





Edmondson Park Frasers Town Centre

Water Cycle Management Plan

Addendum Report

Concept Plan Approval MP10_0118

S75W Application

Frasers Property Australia

16 March, 2016

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1 INTRODUCTION

Frasers Property Australia (Frasers) is proposing a development across the Frasers Town Centre precinct within the Edmondson Park South release area. The Frasers Frasers Town Centre precinct is located north of Campbelltown Road, east of the northern extension of the relocated Macdonald Road alignment and bounded along its northern edge by the existing Transport Infrastructure Development Corporation (TIDC) corridor, including the operational Edmondson Park rail station. The Frasers Town Centre precinct is contained wholly within the Liverpool Council LGA.

Frasers are preparing an application under Section 75W of the Environmental Planning & Assessment Act, 1979 (EP&A Act) for modification or clarification of the existing approval conditions and statement of commitments, as applied to this particular proposed development.

This Stormwater Management report has been prepared to accompany Frasers Section 75W application. This report provides details on why the Frasers Town Centre development needs to modify some elements of the Edmondson Park Concept Plan Approval conditions and statement of commitments as they relate to the approved water cycle management framework. Options are presented as to how the proposed development aims to provide the mechanisms to deliver the appropriate water cycle management infrastructure, the outcomes of which will satisfy the objectives of the Concept Plan Approvals water cycle management framework.

2 DEVELOPMENT APPROVALS FRAMEWORK

The Frasers Town Centre development located within the Edmondson Park south release area is subject to the conditions and statement of commitments of the Edmondson Park Concept Plan Approval MP10_0118, dated 18 August 2011. Within the Concept Plan Approval is a framework for Water Cycle Management across the Edmondson Park South residential and town centre development precincts, as to how the future development is to manage both water quality and water quantity.

The following is an extract from the Concept Plan Approval and statement of commitments, which relate to the Water Cycle Management framework for the Town Centre:

Table 1 - Concept Plan Approval Conditions

Schedule 2	
Part C	Further Environmental Assessment Requirements
Flooding	
Clause 1.20	Any future applications are to demonstrate compliance with the flood management measures outlined in the Part 3A Concept Plan, Water Cycle Management Plan prepared by J. Wyndham Prince, September 2010. Compliance with Campbelltown and Liverpool City Council requirements (as relevant to flooding) should also be demonstrated. Flood modelling should be updated to include recent experience with significant rainfall events.
Water Quality and Riparian Corridors	
Clause 1.21	Any future applications are to provide details on the proposed water sensitive urban design infrastructure, to the satisfaction of the consent authority.
Future Development	
Clause 1.24(b)	Demonstrate compliance with Water Sensitive Urban Design principles established in the concept plan.

Table 2 - Concept Plan Approval Statement of Commitments

Drainage and Stormwater	
#43	Future relevant detailed applications will demonstrate consistency with the approved Concept Plan Water Cycle Management Strategy prepared by J. WYNDHAM PRINCE and included at Appendix H of the Concept Plan Environmental Assessment prepared by JBA Urban Planning Consultants dated March 2010 including the provision of: (a) A regional detention basin within Maxwell's Creek; (b) A regional detention basin within the Bunbury Curran Catchment; (c) Bio-retention raingardens located within public reserves and adjacent to the riparian corridors; and (d) Proprietary gross pollutant traps.

3 PREVIOUS REPORTS / STUDIES

The following previous reports set the principles of the Concept Plan approval water cycle management plan.

J. Wyndham Prince (2007) - *Edmondson Park Water Sensitive Urban Design Strategy – October 2007* (Ref. 1)

The report investigates the requirements of the Edmondson Park development release area within the Liverpool City Council local government area and identifies the size and location of water quality management infrastructure that is anticipated to be required for components for the release area. Raingardens 13 & 14 were identified as the water quality and water quantity infrastructure to service the catchment area within which the Frasers Town Centre development is located.

GHD (2003) – *Edmondson Park Master Planning, Water Cycle Management: Stormwater* (Ref. 2)

The report was prepared as part of early Master Planning processes for Edmondson Park.

The report addressed water cycle management options, identified constraints and opportunities and presented a range of Water Sensitive Urban Design options. Hydrologic and hydraulic (flood mapping) analyses was undertaken as part of the investigation.

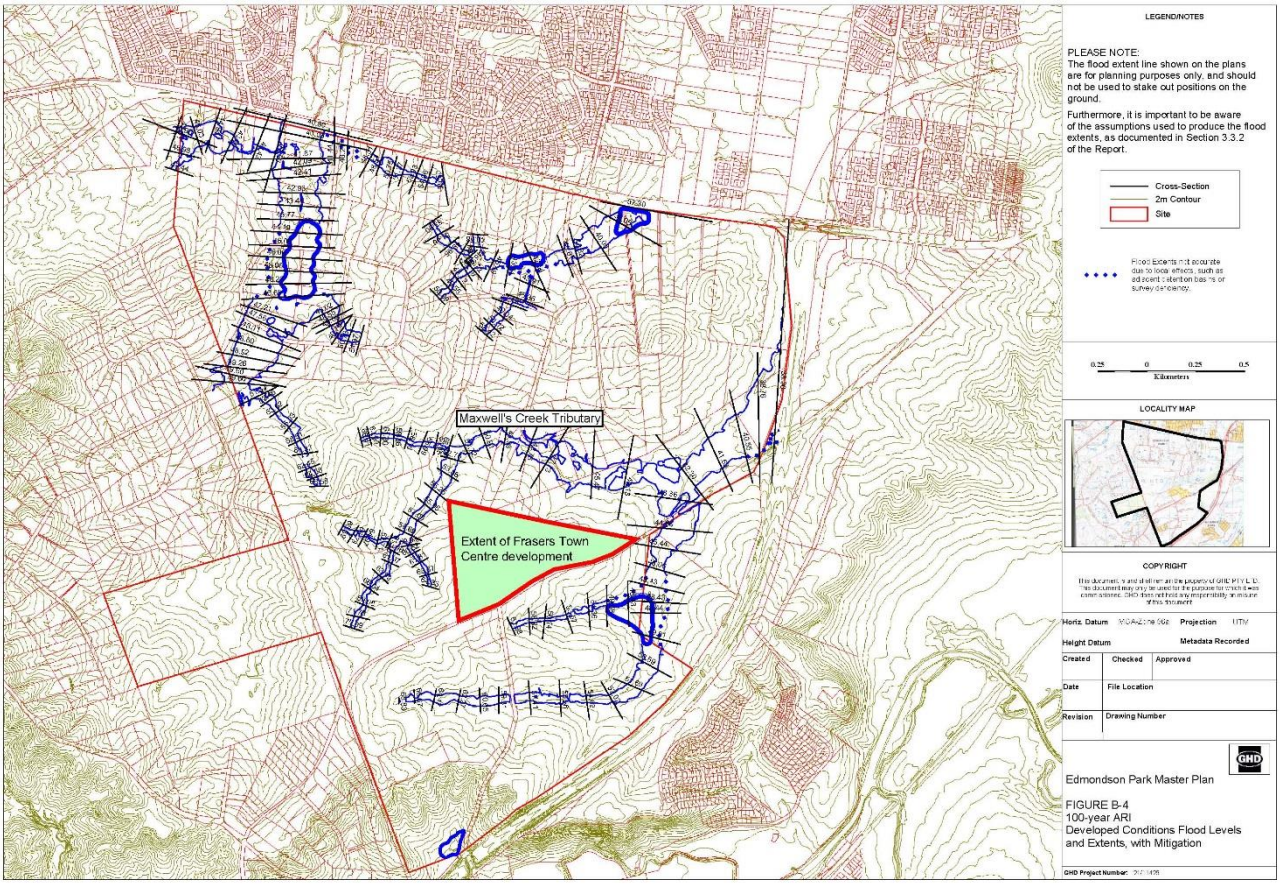
The recommendations from the report addressed water quantity and quality management, for the precinct proposed provision of a number of retarding basins, and constructed wetlands. These water quality and water quantity devices where reviewed further and developed in detail and function as part of the aforementioned J Wyndham Prince report (Ref.1).

4 FLOOD MANAGEMENT

4.1 Regional Flood Management - GHD (2003) Report & Concept Plan Approval Clause 1.20

The GHD (2003) report provided flood analysis and mapping of Cabramatta Creek, a tributary of Maxwell's Creek, and Maxwell's Creek, within the extent of the Edmondson Park release area. In terms of the 100 year ARI flood event, with a developed catchment condition and with the GHD identified flood mitigation measures, their flood extent map is presented in their Appendix B "Flood Extent Mapping" Figure B-4. A copy of that mapping is provided in Plate 1 for reference, onto which we have marked the extent of the proposed Frasers Town Centre development.

Plate 1 – Extract of GHD Flood Extent Mapping 100yr ARI, with Town Centre Overlaid



4.2 Responding to Concept Plan Approval Clause 1.20

As can be seen, the regional post development flood mapping does not impact upon the proposed Edmondson Park Frasers Town Centre development area, hence a more detailed flood impact assessment is not required.

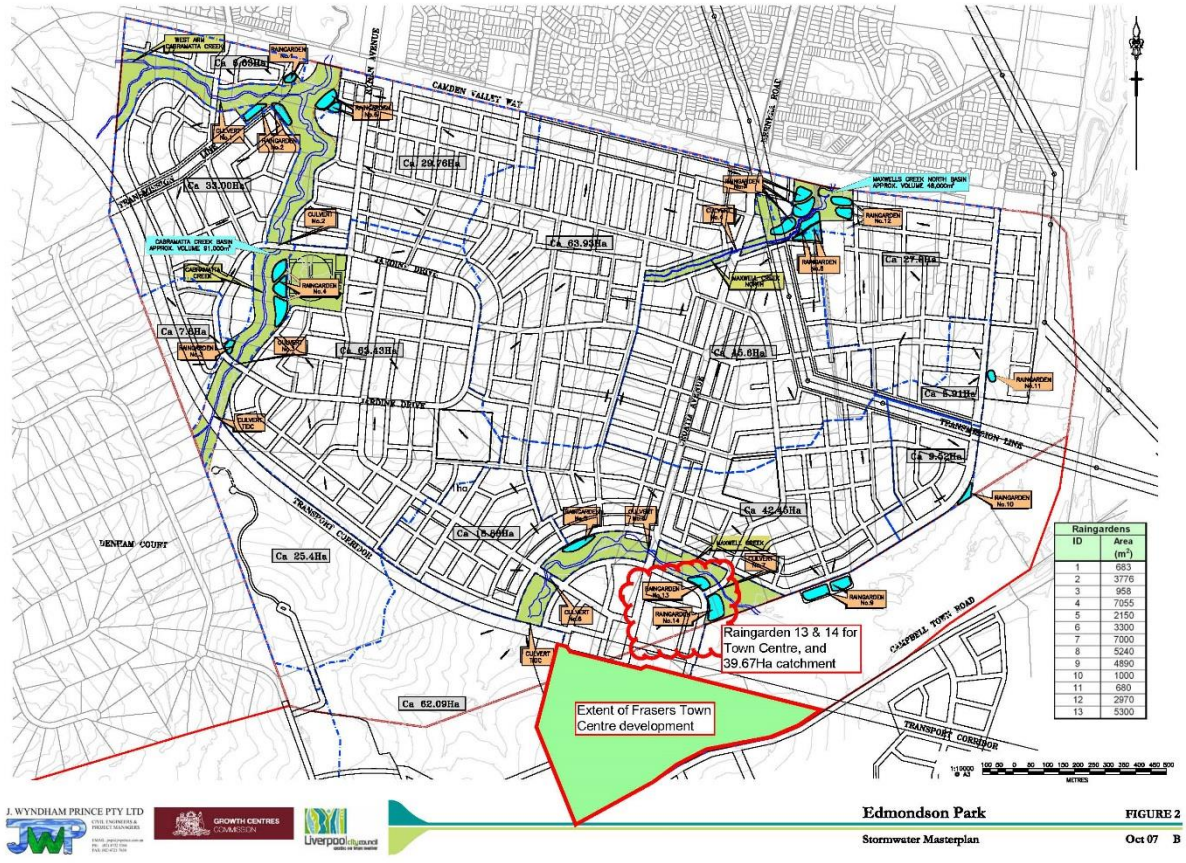
5 WATER QUALITY & WATER QUANTITY MANAGEMENT

5.1 Background

The J. Wyndham Prince (2007) report proposed bio-retention systems for water quality management within the precinct, with the bio-retention systems also incorporating a water quantity management detention storage component that will reduce post development discharges to the watercourses for all storms up to and including the 1.5 year ARI design event to pre-development levels. Each of the combined water quality and quantity control storages are sized approximately proportionate to the catchment it services (1.1% of catchment area). Each of the bio-retention swales/detention basins are to service their own sub-catchments independently.

In relation to the Frasers Town Centre precinct, the combined water quality and water quantity devices are identified as Raingardens 13 & 14, positioned on the northern side of the Maxwell's Creek conservation area, against the northern portion of the town centre residential area. This was presented on J. Wyndham Prince (2007) Figure 2, with an extract of Figure 2 presented at Plate 2.

Plate 2 – Extract of J. Wyndham Prince (2007) Figure 2 Showing Raingardens 13 & 14 Location



5.2 Water Quality Criteria

The J. Wyndham Prince (2007) report outlined the stormwater quality management requirements for post development stormwater runoff to be treated by suitable measures in order to achieve the following :

Pollutant	Minimum Target Reductions (DECC & Council) %
Total Suspended Solids	85
Total Phosphorus	65
Total Nitrogen	45

A range of stormwater management techniques and options identified as being suitable for the management of nutrients and suspended solids discharging from the site are summarised as follows:

- Constructed Bio-Retention systems consist of a filtration bed with either gravel or sandy loam media and an extended detention zone typically from 100-300 mm deep designed to detain and treat first flush flows from the upstream catchment. They typically take the form of a linear swale and are located within the verge area of a road reserve or extend within the bushland corridors or open spaces. The surface of the Bio-Retention Swale can be grassed or mass planted with water tolerant species. Filtration beds of Bio-Retention systems are typically 0.6 metres deep.
- Cartridge filtration systems are underground pollution control devices that treats first flush flows. The units consists of a vault containing a number of cartridges each loaded with media that targets specific pollutants. Each cartridge has a maximum treatable flowrate of approximately 1 litre per second. These cartridge filtration systems would be positioned below the road surface.
- GPT devices are typically provided at the outlet to stormwater pipes. These systems operate as a Primary treatment to remove litter, vegetative matter, free oils and grease and coarse sediments prior to discharge to a downstream (Secondary and Tertiary) treatment devices. They take the form of trash screens or litter control pits, filter pit inserts and wet sump gross pollutant traps.

5.3 Water Quantity Criteria

The J. Wyndham Prince (2007) report outlined that at the raingarden sites, an additional 110 m^3 of storage per catchment hectare is to be provided, this storage will reduce post development discharges to the watercourses for all storms up to and including the 1.5 year ARI design event to pre-development levels.

5.4 Water Quality & Quantity Management for Edmondson Park Frasers Town Centre

The J. Wyndham Prince (2007) identified the Edmondson Park Frasers Town Centre Precinct to be within a 39.69Ha catchment area that naturally drains to the north east into a tributary of Maxwell's Creek. The report identified Raingardens 13 & 14 as the most appropriate water quality management measure for the Town Centre development area. Raingardens 13 & 14 were sized to also account for the additional storage needed to address the 110 m^3 of storage per catchment hectare.

Raingardens 13 & 14 are located adjacent to the tributary, as shown on Figure 2 of the report. This is shown here on Plate 3, in context of the overall water quality management strategy. Plate 4 shows an enlarged extract of the reports Figure 2, for better context.

Plate 3 – Extract of J. Wyndham Prince (2007) Figure 2 Showing Town Centre Water Quality Measure

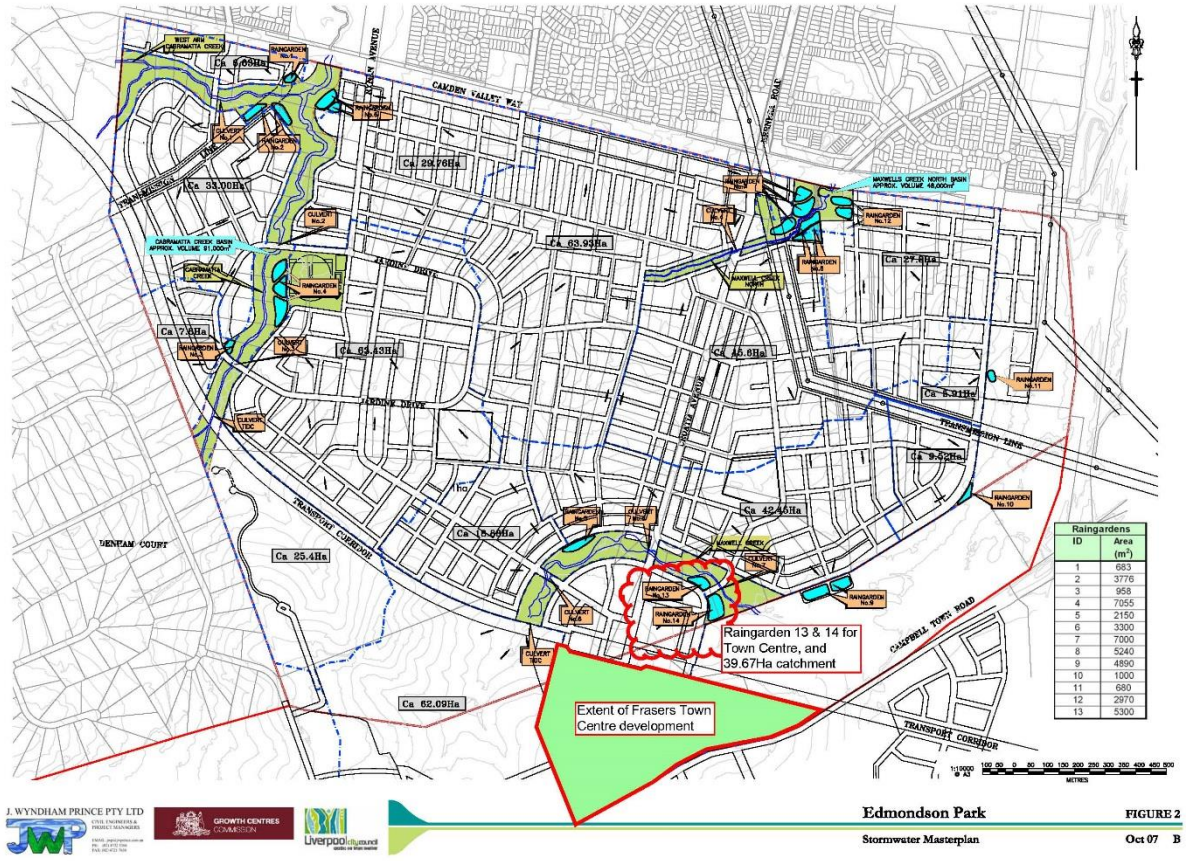
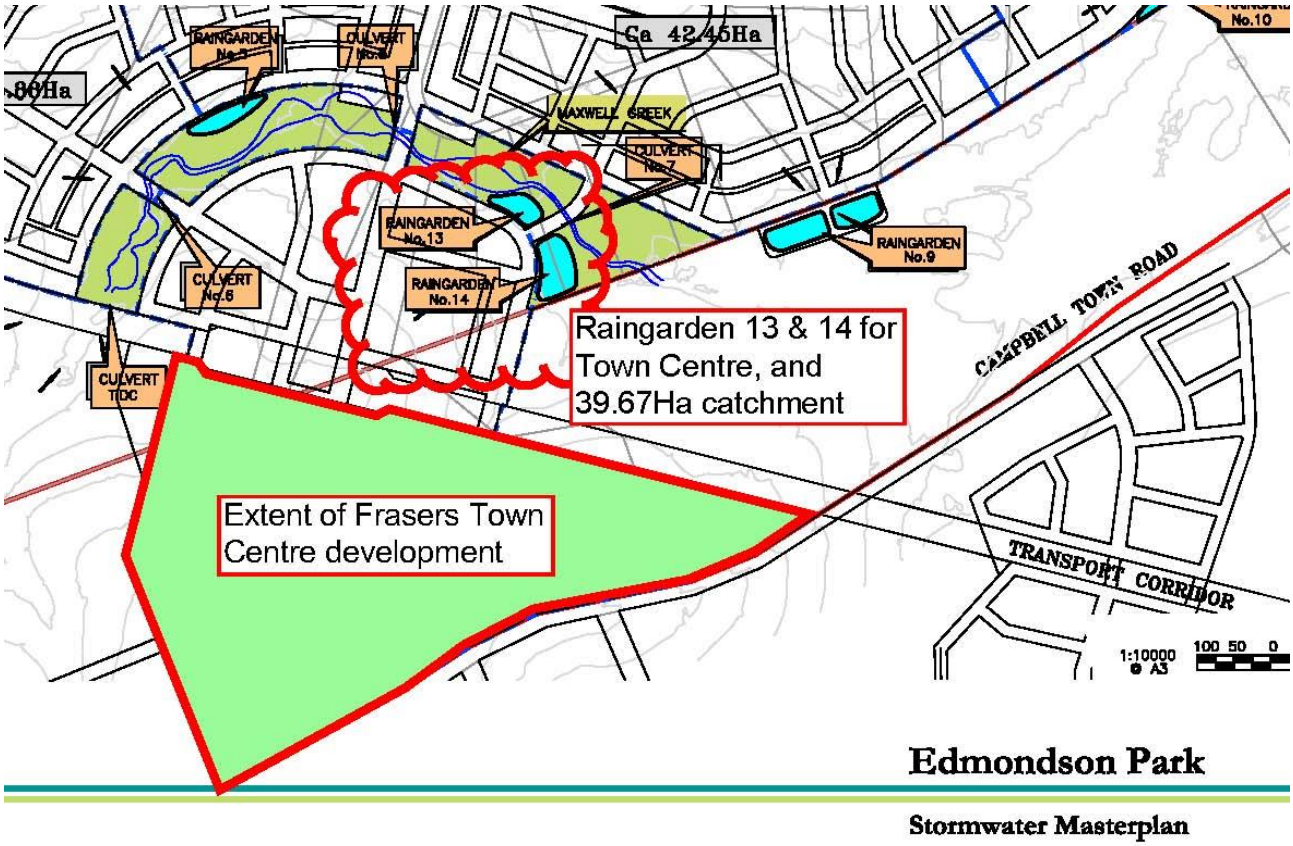
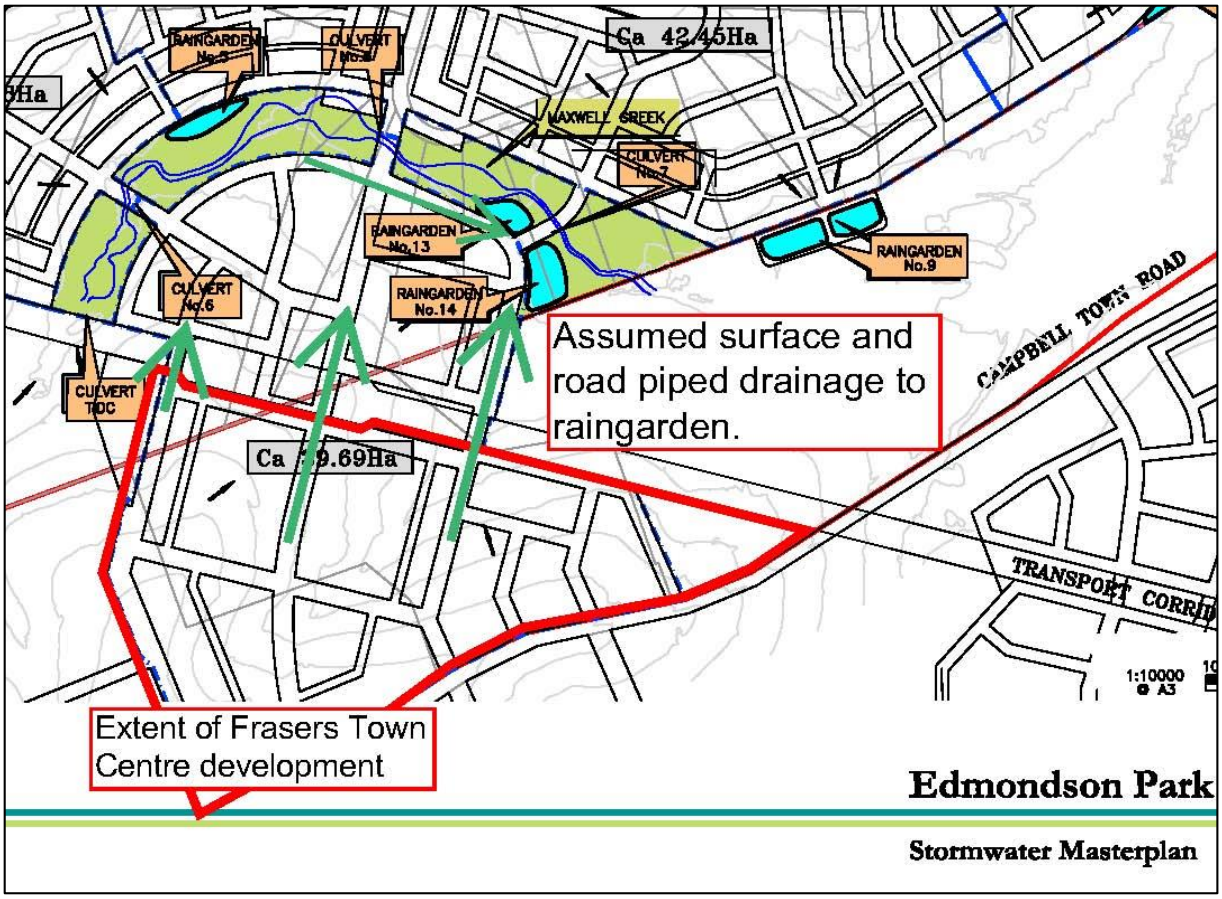


Plate 4 – Enlarged Extract of J. Wyndham Prince (2007) Figure 2



The J. Wyndham Prince (2007) report made the assumption at that time that the stormwater that was to drain to Raingardens 13 & 14, would be conveyed from the catchment via conventional road pipe network, all of which could be conveyed at grade across the future transport corridor. This was evident from the information available at that time, and from the town centre masterplanning layouts that had also been made available at that time, which showed three road corridors across the future rail corridor, being the drainage paths for stormwater flows to Raingardens 13 & 14.. An extract of the J. Wyndham Prince (2007) Figure 2 is shown in Plate 5, with direction arrows to present the assumed drainage paths.

Plate 5 – Enlarged Extract of J. Wyndham Prince (2007) Figure 2 Showing Drainage Paths to Raingardens 13 & 14



5.5 Constructed Transport Corridor

The transport corridor rail link with the Edmondson Park rail station works are now complete and operational. The rail corridor is in part on grade to the natural ground level but at the location of the assumed stormwater flow paths (as shown on Plate 6) this has been built partly in cut with the excavated material placed adjacent. This has created a new high point which will not make it possible for the water to drain uphill over the rail corridor and then down hill towards Raingardens 13 & 14.

Also along the rail corridor and in the immediate vicinity of the Frasers Town Centre development and the Edmondson Park rail station are two drainage culvert structures built by the rail corridor works, in the natural lowpoint of the land form. These are shown on Plate 6.

These built pieces of infrastructure potentially now interfere with the mechanisms presented in the J. Wyndham Prince (2007) as to how Raingardens 13 & 14 were placed to accommodate the contributing catchment and provide the contributing catchment with its required water quality and water quantity management outcomes. The following outlines options as to how the proposed Frasers Town Centre development might be able to deliver upon its water quality and water quantity management obligations.

Plate 6 – Edmondson Park Rail Station & Culverts

Source Nearmap.

5.6 Mechanisms for Stormwater Management for the Town Centre

5.6.1 Stormwater Delivery Mechanism to Raingardens 13 & 14 - Option 1

Investigations are currently being undertaken to assess the viability of utilising the existing rail culvert structure 1 (refer Plate 6) as the pathway for draining the appropriate amount of stormwater from the Frasers Town Centre development towards Raingardens 13 & 14. This will involve the review of the practicality and constructability of the:

- Location and level of the Raingardens 13 & 14 nominated site;
- Available grade and opportunity to drain from rail culvert 1 to Raingardens 13 & 14;
- Available grade to drain out Raingardens 13 & 14 and/or tailout to the Maxwell's Creek tributary, especially its potential depth and extent and its impact on the existing natural environment;
- Existing land holding ownerships over which these drainage works will affect, and assess the potential or otherwise of being able to gain construction & maintenance access;
- Identify any National Parks & Wildlife Services constraints that may be imposed should any of these works be installed on the land under their care and control;
- Whether the existing rail substation facility may interfere with future adjacent drainage works; and

The outcomes of the above will confirm whether the J. Wyndham Prince (2007) assumed mechanisms for conveying stormwater flows to Raingardens 13 & 14 remain viable and if so, confirm the ability for Raingardens 13 & 14, as intended by the Concept Plan Approval, to meet stormwater quality management requirements.

5.6.2 Town Centre Stormwater Quality & Quantity Management - Option 2

In the event that the outcomes from the section 5.6.1 investigations are not viable for the proposed development, the following options for stormwater quality and quantity management maybe considered further.

- Provision within the residential precincts for small linear bio-swale / bio-retention systems located and appropriately sized to service localised catchments;
- Provision of cartridge stormwater filter systems underground within public road reserves, being a combination of small and large tank systems, as required to service the applicable catchment and located to optimise the catchment extent against the tanks outlet discharge of the cleaned water to downstream systems;
- Provision of GPT devices located within public road reserves and appropriately sized to service localised catchments.
- Provision of additional storage capacity at the underground stormwater filter systems, to provide the necessary 110 m^3 of storage per catchment hectare.

There could be a combination of the above elements to form a water quality and water quantity management train, such that the collective post development water quality improvement results across the proposed development satisfy the minimum target reductions, and also manage the water quantity criteria.

6 WATER SENSITIVE URBAN DESIGN

6.1 Reductions in Potable Water Demand

Introduced by the NSW Government, BASIX, the Building Sustainability Index, ensures homes are designed to use less potable water and be responsible for fewer greenhouse gas emissions by setting energy and water reduction targets for house and units.

It is understood that Sydney Water can provided recycled water to the proposed development. Its implementation into the overall project WSUD strategy is being investigated.

Details for potable water demand reductions are also being investigated.

The Town Centre Core is incorporating a retention tank to collect rainwater from the roofs of the apartments. This water is treated and re-used for toilet flushing, irrigation and washing machines. This retention tank could be located within the new public road adjacent to the Town Centre Core.

Any stormwater that cannot be re-used within the Town Centre Core is to be treated by either raingardens or a stormfilter cartridge system.

To meet the quantity requirements of Green Star Communities the medium density residential precincts will use swales / raingardens and GPT structures. This along with the retention in the Town Centre Corewill meet the quantity requirements for Green Star Communities.

6.2 Reductions in Wastewater Generation

Water efficient fixtures and fittings are proposed for the whole site as outlined in the following table.

Fitting	Minimum WELS Rating
Toilets	4 Star
Bathrooms Taps	3 Star
Urinals	6 Star
Kitchen Taps	5 Star
Showers	3 Star
Clothes Washers	4.5 Star
Dishwasher	3 Star

Recycled water either collected on site or as provided by Sydney Water is proposed for toilets, irrigation and washing machines throughout the whole site.

Testing of the fire fighting system will use recycled water.

7 REFERENCES

1. J. Wyndham Prince (2007) – *Edmondson Park Water Sensitive Urban Design Strategy October 2007*

2. GHD (2003) – *Edmondson Park Master Planning, Water Cycle Management: Stormwater*