

08 August 2022

Reeds Ref: 23917E

Attention: Tim Mills  
Gurner™  
168 Williams Road  
Prahran Victoria 3181

**Re: 81-95 BURNLEY STREET AND 26-34 DOONSIDE STREET, RICHMOND (HARRY THE HIRER)**

**Drainage Assessment (revised)- DPO15 of the Yarra Planning Scheme**

Reeds Consulting have been engaged by Gurner™ to undertake a preliminary review of existing Council drainage system adjacent to the subject site located at 81 Burnley Street and 26-34 Doonside Street, Richmond to support the Development Plan application to the City of Yarra.

The aim of this drainage assessment is to undertake;

- a catchment analysis of the existing drainage system in Burnley Street and Doonside Street;
- a capacity assessment of the existing drainage system into which the future development will be discharged;
- a flood analysis which determines the overland flow depth in the road reserves during a 1 in 100 year flood.
- and respond to Council's comments of 30 March 2022

Reeds reviewed available Council drainage MOCS information, Vicmap and Lidar contours, and planning scheme overlays to facilitate the preliminary drainage assessment. Reeds also made a Legal Point of Discharge (LPOD) request with City of Yarra however this advice is still pending.

**1. A Catchment Analysis of the Existing Stormwater Drainage System in Burnley Street and Doonside Street.**

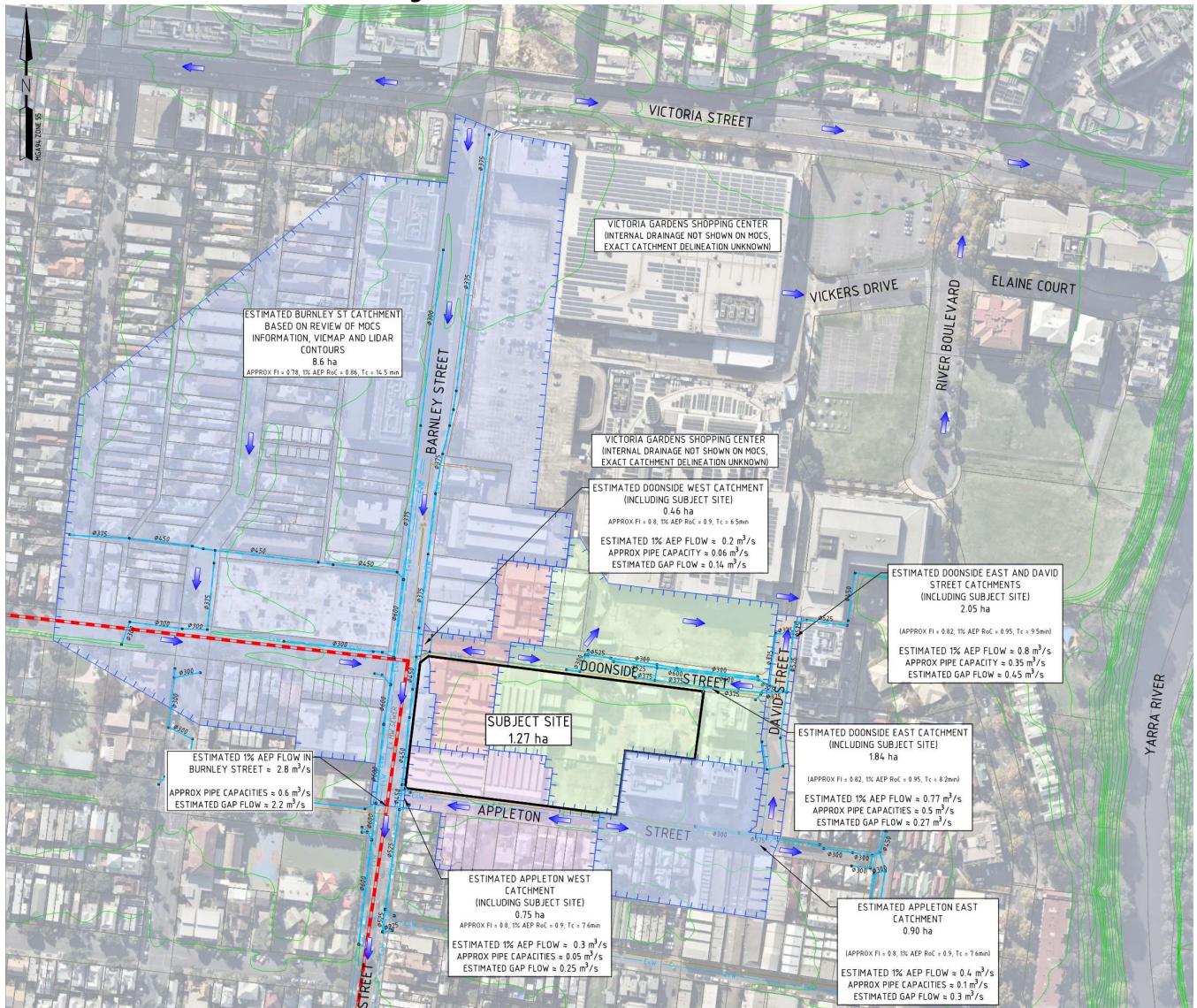
Reeds analysis of the drainage catchment for the area that contributes stormwater to the existing stormwater drainage system in Burnley Street and Doonside Street utilised the available contour information indicates that the existing landform surrounding the site is quite flat which makes accurate external catchment delineation difficult to achieve in the absence of detailed Council drainage information. Further to this, internal drainage in Victoria Gardens Shopping Centre located to the north of the site isn't captured on Council MOCS plans. We have made a conservative assessment of the external road catchments particularly in Burnley Street which does include the Victoria Gardens Shopping Centre existing multi-storey carpark fronting Burnley Street into the drainage catchment boundary.

Council has provided additional information in relation to their drainage network, which we have utilised to update our assessment.

In addition we have completed a site inspection of the existing building and associated roof drainage system to assess the site catchment and confirm that a portion of the existing roof does drain to Appleton Street (west) via a series of downpipes discharging to pop outs into the kerb and channel.

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**Figure 1 – External Catchment Plan.**



## 2. A Capacity Assessment for the Existing Drainage System into which the Future Development will be discharged

The capacity assessment of the existing drainage system has been based on Reeds adopting the drainage sizes shown on available Council MOCS information. Without access to detailed design plans or Council GIS information at the issue date of this report, it was assumed that the existing drains have been laid at constant depth hence their grades (and capacities) were estimated based on review of existing road longitudinal grades. Given the relatively flat nature of the landform this is a reasonable assumption. The detailed level and feature survey of Council's local underground drainage network will be completed at some time in the future.

### Burnley Street

- The estimated capacity of ex 600Ø and 450Ø Council drains in the road reserve is approximately 0.6m³/s

### Doonside Street

- The estimated capacity of ex 300 Ø, 375 Ø and 600Ø Council drains in the road reserve is approximately 0.5m<sup>3</sup>/s

The site does not drain into the existing drain in Appleton Street and hence there has not been assessment of the capacity of that drain.

### **3. A Flood Analysis which Determines the Overland Flow Depth within the Road Reserve During a 1 in 100 year flood**

The flood analysis which determines the overland flow depth within the road reservations during a 1 in 100 year flood utilises the catchment analysis and existing capacity assessment of the drainage system to generate the gap flow measured against the PC-Convey capacity of the road reserve as per the following;

#### ***Estimated 1% AEP overland flows in Burnley Street:***

- Our analysis suggests that Burnley Street adjacent to the site services a drainage catchment of approximately 8.6 ha
- Total 1% AEP flow in the road reserve is estimated at 2.8m<sup>3</sup>/s
- The estimated capacity of ex 600Ø and 450Ø Council drains in the road reserve is approximately 0.6m<sup>3</sup>/s
- The estimated 1% AEP overland gap flow in the road reserve is approximately 2.2m<sup>3</sup>/s
- Estimated flow depth in the road reserve is approximately 0.34m which is near the limit of safe overland flow requirements
- Our assessment suggests that in a 1% AEP storm event the capacity of Burnley Street will be exceeded with flows overtopping top of the footpath hence it is recommended to set finished floor levels above the footpath to ensure protection of the site to Council requirements
- PC-Convery section of Burnley Street is shown in Figure 2 below.
- Further advice will be sought from Council when the civil design is in progress, in particular the existing Council drainage system grades and capacities, as well as confirmation of our conservative external catchment area to confirm the external 1% AEP flows and flood depths in the existing road reserve.

***Figure 2 – Estimated gap flow in Burnley Street***

BURNLEY ST.DAT - Overbank and Channel Output

High Flow Channel grade =  
 1 in 400

Results for water surface elevation = 15.03 m

HELP

Print Preview

Print

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Move Text

Discharge (cumecs): 0.00  
 D = Maximum Depth (m): 0.04  
 V = Average Velocity (m/s): 0.11  
 D(max) x V(ave) (cumecs/m): 0.00  
 Froude Number: 0.24  
 Area (m2): 0.00  
 Wetted Perimeter (m): 0.04  
 Flow Width (m): 0.01  
 Hydraulic Radius (m): 0.00  
 Composite Mannings: 0.013  
 Split Flow?: -

LEFT OVERBANK	MAIN CHANNEL	RIGHT OVERBANK	TOTAL CROSS-SECTION
0.00	2.36	0.00	2.36
0.04	0.34	0.04	0.34
0.11	0.71	0.04	0.71
0.00	0.24	0.00	0.24
0.24	0.55	0.09	0.55
0.00	3.34	0.00	3.34
0.04	20.10	0.04	20.18
0.01	20.00	0.01	20.02
0.00	0.17	0.00	0.17
0.013	0.021	0.036	0.021
-	-	-	No

New Discharge

New Grade

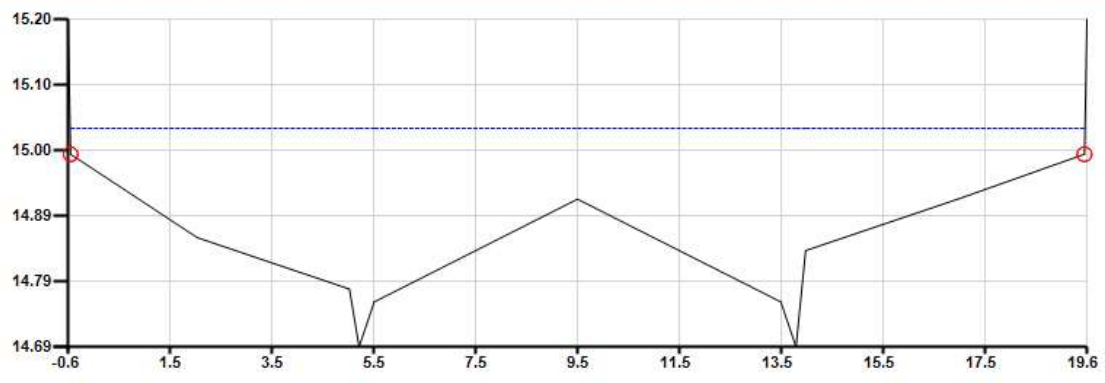
Increase Water Level

Decrease Water Level

Control Panel

View xs at 1:1 scale

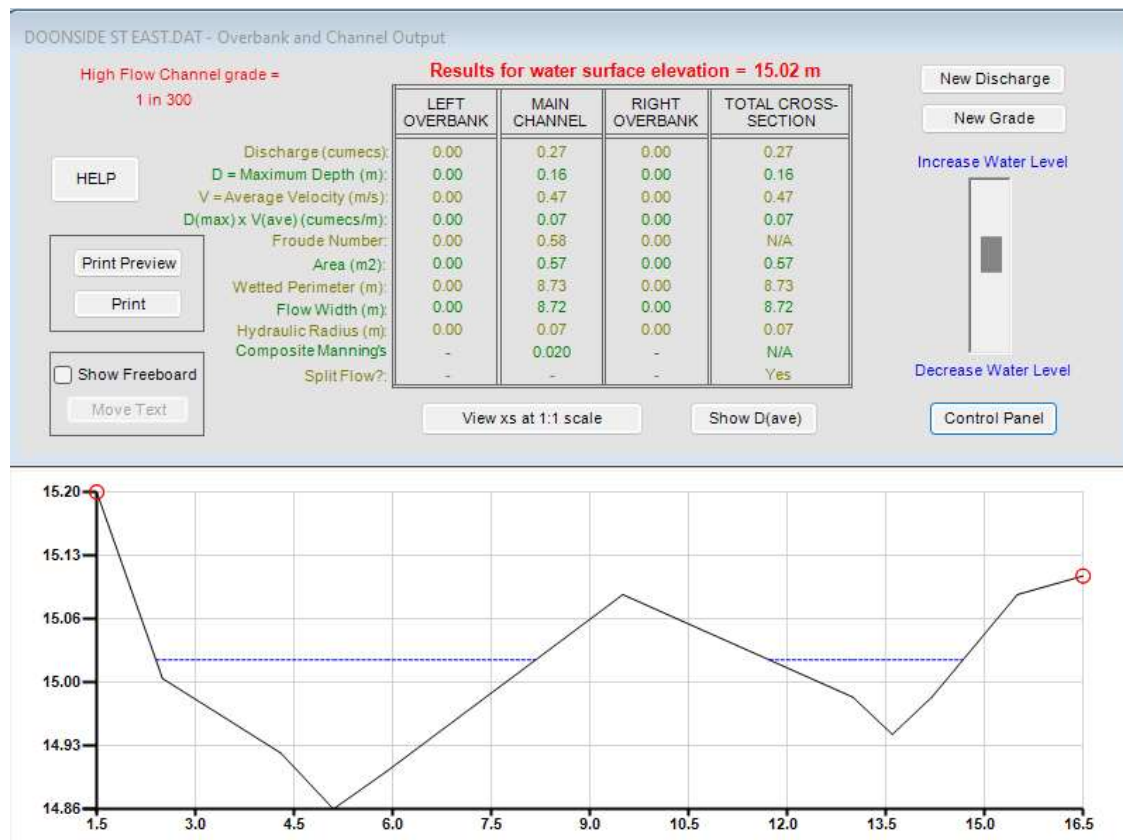
Show D(ave)



### Estimated 1% AEP overland flows in Doonside Street:

- Our analysis suggests that Doonside Street falls in a westerly and easterly direction as shown in our plans
- The critical catchment is Doonside Street East which includes the proposed development (subject to Council LPOD advice)
- Doonside Street (East) is estimated to service a drainage catchment of approximately 1.84 ha
- Total 1% AEP flow is estimated at 0.77m<sup>3</sup>/s
- The estimated capacity of ex 300Ø, 375Ø and 600Ø Council drains in the road reserve is approximately 0.5m<sup>3</sup>/s
- The estimated 1% AEP overland gap flow in the road reserve is approximately 0.27m<sup>3</sup>/s
- Estimated flow depth in the road reserve is approximately 0.16m which appears to be contained within the existing road pavement based on available Lidar data
- Our assessment suggests that in a 1% AEP storm event Doonside Street (East) will contain local catchment flows
- PC-Convery section of Doonside Street is shown in Figure 3 below.

**Figure 3 – Estimated gap flow in Doonside Street (East)**



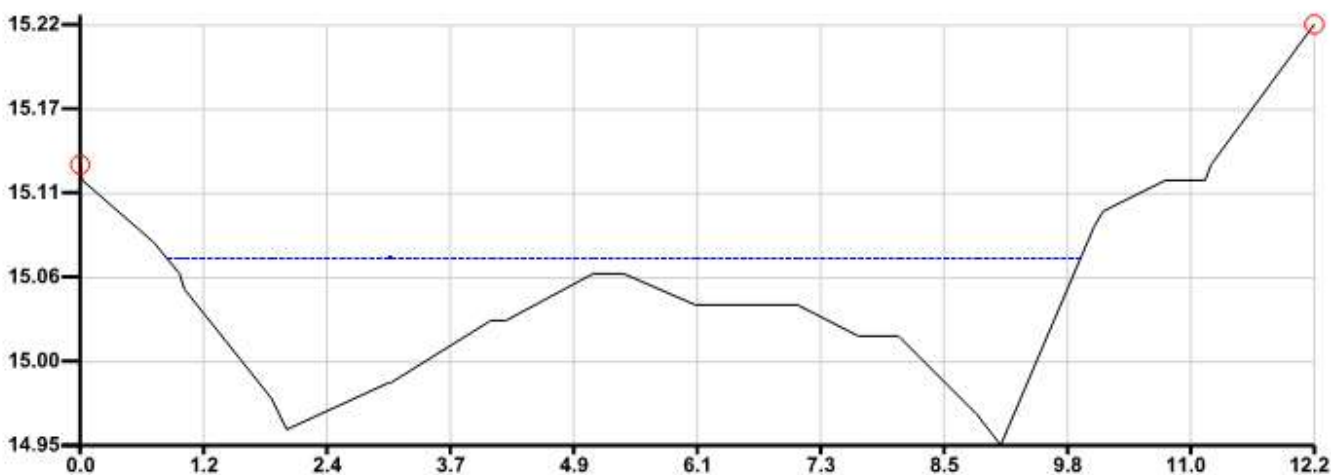
**Figure 4 – Existing drainage system assessment plan**

**Estimated 1% AEP overland flows in Appleton Street:**

- Our analysis suggests that Appleton Street falls in a westerly and easterly direction as shown in our plans
- The critical catchment is Appleton Street West which includes the proposed development (subject to Council LPOD advice)
- Appleton Street (West) is estimated to service a drainage catchment of approximately 0.75 ha
- Total 1% AEP flow is estimated at 0.25m<sup>3</sup>/s
- There are no underground drainage pipes in Appleton Street West.
- Estimated flow depth in the road reserve is approximately 0.12m which appears to be contained within the existing road pavement based on available Lidar data
- Our assessment suggests that in a 1% AEP storm event Appleton Street (West) will contain local catchment flows
- PC-Convey section of Appleton Street is shown in Figure 5 below.

**PROJECT: Doonside**  
**Appleton St-West**  
 Print-out date: 05/08/2022 - Time: 9:45  
 Data File: H:\23917\Overall\Design\PC-Convey\APPLETON ST - West.dal

**1. CROSS-SECTION:**



**2. DISCHARGE INFORMATION:**

100 year (1%) storm event

Total discharge = 0.25 cumecs

There is no pipe discharge

Overland / Channel / Watercourse discharge = 0.250 cumecs

**3. RESULTS: Water surface elevation = 15.070m**

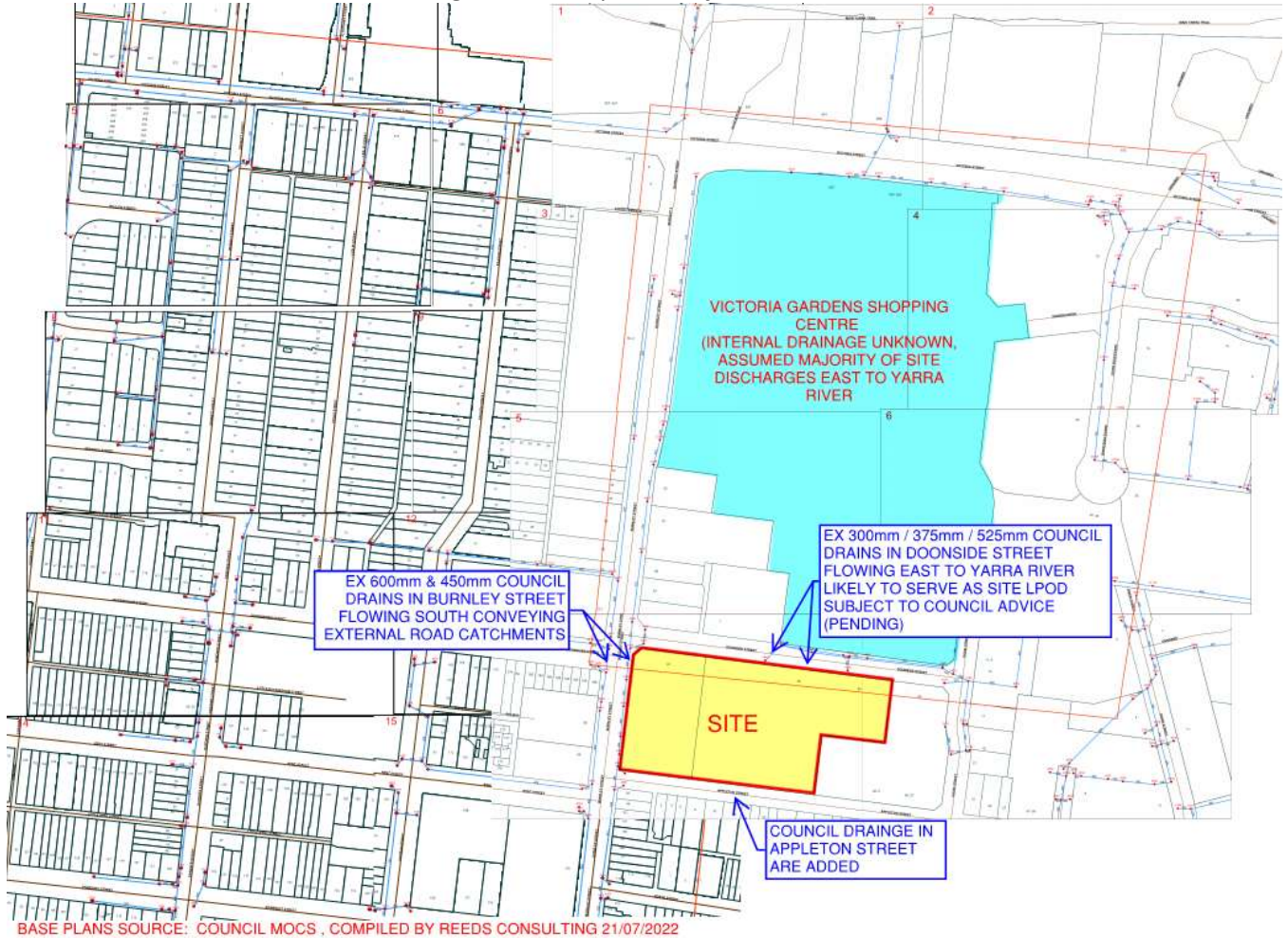
**Existing 1% AEP flood levels in Burnley, Doonside & Appleton Street:**

Based on our analysis the preliminary flood modelling, flood depth plan has been prepared, refer to appendix suggests that Doonside Street falls in

#### 4. Compilation of Council MOCS Plans

As a part of our investigation, we had prepared the compilation of the Council MOCS plans, refer figure 5.

**Figure 5 – Compilation of Council MOCS Plans**



For any queries regarding this matter please contact the undersigned or Gordon Templeton of our office.

Yours faithfully,  
for **REEDS CONSULTING PTY LTD**

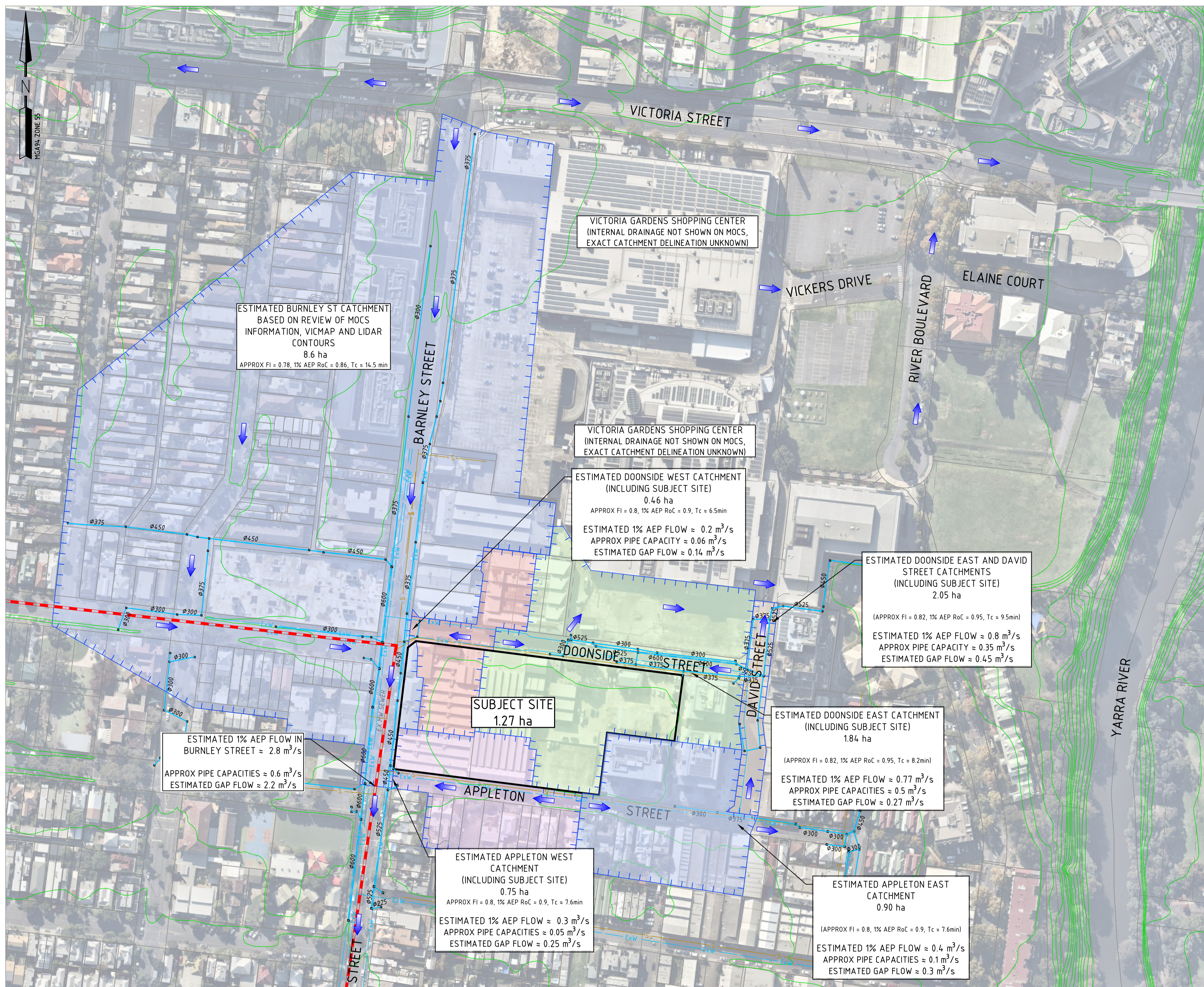
**Sasha Jelicic**  
Senior Drainage Engineer / Engineering Associate

**Disclaimer**

*The information contained within this report has been derived from initial reports or information from the Authorities either verbally or in writing however, until such time as formal detailed investigations are undertaken, applications made and the applicable formal conditions, statutory permits and all relevant approvals obtained, it should only be used as a guide.*

***ANNEXURE 1 – External Catchment Plan***





**LEGEND**

- SUBJECT SITE BOUNDARY
- CATCHMENT BOUNDARY
- EX VICMAP SURFACE CONTOUR (1m)
- INDICATIVE ALIGNMENT OF EXTERNAL MINOR/MAJOR CATCHMENT FLOWS
- INDICATIVE ALIGNMENT OF EXISTING COUNCIL DRAINAGE BASED ON MOCS INFORMATION
- INDICATIVE ALIGNMENT OF EXISTING MELBOURNE WATER SEWER BASED ON MOCS INFORMATION

**NOTES**

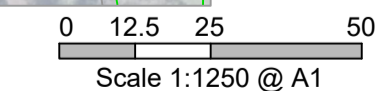
DETAILS SHOWN HERE ARE PRELIMINARY AND SUBJECT TO DETAILED DESIGN AND AUTHORITY APPROVAL

CATCHMENT MINOR AND MAJOR FLOW ESTIMATES SHOWN ON THIS PLAN ARE BASED ON RATIONAL METHOD

PIPE CAPACITY ESTIMATES ARE PRELIMINARY BASED ON EXISTING ROAD GRADING, SUBJECT TO SERVICE PROVING AND DETAILED DESIGN

**WARNING**  
 BEWARE OF UNDERGROUND SERVICES  
 THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

**PRELIMINARY PLAN ONLY**  
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VERSION	REMARKS	DATE	BY
B	UPDATED PIPE DETAILS BASED ON COUNCIL ADVICE	26.07.22	MA
A	PRELIMINARY ISSUE	13.08.21	MA

DRAWN BY	M. AHOOGHALANDARI	DESIGNED BY	M. AHOOGHALANDARI
MELWAY	2H F4	CHECKED BY	X.XXXXX
DATUM	AHD	AUTHORISED BY	G. TEMPLETON

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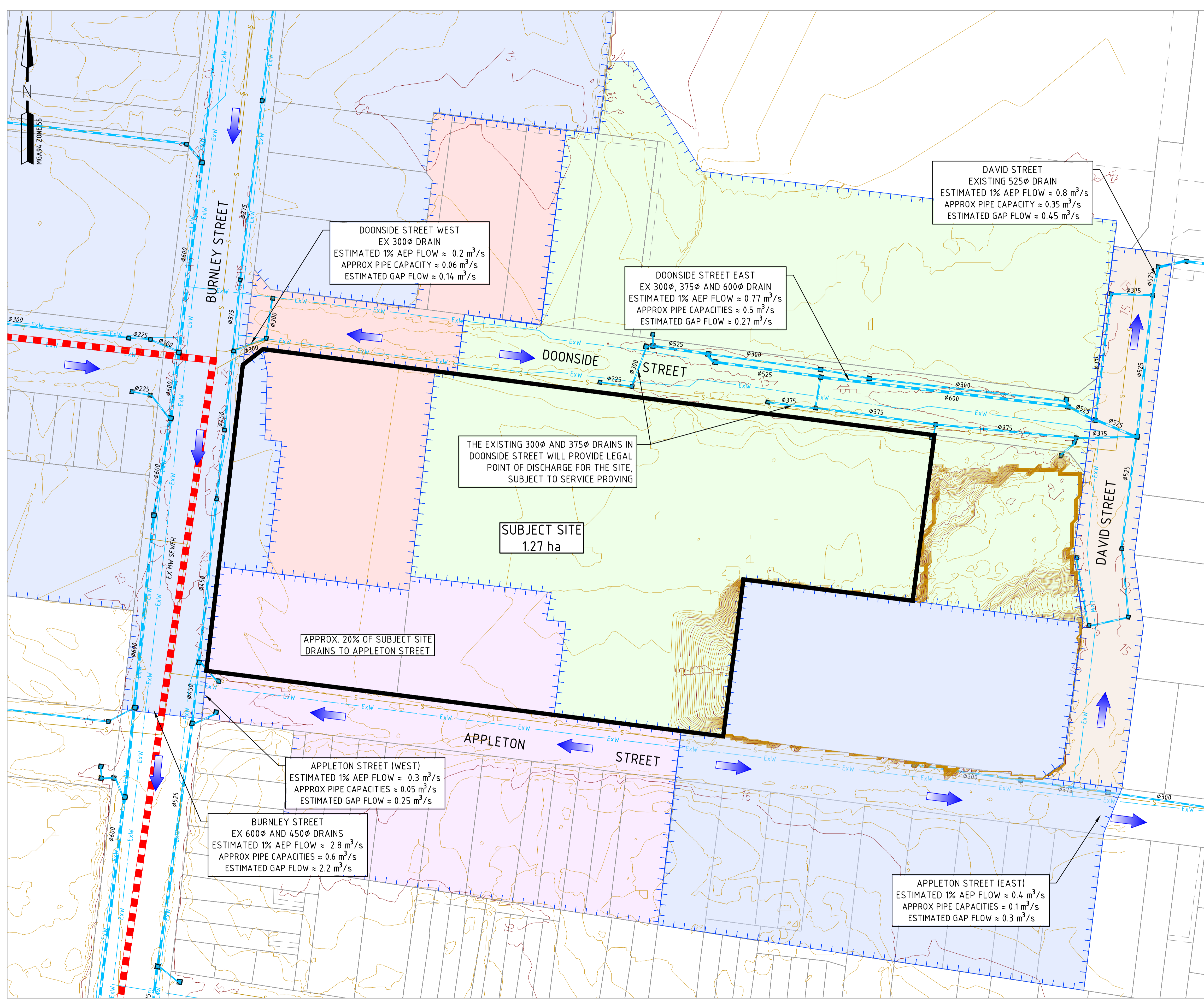
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CITY OF YARRA  
 81 BURNLEY STREET  
 RICHMOND  
 EXTERNAL CATCHMENT PLAN

DRAWING No.	OH1	VERSION	B
REFERENCE	23917E		
SHEET	1 OF 3		

***ANNEXURE 2 – Existing Drainage System Assessment Plan***



LEGEND

- SUBJECT SITE BOUNDARY
- CATCHMENT BOUNDARY
- ~ EX LIDAR SURFACE CONTOUR (1m)
- ~ EX LIDAR SURFACE CONTOUR (0.5m)
- INDICATIVE ALIGNMENT OF EXTERNAL MINOR/MAJOR CATCHMENT FLOWS
- INDICATIVE ALIGNMENT OF EXISTING COUNCIL DRAINAGE BASED ON MOCS INFORMATION
- INDICATIVE ALIGNMENT OF EXISTING MELBOURNE WATER SEWER BASED ON MOCS INFORMATION

NOTES

DETAILS SHOWN HERE ARE PRELIMINARY AND SUBJECT TO DETAILED DESIGN AND AUTHORITY APPROVAL

EXISTING COUNCIL DRAINAGE PIPES SHOWN ON THIS PLAN ARE BASED MOCS INFORMATION, TO BE CONFIRMED BY SURVEY

EXISTING COUNCIL DRAINAGE PIPE GRADES AND CAPACITIES ARE ESTIMATED BASED ON AVAILABLE CONTOUR INFORMATION AND ARE TO BE CONFIRMED BY FEATURE SURVEY OR COUNCIL

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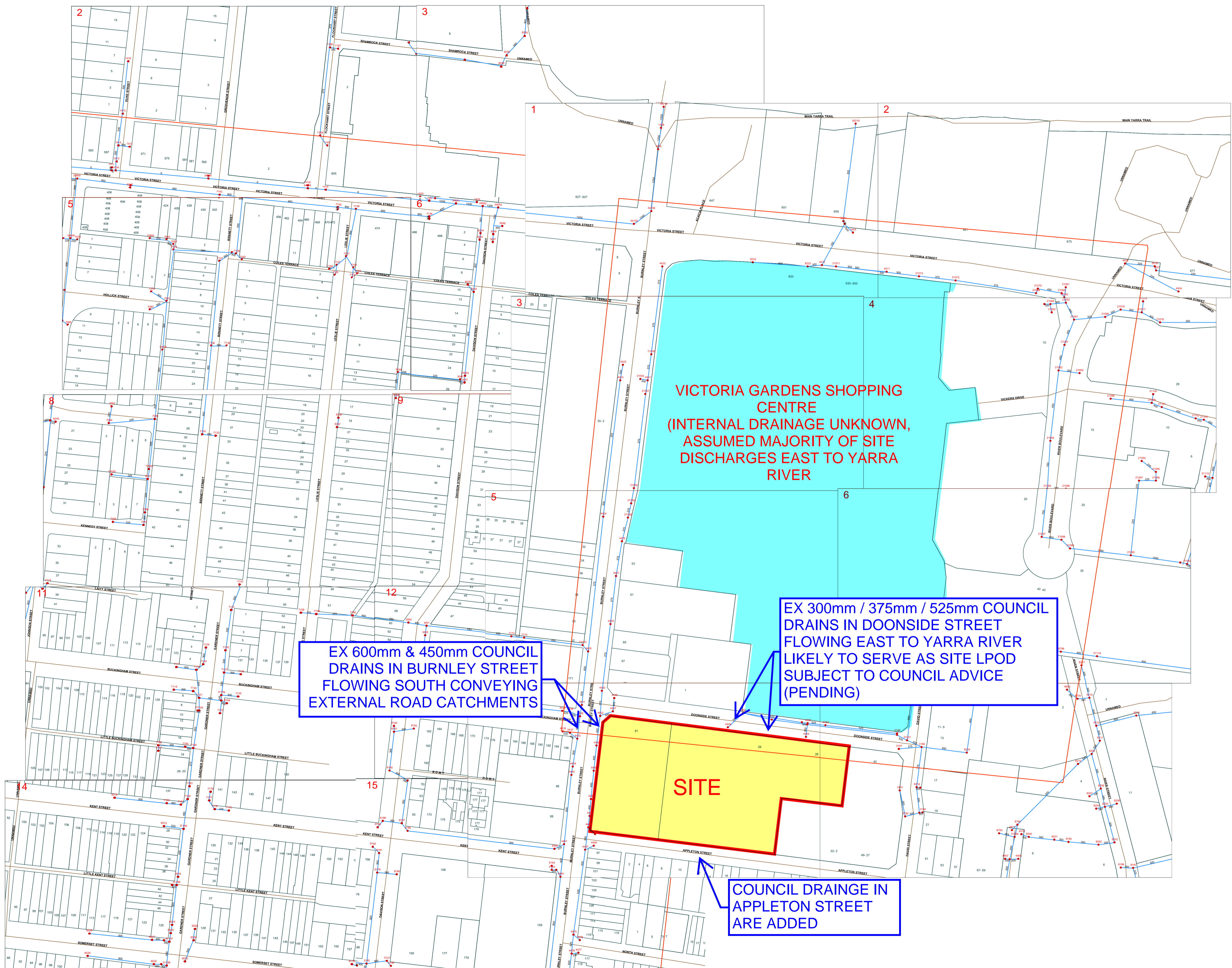
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81 BURNLEY STREET  
RICHMOND  
EXTERNAL DRAINAGE SYSTEM ASSESSMENT

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OCD1	B
REFERENCE	
23917E	
SHEET	2 OF 3

***ANNEXURE 3 – Compilation of Council MOCS Information***



VICTORIA GARDENS SHOPPING CENTRE  
 (INTERNAL DRAINAGE UNKNOWN,  
 ASSUMED MAJORITY OF SITE  
 DISCHARGES EAST TO YARRA  
 RIVER)

EX 600mm & 450mm COUNCIL  
 DRAINS IN BURNLEY STREET  
 FLOWING SOUTH CONVEYING  
 EXTERNAL ROAD CATCHMENTS

EX 300mm / 375mm / 525mm COUNCIL  
 DRAINS IN DOONSIDE STREET  
 FLOWING EAST TO YARRA RIVER  
 LIKELY TO SERVE AS SITE LPOD  
 SUBJECT TO COUNCIL ADVICE  
 (PENDING)

SITE

COUNCIL DRAINE IN  
 APPLETON STREET  
 ARE ADDED

***ANNEXURE 4 – Existing 1% AEP Flood Levels***



LEGEND

- SUBJECT SITE BOUNDARY
- INDICATIVE ALIGNMENT OF EXISTING COUNCIL DRAINAGE BASED ON MOCS INFORMATION
- INDICATIVE ALIGNMENT OF EXISTING MELBOURNE WATER SEWER BASED ON MOCS INFORMATION
- 15.0 ESTIMATED EXISTING 1% AEP FLOOD LEVEL CONTOUR

**FLOOD DEPTHS**

0
0.02
0.05
0.09
0.15
0.25
0.30
0.40
0.55

ESTIMATED EXISTING 1% AEP FLOOD DEPTHS

NOTES

DETAILS SHOWN HERE ARE PRELIMINARY AND SUBJECT TO DETAILED HYDRAULIC MODELLING AND AUTHORITY APPROVAL

FLOOD MODELING METHOD: HECRAS V6 2-DIMENSIONAL FLOW (CELL SIZE: 0.5m x 0.5m)

FLOOD MODELLING BASED ON AVAILABLE 2018 LIDAR DATA

FLOOD LEVEL RESULTS IN HATCHED BOX IS SUBJECT TO CHANGE DUE TO LACK OF FEATURE SURVEY AND LEVEL INFORMATION

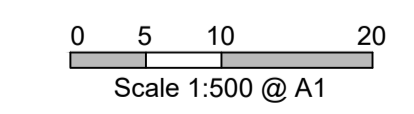
THE AVAILABLE LIDAR DATA IS NOT REPRESENTATIVE OF CURRENT ROAD UPGRADE WORKS IN DAVID STREET; HENCE, THE MODEL RESULTS ARE SUBJECT TO CHANGE

FLOOD LEVELS SHOWN ON THIS PLAN WILL BE CONFIRMED AS PART OF DETAILED DESIGN

**WARNING**

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MELWAY	2H F4	CHECKED BY	X.XXXXX
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CITY OF YARRA  
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RICHMOND  
PRELIMINARY FLOOD MODELLING  
EXISTING 1% AEP FLOOD LEVELS

DRAWING No.	VERSION
FL1	A
REFERENCE	
23917E	
SHEET	3 OF 3

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