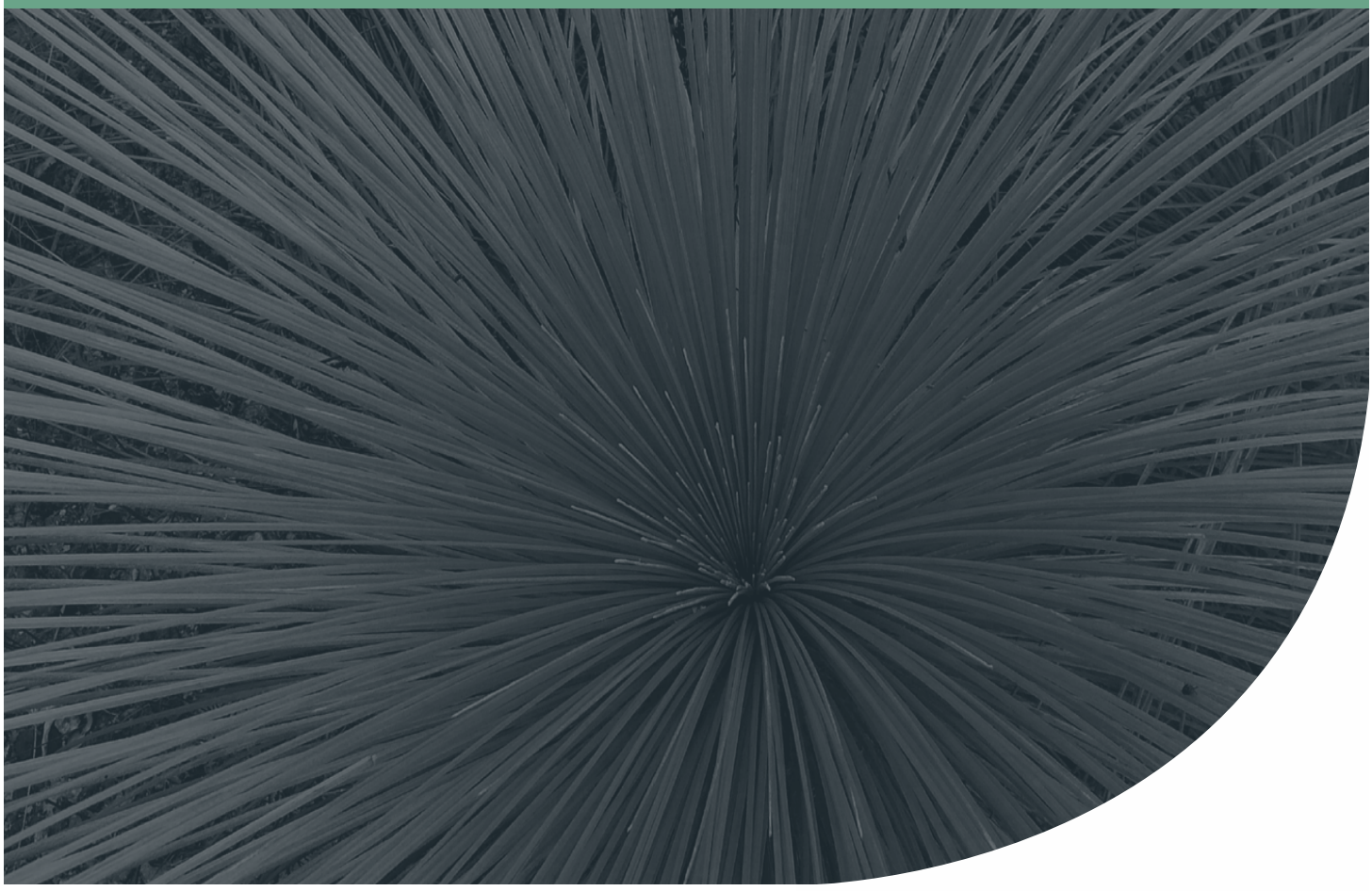
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Local Water Management Strategy Addendum

Eglinton Central Precinct

Project No: EP18-100(12)

Prepared for Eglinton Estates Pty Ltd
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Executive Summary

Eglinton Estates Pty Ltd (the 'proponent') proposes an amendment to Eglinton Central Structure Plan located west of the rail corridor within Lot 9101, Eglinton (herein referred to as 'the site') as part of the Eglinton Local Structure Plan for residential and commercial purposes. The site has an area of approximately 33.7 ha and is zoned 'Urban' under the *CoW Town Planning Scheme No. 2*.

This Local Water Management Strategy (LWMS) Addendum has been prepared to support and amendment to the *Eglington Local Structure Plan*. This LWMS Addendum details the water management approach to support the proposed development and is intended to satisfy the requirement to prepare a LWMS in accordance with *State Planning Policy 2.9 Water* (SPP 2.9).

Water will be managed using an integrated water cycle management approach. The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving waters and their ecosystems. In summary, the environmental investigations conducted to date indicate that:

- The site receives 631.8 mm of rain on average annually with approximately half of this rainfall received between June and August.
- Topography within the site ranges from approximately 27 m Australian height datum (AHD) adjacent to Marmion Avenue up to 53 mAHD at a localised high point in the eastern region. The site has a generally north westerly aspect.
- Soils of the site are characterised as Safety Bay Sands and Tamala Limestone. This is consistent with regional landform mapping which describes the site as being representative of the Quindalup Formation with undulating dunal landforms.
- The site has no known risk of acid sulfate soils (ASS) occurring within 3 m of natural soil surface.
- No surface water bodies or features are observed within the site.
- The site is within a Priority 3 (P3) Public Drinking Water Source Area (PDWSA) with one well head protection zone (WHPZ) located within the site. All intended land uses comply with the permissible land uses for a PDWSA.
- The site not is located in a sensitive water resource area (SWRA).
- Groundwater levels beneath the site are approximately 0.5 mAHD. The represents a depth to ground water beneath the broader site of approximately 26. 5 to 52.5 mBGL.
- Historical groundwater quality within the broader Eglinton development generally displays low to moderate total nitrogen (TN) and total phosphorous (TP) concentrations, with TP being generally below detection limits.

The overall objective for integrated water cycle management for the site is to maintain the existing hydrological regime and minimise pollution. The design objectives of this LWMS seek to deliver best practice outcomes using a water sensitive design (WSD) approach, including management approaches for:

- Water conservation
- Stormwater management
- Groundwater management.

The overall objective for integrated water cycle management for the site is to maintain the existing hydrological regime and minimise pollution. The LWMS Addendum design objectives seek to deliver best practice outcomes using a WSD approach, including management approaches for water conservation, flood mitigation, stormwater quality management and groundwater management.

The criteria proposed within this LWMS Addendum are based on consultation with key stakeholders, the characteristics of the existing environment and a contemporary best-practice approach to integrated water cycle management.

The overall approach to water conservation is to reduce the amount of scheme water required within the development at both a lot and estate scale. Within the lot, potable water consumption will be reduced by promoting water efficient fixtures and appliances (WEFA) and waterwise gardens (WWG) principles. On an estate scale, groundwater will be utilised for irrigation of landscaped areas within POS which will also utilise WWG approaches, including the retention and use of native vegetation where possible.

The stormwater management strategy for the site aims to maintain the existing hydrology by retaining flows up to the major rainfall event on site. Retention will be provided through the use of lot soakwells, bio-retention areas (BRAs) and flood storage areas (FSAs) in public open space (POS) and drainage reserves. Stormwater quality will be addressed using a treatment train approach. The first 15 mm of rainfall will be retained as close to source as practicably possible. Lots will retain up to the major rainfall event in soakwells and on lot permeable area. Runoff from the road network will be conveyed to downstream drainage infrastructure.

Groundwater level management focuses on protecting properties from flooding due to inundation by groundwater. Due to the significant depth to groundwater beneath the site no groundwater level management is proposed. The objective of the management of groundwater quality is to maintain or improve the existing groundwater quality. This will be achieved by reducing total nutrient loads originating from the development and treating surface water runoff as close to source as possible.

The proposed criteria and the manner in which they are proposed to be achieved are presented in **Table E 1**. This table provides a readily auditable summary of the required outcomes which can be used in the future detailed design stage to demonstrate that the agreed objectives for water management at the site have actually been achieved. This LWMS demonstrates that the site is capable of being developed by following the recommendations detailed in this document.

Table E 1 Water management criteria and compliance

Management element	Criteria number	Criteria description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Water Conservation	WC1	Consumption target of 100 kL/person/year	Promote rainwater tanks	Proponent	At point of sale
			Utilise waterwise gardens (WWG) within POS and road verges	Proponent	Landscape design
			Promote WWG within private lots	Proponent	At point of sale
			Utilise WWG within private lots	Lot owner	Post house construction
			Mandate water efficient fittings	Lot owner/Local Government	Building approval
			Promote water efficient appliances	Proponent	At point of sale
			Implement water efficient appliances	Lot owner	Post house construction
	WC2	Maintain an average irrigation rate of 6,750 kL/ha/year in POS areas	POS areas will be irrigated during the initial establishment phase and POS irrigated at a lower rate in the long term prescribed by NWCWSS.	Proponent	Landscape design
				Landscape contractor	Landscape implementation
Stormwater Management	SW1	All runoff up to the major rainfall event (1% AEP) to be retained on site	Residential lots to retain the 1% AEP event on lot in soakwells and pervious garden areas.	Lot owner / developer	Building construction
	SW2	Finished floor levels must have a minimum of 300 mm clearance above the major rainfall event flood levels in road reserves and 500 mm clearance from the major rainfall event flood levels in surface storage areas.	Lots adjacent to the proposed FSA will have a minimum of 500 mm clearance from the major event TWL.	Proponent	Detailed design stage

Table E 1 Water management criteria and compliance (continued)

Management element	Criteria number	Criteria description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Stormwater Management (continued)	SW3	Ensure minor roads remain passable in a minor storm event (20% AEP)	The pipe network is designed to convey the minor rainfall event to ensure roads remain passable in this event	Proponent	Detailed design stage
	SW4	Retain and treat the small rainfall event (first 15 mm) as close to source as possible	Residential lots to retain the small rainfall event on lot in soakwells and pervious garden areas	Lot owner/developer	Building construction
			Road runoff will be retained within tree pits in road verge and BRAs within POS	Proponent	Detailed design stage
	SW5	Reduce nutrient loads by applying appropriate non-structural measures	Minimise use of fertilisers within POS and road verges	Landscape contractor	Landscape implementation
			Use of drought tolerant turf species	Landscape contractor	Landscape implementation
			Maintenance of POS and drainage areas	Maintenance contractor	2 years following construction
			Education of residents regarding responsible nutrient application	Proponent	Point of sale
	SW6	Size surface treatment areas to be (at least) 2% of the total connected impervious area	BRAs are sized to be greater than 2% of the connected impervious Area	Proponent	Detailed drainage design

Table E 1 Water management criteria and compliance (continued)

Management element	Criteria number	Criteria description	Manner in which compliance has been achieved	Responsibility for implementation	When implemented
Groundwater Management	GW1	Maintain groundwater quality leaving the site	Treat surface water runoff prior to infiltration to groundwater in vegetated BRAs	Proponent	Detailed drainage design
			Minimise fertiliser use to establish and maintain POS and road verges	Landscape contractor	Landscape implementation
			Use of drought tolerant species that require minimal water and nutrients	Landscape contractor	Landscape implementation
			Education of residents regarding fertiliser use and vegetation species within lots	Proponent	Point of sale
	GW2	Use water sensitive design (WSD) approaches to recharge the superficial aquifer	Retain and infiltrate all runoff up to the major rainfall event in soakwells, BRAs, FSAs on site	Proponent	Detailed drainage design

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Appendix A

Structure Plan

Appendix B

Groundwater Licences

Appendix C

Modelling Assumptions Report

Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
ABS	Australian Bureau of Statistics
BoM	Bureau of Meteorology
CoW	City of Wanneroo
DBCA	Department of Biodiversity, Conservation and Attractions
DoE	Department of Environment (now DWER)
DoW	Department of Water (now DWER)
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority

Table A2: Abbreviations – General terms

General terms	
ASS	Acid sulfate soils
DWMS	District water management strategy
IWSS	Integrated water supply system
LWMS	Local water management strategy
POS	Public open space
SWMR	Subdivision Water Management Report
TN	Total nitrogen
TP	Total phosphorus
TWL	Top water level
WEFA	Water efficient fixtures and appliances
WHPZ	Well head protection zone
WWG	Water wise gardening

Table A3: Abbreviations – units of measurement

Units of measurement	
cm	Centimetre
ha	Hectare
m	Metre
m^2	Square metre
m^3	Cubic metre
mAHD	m in relation to the Australian height datum
mBGL	Metres below ground level
mm	Millimetre

Table A5: Terminology – design rainfall

Rainfall event	Annual exceedance probability (AEP)	Approximate equivalent average recurrence interval (ARI)
Small	1 exceedance year (EY) event (frequent)	1 in 1 year ARI event
Minor	20% AEP event	1 in 5-year ARI event
Major	1% AEP event	1 in 100-year ARI event

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1 Introduction

1.1 Background

Eglinton Estates Pty Ltd (the 'proponent') proposes an amendment to Eglinton Central Structure Plan located west of the rail corridor within Lot 9101, Eglinton (herein referred to as 'the site') for residential and commercial purposes.

The site is situated 15 km north of Joondalup and 45 km north of Perth central business district. The site has an area of approximately 33.7 ha and is bounded by Pipidinny Road to the north, developed land to the south, a rail corridor to the east and Marmion Avenue to the west. The site is zoned 'Urban' under the *CoW Town Planning Scheme No. 2* (DPLH 2001). The location of the site is shown in **Figure 1**.

1.2 Purpose of this report

This Local Water Management Strategy (LWMS) Addendum has been prepared to support and amendment to the *Eglington Local Structure Plan* (Coffey 2011). This LWMS Addendum details the water management approach to support the proposed development and is intended to satisfy the requirement to prepare a LWMS in accordance with *State Planning Policy 2.9 Water* (SPP 2.9) (DPLH 2025b).

1.3 Policy framework

There are several State and Local Government policies of relevance to the site. These policies include:

- *Kep Katitjin Waterwise Perth Action Plan* (Government of WA 2023)
- *State Water Strategy for Western Australia* (Government of WA 2003)
- *State Water Plan* (Government of WA 2007)
- *State Planning Policy 2.9 Water* (DPLH 2025b)
- *State Planning Policy 2.9 Planning for Water Guidelines* (DPLH 2025a)
- *Statement of Planning Policy No. 3: Urban Growth and Settlement* (WAPC 2006)
- *Liveable Neighbourhoods* (4th Edition) (WAPC 2009, 2015)
- *Guidance Statement No. 33: Environmental Guidance for Planning and Development* (EPA 2008)
- *Local Planning Policy 4.4: Urban Water Management* (CoW 2013)
- *Local Planning Policy 4.3: Public Open Spaces* (CoW 2021)
- *District Planning Scheme No. 2* (CoW 2022).

In addition to the above policies, there are several published guidelines and standards available that provide direction regarding to the water discharge characteristics that urban developments should aim to achieve. There are key inputs that relate either directly or indirectly to the site and include:

- *Australian Rainfall and Runoff* (Ball J *et al.* 2019)
- *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000)
- *Australian Runoff Quality* (Engineers Australia 2006)

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018)
- *Stormwater Management Manual for Western Australia* (DWER 2022)
- *Decision Process for Stormwater Management in Western Australia* (DWER 2017)
- *North West Growth Corridor (NWGC) licensing schedule and guidelines* (DoW 2013)
- *North West Growth Corridor Water Supply Strategy* (DoW 2014)
- *Development Design Specification WD5: Stormwater Drainage Design* (CoW 2015).

1.4 Previous studies and guiding documentation

1.4.1 Alkimos-Eglinton District Structure Plan

The *Alkimos-Eglinton District Structure Plan* (DSP) was prepared by the CoW (2007). A district water management strategy (DWMS) was not prepared as part of the DSP; however, a sustainability strategy including an integrated water cycle management strategy was produced by GHD and was appended to the DSP (GHD Australia 2006).

1.4.2 Local Water Management Strategy

The *Oceanscapes Eglinton Local Water Management Strategy* (LWMS) was prepared by Coffey Environments (Coffey 2011). The key principles proposed in the LWMS are consistent with integrated water cycle management principles outlined in the DWMS, and include:

- Maximise water use efficiency
  - Optimise the use and reuse of rainwater
  - Minimise use of scheme water at a lot scale to 100 kL/person/year
  - Minimise use of water at an estate scale.
- Protect life and property from flooding
  - Retain the 1% average exceedance probability (AEP) within downstream public open space (POS) infiltration areas
  - Provide minimum 500 mm clearance to 1% AEP storage areas top water levels (TWL)
  - Minor roads must be remained passable during the 20% AEP event
  - Provide stormwater flow pathways for 1% AEP event runoff
  - Provide adequate lot clearance to trapped low points
  - Provide storage to accommodate extreme events
  - Design infiltration areas to avoid creating mosquito habitat.
- Protect groundwater quality
  - Treat stormwater runoff before discharging to groundwater
  - Use water sensitive design approaches to recharge the superficial aquifer.

1.4.3 Local Water Management Strategy Addendum

Emerge Associates developed an addendum to the LWMS (Emerge Associates 2024) to support the Eglinton District Centre – Activity Centre Plan (ACP). This addendum presented an updated layout from the original structure plan and to demonstrate that the previous water management strategy for the site could be achieved.

The key principles that were proposed in the LWMS and LWMS Addendum have guided the design criteria for the estate and are detailed in **Section 4**.

2 Proposed Development

The Eglinton Central Precinct is approximately 33.74 ha and propose the following landuses:

- Residential
- Mixed use
- Commercial
- Service commercial
- Public open space (POS)
- Drainage reserves
- Road Network.

The stormwater approach for the Eglinton Central Precinct focuses around optimising the location and amenity provided by POS through appropriate inclusion and configuration of drainage across the development. This has been achieved though the integration of water sensitive design (WSD) measures within road reserves where possible, and by minimising the footprint of stormwater infrastructure through the use of spatially efficient storage.

The Eglinton Central Precinct concept structure plan is provided in **Appendix A**.

3 Summary of the Existing Environment

The environmental characteristics of the site and surrounds has previously been documented in the LWMS and subsequent LWMS Addendum (see **Section 1.4**). In summary, the environmental investigations conducted indicate that the features relevant to water management within the site include:

- The site receives 631.8 mm of rain on average annually with approximately half of this rainfall received between June and August (BoM 2026).
- Topography within the site ranges from approximately 27 m Australian height datum (AHD) adjacent to Marmion Avenue up to 53 m AHD at a localised high point in the eastern region. The site has a generally north westerly aspect (see **Figure 2**).
- Soils of the site are characterised as Safety Bay Sands and Tamala Limestone. This is consistent with regional landform mapping which describes the site as being representative of the Quindalup Formation with undulating dunal landforms (see **Figure 3**).
- The site has no known risk of acid sulfate soils (ASS) occurring within 3 m of natural soil surface.
- No surface water bodies or features are observed within the site.
- The site is within a Priority 3 (P3) Public Drinking Water Source Area (PDWSA) with one well head protection zone (WHPZ) located within the site. All intended land uses comply with the permissible land uses for a PDWSA (DWER 2021) (see **Figure 4**).
- The site not is located in a sensitive water resource area (SWRA) (DPLH 2021).
- Groundwater levels beneath the site range from approximately 0.5 mAHD. The represents a depth to ground water beneath the broader site of approximately 26.5 to 52.5 mBGL (see **Figure 2**).
- Historical groundwater quality within the broader Eglinton development generally displays low to moderate total nitrogen (TN) and total phosphorous (TP) concentrations, with TP being generally below detection limits.

4 Design Criteria and Objectives

This section outlines the objectives and design criteria that this LWMS addendum and future Subdivision Water Management Reports (SWMR) must achieve.

4.1 Integrated water cycle management

The *State Water Strategy* (Government of WA 2003b) and SPP 2.9 endorses the promotion of integrated water cycle management and application of WSD principles to provide improvements in the management of stormwater, groundwater and water resources, and to increase the efficient use of other existing water supplies.

The key principles of integrated water cycle management include:

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

Integrated water cycle management addresses not only physical and environmental aspects of water resource use and planning, but also integrates other social and economic concerns. Water management design objectives should seek to deliver best practice outcomes in terms of:

- Water conservation
- Stormwater management
- Groundwater management.

The first step in applying integrated water cycle management is to establish agreed environmental values for receiving environments which includes the PDWSA integrity, protection and risk management. Guidance regarding environmental values and criteria is provided by several national and state policies and guidelines, as detailed in **Sections 1.3**.

The design criteria discussed in the following sections are based on the assessment of the existing environment within the site and the surrounding area and have the aim of achieving the integrated water cycle outcomes discussed above.

4.2 Water conservation

The design criteria for water conservation management within the site include:

Criteria WC1 Consumption target of 100 kL/person/year.

Criteria WC2 Maintain an average irrigation rate of 6,750 kL/ha/year in POS areas.

The manner in which this objective will be achieved is further detailed in **Section 5**.

4.3 Stormwater management

The design criteria for stormwater management are as follows:

Criteria SW1 All runoff up to the major rainfall event (1% AEP) to be retained on site.

Criteria SW2 Finished floor levels must have a minimum of 300 mm clearance above the major rainfall event flood levels in road reserves and 500 mm clearance from the major rainfall event flood levels in surface storage areas.

Criteria SW3 Ensure minor roads remain passable in a minor storm event (20% AEP).

Criteria SW4 Retain and treat the small rainfall event (first 15 mm) as close to source as possible.

Criteria SW5 Reduce nutrient loads by applying appropriate non-structural measures.

Criteria SW6 Size surface treatment areas to be (at least) 2% of the total connected impervious area.

The manner in which these objectives will be achieved is further detailed in **Section 6**.

4.4 Groundwater management

The design criteria for groundwater management within the site include:

Criteria GW1 Maintain groundwater quality leaving the site.

Criteria GW2 Use WSD approaches to recharge the superficial aquifer.

The manner in which the groundwater management objectives will be achieved is further detailed in **Section 7**.

5 Water Conservation Strategy

5.1 Fit-for-purpose water use

Conservation of water through fit-for-purpose use and best management practices is encouraged so that scheme water is not wasted. Fit-for-purpose describes the use of water that is of a quality suitable for the required use of the water. Fit-for-purpose principles will be utilised in the water conservation strategy for the site. These principles are discussed in the following sections.

5.1.1 Scheme water

The site is proposed to be connected to the Water Corporation (WC) *Integrated Water Supply Scheme* (IWSS). Scheme water is proposed to be used for all potable internal house and non-potable ex-house uses in all development stages.

5.1.2 Groundwater

The *Water Register* (DWER 2026b) indicates that the site is located in the Perth - Eglinton groundwater management sub-area. Groundwater is proposed for irrigation of POS and the establishment of landscaped areas (including road verges). Two groundwater licences are currently applicable to the site and have been summarised in **Table 1** and presented in **Appendix B**.

Table 1: Summary of existing groundwater licenses

Instrument #	Annual entitlement (kL)	Authorised activity
GWL206446	2,940	Public Open Space purposes for Northern Corridor.
GWL206445	17,938	Establishment of Public Open Space purposes for Northern Corridor.

It is noted that the previous LWMS Addendum presented superseded licences and associated volumes. Since this document was written the licences that covered the site have been split due to the subdivision of the super lot that was inclusive of the site.

The site is subject to the requirements of the NWCWSS (DoW 2014) and supporting licencing schedule and calculation methodology, which determines the groundwater allocation available for the development based on the provisions within the proposed structure plan (SP).

5.1.3 Wastewater reuse

Within the Alkimos Eglinton DWMS provision of a non-drinking water (NDW) supply through a dual reticulation (third pipe) network was proposed. The NDW supply was proposed for irrigation uses in the initial stages of development (up to 2015) with the intention of expanding its use to non-potable in-house water uses in the future.

Alternative water sources to supply the NDW network included groundwater, stormwater harvesting and treated wastewater from the adjacent Alkimos WWTP. The network required the agreement and input of a number of stakeholders across the Alkimos-Eglinton DSP area, including the local government and identification of a long-term service provider.

As of March 2019, a recycled effluent scheme capable of supplying a third pipe system to dwellings and commercial premises has not been agreed upon.

5.1.4 Rainwater tanks

Collection of runoffs from roof surfaces can be undertaken, with this water stored within rainwater tanks (RWTs) for later use. Stored rainwater may be used for some irrigation requirements however this will need to be supplemented with scheme water during the lower rainfall months. During higher rainfall months, the majority of the stored rainwater can be used to supplement internal building non-potable uses. This water efficiency strategy recommends that rainwater is used in washing machines, toilets and hot water systems.

The use of rainwater tanks as described in the following sections will not be mandated within the site. An average uptake rate for RWT of 9% of future residents will utilise RWTs, based on typical uptake rates taken from the Australian Bureau of Statistics (ABS) published data (ABS 2013).

The above measures will assist in achieving **Criteria WC1**.

5.2 Water conservation measures

The site will utilise groundwater for POS irrigation, active POS irrigation management, RWTs, waterwise gardening (WWG) principles for lot scale gardens and within site landscaping, and water efficient fixtures and appliances (WEFA) to ensure that the development minimises the use of water. These measures are further discussed in the following sections.

5.2.1 Water efficient fixtures and appliances

Significant reduction in internal house water uses can be achieved through the use of WEFA (between 35% and 50%) (Melbourne Water 2003). Water use rates consistent with water saving devices have been used in the lot scale water usage analysis detailed in **Section 5.3**.

The water conservation strategy adopted for the site proposes that all dwellings use WEFA. Water efficient fixtures will be mandated through the building licence, while uptake of water efficient appliances can be encouraged by State and Local Government rebates, as well as education from the proponent at point of sale. It is assumed that 40% of future residents will utilise water efficient appliances, based on typical uptake rates provided by (ABS 2013).

The above measures will assist in achieving **Criteria WC1**.

5.2.2 Waterwise gardens

Reductions in water use for irrigation by employing water efficiency measures can significantly reduce the total water usage (WC 2003). The development will undertake a variety of measures to limit water use into the future within POS and road verges, and the private residential landscape works under the control of the proponent.

The methods and approaches that will be considered may include any or all of the following:

- The adoption of waterwise species, with a focus on using local native waterwise species.

- Where required, existing site soils improved with soil conditioner certified to AS 4454 to a minimum depth of 150 mm where turf is to be planted and a minimum depth of 300 mm for garden beds.
- The irrigation system will be designed and installed according to best water efficient practices including consideration of hydrozoning.
- Implementation of hydrozoning design practices, which will group plant species with similar/same irrigation requirements.
- Irrigation systems will have emitters which disperse coarse droplets to minimise losses to evaporation.
- Irrigation will not be utilised during winter months and rain sensors will be utilised.
- The adoption of xeriscaped gardens (garden beds are landscaped using 'waterwise plants', which are local native species that require less water).
- Minimising turf areas where possible.
- Educating the community to increase awareness of water conservation.

WWG principles will be carried out within all POS areas and road reserves, and will be promoted to purchasers on sale of lots.

The above measures will assist in achieving **Criteria WC1** and **WC2**.

5.3 Water usage analysis

A water usage analysis has been undertaken to demonstrate the effectiveness of the water conservation strategy proposed. The analysis considers realistic uptakes of non-mandatory water conservation measures and full uptake of mandated measures (discussed in **Section 5.2**).

The water usage analysis has been based on the rates and calculation methodology presented in the Water Corporation spreadsheet *AltWaterSupply_Water_Use_Model.xls* (WC 2011). Uptake rates and population assumptions are based on data provided by the ABS (2013, 2014). The water usage analysis assumes an average of 1.8 people per lot, for lots zoned R80, and 2.6 people per lot, for all other residential zoning (ABS 2022). The water use analysis assumptions on the provision and use of water to various commercial lots assumes a consumption of 1.08 kL/m^2/year.

The results of water usage indicate that on average, if households within the site adopt the proposed water conservation measures at typical uptake rates, they will use 42.9 kL/person/year of scheme water. If non-mandatory water conservation measures are not taken up usage will be 67.7 kL/person/year.

This achieves the state water consumption target of no more than 100 kL/year per person and satisfies **Criteria WC1**.

6 Stormwater Management

The principle behind the stormwater management strategy for the site is to maintain the existing hydrology by retaining surface flows and infiltrating stormwater runoff as close to source as possible. The development drainage system has been designed to achieve the objective and criteria stated in **Section 4.3** and has been informed by the concept earthworks plans prepared for this site (provided in **Appendix A**).

6.1 Residential lot drainage

All lots will fully retain the major rainfall event runoff on lot in soakwells, infiltration in pervious areas and other detention measures.

The implementation of soakwells will assist in achieving **Criteria SW1**.

6.2 Non-residential lot drainage

Commercial/business lots will be required to retain all runoff from all events up to the major rainfall event within lot. This can be achieved within soakwells, surface basins, subsurface storage or alternative storage methods (RWT), and will assist in achieving **Criteria SW1**.

6.3 Development drainage system

The storm water runoff from the small rainfall event will be retained as close to source as practicably possible. There will be no runoff from the development during a small rainfall event. This is consistent with the pre-development environment and the design criteria (see **Section 4.3**).

The retention storage will be provided via vegetated median swales in road reserve, and BRAs in POS or drainage reserve. The vegetation and the infiltration process within the soil column will remove contaminants (nutrients, gross pollutants, suspended sediments, etc.) within the stormwater runoff.

Rainfall events greater than the small rainfall event will be conveyed by overland flow or a pipe network to FSAs, or sub-surface storage. The size of the FSAs and sub-surface storage will be minimised due to the retention storage provided higher up in the catchment and within lots. The stormwater drainage system for the site is shown in **Figure 5**.

6.3.1 Median swale

A vegetated median swale is proposed within the Eglinton Boulevard reserve. This swale will be used to detain runoff from the Eglinton Boulevard reserve from catchments 4 and 5 (Ct 4 and Ct 5) as detailed in **Section 6.4.1** until it reaches capacity, at which point flows from Ct 4 and Ct 5 will be redirected to their respective downstream colocated basins located within the site.

The median swale will be planted with vegetation species suitable for nutrient uptake, consistent with the *Vegetation guidelines for stormwater biofilters in the south-west of Western Australia*

(Monash University 2014). The proposed location of the median swale retention storage in Eglinton Boulevard is shown in **Figure 5**.

The use of a median swale and its detailed design will assist in achieving **Criteria SW1**, **SW2**, **SW4** and **SW6**, **GW1** and **GW2**.

6.3.2 Bio-retention areas

Runoff from the small rainfall event from road reserves will be captured and retained within vegetated BRAs located in POS and drainage reserves. The BRAs will be planted with vegetation species suitable for nutrient uptake, consistent with the *Vegetation guidelines for stormwater biofilters in the south-west of Western Australia* (Monash University 2014).

The infiltration rates used within the hydrological modelling have been based on measurements recorded within soils in the local area and an infiltration rate of 10 m/day has been adopted in the design of storage infiltration structures, with a 50% clogging factor applied for BRAs.

The sizes and spatial requirements for BRAs are further discussed in **Section 6.4.1**. The exact location and configuration of BRAs is subject to confirmation at detailed design stage with any changes made to the assumptions detailed in this LWMS addendum to be indicated in future SWMRs.

The use of BRAs will assist in achieving **Criteria SW1**, **SW5**, **SW6**, **GW1** and **GW2**.

6.3.3 Flood storage area

FSAs will be utilised to infiltrate major event runoff in order to maintain the pre-development hydrological regime. Runoff from rainfall greater than the small rainfall event will be conveyed by the pit and pipe network and overland flow to the FSAs located in POS. Where required, FSAs may be colocated with BRAs to retained surface runoff within the site as per the pre-development environment. The FSAs are not designed to be permanently wet.

The infiltration rates used within the hydrological modelling have been based on measurements recorded within soils in the local area and an infiltration rate of 10 m/day has been adopted in the design of storage infiltration structures.

The design of FSAs will be such that maximum top water levels within basins will remain at least 500 mm below finished floor levels of adjacent lots to ensure protection from flooding during major rainfall events. The sizes and spatial requirements for FSAs are further discussed in **Section 6.4.2**.

The use of FSAs will achieve **Criteria SW1**, while the design of the FSAs will ensure that **Criteria SW2** and **SW6** are achieved.

6.3.4 Sub-surface storage

Sub-surface storage may be used to capture minor and major event runoff in areas where the surface drainage footprint needs to be minimised to ensure a level of usability in POS and efficiency of space considering the overarching needs of the site. Sub-surface storage may be located beneath BRAs with flows above the BRA capacity being directed into the subsurface storage via bubble-down pits. The maximum assumed depth of sub-surface storage is 1.5 m with vertical side slopes. The specific

product to be used in sub-surface storage is still to be determined but may include Stormtech cells or Holcim/Humes Stormtrap system.

Sub-surface storage is not currently proposed for the site but may be implemented during future design stages. The configuration and use of sub-surface storage areas can be reviewed at subdivision if required.

The use of sub-surface storage will assist in achieving **Criteria SW1**.

6.4 Drainage design assessment

As described in **Section 6.3**, this LWMS Addendum proposes to utilise soakwells, median swales, BRAs, FSAs and sub surface storage to retain runoff from all events up to the major rainfall event onsite. The post-development modelling methodology and parameters to size these structures are detailed in the *Modelling Assumptions Report* (Emerge Associates 2019) provided in **Appendix C**. Drainage catchments and stormwater management infrastructure is shown in **Figure 5**.

6.4.1 Small rainfall event modelling results

The design volume and inundated areas of the treatment structures are shown in **Table 2**.

Table 2: Small rainfall event storage volumes

Catchment	WSD infrastructure	Design depth (m)	Design Volume (m^3)	Modelled depth (m)	Modelled volume (m^3)	TWL surface area (m^2)
Ct-1 & 2	BRA 1/2	0.3	410	0.296	405	1,435
Ct-3	BRA 3	0.5	185	0.49	183	430
Ct-4	BRA 4	0.5	130	0.49	128	325
	Median swale	-	-	0.25	65	510
Ct-5	BRA 5	0.3	445	0.29	440	110
	Median swale	-	-	0.25	50	400

The total size of the bio-retention system, achieved through at-source retention storage provided by BRAs and the median swale, is equal to 2% of the connected impervious area, which achieves **Criteria SW6**.

The location and inundated area within the site for the small rainfall event is shown in **Figure 6**.

6.4.2 Minor and major rainfall event modelling results

The site aims to retain runoff from events up to the major rainfall event, as required under **Criteria SW1**. This is achieved by the use of at-source retention and infiltration storage within FSAs located as low point withing drainage catchments. The modelled inundated depths and top water level (TWL) areas for the FSAs are provided in **Table 3**.

Table 3: Major rainfall event storage volumes

Catchment	WSD structure	Minor rainfall event			Major rainfall event		
		Depth (m)	TWL Area (m^2)	Volume (m^3)	Depth (m)	TWL Area (m^2)	Volume (m^3)
Ct-1,2,3	FSA 1	0.52	2,911	1,026	0.9	3,855	3,310
Ct-4	FSA 4 (subsurface storage)	0.37	542	200	1.5	542	813
Ct-5	FSA 5	0.63	625	290	1.2	1,015	750

The minor rainfall event inundation areas are shown in **Figure 7** with major rainfall event inundation areas are shown in **Figure 8**.

Note that the number of BRAs, FSAs, and sub-surface storage (if proposed) can be modified at the detailed design stage, provided the assumed storage volumes detailed **Section 6.4** are maintained.

The above measures will help to achieve **Criteria SW1** and **SW6**.

6.5 Non-structural water quality measures

The structural measures proposed within Eglinton Central Precinct provide both a storage and treatment function to stormwater runoff, as detailed in **Section 7.3**.

A number of non-structural measures will also be implemented across the site to help reduce nutrient loads within stormwater runoff. These measures include:

- Minimising fertiliser use to establish and maintain vegetation within POS areas and road verges.
- Drought tolerant turf species that require minimal water and nutrients will be used.
- Maintenance of treatment areas to remove accumulated sediments and gross pollutants.
- Education of residents regarding fertiliser use and low nutrient requirement vegetation species within lots.

The above measures will assist in achieving **Criteria SW5** and **GW1**.

7 Groundwater Management

The development drainage system has been designed to achieve the objectives and criteria stated in **Section 4.3**.

7.1 Groundwater level management

As discussed in **Section 3**, there is significant depth to groundwater beneath the site, therefore groundwater level management is not required.

7.2 Groundwater quality management

The main objective for the management of groundwater quality is to maintain or improve the existing groundwater quality. This can be achieved by treating surface runoff prior to infiltration via application of appropriate WSD measures, thereby reducing the total nutrient load into the groundwater that originates from the development.

The reduction of nutrient load to the groundwater will be achieved in the development by:

- Directing stormwater to vegetated BRA (detailed further in **Section 6.3.1**).
- Fertiliser use to establish and maintain vegetation within POS areas and road verges will be minimised.
- Drought tolerant turf species that require minimal water and nutrients will be used.
- Roll-on turf will be used within the POS areas and road verges, to prevent the high nutrient input requirement during establishment of the turf.
- Garden beds should not be immediately adjacent to the FSAs or BRAs to reduce nutrient transportation into these infiltration areas.

The above measures will improve the quality of the water prior to it infiltrating into the underlying groundwater, and will assist in achieving **Criteria GW1** and **GW2**.

8 Subdivision Water Management Reports

The requirement to undertake preparation of more detailed water management plans to support subdivision is generally imposed as a condition of subdivision. The development of any future SWMR should follow the guidance provided in SPP 2.9.

While strategies have been provided within this LWMS Addendum address planning for water management within the site, it is a logical progression that future detailed designs and the supportive SWMR will clarify details not provided within the LWMS. The main areas that will require further clarification within future SWMRs include:

- Drainage calculations
- Implementation of water conservation strategies
- Non-structural water quality improvement measures
- Management and maintenance requirements
- Construction period management strategy
- Monitoring and evaluation program
- Status of groundwater abstraction license
- Infiltration assumptions.

These are further detailed in the following sections.

8.1 Drainage calculations

It is acknowledged that the drainage strategies documented in this LWMS Addendum are based upon broadscale assumptions and regional data. These assumptions are considered adequate for development of the proposed drainage strategy and are of an appropriate level of detail. However, verification of proposed subdivision drainage designs within the site area will be undertaken once the specific basin designs are confirmed.

8.2 Implementation of water conservation strategies

A number of potential measures to conserve water have been presented within this LWMS Addendum. These water conservation strategies will be incorporated into the design and the ongoing maintenance of all POS areas. Landscape design measures that will be incorporated into the water conservation strategy will be further detailed within the future SWMRs produced for the development. The manner in which the proponent intends to promote water conservation measures discussed in this LWMS to future lot owners will also be discussed within the future SWMRs.

8.3 Non-structural water quality improvement measures

Guidance for the development and implementation of non-structural water quality improvement measures is provided within the *Stormwater Management Manual for Western Australia* (DWER 2022). Some measures will be more appropriately implemented at a local government level, such as

street sweeping, however many can be implemented relatively easily within the design and maintenance of the subdivision and the POS areas.

It is expected that the future SWMR will provide reference to measures such as public education (through measures such as signage that may be implemented to raise awareness).

8.4 Management and maintenance requirements

The management measures to be implemented to address surface water quality, such as the use of BRAs and FSAs, will require ongoing maintenance. It is therefore expected that the future SWMR will detail management and maintenance procedures that will set out required maintenance actions (e.g. gross pollutant removal), timing (e.g. how often it will occur), locations (e.g. exactly where it will occur) and responsibilities (e.g. who will be responsible for carrying out the actions). Given that approval from the CoW and DWER will be sought for the proposed measures, it is anticipated that consultation with these agencies will be undertaken and referral to guiding policies and documents will be made.

8.5 Construction period management strategy

It is anticipated that the construction stage will require some management of various aspects (e.g. dust, surface runoff, noise, traffic, etc.). The management measures undertaken for construction management will be addressed either in the future SWMR or a separate Construction Management Plan (CMP).

8.6 Monitoring and evaluation program

It will be necessary to confirm that the management measures that are implemented are able to fulfil their intended management purpose and are in a satisfactory condition at a point of management hand-over to the CoW. A post-development monitoring program will be developed to provide this confirmation, and it will include details of objectives of monitoring, relevant issues and information, proposed methodology, monitoring frequency and reporting obligations. These monitoring programs are discussed in **Section 9** of this LWMS and will be further detailed at the SWMR stage.

8.7 Groundwater licence status

There are a number of current groundwater licences for the Eglinton Estates. It is expected that future SWMRs will demonstrate that the landscape designs and irrigation requirements are consistent with the approved allocations available at the time of preparation.

8.8 Infiltration assumptions

The infiltration rates used within the hydrological modelling have been based previous investigations undertaken within the local area and CoW design guidelines. A detailed geotechnical study, including measurement of site-specific infiltration rates, is required to inform further modelling for future

SWMRs. Assumed infiltration rates to be used for detailed design of all infiltration basins (BRAs and FSAs) should be based on site-specific measurements plus an allowance for clogging, to be agreed with the CoW.

9 Monitoring

9.1 Condition monitoring

It is proposed that the overall condition of the development will be monitored on a bi-annual basis. This monitoring will be implemented after the completion of the civil and landscaping works and will continue for a period of two years.

A visual assessment will be undertaken to monitor the overall condition of the development, with the aim to ascertain that the maintenance activities are achieving the overall management objectives for the development. The parameters that will be monitored include:

- Gross pollutants
- Terrestrial weeds
- Irrigation
- Vegetation density
- Paths, benches, walkways and other infrastructure.

The management and maintenance objectives will be detailed within future SWMRs along with details of the corresponding monitoring program.

9.2 Water monitoring

Given that there will be no surface water discharge from the site it will be very difficult to collect a water quality samples for treated surface runoff. Post-development surface water monitoring is therefore not proposed.

Due to the significant depth to groundwater across the site, groundwater quality is not representative of the management practices of the site above. Groundwater monitoring would provide an indication of quality and management of the wider area and not the site specifically. As such, post-development groundwater monitoring is not proposed.

9.3 Infiltration testing

Ongoing infiltration testing may be required post construction and prior to handover. The manner and location of the testing will be detailed within future SWMRs.

9.4 Reporting

A post-development monitoring report will be prepared at the conclusion of the two year monitoring period, and will be provided to CoW and DWER. Interim results (spreadsheet) can be provided to either CoW or DWER on request during the monitoring program.

10 Implementation Plan

10.1 Roles and responsibilities

This LWMS Addendum provides a framework that the proponent can utilise to assist in establishing stormwater management methods that have been based upon site-specific investigations, are consistent with relevant State and Local Government policies and have been endorsed by DWER and CoW. The responsibility for working within the framework established within this LWMS Addendum rests with the proponent, although it is anticipated that future SWMRs will be developed in consultation withthe CoW and in consideration of other relevant policies and documents.

10.2 Funding

The site is owned by the proponent and so all costs will be funded by the proponent, with the exception of within lot drainage infrastructure which will be the responsibility of future lot owners.

10.3 Review

This document will likely be reviewed in the future to account for future design stages. This may be either a revision to this document or an addendum. Regardless of the format of subsequent documents, these will need to demonstrate compliance with the design criteria proposed in this LWMS Addendum, or to demonstrate alternative criteria and a rationale for any proposed changes. The civil designs for the remainder of the site that are not included in this report and will be developed consistent with the approach adopted in this LWMS Addendum and submitted to the CoW when finalised.

The next stage of water management is SWMR preparation. The SWMR is largely an extension of the LWMS, as it should provide detail to the designs proposed within this LWMS Addendum and will demonstrate compliance with the criteria proposed in **Section 4**.

The next stage of development following the SWMR is single lot or multiple dwelling and commercial developments. It is recognised that certain elements of the LWMS and the SWMR will not be implemented until this late stage, and that there is little or no statutory control that can be applied to ensure the implementation of any remaining measures. While the remaining measures are unlikely to be enforced at this stage their implementation could be encouraged by the CoW through policy (or modification of these where necessary), building licence or awareness programs (such as the Water Corporation Waterwise program).

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11.1 General references

The references listed below have been considered as part of preparing this document.

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11.2 Online references

The online resources that have been utilized in the preparation of this report are referenced in **Section 11.2**, with access data provided in **Table R 1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
(BoM 2026)	29/07/2026	Climate data online
(DWER 2026a)	29/07/2026	Perth groundwater map
(DWER 2026b)	29/07/2026	Water Register

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Figure 8: Innundation Areas – 1% AEP

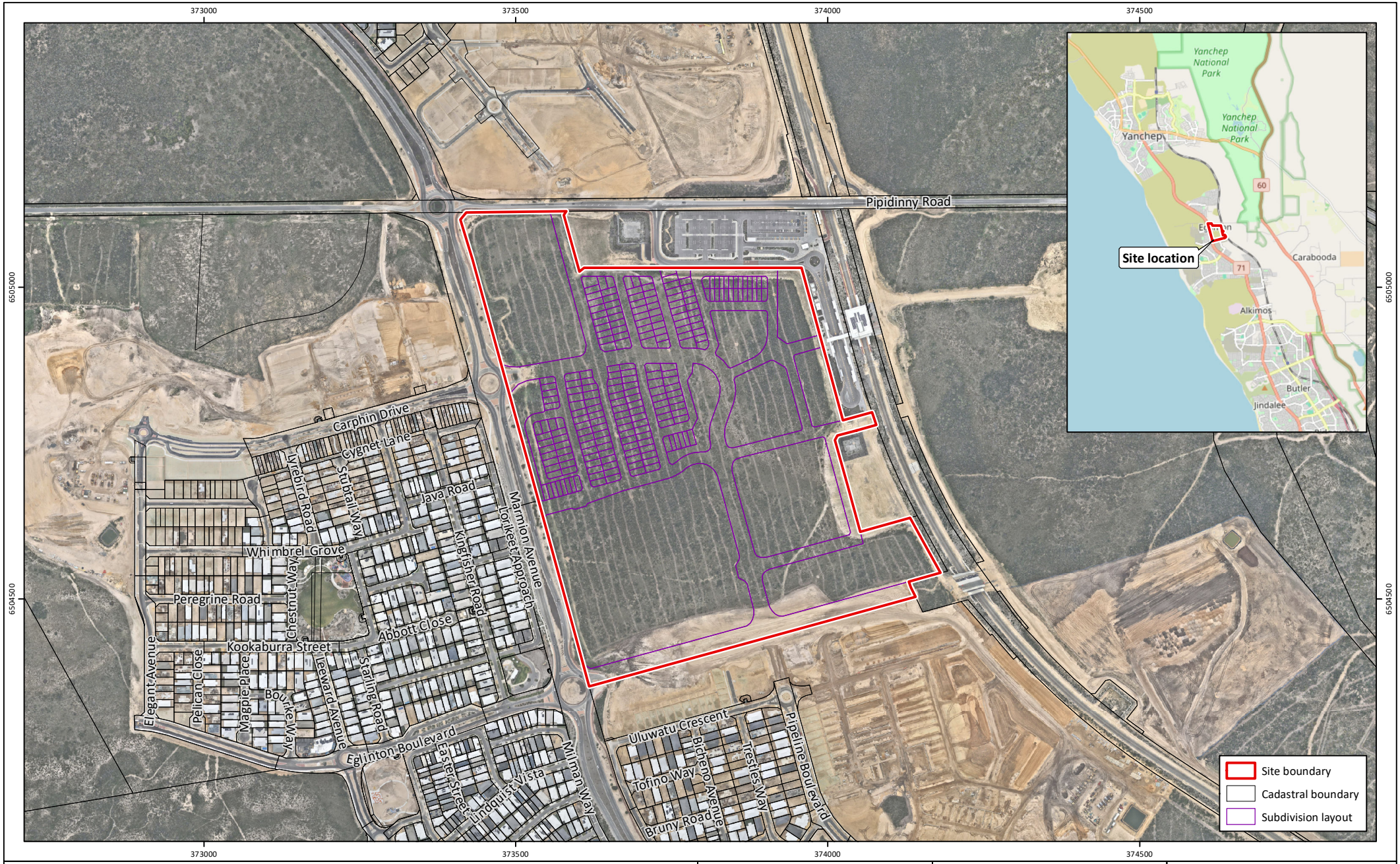


Figure 1: Site Location

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F19

Drawn:	WJC
Date:	31/07/2026
Checked:	MZ
Approved:	BPB
Date:	03/08/2026

Scale: 1:8,000@A4

GDA 1994 MGA Zone 50

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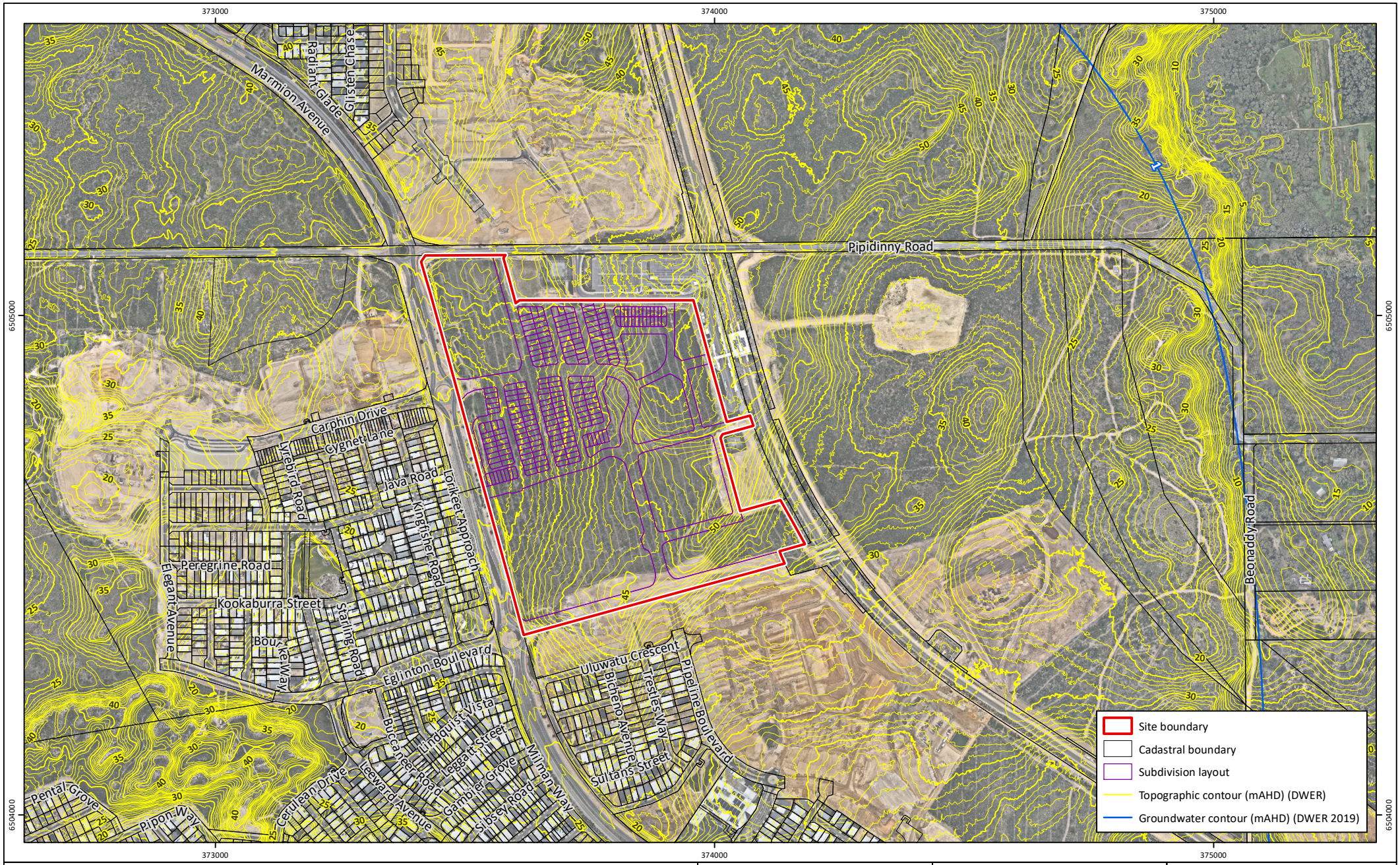


Figure 2: Topographic and Groundwater Contours

Project: Local Water Management Strategy Addendum
Eglinton Central Precinct
Client: Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F20

Drawn:	WJC
Date:	31/07/2026
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Approved:	BPB
Date:	03/08/2026

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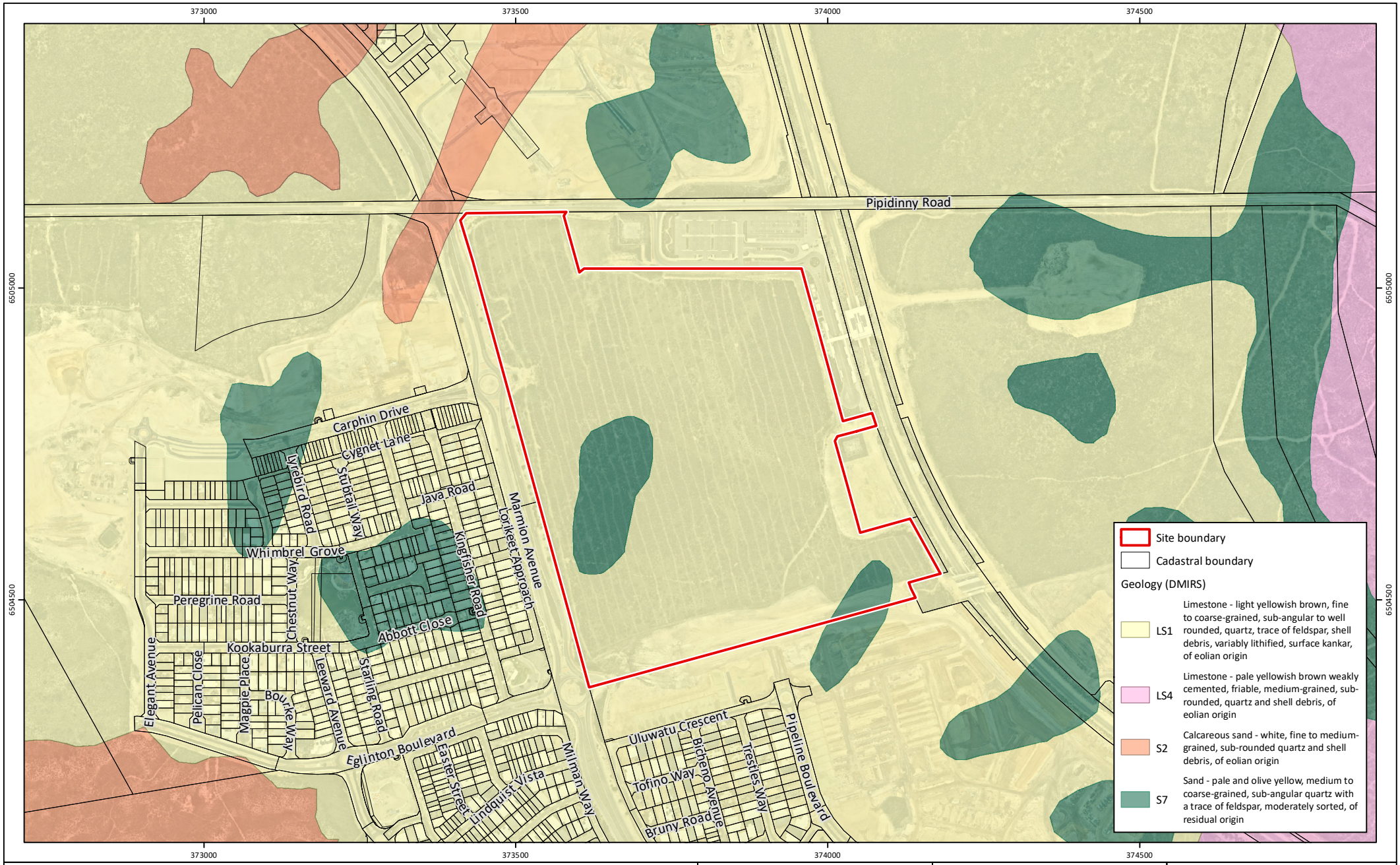


Figure 3: Geological Mapping

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F21

Drawn:	WJC
Date:	31/07/2026
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Date:	03/08/2026

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Metres

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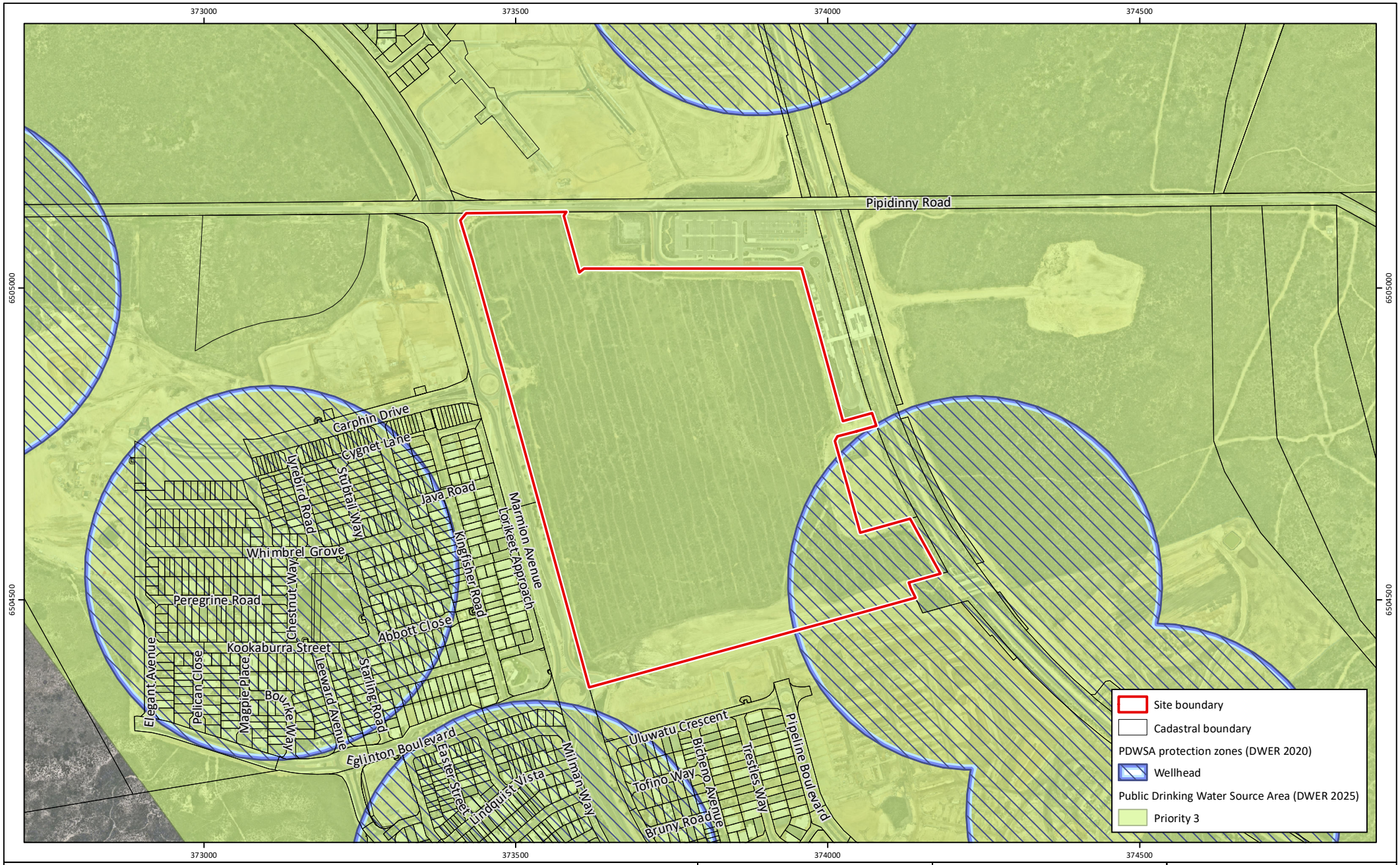


Figure 4: Public Drinking Water Source Areas

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F22

Drawn:	WJC
Date:	31/07/2026
Checked:	MZ
Approved:	BPB
Date:	03/08/2026

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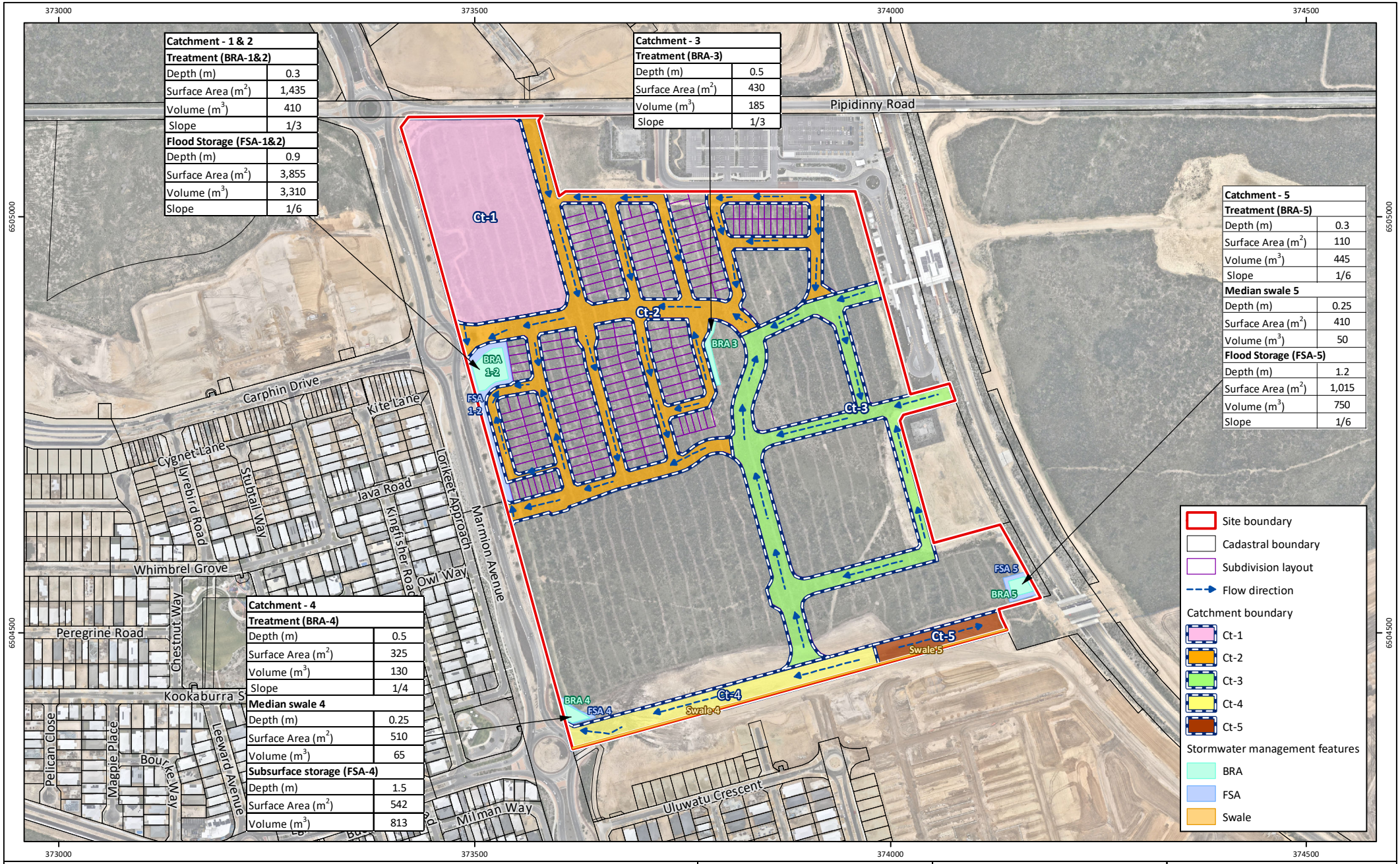


Figure 5: Stormwater Management Plan

Project: Local Water Management Strategy Addendum
Eglinton Central Precinct
Client: Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F23a
Drawn: WJC
Date: 25/09/2026
Checked: MZ
Approved: BPB
Date: 29/09/2026

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Scale: 1:6,000@A4
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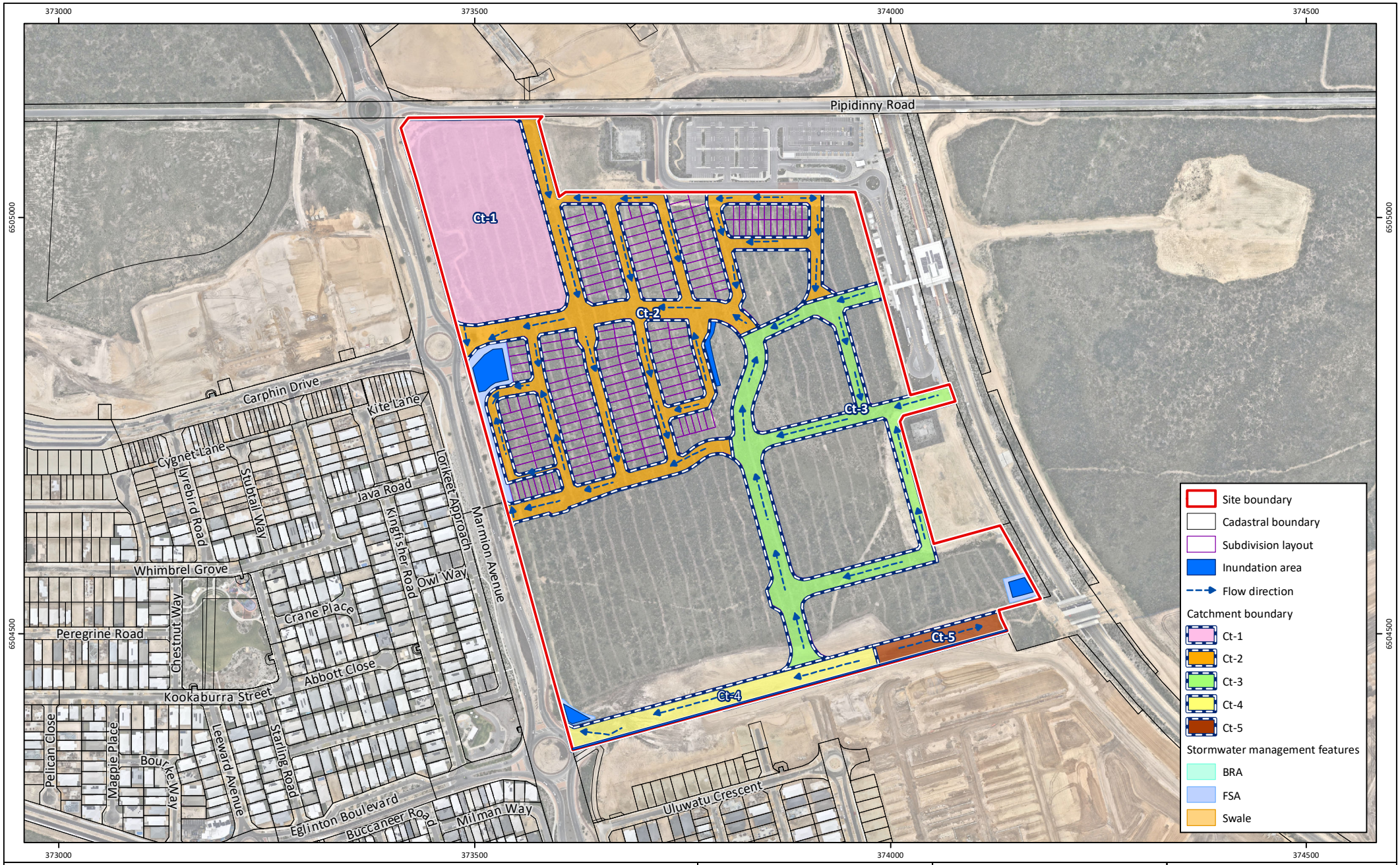


Figure 6: Inundation Areas - First 15 mm

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F24a

Drawn:	WJC
Date:	25/09/2026
Checked:	MZ
Approved:	BPB
Date:	29/09/2026

N

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Metres

Scale: 1:6,000@A4

GDA 1994 MGA Zone 50

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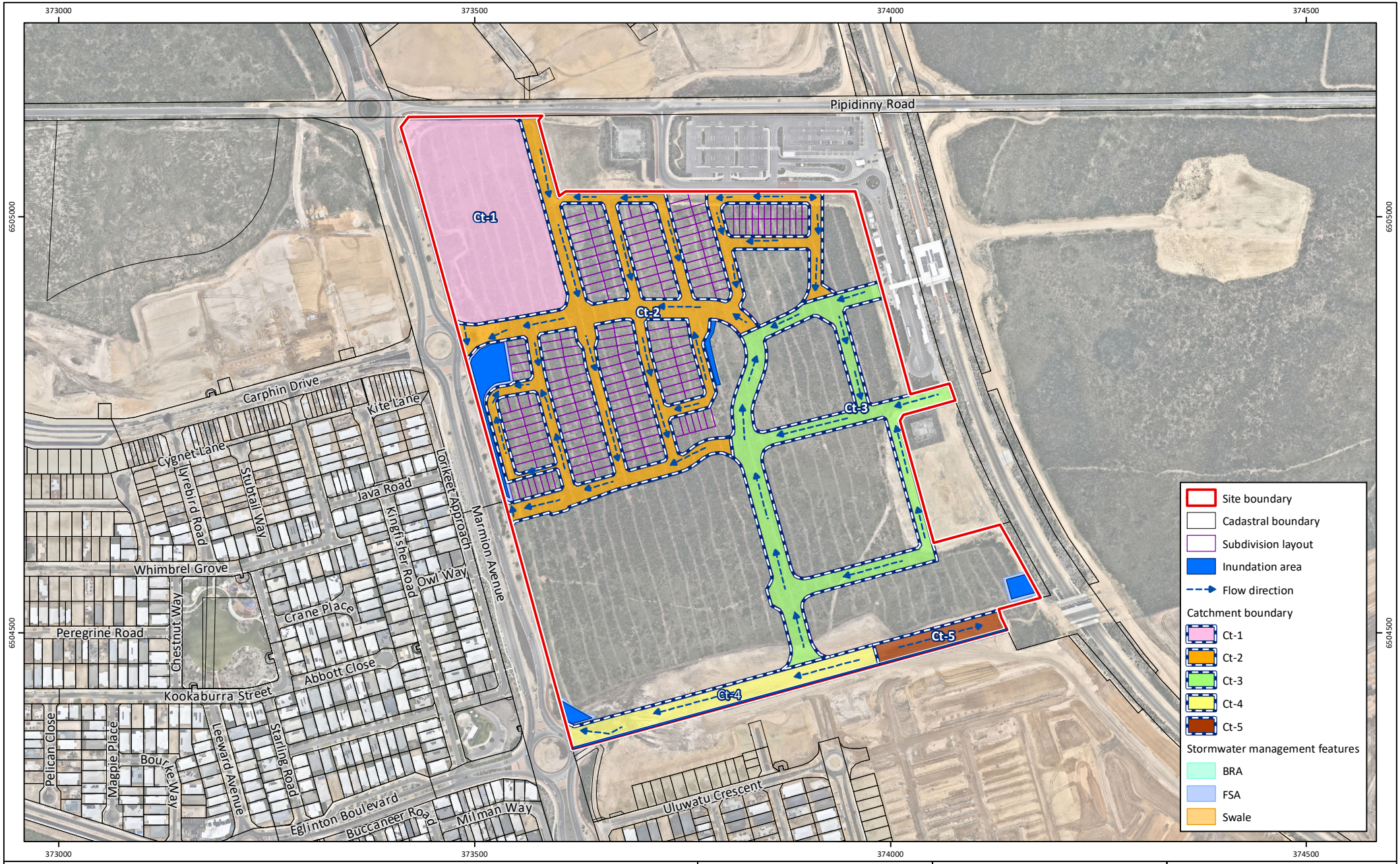


Figure 7: Inundation Areas - 20% AEP

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F25a

Drawn:	WJC
Date:	25/09/2026
Checked:	MZ
Approved:	BPB
Date:	29/09/2026

N

0 100 200
Metres

Scale: 1:6,000@A4

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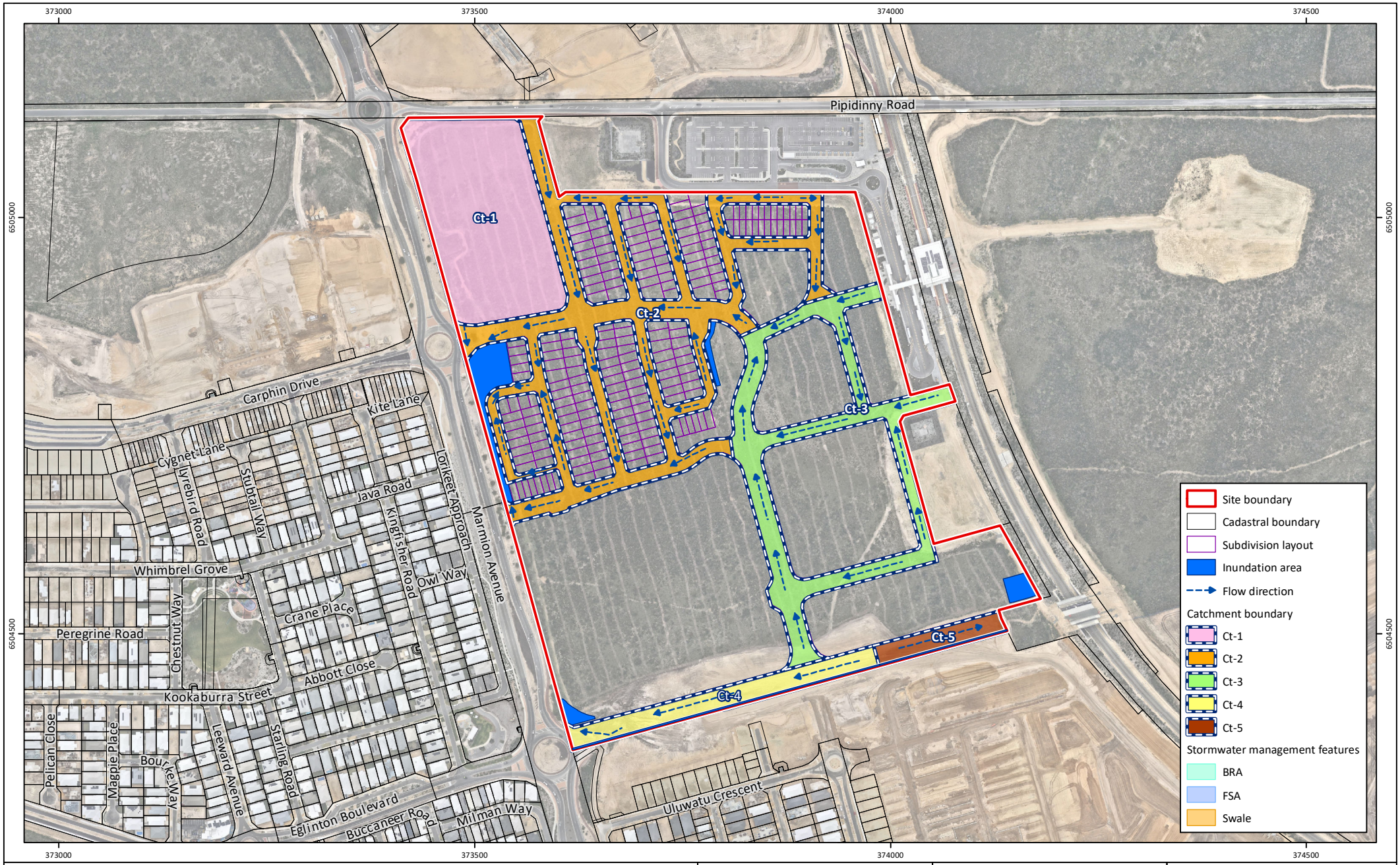


Figure 8: Inundation Areas - 1% AEP

Project:	Local Water Management Strategy Addendum Eglinton Central Precinct
Client:	Eglinton Estates Pty Ltd

Plan Number:
EP18-100(12)--F26a

Drawn:	WJC
Date:	25/09/2026
Checked:	MZ
Approved:	BPB
Date:	29/09/2026

N

0 100 200
Metres

Scale: 1:6,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
©Landgate (2026). Nearmap Imagery date: 19/06/2026

Appendix A

Structure Plan

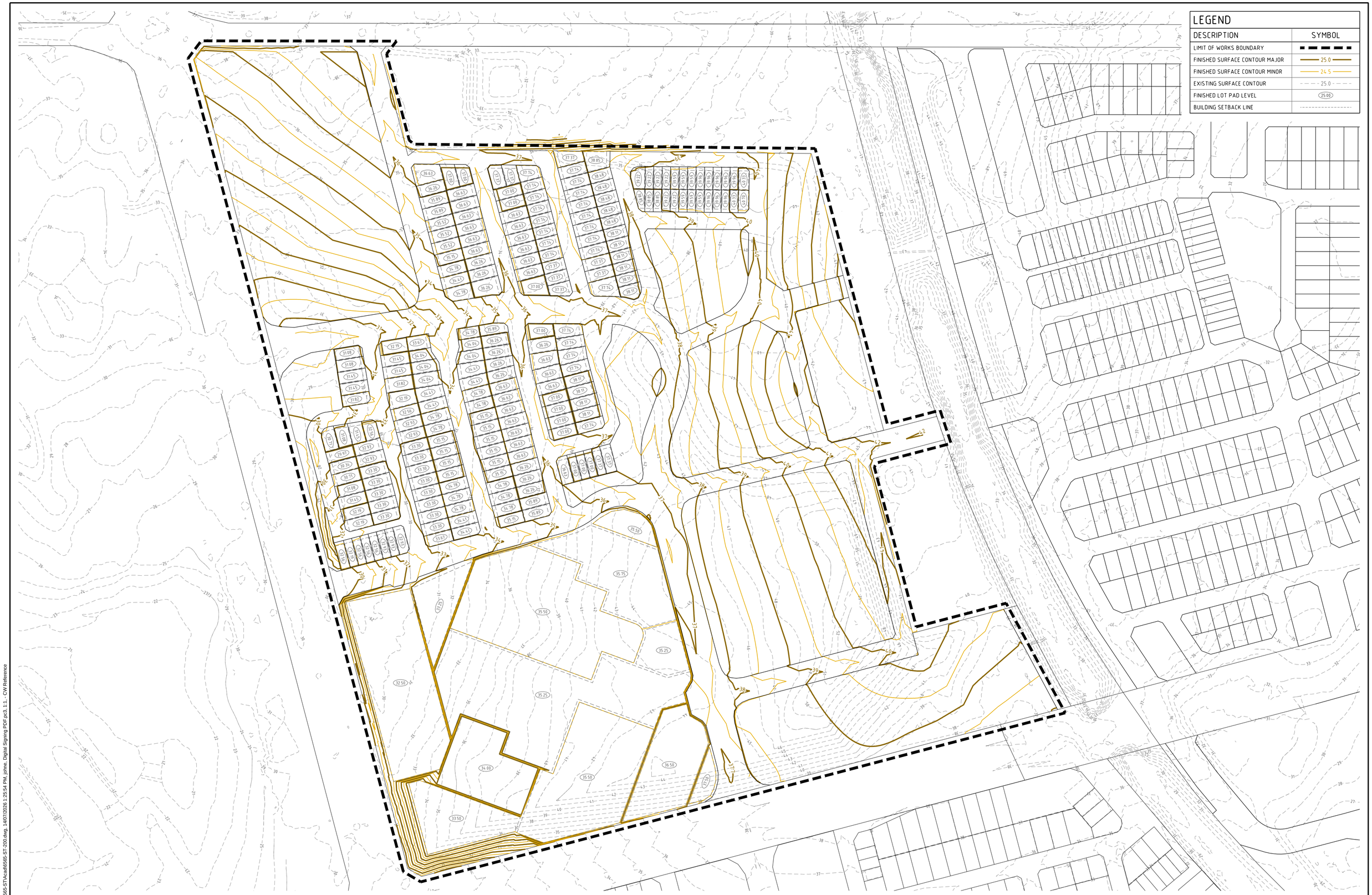


LOT 9101 CENTRAL PRECINCT

EGLINTON - OVERALL CONCEPT PLAN

Date: 13/07/2026 Plan: CFM-1-013A Scale 1:3000@A3

studio CFM
TOWN PLANNING
URBAN DESIGN



REV	DATE	DRN	CKD	APP	AMENDMENT
C	14.07.26	JAE	-		ISSUED FOR INFORMATION
B	15.06.26	JAE	AT	A. THOMSON	ISSUED FOR INFORMATION
A	22.04.26	JAE	MH	-	ISSUED FOR INFORMATION

N

1:1500 0m 30 60 90

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CLIENT: EGLINTON ESTATES

APPROVED

DESIGNED: JAE

SCALE: 1:1500

PROJECT: LOT 9101 AND 9102 EGLINTON - STRATEGIES

TITLE: EARTHWORKS STRATEGY - PLAN
CENTRAL PRECINCT

WAPC No. -

DRAWING No. 6565-ST-200

REVISION C

ORIGINAL SIZE A1

P:\6565 Lot 9101 & 9102 Eglinton\6565-STA\cad\6565-ST-200.dwg, 14/07/2026 1:25:54 PM, johne, Digital Signing PDF pc3, 1:1, - CW Reference

Appendix B

Groundwater Licences

LICENCE TO TAKE WATER

Granted by the Minister under section 5C of the Rights in Water and Irrigation Act 1914

Licensee(s)	Eglinton Estates Pty Ltd		
Description of Water Resource	Perth Perth - Superficial Swan	**Annual Water Entitlement**	17,938kL
Location of Water Source	Lot 805 On Plan 418141 - Volume/Folio 2994/65 - 395 Pipidinny Rd Eglinton		

Authorised Activities	**Taking of water for**	**Location of Activity**
	Establishment of new POS for Northern Corridor	Lot 805 On Plan 418141 - Volume/Folio 2994/65 - 395 Pipidinny Rd Eglinton
Duration of Licence	From 8 October 2021 to 7 October 2026	

This Licence is subject to the following terms, conditions and restrictions:

1. The annual water year for water taken under this licence is defined as 1 March to 28 February.

2. The licensee shall not use water for sprinkler irrigation between 9 am and 6 pm except for the establishment of newly planted areas. For newly planted areas water may be used within these hours for a period of up to 28 consecutive days, commencing from the date of planting.

3. Between 1 June and 31 August in any year, the licence-holder must not water a lawn, garden, or grass-covered area ("turf") by reticulation, provided always that this restriction shall not apply; watering with a hand held hose; or watering, by way of reticulation: golf course tees and greens, turf wickets, bowling greens and active sporting areas; newly planted areas for a period of up to 28 days from the date of planting; for renovating turf; or for maintenance of reticulation systems

End of terms, conditions and restrictions

LICENCE TO TAKE WATER

Granted by the Minister under section 5C of the Rights in Water and Irrigation Act 1914

Licensee(s)	Eglinton Estates Pty Ltd		
Description of Water Resource	Perth Perth - Superficial Swan	**Annual Water Entitlement**	2,940kL
Location of Water Source	Lot 805 On Plan 418141 - Volume/Folio 2994/65 - 395 Pipidinny Rd Eglinton		

Authorised Activities	**Taking of water for**	**Location of Activity**
	Public Open Space purposes for Northern Corridor	Lot 805 On Plan 418141 - Volume/Folio 2994/65 - 395 Pipidinny Rd Eglinton
Duration of Licence	From 8 October 2021 to 7 October 2031	

This Licence is subject to the following terms, conditions and restrictions:

1. The annual water year for water taken under this licence is defined as 1 March to 28 February.

2. The licensee shall not use water for sprinkler irrigation between 9 am and 6 pm except for the establishment of newly planted areas. For newly planted areas water may be used within these hours for a period of up to 28 consecutive days, commencing from the date of planting.

3. Between 1 June and 31 August in any year, the licence-holder must not water a lawn, garden, or grass-covered area ("turf") by reticulation, provided always that this restriction shall not apply; watering with a hand held hose; or watering, by way of reticulation: golf course tees and greens, turf wickets, bowling greens and active sporting areas; newly planted areas for a period of up to 28 days from the date of planting; for renovating turf; or for maintenance of reticulation systems

End of terms, conditions and restrictions

Appendix C

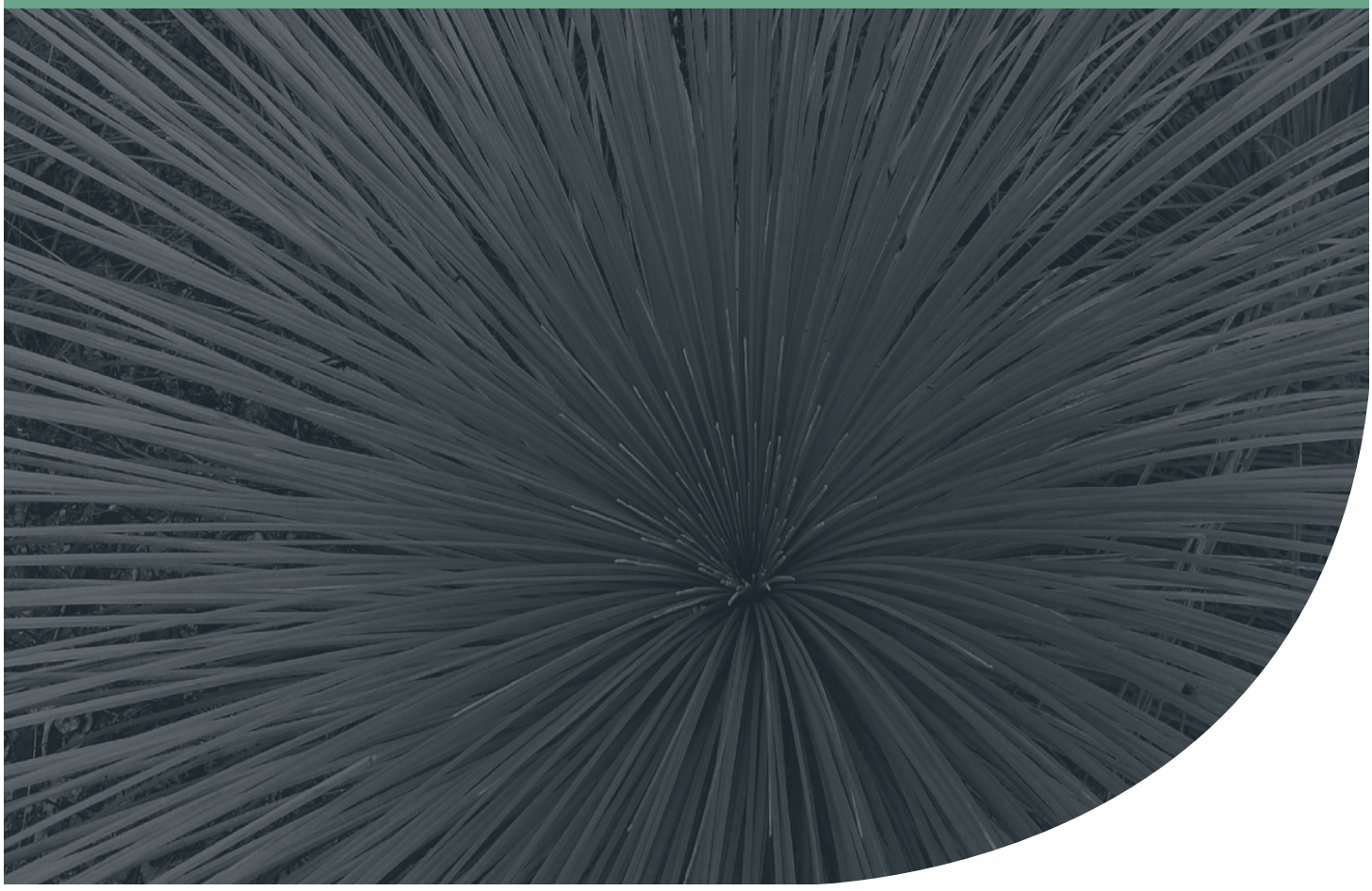
Modelling Assumptions Report

Lot 395 Pipidinny Rd Eglinton

Modelling Assumptions Report

Project No: EP18-100(12)

Prepared for Eglinton Estates Pty Ltd
September 2026



Document Control

Doc name:	Lot 395 Pipidinny Rd Eglinton Modelling Assumptions Report				
Doc no.:	**EP18-100(12) --016 MZ**				
Version	**Date**	**Author**		**Reviewer**	
1	August 2026	Melisa Zea	MZ		
	Appendix to the LWMS Addendum				
A	September 2026	Melisa Zea	MZ		
	Appendix to the LWMS Addendum				

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1 Background

Eglinton Estates Pty Ltd (the 'proponent') proposes an amendment to Eglinton Central located at 395 Pipidinny Rd, Eglinton (herein referred to as 'the site') for residential and commercial purposes. The site will comprise an area of 34 hectares (ha) and is situated 45 km north of Perth central business district, within the City of Wanneroo (CoW).

This report provides a summary of the modelling undertaken to determine the flood storage and treatment requirements for Eglinton Central. The report has been prepared to support the proposed local water management strategy (LWMS) for the Eglinton District Town Centre Activity Centre Plan (ACP).

2 Methodology

XPSWMM hydrologic and hydraulic modelling software (v2024.2) was used to calculate the surface water runoff volumes within the road reserves and lots associated with the development of Lot 395 Pipidinny Rd Eglinton.

The hydrologic component of the software uses the Laurenson non-linear runoff-routing method to simulate runoff from design storm events. Key assumptions regarding the hydrologic model include:

- Runoff is proportional to slope, area, infiltration and percentage of imperviousness of a catchment.
- Sub-catchment areas and slopes are determined from surveyed topographical data and earthworks plans.
- Infiltration rates and percentage imperviousness have been selected based on experience with model preparation for similar soil conditions.

Runoff from each sub-catchment is routed through the catchment using the hydraulic component of XPSWMM. Generally, assumptions associated with the hydraulic component of the model include:

- Virtual links (i.e. purely for model construction, not equivalent to flow path onsite) between nodes within a sub-catchment are given the length of 10 m and slope of 0.05 to minimise the lag time of conveying the water from a sub-catchment node to a 'storage' node, a 'dummy intermediate' node or a conduit/link.
- Links between sub-catchment storages act as conveyance channels (e.g. sheet flow within roads in a 1% annual exceedance probability (AEP)). These links are given lengths and slopes that are representative of the site conditions and actual pathway lengths between catchments.
- All channels are designed with a width of 5 m, roughness of 0.015 (Manning's n) and are trapezoidal in shape. This allows for easy conveyance and represents concrete pipes and road surfaces within the model.
- Where relevant median swales, bio-retention areas (BRAs), and flood storage areas (FSAs) are modelled as nodal-reservoirs with infiltration depth-rating curves to account for differential infiltration rates with changing depth.

2.1 Rainfall

The ensemble temporal patterns obtained from the Australian Rainfall and Runoff (AR&R) Data Hub (AR&R 2019) were used for the rainfall analysis.

Up to eight durations ranging between 1 hour and 72 hours were tested, with the peak flood elevation being assessed as the determining result.

Following the process suggested by AR&R (Ball J et al. 2019), the highest mean duration was selected as the critical duration. AR&R also recommends that when it is not practical to run the entire ensemble array, the ensemble that produces the result closest to the mean (for the critical duration) should be adopted. The 2 hour duration ensemble 5 and the 1 hour duration ensemble 7 was adopted for the 1% AEP and 20% AEP events respectively for catchemnt A. The 3 hour duration ensemble 7 was adopted for the 1% AEP and 20% AEP events respectively for catchemnt B, C and D.

3 Post-development model

An initial loss continuing loss model was adopted to account for post-development catchment losses. The post-development catchment area, land types and loss values were based on the structure plan design, typical infiltration rates for the soils which occur onsite and based on project team experience. Post-development catchment areas and land types within the site were informed by concept plan design provided by Town Planning Urban Desing. **Table 1** summarises the loss parameters used within the post-development model.

Table 1: Post-development parameters

Land type	Initial loss (mm)	Continual loss (mm)	Roughness
Road Surface	1	0.1	0.02
Road Verge	9	1.5	0.05
POS	25	3.5	0.05

A summary of post-development catchment information is provided in **Table 2** with the catchment plan and **Table 2** provides modelled volumes for first 15mm, 20% AEP and 1% AEP events.

Table 2: Post-development catchment areas (ha)

Catchment	Slope	Area (ha)				
		Total area	Total Road reserve	Road pavement	Road verge	POS
Ct-1	0.05	4.42	1.76	1.06	0.70	
Ct-2	0.05	9.53	4.63	2.78	1.85	0.40
Ct-3	0.05	8.24	2.40	1.44	0.96	0.54
Ct-4	0.05	2.60	2.60	0.64	1.04	
Ct-5	0.05	0.74	0.74	0.44	0.29	

Table 3: Modelled Volumes

CT	Structure	Basin	Side slope	15 mm event			20% AEP event			1% AEP event		
				Depth (m)	TWL surface area (m^2)	Volume (m^3)	Depth (m)	TWL surface area (m^2)	Volume (m^3)	Depth (m)	TWL surface area (m^2)	Volume (m^3)
Ct-1,2,3	Co-located basin	BRA 1&2	1/3	0.3	1,435	405						
		FSA 1&2	1/6				0.52	2,911	1,026	0.9	3,855	3,310
Ct-3	Bio-retention area	BRA 3	1/3	0.5	430	183						

Table 4: Modelled Volumes (continued)

CT	Structure	Basin	Side slope	15 mm event			20% AEP event			1% AEP event		
				Depth (m)	TWL surface area (m^2)	Volume (m^3)	Depth (m)	TWL surface area (m^2)	Volume (m^3)	Depth (m)	TWL surface area (m^2)	Volume (m^3)
Ct-4	Bio-retention area	BRA 4	1/4	0.5	325	128						
	Sub-surface storage	FSA 4	-				0.37	542	200	1.5	542	813
	Median swale	Swale 4	1/6	0.25	510	65						
Ct-5	Co-located basin	BRA 5	1/3	0.3	110	440						
		FSA 5	1/6				0.63	625	290	1.2	1,015	750
	Median swale	Swale 5	1/6	0.25	400	50						

The following assumptions were incorporated into the model:

- Lots
  - Lots will have 50% roof areas, 45% paved areas and 5% pervious garden areas.
  - Lots will retain the 1% AEP in pervious garden areas.
  - Residential lots will have little slope (i.e. will be flat) and pockets of storage are likely. This will effectively increase the initial loss (storage) and overall infiltration rate (continual loss).
  - Garden areas in lots will have high infiltration rates as it is likely that sand-based landscape mix or mulch will be used
- Road reserve
  - There will be no infiltration on roads, pavements and driveways. There will however be some minor absorption storage loss which is accounted for in the initial and continuing loss values.
  - Estate road reserve contains 80% pervious verge and 20% impervious bitumen areas. When combined with the initial loss assumptions this equates to a runoff co-efficient of approximately 0.65 from road reserves for the design of downstream infrastructure (i.e. BRA and FSAs).
- Basin catchments and POS
  - Basin catchment areas (FSA footprint and contributing open space) are assumed to be 100% pervious.
  - POS will likely contain dense vegetation or turf over a sand-based landscape mix.
- Storage
  - BRAs retain runoff from events up to and including the frequent event (i.e. first 15 mm).
  - Co-located BRA/FSA have between 1 in 4 and 1 in 6 side slopes with depths between 500 mm and 1.2 m.
  - Median swales are designed with 3 m top width, 250 mm depth and 1 in 6 side slopes.
  - Sub-surface FSAs have a maximum depth 1.5 m and vertical walls.
  - FSA retains runoff from events up to and including the 1% AEP event.
  - Raingardens/roadside swales retain and potentially provide treatment (via infiltration) of small event runoff (first 15 mm) but, due to their limited treatment area, have not been modelled.

- Infiltration
  - A hydraulic conductivity of 2.5 m/day is assumed for the BRA
  - A hydraulic conductivity of 10 m/day is assumed for the FSA
  - BRA (including those collocated with FSAs) bases are to be vegetated and used for treatment, therefore a 50% clogging factor is accounted for in the base of the basin (negligible clogging on side slopes).
  - Infiltration through base area and side slopes of the basins are considered in the overall infiltration rating curve for these areas.
  - Infiltrations rate within sub-surface FSAs has no clogging factor accounted for (i.e. full design rate of 6 m/day)
- Evapotranspiration
  - Volumes leaving the system through evapotranspiration were assumed to be negligible when compared to the total runoff volume and since the duration of the model run was comparatively short. XPSWMM default evapotranspiration assumptions are therefore used.

4 References

4.1 General references

The references listed below have been considered as part of preparing this document.

4.2 Online references

Australian Rainfall and Runoff (AR&R) 2021, ARR Data Hub, viewed 1 December 2021, Available from: <https://data.arr-software.org/>.

Bureau of Meteorology (BoM) 2026, Design Rainfall Data System (2016), Available from, <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>.15

Bureau of Meteorology (BoM) 2026, *Climate Data Online*, Available from <http://www.bom.gov.au/climate/data/>.