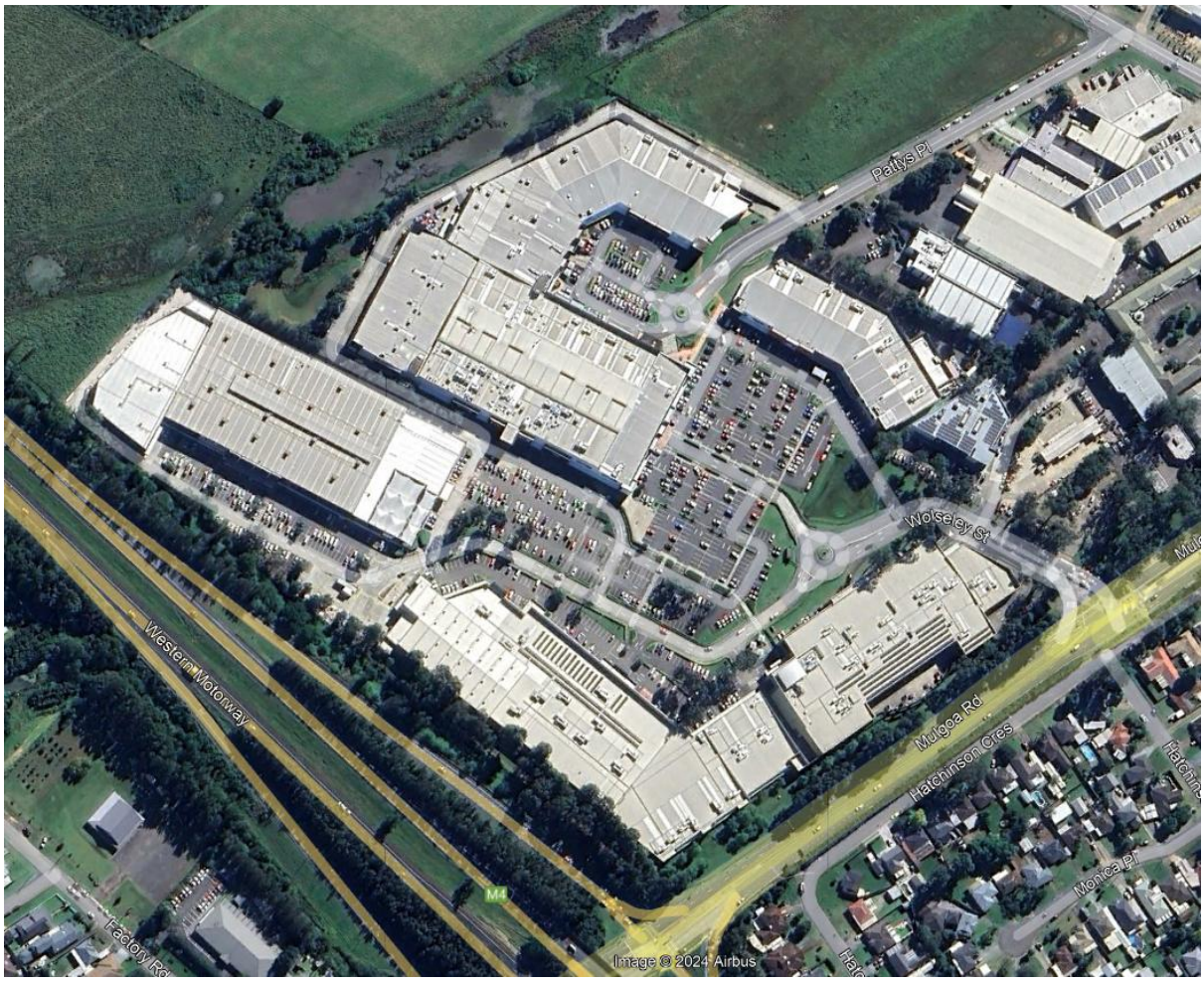
SOILANDWATER

RIPARIAN & WATERCOURSE ASSESSMENT

13-23 Patty's Place
JAMISONTOWN NSW 2750

28 January 2025 (V04)



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Franklin Consulting Australia Pty Limited, trading as Soil and Water, offers expert advice and services to the agriculture, development and environmental conservation sectors. We provide soil and water management advice, undertake land capability and soil assessment, erosion and sediment control, and soil conservation, catchment and property management planning. We have extensive experience in both government and private sectors in senior management and consulting roles.

We provide our services to individual land holders, sub-division developers, surveyors, commercial business owners, and land development and regulatory agencies.

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SUMMARY

Franklin Consulting Australia Pty Ltd was engaged by Harvey Norman to provide a riparian assessment of the watercourse on Lot 10 DP 1046110 (referred to as 'the watercourse'). The assessment provides an initial analysis of the potential impact of the extension of the existing homemaker centre on the current values of the watercourse.

The key attributes of the subject watercourse and riparian zone are as follows:

- mapped as a 1st Order Stream (Strahler method) in NSW Hydroline database,
- intermittent with no permanent flows,
- highly modified including two constructed instream dams and partial filling,
- extensively cleared for agriculture and adjacent urban development
- vegetation is dominated by exotic species with limited native vegetation, and
- the contributing catchment is highly modified with the main land use being agriculture and urban development.

The existing riparian values of the watercourse are likely limited to:

- minor flood detention capacity provided by instream dams,
- minor sediment and associated nutrient detention capacity provided by instream dams,
- potential aquatic habitat provided by permanent water bodies in instream dams, and
- potential habitat provided by limited planted native vegetation within the riparian zone.

The riparian values could be maintained during development of the site by:

- maintaining the flood detention capacity of instream dam structures by keeping the existing dam structures, retaining comparable or increased flood detention capacity in modified structures,
- maintaining the detention capacity of the existing stormwater basin and augmenting capacity to manage any additional stormwater associated with future development on the site,
- maintaining the sediment and nutrient detention capacity of instream dam structures by keeping the existing structures or retaining comparable or sediment and nutrient detention capacity in modified structures,
- maintaining aquatic habitat by keeping the existing instream dams, or creating similar modified structures,
- maintaining riparian habitat provided by native vegetation by maintaining existing and/or comparable/increased areas of native vegetation of the same vegetation community type(s) within the riparian area.
- the site can be developed in a manner consistent with *Controlled activities - Guidelines for riparian corridors on waterfront land* (NSW Water) by utilising the averaging rule.

1. Introduction and scope

Franklin Consulting Australia Pty Limited was engaged by Harvey Norman to undertake an assessment of a watercourse which flows adjacent to an existing retail site at 13-23 Patty's Place Jamisontown (Lot 10 DP 1046110 & Lot 11 DP 1046110), refer **Figure 1**.

A planning proposal is proposed to facilitate the extension of the existing retail facility to increase the permissible height of building. The expanded development footprint will be located within Lot 10 only which contains part of the subject watercourse, which extends into Lot 11 (adjoining the planning proposal site). Refer **Figures 2a-g.**

This report assesses the watercourse and surrounding riparian area to identify existing riparian values and whether these can be maintained during the subsequent development of the site.

The report shows how development on the site can be done in a manner consistent with *Controlled activities - Guidelines for riparian corridors on waterfront land* by using the averaging rule provisions.

The watercourse flows northeast to southwest immediately adjacent to the existing retail centre between Blaikie Road and the Western Motorway. The watercourse flows under the Western Motorway to School House Creek which then flows to join the Nepean River approximately 1.5 kilometres southwest of the site.

A site inspection was undertaken on 2 October 2024. This report also relies on studies and information provided by the client in conjunction with other open-source information. This report is not an exhaustive study of the impact of development on the watercourse and riparian zone as may be required at Development Application stage and is intended only to inform the suitability of the site for the proposed planning proposal.

Figure 1: Site Location.

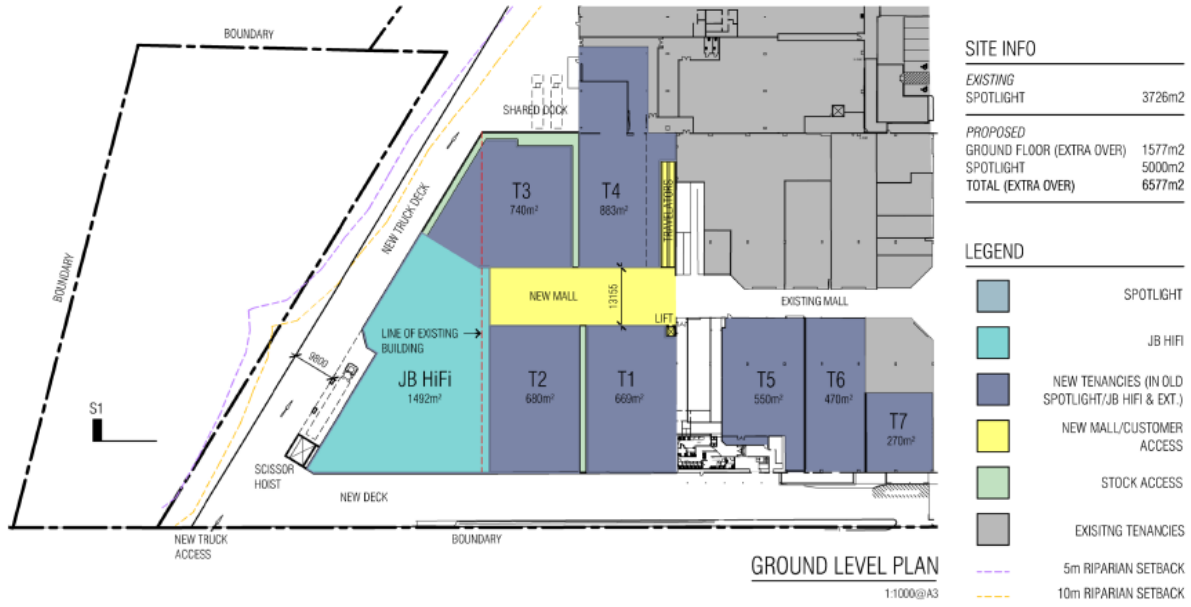

Figure 2a: Conceptual Development Footprint – Ground Level (refer client plans)

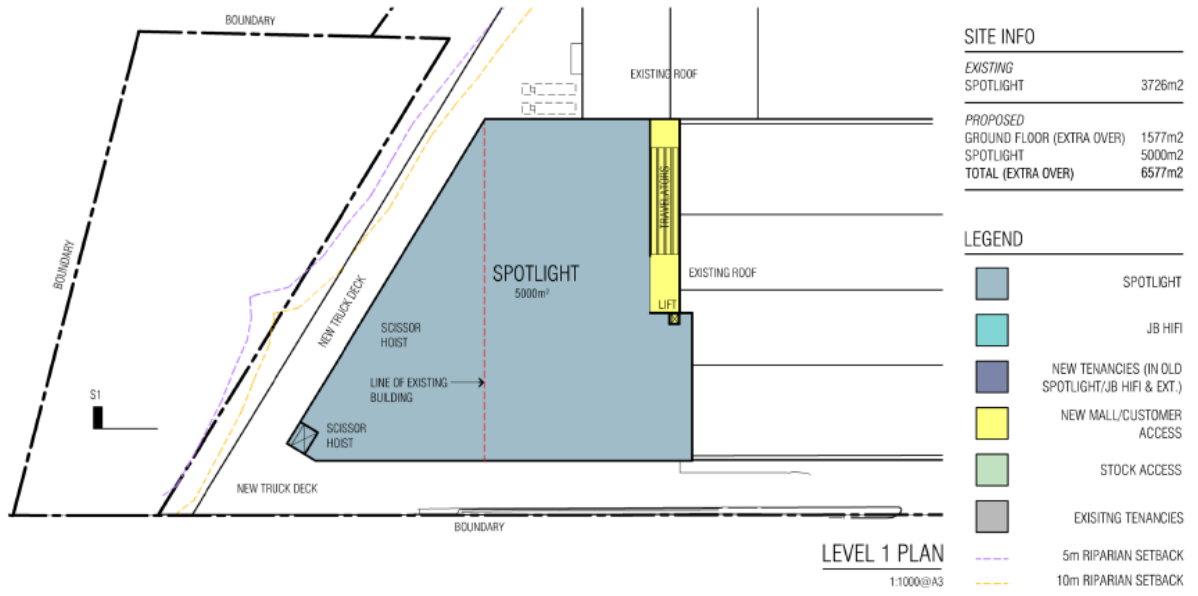

Figure 2b: Conceptual Development Footprint –Level 1 (refer client plans)

Figure 2c: Riparian zone and existing dam

Figure 2d: Sediment detention basing within proposed building footprint

Figure 2e: Dense stands of exotic vegetation in riparian zone

Figure 2f: Dam upstream of development

Figure 2g: Looking downstream along the riparian zone.

2. Watercourse description and assessment

2.1 Stream order

The watercourse is mapped as a minor 1st Order Stream in NSW Hydroline database, refer **Figure 3.** Stream order is classified under the Strahler System based on 1:25,000, 1:50,000 or 1:1000,000 topographic maps whichever is the smallest scale available.

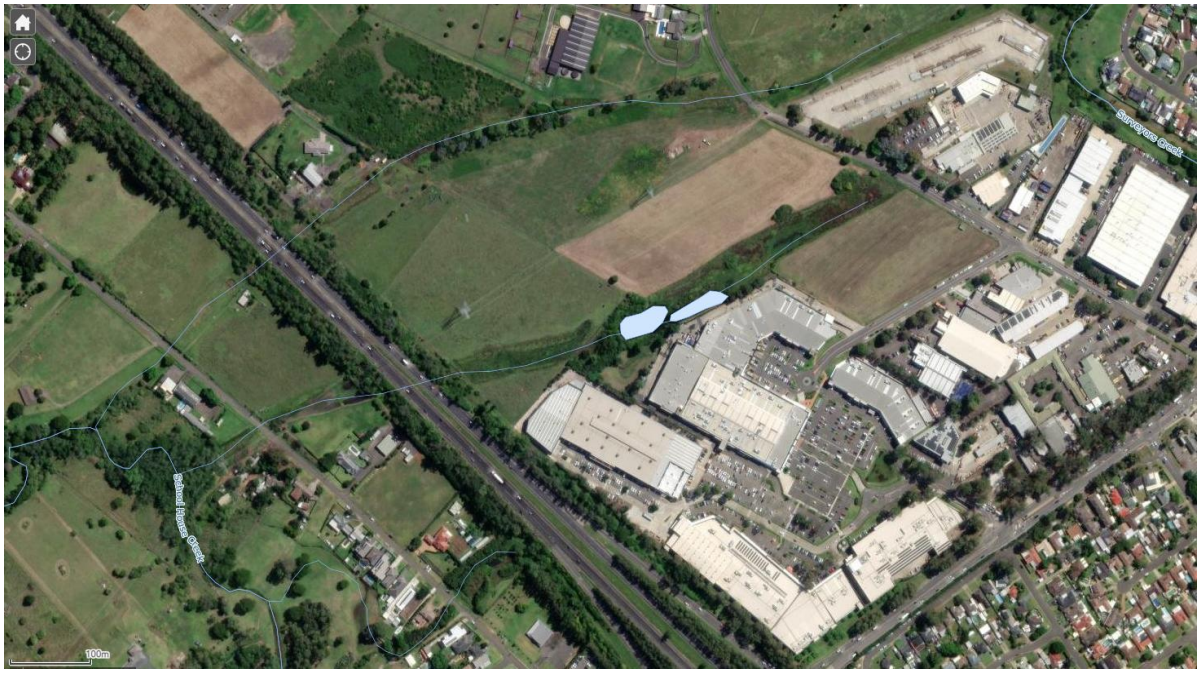

Figure 3: NSW Hydroline Database – note first order stream adjacent to the centre.

First order streams are the starting point of a defined drainage network within a catchment where diffuse overland flows concentrate to the point that the resulting drainage depression begins to develop a defined bed and bank structure.

First order streams are generally minor intermittent streams and as a result are often modified to be less of an imposition on surrounding land uses. Reflecting the minor and non-permanent nature of these streams there are a larger range of activities which may be approved for 1st order streams which include stream realignment, online detention basins and stormwater outlet structures[1].

The allowable activities on waterfront land of the 1st order stream (including stream realignment, online detention basins, stormwater outlet structure works) provides options to mitigate any potential impacts associated with further development of the site including extension of the retail centre.

[1] Controlled activities – Guidelines for riparian corridors on waterfront land, Department of Planning & Environment Fact Sheet, NSW Government (undated)

2.2. Non-permanent flow

First order streams like the subject watercourse, are generally minor intermittent watercourses which only flow after rainfall run-off events. This is a result of the small contributing catchments (**Figure 4**) and lack of a defined drainage network upslope of the watercourse. Historical aerial imagery of the subject watercourse shows that extensive areas upstream of the dams are dry for extended periods, refer **Figure 5**. Some imagery shows that agricultural activity including ploughing, have been undertaken across the drainage depression demonstrating that flows contributing to the subject watercourse are non-permanent, refer **Figures 6.**

The non-permanent/intermittent nature of flows in the subject watercourse limit the habitat value of the watercourse and riparian area as the system cannot support flora, fauna species requiring permanent flows (excepting dams as discussed later).

Non-permanent/intermittent flow in the subject watercourse limits the connectivity for some migratory aquatic species, including connectivity between permanent water bodies (dams) and downstream permanent waterbodies.

Non-permanent/intermittent flows in the subject watercourse present options for managing sediment/erosion issues during any subsequent development construction phase through timing of works.

Figure 4: Limited catchment area upslope of Western Motorway – 23.42 ha.

Figure 5: Intermittent watercourse – note dry watercourse upstream of dams.

Figure 6: Intermittent flows in catchment – note the agricultural activities including ploughing across the drainage depression demonstrating intermittency)

2.3 Highly modified watercourse

The watercourse has been extensively modified through the construction of two instream dam storages. Sections of the watercourse have also been partially filled to reduce the instream area that is periodically inundated and to reduce inundation on adjacent land, refer **Figures 7-9.**

The previous modification of the watercourse through construction of instream dams and partial filling, has impacted natural habitat value of the watercourse and riparian area due to disturbance during the construction phase and the alteration of the natural watercourse by these features. The dams also present a barrier to fish passage and reduces connectively with up and down stream reaches.

The creation of some permanent waterbodies within the watercourse (dams) may have provided habitat for aquatic flora and fauna species which was not previously supported by the natural intermittent watercourse.

The creation of instream water storages (dams) has provided some flood detention capacity in the watercourse.

The creation of instream water storages (dams) has provided some sediment and nutrient retention capacity in the watercourse.

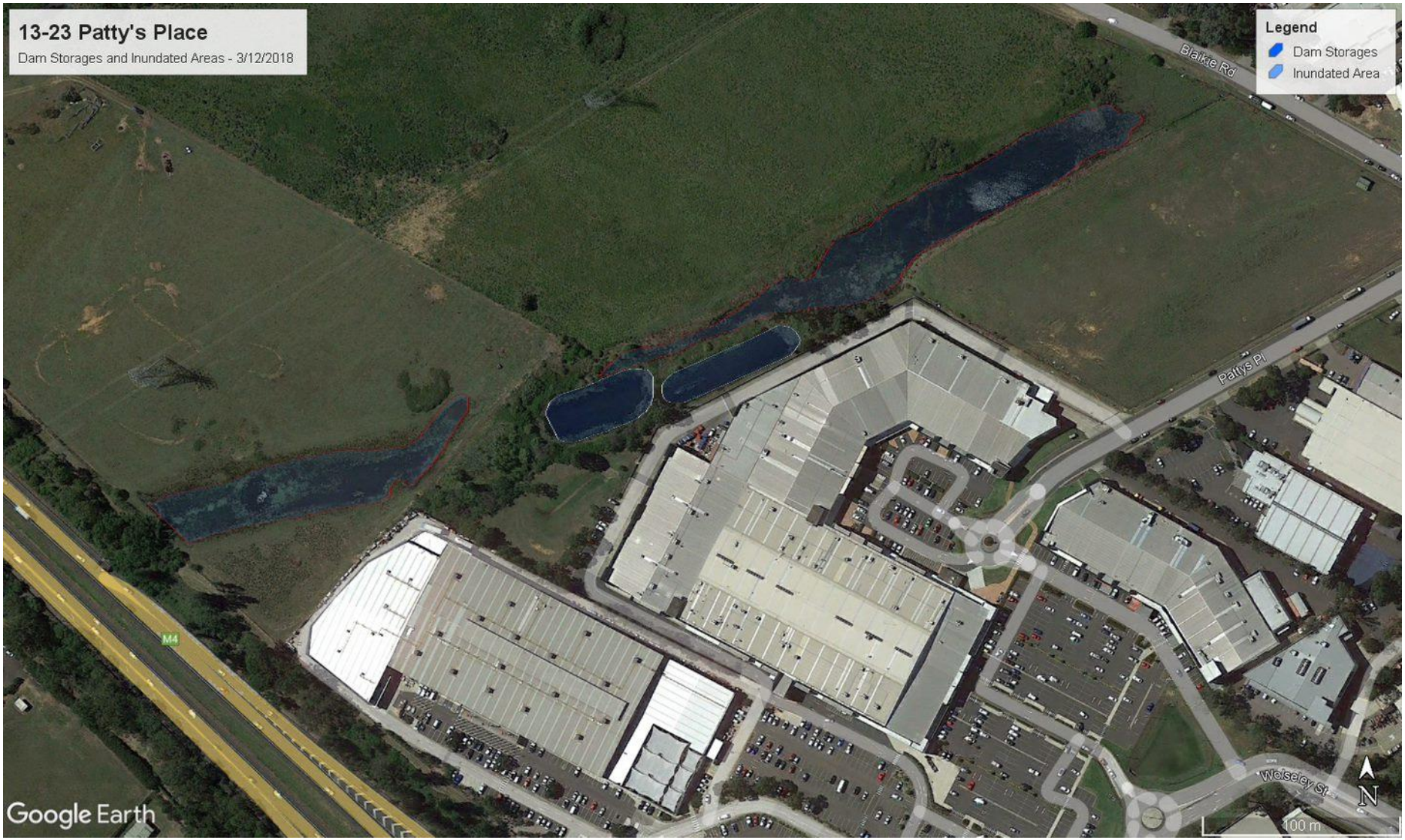

Figure 7: Constructed dam storages and area subject to inundation – 21/7/2002.

Figure 8: Area subject to inundation – 21/7/2002, note width of area upstream of homemaker centre.

Figure 9: Area subject to inundation – 17/4/2006, note <u>reduced</u> width of area upstream of homemaker centre.

2.4 Extensively cleared riparian area dominated by exotic vegetation.

The intermittent watercourse and riparian area have been cleared for agricultural land use and more recently for urban development including the construction of the existing retail complex. Exotic grass /pasture species have colonised the area. Limited areas of native vegetation have established through natural recruitment and/or planting, refer **Figure 10.**

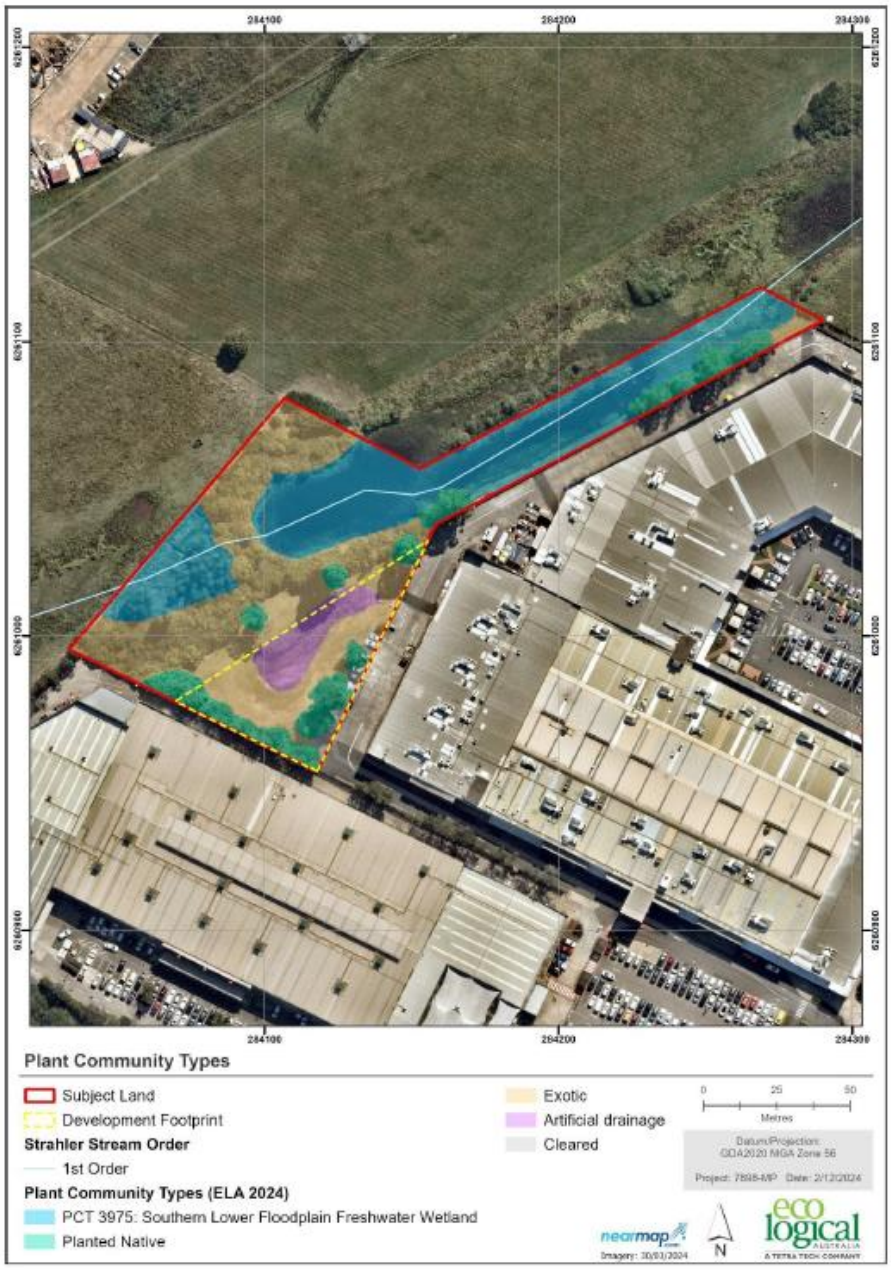

Figure 6: Plant Community Types (PCTs)

Figure 10: Vegetation community mapping – extract from Biodiversity Development Assessment Report (EcoLogical Australia, 11 December 2024).

Following an amendment to the original development footprint, no land identified on the Biodiversity Values Map or remnant native vegetation will be impacted and the proposed development is unlikely to significantly impact upon threatened species listed under the BC Act. As such, the Biodiversity Offsets Scheme (BOS) will not be triggered and a BDAR has been prepared in line with the amended development footprint.

Measures to avoid and minimise impacts to biodiversity values have been considered and applied with regards to locating and designing the development footprint. The amended footprint does not impact on native remnant vegetation with the total area of PCT 3975 (0.46 ha) within the subject land to be retained.

Removal of 0.07 ha of planted native vegetation was assessed against *Appendix D: Streamlined assessment module - planted native vegetation of the BAM 2020* and does not require the offsetting of ecosystem or species credits under the BOS. Planted native vegetation to be impacted by the proposed development does provide potential foraging habitat for the following threatened fauna species.

Measures have also been proposed within this report to mitigate and manage potential impacts to biodiversity values before, during and after construction of the proposed development.

Given the development footprint is located immediately adjacent to an existing development and is predominantly located in exotic vegetation and existing cleared land, the project has been designed to create a commercial area consistent with the surrounding land use.

Further refer to *Biodiversity Development Assessment Report EcoLogical Australia, 11 December 2024.*

2.5 Highly modified contributing catchment.

The contributing catchment which generates flows in the catchment was historically modified for agricultural land use and more recently for urban development including the construction of the retail centre, refer **Figure 5**. The modification of the catchment for agricultural land use changes the hydrology by increasing run-off rates in the catchment (as compared with a natural vegetated catchment) resulting in higher catchment yields and peak discharges. Agricultural land use involving cultivation, as shown in **Figure 5**, can result in increased sediment loads entering the watercourse impacting on water quality and downstream drainage infrastructure. Associated agricultural activities such as fertiliser, herbicide or pesticide application can further contribute to degrading water quality in the watercourse.

Urban development within catchments can also increase run-off rates, catchment yields and peak discharges and impact water quality. These changes can be mitigated through the

construction of stormwater detention basins and related structures as exist at the existing retail facility.

The historical modification of land use in the catchment has changed the catchment hydrology resulting in higher catchment yields, peak discharges. Complimentary studies by the project proponent have demonstrated that any impacts to hydrology associated with future development on the site can be adequately addressed through the augmentation of the stormwater detention basin on the site. Appropriate sediment and erosion control measures during construction will mitigate potential water quality impacts during any future development construction phase.

The existing instream dams will continue to provide some mitigation for hydrology and water quality impacts related to historical changes of land use within the catchment. There is potential to modify these existing dams to increase the stormwater detention and water quality improvement benefits they deliver.

3. Riparian and watercourse values

The watercourse and riparian area in its current condition provide several potential benefits to the immediate and downstream environments.

3.1 Minor flood detention capacity

The existing instream dams on the watercourse provide some flood detention capacity which potentially assists to mitigate increased run off, and peak discharges associated with historical modification of the catchment which did not include specific stormwater detention measures (agricultural land-use).

3.2 Sediment and nutrient retention

The instream dams provide some sediment and nutrient retention capacity by capturing sediment and associated nutrient load mobilised in run-off. This potentially mitigates some of the water quality impacts associated with the historical modification of the catchment which did not include specific stormwater detention measures (agricultural land-use).

3.3 Aquatic habitat

The existing instream dams provide some potential aquatic habitat by providing a permanent water body in otherwise intermittent watercourse. The revised development footprint will not impact the instream dams which may have provided an increase in habitat diversity in an area of otherwise reduced habitat values associated with the historical modification of the catchment and watercourse. *See* also *Eco Logical Australia 2024. 13-23 Pattys Place, Jamisontown - Biodiversity Development Assessment Report.*

3.4 Native vegetation habitat

The limited areas of native vegetation in the riparian area may provide some habitat for endemic native species. The revised development footprint does not impact on native vegetation with the total rea of PCT 3975 (0.46ha) within the subject land to be retained, refer to *Eco Logical Australia 2024. 13-23 Pattys Place, Jamisontown - Biodiversity Development Assessment Report.*

4. Maintaining and/or improving watercourse and riparian values

4.1 Flood detention capacity

Maintaining the existing instream dam structures would retain existing flood detention capacity in the system. This would be feasible if future development included a building elevated on piers above the riparian area.

There may also be an opportunity to modify the existing dams to provide additional flood detention capacity and mitigate impacts that may be associated with future development. This would be consistent with allowable activities for 1st order streams.

4.2 Sediment and nutrient retention capacity

Similarly, maintaining the existing instream dam structures would retain sediment and nutrient retention capacity in the system. This would be feasible if future development included a building elevated on piers above the riparian area.

There may also be an opportunity to improve the sediment and nutrient retention capacity by increasing aquatic vegetation in the instream dam structures.

4.3 Aquatic habitat

Maintaining the existing instream dam structures, or creating similar modified structures, could preserve existing aquatic habitat values. This would be feasible if future development included a building elevated on piers above the riparian area.

4.4 Riparian habitat

Riparian habitat provided by native vegetation could be maintained by providing comparable and/or increased areas of native vegetation of the same vegetation community type(s) within or adjacent to the 1st order stream riparian corridor.

Development on the site can maintain the riparian habitat values of the corridor through the use of the averaging rule provisions which are included in the *Controlled activities - Guidelines for riparian corridors on waterfront land* (NSW Water).

These provisions enable non-riparian activities (such as construction of infrastructure) in the outer 50% of the required 1st order stream riparian corridor of 10 metres, provided an equal or larger offset area can be added elsewhere to riparian corridor.

The proposed development has an encroachment area of 45m^2 into the outer 50% of the riparian corridor. There is an available offset area of 75m^2 on the opposite side of the riparian corridor which could be revegetated with suitable endemic native riparian species, refer **Figure 11.**

Provisions would be required to address impacts to habitat and any threatened species identified by subsequent fauna surveys during construction.

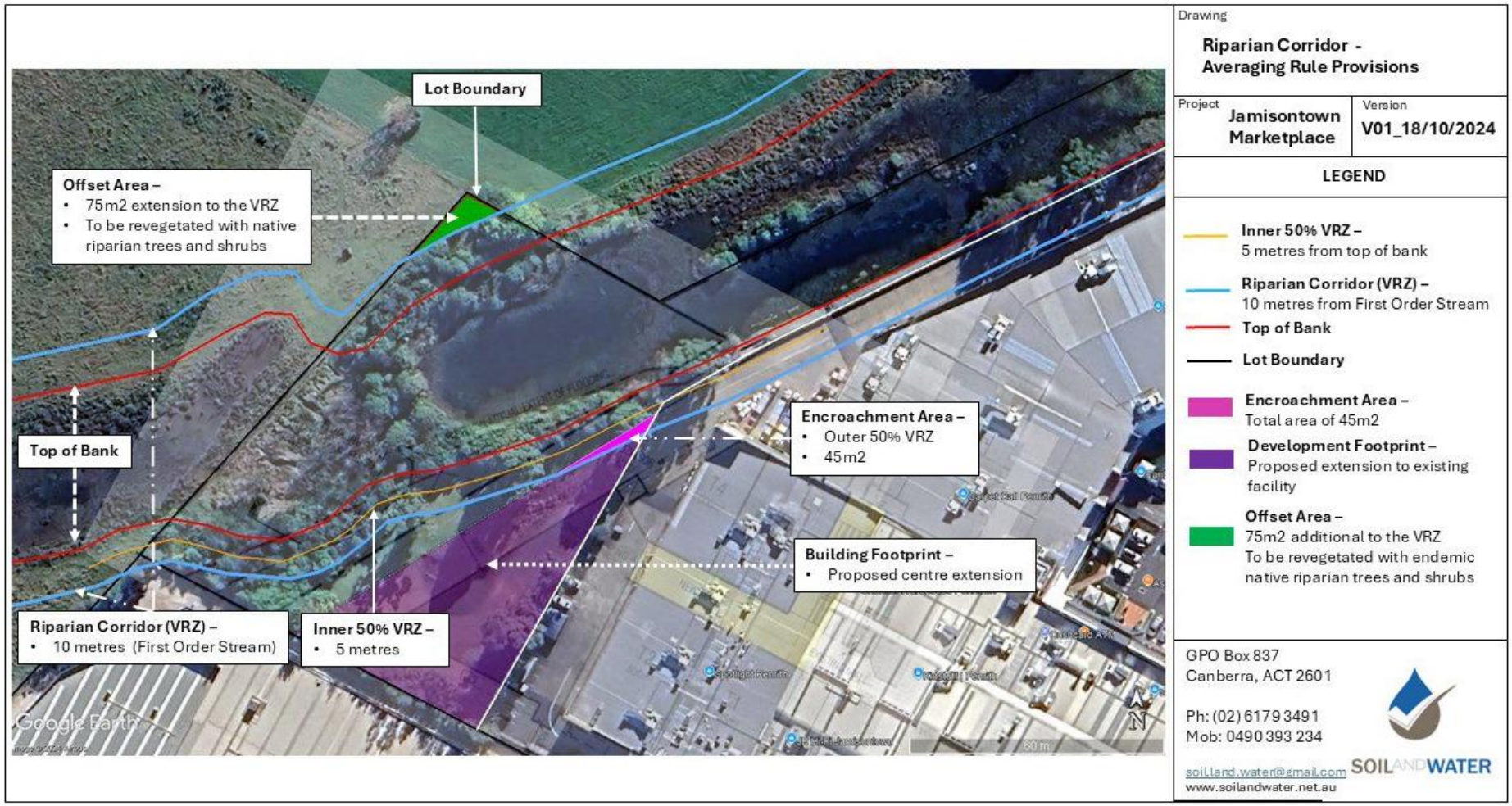

Figure 11: Riparian Corridor Averaging Rule

5. Conclusion

The watercourse is a minor, intermittent stream which has been extensively modified by previous construction of instream dams. The watercourse sits within a highly modified catchment dominated by agricultural and urban land use.

The watercourse and riparian area provide limited flood, sediment and nutrient retention capacity. Instream dams provide potential aquatic habitat value. Limited native vegetation in the riparian area also provides potential habitat for endemic native species.

It is considered that future development could be undertaken on the site without detrimentally impacting existing riparian and watercourse values.

Using the averaging rule on the riparian corridor could deliver an improvement to existing riparian and watercourse values of the site by enabling a net increase in vegetated riparian area adjacent to the site.

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