

Precinct 4 Stormwater Drainage Assessment

Ballarat West DCP

Advisory Committee Hearing

Our Reference: 11736-01

1.0 Introduction

TGM Group Pty Ltd has been engaged by Norton Rose Fulbright (28th May 2013) to complete an assessment and report into the proposed stormwater drainage scheme for the Ballarat West Precinct Structure Plan (BWPSP), an alternative stormwater drainage scheme for Precinct 4 and the separation of Precinct 4 from the drainage component of the Development Contribution Plan (DCP).

2.0 Statement of Qualifications & Expertise

2.1 Name and address

Darren John Trigg
TGM Group Pty Ltd
1315 Sturt Street
Ballarat, Vic 3350

2.2 Qualifications and Experience

Bachelor of Civil Engineering (Ballarat College of Advanced Education)
1990 – 2000: Senior Civil Engineer – Thoms Gibcus McGrath Pty Ltd
September 2000 – April 2013: Director – TGM Group Pty Ltd
April 2013 – Present: General Manager – TGM Group Pty Ltd

2.3 Areas of Expertise

- Civil Engineering Design
- Stormwater Drainage; including flood studies
- Hydraulic Engineering Design – Sewer & Water Infrastructure

2.4 Expertise to make the report

Engineering qualifications and experience in stormwater drainage infrastructure design of projects involving various medium to large developments.

2.5 Instructions that define the scope of the report

I have received instructions from Norton Rose Fulbright on behalf of G & N Closter Pty Ltd to undertake an assessment and report into the proposed stormwater drainage scheme for the BWPSP, an alternative stormwater drainage scheme for Precinct 4 and the separation of Precinct 4 from the drainage component of the DCP.

3.0 Facts, matters and all assumptions

3.1 Existing Documents

An assessment of correspondence and documents has been completed as part of the assessment. The documents obtained and reviewed included:

- Ballarat West Precinct Structure Plan – Final June 2012
- Engineering Costs- Drainage Costing's Catchment 20120224
- Ballarat West Growth Area PSP Drainage Report – Engeny Water Management – 27th February 2012
- Ballarat Planning Scheme Amendment C167 – Explanatory Report
- Benefits of rainwater tanks in Ballarat – AECOM - 8th July 2011

4.0 Ballarat West Precinct Structure Plan (BWPS) – Section 5.7

4.1 General Principles

The basis of Section 5.7 Integrated Water Management of the BWPS, in particular Plan 15 has been developed through a drainage report prepared by Engeny Water Management on behalf of SMEC Urban.

The key design standards provided by the City of Ballarat (BCC) and the Corangamite Catchment Management Authority (CCMA) to Engeny Water Management was to prepare a drainage report for the precinct area where:

- “downstream flows must be no greater than predevelopment levels
- stormwater management should promote conservation and re-use of stormwater for non-potable purposes;
- all new development is to be protected from the 1:100 year flood;
- the local drainage system will have capacity to process a 1 in 5 year storm event;
- water quality is to be treated to best standard practice (currently 45% reduction in total nitrogen and phosphorus and 80% reduction in total suspended solids);
- development should protect and enhance the environmental, social (including heritage) and economic values of waterway”

4.2 Key Objectives

Section 5.7.1 of the BWPS document outlines the key objectives of the Integrated Water Management Plan, to meet the drainage needs of the planned future urban environment.

The key objectives are:

- “Protect the urban areas from flooding through managing the flows of stormwater run-off.

To manage the flows of stormwater runoff and improve the quality of water entering downstream systems:

- Provide stormwater detention to the satisfaction of the Responsible Authority;
- Maintain pre-development stormwater flows to receiving waterways;
- Reduce and filter sediment and nitrogen levels through an integrated water sensitive urban design system; and
- Design developments to meet the current best practice performance objectives for stormwater quality as contained in the *Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999)* as amended.

Design leads to maximising the habitat values and management of wetlands, waterways and open space functions:

- Protect downstream waterways from adverse impacts from urban stormwater run-off.

Water use and savings meet any policy targets for the Ballarat and District Water Supply System set by the Water Authority:

- Reduce potable water consumption through the use of alternative fit-for-purpose water sources;
- Encourage the use of recycled and harvested storm water within the Precinct;
- Encourage consultation with Central Highlands Water, the Corangamite Catchment Management Authority and City of Ballarat regarding the efficiency and sustainability of providing recycled water through harvesting storm water and/or third pipe systems, roof capture and use of water within properties; and
- Encourage consultation with Central Highlands Water, the Corangamite Catchment Management Authority and City of Ballarat regarding the treatment and storage of water within local aquifers.”

4.3 Ballarat West Growth Area PSP Drainage Report – Engeny Water Management

I acknowledge and accept each of the key planning, design guidelines and principles used by Engeny Water Management in preparing the drainage report for the BWSPSP.

4.3.1 Pre-Development & Post Development Peak Flow Assessment

The Engeny Water Management drainage report provides a detailed comparison between the developed and existing condition flow rates for the 100 year ARI storm event at eleven (11) individual locations; reference Table 3.5.

Table 3.5 indicates that at two (2) separate locations on the boundary of Precinct 4 i.e. comparison locations 1 and 2 that the developed peak flow rate does not exceed the existing peak flow rate, consequently satisfying the key criteria of the CCMA that post development peak flow rates do not exceed the existing rate up to and including the 100 year ARI storm event.

The comparative locations 1 and 2 are located at the north-west and south-west boundary extents of Precinct 4. Table 3.5 at locations 1 and 2 demonstrates that the proposed retarding basin network within Precinct 4 upstream of these locations provides suitable infrastructure to satisfy the CCMA peak flow objective in complete isolation to the other BWSPSP Precinct's.

Whilst comparison location 4 is positioned downstream of Precinct 4 in Precinct 2 my initial assessment and analysis of the available data suggests the flow rate comparison from retention basin RB2 at the east and from retention basin RB4 at the south-east boundaries of Precinct 4 is comparable to the pre-development 100 year ARI storm event peak flow rates. Considering the location of RB2 and RB4 at the east and south-east boundary extremities of Precinct 4 respectively, suitable minor modification to the detention capabilities of each basin could be implemented if further detailed analysis indicated the post-development peak flow exceeded the pre-development discharge rate for the 100 year ARI.

Primarily it would appear that the stormwater drainage modelling based on the retarding basin layout completed by Engeny Water Management indicates that Precinct 4 in isolation either currently satisfies or has the ability to satisfy that the CCMA criteria of not increasing the pre development peak flows for the 100 year ARI storm event within its designated boundaries.

4.3.2 Integrated (Dual) Land Uses

Whilst Section 5.7 of the BWSP document outlines that drainage functions “are integrated with other land uses in a way which will maximise both development and environmental potential” the drainage report prepared by Engeny Water Management on which Plan 15 of the BWSP is based does not appear to utilize any initiatives other than dedicated detention basins, wetlands and bio-filters.

In addition the BWSP document outlines that the proposed Integrated Water Management Plan compliments open space, recreation and ecological benefit through the co-location of retarding basins and open space. Whilst this has been acknowledged I do not believe that Plan 15 of the BWSP or the Engeny Water Management report has fully developed the potential integration and ‘dual use’ options.

4.3.3 Engineering Costings - Drainage

Whilst Precinct 4 like each of the other Precincts has been independently assessed, modelled and costed for the BWSP it would appear from my review of the engineering cost estimates summary table for the stormwater drainage infrastructure elements a ‘blanket’ drainage levy has been adopted.

The suggested total DCP contribution for stormwater drainage is \$91,000 per hectare; which includes an infrastructure cost component of \$82,000 per hectare and a land acquisition component of \$8,823 per hectare.

The suggested BWSP contribution for drainage infrastructure construction of \$82,000 per hectare has been based on a total estimated construction cost of \$77.7 Million across the entire BWSP area. However there appears to be a discrepancy in the total BWSP drainage construction cost with the detailed engineering cost estimate spread sheets which indicate a total construction of \$76.5 Million which would equate to an approximate BWSP contribution for drainage infrastructure construction of \$80,700 per hectare (excluding the \$8,823 land acquisition component).

The suggested overall ‘averaged’ drainage levy is ‘reasonably’ comparable to the estimated infrastructure costs for Precinct 1 (\$89,349 per hectare); however it is significantly above Precinct 2 (\$64,909 per hectare) and Precinct 4 (\$59,621 per hectare). The summary table of the engineering cost estimates for the key elements in each Precinct is attached as Appendix A.

The adoption of an overall ‘averaged’ drainage levy would appear contradictory as whilst the modelling provides ten (10) of eleven (11) comparisons that indicate post development peak flows do not exceed pre-development levels, Precincts 2 and 4 are contributing (subsidising) additional costs to stormwater drainage infrastructure outside their Precinct. i.e. Precinct 1.

Through the assessment of the BWSP and accompanying drainage documents it appears that Precinct 4 is capable of satisfying the key criteria for stormwater drainage quality and peak discharge flow rate as outlined in the BWSP, within its own boundaries. The suitable provision of drainage infrastructure in Precinct 4 ensures there is no adverse impact downstream of the Precinct from a water quality and/or peak discharge flow rate for storm events equivalent to the 100 year ARI flood.

Consequently with the ability to ensure the key design standards for stormwater are satisfied within the Precinct boundaries I suggest that it is not appropriate that Precinct 4 also contributes to stormwater drainage infrastructure costs further downstream, beyond its boundaries.

5.0 Alternative Stormwater Management Scheme

I acknowledge that the current BWSP document regularly promotes the design and implementation of alternative stormwater management systems and offers opportunities for design innovations that financially benefit the scheme and encourages the dual use of land for retarding and active or open space.

5.1 Landholder Working Group

TGM have actively facilitated a Precinct 4 working group since the inception of the draft version of the BWSP. The participants of the working group control 74% of the Precinct 4 land area. A detailed plan indicating the details of ownership of the working group participants is attached as Appendix B. All working group members are experienced in the land development industry having completed successful developments in Ballarat and other regional Victorian centres.

I recognize that whilst the working group has not included Mondous/Australand who comprises a further 11.5% of the Precinct 4 land holding their submission to the Advisory Committee Hearing suggests that a peer review of the proposed BWSP drainage scheme be completed.

The working group has progressed an alternative conceptual stormwater management Master Plan for Precinct 4 which follows the precise criteria and design guidelines used by Engeny Water Management in developing the BWSP. The proposal for the Precinct is consistent in offering an effective and environmentally efficient stormwater management strategy alternative.

The conceptual layout for the alternative stormwater management scheme developed in consultation with the working group is attached as Appendix C.

5.2 Key Deliverables

The proposed alternative stormwater management Master Plan for Precinct 4 is predicated on the identical storm events and stormwater flow criteria used by Engeny Water Management and does not look to further refine or critique the design assumptions and philosophies. The key elements of the proposed alternative integrated water management strategy include:

- Stormwater flows to be no greater than pre-development levels
- Retardation to 1 in 100 Year ARI Pre-Development levels
- Reduction & filter sediment & nitrogen levels through a WSUD system
- Maintaining and/or enhancing waterway values of Kensington Creek
- The use of stormwater harvesting tanks
- The 'dual' land use for retarding & open space

Considering the existing site topography and anticipated sub-surface soil conditions, in particular the presence of basalt rock at shallow depths, every effort has been made in preparing the alternative conceptual stormwater system to minimize excavation depths and stormwater pipe diameters. This is to generally be achieved by providing suitable treatment and infrastructure closer to the source; not through larger 'end of line' systems aided by significantly large infrastructure.

The proposed alternative conceptual stormwater management Master Plan looks to utilize the location of existing dams, low lying areas and waterways to more effectively use the existing site topography to provide treatment and storage generally closer to the source to further enhance the waterway values of Kensington Creek.

5.3 Use of Rainwater Tanks

I acknowledge that the Engeny Water Management drainage report and consequently the BWPSP have been based on the assumption of no rainwater tanks in the catchment which is a 'conservative approach'.

The use of stormwater harvesting tanks for individual dwellings, development sites and proposed facilities buildings would be designed and implemented in accordance with Councils 'Benefits of Rainwater Tanks in Ballarat' policy prepared by AECOM.

The use of individual stormwater harvesting tanks whilst promoting re-use and reducing the demand on the potable water supply, will provide water quality, reduced flow and retarding functions also. It is anticipated that individual stormwater harvesting tanks will provide reuse opportunity for toilet flushing, cold laundry water and outdoor (irrigation) use.

The study prepared by AECOM, July 2011, 'Benefits of rainwater tanks in Ballarat' indicates that flood peak reductions can be readily achieved, in particular:

- Rainwater tanks alone can significantly reduce the size of flood peaks from roof runoff for low flow events up to the 1 in 2 year
- For larger events such as the 1 in 10 year, rainwater tanks alone are less effective. By combining them with on-site detention they can achieve reductions to standard development (40% impervious) conditions with significantly less on-site detention than would otherwise be required
- When connected to a 100m² roof area extension on an existing house, a rainwater tank with at least toilet and laundry reuse and size of 3kL can reduce the required size of on-site detention by as much as 50% from 2kL to 1kL.
- Rainwater tanks connected to roofs for a redevelopment site (400m² roof, 600m² site) can effectively reduce the required size of the site OSD by approximately 50% of the rainwater tank volume. This requires use of rainwater tanks that are larger than the minimum otherwise required for rainwater reuse alone. However there are two benefits:
 - Improved potable water savings
 - Reduced size (and potentially cost) of OSD and greater flexibility in how OSD requirements are achieved

From an overall assessment the AECOM 'Benefits of Rainwater Tanks in Ballarat' report suggests:

"Rainwater tanks are an important element of water sensitive urban design and can contribute significantly in terms of providing reductions in potable water demand, stormwater pollutants and the size of minor flood event peaks.

- It is considered that an aspirational target of achieving toilet and laundry use would be appropriate for existing households and a reasonable minimum standard for new households while further reductions in potable use could be realised through the additional supply of hot water
- A tank size of at least 2 and preferably 3kL per 100m² of roof area is needed to provide adequate reliability and benefits. This should be optimised depending upon household roof area, occupancy and expected demand"

The AECOM 'Benefits of Rainwater Tanks in Ballarat' report recommends that "Where large areas of likely potential future development have been identified, it is recommended that an integrated water management approach is adopted to identify the best solutions given a range of opportunities and possible scenarios. This will ensure that the range of possible options are evaluated and the most beneficial and cost effective approach can be adopted."

The potential use of stormwater harvesting tanks on individual development site/lots has the committed support of the Precinct 4 working group. The mandatory inclusion of rainwater tanks for detention purposes can be readily implemented by individual developers through the Section 173 agreement process.

5.4 Dual Land Use

The proposed alternative conceptual stormwater management Master Plan looks to implement the 'dual' land use objective of the BWSP through the utilization of public and passive open spaces generally for storm events exceeding the 1 in 50 year ARI events; however consideration will also be given to 'dual' use in more frequent events during the detailed design phase.

It is anticipated that the 'dual' use of public and passive open spaces will be limited to approximately 50% of the area which would allow for 'dry' areas such as plantings and playgrounds. I acknowledge that the BWSP includes flexibility for some degree of relocation and/or reshaping of open spaces and local parks where this assists in the implementation of 'dual' use initiatives.

The alternative conceptual stormwater management Master Plan includes provision of stormwater harvesting through permanent wetlands and storage facilities in the public and passive open space areas which will provide irrigation opportunities for Council assets.

In addition to the use of public open space and local parks it is anticipated that the road network traversing northwest/southeast through the subject site land will provide an overland flow path for the larger storm events.

5.5 City of Ballarat Involvement

In developing the alternative conceptual stormwater management Master Plan I have engaged with Council's engineering and planning departments. My discussions thus far with Council engineering and planning representatives provide general support for the proposed stormwater management alternative.

Correspondence with Council on the working group's alternative conceptual stormwater management scheme is provided as Appendix D.

Further to Council's initial feedback of the 14th September 2012 the working group's alternative conceptual stormwater management scheme was updated to integrate the key improvements suggested/outlined by Rob Leeson, Coordinator Engineering Development.

The updated concept plan issued to Council on the 21st September 2012 included key initiatives suggested by Council to further enhance the opportunities of dual land use and consequently reduce the reliance on individual basins to provide water quality and detention capabilities. The key elements included:

- The use of open space for stormwater functions
- An increase in the number of parks for dual use
- The use of active open space for retarding
- The use of stormwater harvesting and re-use in public and active open space areas

In addition to the inclusion of a number of the suggested initiatives from the City of Ballarat it is anticipated (as outlined by Council) that further enhancement and expansion in the dual use of public, open and active space areas through relocation and reshaping could be further advanced during the detailed design phase of the stormwater infrastructure network for Precinct 4.

The relocation of retention basin RB2 in the alternative stormwater management scheme has been acknowledged by the landholder; William Byrne, who is also the current landholder of the land immediately to the east on which the relocation of RB2 is currently proposed. The final position of RB2 is currently being further refined and formulated through the development of an urban layout plan for Mr Byrnes' land.

5.6 The Benefits

Whilst the subject site will utilize public and passive open space areas as above ground OSD opportunities, the introduction of stormwater harvesting and reuse via rainwater tanks will form an integral component of 'sharing' the burden of water management within the subject site.

Primarily the proposed alternative stormwater management Master Plan for Precinct 4 provides the opportunity for the subject development Precinct to cater 'solely' for its own catchment/s. Consequently implementing a stormwater management system that meets its individual needs and those required by community facilities, open, public and passive space areas located within this Precinct of the BWSP.

The implementation of rainwater tanks on residential and commercial development sites and the greater application of dual land use initiatives within the Precinct provide the opportunity for significant savings in the provision of stormwater drainage infrastructure.

A reduction in the required detention volume for individual basins is significantly reduced from that required in the current BWSP stormwater drainage proposal; this directly relates to a reduction in the required depth of basins (if a similar 'footprint' area is adopted); which is of prime importance considering the geological profile of the area and the subsequent relatively shallow depth to insitu basaltic rock.

My preliminary assessment and analysis of the alternative stormwater management scheme for Precinct 4 suggests that through the initiatives outlined there is a potential saving of up to \$15,000 per hectare in the provision of stormwater drainage infrastructure to deliver the key outcome of ensuring peak 100 year ARI flows post-development do not exceed the pre-development rates.

6.0 Separation of the Precincts

Considering the key guidelines and criteria stipulated by Council and the CCMA outlined in regular detail in the BWSP; that development must maintain the pre-developed 100 year ARI event peak flow rate I question the principle of an upstream Precinct such as Precinct 4 contributing to downstream stormwater management infrastructure works.

As outlined previously the modelling completed by Engeny Water Management as part of their drainage report to support the BWSP would appear to indicate that Precinct 4 in isolation of the other downstream Precincts (1 and 2) readily satisfies the key criteria of both the City of Ballarat and the Corangamite Catchment Management Authority for stormwater drainage.

Considering that Precinct 4 is readily 'self-sufficient' in achieving the key stormwater objectives and in particular has no impact on the downstream peak flow rate for the 100 year ARI storm event I question the adoption of a stormwater drainage Development Contribution Scheme based on the collective of Precincts 1, 2 and 4.

Further to this the detailed cost estimates and analysis of the stormwater drainage infrastructure undertaken as part of the BWSP as outlined in this report also clearly separates the estimated costs associated with stormwater drainage infrastructure for each individual Precinct.

In consideration that Precinct 4 can be 'self-sufficient' in achieving and delivering the key objectives of the BWSP in reference to stormwater drainage quality and peak discharge flow I can offer no technical basis for as to why Precinct 4 cannot be separated from the other two (2) BWSP Precincts, namely 1 and 2.

The current BWSP and DCP proposal in reference to Precinct 4 appears to be unbalanced. Precinct 4 is contributing more financially to the BWSP stormwater drainage infrastructure than is required to facilitate the development of the Precinct in isolation through satisfying the key stormwater objectives.

With Precinct 4 having the ability to cater for the key stormwater design standards within its boundaries ensuring there is no adverse impact downstream of the Precinct from a water quality and/or peak discharge flow rate for storm events equivalent to the 100 year ARI flood it should be separated from the stormwater drainage component of the BWSP Development Contributions Plan.

7.0 Statement

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance, which I regard as relevant, have to my knowledge been withheld from the Advisory Committee.

TGM GROUP PTY LTD

Ballarat Office

per:



DARREN J. TRIGG

General Manager

13th June 2013

APPENDIX A

Engineering Costings Summary Extract - Drainage Costing's Catchment 20120224

Precinct	Pipes			Wetland/Retarding Basins			Bioretention			Total	Precinct Area	Cost per Ha	Basin Area	% of Precinct
1	\$ 15,638,645	\$ 30,190	34%	\$ 30,432,804	\$ 58,751	66%	\$ 211,372	\$ 408	0%	\$ 46,282,821	518	\$ 89,349	101371	2.0%
2	\$ 4,587,622	\$ 19,439	30%	\$ 9,804,122	\$ 41,543	64%	\$ 926,784	\$ 3,927	6%	\$ 15,318,528	236	\$ 64,909	38323	1.6%
4	\$ 3,570,730	\$ 14,283	24%	\$ 11,171,943	\$ 44,688	75%	\$ 162,594	\$ 650	1%	\$ 14,905,266	250	\$ 59,621	47090	1.9%
TOTAL	\$ 23,796,997	\$ 23,702	31%	\$ 51,408,869	\$ 51,204	67%	\$ 1,300,750	\$ 1,296	2%	\$ 76,506,616	1,004	\$ 76,202	186,784	5%

APPENDIX B

Precinct 4 Working Group Participants



TGM Group Ballarat
 1315 Sturt Street
 Ballarat Vic 3350
 T 03 5330 8888
 F 03 5333 3815
 PO Box 563W
 Ballarat West Vic 3350
 ABN 11 125 568 461
 www.lgmgroup.com



Melbourne | Geelong | Ballina

JAS-ANZ Accredited: Quality ISO 9001 - OH&S AS/NZS 4801 - Environment ISO 14001

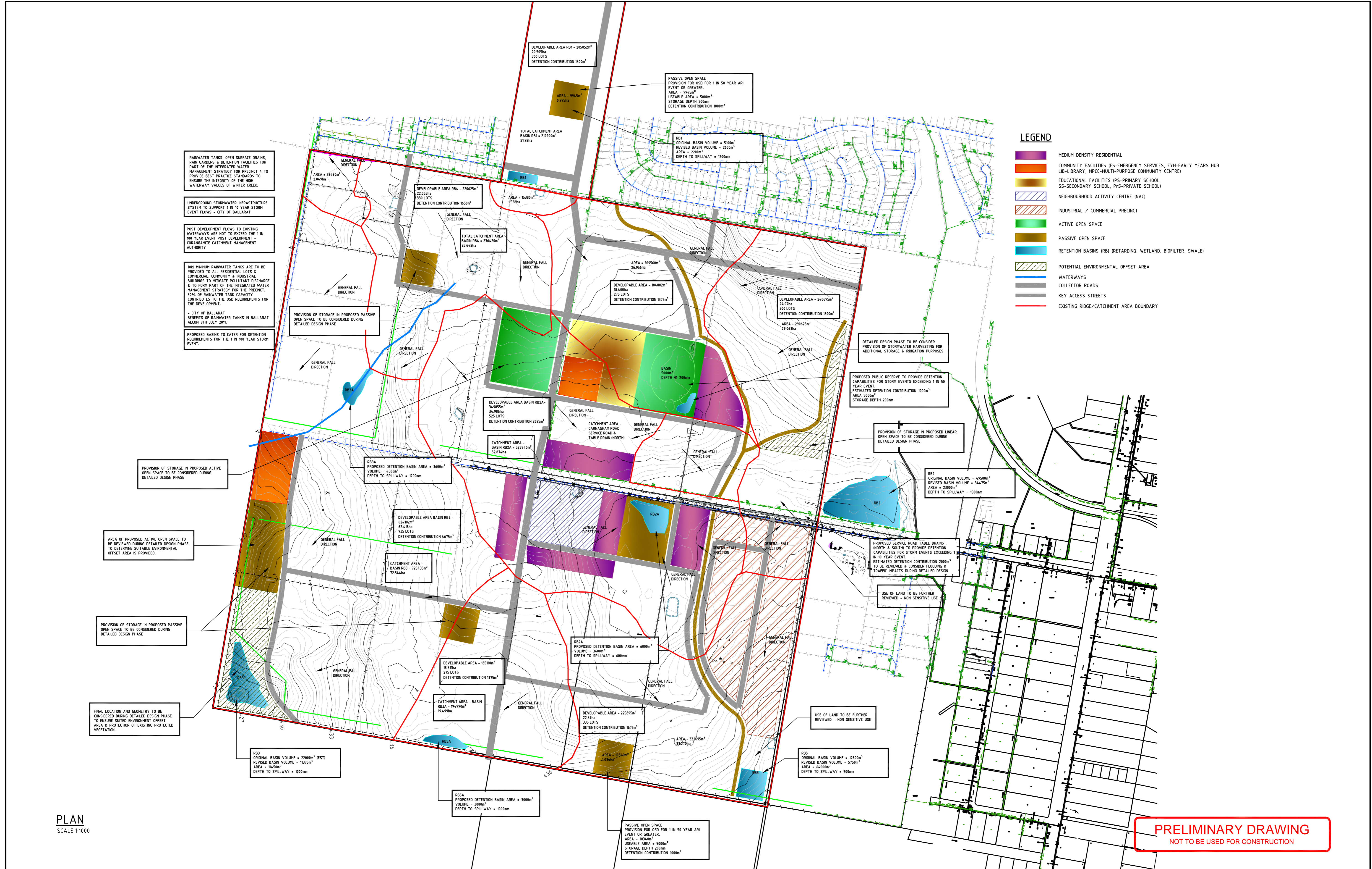
10515-02-WRKGRP-01 09/07/2012 MA

PRECINCT 4 WORKING GROUP BALLARAT WEST

1:12500 @ A3

APPENDIX C

Alternative Stormwater Management Scheme



PLAN
SCALE 1:1000

PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION

ISSUE	ISSUED FOR	DATE	DRAWN	APPROVED	ISSUE	ISSUED FOR	DATE	DRAWN	APPROVED	DESIGNED	DATE	CLIENT	PROJECT	DRAWING TITLE	TGM REF. No.	SHEET	OF	REV.
01	PRELIMINARY	30/8/12	A.T.							D. TRIGG	AUGUST 2012	PRECINCT 4 WORKING GROUP	BALLARAT WEST GROWTH AREA PRECINCT 4 CARNGHAM ROAD DELACOMBE	CIVIL DRAWING	10515-01	C01	1	02
02	PRELIMINARY	21/9/12	A.T.							A. TREVISAN	AS SHOWN			CONCEPTUAL STORMWATER STRATEGY				
										TGM GROUP	A1							

© COPYRIGHT T.G.M GROUP PTY. LTD.

TGM Group Ballarat
1315 Sturt Street
Ballarat Vic 3250
T 03 5330 8888
F 03 5333 3815
PO Box 563W
Ballarat West Vic 3350
ABN 11 125 568 461
www.tgmgroup.com
JAS-ANZ Accredited: Quality ISO 9001 - CH&S AS/NZS 4801 - Environment ISO 14001



CLIENT: **PRECINCT 4 WORKING GROUP**

PROJECT: **BALLARAT WEST GROWTH AREA
PRECINCT 4
CARNGHAM ROAD
DELACOMBE**

DRAWING TITLE: **CIVIL DRAWING**

DRAWING TITLE: **CONCEPTUAL STORMWATER STRATEGY**

TGM REF. No. **10515-01**

SHEET **C01** OF **1** REV. **02**

APPENDIX D

City of Ballarat Correspondence

Darren Trigg

From: Rob Leeson <robleeson@ballarat.vic.gov.au>
Sent: Thursday, 27 September 2012 8:30 AM
To: Darren Trigg
Cc: Jason Forest; Derylle Hastings; Adam Parrott
Subject: RE: Comments on Precinct 4 - Proposed Drainage Strategy

Hi Darren

Thanks for the updated plan, much appreciated.

You may be aware of the drainage issues at the Alfredton Drive Retarding Basin and have noticed that a possible way to address this is to create a high flow bypass at the Alfredton - Dorset Drive roundabout into the PSP are to the south. I know that the land at 84 Alfredton Drive is allocated to become a road— an allowance for stormwater is required in its design, an initial estimate is the drain needs to be at least 1050 mm diameter.

Regards

Rob Leeson | Coordinator Engineering Development

City of Ballarat | PO Box 655, Ballarat, Victoria, 3353
P: 03 5320 5889 | **M:** 0427 165 485 | <http://www.ballarat.vic.gov.au>



Please consider the environment before printing this email.

From: Darren Trigg [mailto:darrent@tgmgroup.com]
Sent: Friday, 21 September 2012 10:48 AM
To: Rob Leeson
Cc: Jason Forest; Derylle Hastings; Adam Parrott
Subject: RE: Comments on Precinct 4 - Proposed Drainage Strategy

Guys

Further to your feedback I have updated the concept plan to incorporate your comments/suggestions, which I have forwarded to the Precinct 4 working group.

This document will provide the 'road map' for the detailed design phase of the stormwater management system for the Precinct. Thanks

Darren Trigg | Director
Mobile 0408 031 421 • **Email** darrent@tgmgroup.com

The logo for TGM Group, featuring the letters "TGM" in a bold, white, sans-serif font. Above the letters are three white, curved lines that suggest motion or a stylized wave.	<p>TGM Group Pty Ltd</p> <p>1315 Sturt St, Ballarat Vic 3350, PO Box 563W, Ballarat West Vic 3350 T 03 5330 8888 • F 03 5333 3815 • www.tgmgroup.com</p> <p>Melbourne Geelong Ballarat Ballina</p> <p>JAS-ANZ Accredited Quality ISO 9001 OH&S AS/NZS 4801 Environment ISO 14001</p>
--	--

From: Darren Trigg
Sent: Tuesday, 18 September 2012 9:58 AM
To: 'Rob Leeson'
Cc: Jason Forest; Derylle Hastings; Adam Parrott
Subject: RE: Comments on Precinct 4 - Proposed Drainage Strategy

Thanks very much for the feedback and support for the revised concept.
I acknowledge and understand each of the comments and advise that those areas of concern/questions you have raised will be considered as we develop the detailed design phase.
I will look at increase usage of open space areas and the implementation of 'permanent' water bodies in these areas for irrigation purposes which will ultimately lead to more flexibility in reducing the footprint of RB3 and the potential use of swales for storage.
Thanks again for the support.

Darren Trigg | Director
Mobile 0408 031 421 • Email darrent@tgmgroup.com

	<p>TGM Group Pty Ltd</p> <p>1315 Sturt St, Ballarat Vic 3350, PO Box 563W, Ballarat West Vic 3350 T 03 5330 8888 • F 03 5333 3815 • www.tgmgroup.com</p> <p>Melbourne Geelong Ballarat Ballina</p> <p>JAS-ANZ Accredited Quality ISO 9001 OH&S AS/NZS 4801 Environment ISO 14001</p>
---	---

From: Rob Leeson [<mailto:robleeson@ballarat.vic.gov.au>]
Sent: Friday, 14 September 2012 9:37 AM
To: Darren Trigg
Cc: Jason Forest; Derylle Hastings; Adam Parrott
Subject: FW: Comments on Precinct 4 - Proposed Drainage Strategy

Hi Darren

Here are some comments to the draft concept proposal for Precinct 4 discussed at the meeting 3 September 2012. Jason and myself have a number of comments regarding the preliminary plan:

- Support the use of rainwater tanks to meet retarding and water quality functions in principle, subject to review of modeling and assumptions.
- The idea of vegetated swale drains for storage is probably the most contentious of the ideas – there are not many real-world examples that work and are maintained effectively, this idea needs to be explored in more detail especially the maintenance period/handover.
- Support the dual use of public open space for stormwater functions as long as this enhances or maintains the recreation function – i.e. subject to detailed design. On the specific proposals presented:
 - The proposals only use open space for storm events of 1 in 50 years and above. Designs that include permanent wetlands and more frequent flood events have worked well in other places and could also be considered.
 - The use of open space in the proposal is limited to 5,000m² per 1ha park. 50% seems a reasonable maximum that would allow for 'dry' areas such as plantings and playgrounds. Higher levels of dual use would need to be supported by detailed design showing that the open space functions are enhanced, not compromised.
 - There are a number of local parks not shown as dual use. Proposals for dual use of these could also be considered.

- The linear open spaces are not shown as being used. The linear open space running northwest/southeast across Mr Byrne's land was planned as a dual use overland flow/linear trail space similar to the Lucas central spine and has substantial additional width for this purpose. As well as providing for overland flow, it may be possible to include retarding & water quality treatment along this corridor.
- I note that the PSP includes flexibility for some degree of relocation and reshaping of open spaces where this assists dual use.
- Proposed use of the Active Open Space for retarding is supported in principle but could pose a staging problem. The Development Contributions Plan only envisages the Open Space facility being completed when 2,400 dwellings are completed in the precinct. However, the stormwater function is likely to be required before that. An interim stormwater facility may therefore need to be created.
- The original location of RB2 was partly chosen to allow for a basin design that could support harvesting and irrigation of the Active Open Space and the PSP includes a guideline as follows: "Provide opportunities for stormwater harvesting and re-use in public open spaces, where possible". A design that supports harvesting for irrigation of the Active Open Space is strongly encouraged. The designs still need to consider the original RB2 location is within the industrial buffer and if this basin is relocated elsewhere an appropriate use of that land is required, ie not Residential.
- The new location of RB3 appears to impact on at least one tree that is shown as protected in the Native Vegetation Precinct Plan. This is unlikely to be supported by the Department of Sustainability and Environment.
- The changes to RB3 have increased the size of the Passive Open Space beyond the original 1.39ha and reduced the land shown for Potential Environmental (tree) Offsets. This is unlikely to be supported by the Department of Sustainability and Environment.
- Land no longer required for drainage functions due to changes to RB5 and RB2 is not suitable for sensitive uses under Part 5.2 of the PSP – an alternative non-sensitive land use will need to be proposed and agreed with City of Ballarat.
- The CCMA has indicated that they like the principle of retaining the waterways throughout the Ballarat West PSP and through past discussions, they have indicated they do not want to see the piping of existing waterways or inappropriate development in the flood plain.

We are looking forward to further refinement of the proposals Precinct 4 in the months to come.

Regards

Rob Leeson | Coordinator Engineering Development

City of Ballarat | PO Box 655, Ballarat, Victoria, 3353
 P: 03 5320 5889 | M: 0427 165 485 | <http://www.ballarat.vic.gov.au>



Please consider the environment before printing this email.

From: Darren Trigg [<mailto:darrent@tgmgroup.com>]
Sent: Monday, 3 September 2012 3:36 PM
To: Jason Forest; Derylle Hastings; Rob Leeson
Subject: Precinct 4 - Proposed Drainage Strategy

Guys

Thanks for taking the time to meet this afternoon, much appreciated.

I have attached the conceptual plan as discussed and have also provided a brief summary of the key elements of the PSP and the proposed alternative stormwater management strategy for Precinct 4.

I look forward to your feedback and your further confirmation that the principles suggested in the alternative proposal meet the general objectives of the PSP in such a manner that further detailed design can be progressed. Thanks

Darren Trigg | Director
Mobile 0408 031 421 • Email darrent@tgmgroup.com

	<p>TGM Group Pty Ltd</p> <p>1315 Sturt St, Ballarat Vic 3350, PO Box 563W, Ballarat West Vic 3350 T 03 5330 8888 • F 03 5333 3815 • www.tgmgroup.com</p> <p>Melbourne Geelong Ballarat Ballina</p> <p>JAS-ANZ Accredited Quality ISO 9001 OH&S AS/NZS 4801 Environment ISO 14001</p>
---	--

It is the responsibility of the recipient to search this document/message for viruses, as although all care is taken to ensure that this message is virus free the TGM Group Pty Ltd will not be held liable for any damage resulting from this transmission. If this message has been received in error, please inform the sender as soon as possible and immediately delete the original transmission. The TGM Group Pty Ltd will not be held liable for any messages of a personal nature. This email message is the property of the TGM Group Pty Ltd and may be subject to legal professional privilege. Consequently, you must not use or disclose this message/document in any form except when authorised by the TGM Group Pty Ltd.

Attention: This message is intended only for the use of the individual or entity named above and may contain information that is confidential and privileged. If you have received this e-mail in error, please notify the sender immediately and delete the message. Any views or opinions presented are solely those of the author.

It is the responsibility of the recipient to search this document/message for viruses, as although all care is taken to ensure that this message is virus free the TGM Group Pty Ltd will not be held liable for any damage resulting from this transmission. If this message has been received in error, please inform the sender as soon as possible and immediately delete the original transmission. The TGM Group Pty Ltd will not be held liable for any messages of a personal nature. This email message is the property of the TGM Group Pty Ltd and may be subject to legal professional privilege. Consequently, you must not use or disclose this message/document in any form except when authorised by the TGM Group Pty Ltd.

Attention: This message is intended only for the use of the individual or entity named above and may contain information that is confidential and privileged. If you have received this e-mail in error, please notify the sender immediately and delete the message. Any views or opinions presented are solely those of the author.