

**Proposed Rezoning of land and Staged, Multi-lot Subdivision of land.  
City of Greater Geelong Planning Scheme Amendment C372**

**REPORT ON DRAINAGE OUTFALL**

35 AND 69-93 HAMS ROAD, WAURN PONDS



Prepared on behalf of Echin Pty Ltd and Waurn Ponds Unit Trust

August 2019

Tomkinson Group Ref: A4073

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**Document History and Status**

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## 1 INTRODUCTION

Tomkinson Group has been engaged by Echin Pty Ltd and Waurn Ponds Unit Trust (Client) to provide a peer review of previous work undertaken in relation aspects of stormwater drainage as part of the proposed re-zoning and Staged, Multi-lot Subdivision of the land at 35 and 69-73 Hams Road, Waurn Ponds. Tomkinson Group understands that it is proposed to develop the subject site for residential use.

This report is intended to provide clarity around the drainage outlet from the site and the options for designing an outlet such that downstream infrastructure (Warrnambool – Geelong rail line) and properties are not affected by any development of the subject site.

## 2 THE SITE AND SURROUNDS

The sites are located on the south side of Hams Road bound by Ghazeeepore Road to the east, Baanip Boulevard/ Warrnambool – Geelong railway line to the south and Geelong Ring Road to the west in Waurn Ponds (refer to Figure 1).



**Figure 1 - Subject Site**

The site is currently farmland that is lightly stocked.

Within the site existing drainage features consist of a meandering waterway with onstream dams. Signs of erosion are present, and stock are not excluded from the waterway.

External catchments from the North and West enter via pipes under Anglesea Road and Hams Road. On the north side of Hams Road 28 ha of developed land in the Grange Park Estate is drained into an existing retarding basin which discharges across Hams Road into the subject site. Several culverts convey flows from the west under the Geelong Ring road (as well as draining the road reserve). These flows enter the site informally as overland flow and show significant erosion.

Flows from the site currently flow to the south through an existing pipe culvert under the Warrnambool - Geelong rail line embankment. This pipe culvert is currently buried under silt deposits and vegetation growth and is not accessible. The Railway culvert is connected by an open drain (also currently filled with silt) to an existing 900 mm diameter culvert 80 m downstream under Ghazeepore Road, which drains to Armstrong Creek in the Armstrong Creek West Precinct (ACWP). Based on the surveyed headwall level of and probed depth to the invert of the culvert it appears that the invert of this culvert may be below the invert of the existing culvert at Ghazeepore Road. (Note: It will be necessary to clean out the Railway culvert in order to confirm as-built dimensions and levels).

### 3 THE PROPOSAL

A Development Plan has been prepared for the future subdivision of the subject site. The Development Plan provides for the subdivision and development to occur in stages. The subdivisions and development of the land will be subject to a Planning Permit.

As part of the re-zoning process, council has sought submissions from stakeholders and interested parties. Submissions have been received from VicTrack and Department of Transport (DOT) raising concerns about the use of the existing pipe culvert under the Warrnambool - Geelong rail line embankment to convey flows from the development. Concerns regarding the development possibly increasing the amount of runoff entering the culvert have also been raised.

#### 3.1 Previous Reports

A Surface Water Management Strategy for the site has been previously prepared by Neil M Craigie Pty Ltd dated 19 September 2013 as well as a Flood Modelling report prepared by Water Technology dated 30 October 2018.

The Surface Water Management Strategy details a number of proposed online Water Sensitive Urban Design (WSUD) assets to provide the required water quality treatment as well as proposing a number of detention basins to retard flows back to pre-development levels.

As part of the review of documentation, the following documents have also been noted:

- Overall Subdivision Masterplan (Version MP19) dated 24 July 2019.
- Preliminary Site Investigation prepared by Tonkin +Taylor dated January 2018
- Cultural Heritage Management Plan prepared by Benchmark Heritage Management dated 31 October 2018

#### 3.2 Planning Permits

Draft Planning Permits have been prepared by the City of Greater Geelong which detail requirements regarding water quality of stormwater discharge from sites as well as retarding flows back to pre-development levels.

It is conditioned within both Planning permits to require engineering designs to be prepared that includes detention basin(s) including any required drainage reserves, water quality treatment and connection to the legal point of discharge. The Consulting Engineer must show that the design for the drainage system includes recommendations of the report 35 & 69-93 Hams Road PSA Flood Modelling (Water Technology). Site runoff is required to be limited to equivalent pre-developed levels for rainfall events up to and including the critical 1% AEP event, to the satisfaction of the Responsible Authority and that that stormwater run-off exiting the land meets the current best practice performance objectives for stormwater quality.

There is also a note that *detailed Road and Drainage Design Plans for any stage that result in flood levels on existing properties being adversely affected by the proposed works will not be approved for construction.*

### 3.3 Section 173 Agreement

In addition to the Planning Permits, in order to ensure that certain works and undertakings will be completed as part of the development of the land, a Section 173 Agreement is also proposed to be placed on the title of the subject site.

#### External drainage works

6. The Owner covenants, acknowledges and agrees with the Responsible Authority:
  - 6.1 It will be responsible for the all External Drainage Works within the VicRoads reserve (Geelong Ring Road Section 4B) to connect and channel the existing drainage network extending from the Ring Road/shared path, to the open waterway reserve in the Land, to the standard specified in the Planning Permit to the satisfaction of the Responsible Authority.
  - 6.2 It will be responsible for External Drainage Works, including but not be limited to: cleaning and upgrading, where necessary, to the Ghazeepore Road culvert and Geelong-Warrnambool railway culvert to the standard specified in the Planning Permit to the satisfaction of the Responsible Authority;
  - 6.3 It will construct the External Drainage Works prior to or at the time specified in the Planning Permit.
  - 6.4 It is responsible for obtaining all approvals, and adherence to maintenance periods, costs, fees and charges associated with the construction of the External Drainage Works.

### 3.4 Stakeholder Meeting

Meetings have been held with the stakeholders including City of Greater Geelong (CoGG) engineers and planners; VicTrack, V/Line and DOT representatives; the Corangamite Catchment Management Authority (CCMA); and adjacent landowners (Boral) to discuss the concerns raised by VicTrack and DOT. No additional concerns have been raised by CoGG or CCMA regarding the reports provided by the proponent with regard to stormwater drainage or flood modelling. During the meeting, and as witnessed during site visits, it became apparent the current silting of the culvert and downstream waterway was main source of concern for VicTrack, V/Line and DOT.

It is evident from site inspections before and after recent heavy rainfall events, that the flows entering the site informally as overland flow from the North are creating significant erosion and this sediment laden runoff is a major cause of the current culvert blockage.

## 4 RECOMMENDATIONS

As sediment laden runoff stemming from erosion on and upstream of the subject site has been identified as the root cause for blockage of the existing railway culvert (which has been identified in submissions received by CoGG as a concern for VicTrack and DOT), the possibility of remedying this erosion and / or upgrading the railway culvert as required through the proposed Planning Permit and S173 agreement in order to develop the subject site will in fact achieve the results that stakeholders such as VicTrack and DOT are seeking. It is therefore apparent that any development of the subject site that includes the required WSUD and stormwater detention (to pre-developed flows) will create a net positive result in relation to the downstream storm water infrastructure.

As the S173 Agreement will stay with the title, regardless of changes in ownership, and will endure beyond the expiry of any planning permits, it is important that this agreement contains adequate provisions in order to ensure that the requirements of all stakeholders are met (including the developer; Council; adjacent landowners and asset owners).

The current proposed S173 Agreement provides specific requirements that meet the objectives required, specifically:

- CI 6.1 requires erosion reduction works and formalisation of flow paths from Vicroads culvert outlets into the proposed development and water way upgrades within the site that will reduce sediment that currently blocks the Warrnambool - Geelong railway culvert.
- CI 6.1 and the Planning permits require WSUD and Detention assets to be constructed to ensure that:
  - Site run-off is required to be limited to equivalent pre-developed levels for rainfall events up to and including the critical 1% AEP event which will ensure that no excess load will be placed on the Warrnambool - Geelong railway culvert.
  - that stormwater run-off exiting the land meets the current best practice performance objectives for stormwater quality that will reduce sediment that currently blocks the Warrnambool - Geelong railway culvert.
- CI 6.2 requires the owner of the land to be responsible for external drainage works, including but not be limited to: cleaning and upgrading, where necessary, to the Ghazeepore Road culvert and Geelong-Warrnambool railway culvert. This clause allows enough room for a design outcome to be achieved, whilst still satisfying the needs of stakeholders. Discussions with V/Line and Victrack have resulted in three general outcomes being possible (refer attachment 2):
  - OPTION 1 – Clean out and / or upgrade existing railway culverts and downstream waterway  
Noting that while this option is not preferred by V/line and VicTrack due to the age of the existing culvert and the fact that any proposed upgrade may not meet current V/line and VicTrack Standards, cleanout and refurbishment of the existing culvert in conjunction with option 2 or 3 may also be possible.
  - OPTION 2 – Possible new culvert (location TBD by agreement) under rail line; Clean out and / or upgrade downstream waterway and Ghazeepore Rd culverts (if required)
  - OPTION 3 – Possible new drainage line from development basin outlet directly to the downstream waterway (ie bypass existing culverts and waterway).
- CI 6.3 and the planning permit ensure that the required upstream and downstream drainage works (as well as internal works) are constructed and delivered in a timely manner.
- CI 6.4 requires the owner to be responsible for obtaining all approvals, and adherence to maintenance periods, costs, fees and charges associated with the construction of the External Drainage Works.

## 5 CONCLUSION

In reviewing the material provided by the Client in relation to the proposed development of the land at 35 and 69-93 Hams Road, Waurm Ponds, we are satisfied that the conclusions of the Surface Water Management Strategy prepared by Neil Craigie and the Flood Modelling report by WaterTech, meet the needs of the stakeholders and address the concerns raised by DOT and VicTrack namely:

- All events up to and including the 100 year ARI flood are fully contained within the proposed waterway and storage system, outside the railway reserve boundary.
- To provide free drainage outfall to the existing Railway culvert it may be necessary for the culvert under Ghazepore Road to be upgraded in capacity and at lower invert level as part of future works downstream of the Railway in the Armstrong Creek West Precinct;
- Final design and construction of the drainage works will be dependent on cleanout and survey proving of the presently obscured pipe under the Railway;
- peak flows expected under existing conditions are not increased by the development and will be close to or matching those for existing conditions for all events up to and including the 100 year ARI event.
- The 2018 modelling, conducted under the new (2016) Australian rain fall and Runoff parameters confirms that the development does not appear likely to have any adverse effects on downstream property owners as the peak flow rate exiting the site in a 1% AEP design flood is reduced with the current design layout. The principles presented within the 2013 Craigie SWMS for online detention of the stormwater runoff are not expected to increase the peak flow rate from the site.

Furthermore, having met with the stakeholders involved (including City of Greater Geelong (CoGG) engineers and planners; VicTrack, V/Line and DOT representatives; the Corangamite Catchment Management Authority (CCMA); and adjacent landowners (Boral)) and having visited the site surrounds and having reviewed the proposed Section 173 agreement and Planning permit Conditions, it is my opinion that:

- The existing culvert under the Warrnambool-Geelong railway line appears to be partially blocked with sediment.
- The existing waterway downstream of the above-mentioned culvert Warrnambool-Geelong railway line appears be partially blocked with sediment.
- The subject site (currently farm land) and the road reserve north of the site (VicRoads road reserve – Geelong Ring Rd Stage 4B) show signs of significant erosion that is contributing to the above-mentioned sediment blockages.
- The in-line Water Sensitive Urban Design Elements and Stormwater Detection assets required to be constructed as part of the development under the proposed Planning permit will act to reduce sediment load on the waterway and culvert downstream of the subject site.
- The proposed Section 173 agreement contains adequate provision for works required to further address the abovementioned erosion and sedimentation concerns raised by VicTrack and DOT.
- The proposed Section 173 agreement contains adequate provision for works required to allow for the stormwater flows travelling through and generated from the subject site to be conveyed under the Warrnambool – Geelong Railway line and Ghazepore Rd to Armstrong Creek West Branch through the use of the existing culvert or an alternate engineering design (such as an upgraded or new culvert).
- Based on the above, and contingent on the proposed Section 173 agreement being entered into, there is no impediment to the proposed development proceeding in the manner proposed which will have no adverse impact on the Warrnambool - Geelong railway line or downstream land.

## 6 ATTACHMENTS

### ATTACHMENT 1 – Photographs of site



Existing Warrnambool - Geelong railway Culvert submerged (upstream)



Existing Warrnambool - Geelong railway Culvert submerged (downstream)



Erosion within the upstream side of the rail reserve (from the east and Ghazeepore rd)



Existing waterway downstream of railway culvert full of sediment.



Existing Ghazeepore Rd culvert



Downstream outlet to Armstrong Creek west



Erosion within the upstream end of site (looking east)



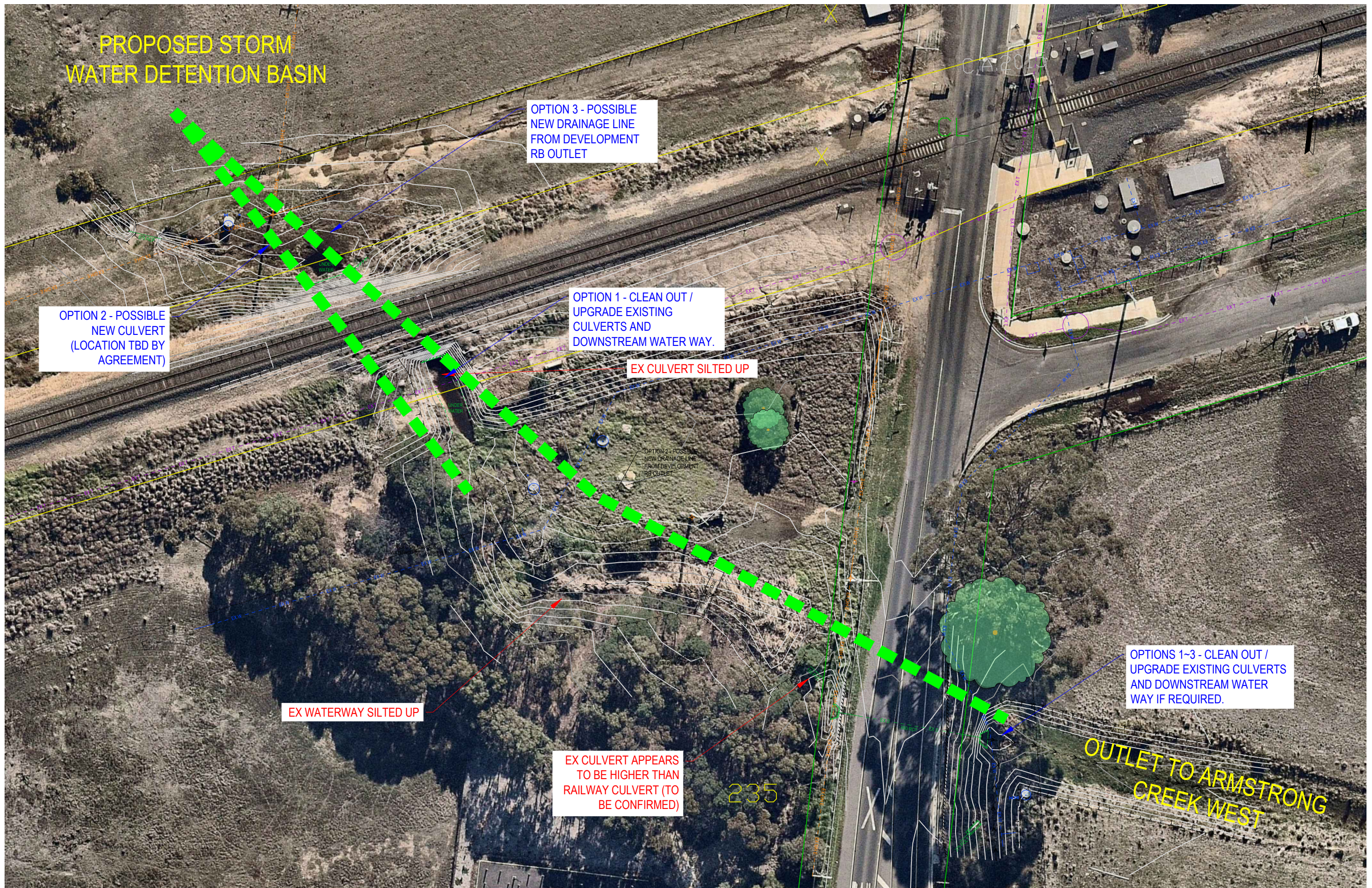
Erosion within the upstream road reserve (outlet from VicRoads culvert from the west)



Erosion within the upstream road reserve (outlet from VicRoads culvert from the west)

**ATTACHMENT 2 – Drainage options**

# PROPOSED STORM WATER DETENTION BASIN



**PRELIMINARY PLAN ONLY**

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**PROPOSED MULTI-LOT SUBDIVISION**  
 HAMS ROAD, WAURN PONDS  
 LAYOUT PLAN

Municipality & Ref:  
 CITY OF GREATER  
 GEELONG

SHT 1 of 1 REV A

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