were invited to an early morning session at Dubbo Airport on 21 March 2019 to discuss what worked well at the airport and areas that may need attention. Attendees included Beal Aircraft Maintenance, NTL, VIVA, council staff including the Airport Manager and Aerodrome Reporting Officers.

Throughout the day REHBEIN Airport Consulting met separately with the Director of Economic Development and Business, the Airport Manager, the Director Infrastructure and Operations, Council Engineering staff and the Manager Strategic Planning Services, and the Manager Capital Projects.

REHBEIN Airport Consulting conducted a site inspection and met with the RFDS at their premises.

5.2 TELEPHONE DISCUSSIONS

Telephone contact was made to various airlines, car hire companies and general Airport users as provided by Council. All phone calls were made on 15 April 2019. Where phone contact was not provided a brief email advised the stakeholder of the review taking place and welcomed their feedback.

5.3 EMERGING THEMES

Generally, comments focussed around the positive growth of the Airport specifically in RPT services and fire activity. The diversity in businesses and growth in emergency services at the Airport is putting pressure on the Airport and its facilities. Stakeholders expressed the importance of evaluating the layout to ensure areas are interconnected and can operate in a safe manner.

The key themes emerging from the consultation are listed below.

5.3.1 THEME 1: TERMINAL AREA

RPT Apron

Stakeholders expressed that the RPT apron was often congested particularly when an unserviceable aircraft (which happens occasionally) parks on the apron. When this happens the RPT apron is fully utilised and aircraft need to be moved out during peak periods.



Passenger Terminal Building

Extension to the terminal building was raised with stakeholders suggesting it will need to expand. Comment was made on the terminal screening location that it is difficult to access the café and on-airport employees are not using the facility.

Visitor attraction to the airport was considered important and could take the form of a viewing platform, café or museum that provides a general meeting place which does not require visitors to pass through passenger screening. Stakeholders feel such improvements would support and attract business at the airport. Council undertakes a bi-annual survey of customers and continually reviews and considers feedback provided.

Car Parking

Car parking was indicated as operating at capacity. Council has reported that the car rental companies have grown by 60 to 70 percent in past year alone.

On site car parking was said to need to double in spaces either by extending laterally or providing multi storey facilities. Interest was expressed for a car wash and possibly a petrol service station to support the car rental services.

Aerodrome Reporting Officer (ARO) Base

Stakeholders expressed the need to provide the AROs a dedicated base for plant, equipment and personnel. Currently the AROs use the existing Airservices building.

Taxiway D

The potential need for upgrading the parallel taxiway to Runway 05/23 (Taxiway Delta) to allow Code C aircraft was noted by some operators, and it was identified that extended runway occupancy time (especially when landing on Runway 05, or departing Runway 23) can sometimes cause issues when there is a high amount of circuit traffic. As an interim and more cost-effective solution, for landings on Runway 05, provision of a turning facility to allow 180 degree turns to be executed along the runway would be beneficial to reduce runway occupancy time for larger aircraft.

Taxiway Delta was also raised in discussions as to how the extension would interact with terminal and RPT apron expansion. The current master plan preserves the extension to connect to both ends of Runway 05/23.

5.3.2 THEME 2: GENERAL AVIATION AREA

General Aviation Apron

Council raised concerns about aircraft parking on the south side of the GA apron and possibly infringing the taxiway clearances. Stakeholders noted a number of competing activities are occurring in the GA area such as local freight, medical transfers, charter operations and refuelling.

It was suggested that the GA area incorporate a dedicated drop/pick up area to prevent unauthorised road vehicle access onto the apron.



Stakeholders commented that the GA apron has experienced drainage issues over the years, and as such, the Apron may experience problems. Council noted that drainage is currently being upgraded along Cooreena Road which is expected to resolve the flooding matters.

Grass Tie Down Area

Various stakeholders expressed that the grass tie down area surface is hard and it is difficult to tie down aircraft. Stakeholders also discussed the need for additional hangar space and tie down areas on the GA apron. Observations included the difficulty for itinerant aircraft using the grass area and occupants walking across apron/taxiway.

In addition, run-up bays should be clearly identified and usable for the GA users.

5.3.3 THEME 3: GROWTH ACTIVITY

Helicopters

Stakeholders are noticing the increased frequency of helicopter traffic at the airport. There is currently no dedicated helicopter landing site or parking stands. Council noted that the Dubbo hospital HLS is currently shut down and as such is contributing to the increased helicopter traffic. Stakeholders stated that at the moment helicopters air taxi to and park on Bay 5 of the RPT apron when available. The majority of helicopter activity is Toll (Air Ambulance) and military.

Large Air Tanker Base

Stakeholders expressed the proposals for a Large Air Tanker (LAT) base and a dedicated precinct to accommodate LAT that frequently visits Dubbo during bushfire season. A design was previously prepared to locate a LAT facility at the western end of the new larger general aviation lots. It was suggested that the location be re-evaluated.

Freight Precinct

Stakeholders expressed the possibility of an international freight operation using a B777F or similar. This may work in connection with the Northern Bypass as included in Councils Transport Strategy.

Commercial Activity

Stakeholders raised the need to provide a more structured layout for the Commercial Precinct as identified in the current Master Plan 2015-2036; specifically, delineation of airside areas and landside areas. It was suggested that recent inquiries for the Commercial Precinct include additional car hire companies, car wash and accommodation facilities.

Stakeholders also thought it adequate for the Master Plan to begin to consider the allocation of suitable land uses across the precinct.

6.0 AVIATION ACTIVITY FORECASTS

Planning for aviation-related facilities (runways, taxiways aprons and other facilities) for the airport is based on a range of factors, including current aviation activity and forecast aviation traffic growth.

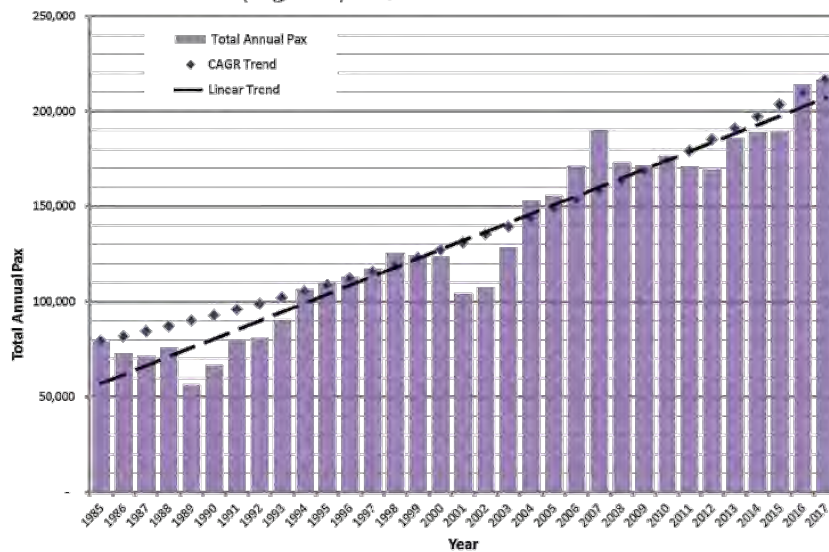
Currently, the airport hosts RPT services and a GA contingent which incorporates predominantly emergency services, a number of smaller general aviation businesses and private operators.

6.1 PASSENGER GROWTH AND PROJECTION

Dubbo City Regional Airport hosts Qantas Link using the Dash 8 Q200 (36 seats), Q300 (52 seats) and Q400 (72 seats), Regional Express and Fly Corporate using the SAAB340 (36 seats) and Fly Pelican using the BAe Jetstream 32 (19 seats) aircraft types.

In 2017 a total of 216,489 passengers passed through the airport (inbound and outbound)³. This is an increase from 1985 where the airport processed a total of 79,308 passengers inbound and outbound. The passenger totals over the period 1985-2017 is represented in Figure 5. The compound annual growth rate for passenger traffic at Dubbo from 1985 to 2017 was 3.2 per cent. For comparison, the Australian total passenger growth rate was approximately 5 per cent for the same time period.

Figure 5: Historical Annual Passenger Growth



³ BITRE Domestic Totals and Top Routes July 2004 – February 2019



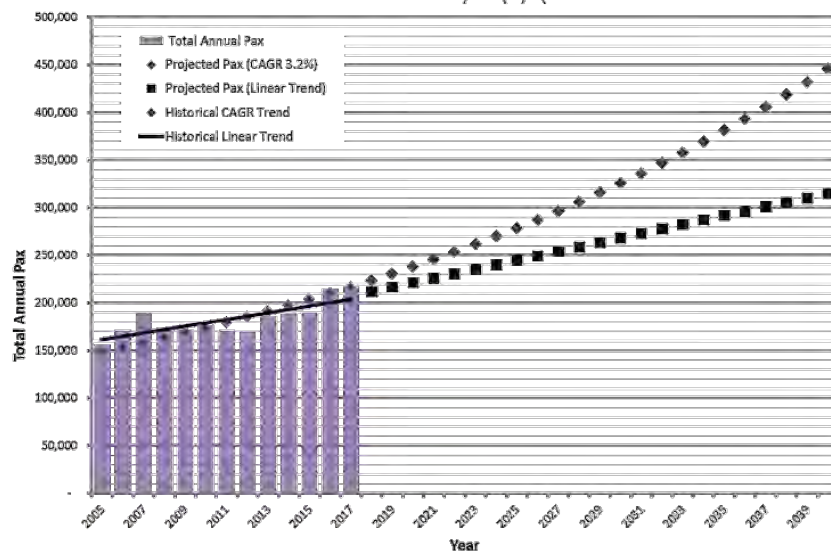
Source: BITRE

There are significant events which may have impacted the RPT passenger growth rates during this time including the pilot strike in 1989-1990, the collapse of Ansett/Hazelton Airlines in 2002 and the Global Financial Crisis in 2013-2015.

Using the historical compound annual growth rate of 3.2 per cent, RPT passenger traffic is projected to reach around 445,000 passengers in 2040.

Extrapolating a linear best fit trend line based on historical data out to 2040, passengers would be estimated at 315,000 as illustrated in Figure 6.

Figure 6: Forecast Passenger Growth Based on Historical Trends



Forecasts for passenger numbers through to 2040 will not necessarily continue to follow historical long-term trends. Total passengers utilising the facility will depend on a range of growth pressures and factors impacting Dubbo, the Orana Region and Central West Region.

6.2 RPT AIRCRAFT TYPE GROWTH PROJECTION

In 2018, the airport hosted a total of 5,291 flights which is an average of 102 flights per week. Dubbo has a relatively comprehensive route network, compared with other regional airports. In 2019 Qantas Link and Rex are servicing the Dubbo – Sydney route 48 times per week; Rex services Dubbo – Broken Hill 6 times per week; Fly Corporate services Dubbo – Brisbane 7 times per week and Dubbo – Melbourne (Essendon) 4 times per week; and Fly Pelican services Dubbo – Newcastle 3 times per week.



For infrastructure planning purposes, modelling of expected RPT aircraft movements was undertaken for both passenger growth rate scenarios, to identify timelines for the introduction of larger aircraft types. Modelling was based on passenger movement forecasts and an assumed typical load factor through to 2040. Destinations and the weekly schedule were maintained similar to the current schedules. Load factors were maintained at approximately 67 per cent which is reflective of typical target ranges used by the incumbent airlines and is somewhat higher than the average historical load factor at Dubbo City Regional Airport of around 62 per cent.

Possible future aircraft types were informed by existing available fleet mix for the current operators at relevant seating capacity. Actual aircraft types in the future fleet may differ as new types with similar seat capacity enter the Australian fleet. Although the current and future types are all likely to fall within the same (Code C) aerodrome reference code designation, these new types are likely to be somewhat larger in footprint, and hence RPT apron space demand, than the equivalent types in the current Australian fleet. These types would, physically, fit within the parking and manoeuvring footprint of the B737-800.

Based on the above assumptions, if passenger demand increases at a compound annual growth rate of 3.2% per year on average 100-seat aircraft (such as the Fokker F100/Bombardier CRJ-900/1000) may be expected at Dubbo to accommodate forecasted passenger numbers commencing around 2026. A further up-gauge to 120-seat regional types (such as Boeing 717-200/Airbus A220-100) would be justified by 2032, with Boeing 737 or similar sized aircraft expected from around 2030 onwards.

If passenger demand increases at a lower rate, based on the historical linear trend, it is expected these dates may be around three to four years later, respectively.

Table 4: Aircraft Type Forecast

Aircraft Size	Typical Aircraft	3.2% CAGR	Linear Forecast
100 seats	Fokker F100 / Bombardier CRJ900 / CRJ1000	2023	2026
120 seats	Boeing 717-200 / Airbus A220-100	2028	2032
150+ seats	Boeing 737 / Airbus A220-300	2030	2034

The information provided is based on an assessment of the above factors and should be used for strategic planning purposes only. All fleet decisions will be evaluated by the airlines and would be based on the aircraft fleet available at the time. The timing of any up-gauging will be determined by the operators and the level of passenger traffic is only one factor in this decision-making.



6.3 GENERAL AVIATION GROWTH AND PROJECTION

General Aviation (GA) is a diverse sector including all flying activity other than commercial transport operations. GA is categorised by BITRE into flying training, mustering, firefighting and emergency services operations, search and rescue, aerial surveying and photography, towing and private flying.

Generally in Australia, GA flying activity increased steadily between 1990 and 2010 but has been decreasing overall since 2010, despite some categories within this sector such as search and rescue which has demonstrated an increased.

Specifically within the private flying sector BITRE statistics show a marked divergence between the aircraft registered with self-administering organisations (i.e. RAAus) and aircraft on the VH-register. Overall private flying hours showed a strong increase between 1990 and 2012 while private hours flown in VH- registered aircraft gradually but consistently fell with a significant decrease in 2014. Flight training by VH- registered aircraft has been falling since 2009. While search and rescue activities vary significantly from year to year, hours flown for these operations have been trending upwards since the early 1990s.

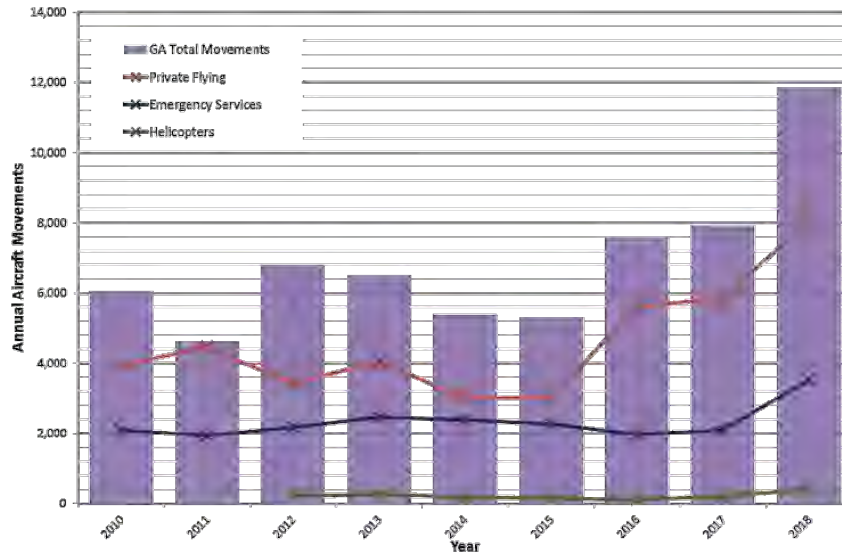
There are two (2) emerging areas of GA growth, self-administering associations and remotely piloted aircraft systems that are having a significant effect on the GA sector in Australia.

Private flying and emergency services (fire and medical) which include helicopters are the main GA activities at Dubbo City Regional Airport. In 2018, GA movements totalled approximately 11,860 of which approximately 67 per cent was private flying, 30 percent emergency services and 3 per cent helicopter activity.



The airport in the past two to three years has seen significant investment from emergency services particularly the RFDS and RFS setting up headquarters and training facilities. The private flying, emergency services and helicopter movements from 2010 to 2018 are illustrated in Figure 7 below.

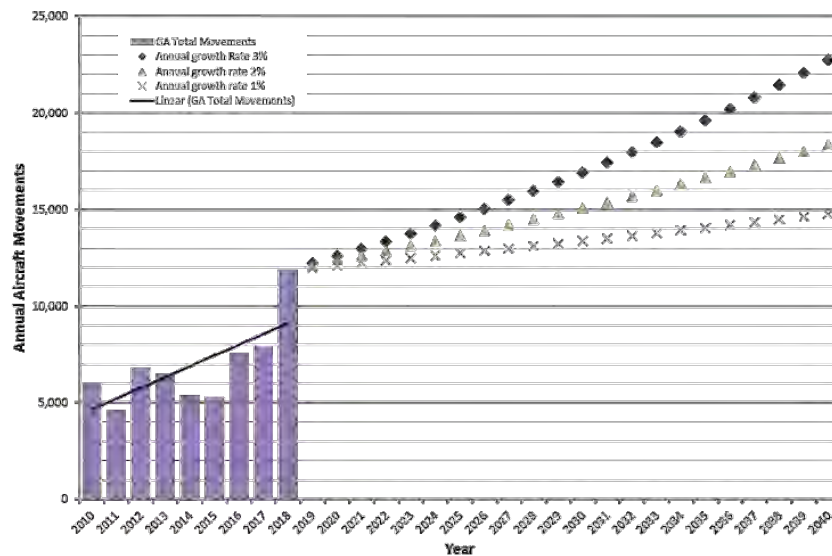
Figure 7: Historical GA Movements



Based on a low growth scenario assuming approximately 1 percent overall, total GA movements would be approximately 15,000 movements by 2040. Based on an annual growth rate of 3 percent total GA movements would be roughly double the 2018 level of activity with around 22,700 in 2040. Growth rates of 1 to 3 percent are typical of growth forecasts for GA within the regional airport sector. The resulting forecast GA movement numbers are also typical of many regional airports. Higher growth may be possible contingent on the amount of development and additional users which Council is able to attract to the airport.



Figure 8: Forecast GA Movements





7.0 STRATEGIC DIRECTION

The establishment of a clear strategic direction is fundamental to the subsequent development of appropriate concept layouts for infrastructure and land use. Vision and objections will guide the strategic direction of Dubbo City Regional Airport and compliment the City's strategic direction providing an understanding of how the airport is likely to change into the future.

The below vision statement was endorsed by Council in the Master Plan 2015 – 2036 and is consistent with key stakeholder feedback provided as a part of this review. The statement, philosophy and goals/objectives are consistent with the *Dubbo Community Plan* and the *Dubbo Urban Areas Development Strategy* 1996.

7.1 VISION STATEMENT

To develop an efficient and fully functioning Airport which significantly contributes to and improves the economic and social base of the Dubbo City area and the wider region.

7.2 PHILOSOPHY

Dubbo City Regional Airport is a major gateway to Dubbo and a significant driver of the economy of the City and the Orana Region

7.3 GOALS AND OBJECTIVES

1. To continue to operate the Airport to provide a commercial return on investment to the community;
2. To provide airport facilities for, and encourage the operation of, economic and viable air services to and from Dubbo;
3. To meet the needs of commuters to and from Dubbo within the financial constraint of the 'user pays' system;
4. To ensure that the operations of the Airport are in accordance with the relevant regulations and that perceived emergency needs can be met;
5. To constantly review, evaluate and update operational procedures in order to stay relevant and effective;
6. To provide for the air users of Dubbo and the wider region, a multi-purpose aerodrome as the basis for their operation;
7. To attract development to the Airport that would be of benefit to the City of Dubbo in general; and
8. To have planned sufficient area for development to meet the anticipated demand in the next five years.

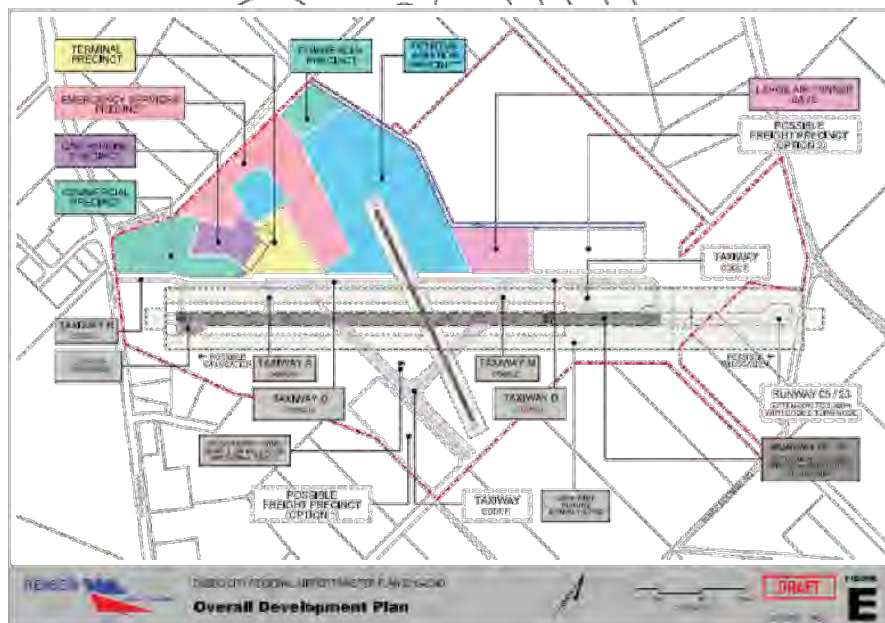
8.0 DEVELOPMENT CONCEPT

Based on the stakeholder feedback and discussion with Council, the precinct layout and airport movement area infrastructure (runway system, taxiway network and apron areas) required to meet the identified Dubbo City Regional Airport vision and purpose were established. This is a key step in the preparation of the Master Plan and includes determining the key facilities and infrastructure required to accommodate the aspirations of key stakeholders and Council to continue to support the airport growth and opportunities.

The development concept is described below:

8.1 OVERALL DEVELOPMENT PLAN

The Overall Development Plan as illustrated below and in Figure E at Appendix A identifies each of the precincts with their own uses.



Central to the Overall Development Plan are the runways and taxiways necessary for the take-off, landing and ground movement of aircraft to access the relevant precincts.



The Precinct Plan identifies the following precincts which are described in the subsequent sub-sections:

- Terminal Precinct;
- Car Park;
- Commercial Precinct;
- Emergency Services Precinct;
- General Aviation Precinct;
- Large Air Tanker (LAT) Base; and
- Freight Precinct.

8.1.1 TERMINAL PRECINCT

The Terminal Precinct is proposed to be extended to accommodate an expansion of the terminal building at the north end and two (2) additional aircraft parking bays for aircraft up to B737-800 size, as well as reconfiguration of the existing RPT apron area. In addition, an ARO Base is proposed at the south end of the terminal building.

8.1.2 CAR PARK

A dedicated Car Park is proposed which expands the general car parking area and includes the existing hire car facilities and relocates the secure car park.

8.1.3 COMMERCIAL PRECINCT

The Commercial Precinct is proposed to accommodate both airside and landside development.

Landside Development

The landside development could include a car wash, service station and accommodation facilities. Accommodation could potentially include demand for airport transits and also, given the proximity to the Mitchell Highway, demand for non-Airport related accommodation. A motel-style facility of one or two-storeys is likely to be the most suitable, however the actual accommodation offering will need to be suited to the specific demand to maximise the commercial return to Council. In order to respect the OLS limitations and maximise visibility and accessibility to both Airport and non-Airport customers, locations abutting Arthur Butler Drive and/or the corner with the Mitchell Highway might be most suitable for accommodation and service station facilities.

Additional commercial land for future use is also identified west of Runway 11. This land abuts Coreena Road and does not have direct airside access. This precinct is suitable for commercial uses that might not necessarily require direct aeronautical facilities but which would complement the either the Emergency Services Precinct development or the proposed General Aviation Precinct and could benefit from access from Coreena Road.



Airside Development

The airside development will accommodate Code C aircraft hangars with airside apron parking and could include helicopter parking and/or hangar facilities with access via Taxiway D. emergency services precinct

The Emergency Services Precinct incorporates all the existing users with additional area to the north adjacent RFS and SES for further expansion.

8.1.4 GENERAL AVIATION PRECINCT

Old GA Area

The existing GA apron can remain broadly as it currently is. However, pending possible relocation of the fuel facilities to the western edge of the apron, greater access into the area for Code B aircraft may be possible.

If additional access for Code B in the Old GA Area is not provided, Code B aircraft operations will need to be located in the New GA Area of the proposed General Aviation Precinct.

It is recommended that options for the ongoing use and development in this Old GA Area be subject to further investigation of options, costs and benefits by Council and the development of a business case for the preferred course of action, in the context of the other Master Plan proposals.

New GA Area

A dedicated Local Freight Processing and Distribution Area is proposed towards the north-west end of the existing Code B lease lots, just to the south west of the existing RFS apron. This area is for aircraft loading/unloading and transferring freight to vehicles. This area has road access to the south and airside access via Taxiway F. The RFS apron includes parking for Air Tractor aircraft as well as RFS water tanks.

GA Precinct Expansion

An expansion of the General Aviation Precinct is proposed at the west end of Runway 11/29. This will incorporate new Code B hangar lease lots north of Runway 11/29 and a new light aircraft tie down areas.

8.1.5 LARGE AIR TANKER (LAT) BASE

A Large Air Tanker (LAT) Base situated to the north-west of the runway intersection is proposed to accommodate three (3) aircraft parking positions each to accommodate two Code C fire-bombing aircraft and one (1) Coulson C130 (Code D) as well as landside area for supporting equipment.

8.1.6 FREIGHT PRECINCT

Council has identified possible use of large scale freight with aircraft up to a B777F. Two options for precinct locations are illustrated on Figure F. **Option 1** is to the south-east of the runways. section of the runways intersection. This Option provides for landside connection directly to the a



possible future road which is subject to Council approval. Airside access would be via proposed new taxiways (Code E) to Runway 05/23.

Freight Precinct **Option 2** is positioned at the threshold of Runway 23 with access via the parallel Taxiway D (Code E). In both Options aircraft using the Freight Precinct will be required to back track the runway. In addition, the runway will be required to be extended, widened through the provision of shoulders and strengthened.

8.2 AIRSIDE INFRASTRUCTURE

Airside infrastructure is comprised of the runway system, taxiway network and apron areas as illustrated on Figure E at Appendix A. All future airside infrastructure is planned in accordance with the CASA *Manual of Standards Part 139 – Aerodromes* (CASA MOS Part 139) as Version 1.14 January 2017, except with respect to parallel taxiway separation distances from Runway 05/23.

Consideration has also been given to the CASA Notice of Proposed Rule Making NPRM1462AS (in particular Annex C *Draft Part 139 Manual of Standards (Aerodromes) Instrument 2017*), where this is anticipated to bring about relevant changes to relevant standards, once finalised and effective in 2020.

In all cases, airside infrastructure must be provided in accordance with the aerodrome standards which apply in the future at the time of development.

8.2.1 RUNWAYS

Runways provide the core functionality of any airport. Therefore, appropriate planning must define future requirements for runways as a central aspect of the airport Master Plan.

Runway 05/23

Runway 05/23 is planned ultimately as a Code 4E instrument non-precision runway in accordance with CASA MOS Part 139. The runway is anticipated to be up to 2,800 metres long and 45 metres wide with runway shoulders provided at 7.5 metres wide either side. The runway will be contained within a 280 metre wide by 2,920 metre long runway strip, with the central 150m width graded. (Note: the minimum strip width requirement is currently 300 metres in accordance with CASA MOS Part 139 v1.14, however is expected to reduce in future to 280 metres, in line with ICAO *Annex 14 Volume I Aerodromes*, 8th Edition, July). 2018 A Code 4E runway as described above will accommodate a B777F or similar aircraft. In order to accommodate this runway length, additional property will be required beyond the existing airport land boundary. Re-alignment of Bunglegumble Road would also be required.

Runway 05/23 is also illustrated at 2,200 metres long to accommodate Code D aircraft operations in the LAT base and Code 4C narrow body jet RPT operations. The runway is to be contained within a 280 metre wide by 2,320 metre long runway strip. The existing 1,708 metres in length will



also require strengthening for the proposed aircraft operations. This runway length could be accommodated within the existing airport land boundary.

In both runway extension scenarios, the existing runway and other relevant taxiway infrastructure would need to be strengthened to accommodate the proposed aircraft operations.

Runway 11/29

Runway 11/29 is planned to remain as a Code 2B non-precision instrument runway. This runway remains as existing, at an overall length of 1,067 metres and 18 metres wide. The runway is situated inside a graded 90 metre wide runway strip. (Note: the minimum strip width requirement is expected to reduce in future to 80 metres, in line with ICAO *Annex 14 Volume I Aerodromes*, 8th Edition, July).

Runway Turning Area

Turning areas will need to be provided for Runway 05/23 in accordance with CASA MOS Part 139 where no entrance or exit taxiway way is provided to the threshold which accommodates the maximum size of aircraft utilising the runway.

Runway Shoulders

Runway shoulders are to be provided for the total length of the runway. A width of 7.5 metres either side of the 45 metre wide runway must be constructed for Code 4D and Code 4E runways. The shoulders provide for erosion protection and must be capable of supporting an aircraft, running off the runway, without causing structural damage to the aircraft.

Runway End Safety Areas (RESA)

RESAs are to be provided at a minimum of 90 metres long and 90 metres wide (or twice the width of the runway) beyond the end of the runway strip for Runway 05/23 in all cases to protect the aircraft in the event of undershooting or overrunning the runway.

8.2.2 TAXIWAY NETWORK

For taxiways and apron configuration refer **Figure F at Appendix A**.

Taxiway Alpha

Taxiway Alpha is planned be upgraded to a Code D taxiway providing accessing between Taxiway D and Runway 05/23, as well as Code C access to RPT Apron in the Terminal Precinct. In order to accommodate jet aircraft, shoulders would need to be provided to a minimum of 3.5 metres either side in accordance with CASA MOS Part 139.

Taxiway Bravo

Taxiway Bravo is planned to remain as a Code C taxiway from Runway 05/23 to the RPT Apron and the aircraft stand-off area in the Terminal Precinct. In order to accommodate jet aircraft, shoulders would need to be provided to a minimum of 3.5 metres either side in accordance with CASA MOS Part 139.



Taxiway Charlie

Taxiway Charlie will be removed to provide for the extension of the RPT Apron on the north side of the RPT terminal building.

Taxiway Delta

Taxiway Delta is a proposed full-length parallel taxiway on the western side of Runway 05/23 and will extend south of the Runway 05 threshold to access the Commercial Precinct. Taxiway Delta is planned in three sections with different capabilities as follows:

- From Taxiway A south to the Runway 05 threshold Taxiway Delta is planned at a minimum of 15 metres wide within a 52 metre wide taxiway strip to provide Code C aeroplane and helicopter taxi access to the Commercial Precinct. This taxiway will need to be separated a minimum of 158 metres from the Runway 05/23 centreline.
- From Taxiway A north to the intersection with Runway 11/29, Taxiway Delta is planned as Code D taxiway with a minimum separation of 166 metres from Runway 05/23. This separation allows for Code 4 non-precision instrument runway operations and Code C taxiway operations in accordance with the current CASA MOS Part 139. Following alignment of CASA MOS Part 139 with the latest ICAO taxiway minimum separation distances and reduction of the runway strip width to 280 metres, this separation will be suitable for Code D taxiway operations. The existing taxiway will need to be realigned to ensure Code D taxiway strip clearances to existing development, and widened to a minimum of 18 metres to accommodate the C130 aircraft. In order to accommodate Code C jet aircraft such as the B737-800, this section would also need to be provided with 3.5m wide shoulders each side. To accommodate larger Code D aeroplanes this taxiway may need to be widened to 23 metres with 7.5 metre wide shoulders.
- From the runway intersection north to the threshold of Runway 23, Taxiway Delta is planned ultimately as a Code E taxiway 23 metres wide with 10.5 metre wide shoulders, accessing the Freight Precinct Option 2 and the Runway 23 threshold. Initially this would be developed to suit Code D aeroplanes only for access to the LAT base. However the taxiway should be constructed with separation from Runway 05/23 suitable for ultimate Code E use. The minimum separation is currently 182.5 metres in accordance with CASA MOS Part 139. However, this is expected to reduce to 172.5 metres following alignment of CASA MOS Part 139 with the latest ICAO taxiway minimum separation distances and reduction of the required runway strip width to 280 metres. (The minimum separation for Code 4 non-precision runway and Code D taxiway operations is currently 176 metres reducing to 166 metres.

Once complete, Taxiway Delta will provide full length Code C aeroplane access parallel to Runway 05/23 as well as Code D access between the Runway 23 threshold and Taxiway A. A short section of backtracking between Taxiway A and the Runway 05 threshold would be required for Code D



aircraft. Council considers that this requirement would not be operationally restrictive, given the respective costs associated with removing existing constraints to achieving Code D clearance in this section.

Taxiway Echo

Taxiway Echo is proposed to be upgraded from Code B to Code C between Taxiway Delta to the entrance of the existing GA apron in order to provide access to the proposed Code C parking positions on the expanded RPT Apron.

Taxiway Juliet

Taxiway Juliet will remain as a Code B taxiway accessing the larger Code B lots in the New GA Area. Taxiway Juliet will be extended west to provide access to the proposed fuelling point and the local freight processing and distribution area adjacent to the hangar lots as well as light aircraft tie-down area further to the west.

Taxiway Lima

A proposed new taxiway (indicatively called Taxiway Lima for the purpose of this Master Plan) is planned to run west from Taxiway Delta on the north side of Runway 11/29 to provide access to the new GA Precinct. A taxiway connection from Taxiway Kilo to the Runway 11 threshold is also proposed.

Taxiway Mike

A proposed new taxiway (indicatively called Taxiway Mike for the purpose of this Master Plan) is planned to provide access for Code D aircraft from the LAT base to backtrack on Runway 05/23. This taxiway may be necessary for the early stages of LAT base operation, depending on how quickly Taxiway Delta is upgraded. Taxiway Mike will also provide an intermediate access/egress point for RPT and other aircraft to/from the main runway.

Taxiway November

A proposed new taxiway (indicatively called Taxiway November) for the purpose of this Master Plan) is planned provide access for Code C aircraft and helicopters to the airside development in the Commercial Precinct south of the Terminal Precinct. This taxiway will need to be located so as to avoid infringement of the OLS by aircraft using it or by those parked within the Commercial Precinct.

8.3 AIRCRAFT PARKING AREAS

RPT Apron

The RPT Apron located in the Terminal Precinct is proposed to be extended north and west around the extension to the terminal building as a Code C. The RPT Apron is proposed to be extended to provide two (2) new aircraft parking bays which can each accommodate up to a B737-800 aircraft. The existing Bay 1 will also be re-designed to accommodate a B737-800, and Bay 3 will be upgraded to accommodate Dash 8-Q400 (DH8D) and Fokker F100 aircraft. Existing Bays 4 and 5



will be removed to allow for Taxiway Delta clearance requirements as a Code D taxiway. The expanded and reconfigured RPT apron will be able to accommodate:

- three (3) aircraft up to B737-800 size (this also includes possible future 100-150 seat regional jet types such as the B717-200 and Airbus A220); and
- two (2) 70-100-seat aircraft such as the Q400 / F100

It is expected that this will be sufficient for RPT operations up to 2040. However, overflow parking will also be provided through stand-off positions.

RPT Stand-Off and Run-Up Bays

A stand-off area east of the RPT Apron will provide for two (2) SAAB 340B maximum or one (1) executive jet such as a Gulfstream IV, Challenger 600 or Falcon 900. The stand-off area is accessed east via Taxiway Bravo.

Four Code B run-up bays accessed via Taxiway Echo are also planned in this area.

Existing Old GA Apron

The existing GA Apron is suitable for the current mix of Code A and Code B uses. Options for increasing the availability of Code B access, including the need and/or benefit for relocation of the existing fuel facilities, should be subject to more detailed feasibility assessment.

Tie-down Parking Areas

Reconfiguration of the GA Apron to accommodate Code B operations, and/or the future RPT Apron expansion will absorb the current grass tie-down parking. Replacement tie-down areas are proposed in the GA Precinct Expansion west of the lease lots to the north of the Emergency Services Precinct. Further tie-down area will be incorporated into the future GA Precinct development north of Runway 11/29.

8.4 PASSENGER TERMINAL BUILDING

The terminal building is planned for expansion to the north of the existing building. Expanding the building on the south end is restricted due to Taxiway Delta clearance requirements. In addition, OLS and taxiway clearance requirements to provide aircraft parking bays up to a Code C B737-800 standard associated with the extension would prohibit these bays being located at the southern end of the RPT apron. The existing Undercover Secure Car Park will need to be relocated to allow for terminal building expansion. This expansion area allows for an additional 600 square metres of terminal space.

Reconfiguration of the internal spaces of the terminal building would be required to accommodate the expansion. This would need to be subject to a further detailed study, however it is anticipated that:

- The existing departures area could expand to the north, with the security screening relocating to the existing check-in area;



- Check-in facilities could be relocated to the existing administration and arrivals areas;
- Arrivals baggage claim area could be expanded to the north along with relocated administration facilities; and
- An airside enclosed or covered walkway could also be incorporated from the existing departures area past the rear of the existing check-in to access the new RPT apron bays and to allow passengers from the southern RPT positions to access the arrivals facilities;

Terminal expansion is likely to be driven by increases in operating RPT aircraft sizes and should be kept under regular review in discussions with airlines.

8.5 CAR PARKING

Car parking is provided for west of the Terminal Precinct with an additional area of approximately 15,500 square metres. The Undercover Secure Car Park (3,600 square metres) would relocate to this area. An additional section of car parking is provided to the south side of the Airport Ring Road intended for Council use in keeping with the existing circumstances.

8.6 ARO BASE

An area to consolidate the ARO facilities and equipment is allocated at the south end of the Terminal Building across the airside access point. The existing Airservices Building may be able to be converted into the ARO facilities, otherwise it may need to be removed to accommodate them in the same location. This location provides the AROs with immediate access to the airside, visual surveillance of the aircraft movement areas while having direct access to the terminal building.

8.7 HELICOPTER PARKING STANDS

Helicopter parking stands are proposed at the east end of the Commercial Precinct to accommodate up to three (3) Agusta Westland AW139 helicopters. This area is directly opposite the end of Runway 05 and land access via Arthur Butler Drive. Helicopters would utilise the runway network for arrivals and departures and taxi to the allocated stand areas. These facilities would form part of the airside commercial precinct.

8.8 WIND DIRECTION INDICATORS AND GROUND SIGNALS

There are three existing wind direction indicators on the airport and an Automatic Weather Information System (AWIS). A primary wind direction indicator illuminated with a signal circle is currently located on the west side of Runway 05/23 between Taxiway Alpha and Taxiway Bravo. An additional illuminated WDI at the threshold of Runway 23 and one non-illuminated WDI at the threshold of Runway 11. The AWIS equipment is located on the east side of Runway 05/23 south of Runway 11/29.

In accordance with MOS Part 139 Section 8.7.1 the airport must install and maintain at least one indicator at the airport. However, when surface wind information is passed to the pilots of aircraft approaching the runway through an automatic weather observing system the requirement to



provide a wind direction indicator at the threshold of the runway is not applicable as per MOS Part 139 Section 8.7.1.3.

In order to allow for the expansion of Taxiway Delta, the RPT Apron and the General Aviation Precinct the primary WDI and the non-illuminated WDI will need to be removed.

One WDI and Signal Circle is provided for in accordance with MOS Part 139 *Aerodromes* south-east of the runways intersection so as to be visible from aircraft that are in flight or aircraft that are on the movement area.

8.9 FUEL STATIONS

New fuel facilities are proposed in the New GA Area next to the freight and distribution area, which could accommodate both Code A and Code B aircraft to power in and out.

The existing fuel bowzers on the east end of the existing general aviation apron may be retained, or relocated to the western end of the apron, depending on the future development option chosen in this area (refer Section 8.1.48.3).

8.10 INDICATIVE DEVELOPMENT STAGING, TRIGGERS AND TIMING

Proposed developments have been grouped into indicative short (1-3 years), medium (3-10 years) and long-term (10+ years) stages. Key developments and triggers are shown in Table 5, Table 6 and Table 7, respectively, below.

A rough order-of-magnitude cost range has also been provided. These cost ranges are based on judgement, rule-of-thumb, experience with similar developments and discussions with Council. No warranty is made as to their accuracy. It should be noted that cost estimates are extremely sensitive to engineering design parameters including, in particular, earthworks and ground conditions, as well as the specific project scope requirements. No investigation or assessment of these items has been undertaken in developing these estimates, nor have the development packages been subject to a formal scope definition, and so the indicative costs should be treated with appropriate caution and are not to be relied upon until engineering design can be further progressed.



Table 5: Proposed Short-Term Development (1-3 Years)

Development package	Indicative Cost	Trigger
Extend Taxiway Juliet	\$0.5 million	Immediate operational requirement
Southern Apron Expansion	\$1 million	Immediate operational requirement
Local Freight Processing and Distribution apron	\$0.5 – 1 million	Immediate operational requirement
Construct LAT Base Stage 1 apron and access road (utilities extra)	\$6.5 – 8 million	Project Partnership Agreement with RFS
Taxiway Lima connection to Runway 05/23	\$500,000	Overall demand and quality of existing infrastructure
Taxiway Delta and Taxiway Echo re-seal	\$300,000	Commercial demand
Re-development of the Café area	\$500,000	Condition and use off the Cross Runway
Re-seal of the Cross Runway 11/29	\$200,000	Passenger Demand and inclement weather
Undercover Walkway for RPT Passengers	\$300,000	Operational demands
Aerodrome Reporting Officers shed and associated facilities		

Table 6: Proposed Medium-Term Development (3-10 Years)

Development package	Indicative Cost	Trigger
Construct LAT Base Stage 2 apron and structures	\$2 million	RFS requirement and industry development opportunities
Runway extension to 2,200 m long Code 4D	\$40 million	
Upgrade and extend Taxiway Delta (Stage 1 Taxiway Alpha to Taxiway Lima, Stage 2 Runway 23 threshold) Staged Code C to Code D	\$15 – 20 million	Code 4C jet or Code 4D runway
Reconfigure existing Old GA Apron to full Code B access including relocation of fuel bowser (if required)	\$0.5 – 2 million	Feasibility study and business case
Additional Northern GA Area (including Taxiways J, K and aircraft parking) (utilities extra)	\$3 – 5 million	Commercial demand
Strengthen Runway 05/23 to Code D/LAT requirements and extend Runway to 2,200m Code D	\$40 million	RFS or RPT Aircraft requirement
Commercial Precinct (landside – Mitchell Highway)	\$5 – 10 million	Commercial demand
Proposed new Fuelling Point	~ \$1 million	Commercial demand
RPT Apron Expansion (including stand-off and run-up bays)	\$5 – 10 million	RPT demand
Relocation of Secure Parking	\$2 – 3 million	Expansion of RPT Apron, passenger and service numbers
Passenger Terminal Expansion	\$5 – 10 million	
Public Car Park Expansion	\$1 – 2 million	Passenger demand



Development package	Indicative Cost	Trigger
Commercial Precinct (Airside) including access via Taxiway November	\$3–5 million	Commercial demand
Warehouse and distribution/ commercial precinct	\$5 million	Commercial demand

Table 7: Proposed Long-Term Development (10+ Years)

Development package	Indicative Cost	Trigger
Freight Precinct Development Runway Extension to 2,800 m long and widening to Code E New Code E taxiway/s (Assumes 2,200m Code 4C runway constructed prior)	\$30–50 million	Wide-body freight operations

Draft



9.0 AIRPORT SAFEGUARDING

9.1 THE NEED FOR SAFEGUARDING

Adequate protection of the basic capability to undertake aircraft operations in accordance with accepted safety standards and regulatory requirements, and in an efficient and economic manner, is imperative to the future realisation of aeronautical opportunities at Dubbo City Regional Airport. Operations at Dubbo City Regional Airport will require adequate safeguarding in order to develop the vision and objectives of the Master Plan.

Airport safeguarding includes a number of elements that will be required throughout the planning and development processes. The various safeguarding elements will be triggered by different activities and aircraft operations.

9.2 NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK

The National Airports Safeguarding Framework (NASF) is a national land use planning framework that aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise-disclosure mechanisms; and
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety-related issues.

The NASF was developed by the National Airports Safeguarding Advisory Group (NASAG), comprising of Commonwealth, State and Territory Government planning and transport officials, the Australian Government Department of Defence, the Civil Aviation Safety Authority (CASA), Airservices Australia and the Australian Local Government Association (ALGA).

NASF currently consists of a set of seven principles and nine guidelines. The full NASF principles and guidelines can be found on the Department of Infrastructure and Regional Development's website at: www.infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf.

The NASF principles are as follows, and each guideline is described in the following subsections.



- **Principle 1:** The safety, efficiency and operational integrity of airports should be protected by all governments, recognising their economic, defence and social significance
- **Principle 2:** Airports, governments and local communities should share responsibility to ensure that airport planning is integrated with local and regional planning
- **Principle 3:** Governments at all levels should align land use planning and building requirements in the vicinity of airports
- **Principle 4:** Land use planning processes should balance and protect both airport/aviation operations and community safety and amenity expectations
- **Principle 5:** Governments will protect operational airspace around airports in the interests of both aviation and community safety
- **Principle 6:** Strategic and statutory planning frameworks should address aircraft noise by applying a comprehensive suite of noise measures
- **Principle 7:** Airports should work with governments to provide comprehensive and understandable information to local communities on their operations concerning noise impacts and airspace requirements.

9.2.1 GUIDELINE A

Measures for Managing Impacts of Aircraft Noise

NASF Guideline A can be used in the assessment of new development applications for noise sensitive uses. While the Australian Noise Exposure Forecast (ANEF) system is recognised by a number of jurisdictions in land use planning decisions, the 20 and 25 ANEF zones do not capture all high noise affected areas around an airport. In addition, Australian Standard AS2021-2015 recognises that the ANEF contours are not necessarily an indicator of the full spread of noise impacts, particularly for residents newly exposed to aircraft noise.

Guideline A is the Government's recognition of the need to consider a complementary suite of noise measures in conjunction with the ANEF system to better inform strategic planning and to provide more comprehensive and understandable information on aircraft noise for communities.

Council should consider, taking into consideration the existing and potential future land uses in the vicinity of the Airport:

- Whether the current ANEF represents an adequate forecast of potential future noise impacts associated with the potential aviation activity foreseen in this Master Plan; and
- Whether there is a need to develop and communicate additional information in addition to the ANEF mapping.



9.2.2 GUIDELINE B

Managing the Risk of Building Generated Windshear and Turbulence at airports

The purpose of this guideline is to assist land use planners and airport operators in their planning and development processes to reduce the risk of building generated windshear and turbulence at airports near runways.

Applicability of this Guideline is initially determined by the location of the building within an 'assessment trigger area' around the runway ends, that is:

- 1200 metres or closer perpendicular from the runway centreline (or extended runway centreline);
- 900 metres or closer in front of runway threshold (towards the landside of the airport); and
- 500 metres or closer from the runway threshold along the runway.

The guideline recommends that all developments within the assessment trigger areas which will infringe a 1:35 sloping surface from the runway centreline should be subject to further assessment.

Positioning of all developments on airport will need to be evaluated on a case by case basis. Subject to confirmation through such evaluation that no adverse impact on aircraft operations is predicted, then buildings may be located closer to the runways and within the 1:35 surface.

Council should retain flexibility in the internal layout of proposed development precincts until the positioning of buildings in relation to Guideline B is resolved.

9.2.3 GUIDELINE C

Managing the Risk of Wildlife Strikes in the Vicinity of Airports

The purpose of Guideline C is to inform the land use planning decisions and the way in which existing land use is managed in the vicinity of airports with respect to the attraction of wildlife, particularly birds. A table is included in Attachment 1 which indicates wildlife attraction risk and associated actions for developments within buffer zones around airports of 3, 8 and 13 kilometres radius.

Council should consider Guideline C in its planning decisions with respect to land uses and developments within 13 kilometres of the Airport.

9.2.4 GUIDELINE D

Managing the Risk to Aviation Safety of Wind Turbine Installations

This guideline provides general information and advice in relation to wind farms and turbines and their hazards to aviation. Proponents of such installations should take account of Guideline D in undertaking assessments of the impacts of the proposals, including on aviation. Council should be aware of the guideline and it may assist Council in evaluating and commenting on any wind farm proposals.



9.2.5 GUIDELINE E

Managing the Risk of Distraction to Pilots from Lighting in the Vicinity of Airports

Guideline E provides guidance on the risk of distractions to pilots of aircraft from lighting and light fixtures near airports. The *CASA Manual of Standards part 139 Aerodromes* Section 9.21: *Lighting in the Vicinity of Aerodromes* sets out the restrictions and provides advice to lighting suppliers on the general requirements, information and correspondence avenues.

Advice for the guidance of designers and installation contractors is provided for situations where lights are to be installed within a 6 kilometre radius of the airport. Lights within this area fall into a category most likely to be subject to the provisions of regulation 94 of CAR 1988.

The primary area is divided into four light control zones; A, B, C and D. These zones reflect the degree of interference ground lights can cause pilots as they approach. Lighting associated with any developments should therefore meet the maximum intensity of light sources measured at 3 degrees above the horizontal associated with each Zone as follows:

- Zone A - 0 cd;
- Zone B - 50 cd;
- Zone C - 150 cd; and
- Zone D - 450 cd.

Council should consider Guideline E in relation to any proposed lighting installations (for example, associated with sports fields, industrial facilities and similar) within 6 kilometres of the Airport.

It should be noted that solar panel installation is a particular consideration in relation to glare/reflectivity affecting aircraft in various stages of flight as well as ATC operations. Should any solar panels be proposed within the vicinity of the Airport a solar glare hazard analysis to satisfy CASA and Council that the safety of aircraft operations will not be affected is recommended.

9.2.6 GUIDELINE F

Managing the Risk of Intrusions into the Protected Airspace of Airports

Guideline F is designed to address the issue of intrusions into the operational airspace of airports by tall structures, such as buildings and cranes in the vicinity of airports.

The safety, efficiency and regularity of aircraft operations require airspace to be largely free of obstacles which may make it unsuitable for the conduct of visual and instrument flights.

At Dubbo City Regional Airport the Obstacle Limitation Surfaces (OLS) are currently provided based on an instrument non-precision Code 4 Runway 05/23 at 2,350 m long. To protect for the operations which may be associated with a possible freight precinct, the OLS should be updated to reflect the possible 2,800 metre long Runway 05/23.

The OLS for an airport describe the airspace boundaries for flight in proximity to an airport which should be kept free of obstacles that may endanger aircraft operations in visual operations or



during the visual stages of an instrument flight. The OLS components are defined in the International Civil Aviation Organization (ICAO) Annex 14 and in Chapter 7 of the CASA Manual of Standards (MOS) Part 139. Subject to aeronautical assessment, an obstacle may be permitted to penetrate the OLS without placing restrictions on the allowable operations, but will normally require it to be marked and/or lit to make it conspicuous to pilots. CASA may also impose operational limitations on aerodrome users in the presence of obstacles. To avoid any undesirable limitations on operations, it is recommended to ensure that obstacles are not permitted to penetrate the approach or departure areas.

The Guideline also addresses activities that could cause air turbulence that could affect the normal flight of aircraft operating in the prescribed airspace and/or emissions of steam, other gas, smoke, dust or other particulate matter that could affect the prescribed airspace in accordance with Visual Flight Rules (VFR).

9.2.7 GUIDELINE G

Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)

Essendon Airport operates a number of aviation based CNS facilities. Protection surfaces have been established and published for these facilities so as to prevent interference with the performance of the facilities.

9.2.8 GUIDELINE H

Protecting Strategically Important Helicopter Landing Sites (HLS)

Guideline H provides guidance on the ongoing operations, protection of flight paths and areas for off-airport HLS. As such it is not applicable to on-airport facilities. However, on-airport helicopter facilities should be planned and designed in accordance with the guidance set out in CAAP 92-2(2) *Guidelines for the establishment of on-shore helicopter landing sites*.

9.2.9 GUIDELINE I

Managing the Risk in Public Safety Areas at the Ends of Runways

Guideline I provides guidance on approaches for the application of a Public Safety Area (PSA) planning framework in Australian jurisdictions. The Guideline is intended to ensure there is no increase in risk from new development and to assist land-use planners to better consider public safety when assessing development proposals, rezoning requests and when developing strategic land use plans.

A PSA is a designated area of land at the end of an airport runway within which development may be restricted in order to control the number of people on the ground around runway ends. The size and shape of a PSA typically depend on the statistical chance of an accident occurring at a particular location. The risk is related to the number and type of aircraft movements and the distance from the critical take-off and landing points. PSAs are based on the landing threshold for



each end of the runway and in most cases become narrower with increasing distance before the threshold.

Guideline 1 provides two examples of most relevance to Australia (the UK and Queensland approaches) to developing PSA extents:

- The UK model is the most formalised approach to defining a PSA and has been applied at a number of international and Australian airports; and
- The Queensland model is a modified version of the policy and research conducted in the UK. The Queensland model may be more appropriate at a regional airport such as Dubbo.

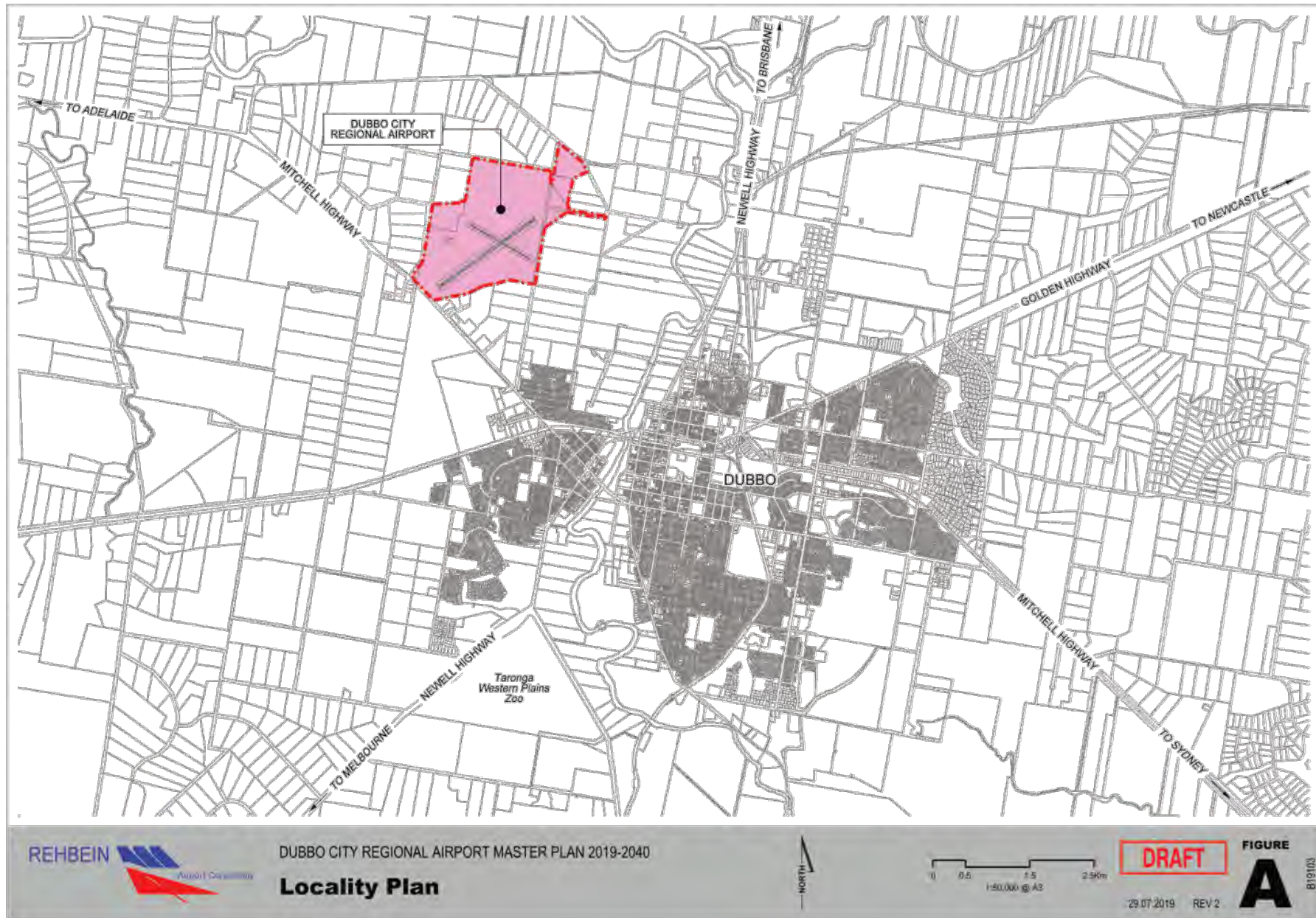
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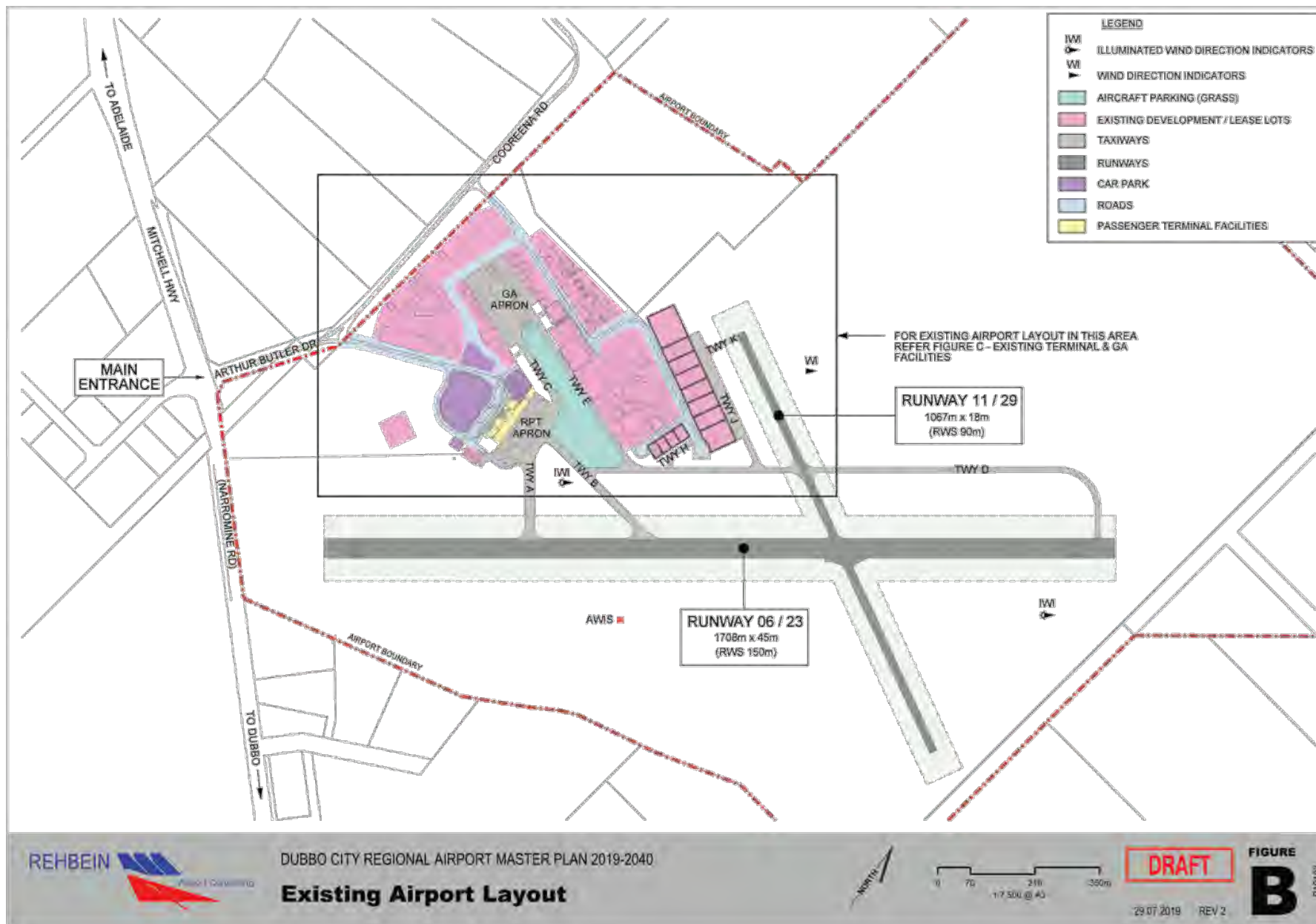


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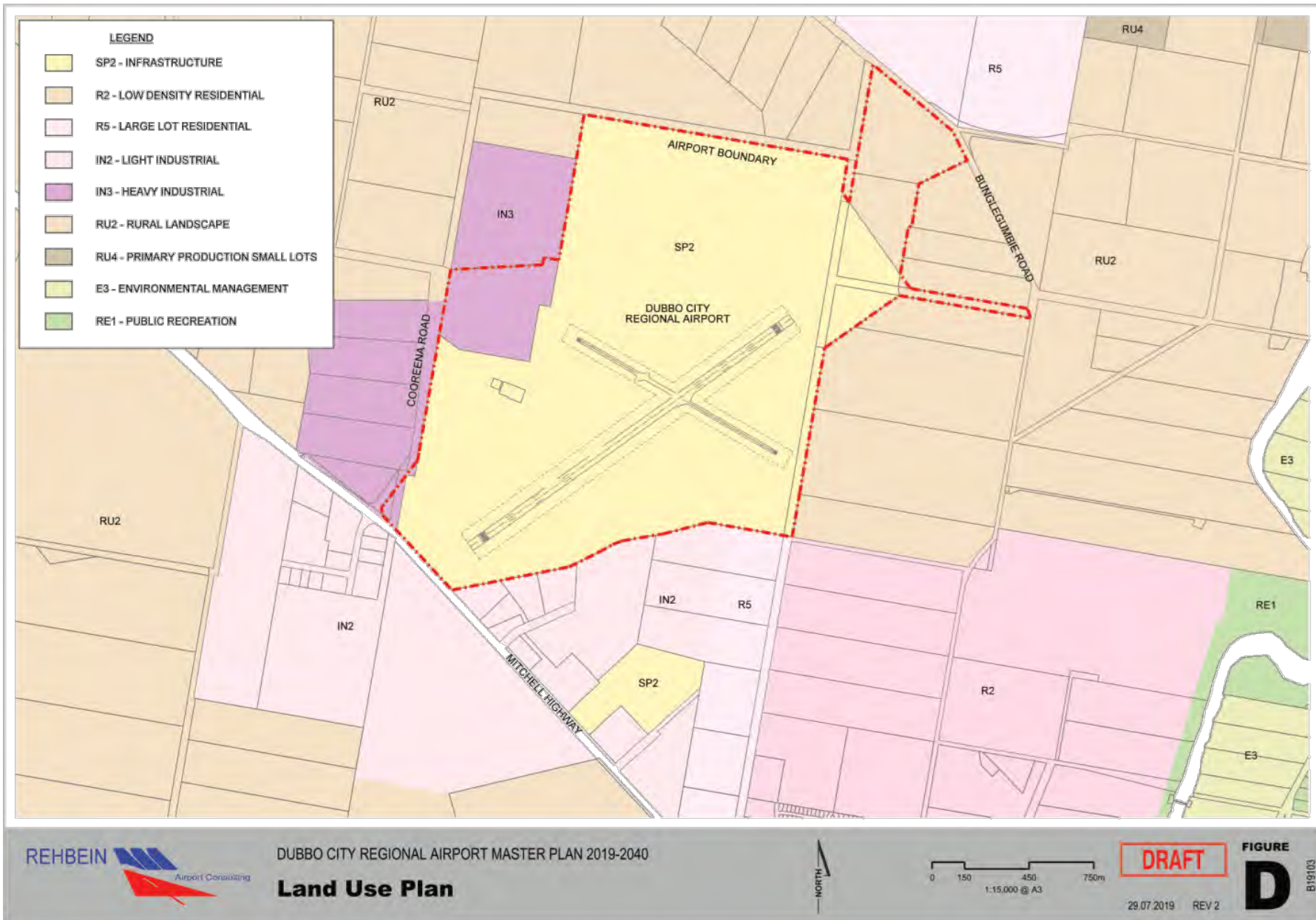
APPENDIX A

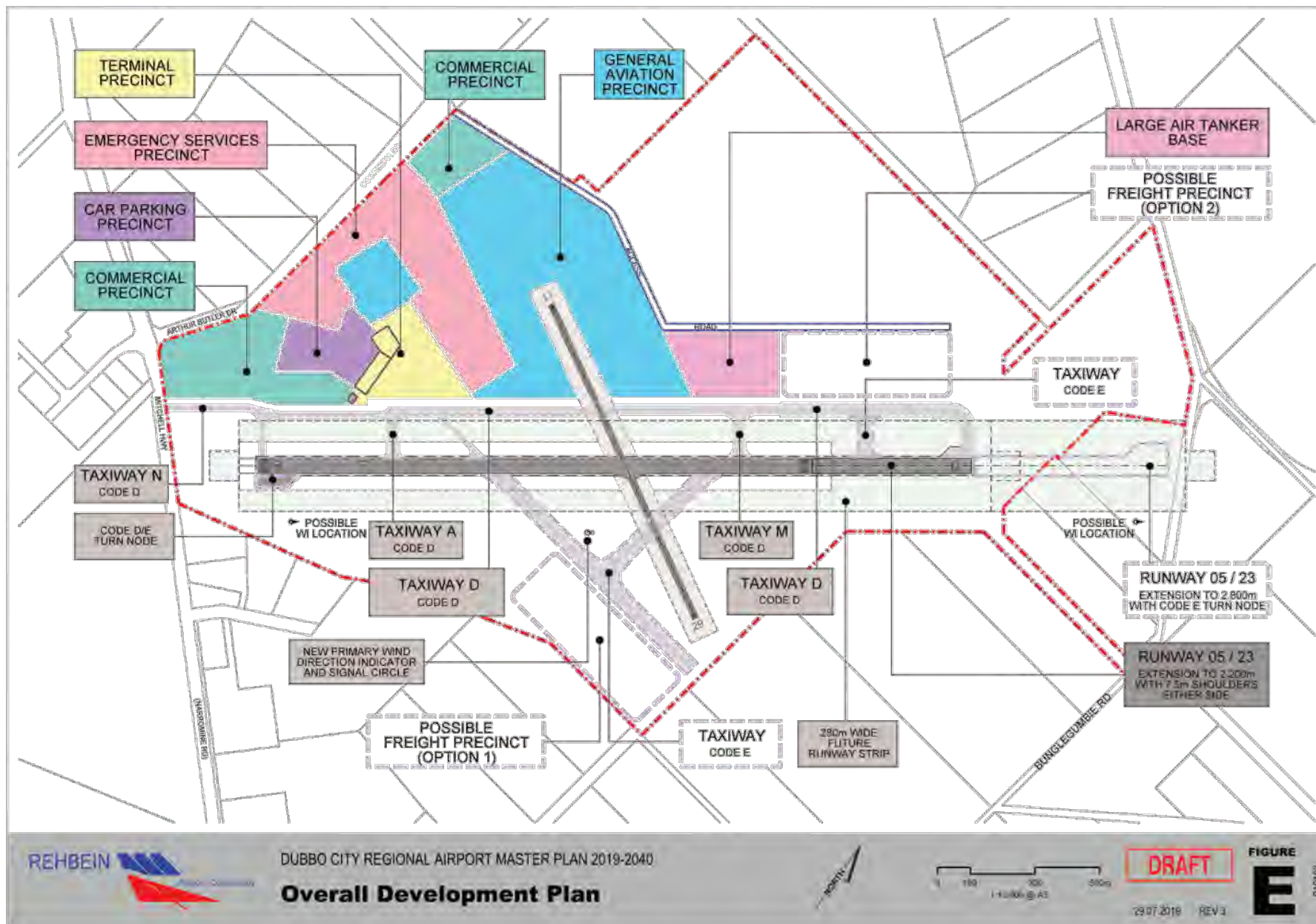
MASTER PLAN FIGURES

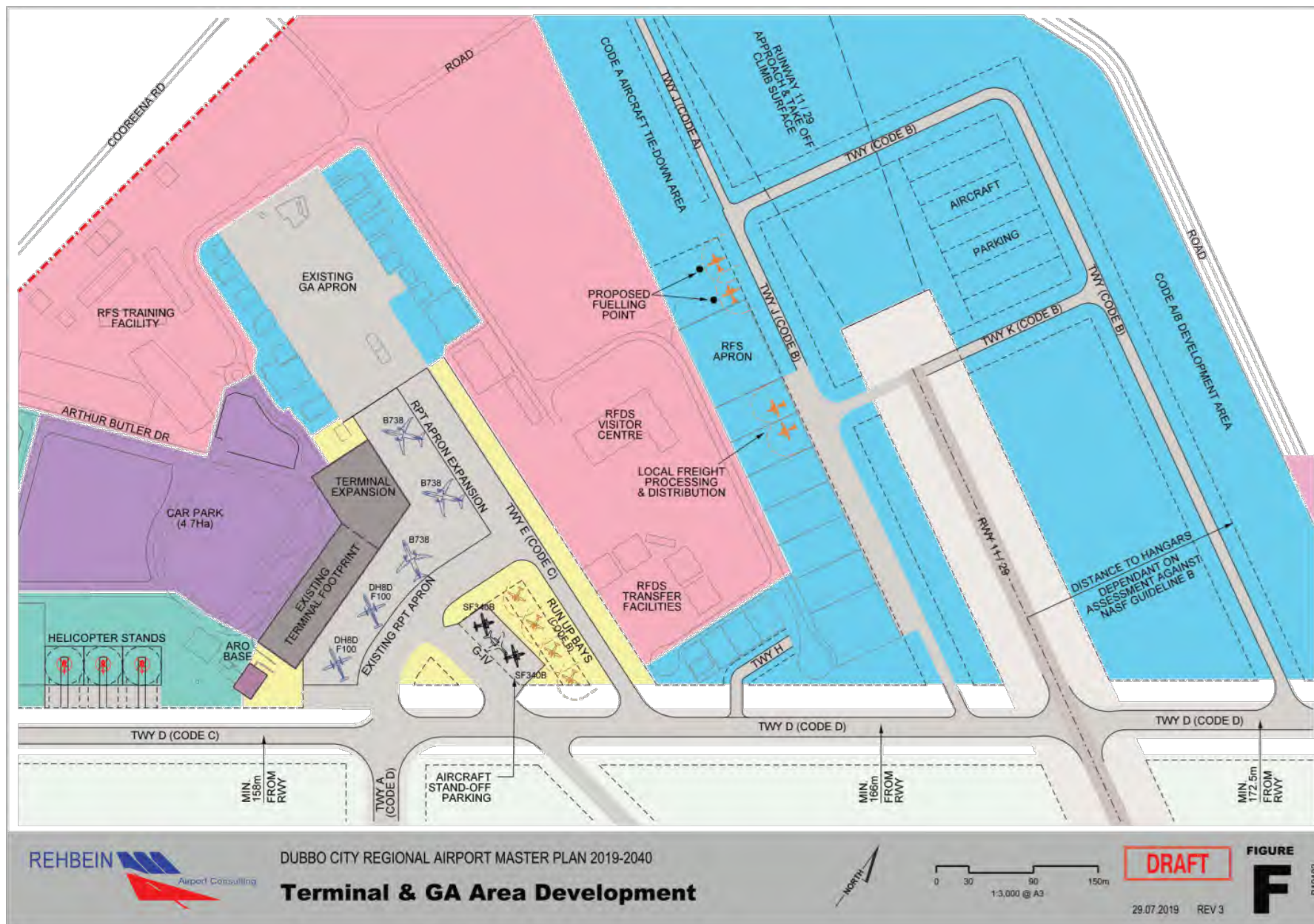














**REPORT: D2017-671(2) 1 Church Street,
Dubbo - Variation to Contributions
Applicant: G H Dubbo Pty Ltd and Icanso
Pty Ltd**

AUTHOR: Manager Building and Development
Services
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1497

EXECUTIVE SUMMARY

Development Application D17-671 was approved and dated 29 November 2018, by the Western Regional Planning Panel.

The subject Modified Development Application was lodged with Council on 2 May 2019 by G H Dubbo Pty Ltd and Icanso Pty Ltd, utilising the services of Premises NSW Pty Ltd as their consultant.

The proposed modified Development Application D17-671(2) has sought to modify Conditions 3 (Sewerage Headworks), 4 (Water Supply Headworks), 5 (Open Space and Recreation Facilities), 6 (Urban Roads - Trips) and 7 (Urban Roads - Parking Spaces) with regard to the contributions levied for the development at Lot 22 DP 230028, 1 Church Street, Dubbo.

The variations sought with regard to Conditions 3, 4, 5 and 6 have been suitably justified in accordance with the relevant Contribution Plans. However, the variation sought (deletion) with regard to Condition 7 has not been justified and is therefore not supported.

The proposed modification is not considered likely to have any detrimental impacts upon the environment or upon the amenity of the locality. The proposed modified development is therefore recommended for approval subject to the modified conditions of consent attached.

FINANCIAL IMPLICATIONS

There are financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

That modified Development Application D2017-671(2) for a Mixed Use Development at Lot 22 DP 230028, Church Street, Dubbo, be granted approval subject to the modified conditions of consent attached in Appendix 1, noting the modifications to Conditions 3, 4, 5 and 6.

Darryll Quigley

Manager Building and Development Services

BACKGROUND

Development Application D17-671 was approved and dated 29 November 2018, by the Western Regional Planning Panel.

The approved development is for a 'Mixed use' development comprising commercial premises (restaurant and bar) on ground floor, 57 serviced apartments (floors 2 to 6) and 27 shop top housing units (floors 7 to 13), plus parking over four (4) levels and roof terrace. The proposal also includes a four (4) lot stratum and subsequent 84 lot strata title subdivision at Lot 22 DP 230028, Church Street, Dubbo.



Figure 1: Site Location - Lot 22 DP 230028, 1 Church Street, Dubbo.

The subject Modified Development Application was lodged with Council on 2 May 2019 by G H Dubbo Pty Ltd and Icanso Pty Ltd, utilising the services of Premises NSW Pty Ltd as their consultant.

The proposed modification relates to the determination of various contributions as detailed in Conditions 3, 4, 5, 6 and 7 (see below).

The proponent's consultant in correspondence dated 29 April 2019 (**Appendix 2**), has provided arguments regarding each matter, which will be detailed later in the report.

REPORT

Environmental Planning and Assessment Act 1979

Section 4.55 Considerations

Section 4.55(1A) of the Environmental Planning and Assessment Act 1979 pertains to modifications to a consented Development Application involving minimal environmental impact. It states:

“A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

- (a) it is satisfied that the proposed modification is of minimal environmental impact, and*
 - (b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and*
 - (c) it has notified the application in accordance with:*
 - (i) the regulations, if the regulations so require, or*
 - (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
 - (d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.*
- (3) In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 4.15(1) as are of relevance to the development the subject of the application.”*

Given the nature of the proposed modification (having no physical impacts), it is considered that the proposed modification will result in negligible environmental impacts and is substantially the same development as the consent which was originally granted. Additionally, the proposal was not required to be notified to adjoining owners and as such, no submissions have been received.

There are no issues raised under Section 4.15(1) of the Act with regard to Dubbo Local Environmental Plan 2011 or Dubbo Development Control Plan 2013. The only matter to be addressed is Council's Contribution Plans under the Local Government Act 1993 (section 64) and the Environmental Planning and Assessment Act 1979 (section 7.11).

PLANNING ASSESSMENT Section 4.15(1)

As required by the Environmental Planning & Assessment Act, 1979, Section 4.15(1), the following relevant matters are addressed below:

- Environmental planning instruments (State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs);
- Draft environmental planning instruments;
- Development control plans;
- Planning agreements;
- Regulations;
- Environmental (natural and built), social and economic impacts;
- Suitability of the site;
- Submissions; and
- Public interest

(a)(i) Environmental Planning instruments

Not applicable.

(a)(ii) Draft Environmental Planning instruments

No draft environmental planning instruments apply to the land to which the Development Application relates.

(a)(iii) Development control plans

Not applicable.

(a)(iii) planning agreements

Not applicable.

(a)(iv) the regulations

Not applicable.

(b) environmental (natural and built), social and economic impacts

Not applicable.

(c) suitability of the site

Not applicable.

(d) submissions

Given the nature of the proposed modification (having no physical impacts) the proposal was not required to be notified to adjoining owners and as such, no submissions have been received.

(e) *public interest*

There are no matters other than those discussed in the assessment of the Modified Development Application that would be considered contrary to the public interest.



Figure 2: North-western elevation

CONTRIBUTIONS Section 64 and Section 7.11

Please note that the dollar value rates relate to 2018/2019 financial year for consistency. Payments of the contributions will be indexed to the current financial year when payment is sought.

Condition 3 Sewerage Services Headworks Contribution, reads as follows:

- (3) *The Sewerage Services headworks contribution of \$372,911.30 (65.26 ETs), calculated on an equivalent tenement (ET) basis, pursuant to Section 64 of the Local Government Act, 1993, Division 5 of Part 2 of Chapter 6 of the Water Management Act, 2000 and in accordance with Council's adopted Combined Water Supply and Sewerage Contributions Policy dated November 2002, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.*

Such contribution rate per ET lot is adjusted annually in accordance with Section 3 of the Combined Water Supply and Sewerage Contributions Policy becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$5,714.24 per ET.

Note 2: As the above contribution rate is reviewed annually, the 'current contribution rate' is to be confirmed prior to payment.

*Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.
{Reason: Implementation of Council's adopted Combined Water Supply and Sewerage Contributions Policy, November 2002, operating from 1 January 2003}*

From the consultant's covering letter dated 29 April 2019, the following comments are provided with regard to Condition 3:

The calculation of Council's ETs for the development is set out below:

14 (1 bedrooms) x 0.50 + 43 (2 bedrooms) x 0.75 + 4 (1 bedrooms) x 0.50 + 12 (2 bedrooms) x 0.75 + 11 (3 bedrooms) x 1.00 + 0.01 x 106 (Restaurant area) + 0.05 x 79 (Bar area) = 66.26 ETs

A credit of 1 ET has been applied by Council for the existing lot and, less 1 ET credit = 65.26 ETs

Based on Council's calculations, the Restaurant and Bar area in the development contributes 5.01 ET. The use of the Water Directorate data for the Restaurant and Bar area assumes each operates as a standalone business attracting separate clientele rather than considering the facility as an integrated entity.

The purpose of the bar area, as with most small bars associated with restaurants in accommodation premises, is either to provide drinks to clientele whilst they are waiting for a table in the restaurant or providing drinks to clientele when they are sitting having a meal at the restaurant tables.

We have previously made the case to Council that the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract most of its clientele from in house guests.

On this basis, sewage generation by in house guests is predominantly accounted for in the ET allocation for the various combinations of residential and serviced apartments in the building.

In determining the overall ET count for the development, Council has allowed a credit of 1 ET for the existing allotment. However, if the Water Directorate guidelines are to be applied, then the credit should be calculated based on the existing use of the building on the site as office premises.

Council has previously advised that the net lettable area of the building is approximately 385.6m² and the Water Directorate allows sewage generation for offices as .01 ET per m². On this basis, the credit allowed by Council should be 3.85 ETs.

Our calculation of the sewage ETs generated by the development would be as follows:

Dwellings

14 (1 bedrooms) x 0.50 + 43 (2 bedrooms) x 0.75 + 4 (1 bedrooms) x 0.50 + 12 (2 bedrooms) x 0.75 + 11 (3 bedrooms) x 1.00 = 61.25 ETs.

Credit

As outlined, 3.85 ETs.

Total ETs = 61.25 - 3.85 = 57.4 ETs.

On this basis, the contribution required to be paid at the rate of \$5,714.24 per ET is \$327,997.38.

Comment

With regard to the Restaurant and Bar (the differing ET rates are noted) but there is no evidence to support the statement that these will operate as an integrated entity and if they did, to what extent.

The Restaurant and Bar are not the exclusive use of 'in-house guests' and therefore additional persons will frequent the premises. Also, the sewage generation by 'in house guests' is predominantly accounted for with the residential and serviced apartments. As such, to completely exclude this area from the contribution calculation would seem to be inappropriate. Council would agree that some revision of the calculation is warranted, but the question arises as to the degree of the variation, as no factual data or evidence has been provided.

With regard to the comments for credits to the existing building, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. The initial assessment provided a 1 ET credit for the existing allotment, on the basis that the existing building (development) had not contributed any monies towards Council's infrastructure.

However, it is noted that contributions are levied on the basis of additional impact upon Council's infrastructure. As such, Council recognises the existing building (GFA 385.6m²) and concedes that the credit shall be increased to 3.856 ETs (385.6m² x 0.01 ETs per m²) and the contribution recalculated accordingly (see below).

Utilising the Water Directorate information 2017

Multi-residential lots (high density)

1 bedroom – 0.50 ETs, 2 bedroom – 0.75 ETs and 3 bedrooms – 1.0 ETs
 $= 4 \times 0.50 + 12 \times 0.75 + 11 \times 1.0 = 2.0 + 9.0 + 11.0 = 22.0$ ETs

Serviced apartments (self-contained) – use multi-residential lots (high density)

1 bedroom – 0.50 ETs and 2 bedroom – 0.75 ETs
 $= 14 \times 0.50 + 43 \times 0.75 = 7.0 + 32.25 = 39.25$ ETs

Restaurant – 0.01 ETs per m² and Bar 0.05 ETs per m²

$= 106 \times 0.01 + 79 \times 0.05 = 1.06 + 3.95 = 5.01$ ETs

Existing building – 385.6m² GFA being an office calculated @ 0.01 ETs per m²
 $= 385.6 \times 0.01 = 3.856$ ETs

Total = 62.41 ETs

Grand total = 62.404 ETs @ \$5,714.24 per ET = **\$356,591.43**

Condition 4 Water Supply Headworks Contribution, reads as follows:

- (4) *The Water Supply headworks contribution of \$247,086.33 (43.24 ETs), calculated on an equivalent tenement (ET) basis, pursuant to Section 64 of the Local Government Act, 1993, Division 5 of Part 2 of Chapter 6 of the Water Management Act, 2000 and in accordance with Council's adopted Combined Water Supply and Sewerage Contributions Policy dated November 2002 shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.*

Such contribution rate per ET is adjusted annually in accordance with Section 3 of the Combined Water Supply and Sewerage Contributions Policy becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$5,714.30 per ET.

Note 2: As the above contribution rate is reviewed annually the 'current contribution rate' is to be confirmed prior to payment.

Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application. {Reason: Implementation of Council's adopted Combined Water Supply and Sewerage Contributions Policy, November 2002, operating from 1 January 2003}

From the consultant's covering letter dated 29 April 2019, the following comments are provided with regard to Condition 4:

The Servicing Strategy Report dated December 2017 prepared in support of the development of 1 Church Street calculated the water supply demand as 44 ET. This is generally in accordance with Council's calculations based on the Water Directorate Equivalent Tenement Guidelines. Council's calculations have been checked in accordance with the Guidelines and the calculated headworks contribution based on 43.24 ET is accepted.

Comment

The consultant has accepted the contribution in this instance and has not made any reference to the existing building credit. However, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. The initial assessment provided only a 1 ET credit for the existing allotment, on the basis that the existing building (development) had not contributed any monies towards Council's infrastructure.

It is noted that contributions are levied on the basis of additional impact upon Council's infrastructure. As such, Council recognises the existing building (GFA 385.6m²) and provides that the credit shall be increased to 3.856 ETs (385.6m² x 0.01 ETs per m²) and the contribution recalculated accordingly (see below).

Utilising the Water Directorate information 2017

Multi-residential lots (high density)

1 bedroom – 0.33 ETs, 2 bedroom – 0.5 ETs and 3 bedrooms - 0.67 ETs

= 4 x 0.33 + 12 x 0.5 + 11 x 0.67 = 1.32 + 6.0 + 7.37 = 14.69 ETs

Serviced apartments (self-contained) – use multi-residential lots (high density)

1 bedroom – 0.33 ETs and 2 bedroom – 0.5 ETs

= 14 x 0.33 + 43 x 0.5 = 4.62 + 21.5 = 26.12 ETs

Restaurant – 0.01 ETs per m² and Bar 0.03 ETs per m²

= 106 x 0.01 + 79 x 0.03 = 1.06 + 2.37 = 3.43 ETs

Existing building – 385.6m² GFA being an office calculated @ 0.01 ETs per m²

= 385.6 x 0.01 = 3.856 ETs

Total = 40.384 ETs

Grand total = 40.384 ETs @ \$5,714.30 per ET = **\$230,766.29**

Condition 5 Open Space and Recreation Facilities Contribution, reads as follows:

- (5) *The contribution by the developer of the sum of \$187,711.81 (134.6 persons) in accordance with Council's Section 94 Development Contributions Plan for Dubbo Open Space and Recreation Facilities – 2016-2026. Such contribution shall be paid to Council prior to the issue of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.*

Such contribution rate per ET is adjusted annually in accordance with Section 2.17 of the Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$1,394.59 per person given the location of the development in the Central (south) planning unit.

Note 2: As the above contribution rate is reviewed annually the 'current contribution rate' is to be confirmed prior to payment.

*Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.
{Reason: Implementation of Council's Section 94 Development Contributions Plan for Dubbo Open Space and Recreation Facilities – 2016-2026}*

From the consultant's covering letter dated 29 April 2019, the following comments are provided with regard to Condition 5:

Council's calculation of the contribution payable is based on the rate of dwelling occupancy as outlined in the policy code, namely:

One (1) bedroom dwellings: 1.1 persons per dwelling

Two (2) bedroom dwellings: 1.6 persons per dwelling

Three (3) or more bedroom dwellings: 2.6 persons per dwelling

Council policy applies the rate of dwelling occupancy equally to residential accommodation and tourist/visitor accommodation.

Based on the latest layout of residential apartments and serviced apartments contained in the proposed development, the calculation indicates 136.4 persons within the complex. On this basis, the contribution required to be paid at the rate of \$1,394.59 per person is \$190,222.08.

Comment

The consultant has picked up a minor miscalculation (0.8 persons), but has then omitted the 2.6 person credit and is arguably requesting a higher contribution than that levied. However, the contribution is recalculated accordingly.

The site is located in the Central (South) planning unit.

Calculated at the following rate: 1 bedroom apartments - 1.1 persons, 2 bedroom apartments – 1.6 persons and 3 or more bedroom apartments – 2.6 persons.
 $= 18 \times 1.1 + 55 \times 1.6 + 11 \times 2.6 = 19.8 + 88.0 + 28.6 = 136.4$ persons

Total = 136.4 persons – 2.6 person credit (existing lot) = **133.8 persons** @ \$1,394.59 per person = **\$186,596.14**

Condition 6 Urban Road Headworks Contribution, reads as follows:

- (6) *The Urban Roads headworks contribution of \$199,046.60 (425.5 trips), calculated on a residential and commercial development land use basis, in accordance with Council's adopted amended Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking, operational 3 March 2016, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.*

Such contribution rate, trip, is adjusted annually in accordance with Section 6.0 of the Section 7.11 Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$600.35 (per residential trip) and \$401.40 (per commercial trip). The residential component generates 142 trips and the commercial component generates 283.5 trips.

Note 2: As the above contribution rate is reviewed annually, the current contribution rate is to be confirmed prior to payment.

*Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.
{Reason: Implementation of Council's Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking dated 2016}*

From the consultant's covering letter dated 29 April 2019, the following comments are provided with regard to Condition 6:

We agree with Council's determination of the contribution required based on a trip generation basis.

Comment

The consultant has accepted the contribution in this instance and has not made any reference to the existing building credit. However, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. The initial assessment provided an 11 trip credit for the existing allotment, on the basis that the existing building (development) had not contributed any monies towards Council's infrastructure.

It is noted that contributions are levied on the basis of additional impact upon Council's infrastructure. As such, Council recognises the existing building (GFA 385.6m²) and concedes that the credit shall be increased and the contribution recalculated accordingly (see below).

The development results in **142 trips (residential) + 294.5 trips (commercial)**

The existing building (GFA 385.6m²) being an office premises, would be entitled to a credit at the CBD Commercial rate 25 trips per 100m² GFA.

Therefore: $385.6 / 100 \times 25 = \mathbf{96.4 \text{ trips credit (commercial)}}$

Therefore: **142 trips (residential) @ \$600.35 per trip = \$85,249.70**
 $294.5 - 96.4 = \mathbf{198.1 \text{ trips (commercial) @ \$401.40 per trip = \$79,517.34}}$

Total: $142 \text{ (residential)} + 198.1 \text{ (commercial)} = \mathbf{340.1 \text{ trips} = \$164,767.04}$

Condition 7 Urban Road Headworks Contribution (parking spaces), reads as follows:

- (7) *The Urban Roads headworks contribution of \$1,241,740.00 (47 spaces), calculated on the amount of carparking spaces not provided with the development, in accordance with Council's adopted amended Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking, operational 3 March 2016, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.*

Such contribution rate, trip, is adjusted annually in accordance with Section 6.0 of the Section 7.11 Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$26,420.00 (per carparking space).

Note 2: As the above contribution rate is reviewed annually, the current contribution rate is to be confirmed prior to payment.

{Reason: Implementation of Council's Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking dated 2016}

From the consultant's covering letter dated 29 April 2019, the following comments are provided with regard to Condition 7:

1 Church Street Carparking Provision Justification

For the Restaurant and Bar component of the development, Council's Development Control Plan does not require the provision of carparking if commercial space in the CBD is converted to a café or restaurant usage. The usage of the existing building at 1 Church Street is for commercial office space.

We have previously made the case to Council that the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract most of its clientele from in house guests.

For any outside patrons that may utilise the restaurant at night, there is ample on street parking available in Church Street where easy access to the restaurant from the street is

available. Other outside patrons may already be in the CBD area for work purposes and have their cars parked at other locations in the CBD.

The usage of on street parking at night is utilised by patrons of the majority of restaurants that operate in the CBD area of Dubbo.

Council's calculation of a parking provision for the restaurant/bar area on a standalone basis for a business attracting separate clientele rather than considering the facility as an integrated entity is an incorrect assumption.

As previously submitted to Council, reasoning for the provision of the 60 carparking spaces on site for the 57 serviced apartments are outlined below:

- Whilst the 2 bedroom apartments are denoted as 2 key apartments, it is most likely that families will occupy those apartments. On that basis, a family would arrive in a single car and therefore only require a single parking space.*
- Colleagues that attend conferences either at 1 Church Street or at another venue in Dubbo are likely to travel together rather than arrive in single vehicles, thus reducing the number of parking spaces required.*
- Air links to Dubbo from Sydney, Brisbane, Melbourne, Newcastle and Canberra allows people to fly to Dubbo, arrive at accommodation facilities by taxi then arrange transport to visit local tourist attractions or attend business meetings etc.*
- The XPT train service allows people from Sydney to visit Dubbo for tourist related activities, most likely as a family holiday.*
- Package tours to Dubbo by organised groups such as sporting clubs or social clubs using coach transport, thus significantly reducing the number of parking spaces required.*

The combination of factors outlined supports the provision of 60 carparking spaces associated with the 57 serviced apartment component in the development of the 1 Church Street residential complex. Notwithstanding that the provision of the 60 parking spaces is 60% of the rate of parking provision calculated by Council, the 60 parking spaces on site provides more than 1 space for each of the 57 individual apartments

By way of comparison, the following information is provided for an existing serviced apartment complex in the CBD. We understand that the serviced apartment complex has a total of 64 apartments comprising the following mix:

Studio apartments: 23 apartments

1 Bedroom apartments: 26 apartments

2 Bedroom apartments: 12 apartments

3 Bedroom apartments: 3 apartments

Council's rate of provision for serviced apartments is:

- *One space for one bedroom apartments; and*
- *Two spaces per two or more bedroom apartments.*

The number of parking spaces required for the existing serviced apartment complex (and allowing 1 parking space for a studio apartment), the following parking spaces would be required:

23 x studio apartments x 1 space = 23 spaces

26 x 1 bedroom apartments x 1 space = 26 spaces

12 x 2 bedroom apartments x 2 spaces = 24 spaces

3 x 3 bedroom apartments x 2 spaces = 6 spaces

Total 79 spaces

The number of parking spaces provided on site for the existing serviced apartment complex is a total of 44 carparking spaces including 3 stacked parking spaces, presumably associated with the 3 x 3 bedroom apartments. The provision of 44 parking spaces on site is an apparent shortfall of 35 parking spaces compared to Council's rate of parking provision.

The 44 parking spaces provided on site are at an approximate rate of provision of 56% of actual spaces to the calculated required spaces under Council's DCP. Additionally, until recently, the serviced apartment complex included the operation of a large restaurant and bar facility, however, parking associated with the restaurant is not included in the serviced apartment allocation.

Given that the restaurant has an area of approximately 120m² including the bar space, the required parking allocation under Council's reasoning related to 1 Church Street would be 5 spaces.

Therefore, if assessed in accordance with Council's application of the DCP provisions to 1 Church Street, then the existing serviced apartment complex including the restaurant has an apparent total shortfall of 40 parking spaces.

We are not aware that the development of the serviced apartment complex in the CBD was required to pay Council a contribution for the indicated shortfall of 40 parking spaces compared to the 44 parking spaces actually provided on site.

Comment

With regard to the consultant's justification to vary the parking rate, thereby reducing the number of parking spaces which it is deficient and thereby reducing the value of the parking contribution, the following comments are provided.

The consultant states that: *“For the Restaurant and Bar component of the development, Council’s Development Control Plan does not require the provision of carparking if commercial space in the CBD is converted to a café or restaurant usage. The usage of the existing building at 1 Church Street is for commercial office space.”*

Firstly, the ‘bar’ component is not relevant (ie. not a café or restaurant) and secondly, the exemption applies to ‘change of use’ applications, not demolition and rebuilds.

The consultant states that: *“For any outside patrons that may utilise the restaurant at night, there is ample on street parking available in Church Street where easy access to the restaurant from the street is available. Other outside patrons may already be in the CBD area for work purposes and have their cars parked at other locations in the CBD.”*

The public street is not a substitute for the parking required for the approved development.

The consultant states that: *“Council’s calculation of a parking provision for the restaurant/bar area on a standalone basis for a business attracting separate clientele rather than considering the facility as an integrated entity is an incorrect assumption.”*

Comments from Council’s Manager Infrastructure Strategy and Design read as follows: *“It is not unreasonable to impose a requirement for car parking for a new restaurant and bar on a greenfield development. The facility will be subject to a high quality of service and product will likely be an attractor in its own right. The viability of the facility will rely on patronage of both external customers and residents of the development.”*

The restaurant and bar are on a river side location, which may soon become an entertainment area (under the Beautification of the Macquarie River Corridor of the Dubbo Central Business District). It is likely that the views from the development will also be an attractor and encourage additional clientele to the bar and restaurant who will undoubtedly require some parking availability. In addition, 57% of tourists to Central NSW eat out at restaurant or café.

The argument that all potential customers will be in the area and using street parking is arguing that no new development generates traffic or demand for parking.”

As stated earlier in the Report, Council will consider the development on an integrated basis, when some factual data is provided arguing this issue. Otherwise, Council has no option than to apply parking rates based on the floor area of the approved plans for the separate components.

The consultant states: *“The combination of factors outlined supports the provision of 60 carparking spaces associated with the 57 serviced apartment component in the development of the 1 Church Street residential complex.”*

Reasoning by the consultant for the reduced parking rate includes the following:

- Whilst the 2 bedroom apartments are denoted as 2 key apartments, it is most likely that families will occupy those apartments. On that basis, a family would arrive in a single car and therefore only require a single parking space.
- Colleagues that attend conferences either at 1 Church Street or another venue in Dubbo are likely to travel together rather than arrive in single vehicles, thus reducing the number of parking spaces required.
- Air links to Dubbo from Sydney, Brisbane, Melbourne, Newcastle and Canberra allows people to fly to Dubbo, arrive at accommodation facilities by taxi then arrange transport to visit local tourist attractions or attend business meetings etc.
- The XPT train service allows people from Sydney to visit Dubbo for tourist related activities, most likely as a family holiday.
- Package tours to Dubbo by organised groups such as sporting clubs or social clubs using coach transport, thus significantly reducing the number of parking spaces provided.

Comments from Council's Manager Infrastructure Strategy and Design (**Appendix 4**) read as follows: "There has been no evidence provided to substantiate the claim that only 1 vehicle would only be required for a 2 bedroom apartment (colleagues travelling separately) or that coach tours are more popular and therefore negate the need for car parking requirements. Tourism data does not correlate with Premise's arguments.

Tourism data produced by Destination NSW indicates that:

- 89% of domestic visitors to Central NSW travelled by private car/company car, the remaining 11% was air/coach.
- 50% of international visitors travelled in private/rental cars.
- 58% of visitors to the region travelled for holiday/business, so would require accommodation.
- 57% of tourists to Central NSW eat out at restaurant or café.

Whilst the increase in air traffic is agreed with, tourism figures suggest that almost 89% of domestic visitors to Central NSW travelled by private car/company car.

The vehicle hire facilities at the Dubbo Regional Airport has recently been expanded to accommodate the growth in demand for hire vehicles.

There is no data presented to confirm that the increase in air travel and passenger numbers reduces the need for driving a vehicle and requiring parking, as there are passengers who require taxi services for potential accommodation visitation and passengers who hire vehicles who may or may not accommodate in Dubbo."

In summing up this matter Council's Manager Infrastructure Strategy and Design states: "Consideration has been given to the arguments presented by Premise of which most is based on the Quest development and anecdotal claims and assumptions on the parking behaviour and vehicle generation that will occur with the development.

The adopted rate for the Quest development was based on the factual occupancy data obtained from 18 Quest developments. It must be noted that Quest only provides typical short-term accommodation facilities, whereas the development at 1 Church Street is a mixed-use development. Infrastructure has presented evidence that does not correlate with the arguments presented by premise. As such, no reduction in contributions should be provided.

It needs to be understood that Council's Section 94 Contribution Plan has been developed based on the future growth, development and parking needs of the City with a dollar value assigned to the infrastructure requirements that Council is to provide a contribution rate has been adopted to satisfactorily accommodate that growth.

Historically Council has given consideration to vary the contributions based on factual, comprehensive and relevant data that allows an informed and logical decision to be made. However, in the case for 1 Church Street, Premise have concluded that there is no requirement for any additional car parking contribution for the serviced apartments other than for their calculated 60 spaces being 44% less than the DCP requirement of 107 spaces.

It should also be noted that parking figures for other similar developments assessed in recent times (102 Macquarie Street, MAAS, Kim Williams) were calculated using Dubbo DCP figures, or a detailed transportation/parking study was provided."

Engineering Assessment

Council wrote the applicant on three (3) separate occasions (22 May 2019, 5 July 2019 and 3 September 2019) (**Appendix 3**), seeking justification (detailed evidence/studies) to support the variation sought. Further information dated 5 September and 22 October 2019 (**Appendix 2**) was received from the applicant and referred onto Council's Infrastructure Strategy and Design Division for assessment.

The resultant comments were that the applicant has not justified the proposed deletion of Condition 7 equating to \$1,241,740.00 (47 spaces), as the details provided were deemed to be inadequate, such that no variation could be adequately determined.

As such, the proposed development does not meet the parking requirement for **141 spaces**. The approved plans indicate that 94 spaces have been provided, being a deficit of **47 spaces**.

The contribution plan makes provision for developments that cannot meet the required parking rate, to provide a monetary payment to Council. The current car space value is \$26,420.00 per space and therefore the applicable contribution will be \$1,241,740.00 for the 47 spaces, as detailed in Condition 7.

It should be noted that the proponent has other options to reduce the number of outstanding parking spaces and hence the value of the contribution. For instance, this could be achieved by redesigning the development reduced number of serviced apartment or shop top housing units; providing additional parking; or a combination of both.

SUMMARY

The proposed modified Development Application D17-671(2) has sought to modify Conditions 3, 4, 5, 6 and 7 with regard to the contributions levied for the development at Lot 22 DP 230028, 1 Church Street, Dubbo.

The variations sought with regard to Conditions 3, 4, 5 and 6 are noted and agreed. However, the variation sought (deletion) with regard to Condition 7 has not been justified and is therefore not supported.

The proposed modification is not considered likely to have any detrimental impacts upon the environment or upon the amenity of the locality. The proposed modified development is therefore recommended for approval subject to the modified conditions of consent attached. **(Appendix 1).**

Appendices:

- 1 [↓](#) Conditions and Notations
- 2 [↓](#) Consultants Submissions
- 3 [↓](#) Council's Correspondence dated 22 May 2019
- 4 [↓](#) Manager Infrastructure Strategy and Design- Referral table 1 dated 8 November 2019

APPENDIX 1: MODIFIED CONDITIONS OF CONSENT D2017-671(2)**CONDITIONS**

- (1) The development shall be undertaken generally in accordance with the Statement of Environmental Effects and stamped approved plans (as amended in red) detailed as follows except where modified by any of the following conditions:

Title/Plan No.: COVER PAGE / DA000
 Issue/Dated: C / 2018.08.24
 Drawn by: PBD ARCHITECTS

Title/Plan No.: DEMOLITION PLAN / DA003
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: BASIX Commitments / DA004
 Issue/Dated: C / 2018.10.22
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LOWER GROUND FLOOR PLAN / DA100
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: MEZZANINE FLOOR PLAN / DA101
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: GROUND FLOOR PLAN / DA102
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 1 PLAN CARPARK / DA103
 Issue/Dated: C / 2018.08.23
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 2 PLAN SERVICED APARTMENTS & FACILITIES / DA104
 Issue/Dated: C / 2018.08.23
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 3 - 6 PLAN SERVICED APARTMENTS/ DA105
 Issue/Dated: C / 2018.08.23
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 7 - 10 PLAN / DA106
 Issue/Dated: C / 2018.08.23
 Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 11 PLAN RESIDENTIAL & COMMUNAL OPEN SPACE / DA107
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: LEVEL 12 – 13 PLAN RESIDENTIAL / DA108
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: ROOF PLAN / DA109
Issue/Dated: B / 2018.07.16
Drawn by: PBD ARCHITECTS

Title/Plan No.: NORTH ELEVATION (Church Street) / DA200
Issue/Dated: B / 2018.07.13
Drawn by: PBD ARCHITECTS

Title/Plan No.: WEST ELEVATION (Bligh Street) / DA201
Issue/Dated: B / 2018.07.13
Drawn by: PBD ARCHITECTS

Title/Plan No.: SOUTH ELEVATION / DA202
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: EAST ELEVATION / DA203
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: SECTION A / DA300
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: SECTION B / DA301
Issue/Dated: B / 2018.07.13
Drawn by: PBD ARCHITECTS

Title/Plan No.: MATERIAL SCHEDULE NORTH ELEVATION / DA400
Issue/Dated: B / 2018.07.13
Drawn by: PBD ARCHITECTS

Title/Plan No.: MATERIAL SCHEDULE WEST ELEVATION / DA401
Issue/Dated: B / 2018.07.13
Drawn by: PBD ARCHITECTS

Title/Plan No.: MATERIAL SCHEDULE SOUTH ELEVATION / DA402
Issue/Dated: C / 2018.08.23
Drawn by: PBD ARCHITECTS

Title/Plan No.: MATERIAL SCHEDULE EAST ELEVATION / DA403
 Issue/Dated: C / 2018.08.23
 Drawn by: PBD ARCHITECTS

Title/Plan No.: ADAPTABLE UNIT TYPE A RESIDENTIAL UNIT 702, 802 / DA700
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: ADAPTABLE UNIT TYPE B RESIDENTIAL UNIT 706, 806, 906, 1006 / DA701
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: ADAPTABLE UNIT TYPE C SERVICED APARTMENT UNIT 302, 402, 502, 602 / DA702
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: ADAPTABLE UNIT TYPE D SERVICED APARTMENT UNIT 309, 409, 509, 609 / DA703
 Issue/Dated: B / 2018.07.16
 Drawn by: PBD ARCHITECTS

Title/Plan No.: STRATUM SUBDIVISION / Sheets 1 to 7
 Surveyor's Ref: 117187.08B.SP
 Drawn by: WARREN R. SAUNDERS

Title/Plan No.: STRATA SUBDIVISION OF LOT 4 / Sheets 1 to 10
 Surveyor's Ref: 117187.07B.SP
 Drawn by: WARREN R. SAUNDERS

{Reason: To ensure that the development is undertaken in accordance with that assessed}

- (2) Carspaces R28 and R29 as shown on LEVEL 1 PLAN CARPARK, DA103 Issue C dated 2018.08.23, are positioned in a stacked arrangement and as such the two (2) spaces shall be designated to a three (3) bedroom shoptop housing apartment.
 {Reason: To ensure the orderly allocation of parking}

CONDITION (3) AMENDED WITH CONSENT D17-671 PART 2 TO READ AS FOLLOWS:

- (3) The Sewerage Services headworks contribution of \$356,591.43 (62.404 ETs), calculated on an equivalent tenement (ET) basis, pursuant to Section 64 of the Local Government Act, 1993, Division 5 of Part 2 of Chapter 6 of the Water Management Act, 2000 and in accordance with Council's adopted Combined Water Supply and Sewerage Contributions Policy dated November 2002, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.

Such contribution rate per ET lot is adjusted annually in accordance with Section 3 of the Combined Water Supply and Sewerage Contributions Policy becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$5,714.24 per ET.

Note 2: As the above contribution rate is reviewed annually, the 'current contribution rate' is to be confirmed prior to payment.

Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.

{Reason: Implementation of Council's adopted Combined Water Supply and Sewerage Contributions Policy, November 2002, operating from 1 January 2003}

CONDITION (4) AMENDED WITH CONSENT D17-671 PART 2 TO READ AS FOLLOWS:

- (4) The Water Supply headworks contribution of \$230,766.29 (40.384 ETs), calculated on an equivalent tenement (ET) basis, pursuant to Section 64 of the Local Government Act, 1993, Division 5 of Part 2 of Chapter 6 of the Water Management Act, 2000 and in accordance with Council's adopted Combined Water Supply and Sewerage Contributions Policy dated November 2002 shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.

Such contribution rate per ET is adjusted annually in accordance with Section 3 of the Combined Water Supply and Sewerage Contributions Policy becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$5,714.30 per ET.

Note 2: As the above contribution rate is reviewed annually the 'current contribution rate' is to be confirmed prior to payment.

Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.

{Reason: Implementation of Council's adopted Combined Water Supply and Sewerage Contributions Policy, November 2002, operating from 1 January 2003}

CONDITION (5) AMENDED WITH CONSENT D17-671 PART 2 TO READ AS FOLLOWS:

- (5) The contribution by the developer of the sum of \$186,596.14 (133.8 persons) in accordance with Council's Section 94 Development Contributions Plan for Dubbo Open Space and Recreation Facilities – 2016-2026. Such contribution shall be paid to Council prior to the issue of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.

Such contribution rate per ET is adjusted annually in accordance with Section 2.17 of the Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$1,394.59 per person given the location of the development in the Central (south) planning unit.

Note 2: As the above contribution rate is reviewed annually the 'current contribution rate' is to be confirmed prior to payment.

Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.

{Reason: Implementation of Council's Section 94 Development Contributions Plan for Dubbo Open Space and Recreation Facilities – 2016-2026}

CONDITION (6) AMENDED WITH CONSENT D17-671 PART 2 TO READ AS FOLLOWS:

- (6) The Urban Roads headworks contribution of \$164,767.04 (340.1 trips), calculated on a residential and commercial development land use basis, in accordance with Council's adopted amended Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking, operational 3 March 2016, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.

Such contribution rate, trip, is adjusted annually in accordance with Section 6.0 of the Section 7.11 Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$600.35 (per residential trip) and \$401.40 (per commercial trip). The residential component generates 142 trips and the commercial component generates 283.5 trips.

Note 2: As the above contribution rate is reviewed annually, the current contribution rate is to be confirmed prior to payment.

Note 3: Should an applicant seek to utilise a bank guarantee or bond that has been agreed to by Council's Infrastructure and Operations Division, such shall be provided with the lodgement of the Occupation Certificate or Subdivision Certificate application.

{Reason: Implementation of Council's Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking dated 2016}

- (7) The Urban Roads headworks contribution of **\$1,241,740.00 (47 spaces)**, calculated on the amount of carparking spaces not provided with the development, in accordance with Council's adopted amended Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking, operational 3 March 2016, shall be paid by the developer on the submission of the relevant Occupation Certificate or Subdivision Certificate, whichever occurs first.

Such contribution rate, trip, is adjusted annually in accordance with Section 6.0 of the Section 7.11 Contributions Plan becoming effective from 1 July each year and as adopted in Council's annual Revenue Policy.

Note 1: Council's adopted 2018/2019 financial year rate is \$26,420.00 (per carparking space).

Note 2: As the above contribution rate is reviewed annually, the current contribution rate is to be confirmed prior to payment.

{Reason: Implementation of Council's Section 7.11 Contributions Plan - Roads, Traffic Management and Car Parking dated 2016}

- (8) The development shall be landscaped generally in accordance with the Statement of Environmental Effects and stamped approved plans (as amended in red) detailed as follows except where modified by any of the following conditions:

Title/Plan No.: PROPOSED LANDSCAPE PLAN – COVER SHEET / L/00
Issue/Dated: B / 28/08/18
Drawn by: A Total Concept Landscape Architects

Title/Plan No.: PROPOSED LANDSCAPE PLAN – LOWER GROUND / L/01
Issue/Dated: A / 13/12/17
Drawn by: A Total Concept Landscape Architects

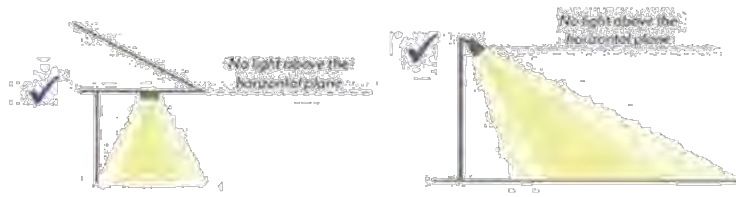
Title/Plan No.: PROPOSED LANDSCAPE PLAN – GROUND LEVEL / L/02
Issue/Dated: A / 13/12/17
Drawn by: A Total Concept Landscape Architects

Title/Plan No.: PROPOSED LANDSCAPE PLAN – LEVEL 2 / L/04
Issue/Dated: A / 13/12/17
Drawn by: A Total Concept Landscape Architects

Title/Plan No.: PROPOSED LANDSCAPE PLAN – LEVEL 11 / L/05
Issue/Dated: B / 28/08/18
Drawn by: A Total Concept Landscape Architects

{Reason: To ensure that the development is undertaken in accordance with that assessed}

- (9) Any external light fittings for the subject development shall be shielded. This will include the facilities area proposed for Level 2 and the communal open space for Level 11. The shielded outside light fittings should also be automatic light fittings, where appropriate.



automatic light fitting means a light fitting that is activated by a sensor and switches off automatically after a period of time.

horizontal plane, in relation to a light fitting, means the horizontal plane passing through the centre of the light source (for example, the bulb) of the light fitting.

outside light fitting means a light fitting that is attached or fixed outside, including on the exterior of a building.

shielded light fitting means a light fitting that does not permit light to shine above the horizontal plane.

{Reason: To limit light pollution and sky glow and to protect observation conditions at the Siding Spring Observatory}

- (10) The drainage and plumbing installation shall comply with the provisions of the Local Government (General) Regulation, 2005 and the requirements of Council as the water and sewerage authority.

{Reason: Statutory and Council requirement}

- (11) The marking and signage to the disabled car park spaces shall be maintained in a trafficable and legible condition to the requirements of AS/NZS 2890.6. Such parking spaces shall have a continuous accessible path of travel provided between them and the passenger lifts servicing each floor of the building.

{Reason: Council requirement in consideration of section 4.15 of the EP&A Act and the DDA 1992}

- (12) The Applicant must forward to the Certifying Authority with the Construction Certificate application, specifications, drawings and hydraulic design calculations of the proposed fire hydrant and hose reel system, prepared by a practicing hydraulics engineer. Such details shall form part of the building's Construction Certificate.

The submitted design information must include relevant details relating to:

- (a) Pipe sizes, materials, bedding and cover requirements, thrust blocks;
- (b) Positions of any valves, hydrants, hose reels, pumps, booster valves, branch off-takes, storage tanks, meter and backflow devices;
- (c) Location and size of any connection to Council's water mains and proposed draw-off rate;
- (d) Diagrammatic design and elevation view of the meter stand assembly and fire brigade booster assembly, ensuring the direction of flow from the Council water main is clearly indicated;
- (e) Design calculations indicating:
 - (i) Residual outlet pressure achieved at the most disadvantaged fire hose reel as

- stipulated under AS 2441;
- (ii) Residual outlet pressure achieved during the simultaneous operation of the required number of most disadvantaged hydrants as stipulated under AS 2419.1;
 - (iii) Written advice of the water supply authority as to the minimum and maximum static pressures expected from its supply, as well as the pressures expected at fire flow rates of at least 10, 20 and 30 l/s; and
- (f) Specifications/diagrams indicating design and installation information appropriate for:
- (i) Type of hydrants and valves, provision of hydrant blanking caps, etc; and
 - (ii) In relation to the fire brigade booster assembly, the required notices, markings and system block plan stipulated by AS 2419.1. In particular, a diagrammatic representation of the proposed system block plan is to be provided, together with the system's stated designed working pressure.

{Reason: Council requirement to ensure compliance with the BCA is demonstrated}

- (13) The applicant must forward to the Certifying Authority with the Construction Certificate application, a detailed design of the development's and building's proposed stormwater drainage system, which shall include hydraulic design calculations, surface and invert levels, pipe sizes and grades. Such details shall form part of the building's Construction Certificate.

Such design must also facilitate the cleaning and disposal of accumulated sediment and impounded floodwaters from the Lower Ground floor and Mezzanine floor carpark levels following inundation by a flood event having a magnitude of up to the 1% AEP (i.e. RL 262.5m AHD).

In conjunction with the preparation with the above stormwater design as well as the building's architectural plans, the driveway entry from Bligh Street into the Lower Ground Floor Level, must be provided with a crest level of at least 200mm above the street kerb level (approximately 257.4m AHD) at the building's alignment, to reduce the frequency of stormwater entry from the road.

{Reason: Council requirements to demonstrate compliance with the BCA; provision of an adequate means of disposal of floodwater and sediment; and limit stormwater entry}

- (14) Temporary closet accommodation shall be provided onsite before work on the proposed building is commenced.

{Reason: Council requirement to preserve public hygiene}

- (15) Separate approval is required to be obtained from Council (as the relevant Roads Authority) if it is proposed to erect a hoarding upon Council's footpath. Enquiries in this regard should be directed to Council's Infrastructure and Operations Division.

{Reason: Statutory requirement of s138 Roads Act 1993}

(16) The Applicant must comply with the following:

- (a) The Applicant/proponent must at its own expense:
 - (i) Prior to work commencing, engage suitably experienced contractor/s to carry out an inspection of the adjoining premises and prepare and submit to Council a 'dilapidation report' documenting the current condition of all buildings on each parcel adjoining No: 1 Church Street; and
 - (ii) Preserve and protect the adjoining buildings from damage during the excavation and demolition work; and
 - (iii) If necessary, underpin and support the building(s) in an approved engineered manner in accordance with industry standards; and
- (b) The applicant must give the owners of the 'adjoining premises, at least fourteen (14) days written notice of the need for his representative/contractor to inspect the premises in order to prepare the 'dilapidation report' required above, before demolition or excavation work begins; and
- (c) Should an owner of an adjoining premises refuse access or fail to respond within the aforementioned timeframe, the contractor may proceed with the excavation works without further notice; and
- (d) The applicant and contractor must, at least seven (7) days before excavating below the level of the base of the footings of any building on the adjoining allotment(s), give notice of intention to do so to the owner of such adjoining allotment and furnish particulars to the owner of the proposed work; and
- (e) Within fourteen (14) days of the completion of the demolition, excavation and retaining wall construction work, the contractor who carried out the initial inspection and prepared the 'dilapidation report' shall carry out a re-inspection of each adjoining premises (if a report was prepared) to determine any changes in the condition of the premises that may be attributed to the demolition and excavation/retaining wall construction work.

{Reason: To ensure support is maintained to neighbouring buildings and any detrimental effects of the approved works are able to be identified by comparison to a pre-development report}

- (17) A hoarding, barricade or fence shall be erected between the demolition/construction site and any adjoining public place and/or around any road openings or obstructions if pedestrian or vehicular traffic is likely to be endangered, obstructed or inconvenienced by the proposed works. If necessary, an awning sufficient to prevent any material from, or in connection with the work falling onto the public place is also to be erected.

The work is to be kept lit during the time between sunset and sunrise if the work may be a source of danger to persons using the adjoining public place.

{Reason: Council requirement for the protection of the public}

- (18) The sanitary, water plumbing and drainage associated with the proposed building requires the issue of a separate approval from Council prior to being installed. In this regard a Drainage and Plumbing Approval Application form is available from Council, and must be completed by the licensed plumbing and drainage contractor and returned to Council with the appropriate fee. Drainage or plumbing works must not be commenced until Council has issued a permit authorising such works.

To facilitate Council's inspection of the water plumbing and sanitary plumbing and drainage work associated with the proposed development, a copy of such building's final hydraulic and fire service drawing(s) and/or floor plan must be submitted to Council's Planning and Environment Division prior to such works commencing.

{Reason: Statutory requirement of Local Government Act 1993}

- (19) All sanitary plumbing and drainage and water plumbing work shall be carried out by a licensed plumber and drainer.

{Reason: Statutory requirement of Section 634 Local Government Act 1993}

- (20) A survey certificate indicating the position of the building's external walls and balconies in relation to the allotment boundaries and adjoining roads, shall be submitted to the Principal Certifying Authority (PCA) and Council prior to issue of the building's occupation certificate. Such survey certificate shall also provide the finished floor levels of the lower and upper car park floors and the ground retail/commercial floor, relative to Australian Height Datum.

{Reason: To ensure setbacks/clearances have been achieved as approved in the development consent}

- (21) Council's footpath and adjoining car park and pedestrian access ways shall be kept free of all refuse, building materials and unnecessary traffic and disturbance. Any unauthorised material found upon Council's footpath or land may be impounded or removed without notice. Any proposed occupation of footpath and adjoining Council land must be approved by Council and/or be the subject of a Section 138 approval under the Roads Act.

{Reason: Council requirement as the relevant road authority and land owner}

- (22) The top of the building's overflow (relief) gully shall be a minimum 150 mm below the building's lowest sanitary fixture.

The building's overflow (relief) gully shall also:

- (a) Be a minimum 75 mm above the finished surrounding ground level; or
- (b) Where the overflow (relief) gully is located in a path or paved area which is finished such that surface water cannot enter it and is graded away from the building, it may be finished level with such path or paved area; and
- (c) A minimum 150mm above the 1% AEP flood event level of RL 262.5 m AHD.

{Reason: Statutory requirement}

- (23) The following applicable works shall be inspected and passed by an officer of Council, irrespective of any other inspection works undertaken by an accredited certifier, prior to them being covered. In this regard, at least 24 hours notice shall be given to Council for inspection of such works. When requesting an inspection, please quote Council's reference number **D2017-671**.

Advanced notification for an inspection should be made by emailing enviroadmin@dubbo.nsw.gov.au or by telephoning Council's Planning and Environment Division on 6801 4612.

- Internal and external sanitary plumbing and drainage including stackwork, under hydraulic test.
- Water plumbing, under hydraulic test.
- Fire services water plumbing under hydraulic test.
- Final inspection of the installed sanitary and water plumbing fixtures upon the building's completion prior to its occupation/use.

{Reason: Statutory provision and Council requirement being the delegated Regulatory Authority & water supply operator}

- (24) The hot water delivered to the outlets of all hand-basins, baths and showers shall not exceed 50°C, whilst similar ambulant and disabled fixtures shall not exceed 45° C.

{Reason: Council policy and statutory requirement of the Plumbing Code of Australia}

- (25) All roof and stormwater work shall be carried out in accordance with the requirements of the Local Government (General) Regulation and the Plumbing Code of Australia. In this regard the licensee is required to submit to Council a Certificate of Compliance for the subject stormwater work within two days of completion.

{Reason: Statutory and Council requirement}

- (26) The applicant shall ensure that the responsible builder or contractor submits to Council, if Council is engaged to act as the Principal Certifying Authority (PCA), a Certificate of Installation certifying that the wet areas of the building have been protected by the installation of a water-proofing system conforming to AS 3740 'Waterproofing of domestic wet area'. Such Certificate must be provided prior to occupation or use of the building.

{Reason: To demonstrate the provision of an adequate moisture proofing system}

- (27) The building or part thereof shall not be occupied or used until the Principal Certifying Authority (PCA) has first issued an Occupation Certificate.

{Reason: Statutory requirement to ensure the building or is fit for occupation}

- (28) All excavations associated with the erection of the building and installation of associated services must be properly guarded and protected to prevent them from being dangerous to life or property. Excavations undertaken across or in a public place must be kept adequately guarded and/or enclosed and lit between sunset and sunrise, if left open or otherwise in a condition likely to be hazardous to persons in the public place.

{Reason: Council requirement for protection of public}

- (29) All building work must be carried out in accordance with the provisions of the Building Code of Australia.

{Reason: Prescribed statutory condition under EP&A Act}

- (30) If an excavation associated with the proposed building work extends below the surface level of an adjoining allotment of land and/or the base of the footings of a building on an adjoining allotment of land, the person having the benefit of the development consent must, at the person's own expense:

- (a) Protect and support the adjoining premises from possible damage from the excavation; and
- (b) Where necessary underpin the adjoining premises to prevent any such damage.

For the purposes of this condition, *allotment of land* includes a public road and any other public place. This condition does not apply if the person having the benefit of the development consent owns the adjoining land, or the owner of the adjoining land has given consent in writing to this condition not applying.

{Reason: Prescribed condition pursuant to clause 98E of the EP&A Regulation 2000 and Council requirement to preserve the stability of adjoining roads/public places}

- (31) Prior to works commencing the Applicant shall ensure that a sign is erected on the work site in a prominent position at the front of the property showing:
 - (a) The name, address and telephone number of the Principal Certifying Authority (PCA) for the work;
 - (b) The name of the principal contractor for the building/demolition work and a telephone number on which that person may be contacted outside of working hours; and
 - (c) Stating that unauthorised entry to the work site is prohibited.

Such sign must be maintained on the site during the course of the building/demolition work and not be removed until the work has been completed.

{Reason: Statutory condition imposed by clause 98A of the EP&A Regulation 2000}

- (32) Prior to the issuing of an Occupation Certificate for the Class 2 portions of the building, documentary evidence is to be provided to the Principal Certifying Authority (PCA) identifying that the commitments set out in the approved BASIX Certificate have been satisfied.

{Reason: To fulfil the statutory requirement of Environmental Planning and Assessment Regulation 2000}

- (33) If Council is engaged to act as the Principal Certifying Authority (PCA), the applicant shall ensure that the responsible builder and/or applicable contractors submit to Council documentary evidence identifying and confirming that their respective work was undertaken in conformity with the relevant Section J provisions of the BCA, as approved under the Construction Certificate. Such documentation must be provided prior to issue of the building's Occupation Certificate.

{Reason: To satisfy Council as the PCA that the applicable work has been undertaken in conformity with the BCA}

- (34) A Flood Management Plan shall be developed for the subject development prior to any Occupation Certificate being issued for the Lower Ground floor and Mezzanine floor car park levels and the Ground Floor commercial/car park level of the development (if staged construction), a copy of which shall be submitted to Council.

Prior to any Occupation Certificate being issued for any of the residential accommodation floor levels, a comprehensive Flood Management Plan (incorporating any initial plan provisions for the car park and retail levels) shall have been prepared and a copy submitted to Council.

The subject Flood Management Plan must include, but is not limited to, the following aspects as relevant to the development-

Preparedness

Activation – detail the circumstances (river heights, level of flooding etc) upon which the Plan is activated, the authority to activate it and the organizations/persons (internal and external) that must be notified. Identify the maximum height and level to which evacuation must be commenced to affect evacuation of the building before evacuation routes are cut by flood waters. References to flood warning heights to activate preparedness activities, evacuation commencement and completion need to be stipulated in both qualitative and quantitative terms, as provided by the Bureau of Meteorology's (BoM) flood warning service;

Warning – describe the warning arrangements to be provided to tenants, residents and relevant external agencies/persons;

Education – outline flood preparedness information to be provided to tenants and residents operating in the car park levels;

Responsibilities – list responsibilities for various actions;

Preliminary Actions/Deployments – detail actions required to be implemented, resources to be notified, placed on stand-by, marshaled and deployed in advance of flooding.

Response

Control – detail who is in charge/in control of the development's flood response;

Operations Centre – nominate the location for the co-ordination of the development's response operations;

Liaison – detail person or persons responsible for maintaining contact with external agencies ie SES, Police, Council, media etc. Outline arrangements for recording tenant and resident evacuations and off-site/forwarding contact details;

Communications – detail any special requirements and any dedicated communication channels for internal and external use;

Information – detail arrangements for the passing of information to and from tenants/residents and other occupants;

Actions/Deployments – list/detail critical flood heights/levels and required responses. Identify where, when and how infrastructure and services must be removed or shut-down and areas evacuated, including resources and likely time required to implement. Identify the critical level/point at which the development must be evacuated and closed down. Outline resources required to effect evacuations, having regard to the likely unavailability of significant resources from the emergency services; and list alternative accommodation locations. Note: it is preferable that critical levels be correlated to gauge heights at the

Dubbo Pump Station gauge site, being the principal flood warning gauge for Dubbo;

Resupply Logistics – detail arrangements required to be implemented to facilitate loading and unloading of supplies to the development upon basement road access being unavailable;

Road Arrangements – detail arrangements with the local Roads Authority for alternative loading/unloading areas, vehicle parking, refuse collection etc upon basement road access becoming unavailable.

Recovery

Co-ordination – outline who is to co-ordinate the inspection, repairs and reinstatement of the development's services and infrastructure;

Cleaning – outline arrangements for removal of flood debris, damaged furnishings etc and cleaning/hosing down; list of recommended and specialist contractors;

Reinstatement of services – outline arrangements for inspection of services to determine damage, repairs and reinstatement; list of recommended and specialist contractors;

Repairs – outline arrangements for repairs, list of recommended and specialist contractors;

All-clear – outline arrangements for authorizing reoccupation/use of flood affected areas.

{Reason: Council requirement to ensure appropriate flood management planning is instigated to prevent occupants being trapped by floodwaters, minimise flood damage and facilitate earlier reoccupation}

- (35) The subject building shall be evacuated of all tenants, residents and occupants prior to the building's highest evacuation point (i.e. the Church Street vehicular crossing) being inundated by flood waters. As a consequence, the required Flood Management Plan must specify-

- (a) the actual or estimated height at which pedestrian access by that evacuation route becomes untenable, including relating such height to the Dubbo Pump Station;
- (b) the minimum time required to effect the complete evacuation of the building, including relating such height to the Dubbo Pump Station; as well as a factor of safety; and
- (c) the actual or estimated height at which evacuation must be instigated, related to the aforementioned evacuation time with a factor of safety, to effect evacuation of the building before the evacuation route becomes untenable.

{Reason: Council requirement to ensure that occupants of the subject building are not trapped by floodwaters and have to be subsequently rescued by emergency services, risking the lives of such personnel and the occupants}

- (36) All electrical and mechanical equipment such as main power supply, heating/air conditioning units and the like, where practicable, shall be located above the Flood Planning Level, which for this site is RL 263.0 m AHD. All fittings below such level shall be designed to be flood compatible and of flood compatible materials having an order of preference of 'suitable' in accordance with Appendix A 'Dubbo Flood Proofing Guidelines' of Council's Flood Prone-land Policy (refer to Table 10 of Appendix F in the Floodplain Development Manual 1986).

{Reason: Council requirement having regard to Council's Flood-prone Land Policy to minimise property damage}

- (37) The structural details of the proposed building shall be designed and certified by an appropriately qualified structural engineer familiar with the design of buildings on floodplain lands ensuring that the structure can withstand the likely buoyancy, velocity and debris impact forces that may result as a consequence of inundation during a flood event. The Certifying Authority shall satisfy itself that compliance with this condition has been met, prior to release of the applicable Construction Certificate.

{Reason: Council requirement to ensure structural stability of the building on flood prone land}

- (38) All utilities, services and infrastructure necessary to maintain and permit the continued safe and healthy occupation and operation of the development's retail/commercial and residential storey levels, shall be located above and/or flood-proofed to at least the Flood Planning Level, which for this site is RL 263.0 m AHD, unless otherwise permitted under this condition. Services associated with the Lower Ground floor and Mezzanine floor car park levels whilst having to be flood compatible, must also be designed to be shut-down / disconnected / isolated in advance of inundation without detrimentally affecting the rest of the building's services.

As occupation of the subject building cannot be achieved up to the 1% AEP flood event level of 262.5m AHD due to an inability to sustain appropriate building services, safe and healthy conditions and evacuation measures up to that height, then the lowest height to which they can be maintained must be specified in the Flood Management Plan required by separate condition on this consent. Under these circumstances, the subject services must be flood-proofed and if not otherwise practicable to do so, be flood compatible to a height of 500mm above the level at which the building is required to have been evacuated and cleared of all occupants.

Prior to any Occupation Certificate being issued for the building's three lowest floor levels (i.e. Lower Ground, Mezzanine and Ground), each relevant service design engineer (ie electrical, hydraulic, mechanical, fire safety etc) shall provide a design statement to the effect that their respective service designs will in their opinion achieve compliance with the requirements of this condition.

{Reason: Council requirement to ensure the building is designed to be able to continue to function after flood inundation}

- (39) Should any contaminated, scheduled, hazardous or asbestos material be discovered before or during earthmoving/construction works, the applicant and contractor shall ensure the appropriate Regulatory Authority (eg EPA, WorkCover Authority, Council, NSW Fire Brigade etc) is notified, and that such material is contained, encapsulated, sealed, handled or otherwise disposed of to the requirements of such Authority. (Note: Such materials cannot be disposed of to landfill unless the facility is specifically licensed by the EPA to receive that type of waste).

{Reason: Council requirement to prevent the contamination of the environment}

- (40) Noise from the development (L_{Aeq}) shall not exceed the background (L_{A90}) by more than 5dB(A) at any time including any allowance for impulsiveness and tonal characteristics, when measured at the most affected residential premises.

{Reason: Council requirement to prevent the generation of a noise nuisance}

- (41) Prior to any Construction Certificate being issued by any Principal Certifying Authority a plant noise emission assessment demonstrating that the proposed mechanical services plant and equipment will comply with the Protection of the Environment Operations Act shall be submitted and approved by Council. It is noted that acoustic treatments could include acoustic barriers, lined ducting and attenuators on any intake or discharge louvers or openings, variable speed controllers and the like.

{Reason: Council requirement to require compliance with the POEO Act}

- (42) Prior to any Construction Certificate being issued by any Principal Certifying Authority, details showing the construction of the proposed glazing elements, openable frames and acoustic seals to control external noise ingress as recommended by the Noise Impact Assessment prepared by Acoustic Logic (dated 14 December 2017) shall be submitted to and approved by Council.

In addition to complying with the minimum scheduled glazing thickness, the STC rating of the glazing fitted into openable frames and fixed into the building opening shall not be lower than the values recommended in the assessment. Where nominated, this will require the use of acoustic seals around the full perimeter of openable frames and the frame will need to be sealed into the building opening using a flexible sealant. It should be noted that mohair seals in windows and doors are not acceptable where acoustic seals are required.

Note: It may be necessary to provide alternative ventilation so that external windows and doors can be kept closed. In this way the indoor noise goals can be met while providing room ventilation that meets the Building Code of Australia. Any mechanical ventilation system that is installed should be acoustically designed such that acoustic performance of the recommended construction methods are not reduced by any duct or pipe penetrating the building fabric elements. Noise emission to the adjacent property boundaries by any ventilation system shall not create offensive noise.

The site is located in close proximity to a hotel that may generate elevated noise, especially late at night. Therefore, the use of double glazing or similar mitigation measures to habitable rooms may assist towards improving residents comfort and amenity.

{Reason: Council requirement to require compliance with the POEO Act}

(43) Prior to the release of any Construction Certificate the applicant shall prepare and submit a Construction Environmental Management Plan (CEMP) to Council for assessment and approval. The CEMP shall detail acceptable methods for the adequate control and management of the following:

- Noise impacts – Detailing the implementation of noise mitigation measures to minimise noise and to limit the impact on adjoining development.
- Dust Suppression and Mitigation – Detailing dust suppression and mitigation measures to be employed during works on the site to ensure dust is not emitted from the site at all times including when no activities are taking place on the site.
- Erosion and Sedimentation Control Plan – Detailing the methods to be employed to ensure the adequate management of the surface and stormwater associated with demolition and construction activities.
- Waste Management Plan – Detailing the reuse or disposal of solid and liquid wastes to update the expected quantities of wastes likely to be created and where these wastes will be taken for appropriate disposal.

The CEMP shall be approved by Council prior to any works being commenced and shall be implemented at all times during the operation of this consent.

{Reason: Council requirement to ensure the amenity of the locality is protected}

(44) The demolition of the existing building is required to be undertaken in conformity with AS 2601-1991. A requirement of clause 1.7.1 of such standard is that the applicant and/or its contractor must prepare a Work Plan and submit such plan to Council prior to any demolition work commencing.

In particular, such Work Plan must include proposed measures to address dust generation; protection of the public; assessment, removal and disposal of hazardous materials and conditions (especially asbestos sheeting, lead-based paint and any organochlorine contaminated soil); noise control and protection of Council's services (including the capping of proposed abandoned sewer junction connections).

{Reason: Council requirement to prevent environmental contamination and creation of public nuisances arising from demolition works}

(45) The applicant shall ensure all practicable measures are taken to minimise the release of dust into the atmosphere at the demolition site and from vehicles transporting material off-site.

{Reason: Council requirement to prevent dust nuisance and contravention of the POEO Act}

(46) The demolition contractor shall be given a copy of Council's conditions of development consent.

{Reason: To facilitate compliance with Council's Approval by the demolition contractor}

- (47) In the event of any Aboriginal archaeological material being discovered during earthmoving/construction works, all work in that area shall cease immediately and the Office of Environment and Heritage (OEH) notified of the discovery as soon as practicable. Work shall only recommence upon the authorisation of the OEH.
{Reason: Council and statutory requirement to protect Aboriginal heritage}
- (48) All solid waste from construction and operation of the proposed development shall be assessed, classified and disposed of in accordance with the NSW Environment Protection Authority's Waste Classification Guidelines. Whilst recycling and reuse are preferable to landfill disposal, all disposal options (including recycling and reuse) must be undertaken with lawful authority as required under the Protection of the Environment Operations Act, 1997.
{Reason: Council requirement to require compliance with the POEO Act, 1997}
- (49) Prior to occupation of the building or part thereof, copies of all weighbridge or receipt dockets from the licensed Waste Disposal Depot shall be provided to Council.
{Reason: Council requirement to require compliance with the POEO Act}
- (50) Plans detailing the construction and fit-out of the food preparation areas shall be submitted and approved by Council prior to the relevant Construction Certificate being issued.
{Reason: To ascertain compliance with Food Act requirements}
- (51) Those portions of the building proposed to be used for the manufacturing, preparing, storing or handling of food shall be constructed and operated in accordance with the requirements of Food Act 2003, Food Regulations 2015 and the relevant Standards. At completion of all works, the premise occupier shall notify Council and a satisfactory inspection shall be completed by an Authorised Officer of Council.
{Reason: Statutory requirement of the Food Act, 2003}
- (52) All walls, floors, ceilings, shelves, fittings and furniture in the food preparation area shall be constructed of material that is durable, impervious and capable of being easily cleaned.
{Reason: Council requirement to achieve compliance with food safety standards}
- (53) Mechanical exhaust ventilation conforming to the Building Code of Australia (BCA) is to be provided to the food preparation cooking area. Such exhaust ventilation system shall discharge above roof level in accordance with AS 1668 Parts 1 and 2.

Details demonstrating compliance with AS 1668 Parts 1 and 2 are to be submitted to Council prior to the relevant Construction Certificate being issued by the Certifying Authority.

{Reason: Council requirement to prevent odour nuisance and ensure compliance with the POEO Act}

- (54) Prior to the issue of the relevant Occupation Certificate, the applicant must obtain and have submitted to the principal certifying authority, a certificate from a practising mechanical ventilation engineer, certifying that the building's air-handling system installation is in compliance with AS/NZS 3666.1:2011 and Clause 6 of the Public Health Regulation 2012.

{Reason: To demonstrate compliance with statutory provisions has been achieved}

- (55) Any proposed air-handling system, hot-water system (>60C), warm-water system (20C - 60C), or water-cooling system proposed to be installed in the subject building, shall be installed, operated and maintained in accordance with the requirements of the Public Health Regulation 2012.

{Reason: Statutory requirement of Public Health Act}

- (56) Proposed swimming pool used by the guests shall be continuously disinfected in accordance with the NSW Health Department's guidelines for disinfecting public swimming pools and spa pools. Water in all pools shall be tested at least every four hours when the pool is in use and all results recorded in a log book kept onsite.

{Reason: To preserve and protect human health and comply with Public Health Regulation 2012}

- (57) Prior to any Occupation Certificate being issued by any Principal Certifying Authority, the applicant shall have offset plantings completed to replace the three (3) large River Red Gums (*Eucalyptus camaldulensis*) that will be removed through this proposal. Replacement trees shall be of the same species, *Eucalyptus camaldulensis*, and the plantings shall be carried out at a 5:1 ratio, with a total of 15 trees to be planted.

Such offset plantings shall be planted within the riverine corridor by Council's Community and Recreation Division at full cost to the developer. The replacement trees shall be advanced specimens sourced and planted by Council in agreement with Council's Manager Recreation and Open Space.

{Reason: Council requirement to mitigate flora and fauna impacts}

- (58) Should the existing town water supply service connection(s) not be suitably located and/or of a suitable size to accommodate the proposed development, then a separate application will be required to be made to Council, with the appropriate fee(s) being paid.

Note: As Council is the local water authority, separate metered connections will be required in respect to the provision of a suitably size domestic water meter and separate fire service meter to the development site.

{Reason: Council policy in respect of commercial developments}

- (59) Commercial standard concrete vehicular cross-overs, and kerb and gutter vehicle entrances, constructed in accordance with Council's standards STD 5211 and STD 5235 being provided by and at full cost to the Developer at the location shown on the approved development plan.

However, prior to any construction works being undertaken on the access driveways a detailed (fully dimensioned) site plan is to be lodged with and approved by Council.

The access driveway is to be designed and constructed of sufficient width at the roadway (kerb and gutter alignment) and the property boundary alignment such that a service vehicle (8.8m in length) can (utilising the Austroads design templates, and a turning speed of 5-15 km/hr) is able to access the subject land in a forward motion from the through travel lane(s) of Church Street and Bligh Street without the need to cross over onto the wrong side of the road at any time.

Such works shall also include the reconstruction of the footpath for the full frontage of the development and the reinstatement of the redundant kerb and gutter vehicle crossing back to 'upright' kerb and gutter at full cost to the developer; this work is to also include restoration of the road shoulder following construction in accordance with Council's adopted AUS-SPEC #1 Development Specification Series - Construction Standards.

Should Council's Senior Development Engineer (or his representative) not undertake the required inspections as detailed in the abovementioned Council standards, then a detailed list of inspections undertaken by an accredited private certifier verifying compliance with the abovementioned Council standards will be required to be lodged with Council prior to the issue of the Occupation Certificate for the proposed development.

{Reason: Council policy in respect of commercial developments}

- (60) No vehicles larger than a 'Service Vehicle' 8.8m in length, (utilising the Austroads design templates), are permitted to access the proposed development off Bligh Street.

{Reason: The internal manoeuvrability and access to this area will only facilitate service vehicles 8.8m in length or vehicles of lesser dimensions at this location}

- (61) All driveways, hard stand areas and parking areas shall be drained to Council's satisfaction, noting that all stormwater drainage discharge from the proposed development shall be discharge at the corner of Church Street and Bligh Street stormwater pit without impact on adjacent private property including following:

- The incorporation of the minimum height of 100mm above the adjacent top of kerb level must be ensured;
- A drainage pit with a small pump shall be installed at lower ground floor carpark to remove any trapped water or water that may be brought into the carpark by vehicles during rainfall events etc.;
- The discharge from the drainage pump will be directed to the main stormwater drainage discharge from the building ensuring that the disposal of stormwater from the pump system is via the GPT prior to connecting to Council's underground stormwater system.

Note: Stormwater discharge to the gutter is limited to an amount that can be safely conveyed within the gutter, and that overall gutter flows within the street are within Auspec guidelines for gutter flow width and depth.

In this respect the Developer must have approved by Council, prior to the issue of the building's Construction Certificate, full and detailed hydraulic design calculations and revised drawings of the proposed development's stormwater drainage system.

Prior to the discharge into Council's system, the Developer will be required to install at their own expense a 'pollution control device(s)' which will collect all oil, sediment and litter from the development proposal.

{Reason: To achieve a satisfactory standard of stormwater disposal from the proposed development}

- (62) The construction by and at full cost to the Developer of two (2) pedestrian refuges in Bligh Street, located on the northern and southern sides of the Church and Bligh streets intersection, including line marking and signage generally in accordance with 'Bligh Street and Church Street Road Configuration' Geolyse Project No. 117187, sheet C003, C004 & C005 of C011, set 09B, dated 24.08.2018.

However, prior to any construction works being undertaken, a detailed (fully dimensioned) site plan is to be lodged with and approved by Council.

All construction works associated with this condition are to be undertaken in accordance with Council's adopted AUS-SPEC #1 Development Specification Series - Construction standards and to Council's adopted standard drawings STD 5235 and 5251.

Should Council's Senior Development Engineer (or his representative) not undertake the required routine inspections during the course of construction of these footpaths, then a detailed list of inspections undertaken by an accredited private certifier verifying compliance with Council standards will be required to be lodged with Council prior to the issue of the Occupation Certificate for the proposed development.

{Reason: Implementation of Council Policy}

- (63) No buildings or structures (including advertising structures) shall be erected or overhang over Council's road reserve or footpath area.

{Reason: Implementation of Council policy}

- (64) Should any of the proposed works encroach onto the road reserve area (which includes the footpath area) and prior to any works commencing on the site, the applicant/developer is required to make a separate 'Road Opening Application' (Section 138 Application under the Roads Act, 1993) with Council's Infrastructure and Operations Division, plus payment of any appropriate fee(s).

In conjunction with the Section 138 Application, a Traffic Management Plan showing all activities for controlling pedestrian and vehicular traffic shall be prepared by a suitably accredited person, submitted to, and approved by Council's Senior Traffic Engineer, demonstrating that the proposed demolition works can be undertaken in a safe manner minimising disruption to pedestrian and vehicular traffic movement(s).

The Traffic Management Plan shall include layout plans showing temporary detours, details of arrangements for demolition work under traffic and the location, size and legend of all temporary signs and other traffic control devices and be in accordance with the WorkCover Authority requirements.

Prior to the issue of the Occupation Certificate for the proposed development, the developer/applicant is to provide the Principal Certifying Authority (PCA) with written evidence/confirmation that the required Section 138 Application was lodged with Council and that any relevant condition(s) have been complied with.

{Reason: To ensure adequate safety measures are in-place for the public utilising the adjacent footpaths and roadways}

- (65) Any damage incurred to the footpath, kerbing and guttering, road or road shoulder or any other utility services shall be repaired/restored at full cost to the developer and in accordance with Council's adopted AUS-SPEC #1 Development Specification Series - Construction Standards. Should the developer not complete repairs as necessary and/or as directed by Council, Council will undertake such repair work(s) and recover the cost(s) from the developer.

Note: It is recommended that the applicant record the existing conditions of all footpaths, road and other Council property adjoining the subject site prior to the contractor taking possession of the site).

{Reason: Implementation of Council policy}

- (66) All vehicles must enter and exit the subject land and proposed development in a forward direction. No reversing of vehicles onto the public roadway system will be permitted.

{Reason: To provide safety for the travelling public utilising the public roadways}

- (67) All loading and unloading of goods related to the development proposal shall be carried out within the confines of the allotment's boundary. Under no circumstances will the loading or unloading of goods on the public roadway system be permitted.

{Reason: Requirement of Council so as not to create adverse traffic conditions}

- (68) No materials, goods, plant or vehicles associated with the proposed development shall be stored, displayed or placed for advertising purposes outside the allotment's boundary.

{Reason: Implementation of Council's Policy Codes}

- (69) Should any of the proposed demolition activity works encroach onto the road reserve area (which includes the footpath area) and prior to any works commencing on the site, the applicant is to ensure that any sub-contractor(s) working on the site have current public liability insurance policy(ies) to cover Council to an amount of not less than \$20 M in respect of any and all actions, costs and claims for damages that may be brought or made or claimed against Council in relation to the granting of this approval. Such policy shall note the interest of Council which ensures that Council is indemnified against any possible action.

{Reason: Implementation of Council's policy}

- (70) The conveyance of effluent from the proposed development to Council's sewer constitutes a trade waste discharge therefore a Trade Waste Application must be completed. The completed application, along with the appropriate application fee, all required details covering drainage, discharge and capacity, pre-treatment devices and installation must be submitted to Council's Water Supply and Sewerage Client Services Coordinator and approved by Council prior to issuing the building's Construction Certificate. No effluent will be permitted to be discharged to Council's sewer until the required Trade Waste Approval has been obtained and all required pre-treatment devices have been installed and passed by Council.

{Reason: Statutory requirement of the Local Government (General) Regulation, 2005}

- (71) No parking is allowed along the Bligh Street road frontage of the proposed development between the proposed driveway (porte-cochere) and the entry/exit and for lower ground and mezzanine floors, vehicular entry and exit shall be left in and left out only.

{Reason: Implementation of Council's policy}

- (72) The 'easement(s) to drain sewage' created under DP 230028 over the subject land shall remain in force with this current Development Application to subdivide land.

{Reason: Implementation of Council policy}

- (73) Evidence shall be provided to Council prior to the issue of the relevant Occupation Certificate that the Royal Australian Air Force has been informed of the proposed development, being a structure that is more than 30 metres above ground level—within 30 km of an aerodrome.

{Reason: Compliance with Civil Aviation Safety Authority circular 'Reporting tall structures and hazardous plume sources' dated March 2018}

- (74) The applicant shall prepare and submit for the approval of Council Officers plans detailing architectural treatment or public art solutions to ameliorate the visual impact of the blank facades on the southern elevation (to Level 6) and eastern elevation (to Level 1). The plans are to be submitted and approved prior to the issue of a Construction Certificate.

{Reason: To ensure the streetscape of the locality is not detrimentally impacted}

NOTES

- (1) The house numbering for the strata lots will be issued at the Subdivision Certificate stage, please contact Council's LIS & E-Services Coordinator, 6801 4000 prior to lodging the application.
- (2) The development shall be carried out in accordance with Essential Energy's correspondence dated 5 January 2018 (copy attached).
- (3) A separate application is required to be submitted to either Council or an accredited certifier to obtain a Construction Certificate to permit the erection of the proposed building and associated works.

- (4) A list of Fire Safety Measures must be submitted with the Construction Certificate application pursuant to clause 139 of the Environmental Planning and Assessment Regulation 2000. The Regulation prescribes that the information to be submitted must include:
- A list of any existing fire safety measures provided in relation to the land or any existing building on the land; and
 - A list of the proposed fire safety measures to be provided in relation to the land and any building on the land as a consequence of the building work.
- (5) Details of the disabled facilities (including access paths, toilets, signage and location of any tactile ground surface indicators) need to be adequately detailed on the Construction Certificate application plans to permit assessment and compliance evaluation with the provisions of the Council's Development Control Plan (where applicable), the Premises Standards and the BCA. In particular, the submitted details for the proposed disabled and ambulant toilets should include elevations and floor plans of the facilities drawn to a scale of 1:20. Reference should be made to AS 1428.1, the Access Code under the Premises Standards and AS/NZS 2890.6 regarding specific design parameters.
- (6) On completion of the erection of the subject building, the owner of the building is required to submit to the Principal Certifying Authority (PCA) a Fire Safety Certificate(s) with respect to each *essential fire safety measure* installed in association with the building - as listed on the Fire Safety Schedule attached to the Construction Certificate. Such certificate(s) must be submitted to the PCA prior to occupation or use of the subject building.
- Copies of the subject Fire Safety Certificate(s) must also be forwarded by the owner to Council (if not the appointed PCA) and the Commissioner of Fire and Rescue NSW and displayed within the subject building in a prominent position.
- (7) The owner of the building is required to submit to Council at least once in each period of 12 months following the completion of the building an Annual Fire Safety Statement(s) with respect to each essential fire safety measure associated with the building.
- Copies of the subject Annual Fire Safety Statements must also be forwarded by the owner to the Commissioner of the Fire and Rescue NSW and displayed within the subject building in a prominent position. In this regard Fire and Rescue NSW has requested that only electronic copies of the statement be forwarded, with their dedicated email address for such Statements being: afss@fire.nsw.gov.au
- (8) The proposed fire service comprising sprinklers, hydrants, hose reels and fire brigade booster assembly, must be connected to a separately dedicated metered water service. Council Policy requires all new fire services to be connected to a separately dedicated metered water service. No domestic water services are permitted to be branched off from the fire service pipeline and vice versa.

Enquiries concerning specific requirements of the policy, and the provision of a new fire service connection to the subject property, should be referred to Council's Water Supply and Sewerage Branch.

- (9) The sanitary, water plumbing and stormwater drainage associated with the proposed building work requires the issue of a separate approval from Council prior to being installed, and includes plumbing work associated with the building's fire services. In this regard a Drainage and Plumbing Approval Application form is available from Council, and must be completed by the licensed plumbing and drainage contractor and returned to Council with the appropriate fee. Drainage or plumbing works must not be commenced until Council has issued a permit authorising such works.

This approval does not negate the statutory requirement for the plumbing and drainage licensee to provide to Council as the delegated Plumbing Regulator, the Notice of Work (NoW), Certificate of Compliance (CoC) and Sewerage Service Diagram (SSD) as prescribed under the Plumbing and Drainage Act 2011, for the proposed sanitary drainage/plumbing and domestic water plumbing works. It should be noted that the NoW does not include plumbing work associated with fire services and work of stormwater.

- (10) Offensive noise as defined under the Protection of the Environment Operations Act, 1997 shall not be emitted from the proposed development.

Air impurities as defined under the Protection of the Environment Operations Act, 1997 shall not be released or emitted into the atmosphere in a manner which is prejudicial to the health and safety of occupants, the surrounding inhabitants or the environment.

- (11) In the unlikely event that objects are encountered that are suspected to be of Aboriginal origin (including skeletal material), the *Unanticipated Finds Protocol* must be followed.
- (12) Depending on the outcome of the Council's Water and Sewer Branch investigation for water pressure at Church Street and Macquarie Street, the applicant may require to upgrade water main at no cost to Council to comply with the water pressure for the proposed development.
- (13) The Council Section 64/7.11 (formerly 94) Contribution Plans referred to in the conditions of this consent, may be reviewed by the public without charge, at Council's Administration Building, Church Street, Dubbo between the hours of 9:00am and 5:00pm, Monday to Friday. Copies are also available online www.dubbo.nsw.gov.au.
- (14) Fees and contributions in respect of this application will be those applicable at the date of release of the Occupation Certificate or Subdivision Certificate.
- (15) Following compliance with all relevant conditions of this Development Consent the applicant should apply to Council, with lodgement of the Subdivision Certificate Application and payment of the prescribed fee, for release of the Linen Plan(s) of subdivision, which will be duly released.



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Our Reference: 117187_LEO_005

29 April 2019

The Chief Executive Officer
Dubbo Regional Council
PO Box 81
DUBBO NSW 2830

Attention: Mr Darryll Quigley

Dear Sir

**MIXED USE DEVELOPMENT AT 1 CHURCH STREET DUBBO
COUNCIL REFERENCE D2017-671 REVIEW OF VARIOUS COUNCIL CONTRIBUTIONS**

Reference is made to Council's Development Approval D2017-671 dated 29 November 2018 for the development of 1 Church Street, Dubbo comprising a commercial premises (restaurant and bar), 57 serviced apartments, 27 shop top housing units, roof top terrace and associated parking over four (4) levels.

This submission has been prepared in support of a Section 4.55 modification application for the development.

Specifically, this submission addresses the contributions required by Council for the following Conditions of Consent:

- Condition No. 3 – Sewerage Services headworks contribution;
- Condition No. 4 – Water Supply headworks contribution;
- Condition No. 5 – Open Space and Recreation Facilities contribution;
- Condition No. 6 – Urban Roads headworks contribution (trips); and
- Condition No. 7 – Urban Road headworks contribution (spaces).

Our response to the various issues relating to the specific Conditions of Consent are set out in the following Sections of this submission.

Condition of Consent No. 3 - Sewerage Services Headworks Contribution

Condition of Consent No. 3 requires the payment of a sewerage headworks contribution of \$372,911.30 based on Council's calculation of the generation of 65.26 ETs from the proposed development at a rate of \$5,714.24 per ET.



Council's calculation of the contribution payable is based on the ET allocation to the various components of the development as outlined in the Water Directorate, namely:

One (1) bedroom dwellings:	0.50 ETs per dwelling
Two (2) bedroom dwellings:	0.75 ETs per dwelling
Three (3) bedroom dwellings:	1.00 ETs per dwelling

Also,

Restaurant:	0.01 ETs per m ²
Bar:	0.05 ETs per m ²

The calculation of Council's ETs for the development is set out below:

$14 (1 \text{ bedrooms}) \times 0.50 + 43 (2 \text{ bedrooms}) \times 0.75 + 4 (1 \text{ bedrooms}) \times 0.50 + 12 (2 \text{ bedrooms}) \times 0.75 + 11 (3 \text{ bedrooms}) \times 1.00 + 0.01 \times 106 (\text{Restaurant area}) + 0.05 \times 79 (\text{Bar area}) = 66.26 \text{ ETs}$

A credit of 1 ET has been applied by Council for the existing lot and, less 1 ET credit = 65.26 ETs

Based on Council's calculations, the Restaurant and Bar area in the development contributes 5.01 ET. The use of the Water Directorate data for the Restaurant and Bar area assumes each operates as a standalone business attracting separate clientele rather than considering the facility as an integrated entity.

The purpose of the bar area, as with most small bars associated with restaurants in accommodation premises, is either to provide drinks to clientele whilst they are waiting for a table in the restaurant or providing drinks to clientele when they are sitting having a meal at the restaurant tables.

We have previously made the case to Council that the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract most of its clientele from in house guests.

On this basis, sewage generation by in house guests is predominantly accounted for in the ET allocation for the various combinations of residential and serviced apartments in the building.

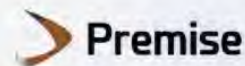
In determining the overall ET count for the development, Council has allowed a credit of 1 ET for the existing allotment. However, if the Water Directorate guidelines are to be applied, then the credit should be calculated based on the existing use of the building on the site as office premises.

Council has previously advised that the net lettable area of the building is approximately 385.6m² and the Water Directorate allows sewage generation for offices as .01 ET per m². On this basis, the credit allowed by Council should be 3.85 ETs.

Our calculation of the sewage ETs generated by the development would be as follows:

Dwellings

$14 (1 \text{ bedrooms}) \times 0.50 + 43 (2 \text{ bedrooms}) \times 0.75 + 4 (1 \text{ bedrooms}) \times 0.50 + 12 (2 \text{ bedrooms}) \times 0.75 + 11 (3 \text{ bedrooms}) \times 1.00 = 61.25 \text{ ETs}$



Credit

As outlined, 3.85 ETs.

Total ETs = 61.25 – 3.85 = 57.4 ETs.

On this basis, the contribution required to be paid at the rate of \$5,714.24 per ET is \$327,997.38.

Condition of Consent No. 4 – Water Supply Headworks Contribution

Condition of Consent No. 4 requires the payment of a water supply headworks contribution of \$247,086.33 based on Council's calculation of the generation of 43.24 ETs from the proposed development at a rate of \$5,714.30 per ET

The Servicing Strategy Report dated December 2017 prepared in support of the development of 1 Church Street calculated the water supply demand as 44 ET. This is generally in accordance with Council's calculations based on the Water Directorate Equivalent Tenement Guidelines. Council's calculations have been checked in accordance with the Guidelines and the calculated headworks contribution based on 43.24 ET is accepted.

Condition of Consent No. 5 – Open Space and Recreation Facilities Contribution

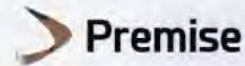
Condition of Consent No. 5 requires the payment of a contribution of \$187,711.81 based on Council's calculation of the generation of 134.6 persons by the proposed development at a rate of \$1,394.59 per person.

Council's calculation of the contribution payable is based on the rate of dwelling occupancy as outlined in the policy code, namely:

One (1) bedroom dwellings:	1.1 persons per dwelling
Two (2) bedroom dwellings:	1.6 persons per dwelling
Three (3) or more bedroom dwellings:	2.6 persons per dwelling

Council policy applies the rate of dwelling occupancy equally to residential accommodation and tourist/visitor accommodation.

Based on the latest layout of residential apartments and serviced apartments contained in the proposed development, the calculation indicates 136.4 persons within the complex. On this basis, the contribution required to be paid at the rate of \$1,394.59 per person is \$190,222.08.



Condition of Consent No. 6 – Urban Roads Headworks Contribution on a Trip Basis

Condition of Consent No. 6 requires the payment of a contribution of \$199,046.60 based on Council's calculation of the generation of 425.5 trips by the proposed development at the rate of \$600.35 per trip for 142 residential trips and \$401.40 per trip for 283.5 commercial trips.

We agree with Council's determination of the contribution required based on a trip generation basis.

Condition of Consent No. 7 – Urban Roads Headworks Contribution on a Parking Space Basis

Condition of Consent No. 7 requires the payment of a contribution of \$1,241,740.00 based on Council's calculation of the shortfall of car parking spaces of 47 spaces for the proposed development at the rate of \$26,420.00 per space.

The calculation of Council's required car parking spaces is set out below:

High Density Residential/Shop Top Housing

For the high density residential component of the development, the criteria outlined in SEPP 65 and subsequently the *Apartment Design Guide* allows the RTA estimates for carparking provision to be used as set out below:

- 0.6 spaces per 1 bedroom unit
- 0.9 spaces per 2 bedroom unit
- 1.4 spaces per 3 bedroom unit
- 1 space per 5 units (visitor parking)

The number of residential units to be developed for each parking category is summarised below:

1 bedroom units:	4 units
2 bedroom units:	12 units
3 bedroom units:	11 units
Total:	27 units

The calculations for the provision of carparking spaces for the residential units is set out below:

4 x 1 bedroom units x 0.6 spaces	=	2.4 spaces
12 x 2 bedroom units x 0.9 spaces	=	10.8 spaces
1 x 3 bedroom units x 1.4 spaces	=	15.4 spaces
Total	=	26.6 spaces, say 29 spaces
27 units / 5 x 1 visitor space	=	5.4 spaces, noting that 5 spaces will be provided

The total parking spaces to be provided for the high density residential component of the complex will be 29 spaces + 5 spaces = 34 carparking spaces.

Council agrees with the calculated parking provision for the high density, shop top housing, component of the development.



Serviced Apartments

For the Serviced Apartments component of the development, Council's Development Control Plan requires the following rate of provision for serviced apartments:

- One space for one bedroom apartments; and
- Two spaces per two or more bedroom apartments.

The number of serviced apartments comprise:

1 bedroom apartments:	14 apartments
2 bedroom apartments:	43 apartments
Total:	57 apartments

Based on Council's rate of provision, the number of parking spaces to be provided in accordance with the Development Control Plan is:

14 x 1 bedroom apartments x 1 space	=	14 spaces
43 x 2 bedroom apartments x 2 spaces	=	86 spaces
Total	=	100 spaces

Restaurant/Bar Area

For the combined restaurant bar area of 185m², Council's DCP parking provision requires 1 parking space per 25m² or 7.4 spaces, say 7 parking spaces.

Council's Calculation of Shortfall

Whilst Council's Development Control Plan rate of provision indicates that 100 spaces are required for the 57 serviced apartments and 7 spaces for the restaurant/bar area, it is proposed that a total of 60 carparking spaces are allocated for the serviced apartment component of 1 Church Street. Council indicates that this rate of provision is 47 carparking spaces short of its calculations.

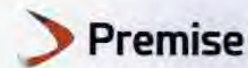
1 Church Street Carparking Provision Justification

For the Restaurant and Bar component of the development, Council's Development Control Plan does not require the provision of carparking if commercial space in the CBD is converted to a café or restaurant usage. The usage of the existing building at 1 Church Street is for commercial office space.

We have previously made the case to Council that the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract most of its clientele from in house guests.

For any outside patrons that may utilise the restaurant at night, there is ample on street parking available in Church Street where easy access to the restaurant from the street is available. Other outside patrons may already be in the CBD area for work purposes and have their cars parked at other locations in the CBD.

The usage of on street parking at night is utilised by patrons of the majority of restaurants that operate in the CBD area of Dubbo.



Council's calculation of a parking provision for the restaurant/bar area on a standalone basis for a business attracting separate clientele rather than considering the facility as an integrated entity is an incorrect assumption.

As previously submitted to Council, reasoning for the provision of the 60 carparking spaces on site for the 57 serviced apartments are outlined below:

- Whilst the 2 bedroom apartments are denoted as 2 key apartments, it is most likely that families will occupy those apartments. On that basis, a family would arrive in a single car and therefore only require a single parking space.
- Colleagues that attend conferences either at 1 Church Street or at another venue in Dubbo are likely to travel together rather than arrive in single vehicles, thus reducing the number of parking spaces required.
- Air links to Dubbo from Sydney, Brisbane, Melbourne, Newcastle and Canberra allows people to fly to Dubbo, arrive at accommodation facilities by taxi then arrange transport to visit local tourist attractions or attend business meetings etc.
- The XPT train service allows people from Sydney to visit Dubbo for tourist related activities, most likely as a family holiday.
- Package tours to Dubbo by organised groups such as sporting clubs or social clubs using coach transport, thus significantly reducing the number of parking spaces required.

The combination of factors outlined supports the provision of 60 carparking spaces associated with the 57 serviced apartment component in the development of the 1 Church Street residential complex. Notwithstanding that the provision of the 60 parking spaces is 60% of the rate of parking provision calculated by Council, the 60 parking spaces on site provides more than 1 space for each of the 57 individual apartments

By way of comparison, the following information is provided for an existing serviced apartment complex in the CBD. We understand that the serviced apartment complex has a total of 64 apartments comprising the following mix:

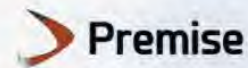
Studio apartments: 23 apartments
 1 Bedroom apartments: 26 apartments
 2 Bedroom apartments: 12 apartments
 3 Bedroom apartments: 3 apartments

Council's rate of provision for serviced apartments is:

- One space for one bedroom apartments; and
- Two spaces per two or more bedroom apartments.

The number of parking spaces required for the existing serviced apartment complex (and allowing 1 parking space for a studio apartment), the following parking spaces would be required:

23 x studio apartments x 1 space	=	23 spaces
26 x 1 bedroom apartments x 1 space	=	26 spaces
12 x 2 bedroom apartments x 2 spaces	=	24 spaces



3 x 3 bedroom apartments x 2 spaces	=	6 spaces
Total	=	79 spaces

The number of parking spaces provided on site for the existing serviced apartment complex is a total of 44 carparking spaces including 3 stacked parking spaces, presumably associated with the 3 x 3 bedroom apartments. The provision of 44 parking spaces on site is an apparent shortfall of 35 parking spaces compared to Council's rate of parking provision.

The 44 parking spaces provided on site are at an approximate rate of provision of 56% of actual spaces to the calculated required spaces under Council's DCP. Additionally, until recently, the serviced apartment complex included the operation of a large restaurant and bar facility, however, parking associated with the restaurant is not included in the serviced apartment allocation.

Given that the restaurant has an area of approximately 120m² including the bar space, the required parking allocation under Council's reasoning related to 1 Church Street would be 5 spaces.

Therefore, if assessed in accordance with Council's application of the DCP provisions to 1 Church Street, then the existing serviced apartment complex including the restaurant has an apparent total shortfall of 40 parking spaces.

We are not aware that the development of the serviced apartment complex in the CBD was required to pay Council a contribution for the indicated shortfall of 40 parking spaces compared to the 44 parking spaces actually provided on site.

Summary

A summary of the issues evaluated in this submission for the subject Conditions of Consent are outlined below:

Condition No. 3 – Sewerage Services headworks contribution

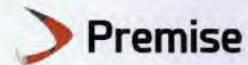
Council has calculated that the development generates 65.26 ET as the basis of the contribution of \$372,911.30.

We submit that the development generates 57.4 ETs as the basis of the revised contribution of \$327,997.38.

Condition No. 4 – Water Supply headworks contribution

Council has calculated that the development generates 43.24 ET as the basis of the contribution of \$247,086.33.

We agree with this rate of contribution.



Condition No. 5 – Open Space and Recreation Facilities contribution

Council has calculated that the development requires the contribution of \$187,711.81 based on 134.6 persons.

We submit that the development generates 136.4 persons and requires the contribution of \$190,222.08.

Condition No. 6 – Urban Roads headworks contribution (trips)

We agree with Council's determination of the contribution required based on a trip generation basis.

Condition No. 7 – Urban Road headworks contribution (spaces)

Council has calculated that the development requires the contribution of \$1,241,740.00 based on a shortfall of 47 carparking spaces.

We submit that the development of 1 Church Street does not have a shortfall of carparking spaces based on the reasoning outlined in this report.

We trust that the submission of this information in regards to the contributions required by the subject Conditions of Consent in D2017-671 is satisfactory for Council to consider the matters raised, however, if there are any questions or any issue requires further clarification, please do not hesitate to contact our Dubbo office.

Yours faithfully

A handwritten signature in blue ink, appearing to read 'S. Hoynes', written over a light blue grid background.

STEPHEN J HOYNES
Principal | Civil Engineer



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Our Reference: 117187_LEO_006

5 September 2019

The Chief Executive Officer
Dubbo Regional Council
PO Box 81
DUBBO NSW 2830

Attention: Mr Darryll Quigley

Dear Sir

**FURTHER INFORMATION SUBMISSION - MIXED USE DEVELOPMENT AT 1 CHURCH STREET DUBBO
COUNCIL'S REFERENCE D2017-671**

We refer to the above matter and Council's response by letter dated 22 May 2019 to the Section 4.55 Modification Application. This further information submission provides additional information in support of the application.

The Modification Application sought Council's re-assessment of the headworks contributions stipulated by in the following Conditions of Consent:

- Condition No. 3 – Sewerage Services headworks contribution;
- Condition No. 4 – Water Supply headworks contribution;
- Condition No. 5 – Open Space and Recreation Facilities contribution; and
- Condition No. 7 – Urban Road headworks contribution (spaces).

Council's response letter dated 22 May 2019 has advised adjustments would be actioned to the contributions with respect to Condition 3 (Sewer Services headworks), Condition 4 (Water Supply headworks) and Condition 5 (Open Space and Recreation Facilities headworks).

However, Council has requested additional information to justify any amendment to Condition No 7 with respect to the provision of car parking spaces.

It is important to acknowledge the purpose of Council imposing this condition.

Fundamentally, the condition is imposed due to the presumption, based on the application of Council's Car Parking standards prescribed in the Dubbo Development Control Plan 2012, that the development is not able to physically provide the number of car spaces that the DCP states should be provided. It follows that the contribution to be collected by Council would then allow Council to build a public car park that provided the shortfall of spaces.



However, it is equally important to acknowledge that if it can be determined, by the presentation of data and other evidence, that the development would not generate a demand for the DCP calculated number of spaces, then there is no need for the public car park to be built and Council has no nexus by which it can collect the contribution for this purpose.

Condition of Consent No. 7 – Urban Roads Headworks Contribution on a Parking Space Basis

Condition of Consent No. 7 requires the payment of a contribution of \$1,241,740.00 based on Council's calculation of the shortfall of 47 car parking spaces for the proposed development at the rate of \$26,420.00 per space (2019 financial year rate).

The proponent agrees with Council's requirement for the provision of 29 car parking spaces for the residential component plus 5 visitor car parking spaces, totalling 34 spaces for the shop-top housing land use.

In relation to the provision of car parking spaces for the commercial land uses, we advise as follows:-

Serviced Apartments by the DCP

Council's Development Control Plan (DCP) requires the following rate of provision for serviced apartments:

- One space for one bedroom apartments; and
- Two spaces per two or more bedroom apartments.

The number of serviced apartments comprise:

1 bedroom apartments:	14 apartments
2 bedroom apartments:	43 apartments
Total:	57 apartments

Based on Council's rate of provision, the number of parking spaces to be provided in accordance with the Development Control Plan is:

14 x 1 bedroom apartments x 1 space	=	14 spaces
43 x 2 bedroom apartments x 2 spaces	=	86 spaces
Total	=	100 spaces

Restaurant/Bar Area by the DCP

For the combined restaurant bar area of 185m², Council's DCP parking provision requires 1 parking space per 25m² or 7.4 spaces, say 7 parking spaces.

Council's Calculation of Shortfall

Whilst Council's Development Control Plan rate of provision indicates that 100 spaces are required for the 57 serviced apartments and 7 spaces for the restaurant/bar area, it is proposed that a total of 60 carparking spaces are allocated for the serviced apartment component of 1 Church Street and nil spaces for the restaurant and bar. Council indicates that this rate of provision is 47 carparking spaces short of its calculations.





Justification for shortfall

(i) Bar

In relation to the provision of car parking spaces for the restaurant and bar, the Modification Application submission stated that the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract the majority of its clientele from in house guests.

The **NSW Department of Industry (Liquor and Gaming) Fact Sheet FS3061** (copy attached) "outlines statutory conditions and requirements for on-premises licence that relate to a restaurant".

The Fact Sheet refers to Section 24 of *The Liquor Act 2007* which identifies an ongoing licencing requirement that liquor must be sold/supplied with another product or service. Section 27 of the Act also identifies that as a condition of the liquor licence, "food of a nature and quantity consistent with the responsible sale, supply and service of alcohol" must be made available on a licensed premise.

In effect, *The Liquor Act* would not permit the bar to operate independently of another product or service, in this case the other product or service being the restaurant.

In the circumstances, it is unreasonable to impose any requirement for carparking on the bar land use (approximately 79m²), reducing the restaurant/bar spaces required to be provided by 3.2 spaces from 7.4 to 4.2 spaces, or say 4 spaces

(ii) Restaurant

In relation to the restaurant land use, there are no grounds on which Council can reasonably impose a full obligation for the provision of car spaces equating to the total floor area of the restaurant. To do so would assume that neither the residents of the shop top housing or serviced apartments would ever be using the restaurant. The reality, although difficult to quantify, is that the majority of patrons using the restaurant would likely be in the building staying in the serviced apartments or living in the shop-top housing.

This presumption was clearly supported in Council's determination of D2008/364 in the development consent issued by Council on 8 October 2009 for *Tourist Accommodation, Advertising Signs and 44 Lot Strata Title Subdivision*, being the Quest Apartments development at 22 Bultje Street Dubbo.

We have obtained (under the Government Information (Public Access) Act 2009) a copy of the development consent and the Traffic Report prepared by Masson Wilson Twiney (the MWT report) dated 26 August 2008 and submitted in support of this application. Although a large footprint restaurant site including a bar was constructed with the development, there were to our knowledge no provisions made for carparking associated with this component of the land use in the development.

In view of the above, we request that the consent condition be modified to reflect a zero provision of car parking spaces for the restaurant land use.

(iii) Serviced Apartments

The MWT report for the Quest Apartments development relies upon a survey of 18 existing Quest motels across Australia conducted in 2006 and 2007. In our opinion, despite its age it is reasonable to rely upon the data provided by that traffic study as the land uses of the Quest motels are identical to the serviced apartments land use in the subject application. We do not believe the passage of time since the traffic



study was completed would have diminished the relevance of the data collected. If anything, the increased options since 2007 for air travel access to Dubbo from places other than Sydney (Newcastle, Brisbane, Melbourne) would be more likely to reduce the incidence of visitors driving their vehicles to Dubbo, thus further reducing the demand for car parking spaces.

The MWT report determines that *"the parking requirements for the proposed development equates to 1.02 spaces per unit or 0.65 spaces per let key unit"*. The MWT report notes that 41 units were to be provided equating to a need for the provision of 42 car parking spaces.

Using the results of the MWT report and applying the ratio of 1.02 spaces per unit required, the proposed 57 serviced apartments in the subject application would need to make provision for 58 car parking spaces. The proposed development will provide 60 spaces.

The results of the MWT report substantiate the assertions made in our previous modification application submission, justifying a reduction in the provision of parking spaces for serviced apartments from Council's Development Control Plan standards. This reduction is further supported by reviewing the car parking policies of other NSW regional centres, these centres being Dubbo's 'competition' in the tourist marketplace and is an ideal litmus test for what should be expected in respect to the provision of car parking spaces.

The following is a summary of the requirements for the provision of car parking spaces for serviced apartment developments in the major regional centres in NSW:-

1. Dubbo 1 space for one bedroom premises and 2 spaces per two or more bedrooms
2. Albury 1 space per unit plus 1 space per 2 employees
3. Bathurst 1 space per unit plus 1 space per 2 employees
4. Wagga Wagga 1 space per unit plus 1 space per 2 employees
5. Tamworth 1 space per unit plus 1 space per 2 employees
6. Orange 1 space per unit/bedroom/tent or caravan site plus 1 space per 2 employees (plus 1 space for every 3 restaurant seats plus 1 space for every 10m² of entertainment/function rooms).

Notwithstanding Orange Council's reference to the restaurant area, each of the other major regional Council's require just 1 space per unit plus 1 space per 2 employees. This formula is also consistent with the parking guidelines for casual accommodation in the RTA's Guide to Traffic Generating Developments.

Dubbo is the only Council in the sampled group that requires 2 spaces to be provided for units with 2 or more bedrooms.

In relation to staff numbers for the subject application, it is estimated there would be approximately 14 staff, although it is highly improbable that all of the staff would be on site at any one time due to the casual nature of all but the reception and management staff. The 14 staff would generally comprise:-

- Reception (2)
- Management (2)
- Housekeeping and Cleaners (5)
- Restaurant and bar (4)
- Maintenance (1)

The MWT report makes no specific provision for staff parking other than identifying that *"employee parking is proposed to be provided through shared usage of the visitor spaces since the peak parking demand time of visitors and staff do not coincide"*.



A similar approach is proposed to be adopted for this application, notwithstanding that 2 spaces would be available for employees, given 58 of the 60 serviced apartment spaces would be required for the serviced apartments (as per the ratio of 1.02 spaces per unit adopted for the Quest development).

The combination of the above data and discussion supports as adequate the provision of 60 carparking spaces associated with the 57 serviced apartment land use.

Summary

Condition No. 7 – Urban Road headworks contribution (spaces)

Council has calculated that the development provides a shortfall of 47 carparking spaces and Condition No 7 consequently requires the contribution of \$1,241,740.00 for spaces not provided.

We submit that the development of No. 1 Church Street does not have a shortfall of carparking spaces based on the reasoning outlined in this report and request that Condition No 7 be deleted.

Yours faithfully

A handwritten signature in black ink that reads 'Matthew G Thorne'.

MATTHEW G THORNE

Town Planner | Registered Surveyor

From: Matthew Thorne <matthew.thorne@premise.com.au>
Sent: Tuesday, 22 October 2019 5:52 PM
To: Darryll Quigley
Cc: John Walkom; Stephen Hoynes
Subject: D2017-671 : 1 Church Street
Attachments: Dubbo City regional Airport_Passenger Number Graph - until 2019.jpg

Darryll

Further to our meeting last week to discuss the progress on the assessment of the Modification Application, we confirm our client's request that the application be determined on the basis of the information already submitted to Council, subject however to the further comments below. In addition, we reiterate our client's request that the application be determined by the Council, rather than staff under delegation.

In relation to the matters discussed at our meeting on 16 October, the following comments are relevant:-

1. Council had provided a letter dated 11 October 2019 which advised that in relation to Condition 7 of the consent "Council's Infrastructure Division has assessed the further information dated 5 September 2019 and noted there is insufficient information or unsubstantiated data available for the justification to reduce the Urban Road Headworks Contribution (Parking)".
2. Stephen Hoynes and I questioned Council's response, particularly as the information we provided in the 5 September letter was precisely the material that we had discussed at an earlier meeting attended by Council's Mayor, CEO, Director Environmental Services and yourself and there was a general understanding that the data from the Quest development would be pertinent and applicable to our client's development. Our 5 September submission drew the requisite comparisons between the developments and made conclusions as to the need for the provision of carparking, also referring to other relevant factors, including for example (i) NSW Department of Industry Fact Sheet in relation to provision of car parking for bar and restaurant developments, and (ii) a comparison with carparking requirements for similar developments at other major regional centres in NSW (in essence for the purposes of ground truthing the data).
3. It was suggested that we should provide further substantiation of the claims made in our DA that air traffic movements into Dubbo had increased over recent years and that an increasing proportion of visitors to the City's tourist and visitor accommodation facilities, such as the 1 Church Street serviced apartment development, would not be arriving in their own vehicles. To this end we requested Dubbo airport passenger numbers from Jacki Parish, Manager Dubbo City Regional Airport and were provided the attached graph identifying the Passenger Numbers through the airport for the last 40 years. The graph tells many stories relating to a range of local and industry influences that have occurred over the years, but the telling statistic is that since the introduction of Regional Express services in 2002/2003 through to 2018/2019, there has been a steady and generally upward trend in the growth in total passenger numbers from about 110,000 to about 200,000 per year. The availability of the two major air service providers (Qantas Link and Regional Express) supplemented by access with other airlines to the additional ports of Newcastle, Brisbane and Melbourne has reinforced the attractiveness of air travel as an alternative to driving a vehicle to visit Dubbo.

In summary, we request that Council reviews all of the information that has been provided in the Modification Application. We maintain that the information and data provided substantiates the adequacy and appropriateness of the parking spaces proposed in the application as submitted.

regards

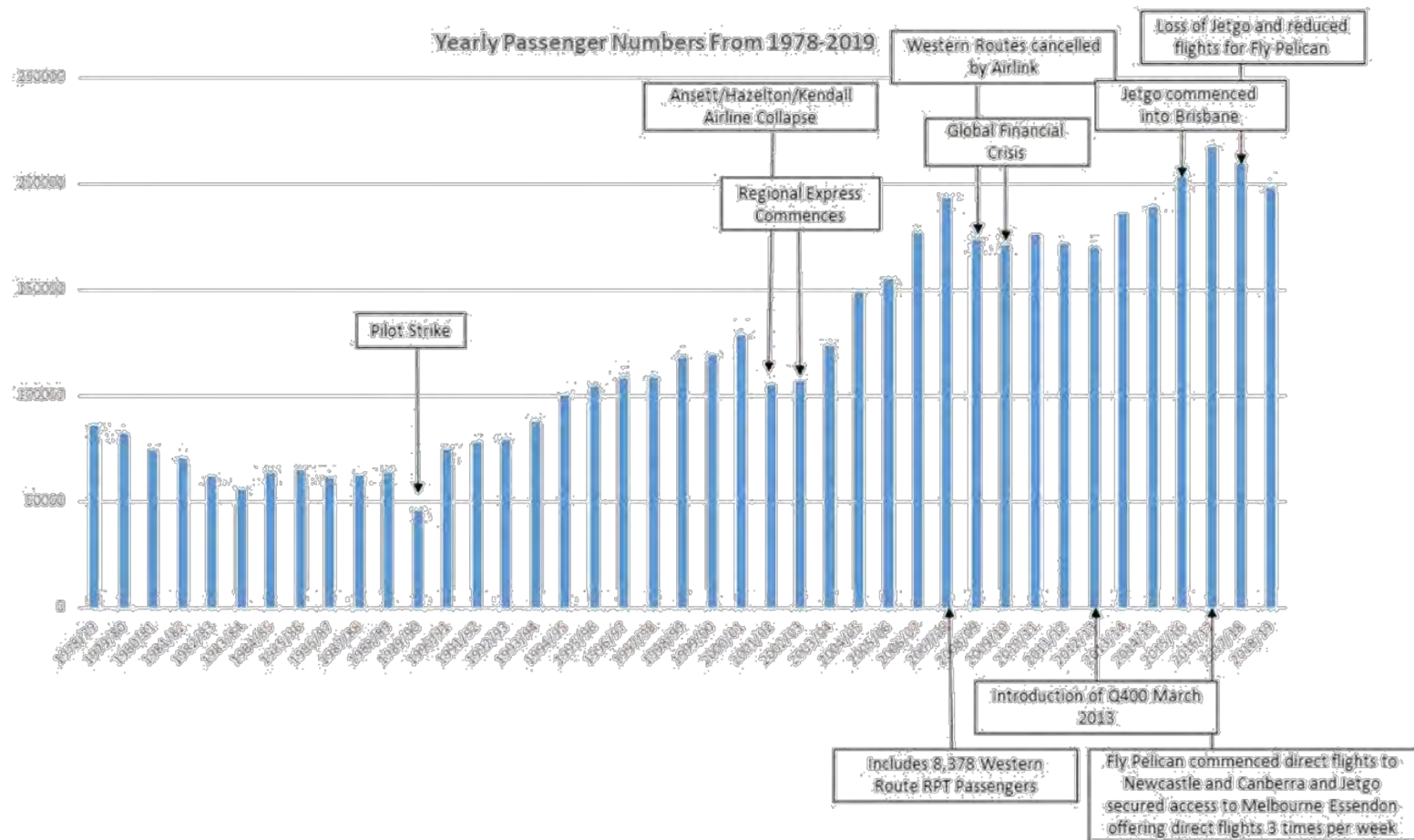


MATTHEW THORNE
State Director – NSW

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E matthew.thorne@premise.com.au
A 1st Floor, 62 Wingewarra Street, Dubbo NSW 2830



We have recently rebranded, can you please update your records



D2017-671 Part 2
Parcel 10232
DTQ:DQ

22 May 2019

G H Dubbo Pty Ltd & Icanso Pty Ltd
C/- Premise NSW Pty Ltd
PO Box 1842
DUBBO NSW 2830



Dear Stephen

MODIFICATION APPLICATION D2017-671(2)

Property: Lot: 22 DP: 230028, 1 Church Street DUBBO
Modified Application: Mixed use development comprising commercial premises (restaurant and bar) on ground floor, 57 serviced apartments (floors 2 to 6) and 27 shop top housing units (floors 7 to 13), plus parking over four (4) levels and roof terrace. The proposal also includes a four (4) lot stratum and subsequent 84 lot strata title subdivision.

Thank you for the Modification Application that you have lodged with Council. Preliminary assessment of the application has revealed that the following comments are provided for your considered response, to enable Council to determine the application.

Condition 3 – Sewerage Services Headworks Contribution

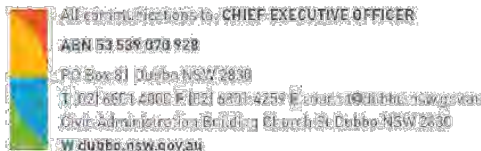
With reference to supporting correspondence dated 29 April 2019 the following quotes raise some ongoing issues to be addressed:

- *The use of the Water Directorate data for the Restaurant and Bar area assumes each operates as a standalone business attracting separate clientele rather than considering the facility as an integrated entity.*

Whilst the differing ET rates are noted, there is no evidence to support the statement that the Restaurant and Bar will operate as an integrated entity and then to what extent.

- *... the Restaurant and Bar facility will not be a major destination attractor for outside patronage but rather will attract most of its clientele from in house guests. On this basis, sewage generation by in house guests is predominantly accounted for in the ET allocation for the various combinations of residential and serviced apartments in the building.*

The Restaurant and Bar facility are not the exclusive use of in house guests and therefore additional persons will frequent the premises. Also the sewage generation by 'in house



guests' is predominantly accounted for with the residential and serviced apartments. As such, to completely exclude this area from the contribution calculation would seem to be inappropriate. Council would agree that some revision of the calculation is warranted, but the question arises as to the degree of the variation, as no factual data or evidence has been provided.

- With regard to the comments for credits to the existing building, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. On review, Council recognises the existing building (GFA 385.6m²) and agrees that the credit shall be increased to 3.856 ETs and the contribution recalculated accordingly.

Condition 4 – Water Supply Headworks Contribution

- With regard to the comments for credits to the existing building, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. On review, Council recognises the existing building (GFA 385.6m²) and agrees that the credit shall be increased to 3.856 ETs and the contribution recalculated accordingly.

Condition 5 – Open Space and Recreation Facilities Contribution

- The correspondence correctly notes a minor miscalculation in the number of persons calculated for the sake of the contribution. Rather than 134.6 persons (being 137.2 – 2.6 persons), the figure should have been 133.8 persons (being 136.4 – 2.6 persons). As such, the figure equates to 133.8 persons x \$1,394.59 per person = \$186,596.14 the condition shall be amended accordingly.

Condition 7 – Urban Roads Headworks Contribution

With reference to supporting correspondence dated 29 April 2019 the following quotes raise some ongoing issues to be addressed:

- *For the Restaurant and Bar component of the development, Council's Development Control Plan does not require the provision of carparking if commercial space in the CBD is converted to a café or restaurant usage. The usage of the existing building at 1 Church Street is for commercial office space.*

Firstly, the 'bar' component is not relevant and secondly, the exemption applies to 'change of use' applications, not demolition and rebuilds.

- *For any outside patrons that may utilise the restaurant at night, there is ample on street parking available in Church Street where easy access to the restaurant from the street is available. Other outside patrons may already be in the CBD area for work purposes and have their cars parked at other locations in the CBD.*

The public street is not a substitute for the parking required for the approved development.

- *Council's calculation of a parking provision for the restaurant/bar area on a standalone basis for a business attracting separate clientele rather than considering the facility as an integrated entity is an incorrect assumption.*

Council will consider the development on an integrated basis, but until some factual data is provided to Council arguing this issue, Council has no other option than to apply parking rates based on the floor area of the approved plans.

- *The combination of factors outlined supports the provision of 60 carparking spaces associated with the 57 serviced apartment component in the development of the 1 Church Street residential complex.*

The points raised in the correspondence do not factually support a reduction to the parking rate for the 57 units by 40%. Council has previously stated that the argument presented does merit a reduction, however, it does not provide any basis for that reduction being 40%.

The correspondence continues to make a comparison with what Council assumes is the Quest Apartments building. This approval underwent a number of modifications, but the current version has approved and registered 42 units (including 21 dual keys), equating to 63 tenancies, with 44 allocated parking spaces.

D08-364 approved 45 parking spaces for 65 tenancies. To demonstrate that an adequate amount of car parking spaces were provided, car park survey results and occupancy rates were obtained for 18 existing Quest motels across Australia. The result was that parking needed to be provided at a ratio of 0.65 spaces per serviced apartment, which in this instance meant that only 42 spaces were required. The report prepared by Masson, Wilson, Twiney is dated 26 August 2008.

D17-671 has the equivalent of 100 units and therefore at a ratio of 0.65 spaces per unit, would equate to 65 spaces, not far off the requested 60 spaces. However, that rate was based on survey data more than 13 years old and whilst providing a guide, would need to be updated.

Notwithstanding the above comments, with regard to the above comments for credits to the existing building, Council notes that the levying of contributions relates to the additional impost placed upon Council's infrastructure. On review, Council recognises the existing building (GFA 385.6m²) and advises that at the CBD Commercial rate of 25 trips per 100m² GFA, the credit shall be 96.4 trips and the contribution recalculated accordingly.

It is requested that the information be provided to Council by 12 June 2019. If this is not possible, you are requested to contact Council's Manager Building and Development Services, Darryll Quigley, to arrange for an extension of time within which to submit the required information.

Page 4 of 4

Pursuant to clause 112 of the Environmental Planning and Assessment Regulation, 2000, you are advised that the time which lapses between the date of this correspondence and the date upon which Council receives the requested information or written advice from you that such information will not be forthcoming, is not taken into consideration when determining the application's assessment period for the purposes of clause 106 of the Environmental Planning and Assessment Regulation.

If you have any enquiries in this matter, please do not hesitate to contact Mr Quigley during normal office hours, on 6801 4000.

Yours faithfully

Darryll Quigley
Manager Building and Development Services

**Table 1: Infrastructure Division Assessment of Premise Urban Roads Headworks Contribution (Parking)
DA Condition 7 of D2017-671 Part 2, 1 Church Street**

Item	Council Assessment	Applicant Assessment	Quest 2008	Infrastructure Comments	Reference from Infrastructure
Accommodation Type	57 units Development Control Plan 2013 - 1 bedroom unit: 1 car parking space per unit; - 2 or more bedroom unit: 2 car parking spaces per unit; (page 305 of Dubbo DCP 2013). Therefore, parking requirement – for 14 x 1 bedroom = 14 spaces; for 43 x 2 bedroom = 86 spaces. - Total parking requirement 14	Mixed Use Residential Shop Top (permanent living), serviced apartments and commercial (bar and restaurant) development. 57 units - 14 x 1 bedroom units - 43 x 2 bedroom units	41 units (65 lettable key units) - 14 x 2 bedroom units - 24 x 2 bedroom dual key units - 3 x 3 bedroom	Noted the assessment of required spaces under DCP.	<ul style="list-style-type: none"> Dubbo Development Control Plan 2013

Item	Council Assessment	Applicant Assessment	Quest 2008	Infrastructure Comments	Reference from Infrastructure
	+ 86 = 100 spaces				
Restaurant/Bar floor area	1 space per 25 m ² of NLA Therefore, parking requirement – $185/25 = 7.4 \approx 7$ spaces.	185 m ² Bar = 79 m ² Fact Sheet FS3061 says liquor can't be provided without restaurant, so only the restaurant area should be included in the calculation (106 m ² total)	0 **rough area is 200m ²	The Quest development DA plans showed 2 meeting rooms in the original DA. These meeting rooms were converted to a restaurant at one stage, however it no longer functions as one.	<ul style="list-style-type: none"> Dubbo Development Control Plan 2013
Parking spaces proposed	Total Parking DCP requirement: 100+7=107 spaces DCP says 107 spaces should be provided, so there is a shortfall of 57 spaces.	45 spaces	60 spaces	Premise have not relied upon any factual data from other similar residential shop top developments to substantiate the presented arguments. Therefore, there is insufficient evidence to modify the parking contribution.	

Item	Council Assessment	Applicant Assessment	Quest 2008	Infrastructure Comments	Reference from Infrastructure
Parking generation rates					
Average parking rates for peak periods		Relied on Quest data, no new information provided	Morning = 0.54 Evening = 0.63 Combined = 0.58 - from a survey of 18 Quest sites	Noted. Not included in the calculations as relevance to today is not qualified by Premise.	
85 th percentile parking rates for peak periods		Relied on Quest data, no new information provided	Morning = 0.95 Evening = 0.86 Combined = 0.93	Noted. Not included in the calculations as relevance to today is not qualified by Premise.	
Average room occupancy rate (ABS)		Relied on Quest data, no new information provided	60.1% (2007-2008, ABS 8635) 85 th percentile = 67.3%	ABS stopped reporting by Local Government Area in June 2011, rather moving to State average.	Austrade Research (https://www.tra.gov.au/Regional/Local-Government-Area-Profiles/local-government-area-profiles), Destination NSW (https://www.destinationnsw.com.au/wp-content/uploads/2017/02/Dubbo.pdf)

Item	Council Assessment	Applicant Assessment	Quest 2008	Infrastructure Comments	Reference from Infrastructure
					https://www.destinationnsw.com.au/wp-content/uploads/2019/05/str-tourist-accommodation-snapshot-mar-qtr-2019.pdf

Additional justifications presented by Premise

Premise Justification	Infrastructure response	Reference
Air travel increased from 110,000 passengers (2002/2003) to 200,000 (2018/2019) Less requirement for people in cars (i.e. use taxis)	<p>Whilst the increase in air traffic is agreed with, tourism figures suggest that almost 89% of domestic visitors to Central NSW travelled by private car/company car.</p> <p>The vehicle hire facilities at the Dubbo Regional Airport has recently been expanded to accommodate the growth in demand for hire vehicles.</p> <p>There is no data presented to confirm that the increase in air travel and passenger numbers reduces the need for driving a vehicle and requiring parking, as there are passengers who require taxi services for potential accommodation visitation and passengers who hire vehicles who may or may not accommodate in Dubbo.</p>	<p>https://www.destinationnsw.com.au/wp-content/uploads/2019/10/central-nsw-time-series-ye-jun-2019.pdf</p> <p>https://www.destinationnsw.com.au/wp-content/uploads/2019/04/travel-to-central-nsw-snapshot-dec-2018.pdf</p>
Restaurant and bar will not be a major attractor to outside clientele (so additional parking spaces not required), or people will	<p>Infrastructure does not agree with this argument.</p> <p>It is not unreasonable to impose a requirement for car parking for a new restaurant and bar on a greenfield development. The facility will be subject to a high quality of service and product will</p>	https://www.destinationnsw.com.au/wp-content/uploads/2019/10/central-nsw-time-series-ye-jun-2019.pdf

already be in the CBD and can use on street parking (as other restaurants do).	<p>likely be an attractor in its own right. The viability of the facility will rely on patronage of both external customers and residents of the development.</p> <p>The restaurant and bar are on a river side location, which may soon become an entertainment area (under the Beautification of the Macquarie River Corridor of the Dubbo Central Business District). It is likely that the views from the development will also be an attractor and encourage additional clientele to the bar and restaurant who will undoubtedly require some parking availability. In addition, 57% of tourists to Central NSW eat out at restaurant or café.</p> <p>The argument that all potential customers will be in the area and using street parking is arguing that no new development generates traffic or demand for parking.</p>	
2 bed apartments would be 1 family or colleagues, so 1 car only is required. Coach tours are more popular, so car parking requirements are lower.	<p>There has been no evidence provided to substantiate the claim that only 1 vehicle would only be required for a 2 bedroom apartment (colleagues travelling separately) or that coach tours are more popular and therefore negate the need for car parking requirements. Tourism data does not correlate with Premise's arguments.</p> <p>Tourism data produced by Destination NSW indicates that:</p> <ul style="list-style-type: none"> - 89% of domestic visitors to Central NSW travelled by private car/company car. Remaining 11% was air/coach - 50% of international visitors travelled in private/rental cars - 58% of visitors to the region travelled for holiday/business, so would require accommodation. 	https://www.destinationnsw.com.au/wp-content/uploads/2019/10/central-nsw-time-series-ye-jun-2019.pdf

	- 57% of tourists to Central NSW eat out at restaurant or café.	
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Consideration has been given to the arguments presented by Premise of which most is based on the Quest development and anecdotal claims and assumptions on the parking behaviour and vehicle generation that will occur with the development.

The adopted rate for the Quest development was based on the factual occupancy data obtained from 18 Quest developments. It must be noted that Quest only provides typical short-term accommodation facilities, whereas the development at 1 Church Street is a mixed-use development. Infrastructure has presented evidence that does not correlate with the arguments presented by premise. As such, no reduction in contributions should be provided.

It needs to be understood that Council's Section 94 Contribution Plan has been developed based on the future growth, development and parking needs of the City with a dollar value assigned to the infrastructure requirements that Council is to provide a contribution rate has been adopted to satisfactorily accommodate that growth.

Historically Council has given consideration to vary the contributions based on factual, comprehensive and relevant data that allows an informed and logical decision to be made. However, in the case for 1 Church Street, Premise have concluded that there is no requirement for any additional car parking contribution for the serviced apartments other than for their calculated 60 spaces being 44% less than the DCP requirement of 107 spaces.

It should also be noted that parking figures for other similar developments assessed in recent times (102 Macquarie Street, MAAS, Kim Williams) were calculated using Dubbo DCP figures, or a detailed transportation/parking study was provided.

Assessment completed by:

Stephen Howlett, Manager Infrastructure Strategy and Design

Dennis Valantine, Senior Traffic Engineer

Ridwan Quaium, Safe Roads Engineer

Musarrat Khan, Senior Development Engineer



REPORT: 1R Old Dubbo Road, Dubbo - Development Control Plan - Results of Public Exhibition

AUTHOR: Growth Planner
REPORT DATE: 22 November 2019
TRIM REFERENCE: ID19/1490

EXECUTIVE SUMMARY

Council has been provided with a draft, site-specific Development Control Plan by consultant, Claire Johnson Planning and Development on behalf of Neil and Jennifer O'Connor, landowners of Lot 1 DP 807767, 1R Old Dubbo Road, Dubbo (**Appendix 1**). The subject land is situated in the South-East Dubbo Residential Urban Release Area under the provisions of the Dubbo Local Environmental Plan (LEP) 2011.

The draft Development Control Plan (DCP) has been prepared as a requirement of Clause 6.3 of the Dubbo LEP to facilitate development of the subject land. The DCP is required to be prepared prior to any development on the land, including development for the purposes of residential land subdivision.

Council at its Development and Environment Committee meeting on 8 October 2019 considered a report in respect of the draft DCP and resolved as follows:

- "1. That the draft Miriam Hill Estate Development Control Plan, as provided here in Appendix 1, be adopted for the purpose of public exhibition.*
- 2. That the draft Miriam Hill Estate Development Control Plan be placed on public exhibition for a period of not less than 28 days in accordance with the requirements of the Environmental Planning and Assessment Act, 1979.*
- 3. That following completion of the public exhibition process, a further report be provided to Council for consideration."*

The draft DCP was placed on public exhibition from Tuesday 15 October 2019 to Tuesday 12 November 2019, a period of 28 days. Two (2) submissions were received during the public exhibition period.

This report recommends that the Development Control Plan for 1R Old Dubbo Road, as exhibited and provided in **Appendix 1**, be adopted by Council.

FINANCIAL IMPLICATIONS

The proponent has paid a fee of \$10,000 to Council in accordance with Council's Revenue Policy for the preparation and assessment of a site-specific Development Control Plan.

POLICY IMPLICATIONS

If adopted by Council, the Development Control Plan for 1R Old Dubbo Road, Dubbo will form a Council Policy document that will guide future development on the subject site. The Development Control Plan will be required to be considered by Council in the assessment and determination of any future development applications on the subject land.

RECOMMENDATION

- 1. That the Development Control Plan for 1R Old Dubbo Road, as provided here in Appendix 1, be adopted.**
- 2. That the Development Control Plan be adopted without any estate name contained within.**
- 3. That an advertisement be placed in local print media specifying adoption of the Development Control Plan for 1R Old Dubbo Road.**
- 4. That those who made a written submission be acknowledged and advised of Council's determination in this manner.**

Stefanie Presland
Growth Planner

BACKGROUND

Council has been provided with a draft, site-specific Development Control Plan by consultant, Claire Johnson Planning and Development on behalf of Neil and Jennifer O'Connor, landowners of Lot 1 DP 807767, 1R Old Dubbo Road, Dubbo (**Appendix 1**). The subject land is situated in the South-East Dubbo Residential Urban Release Area under the provisions of the Dubbo Local Environmental Plan (LEP) 2011.

The draft Development Control Plan (DCP) has been prepared as a requirement of Clause 6.3 of the Dubbo LEP to facilitate development of the subject land. The DCP is required to be prepared prior to any development on the land, including development for the purpose of residential land subdivision.

The Development and Environment Committee at its meeting on 8 October 2019 resolved to place the draft DCP on public exhibition for a period of no less than 28 days.

The draft DCP is proposed to apply to Lot 1 DP 807767, 1R Old Dubbo Road as shown in Figure 1. The subject land covers an area of 2.35 Hectares and is zoned R2 Low Density Residential under the provisions of the Dubbo Local Environmental Plan (LEP) 2011. The land has a minimum allotment size for subdivision of 600m² under the provision of the Dubbo LEP 2011.

An indicative Subdivision Layout Plan has been provided by the owners of the subject land. The indicative subdivision layout shows there could potentially be 10 additional lots. The majority of lots range in area from 683m² to 1,070m² with one (1) lot being 7,133m², containing an existing dwelling.



Figure 1: Subject Area

The draft DCP has been prepared utilising a similar structure, form and content as the Dubbo Development Control Plan 2013 (Dubbo DCP 2013). It is considered that this will aid in a better understanding of the Plan by the Building and Development Industry and ensure a level of parity is provided between the expectations of the Dubbo DCP 2013 and the draft DCP.

The draft DCP has been prepared in a number of separate components, which is consistent with the structure of the Dubbo DCP 2013. The draft DCP consists of the following components:

- Introduction;
- Residential Subdivision; and
- Residential Design.

This report recommends that the Development Control Plan for 1R Old Dubbo Road, as exhibited and provided in **Appendix 1**, be adopted by Council.

REPORT

1. Public Exhibition

Council's Development and Environment Committee at its meeting on 8 October 2019 considered a report in respect of the draft Development Control Plan (DCP) for 1R Old Dubbo Road. The Committee in consideration of the report resolved to place the draft DCP on public display for a period of no less than 28 days.

The draft DCP was placed on public exhibition from Tuesday 15 October 2019 to Tuesday 12 November 2019, a period of 28 days.

The draft DCP was available for view online at www.dubbo.nsw.gov.au with hardcopies available at the Dubbo Council Civic Administration Building on the corner of Darling and Church Streets and at the Macquarie Regional Library (Dubbo Branch). A notice was placed in the local newspaper and correspondence sent to land owners immediately adjoining the subject lands.

2. Results and impact of public exhibition

Council received a total of two (2) written submissions during the public exhibition period. A copy of submissions is provided within **Appendix 2** and **Appendix 3**.

Submission 1

Received in pre-advice advising Council to consider the Development near Rail Corridors and Busy Roads – Interim Guideline 2008 (the guidelines). Further detailed submission was received which addresses the following points:

- Page 13 – Element 3 Landscaping, Fencing

John Holland Rail have requested that landscaping is avoided within 60m of the rail corridor in order to provide Bushfire mitigation and to maximise level crossing sighting

Comment:

It appears the request for avoiding landscaping within 60m of the rail corridor is not contained within the Development Near Rail Corridors and Busy Roads – Interim Guideline (2008). Additionally, the area is not subject to bushfire hazards and there are no level crossings in the locality.

It is considered that this change is not substantiated by legislative authority and therefore is not to implemented in the Development Control Plan.

- Page 21 – Element 6 Stormwater Managements

John Holland Rail have requested the inclusion of additional Acceptable Solution into the DCP which outlines how stormwater should be treated for the development.

Comment:

It is considered that these changes are relevant to the Development Control Plan and are considered within the evaluation criteria of Section 4.15 of the Environmental Planning and Assessment Act 1979. The requested additional Acceptable Solutions have been included in the Plan.

- Page 25 – Element 2 Building Setbacks

Setback design complies Section 3.8 of the guidelines regarding design principals for encouraging noise and vibration mitigation techniques.

Comment:

It appears the request to require the design principals of Section 3.8 of the guidelines to be included in the DCP is not enforced within the guidelines. As such, although it would be in the interests of developers and future residents to be aware of these building principals to encourage best practice design of dwellings Council has no authority to ensure the developers comply with these principals.

Instead it is recommended that an objective to Element 1 Streetscape Character (Page 25) is included in the DCP which reads *“to design residential housing in keeping with the general intent of Section 3.8 Development Near Rail Corridors and Busy Road – Interim Guideline 2008”*.

- Page 41 – Element 6 Visual and Acoustic Privacy

John Holland Rail requested that the wording be updated to reflect Zone B to be within 60m of a rail corridor not 25m as displayed in the draft document.

Comment:

It appears that Zone B should correctly reflect 60m within a rail corridor as per the guidelines. The DCP has been updated to reflect this correction.

- Additional items requested to be included in the DCP

John Holland Rail have requested that the use of red and green lights is to be avoided in all signed, lighting buildings and colour scheme facing the rail corridor.

John Holland have requested that the situation of concurrent development as per State Environmental Planning Policy (Infrastructure) 2007 be included in the DCP. The situations for concurrent development include the creation of new level crossings or the excavation exceeding 2m below the ground level within 25m of the rail corridor.

Comment:

A new performance criteria and acceptable solution regarding the avoidance of red and green lights/colours facing the rail corridor has been included in Element 1 Streetscape Character.

With regard to the request that the situations of concurrent development be included in the DCP, SEPP (Infrastructure) 2007 has a higher legislative authority being a prescriptive tool than a Development Control Plan which is performance tool (in essence a guideline). Therefore, SEPP (Infrastructure) 2007 enforces the concurrence in legislation and the DCP is not required to duplicate the requirements.

Submission 2

- That 2R Old Dubbo Road property is named “Miriam” and therefore the estate name of “Miriam Hill Estate” is not suitable.

Comment:

It appears that historically the subject land was subdivided in 1986 (SR86-2) which created 1R Old Dubbo Road and 2R Old Dubbo Road. Since this subdivision it appears that 2R Old Dubbo Road has retained the property name of “Miriam” while the original homestead heritage listed under the provision of the Dubbo Local Environmental Plan as “Miriam” is located on 1R Old Dubbo Road.

The Environmental Planning and Assessment Act 1979 does not provide Council with any powers for controlling the naming of estates. The matter is purely at the discretion of the land owner and is exclusively a marketing tool for the sales of the final product, in this case being land allotments.

It is considered the estate naming is inapplicable to Council plans and policies, including DCPs. Therefore, it is recommended that the DCP proceeds without any estate name contained within.

3. Future Direction

This report recommends Council adopt the Development Control Plan for 1R Old Dubbo Road, Dubbo to satisfy Clause 6.3 of the Dubbo Local Environmental Plan 2011 to facilitate development of the subject lands. Further the DCP is recommended to proceed without any estate name contained within.

Changes are displayed in green and are contained within **Appendix 1**. All changes are considered to be of minor nature and are a direct amendment to address submissions discussed within this report.

SUMMARY

Council has been provided with a draft, site-specific Development Control Plan by consultant, Claire Johnson Planning and Development on behalf of Neil and Jennifer O'Connor, landowners of Lot 1 DP 807767, 1R Old Dubbo Road, Dubbo (**Appendix 1**). The subject land is situated in the South-West Dubbo Residential Urban Release Area under the provisions of the Dubbo Local Environmental Plan (LEP) 2011.

The draft DCP was placed on public exhibition from Tuesday 15 October 2019 to Tuesday 12 November 2019, a period of 28 days.

This report recommends Council adopt the Development Control Plan for 1R Old Dubbo Road, Dubbo to satisfy Clause 6.3 of the Dubbo Local Environmental Plan 2011 to facilitate development of the subject lands.

Appendices:

- 1 [Development Control Plan](#)
- 2 [Submission 1 - John Holland](#)
- 3 [Submission 2 - Mr Shibble](#)



Development Control Plan

1R Old Dubbo Road, Dubbo

Lot 1 DP 807767

ED19/174370

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Part 1 Introduction

1.1 Name and Application of this Plan

This Development Control Plan (DCP) is known as 1R Old Dubbo Road, Development Control Plan (the Plan).

1.2 Purpose of this Plan

The purpose of this Plan is to:

- Provide guidance to developers/applicants/builders in the design of development proposals for land to which this Plan applies.
- Communicate the planning, design, environmental objectives and controls against which the Consent Authority will assess development applications at 1R Old Dubbo Road.
- Promote the achievement of residential amenity and an attractive neighbourhood by encouraging quality urban design outcomes to meet environment, social and economic suitability.
- Reinforce the aims and objectives of the R2 Low Density Residential Zone under the provisions of the Dubbo Local Environmental Plan 2011.
- Promote quality urban design outcomes within the context of environmental, social and economic sustainability.
- Provide guidance on the orderly and efficient development of 1R Old Dubbo Road.

1.3 Statutory Context

This Plan has been prepared by Council in accordance with Section 3.43 of the Environmental Planning and Assessment Act, 1979 (the Act) and Part 3 of the Environmental Planning and Assessment Regulation, 2000 (the Regulation).

The Plan was adopted by Council and commenced on

The Plan should be read in conjunction with the Dubbo Local Environmental Plan 2011 and the Dubbo Development Control Plan 2013 (DCP).

1.4 Application of Plan

This DCP applies to land known as 1R Old Dubbo Road being land identified (outlined red) as Lot 1 DP 807767 as shown in Figure 1.



Figure 1. Area to which this Plan applies

1.5 Background

This Plan has been written to guide residential development of the subject land. The development controls provided here rely on the proponents demonstrating how development of the land meets the objectives of each relevant element and the associated performance criteria.

1.6 Relationship to other plans and documents

Under the Act, Council is required to take into consideration the relevant provisions of this Plan in determining an application for development on land to which this Plan applies.

In the event of any inconsistency between an Environmental Planning Instrument (EPI) and this Plan, the provisions of the EPI will prevail.

Council in the assessment of a development application will consider all matters specified in Section 4.15 (previously S79C) of the Act. Compliance with any EPI or this Plan does not infer development consent will be granted.

1.7 How to use this Plan

When preparing a development application, all relevant sections of the Plan are required to be considered.

The majority of sections in the Plan incorporate design elements that are required to be considered and addressed by a proponent in the design process.

Each section of the Plan has a consistent format to allow for ease of use and understanding. The objectives of each section are stated at the top of the page and the proposed development is required to focus on satisfying these objectives.

Below the objectives is a table with two columns. The column on the left outlines the aim of the design element, while the column on the right offers default design guidelines that an applicant can choose to use in their development in lieu of designing to satisfy the intent of the column on the left.

In summary, the column on the left provides more flexibility in design, while the column on the right provides standard solutions that are acceptable to Council.

If a proponent chooses not to use the 'Acceptable Solutions' in the right hand column, written detail must be provided with any development application of how the design satisfies the 'Performance Criteria' in the left hand column.

An example of how an element of the Plan is structured has been provided below.

Performance criteria		Acceptable solutions	
The streetscape character objectives may be achieved where:		The acceptable solutions illustrate one way of meeting the associated performance criteria:	
Built form			
P1	The frontage of buildings and their entries are readily apparent from the street.	A1.1	Buildings adjacent to the public street, address the street by having a front door or living room window facing the street.

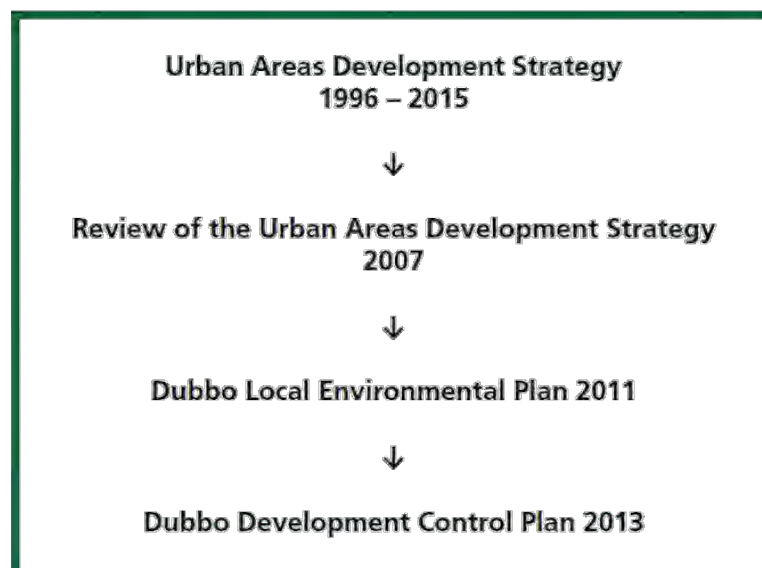
1.8 Strategic Context

Dubbo Urban Areas Development Strategy 1996

The Dubbo Urban Areas Development Strategy 1996 has facilitated the creation of a range of lifestyle options for the urban area of the city. Through the restriction of urban development to a defined area, Council is seeking to protect the long-term future of agricultural land located beyond the urban area.

These lifestyle options have been developed through the Dubbo Urban Areas Development Strategy (UADS) adopted by Council in 1996 and the Review of the UADS adopted by Council in 2007. The Dubbo Local Environmental Plan (LEP) 2011 facilitates achievement of the Strategy components in zoning land for the sustainable development of the city.

The following figure details the context of the planning documents applicable to residential lands.



The Dubbo Urban Areas Development Strategy consists of the following components:

- Residential Areas Development Strategy;
- Commercial Areas Development Strategy (Repealed);
- Industrial Areas Development Strategy (Repealed);
- Institutional Areas Development Strategy (Repealed);

- Recreational Areas Development Strategy; and
- Future Directions and Structure Plan

The Urban Areas Development Strategy was created to manage the development and conservation of land within the urban area of the city through ensuring the Central Business District is at the centre of the City.

The Employment Lands Strategy was adopted by Council 11 March 2019 and provides the strategic direction for all commercial, industrial and institutional lands within the Dubbo city urban area.

The Residential Areas Development Strategy facilitates further residential development being undertaken in west Dubbo to encourage the centralisation of Dubbo city surrounding the Central Business District. The Strategy includes extensive areas in north-west and south-west Dubbo as being suitable for further residential development to incorporate the following:

North-west sector – 2,600 lots (approximately)
South-west sector – 3,281 lots (approximately)

The Dubbo Local Environmental Plan 2011 offers a range of lot sizes in the West Dubbo Urban Release Areas, ranging from 600 square metres to 20 ha. This ensures a variety of lifestyle opportunities can be provided within a close proximity to the city centre.

The Strategy also allows for infill subdivision opportunities in the south-east sector with the Dubbo LEP 2011 allowing for the potential development of 1,059 lots within this sector. The subdivision considered by this Plan is in the south-east sector.

The Strategy does not provide for any further reduction in the minimum lot size for subdivision in the eastern sector of the city based on centralisation of the Central Business District to the west, environmental constraints, infrastructure provision and transport requirements.

1.9 Notification of Development

Council will generally not publicly notify any development applications for residential accommodation within the area to which the Plan applies. However, if in the opinion of the Council a proposed development could impact the amenity of surrounding development, Council may publicly notify and/or advertise the development application in the local print media.

Any development application received by Council for non-residential development will be publicly notified to adjoining and adjacent property owners in the immediate locality who in the opinion of Council may be impacted by the proposed development.

Part 2 Residential Development and Subdivision

Residential Subdivision Controls (Dwellings and Dual Occupancy)

This section is designed to encourage current 'best practice' solutions for the design of residential subdivision on the subject land. The achievement of a pleasant, safe and functional subdivision is the main objective for design of any subdivision on the land.

This section lists subdivision design elements under the following headings:

- Element 1 Neighbourhood design
- Element 2 Lot layout
- Element 3 Landscaping
- Element 4 Infrastructure
- Element 5 Street design and road hierarchy
- Element 6 Stormwater management
- Element 7 Water quality management

Each design element has been structured so that it contains:

- 'Objectives' for each design element that describe the required outcomes;
- 'Performance criteria' which outlines the range of matters which shall be addressed to satisfy the objectives (i.e. the performance criteria explains how an objective is to be achieved);

Note: Not all performance criteria will be applicable to every development.

- 'Acceptable Solutions' which are specific measures which illustrate one way of meeting both the performance criteria and objectives of an element. They are examples only and are not mandatory; and
- 'References' to relevant clauses of the Dubbo LEP 2011, other relevant legislation, Council policies and literature relevant to the design element.

Element 1. Neighbourhood Design**Objectives**

- To provide a neighbourhood that offers opportunities for social interaction;
- To encourage aesthetically pleasing neighbourhood design that caters for a broad diversity of housing needs;
- To ensure motor vehicles do not dominate the neighbourhood;
- To establish a clear residential structure that facilitates a 'sense of neighbourhood' and encourage walking and cycling within the estate and connections into adjoining estates; and
- To encourage a subdivision design which is sympathetic to the local heritage item onsite.

Performance criteria The streetscape character and building design objectives may be achieved where:		Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
P1	Natural and cultural features in the area are emphasised and enhanced in the design of the subdivision.	A1.1 Where practicable, watercourses and natural vegetation are retained and emphasised in the design of the subdivision.
P2	The subdivision layout provides for community focal points and public open space that promotes social interaction.	A2.1 Pedestrian connectivity is maximised within the development with a particular focus on pedestrian routes connecting to public open space, walking tracks bus stops, and recreation facilities in the extended locality.
P3	Neighbourhood design provides for passive surveillance of residences and public areas to enhance personal safety and minimise the potential for crime.	A3.1 Layout of the subdivision minimises narrow pedestrian pathways between or behind development. A3.2 The subdivision layout enhances legibility and way-finding through an easily-understood street layout. A3.3 The subdivision is designed with high levels of physical connectivity for pedestrians, cyclists and vehicles.
P4	Street networks provide good external connections for local vehicle, pedestrian and cycle movements.	A4.1 The subdivision development is designed to allow the future road connectivity link between this estate and future adjoining residential estates.

Performance criteria The streetscape character and building design objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>Street design promotes functional movement while limiting speed and detours through traffic.</p> <p>Street design allows for connectivity links with adjoining future residential development.</p>	
P5 The Subdivision Layout is designed to provide an appropriate curtilage around the local heritage item 'Miriam'.	A5.1 A Heritage Impact Statement is submitted with any applications for the subdivision of land.

Element 2. Lot Layout**Objectives**

- To provide a range of lot sizes to suit a variety of household types and requirements whilst considering the characteristics of the surrounding locality; and
- To create attractive residential streets by carefully planning the location of garage and driveways within street frontages and improving the presentation of dwelling houses.

Performance criteria The lot layout objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Lot frontage P1 Where practicable, the subdivision is designed to optimise outlook and proximity to public open space and to utilise the rural outlook of the land.	There is no applicable Acceptable Solution to this Performance Criteria.
Lot Types P2 Lots shall be provided with varying dimensions and street frontages to encourage a variety of housing types and styles.	There is no applicable Acceptable Solution to this Performance Criteria.
P3 A variety in dwelling size, type and design is provided to promote housing choice and create attractive streetscapes with distinctive character.	A3.1 Lots should generally be rectangular in shape. Where lots are an irregular shape, they are to be of a sufficient size and orientation to enable siting of a dwelling house in compliance with the controls contained in this Plan. A3.2 Optimal lot orientation is east-west, or north-south where the road pattern requires. Exceptions to the preferred lot orientation may be considered where factors such as topography or drainage lines prevent achievement of the preferred orientation. A3.3 Lot size and shape take into account the slope of the land and minimise earthworks/retaining walls associated with dwelling construction.

Performance criteria The lot layout objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
P5 The visual impact to the streetscape of battle-axe entry ways and driveways should be ameliorated, where possible.	A5.1 There is no applicable Acceptable Solution to this Performance Criteria.
Corner Lots P6 To ensure corner lots are of sufficient dimensions and size to enable residential controls to be met.	A6.1 Corner lots are to be designed to allow residential accommodation to positively address both street frontages as indicated in Figure 2. A6.2 Garages on corner lots are encouraged to be accessed from the secondary street frontage.

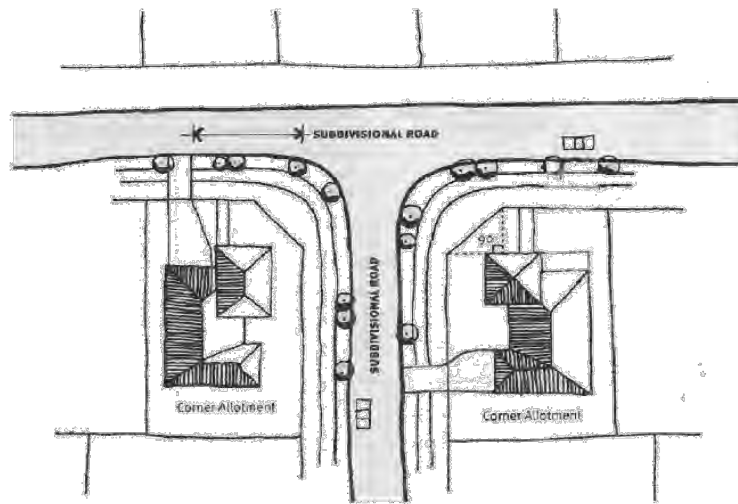


Figure 2. Corner lots

Element 3. Landscaping**Objectives**

- To provide landscaping that contributes to the identity and environmental health of the community; and
- To ensure streetscape components do not detrimentally affect solar access to individual dwellings.

Performance criteria The public open space and landscaping objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Landscaping – General P1 Landscaping is designed and located to not impact built infrastructure.	A1.1 Landscaping is provided in accordance with the requirements of a landscaping schedule that has been approved by Council's Liveability Division.
P2 Landscaping is undertaken in an environmentally sustainable manner which limits the time and costs associated with maintenance.	A2.1 Species selected are suitable for the local climate. A2.2 Species selected require a minimal amount of watering. A2.3 Landscaping does not impact ground-water levels by encouraging over-watering resulting in groundwater level increases or the pollution of waters.
Existing Vegetation P3 The subdivision is designed in an sensible manner which limits the amount of existing/native vegetation being removed.	P3.1 Existing native trees are retained wherever possible. P3.2 Documentation is to accompany the application which highlights that any relevant vegetation and biodiversity legislation is complied with.
Street Trees P4 Street trees are selected to provide summer shading while not impeding solar access to dwellings in winter.	A4.1 Street trees are provided in accordance with the requirements of Council's Liveability Division generally and any applicable Tree Planting Standards.

Performance criteria The public open space and landscaping objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<p>A4.2 Deciduous trees are selected where shadows adversely impact solar access.</p> <p>A4.3 Taller tree species are planted on the northern side of east-west aligned streets, shorter species are planted on the southern side.</p> <p>A4.4 Indigenous species or species with a proven tolerance to the local climate and conditions that preserve solar access of adjoining properties are provided.</p> <p>A4.5 Plantings with low maintenance and low water consumption are provided.</p> <p>A4.6 Evergreen species for windbreaks and planting along the south or west side of the area are protected against wind.</p>
Fencing P5 Continual lengths of solid fencing along open space areas is avoided. Fencing along the rail corridor prevents unauthorised entry.	<p>A5.1 For any private allotment having a boundary with an area of public open space, open style fencing, low hedges or permeable vegetation shall be provided along the boundary.</p> <p>A5.2 Fencing is provided during construction and will remain installed along the rail corridor which is 1.8m in height and provides delineation between the estate alignment and the rail corridor.</p> <p>Landscaping will be used to provide a permeable vegetation barrier to soften the fencing.</p>

A landscape plan is required to be submitted with any development application for subdivision of the land, where land may be sought to be dedicated to Council. Table 1 specifies the level of information required to be included on the landscape plan:

Minimum information standard

A separate landscape plan and planting schedule including the following:

1. Any land proposed to be dedicated to Council and the location of the landscaping on that site.
2. Scientific name of all plant material.
3. Height and characteristics of plant material at maturity.
4. Status of landscaping at planting.
5. Specification of a maintenance regime.
6. Specification of irrigation systems for maintenance of landscaping referencing Council's current standards.
7. Planting specifications showing staking, hole preparation, depth and root control devices.
8. Provision for mulching.
9. Specification that a horticultural professional will supervise implementation of the works in the landscape plan.
10. The plan shall be drawn to a recognised scale.

The landscape plan and supporting information shall be prepared by a suitably qualified and experienced horticultural professional or landscape architect.

Element 4. Infrastructure**Objectives**

- To ensure the estate is serviced with essential services in a cost-effective and timely manner;
- To ensure the estate is adequately serviced with water and sewerage infrastructure; and
- To ensure any subdivision and development on the land adequately plans for the provision of required stormwater infrastructure in accordance with the requirements of Council.

Performance criteria The infrastructure objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Utilities P1 Design and provision of utility services including sewerage, water, electricity, gas, street lighting and communication services are cost-effective over their lifecycle and incorporate provisions to minimise adverse environmental impacts in the short and long term.	A1.1 The design and provision of utility services conforms to the requirements of Dubbo Regional Council and all relevant service authorities. A1.2 Water and sewerage services are to be provided to each allotment at the full cost of the developer. A1.3 Water and sewerage services are to be designed and constructed in accordance with the requirements of NAT-SPEC (Dubbo Regional Council version) Development Specification Series – Design and Development Specification Services – Construction. A1.4 Electricity supply is provided via underground trenching in accordance with the requirements of the energy supply authority. A1.5 Activities near or within Electricity Easements or close to Electricity Infrastructure comply with ISSC 20 Guideline for the Management of Activities within Electricity Easements and Close to Electricity Infrastructure 2012.

Performance criteria The infrastructure objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Common Trenching P2 Compatible public utility services are located in common trenching in order to minimise the land required and the costs for underground services.	A2.1 Services are located next to each other in accordance with Council's policy for trenching allocation in footways (Standard Drawing 5268).
Availability of Services P3 Water supply and sewerage networks are available, accessible, easy to maintain and are cost-effective based on life cycle costs.	A3.1 Council will not consent to the subdivision of land until adequate water supply and facilities for sewage and drainage are available or until arrangements satisfactory to Council have been made for the provision of such supply and facilities. A3.2 Council considers that further investigation by the proponent is required to ascertain how the estate will be connected to Council gravity sewer and potable water supply. A3.3 Development is to be carried out within the water supply and sewer catchment as described by Council Section 64 Policy for Water and Sewerage.

Element 5. Street Design and Road Hierarchy

Objectives

- To ensure streets fulfil their designated function within the street network;
- To facilitate public service utilities;
- Encourage street designs that accommodate drainage systems; and
- Create safe and attractive street environments.

Performance criteria The street design and road hierarchy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Function and Width P1 The street reserve width is sufficient to cater for all street functions. <ul style="list-style-type: none"> - Safe and efficient movement of all users, including pedestrians and cyclists; - Provision for parked vehicles; - Provision for landscaping; and - Location, construction and maintenance of public utilities. 	A1.1 The road hierarchy complies with the South-East Dubbo Residential Release Strategy Residential Release Strategy. A1.2 The road hierarchy is designed and constructed in accordance with Aus-Spec (Dubbo Regional Council version). A1.3 Road reserve widths are in conformity with the Dubbo Road Transportation Strategy to 2045 (or its subsequent replacement). Roads within any subdivision on the land shall be constructed in accordance with Council's Engineers requirements. A1.4 The road layout provides appropriate connectivity as approved by Council, between adjoining residential land for both vehicular and pedestrian movement. A1.5 No direct vehicular access from any of the proposed lots will be permitted onto Old Dubbo Road.
P2 The verge width is sufficient to provide for special site conditions and future requirements.	A2.1 The verge width is increased where necessary to allow space for: <ul style="list-style-type: none"> - Larger scale landscaping; - Future carriageway widening; - Retaining walls; - Cycle paths; and

Performance criteria The street design and road hierarchy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<ul style="list-style-type: none"> - Overland flow paths.
Design for Safety P3 Street design caters for all pedestrian users including the elderly, disabled and children by designing streets to limit the speed motorists can travel.	There is no Acceptable Solution for this Performance Criteria.
Driveway Access P4 Driveway egress movements do not create a safety hazard.	A4.1 Motorists can enter or reverse from a residential lot in a single movement. A4.2 Driveways and vehicular access to lots do not directly access Old Dubbo Road.
Geometric Design P5 Bus routes have a carriageway width that: <ul style="list-style-type: none"> - Allows for the movement of buses unimpeded by parked cars; - Safely accommodates cyclists; and - Avoids cars overtaking parked buses. 	A5.1 The geometry of streets identified as bus routes provides suitable turning, stopping sight distance, grade and parking for buses.
P6 Geometric design for intersections, roundabouts and slow points is consistent with the vehicle speed intended for each street.	A6.1 Sufficient area is provided at the head of cul-de-sacs for waste disposal vehicles to make a three point turn.
P7 Car parking is provided in accordance with projected need determined by: <ul style="list-style-type: none"> - The number and size of probable future dwellings. - The car parking requirements of likely future residents. - Availability of public transport. - Likely future onsite parking provisions. 	There is no applicable Acceptable Solution to this Performance Criteria

Performance criteria The street design and road hierarchy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<ul style="list-style-type: none"> - Location of non-residential uses such as schools/shops - The occasional need for overflow parking. 	
P8 Car parking is designed and located to: <ul style="list-style-type: none"> - Conveniently and safely serve users, including pedestrian, cyclists and motorist. - Enable efficient use of car spaces and access ways including adequate manoeuvrability between the street and lots. - Fit in with adopted street network and hierarchy objectives and any related traffic movement plans. - Be cost effective. - Achieve relevant streetscape objectives 	There is no applicable Acceptable Solution to this Performance Criteria

Element 6. Stormwater Management**Objectives**

- To provide major and minor drainage systems which:
 - Adequately protect people, the natural and built environments to an acceptable level of risk and in a cost effective manner in terms of initial costs and maintenance; and
 - Contribute positively to environmental enhancement of catchment areas.
- To manage any water leaving the site (during construction and operation) with stormwater treatment measures.

Performance criteria The stormwater management objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
P1 Stormwater infrastructure is provided on the land in accordance with the requirements of Council.	A1.1 An independent stormwater drainage Strategy shall detail how the projected stormwater volumes can be managed on the subject land and through to receiving waters.
P2 Post development peak flows (up to 100 year ARI storm events) are limited to 'pre-development' levels.	A2.1 Water sensitive urban design or onsite bio-retention in the form of rain gardens, swales and absorption trenches are amalgamated into the design of the road network.
P3 The stormwater drainage system has the capacity to safely convey stormwater flows resulting from the relevant design storm under normal operating conditions, taking partial minor system blockage into account.	<p>A3.1 The design and construction of the stormwater drainage system is in accordance with the requirements of Australian Rainfall and Runoff 1987 and Aus-Spec (Former Dubbo Regional Council version) Development Specification Series – Design and Development Specification Series – Construction.</p> <p>A3.2 Infrastructure plans for the subdivision of the land shall show all minor and major stormwater systems clearly defined and identified.</p> <p>Minor systems for residential areas are designed to cater for the 10 year</p>

Performance criteria The stormwater management objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	ARI, whilst 'major' systems are to be designed to cater for the 1-in-100 year storm event. 1 in 100 year storm event. These systems are to be evident as 'self-draining' without impacting or flooding of residential houses etc.
P5 The stormwater system/drainage network is designed to ensure that there are no flow paths which would increase risk to public safety and property.	There is no applicable Acceptable Solution to this Performance Criteria.
P6 The system design allows for the safe passage of vehicles at reduced speeds on streets which have been affected by run-off from the relevant design storm.	A6.1 The system allows for the safe passage of vehicles at reduces speeds on streets which have been affected by run-off from a 20% AEP event.
Site Drainage P7 The design and layout of the subdivision provides for adequate site drainage.	A5.1 Where site topography prevents the discharge of stormwater directly to the street gutter or a Council controlled piped system, inter-allotment drainage is provided to accept run-off from all existing or future impervious areas that are likely to be directly connected. A5.2 The design and construction of the inter-allotment drainage system are in accordance with the requirements of Australian Rainfall and Runoff (1987) and Aus-Spec (Former Dubbo City Council version) Development Specification Series – Design and Development Specification Series – Construction.
P8 Site Drainage should considered the Development near Rail Corridors and Busy Roads – Interim Guideline 2008.	A8.1 Drainage systems should be designed in a way that stormwater is diverted away from the rail corridor. A8.2 Run off from the development is not to impact on the rail corridor by

Performance criteria The stormwater management objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	increasing pre-construction flows into the rail corridor.

Element 7. Water Quality Management**Objective**

- To provide water quality management systems which:
 - Ensure that disturbance to natural stream systems is minimised, and;
 - Stormwater discharge to surface and underground receiving waters, during construction and in developing catchments, does not degrade the quality of water in the receiving areas.

Performance criteria The water quality management objectives may be achieved where:		Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:	
P1	Adequate provision is made for measures during construction to ensure that the land form is stabilised and erosion is controlled.	A1.1	An Erosion and Sediment Control Plan is prepared by suitably qualified professionals using the 'Blue Book – Managing Urban Stormwater: Soils and Construction' and provided to Council with the subdivision Construction Certificate.
P2	The system design optimises the interception, retention and removal of water-borne pollutants through the use of appropriate criteria prior to their discharge to receiving waters.	A2.1	The Erosion and Sediment Control Plan is to comply with the document 'Managing Urban Stormwater: Soils and Construction', produced by NSW Department of Housing.

Residential Design (Dwellings and Dual Occupancy)

This section is designed to encourage 'best practice' solutions and clearly explain requirements for the development of dwelling houses and dual occupancy development (attached or detached).

The objectives of this section are:

- To facilitate a mix of dwelling sizes complementing the character of the area and that provide accommodation for all sectors of the community; and
- To facilitate low density residential accommodation with an economic use of infrastructure.

This section lists design elements under the following headings:

- Element 1 Streetscape character
- Element 2 Building setbacks
- Element 3 Solar access
- Element 4 Private open space and landscaping
- Element 5 Infrastructure
- Element 6 Visual and acoustic privacy
- Element 7 Vehicular access and car parking
- Element 8 Waste management
- Element 9 Site facilities
- Element 10 Signage
- Element 11 Non-residential uses

Each design element has been structured so that it contains:

- 'Objectives' describing the required outcomes;
- 'Performance criteria' outlining the range of matters that need to be addressed to satisfy the objectives (i.e. the performance criteria explains how an objective is to be achieved);

Note: Not all performance criteria will be applicable to every development.

- 'Acceptable solutions' are specific measures which illustrate one way of meeting both the performance criteria and objectives of an element. They are examples only and are not mandatory; and
- 'References' to relevant clauses of the Dubbo LEP 2011, other relevant legislation, Council policies and literature relevant to the design element.

Element 1. Streetscape Character**Objectives**

- To design residential housing in keeping with the desired future streetscape and neighbourhood character.
- To design residential housing in keeping with the general intent of Section 3.8 Development near Rail Corridors and Busy Road – Interim Guideline 2008.

Performance criteria The streetscape character objectives may be achieved where:		Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:	
Built form			
P1	The frontage of buildings and their entries are apparent from the street.	A1.1	Buildings adjacent to the public street, address the street by having a front door facing the street.
		A1.2	Where dual occupancies are situated on corner blocks, the development is designed to face each street frontage.
		A1.3	Dual occupancy development shall not be designed as 'mirror reversed'.
P2	The development is to be designed to respect and reinforce the positive characteristics of the neighbourhood, including: <ul style="list-style-type: none"> – Built form; – Bulk and scale; – Vegetation; and – Topography. 	A2.1	Design elements to consider include: <ul style="list-style-type: none"> – Massing and proportions; – Roof form and pitch; – Façade articulation and detailing; – Window and door proportions; – Features such as verandahs, eaves and parapets; – Building materials, patterns, textures and colours; – Decorative elements; – Vehicular footpath crossing (location and width); – Fence styles; and – Building setbacks.
P3	Walls visible from the street are adequately detailed for visual interest.	A3.1	This may be achieved by recesses, windows, projections or variations of colour, texture or materials.

Performance criteria The streetscape character objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	A3.2 Walls longer than 15 m are articulated with a variation of not less than 600 mm for a minimum length of 4 m.
P4 Garages and parking structures (carports) are sited and detailed to ensure they do not dominate the street frontage, integrate with features of the dwelling and do not dominate views of the dwelling from the street.	A4.1 Garages or parking structures are located in line with or behind the alignment of the front façade/entrance of the dwelling, with a minimum setback of 5.5 m (see Element 2 – Building Setbacks), where the street frontage is in excess of 12 m. A4.2 The width of a garage door or parking structure facing the street shall not be greater than 50% if the total width of the front of the building for an allotment in excess of 12m in widths, measure at the street frontage.
Fencing P5 Fencing is consistent with the existing character of the area.	A5.1 Fences shall take elements from neighbouring properties where elements are representative of the character of the street.
P6 Front fences enable outlook from the development to the street or open space to facilitate surveillance and safety.	A6.1 Front fences have a maximum height of 1.2 m if solid or less than 20% transparent and 1.5 m if greater than 50% transparent. A6.2 A front fence on the secondary frontage may have a maximum height of 1.8 m for 50% of the length of the boundary to the secondary road, which is measured from the corner splay of the primary road boundary. In addition, <ul style="list-style-type: none"> – The fence is constructed of materials which are consistent with those used in

Performance criteria The streetscape character objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<p>development on the site and adjoining developments; and</p> <ul style="list-style-type: none"> – The fence is softened with the use of landscaping.
<p>P8 Fencing style and materials reflect the local streetscape and do not cause undue overshadowing of adjoining development.</p> <p>Note: Barbed/razor wire or electrified fencing in residential areas is not permitted.</p>	<p>A8.1 Side fences on corner allotments are setback and/or articulated to provide for vegetation screening to soften the visual impact of the fence.</p> <p>A8.2 Side fences forward of the building line are not constructed of solid metal panels or chain wire fencing (including factory pre-coloured materials).</p>
<p>P9 Fencing on corner allotments does not impede motorists' visibility at the intersection.</p>	<p>A9.1 Fencing is either splayed, setback, reduced in height or transparent to maintain visibility for motorists.</p>
<p>P10 Gates are designed to ensure pedestrian and motorist safety.</p> <p>Note: Gates are not permitted to open across the footpath (Clause 21, Roads Regulation 2008).</p>	<p>A10.1 Where a driveway is provided through a solid fence, adequate visibility for the driver is maintained.</p>
<p>Heritage</p> <p>P11 New building design for any properties adjoining a heritage item shall relate to the significance and the character of the heritage item.</p>	<p>A11.1 If new buildings adjoin a heritage item, the application to build will be accompanied by an analysis (Heritage Management Document or Heritage Impact Assessment) of how new buildings relate to the heritage item</p> <p>A11.2 New buildings adjoining a heritage item are designed in a contemporary manner that is sympathetic to the heritage item</p>
<p>P12 In designing new buildings adjoining a heritage item, the size, shape and</p>	<p>A12.1 Differences in building height between existing buildings and new</p>

Performance criteria The streetscape character objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
height shall reflect the predominant height and proportions of the heritage item.	development is not more than one storey when viewed from the public street.
P13 Development shall visually relate to the streetscape of the heritage item.	<p>A13.1 Development shall not visually dominate or obscure views or sightlines to the heritage item.</p> <p>A13.2 Development shall enhance and complement the streetscape and amenity of the heritage item.</p>
P14 Fencing adjoining a heritage item is in keeping with the existing character of the heritage item.	A14.1 New fencing shall be simple, compatible in height and of suitable material and spacing to the building and the heritage item. The exact reproduction of traditional fence styles should be avoided.
P15 Lighting and external finishes of buildings do not hinder the Rail Corridor efficiency.	<p>A15.1 The use of red or green lights is to be avoided in all signage facing the Rail Corridor.</p> <p>A15.2 The use of red or green coloured paint or materials is avoided for buildings or facades facing the Rail Corridor.</p>

Element 2. Building Setbacks

Objectives

- To ensure that the setback of a building from the property boundaries, the height and length of walls, site coverage and visual bulk are appropriate for a low density residential neighbourhood; and
- To ensure habitable rooms of dwellings and private open space within the development and in adjacent development can receive adequate sunlight, ventilation and amenity.

Performance criteria The building setback objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>P1 Front Boundary Setback – Dwellings and ancillary structures The setback of development from the front boundary of the allotment is consistent with the desired low density character of the subdivision.</p> <p>Note: The setback is measured from the property boundary to the first vertical structural element of the development. No portico, posts, etc shall be any closer than the stated setback.</p> <p>Note: This applies to a dwelling house and any ancillary structure that is attached or detached to a dwelling house.</p>	<p>Primary Frontage A1.1 Minimum setback of 4.5 m from the front property boundary where no streetscape setback has been established.</p> <p>Secondary Frontage A1.2 The secondary (side) setback is 3 m. Where the corner is splayed, residential development is designed accordingly.</p>
<p>P2 Side and rear boundary setbacks – dwellings The setback of development from the side and rear boundaries of the allotment is consistent with the desired low density character of the subdivision.</p> <p>Note: The setback is measured from the property boundary to the first vertical structural element of the development. No portico, posts etc. shall be any closer than the stated setback.</p>	<p>A2.1 Residential development is setback such that it complies with the requirements of the Building Code of Australia (BCA).</p>

Performance criteria The building setback objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>P3 Front boundary setback – garages and carports</p> <p>The location of garages and carports does not diminish the attractiveness of the streetscape, does not dominate views of the dwelling from the street and integrates with features of associated dwellings.</p>	<p>Primary frontage</p> <p>A3.1 Garages and carports are setback a minimum of 5.5 m from the front property boundary and in line with or behind the alignment of the front façade of the dwelling.</p> <p>Secondary frontage</p> <p>A3.2 Garages and carports on secondary frontages of corner allotments may extend beyond the alignment of the secondary façade of the dwelling and shall achieve a minimum 5.5 m setback from the secondary property boundary (see Figure 3).</p>
<p>P4 Side and rear boundary setbacks – garages and carports</p> <p>The location of garages and carports does not diminish the attractiveness of the locality and integrates with features of associated dwellings.</p>	<p>A4.1 Garages and carports are setback such that they comply with the requirements of the Building Code of Australia.</p> <p>Where a garage or carport is provided on a secondary street frontage, regular building setback requirements of this Plan are applicable.</p>

PRIMARY FRONTAGE

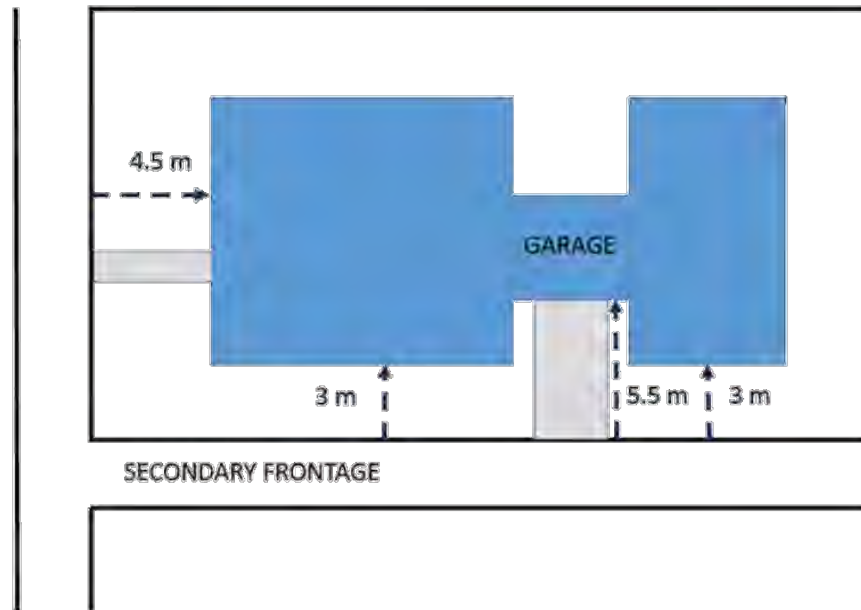


Figure 3. Corner allotment with the main entry to the primary road and the garage to the secondary road, with a setback minimum of 5.5 metres

Element 3. Solar Access**Objectives**

- To ensure all development provides an acceptable level of solar access for occupants; and
- To ensure development does not significantly impact on the solar access and amenity of adjoining and adjacent allotments.

Performance criteria The solar access objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Solar Access P1 Development is designed to ensure solar access is available to habitable rooms, solar collectors (photovoltaic panels, solar hot water systems etc.) private open space and clothes drying facilities. Note 1: Council requires the submission of a shadow diagram to demonstrate the impact of overshadowing on adjoining and adjacent allotments for any residential development above single storey. Shadow diagrams are to be prepared for 9 am, 12 noon and 3 pm on 22 June. The shadow diagrams are to demonstrate the extent of overshadowing of the proposed and existing development on the subject land and adjacent sites.	A1.1 Dwellings are sited in accordance with Figure 5. A1.2 On east/west orientated lots, the setback on the north-side of the lot is increased to allow for maximum solar access to habitable rooms located on the north-side of the dwelling. A1.3 A roof area sufficient to meet the space requirements for a solar hot water service is provided where it faces within 20° of north and receives direct sunlight between the hours of 9 am and 3 pm on 22 June. A1.3 Outdoor clothes drying area are located to ensure adequate sunlight and ventilation are provided between the hours of 9am and 3pm on 22 June to a plan of 1m above the finished ground-level under the drying lines.
P2 Development does not reduce the level of solar access currently enjoyed by adjoining or adjacent allotments.	A2.1 Habitable rooms of adjoining development receive a minimum of four hours solar access between the hours of 9 am and 3 pm on 22 June.

Performance criteria The solar access objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<p>A2.2 The solar impact of development shall be shown with the submission of shadow diagrams taken on 22 June (winter solstice).</p> <p>A2.3 Principal Private Open Space (PPOS) of adjoining and adjacent development receives a minimum of four hours solar access over 75% of the principal private open space area between 9am and 3pm on 22 June.</p> <p>A2.3 Landscaping is designed to ensure that when mature, required areas of private open space or established BBQ/pergola areas on adjoining allotments maintain solar access on 22 June.</p>

House orientation not encouraged

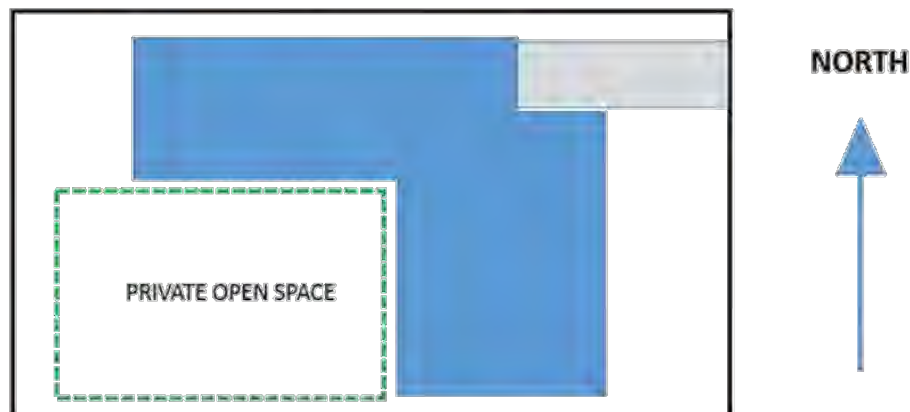


Figure 4. Siting of dwellings on east/west lots

Rationale

A dwelling built close to the northern boundary results in little to no winter sunlight being able to enter habitable rooms in the dwelling. The location of the house increases the shading of the private open space area.

House orientation encouraged

Figure 5. Siting of dwellings on east/west lots

Rationale

A dwelling built close to the southern boundary enables winter sunlight to enter habitable rooms in the dwelling. Good solar access is available to private open space during winter.

Element 4. Private Open Space and Landscaping

Objectives

- To provide private outdoor open space that is well-integrated with the development and is of sufficient area to meet the needs of occupants;
- To provide a pleasant, safe and attractive level of residential amenity; and
- To ensure landscaping is appropriate in nature and scale for the site and the local environment.

Performance criteria	Acceptable solutions
The private open space and landscaping objectives may be achieved where:	The acceptable solutions illustrate one way of meeting the associated performance criteria:
Private Open Space P1 Private open space is of an area and dimension facilitating its intended use. Note: See Element 3 – Solar Access requirements for private open space development in the estate.	A1.1 Dwelling houses and dual occupancy developments shall have a Principal Private Open Space (PPOS) area, in addition to the general Private Open Space (POS). A1.2 The PPOS area has a minimum area per dwelling of 25 m ² and a minimum dimension of 5 m. This area can include covered (not enclosed) outdoor entertainment areas. A1.3 Dwelling houses and dual occupancies have an overall minimum POS area (including PPOS) of 20% of the site area (excluding the area located forward of the building line).
P2 Private open space is easily accessible by the occupants of the development and provides an acceptable level of privacy.	A2.1 All Principal Private Open Space (PPOS) is directly accessible from the main living area. A2.2 All private open space is located behind the front building line and is screened to provide for the privacy of occupants and the occupants of adjoining properties.

Performance criteria The private open space and landscaping objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>Landscaping</p> <p>P3 Landscaping is provided at a scale and density which is appropriate for the development.</p>	<p>A3.1 Landscaping is provided in accordance with the requirements of the Landscaping Schedule.</p> <p>A3.2 The height and density of vegetation at maturity should be suitable to screen and soften the development.</p> <p>A3.3 A landscape plan is required to be provided for assessment with the lodgement of development applications for dual occupancy developments.</p>
<p>P4 Landscaping is located to not impact infrastructure, development on the site or development adjoining the site.</p>	<p>A4.1 Species are selected and located taking into consideration the size of the root zone of the tree at maturity and the likelihood of potential for the tree to shed/drop material.</p> <p>A4.2 Landscape species are selected and located to ensure the amenity of adjoining and adjacent properties is not impacted.</p> <p>This shall ensure that inappropriate vegetation is not provided that reduces the level of solar access enjoyed by adjoining and adjacent properties and is likely to provide any safety impacts to residents.</p>
<p>P5 Landscaping activities are undertaken in an environmentally sustainable manner which limits the time and costs associated with maintenance.</p>	<p>A5.1 Species selected are suitable for the local climate.</p> <p>A5.2 Species selected require a minimal amount of watering.</p> <p>A5.3 Landscaping does not impact ground-water levels by over watering resulting in ground-water</p>

Performance criteria The private open space and landscaping objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<p>level increases or the pollution of waters.</p> <p>A5.4 Existing native trees are retained when possible.</p> <p>A5.5 Landscaping is provided with a timed watering system and moisture meter to determine if watering is required.</p> <p>A5.6 Sensors are used to control watering systems.</p>

Landscaping Schedule

A Landscaping Plan is required to be submitted with a Development Application for a dual occupancy development. The table below shown below specifics the level of information required to be included for landscape plans:

Minimum information standard
<p>Details of ground cover and landscaping shown on the site plan including the following:</p> <ul style="list-style-type: none"> • Location of landscaping on the site. • Scientific name of all plant material. • Height and characteristics of plant material at maturity. • Status of landscaping at plantings. • Specification of a maintenance regime. • The plan shall be drawn to a recognised scale. <p>The landscape plan shall be prepared by a building design professional or appropriately qualified and experienced professional preparing the development plans.</p>

Element 5. Infrastructure**Objectives**

- To encourage residential development in the estate where it can take advantage of existing physical and social infrastructure;
- To ensure infrastructure has the capacity or can be economically extended to accommodate new residential development;
- To efficiently provide development with appropriate physical services; and
- To minimise the impact of increased stormwater run-off to drainage systems.

Performance criteria The infrastructure objectives may be achieved where:		Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:	
P1	Residential development shall not overload the capacity of public infrastructure including reticulated services, streets, open space and human services.	A1.1	Physical infrastructure is provided by the proponent in accordance with the former Dubbo City Council's adopted version of NAT Spec and relevant policies.
P2	Design and layout of residential development provides space (including easements) and facilities to enable efficient and cost-effective provision of telecommunication services.	A2.1	Development is connected to a telecommunication system provided in accordance with the requirements of the appropriate authority.
P3	The development is connected to reticulated sewerage, water supply and electricity systems and to natural gas where available.	A3.1	Development is connected to Council's reticulated water supply, stormwater drainage and sewerage system to the former Dubbo City Council's adopted version of AUSPEC and relevant policies (including separate water meters where the development is to be subdivided).
		A3.2	Development is located where ready access to an electricity supply is available or where electricity supply can be easily extended.

Element 6. Visual and Acoustic Privacy**Objectives**

- To limit overlooking of private open space and views into neighbouring development;
- To substantially contain noise within each dwelling and to limit noise from communal areas or shared facilities affecting nearby dwellings; and
- To protect internal living and sleeping areas from inappropriate levels of external noise.

Performance criteria The visual acoustic and privacy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>Visual Privacy</p> <p>P1 Private open spaces and living rooms of adjacent residential accommodation are protected from direct overlooking by an appropriate layout, screening device and distance.</p> <p>Note: No screening is required if:</p> <ul style="list-style-type: none"> - Bathrooms, toilets, laundries, storage rooms or other non-habitable rooms have translucent glazing or sill heights of at least 1.5 m. - Habitable rooms having sill heights of 1.5 m or greater above floor level or translucent glazing to any window less than 1.5 m above floor level. - Habitable rooms facing a property boundary have a visual barrier of at least 1.5 m high (fences and barriers other than landscaping are not to be any higher than 1.8 m) and the floor level of the room is less than 0.6 m above the level of the ground at the boundary. 	<p>A1.1 Windows of habitable rooms with an outlook to habitable room windows in adjacent development within 10 m:</p> <ul style="list-style-type: none"> - Are offset a minimum distance of 1 m from the edge of the opposite window in the proposed development; - Have a sill height of 1.5 m above floor level; - Have a fixed obscure glazing in any window pane below 1.5 m above floor level; or <p>A1.2 Screens are solid, translucent or perforated panels or trellis which:</p> <ul style="list-style-type: none"> - Have a minimum of 25% openings; - Are permanent and fixed; - Are of durable materials such as galvanised steel, iodised aluminium or treated timber; and <p>A1.3 Windows and balconies of residential accommodation shall be designed to prevent overlooking of more than 50% of the private open space of any adjoining residential accommodation.</p>

Performance criteria The visual acoustic and privacy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>Acoustic Privacy</p> <p>P2 The transmission of noise to and the impact upon habitable rooms within the proposed development and adjoining and adjacent development is minimised.</p>	<p>A2.1 Living rooms or garages of residential development does not adjoin or abut bedrooms if adjacent residential development.</p> <p>A2.2The plumbing of residential development and is separate and contained sufficiently to prevent transmission of noise.</p> <p>A2.3 Electrical, mechanical or hydraulic equipment or plant generating a noise level no greater than 5dBA above ambient L90 sound level at the boundary of the property.</p> <p>A2.4Residential development is constructed to ensure habitable rooms are not exposed to noise levels in excess of the standards contained in the relevant Australian Standard(s) including AS 3671 – Road Traffic.</p>

Performance criteria The visual acoustic and privacy objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
<p>Rail Noise Impacts</p> <p>P3 Development of the land is not unreasonably impacted by noise associated with use of the Dubbo-Molong Rail Corridor.</p>	<p>A3.1 The development complies with the requirements of State Environmental Planning Policy (infrastructure) 2007 and the Development near Rail Corridors and Busy Roads –Interim Guideline (2008) (or its equivalent).</p> <p>A3.2 All residential buildings located within 60m of the rail corridor (Zone B) require standard noise mitigation measures consistent with Category 2 Noise Control Treatments (interim Guideline C) which include:</p> <ul style="list-style-type: none"> - Windows/sliding doors – openable with minimum 6mm monolithic glass and full perimeter acoustic seals - Wall construction 110mm brick, 90mm timber stud frame, minimum 50mm clearance between masonry and stud frame, 10mm standard plasterboard internally. - Roof – Pitched concrete or terracotta tile or metal sheet rood sheeting with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity. - Entry Door -40mm solid core timber door fitted with full perimeter acoustic seals. - Floor – 1 layer of 19mm structural floor boards, timber joists on piers or concrete slab on floor on ground.

Element 7. Vehicular access and car parking**Objectives**

- To provide adequate and convenient parking for residents, visitors and service vehicles;
- To ensure street and access ways provide safe and convenient vehicle access to dwellings and can be efficiently managed; and
- To avoid parking and traffic difficulties in the development and the neighbourhood.

Performance criteria The vehicular access and car parking objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Parking Provision P1 Car parking is provided according to projected needs, the location of the land and the characteristics of the immediate locality.	A1.1 Dwelling houses and dual occupancy development provides the following vehicle parking: <ul style="list-style-type: none"> - One bedroom dwelling – one car parking space per dwelling, situated behind the front building setback; and - Dwelling with two or more bedrooms – two car parking spaces per dwelling.
Design P2 Car parking facilities are designed and located to conveniently and safely serve users including pedestrians, cyclists and vehicles.	A2.1 The dimensions of car spaces and access comply with AS2890.1. A2.2 Access ways and driveways are designed to enable vehicles to enter the designated parking space in a single turning movement and leave the space in no more than two turning movements. A2.3 The design and appearance of garages and carports shall: <ul style="list-style-type: none"> - Be in line with or behind the alignment of the front façade of the dwelling (noting that they cannot be less than 5.5 m from the front property boundary in the R2 zone); - Garages and carports on secondary frontages of corner

Performance criteria The vehicular access and car parking objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	allotments may extend beyond the alignment of the secondary façade of the dwelling but shall achieve a minimum 5.5 m setback from the secondary property boundary; <ul style="list-style-type: none"> - Lots with a narrow frontage of 15 m or less have a single width garage/carport; - Large parking areas are broken up with trees, buildings or different surface treatments; - Parking is located so that the front windows of a dwelling are not obscured; - The dwelling design highlights the entry and front rooms rather than the garage; and - Garages are located under the roof of two-storey dwellings.
Emergency Vehicle Access P3 Standing and turning areas for service, emergency or delivery vehicles are provided where access to any dwelling from a public street is remote or difficult.	A3.1 Access ways are designed to cater for an 'AUSTROADS 8.8 m length Design Service Vehicle'.
Surface Treatment P4 Driveways, car parks and access points are designed in accordance with Section 3.5 Parking.	A4.1 Car spaces, accessways and driveways are formed, defined and drained to a Council drainage system and surfaced with: <ul style="list-style-type: none"> - An all-weather seal such as concrete, coloured concrete, asphalt or mortared pavers. - Stable, smooth, semi-porous paving material (such as brick, stone or concrete pavers) laid to the paving standard of light vehicle use.

Element 8. Waste Management**Objective**

- To ensure waste disposal is carried out in a manner which is environmentally responsible and sustainable.

Performance criteria The waste management objectives may be achieved where:		Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:	
Domestic Solid Waste			
P1	Domestic solid waste is disposed of in an environmentally responsible and legal manner.	A1.1	Residential development shall participate in Council's garbage and recycling materials collection service.
		A1.2	Recycling of wastes such as paper (mulch in garden), plastics, glass and aluminium.
		A1.3	Reuse of waste such as timber.
		A1.4	Dispose of waste to a Council-approved waste facility or transfer station.
		A1.5	Organic waste shall be composted.
P2	The amount of liquid waste generated is minimised	A.2.1	Dual flush toilet systems and water saving fittings and appliances shall be used.
P3	Adequate space is provided to store waste collection bins in a position which will not adversely impact upon the amenity of the area.	A3.1	Waste collection bins are stored behind the building line.
P4	New buildings are constructed on land where the risk of harm to human health is low.	A4.1	State Environmental Planning Policy No 55 Remediation of Land is considered where potentially contaminating items or activities have historically been undertaken (e.g historical septic tanks on the land).

Element 9. Site Facilities**Objective**

- To ensure that site facilities are functional, readily accessed from dwellings, visually attractive, blend in with the development and street character and require minimal maintenance.

Performance criteria The site facilities objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Mail Boxes P1 Mail boxes are located for convenient access by residents and the delivery authority.	A1.1 Individual mail boxes are located to each ground-floor entry of residential accommodation or a mail box structure is located close to the major pedestrian entrance to the site.
Antennae P2 Telecommunications facilities are provided to serve the needs of residents and do not present any adverse visual impacts	A2.1 The number of television antennae and other receiving structure is kept to a minimum, or where appropriate, a receiver is provided to serve all dwellings within a single building.

Element 10. Signage**Objectives**

- The residential character of the locality is maintained; and
- Any signage is appropriate for the locality and does not detract from the development or the street character.

Performance criteria The signage objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Signage P1 Signs are appropriate for the nature of the business and the locality.	A1.1 Signage shall: <ul style="list-style-type: none"> - Be non-moving; - Relate to the lawful use of the building (except for temporary signs) on which the sign is located; - Not be detrimental to the character and functioning of the building; - Not cover mechanical ventilation inlet or outlet vents; - Not obstruct the sight line of vehicular traffic; - Not obstruct pedestrian traffic; and - Not be illuminated or flashing.
Business Identification Signage P2 Signs are appropriate for the nature of the business and the locality.	A2.1 Home-based child care, home business, home industry and home occupation development signage shall: <ul style="list-style-type: none"> - Meet the general requirements for signage (P1); - Have one sign per premises. - Have a maximum area — 0.75 m²; and - Not advertise specific products or brands. <p>Note: Signs meeting the above requirements will not require development approval.</p>

Performance criteria The signage objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<p>A2.2 Permissible non-residential development signage shall:</p> <ul style="list-style-type: none"> - Meet the general requirements for signage (P1); - Have one sign per premises; and - Have a maximum area 1.5 m². <p>Note: Signs meeting the above requirements will not require development approval.</p>
<p>Real Estate Signs (Advertising Premises or Land Sale or Rent)</p> <p>P3 Signs are appropriate for the residential locality and are of a temporary nature.</p>	<p>A3.1 Real estate signage shall:</p> <ul style="list-style-type: none"> - Meet the general requirements for signage (P1); - Have a maximum area—3 m²; and - Be removed within seven days after the premises or land is sold or let. <p>Note: Signs meeting the above requirements will not require development approval.</p>
<p>Temporary Signs (Special Events)</p> <p>P4 Signs are appropriate for the residential locality and are of a temporary nature.</p>	<p>A4.1 Temporary (special events) signage shall:</p> <ul style="list-style-type: none"> - Meet the general requirements for signage (P1); - Have a maximum of two signs onsite; - Have a maximum one sign off site, which if located in a road reserve shall be acceptable to the relevant road authority in terms of location, traffic and pedestrian safety; - Have a maximum area 1.5 m² and maximum height of 1.5 m;

Performance criteria The signage objectives may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
	<ul style="list-style-type: none"> - Not include commercial advertising apart from the name of any event sponsors; and - Not be displayed earlier than one month before or later than two days after the event. <p>Note: Signs meeting the above requirements will not require development approval.</p>

Element 11. Non-Residential Uses**Objective**

- To ensure non-residential development is of a type, scale and character which will maintain an acceptable level of amenity.

Performance criteria The non-residential uses objective may be achieved where:	Acceptable solutions The acceptable solutions illustrate one way of meeting the associated performance criteria:
Amenity P1 Non-residential use does not result in detrimental impacts to residential amenity having regard to traffic, parking, noise, odour, signage and safety.	A1.1 The level of noise and volume of traffic is not greater than the expected level associated with the regular activities of a residential area. A1.2 Car parking is provided and designed appropriate for the site, such that adequate off-street car parking will be provided so that it can be demonstrated that there will be no requirement for on-street car parking. A1.3 Traffic can manoeuvre in and out of the site in a forward direction. A1.4 Noise from the development does not exceed the background noise level (LA90) by more than 5dB(A) during approved business hours and does not exceed the background noise level at any frequency outside approved business hours. A1.5 Hours of operation are to be restricted to normal business hours. A1.6 The scale and character of non-residential buildings is compatible with the residential nature of the locality.

**JOHN
HOLLAND**

15 November 2019

The Chief Executive Officer
Dubbo Regional Council
PO Box 81
DUBBO NSW 2830

Only via email: council@dubbo.nsw.gov.au

Dear Sir/Madam,

RE: Draft Miriam Hill Estate Development Control Plan
PROPERTY: Lot 1 DP 807767, 1R Old Dubbo Road Dubbo

I refer to your letter dated 14 October 2019 inviting John Holland Rail (JHR) to comment on the Draft Miriam Hill Estate Development Control Plan (**Draft DCP**).

Background

Rail Corporation New South Wales (**RailCorp**) is the landowner of the Country Regional Network (**CRN**) railway lines across NSW. As of 15 January 2012, John Holland Rail (**JHR**) has been appointed to manage the CRN. As such, JHR is responsible for reviewing development applications, planning proposals, development control plans (DCP) and policies adjoining the rail corridors to ensure that potential impacts to rail operations (current and future) are considered and addressed.

The Draft DCP is related to Lot 1 DP 807767 (Land) only which directly adjoins the non-operational Yeoval to Dubbo rail corridor.

In fact, our records indicate that JHR have previously reviewed development applications and have also endorsed access to the rail corridor in respect of the Land. Set out below are our records in detail reflecting JHR's views on the development applications and its endorsement of Infrastructure Licence which are shown in **Attachment A**.

1. Development Application No. D2018-257 for dual occupancy. A copy of JHR's submission letter dated 26 September 2019 is **attached**;

Draft Miriam Hill Estate Development Control Plan

JOHN
HOLLAND

2. Stormwater Management regarding D2018-257 was subsequently reviewed and approved by JHR following its submission letter dated 26 September 2019;
3. Development Application No. D2018-319 for erection of boundary and front fencing. JHR have provided its requirements regarding fencing to Council. A copy of an email from the writer to Mr. Stanger of Council dated 7 September 2018 is **attached**; and
4. Infrastructure Licence with Council duly executed 13 March 2019 for the purpose of installation and maintenance of a sewer main and a manhole on the rail land in order to connect the Council's sewer pipeline to the Land. A copy of Infrastructure Licence is **attached**;

As such, it is requested that Council must consider JHR's requirements associated with previous matters mentioned above in conjunction with the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP), in particular, Subdivision 2 of Division 15 and *Development Near Rail Corridors and Busy Roads – Interim Guideline* (2008) (the **Guideline**) <https://www.planning.nsw.gov.au/-/media/Files/DPE/Manuals-and-guides/development-near-rail-corridors-and-busy-roads-interim-guideline-2008.pdf> in its finalisation of the Draft DCP.

Review

A review of the Draft DCP for Miriam Hill Estate has been undertaken with comments including but not limited to the following specific matters:

- Visual and Acoustic Privacy;
- Stormwater Drainage; and
- Fencing

In additions, our comments include additional items in **blue** are summarised in **Attachment B**.

In the event that there is an inconsistency between JHR's previous requirements in its previous submission letters and in this letter, JHR's requirements in this letter shall prevail to the extent of inconsistency.

Thank you again for requesting JHR to comment on this proposal. If you have any further questions, please contact the writer either via email at joanne.cheoung@jhg.com.au or telephone (02) 9685 5092 at your earliest convenience.

Yours faithfully,

Draft Miriam Hill Estate Development Control Plan



Joanne Cheoung
Commercial Property Analyst
John Holland Rail
Country Regional Network



Draft Miriam Hill Estate Development Control Plan

**JOHN
HOLLAND**

ATTACHMENT A

Draft Miriam Hill Estate Development Control Plan



26 September 2018

Ms Tracie Smart
Dubbo Regional Council
PO Box 81
DUBBO NSW 2830

Also by email: Tracie.Smart@dubbo.nsw.gov.au

Dear Ms Smart,

RE: Development Application D2018-257
PROPOSAL: Dual Occupancy
LAND: Lot 1 DP 807767 (1R Old Dubbo Road Dubbo)

I refer to your email dated 18 July 2018 together with a letter dated 17 May 2018 from Dubbo Regional Council (**Council**) to Transport for NSW (**TfNSW**) in respect of the Development Application D 2018-257(**DA**). I also refer to your email dated 20 July 2018 confirming that you have not received comments from John Holland Rail (**JHR**) or TfNSW on the DA to date.

As such, JHR takes this opportunity to provide its comments on the DA as it appears that the DA has not been approved as of the date of this letter.

Background

TfNSW is the land owner of the Country Regional Network (**CRN**) railway lines across NSW. As of 15 January 2012, JHR has been appointed to manage the CRN. As such JHR is responsible for reviewing development applications, planning proposals and policies on the lands adjoining rail corridors to ensure that potential impacts to rail operations (current and future) are considered and addressed.

The land affected by the DA, being Lot 1 DP 807767 (**Land**) directly adjoins the land which forms part of the rail corridor of the non-operational Yeoval to Dubbo line.

Review

In the assessment of the DA, Council must consider the following:

- A. State Environmental Planning Policy (Infrastructure) 2007 (**ISEPP**);
- B. Development Near Rail Corridors and Busy Roads – Interim Guideline (2008) (**RMS Guideline**); and
- C. TfNSW's Policy regarding new level crossings (**attached**)

Particularly, it is requested that Council consider the following:

1. Excavation in, above, below or adjacent to rail corridors

Clause 86 of the ISEPP stipulates that the consent authority must not grant consent without consulting with the rail authority and obtaining concurrence consistent with clauses 86(2) – (5) in the event that the development involves the penetration of ground to a depth of at least 2m below ground level on land within 25m of a rail corridor.

Please be advised that the details of excavation are not available to us as of the date of this letter. In the event that this development involves excavation exceeding 2m below within 25m of the rail corridor, it is then requested that Council require a condition imposing the applicant to provide geotechnical advice confirming that the DA, during construction or operation, will have no impact on the stability of the rail corridor land.

johnholland.com.au | John Holland Rail Pty Ltd | A subsidiary of JHR | Level 1, 50 Smith Street, Parramatta NSW 2150

JOHN
HOLLAND

Accordingly, JHR will advise TfNSW that until information regarding the excavation details is received and reviewed by JHR, Council's consent should be conditional that excavation will not exceed 2m below, within 25m of the rail corridor, without prior written consent from TfNSW.

2. Traffic Management

The Statement of Environmental Effects (SSE) states that due to the nature of the development and its location in a residential area, it is envisaged that traffic will be minimal. However, JHR requests Council to consider and provide further information regarding an assessment of suitability of new level crossings in preparation for the event that the rail corridor becomes operational in the future. Furthermore, JHR recommends that Council consider the Rail Safety National Law 2012 in its application of the Road Rail Interface Agreements for the prospective level crossings in the area.

3. Cranes

The RMS Guideline provides that a crane, concrete pump or other equipment must not be used in airspace over the rail corridor without approval in writing from JHR.

4. Stormwater management

The RMS Guideline provides that discharge of stormwater from a development during and after construction should be designed to ensure that no adverse effects will be had on the existing watercourse and drain infrastructure system.

JHR note that stormwater from the Land is to be discharged onsite in accordance with the SSE. On the contrary, the Concept Plan – Stormwater Drainage appears to indicate that stormwater from the Land is proposed to be discharged into the land, being Lot 2 DP176756 forming part of the rail corridor. Furthermore, the proposed installation of the headwall located in close proximity to the rail corridor indicates that there will be uncontrolled flows of the stormwater to be discharged into the rail corridor.

As information from the SSE and the Concept Plan – Storm water Drainage is not consistent regarding the proposed stormwater management, JHR request Council to require the applicant to clarify and provide the following:

- a. Should the stormwater be discharged onsite, please provide us with a new plan clearly showing the direction of the flows in the Land and how the stormwater will be captured, collected and discharged onsite; or
- b. Should the stormwater be discharged into the rail corridor, the applicant is required to consider installing a new infrastructure (i.e. new underground pipelines) in the rail corridor as it appears that there is no existing infrastructure currently available for stormwater. Our records indicate that there are two agreements between Council and TfNSW permitting Council to install pipelines in the corridor in close proximity to the Land, one of which is Licence for installation of underbore for sewer main pipelines, the other is Pipeline Agreement (*attached*) for G.I. water being fresh drinking water in accordance with JHR's engineers. As such, neither of them appears to be adequate for the stormwater from the Land to be connected for discharge into the rail corridor.

In the event that the applicant elects to install new pipelines for stormwater in the rail corridor, then an application must be submitted to JHR for its review and for TfNSW's approval. Once approved, the applicant is further required to enter into a licence agreement with TfNSW for such installation.

Accordingly, Council is requested to require the applicant to provide JHR with further information as requested above for JHR's assessment and TfNSW's approval.

RE: Development Application D2018-257 for Dual Occupancy
LAND: Lot 1/DP807767 (1R Old Dubbo Road DUBBO)

**JOHN
HOLLAND****5. Noise, vibration & air quality**

The RMS Guideline provides that for development that is in or immediately adjacent to a rail corridor the consent authority must be satisfied that the development would not be adversely affected by rail noise, vibration or air quality due to the volume of traffic the rail line carries should the rail line become operational. Council is to consult the RMS Guideline and ISEPP in its assessment of the applications.

6. Derailment protection and other potential impacts of adjacent development on railway

The RMS Guideline provides information regarding the potential risks from a possible derailment should the rail line become operational and it is requested that Council should consider these risks in the context of the design of buildings and structures adjoining the rail corridor.

7. Access to the rail corridor

Should any access to TfNSW land (or air space) be required, an application must be submitted to enter into a licence agreement by the applicant. This application will be reviewed by JHR and if endorsed, submitted TfNSW for approval / no approval.

8. Lighting, external finishes and design

The RMS Guideline provides information regarding lighting and external finishes of buildings which may have potential impacts on the rail corridor. In particular, it is requested that Council require the use of red and green lights to be avoided in all signs, lighting building colour schemes on any part of a building which faces the rail corridor.

9. Access to the Land

It is noted that access to the Land is proposed to be via Old Dubbo Road during or after the construction during the normal business hours. Please note that access via the rail corridor must be strictly prohibited unless permitted in writing otherwise.

Should you have any further enquiries regarding this matter please contact the writer either email at joanne.cheung@jhg.com.au or telephone (02) 9685 5092 at your earliest convenience.

Yours faithfully,



Joanne Cheung
Business Analyst
John Holland Rail
Country Regional Network

RE: Development Application D2018-257 for Dual Occupancy
LAND: Lot 1/DP807767 (1R Old Dubbo Road DUBBO)



Construction of New Level Crossings Policy

Purpose

To provide guidance and direction to transport planners and infrastructure managers in the ongoing development and management of the NSW rail network.

Background

Level crossings are the points at which roads and rail meet at substantially the same grade; they can represent significant collision potential for pedestrians, road and rail users.

Although the number of collisions appear to have stabilised in recent years and is at a historically low level, crashes at level crossings have the potential for high consequences.

In addition, there is concern about the number and significance of level crossing safety incidents involving heavy vehicles. Findings from a 2011 national research project show heavy freight vehicles are over represented in collisions at level crossings and the likelihood of fatalities is greater in crashes involving heavy freight vehicles compared to other types of road vehicles. This is also of concern given the projected growth in Australian freight over the next few decades; between 2010 and 2030 truck traffic is predicted to increase by 50% and rail freight is expected to jump by 90%.¹

TfNSW Position

The approach taken by TfNSW and rail and road agencies is to avoid building new level crossings wherever possible given the inherent risk attached to any level crossing, even those with modern active controls.

The Process for Opening a New Level Crossing and Issues to be Considered

Under the *State Environmental Planning Policy (SEPP) (Infrastructure) 2007* (section 84), permission to build a new level crossing must be obtained from the consent authority (the relevant council or, where specified in the *Environmental Planning and Assessment Act 1979*, a Minister or public authority).

The consent authority must give written notice of the development application to the relevant rail infrastructure manager and, before determining the application, take into consideration:

- The implications for traffic safety including the costs of ensuring an appropriate level of safety having regard to the existing traffic characteristics and any likely change in traffic affecting the crossing as a result of the development, and
- The feasibility of alternative means of access to the development that does not involve use of level crossings and
- Any comments received from the CEO of the rail authority on the proposal.

The consent authority must only approve the development application if the rail infrastructure manager agrees. The SEPP also specifies that the rail infrastructure manager must consider rail safety and operational issues, and traffic safety issues, before indicating their agreement.

¹ Sources: ITSIR, *NSW Level Crossing Strategy Council Six-monthly report covering occurrences to 31 March 2012*, April 2012 and Source: [Infrastructure Australia](http://infrastructureaustralia.com.au)

The NSW Department of Planning, *Development near Rail Corridors and Busy Roads – Interim Guideline* (2008), states “new level crossings are to be avoided wherever possible because of their inherent safety risks. Alternative arrangements should always be explored first prior to the option of a new crossing being considered”.

Consequently, developers and other organisations seeking to open a new level crossing should exhaust all other options including grade separation and use of existing level crossings prior to proposing to build a new level crossing. If it is considered that a new level crossing is still required, the organisation will need to demonstrate that they have taken these steps to consider all the possible alternatives to a new level crossing. They also need to provide information about the safety and operational impacts and/or benefits of the proposed new crossing.

If a new crossing is approved, an interface agreement between the relevant road and rail infrastructure managers must be developed under the *Rail Safety National Law (NSW)*. Interface agreements clarify responsibilities for installing and maintaining traffic controls at level crossings.

If a new crossing is approved, it would also be likely that the organisation proposing the crossing would have to obtain a licence from the rail agency for the new crossing. This licence would outline any cost and maintenance responsibilities of the proponent for the new level crossing.

TfNSW and the Level Crossing Strategy Council (LCSC) can be asked to provide advice on proposals for new level crossings.

From: [Joanne Cheung](#)
To: council@dubbo.nsw.gov.au
Subject: DA D2018-319 Erection of boundary and front fencing
Date: Friday, 7 September 2018 3:23:00 PM
Attachments: [image013.png](#)
[image014.png](#)
[image015.png](#)
[image016.png](#)
[image017.png](#)
[image018.png](#)

Attention: Alan Stanger

Dear Mr. Stanger,

I refer to our telephone conversation on 5 September 2018.

I confirm your advice that the DA has now been determined.

However, please kindly advise the applicant to comply with Engineering Specification published in **CRN CP 511** (<http://www.jhrcrn.com.au/media/2071/crn-cp-511-v1-1.pdf>) in its installation.

Should you have any questions regarding the above, please contact the writer at your earliest convenience.

Regards,

Joanne Cheung
Business Analyst - Property
Country Regional Network

**JOHN
HOLLAND**

Level 1, 20 Smith St
Parramatta NSW 2150
P. +61 2 9685 5092
W. johnholland.com.au



Application No: 000325
Agreement No: AGR-13121

INFRASTRUCTURE LICENCE

BETWEEN

TRANSPORT for NSW

AND

DUBBO REGIONAL COUNCIL

DATED the 11th day of March, 2019

Infrastructure Licence Version 1.7 (5021X) - Dubbo Regional Council - Dubbo
Application No: 000325
Agreement No: AGR-13121

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LICENCE

BETWEEN: TRANSPORT for NSW (ABN 18 804 239 602) of Level 6, 18 Lee Street, Chippendale NSW 2008 ("TfNSW")

AND: The party named as the Licensee in Item 1 of Schedule 1 ("the Licensee")

BACKGROUND:

- A. TfNSW is the owner of or has the care, control and management of the Licensed Area.
- B. The Licensee has requested, and TfNSW has agreed to grant a licence to carry out the Permitted Use on the Licensed Area for the Term in accordance with the terms and conditions of this Licence.
- C. TfNSW has appointed an Agent to manage the Licensed Area and to administer and manage this Licence on its behalf. It is hereby acknowledged that the Agent is a Rail Infrastructure Manager accredited under the Rail Safety Law.

THE PARTIES AGREE AS FOLLOWS:**1. DEFINITIONS**

In this Licence the following definitions apply, unless the context requires otherwise:

"Activity" means any undertaking, development, work or use in, on, under or near the Licensed Area or Railway Infrastructure, and includes the storage, transportation, leak, escape, removal, discharge, release or disposal of any substance, Contaminant or waste in, on, under, to, from or near the Licensed Area or Railway Infrastructure.

"Agent" means that party named in Item 2 of Schedule 1 (or such other agent as appointed by TfNSW from time to time) as appointed by TfNSW pursuant to clause 6.

"Asbestos" has the same meaning as in the WHS Regulation.

"Asbestos Management Plan" has the same meaning as in the WHS Regulation.

"Asbestos Register" has the same meaning as in the WHS Regulation.

"Authorisation" means any approval, consent, exemption, licence or registration, however described, and any renewal of any of them.

"Bank Guarantee" means a bank guarantee that complies with clause 21(a).

"Bankruptcy Act" means the *Bankruptcy Act 1966 (Cth)*.

"Business Day" means a day not being a Saturday, Sunday or public holiday in New South Wales and excludes the period from and including 25 December of one calendar year to 1 January of the following calendar year.

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"Claim" includes any claim, demand, objection, requisition, remedy, suit, injury, damages, penalty, loss, Cost, liability, action, proceeding, right of action and claim for compensation (including the Costs of defending or settling any action, proceeding, claim or demand).

"Commencement Date" means the date set out in Item 4 of Schedule 1.

"Construction Induction Certificate" means the certificate of the same name issued after completion of general construction induction training with WorkCover or a registered training organisation.

"Construction Work" has the same meaning as in Part 6.1 of the WHS Regulation.

"Contamination" has the meaning given in the *Contaminated Land Management Act 1997* (NSW).

"Contractor" means each and any of the Licensee's contractors, and sub-contractor and, where applicable, includes the Licensee.

"Corporations Act" means the *Corporations Act 2001 (Cth)*.

"Cost" includes any cost, charge, expense, outgoing, payment or other expenditure of any nature (whether direct, indirect or consequential and whether accrued or paid) including where appropriate all legal fees.

"CPI" means the consumer price index published by the Australian Bureau of Statistics for All Groups (Sydney) or the index which replaces it under clause 1.2 of Schedule 5.

"CPI Review Date" means each date set out in Item 7A of Schedule 1.

"CRN" means the country regional rail network owned by or vested in TNSW comprising an operational network, containing passenger, freight and grain lines, and a non-operational network, as it exists from time to time.

"Current CPI" means for a CPI Review Date, the CPI number for the quarter ending immediately before that Review Date.

"Danger Zone" means the envelope of land and airspace around the rail track which extends:

- (a) horizontally, between two (2) notional lines, one on either side of the rail track and each running parallel to the track at a distance of three (3) metres from the outer edge of the nearest rail; and
- (b) vertically unlimited in height.

"Date of Termination" means

- (a) the Expiry Date;
- (b) any earlier date on which this Licence is terminated or otherwise determined; or
- (c) the end of any period of holding over under clause 12.3,

as appropriate.

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"Employee" means:

(a) in respect of a party:

- a. the employees, officers, directors, agents, invitees, lessees, licensees or contractors of, or any other person under the control or supervision of, that party;
- b. the employees, officers, directors, agents, invitees, lessees, licensees or contractors of, or any other person under the control or supervision of, the agents, lessees, licensees, contractors or any other person under the control or supervision of, a party,

(b) and in respect of the Licensee, includes Contractors,

but TINSW's Employees do not include the Licensee or the Licensee's Employees.

"Energy" has the meaning given in the NGER Act or other relevant Sustainability Legislation.

"Energy Data" means:

- (a) a record of the total amount of Greenhouse Gases emitted, the total amount of Energy consumed and the total amount of Energy produced in respect of the Licensed Area, as defined in the NGER Act including all information concerning how such amounts were calculated; and
- (b) a record of the data required under the relevant Sustainability Legislation.

"Environmental Law" means any law relating to the environment including any Law relating to land use, planning, pollution of air, soil or ground water, chemicals, waste, the use, transport, storage and handling of dangerous goods, the health or safety of any person or any other matters relating to but not limited to the protection of the environment, health or property.

"Event of Default" has the meaning given in clause 13.3.

"Expiry Date" means the date set out in Item 5 of Schedule 1.

"Fire Break" means a strip of land properly cleared for a minimum width of two (2) metres either side of the Railway Infrastructure and Infrastructure owned by TINSW.

"Fixed Rate" means the percentage increase for each Fixed Review Date set out in Item 7B of Schedule 1.

"Fixed Review Date" means each date set out in Item 7B of Schedule 1.

"Government Agency" means any government, government department or government agency, a governmental semi-governmental or judicial person or a person (whether autonomous or not) charged with administration of any applicable Law.

"Greenhouse Gas" has the meaning given to in the NGER Act.

"Improvement" means all buildings, structures and other improvements, if any, existing on the Licensed Area at the Commencement Date, any other improvements constructed, erected

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or made to the Licensed Area during the Term and the Licensee's Equipment but excluding the Railway Infrastructure Facilities and excluding any chattels forming part of the Licensee's Equipment.

"Incident" means an occurrence involving or affecting operations on the CRN, which has resulted in, or has the potential to result in, death or injury, property damage, disruption to train services or adverse environmental consequences.

"Infrastructure" means 1 x 150mm sewer main pipe, 35m in length and a manhole installed on the Licensed Area by the Licensee pursuant to this Licence, being the facility, structure or other installation more specifically set out in Schedule 9.

"Initial Environmental Report" means the report on the environmental condition of the Licensed Area as at the Commencement Date from an appropriately qualified environmental consultant and prepared in accordance with the guidelines made or approved by the Office of Environment and Heritage under section 105 of the *Contaminated Land Management Act 1997* (NSW) (including the Sampling Design Guidelines (1995) and the Guidelines for Consultants Reporting on Contaminated Sites (August 2011)) (as updated or replaced from time to time) and provided to TfNSW by the Licensee in accordance with clause 18.1.

"Law" includes the common law and equity together with any legislation, delegated legislation, regulations, statutory instruments, statutory notices and statutory directions.

"Liability" means all threatened or actual actions, proceedings, demands, damages, losses, claims, costs, expenses and liabilities.

"Licence" means this document, any Schedule, annexure or exhibit and includes any amendments made thereto.

"Licence Fee" means the fee set out in Item 6 of Schedule 1.

"Licensed Area" means that area set out in Item 3 of Schedule 1, but excludes any Railway Infrastructure, and is as set out in the plans at Schedule 7.

"Licensee's Equipment" means any and all fixtures and fittings and plant, equipment and chattels installed on, or brought on to, or kept (temporarily or permanently) on the Licensed Area by the Licensee.

"Market Review Date" means each date set out in Item 7C of Schedule 1.

"Network Rules and Procedures" means the NSW network rules and procedures as published by TfNSW or the Agent from time to time and found at <http://www.tfnsw.com.au/what-we-do/network-rules-and-procedures>.

"NGER Act" means the *National Greenhouse and Energy Reporting Act 2007* (Cth) and all associated regulations, policies and guidelines as amended from time to time.

"Operator" means any rail operator with access rights to all or part of the Rail Infrastructure Facilities pursuant to a valid access agreement with TfNSW.

"Payment Date" means the Commencement Date and each anniversary of the Commencement Date during the Term or such other date as set out in Item 6 of Schedule 1.

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Application No: 000325
Agreement No: AGR-11121

"Permitted Loading Operations" has the meaning set out in Item 14 of Schedule 1.

"Permitted Use" means the use set out in Item 8 of Schedule 1 and any special conditions set out in Schedule 2, Schedule 3 and Schedule 4.

"Pollution" shall have the same meaning ascribed to that term in the Protection of Environment Operations Act 1997 (NSW) or any other Act which repeals or is substituted for that Act.

"Possession Planning" means the Possession Planning representative in Item 22 of Schedule 1.

"Possession Planning Process" means the process for applying for track possessions in force for and applicable to the CRN.

"Previous CPI" means for a CPI Review Date, the CPI number for the quarter ending immediately before the last Review Date (or if there has not been a review, the Commencement Date).

"Principal Contractor" means the Licensee, or the Licensee's nominee as authorised in writing by TfNSW, appointed in accordance with clause 20.1(a).

"Principal Contractor Works" means Construction Work, where the cost of the Construction Work is \$250,000 or more, in connection with the Licensed Area.

"Protection Officer" means a worker with appropriate qualifications, as required by the Agent, who is responsible for safe working protection upon and in the Rail Corridor.

"Rail Corridor" means fence line to fence line or 15 metres from the outside rail where there are no fences and also includes any land on which operational Rail Infrastructure Facilities are located.

"Rail Infrastructure Facilities" has the meaning given to that term in the Transport Administration Act.

"Rail Infrastructure Manager" has the meaning given to that term in section 4 of the Rail Safety Law.

"Rail Safety Law" means:

- (a) the Rail Safety National Law as applied (with modifications) as a law of NSW by the *Rail Safety (Adoption of National Law) Act 2012*; and
- (b) any such other NSW Acts which may relate to rail safety.

"Rail Trail" includes any roadway, pathway, track, bridle path, footpath, trail or route on, within, near or adjacent to the Licensed Area which may be used for recreational or leisure activities.

"Railway Infrastructure" means that part of the railway system owned or controlled by TfNSW, its successors and assigns on and adjacent to the Licensed Area, that may or may not be operational, including the Rail Infrastructure Facilities owned or controlled by TfNSW, its successors and assigns and, in particular, the single line standard gauge track and supporting structures.

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"Review Date" means a CPI Review Date, a Fixed Review Date or a Market Review Date (as the context requires).

"RIM" means Rail Infrastructure Manager as defined.

"Safety Protocols" means the procedures, rules and protocols in relation to safety as set out in Schedule 6 (as amended by TINSW from time to time).

"Schedule 1" means schedule 1 to this Licence.

"Schedule 2" means schedule 2 to this Licence.

"Schedule 3" means schedule 3 to this Licence.

"Schedule 4" means schedule 4 to this Licence.

"Schedule 5" means schedule 5 to this Licence.

"Schedule 6" means schedule 6 to this Licence.

"Schedule 7" means schedule 7 to this Licence.

"Schedule 8" means schedule 8 to this Licence.

"Schedule 9" means schedule 9 to this Licence.

"Services" includes water, electricity, gas, drainage, sewerage, telephone and telecommunications services, including signalling and associated cabling.

"Sustainability Legislation" means the NGER Act and any other legislation, regulations, policies and guidelines relating to sustainability, energy efficiency, energy production and energy consumption.

"Team Manager" means the person in Item 11 of Schedule 1.

"Term" means the period starting on the Commencement Date and ending on the Date of Termination and includes any holding over period in accordance with clause 12.3.

"Track Safety Awareness Certificate" means the card or certificate issued after completion of the relevant Track Safety Awareness course with a registered training organisation.

"Train Control" means the Train Control centre in Item 12 of Schedule 1.

"Transport Administration Act" means the *Transport Administration Act 1988* (NSW).

"WHS Act" means the *Work Health and Safety Act 2011* (NSW).

"WHS Regulation" means the *Work Health and Safety Regulation 2011* (NSW).

2. INTERPRETATION

Unless expressed to the contrary:

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- (a) words importing:
 - (i) the singular include the plural and vice versa; and
 - (ii) any gender includes the other genders;
- (b) if a word or phrase is defined, cognate words and phrases have corresponding definitions;
- (c) where two or more persons are Licensees the covenants and obligations on their part contained binds them jointly and each of them severally;
- (d) a reference to:
 - (i) a person includes a firm, unincorporated association, corporation and a government or statutory body or authority;
 - (ii) a person includes its legal personal representatives, successors and assigns;
 - (iii) a statute, ordinance, code or other law includes regulations and other statutory instruments under it and consolidations, amendments, re-enactments or replacements of any of them;
 - (iv) a right includes a benefit, remedy, discretion, authority or power; and
 - (v) an obligation includes a warranty or representation and a reference to a failure to observe or perform an obligation includes a breach of warranty or representation;
- (e) capitalised words not having a defined meaning under clause 1 have the meaning prescribed in the Transport Administration Act at the date of this Licence. To the extent of any inconsistency, the definitions in the Transport Administration Act shall prevail;
- (f) where a reference is made to any body or authority such reference is, if the body or authority has ceased to exist, deemed to be a reference to the body or authority as then serves substantially the same objects as that body or authority and any reference to the President of such body or authority is in the absence of a President to be read as a reference to the senior officer for the time being of the body or authority or such other person fulfilling the duties of the President;
- (g) where the day or last day for taking action or doing anything on which an entitlement is due to arise is a Saturday, Sunday or public holiday in New South Wales, the day or last day for taking action or doing the thing or date on which the entitlement arises is for the purposes of this Licence the immediately following day that is not a Saturday, Sunday or public holiday;

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- (h) any act or omission of the Licensee includes any act or omission of any sublicensee, Employee, legal personal representative, successor or assignee of the Licensee;
- (i) if any form of the word "include" is used, it is to be read as if followed by the words "without limitation";
- (j) no rule of construction will apply to a clause to the disadvantage of a party merely because that party put forward the clause or would otherwise benefit from it; and
- (k) headings are for convenience only and do not affect the interpretation of a clause.

3. GRANT OF LICENCE

- (a) In consideration of payment of the Licence Fee, TNSW grants and the Licensee accepts a licence of the Licensed Area for the Permitted Use for the Term, subject to any rights of early termination contained in this Licence.
- (b) This Licence confers no right of exclusive occupation of the Licensed Area to the Licensee and TNSW may at any time exercise any of its rights as owner or controller (as the case may be) of the Licensed Area including granting other licences over the Licensed Area.
- (c) The rights conferred by this Licence shall rest in contract only and shall not create or confer upon the Licensee any tenancy, estate or interest in or over the Licensed Area and the rights of the Licensee under this Licence shall be those of a licensee only and do not comprise or include any further or other rights.
- (d) Except as this Licence otherwise expressly provides, the Licensee is not permitted to use or access any part of the Land or the CRN other than the Licensed Area.
- (e) The Licensee acknowledges that TNSW makes no warranty as to, or in relation to, contamination that may be present, caused by or affecting the Licensed Area and the Licensee accepts the Licensed Area in its present state of repair and condition as at the Commencement Date.

4. LICENCE FEE AND CHARGES

- (a) If the Licence is for a period of one year or longer, the Licensee must pay the Licence Fee to TNSW annually in advance on each Payment Date (unless a date other than annually is specified in Item 6 of Schedule T). If the Date of Termination falls on a date other than an anniversary of the Commencement Date, then the final payment of the Licence Fee will be a proportional payment.

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- (b) If the Licence is for a period of less than one year, the Licensee must pay the Licence Fee to TfNSW in equal monthly instalments in advance on the first day of each month. If this Licence commences on a date other than the first day of the month then the first and last payments will be proportional ones.
- (c) The Licensee will be responsible for and pay, to the relevant Government Agency (or any other authority having jurisdiction or authority in respect of the Licensed Area), when they are due for payment, the full amount of all accounts, invoices, assessments and charges with regard to:
- (i) all rates, taxes, charges, assessments, duties, impositions and fees at any time or from time to time payable to any Government Agency in respect of the Licensed Area which are levied or assessed directly on or to the Licensee;
 - (ii) if applicable to the Permitted Use, the use of telephone, light and other facilities and the consumption of electricity, gas, and any and all other services and utilities supplied to or used from and separately metered to the Licensed Area;
- (d) The Licensee must pay to TfNSW within 14 days of demand a reasonable proportion (as determined by TfNSW) of the amount of all accounts, invoices, assessments and charges with regard to:
- (i) all rates, taxes, charges, assessments, duties, impositions and fees at any time or from time to time payable to any Government Agency in respect of the Licensed Area;
 - (ii) if applicable to the Permitted Use and not separately metered to the Licensed Area, the use of telephone, light and other facilities and the consumption of electricity, gas, and any and all other services and utilities supplied to or used from the Licensed Area.

5. LICENCE FEE REVIEWS

Review of Licence Fee

The Licence Fee will be reviewed in accordance with Schedule 5.

6. TfNSW'S AGENT

- (a) TfNSW may from time to time appoint an Agent to manage and control the Licensed Area on behalf of TfNSW.
- (b) The Agent has the power to operate and manage the Licensed Area on behalf of TfNSW.
- (c) The Agent as so appointed has the full responsibility for the management and administration of the Licensed Area and this Licence and will have the full authority and power of TfNSW to act for and on behalf of TfNSW under this Licence.

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- (d) The Licensee agrees that any direction given by any Agent or request for documentation or information from any Agent is to be taken to be a direction or request from TfNSW, and copies of all documentation provided by the Licensee to TfNSW under this Licence can be provided by TfNSW to any Agent.
- (e) TfNSW will give the Licensee prompt written notice of revocation of the appointment of any Agent.

7. USE OF LICENSED AREA

7.1 Permitted Use

The Licensee must use the Licensed Area only for the Permitted Use and must not use or allow the Licensed Area to be used for any other use (without TfNSW's prior written consent).

7.2 Railway Infrastructure

The Licensee, or any of its Employees as the case may be, must:

- (a) not enter upon any part of the Railway Infrastructure unless prior written approval is received from TfNSW;
- (b) not attach anything (including light, bracket or wiring) to, or place any Licensee's Equipment on, Railway Infrastructure;
- (c) not do anything to interfere with, or impede, any Fire Breaks or clearances that TfNSW deems necessary to maintain adjacent to any parts of the Railway Infrastructure;
- (d) comply with all reasonable directions given by TfNSW or any of TfNSW's Employees or Agent in relation to the Railway Infrastructure; and
- (e) notify TfNSW in writing immediately of becoming aware of any damage caused to any part of the Railway Infrastructure.

7.3 Offensive Activities

The Licensee must not carry on any illegal, offensive hazardous or dangerous activities on or from the Licensed Area or create a nuisance or disturbance either:

- (a) for TfNSW;
- (b) for the Agent; or
- (c) for the owners or occupiers or users of any part of the Licensed Area or any adjoining property.

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7.4 Dangerous Equipment and Installations

In addition to the obligations set out in clause 9.2 the Licensee may only install or use within the Licensed Area Licensee's Equipment which is reasonably necessary for and normally used in connection with the Permitted Use and will not install or bring onto the Licensed Area:

- (a) any electrical, gas powered or other machinery or equipment; or
- (b) any chemicals or other dangerous substances or hazardous chemicals (as that term is defined in the WHS Regulation),

which may pose a danger, risk or hazard.

7.5 No Warranty

TfNSW makes no warranty or representation regarding the suitability of the Licensed Area for the Permitted Use or any other purpose.

7.6 Clearances

- (a) The Licensee must, to the satisfaction of TfNSW, maintain on the Licensed Area a Fire Break at all times during the Term.
- (b) The Licensee must maintain such other clearances around the Railway Infrastructure as TfNSW shall require in writing.

7.7 Comply with Laws

- (a) The Licensee must comply with all Laws which may from time to time apply to the Licensed Area, the Permitted Use or the Licensee's activities on the Licensed Area, including laws relating to work health and safety, endangered species and the control of noxious weeds and feral pests. The Licensee acknowledges and agrees to comply with TfNSW's powers and obligations under the Rail Safety Law, the Transport Administration Act and any other relevant Law, rules or procedures that TfNSW requires the Licensee to comply with.
- (b) The Licensee must obtain, maintain and comply with, at the Licensee's Cost, all Authorisations from all Government Agencies which may from time to time be necessary or appropriate for the Licensee's activities on the Licensed Area, including any Authorisations required by any local council, the Environment Protection Authority and the Office of Environment and Heritage.
- (c) The Licensee must not by any act or omission cause or permit any such Authorisations to lapse or be revoked.

7.8 Safety

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Any breach of this clause 7.8 shall be a fundamental breach of this Licence by the Licensee and may result in the immediate termination of this Licence by TINSW.

- (a) The Licensee must only enter onto any part of the Rail Corridor, and must ensure that its Employees only enter onto any part of the Rail Corridor, in accordance with the terms and conditions of this Licence, and for which consent is given by TINSW.
- (b) The Licensee must not, and must ensure that its Employees do not nor permit or suffer any other person to:
 - (i) enter any part of the Rail Corridor without the prior written consent of TINSW; or
 - (ii) enter the Danger Zone at any time.
- (c) Unless otherwise authorised by TINSW, no vehicle, equipment or person authorised by the Licensee (including any Employee) may enter the Rail Corridor unless under the supervision of a qualified Protection Officer.
- (d) The Licensee is responsible for the adequacy of the systems used to ensure compliance with the requirement in this clause 7.8, and must provide a written safety plan in accordance with the Network Rules and Procedures and the Safety Protocols (as applicable) detailing those systems to the Agent at least seven (7) days prior to any access to the Licensed Area or the Rail Corridor by any vehicle, equipment, thing or person. Compliance with this requirement is intended to ensure that the Licensee's use of the Licensed Area will not interfere with the safe operation of the rail network.
- (e) The Licensee has full responsibility for the establishment of safe systems of work for all persons accessing the Licensed Area or the Rail Corridor and carrying out the Permitted Use pursuant to this Licence.
- (f) The Licensee must ensure that prior to breaking the surface of the Licensed Area for any reason, the Licensee and all of its Employees locate any Services, to avoid conflict and damage. Without limitation, the Licensee must contact "Dial Before You Dig" – telephone 1100 – for information relating to third party buried assets.
- (g) The Licensee must at no Cost to TINSW provide TINSW with copies of any information acquired by the Licensee in relation to the location of any Services on the Licensed Area.
- (h) The Licensee must exercise the Licensee's rights and perform the Licensee's obligations under this Licence in accordance with all applicable safety standards with which TINSW or its Agent is obliged to comply under all relevant safety Laws (including *Australian Standard AS 4292 (Railway Safety Management)*).
- (i) The Licensee must comply, and must ensure that all of its Employees entering the Rail Corridor or the Licensed Area comply with the Rail Safety Law; all other applicable

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Laws and standards including the Network Rules and Procedures and the Safety Protocols.

- (f) The Licensee must ensure that its Employees do not enter the Licensed Area or the Rail Corridor unless appropriately qualified, competent, experienced and accredited to carry out work within the Licensed Area and Rail Corridor;
- (g) The Licensee must ensure that all of its Employees entering the Rail Corridor or the Licensed Area:
 - (i) hold the relevant Construction Induction Certificate and Track Safety Awareness Certificate and carry copies of such certificates when on the Rail Corridor or the Licensed Area; and
 - (ii) attend any induction or training required by TNSW;
- (h) The Licensee must notify Train Control and the Team Manager verbally and in writing:
 - (i) of dates and times of proposed access to the Rail Corridor during the Term, no less than 5 Business Days prior to such access or in accordance with the Possession Planning Process;
 - (ii) of any changes to the dates and times of access notified to Train Control and the Team Manager and agreed between the parties in accordance with clause 7.8(k)(i) no less than 2 Business Days prior to such access or in accordance with the Possession Planning Process; and
 - (iii) immediately in the event of any emergency or incident concerning the track.

8. INSURANCE

8.1 Licensee Must Insure

- (a) The Licensee must take out and maintain, at all times during the Term, and require its Contractors to keep current for any time during which they undertake work on the Licensed Area, a public liability insurance policy in respect of the Licensed Area and the business and activities conducted on the Licensed Area for an amount no less than the amount stated in Item 9A of Schedule 1 (or any other amount that TNSW may reasonably require from time to time) that:
 - (i) contains all provisions that are normally contained in public liability policies and any other provisions reasonably required by TNSW; and
 - (ii) without limiting anything in this clause, covers death or injury to any person and damage to property of any person sustained when that person is using or entering the Licensed Area or resulting from anything originating from the Licensed Area.

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- (b) If the Licensee carries out any alterations, additions or other works then the Licensee must take out and maintain, until any such works are completed, and require its Contractors to keep current for any time during which they undertake works on the Licensed Area, a contract works insurance policy for the full value of the relevant works.
- (c) The Licensee must effect and maintain during the Term property insurance for the full replacement value of the Licensee's Equipment.
- (d) The Licensee must ensure that it, and all of its Contractors, hold a current policy of:
 - (iii) if there is an amount in Item 9B of Schedule 1, professional indemnity insurance in respect of activities the Contractors conduct on the Licensed Area for an amount no less than the amount stated in Item 9B of Schedule 1; and
 - (iv) workers compensation insurance as required under the *Workers Compensation Act 1987* (NSW).
- (e) The insurance policies referred to in clauses 8.1(a) and 8.1(b) must include coverage for TINSW and the Agent as named insureds for their respective interests in the Licensed Area.
- (f) The insurance policies required to be effected under clauses 8.1(a), 8.1(b) and 8.1(c) must:
 - (i) be effected with insurers approved by TINSW or insurers that maintain a Standard & Poers rating of A minus or greater;
 - (ii) be on terms acceptable to TINSW, including a provision or endorsement that no cancellation or material change in coverage will be made without giving TINSW 60 days' prior written notice;
 - (iii) include a provision to the effect that the actions or insolvency of one named insured does not prejudice the rights and interests of any other named insured under the policy;
 - (iv) cover events occurring during the policy's currency regardless of when claims are made;
 - (v) note that despite any similar policies of TINSW, the Licensee's policies will be the primary policies; and
 - (vi) not contain an exclusion in respect of the risks associated with, or works on or near, Rail Infrastructure Facilities.
- (g) The parties acknowledge and agree that:

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- (i) clause 8.1(f) in no way derogates from the Licensee's obligation to take out and maintain the policies of insurance required under this Licence;
- (ii) in accepting the insurance policy terms TINSW makes no representation or warranty that the insurance obtained by the Licensee meets the requirements of this Licence; and
- (iii) the effecting of insurance does not limit any liability or obligations of the Licensee under this Licence.

- (h) The Licensee must provide to TINSW, prior to the Commencement Date, certificates of currency or other relevant evidence that the policies of insurance required by this clause 8.1 are in effect, and thereafter, must provide to TINSW an updated certificate of currency or other relevant evidence in respect of the policies of insurance required by clause 8.1 on each anniversary of the Commencement Date or prior to the expiry of the current certificate, whichever occurs first or at any time upon request from TINSW.

8.2 Insurance Affected

- (a) The Licensee must not do anything which may:
 - (i) prejudice any insurance of, or in relation to, the Licensed Area; or
 - (ii) increase the premium for that insurance.
- (b) If the Licensee does anything (with or without TINSW's consent) that increases the premium of any insurance TINSW has in connection with the Licensed Area, the Licensee must on demand pay the amount of that increase to TINSW.

8.3 Notices of Potential Claims

The Licensee must give written notice in reasonable detail to TINSW of the occurrence of an event likely to give rise to a claim under a policy of insurance required under this Licence as soon as practicable after the occurrence of the event and must keep TINSW informed of subsequent developments concerning any claim.

8.4 Settlement of Claims

Without limiting the liability of the Licensee under this Licence, upon settlement of a claim under insurance required by this Licence covering damage to Rail Infrastructure Facilities, any money received by the Licensee must be paid to TINSW.

9. MAINTENANCE OF LICENSED AREA

9.1 Maintenance

- (a) In carrying out the Permitted Use, the Licensee must keep and maintain the Licensed Area and any Improvements on the Licensed Area in good repair, excluding any Railway Infrastructure.
- (b) If TINSW requires the Licensee to do so, the Licensee must promptly repair any damage to the Licensed Area caused or contributed to by the act, omission, negligence or default of the Licensee or its Employees. If the Licensee is unable or unwilling to

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carry out the required repair in accordance with TfNSW's requirements and timeframe (or if TfNSW considers the repair to be urgently required), TfNSW may carry out the repairs itself at the Licensee's Cost. The Licensee must pay the Costs of such repair within 30 days after receipt of a tax invoice from TfNSW.

- (e) Repairs to or damage to any Railway Infrastructure caused by the act, omission, negligence or default of the Licensee or its Employees, will be carried out by TfNSW at the Licensee's cost and the Licensee must pay the Costs within 30 days after receipt of a tax invoice from TfNSW.

9.2 Alterations by Licensee

- (a) The Licensee must not carry out any alterations or additions, including erecting any advertising signs or structures, to the Licensed Area without TfNSW's prior written consent.
- (b) The Licensee must provide full details of any proposed alterations and additions to TfNSW for approval.
- (c) TfNSW may impose any conditions it considers necessary if it gives its approval, including requiring the Licensee to obtain TfNSW's consent to any agreements that the Licensee enters into in relation to the alterations or additions.
- (d) The Licensee must carry out any approved alterations and additions:
 - (i) in a proper and workmanlike manner;
 - (ii) in accordance with all Laws and any Authorisations; and
 - (iii) in a way to minimise disturbance to others.
- (e) Unless otherwise agreed in writing between the parties, all alterations and additions to the Licensed Area made pursuant to this clause will be or become the property of TfNSW.
- (f) The Licensee will pay all of TfNSW's Costs (including any consultant's or adviser's costs and legal costs) arising as a result of the Licensee's alterations and additions.

9.3 Access to the Rail Corridor

Each time the Licensee requires access to the Rail Corridor to carry out the Works or maintenance activities contemplated in **Schedule 3** (including that part of the Licensed Area within the Rail Corridor), the Licensee must request such access by notifying TfNSW in writing (**Access Request**) and specifying the:

- (a) purpose for access, including detailed plans and designs in relation to any proposed works that are to be carried out within the Rail Corridor; and
- (b) timeframe for the proposed access including the commencement date and completion date for any proposed works.

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9.4 Review of Access Request

TfNSW will respond to any Access Request within 10 Business Days of receipt and may:

- (a) request further information, in which case TfNSW will respond to the Licensee within 10 Business Days upon receipt of the further information; or
- (b) consent to the Access Request by issuing a letter to the Licensee which may contain any conditions that TfNSW considers necessary in its absolute discretion (**Consent Letter**).

9.5 Consent Letter

For clarification, the Licensee:

- (a) must not enter the Rail Corridor for the purposes of the carrying out the works or maintenance activities contemplated in **Schedule 3** until it has received the Consent Letter from TfNSW; and
- (b) the Consent Letter must be kept by the Licensee on the Rail Corridor at all times.

10. TRANSFERRING**10.1 Transfer by Licensee****(a) Prohibition on Transferring**

The Licensee must not charge, transfer, assign, sublicense or otherwise deal with its interest under this Licence without the prior written consent of TfNSW (which consent may be withheld in TfNSW's absolute discretion).

(b) Deemed Assignment

If the Licensee is a corporation (not being a company with its shares listed on any Stock Exchange in Australia) or an association, any change in the beneficial ownership of 20% or more of the voting shares in the corporation or any change in the effective control of the corporation or association, will be deemed to be an assignment of the Licence requiring TfNSW's consent.

(c) Costs

The Licensee must pay all Costs reasonably incurred by TfNSW (including the costs of any consultant or any legal fees) in relation to any dealing under this Licence, including considering whether or not to grant any consent to a request by the Licensee under this clause **10.1**.

10.2 Transfer by TfNSW

The Licensee acknowledges and agrees that:

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- (a) TINSW may be reconstituted, renamed, dissolved, replaced or restructured and that some or all of the powers, functions, assets, liabilities or responsibilities of TINSW may be transferred to or vested in another entity;
- (b) TINSW may, or may be required to (including as a result of changes to New South Wales Government policy or directions) add to, or dispose of, any property or assets forming part of TINSW's assets at its absolute discretion;
- (c) any such change to TINSW's assets may involve amendment to the Licensee's rights and obligations under this Licence, including an amendment to the Licensed Area;
- (d) the Licensee will not have, and TINSW will not be liable for, any Claim as a result of the changes to TINSW's assets referred to in this clause.

10.3 Assignment or novation by TINSW

The Licensee acknowledges and agrees that:

- (a) TINSW may assign or novate this Licence, its interest in the subject matter of this Licence or any right under this Licence without the prior consent of the Licensee; and
- (b) TINSW may enter into an subcontracting or agency agreements or arrangements in relation to any of its functions;
- (c) it will undertake all actions reasonably requested by TINSW to effect such a novation, assignment or other transfer; and
- (d) it is not entitled to make, and TINSW and any novatee, assignee or transferee will not be liable upon, any claim arising from or in connection with any novation, assignment or transfer contemplated by this clause.

11. TINSW'S OBLIGATIONS AND RIGHTS

11.1 Right to Enter

Nothing in this Licence provides the Licensees with a right to exclusive occupation of the Licensed Area and TINSW may enter the Licensed Area without notice and exercise any of its rights as owner or controller of the Licensed Area, including:

- (a) carrying out repairs and maintenance to the Railway Infrastructure or other works which cannot reasonably be done unless TINSW or its Agent or TINSW's Employees enters onto the Licensed Area; and
- (b) to do anything TINSW must or may do under this Licence or must do under any Law or to satisfy the requirements of any Government Agency.

11.2 Works and Restrictions

- (a) TINSW may:
 - (i) carry out works on the Licensed Area (including works on the Railway Infrastructure); and

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- (h) close (temporarily or permanently) and restrict access of certain parts of the Licensed Area to the Licensee;
- (b) TINSW must (except in cases of emergency) take reasonable steps to minimise interference with the Licensee's use and occupation of the Licensed Area when exercising its rights under this clause;
- (c) The Licensee and any of the Licensee's Employees will comply with any reasonable directions given by TINSW, TINSW's Employees or Agent given in the exercise of TINSW's rights under this clause.

12. RIGHTS AND OBLIGATIONS ON EXPIRY

12.1 Expiry

This Licence will come to an end at midnight on the Expiry Date, or at the end of the Holding Over period pursuant to clause 12.3, unless it is properly terminated earlier by TINSW or the Licensee under any other provision of this Licence.

12.2 Required Works

Prior to the Date of Termination (or at such later date as agreed to by TINSW in its absolute discretion), the Licensee must to the satisfaction of TINSW:

- (a) if required by TINSW, remove all of the Licensee's Equipment and repair any damage caused by such removal;
- (b) if required by TINSW, remove and reinstate any alterations or additions made to the Licensed Area by the Licensee;
- (c) complete any repairs or maintenance which the Licensee is obliged to carry out under this Licence; and
- (d) otherwise, reinstate the Licensed Area to the condition it was in as at the Commencement Date.

If the Licensee fails to comply with any of its obligations set out in clauses 12.2(a) to clause 12.2(d) by the Date of Termination or such later date as agreed by TINSW in its absolute discretion, TINSW may, and without prejudice to any other remedy available to TINSW, carry out the actions required to fulfil these obligations on behalf of the Licensee. Any Costs incurred by TINSW under this clause 12.2 will be a debt due and payable by the Licensee to TINSW within 30 Business Days after receiving a tax invoice from TINSW.

12.3 Holding Over

If, with TINSW's consent, the Licensee continues to occupy the Licensed Area after the Expiry Date, the Licensee does so on a month-to-month basis at one-twelfth of the Licence Fee per month payable immediately prior to expiry plus 11.5% per month, which:

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- (a) either party may terminate on one month's notice given at any time; and
- (b) is on the same terms as this Licence except that the Licence Fee will be reviewed every six months on the commencement date of the holding over period.

13. BREACH AND TERMINATION FOR BREACH

13.1 TINSW's Rights on Breach—Remedy by TINSW

- (a) Without limiting clause 13.5, if the Licensee is at any time in breach of any of its obligations under this Licence (whether or not that breach constitutes an Event of Default), and the Licensee fails to remedy that breach to the satisfaction of TINSW, and within a reasonable time after being requested by TINSW to do so, TINSW and anybody authorised by TINSW for that purpose may at any time thereafter come onto the Licensed Area without notice and do all things necessary to remedy that breach, including any work required to be undertaken on the Licensee's Equipment.
- (b) The Licensee will be liable to pay or reimburse TINSW for all Costs incurred by TINSW in exercising any of its rights under clause 13.1(a) which TINSW may recover from the Licensee as a debt due and payable on demand.

13.2 TINSW's Rights on Breach—Suspension of Access

- (a) If the Licensee fails to perform any of its obligations under this Licence, TINSW may render the Licensed Area inaccessible without notice until the default is rectified and any amounts payable under this Licence are paid.
- (b) If the Licensed Area is rendered inaccessible under clause 13.2(a), the Licensee and the Licensee's Employees must not use the Licensed Area and the Licensee must implement reasonable measures to ensure that members of the general public do not use the Licensed Area.
- (c) The exercise by TINSW of its rights under clause 13.2(a) shall not give rise to a claim for compensation by the Licensee or any other party against TINSW or the Agent.

13.3 Events of Default

Each of the following is an Event of Default:

- (a) any monies (or part of any monies) payable under this Licence are unpaid for the period of seven (7) days after any day on which the same ought to have been paid (although no formal or legal demand has been made);
- (b) the Licensee commits, permits or suffers to occur any breach or default in the due and punctual observance and performance of any of the covenants, obligations and provisions of this Licence (other than a breach or default referred to in clause 13.5(a) or 13.5(b), or if clause 13.5(d) applies) and;

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- (i) if the breach or default can be remedied, the Licensee does not remedy that default within a reasonable time after TNSW gives the Licensee notice of the default;
 - (ii) if the breach or default cannot be remedied but TNSW can be compensated, the Licensee does not pay TNSW compensation for the breach or default within a reasonable time after TNSW gives the Licensee notice of the amount of compensation payable; or
 - (iii) the breach or default cannot be remedied or compensated;
- (c) in the case of a Licensee being a company or association:
- (i) a meeting of the directors or members of the Licensee is convened to pass a resolution that an administrator of the Licensee be appointed or that the Licensee be wound up voluntarily;
 - (ii) any person appoints an administrator of the Licensee;
 - (iii) an application is made to any court to wind up the Licensee;
 - (iv) an application is made pursuant to Section 411 of the Corporations Act;
 - (v) a controller, managing controller, receiver or receiver and manager is appointed to the Licensee or in respect of any property of the Licensee;
 - (vi) any change in the beneficial ownership of 20% or more of the voting shares in the corporation or any change in the effective control of the corporation or association; or
 - (vii) the Licensee is deregistered or dissolved;
- (d) in the case of a Licensee being a natural person:
- (i) the Licensee commits an act of bankruptcy or a sequestration order is made against the Licensee;
 - (ii) a creditor of the Licensee presents a creditor's petition against the Licensee under the Bankruptcy Act;
 - (iii) the Licensee presents a petition against himself or herself under the Bankruptcy Act;

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- (iv) the Licensee signs an authority under Section 188 of the Bankruptcy Act;
- (v) the Licensee gives a debt agreement proposal to the Official Trustee under Part IX of the Bankruptcy Act, and that debt agreement proposal is accepted by the Licensee's creditors;
- (vi) the Licensee becomes subject to an order directing the Official Trustee or a specified registered Trustee to take control of his or her property before sequestration; or
- (vii) the Licensee is convicted of an indictable offence (other than a traffic offence);
- (e) execution is levied against the Licensee and not discharged within thirty (30) days; or
- (f) any property in or on the Licensed Area is seized or taken in execution under any judgment or proceedings;

13.4 Essential terms

The Licensee acknowledges that the following obligations under this Licence are essential terms:

- (a) the obligation to pay the Licence Fee;
- (b) the obligations and prohibitions in relation to use of the Licensed Area, including clause 7.8 and any obligations and prohibitions set out in Schedule 2, Schedule 3 and Schedule 4;
- (c) the obligations and restrictions in relation to additions and alterations to the Licensed Area;
- (d) the restriction on assignment, sub-licensing, mortgaging, licensing, or otherwise dealing with its interest in this Licence;
- (e) the obligation to effect insurance under clause 8; and
- (f) any provisions in Schedule 2, Schedule 3 and Schedule 4. That are expressed to be essential terms.

13.5 Termination by TfNSW for Breach

TfNSW may terminate this Licence immediately by notice to the Licensee if:

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- (a) the Licensee breaches an essential term (which includes those terms set out in clause 13.4);
- (b) the Licensee uses the Licensed Area for a use other than the Permitted Use;
- (c) an Event of Default occurs;
- (d) in TINSW's reasonable opinion, there is or is likely to be a real safety risk if this Licence continues in operation; or
- (e) the Licensee repudiates this Licence.

13.6 No waiver

If TINSW accepts payment of the Licence Fee or any other monies late or does not act or exercise any rights immediately or at all in respect of any breach of an essential term, that conduct on the part of TINSW will not be deemed to amount to a waiver of the essential nature of that essential term.

13.7 Damages

The Licensee agrees that if this Licence is terminated by TINSW because of a breach by the Licensee, or if the Licensee repudiates this Licence and TINSW accepts that repudiation thereby ending this Licence, the Licensee will be obliged to pay compensation to TINSW including the Licence Fee and other monies which TINSW would otherwise have received under this Licence for the balance of the Term had the Licensee not breached an essential term or repudiated this Licence. In those circumstances TINSW will be obliged to take reasonable steps to mitigate its losses and to endeavour to licence the Licensed Area at a reasonable fee and on reasonable terms.

13.8 Interest

- (a) If the Licensee defaults in the payment of any amount due to TINSW under this Licence, the Licensee must pay interest on that amount, or the outstanding balance, until it is paid in full. The interest rate will be two (2) percentage points above the prime lending rate charged on overdrafts of \$100,000 or more by the National Australia Bank or its successor:
 - (i) as published within the Australian Financial Review at the time of such default; or
 - (ii) as advised in writing by the Senior Manager responsible for Business Services at the head office of the National Australia Bank.
- (b) The interest referred to in this clause 13.8 will accrue and be recoverable from day to day.

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13.9 Rights of TfNSW Not Limited

The rights of TfNSW under this Licence and at law resulting from a breach of this Licence by the Licensee shall not be excluded or limited in any way by reason of TfNSW having or exercising any powers under this clause 13.

13.10 Suspension

- (a) Without in any way limiting the rights of TfNSW under any other provision of this Licence, if TfNSW is entitled to terminate this Licence, it may elect instead to suspend the rights and obligations of the Licensee under this Licence (subject to clause 13.10(b)) until such time as the cause giving rise to the right to terminate is remedied or such other time as determined by TfNSW.

An election referred to in clause 13.10(a) is revocable at any time by TfNSW and has no effect upon obligations, debts or liabilities which have accrued before the election to suspend this Licence.

14. TERMINATION FOR CONVENIENCE**14.1 Termination by TfNSW for Convenience**

- (a) TfNSW may terminate this Licence for any circumstance or reason by giving the Licensee no less than 3 months' notice in writing of its intention to do so.
- (b) If TfNSW terminates this Licence under clause 14.1(a), the Licensee will not be entitled to any compensation from TfNSW.

15. INDEMNITY AND RELEASE**15.1 Risk**

- (a) The Licensee uses the Licensed Area at the Licensee's risk and TfNSW accepts no responsibility for undertaking any maintenance, repair or remediation of the Licensed Area or any improvements on the Licensed Area or any loss or damage to the Licensed Area or any property of the Licensee or any loss, damage or destruction to property or injury to or death of any person.
- (b) If the Licensee is obliged to do anything under this Licence, it must do so at its Cost and at its risk.

15.2 Indemnity

The Licensee is liable for and indemnifies TfNSW and its Employees against all Claims for any loss, damage, injury or death, including any Costs associated with the delay or disruption to the use of Rail Infrastructure Facilities or the operation of the CRN, arising out of or in connection with:

- (a) any act or omission of the Licensee and/or its Employees;
- (b) TfNSW's suspension or termination of the Licence under clause 13;
- (c) the use of the Licensed Area by the Licensee and/or its Employees, or otherwise relating to the Licensed Area;
- (d) a breach of this Licence by the Licensee and/or its Employees;
- (e) any Event of Default;
- (f) any loading or unloading operations or activities (including the Permitted Loading Operations where permitted under this Licence), including but not limited to anything incidental to such loading or unloading, carried out under or in connection with this Licence; or
- (g) the Licensee's and/or its Employees' use or occupation of the Licensed Area.

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15.3 Release

- (a) The Licensee releases TNSW and its Employees from all Claims for any damage, loss, injury or death arising out of or in connection with the Licensed Area except to the extent that they are caused by TNSW's gross negligence.
- (b) The Licensee acknowledges and agrees that the Licensed Area may be Contaminated and releases and indemnifies TNSW and its Employees against all Claims in relation to the Licensee's use of the Licensed Area.

15.4 Indemnities are Independent

Each indemnity in this Licence is independent from the Licensee's other obligations and continues during this Licence and after this Licence ends, and to the extent that TNSW's Employees are indemnified TNSW may act as an agent for them and receive any benefit of any indemnity on their behalf.

16. INDEMNITY – ENVIRONMENT

- (a) The Licensee must not do any act or omit to do any act which may result in, cause, aggravate or exacerbate Contamination of the Licensed Area or the Railway Infrastructure or result in a direction, notice or order being given or made under any Environmental Law in respect of the Licensed Area or the Railway Infrastructure or any breach of any Environmental Law;
- (b) The Licensee does hereby and will continue to indemnify, release and hold harmless TNSW against all Liabilities suffered or incurred by TNSW in respect of any:
 - (i) direction, notice or order given or made under any Environmental Law;
 - (ii) breach of any Environmental Law; or
 - (iii) any Claim in respect of Contamination of the Licensed Area or the Railway Infrastructure; and,
 arising out of or in relation to any Activity during the Term or the Licensee's use of the Licensed Area.
- (c) This clause shall not merge on the expiration or earlier termination of this Licence.
- (d) This clause is without limitation to the general indemnity contained in clause 15.

17. ENVIRONMENTAL**17.1 Licensee's responsibilities**

- (a) The Licensee accepts the Licensed Area in its present state of repair and condition at the Commencement Date of this Licence.

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- (b) Despite any other provision of this Licence, the Licensee must introduce and implement all operating policies, health and safety policies and environmental policies relating to the Licensed Area.
- (c) The Licensee must comply with all reporting obligations imposed on the Licensee by the Sustainability Legislation relating to the Licensed Area.
- (d) The Licensee must cooperate with TfNSW to enable TfNSW to comply with any of TfNSW's obligations under Sustainability Legislation including:
 - (i) keeping accurate records and making available to TfNSW all Energy Data, operating, health, safety and environmental policies relating to the Licensee's use and occupation of the Licensed Area;
 - (ii) providing all information, Energy Data and records that TfNSW reasonably requires the Licensee to provide to assist TfNSW to comply with its obligations under the Sustainability Legislation; and
 - (iii) providing TfNSW with access to the Licensed Area for the purpose of collecting the Energy Data or otherwise in connection with TfNSW's obligations under the Sustainability Legislation.
- (e) TfNSW has the right to use the Licensee's Energy Data, records and information obtained under this clause:
 - (i) as required by Law; and
 - (ii) in any way TfNSW chooses provided the identity of the Licensee is not disclosed if the Licensee requests TfNSW to keep the Licensee's identity confidential.

17.2 Licensee environmental covenants

The Licensee must:

- (f) not cause or contribute to Pollution or Contamination of or from the Licensed Area;
- (g) not aggravate or exacerbate any Contamination which was present on the Licensed Area prior to the Commencement Date;
- (h) comply with all applicable Environmental Law in respect of the Licensed Area and the conduct of the Permitted Use;
- (i) notify TfNSW as soon as practicable after becoming aware of:
 - (i) a breach of the Environmental Law in respect of the Licensed Area or any Activity carried out in the Licensed Area (other than an Activity carried out by TfNSW or a TfNSW Authorised Person);
 - (ii) an Environmental Notice is served on the Licensee;

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- (iii) any part of the Licensed Area is or becomes Contaminated due to the negligence or default of the Licensee;
- (iv) existing Contamination on any part of the Licensed Area that is aggravated or exacerbated, whether through the actions of the Licensee or otherwise;
- (v) any unlawful Pollution is emitted or discharged on or from the Licensed Area that is likely to cause harm; or
- (vi) any act or omission which is likely to result in Contamination of the Licensed Area, a direction, notice or order being given or made under any Environmental Law in respect of the Licensed Area or any breach of any Environmental Law.

18. ENVIRONMENTAL REMEDIATION

18.1 Licensee to provide Initial Environmental Report

The Licensee, unless otherwise advised by TfNSW acting in its absolute discretion, must at its own Cost provide an Initial Environmental Report prior to, or within three (3) months of the Commencement Date. In respect of the Initial Environmental Report:

- (a) scope is to be agreed by TfNSW and Licensee (acting reasonably); and
- (b) must be capable of being relied upon by both TfNSW and the Licensee.

18.2 Environmental Management Plan

If required by TfNSW, the Licensee must, within three (3) months of a request by TfNSW, provide to TfNSW an Environmental Management Plan ("EMP") for the management of any environmental issues arising out of or in relation to Licensee's use and occupation of the Licensed Area. The Licensee must:

- (a) promptly make such amendments to the EMP, and any revised EMP prepared under clause 18.2, as required by TfNSW (which may include preparation of a new EMP);
- (b) comply with the EMP; and
- (c) revise the EMP upon commencement of new or amended Environmental Laws or following the occurrence of an Incident or change in business activity and promptly submit the revised EMP to TfNSW.

18.3 Subsequent Environmental Report

If at any time TfNSW reasonably considers that the Licensee's occupation and/or use of the Licensed Area may have resulted in Contamination or Pollution then TfNSW may direct the Licensee to and the Licensee shall at its own Cost provide TfNSW with an environmental audit report (the "Subsequent Environmental Report") to be prepared to a specification and by a qualified person approved by TfNSW in writing. TfNSW may exercise its rights under this clause multiple times during the Term.

The Subsequent Environmental Report shall:

- (a) be capable of being relied on by TfNSW and the Licensee. The Subsequent

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Environmental Report must also, if agreed to by the consultant preparing the Subsequent Environmental Report (and at no additional cost to the Licensee), be capable of being relied on by (or at least released to) any subsequent Licensee for the purposes of establishing the environmental condition of the Licensed Area at commencement of any subsequent licence;

- (b) identify all environmental and Pollution consequences arising out of or in any way connected with the Licensee's use and occupation of the Licensed Area at any time; and
- (c) formulate a remediation programme in respect of any Contamination or Pollution which arises out of or is in any way connected with the Licensee's use and occupation of the Licensed Area, to remediate the Licensed Area to a condition that would enable the Licensed Area to be used for its highest and best use based on the zoning of the Licensed Area at the time the programme is formulated; and
- (d) be prepared in accordance with the guidelines made or approved by the Office of Environment and Heritage under section 105 of the *Contaminated Land Management Act 1997* (NSW) (including the Sampling Design Guidelines (1995) and the Guidelines for Consultants Reporting on Contaminated Sites (August 2011) (as updated or replaced from time to time)) or be prepared on such basis as reasonably directed by TfNSW.

18.4 Remediation

- (a) The Licensee agrees at its own Cost to promptly, and in accordance with any requirements, implement the remediation programme referred to in clause 18.3(c) hereof. Upon completion of any such remediation programme, the Licensee shall, if requested by TfNSW provide TfNSW with a validation report confirming that such programme has been properly completed.
- (b) In the event of the implementation of any remediation programme or compliance with any requirements referred to in this clause occurring or continuing after Date of Termination, the Licensee must, if TfNSW requires in writing, continue until such time as the programme is completed and the requirements of the Subsequent Environmental Report, any Government Agency or other competent authority, and any Law are complied with, pay the Licence Fee and perform and observe all the Licensee's obligations under this Licence.

19. PAYMENT OBLIGATIONS AND GOODS AND SERVICES TAX

19.1 Payment Obligations

- (a) The Licensee must make payments due under this Licence:
 - (i) without demand (unless this Licence provides demand must be made);
 - (ii) without set-off, counter-claim, withholding or deduction;
 - (iii) to TfNSW or as TfNSW directs; and
 - (iv) by direct debit or such other means as directed by TfNSW.

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- (b) If payment is stated to be due on a particular Payment Date (such as the next Payment Date or the first Payment Date after an event) and there is no such Payment Date, the Licensee must make that payment on demand.

19.2 GST

- (a) In this clause 19.2:

- (i) words and expressions which are not defined in this Licence but which have a defined meaning in GST Law have the same meaning as in the GST Law; and
- (ii) "GST Law" has the meaning given to that expression in the A New Tax System (Goods and Services Tax) Act 1999 (Cth).

- (b) Unless otherwise expressly stated, all amounts or other sums payable or consideration to be provided under this Licence are exclusive of GST.

- (c) If GST is payable by a supplier, or by the representative member for a GST group of which the supplier is a member, on any supply made under this Licence, the recipient will pay to the supplier an amount equal to the GST payable on the supply.

- (d) The recipient will pay the amount referred to in clause 19.2 in addition to and at the same time that the consideration for the supply is to be provided under this Licence.

- (e) The supplier must deliver a tax invoice or an adjustment note to the recipient before the supplier is entitled to payment of an amount under clause 19.2. The recipient can withhold payment of the amount until the supplier provides a tax invoice or an adjustment note, as appropriate.

- (f) If an adjustment event arises in respect of a taxable supply made by a supplier under this Licence, the amount payable by the recipient under clause 19.2 will be recalculated to reflect the adjustment event and a payment will be made by the recipient to the supplier or by the supplier to the recipient as the case requires.

- (g) Where a party is required under this Licence to pay or reimburse an expense or outgoing of another party, the amount to be paid or reimbursed by the first party will be the sum of:

- (i) the amount of the expense or outgoing less any input tax credits in respect of the expense or outgoing to which the other party, or to which the representative member for a GST group of which the other party is a member, is entitled; and
- (ii) if the payment or reimbursement is subject to GST, an amount equal to that GST.

20. WORKPLACE HEALTH AND SAFETY

20.1 Work health and safety

- (a) TNSW:

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- (i) appoints the Licensee, or the Licensee's nominee as authorised in writing by TfNSW, as the Principal Contractor in relation to any Principal Contractor Works carried out by the Licensee or on the Licensee's behalf, including that which is carried out on behalf of TfNSW; and
 - (ii) authorises the Licensee, or the Licensee's nominee as authorised in writing by TfNSW, to have management or control of the workplace and to discharge the duties of a principal contractor under the WHS Regulation.
- (b) The Licensee, or the Licensee's nominee as authorised in writing by TfNSW, must:
- (i) ensure that any person employed or engaged by the Licensee to carry out work in the Licensed Area, completes a work health and safety induction programme, to TfNSW's reasonable satisfaction;
 - (ii) comply with the requirements of the WHS Act and WHS Regulation including as the person conducting a business or undertaking in relation to Parts 4.6, 6.3, 6.4 and 6.5 of the WHS Regulation and the duty to consult, cooperate and coordinate activities with all other persons who have a work health and safety duty in relation to the same matter;
 - (iii) promptly notify TfNSW of, and assist TfNSW as requested in relation to, any actual or potential incident of which the Licensee is aware, that arises from the Licensed Area which is notifiable to an Authority;
 - (iv) provide TfNSW, at least 48 hours prior to the intention to commence any Construction Work, with an outline of the scope of that Construction Work; and
 - (v) at all times comply, and must ensure that any contractors (and their employees) engaged by it, or any contractor engaged by any of its contractors, in relation to the Construction Work at all times comply, with the WHS Act, the WHS Regulation and all relevant codes of practice and compliance codes.
- (c) The Licensee agrees that TfNSW does not control or influence health and safety matters in relation to the Licensee's use of the Licensed Area, other than as set out in this Licence.

20.2 Asbestos

- (a) The Licensee must notify TfNSW immediately if any Asbestos is identified within the Licensed Area and follow all Laws in relation to the management of Asbestos;
- (b) The Licensee must comply with the Asbestos Management Plan, if any;
- (c) If an Asbestos Register is required to be kept and updated at the Licensed Area, the Licensee must comply with the WHS Regulation in relation to that Asbestos Register.

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- (d) The Licensee must not bring, or allow any of its Employees to bring, any Asbestos onto the Licensed Area and if it does so, the Licensee will be responsible for the removal of the Asbestos in accordance with the relevant legislation and guidelines and at its own Cost.
- (e) The Licensee must not disturb or disperse or allow any of its Employees to disturb or disperse any Asbestos that has been identified within the Licensed Area. If it does so, the Licensee will be responsible for the removal or remediation of the Asbestos in accordance with the relevant legislation and guidelines and at its own Cost.

21. BANK GUARANTEE

- (a) As security for the performance by the Licensee of its obligations under this Licence, on or before the commencement of this Licence the Licensee shall provide TfNSW with security in the form of an unconditional bank guarantee which:
 - (i) is in a form acceptable to TfNSW;
 - (ii) is issued by a bank licensed under the Banking Act 1959 (Cth) which has a branch in Sydney; and
 - (iii) does not have an expiry date.
- (b) The amount of the Bank Guarantee shall be a sum equal to the amount specified in **Item 13 of Schedule 1**.
- (c) TfNSW may, without notice to the Licensee, recover from the Bank Guarantee any Cost incurred or loss suffered by TfNSW if the Licensee breaches this Licence.
- (d) Upon the Date of Termination of this Licence and the Licensee complying with all of its obligations under this Licence TfNSW will return the Bank Guarantee or any unused portion of it to the Licensee **SUBJECT HOWEVER** to the right at any time (including after the Date of Termination) that TfNSW has to call up the Bank Guarantee and to deduct therefrom any amount which may be owing to TfNSW or which may become payable to TfNSW as a result of any breach by the Licensee of any of the provisions of this Licence and such deduction shall be deemed not to waive any right of TfNSW arising from the Licensee's breach.
- (e) During the Term the Licensee will cause further Bank Guarantees to be delivered to TfNSW so that any time TfNSW holds Bank Guarantees for an amount equal to the amount specified in **Item 13 of Schedule 1**.
- (f) To the extent that TfNSW has had recourse to any Bank Guarantee, the Licensee shall forthwith replace such Bank Guarantee to the intent that at all times TfNSW shall hold guarantees for not less than the amount specified in **Item 13 of Schedule 1**.

22. GENERAL

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22.1 Costs

The Licensee must, on request, pay or reimburse to TINSW:

- (a) all stamp duty (if any) payable on this Licence;
- (b) all legal costs (determined on a solicitor and client basis) incurred by TINSW in connection with the preparation of this Licence, negotiating, revising and engrossing this Licence (including all attendances on the Licensee and its legal and other advisers and all advices provided to TINSW) and attending to the execution of this Licence; and
- (c) all legal and other Costs and expenses incurred by TINSW in consequence of any actual or threatened breach by the Licensee hereunder or in exercising or enforcing (or attempting to do so) any rights or remedies of TINSW hereunder or at law or otherwise arising in consequence of any actual or threatened breach by the Licensee.

22.2 Waiver

If TINSW accepts or waives any breach by the Licensee, that acceptance or waiver cannot be taken as an acceptance or waiver of any future breach of the same obligation or of any other obligation under this Licence.

22.3 Governing Laws

This Licence is governed by the law in force in the jurisdiction in which the Licensed Area is located and the parties submit to the exclusive jurisdiction of the courts of that jurisdiction and any courts which may hear appeals from those courts in respect of any proceedings in connection with this Licence.

22.4 No Merger

The provisions of this Licence do not merge on expiry or termination of this Licence and will continue to apply after termination or expiry of this Licence.

22.5 No Prejudice to Accrued Rights

The expiration or termination of this Licence shall be without prejudice to the accrued rights of either party at the time of expiration or termination.

22.6 No Fetters

Nothing in this Licence fetters the statutory rights and powers of TINSW.

22.7 Notice

- (a) For the purpose of this clause notice means a notice, consent, approval or other communication under this Licence.
- (b) A notice must be in writing and signed by or on behalf of the person giving it, addressed to the person to whom it is to be given, and:

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- (i) delivered by hand to that person's address;
- (ii) sent by post to that person's address; or
- (iii) transmitted to the email address of that person.

(c) Notices should be addressed:

- (i) in the case of TfNSW, in accordance with clause 22.7(e)(i) and
- (ii) in the case of the Licensee, in accordance with clause 22.7 (e) (ii).

(d) A notice given to a person in accordance with this clause is treated as having been given and received:

- (i) if delivered by hand, on the day of delivery if delivered before 4.00pm on a Business Day, otherwise on the next Business Day;
- (ii) if sent by post on the sixth Business Day after posting; or
- (iii) if transmitted by email on the first to occur of

receipt by the sender of an email acknowledgement from the recipient's information system showing that the notice has been delivered to the email address set out in clause 22.7; and

the time that the notice enters an information system which is under the control of the recipient.

but if the result is that a notice would be taken to be given or made on a day that is not a Business Day or is later than 4.00pm (Sydney time) it will be taken to have been duly given or made at the start of business on the next Business Day.

(e) Each party's address for service is:

- (i) in the case of TfNSW:

Name: Transport for NSW
Address: Level 3, 237 Wharf Rd, Newcastle NSW 2300
Attention: Associate Director, Country Rail Contracts
Email address: countryrail@transport.nsw.gov.au

with a copy to TfNSW's Agent:

Name: John Holland Rail Pty Ltd
Address: Level 1, 20 Smith Street, Parramatta NSW 2150
Attention: Property Manager
Email address: crm.enquiry@jhg.com.au

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(ii) in the case of the Licensee:

Name: Dubbo Regional Council
 Address: Corner of Church and Darling Streets Dubbo NSW 2830
 Attention: Paul Yeo
 Email address: paul.yeo@dubbo.nsw.gov.au
 council@dubbo.nsw.gov.au

(f) A party may from time to time change its addressee, address details or email address by written notice to the other party.

22.8 Severance

If any part of this Licence is found to be invalid or void or unenforceable, then that part will be severed from this Licence and the remainder of this Licence will continue to apply.

22.9 Entire Agreement

TfNSW and the Licensee acknowledge and agree that this Licence contains and represents the entire agreement reached between them with regard to the Licensed Area and that no promises, representations or undertakings, other than those contained in this Licence, were made or given or relied upon.

22.10 Resumption

If TfNSW receives notice of resumption or acquisition of the Licensed Area or any part of it from or by any Government Agency, then TfNSW may terminate this Licence by giving not less than three (3) months written notice to the Licensee. When such termination takes effect, the rights and obligations of TfNSW and the Licensee hereunder will come to an end and no compensation will be payable as a result of such termination but if any breach by either party still exists at that time then the rights of the other party with regard to that existing breach will continue.

22.11 Survival

The following clauses survive the expiration or earlier determination of this Licence:

- (a) clauses 7.8, 8, 10.1(c), 10.2(d), 10.3(d), 12, 13, 15, 16, 17, 18, 21, 22.1, 23 and 25; and
- (b) any provisions in Schedule 2, Schedule 3 and Schedule 4 that are expressed to survive.

22.12 Notice before TfNSW liable

Despite anything to the contrary in this Licence, TfNSW is not in default of a remediable breach of this Licence unless:

- (a) the Licensee has given written notice of the breach to TfNSW; and

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- (b) TINSW has failed to remedy the breach within a reasonable time after receipt of the notice.

22.13 TINSW's consent

- (a) Subject to any other provision of this Licence, if the Licensee requires TINSW's consent to do something under this Licence, the consent:
- (i) may be granted at TINSW's discretion;
 - (ii) may be granted with conditions; and
 - (iii) must be in writing.

- (b) If the Licensee requests the consent of TINSW under this Licence, the Licensee must pay TINSW's Costs and expenses for the consent.

22.14 Licensee to ensure compliance

If, under this Licence, the Licensee must not do something:

- (a) the Licensee must not authorise another person to do that thing; and
- (b) the Licensee must ensure that the Licensee's Employees do not do that thing.

22.15 Civil Liability Act

It is agreed that, to the maximum extent permitted by law, the operation of Part 4 of the *Civil Liability Act 2002* (NSW) is excluded in relation to all and any obligations and liabilities of the Licensee under or in connection with this Licence whether such obligations or liabilities are sought to be enforced as a breach of contract or claim in tort (including negligence), in equity, under statute or otherwise at Law.

22.16 Amendments

- (a) Except where this agreement expressly provides otherwise, and subject to clause 22.16(b), the provisions of this Licence may only be varied by a document signed by or on behalf of each party.
- (a) Where the Licensee requests any amendment to this Licence, it will be liable to pay all the Costs incurred by the TINSW in facilitating that amendment.

23. CONFIDENTIALITY

- (a) Subject to clause 23(b), each party must keep the contents of this Licence (and all plans, documents and information made available to that party for the purpose of entering into this Licence or in the course of the performance of this Licence) confidential, and must not disclose any information to any other person without the written consent of the other party.

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(b) Clause 23(a) does not apply in the following circumstances:

- (i) any disclosure required by Law;
- (ii) any disclosure required by any applicable stock exchange listing rules;
- (iii) disclosures to solicitors, barristers or other professional advisers under a duty of confidentiality;
- (iv) disclosure to a banker or other financial institution relevant to a party, to the extent required for the purpose of raising funds or maintaining compliance with credit arrangements;
- (v) disclosure to any consultant engaged by a party in connection with the proper performance of that party's obligations under this Licence;
- (vi) disclosure to a bona fide potential purchaser or licensee of the Land; or
- (vii) disclosure to any Government Agency or other competent authority.

24. SPECIAL CONDITIONS

The special conditions set out in Schedule 2, Schedule 3 and Schedule 4A form part of this Licence. The Licensee must comply with all applicable special conditions in addition to the other terms and conditions of this Licence. In the event of any inconsistency between the special conditions and the terms of this Licence the special conditions will prevail.

25. RAIL TRAIL

(a) The Licensee acknowledges that:

- (i) all or part of the Licensed Area, and/or areas adjacent to the Licensed Area, may be required for the purpose of a Rail Trail at any time before or during the Term and as a consequence the Licensed Area may be varied or reduced, or terminated or suspended pursuant to clause 13.10 or clause 14.1; and
- (ii) if all or part of the Licensed Area, and/or areas adjacent to the Licensed Area are required for a Rail Trail as contemplated in clause 25(a)(i) then to the extent required by TNSW, the use of the Licensed Area (or relevant part thereof) as a Rail Trail will take priority over the Licensee's use of the Licensed Area under this Licence (which may include the termination, suspension, variation or reduction in the Licensed Area or re-organisation of Rail Operations).

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- (b) If all or part of the Licensed Area, and/or areas adjacent to the Licensed Area, are required for a Rail Trail as contemplated in clause 25(a)(i), the Licensee must:
- (i) do all things necessary to ensure that the use of the Licensed Area by the Licensee does not interfere with the use of all or part of the Licensed Area as a Rail Trail;
 - (ii) co-operate with TfNSW, any relevant Government Agency or other entity or individual to formulate, implement and enforce appropriate protocols including entering into, for example, a cooperation agreement or Interface Agreement, to ensure the safe use and operation of the Rail Trail (which may include the termination, suspension, variation or reduction in the Licensed Area or re-organisation of Rail Operations); and
 - (iii) otherwise comply with any directions given by TfNSW in relation to the Rail Trail.
- (c) The Licensee may not make any Claim in connection with TfNSW's exercise of its rights under this clause 25, including but not limited to any Claim for Costs incurred by the Licensee.


26. COUNTERPARTS

This Licence may be executed in counterparts. All counterparts taken together will constitute one Licence.

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DATED the 13 day of March 2019.

SIGNED for and on behalf of TRANSPORT
for NSW by its authorised delegate in the
presence of:


Signature of Witness
Sophie De Vries
Name of Witness


Signature of Delegate
Vince O'Shea
Name of Delegate

SIGNED for and on behalf of DUBBO
REGIONAL COUNCIL ABN 55 539 070 928
by its authorised delegate in the presence of:


Signature of Witness
Paul Yee
Name of Witness


Signature of Delegate
Chris Davitt
Name of Delegate

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SCHEDULE 1

ITEM 1 Licensee	Dubbo Regional Council ABN 53 539 070 928 Corner of Church Street and Darling Street Dubbo NSW 2830	
ITEM 2 Agent	John Holland Rail Pty Ltd ABN 61 009 352 653 Level 1 20 Smith Street Parramatta NSW 2150	
ITEM 3 Licensed Area	That part of the land of being Lots 1 and 2 DP 173942 located at 484.67km to 484.72km forming part of the non-operational Yeoval to Dubbo line delineated in yellow shown on the plan in Schedule 7.	
ITEM 4 Commencement Date	5 March 2019	
ITEM 5 Expiry Date	4 March 2029	
ITEM 6 Licence Fee	\$550.00 per annum (inclusive of GST) during the first year of the Term (subject to review pursuant to clause 5).	
ITEM 7A CPI Review Dates	Not applicable	
ITEM 7B Fixed Review Dates and Fixed Rate	Fixed Review Date	Fixed Rate
	on each anniversary of the Commencement Date throughout the Term	3%
ITEM 7C Market Review Dates	Not applicable	
ITEM 8 Permitted Use	Install, keep and maintain the Infrastructure.	
ITEM 9A Public Liability Insurance	20 million dollars	
ITEM 9B Professional Indemnity Insurance	20 million dollars	
ITEM 10 Address for Notices	TNSW-C- John Holland Rail Pty Ltd Level 1, 20 Smith Street, Parramatta NSW 2150 Telephone: (02) 9685 5100	

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	Facsimile: (02) 9685 5190 Licensee: Dubbo Regional Council Address: PO Box 81 Dubbo NSW 2830 Telephone: (02) 6861 2333 Facsimile: (02) 6862 3946
ITEM 11 Team Manager	Luke Cunningham Telephone: (02) 9685 5131 Mobile: 0417 485 092 Email: luke.cunningham@jhg.com.au
ITEM 12 Train Control	North West Control Telephone: (02) 4028 9501
ITEM 13 Amount of Bank Guarantee	Not applicable
ITEM 14	NOT USED
ITEM 15 Permitted Loading Operations	NOT USED
ITEM 17 Specified Equipment	NOT USED
ITEM 18 Clearance Dimensions	NOT USED
ITEM 19 Permitted Times	NOT USED
ITEM 20 TNSW's Emergency Contact	North West Control Telephone: (02) 4028 9541
ITEM 21 Further Special Conditions	Not applicable
ITEM 22 Possession Planning	Not applicable

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SCHEDULE 2**SPECIAL CONDITIONS**

The following special conditions apply:

- (a) The Licensee is required to stabilise all spoil in accordance with Landcom Soils and Construction Managing Urban Stormwater – Blue book.

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SCHEDULE 3**SPECIAL CONDITIONS - INFRASTRUCTURE**

In this Schedule, in addition to the definitions in Schedule 2 and the definitions at clause 1 of this Licence, the following definitions apply, unless the context requires otherwise:

"As Built Drawings" means drawings which fully and accurately identify the completed Works, including any changes or modifications to the Design made during the course of completing the Works.

"Completion" means that stage in the performance of the Works when:

- (a) the Works have been completed in accordance with this Licence;
- (b) all debris, rubbish, building materials, construction plant and equipment have been removed from the Rail Corridor;
- (c) all consents and approvals the Licensee is required to obtain have been obtained; and
- (d) the Licensee has provided to TfNSW As Built Drawings.

"Date for Completion of Works" means 30 April 2019 being the date for Completion of the Works
"Design" means the design and location of the Infrastructure.

"Design Review" means TfNSW's review of the Design as described in clause 5.1 of this Schedule 3.

"Design Review Period" means 6 weeks.

"Independent Certifier" means an appropriately qualified independent person engaged by the Licensee in accordance with clause 5.5 of this Schedule 3.

"Notice of Completion" means a certificate completed, dated and signed by the Independent Certifier which states:

- (a) that the Works are complete in accordance with this Licence;
- (b) the Works meet the requirements of the Design consented to by TfNSW; and
- (c) the Works are suitable for use in accordance with the relevant Laws and standards.

"TfNSW Material" is any information or data in respect of the Works or TfNSW's Rail Infrastructure Facilities supplied or made available by TfNSW to the Licensee in any form from time to time, including any reports relating to, or opinions in respect of, any such information or data.

"TfNSW Train Control" means the person occupying the position of TfNSW Train Control as notified by TfNSW to the Licensee from time to time.

"Works" means the construction, installation and commissioning of the Infrastructure, more particularly described in Schedule 10.

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1 CONDITIONS PRECEDENT

The following are conditions precedent to the commencement of the Works and to the rights and obligations in this Licence in relation to the Works coming into effect (other than clauses 1 and 4 of Schedule 3 and clause 1 of the body of this Licence):

- (a) that Not Used; and
- (b) that the Licensee provides to TNSW copies of all policies of insurance required under clause 8 of the body of this Licence with certification that such policies are in full force and effect.

2 GRANT OF RIGHT TO DO WORKS

- (a) In consideration of payment of the License Fee, TNSW grants and the Licensee accepts, a non-exclusive licence for the Term, subject to any rights of early termination contained in the body of this Licence, to:
 - (i) enter the Licensed Area to conduct the Works at access times agreed with TNSW in accordance with clause 5.4(a) of this Schedule 3;
 - (ii) upon completion of those Works, keep and maintain the Infrastructure on the Licensed Area; and
 - (iii) access the Licensed Area in order to keep and maintain the Infrastructure on the Licensed Area.
- (b) Subject to clause 5.4(c) of this Schedule 3, the Works must be completed by the scheduled Date for Completion of Works.

3 INSPECTION FEE

If at any time during the Term TNSW inspects the Licensed Area for the purpose of determining whether the Works and the Infrastructure will impact on the maintenance requirements of TNSW's Rail Infrastructure Facilities, then TNSW may require the Licensee to pay a fee to cover TNSW's costs of inspection ("Inspection Fee") as reasonably determined by TNSW including TNSW's internal costs. The Inspection Fee as notified by TNSW to the Licensee must be paid within 30 days of the date of the notice. An Inspection Fee may be charged more than once during the Term subject to TNSW's reasonable need to re-inspect the Licensed Area and the Infrastructure during the Term.

4 INTERFACE AGREEMENT

Not Used.

5 UNDERTAKING THE WORKS

5.1 Design

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- (a) The Licensee must not carry out any Works unless and until TNSW has provided written consent to the Design. If TNSW refuses consent to the Design, the Licensee may resubmit an amended or new Design for further review by TNSW in accordance with this clause.
- (b) The Design must, as a minimum, meet or exceed the requirements of any relevant Australian Standard and should comply with all relevant Laws, Authorisations and requirements of Government Agencies.
- (c) The Licensee must forward to TNSW all information reasonably required by TNSW to allow TNSW to review the Design ("Design Review").
- (d) The Design Review will take account of any matters considered relevant by TNSW, which may include, among other things, safety aspects of construction, operation and maintenance of the Infrastructure as well as quality of materials, structural integrity, design suitability, integration with rail facilities, suitability of proposed location and future use.
- (e) TNSW shall complete the Design Review within the Design Review Period starting from receipt of all relevant information from the Licensee and may in its absolute discretion give or refuse consent to the Design, or give consent subject to conditions.
- (f) The parties acknowledge that this process may have occurred prior to the execution of this Licence.

52 The Contractors

- (a) Without in anyway limiting clause 7.8 of the body of this Licence, the Licensee must ensure that no Contractor enters the Licensed Area or the Rail Corridor unless that Contractor has been approved in writing by TNSW. TNSW may at its discretion refuse to approve a Contractor or may withdraw its approval of a Contractor at any time. TNSW has no liability to the Licensee for refusing or withdrawing approval to any Contractor. If TNSW withdraws approval to a Contractor before the Works are complete, TNSW may complete the Works at the Licensee's Cost and the Licensee must pay the Costs of such works within 30 days of receipt of an invoice from TNSW.
- (b) The Licensee must ensure that any Contractor on the Rail Corridor is at all times under the supervision of a Protection Officer and as a minimum complies with the Network Rules and Procedures.

53 Liability

- (a) In undertaking the Design Review and giving its consent (whether conditional or absolute) to the Design or a Contractor TNSW makes no representation or warranty:
 - (i) that the Design, Infrastructure or Contractor:
 - (A) is suitable or fit for any purpose;
 - (B) meets the requirements of TNSW pursuant to this Licence; or
 - (C) meets the requirements of any applicable Law or standard; or

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- (a) that any information contained in the Design is correct.
- (b) The Licensee acknowledges that it will make its own enquiries in relation to the matters listed in clause 5.3(a) of this Schedule 3 and shall in no way rely on the Design Review or consent to the Design or a Contractor in relation to those matters. Without in anyway limiting the foregoing, TNSW shall be in no way liable for any loss, Cost or damage arising from the Design, Infrastructure or a Contractor or any loss, Cost or damage suffered or incurred by the Licensee or any other person as a result of any deficiency in the Design, Infrastructure or a Contractor;
- (c) Without in anyway limiting this clause 5.3 of Schedule 3, the Licensee acknowledges and agrees that:
- (i) TNSW is not responsible for the accuracy of the contents of and makes no representations nor assumes any duty of care in respect of any of the TNSW Material;
 - (ii) it has not relied upon any of the TNSW Material or the non-production of any other document held by TNSW in entering into this Licence;
 - (iii) it will not rely upon any of the TNSW Material or the non-production of any other document held by TNSW in the carrying out of the Works; and
 - (iv) in all respects it has relied on the outcome of its own investigations relating to the entering into of this Licence and the carrying out of the Works.
- (d) Without in anyway limiting this clause 5.3 of Schedule 3, TNSW is not liable for any Costs incurred by the Licensee as a consequence of the discovery of a condition at the Licensed Area that was not anticipated by the Licensee.

5.4 The Works:

- (a) The Licensee agrees and acknowledges that it:
- (i) shall comply with the reasonable directions of TNSW in relation to entering the Licensed Area and the performance of the Works;
 - (ii) understands that the Rail Corridor and Licensed Area is part of an operating rail network and that TNSW does not make any promise that the Licensed Area will be available at any particular time for the carrying out of the Works;
 - (iii) is the Licensee's responsibility to liaise with TNSW to make alternative arrangements if works are unable to proceed as planned on a particular occasion and that TNSW is not liable for any costs incurred by the Licensee as a consequence of changes in the timing of access to the Rail Corridor and Licensed Area;
 - (iv) has, prior to executing this Licence, had the opportunity to inspect the Licensed Area and accepts the Licensed Area in its present condition and subject to any defects, latent or patent, whether foreseeable or not;
 - (v) accepts all risk in the Works;

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- (vi) undertakes the Works in accordance with all applicable Laws, Authorisations and any other conditions specified by TfNSW or any other Government Agencies;
 - (vii) will not interfere with any other users of the Land or use of the Rail Corridor;
 - (viii) will use its best endeavours to restrict noise and any other nuisance caused by the Works;
 - (ix) will immediately notify TfNSW of any anticipated delays in completion of Works;
 - (x) will immediately notify TfNSW Train Control and Team Manager of any damage it causes to the Rail Corridor, Rail Infrastructure Facilities or the Licensed Area and will comply with any directions of TfNSW in respect to that damage; and
 - (xi) will satisfy TfNSW, through any requirements as notified by TfNSW, that the Works have been completed in accordance with the Designs, Laws and Authorisations of Government Agencies.
- (b) The Licensee must carry out or cause to be carried out the Works:
- (i) in strict accordance with the Design consented to by TfNSW;
 - (ii) in strict accordance with any relevant TfNSW standard or Australian Standard for that type of infrastructure;
 - (iii) in a good and workmanlike manner;
 - (iv) at the expense of the Licensee in all things; and
 - (v) on or before the Date for Completion of Works or such other extended date as agreed pursuant to clause 5.4(c) of this Schedule 3.
- (c) The Licensee may not carry out any Works on the Licensed Area after the Date for Completion of Works. If the Licensee believes it will not complete the Works by the Date for Completion of Works then the Licensee must as soon as possible apply to TfNSW for an extension to 5.4 the Date for Completion of Works, which TfNSW may give or withhold in its absolute discretion.
- (d) If TfNSW withholds consent to an application for an extension to the Date for Completion in accordance with clause 5.4(c) of this Schedule 3 TfNSW or the Licensee may terminate this Licence subject to the terms of this Licence.
- (e) When the Works are completed the Licensee must at its own Cost in all things and as soon as possible provide to TfNSW certification of the Date for Completion of the Works and provide two (2) copies of the As Built Drawings.
- (f) Without in any way limiting the indemnities and releases otherwise provided in this Licence:
- (i) the Licensee releases TfNSW from any damage caused to the Infrastructure as a result of; and

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- (ii) the Licensee indemnifies TINSW and any person claiming through TINSW against all Claims liability and damage incurred or suffered, including indirect losses arising in any way out of or in connection with, any error or omission in the As Built Drawings or any inconsistency between such plans and the actual location or nature of the Infrastructure.
- (g) The Licensee must obtain at its own cost all Authorisations required for lawfully carrying out the Works and, without in anyway limiting clause 7.3(a) of the body of this Licence must at all times comply with such Authorisations and the requirements of all Laws in any way affecting or applicable to the Works or the Infrastructure, including the WHS Act, WHS Regulation and the Rail Safety Law.
- (h) The Licensee must during the performance of the Works:
 - (i) keep the Works and the Licensed Area clean and tidy;
 - (ii) regularly remove from the Licensed Area all surplus materials; and
 - (iii) remove from the Licensed Area daily all spent material, chattels, effects and things brought onto the Licensed Area or arising from the Licensee's activities on the Licensed Area.
- (i) The Licensee agrees that during the performance of the Works, TINSW may:
 - (i) at all reasonable times, undertake inspections of the Works; and
 - (ii) acting reasonably, require the Licensee to alter or remove any parts of the Works that have not been carried out in accordance with the Design consented to by TINSW at the cost of the Licensee in all things.
- (j) If the Licensee does not comply with this clause, TINSW may carry out the Works without notice and at the Cost of the Licensee. The Licensee must pay such Costs within 30 days after receipt of an invoice from TINSW.

5.5 Independent Certifier

- (1) The Licensee must engage an Independent Certifier acceptable to TINSW acting reasonably, at the Licensee's cost for the purpose of:
 - (a) independently certifying that the design for the Works meets the requirements of this Licence, including TINSW's requirements set out in this Licence;
 - (b) independently certifying that the Works have reached Completion; and
 - (c) issuing a Notice of Completion once the Works have reached Completion.
- (2) Prior to commencing the Works, the Licensee must ensure that the Independent Certifier has executed the deed poll in favour of TINSW which is at Schedule 8 to this Licence and has provided TINSW with a copy of the executed deed poll.
- (3) The Independent Certifier is required to act reasonably, in good faith and independently of the Licensee and TINSW and any of their Employees and the Licensee must ensure that the Independent Certifier performs its functions under this Licence in this manner.

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- (4) The Licensee and TfNSW must provide the Independent Certifier with all information and documents as may be reasonably necessary to allow the Independent Certifier to perform its obligations.

6 INFRASTRUCTURE

6.1 Use and maintenance of Infrastructure

- (a) The Licensee owns the Infrastructure and upon completion of the Works as notified pursuant to clause 5.4(e) of this Schedule 3, the Licensee is thereafter licensed, subject to the provisions of this Licence, to keep the Infrastructure on the Licensed Area.
- (b) At any time after completion of the Works as notified pursuant to clause 5.4(e) of this Schedule 3, the Licensee must if required by TfNSW provide surveyed plans in a form acceptable to TfNSW delineating the location of the Infrastructure on the Licensed Area within a period specified by TfNSW.
- (c) Clause 9.1 of the body of this Licence does not apply during the period of the Works. Once a Notice of Completion has been issued by the Independent Certifier clause 9.1 of the body of this Licence will apply as drafted to the Infrastructure in addition to clauses 6.1(d), 6.1(e) and 6.1(f) of this Schedule 3 as set out below.
- (d) The Licensee must maintain, repair and keep the Infrastructure in good and substantial repair, order and condition. After completion of the Works if the Licensee requires access to the Rail Corridor to undertake maintenance or to carry out any other activity with respect to the Infrastructure, the Licensee must obtain TfNSW's prior consent on each such occasion. TfNSW's consent may upon reasonable grounds be withheld or granted conditionally.
- (e) The Licensee must ensure that the Infrastructure and the Licensee's use of the Infrastructure does not interfere with TfNSW and other users' use of the Licensed Area.
- (f) TfNSW may inform the Licensee that maintenance or repairs to the Infrastructure are required in order to protect TfNSW's interests or property. If TfNSW gives such notice to the Licensee, the Licensee must carry out the maintenance and repairs required by TfNSW within the time and on the conditions required by TfNSW. If the Licensee is unable or unwilling to carry out the required maintenance in accordance with TfNSW's requirements and timeframe (or if TfNSW considers the maintenance to be urgently required), TfNSW may carry out the maintenance itself at the Licensee's Cost. The Licensee must pay the Cost of such maintenance and repair within 30 days after receipt of an invoice from TfNSW.

6.2 Infrastructure after expiry or termination

- (a) Clauses 12.2 and 12.3 of the body of this Licence do not apply.
- (b) Upon the expiration, termination or earlier determination of this Licence:
- (i) TfNSW may purchase the Infrastructure for the consideration of \$1.00. Upon TfNSW giving notice in writing of the exercise of such option and paying the \$1.00, title to the Infrastructure shall automatically pass to TfNSW without any further act or instrument being necessary and the Licensee must at its own

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expense cause any charge, encumbrance or other interest in the Infrastructure to be wholly discharged; or

(ii) if TNSW does not purchase the Infrastructure pursuant to clause 6.2(b)(i) of this Schedule 3, the Licensee must, to the satisfaction of TNSW:

- i. remove all of the Licensee's Equipment and repair any damage caused by such removal;
- ii. remove and restate any alterations or additions made to the Licensed Area by the Licensee;
- iii. complete any repairs or maintenance which the Licensee is obliged to carry out under this Licence; and
- iv. otherwise reinstate the Licensed Area to the condition it was in as at the Commencement Date.

(c) If the Licensee fails to comply with clause 6.2(b)(ii) of this Schedule 3 TNSW may, at the Cost of the Licensee take any steps necessary to fulfil the Licensee's obligations under clause 6.2(b)(ii) of this Schedule 3 and do anything else related to rendering the Infrastructure safe or inaccessible

(d) The Licensee must pay or reimburse TNSW for all Costs incurred under clause 6.2(c) of this Schedule 3, within 30 days after receiving a request for payment from TNSW.

(e) This clause 6.2 survives expiry or termination of this Licence.

7 REPORTS

- (a) If the Licensee commissions a review, investigation, inquiry, audit or other form of report in relation to the Land, the Improvements, the Infrastructure, the Services or the Railway Infrastructure (Report), the Licensee must upon completion of the Report, notify TNSW of the existence of the Report.
- (b) If TNSW requests a copy of the Report, the Licensee must provide TNSW with a copy of the Report within 7 days of the date of request.
- (c) The parties acknowledge that if a copy of the Report is provided to TNSW, it is provided for information purposes only and TNSW is not obliged to rely on the Report.

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SCHEDULE 4

Not applicable.

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SCHEDULE 5**REVIEW OF LICENCE FEE****1. CPI REVIEW****1.1 CPI Review**

The Licence Fee on and from each CPI Review Date may, if TNSW so determines, be reviewed and recalculated as follows:

$$R_2 = R_1 \times \frac{\text{Current CPI}}{\text{Previous CPI}}$$

Where:

R_2 is the Licence Fee after the CPI Review Date; and

R_1 is the Licence Fee immediately before the CPI Review Date.

1.2 Change to CPI Index

If the CPI is no longer published, either party may ask the President of the New South Wales Division of the Australian Property Institute to nominate an index which reflects the rate of price change in the area and group for the CPI and "CPI" then means that index. The parties must each pay one half of the President's costs for nominating an index.

2. FIXED REVIEW

The Licence Fee on and from each Fixed Review Date will be reviewed and recalculated by increasing the Licence Fee payable immediately before the Fixed Review Date by the Fixed Rate.

3. MARKET REVIEW

(a) The Licence Fee on and from each Market Review Date will be reviewed and recalculated by adjusting the yearly rent payable in the immediately preceding year to a **CURRENT MARKET RENT** as agreed by the parties, or if either party believes that agreement can not be reached within a reasonable time then as determined by an independent valuer agreed between the parties, or if either party believes that agreement can not be reached within a reasonable time then as appointed by the President for the time being of the Australian Property Institute Incorporated (NSW Division) provided however that there is to be no decrease in the rent.

(b) Any valuer appointed under clause 3(a) of this Schedule 5 must have at least 10 years' experience valuing licensed areas similar to the Licensed Area and must comply with the following conditions:

(i) the valuer must determine the current market rent

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Application No: 090235
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(A) assuming a licence of the Licensed Area between a willing but not anxious licensor and a willing but not anxious licensee who have both acted knowledgeably, prudently and without compulsion;

(B) based on the use of the Licensed Area at that time;

(ii) the valuer must act as an expert and not as an arbitrator; and

(iv) the valuer must take into account submissions from the parties.

(c) The parties must equally share the costs and expenses of any valuer appointed under this clause 3 of Schedule 3.

4. LICENCE FEE PENDING DETERMINATION

(a) The Licence Fee may be reviewed at any time from a Review Date even if the review is instituted after that Review Date.

(b) If the Licence Fee to apply on and from a Review Date has not been agreed on or determined by that Review Date, the Licensee must continue to pay instalments of the Licence Fee at the rate that applied before the relevant Review Date until the Licence Fee is determined.

5. ADJUSTMENT ONCE LICENCE FEE DETERMINED

Once the Licence Fee to apply on and from a Review Date is determined, the Licensee will pay any shortfall or TINSW will allow any adjustment for overpayment at the next Payment Date.

6. NO DECREASE IN LICENCE FEE

The Licence Fee will not decrease on a Review Date.

7. OTHER REVIEW

Nothing in this Licence prevents TINSW and the Licensee negotiating and agreeing on a Licence Fee to apply from a Review Date without following this Schedule 3.

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SCHEDULE 6

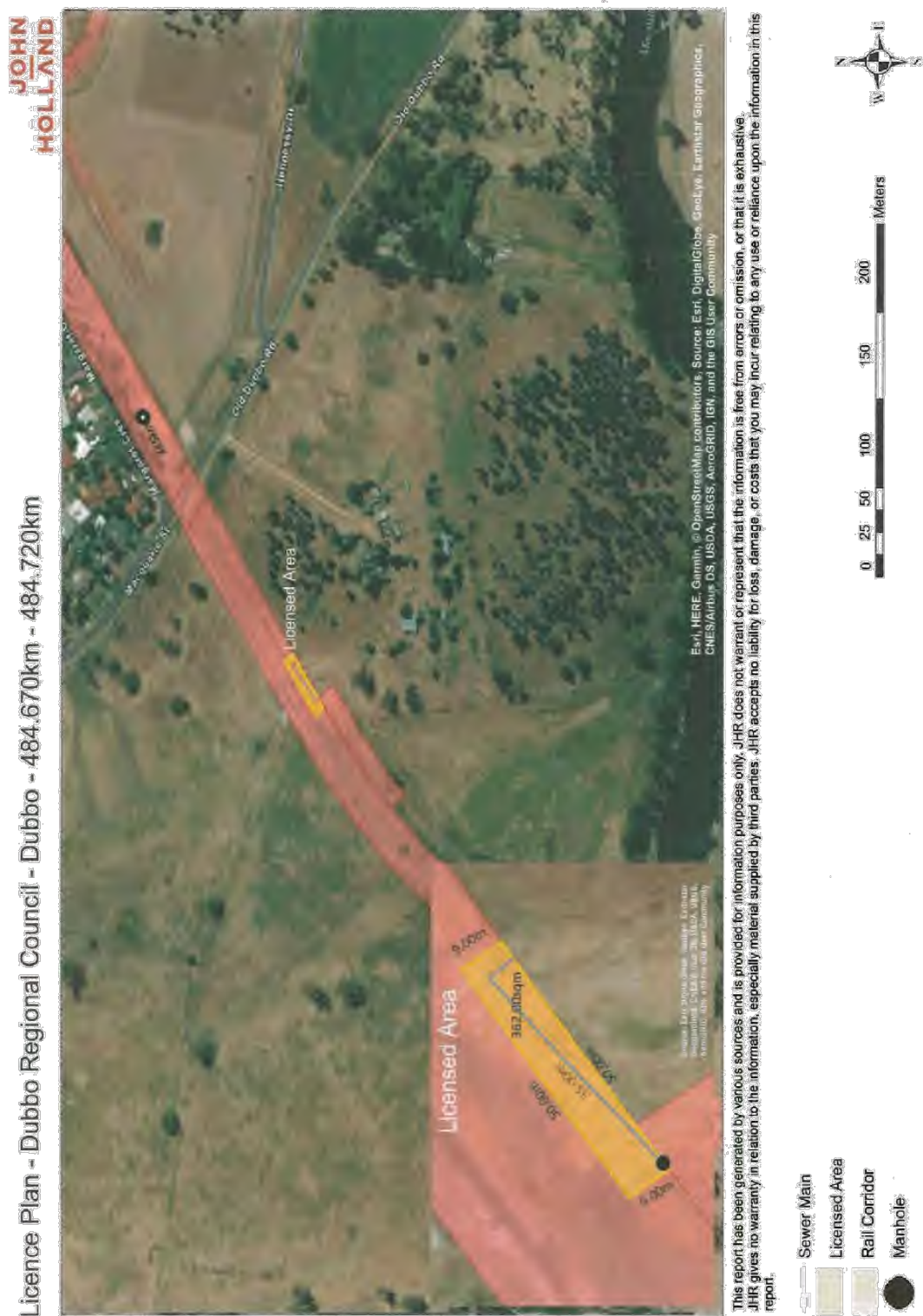
SAFETY PROTOCOLS

JHR Policy CRN-GDL-RLS-001 available at <http://www.jhrm.com.au/media/3898/crn-gdl-rls-001-accessing-the-country-accidental-network.pdf>

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SCHEDULE 7
PLANS OF LICENSED AREA

Infrastructure Licence Version 1.7 (30/03/18) - Dubbo Regional Council - DRC
Application No: 009433
Agreement No: 2018-11121



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SCHEDULE 8

DEED POLL BY INDEPENDENT CERTIFIER

*(Insert name, ABN and address of Independent Certifier) (Independent Certifier)*in favour of: **TRANSPORT FOR NSW** (ABN 18 804 239 602) of Level 3, 237 Wharf Road Newcastle NSW 2300 ("TfNSW").**1. DEFINITIONS AND INTERPRETATION**

Unless expressly stated otherwise, the definitions and rules of interpretation as set out in the Licence apply to this deed poll. In addition:

Independent Certifier's Obligations means the obligation of the Independent Certifier to certify in favour of TfNSW that the Works have been completed in accordance with the requirements set out in the Licence.

Licence means the licence between TfNSW and the Licensee dated *(insert date)*.

2. GOVERNING LAW

This deed poll is governed by and will be construed according to the laws of New South Wales.

3. INDEPENDENT CERTIFIER**3.1 Acknowledgment**

(1) The Independent Certifier acknowledges that:

- (a) it has received a copy of the Licence and it has read and is familiar with the terms of the Licence as it relates to the Independent Certifier's Obligations;
- (b) TfNSW:
 - (i) is relying on the skill and expertise of the Independent Certifier in the performance of its obligations under this deed poll;
 - (ii) may suffer loss if it does not perform its obligations in accordance with the requirements of this deed poll;
 - (iii) may provide written comments and submissions to the Independent Certifier and the Independent Certifier must give due consideration to those submissions; and
 - (iv) is entitled to and will rely on any certificate signed by or given by the Independent Certifier under or pursuant to this deed poll.

3.2 Warranties

- (1) The Independent Certifier warrants to TfNSW that in performing the Independent Certifier's Obligations, it will comply with all Laws, act honestly, diligently, reasonably and with the degree of professional skill and care which would be expected of an expert professional providing similar services within the construction industry generally.
- (2) The Independent Certifier further warrants that, at all times, it will act within the requirements for performance of its obligations under this deed poll or if no time is stated, within a reasonable period of time.

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3.3 Other obligations

- (1) The Independent Certifier must certify the matters required in clause 5.5 of Schedule 3 of the Licence, as a prerequisite to the achievement of Completion of the Works that the Works comply with the requirements of the Licence.
- (2) In carrying out the Independent Certifier's Obligations, the Independent Certifier will act independently of TNSW and the Licensee and its Employees.
- (3) The Independent Certifier will immediately notify TNSW in writing upon becoming aware of the existence or possibility of a conflict of interest.

3.4 Confidentiality

- (1) The Independent Certifier must keep confidential details of this deed poll and any documentation in relation to the Works including all information and documents provided to it and must not provide, disclose or use the information or documents unless in performance of the Independent Certifier's Obligations under or in accordance with this deed poll or as otherwise permitted by TNSW or:
 - (a) where required by law or to obtain legal advice on this deed poll;
 - (b) with the prior written consent of TNSW; or
 - (c) where the information is in the public domain (other than by reason of breach of this deed poll).
- (2) This obligation will survive completion of the Independent Certifier's Obligations or termination of this deed poll.

EXECUTED as a deed poll.

DATED the _____ day of _____

EXECUTED by insert name of Independent Certifier by or in the presence of:_____
Signature of Director_____
Signature of director/secretary_____
Name_____
Name

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 Application No: 000525
 Agreement No: AGR-01121

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SCHEDULE 9**WORKS**

The Works are as follows:

- (a) Installation of a 150mm sewer main being 35 m in total length as indicated in blue and;
- (b) Installation of a manhole in black in the plan attached at Schedule 7.

Infrastructure Licence Version 1.7 150218 - Dubbo Regional Council - Dubbo
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HOLLAND**

ATTACHMENT B

Items	Issues	Recommendations
Page 13 - Fencing	A5.2 Fencing along the rail corridor	The following changes/additions are proposed: A5.2 Fencing is provided along the rail corridor which is 1.8m in height and provides delineation between the estate alignment and the rail corridor during construction and to remain installed on the property boundary. Landscaping will be avoided within 60m of the rail corridor to mitigate bushfire risks and to maximize level crossing sighting in the event that the rail corridor becomes operational.
Page 20-21 – Element 6. Stormwater Management	For the purpose of protecting the rail corridor.	Additional items to be added to Controls: 14. Developments must be considered in the context of the <i>Development near Rail Corridors and Busy Roads – Interim Guideline</i> (Department of Planning 2008) in relation to, but not limited to, the following: <ul style="list-style-type: none"> • Drainage systems should be designed in a way that stormwater is captured on site for reuse, and preferably diverted away from the rail corridor. • Stormwater run-off from the development land will not have adverse impact on the rail corridor by increasing pre-construction flows into the rail corridor.

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Page 28 – Element 2. Building Setbacks	Setbacks from the rail corridor may be required in designing for noise and vibration and stormwater drainage.	<p>The following changes/additions are proposed:</p> <p><i>Setbacks from the rail corridor</i></p> <p>Setbacks from the rail corridor need to consider the design principles in section 3.8 of the <i>Development near Rail Corridors and Busy Roads – Interim Guideline</i> (Department of Planning, 2008) and the need for appropriate stormwater drainage.</p>
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Items	Issues	Recommendations
Page 40 – Rail Noise Impacts P3 - A3.2	The control should refer to a detailed list of design principles.	<p>The following changes/additions are proposed:</p> <p>P3 Development of the land is not unreasonably impacted by noise associated with the potential future rail use of the Dubbo- Molong Rail Corridor</p> <p>All residential buildings located within 60m of the rail corridor (Zone B) should detail siting considerations, design and architectural treatments with consideration to the design principles in section 3.8 of the <i>Development near Rail Corridors and Busy Roads – Interim Guideline</i> (Department of Planning, 2008) and include ventilation that meets the requirements of the Building Code of Australia where windows are required to remain closed to meet internal noise levels.</p> <p>Standard noise mitigation measures will be required consistent with Category 2 Noise Control Treatments (Interim Guideline) which include:</p> <ul style="list-style-type: none"> - Windows/sliding doors – openable with minimum 6mm monolithic glass and full perimeter acoustic seals - Wall construction 110mm brick, 90mm timber stud frame, minimum 50mm clearance between masonry and stud frame,

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		<p>10mm standard plasterboard internally.</p> <ul style="list-style-type: none"> - Roof – Pitched concrete or terracotta tile or metal sheet roof sheeting with sarking, 10mm plasterboard ceiling fixed to ceiling joists, R2 insulation batts in roof cavity. - Entry Door -40mm solid core timber door fitted with full perimeter acoustic seals. - Floor – 1 layer of 19mm structural floor boards, timber joists on piers or concrete slab on floor on ground.
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Items	Issues	Recommendations
Additional items in relation to the protection of rail corridor	<p>The Draft DCP should include Controls that address the following aspects:</p> <ul style="list-style-type: none"> • Lighting and external finishes and design • Level crossings 	<p>It is recommended that the following controls be added to relevant section(s) in the DCP:</p> <ul style="list-style-type: none"> • The use of red and green lights is to be avoided in all signs, lighting building, colour, scheme on any part of a building facing rail corridors • If a development involves a new level crossing, a conversion into a public road of a private access road across a level crossing, a likely significant increase in the total number of vehicles or the number of trucks using a level crossing, the development must be consulted and concurrence given by the rail authority in accordance with Clause 84 of the State Environmental Planning Policy (Infrastructure) 2007.
	Excavation in, above, below or adjacent to rail corridors.	<p>It is strongly recommended that the following controls be added to the relevant section(s) in the DCP:</p> <ul style="list-style-type: none"> • In the event that developments in the Land involves excavation exceeding 2m below within 25m of the rail corridor,

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		it must be required to obtain concurrence from the relevant rail authority in accordance with Clause 86 of the State Environmental Planning Policy (Infrastructure) 2007.
	Use of Cranes, concrete pumps or other equipment	<p>It is strongly recommended that the following controls be added to the relevant section(s) in the DCP:</p> <ul style="list-style-type: none">• Should a crane, concrete pump or other equipment must not be used in airspace over the rail corridor without approval in writing from JHR in accordance with the Interim Guideline.

Reference: DP 807767 1R Old Dubbo Road, Dubbo.

31st

October, 2019

"Miriam Hill Estate"

Dear Sir/Madam,

I am writing on behalf of my Father, Joseph Shibble to object to the naming, by Neil and Jennifer O'Connor of 1R Old Dubbo Road, of the proposed subdivision as "Miriam Hill Estate". My Father is unable to write this letter due to his age of 95yrs and he is in a nursing home. Joseph Shibble owns the property "Miriam" and has done for 74yrs. His property "Miriam" surrounds the lot owned by Neil and Jennifer O'Connor and was once owned by him. 1R Old Dubbo Rd is just a section at the base of this hill which has no significance to my Fathers property "Miriam". He owns this hill "Miriam" and Neil and Jennifer O'Connor have no right taking the name from this property of which they have nothing to do with. It is very upsetting for my Father being very proud of his property and sometimes referred to by locals as

Shibble's Hill. Neil and Jennifer O'Connor will have to change the naming of this proposed estate to something completely different as they cannot take the name of my Father's property or mention Hill as it has nothing to do with the hill owned by my Father.

There is no objection so far as to the development of 1R Old Dubbo Road but the naming of the estate is at this stage a serious matter for our Family so we ask Council to making sure this is changed.

Steven Shibble

Ph:

0268893147

Mobile:

0428893147



REPORT: South Bridge Update

AUTHOR: Manager Infrastructure Strategy and Design
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1598

EXECUTIVE SUMMARY

In late August 2019, Council received \$100,000 from the NSW Government for the investigation of a southern bridge crossing in Dubbo, to be completed by 30 June 2020. Council has subsequently engaged GHD Pty Ltd to undertake a route options analysis report and prepare a civil engineering concept design showing a preferred alignment.

At the time of writing this report, the concept civil engineering designs are available and included as **Appendix 1**. The report detailing the route analysis, preferred alignment, and estimated cost is yet to be finalised. It is anticipated the report will be provided to Council by 13 December 2019.

It is planned to commence work on the Business Case report (including Benefit Cost Ratio Calculation) in January 2020. Community consultation showing the preferred alignments and Business Case report will be undertaken during April and May 2020, with the project to be completed by 30 June 2020.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

That the report of the Manager Infrastructure Strategy and Design dated 26 November 2019 be noted.

Stephen Howlett
Manager Infrastructure Strategy and Design

BACKGROUND

On 23 August 2019, Council received confirmation from Roads and Maritime Services that \$100,000 in grant funding had been provided for the investigation of a southern bridge crossing in Dubbo. As part of the funding agreement, the minimum output to be delivered was an options analysis and preferred alignment, followed by a detailed business case report (including benefit cost ratio calculations and community consultation).

The project has a deadline of 30 June 2020.

REPORT

Council engaged civil engineering consultants GHD Pty Ltd to undertake the options analysis report and determine a preferred alignment. The aim of the initial engagement was to determine the most appropriate option for a new bridge in terms of location, engineering community, environmental constraints and cost.

Table 1 below shows a progress summary of the work that GHD have been undertaking for Council.

ITEM OF WORK	DESCRIPTION	PROGRESS
Identify and document three strategic option locations	The three options are: 1. Minore Road to South Street/Tamworth Street 2. Minore Road to Sandy Beach Road/ Bligh Street 3. Yuille Court to Tamworth Street/South Street Prepare general arrangement (GA) sketch for each road alignment option, consisting of plan view, sketch of bridge location, approaches and intersection tie-in locations.	Work complete. Refer to Appendix 1 for detailed route maps
Strategic Concept Design and Options Report	Plans and report detailing: 1. Concept design of approach roads and calculation of earthworks and pavement volumes 2. Impacts to services and required works to services. 3. Typical bridge elevation sketch sections indicating deck level. 4. Concept plans showing intersection upgrades 5. Provision of cost estimates for each option 6. Final report	Complete Complete Complete Complete 90% complete Due to Council by 13 December 2019
Business Case Report	Detailed report which will include the following items to be used for grant funding submissions 1. Strategic Alignment (eg Dubbo 2040, Future Transport 2056, Regional NSW Services and	Will commence in January 2020

	Infrastructure Plan) 2. Calculation of Benefit Cost Ratios 3. Community consultation to garner feedback (April-May 2020)	Due for completion by 30 June 2020
--	---	--

Table 1 – Work and progress to date

SUMMARY

GHD Pty Ltd has been working on this project in conjunction with Council. The options analysis report and preferred alignment are due to Council by 13 December 2019. Following review and acceptance, Council will commence the detailed business case report and community consultation, with all work to be completed prior to 30 June 2020.

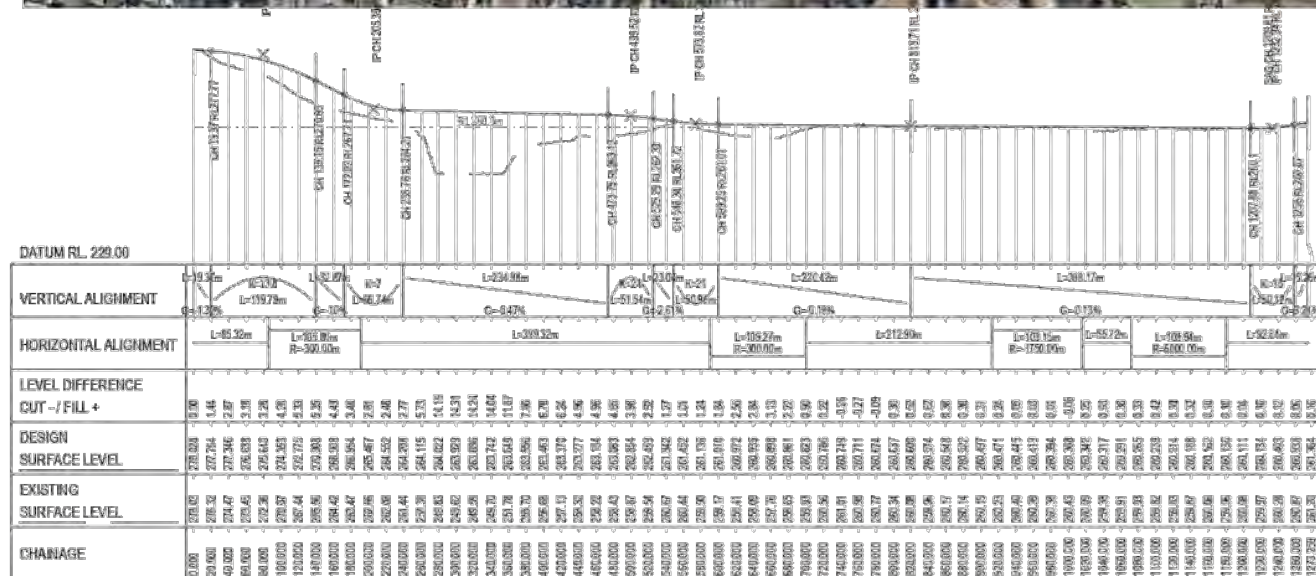
Appendices:

1 [South Bridge Information/Update](#)



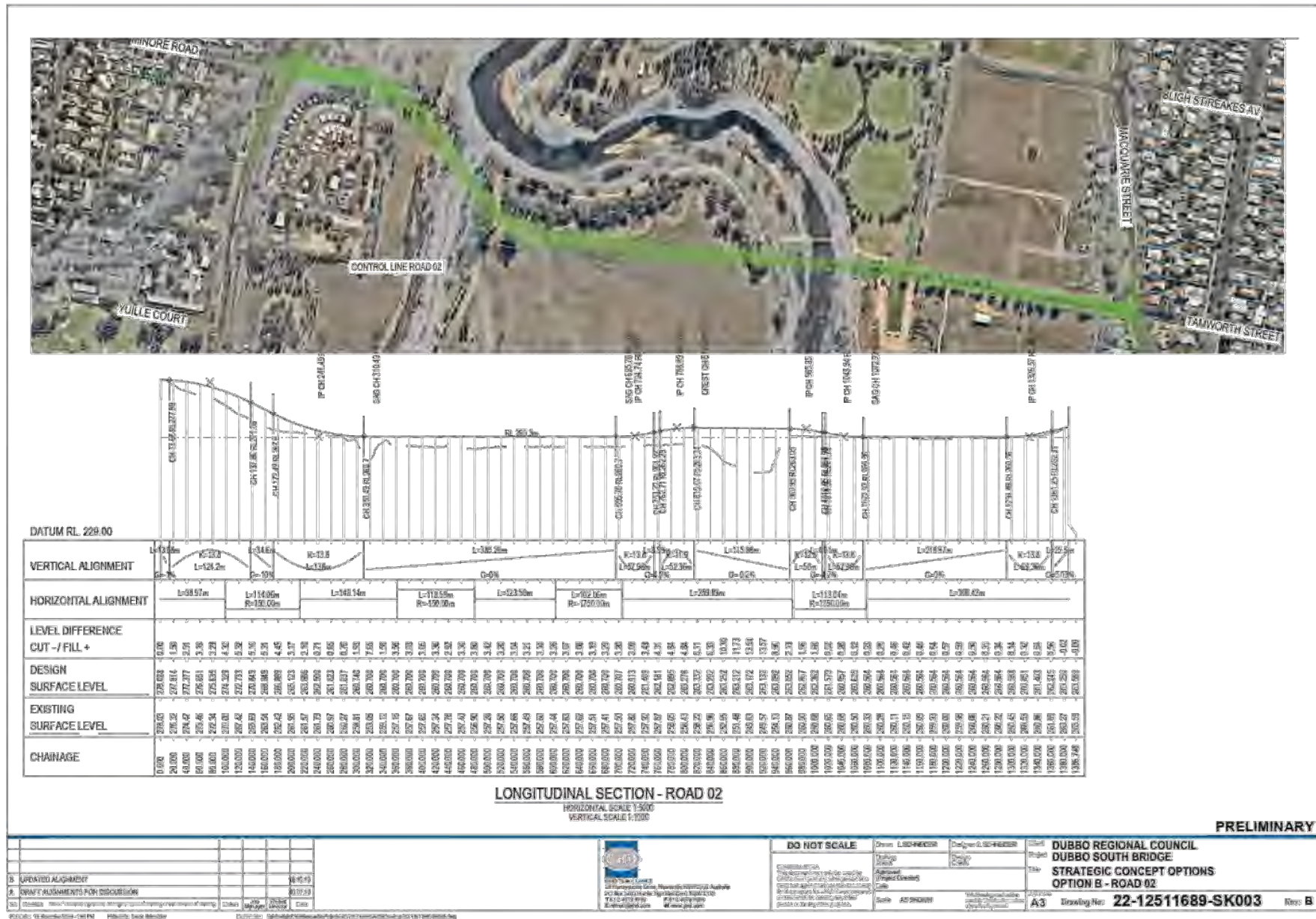
PRELIMINARY

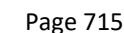
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HORIZONTAL SCALE 1:5000
VERTICAL SCALE 1:1000

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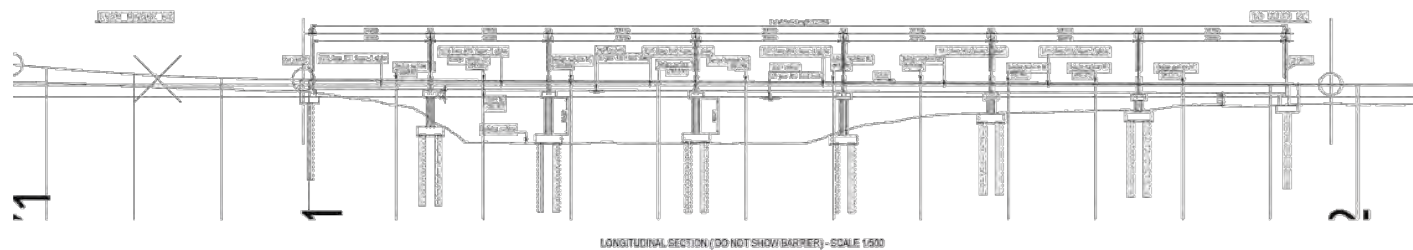




No	Structure	Bridge total width	Bridge total length of deck	Total deck surface area	Number of spans	Total number of beams	Number of Piers	Number of Abutments
		m	m	m ²	EA	EA	EA	EA
1	Road 1							
1.1	Option 1 Simple supported Super T-type 4 girders (Precast prestressed concrete-4515mm deep), In-situ Column Piers with bored piles	13.5	222.85	3008.48	7	42	5	2
1.2	Option 2 Simple supported Precast prestressed 600 deep Void planks,, In-situ Column Piers with bored piles	13.5	225.0	3037.50	15	240	14	2
2	Road 2							
2.1	Option 1 Simple supported Super T-type 4 girders (Precast prestressed concrete-4515mm deep), In-situ Column Piers with bored piles	13.5	121.55	1640.93	4	24	3	2
2.2	Option 2 Simple supported Precast prestressed 600 deep Void planks,, In-situ Column Piers with bored piles	13.5	119.05	1619.33	8	128	7	2
3	Road 3							
3.1	Option 1 Simple supported Super T-type 4 girders (Precast prestressed concrete-4515mm deep), In-situ Column Piers with bored piles	13.5	101.2	1366.20	3	18	2	2
3.2	Option 2 Simple supported Precast prestressed 600 deep Void planks,, In-situ Column Piers with bored piles	13.5	105.0	1417.50	7	112	6	2

UNDER REVISION

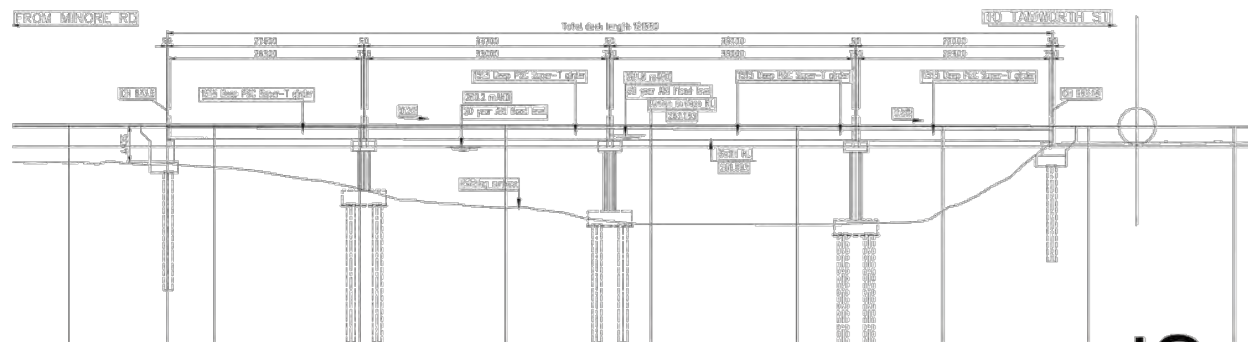
DO NOT SCALE Conditions of this drawing are subject to the validity of the design and any other general conditions of contract and shall be subject to any other conditions of contract.		Drawn: M382 Checked: M382 Approved: (Signature) Date: 22/12/2019	Design: M382 Checked: M382 Approved: (Signature) Date: 22/12/2019	Client: ROADS AND MARITIME SERVICES Project: DUBBO SOUTH BRIDGE Site: BRIDGE STRUCTURE Quantity Summary:
Job: UNDER REVISION - FOR INTERNAL CND USE ONLY Job Manager: GJH Job Number: 22-12511883-RAISED AL-STRUCTURE OPTS-N Date: 22/12/2019		Drawing No: 22-12511883-RAISED AL-STRUCTURE OPTS-N Scale: A1 Date: 22/12/2019		



PLAN- SCALE 1:500

UNDER REVISION

												DO NOT SCALE Conclusions of this study should not be used for design purposes without the approval of the design engineer.		Design: RAISED Existing: STOCKED Approved: (Signed) [Signature] Date:		Design: RAISED Existing: STOCKED Approved: (Signed) [Signature] Date:		Other: ROADS AND MARITIME SERVICES Project: DUBBO SOUTH BRIDGE Title: BRIDGE STRUCTURE ROAD 1 - OPTION 1, SUPER-T ORISER		Drawing No: 22-151688-RAISED AL-STRUCTURE OPTS-N Rev: UR	
UR UNDER REVISION - FOR INTERNAL OHIO USE ONLY										GIH											
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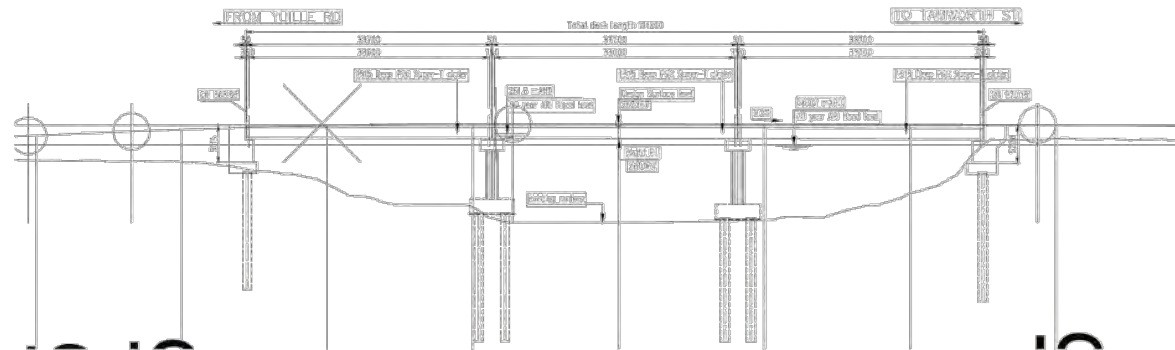
LONGITUDINAL SECTION (DO NOT SHOW BARRIER) - SCALE 1:300



PLAN - SCALE 1:300

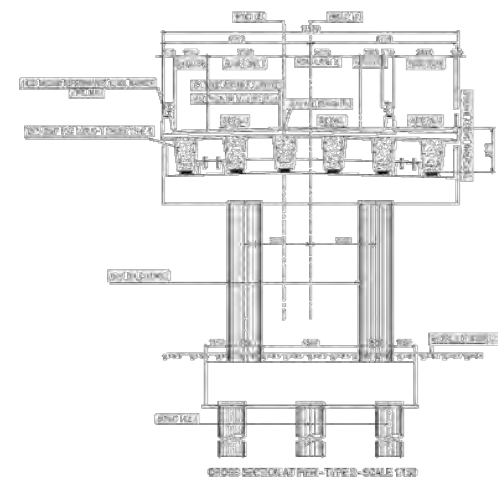
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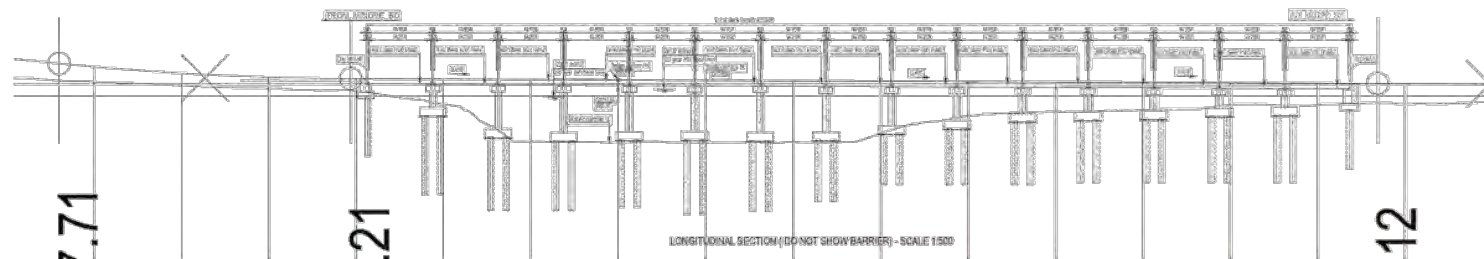
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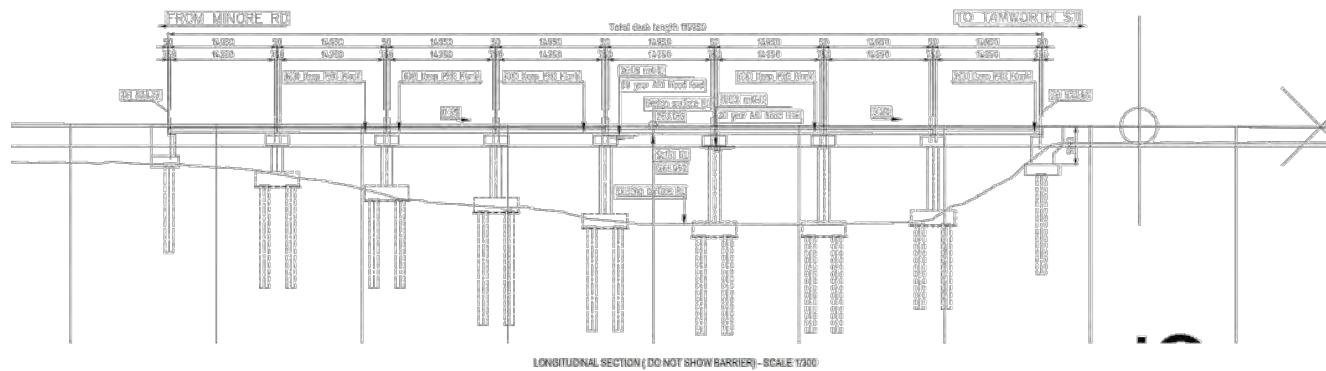
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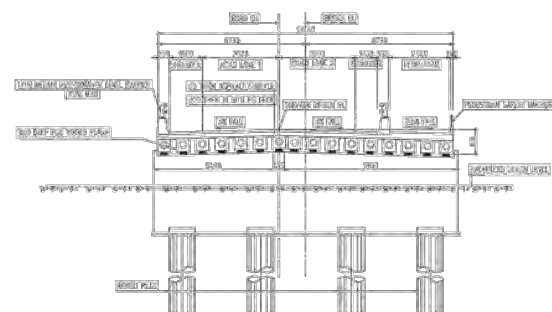
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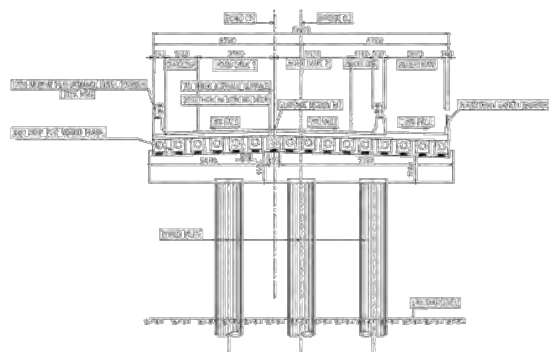


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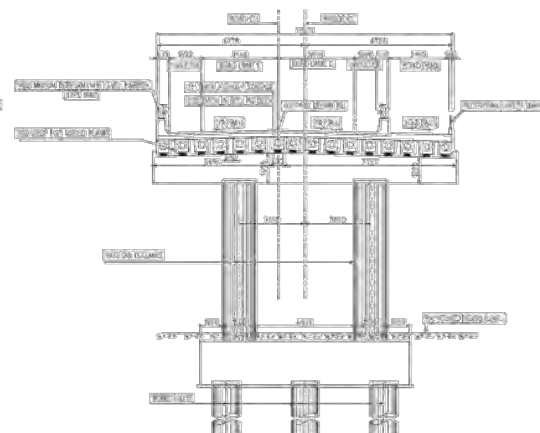
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REPORT: New/Updated Macquarie River Flood Study

AUTHOR: Manager Infrastructure Strategy and Design
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1599

EXECUTIVE SUMMARY

At Council's Infrastructure, Community, and Recreation Committee meeting held 9 September 2019, a report was presented in regards to the New/Updated Macquarie River Flood Study (ICRC19/46).

The recommendations of the report were as follows.

1. *That the report of the Manager Infrastructure Strategy and Design be noted.*
2. *That the digital maps generated by the 2019 Macquarie River Flood Study be placed on public exhibition on Council's website for a period of six (6) weeks, commencing 23 September 2019.*
3. *That during the period of public exhibition two workshops be held with significant stakeholders and relevant government agencies to review the maps and gather feedback.*
4. *That following the period of public exhibition, a report be presented to the December 2019 meeting of Council, detailing the outcomes of the public exhibition period and proposing a programme for the implementation of the Floodplain Risk Management Plan.*
5. *That in the interim, the model data be adopted for the purposes of zoning decisions in respect of any amendments to the Dubbo LEP 2011 and assessment of development applications in Flood Prone or Flood Affected areas.*

At the Ordinary Council meeting held on 23 September 2019, Council resolved to implement Level 3 and Level 4 Water Restrictions. This required extensive involvement of Council staff, residents, and the business community. Given the information that needed to be conveyed to the community, and the involvement of staff time, the community consultation regarding the Flood Study did not proceed as planned.

As per recommendation 2, the report has been available on Council's website since 23 September 2019, however it has not been well publicised given the focus on water restrictions. Additionally, the two workshops proposed in recommendation 3 did not occur.

It is therefore proposed that community consultation, including the workshops now occur in February and March 2020, with a report to May 2020 Infrastructure and Liveability Committee detailing the results.

FINANCIAL IMPLICATIONS

There are no financial implications arising from the recommendations of this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

- 1. That the report of the Manager Infrastructure Strategy and Design be noted.**
- 2. That the digital maps generated by the 2019 Macquarie River Flood Study remain on public exhibition on Council's website until 14 March 2020.**
- 3. That during February and March 2020 two workshops be held with significant stakeholders and relevant government agencies to review the maps and gather feedback.**
- 4. That following the period of public exhibition, a report be presented to the May 2020 Infrastructure and Liveability Committee meeting, detailing the outcomes of the public exhibition period, and proposing a programme for the implementation of the Floodplain Risk Management Plan.**

Stephen Howlett

Manager Infrastructure Strategy and Design

BACKGROUND

At Council's Infrastructure, Community, and Recreation Committee meeting held 9 September 2019, a report was presented in regards to the New/Updated Macquarie River Flood Study (ICRC19/46).

The recommendations of the report were as follows:

1. *That the report of the Manager Infrastructure Strategy and Design be noted.*
2. *That the digital maps generated by the 2019 Macquarie River Flood Study be placed on public exhibition on Council's website for a period of six (6) weeks, commencing 23 September 2019.*
3. *That during the period of public exhibition two workshops be held with significant stakeholders and relevant government agencies to review the maps and gather feedback.*
4. *That following the period of public exhibition, a report be presented to the December 2019 meeting of Council, detailing the outcomes of the public exhibition period and proposing a programme for the implementation of the Floodplain Risk Management Plan.*
5. *That in the interim, the model data be adopted for the purposes of zoning decisions in respect of any amendments to the Dubbo LEP 2011 and assessment of development applications in Flood Prone or Flood Affected areas.*

REPORT

At the Ordinary Council meeting held on 23 September 2019, Council resolved to implement Level 3 and Level 4 Water Restrictions. This required extensive involvement of Council staff, residents, and the business community. Given the information that needed to be conveyed to the community, and the involvement of staff time, the community consultation regarding the Flood Study did not proceed as planned.

As per recommendation 2, the report has been available on Council's website since 23 September 2019, however it has not been well publicised given the focus on water restrictions. Additionally, the two workshops proposed in recommendation 3 did not occur.

It is therefore proposed that community consultation, including the workshops now occur in February and March 2020, with a report to May 2020 Infrastructure and Liveability Committee detailing the results.

SUMMARY

Following the implementation of Level 3 and Level 4 Water Restrictions, community consultation in relation to the New/Updated Macquarie River Flood Study did not proceed as planned. It is therefore proposed that community consultation and workshops in regards to the Flood Study will continue into March 2020, with a detailed report to be presented to the May 2020 Infrastructure and Liveability Committee report.



REPORT: Neighbourhood Shopping Centre Beautification Proposals

AUTHOR: Manager Infrastructure Strategy and Design
REPORT DATE: 29 November 2019
TRIM REFERENCE: ID19/1609

EXECUTIVE SUMMARY

In 2018 Council considered the progress of the project to develop neighbourhood shopping centre beautification proposals in Boundary Road, Tamworth Street, and Victoria Street, Dubbo. Landscape architecture consultants assisted Council in undertaking onsite appraisals of the centres, and held initial consultation sessions with the businesses and property owners from each of the centres. Following these sessions, concept plans were provided to Council.

A detailed review of those plans by Council staff indicated a substantial amount of additional work from Council's Infrastructure and Liveability divisions was needed to ensure the concept plans could proceed to construction.

Attached to this report (**Appendix 1**) is a concept engineering plan for the Boundary Road Shopping Centre. A three-dimensional landscape plan will be completed ready for the consultation period to businesses and residents in February 2020. It is planned to present this plan to businesses and residents in February 2020 after the Christmas holiday period. Earlier consultation was not undertaken due to the community focus needed on water restrictions. Plans for Tamworth Street will be finalised in January 2020, and available for consultation with businesses and residents at a similar time to Boundary Road.

Following community consultation, detailed design will commence, with works to commence in Boundary Road in the 2019/2020 financial year. Tamworth Street is planned for construction in the 2020/2021 financial year.

Discussions will continue with Roads and Maritime Services (RMS) and the Victoria Street Beautification Project Committee, with the beautification of the Victoria Street shops to be included in the Newell/Mitchell Highway intersection upgrade project being run by RMS.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

- 1. That the report of the Manager Infrastructure Strategy and Design dated 28 November 2019 be noted.**
- 2. That consultation be undertaken with businesses and residents in regards to the Boundary Road Shopping Centre and Tamworth Street Shopping Centre in February 2020.**
- 3. That Council continue discussions with Roads and Maritime Services and Victoria Street Beautification Project Committee, incorporating beautification into the Newell/ Mitchell Highway Intersection Upgrade Project.**

Stephen Howlett

Manager Infrastructure Strategy and Design

BACKGROUND

In 2018, Council considered the progress of the project to develop neighbourhood shopping centre beautification proposals in Boundary Road, Tamworth Street, and Victoria Street, Dubbo. Landscape architecture consultants assisted Council in undertaking onsite appraisals of the centres, and held initial consultation sessions with the businesses and property owners from each of the centres. Following these sessions, concept plans were provided to Council.

REPORT

A detailed review of the plans prepared by consultant landscape architects by Council staff indicated that a substantial amount of additional work from Council's Infrastructure and Liveability divisions was needed to ensure the concept plans could proceed to construction.

Council staff have been developing engineering plans for the Boundary Road Shopping Centre (**Appendix 1**). A three-dimensional landscape plan will be completed before Christmas 2019.

It is planned to present this to businesses and residents in February 2020 after the Christmas holiday period. Earlier consultation, which was proposed for September and October 2019, was not undertaken due to the community focus required to move to Level 3 and subsequently Level 4 water restrictions.

Similar engineering and landscape plans for Tamworth Street will be finalised in January 2020, and available for consultation with businesses and residents at a similar time to Boundary Road.

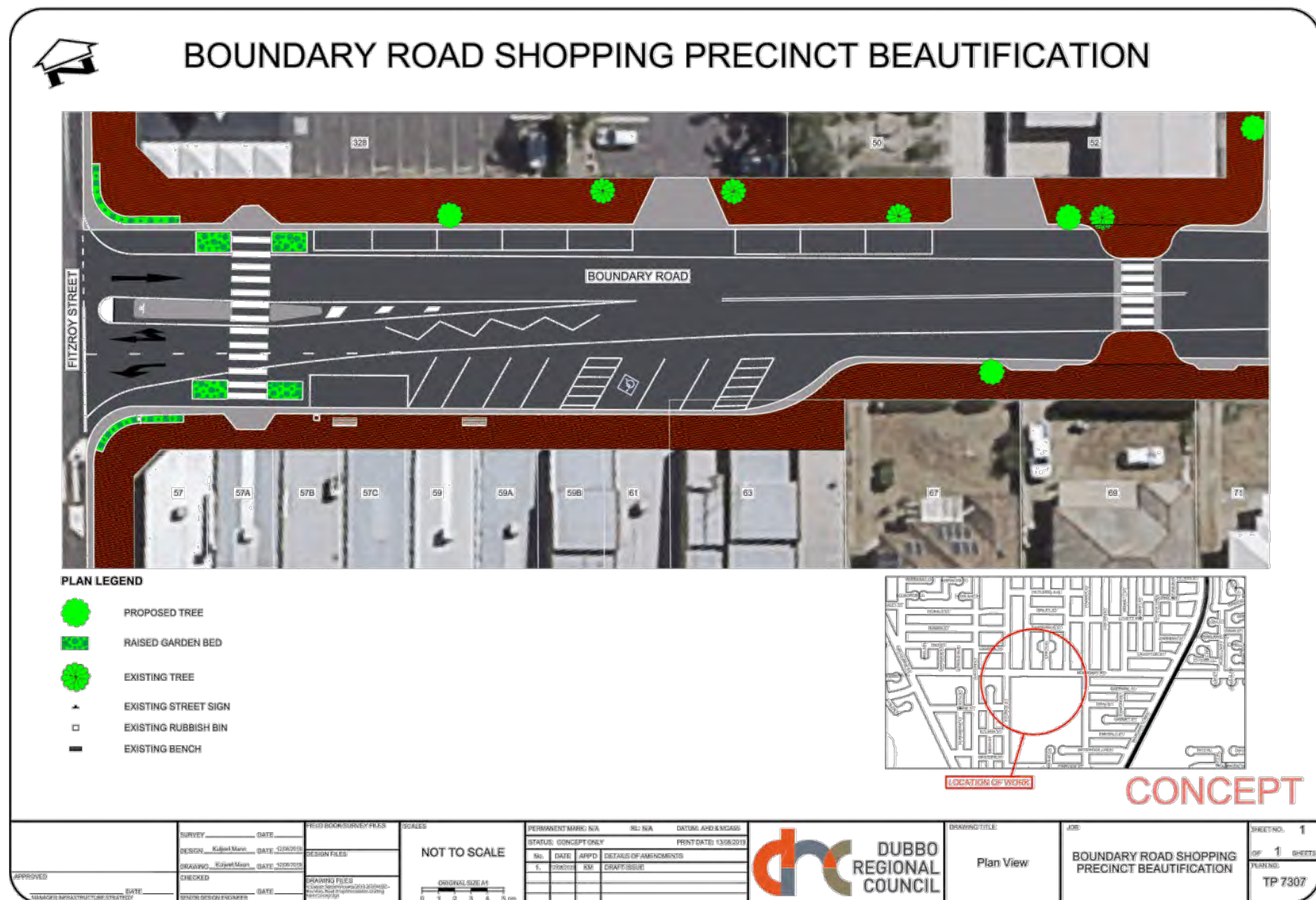
Following community consultation, detailed design will continue, with construction works to commence in Boundary Road in the 2019/2020 financial year. Tamworth Street is planned for construction in the 2020/2021 financial year.

SUMMARY

A concept engineering plan and three-dimensional landscape plan has been created for the Boundary Road Shopping Centre. It is planned to present this to businesses and residents in February 2020 after the Christmas holiday period. Plans for Tamworth Street will be finalised in January 2020, and available for consultation with businesses and residents at a similar time to Boundary Road.

Appendices:

[1](#) Boundary Road Shopping Precinct Beautification - Concept Plan





REPORT: 2020 Dubbo Cycle Club Season

AUTHOR: Senior Traffic Engineer
REPORT DATE: 25 November 2019
TRIM REFERENCE: ID19/1588

EXECUTIVE SUMMARY

This report deals with the approval procedures required for bicycle road races on public roads as detailed in the Roads and Maritime Services' Guidelines for Bicycle Road Races.

Dubbo Cycle Club Inc has requested approval to conduct the 2020 Class 2 competition season for juniors and seniors utilising Sheraton, Benolong, Burroway, Mogriguy, Wongarbon/Westella roads in the Dubbo area; and in the Wellington area, Arthurville, Suntop, Terrabella, River, Hermitage, Comobella roads and Zaias Lane, between 1 January 2020 and 23 December 2020. Event Application and Management Plans are attached to the report (**Appendix 1**). A requirement of the guidelines is that bicycle road races be referred to the Local Traffic Committee for consideration.

It is recommended that the Committee concur with the events as proposed, and conditioned by Council, and the NSW Police in accordance with the Guidelines for Bicycle Road Races.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION TO THE LOCAL TRAFFIC COMMITTEE

1. That the application of the Dubbo Cycle Club Inc Racing Season 2020 between 1 January 2020 and 23 December 2020, be approved and undertaken in accordance with the Event and Traffic Management Plan as conditioned by the NSW Police and the following conditions of Dubbo Regional Council:
 - a. Sheraton Road - Southern section of Sheraton Road for Junior Racing commencing at the end of the 40/60 km/h School Zone speed signs (south of St Johns College), south for a distance of 1.9 km and return on Sundays between 1 pm and 4.30 pm.
 - b. Burroway Road - Commencing 500 m west of the Newell Highway at Brocklehurst for 18 km to 200 m east of Rawsonville Bridge Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - c. Mogriguy Road - Time trial course commencing 650 m north of the Mendooran Road intersection for a distance of 10.5 km to Mogriguy Village. Long course

- commencing 650 m north of the Mendooran Road intersection for 19 km with turnaround being 5.1 km north of the Coolbaggie Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
- d. Wongarbron - Wongarbron/Westella roads - short course, commencing in Barbigal Street 100 m north of Derribong Street for a distance of 15 km being 175 m east of the Westella Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm. Long course along Westella Road and Ballimore/Geurie roads for 25 km to a turnaround 550 m south of the Golden Highway and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - e. Benolong Road - Sprint course start and finish is on Nubingerie Road 1.2 km south of the Benolong Road intersection (adjacent the Benolong Rural Fire Brigade) then west on Benolong Road to a turnaround 300 m east of the Wambangalang Creek Bridge on Saturdays between 1 pm and 5 pm or Sundays between 8 am and 4 pm.
 - f. South Geurie - Arthurville Road - Short course, commencing 400 m south of the bridge over the Macquarie River for a distance of 15 km to a turnaround 600 m north-east of the intersection of Hermitage and Arthurville roads, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - g. South Geurie – Arthurville Road - Middle course, commencing 400 m south of the bridge over the Macquarie River for a distance of 21 km with the turnaround point being 3.2 km on Suntop Road east of the intersection with Arthurville Road, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - h. South Geurie - Arthurville Road - Long course commencing 400 m south of the bridge over the Macquarie River for a distance of 30 km to a turnaround 3.8 km on Suntop Road west of the intersection of Renshaw-McGirr Way, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - i. South Geurie - Terrabella Road - Time trial course, commencing 2.1 km west of the intersection of Terrabella and Arthurville roads for a 6.4 km distance to a turnaround being 1.3 km east of the bridge over Little River, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - j. South Geurie - Arthurville Road - Strada long loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 50.3 km incorporating River Road 10.6 km, Zaias Lane 3 km, Bennetts Road 6.5 km, Suntop Road 9 km, Arthurville Road 2.2 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish line, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - k. South Geurie - Arthurville Road - Strada short loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 42 km incorporating Arthurville Road 4.3 km, River Road 10.6 km, Zaias Lane 8.1 km, Arthurville Road 4.5 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish, on Saturdays between 1 pm and 5 pm, or on Sundays between 8 am and 4 pm.
 - l. North Geurie - Comobella Road, commencing 0.25 km north from the intersection of Paxton and Fitzroy streets for 13 km to a turnaround 0.15 km west of Cobbora Road, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.

- m. The approval for use of the roads will alternate between locations in accordance with the nominated block dates.
2. That Dubbo Cycle Club shall provide a calendar of proposed race events at two (2) monthly intervals before commencement of the first event.
3. That the submission of Traffic Control Plans to Council for approval be submitted a minimum of three (3) weeks prior to the first event. All traffic control measures contained in the Plan are to be in accordance with Australian Standard AS 1742.3, the Road and Maritime Services NSW Guidelines for Bicycle Road Races and the Traffic Control at Worksites Technical Manual prepared by an accredited person.
4. That all traffic control including the placement and removal of barricades and/or regulation of traffic is to be carried out by traffic controllers appropriately trained in accordance with the requirements of Australian Standard AS1742.3 and the Roads and Maritime Services accreditation requirements for Traffic Control Planners or Controllers as required. In this respect there is a requirement that traffic controllers and not marshals are to be provided at the start/finish and turnaround to stop all traffic whilst riders are:
 - a. Starting and finishing within a 60 km/h or less speed zone.
 - b. Assembled on the road carriageway immediately prior to a mass or staggered start.
 - c. Undertaking the turnaround movement.
 - d. Sprint to the finish line.
5. That the NSW Police consent and conditions for bicycle races permit under the NSW Road Transport Act 2013, Section 115 is required with documented evidence submitted to Council.
6. That the Council's Executive Manager Governance and Internal Control must sight a copy of the Public Liability Insurance Policy for a minimum amount of \$20 million on which Dubbo Regional Council and NSW Police are specifically noted to be indemnified against any action resulting from the cycle race.
7. That the applicant is to submit to Council all the appropriate documentation required accepting the above conditions before final approval is granted.
8. That the approval is for a 12 month period commencing at the time final authorisation of all documentation is granted.

LOCAL TRAFFIC COMMITTEE CONSIDERATION

This matter was considered by the Local Traffic Committee at its meeting held on Monday, 25 November 2019. The Committee had unanimous support in the adoption of the recommendation.

RECOMMENDATION

1. That the application of the Dubbo Cycle Club Inc Racing Season 2020 between 1 January 2020 and 23 December 2020, be approved and undertaken in accordance with the Event and Traffic Management Plan as conditioned by the NSW Police and the following conditions of Dubbo Regional Council:
 - a. Sheraton Road - Southern section of Sheraton Road for Junior Racing commencing at the end of the 40/60 km/h School Zone speed signs (south of St Johns College), south for a distance of 1.9 km and return on Sundays between 1 pm and 4.30 pm.
 - b. Burroway Road - Commencing 500 m west of the Newell Highway at Brocklehurst for 18 km to 200 m east of Rawsonville Bridge Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - c. Mogriguy Road - Time trial course commencing 650 m north of the Mendooran Road intersection for a distance of 10.5 km to Mogriguy Village. Long course commencing 650 m north of the Mendooran Road intersection for 19 km with turnaround being 5.1 km north of the Coolbaggie Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - d. Wongarbon - Wongarbon/Westella roads - short course, commencing in Barbical Street 100 m north of Derribong Street for a distance of 15 km being 175 m east of the Westella Road intersection and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm. Long course along Westella Road and Ballimore/Geurie roads for 25 km to a turnaround 550 m south of the Golden Highway and return on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - e. Benolong Road - Sprint course start and finish is on Nubingerie Road 1.2 km south of the Benolong Road intersection (adjacent the Benolong Rural Fire Brigade) then west on Benolong Road to a turnaround 300 m east of the Wambangalang Creek Bridge on Saturdays between 1 pm and 5 pm or Sundays between 8 am and 4 pm.
 - f. South Geurie - Arthurville Road - Short course, commencing 400 m south of the bridge over the Macquarie River for a distance of 15 km to a turnaround 600 m north-east of the intersection of Hermitage and Arthurville roads, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - g. South Geurie – Arthurville Road - Middle course, commencing 400 m south of the bridge over the Macquarie River for a distance of 21 km with the turnaround point being 3.2 km on Suntop Road east of the intersection with Arthurville Road, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - h. South Geurie - Arthurville Road - Long course commencing 400 m south of the bridge over the Macquarie River for a distance of 30 km to a turnaround 3.8 km on Suntop Road west of the intersection of Renshaw-McGirr Way, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - i. South Geurie - Terrabella Road - Time trial course, commencing 2.1 km west of the intersection of Terrabella and Arthurville roads for a 6.4 km distance to a turnaround being 1.3 km east of the bridge over Little River, on Saturdays

- between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
- j. South Geurie - Arthurville Road - Strada long loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 50.3 km incorporating River Road 10.6 km, Zaias Lane 3 km, Bennetts Road 6.5 km, Suntop Road 9 km, Arthurville Road 2.2 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish line, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - k. South Geurie - Arthurville Road - Strada short loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 42 km incorporating Arthurville Road 4.3 km, River Road 10.6 km, Zaias Lane 8.1 km, Arthurville Road 4.5 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish, on Saturdays between 1 pm and 5 pm, or on Sundays between 8 am and 4 pm.
 - l. North Geurie - Comobella Road, commencing 0.25 km north from the intersection of Paxton and Fitzroy streets for 13 km to a turnaround 0.15 km west of Cobbora Road, on Saturdays between 1 pm and 5 pm, or Sundays between 8 am and 4 pm.
 - m. The approval for use of the roads will alternate between locations in accordance with the nominated block dates.
2. That Dubbo Cycle Club shall provide a calendar of proposed race events at two (2) monthly intervals before commencement of the first event.
 3. That the submission of Traffic Control Plans to Council for approval be submitted a minimum of three (3) weeks prior to the first event. All traffic control measures contained in the Plan are to be in accordance with Australian Standard AS 1742.3, the Road and Maritime Services NSW Guidelines for Bicycle Road Races and the Traffic Control at Worksites Technical Manual prepared by an accredited person.
 4. That all traffic control including the placement and removal of barricades and/or regulation of traffic is to be carried out by traffic controllers appropriately trained in accordance with the requirements of Australian Standard AS1742.3 and the Roads and Maritime Services accreditation requirements for Traffic Control Planners or Controllers as required. In this respect there is a requirement that traffic controllers and not marshals are to be provided at the start/finish and turnaround to stop all traffic whilst riders are:
 - a. Starting and finishing within a 60 km/h or less speed zone.
 - b. Assembled on the road carriageway immediately prior to a mass or staggered start.
 - c. Undertaking the turnaround movement.
 - d. Sprint to the finish line.
 5. That the NSW Police consent and conditions for bicycle races permit under the NSW Road Transport Act 2013, Section 115 is required with documented evidence submitted to Council.
 6. That the Council's Executive Manager Governance and Internal Control must sight a copy of the Public Liability Insurance Policy for a minimum amount of \$20 million on which Dubbo Regional Council and NSW Police are specifically noted to be indemnified against any action resulting from the cycle race.

7. That the applicant is to submit to Council all the appropriate documentation required accepting the above conditions before final approval is granted.

Dennis Valentine
Senior Traffic Engineer

REPORT

The Roads and Maritime Services Guidelines for Bicycle Road Races provides a comprehensive overview of the approval process and requirements of statutory bodies and the cycling organisation. An approval by the NSW Police under Section 115 of the Road Transport Act 2013 is required to conduct a cycle race on public roads. The measures set down in this document explain to the applicants how to make application and the minimum expectations for managing traffic and conducting a cycle race. Bicycle road races are categorised into a Class 1 and 2 events with the differentiation being that one impacts on major traffic transport systems and the other does not.

Dubbo Cycle Club Inc has submitted a comprehensive Event and Traffic Management Plan (**Appendix 1**) with the request for the use of Sheraton, Benolong, Burroway, Mogriguy and Wongarbon/Westella roads in the Dubbo area and in the Wellington area Arthurville, Suntop, Terrabella, River, Hermitage, Comobella roads and Zaias Lane to undertake its 2020 Competition Racing Season. It is categorised as a Class 2 event with the course details provided as follows:

Junior Competition

The junior competition is held in the southern section of Sheraton Road, the course commences at the 40/60 km/h School Zone speed zone signs south of St Johns College, then south for a distance of 1.9 km and return. Competition is undertaken on Sundays between 1 pm and 4.30 pm from 1 January 2020 to 23 December 2020. For the past eight seasons the local residents and quarry development have supported the Club's program with no adverse impact on access. More recently there have been two new developments in Sheraton Road, adjacent to the existing quarry, being a solar farm and a second quarry. Due to the nature of the developments there is no expected road safety impact on the junior competition.

Senior Competition

The senior competition will be run on either Saturdays between 1 pm and 5 pm, or on Sundays between 8 am and 4 pm, from 1 January 2020 to 23 December 2020 on the following courses:

- Mogriguy Road - Commencing 650 m north of Mendooran Road for a course distance of 10.5 km (time trial) to Mogriguy Village and 19 km (long course) with turnaround being 5.1 km north of Coolbaggie Forest Road and return.
- Burroway Road - Commencing 500 m west of Newell Highway for a distance of approximately 18 km to 200 m east of the Rawsonville Road intersection and return.
- Wongarbon/Westella road - Commencing on Barbigal Street 100 m north of the intersection with Derringbong Street for a distance north of 15 km (short course) and approximately 25 km (long course) along Westella Road and Ballimore/Geurie road, to a turnaround 550 m south of the Golden Highway intersection and return.
- Benolong Road – Sprint course commencing on Nubingerie Road 1.2 km south of Benolong Road then north along Nubingerie Road, and west in Benolong Road for a

distance of 10.5 km to the turnaround, being 300 m east of Wambangalang Creek Bridge.

- South Geurie - Arthurville Road - Short course, commencing 400 m south of the bridge over the Macquarie River for a distance of 15 km to a turnaround 600 m north-east of intersection of Hermitage Road.
- South Geurie – Arthurville Road - Middle course, commencing 400 m south of the bridge over the Macquarie River for a distance of 21 km with the turnaround point being 3.2 km on Suntop Road east of the intersection with Arthurville Road.
- South Geurie - Arthurville Road - Long course commencing 400 m south of the bridge over the Macquarie River for a distance of 30 km to a turnaround 3.8 km on Suntop Road west of the intersection of Renshaw-McGirr Way.
- South Geurie - Terrabella Road - Time trial course, commencing 2.1 km west of the intersection of Terrabella and Arthurville roads for a 6.4 km distance to a turnaround being 1.3 km east of the bridge over Little River.
- South Geurie - Arthurville Road - Strada long loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 50.3 km incorporating River Road 10.6 km, Zaias Lane 3 km, Bennetts Road 6.5 km, Suntop Road 9 km, Arthurville Road 2.2 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish line.
- South Geurie - Arthurville Road - Strada short loop, commencing 400 m south of the bridge over the Macquarie River on Arthurville Road for a distance of 42 km incorporating Arthurville Road for a distance of 4.3 km, River Road 10.6 km, Zaias Lane 8.1 km, Arthurville Road 4.5 km, Hermitage Road 11.9 km, Terrabella Road 0.35 km, Arthurville Road 2.9 km to the finish.
- North Geurie - Comobella Road, commencing 0.25 km north from the intersection of Paxton and Fitzroy streets for 13 km to a turnaround 0.15 km west of Cobbora Road.
- All the roads within the Dubbo and Wellington area are considered low trafficked roads with minimal impact on the road network.

The Club will provide Council a full racing calendar prior to January 2020 and at two monthly intervals before the first event.

Bicycle races of a repetitive nature can be approved on a 12 monthly basis. Conditions applicable to a cycle race of a minor impact can be undertaken in consultation with the NSW Police and/or Roads and Maritime Services as considered necessary and dependant on the road classification and class of the event. The process can be managed under delegated authority, however referral and concurrence of the Traffic Committee is required in accordance with the Cycle Race Guidelines.

General conditions that apply to organisations to conduct cycle races include compliance with the road rules, provision of traffic management and traffic control plans prepared by accredited persons, together with accredited traffic controllers, as considered necessary in respect of the road race permit from the NSW Police and public liability insurance. The Club has undertaken traffic control training and now has some 13 accredited traffic controllers.

It is recommended that approval be granted to the Dubbo Cycle Club to conduct the 2020 Racing Season on the nominated roads within the Dubbo and Wellington area in accordance with the Event and Traffic Management Plan as conditioned by the NSW Police and Council.

Appendices:

- 1  2020 Dubbo Cycle Club Application and Associated Documents



APPLICATION BY DUBBO CYCLE CLUB TO CONDUCT CYCLE RACES IN THE WESTERN PLAINS REGIONAL COUNCIL AREA DURING 2020.

1. INTRODUCTION

The Dubbo Cycle Club is an incorporated club and seeks approval to conduct Class 2 Club level cycling events on various roads in the Dubbo Regional Council area.

EVENTS

The events would be conducted on Saturday afternoons between the hours of 1.00pm and 5.00pm or Sunday mornings between the hours of 8.00am and 4.00pm from 1st January to 23rd December 2020 (inclusive). These events would take place on the roads nominated on the days listed as per forwarded calendar table, 1-month before and in 2-month blocks as a minimum.

Junior course at Sheraton Road on Sunday's 1.00pm to 4.30pm.

Mogriguy Time Trial course

10.5 km from start line to the turn point. Start and finish line is 650m north on Mogriguy road from the intersection with Mendooran road. The turn point is 180m south on Mogriguy road from the intersection with Moonul street Mogriguy.

Mogriguy course

19 km from start line to the turn point. Start and finish line is 650m north on Mogriguy road from the intersection with Mendooran road. Turn point closest intersection is 5.1 km north of turn point which is Mogriguy road and Coobaggi Forrest road.

Burraway course

17.5 km from start line to turn point. Start line and finish line is on the Burraway road 500m west of the intersection with the Newell Hwy. The turn point is 200m east on Burraway from the intersection with Rawsonville Bridge road.

Benolong road sprint course

10.5 km from start line to the turn point. Start line and finish line is on Nubingenie road adjacent to the Benolong Rural Fire Brigade shed 1.2km south of the intersection with Benolong road and Terrabella road. Turn point is 300m east of Wambangalong Creek bridge on Benolong road.

Wongarbon short course

15km from start line to the turn point. Start line is 100m north on Barbical street from the intersection with Derribong street, with the finish line 300m north on Barbical street from the intersection with Derribong street. The turn point is 175m east of the T intersection on Westella road.

Wongarbon long course

25 km from start line to the turn point. Start line is 100m north on Barbical street from the intersection with Derribong street, with the finish line 300m north on Barbical street from the



intersection with Derribong street. The turn point is 550m south on the Westella road from the intersection with Golden Hwy (Cobboza road).

Sheraton Road south (junior course)

The start point is at The End of School zone sign south of St Johns high school entrance and is 1.9 km from the start line to the turn point which is a dead end when the races are conducted on Sunday afternoons.

South Geurie short course.

15 km from start line to turn point. Start line and finish line is 400m south of the bridge over the Macquarie river on the Arthurville road and 2.8 km north of the intersection with Terrabella road. The turn point is 600m north east of the intersection of Arthurville road and Hermitage road.

South Geurie middle course

21 km from start line to turn point. Start line and finish line is 400m south of the bridge over the Macquarie river on the Arthurville road and 2.8 km north of the intersection with Terrabella road. The turn point is 3.2 km on the Suntop road east of the intersection with Arthurville road.

South Geurie long course

30 km from start line to the turn point.

Start line and finish line is 400m south of the bridge over the Macquarie river on the Arthurville road and 2.8 km north of the intersection with Terrabella road. Turn point is 3.8 km on the Suntop road west of the intersection with Renshaw-McGirr way.

South Geurie (Terrabella Road) Individual Time Trial Course

6.4 km from start line to the turn point. Start line and finish line is 2.1 km west of the intersection of Terrabella road and Arthurville road. The turn point is 1.3 km east of the bridge over the Little River on Terrabella road.

South Geurie strada loop (long) 50.3klms

Start line and finish line is 400m south of the bridge over the Macquarie river on the Arthurville road and 2.8 km north of the intersection with Terrabella road. The loop turns left onto River Road at 4.3klms from the start line and travels river road for 10.6klm to the intersection with Zaia's lane, turning right on to Zaia's Lane and travel 3klms to the intersection with Bennetts Road, turning left on to Bennett's Road and travelling 6.5klm to the intersection of Suntop Road and turning right and travel 9klms to the intersection with Arthurville Road and turn right onto Arthurville Road and travel 2.2klms to the cross roads of Arthurville, Little River and Hermitage Roads, continuing onto Hermitage Road and travel 11.9klm to Terrabella Road and turn right and travel 350 metres to the Arthurville Road and turn left and travel 2.9klm to the finish line on Arthurville Road 400metres before the Macquarie river on the Arthurville Road.



Victoria Park, Darling St Dubbo
A.B.N. 801 492 731 94

South Geurie strada loop (short) 42klm

Start line and finish line is 400m south of the bridge over the Macquarie river on the Arthurville road and 2.8 km north of the intersection with Terrabella road. The loop turns left onto River Road at 4.3klms from the start line and travels river road for 10.6klm to the intersection with Zaias lane, tuning right on to Zaias Lane and travel 8.1klm to the intersection of Arthurville Road turn left on to Arthurville Road and travel 4.5klm to the cross roads of Arthurville, Little River and Hermitage Roads, continuing onto Hermitage Road and travel 11.9klm to Terrabella Road and turn right and travel 350 metres to the Arthurville Road and turn left and travel 2.9klm to the finish line on Arthurville Road 400metres before the Macquarie river on the Arthurville Road.

North Geurie

13 km from start line to the turn point. Start line is 250m north from the intersection of Paxton street and Fitzroy street, with the finish line 500m north of Paxton street and Fitzroy street Geurie. The turn point is 150m on the Commabella road west of the intersection with Cobbora road.

It should be noted that the roads used during Eastern Standard Time are quiet rural roads with very little vehicular traffic on Saturday afternoons and Sunday mornings at the times indicated. A calendar has not been included at this stage. However, the Club will provide Council with a calendar at two (2) monthly intervals and before the first event. A full calendar will be ready by January 1st at <http://www.dubbocycleclub.com.au/Calendar.html>



2. NATIONAL TRANSPORT REGULATIONS

The Club is aware of the need to comply with the National transport regulations. In particular, we are cognisant of the requirement for consideration of public safety, convenience and consultation when conducting cycling events on public roads. In this regard, the Club believes that from experience gained over a number of years in conducting road events, combined with the process of consultation with State and Local Government authorities and the Police, we have sufficiently considered all potential risks and control measures when conducting cycle events.

3. PUBLIC SAFETY AND CONVENIENCE

The Club has comprehensive Insurance Cover of which will be provided.

- a) Safety for both cyclists and road users are the paramount criteria when choosing venues and when conducting events. The proposed courses have been designed to minimise the number of intersections and turning points involved. There are no crossroads. Start/finish and turn points have been chosen to ensure minimum sight lines of 200m for other road users.
- b) There are no road closures required nor crossroads involved, and as noted above, the courses are on roads through rural areas carrying minimal traffic and cycling will not impinge upon residential amenity.
- c) The Club's commitment to rider safety is evidenced by the use of instructions read to riders prior to the start of an event to ensure all possible action is taken to maintain rider and public safety.
- d) RTA standard approved road signs displaying the words "CYCLISTS RACE IN PROGRESS" will be placed at strategic locations on the course to warn motorists approaching from either direction of the work site areas of start/finish and at the turn around point.

There will be work site traffic signs appropriate for the event being held placed at the start/finish area and turn point to inform approaching traffic of the event and reduced speed limits in place for the mentioned areas, the signs will be set out as per the TCP supplied by Dubbo Traffic Control and implemented by suitably qualified persons, there is also provisions to have traffic controllers in place if the need arises due to unexpected high traffic movements at the locations being used. Each location will have a SWMS for Erecting Temporary Traffic Control and if needed Traffic Control plus Site Specific Risk Assessment carried out by suitably qualified persons.

Signs will be placed at other points on the course. Escort vehicles, with signage, 2 flashing amber dome lights and UHF radio communication between vehicles, will precede and follow the riders.

- e) One qualified club member will be rostered as Commissaire (Referee), and another club member will be rostered as race Marshal for each event to ensure all requirements are carried out prior to and during the event. A senior and experienced club member who holds a current driver's licence will be stationed at the Start/Finish line, and at the turn around point to ensure cyclists are stopped if there is the likelihood of a rider interfering with vehicular traffic.



- f) Commissaire, Marshals and cyclist Controllers will be people with detailed knowledge and experience regarding the venue.
- g) The Commissaire will not permit any event to commence unless the required vehicles and signs are in place. The turn-around Controller will be in place well before cyclists reach the point.
- h) The Commissaire, Marshal and cyclist Controllers will wear identifiable safety vests and have a red flag to warn cyclists to stop if deemed necessary.
- i) Marshals clearly understand the road rules and if necessary, will slow down and/or stop cyclists to give priority to other road users at turning points or Start/Finish lines.
- j) UHF radios are to be used for communication between lead and follow cars.
- k) Our cyclists and officials are all experienced in riding on open roads for both racing and recreation and have developed considerable bike handling skills and a keen sense of road traffic awareness when turning or when being overtaken by vehicles.
- l) All cyclists will be instructed to stay on the left-hand side of the left hand carriage-way on all roads to enable vehicles to overtake in a safe manner. Any cyclist who crosses the road centre-line is automatically disqualified from the event and the Club officials may take further disciplinary action.
- m) The venues have been chosen to provide off-road parking at the Start/Finish area to ensure unhindered progress of other road users.
- n) Club members are aware of their responsibilities to avoid damage to local flora and fauna and the need to preserve the area as per government requirements.
- o) Any rubbish will be removed from the Start/Finish area and riders are forbidden to litter roadways during events.

4. SUMMARY

We endeavour at all times to foster a positive response to cycling in general from the local community, and we are willing to participate in any proposal that will further this cause. The Club requests that you give a favourable response to this submission.

The Locality maps together with start/finish and turnaround point diagrams, List of equipment, Traffic management plan, SWMS for Erecting Temporary Traffic Control and if needed Traffic Control. Site Risk Assessment Guidelines. Chief Marshal/Duty Official, Marshal's duties, Instructions to riders, and Insurance Certificate of Currency are in the attachments with this application.



LIST OF ATTACHMENTS

Attachments other than this application.

- Safe Work Method Statement
- Site Specific Risk Assessment and Site Record Sheet.
- Generic TCP Traffic Control Plan.
- Site Specific TCP Traffic Control Plan.
- Locality Maps of 2020 courses.
- Special Event Transport Management Plan Template.
- 2020 Road Risk Management Plan.
- Emergency and/or Accident Procedure (Non-First Aid)
- List of Equipment.
- Certificate of currency Insurance.



TRAFFIC MANAGEMENT PLAN

Courses

Mogriguy/Eumungerie Road, Burraway Road, Benolong Road and Wongarbon/Westella Road, Benolong Road, Sheraton Road, Geurie South, Geurie North and Terrabella Road,

South Geurie Strada loop (long and short).

Locations.

As per locality maps attached. Appropriate signage will be put in place at strategic points on the courses. These are indicated on the Start/Finish and Turn Around Point diagrams, to warn other road users of the presence of cyclists.

Car Parking

Competitors will park on the verge in the vicinity of, but well clear of the Start/Finish line. The road at each location has plenty of parking area, clear of the roadway. There are sight lines in excess of 150m in each direction.

Times

The events on the Mogriguy/Eumungerie Road, Burraway Road, and Wongarbon/Westella, Benolong Road, Sheraton Road, Geurie South, Geurie North, Terrabella Road, South Geurie Strada loop (long and short). Roads, will be on Saturdays between 1.00pm and 5.00pm OR Sunday's 8.00am and 2.00pm.

Sheraton Road Sundays 1.00pm to 4.30pm.

Saturdays between 1.00pm and 5.00pm, Sunday mornings 7.30am to 1.00pm or Sunday afternoons 2.00pm to 5.00pm.

Traffic Management.

SEE ATTACHED DOCUMENTS OF

- Traffic Control Plans (TCP's)
- Site Specific Risk Assessment and Site Record Sheet
- Safe Work Method Statement (SWMS)
- For: Erecting temporary traffic control and Traffic control.



The Riders.

The riders will be briefed on the start line to:

- (a) Adhere to the general road rules. In particular NOT to cross the centre line.
- (b) Ride no more than two abreast, stay in the LEFT lane and generally keep left.
- (c) To alert the group of any vehicles approaching from the rear.
- (d) To give way to other vehicular traffic and allow it to pass safely.

Escort Vehicles.

Escort vehicles with signage, flashing hazard lights and 2 rotating amber lights, UHF radio, mobile 'phone and First Aid kit will lead and follow riders.

GUIDE LINES FOR CHIEF MARSHAL/DUTY OFFICIALS and Traffic Control Persons

Your Priorities.

- a) Safely and effectively run events for riders.
- b) Cause minimum inconvenience to other road users.
- c) Comply with the Road Traffic legislation.

Prior to each Event.

- (a) Confirm which course is to be used.
- (b) Familiarise yourself with the NSW POLICE CONDITIONS for cycling events and the relevant Traffic Management Plans and ensure they are in place and ready before hand.
- (c) Familiarise yourself with the Emergency Procedures which layout exactly what you should do in the event of an accident at your event.
- (d) Ensure that the grading/handicap details have been updated and will be available at Sign On table.
- (e) Confirm that all signs, UHF radios, etc., as per Equipment List attached, will be at the event. Ensure any batteries are charged.

Prior to Event Start.

- (a) Confirm course length.
- (b) Confirm starting order and times from the handicapper.
- (c) If there is any doubt that the event will continue safely e.g., inclement weather, road works, traffic conditions, lack of marshals, etc., - discuss with committee members.
- (d) Brief Marshals and Traffic Controllers on their locations, communication ('phone, radio use), positioning of warning signs, Accident Management guidelines.
- (e) Ensure escort vehicles are equipped with radios, signs, and flashing beacons, and that the drivers know the procedure

NOTE:

Only club members who hold a current driver's licence can act as Marshals. If the minimum numbers of marshals or traffic control personnel are not available the event is to be cancelled.



- (a) Ensure all marshals are familiar with Marshal's Duties. Marshals' must have read a copy of the NSW Police Conditions.
- (b) Besides the UHF radios, ensure officials have road worker's safety vests, red flags, TCP's are in place traffic cones and cyclist race signs to be positioned along the course.
- (c) Assign a location to each Marshal and explain particular responsibilities associated with that location, e.g., positioning of warning signs.
- (d) Brief all Marshals on limits of responsibility. Stress that if necessary, they are to stop riders to ensure other road are safe while using the roads.
- (e) Instruct the Marshal at the turn around point not to leave the location until the last rider has passed that point and to follow that rider back to the Start/Finish point, picking up, if necessary, any riders who have pulled out, or are unable to continue.

Communications.

Issue UHF radios to drivers and brief them on its operation.

Sign on Table Procedures.

- (a) Ensure the following are available: Rider numbers (if necessary), Sign-on sheet, visitor's book, cash tin/bag.
- (b) Ensure all riders are financial Dubbo Cycle Club members and/or hold a current Cycling Australia race licence. This is particularly important for insurance purposes, especially at the start of each year. **NO LICENCE, NO RIDE.**
- (c) Ensure any visiting riders are registered in the Visitor's Book, so they can be followed up after the event.



Guidelines for Marshalls.

Start line procedure.

- (a) Call grades/handicap groups to the starting line in agreed starting order.
- (b) Remind all riders waiting start to stay off the road. Ensure other traffic is safely managed and not inconvenienced.
- (c) Conduct a roll call of all riders for each grade/handicap group to ensure all are present at start to hear briefing and introduce any visitors to the bunch.
- (d) Brief each grade/group of riders on course details and safety issues, i.e:-
Total distance.

Crossing of centre line, if observed or reported, will result in **DISQUALIFICATION**. Urge riders to remind each other of this beforehand in a briefing and during the event.

Location of turn around point.

Location of any known hazards – road works, gravel/sand patches, bad potholes, causeways, etc.

Keep to the left-hand side of the left-hand carriageway to enable any following vehicle to overtake the group safely. Riders at the rear of a group/bunch are to warn riders ahead of vehicles approaching from behind.

After the Event.

- (a) Ensure all road signs and traffic cones have been retrieved from the course.
- (b) Ensure site is left in a clean and tidy state. All rubbish to be properly disposed of in public rubbish bins (if available at site), or else returned to Club members' homes and disposed of there.



MARSHALS' DUTIES.

*The **SAFETY** of riders and other road users is your primary concern.*

Equipment.

Work site traffic control signs for TCP implementation

Reflective "Road Worker" vests.

Traffic Cones.

Vehicle signs, amber beacons

Red flag.

Warning Signs "warning cyclists ahead"

UHF radio and/or mobile phone.

Obtain briefing from Chief Marshal/Duty Official.

Safety, locations, warning signs, timing, radio use, emergency procedures per the **Accident Management Guidelines**.



INSTRUCTIONS TO RIDERS BEFORE EACH EVENT.

- TODAYS RACE WILL BE RUN IN ACCORDANCE WITH DUBBO CYCLE CLUB RULES, AND THE REQUIREMENTS OF OUR RACE PERMITS.
- YOU ARE REMINDED THAT WE ARE RACING ON OPEN ROADS, AND THAT CROSSING THE CENTRE OF THE ROAD WILL NOT BE TOLERATED.
- RIDE NO MORE THAN TWO ABREAST, STAY IN LEFT LANE AND GENERALLY KEEP LEFT.
- ALERT THE GROUP OF ANY VEHICLES APPROACHING FROM THE REAR.
- GIVE WAY TO OTHER VEHICULAR TRAFFIC, AND ALLOW IT TO PASS SAFELY.
- YOU MUST OBEY THE INSTRUCTIONS OF THE REFEREE, MARSHALS AND OFFICIALS, AND IF ASKED TO STOP, YOU MUST DO SO.
- UNOFFICIAL PRIVATE VEHICLES ARE NOT PERMITTED TO FOLLOW, AND ANY VIOLATION WILL RESULT IN THE RIDER BEING PENALISED
- PUBLIC URINATION WILL NOT BE TOLERATED, AND OFFENDERS WILL BE PENALISED.
- ANY RIDER WITHDRAWING FROM THE RACE IS ASKED TO ADVISE AN OFFICIAL SO WE CAN ACCOUNT FOR ALL RIDERS AT THE FINISH.
- RIDERS ARE REMINDED TO CLAIM PLACINGS.
- FOLLOWING THE ABOVE, GIVE DETAILS OF ANY DANGER SPOTS, ETC TO THE
- RIDERS IN EACH GROUP.

Regards,
Mathew Gilbert
President
Ph: 0400894512
president@dubbocycleclub.com.au
www.dubbocycleclub.com.au

Special Event Resources

Special Event Transport Management Plan

Refer to [Chapter 7](#) of the Guide for a complete description of the Transport Management Plan

1. EVENT DETAIL

1.1. Event Summary

Event Name: Dubbo Cycle Club Road Racing

Event Location: As per attachment locality maps

As per Calendar Sat 1pm Sat 5pm
Event Date: Avail 1/1/20 Event Start Time: Sun 1pm Event Finish Time: Sun 5pm

Event Setup Time: 2.5hrs prior Event Pack down Finish Time: 30min after

Event is ☐ off-street ☐ on-street moving ☐ on-street non-moving

Event is ☒ held regularly throughout the year (calendar attached)

1.2. Event Summary

Event Organiser*: Dubbo Cycle Club

Phone: _____ Fax: _____ Mobile: 0400894512

Email: president@dubbocycleclub.com.au

Event Management Company (if applicable): _____

Phone: _____ Fax: _____ Mobile: _____

Email: _____

Police: _____

Phone: _____ Fax: _____ Mobile: _____

Email: _____

Council: DUBBO REGIONAL COUNCIL

Phone: _____ Fax: _____ Mobile: _____

Email: _____

Transport Management Centre

(if Class 1 – Sydney Metropolitan Area): _____

Phone: _____ Fax: _____ Mobile: _____

Email: _____

Roads & Maritime Service

(if Class 1 – regional NSW and Class 2 event): _____

Phone: _____ Fax: _____ Mobile: _____

Email: _____

*Note: The Event Organiser is the person or organisation in whose name the Public Liability Insurance is taken out.

SPECIAL EVENT GUIDE

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To undertake Cycle Racing on the roads listed on the locality maps as per calendar that will be provided in a minimum of 2 months blocks if changed and available on January 1st.

Either on Saturday afternoons Sunday afternoons from 1st of January 2019 to December 31st 2019

2. RISK MANAGEMENT TRAFFIC

<div>Class 1</div> <div>Class 2</div> <div>Class 3</div>	2.1. Occupational Health & Safety – Traffic Control
	<input checked="" type="checkbox"/> Risk assessment plan (or plans) attached
	2.2. Public Liability insurance
	<input checked="" type="checkbox"/> Public liability insurance arranged. Certificate of currency attached.
	2.3. Police
	<input type="checkbox"/> Police written approval obtained
	2.4. Fire Brigades and Ambulance
	<input type="checkbox"/> Fire brigades notified
	<input type="checkbox"/> Ambulance notified

3. TRAFFIC & TRANSPORT MANAGEMENT

<div>Class 1</div> <div>Class 2</div> <div>Class 3</div>	3.1. The route or location
	<input checked="" type="checkbox"/> Map attached
	3.2. Parking
	<input type="checkbox"/> Parking organised – details attached
	<input type="checkbox"/> Parking not required
	3.3. Construction, traffic calming and traffic generating developments
	<input checked="" type="checkbox"/> Plans to minimise impact of construction activities, traffic calming devices or traffic-generating developments attached
	<input type="checkbox"/> There are no construction activities, traffic calming devices or traffic-generating developments at the location/route or on the detour routes
	3.4. Trusts, authorities or Government enterprises
	<input type="checkbox"/> This event uses a facility managed by a trust, authority or enterprise; written approval attached
	<input checked="" type="checkbox"/> This event does not use a facility managed by a trust, authority or enterprise
	3.5. Impact on/or Public Transport
	<input type="checkbox"/> Public transport plans created - details attached
	<input checked="" type="checkbox"/> Public transport not impacted or will not impact event
3.6. Reopening roads after moving events	
<input checked="" type="checkbox"/> This is a moving event - details attached.	
<input checked="" type="checkbox"/> This is a non-moving event. (Fixed points at either end of moving points.)	
3.7. Traffic management requirements unique to this event	
<input checked="" type="checkbox"/> Description of unique traffic management requirements attached	
<input type="checkbox"/> There are no unique traffic requirements for this event	
3.8. Contingency plans	
<input type="checkbox"/> Contingency plans attached	

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3.9. Heavy vehicle impacts

- ☐ Impacts heavy vehicles – RMS/TMC to manage
- ☒ Does not impact heavy vehicles

3.10. Special event clearways

- ☐ Special event clearways required - RMSTMC to arrange
- ☒ Special event clearways not required

4. MINIMISING IMPACT ON NON-EVENT COMMUNITY & EMERGENCY SERVICES



4.1. Access for local residents, businesses, hospitals and emergency vehicles

- ☒ Plans to minimise impact on non-event community attached
- ☐ This event does not impact the non-event community either on the main route (or location) or detour routes

4.2. Advertise traffic management arrangement

- ☐ Road closures or restrictions - advertising medium and copy of proposed advertisements attached
- ☐ No road closures or restrictions but special event clearways in place - advertising medium and copy of proposed advertisements attached
- ☒ No road closures, restrictions or special event clearways - advertising not required

4.3. Special event warning signs

- ☒ Special event information signs are described in the Traffic Control Plan/s
- ☐ This event does not require special event warning signs

4.4. Permanent Variable Message Signs

- ☐ Messages, locations and times attached
- ☒ This event does not use permanent Variable Message Signs

4.5. Portable Variable Message Signs

- ☒ The proposed messages and locations for portable VMS are attached
- ☒ This event does not use portable VMS

5. PRIVACY NOTICE

The "Personal Information" contained in the completed Transport Management Plan may be collected and held by the NSW Police, the NSW Roads & Maritime Services (RMS), Transport Management Centre (TMC) or Local Government.

I declare that the details in this application are true and complete. I understand that:

- The "personal information" is being collected for submission of the Transport Management Plan for the event described in Section 1 of this document.
- I must supply the information under the Road Transport Legislation (as defined in the *Road Transport (General) Act 1999*) and the *Roads Act 1993*.
- Failure to supply full details and to sign or confirm this declaration can result in the event not proceeding.
- The "personal information" being supplied is either my own or I have the approval of the person concerned to provide his/her "personal information".
- The "personal information" held by the Police, RMS/TMC or Local Government may be disclosed inside and outside of NSW to event managers or any other person or organisation required to manage or provide resources required to conduct the event or to any business, road user or resident who may be impacted by the event.
- The person to whom the "personal information" relates has a right to access or correct it in accordance with the provisions of the relevant privacy legislation.

6. APPROVAL

TMP Approved by: _____ Event Organiser _____ Date _____

7. AUTHORISATION TO *REGULATE TRAFFIC

Council's traffic management requirements have been met. Regulation of traffic is therefore authorised for all non-classified roads described in the risk management plans attached to this TMP.

Regulation of traffic authorised by: _____ Council _____ Date _____

The RMS/TMC's traffic management requirements have been met. Regulation of traffic is therefore authorised for all classified roads described in the risk management plans attached to this TMP.

Regulation of traffic authorised by: _____ RMS/TMC _____ Date _____

** "Regulate traffic" means restrict or prohibit the passage along a road of persons, vehicles or animals (Roads Act, 1993). Council and RMS/TMC require traffic to be regulated as described in the risk management plans with the layouts installed under the direction of a qualified person.*

SPECIAL EVENT GUIDE

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Taken from NSW Police website:

[https://www.police.nsw.gov.au/data/assets/pdf_file/0007/275560/Notice of Intention to Hold a Public Assembly.pdf](https://www.police.nsw.gov.au/data/assets/pdf_file/0007/275560/Notice_of_Intention_to_Hold_a_Public_Assembly.pdf)**Summary Offences Act 1988***To the Commissioner of Police*

1 I, Mathew Gilbert
Name
 of 21 CORAL CRESCENT DUBBO
Address
 on behalf of DUBBO CYCLE CLUB
Organisation
 notify the Commissioner of Police that on the From 1/1/2020 to 23/12/2020
Day
 of Saturday Afternoon and Sunday Afternoons
Month/Year

it is intended to hold:

either:

(a) a public assembly, not being a procession, of approximately

30-60
Number persons which will assemble

at The listed locations on locality maps
Place Saturday's 1pm

at approximate Sunday's 1pm am/pm
Time Saturday's 5pm

and disperse at approximately Sunday's 5pm am/pm
Time

or(b) a public assembly, being a procession of approximately
Number

persons which will assemble at
Place

at approximately am/pm
Time

and at approximately am/pm the procession willcommence and shall proceed

Specify route, any stopping places and the approximate duration of any stop: and the approximate time of termination. A diagram may be attached.

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- 2 The purpose of the proposed assembly is.....

 Marshaling of start and finish area for Cycle racing.

 State purpose
- 3 The following special characteristics associated with the assembly would be useful for the Commissioner of Police to be aware of in regulating the flow of traffic or in regulating the assembly:
- * (i) There will be⁴.....(number) of vehicles and/or* floats involved and their type and dimensions are as follows:
 Domestic Motor Car or/and Motorcycle, Lead vehicle

 Commissaries, First Aid vehicle & follow vehicle.


- * (ii) There will be(number) of bands, musicians, entertainers etc entertaining or addressing the assembly

- * (iii) The following number and type of animals will be involved in the assembly

- * (iv) Other special characteristics of the proposed assembly are as follows:

- 4 I take responsibility for organising and conducting the proposed public assembly.
- 5 Notices for the purposes of the *Summary Offences Act 1988* may be served on me at the following:
- Address: 21 CORAL CRESCENT DUBBO N.S.W.

 Post Code..... 2830
- Telephone: 0400 894 512

 Signed: 

 Capacity/Title CLUB PRESIDENT

 Date 31/10/2019

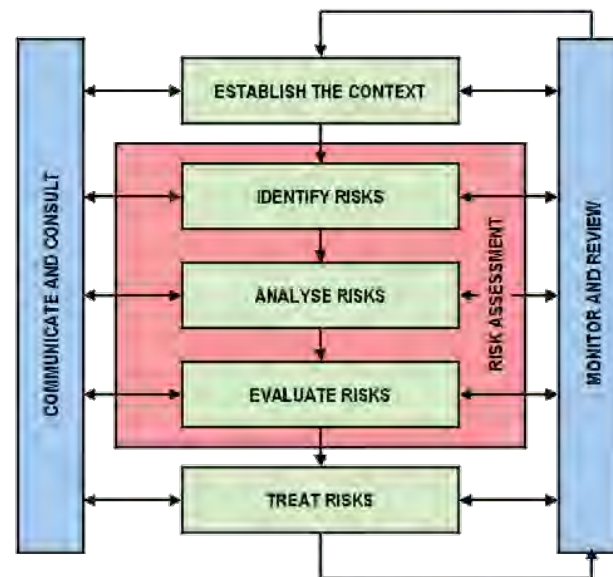
- Delete as applicable



Instructions:

The purpose of this guide is to outline the Australian/New Zealand Risk Management Standard ISO 31000:2009. Your identification of risks and the recommendation of control measures to reduce the level of risk to an acceptable or tolerable level are therefore crucial in the planning process for your on road event

The risk management process consists of a series of steps that, when undertaken in sequence, enable continual improvement in decision-making. The elements of the risk management process are summarised in the following diagram;



What is risk? The Australian/New Zealand Risk Management Standard ISO 31000:2009 describes risk as follows;

Risk is the chance of something happening that will affect objectives – it is measured in terms of event likelihood and consequences.

Risk is measured in terms of;

- Vulnerability (weakness that can be exploited)
- Event Likelihood (frequency)
- Event Consequences (outcome possibilities)

Ask yourself:

- What could happen?
- How could it happen?
- Who could be harmed?
- What could be harmed?
- When could it happen?

The level of risk is determined by considering:

LIKELIHOOD and CONSEQUENCE

The purpose of risk evaluation is to make decisions, based on the outcomes of risk analysis, about which risks need treatment and treatment priorities.

Risks deemed ‘tolerable’ are monitored in accordance with the risk management plan until treatment measures have been implemented.

Once the risks have been identified and rated (Initial Risk level) Treatments (counter measures, Control Measures, Proposed Controls) need to be considered. Treatments must be appropriate to the level and type of risk.

A risk treatment plan (Proposed controls) documents the actions that are proposed to treat the risk. It usually lists the following information:

- Actions to be taken and the risks they address.
- Responsibilities for implementing the plan.
- Resources to be utilised.
- Timetable for implementation.

- Mechanism and Frequency of review.

The design of the risk treatment measures should be based on a comprehensive understanding of the risks concerned; this understanding comes from an appropriate level of risk analysis.

REMEMBER RISK IS IDENTIFIED AS FOLLOWS

$$\text{LIKELIHOOD} \times \text{CONSEQUENCE} = \text{RISK}$$

PROPOSED CONTROLS – What will be put in place

The risk table will provide you with a Risk Rating. This risk rating could be anything from Very Low to Extreme. The proposed controls section of your risk register is where you will outline your recommendations and plans to reduce the risk level if that is possible.

To change the risk level you want to come up with control measures which may do the following in relation to your identified risks;

- **REDUCE THE LIKELIHOOD**
- **REDUCE THE CONSEQUENCES**

Remember that it may not always be possible to reduce the consequences of a risk. Sometimes you can do both. But depending on the risk you have identified you may be only able to implement control measures that will reduce the likelihood.

The following scenario is a good way to think about this concept.

The risk: Death or Serious Injury as a result of crossing a roadway.

A group of 10 people want to cross a roadway. They plan to walk together slowly in a group during afternoon peak when the roadway is very busy. The consequences of this action would mean that most of the group would be killed or seriously injured.

Likelihood: Likely
Consequence: Major
Risk Rating: Extreme

Implementing control measures,

A group of 10 people cross the roadway. They walk in single file with a few seconds space between them. They cross on a pedestrian crossing.
The consequences of this action would mean that if a car doesn't stop, then perhaps only one person will be killed or seriously injured.

Likelihood: Possible
Consequences: Minor
Risk Rating: Low

In both outcomes the consequence is **DEATH or SERIOUS INJURY**. However the control measures have been able to reduce both likelihood and consequences.

If this scenario was only one person wanting to cross the road, the consequences would be the same, it would only be the likelihood that you could change.

Writing up Proposed Control Measures

Control measures should be detailed. They should be specific to the identified risk and be actions that will either reduce the likelihood and/or the consequence of the identified risk. Remember that the risk register is a skeleton on which you are building your operational orders and venue operating plans. The treatment measures should avoid being generic statements. Where possible they should be clear and succinct and not lengthy. You can use dot points or short paragraphs in relation to your proposed controls. Avoid lengthy paragraphs that don't clearly articulate your proposed controls.

Key Risk Management Terms

The following terms and ratings are used in risk management. It is recommended that readers become acquainted with them, to better understand the basis of comments and recommendations made.

Likelihood – A description of how likely a risk is to occur.

Consequences – The harm to, or impact on the organisation's goals.

Controls – The processes that are used to address the identified risks.

Risk – A harmful event that could occur, measured in terms of both its consequences and likelihood.

Risk rating – An overall assessment of a risk, achieved by combining the consequences and the likelihood ratings of a risk. Such rating enables risks of differing consequences and likelihood to be comparatively assessed in terms of the relative seriousness and priority of treatment.

Risk consequence – The outcome of an event. For example the loss, injury, disadvantage or gain. It can be expressed qualitatively or quantitatively.

Risk level – An overall assessment of a risk, achieved by combining the consequences and the likelihood ratings of a risk. Such rating enables risks of differing consequences and likelihood to be comparatively assessed in terms of the relative seriousness and priority of treatment.

Risk likelihood – The probability of a risk occurring.

Risk treatments – See Controls

Qualitative Measure of Consequence

Risk	Consequence	Description
1	Insignificant	No injury
2	Minor	Non lost time injury - disruption to working systems - financial loss - systems review
3	Moderate	Lost time injury - disruption to users - high financial loss-possible litigation, systems review - management concerns
4	<i>Major</i>	Permanent Injury - major loss of service to users - major financial loss - possible litigation and fines - systems review by external agency - possible industrial action - public concern, ministerial media attention
5	Catastrophic	Death - complete loss of service or output - huge financial loss - possible fine and compensation, likely litigation - systems reviewed by external agency - impact on morale - industrial intervention - loss of public support - media attention

2. Qualitative Measure of Likelihood

Risk	Likelihood	Description
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur only in exceptional circumstances

Level of Risk Tolerance

E	Extreme Risk	Not tolerated IMMEDIATE action required to reduce risk
H	High Risk	If elimination is not possible the risk must be constantly monitored by Command staff
M	Moderate Risk	If acceptable monitor using standard operating procedures
L	Low Risk	Manage by routine procedures

Risk Matrix

Based on AS/NZS 4360:2004 and HB 436:2004

Consequences

Likelihood		Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Catastrophic (5)
	Almost Certain (5)	LOW (5)	MEDIUM (10)	HIGH (15)	EXTREME (20)	EXTREME (25)
	Likely (4)	LOW (4)	MEDIUM (8)	HIGH (12)	EXTREME (16)	EXTREME (20)
	Possible (3)	LOW (3)	LOW (6)	MEDIUM (9)	HIGH (12)	HIGH (15)
	Unlikely (2)	VERY LOW (2)	LOW (4)	LOW (6)	MEDIUM (8)	HIGH (10)
	Rare (1)	VERY LOW (1)	VERY LOW (2)	LOW (3)	MEDIUM (4)	MEDIUM (5)

ON ROAD EVENTS RISK REGISTER

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
1	Vehicular Traffic	B	4/5	E	<ul style="list-style-type: none"> • Use of the TCP • Marshall's, • Escorts vehicles • And possibly the riding formation (number of cyclists abreast) etc • Ensure all riders obey all the road rules. • Ensure riders have approved helmets. • Ensure both support vehicles have a first aid kit. • Call emergency services if needed. • Public Liability Insurance obtained 	C	4/5	H
2	Severe Weather Conditions eg Rain – Hail – Heavy Fog - Severe Winds – Excessive Heat encountered at the commencement/during event.	C	3	M	<ul style="list-style-type: none"> • Check Weather forecasts. • Advise riders of any adverse weather conditions. • Keep riders up to date of weather conditions. • Have a guideline set out on what to do when extreme weather will delay or cancel the ride, and when and who will enact this. 	D	2	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
3	Participant's health deteriorates during the event as a result of dehydration – sunburn – frostbite.	C	3	M	<ul style="list-style-type: none"> Ensure each rider has adequate water. Ensure that the support vehicles have back up supplies of water. Ensure adequate sunscreen is available. Monitor riders during the ride for signs of fatigue or dehydration or stress at the rest points. Ensure both support vehicles have a first aid kit. 	D	2	L
4	Participant involved in an incident during the event resulting in serious injury.	C	3	M	<ul style="list-style-type: none"> Utilise the support vehicles to warn oncoming motorists of an incident up ahead. Ensure all participants are made aware of possible road conditions such as traffic, road debris, animals, pot holes etc. Ensure all riders obey all the road rules. Ensure riders have approved helmets. Ensure both support vehicles have a first aid kit. Call emergency services if needed. Public Liability Insurance obtained. Advise police of event. 	C	3	M

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
5	Participant involved in an incident during the event resulting in a non serious injury that requires some degree of attention.	C	3	M	<ul style="list-style-type: none"> Utilise the support vehicles to warn oncoming motorists of an incident up ahead. Ensure all participants are made aware of possible road conditions such as traffic, road debris, animals, pot holes etc. Ensure all riders obey all the road rules. Ensure riders have approved helmets. Ensure both support vehicles have a first aid kit. Utilise the support vehicle to carry the injured rider and bike if possible. Call emergency services if needed. Public Liability Insurance obtained. Advise police of event. 	D	2	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
6	Participants come across poor road conditions – road blocked/impassable during the event.	D	2	L	<ul style="list-style-type: none"> All riders to obey road rules. All riders to be made aware of the road conditions by the support team. Lead Riders to use standard calls to advise of road conditions. The Support team to keep abreast of road conditions and road works or road incidents and communicate to the riders. Support vehicles to assist with their flashing lights and warning signs and protect riders on tight bends etc. Guideline in place as to what will stop, or delay the ride and who will enact it. 	E	1	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
7	Participants come across severe accent/decent on the road network during the event.	D	2	L	<ul style="list-style-type: none"> All riders obey road rules. All riders to be made aware of the road conditions by the support team. The Support team to keep abreast of road conditions and road works or road incidents and communicate to the riders. Support vehicles to assist with their flashing lights and warning signs and protect riders on tight bends etc. Guideline in place as to what will stop, or delay the ride and who will enact it. 	E	1	L
8	Participants have limited/no experience in participating in an event.	D	2	L	<ul style="list-style-type: none"> All participants will be provided with the requirements and conditions likely to be expected during the ride. Riders encouraged to be realistic about their ability to continue. 	E	1	L
9	Participants loose their way during the event.	E	1	1	<ul style="list-style-type: none"> Support vehicle is to be behind the last rider so if they have not caught up with the group, the support vehicle can pick them up and bring them in. Extra support vehicle provided during this event which will help manage this. 	E	1	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
10	Participant's equipment/vehicle becomes unserviceable or unroadworthy during the event.	D	2	L	<ul style="list-style-type: none"> All riders are to provide a bike in appropriate condition Riders encouraged to service bike pre-event – clean and lubricate chain, derailleur, and other components. Ensure brakes and gearing in good working order and fitted correctly. Limited spares to be carried by the support team. Bikes in inadequate condition to be excluded from participation. 	D	2	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS								
REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
11	Participants suffer a mechanical/equipment breakdown/failure during the event.	D	2	L	<ul style="list-style-type: none"> All riders are to provide a bike in appropriate condition Riders encouraged to service bike pre-event – clean and lubricate chain, derailleur, and other components. Ensure brakes and gearing in good working order and fitted correctly.. Limited spares to be carried by the support team. Bikes in inadequate condition to be excluded from participation. Rider to pull off to a safe location to attend to the breakdown. If unable to repair on the side of the road, support vehicle to load the bike and rider and take to the next town. 	D	2	L
12	Pilot/rear escort vehicle/s suffers mechanical breakdown during the event.	D	3	M	<ul style="list-style-type: none"> Communicate immediately to other support vehicles for back up. Spare vehicle to provide assistance and then take up the position of the vehicle that has broken down. 	D	2	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS

REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
13	Support vehicle/s suffers mechanical breakdown during the event.	D	3	M	<ul style="list-style-type: none"> Communicate immediately to other support vehicles for back up. Spare vehicle to provide assistance and then take up the position of the vehicle that has broken down. Have a list of all emergency services at each location and call for assistance if needed. 	D	2	L
14	Participant attempts/participates in event when not authorised/licensed to drive/ride a vehicle, motor bike or boat.	E	2	L	<ul style="list-style-type: none"> All riders are to provide a bike in appropriate condition. All riders and support crew will have all appropriate licences and gear checked prior to riding in the event. 	E	2	L
15	Approved route unable to be travelled upon.	E	2	L	<ul style="list-style-type: none"> Check the route prior to ride starting to ensure that there are no major roadworks or roads cut due to flooding etc. Seek alternate way around. If unable to go around the blockage, find out if it will only be for a short period of time and delay the ride. If for longer, ride will have to be called off 	E	1	L

RISK REGISTER AND CONTROL PLAN – ON ROAD EVENTS

REF	HAZARD	L	C	INITIAL RISK	RISK CONTROL PLAN	L	C	RESIDUAL RISK
16	Event cancelled prior/during the event.	E	2	L	<ul style="list-style-type: none"> All participants, Police and Insurance will be advised of the cancellation and the reasons why. 	E	1	L

L = LIKELIHOOD
C = CONSEQUENCE



Victoria Park, Darling St Dubbo
A.B.N. 801 492 731 94

EMERGENCY AND/OR ACCIDENT PROCEDURES (non first aid)

The below is a basic outline of what could be needed and used in the case of a racing accident, but it does not cover all or every possible scenarios that could possibly happen when conducting cycle road racing or group recreational riding.

Communication is key to seeking help and support for any incident so it would help if phones were carried and the emergency + app was installed.

<http://emergencyapp.triplezero.gov.au/>

At the scene check for any dangers to your self, bystanders, the casualty/s and remove any hazards such as bikes, equipment or any thing else wear possible that may cause further accidents including bystanders and competitors who are not assisting. But do not put your self in danger doing any of the above or any thing else.

If a First Aid person, or a person who is confident in helping is not at the scene first and you have a phone or two way radio call for assistance from a event official or in serious situations call 000 or phone app Emergency + when it would be needed.

Where possible have 2 people with the injured and 2 in opposite direction approx 200 meters from the injured to warn and slow traffic but be off the roads edge and not in danger of becoming a casualty

If the injured are able to move by them selves or with some assistance have them Move away from the road or road edge to be at a safe distance from the road. But still where possible have 2 people with the injured and 2 in opposite direction approx 200 meters from the injured to warn and slow traffic but be of the roads edge and not in danger of becoming a casualty.

Any extra bystanders or competitors should be well off the road and away from the casualty/s or competitors can continue on with the race or ride.

Your safety is most important you do not want to be a casualty from putting yourself in dangers way.

If you have witnessed and /or assisted at an accident during a race you will need to see the Chief Marshall and/or commissioner to supply information about the incident to help with the reports that are needed to be fill in.



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COMMISARRIER/RACE DAY DIRECTOR

The Commissaire is in charge of the event from 1 hour before and until the completion of the presentation at the end of the event.

You will need one amber flashing light on the roof, a Cyclist Ahead sign on the rear of your vehicle, headlights on and hazard lights on. You will also need to have a 2 way radio, mobile phone and first aid kit.

You are able to apply and use all UCI, Cycling Australia, Cycling NSW and Dubbo Cycle Club rules that are used for competition and administration of the event.

You will over see the sign on, handicapping; start line, racing, and riders on the course, finish and presentation.

As you cannot be everywhere at the same time you will be reliant on the marshals and other nominated officials of the event to advice if there are any issues that need attending to.

You will follow and observe the rides and groups of riders that make up the race entries you can follow selected groups as they leave the start line for a time but will follow the last group of riders as they leave from the start line to the turn point remaining behind them.

You will need to make sure they are obeying the rules and regulations required by the club to conduct road cycle races.



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You may use the horn of the vehicle to warn the riders of traffic approaching from the rear with 2 short 2 second sounds of it, you can use 4 - 5 3 second sounds of it to warn riders they are across the centre of the road this is most important on bends and hills where blind approaches will occur

After the turn point you can make your way up to other groups and observe making sure it is safe to pass them as you go.

You will find the group that will most likely be the first across the line and follow for the last couple of klm's

You can make your way back to the remaining riders and find the largest group and follow them to the finish at which point park safely off the road and watch the remaining riders finish.

Once all riders have finished you will check with the finish line marshal that there was no problems and head to marshaling point to give the results to the event director for presentation. At this point you should advise director if there are any infringements or warnings that need to be dealt with.



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LEAD CAR

The lead car will need to have 2 amber flashing lights mounted on the roof and flashing while on the road in front of the race.

There will also need to be a sign on the front of the car that says CYCLIST FOLLOWING and needs to be fully visible to on coming traffic.

The lead car will also need to travel with the headlights on and hazards flashing, also carry a 2 way radio and mobile phone.

The lead car should be positioned approx 250 to 300 meters ahead of the first/leading rider in the race/event.

The lead car is to move off the road when required to wait for participants so as not to obstruct traffic on single lane roads

The lead car may need to move further forward when approaching the turn point to be able to make the turn before the lead rider gets to the turn point so the lead car is still in front of the lead rider on the return part of the race/event.

The lead car will need to be aware of the speed of the lead rider/bunch of riders heading to the finish line as it may increase by a quite a bit so the lead car will need to increase its speed to maintain the gap.

The lead car after crossing the finish line should continue along the road for at least 500 to 750 meters and move to the edge of the road and check for traffic, riders etc before making the turn to return back to the marshalling area and park off the road as not to obstruct any part of the road.

Dubbo Cycle Club Road Racing Race Day Set to Pack Up

The traffic control plans will need to be set up using the TCP and markings on the road and all set in place before the rider Sign On opens at its set time.

It will also be the responsibility of the people setting out the TCP to set up the Sign On area and have the boards, numbers, first Aid kits, vehicle boxes, stop watch etc all laid out or on the table ready to go for the rostered helpers when they turn up for duty.

This will take quite a bit of time depending on the length of the course and the lay out of the sign's for the start/finish area the longer the course and the more technical the area the longer it will take, any where from 2.5 to 3.5 hours.

Race officials will need to be at the course location 10 min before Sign On starts and Sign them selves On to the roster Sign On sheets and have their fluoro vests on. The officials rostered to do Sign On and start/finish line will all need to work together to check the boards are ready to go along with numbers etc.

As sign on starts the traffic controllers will need to take there position at the work site and will have control of that area, any issues with people on the road way etc will be relayed to the sign on area via 2 way radio

Get the riders to sign the sign on sheet and write their number down next to the signature you will then need to high light their name on the start/handicap/group run sheet which is used to start the groups that are at the race so they set off in their correct time slots etc.

The other race officials will need to collect there boxes which each have a general description of the task and what is required to be prepared before the start of racing, they may need to help out with keeping riders off the road while stationary ie do not allow groups of ride stoped on the road way just talking and milling around.

At the close of sign on an official road handicapper will need to see the final list of riders and make any adjustments that may be needed to groups and time gaps etc.

When this has been done the race day coordinator will start calling riders to a pre race briefing and run through any issues that may be out on the course, riding etiquette and rules to be followed during the race and then read out the riding groups and time gaps as needed depending on the race format etc.

All race officials will need to be ready to perform their tasks, as needed once the first group is ready to start.

You will then need to make the traffic controller aware that the race start is about the happen and the traffic cones are to be placed on the road way by the start line officials to block the lane for the riders to form up in front of and the traffic controllers will control traffic flow around that closed lane for the who time until the last group of riders have left the site and then the cone can be removed from the road way.

For the finish of the race the traffic controllers will be in place and control traffic around the finishing bunches it will be expected that the riders will endeavour to remain in the left hand lane as much as possible for the sprint to the finish and only the first bunch of riders to come to the finish should be battling it out after that as riders come to the line they will be expected to maintain a position to the left of the left hand lane no more than 2 abreast.

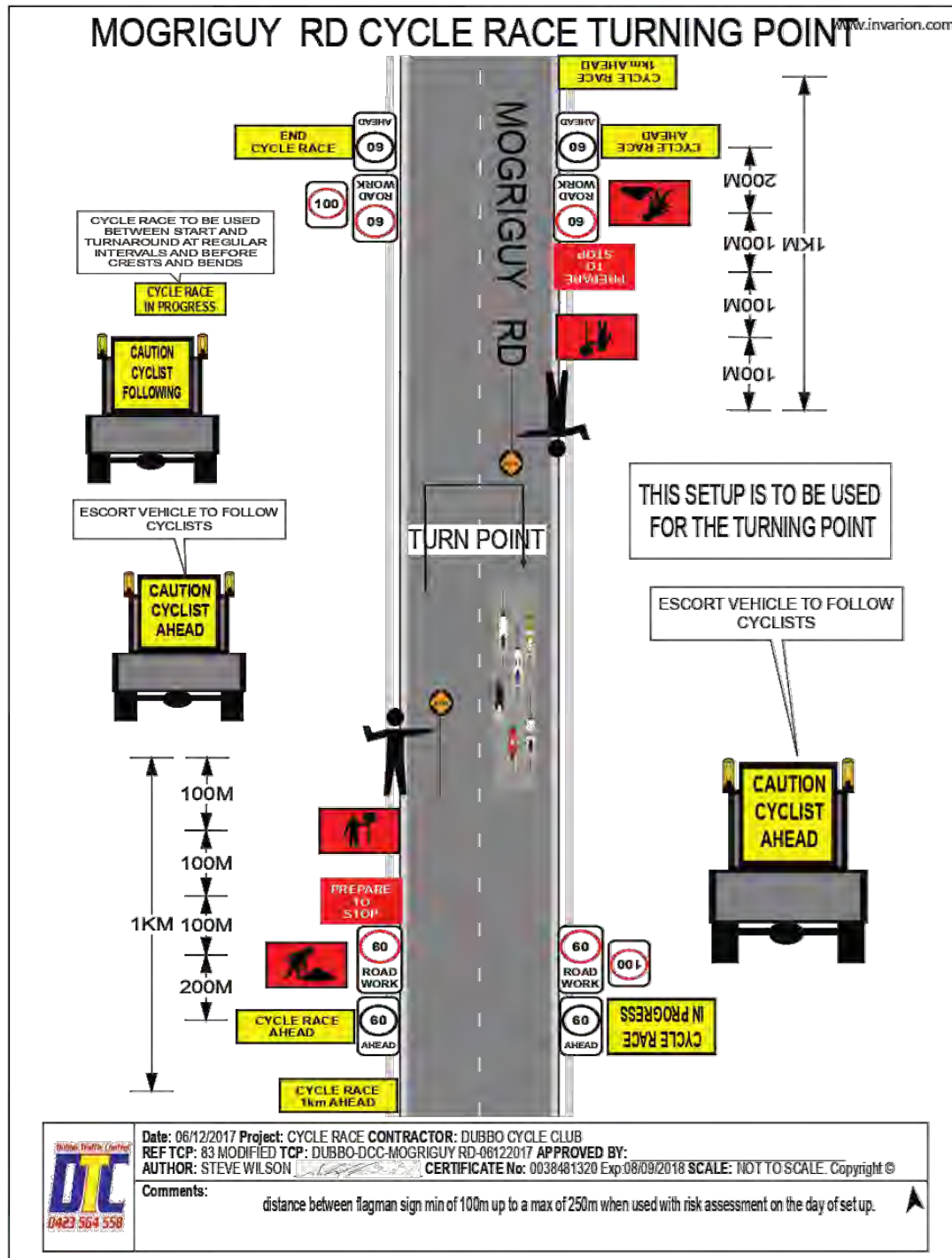
When riders have finished and are rolling down they will need to be vigilant of other road users and follow ALL road rules including directions from the site traffic controllers. Once the last rider and follow car has crossed the finish line and the road is clear the traffic controllers may step down.

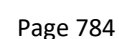
At this point there should be NO ONE milling on or close to the edge of the road, the site signs should remain in place until after the presentation and only then start to be packed up.

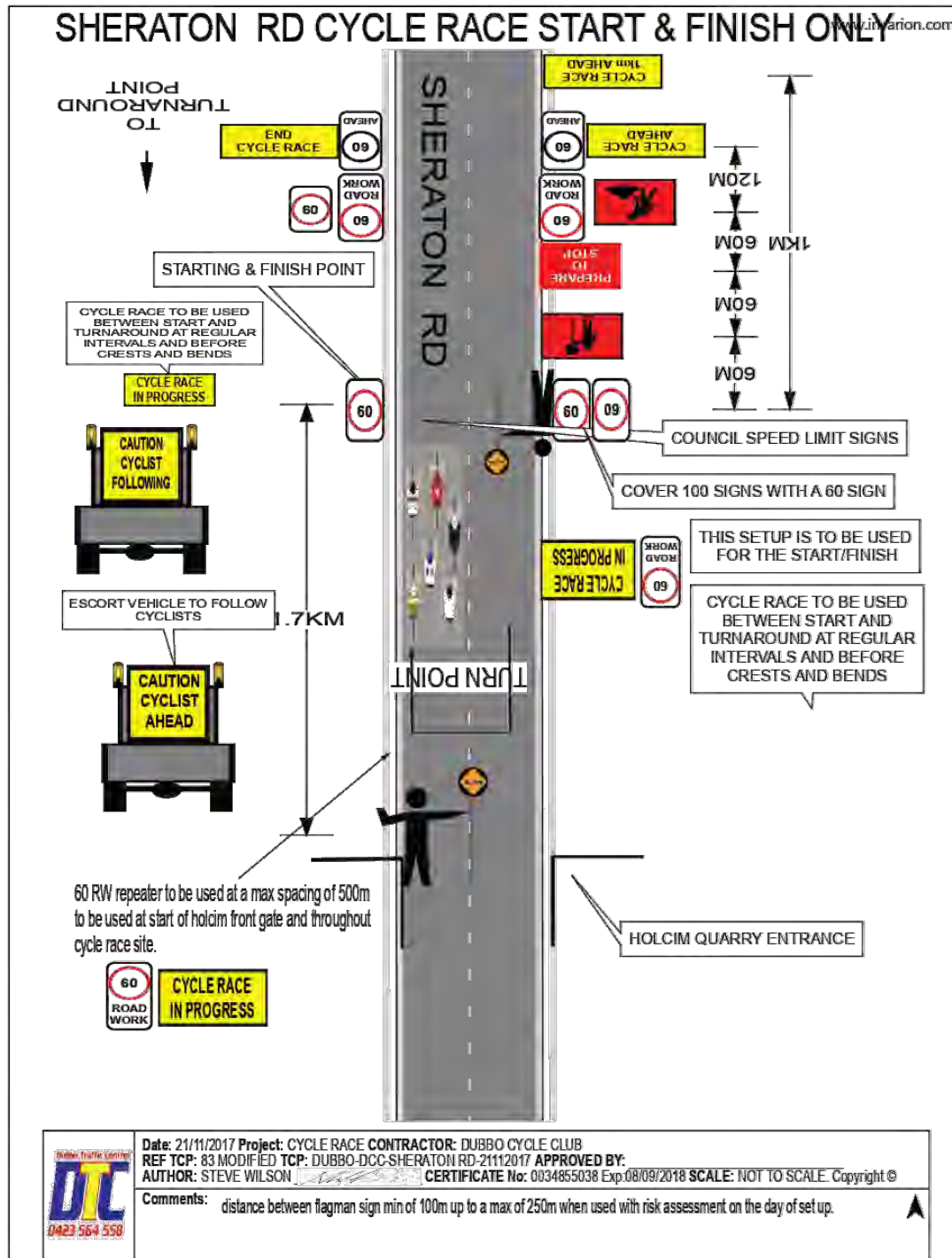
At the completion of the race after the last rider has crossed the finish line Check with the commissaire if there are any issues to report if so then Call the riders out who need to see the commissaire, then the presentation of placing will need to take place and top 5 placing to have a photo with a Toyota flag or sign in the shot, also announce the fastest time male and female if known at that time.

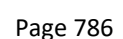
All documentation of the day are to be kept so it can be filed for future references.

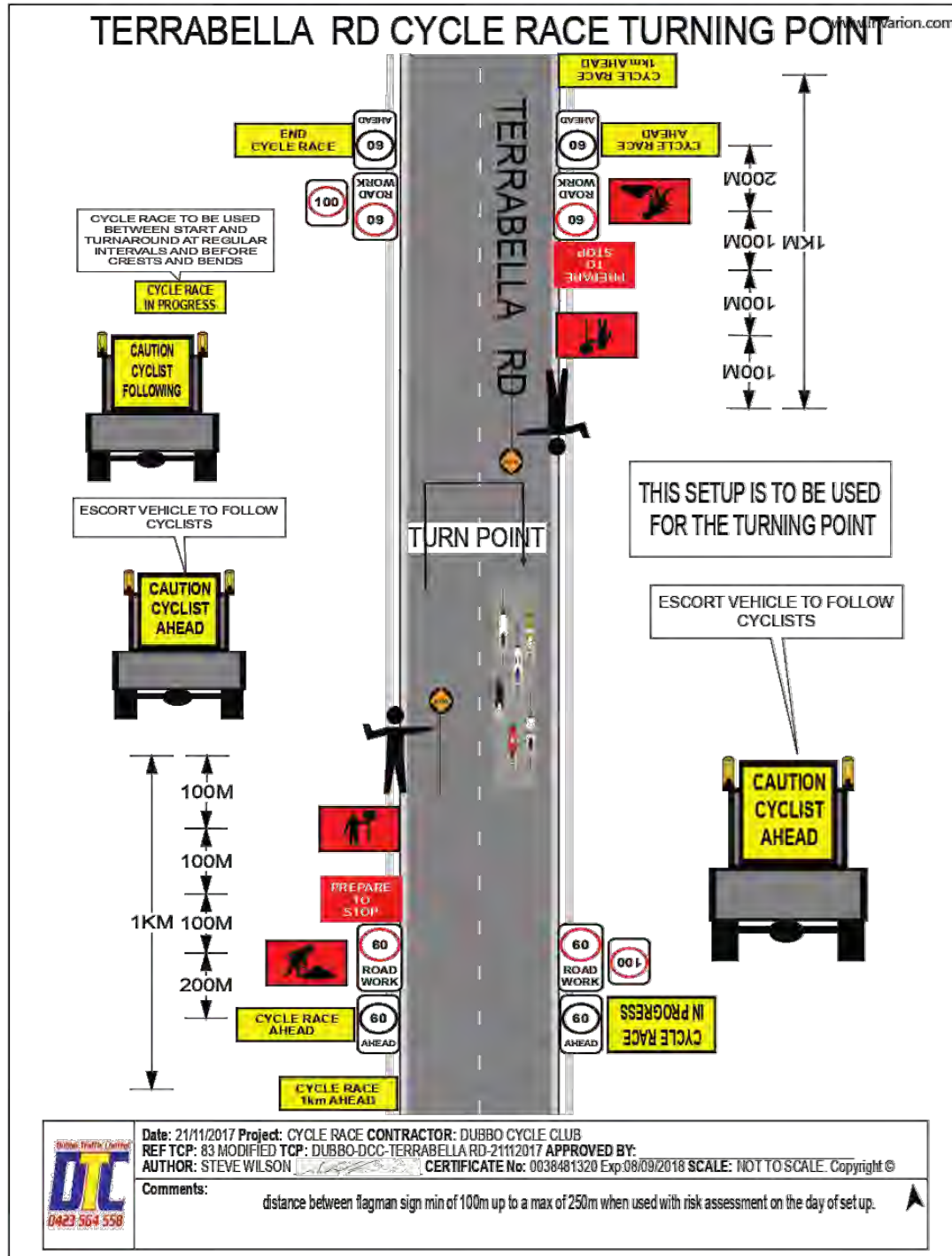
It is then the responsibility of all officials to assist with the pack up and have every thing ready to go back in the trailer and/or vehicle, make sure every one has taken all their rubbish and the area is left clean and as it was before we got there.

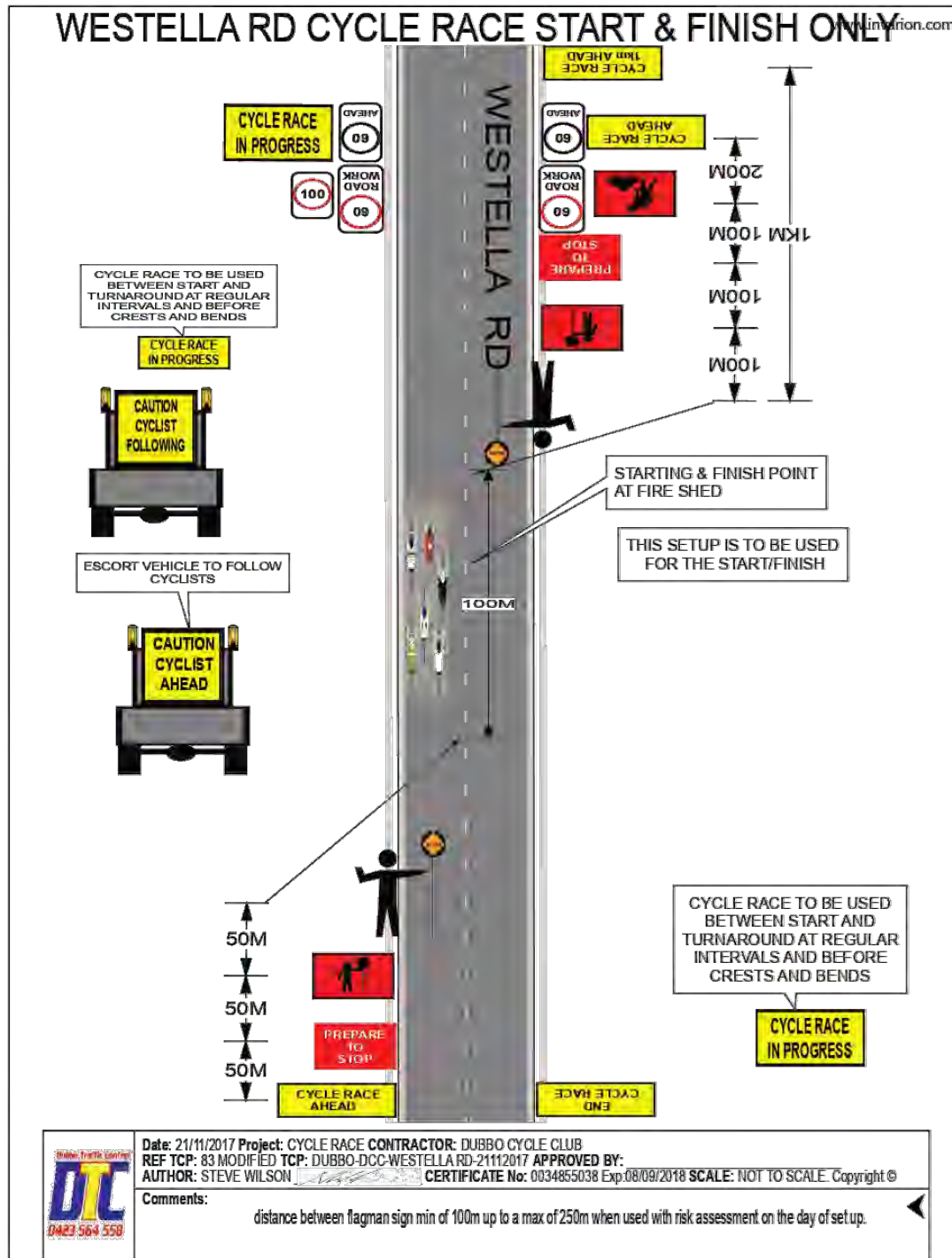


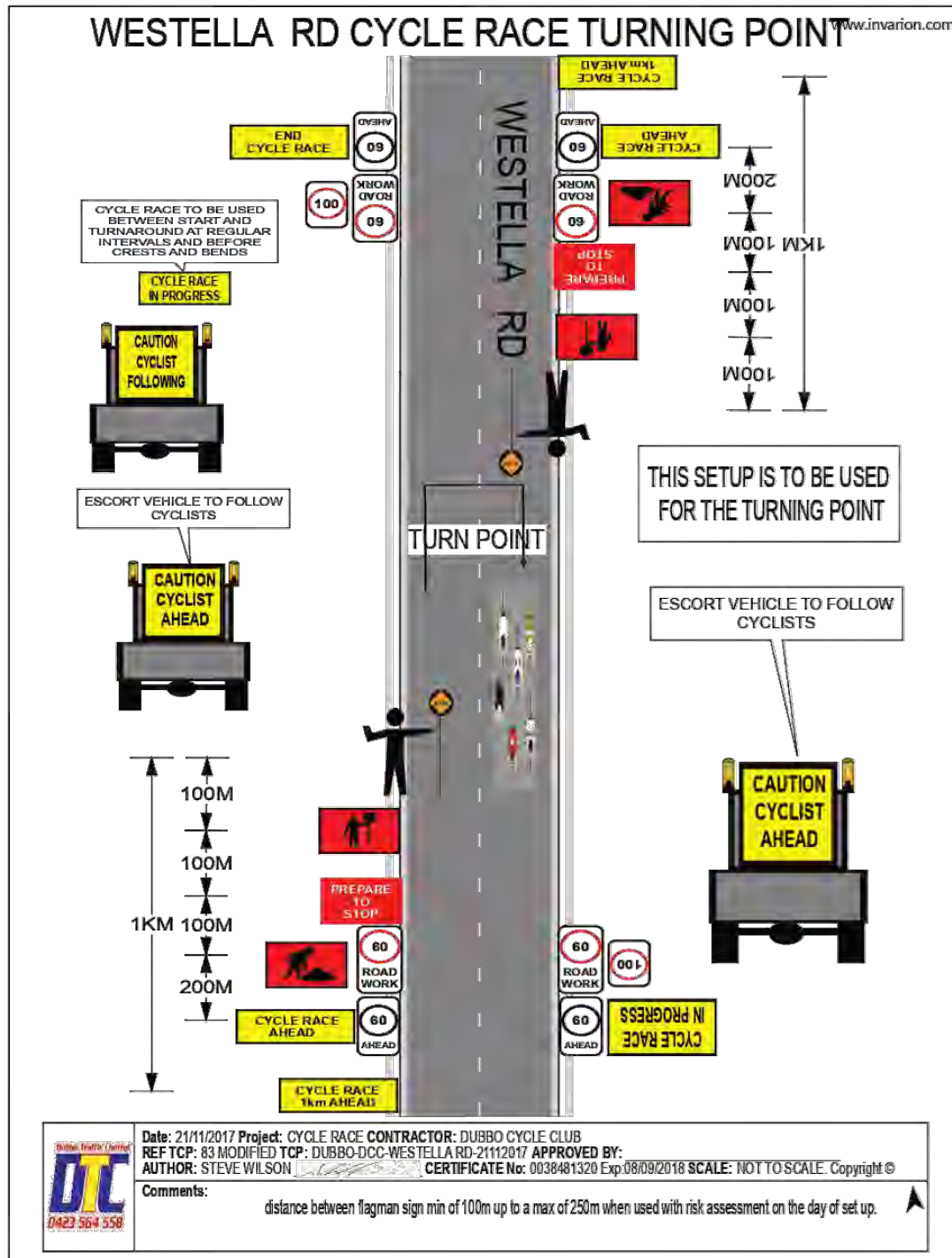


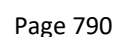


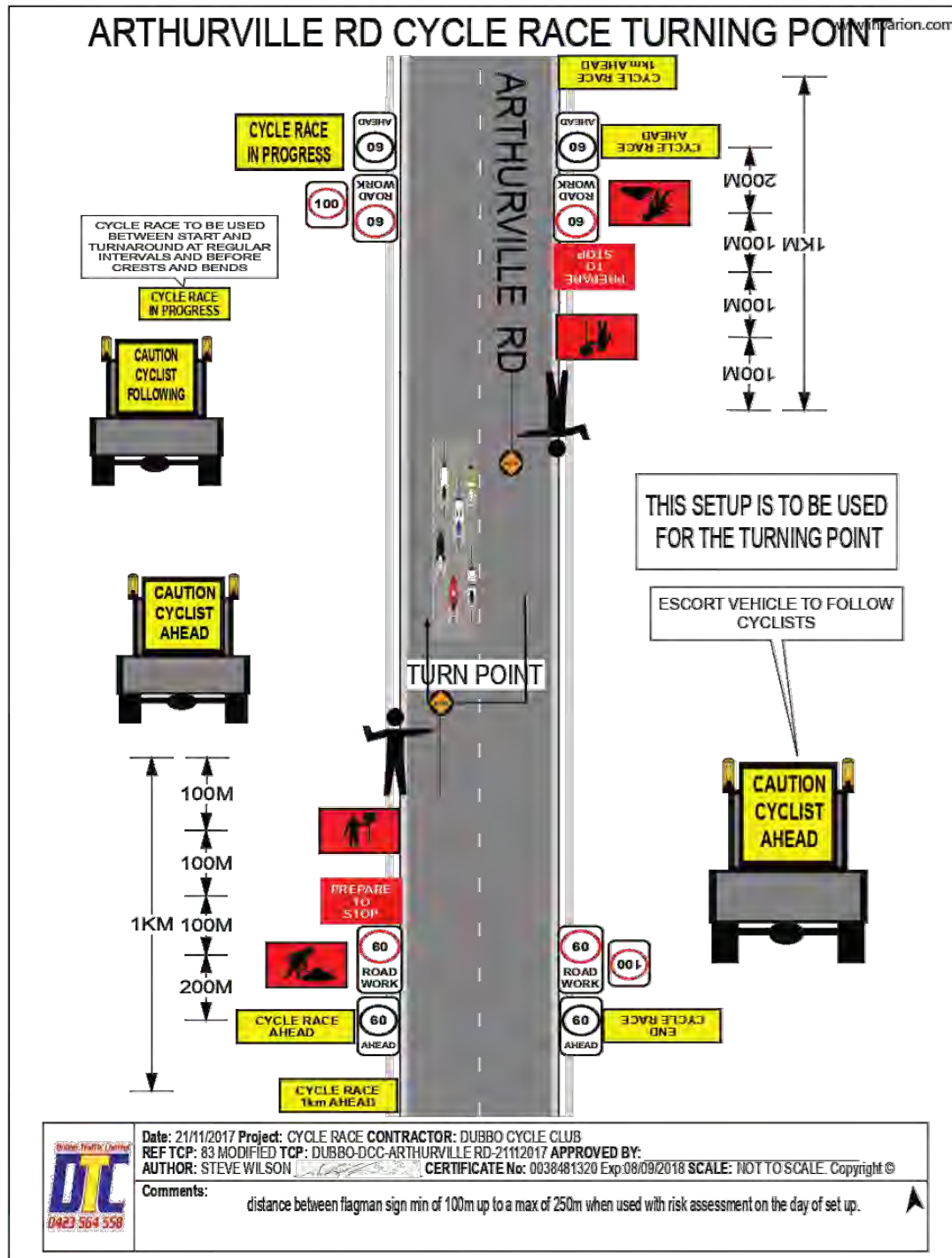


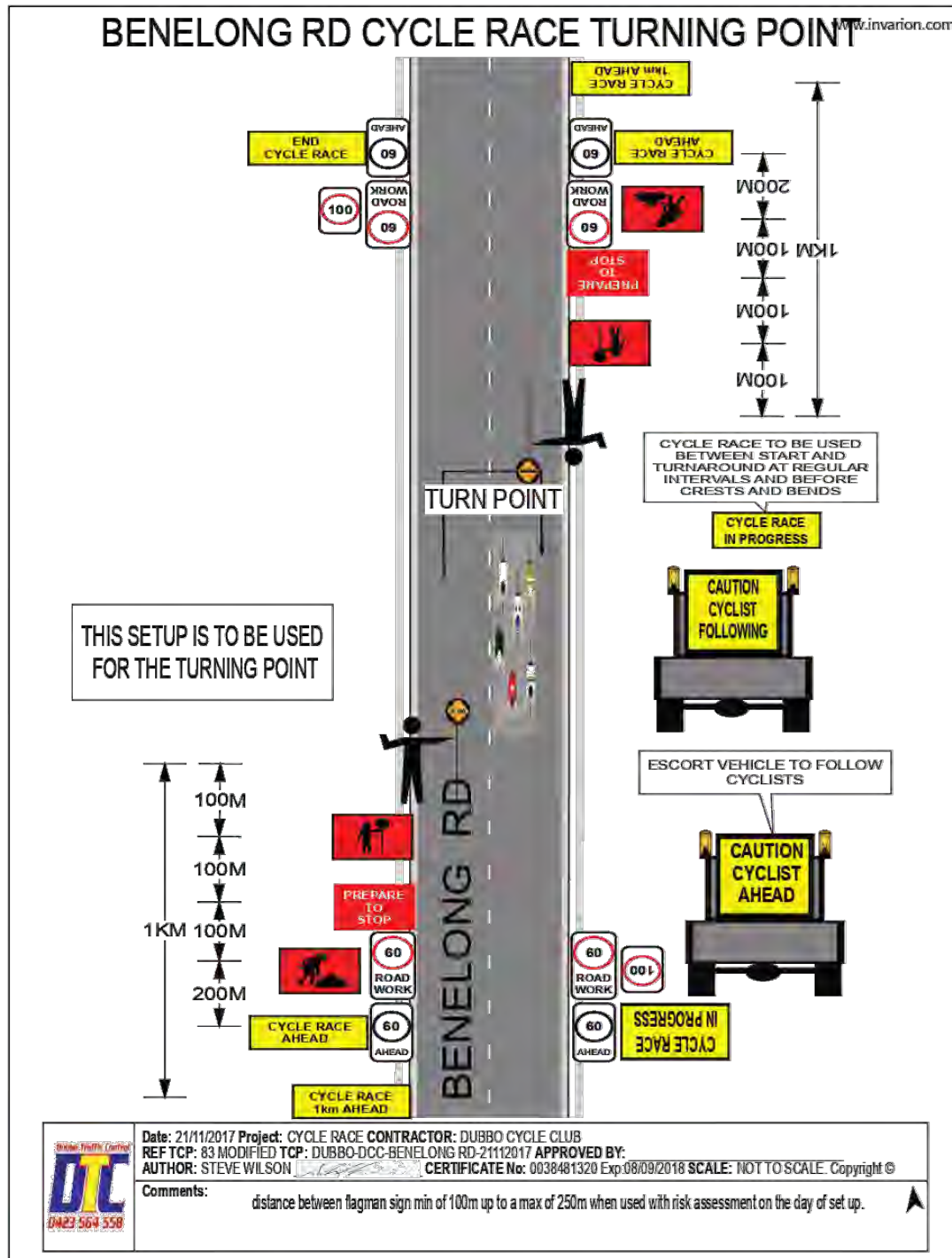


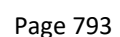


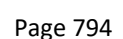


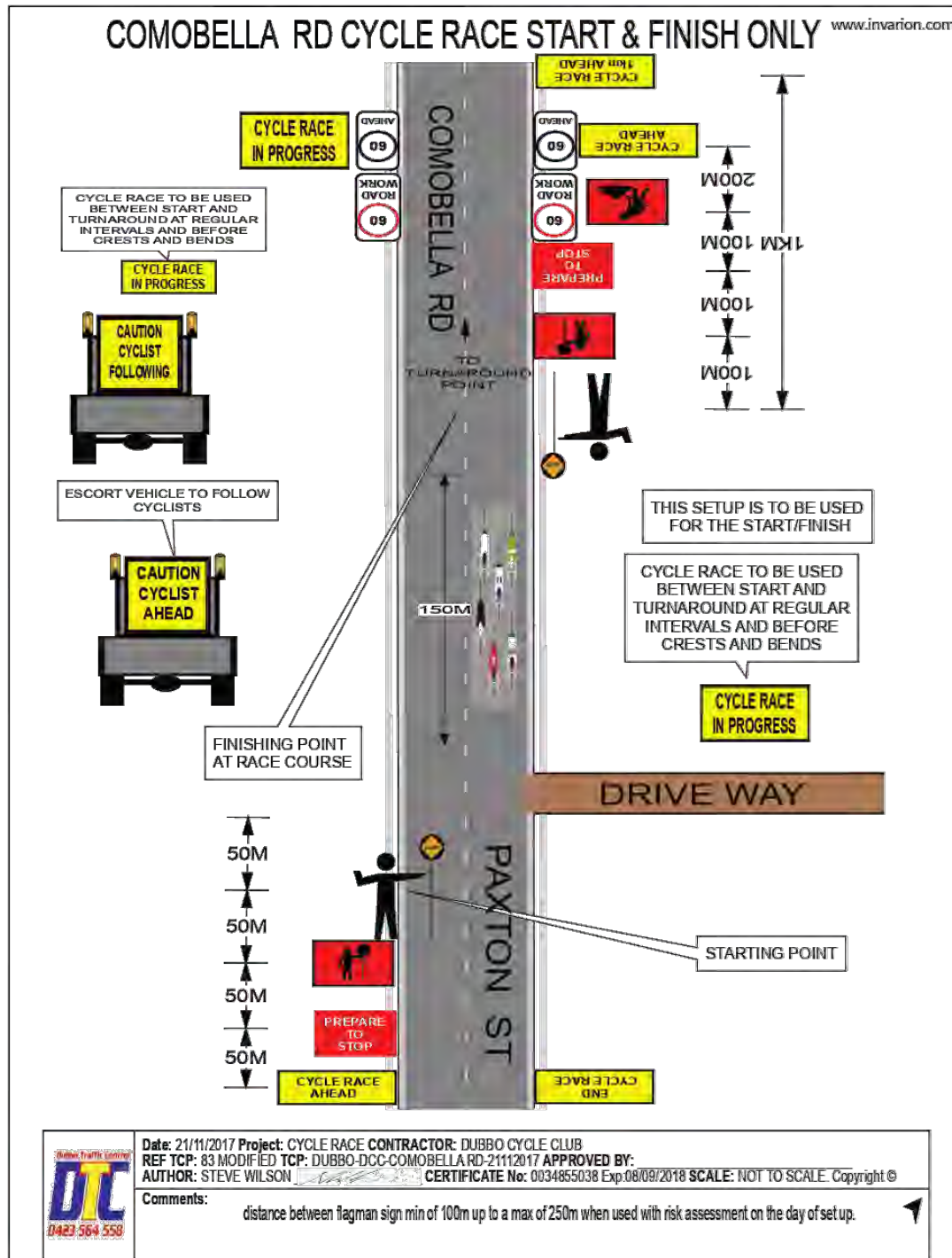


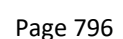


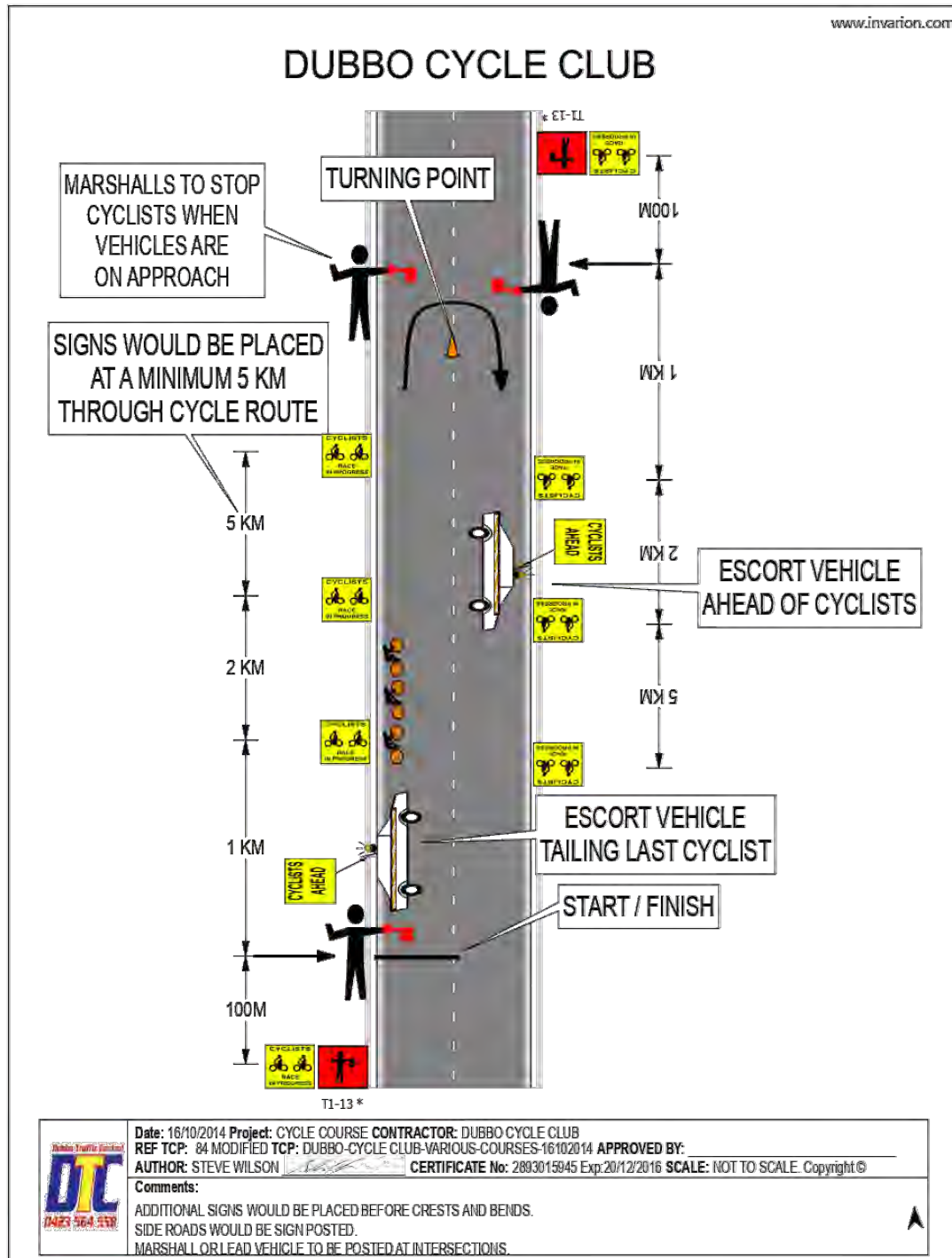


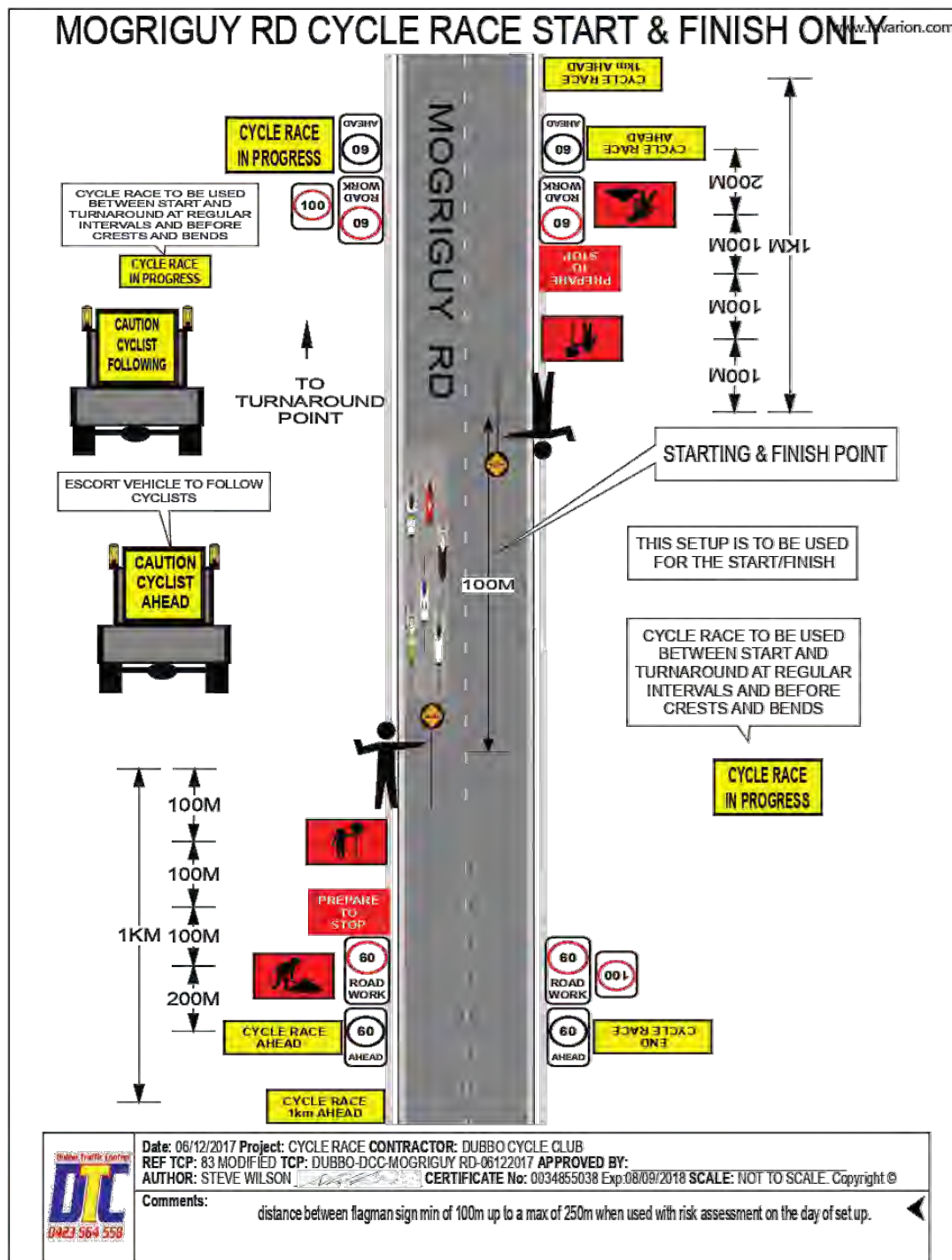














REPORT: 2020 Mumbil Markets and Music Festival

AUTHOR: Senior Traffic Engineer
REPORT DATE: 25 November 2019
TRIM REFERENCE: ID19/1589

EXECUTIVE SUMMARY

Mumbil Advancement Association have submitted an application to hold the inaugural Mumbil Markets and Music Festival on Saturday 7 March 2020. The Festival will be held within the Mumbil Oval and Mumbil Hall area, separated by the Burrendong Way. An attendance of some 3,000 participants is expected. Council approval has been requested for a reduced speed zone on Burrendong Way to manage pedestrian and traffic interaction, rather than a temporary road closure that has typically been applied to the annual Mumbil Anzac Ceremony or Mumbil Black Wattle Fair over numerous years.

It has been determined that due to the expected attendance of some 3,000 participants a temporary road closure of Burrendong Way will be required to provide the optimum road safety environment for the event and will be implemented between Apsley Crescent and Railway Parade from 6.00 am to 5.00 pm. The Burrendong Way will also be used for event parking with a detour posted along Apsley Crescent and Railway Parade. Burrendong Way is a regional road and will require the consent of the Roads and Maritime Services (RMS). A detour will be required around the closure through surrounding streets.

The existing Traffic Management Plan that has been used for the annual Mumbil Anzac Ceremony has not experienced any concerning traffic issues and has been modified for the Markets and Music Festival.

The application, supporting documentation and Council's Traffic Control Plan TM7317 and parking plan for the event are attached as **Appendices 1 and 2**.

It is recommended that approval be granted for the Mumbil Advancement Association to implement a temporary road closure of the Burrendong Way and detour via Apsley Crescent and Railway Parade for the 2020 Mumbil Markets and Music Festival in accordance with the Traffic Management Plan and conditions of approval as imposed by the NSW Police, Council and the RMS.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION TO THE LOCAL TRAFFIC COMMITTEE

That Council approval be granted for a temporary road closure of Burrendong Way between Apsley Crescent and Railway Parade on Saturday 7 March 2020 for the 2020 Mumbil Markets and Music Festival between 6.00 am and 5.00 pm, subject to:

- a. Consent is received from the Roads and Maritime Services for the event to temporarily close part of Burrendong Way, with evidence provided to Council of the conditions of approval. In the event that approval is not granted, then the applicant is to advise Council if the event will proceed with a re-design that excludes the crossing of Burrendong Way.
- b. The submission of an Event and Traffic Management and Parking Plan and Traffic Control Plan to Council for approval in accordance with Australian Standard 1742.3 and the Roads and Maritime Services Guide to Traffic Control at Worksites Manual, prepared by an accredited person. Council's Traffic Control Plan TM 7317 is to be used for the event.
- c. Traffic controllers and trained course marshals are to be provided at all road closure points and other locations as identified in the Event Management Plan and Traffic and Parking Management Plan with restricted access only to emergency and authorised vehicles. All traffic controllers are to be specially authorised for the event with current Roads and Maritime Services certification.
- d. Council's Executive Manager of Governance and Internal Control must sight a copy of the current Public Liability Insurance Policy for a minimum amount of \$20 million on which Dubbo Regional Council, Roads and Maritime Services and NSW Police is specifically noted to be indemnified against any action resulting from the event.
- e. The applicant is responsible for the provision of all traffic management required for the event in accordance with the Traffic Management Plan.
- f. The applicant is responsible for all costs associated with the placement of a public notification a minimum of two weeks prior to the event, and advice to the residents within the closed roads advising of the 2020 Mumbil Markets and Music Festival and road closure at Mumbil.
- g. All traffic advisory signs shall be placed in accordance with the approved Traffic Control Plan and the Event and Traffic Management and Parking Plan.
- h. The NSW Police consent and conditions for the running of the event as considered necessary.
- i. The applicant is to submit to Council all the appropriate documentation required accepting the above terms and conditions before final approval will be granted.
- j. All costs associated with implementing these event conditions are to be met by the event organiser.

Pre-event advice signage is to be located on the Burrendong Way Mumbil in advance of the proposed road closure area a minimum of two weeks prior to the event.

LOCAL TRAFFIC COMMITTEE CONSIDERATION

This matter was considered by the Local Traffic Committee at its meeting held on Monday, 25 November 2019. The Committee had unanimous support in the adoption of the recommendation.

RECOMMENDATION

That Council approval be granted for a temporary road closure of Burrendong Way between Apsley Crescent and Railway Parade on Saturday 7 March 2020 for the 2020 Mumbil Markets and Music Festival between 6.00 am and 5.00 pm, subject to:

- a. Consent is received from the Roads and Maritime Services for the event to temporarily close part of Burrendong Way, with evidence provided to Council of the conditions of approval. In the event that approval is not granted, then the applicant is to advise Council if the event will proceed with a re-design that excludes the crossing of Burrendong Way.
- b. The submission of an Event and Traffic Management and Parking Plan and Traffic Control Plan to Council for approval in accordance with Australian Standard 1742.3 and the Roads and Maritime Services Guide to Traffic Control at Worksites Manual, prepared by an accredited person. Council's Traffic Control Plan TM 7317 is to be used for the event.
- c. Council to undertake assessment of the detour route for the suitability of heavy vehicle movements.
- d. Traffic controllers and trained course marshals are to be provided at all road closure points and other locations as identified in the Event Management Plan and Traffic and Parking Management Plan with restricted access only to emergency and authorised vehicles. All traffic controllers are to be specially authorised for the event with current Roads and Maritime Services certification.
- e. Council's Executive Manager of Governance and Internal Control must sight a copy of the current Public Liability Insurance Policy for a minimum amount of \$20 million on which Dubbo Regional Council, Roads and Maritime Services and NSW Police is specifically noted to be indemnified against any action resulting from the event.
- f. The applicant is responsible for the provision of all traffic management required for the event in accordance with the Traffic Management Plan.
- g. The applicant is responsible for all costs associated with the placement of a public notification a minimum of two weeks prior to the event, and advice to the residents within the closed roads advising of the 2020 Mumbil Markets and Music Festival and road closure at Mumbil.
- h. All traffic advisory signs shall be placed in accordance with the approved Traffic Control Plan and the Event and Traffic Management and Parking Plan.
- i. The NSW Police consent and conditions for the running of the event as considered necessary.
- j. The applicant is to submit to Council all the appropriate documentation required accepting the above terms and conditions before final approval will be granted.
- k. All costs associated with implementing these event conditions are to be met by the event organiser.
- l. Pre-event advice signage is to be located on the Burrendong Way Mumbil in advance of the proposed road closure area a minimum of two weeks prior to the event.

Dennis Valentine
Senior Traffic Engineer

REPORT

Council has received an Event Application from the Mumbil Advancement Association to facilitate the inaugural Mumbil Markets and Music Festival on Saturday 7 March 2020. The Festival will be held within Mumbil Oval and the adjacent Mumbil Hall located on the eastern side of Burrendong Way. The Association has requested approval for the implementation of a 20 km/h reduced speed zone on the Burrendong Way to facilitate the movement of pedestrians across the Burrendong Way between 6.00 am to 5.00 pm. Event parking will utilise the surrounding village streets to the Mumbil Oval.

In Mumbil the Anzac Day Ceremony and the Black Wattle Fair are two additional annual events that require the temporary closure of the Burrendong Way. The Anzac Day ceremony requires a detour via Apsley Crescent and Railway Parade with the Black Wattle Fair via Cudgegong, Naroogal and Mackeral streets. The application indicates an attendance of some 3,000 participants for the Festival.

There is a concern that a reduced speed zone on the Burrendong Way will not provide an appropriate safe road environment for the event and through traffic. Given the expected 3,000 attendance there will be a heavy demand for parking around the Oval, Burrendong Way and the surrounding streets. Consideration has been given to implementing a road closure of the Burrendong Way, between Apsley Crescent and Railway Parade, with a detour along the topside of the village via Apsley Crescent and Railway Parade. A full closure of the Burrendong Way will remove through traffic which can then be utilised for on street event parking north of Cudgegong Street and south of Mackeral Street under the direction of marshals, and will also permit local resident access to the eastern Cudgegong Street residential area. Burrendong Way between Cudgegong and Mackeral streets adjacent the Mumbil Oval and Hall will be closed to traffic to facilitate movements between the Oval and Hall. There is also the potential for event parking to encroach onto the detour route. To address this matter a Parking Management Plan is required to direct event parking from the detour route via the two Naroogal Street intersections and parking undertaken in an orderly manner as directed by marshals. A Parking Management Plan is required from the organisers. Discussions with the organiser has reinforced the need to develop a Parking Management Plan and should be available at the meeting. Council's Traffic Control Plan TM7317 details the road closure and detour.

A temporary road closure of the Burrendong Way is the preferred traffic management option over a proposed reduced speed zone to ensure the safe movement of participants across the road and eliminate any through traffic movements within the Festival confines and Mumbil Hall activities. Burrendong Way is not a heavily trafficked road and can be easily accommodated with the detour through the Village. The Festival is a much larger event than has been previously experienced in Mumbil and will require an expanded traffic and parking managed environment. Burrendong Way is a regional road and will require the consent of the RMS for its closure and detour.

A proposed 20km/h speed zone will have potential road safety implications with pedestrians meandering across the roadway and interacting with through traffic and vehicle parking

activity in an uncontrolled environment. The preference is to implement a temporary road closure of the Burrendong Way ensuring a secured pedestrian environment free of vehicle traffic and the introduction of a Parking Management Plan in association with Council's Traffic Control Plan TM7317.

It is recommended that approval be granted for the Mumbil Advancement Association to undertake the 2020 Mumbil Markets and Music Festival on Saturday 7 March 2020 as conditioned by Council, NSW Police and subject to the RMS' formal consent of the road closure and conditions as applied.

Appendices:

- 1 [↓](#) 2020 Mumbil Markets and Music Festival - Event Application Form - Event Management Plan - Traffic Control Plan and Risk Assessment Form
- 2 [↓](#) Mumbil Music Festival 2020 - Parking Plan

Special Event Resources

Special Event Transport Management Plan Template

Refer to Chapter 7 of the Guide for a complete description of the Transport Management Plan

I EVENT DETAILS

1.1 Event summary

Event Name: MUMBIL MARKETS & MUSIC FESTIVAL

Event Location: MUMBIL OVAL

Event Date: 7-3-20 Event Start Time: 8AM Event Finish Time: 5PM

Event Setup Start Time: 6AM Event Packdown Finish Time: 5PM

Event is ☒ off-street ☐ on-street moving ☐ on-street non-moving
☐ held regularly throughout the year (calendar attached)

1.2 Contact names

Event Organiser* MUMBIL ADVANCEMENT ASSOC INC.

Phone: 0418669867 Fax: Mobile: E-mail: penhulld@bigpond.com

Event Management Company (if applicable)

Phone: Fax: Mobile: E-mail:

Police WELLINGTON

Phone: 68402099 Fax: Mobile: E-mail:

Council DUBBO REGIONAL COUNCIL

Phone: 62014000 Fax: Mobile: E-mail: council@dubbo.nsw.gov.au

Roads & Traffic Authority (if Class 1)

Phone: Fax: Mobile: E-mail:

*Note: The Event Organiser is the person or organisation in whose name the Public Liability Insurance is taken out.

1.3 Brief description of the event (one paragraph)

MARKET STALLS - MUSICAL ENTERTAINMENT
SPORTING EVENTS - DEMONSTRATIONS

2 RISK MANAGEMENT - TRAFFIC

2.1 Occupational Health & Safety - Traffic Control

☒ Risk assessment plan (or plans) attached

2.2 Public Liability Insurance

☒ Public liability insurance arranged. Certificate of currency attached

2.3 Police

☐ Police written approval obtained

2.4 Fire Brigades and Ambulance

☒ Fire brigades notified

☒ Ambulance notified

3 TRAFFIC AND TRANSPORT MANAGEMENT

3.1 The route or location

☒ Map attached

3.2 Parking

☒ Parking organised - details attached

☐ Parking not required

3.3 Construction, traffic calming and traffic generating developments

☐ Plans to minimise impact of construction activities, traffic calming devices or traffic generating developments attached

☒ There are no construction activities, traffic calming devices or traffic generating developments at the location/route or on the de-tour routes

3.4 Trusts, authorities or Government enterprises

☒ This event uses a facility managed by a trust, authority or enterprise; written approval attached

☒ This event does not use a facility managed by a trust, authority or enterprise

3.5 Impact on/of Public transport

☐ Public transport plans created - details attached

☒ Public transport not impacted or will not impact event

3.6 Reopening roads after moving events

☐ This is a moving event - details attached

☒ This is a non-moving event

3.7 Traffic management requirements unique to this event

☐ Description of unique traffic management requirements attached

☒ There are no unique traffic requirements for this event

3.8 Contingency plans

☐ Contingency plans attached

Class 2	3.9 Heavy vehicle impacts	
	<input type="checkbox"/> Impacts heavy vehicles - RTA to manage <input checked="" type="checkbox"/> Does not impact heavy vehicles	
Class 2	3.10 Special event clearways	
	<input type="checkbox"/> Special event clearways required - RTA to arrange <input checked="" type="checkbox"/> Special event clearways not required	
4	MINIMISING IMPACT ON NON-EVENT COMMUNITY & EMERGENCY SERVICES	
Class 2	4.1 Access for local residents, businesses, hospitals and emergency vehicles	
	<input type="checkbox"/> Plans to minimise impact on non-event community attached <input checked="" type="checkbox"/> This event does not impact the non-event community either on the main route (or location) or detour routes	
	4.2 Advertise traffic management arrangements	
	<input type="checkbox"/> Road closures or restrictions - advertising medium and copy of proposed advertisements attached <input type="checkbox"/> No road closures or restrictions but special event clearways in place - advertising medium and copy of proposed advertisements attached <input checked="" type="checkbox"/> No road closures, restrictions or special event clearways - advertising not required	
	4.3 Special event warning signs	
	<input checked="" type="checkbox"/> Special event information signs are described in the Traffic Control Plan/s <input type="checkbox"/> This event does not require special event warning signs	
	4.4 Permanent Variable Message Signs	
	<input type="checkbox"/> Messages, locations and times attached <input checked="" type="checkbox"/> This event does not use permanent Variable Message Signs	
	4.5 Portable Variable Message Signs	
	<input type="checkbox"/> The proposed messages and locations for portable VMS are attached <input checked="" type="checkbox"/> This event does not use portable VMS	
	5	PRIVACY NOTICE
	<p>The "Personal Information" contained in the completed Transport Management Plan may be collected and held by the NSW Police, the NSW Roads and Traffic Authority (RTA), or Local Government.</p> <p>I declare that the details in this application are true and complete. I understand that:</p> <ul style="list-style-type: none"> The "personal information" is being collected for submission of the Transport Management Plan for the event described in Section 1 of this document. I must supply the information under the Road Transport Legislation (as defined in the <i>Road Transport (General) Act 1999</i>) and the <i>Roads Act 1993</i>. Failure to supply full details and to sign or confirm this declaration can result in the event not proceeding. The "personal information" being supplied is either my own or I have the approval of the person concerned to provide his/her "personal information". The "personal information" held by the Police, RTA or Local Government may be disclosed inside and outside of NSW to event managers or any other person or organisation required to manage or provide resources required to conduct the event or to any business, road user or resident who may be impacted by the event. The person to whom the "personal information" relates has a right to access or correct it in accordance with the provisions of the relevant privacy legislation. 	

6 APPROVAL

TMP Approved by: _____ Event Organiser: _____ Date: _____

7 AUTHORISATION TO REGULATE TRAFFIC

Council's traffic management requirements have been met. Regulation of traffic is therefore authorised for all non-classified roads described in the risk management plans attached to this TMP.

Regulation of traffic authorised by: _____ Council: _____ Date: _____

The RTA's traffic management requirements have been met. Regulation of traffic is therefore authorised for all classified roads described in the risk management plans attached to this TMP.

Regulation of traffic authorised by: _____ RTA: _____ Date: _____

"Regulate traffic" means restrict or prohibit the passage along a road of persons, vehicles or animals (Roads Act 1993). Council and RTA regulate traffic to be regulated as described in the risk management plans with the layout installed under the direction of a qualified person.

Schedule 1 Form - Notice of Intention to Hold a Public Assembly

SUMMARY OFFENCES ACT 1988 - Sec 23

To the Commissioner of Police

1	<p>TERRY BENNETT PENHALL (name) of 520 QUIRKS LOOP STUART TOWN NSW (address) on behalf of MUMBIL ADVANCEMENT ASSOC INC (organisation) notify the Commissioner of Police that on the 7th (day) of MARCH (month), 2020 (year), it is intended to hold either: (a) a public assembly, not being a procession, of approximately 3000 persons, which will assemble at MUMBIL OVAL (Place) at approximately 9 am/pm and disperse at approximately 5 am/pm or (b) a public assembly, being a procession of approximately (number) persons, which will assemble at approximately am/pm, and at approximately am/pm the procession will commence and shall proceed (Specify route, any stopping places and the approximate duration of any stop, and the approximate time of termination. A diagram may be attached)</p>
2	<p>The purpose of the proposed assembly is MARKET STALLS - MUSIC ENTERTAINMENT OPEN TO THE PUBLIC</p>

3	<p>The following special characteristics associated with the assembly would be useful for the Commissioner of Police to be aware of in regulating the flow of traffic or in regulating the assembly (<i>strike out whichever is not applicable</i>):</p> <p>(i) There will be (number) of vehicles and/or (number) of floats involved.</p> <p>The type and dimensions are as follows:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>(ii) There will be <u>FIVE</u> (number) of bands, musicians, entertainers, etc. which will entertain or address the assembly.</p> <p>(iii) The following number and type of animals will be involved in the assembly:</p> <p>.....</p> <p>.....</p> <p>(iv) Other special characteristics of the proposed assembly are as follows:</p> <p>.....</p>
4	<p>I take responsibility for organising and conducting the proposed assembly.</p>
5	<p>Notices for the purposes of the <i>Summary Offences Act 1988</i> may be served upon me at the following address:</p> <p><u>520 QUIRKS LOOP</u></p> <p><u>STUART TOWN NSW</u></p> <p>..... <u>2820</u> Postcode.</p> <p>Telephone No. <u>0418669867</u></p>
6	<p>Signed <u>JP Penhall</u></p> <p>Capacity/Title <u>TREASURER - PROMOTIONS OFFICER</u></p> <p>Date <u>22-8-19</u></p>

EVENT APPLICATION FORM



This Event Application Form is required if you are staging your event on (or in part) on a Council road, footpath, reserve or park. This form does not require completion if the event is being held within a designated event venue.

Trim Reference
Office Use Only
38/637
ED

If you are planning to have an event on privately owned/operated land, please contact Council's Duty Planner on 6801 4000 to enquire regarding appropriate land use consents required.

All annual events being staged on (or in part) on a Council road, footpath, reserve or park are required to submit an Event Application Form, regardless if the event is held annually.

Before completing this form please refer to Council's Event Starter Guide.

Applications should be submitted between twelve (12) and six (6) months in advance.

SECTION 1: DETAILS OF THE EVENT	
Owner of event	Mumbil Advancement Association Inc
Name of event	Mumbil Markets and Music Festival
Location of event	Mumbil Oval
Time of Event	From: 6am To: 5pm
Date of event	7 March 2020
Bump in date/s	7 March 2020
Bump out date/s	7 March 2020
Estimated attendance	
LGA residents	2500
Day trippers (outside LGA)	300
Overnight visitors	200
Why are you organising this event	To attract people to Mumbil, promote healthy lifestyle by engaging children in sporting events. To provide an enjoyable and entertaining event for Mumbil with live music, market stalls, and food vans.
How many years has the event been held	First year
Applicant's contact details	
Name	Ben Penhall
Mobile	0418669867
Email address	penhallb@bigpond.com
Event Owner's details	
Mobile	0418669867
Email address	penhallb@bigpond.com
Postal address	520 Quirks Loop Stuart Town 2820

EVENT APPLICATION FORM



SECTION 2: OBLIGATIONS OF EVENT OWNERS			
Part 1	Element		
A	Have you tentatively booked the location?		Yes
B	I have attached a Certificate of Currency for \$20M Public Liability		No
	<p>Date of expiry _____</p> <p>If the Certificate of Currency does not cover the date of your event, your application will be processed conditional to Council receiving the Certificate of Currency no less than six months prior to the event. Notations Will provide a new one as ours has just expired.</p>		
Part 2	Element		Event Starter Guide Reference
A	Will the event be serving or supplying food?	Yes	2.6
B	Will alcohol be served or supplied?	No	5.2
C	Do you wish to use (or in part) Council roads or footpaths? Will pedestrian or vehicle traffic overspill to roads or footpaths? If yes, you are required to complete Application – Special Event - Do not submit this application without attaching the Application – Special Event form	Yes	4.4
D	<p>If you require a Traffic Control Plan developed or assessed, Council will assist based on a fee-for-service charge.</p> <p>Council can also provide resources to assist you to enact the Plan. This is also based on a fee-for-service.</p> <p>Yes, I would like Council to provide a quote. I understand that Council will charge for any services provided.</p> <p>No, I will be engaging:</p>		
E	Will your event play amplified sound? If yes, please specify time-frame 12pm - 5pm	Yes	2.8
F	Will there be a fireworks or pyrotechnics display?	No	5.5
G	Is there plans to have a jumping castle or amusement ride at your event? (See below – Event Organisers Toolbox)	Yes	5.3
H	Will there be temporary structures at your event Staging If yes, please indicate size of the stage/s _____ Marquees If yes, please indicate total area of marquee/s space 50sqm	No Yes	
I	How many people do you expect to attract to this event?	3000	
J	Have you determined number of toilets for the size of your event? Have you started work on a waste management plan?	Yes Yes	2.11 2.13



EVENT APPLICATION FORM




SECTION 2: OBLIGATIONS OF EVENT OWNERS

Part 2	Event Management Plan
Risk Management Plan <p>A Risk Management Plan is required to be submitted with this application form.</p> <p>If a Plan is not completed, please submit a draft and approval will be granted subject to the finalisation of the Plan.</p>	<p>Please select from the options below:</p> <p><input checked="" type="checkbox"/> I have attached a draft Risk Management Plan</p> <p><input type="checkbox"/> I have attached a finalised Risk Management Plan</p>
<p>It is expected that all events held in the Local Government Area are arranged and delivered in a safe and sustainable manner.</p> <p>Council may request a copy of plans as part of its assessment of your application.</p> <p>Conditional approval may be granted subject to plans being provided to Council.</p>	<p>Please indicate which plans are in place to support your event:</p> <p><input checked="" type="checkbox"/> Running sheet including roles and responsibilities</p> <p><input checked="" type="checkbox"/> Risk Management Plan incorporating Emergency Evacuation Procedure</p> <p><input checked="" type="checkbox"/> Accessibility Plan</p> <p><input checked="" type="checkbox"/> Waste Management Plan</p> <p><input checked="" type="checkbox"/> Traffic Control Plan (where applicable)</p>

SECTION 3: SUPPORT AND PROMOTION – DUBBO REGIONAL COUNCIL

Part 3	Level of support	Weblink
A	Event Organisers Toolbox including <ul style="list-style-type: none"> Planning templates Guidelines Banner Installation – Dubbo LGA Media contacts APRA guidelines Accessibility guidelines Amusement device application form 	https://www.dubbo.nsw.gov.au/Community-and-Groups/Events-Community-and-Awards/support-for-your-event
B	Event Funding	https://www.dubbo.nsw.gov.au/Community-and-Groups/Grants-and-Funding/event-funding
C	Event Promotion	https://www.dubbo.nsw.gov.au/Community-and-Groups/Events-Community-and-Awards/promote-your-event
D	Advice and Assistance Contact Council's Marketing, Events and Partnerships team (02) 6801 4000 marketingandevents@dubbo.nsw.gov.au	
F	Check on the timing of your event to avoid a clash of dates: http://dubbo.com.au/Events/calendar	

**Please complete this application in reference to
Council's Event Starter Kit
and submit no less than 6 months in advance of your event to
council@dubbo.nsw.gov.au**

Business Insurance Certificate of Currency																	
Policy Number EBU347698PK	Client Number ES127292																
<p>MUMBIL ADVANCEMENT ASSOCIATION 520 QUIRKS LOOP STUART TOWN NSW 2820</p>																	
<p>Notice Sent Via: Elders Insurance ELDERS INSURANCE WESTERN PLAIN ABN: 15 159 270 970 ATTN: DAVID GRANT PO BOX 1013 DUBBO NSW 2830 (P) 02688 14777 (F) 02688 14750 (E) eldersdubboinsurance@elders.com.au</p>																	
<p>Period of Insurance From 29/05/2018 To 29/05/2019 at 4pm</p>																	
<p>Issued By: Elders Insurance (Underwriting Agency) Pty Limited</p>																	
<p>This certificate acknowledges that the policy referred to is in force for the period shown. Details of the cover are listed below.</p>																	
<p>The Insured:</p> <p>MUMBIL ADVANCEMENT ASSOCIATION</p>																	
<p>Cover Details</p> <p>Location: 520 QUIRKS LOOP STUART TOWN NSW 2820 Risk Number 1 Business: CLUB, COMMUNITY ASSOC. OPERATI Interested Party: None Noted</p>																	
<p>Broadform Liability Section</p> <table border="1"> <thead> <tr> <th>Particulars</th> <th>Total Sum Insured</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>Limit of liability, any one occurrence</td> <td></td> <td>\$20,000,000</td> </tr> <tr> <td>Products liability, in aggregate</td> <td></td> <td>\$20,000,000</td> </tr> <tr> <td>Property in Your physical and legal control</td> <td>\$250,000</td> <td></td> </tr> <tr> <td>Excess: \$1,000 for property damage claims only \$0 for personal injury claims</td> <td></td> <td></td> </tr> </tbody> </table>			Particulars	Total Sum Insured	Limit	Limit of liability, any one occurrence		\$20,000,000	Products liability, in aggregate		\$20,000,000	Property in Your physical and legal control	\$250,000		Excess: \$1,000 for property damage claims only \$0 for personal injury claims		
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<p>Clauses</p> <p>B40: ORGANISERS The Broadform Liability Section of this Policy does not cover liability for claims in respect of:</p> <ol style="list-style-type: none"> 1. Personal injury or damage to property of persons actually participating in any performance, sport, game, contest or display involving athletic, acrobatic, military or equestrian skill or the use of firearms, missiles of any kind, explosives or combustibles. 2. Personal injury or damage to property of persons caused by the use of mechanical amusement devices. 																	
<p>Issued by Elders Insurance (Underwriting Agency) Pty Limited ABN 55 159 270 970 AFS Licence 340 965 Level 6, 400 King William Street Adelaide SA 5000 Underwritten by QBE Insurance (Australia) Limited (ABN 70 001 191 015 AFS Licence 2 395 12) Level 5, 3 Park Street Sydney NSW 2000</p>																	

RUMBLE IN MUMBIL FESTIVAL
SATURDAY 7TH MARCH 2020
MUMBIL OVAL
MUMBIL ADVANCEMENT ASSOCIATION INC.
CONTACT BEN PENHALL PH 0418669867 E. penhallb@bigpond.com

SPORTING EVENT FOR CHILDREN (T BALL), ADULT BASEBALL EXHIBITION MATCH
MARKET STALLS, LIVE MUSICAL ENTERTAINMENT, STATIC CAR DISPLAY, JUMPING
CASTLE & SLIDE. Early planning stage, further attractions will be notified with risk update.

Risk Management Plan

Identified Risks

1. Traffic movement
2. Patrons slipping, tripping or falling
3. Electricity & Gas
4. Stall holders
5. Waste & toilet hazard
6. Hot weather and wet weather
7. Emergency vehicle access
8. Fire and evacuation
9. Security
10. Medical emergency
11. Volunteer safety
12. Tree branches

Risk Control

1. Signage; 2 x Event ahead, 4 x 20km/hr, (Council or Contractor may supply).
Parking and no parking signs, 12 volunteers to handle stall holder arrival and general
public traffic. Entry gate signs.
2. Oval and footpaths to be mown, hazards to be removed or sign posted.
3. Leads and bottles to be checked.
4. Information pack will be sent to stall holders and operators outlining the appropriate
Licences, Certificates and Insurance required and their obligation toward safety. It will
include emergency phone numbers for the day and how to identify volunteer staff.

5. Toilets will be cleaned and monitored by 2 volunteers. Two mobile toilets will be on site. We would like Council to unlock the toilets at the Community Hall for the day. Volunteers will distribute 20 wheelie bins through the site and dispose of the waste. Access to Mumbil Waste Facility would be required on the day.
6. There is adequate shelter available from heat. In the event of bad weather a decision will be made whether to cancel the event.
7. Traffic control personnel will maintain an emergency route to the site.
8. Mumbil RFS (adjacent to the oval) will be notified of the event. Evacuation will be to the centre of the oval directed by volunteers and public address system.
9. Wellington Police will be notified of the event and volunteers will monitor behaviour.
10. St Johns Ambulance will be on duty and Wellington Ambulance notified of the event.
11. Volunteers will be identified by special Festival vests. There will be a number of meetings to discuss personal safety prior to the event.
12. A Council employee has inspected some of the trees at the oval and expressed a need for attention.

Level of Risk

1. C2
2. C2
3. E4
4. D3
5. D2
6. C2
7. D2
8. E3
9. D2
10. C3
11. C2
12. D3

PRELIMINARY FLYER TO OUTLINE THE CONFIRMED ACTIVITIES

MUMBIL MARKETS & MUSIC FESTIVAL

7th March 2020 at Mumbil Oval 9AM – 5PM

PROMOTED BY MUMBIL ADVANCEMENT ASSOCIATION INC. and supported by DUBBO REGIONAL COUNCIL

FOR THE PLEASURE OF LOCAL'S AND VISITORS - EXTENSIVE TV AND MEDIA ADVERTISING

UP TO 100 MARKET STALLS - SPORTING EXHIBITIONS – CHILDREN & ADULTS

60'S TO 90'S MUSIC PLUS COUNTRY & WESTERN



FEATURING; DON COSTA, Australian Country Music Hall of Fame

MICK AUSTIN – TRACY CHARMAN – Wellington

SIMON BUSSMAN – Central Coast

Other artists to be confirmed

CAR DISPLAYS, JUMPING CASTLE



VINTAGE AIRCRAFT FLYOVER & AEROBATICS

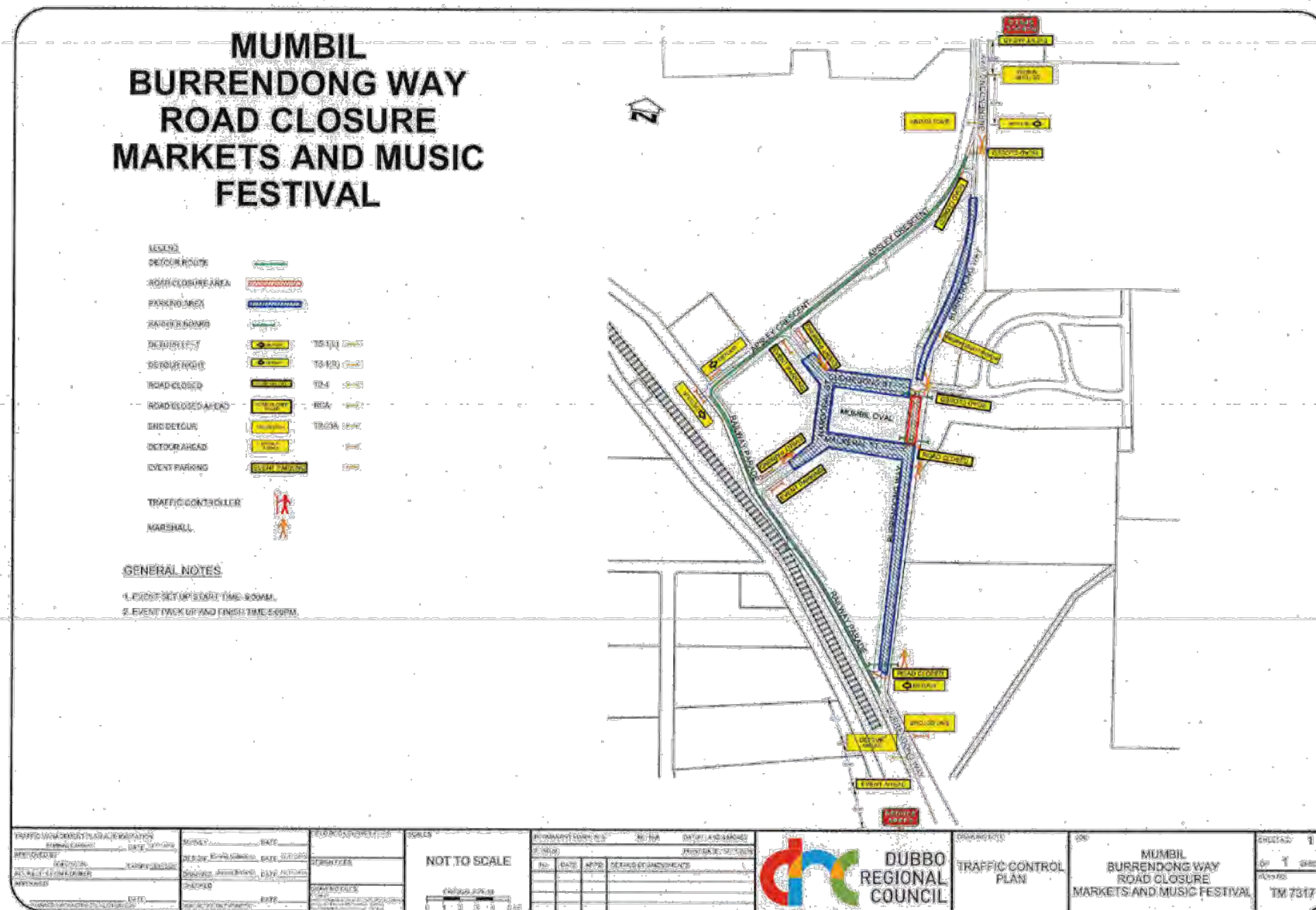


HAY RUN TOMMY'S TRUCK RECEIVING DROUGHT DONATIONS

GLOSSY PROGRAM OF EVENTS WITH LUCKY NUMBER DRAW

MANY FURTHER ACTIVITIES TO BE CONFIRMED

ENQUIRIES TO; BEN 0418669867



Mackeral St	200m parallel parking northern side	=	33
	200m angle parking southern side = 64 – 5 driveways	=	54
Cudgegong St	200m angle parking both sides = 129 – 3 driveways	=	123
Burrendong Way			
South end	400m angle parking both sides = 258 – 3 driveways	=	252
Burrendong Way			
North end	300m Parallel parking West side	=	50
	300m angle parking East side		
	Depth of I to 3 vehicles	=	190
Community Hall	leaving area in front of Hall vacant	=	25
Naroogal St			
North end	100m angle parking both sides	=	64
Centre	100m angle Handicap parking		
	one side – entry gates	=	28
South end	With driveways	=	5
Vacant block			
Naroogal St			
South		=	20
Apsley Crescent			
Which is quite wide			
Each side	600 m parallel parking	=	200
Continuation of			
Cudgegong St			
To the east into			
Bonada etc	Minus driveways	=	100
Vacant block			
Naroogal St			
North	100m 2 to 3 car depth	=	80
Apsley Crescent			
Opposite Hotel	Vacant block for overflow	=	200
Vacant block			
Top Railway			
Pde	Overflow	=	40
School compound		=	20
Total			1484

My experience in managing The Man From Ironbark Festival in Stuart Town for 4 years, building to a crowd of 5000, and considering Stuart Town being no bigger than Mumbil, I believe Mumbil can cope with the anticipated crowd. Considering any Festival has a transient attendance with people arriving at 8.30am, leaving two or three hours later and another wave arriving say 11am, leaving 2pm another wave arriving 1 pm, staying until 4pm, the total of vehicles at any one point should not exceed 1000. Hard to gauge occupants of vehicles, but given that it's a fair drive from major centres one would expect an average of at least 3 if not 4 to 5 passengers per vehicle. Also considering there are over 200 residents in Mumbil who will walk to the Festival and don't require parking.

I will appoint two more traffic marshals to regulate traffic in Apsley Crescent and overflow parking areas.

The corner at the Hotel was a point discussed as to heavy vehicles negotiating it, I have enclosed photos of this corner for you to review. If 2 semi's negotiated this corner in opposite directions, they would barely need to be over cautious as there is room to move over and pass without difficulty. If it were 2 B Doubles it would be a bit of a shuffle but from what I understand they should not be on Burrendong Way.

Our Committee want this event to succeed for Mumbil and for the landholders particularly who are suffering under the drought conditions. A day out, with the entertainment we are providing will hopefully give everyone a lift and a reason to push through the difficult times.

Thanks Dennis for your support, trust members of the Committee will attend and review the operation with input for the next one. It is a bit of a gray area and promoters need input from professionals to get it right.

Best Regards, Ben Penhall,
Festival Manager



REPORT: Macquarie River CBD Masterplan

AUTHOR: Director Liveability
REPORT DATE: 26 November 2019
TRIM REFERENCE: ID19/1600

EXECUTIVE SUMMARY

At the Ordinary Meeting of Council held on 25 June 2018 the Mayor tabled a Mayoral Minute on Focusing on the Beautification of the Macquarie River Corridor of the Dubbo Central Business District, and it was resolved in part that:

“4. That savings identified at the December 2017 Quarterly Operational Plan and Budget Review allocate \$60,000 to the development of a Master Plan for CBD parks and reserves that are between the LH Ford and Serisier bridges.

5. That the Dubbo Stampede and Titan Macquarie River Mud Run Committee be invited to be integral contributors to the new masterplan in view to their former proposed upgrades to the river corridor be an equally significant component of the new CBD plan.

6. That Council consider the allocation of \$500,000 to the embellishment and improvement of CBD parks and reserves that are between the LH Ford and Serisier bridges during the development process of the Draft 2019/2020 Operational Plan and Budget and associated draft Delivery Program”.

Following a subsequent Councillor workshop during February 2019, an expression of interest was developed to source suitably qualified and experienced landscape designers from which Group GSA were appointed.

Group GSA has provided two (2) well considered masterplan offerings for Council’s consideration, for the Macquarie River CBD masterplan, defined as the *Wandering stage* and *Dubbo Borough*. This follows a Mayoral minute from June 2018, to activate the riverfront, between LH Ford Bridge and Seriser Bridge.

FINANCIAL IMPLICATIONS

The project in its entirety has been costed at more than \$3.5 million. Monies allocated to date include five hundred thousand dollars \$500,000 allocation an additional \$200,000 specifically for an amenities building, as a part of the 2019/20 Liveability, Recreation and Open Space budget; and more recently a NSW State Government grant funding allocation, for the sum of \$2,6 million.

POLICY IMPLICATIONS

Development and implementation of a Macquarie River CBD masterplan is consistent with Dubbo Regional Council's *Community Strategic Plan*, Community Leadership theme 4.3, "the resources of Council are appropriately managed"; Liveability theme 5.5, "the community has an opportunity to participate in a diverse range of lifestyle, sporting and passive recreational pursuits"; and the economy theme 3.8 "the Dubbo Central Business District... is strategically managed to promote occupation, activity and investment".

RECOMMENDATION

- 1. That of the two draft masterplans, Wandering Stage and Dubbo Borough provided by Group GSA be endorsed for purposes of public exhibition.**
- 2. That a further report be presented to Council in April 2020.**

Skye Price
Director Liveability

BACKGROUND

The Macquarie River CBD masterplan is inclusive of the eastern riverfront between LH Ford Bridge and Seriser Bridge. It gives due consideration to Riverside Park, Ollie Robbins Oval, Hans Clavan Oval; as well as Macquarie Lions Park; and Visitor Information Centre.

The Central Business District thoroughfares to the Macquarie River precinct include Church Street, Wingewarra Street, Bultje Street; and Talbragar Street. Bligh Street is adjacent to the precinct, along the eastern perimeter; and Macquarie River waterfront is on the western perimeter.

The masterplan options have been devised following comprehensive scoping, research and community engagement. During May 2019 a preliminary site meeting and work consideration occurred, with prospective design organisations.

The genesis of this project was a Mayoral Minute tabled at Ordinary Council, 25 June 2018. This Mayoral Minute had a dual focus. First, rescission of the Regand Park Master Plan. Second, development of a master plan which would beautify and further activate the Macquarie River corridor (eastern side) between the LH Ford Bridge and the Seriser Bridge. A Councillor Workshop was then held during February 2019, to suitably define the area for which the master plan would be developed; and to provide Councillors with an early opportunity to identify opportunities, areas of concern; and general feedback pertaining to the approach which was being undertaken.

Following the Councillor Workshop, an Expression of Interest was developed to ascertain the level of interest by suitably qualified and experienced landscape designers, for development of a Macquarie River CBD Masterplan. The Expression of Interest was advertised in the Sydney Morning Herald and via Tenderlink. Dubbo Regional Council received seventeen (17) Expression of Interests. Following an assessment of Expression of Interests submissions, six (6) businesses were invited to proceed to quotation stage. Five (5) quotations were subsequently received. Group GSA was engaged during June 2019 on the basis of price and ability to complete works in accordance with quotation specifications.

Subsequently, Group GSA representatives John Holland and Katie Earle have been working with the Recreation and Open Space team to ensure that designs provide an increased level of access to the Macquarie River; and significantly enhance the existing event precinct that will have the ability to attract large community and commercial events, driving economic activity with the Central Business District; and providing strong, expansive environmental benefits through rehabilitation and restorative planting.

A community consultation workshop occurred Friday 20 September 2019, with more than forty participants, Council staff and Group GSA representatives. Conceptual drawings were provided for stakeholders' consideration. Round table discussion then occurred with regard to community needs and aspirations.

Community representation was diverse, inclusive of sporting groups: Dubbo and District Football Association, Macquarie Titan Mud Run, Dubbo Triathlon Club; environmental groups: Dubbo Field Naturalists and Conservation Society, Dubbo Bush Care, Dubbo River Care, Inland Waterways Rejuvenation Association; NSW Department of Primary Industries – Fisheries, Outback Dragon Boat, heritage representatives, Western Paddlers NSW; as well as NSW Department of Roads and Maritime Services. Broader community consultation was sought through a pop-up stall at the Farmer's Markets on Saturday 21 September 2019. A total of 30 submissions (mostly positive) were received from this targeted community consultation.

A Councillor workshop occurred Monday 29 September and the Macquarie River CBD masterplan was one of the agenda items. Three conceptual options were presented for Elected Member consideration. It was requested that the concepts be refined; and that the two strongest options be presented for Council's later consideration.

It will be recommended that the two concept designs be publicly exhibited to enable the community to provide further feedback for development of the final master plan.

REPORT

Group GSA has expanded upon original conceptual drawings, then integrated feedback from community stakeholders, as well as Elected Members, to devise two (2) thorough and considered masterplan options, the *Wandering Stage* and *Dubbo Borough*.

Central Business District

Both masterplan options embrace the requirement to integrate the CBD with the riverfront, as well as consideration in providing a strong visual and functional link through to Macquarie Street via structural elements and street tree planting.

Tracker Riley cycleway

The masterplans understand and capitalise on the established Tracker Riley cycleway by creating destination points along the path system, which also has the potential to significantly revitalise the area, encouraging people to visit as pedestrians and on bicycles and encouraging between interaction and expenditure in the Central Business District, by deliberate thoroughfare design.

Sporting ovals

The masterplans acknowledge that the existing sporting fields (Hans Clavan fields) for soccer, have a relatively low usage (mostly activity occurs during the winter sporting season); and there is the potential to increase utilisation of this area. An important consideration in the transferring of soccer from the Hans Clavan Fields is that Council is currently constructing new soccer fields at the former Pavan's / Battistell's site. These new fields will easily compensate the loss of the two (2) fields at Hans Clavan Fields. As such, the sporting fields in the precinct can become multi-purpose facilities.

Council ownership

Dubbo Regional Council has a policy that has been in place since the 1960s, of securing ownership along the Macquarie River frontage.

As a result of this policy, Council owns or manages approximately eighty-five percent (85%) of the Dubbo urban river corridor. Master planning has occurred between the LH Ford Bridge and Seriser Bridge with an understanding that Council manages this land as the Trust Manager.

Flooding

Master planning the two designs has also been cognisant that structures will be of suitable materials and utilise contemporary construction techniques, able to withstand periodic inundation along the Macquarie River corridor.

It was also identified early on in the design process that the Macquarie River CBD river foreshore precinct needed to have strong structural and visual links to Macquarie Street. To achieve this, a number of structural elements have been incorporated in the roundabout and prominent nodes. To achieve an increase in luminance in the Central Business District, and to create a positive point of difference between Dubbo and other centres, structural elements are proposed that will have LED lights built into their form. This approach works towards potentially eliminating potential vandalism, limits damage by birds and other wildlife; and activates the spaces, for longer durations, which leads to passive surveillance, too.

THE WANDERING STAGE - MASTERPLAN



THE DUBBO BOROUGH - MASTERPLAN



STRUCTURAL ELEMENTS

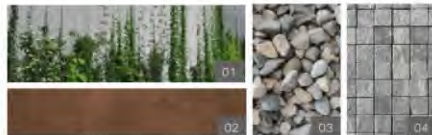


01 SCULPTURAL ROUNDBABOUT

AIMS

- TO CREATE A SENSE OF ARRIVAL AND PLACEMAKING
- WAYFINDING AND DIRECTIONAL
- CONNECTING CENTRAL STREETS THROUGHOUT THE CBD

MATERIALS



- 01- STAINLESS STEEL TRELLIS SYSTEM CONNECTED TO STRUCTURE
- 02- FEATURE COB-TEN STRUCTURE
- 03- PEBBLE EDGE / PERMEABLE EDGE
- 04- COBBLE / VARYING ROAD TREATMENT TO CENTRAL STRUCTURE

PRECEDENTS



03 PLAY ELEMENT

AIMS

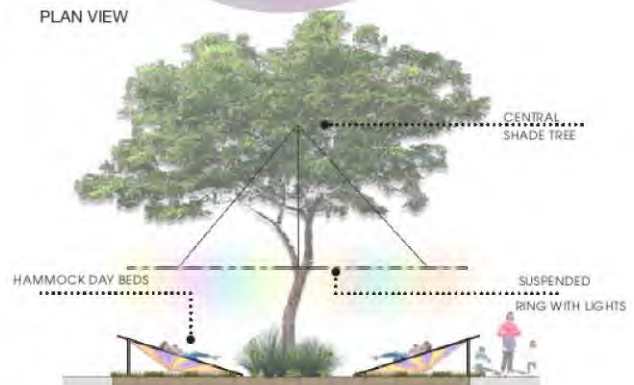
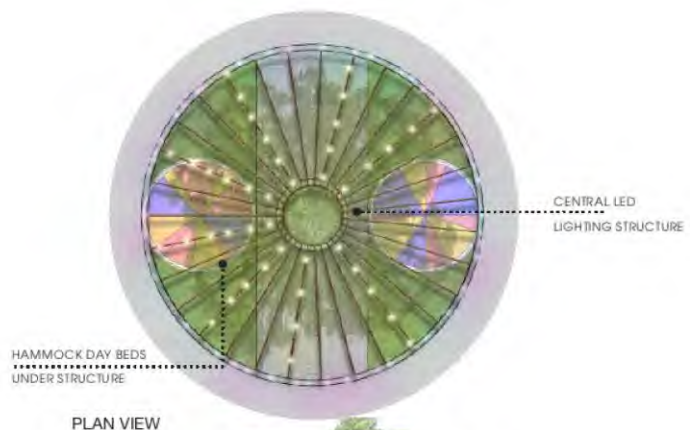
- TO CREATE A SENSE OF ARRIVAL AND PLACEMAKING
- INTERACTIVE AND INTERESTING LIGHT DISPLAY THAT ACTIVATES SPACES

MATERIALS



- 01- FEATURE COB-TEN STRUCTURE
- 02- COLOUR DISPLAY AT NIGHT BECOMES LED LIGHT DISPLAY
- 03- HAMMOCK DAY BEDS

PRECEDENTS



SUMMARY

Group GSA has provided two (2) well considered masterplan offerings for Council's consideration, defined as the *Wandering stage* and *Dubbo Borough*. Importantly, the masterplan documentation is inclusive of better connectivity with the Central Business District, as well as genuine activation of the Macquarie riverfront precinct. The masterplan options make provision for a dedicated event staging space, as well as sports and recreation, within the broader precinct. The masterplans also capitalise on the waterfront, by ensuring adoption of place making principles, providing for additional tree planting, vegetation and shade, as well as aesthetically appealing promenades for all abilities, enhanced amenities; and social gathering opportunities.



REPORT: Aquatic Leisure Centres interim season report

AUTHOR: Director Liveability
REPORT DATE: 29 November 2019
TRIM REFERENCE: ID19/1607

EXECUTIVE SUMMARY

This report constitutes an interim update, pertaining to Council's Aquatic Leisure Centre assets and operations, during the 2019/2020 financial year. There were staggered commencement dates at Dubbo, Wellington and Geurie pools. As at the end of November 2019, more than 19,000 people had been in attendance. Cumulative revenue at that time was \$136,000. This report also provides observations from the broader sector; as well as intended actions for the balance of the 2019/2020 season and into the 2020 calendar year. Such considerations are inclusive of plant and equipment auditing and renewal; ongoing infrastructure modifications and improvements; commercial assessment and business plan development; marketing and promotional planning, with regard for demographic profiling and historical usage patterns; as well as preliminary feasibility and facility diversification scoping, particularly for an indoor Dubbo facility.

FINANCIAL IMPLICATIONS

Pool takings for the 2019/2020 season as at 30 November 2019 totalled \$136,000. It is important to highlight that the Wellington facility season commenced later than usual, that the official opening day was free; and that a two dollar entry fee is applicable for individual entry at the Wellington facility, until 26 January 2020. (A casual adult visit is usually \$5.20). The two dollar entry fee also impacts the sale of season and multi-entry passes. Many people chose not to purchase a multi-entry, or season pass, in lieu of Council endorsed two dollar entry options.

POLICY IMPLICATIONS

Aquatic Leisure Centres' management and operations are consistent with Dubbo Regional Council's *Community Strategic Plan*, Community Leadership theme 4.3, "the resources of Council are appropriately managed"; and Liveability theme 5.5, "the community has an opportunity to participate in a diverse range of lifestyle, sporting and passive recreational pursuits".

RECOMMENDATION

- 1. That the report of the Director Liveability dated 29 November 2019 be noted.**
- 2. That an end of season report be provided to Council in April 2020.**

Skye Price

Director Liveability

BACKGROUND

During the 2019 off-season, Dubbo Regional Council assessed personnel structures, operations; and Aquatic Leisure Centres compliance. Periodic review of all Council functions is critical, to ensure community safety and wellbeing, legislative adherence, bench marking against industry standards; and identification of opportunities for improvement.

Aquatic Leisure Centre assessments revealed concerns with regard to aged and dilapidated infrastructure, inclusive of plant room equipment; unsafe, non-compliant, chemical bunding and storage; limited merchandise offerings; limited café offerings; fluctuating aquatic classes/lessons product offerings; archaic entry systems; and inconsistencies with regard to group bookings, as well as event bump-in, implementation and bump-out.

Dubbo Aquatic Leisure Centre commenced the season, 7 September 2019. Geurie's aquatic facility season began 2 November 2019. Wellington Aquatic Leisure Centre's new \$8.25 million facility grand opening with Mayor Ben Shields, State Member, Dugald Saunders and dignitaries, occurred 16 November 2019. All three facilities have been operating a full breath of opening hours since that date.

Facility opening hours

Site	Monday – Friday	Saturday	Sunday
Dubbo	5:30am – 8:30pm	6:00am – 8:30pm	10:00am – 8:00pm
Wellington (October – March excluding January)	6:00am – 6:30pm	8:00am – 6:30pm	10:00am – 6:30pm
Wellington (January)	6:00am – 7:30pm	8:00am – 7:30pm	10:00am – 7:30pm
Geurie	6:00am – 7:00am 12:00pm – 7:00pm	9:00am – 7:00pm	9:00am – 7:00pm

Pool season closure: 29 March 2020

REPORT

Aquatic Leisure Centres are dynamic community facilities. They require dedicated, multi-disciplined staff, to ensure both efficient, effective front-of-house customer service interactions and seamless back-end operations.

Additionally, there are a range of wellbeing considerations with regard to operating Aquatic Leisure Centres. Ongoing variables pertain to weather, pool conditions inclusive of water quality and equipment functionality, fluctuating patron numbers because of the time of day, season, or weather; staffing qualifications and capabilities; as well as community expectations.

The return on investment for Aquatic Leisure Centres is immeasurable. This is amplified during periods of drought. Council has an obligation to offer safe, well maintained, aesthetically appealing, contemporary facilities, for locals and visitors. Swim skills are a safety and survival requirement. They are also positive for health, recreation and leisure. People from socio-economically disadvantaged backgrounds would not have an opportunity to gain such skills, or enjoy the water, if public aquatic leisure facilities were not offered.

Organisational structure and management

It is imperative for Dubbo Regional Council to grow a consistent, user centric culture, at all three facilities. By choosing to adopt a model of management with direct responsibility for all three Council sites – Dubbo, Wellington and Geurie – standardised service delivery and best practice aquatic leisure facility practices can be consistently implemented and upheld.

Introduction of contemporary management principles means that all team members participate in corporate induction processes, as well as ongoing training and development. Personnel are equipped to have all interactions in keeping with a specific customer service charter. Senior staff will also progressively be able to proactively consider existing user wants and needs, as well as plan for target audiences who do not presently make use of the facilities.

One of the immediate actions related to this priority included transition to a sophisticated, industry specific software, Point of Sale system, Links. The Links system provides a range of modules to ensure that membership classifications are suitably developed, entered and recorded. It is scalable for multi-site facilities like Dubbo Regional Council's Aquatic centres. Customer service team members can now quickly create new digitised member contacts, set up payments, find available program and class times, make reservations, generate invoices; and track customer history. The Links software also reduces costs through integrated payment processing; and can increase revenue with a range of customer relationship tools.

Culture of safety

Royal Lifesaving Australia were engaged to undertake an Aquatic Facility Safety Assessment at Dubbo and Geurie facilities, at the conclusion of May 2019. Assessment of the Wellington facility will follow shortly. Staff have been working diligently to address and resolve matters identified as a part of the Safety Improvement Plan; as well as adopting a safety centric culture, in terms of everything that all team members do, at all times.

One of the most important considerations with regard to pool management and safety pertains to water quality, in each separate pool. The NSW Department of Health conducts periodic spot checks and water testing at each of Council's aquatic leisure centre sites. The Department of Health also prescribes microbiological criteria parameters for public pools, which Council upholds. Additionally, Council's Environmental and Health Compliance team conduct periodic testing. Further, lifeguards on site conduct four hourly manual water testing. Test results consider pH levels and any water contamination. Periodically, Council may seek other independent third-party testing, too. Water quality results are consistently in acceptable statistical ranges. Predominant concerns with water quality at present pertain to dust from storms; and leaves, from strong, prevailing winds.

Plant and equipment

Economic rationalisation has been an important consideration with regard to Dubbo Regional Council Aquatic Leisure Centres. A model of management with direct responsibility for all three Council sites ensures that operational costs pertaining to consumables, particularly pool chemicals is now minimised because consolidated buying has been implemented.

Comprehensive auditing pertaining to existing infrastructure, plant and equipment is also in the process of being undertaken. Independent third-party industry specialists Trisleys conducted a two-day on-site assessment, comprising consideration of both the Dubbo and Geurie facilities, during mid-November.

With rigorous assessment of Council asset water usage and troubleshooting on site, it became apparent that there is a long-term, slow water leak from the Dubbo facility, fifty metre pool. Unfortunately, the leak was not previously reported to Dubbo Regional Council. Extravagant difference in water consumption readings between 1 September 2017 and 1 September 2018 confirm the leak. Information pertaining to the pool leak assessment will be forthcoming. Then, priority leak mitigation works, as well as a staged renewal and a rigid periodic service maintenance plan can be developed and implemented.

Date	Water consumption (kilolitres)
1 September 2017	3,817
1 September 2018	6,383

Dubbo Aquatic Leisure Centre water consumption readings

A preliminary report from Trisleys pertaining to plant and equipment has been received. It is apparent from the report that pumps and equipment associated with operation of the Leisure Pool have reached the end of their useful lifespan and that they are all in poor repair. This provides explanation for the leisure pool periodically being offline, due to pump functionality complications. Trisleys has also been commissioned to prepare operational manuals and technical guidelines for chlorination/reticulation systems at the Dubbo facility because they were not on site, following contractor handover.

Infrastructure improvement program

Dubbo improvements

Extensive facility improvements have included thorough site clean-up of soil piles and rollout of landscaping works. Correction of hazards including removal of numerous steel star pickets, repair of irrigation, replacement of both broken and missing concrete pit covers, removal of several pallets of terracotta roof tiles and removal of timber off-cuts have also been addressed. Removal of non-compliant wheelie bins has occurred; and removal of obsolete pool covers and reels is pending. Repair and improvement of security and emergency access gates has also occurred. Gates are now accessible and compliant, for emergency services.

Further, Safe Work Methods Statements and enhancements to more modern pool cover systems, are being devised for ongoing use. A security assessment is also being undertaken

with an improvement program being implemented, including progressive rollout of a new master key locking system, and up-to-date key register; across all three sites.

Roll-out of Closed Circuit Television (CCTV) in work spaces for the safety of staff, as well as assets, inclusive of plant and equipment, will also occur, after a legislative mandatory notice period for staff has concluded. There have been unexplained incidents of valve and pump adjustments, during night time hours, for some months, which are the subject of Police investigation.

Assessment of water slides revealed corrosion, rusting and compromised integrity of several uprights. As such, replacement of five galvanised steel posts and other components occurred, before slides were commissioned for the season.

A signage audit of the facility also occurred and Royal Lifesaving Australia compliant signage was sourced and implemented. Additionally prior to season opening, reconfiguration of the existing building occurred to better utilise space and integrate office/administrative work spaces. Significant repairs to the pool shell, including tile replacement and resealing expansion joints also occurred.

Further, there are preliminary plans to enclose the breezeway entrance to the facility, offering a more sophisticated front-of-house experience, introducing improved signage and messaging, as well as a greater swim and aquatics merchandise, inclusive of a convenience and suggestive selling range. This can occur via a potential affiliate marketing opportunity with a local sports store; or independently, with large commercial providers, like Speedo and Aqualink.

With additional, well planned amenities, pool facilities can become social hubs and recreation destinations unto themselves, equipped to ensure greater patronage; and greater lengths of stay. Attention to amenities is important and there was an opportunity to capitalise on the café offering at the Dubbo facility, in particular. The Dubbo café is currently being refurbished to integrate a dedicated cool room, a commercial catering fit-out, and extensive new decking, for tables, chairs and market umbrellas. The deck and café serveries are in the process of being enhanced and expanded, to ensure that potential clientele from Victoria Park gardens and playing fields can purchase meals, snacks, refreshments and enjoy the ambience of the gardens, without necessarily accessing aquatic leisure offerings. This expands the potential revenue streams for the café. There will also be a diversification of café product offering.

Wellington improvements

The traditional entrance to the Wellington Aquatic Leisure Centre, was a 1950s red brick structure, with turnstiles and an enclosed breezeway. Retrofitting the entrance was not considered during master planning for the new facility. However, Council funds were sought and awarded during a mid-year 2019/2020 budget review, to fit out the former entrance as a multi-purpose/meeting room facility, inclusive of kitchenette, family change room's pool side; and ambulant access from the Warne Street frontage. This maintains the traditional façade of the original entrance, whilst ensuring that the former entry area is practical and functional, as a part of the new facility. There is also capacity to work collaboratively with Wellington Swim Club, to retrofit the traditional stand-alone club room. Otherwise, the brand-new complex should adequately accommodate ongoing adaptation and growth, for many years to come.



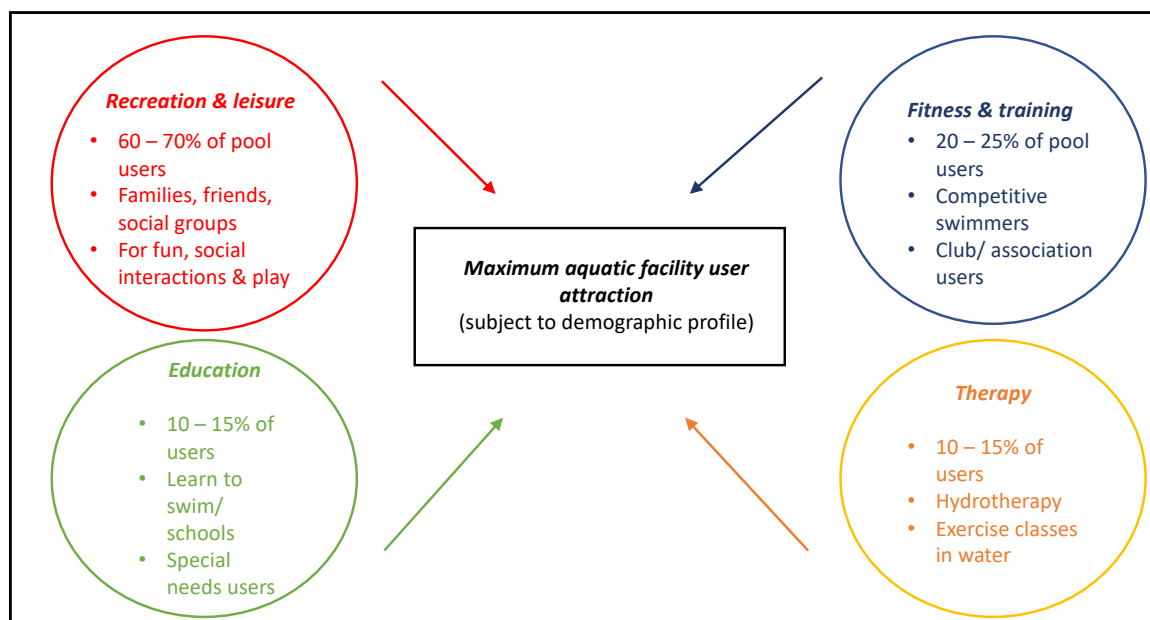
Image: Aerial view of new Wellington Aquatic Leisure Centre, November 2019

Branding, marketing and publicity

The infrastructure at the Dubbo Aquatic Leisure facility was aesthetically unappealing and there was no strong street presence related to the facility. As such, a rebranding and presentation improvement plan has been embarked upon. This involves prominent Dubbo Regional Council signage, facility signage and more contemporary promotion of the facility. Eighty-five percent (85%) of rebranding has been completed. Signage for the external grandstand wall facing north to Talbragar Street is pending. Signage for the front entrance of the facility, facing due west onto Victoria Park, is pending and is expected to be completed prior to Christmas. Way finding and promotional signage will also be installed on street furniture, at the intersection of Talbragar and Darling streets.

During the 2020 off-season, a review of leisure offerings in terms of casual classes, swim programs and events will occur. Then, a comprehensive marketing plan and publicity strategy will be developed, with due consideration for usage patterns and custom during the 2019/2020 season, as well a focus on specific non-user demographic target audiences.

Contemporary aquatic leisure facilities have four main market segments, comprising recreation and leisure, fitness and training, education, as well as therapy.



Aquatic facility trends

Warm water exercise (hydrotherapy pools)

Aquatic therapies are experiencing exponential growth. They are the fastest growing form of aquatic activity in Australia. General Practitioners, personal trainers, physiotherapists, occupational therapists and other healthcare professionals acknowledge the benefit of aquatic therapies and are increasingly prescribing water exercise programs for rehabilitation, injury prevention and pain management.

Development of indoor aquatic facilities for Dubbo

Local government authorities are increasingly constructing and operating indoor aquatic complexes; diversifying from traditional fifty metre pools, to better accommodate a range of demographic profiles, interests and water competency skill levels. This model of facility also offers a better financial and social return on investment, particularly if there is critical mass. Dubbo's population was 39,392 as at 30 June 2018. Projected growth allows for an additional 10,000 residents in Dubbo, by 2036.

Taking account of private sector indoor pool offerings in the City, there is feasibility for Dubbo to offer a diversified indoor facility, with recreation/play water offerings. Given Dubbo's heatwaves, current drought conditions and associated dust storms, an indoor facility would be a positive enhancement of offerings. A point of difference could pertain to the type of play water offering. A wave pool concept could be an integral element of a new space, for the Orana and greater western NSW. The velocity and frequency of waves, can be adjusted according to the needs of clientele, e.g. a school group visit, or seniors. Lightening Ridge has a traditional wave pool, with simplistic mechanisms. Darwin Waterfront in the Northern

Territory has a more contemporary offering, similar to a larger scale, Wet n Wild on the Gold Coast in Queensland. Casey ARC in south east Melbourne has a smaller scale version; and Melbourne metro has a large URBNSURF dedicated surf facility on a grand, commercial scale.

Leisure water play areas

Water play areas, or splash pads, with zero depth, are the latest trend in aquatic recreation. Splash pads incorporate various types of water elements including a relatively flat surface covered with colourful resilient surfacing, interactive water sprays emanating from the ground; and vertical play elements. Splash pads are commonly located within aquatic facilities, highlighting a deliberate focus upon accessibility, safety, innovation and affordability.

The Dubbo facility integrates a complex splash pad offering with slides, buckets, as well as spray components, which have only been operational for two seasons. There is also a leisure/learn to swim pool, as well as a ten lane, fifty metre pool and two elevated water slides. The infrastructure associated with the water slides is dated and periodically failing.

The Geurie facility is 23.5 kilometres from Wellington and 30 kilometres from Dubbo. The twenty-five metre pool is aged and dilapidated, with some water leakage. A viable facility improvement strategy might be to transition conventional pool facilities to a splash pad offering. This reduces the use of water and chemicals. It also reduces active supervision requirements, meaning that fewer staff need to be on site, during opening hours. Training and competitive swimming is more likely to occur in a fifty-metre pool, at neighbouring Wellington, or Dubbo. A splash pad would offer recreation and play for the most prevalent users, in Geurie.



Image: Wellington local Lola enjoys splashing at Wellington Aquatic Leisure Centre.

Gymnasiums and saunas amenities

There are several gymnasium offerings in both Dubbo and Wellington. However, feasibility studies will be undertaken to ascertain whether childcare/crèche, school holiday programming and/or gym circuit equipment should be offered at the Dubbo and Wellington facilities. During the interim, carpentry work will be undertaken to improve functionality, storage and display of ephemera in the existing multi-purpose room.

Universal access

All abilities access is important for people undertaking injury management, as well the aged; and infirm. This usually integrates ramp access into pools, hoists, accessible toilets and change facilities. Dubbo Regional Council facilities are well equipped with regard to universal access offerings and principles.

Allied health

New aquatic facilities are increasingly providing health and therapeutic services such as health consultancies, naturopathy, weight loss; massage and other therapeutic services. Dubbo Regional Council has capacity for these offerings at the Dubbo and Wellington sites, in an affiliate, or consulting room leasing arrangement. This will be further explored, as a part of formal business plan development.



Image: Neil, senior lifeguard and avid morning lap swimmer, in Dubbo, enjoys the water.

Environmentally sustainable design

Commercial, domestic and public buildings now integrate design principles which minimise environmental impacts. There are also many strategies for retrospectively fitting and adapting existing buildings. Sustainable features include water and power efficient appliances and fixtures.

Water saving measures and harvesting of rainwater, have also been given consideration. A request to install a 20,000 litre tank at the new Wellington facility was made, during October 2019. This will enable Council to conserve potable water, when washing down concourses and utilising water for other ancillary purposes.

Dubbo Regional Council now has Water Saving Action Plans (WSAPs) for each of the three aquatic facilities. This documentation was completed during November 2019. Requests have been made for drought allocation funding, to transition shower heads and implement shower timers, at each of the facilities. Automatic switch off mechanisms will also be rolled out for aquatic facility taps, where Council doesn't already have them. Senior staff are also working with the Environmental Protection Association (EPA), to investigate and potentially introduce formally mandated reuse of stormwater runoff. If endorsed, this will also lead to significant water saving.

Investigations to fund changeover to LED lighting rollout for the Dubbo Aquatic Leisure Centre and Geurie Pool are also being undertaken. Additionally, the prospect of retrofitting solar panels at each of the three sites is being investigated.

Demographic review

The estimated population in 2019, for the Dubbo Regional Council area is 52,445. In 2036, the forecast population will be 60,866. As such, the population throughout the Local Government Area and the greater Orana can sustain a diversified Dubbo Aquatic Leisure Centre offering, a Wellington offering and a customised, Geurie offering.

Future market growth potential

The current median age is 37, lower than the national average. The age profile for the Local Government Area will continue with the trend of being younger than the greater nation, too. This creates merit for aqua play and diminishes anticipated requirements for warm water therapy offerings, as is the predominant need in other regional centres and metropolitan areas. This indicates a need to focus on target audiences comprising young families and people early in their trade or professional careers.

Demographic information will be utilised in collaboration with community surveys, stakeholder focus group session outcomes and usage data, to develop a targeted marketing plan and publicity campaign for the 2020 pool season.

Aquatic Centre usage to 25 November 2019

	DALC 28 September onwards	WALC 16 November onwards	GALC 2 November onwards
<i>Admissions</i> – including general public, fitness passport and memberships	15,784	3324 (including 1,067 on the opening day)	331
<i>Learn to swim</i> Term 4 enrolments	77	111	0
<i>Learn to Swim</i> school programs delivered by Council staff	380	75	0
schools visiting the facility to teach <i>Learn to Swim</i>	3 schools 1 x Western Region Schools Assn (delivery for 8 schools)	2	2
Aqua Aerobics programs – community run	1	1	
Squad training and club nights	2 (Thursday and Friday)	2 (Tuesday and Friday)	
Community training courses conducted at the facility	1 fitness trainers 1 First Aid 4 pool lifeguard training courses		
Carnivals	2 (700+ participants, visitors and volunteers attending)		
School PE Sport	2	2	
Triathlon	2 meetings (monthly events)		
Water Polo	1 weekly competition (Tuesday)		
Water slide bookings November	14		
December 2019 Waterslide bookings	43		

SUMMARY

A range of simultaneous improvements for Dubbo Regional Council aquatic leisure centre facilities are currently being undertaken. The next significant steps related to the facilities include thorough review of the 2019/2020 season; development and rollout of a five-year, staged business plan; development of marketing and publicity plans; as well as feasibility and stakeholder engagement related to facility diversification and potential indoor aquatic offerings.



REPORT: Dubbo Regional Council - Recreation Strategy 2030 - Results of Public Exhibition

AUTHOR: Recreation Coordinator
REPORT DATE: 20 November 2019
TRIM REFERENCE: ID19/1578

EXECUTIVE SUMMARY

At the September 2019 Ordinary Council Meeting the draft Dubbo Regional Council Recreation Strategy 2036 was tabled and it was resolved that:

- "1. That the report by the Manager Recreation and Open Space, dated 20 August 2019, be noted.*
- 2. That the Dubbo Regional Council Recreation Strategy be approved to go on public exhibition for 28 days, with a further report to Council following feedback from the community and any required amendments."*

Public exhibition commenced in late September 2019 through the Dubbo Regional Council website, which was then followed up in the Council Snapshot in the Dubbo Photos News published 3 October 2019 and emailed to the Dubbo Regional Sports Council members on Wednesday 2 October 2019.

FINANCIAL IMPLICATIONS

The Recreation Strategy 2030 will assist in the delivery and prioritisation of capital works upgrades and maintenance of sporting facilities supporting transparency and equity in use of public funds.

The Recreation Strategy 2030 will also assist Dubbo Regional Council in the preparation of future grant funding applications to reduce the financial burden on the ratepayers of Dubbo.

POLICY IMPLICATIONS

The Recreation Strategy 2030 supports Dubbo Regional Council Community Strategic Plan 2040 principles:

Theme 5:

Liveability

5.5 The community has the opportunity to participate in a diverse range of lifestyle, sporting and passive recreational pursuits.

Strategy:

- 5.5.1 Access to recreation and cultural facilities for young people are improved.
- 5.5.2 Quality passive and active open space is located to maximise access and use by the community.
- 5.5.3 Unique recreational facilities and opportunity are available.
- 5.5.4 Our sporting facilities are recognised as catering for a wide range of local, regional and state sporting events and opportunity.

RECOMMENDATION

- 1. That the report by the Recreation Coordinator, dated 20 November 2019, be noted.**
- 2. That the amended Dubbo Regional Council Recreation Strategy 2036 be adopted.**

Tracey Whillock
Recreation Coordinator

REPORT

The draft Dubbo Regional Council Recreation Strategy 2030 was placed on public exhibition from Monday 30 September 2019 through to Monday 28 October 2019 to provide the community the opportunity to review and provide feedback on its content.

The aim of the Recreation Strategy 2030 is to be practical and equitable in the delivery of sport and public open space across the region. To assist in the delivery of the Recreation Strategy 2030, four (4) Action Plans have been developed that clearly identifies Objectives and Actions that will deliver on:

- Structured sports – sports played in clubs, such as Rugby, Netball and Cricket.
- Activated Open Space – improvements to liveability through passive recreational activities such as dog walking, cycling and leisure activities.
- Indoor and Aquatic Facilities – identifying opportunities to provide increased diversity in recreational offering to our communities.
- Partnerships and Programs – identifying opportunities and means to increase our abilities to partner with community and government agencies.

The Recreation Strategy includes actions for planning, continued support, maintenance and usage/participation audits and these actions and outcomes are divided into short term (1-3 years), medium term (3-6 years) and long term (6-10 years) deliverables.

Following the end of public exhibition Council received one (1) submission. This is attached as **(Appendix 2)**.

In response to the feedback received the Dubbo Regional Council Recreation Strategy was amended as follows:

- Comments regarding the facilities for Ultimate Frisbee and disc golf have been added to the Recreation Strategy – page 21.
- The facilities map has been updated to include Ultimate Frisbee and show Sandy beach as an active recreation facility – page 22.
- Detailed planning for individual sporting facilities for tourism and events – page 48.
- Clarification has also been added to the comment regarding sport specific facility preparation – page 47.

Furthermore, SMART targets and local trends feedback has resulted in plan actions which will focus on working with the NSW Office of Sport to collect data, in order to analyse local trends and use such information to assist long term planning and implementation of the plan.

In regard to ‘promoting equity across the region’ this relates to providing opportunities across individual sports to meet the needs of local amateur to professional sport practice and competition through provision of a range of facilities for local, district, state and national. The diagrams provide an illustration of what this may look like in terms of amenity, quality, size and maintenance regimes across venues. Indoor sport such as basketball is addressed as an action to address the individual needs of this sport.

Following public exhibition and feedback resulting in the amendment of the original document, the revised Dubbo Regional Council Recreation Strategy 2030 is submitted back to Council for consideration, and adoption (**Appendix 1**).

Appendices:

- 1 [!\[\]\(f15d3c54be60b4fd0ce1da9fb3f67256_img.jpg\)](#) Final - Dubbo Regional Council - Recreation Strategy 2030
- 2 [!\[\]\(7bf135d42c40a6430c927b2fd03d7659_img.jpg\)](#) Submission Tim Hosking, Dubbo Ultimate Frisbee Federation - Dubbo Regional Council Recreation Strategy 2030



CEO'S MESSAGE



We have a proud history of being welcoming yet formidable sports people.

Sport and physical recreation is essential to our local area and it is the cornerstone of improved health and well being. Sport gives us a great sense of belonging to our community through the social connections it brings.

This strategy recognises the importance of accessible, diverse, safe and appealing open space networks for the many diverse cultural groups, ages and abilities in the cities and towns that make up Dubbo Regional Council.

Opportunities for the future are detailed through the Action Plans to improve both structured sports and informal recreation to activate our cities and neighbouring towns. The actions were prepared in consultation with community and key stakeholders.

We provide a framework to work together into the future. Through this strategy we aim to partner with sporting agencies and associations over the next 10 years. This is our plan to deliver better sport and green infrastructure.

This strategy aims to build participation and strengthen our networks to ensure that our community enjoys vibrant, healthy and dynamic lifestyles.

Michael McMahon
Chief Executive Officer





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About the Strategy

The aim of this strategy is to set out how we will improve recreational opportunities over the next 10 years.



This strategy guides future planning and delivery of recreation to ensure that our community has access healthy and vibrant lifestyles in DRC.

Sport and recreation enhances the lives of the community. The benefits of active and passive recreation in delivery of social, physical, economic and community well being is widely documented.

Our region is fortunate to have a unique population of younger families and is a region that is growing. To increase opportunities for all includes developing the life long enjoyment of sport and in being an active member of the community.

Additionally our region also has the benefit of broad landscapes and scenic river corridors that lend themselves to offering nature-based recreation experiences.

This strategy addresses the benefits of recreation in terms of improvements to health and wellbeing of the individual and for the community.

This strategy sets our vision and guiding principles. So we are future focused, practical and equitable in delivering great spaces for structured sport and leisure. The Action Plans list these goals point by point and include planning outcomes as well as specific support, maintenance and capital works improvements. The goals are set over a 10 year timeframe.



Recreation at Dubbo Regional Council

About our region

Our region is strategically important. Dubbo and Wellington provide the economic growth centres where access to public government departments and facilities support neighbouring towns and villages. The use of Council facilities for major events is supported by planning at local and state levels.

Our region consists of two major urban areas, Dubbo and Wellington and the surrounding interdependent villages of Ballimore, Brocklehurst, Wongarbon, Eumungerie, Mogriguy, Elong Elong, Stuart Town, Mumbil, Geurie, Euchareena and (North) Yeoval.

It is anticipated that Dubbo and Wellington will continue to grow.

The current population of DRC is around 51,398 and the forecast is for growth to around 64,487 by 2041.¹

The median age of our area is 35 years, which is slightly younger than the NSW average of 38 years. The focus of this strategy is to support development of sports and continuation of participation through teenage years into adulthood and senior years.

Consultation undertaken with our community and stakeholder groups report offering inclusive, anti discriminatory and thoughtful ways to improve participation.

Many clubs advocate great outcomes for our community including support for mental health, encouraging indigenous and female participation.

Trends in recreation demand align with demographics and differ dependent on age grouping. For instance, extreme sports are increasing in younger groups and youth.

Passive recreation such as walking has increased in demand across all age groups.

Consultation with stakeholders identified that lighting for structured sports as well as to allow walking activities is

desirable. This strategy addresses consistency, equity and prioritisation in delivering better networks over time.

Key challenges

Current challenges in providing sports infrastructure include:

- 👉 Facilities age and require maintenance.
- 👉 Inefficient provision and duplication across the former Wellington and Dubbo local government areas.
- 👉 Managing community and sporting association expectations.

Aiming for equitable provision of good quality sports fields and connected open space is an objective of this strategy.

Sports Council Feedback

DRC has a strong working relationship with sports associations in the region. Action Plans and outcomes were identified with consultation from sporting and community groups.

Prioritisation of sport and recreation funding is facilitated through this collaborative approach.

Collaboration with community relies on decision making tools to assist us in the determination of priorities.





Determining funding for upgrading sports facilities across the LGA requires a method of delivering equity across groups of users. As a government entity, we promote transparency and fairness in our decision making.

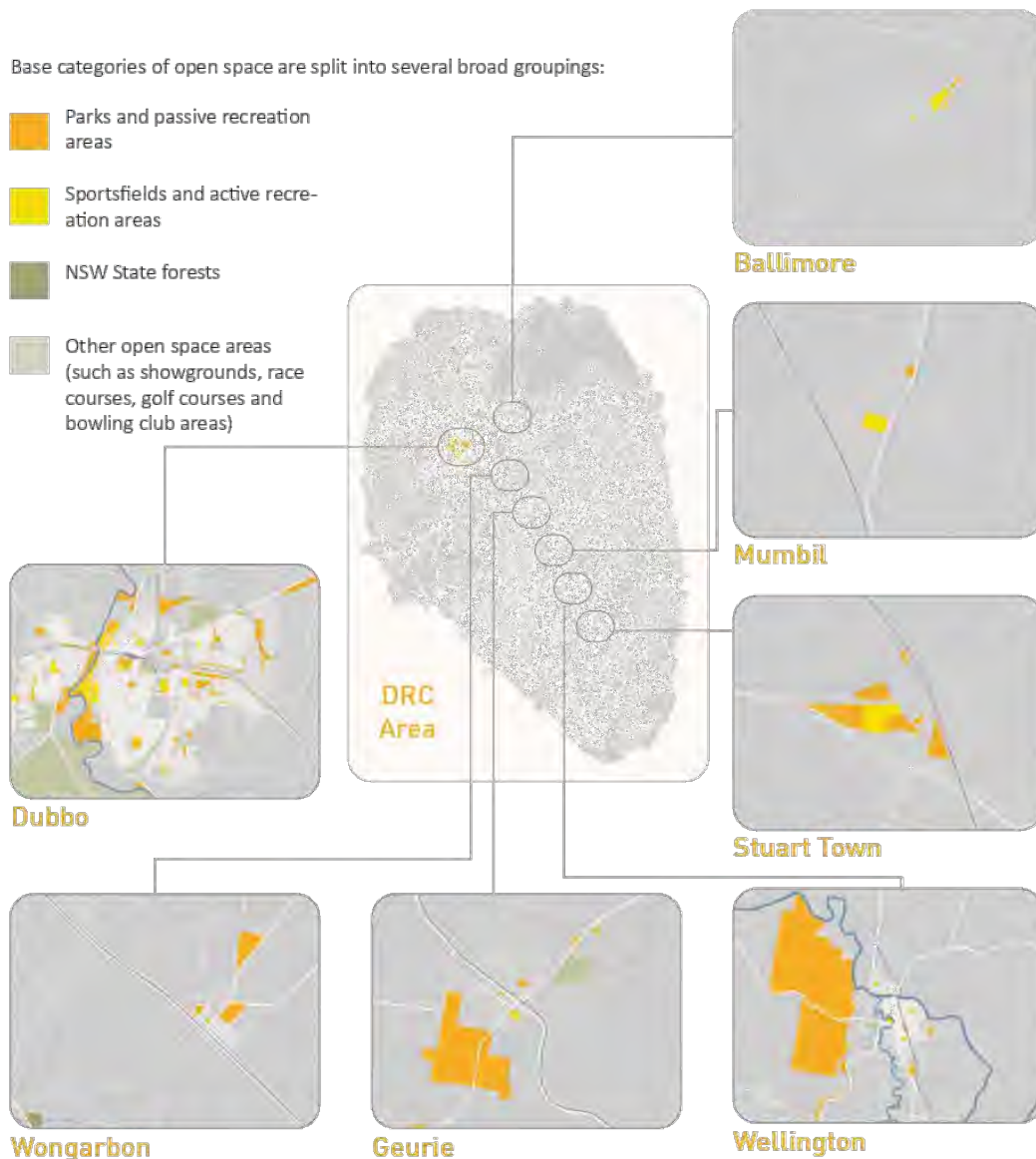
Tools such as a desired standard of service assist in this process. A standard of service is a matrix to assist classification of sports grounds with their performance requirement as a hierarchy. This assesses the provision of standard of quality required for amateur to elite levels, from local to regional, planning and design criteria, and expectations of developers and partner agencies.

Parks and Reserves Overview

The region is split into Dubbo, Wellington and smaller villages. The map below illustrates the general location of areas with reserves and sports fields.

Base categories of open space are split into several broad groupings:

-  Parks and passive recreation areas
-  Sportsfields and active recreation areas
-  NSW State forests
-  Other open space areas (such as showgrounds, race courses, golf courses and bowling club areas)



Benefits of Recreation

The Australian Government estimate that for every \$1 spent on sport and recreation returns \$7 benefit to the community.

Healthy communities

Physical activity is key to a healthy lifestyle. Whether this is through active participation in sports or unstructured use it is vital that public sports grounds, playgrounds, fitness equipment and open space is safe and available for use. ²

Physical activity is important for every member of the community for health, social interaction and well being. Estimates suggest that physical inactivity contributes to the death of 16,000 Australians every year. This is 14 times the national road toll. ³

Unstructured recreation is as important as active sports because humans require daily activity to remain healthy.

Changes in length of time in work related activities as well as less physical occupations mean that quality public

open space for recreation is vital.

Quality open space relates to its design, continued maintenance, openness, equipment an accessibility. The quality of space for recreation delivered by us has a direct relation to quality of life.

Financial estimates for the benefit of sport

Data regarding income through sports related businesses across Australia, estimates sport related businesses bring **\$83 billion** in combined health, education and economic benefits each year. ⁴

Conversely the cost of not supporting active and healthy communities is expected to cost over **\$87.7 billion** in additional health and social costs over 10 years to 2025⁵. Other sources of economic value including, improved labour productivity due to healthier workforces or economic benefit that volunteers contribute⁶.





Trends in Sport and Recreation

Current trends indicate that Australians are becoming more aware of the importance of sport for health and well being.⁷

The top 20 sports across Australia (past 3 years)

1. Walking (Recreational)
2. Fitness/Gym
3. Swimming
4. Running/Athletics
5. Cycling
6. Football
7. Tennis
8. Bush walking
9. Basketball
10. Golf
11. Yoga
12. Australian Football
13. Netball
14. Cricket
15. Dancing (recreational)
16. Pilates
17. Surfing
18. Gymnastics
19. Touch football
20. Martial arts

Current trends in participation

- ✎ Walking, running, cycling and bush walking whilst having the highest participation rates are generally not organised activities. Bush walking and running are also considered to have the greatest gender equity.
- ✎ Activities with the largest percentages of women participating are Pilates, Netball, Dancing and Yoga.
- ✎ Activities with the largest percentage of men participating are Cricket, Australian Football and Golf.
- ✎ Australian Football has recently surged in participation by women. The number of women participating twice a week has jumped 154% from 19,005 in 2017

to 48,225 in 2018.

- ✎ The interest in traditionally male sports transitioning to greater female participation has also been of interest to other structures sports, e.g. Cricket.
- ✎ Football is overall the largest team sport in terms of numbers participating.
- ✎ Adult participation in regional areas is higher for Touch Football, Tennis, Australian Football, Cricket, Netball, Basketball and Walking.
- ✎ Indigenous communities have higher rates of participation in Basketball, Touch Football, Netball, Cricket, Martial Arts and Australian Football.
- ✎ The greater percentage of participation for adults with disabilities is for walking and martial arts.
- ✎ Cycling is considered to have two peak age groups for organised participation: the first age group is 9-11 then 45-54.

Opportunities for active sports

There have been several studies that identify the positive relationship between provision of sports facilities and the increase in participation.⁸

We have an opportunity to set out a standard of service for the short, medium and long term maintenance and upgrade of facilities.⁹

This will ensure that sports associations are able to promote greater participation, support high performance teams and facilitate change. Facilitating change can include opportunities to offer sports to a wider and more diverse group or promote partnerships. This aids our ability to offer differing services and programs within sport.

Promoting Equity Across the Region

Our parks and sports grounds are a mixture of local, district and regional facilities. This section explores what you might expect to find at each level. There are more variations between low, medium and top level fields,

and premium parkland areas will often have additional community benefits such as education, interpretation of historic sites or tourism.



Local or Neighbourhood Parks and Sports

Local parks and sports fields are the first level and common small parks at the end of suburban streets.

At a minimum you may expect to find:



10

District Level Parklands and Sportsgrounds

This example shows a district park with medium level facilities.

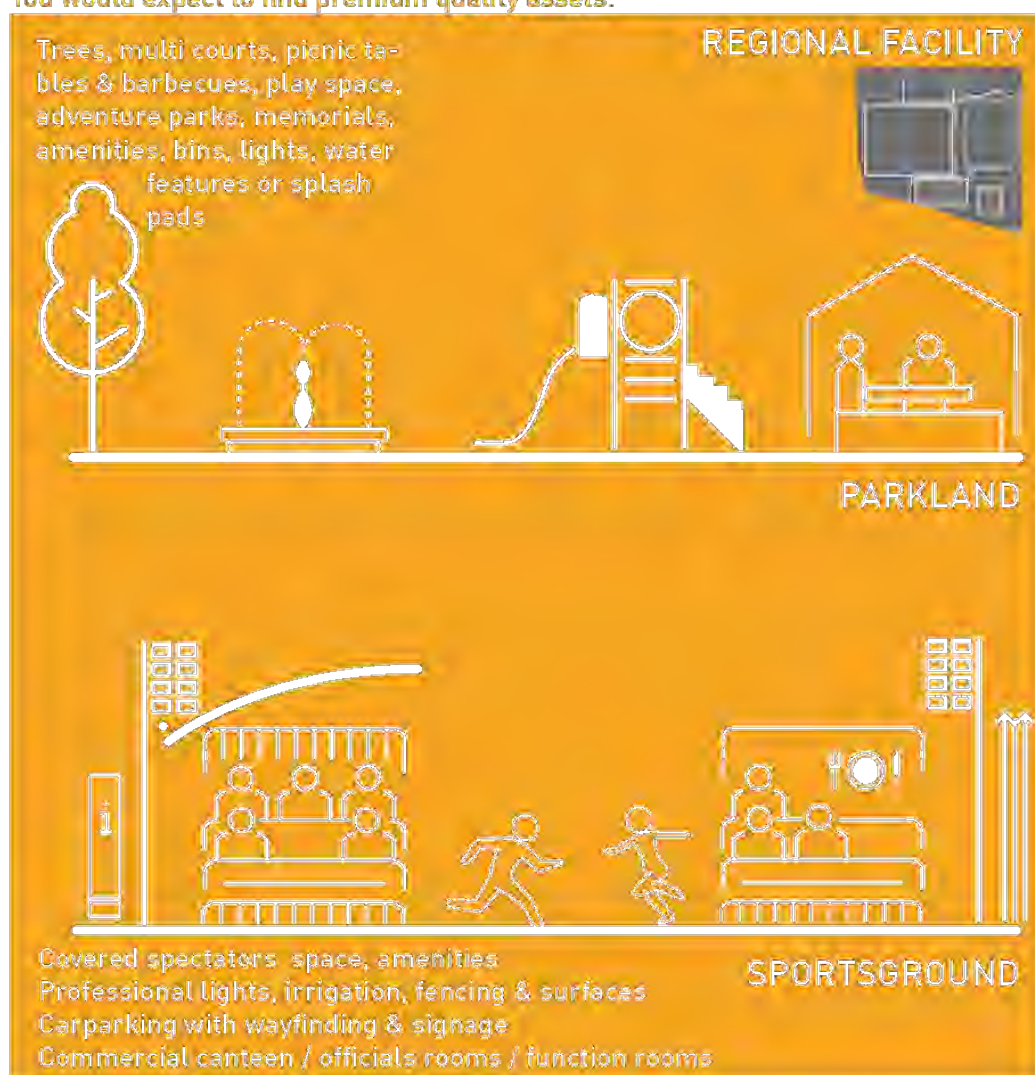
At mid level facilities you would expect to find a mixture of assets:-



Regional or State Parklands and Sportsgrounds

This example shows a premium facility which may attract large events.

You would expect to find premium quality assets:



The Supporting Framework

The DRC Planning Framework

This strategy is aligned with council planning for open space and recreation. This document presents connected planning for both open space and recreation in our region.

2040 Community Strategic Plan Theme 5: Liveability

The 2040 Community Strategic Plan forms the central component of integrated planning and reporting for our region. The direction of this strategy is based on the overarching principles defined under Theme 5: Liveability in the plan.

In particular section 5.5 - The community has the opportunity to participate in a diverse range of lifestyle, sporting and passive recreation pursuits.

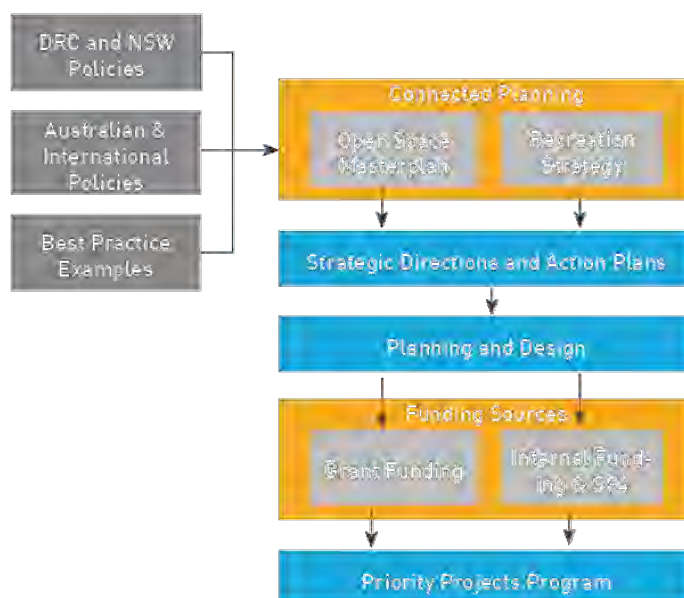
The action plans within this strategy deliver on:

- 5.5.1 Access to recreation and cultural facilities for young people is improved
- 5.5.2 Quality passive and active open space is located to maximise access and use by the community
- 5.5.3 Unique recreational facilities and opportunity are available
- 5.5.4 Our sporting facilities are recognised as catering for a wide range of local, regional and state sporting events and opportunity

Other Recreation and Open Space Planning Documents

This strategy supports and builds on key gaps identified in the **Open Space Masterplan 2018** to:

- develop a unified open space strategy for Wellington and Dubbo.
- plan for new urban release areas to join the network
- build networks of open space connections.
- prioritise capital works programs for delivery.





This strategy has been informed by best practice sources as well as governmental policies and advice. These include local, state, federal and international supporting policy and guidance.

Key commonwealth and NSW Government documents have been reviewed in this section to support this strategy and its framework.

The Action plans delivered in this Strategy will be delivered incrementally over the 10 year plan through a variety of funding sources, for example, annual works programs.

Commonwealth Strategic Initiatives

Sport 2030

Australian Government priorities for sport focus on building a more active population. The plan for Sport 2030 aims to produce sporting excellence across Australia and build a strong industry that is free from corruption.

The key priorities from the top down:

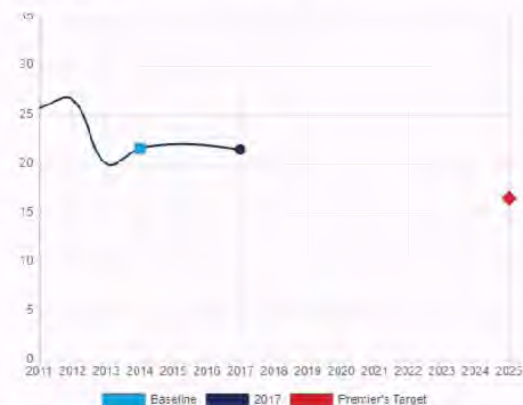
- 🏆 Building a more active Australia
- 🏆 Achieving sporting excellence
- 🏆 Safeguarding the integrity of sport
- 🏆 Strengthening Australia's Sport Industry

NSW Government Planning Context

Sport and recreation planning documents that over-arch this DRC Recreation Strategy include directives from the Premier, NSW Departments and Agencies including the Office of Sport.

12 Premier's Priorities

Reduction of childhood obesity is listed as a top priority of the Premier. The aim is to reduce obesity rates of children by five percentage points by 2025. Active Kids vouchers are an initiative of this priority to get more children into active sports.



The Supporting Framework

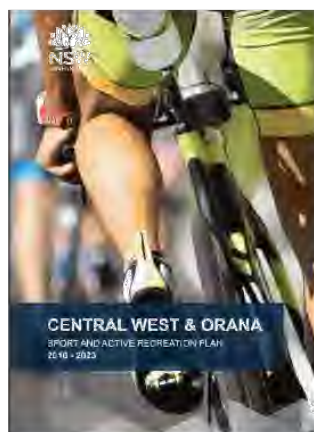
NSW Office of Sport



Sport NSW

The guiding principles within this document have been aligned with NSW future directions for sport.

This report aims to improve delivery of sport across the industry through collaboration, capacity, innovation and engagement with active recreation. ⁸



The plan highlights the connection between development of Regional Sports Hubs, other regionally significant facilities and local facilities.

This Strategy reflects a common hierarchy of regional, district and local sports and open spaces.

Health Stats NSW 2002-2017

Data in our region indicate over 50% of adults are either overweight or obese. The rate for children was around 20%.

Health indicators for suicide were slightly higher than the NSW average at around 11 per 100,000 population.

Central West and Orana Sport and Active Recreation Draft Plan 2018 - 2023

The plan highlights the role of DRC in:

- 👉 Constructing, maintaining and managing sport and active recreation infrastructure and programs in local communities.
- 👉 Collaborating with the community to identify sporting infrastructure and program needs.
- 👉 Incorporating sport and active recreation into Community Strategic Plans.
- 👉 Contributing to the development of Regional Sport and Active Recreation Plans.
- 👉 Aligning service delivery with the Regional Sport and Active Recreation Plans

NSW Planning and Environment Central West and Orana Regional Plan Implementation Plan 2017-2019

Directions from the plan support recreation through:

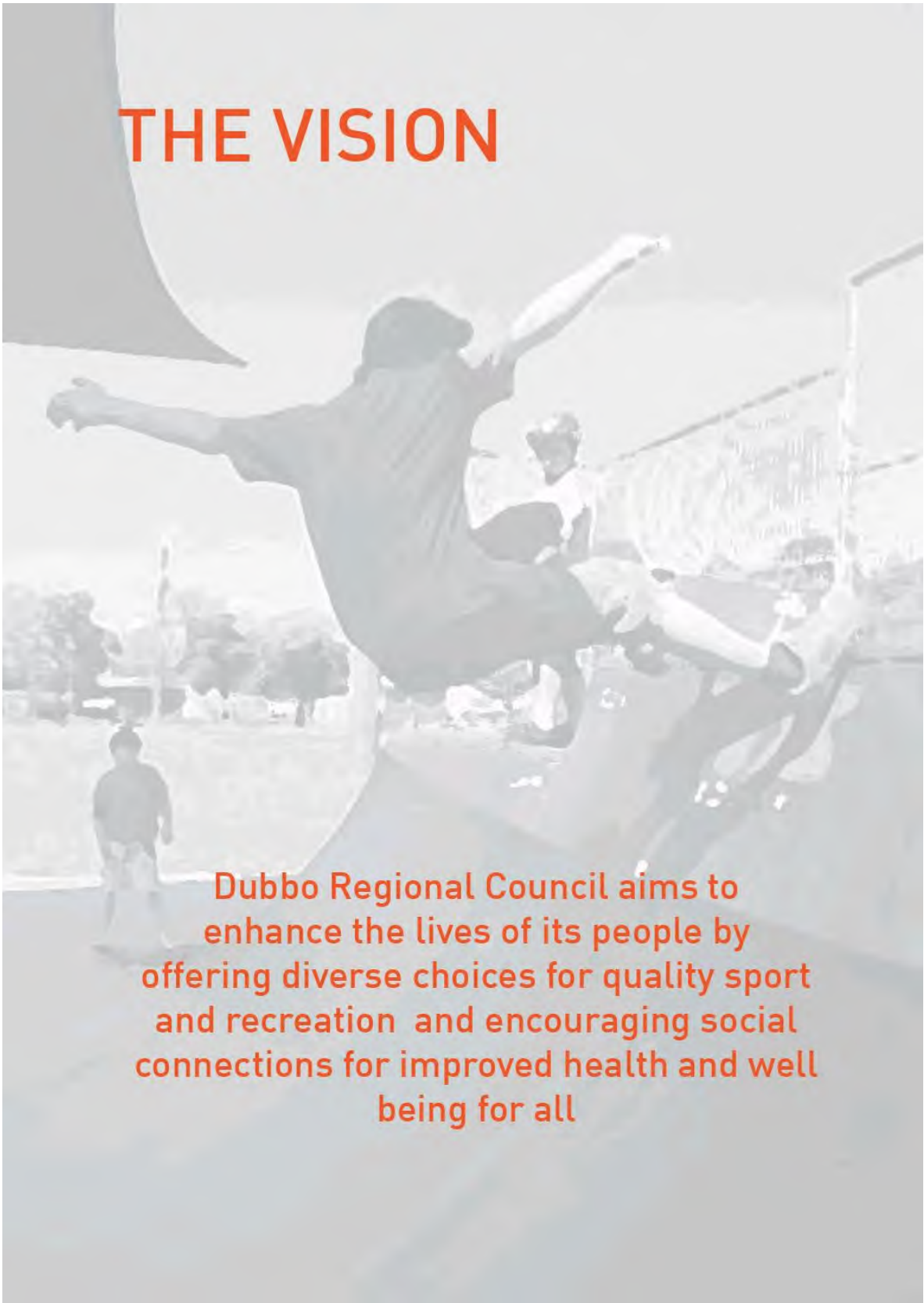
- 👉 Direction 13.5: Protection and management of environmental assets, including for recreation.
- 👉 Direction 14.3: Management and conservation of water resources for recreational fishing.
- 👉 Direction 29.2: Enhance the quality of neighbourhoods by integrating recreational walking and cycling networks.

Other Guiding Documents

Victorian and SA documents have also been reviewed in context of providing the best practice action plans. These strategic documents share a focus on the benefits of sport and recreation to our communities.

The focus of all strategic documents is aimed at facilitating Australian communities to become more active overall.

THE VISION



Dubbo Regional Council aims to
enhance the lives of its people by
offering diverse choices for quality sport
and recreation and encouraging social
connections for improved health and well
being for all

Guiding Principles

We understand the value of sport and recreation in improving the health and social well being of our communities.

The purpose of the vision is to consider the needs of our community for now and in the future. The vision assists in delivering on the following guiding principles in the prioritisation of action plans.

Activation

Activation is the process of integrating public space with community by the layering of programs, activities and amenities.

The aim is to get an increased number of residents to participate in sport and active recreation.

This means that we must aim to:

- 👉 Offer broader and more inclusive opportunities for participation in sport, informal recreation and leisure activities.
- 👉 Plan an integrated system of open space with infrastructure that is flexible to address the demands and structure of community sport.

Quality offering

Quality recreation is planning for DRC to have facilities that are robust and flexible and allow for high-performance sport and events.

The Action Plans consider the physical attributes of a system that requires incremental upgrades, maintenance schedules and communication between user groups.

Future proofing

Well planned and connected investment will maximise participation and enhance the benefits of leading and active lifestyle. Actions Plans provide consideration of current and future trends with the aim of providing sustainable, efficient and maintained infrastructure.

Future proofing recreation means thinking about the partners that DRC makes with associations, government agencies and private businesses to increase integration and active participation.

Inclusion

Increasing the number of people participating in sport and active recreation requires a collaborative system where all have the opportunity to be involved.

Some user groups have been identified as requiring additional support to improve participation.

To be broader and more inclusive, we need to continue to:

- 👉 support all abilities
- 👉 provide affordable options
- 👉 advocate equality and anti discrimination
- 👉 increase participation for women
- 👉 support indigenous access
- 👉 increase options for youth engagement



Action Plan 1: Structured Sports

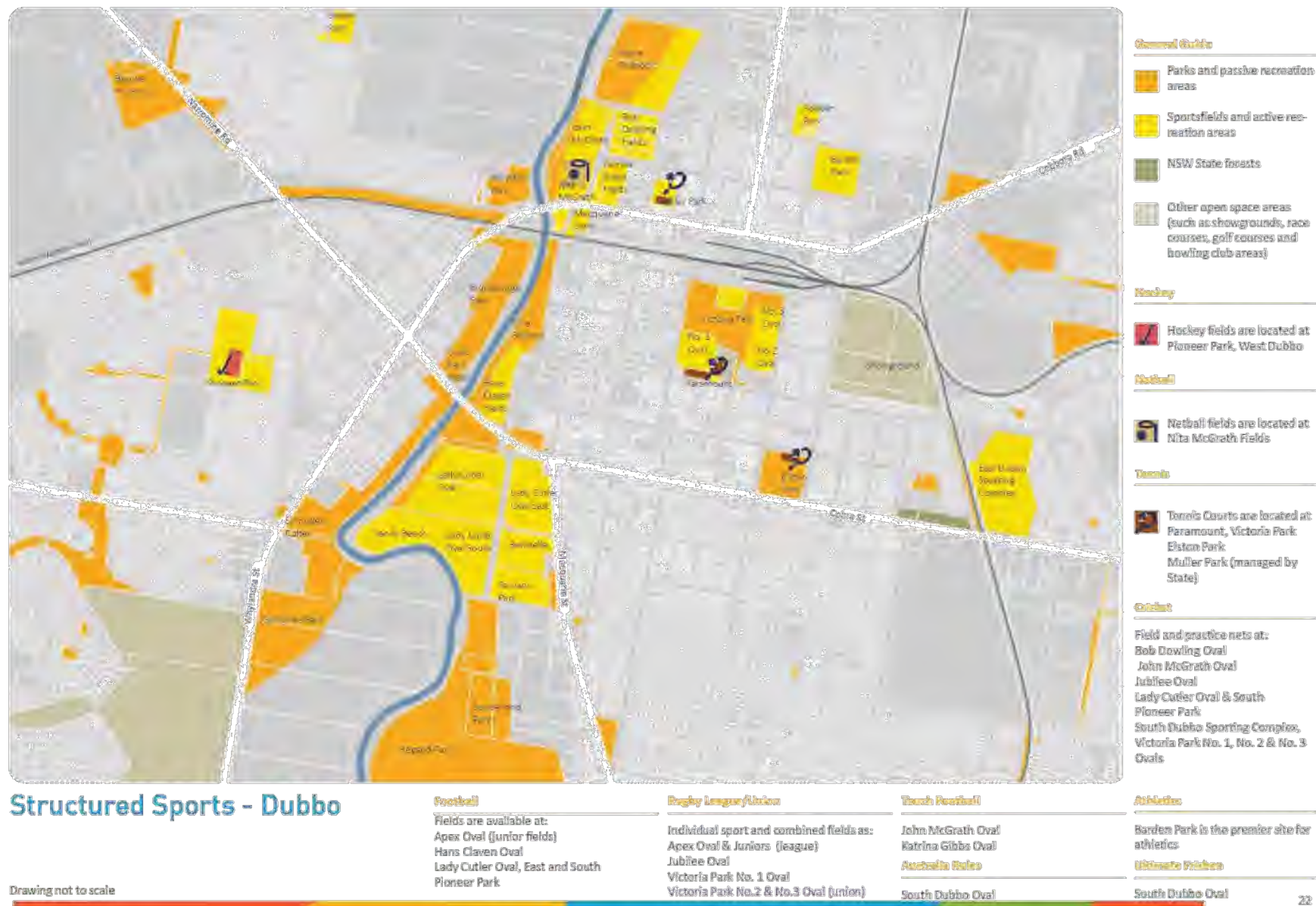
OBJECTIVES	ACTIONS
1. Deliver long term planning for the equitable spread of sports grounds across the LGA	<p>1.1 Planning for future needs of the community through analysis of current supply, future needs and gap analysis (in partnership with Office of Sport). Identification of key areas for activation within community. Prepare activation plan based on outcomes to define:</p> <ul style="list-style-type: none"> High use areas Areas of low use and causes Key activation zones Key public space interface areas <p>1.2 Annual review of sports field utilisation to inform maintenance needs diversify opportunities and increase active participation.</p> <p>1.3 Plan for spreading the use of fields across the LGA to increase efficiency, improve usage and capacity of current sports fields available. This will assist in optimising the usage of existing sport and recreation land available.</p>
2. Provide quality playing surfaces and amenities	<p>2.1 Liaise with sporting club management to prioritise short term plans for maintenance schedules (1-3 years) and medium to long term facility upgrades (3-10 years).</p> <p>2.2 Deliver focused and prioritised improvements to sports facilities based on best practice maintenance based standards of service policy.</p> <p>2.3 Design for flexible multi court surfaces between sports at selected locations.</p> <p>2.4 Annually review usage of fields Seek improvements in efficient usage of ground through consolidation of improvements to existing recreation facilities prior to delivery of new assets.</p> <p>2.5 Plan for medium to long term water, irrigation and storm water reuse for sports field maintenance.</p> <p>2.6 Review and plan for progressive upgrade for lighting across priority regional, district and local sports fields. Plan existing and future demand using needs-based analysis.</p>

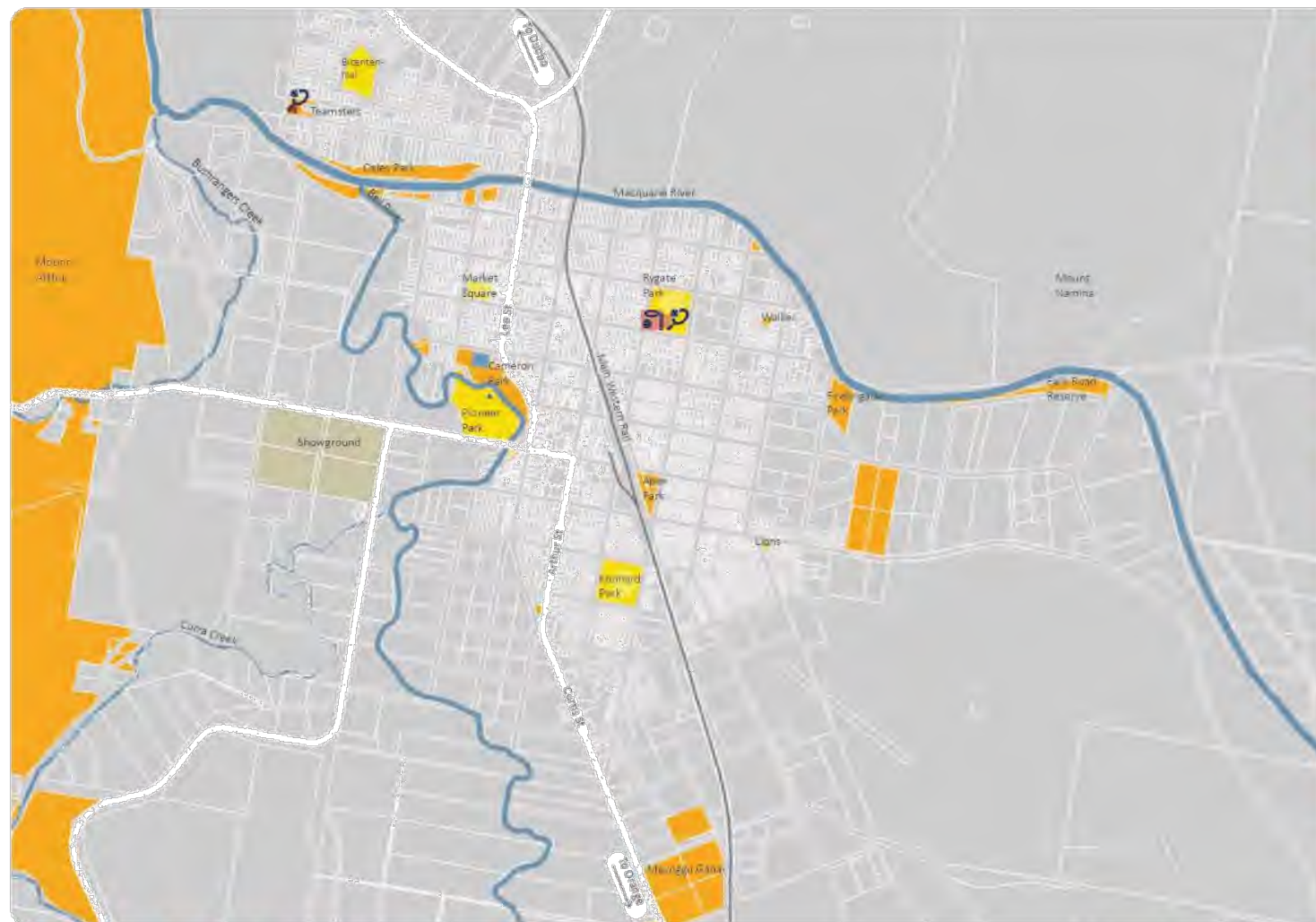
Action Plan 1: Structured Sports

OBJECTIVES	ACTIONS
3. Focused improvement for key facilities for sporting associations	<p>Deliver improvement to develop sport and increase participation:</p> <p>3.1 AFL Review usage, facilities and priorities at South Dubbo Oval.</p> <p>3.2 Athletics Continue to maintain Barden Park to standard. Review athletics specific infrastructure at Rygate Park.</p> <p>3.3 Cricket Partner Cricket Associations in prioritisation of facilities maintenance and upgrades to grounds available.</p> <p>3.4 Focused upgrades including synthetic Cricket pitches and nets to current standard.</p> <p>3.5 Priorities Victoria No. 1 oval to state standard.</p> <p>3.6 Cycling Assist transition from Victoria Park Oval 1 to Dubbo Cycle Facility. Assess feasibility of cycling at other locations for mountain biking and to accommodate other biking and cycling disciplines.</p> <p>3.7 Golf Support Wellington club in encouraging young membership.</p> <p>3.8 Hockey Prioritise Pioneer park facilities.</p> <p>3.9 Liaise with members to for event planning and incremental upgrades to maintain current standard surfaces.</p> <p>3.10 Support delivery programs in Wellington and ties between clubs.</p> <p>3.11 Netball Support Wellington Netball membership and program.</p> <p>3.12 Facilitate planning to meet growing club needs.</p> <p>3.13 Paddling Review long term planning for Macquarie River to support accessibility, storage and amenities. Facilities may include shared storage between other water based sports and triathlon club.</p> <p>3.14 Support Paddle Club to develop junior programs development and event attraction.</p>

Action Plan 1: Structured Sports

OBJECTIVES	ACTIONS
	<p>3.15 Rugby League Prioritise Apex Park facilities to maintain standard of a state level facility.</p> <p>3.16 Deliver Kennard Master plan priority upgrades.</p> <p>3.17 Plan for maintenance and upkeep of rugby playing surfaces.</p> <p>3.18 Assist with negotiation between winter and summer sports</p> <p>3.19 Rugby Union Review junior and senior clubhouse separation and support possible medium to long term amalgamation.</p> <p>3.20 Soccer - Football Partner Dubbo & District Football Association in prioritisation of grounds, maintenance and upgrades and summer and winter sports field usage.</p> <p>3.21 Wellington irrigation renewal at Pioneer Park. Plan medium to long term upgrade of western field drop off.</p> <p>3.22 Assist equitable management of high use fields with other sports and passive recreation concerns.</p> <p>3.23 Ultimate Frisbee & Disc Golf: Review usage, facilities and priorities at South Dubbo Oval (Ultimate Frisbee) and Sandy Beach (Disc Golf).</p> <p>3.24 Possible long term review of current fields to consider increase to facilitate state and regional carnivals.</p> <p>3.25 Triathlon Provide assistance to facilitate events and negotiate competition.</p> <p>3.26 Possible medium term planning for storage.</p> <p>3.27 Touch Football Provide maintenance to existing facilities. Consider embellishment and enhancement to facilities over long term through addition of lights at John McGrath field and increasing formalised parking. Prepare planning for future designs for Police Paddock.</p> <p>3.28 Possible review of fields to consider increase to 30 fields over medium to long term to facilitate state and regional carnivals.</p>





Structured Sports - Wellington

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General Guide

- Parks and passive recreation areas
- Sportsfields and active recreation areas
- NSW State forests
- Other open space areas (such as showgrounds, race courses, golf courses and bowling club areas)

Netball

- Netball fields are located at Rygate Park

Tennis

- Tennis Courts are located at Rygate Park and Teamsters Park

Cricket

- Pitches are located at:
Pioneer Park
Rygate Park

Athletics

- Rygate Park accommodated athletics

Football

- Fields are available at:
Pioneer Park

Touch Football

- Touch is played at Rygate Park

Rugby League/Union

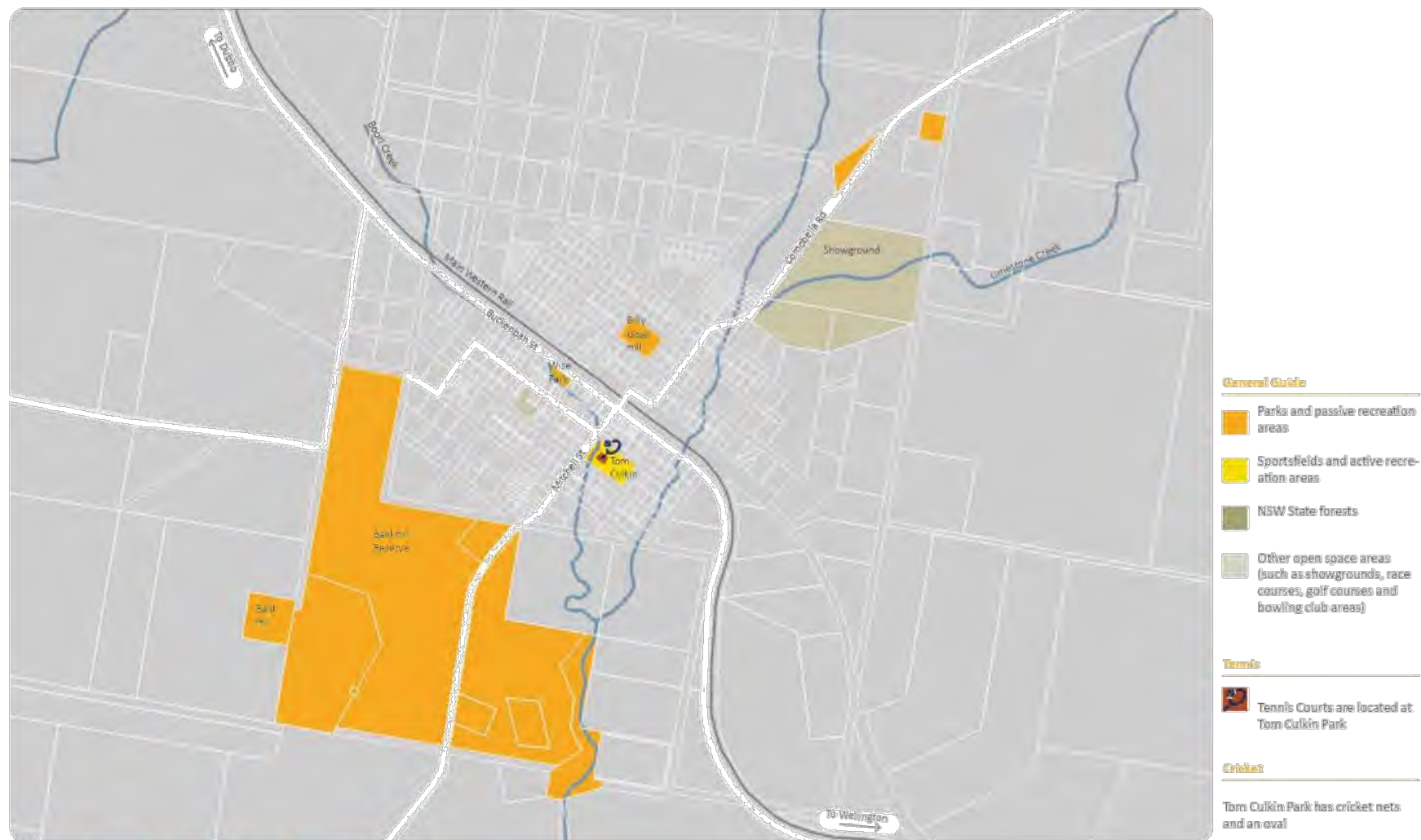
- Key parks for Rugby League and R. Union:
Kennard Park
Bicentennial Park (union)



Structured Sports - Ballimore

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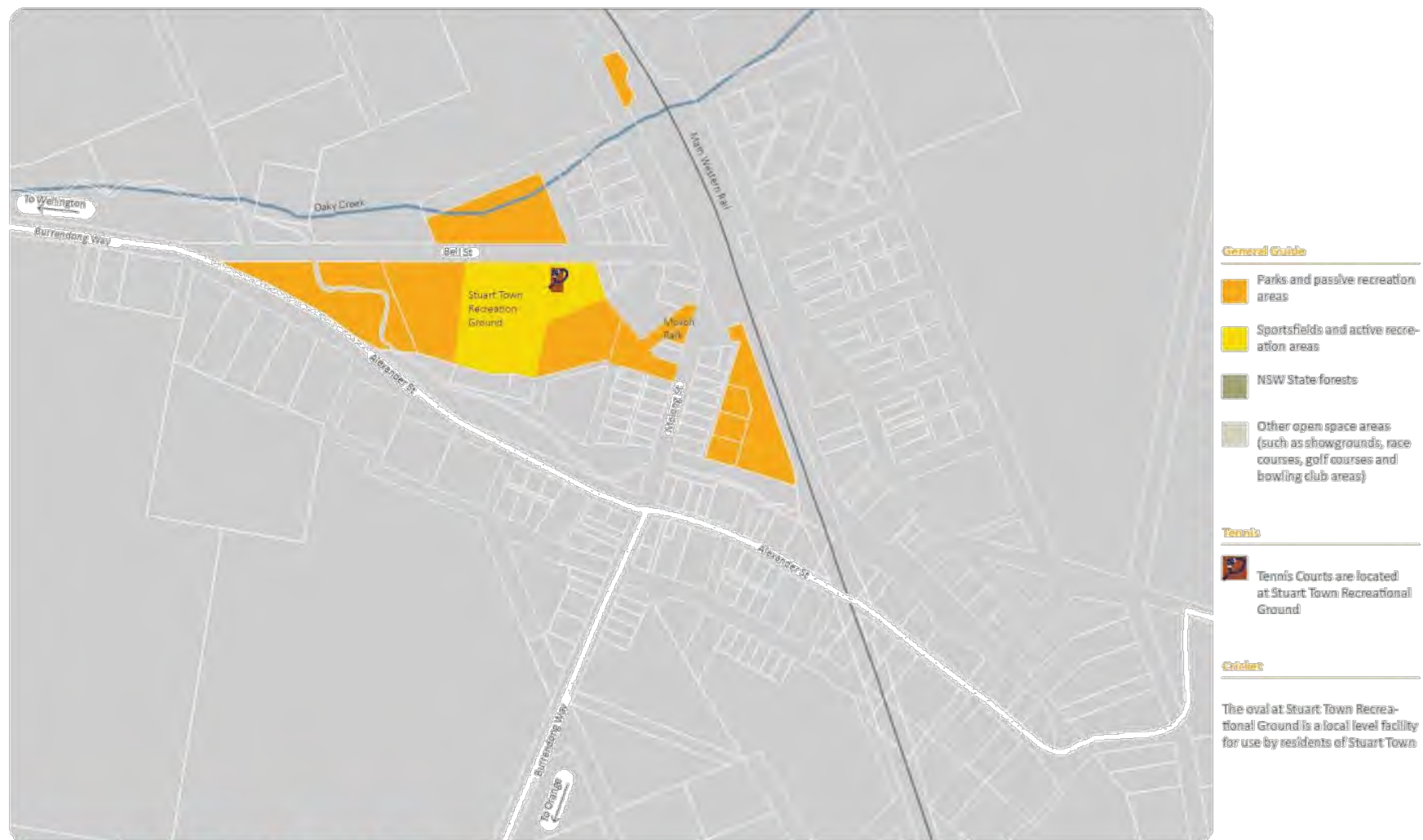
Structured Sports - Geurie

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Structured Sports - Mumbil

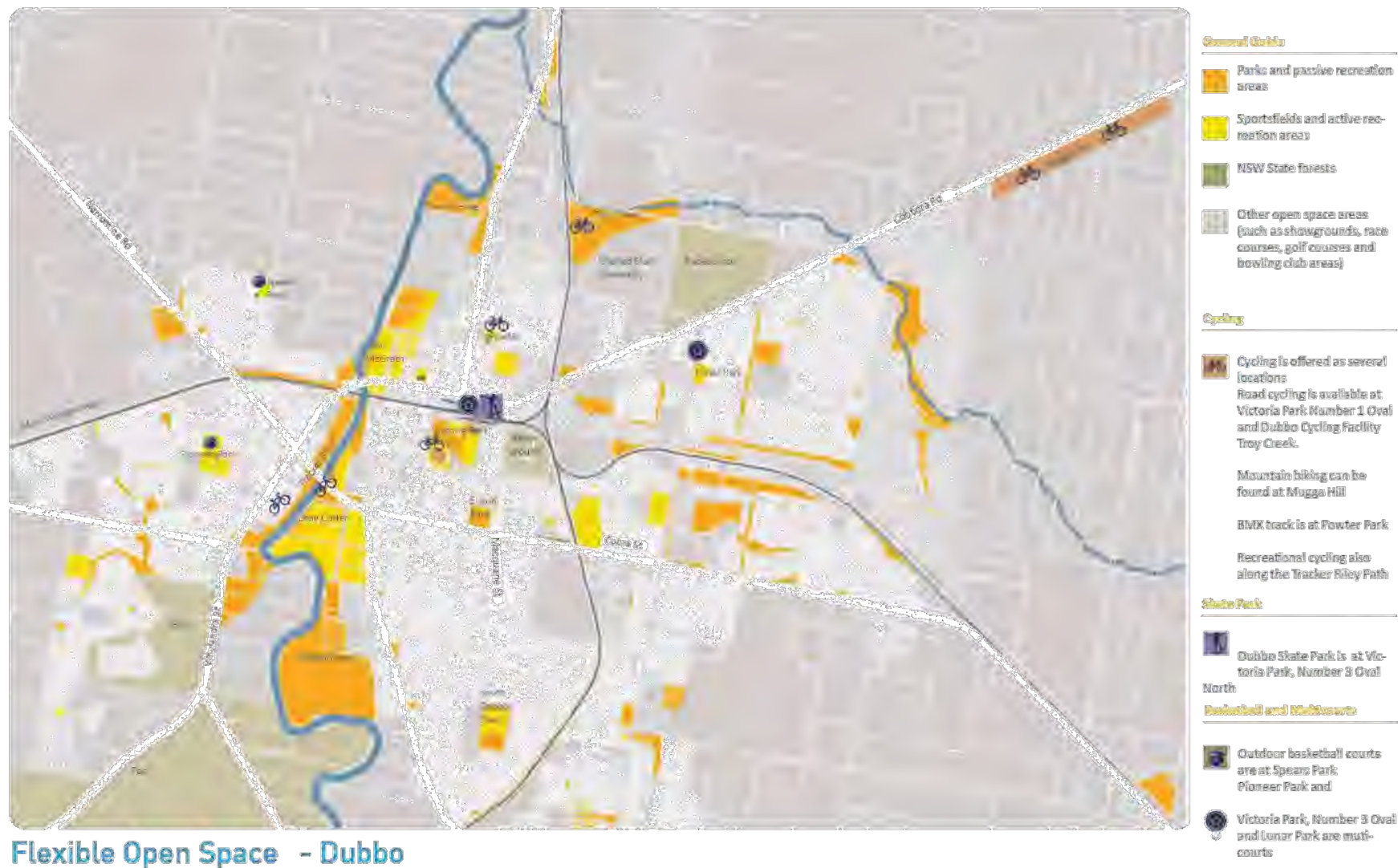
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Structured Sport - Stuart Town

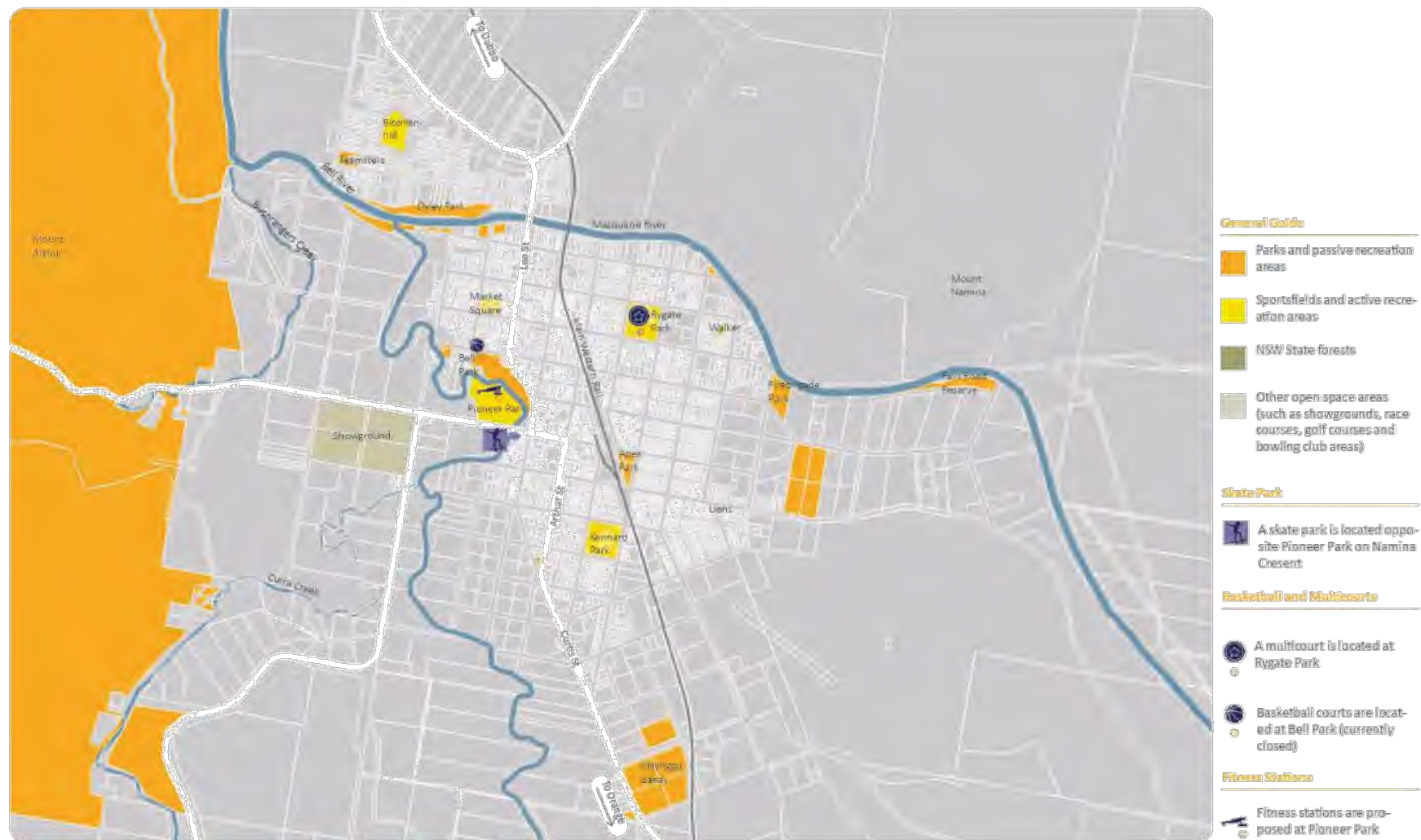
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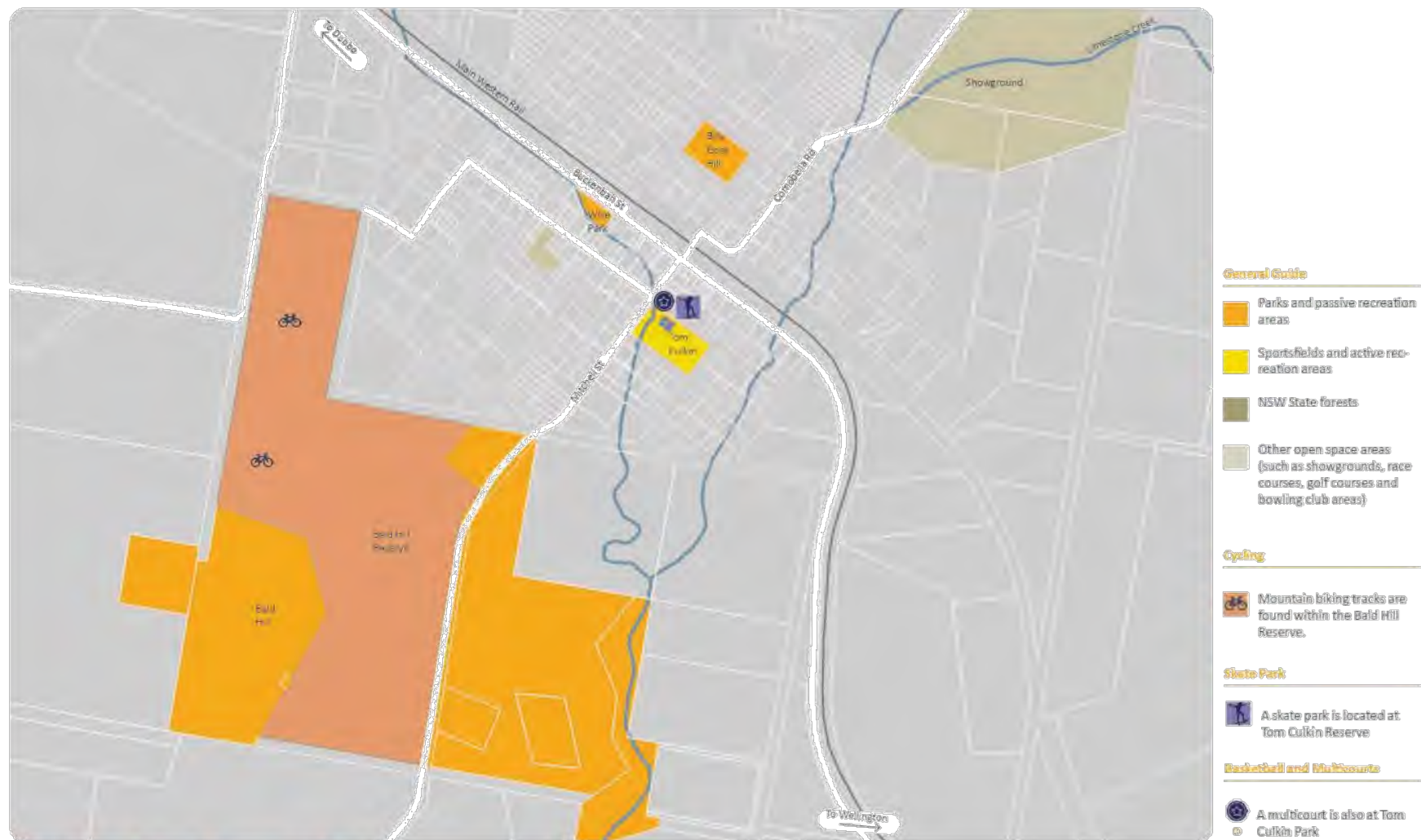
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Flexible Open Space- Wellington

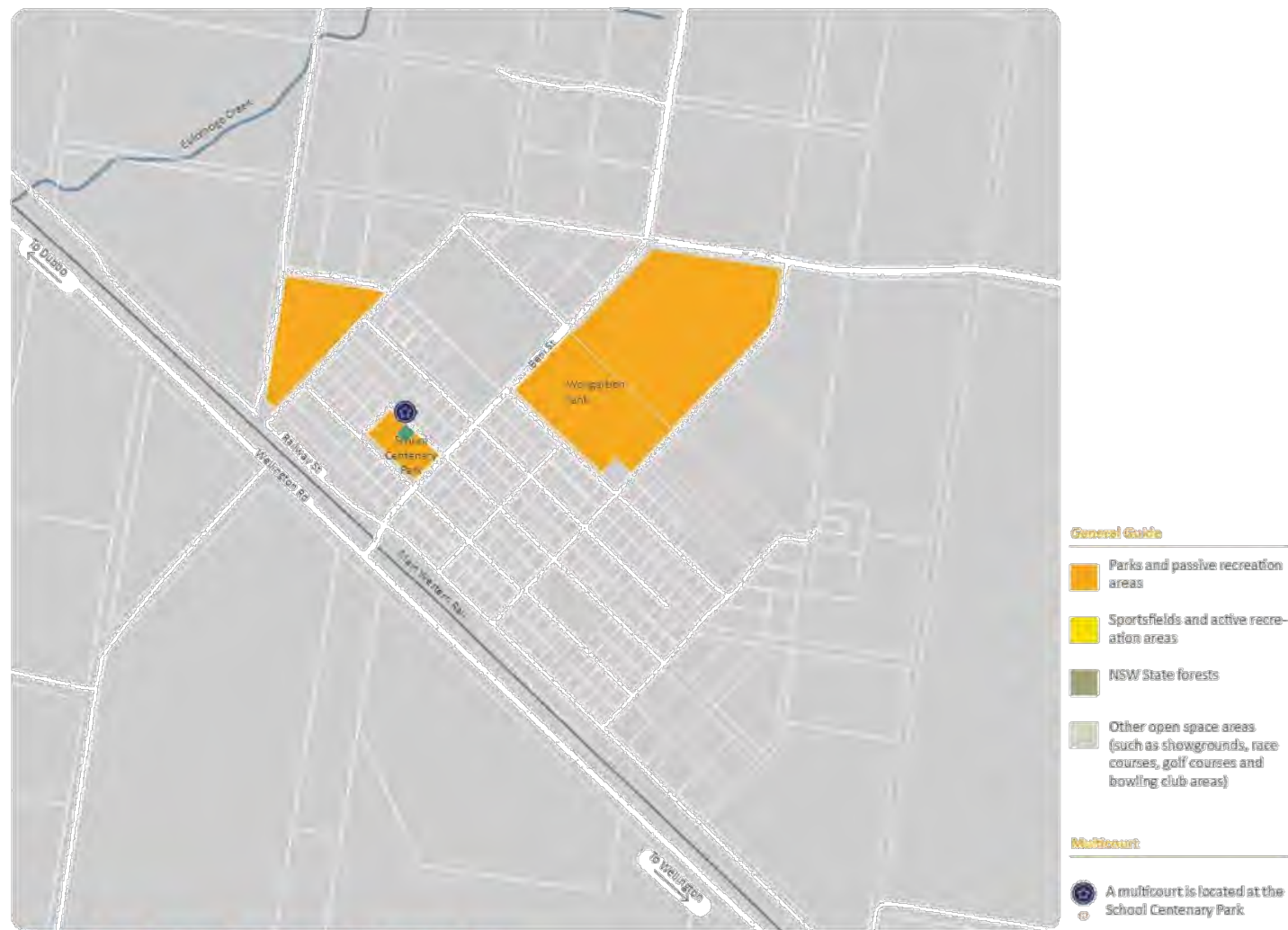
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Flexible Open Space - Geurie

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Flexible Open Space - Wongarbron

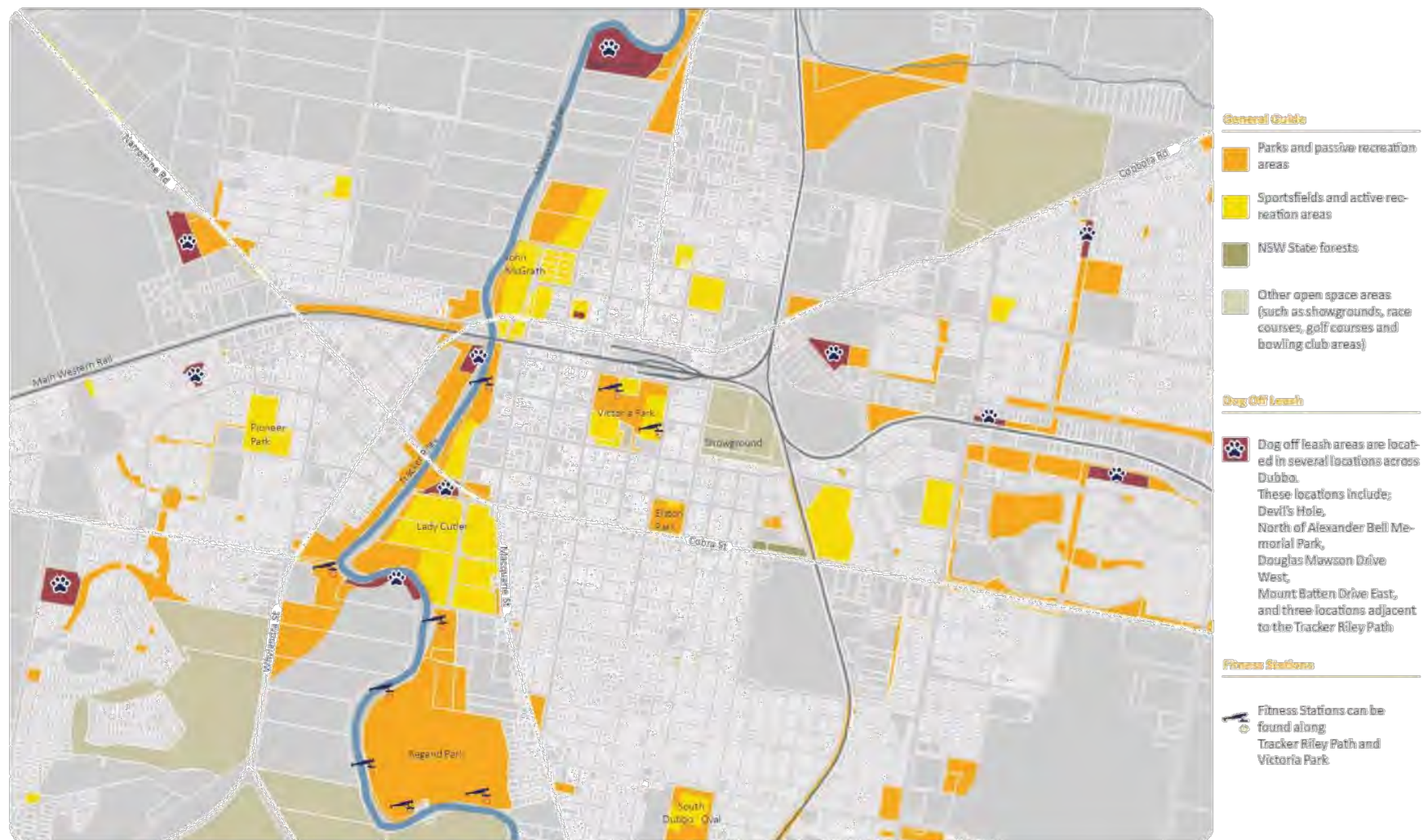
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Action Plan 2: Activated Open Space

OBJECTIVES	ACTIONS
4. Develop plans for quality informal recreation to meet future needs of the community	<p>4.1 Develop plans to activate precincts to meet future population growth areas, particularly in urban release areas. This includes, Keswick, Southlakes, Grangewood / Delroy, Holmwood and Montifiores.</p> <p>4.2 Review the supply of open space for recreation in DRC neighbourhoods, particularly outside of Dubbo and Wellington, including a plans for the villages.</p> <p>4.3 Review playground areas and use to ensure a spread of quality playgrounds.</p> <p>4.4 Develop policy and plan for accessible options for disabilities at selected locations.</p> <p>4.5 Review and plan for future playgrounds across key locations including new release areas and towns.</p> <p>4.6 Review and plan opportunities to increase provision for leisure and passive recreation based sports, including, walking, running, bush walking, trail riding, cycling, mountain biking, skating, outdoor table tennis, volleyball, kayaking.</p> <p>4.7 Update landscape guidelines to support recreation and open space development.</p> <p>4.8 Embellishment of connections to Macquarie River Corridor, Dubbo, and Bell River, Wellington. Activate connections and linkages to the city, tracks and trails.</p> <p>4.9 Implement connections to camping and kayaking locations.</p> <p>4.10 Continue to develop concept and master planning for major park facilities.</p>

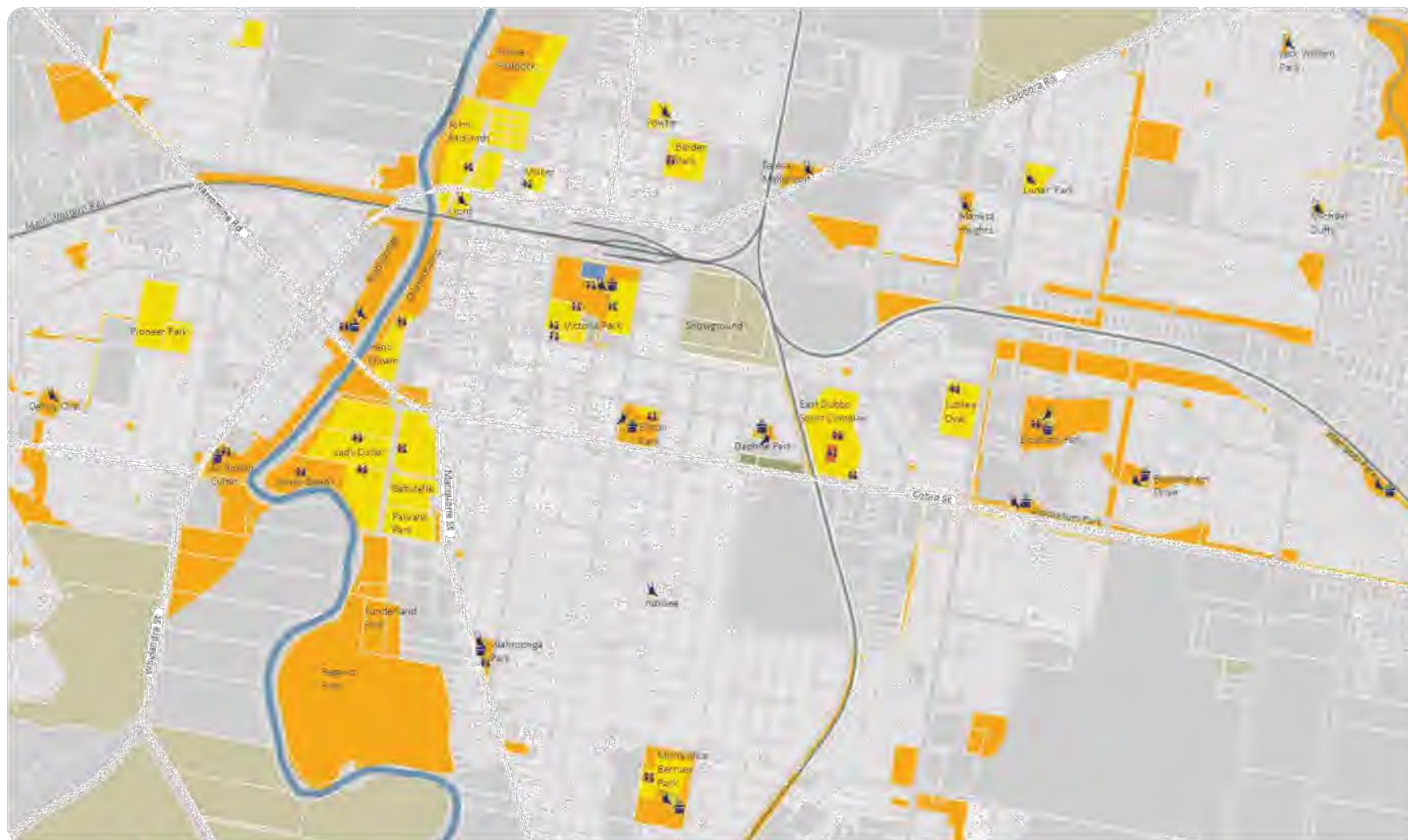
Action Plan 2: Activated Open Space

OBJECTIVES	ACTIONS
5. Provide opportunities for a diverse range of recreation opportunities to benefit the health and well being of the community	<p>5.1 Develop and implement a style manual for a consistent look for DRC structures and furniture. To include:</p> <ul style="list-style-type: none"> Shade structures Fencing types Standard park and street furniture Way-finding and signage Lighting <p>5.2 Implement an LGA wide approach to locations for group fitness, boot camps, fitness stations and obstacle or 'Ninja' style training.</p> <p>5.3 Develop networks and safe connections for cycling, walking, dog-off leash areas, walking to school, shade and resting stops to improve ease of access to maintain a healthy lifestyle. Improve integration of work with cycling and walking networks.</p> <p>5.4 Provision of quality, safe and well maintained infrastructure to facilitate activation of open space networks. Including networks to join new release residential areas along north west, north east and south Dubbo.</p> <p>5.5 Provision of embellishment to assist with creation of recreational networks, including play space, car parking and footpath extensions to support the Macquarie River corridor.</p>
6. Provide opportunities for engaging younger people in recreation	6.1 Provide recreational opportunities for youth spaces, skate parks, multi courts and dance space with a social engagement focus.
7. Provide a framework to allow for opportunities for private activation.	7.1 Develop opportunities and space for private businesses to expand recreational opportunities e.g. mobile food and coffee to bike or kayak hire.



Activated Open Space - Dubbo

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Leisure - Dubbo

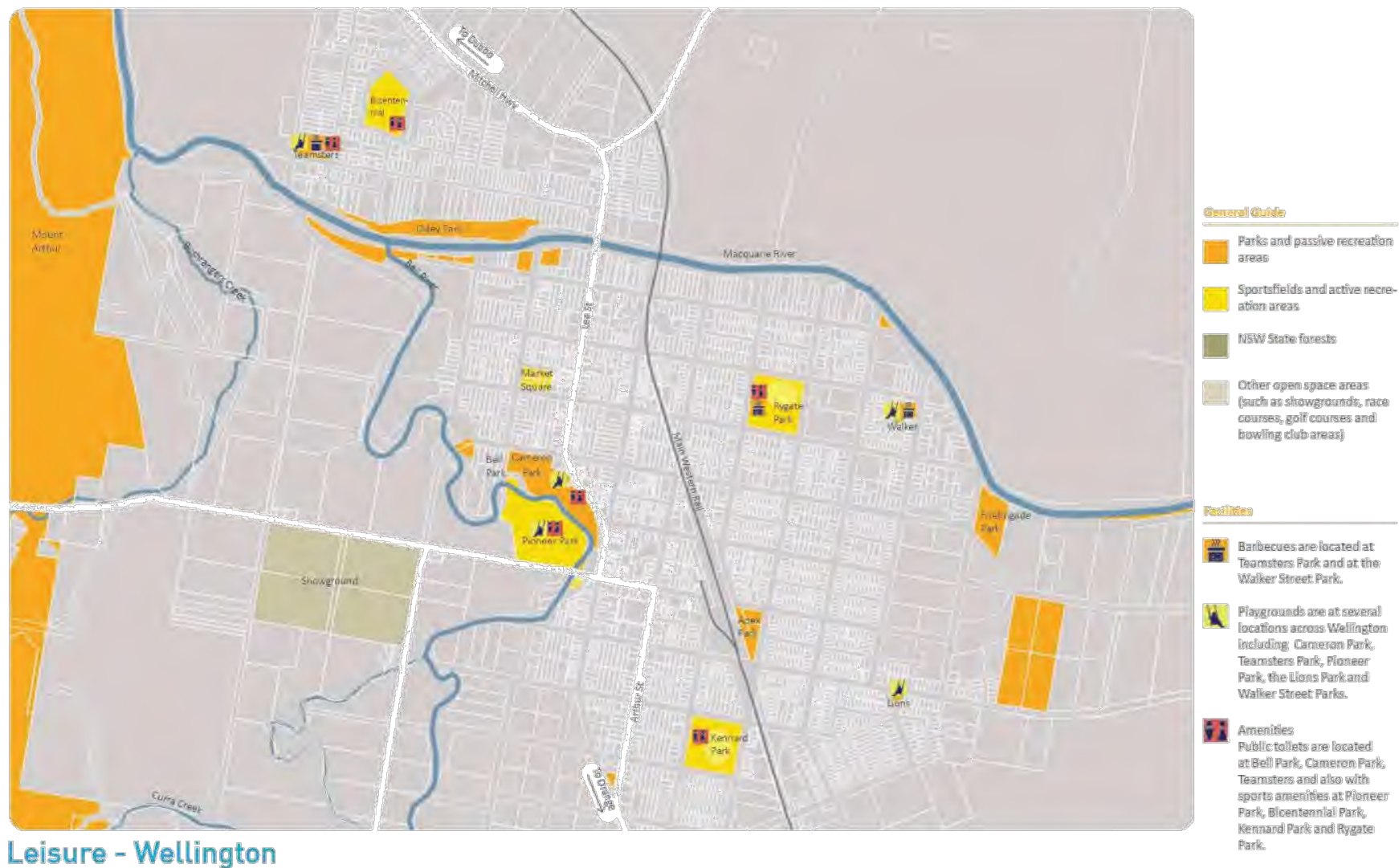
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General Guide

- Parks and passive recreation areas
- Sportsfields and active recreation areas

Facilities

- Picnic shelters and Barbecues
Popular areas include Sir Roden Cutler, Victoria Park and Elizabeth Park
- Playgrounds
Larger facilities can be found at Elizabeth Park, Deroy Oval, Elston Park and Livi's Place within Victoria Park.
- Amenities
Public toilet and change facilities are in several locations across Dubbo.



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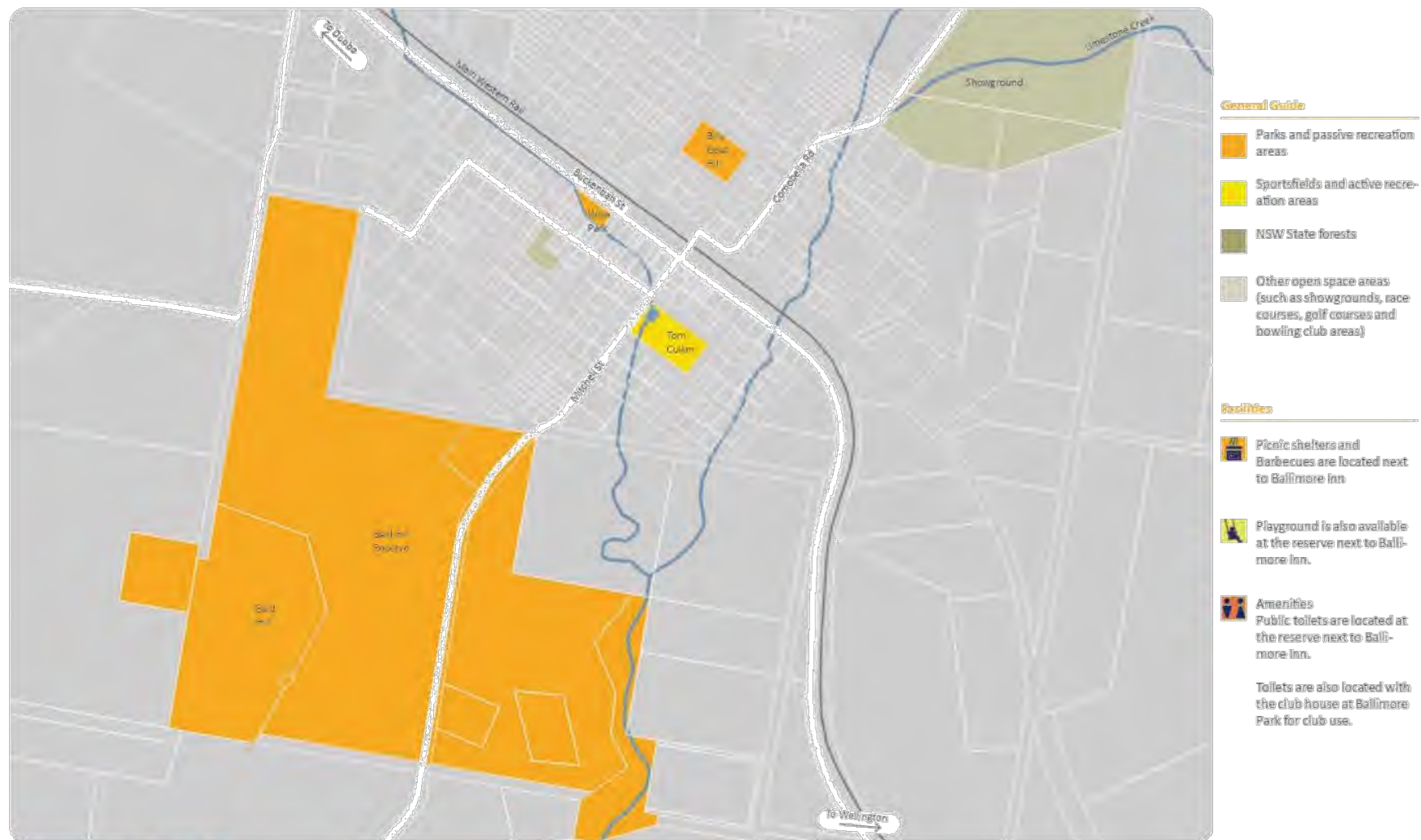
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Leisure - Ballimore

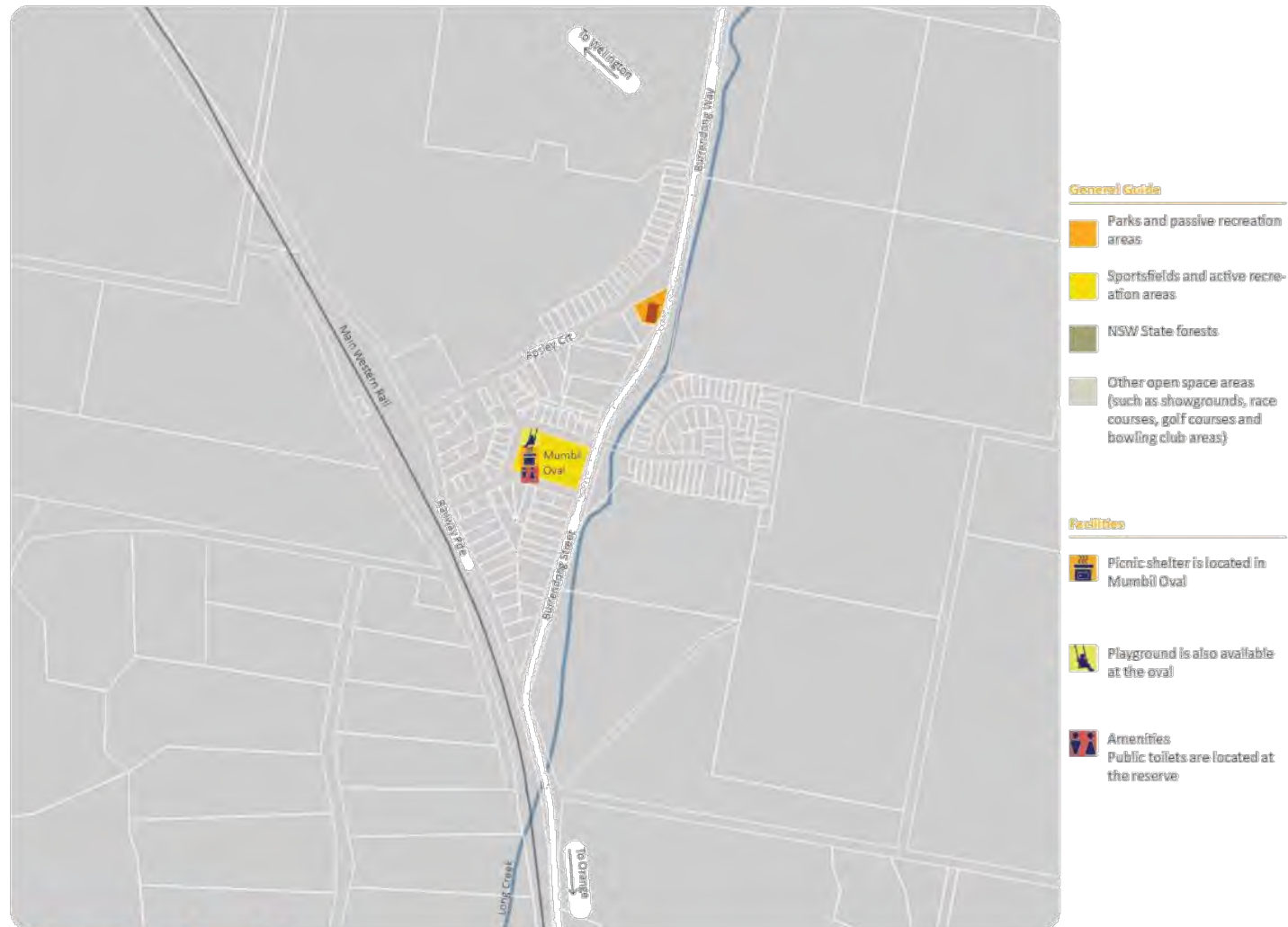
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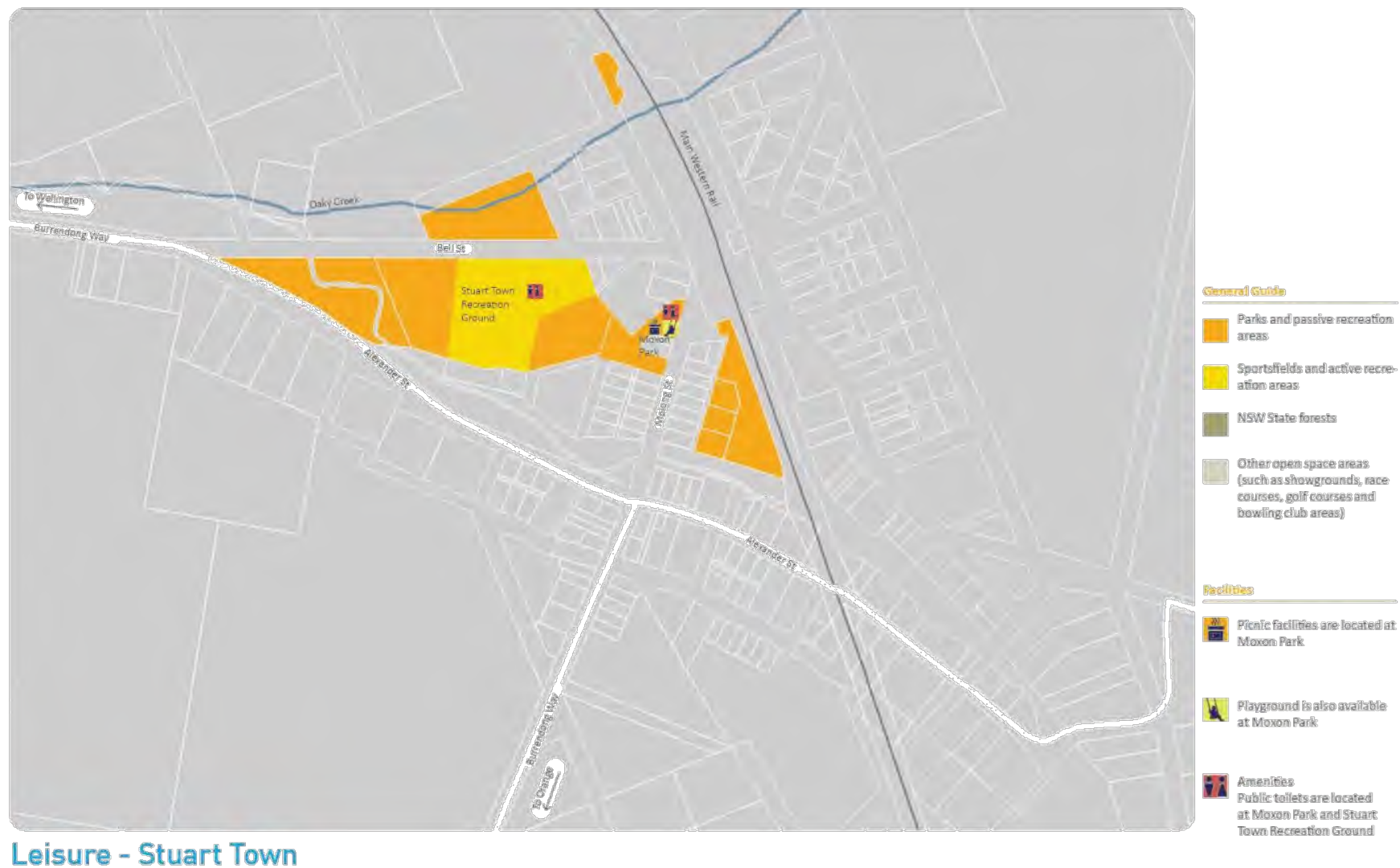
Leisure - Geurie

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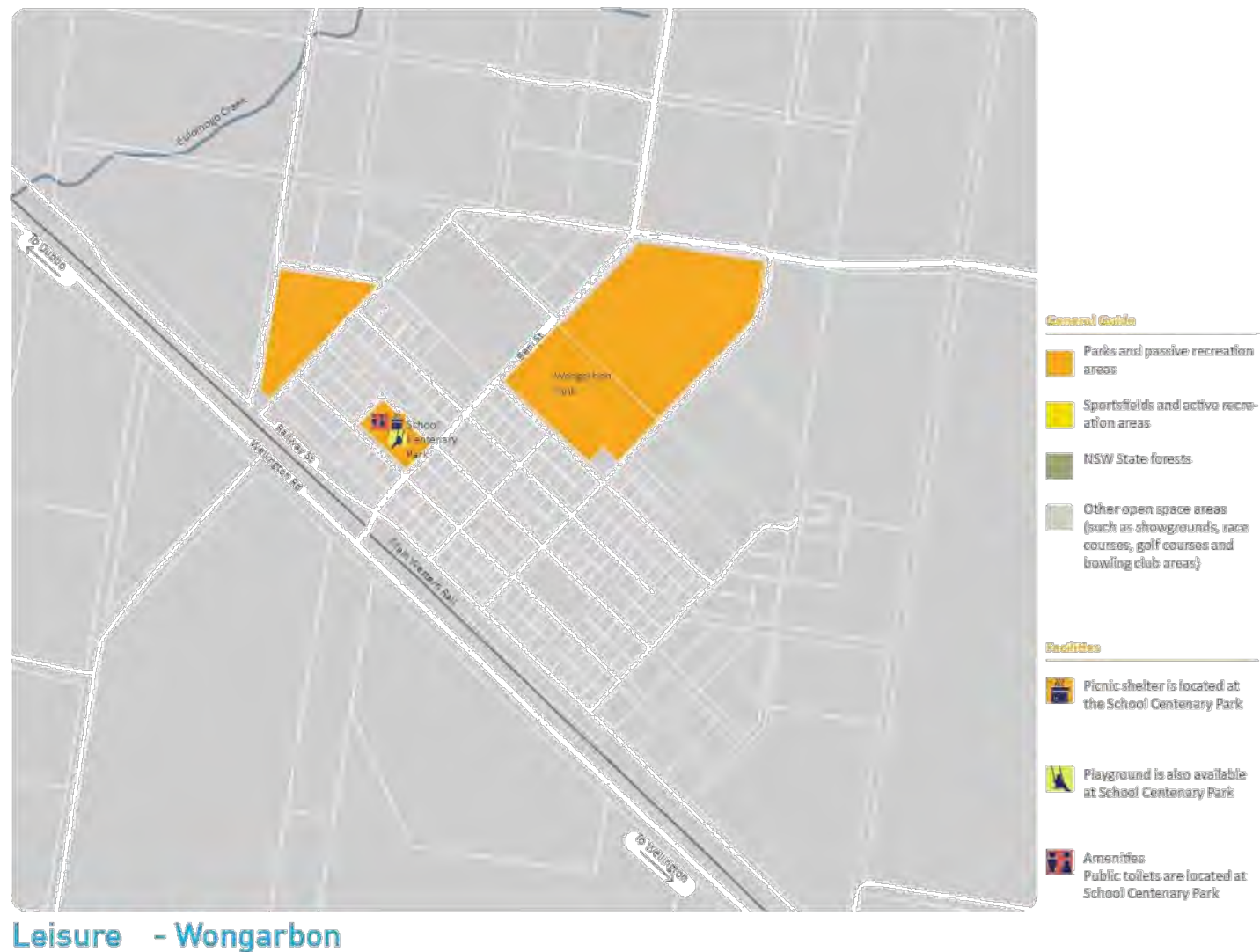
Leisure - Mumbil

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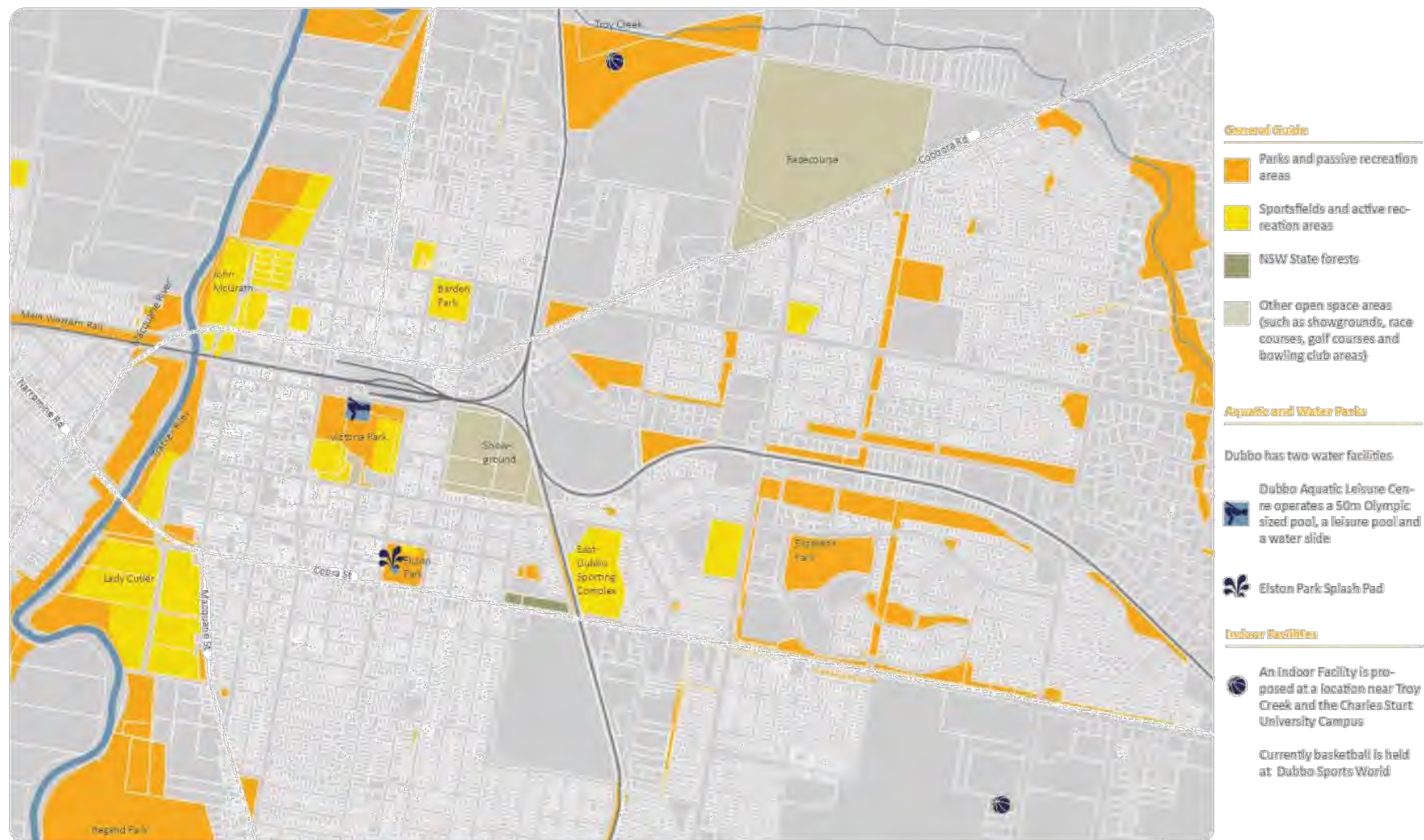
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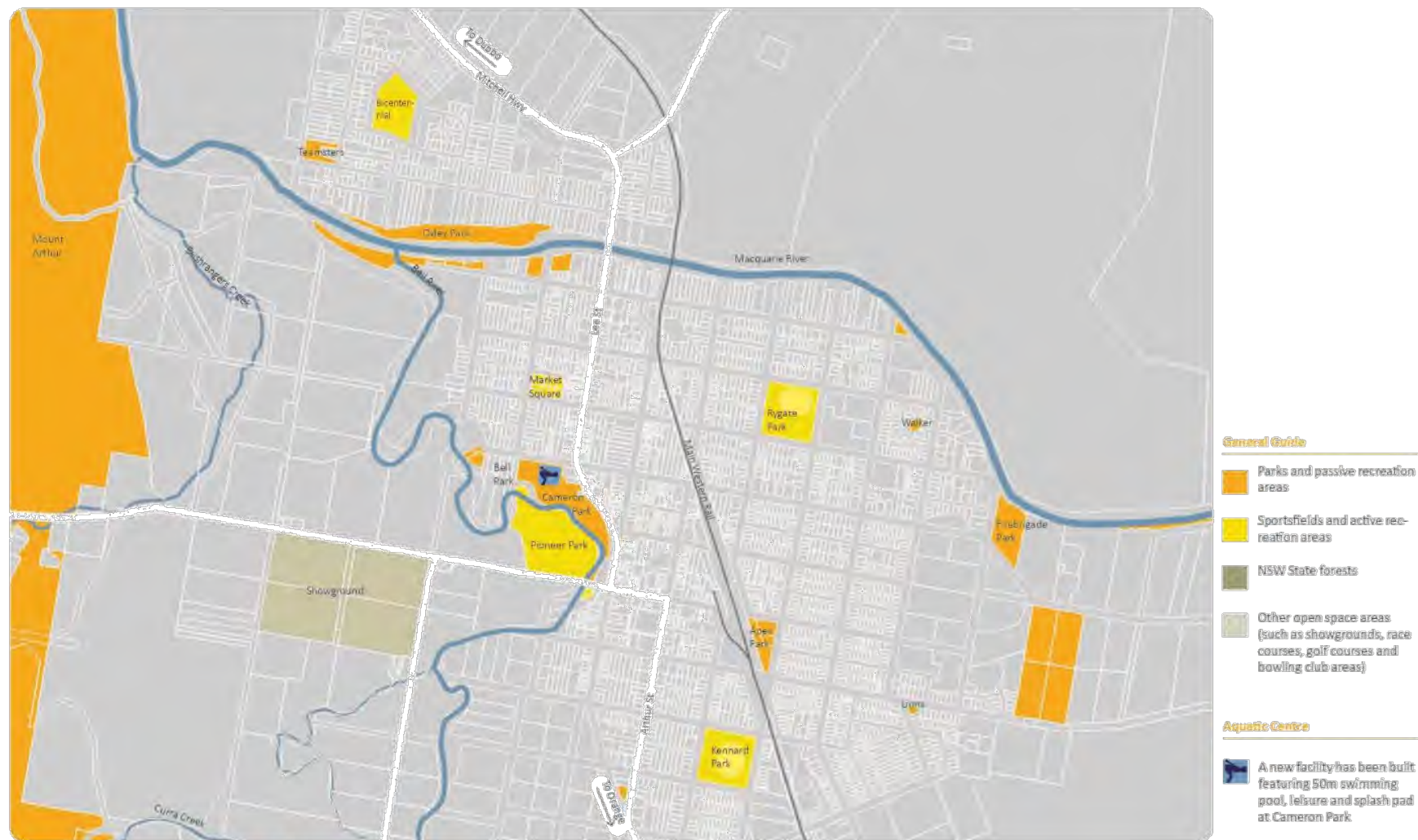
Action Plan 3: Indoor and Aquatic Facilities

OBJECTIVES	ACTIONS
8. Plan for long term equitable spread of indoor and aquatic facilities	8.1 Complete analysis of current and future needs analysis, including supply and demand assessment as well as potential shortfalls in indoor courts.
	8.2 Basketball: Assist in coordination of a community based facility long term at the new Indoor Sports Facility. Dubbo Basketball in expanding its opportunities for long term facilities upgrades. Assess feasibility for the number of courts and programs across the region as staged development.
	8.3 Support Basketball programs to encourage diverse and inclusive groups including indigenous, youth and social engagement programs.
	8.4 Promote partnerships with the existing indoor sports centre to ensure equitable use of spaces.
9. Develop Dubbo Regional Sporting Hub	9.1 Plan for a key indoor facility to be co-located with the Charles Sturt University, Dubbo Indoor Multi-court Facility, Cycling, PCYC and netball facilities. Construction planning for stages.
	9.2 Investigate partnerships with key stakeholders such as, state sporting organisations, community groups and agencies, local schools and hospitals to expand offering of activities and complementary services.
10. Improve water based sports	10.1 Deliver Dubbo Aquatic Leisure Centre master plan with opportunities to expand the facility mix, programs and services at existing aquatic centres.
	10.2 Improve offering of activities. These may include offering expanded types of water based activities (e.g. aquarobics) as well as use of spaces for complimentary services (e.g. yoga, pilates or physiotherapy).
	10.3 Swimming: Support swimming club programs and assist in encouraging higher level competition at the indoor facility.
	10.4 Support Wellington Swimming Club with programs and training to provide a sustainable long term facility.
	10.5 Deliver Geurie Swimming Pool long term vision.



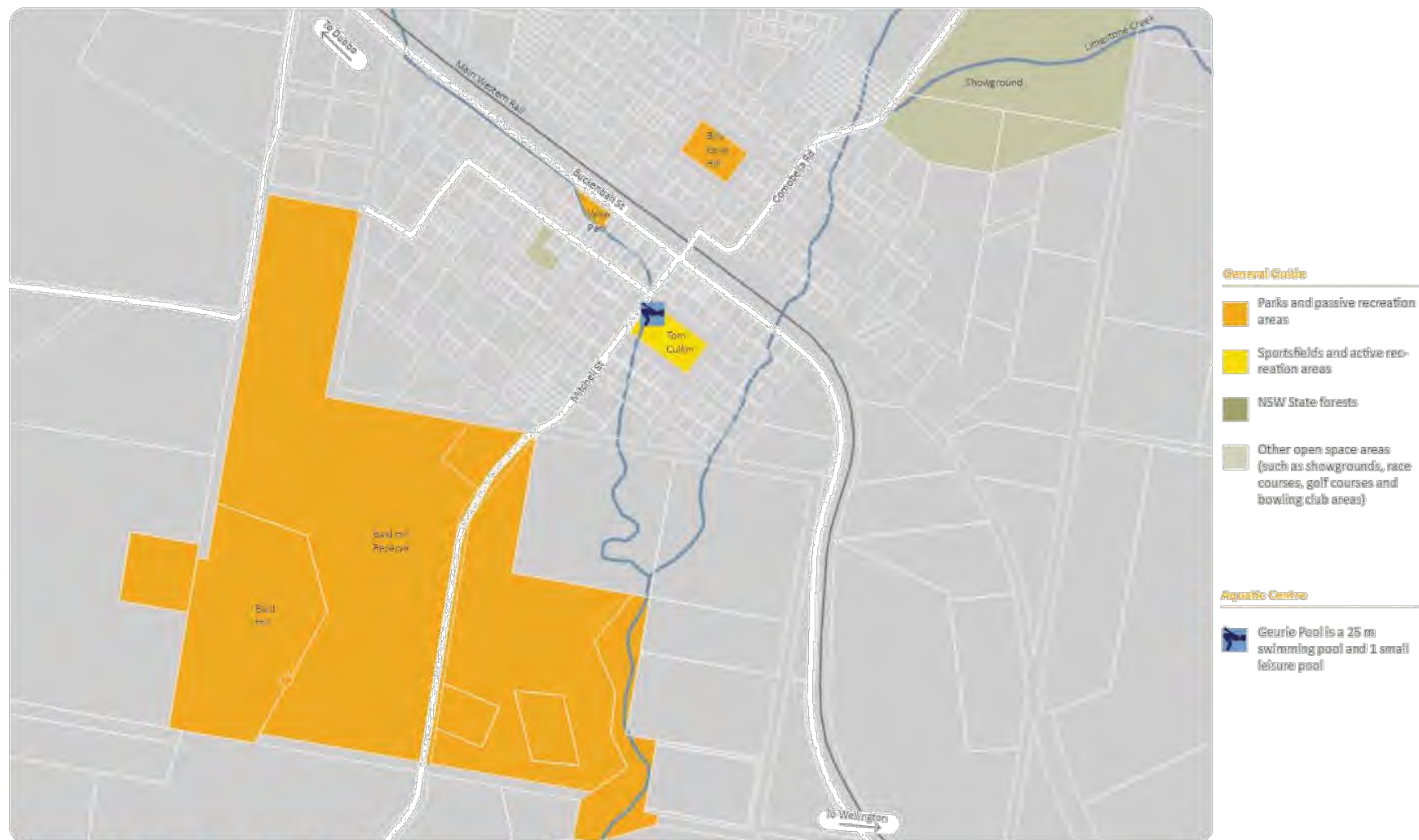
Indoor and Aquatic Facilities - Dubbo

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Aquatic Facility - Wellington

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Aquatic Facility - Geurie

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Action Plan 4 : Partnerships and Programs

OBJECTIVES	ACTIONS
11. Improve communication and usage across all facilities	<p>11.1 Clearly communicate seasonal allocation of sports grounds to maximise usage and plan for periods of targeted maintenance.</p> <p>11.2 Update the Playing Field Policy to communicate to all users defined maintenance standards, schedules for cleaning and operating responsibilities.</p> <p>11.3 Develop a marketing and communication strategy to promote passive and unstructured recreation. This may include web links for walking, cycling, kayaking and camping.</p> <p>11.4 Update hire agreements and expectations of DRC every year. Hire agreements should clearly communicate all responsibilities, expectations for waste and cleaning, permissible uses, fees and charges.</p>
12. Develop healthy programs	<p>12.1 Develop the overarching participation and partnership program directions to foster activation, sustainable recreation and accessible physical activity programs.</p> <p>12.2 Work with NSW Office of Sport and other partners to assist in delivery of combined outcomes.</p> <p>12.3 Support under-represented community groups to improve access to sport and recreation opportunities. These groups may include: Indigenous and culturally diverse groups Youth to Seniors People with a disability Inactive.</p> <p>12.4 Continue to support sport in the LGA through provision of a discount to sporting organisation annual fees and charges for sport specific facility preparation.</p>
13. Promote fit for purpose facilities across the LGA	<p>13.1 Partner Office of Sport for collection of baseline data including sport usage modelling, data collection and review. Undertake review of existing under utilised facilities.</p> <p>13.2 Facilitate recreational outcomes across master plans such as North Dubbo Sporting Complex, Macquarie River corridor, Police Paddock and Lady Cutler precincts. Design principles to align with this strategy.</p>

Action Plan 4 : Partnerships and Programs

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| 14. Grow sustainable opportunities for inclusive partnerships | 14.1 Work with sporting associations, community, PCYC, Health and other agencies to improve their capacity to provide appropriate and successful programs. |
| | 14.2 Partner attendance at the Dubbo Regional Sports Council. Support clubs on strategic and development programs aimed at improving governance and management arrangements. Aim to support increasing participation and planning for infrastructure. |
| | 14.3 Plan for appropriate spaces for sports events, festivals, markets, fairs and other temporary opportunities that may support tourism to the region. |
| | 14.4 Maintain and enhance existing successful sporting and active recreation events. |
| | 14.5 Work in collaboration with key stakeholders to attract sport and recreation events and ensure event legacy planning. |
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Footnotes

1. NSW Government 2017, Department of Planning and Environment, Central West and Orana Regional Plan 2036
2. Kostrzewska, M 2017, 'Activating Public Space: How to Promote Physical Activity in Urban Environment' IOP Conf. Ser.: Mater. Sci. Eng. 245 052074
3. Australian Government 2019, Australian Sports Commission, 'Australia's top 20 sports and physical activities revealed'
4. Australian Government 2018, Department of Health, Sport 2030
5. PricewaterhouseCoopers 2015, Weighing the cost of obesity: A case for action, PWC (2015)
6. Parsons, S 2018, 'More than a Game: Evaluating the Economic Contribution of Sport to the Australian Economy,' 2018 Treasury Research Institute Essay Competition
7. Australian Government 2019, Australian Sports Commission, 'Clearinghouse for Sport and Physical Activity' - <http://www.ausport.gov.au>.
Also refer to: Australian Government 2019, Australian Sports Commission, 'Australia's top 20 sports and physical activities revealed'
8. Eime RM, Harvey J, Charity MJ, Casey M, Westerbeek H, Payne WR 2017, 'The relationship of sport participation to provision of sports facilities and socioeconomic status: a geographical analysis' *Aust NZ J Public Health*. 2017; Online; doi: 10.1111/1753-6405.12647
9. NSW Government 2019, Sport NSW, Future Directions An aspirational and inclusive approach to the delivery of sport and active recreation in NSW 2019-2022.



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REPORT: Large Regional Airport of the Year 2019 and Engineering Excellence Award 2019.

AUTHOR: Director Culture and Economy
REPORT DATE: 22 November 2019
TRIM REFERENCE: ID19/1562

EXECUTIVE SUMMARY

Dubbo City Regional Airport has been recognised for strategic planning, significant airside infrastructure developments and stakeholder engagement, in being awarded Large Regional Airport of the Year at the Australian Airports Association (AAA) National Airport Industry Awards 2019.

There has been more than \$18 million of airside infrastructure development in recent years, with the 05/23 runway overlay and lighting upgrade, construction of the aeromedical facility and the general aviation expansion. The lighting upgrade included installation of a new LED runway edge lighting system, installation of new taxiway edge lighting and installation of two illuminated wind indicators.

Mayor of the Dubbo Region Ben Shields, and Airport Technical Advisory Committee Chairperson, Councillor Greg Mohr joined Dubbo City Regional Airport Manager Jacki Parish, and Building Infrastructure Leadership Team (BILT) Manager Natalie Nissen to receive the Award at as part of the Annual Australian Airports Association Conference held on the Gold Coast in 2019.

On 7 November 2019, Dubbo Regional Council staff, Project Engineer Matthew Grebenc, Building Consultant Mick Wilson, and Building Infrastructure Leadership Team (BILT) Manager Natalie Nissen were also recognised at the Institute of Public Works Engineering Australasia (IPWEA) (NSW) 2019 State Conference being awarded an Engineering Excellence Award. This award was in the category of Projects greater than \$5 million, which included the construction of an eleven lot subdivision for General Aviation expansion and four Aeromedical Hangers, a Pilot Flight Preparation Building, Internal Road Network, Taxiway Network and infrastructure services including Water, Sewer, Stormwater, Electrical and NBN.

The exceptional operation of the Dubbo City Regional Airport and the development of the Airport Precinct is a collaborative achievement of many across the Organisation. As a large, complex and expanding facility servicing our growing population it requires vision, insight, input and support from every Division of Council from Strategic Planning, Risk, Finance and Asset Management to Design, Approvals, Construction and Communications. These awards are recognition of the teamwork within Dubbo Regional Council and the effective partnerships established with airport stakeholders and the State and Federal Government.

FINANCIAL IMPLICATIONS

There are no financial implications arising from this report.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

- 1. That the information contained within the report of the Director Culture and Economy dated 22 November 2019 be noted.**
- 2. That Council Staff be congratulated on the awarding of the Large Regional Airport of the Year 2019.**
- 3. That Council Staff be congratulated on the awarding of the Engineering Excellence Award 2019.**

Natasha Comber
Director Culture and Economy



REPORT: Event Development Fund and Major Event Sponsorship Fund 2019/2020 - Stream 2

AUTHOR: Manager Regional Events
REPORT DATE: 11 November 2019
TRIM REFERENCE: ID19/1536

EXECUTIVE SUMMARY

Funding under Stream 2 of the Event Development Fund and Major Event Sponsor Program is invited annually each September and open to events being held in the Dubbo Region LGA in the following calendar year.

Council invited applications for \$3,001 or more under each channel on 2 September 2019. Applications closed 31 October 2019.

Council received nine (9) applications under the Event Development Fund (EDF) and 16 applications under the Major Event Sponsor Program (MESP). Combined, 25 events applied for a total of \$454,292.

Funding in the amount of \$69,667 will support 18 events set to be held in the Dubbo Local Government Area in 2020. Combined, these events are expected to inject in excess of \$7M into the local economy.

FINANCIAL IMPLICATIONS

Recommendations for Event Development Fund the Major Event Sponsor Program funds are contained within the Regional Events operating budgets.

POLICY IMPLICATIONS

There are no policy implications arising from this report.

RECOMMENDATION

- 1. That funding determined under Stream 2 of the Event Development Fund totalling \$13,000 be noted.**
- 2. That funding determined under Stream 2 of the Major Event Sponsor Program totalling \$56,667 be noted.**

Kim Hague
Manager Regional Events

BACKGROUND

Stream 2 of the Event Development Fund and Major Event Sponsor Program invites applications for \$3,001 or more for events being held between 1 January 2020 and 31 December 2020.

The Event Development Fund (EDF) aims to assist events to build and grow during the infancy stages, whilst the Major Event Sponsor Program (MESP) is intended to attract and retain major event activity in the Dubbo Region LGA.

Applications for both channels opened on 2 September and closed on 31 October 2019.

This report is provided in accordance with Council's Financial Assistance Policy.

REPORT

Council invited applications for funding under Stream 2 of the Event Development Fund and the Major Event Sponsor Program on 2 September 2019. Applications were open 8 weeks and the opportunity to apply was communicated as follows:

- Social media via DRC channels
- Media releases
- Inclusion in Mayoral column
- Paid advertising in Council's column
- Targeted emails to event owners (Dubbo Region Event Network)
- Broad communications via Eblast

Applications closed on 31 October 2019. Council received nine (9) applications under the Event Development Fund (EDF) and 16 applications under the Major Event Sponsor Program (MESP). Combined, 25 events applied for a total of \$454,292.

In accordance with Council's Financial Assistance Policy a panel was convened comprising of the Manager Regional Events; Economic Development Team Leader; Recreation Co-ordinator; Cultural Development Co-ordinator and Council's Grants Officer. The recommendations of the panel were then approved by Director Culture and Economy and Chief Executive Officer. This process is in accordance with the adopted Events Support Program.

The panel met on 8 November 2019 and an assessment of each application was undertaken in reference to the EDF and MESP funding guidelines and criteria, and guided by the insights of individual members of the assessment panel.

Event Development Fund – Stream 2: [\$3,001 or more]

Intent: help build and develop sustainable, locally-grown events

Funding as recommended below aligns with Council's operational budget:

Event Development Fund – Stream 2 [01.01709.1004]: Allocated budget \$30,000.

- Budget allocated \$30,000.
- Funding recommended \$17,000.
- Balance \$17,000. – transferred to MESP 2

EVENT	Date	Application	Recommended funding	Funds returned to DRC (via fees)
Geurie Picnic Races	1 February 2020	\$ 4,200	1,000	nil
Under Western Skies Festival	21 March 2020	\$ 12,700	2,000	nil
Wellington Boot Racing Carnival	4-5 April 2020	\$ 17,000	3,500	nil
Dubbo Motorbike Rally	2 May 2020	\$ 17,580	3,000	nil
145 th Annual Wellington Show	16 May 2020	\$ 5084	See community event note below	\$4000
Endurance Event – Dubbo Kart Club	16-17 May 2020	\$ 5,000	2,500	nil
Opera at Dundullimal	16 May 2020	\$ 9,000	1,000	nil
Wellington Pony Club Annual Pony Camp	4-7 July 2020	\$ 3,500	*	
Orana Relay for Life	12-13 September 2020	\$ 4,300	**	
TOTALS		\$77,934	\$13,000	
Budget available			\$30,000	
Available funds to be transferred to MESP2			\$17,000	

*event invited to apply for funding under Stream 1 of the MESP when it opens on 1 July 2020.

**this event does not qualify for funding under either channel of funding. The event owner will be invited to apply for funding under the CEO's Sponsor Fund.

Major Event Sponsor Program – Stream 2 [\$3,001 or more]

Intent: attract/retain major event activity in the Dubbo Region LGA

Funding as recommended below aligns with Council's operational budget:

Major Event Sponsor Program – Stream 2 [01.01705.1004]: Allocated budget \$92,000

- Budget allocated \$92,000 less \$50,000 provided as incentive funding - \$42,000
- \$17,000 from EDF 2 transferred to MESP 2
- Total funding \$42,000 + \$17,000 = \$59,000
- Funding recommended \$56,667

EVENT	Date	Application	Recommended funding	Funds returned to DRC (via fees)
NYE Fireworks	31 December 2019	15,000	Corporate Sponsorship	
Under 13/14 State Cricket Challenge	19-23 January 2020	18,000	* \$16,667	16,667
Little Athletics Region 3 Championships	2–3 February 2020	5,303	\$4,000	4000
NSW U9 – U13 Track Cycling Championship	8-9 February 2020	5,000	\$1,000	1,000
Dorper Sheep Australia Eastern Region Show and Sale	27-28 February 2020	5,055	\$1,000	1,000
Worrells Women's NSW Open	27 February – 1 March 2020	19,125	* \$10,000	Nil
Wellington Vintage Fair and Swap Meet	29 February – 1 March 2020	7,600	\$4,000	4000
Man from Ironbark Festival	11 April 2020	8,500	\$2,000	0
Dubbo Show	22-24 May 2020	20,000	See community event note below	
BBi Conference	2-3 July 2020	51,700	** \$2,000	2,000
43rd Annual Wellington Eisteddfod	July - August 2020	5,000	\$5,000	5000
Wellington Arts and Sculpture Festival	5-6 September 2020	13,000	\$2,000	0
Group XI Rugby League Grand Final	6 September 2020	5,000	\$2,000	2000
Moorambilla Voices Workshops and Concert	22-26 September 2020	177,075	See community event note below	0
Under 13/14/15 NSW Youth Cricket Championships	27 September – 2 October 2020	7,000	* \$7,000	7,000

GC Conference 2020	30 September – 2 October 2020	5,000	Nil	0
TOTALS		\$367,358	\$56,667	\$42,667

*Pre-committed funds

** Business event (focus for diversity of event funding)

Funds expected to be returned to the Organisation under Stream 2 of the MESP and EDF total \$46,667 which is 63% of funds distributed to events.

Major Community Events

Dubbo Show, Wellington Show and the Moorambilla Voices Workshops and Concert are major community events that provide social and cultural outcomes for the region. It is recommended that Council consider alternate funding sources for these events outside the event development framework.

SUMMARY

Stream 2 of Council's Event Development Fund and Major Event Sponsor Program opened on 2 September and closed on 31 October. The channels were open for application for funding of \$3001 or more from events held in the Dubbo LGA between 1 January 2020 and 31 December 2020.

Council received 25 applications with a combined total of \$454,292. Total funding allocated under Stream 2 of the Event Development Fund and Major Event Sponsor Program was \$69,667

Funding in the amount of \$69,667 will support 18 events set to be held in the Dubbo Local Government Area in 2020. Combined, these events are expected to inject in excess of \$7M into the local economy.