Our Ref: BE220612-HIA-Letter-20240722
Enquiries to:

22nd July 2024

Logan City Council
150 Wembley Road
LOGAN CENTRAL QLD 4114

Attention: Logan City Council

Dear Sir/Madam

Re: BE220612 - 530 Chambers Flat Road, Logan Reserve - Hydraulic Impact Assessment Letter

1. INTRODUCTION

GC Dev 6 Pty Ltd have engaged Burchills Engineering Solutions to prepare a Hydraulic Impact Assessment (HIA) Letter to be considered part of a Development Application to Logan City Council for the establishment of a 1 into 31 lot subdivision along with a bioretention basin and drainage reserve. The proposed development is located at 524 - 530 Chambers Flat Road, Logan Reserve.

The purpose of this letter is to assess the hydraulic impact of the proposed development. The flow characteristics within the catchment have been modelled to ensure that the proposed development results in no adverse impacts upon adjoining properties.

This letter also addresses PO25 of the TLPI No.1/2023 which requires an assessment for flood events up to and including the probable maximum flood to demonstrate that the development will not cause a rapid or unexpected increase in safety risks or flood damage.

1.1 SITE DETAILS

The subject site is located at 524-530 Chambers Flat Road, Logan Reserve, and is legally described as Lot 10 on RP97736. The site is rectangular and occupies an area of 3.34 ha.

The site is identified by the Logan Planning Scheme 2015 (Version 8.1) as being located within an Emerging Community zone. Figure 1.1 below identifies the location of the subject site.



Figure 1.1 – Site Locality Plan (MetroMap, 2022)

1.2 Neighbouring Development and Approvals

Burchills have previously completed a HIA over the neighbouring lot to the south, 532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve, properly described as Lots 6-9 on RP97736. OPW approval (COM/60/2022) has been obtained for this neighbouring development and construction is currently underway.

The hydraulic model (TUFLOW) prepared by Burchills Engineering Solutions for the purpose of that assessment has been used as the base case for assessment of the proposed development over 530 Chambers Flat Road, Logan Reserve.

The Logan Albert TUFLOW model has been used to assess the hydraulic behaviour in the 0.5% AEP, 0.2% AEP and the PMF.

1.3 Scope

This HIA has been undertaken using the following scope:

- Model Development
  - Amend existing TUFLOW models to best represent proposed development;
- Review of Model Results
  - Review of modelling results, including water level impacts, velocity impacts, hazards and modelling inefficiencies.
- Report and Mapping
  - Presentation of pre-development and post-development flow extents, depths, and velocities (where applicable);
  - Impact assessment including afflux contours and risk assessment; and
  - Review of any impacts resulting from the proposal in the context of whether such afflux may give rise to potential actionable damage to surrounding properties.

2. PROPOSED DEVELOPMENT

2.1 Proposed Development

The subject site is proposed to be reconfigured and developed from 1 into 31 lots, along with a bioretention basin and drainage reserve. The proposed development layout is shown below in Figure 2.1, and on the Master Plan prepared by Burchills Engineering Solutions (Drawing No. BE220612-SK01-D) which is included in Appendix A of this report. Concept Civil Engineering Plans have also been included in Appendix A.

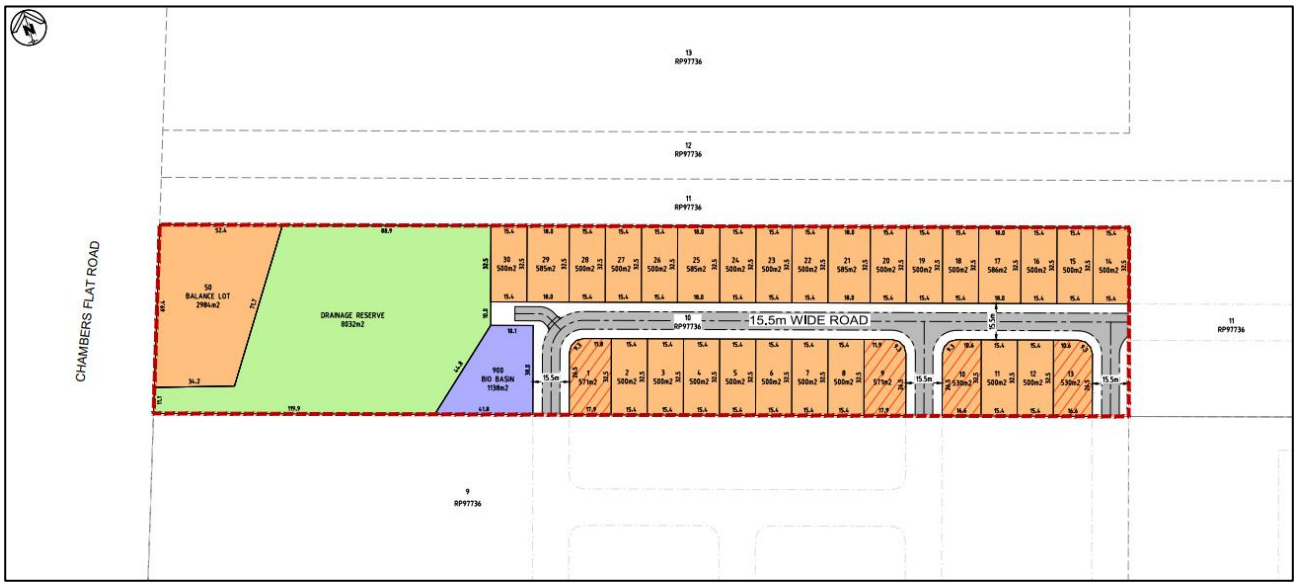


Figure 2.1 Subdivision Proposal Plan

3. HYDRAULIC MODELLING

Details pertaining to the hydraulic model set up can be found in the approved Burchills Hydraulic Impact Assessment (BE210264-RP-03) and subsequent HIA Letter (BE210264_HIA_Letter_20240123) prepared to address PO25 of the TLPI No.1/2023. These documents have been appended to this letter.

The existing scenario for the purpose of this assessment will assume the upstream neighbouring development (532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve) has been constructed.

4. MODELLED EVENTS

4.1 Critical Durations

Shown below in Table 4-1 are the critical durations modelled for the assessment. A range of durations were run for the nominated events in the existing scenario and the following durations were determined to be critical at the subject site.

Table 4-1 Critical Durations

TUFLOW Model	Event	Critical Duration
Logan Albert 2023	PMF	36 hour
Logan Albert 2023	0.2% AEP (CC RCP 4.5)	1 hour
Logan Albert 2023	0.5% AEP (CC RCP 4.5)	1 hour
Burchills TUFLOW Model	1% AEP	2 hour
Burchills TUFLOW Model	2% AEP	1.5 hour
Burchills TUFLOW Model	5% AEP	2 hour
Burchills TUFLOW Model	10% AEP	2 hour
Burchills TUFLOW Model	18% AEP	2 hour
Burchills TUFLOW Model	39% AEP	1 hour

4.2 Development Representation

The proposed development over 530 Chambers Flat Road, Logan reserve has been represented using the preliminary design surface developed by Burchills Engineering Solutions. The extent of the design surface represented in the model is shown below.



Figure 4.1 Proposed Design Surface Extent

5. RESULTS AND DISCUSSION

Resulting flood mapping and afflux mapping has been appended to this letter.

In summary, the pre and post developed modelling results were assessed to demonstrate that the development does not cause increase in flood levels or flood velocities external to the site in modelled flood events up to and including the PMF event. Given that the proposed development does not majorly encroach on the existing conveyance path through the site, these findings are in line with the expected results.

5.1 Velocity and Scour Assessment

Modelling results indicate that the velocity of flood water is generally unchanged from the pre-developed scenario.

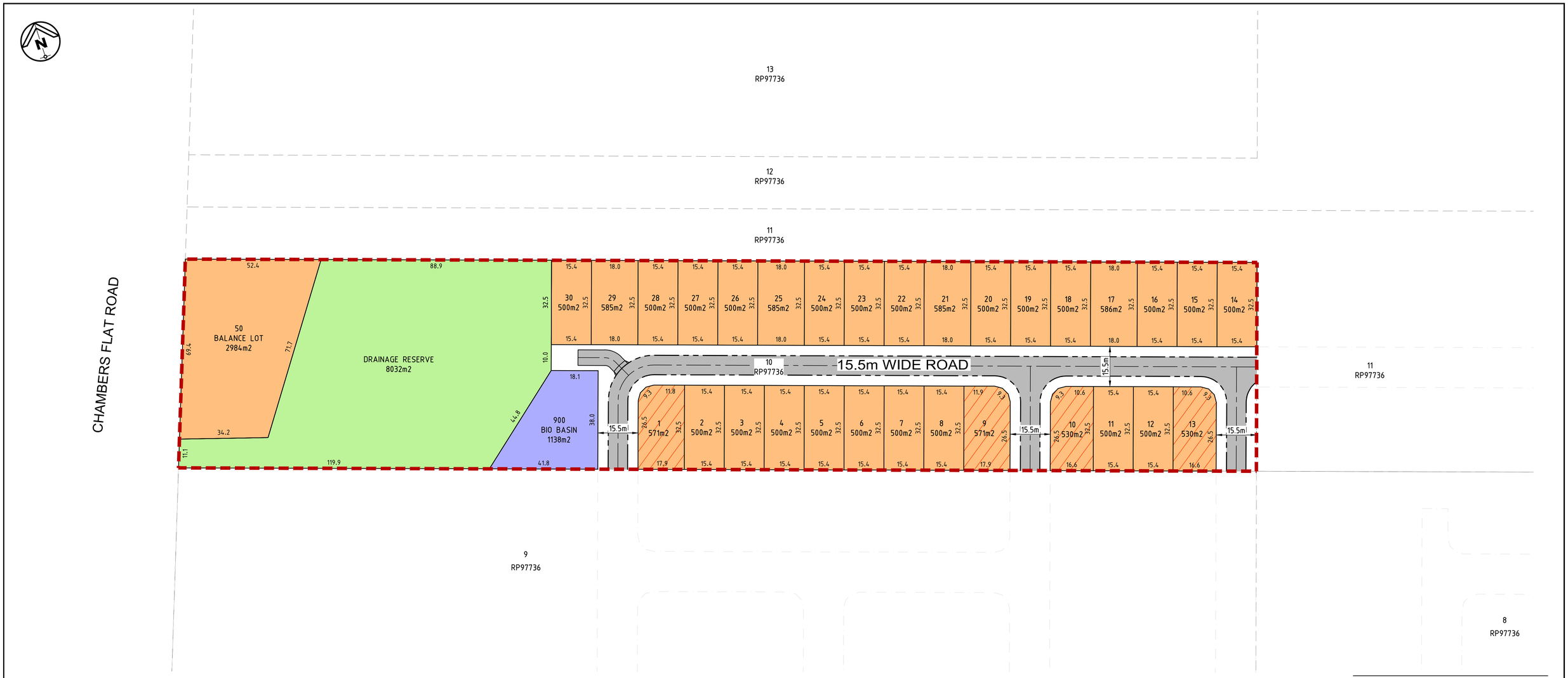
Prepared By

Joshua Micallef
Civil and Water Engineer

Reviewed By

Lucas Faulkner
RPEQ 8093
Principal Civil Engineer

Appendix A – Proposed Development Plan



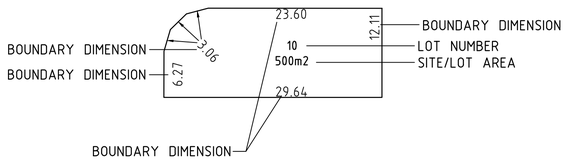
MASTER PLAN
VILLAGE PRECINCT

SCALE 10 0 5 10 15 20 25 30 35 (metres)
1 : 750 (FULL SIZE)

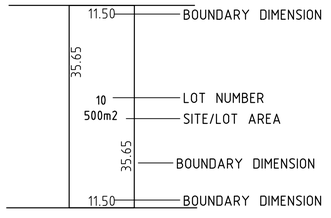
DEVELOPMENT SUMMARY

TOTAL SITE AREA:	3.337 ha
TOTAL AREA OF NEW ROAD:	0.567 ha
LENGTH OF NEW ROAD:	383.18 meters
TOTAL AREA ROAD PAVEMENT:	0.267 ha
TOTAL AREA DRAINAGE RESERVE :	0.803 ha
TOTAL AREA BALANCE LOT :	0.298 ha
TOTAL AREA OF BASIN :	0.114 ha
NET DEVELOPMENT AREA :	1.853 ha
NET SITE AREA DENSITY:	16.73 DWELLINGS/ha
GROSS SITE DENSITY:	9.29 DWELLINGS/ha

CORNER ALLOTMENT



STANDARD ALLOTMENT



LEGEND:

- TYPICAL ALLOTMENTS
- CORNER ALLOTMENTS
- STAGE BOUNDARY

LOT FRONTAGE WIDTH BREAKDOWN

FRONTAGE WIDTH	No. ON LOTS
15.0-15.99m	22
16.0-16.99m	2
17.0-17.99m	2
≥18m	5
TOTAL	31

YIELD BREAKDOWN

LOT SIZE	No. ON LOTS
500-549m2	24
549-600m2	6
>600m2	1
TOTAL	31

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE
LOT 10 RP97736; 524-530 CHAMBERS FLAT ROAD
FOR
GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
D	LOT FRONTAGE WIDTH AMENDED	15.07.24
C	SURVEY BOUNDARIES REVISED	08.07.24
B	LAYOUT AMENDED	24.04.23
A	ORIGINAL ISSUE	11.11.22

COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.
DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.
NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
524-530
CHAMBERS FLAT ROAD
PRELIMINARY CIVIL
ENGINEERING DESIGN

DRAWING TITLE :
MASTER PLAN
VILLAGE PRECINCT

DEVEL. APPLIC. No. :	DATE : 15.07.2024
PROJECT LEADER : FRASER LUCAS	DESIGNER : TG
DRAFTSPERSON : TN	CHECKED : FRASER LUCAS

APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365
RPEQ:

SCALE :	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE220612	DRAWING No. : SK01	VERSION: D

Appendix B – Flood Result Mapping (1% AEP – 39% AEP)

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 01 PRE DEVELOPMENT
1% AEP
FLOOD WATER LEVEL

TWL01

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

0 100 200 300 400 500 m

Project:	BE220612
Date:	10/05/2024
Scale:	1:7000 at A3
Projection:	GDA 94/ MGA zone 56
Data Sources:	

BURCHILLS ENGINEERING SOLUTIONS

FOR

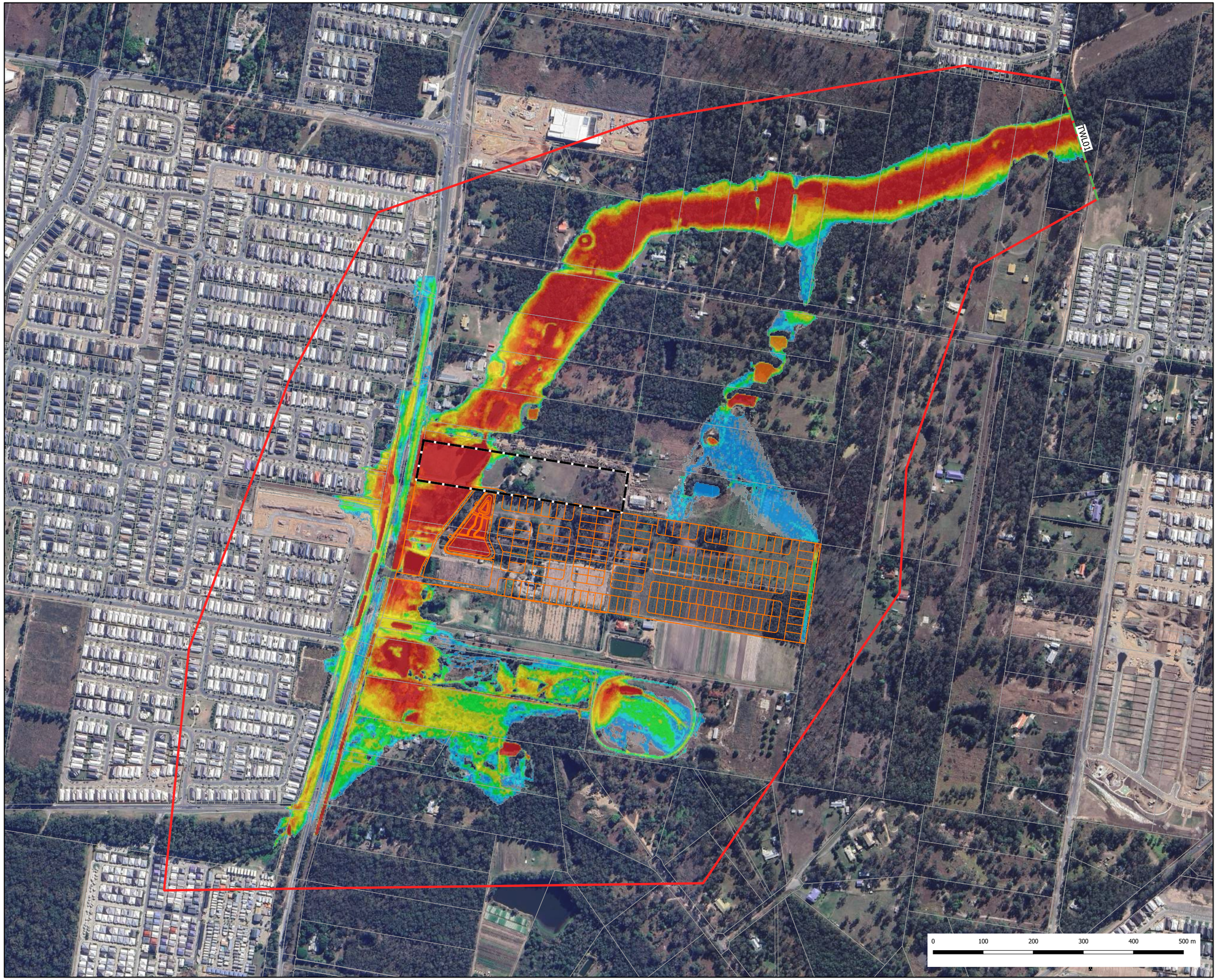
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 02 PRE DEVELOPMENT
1% AEP
FLOOD WATER DEPTH





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Depth (m)

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- above 0.8

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

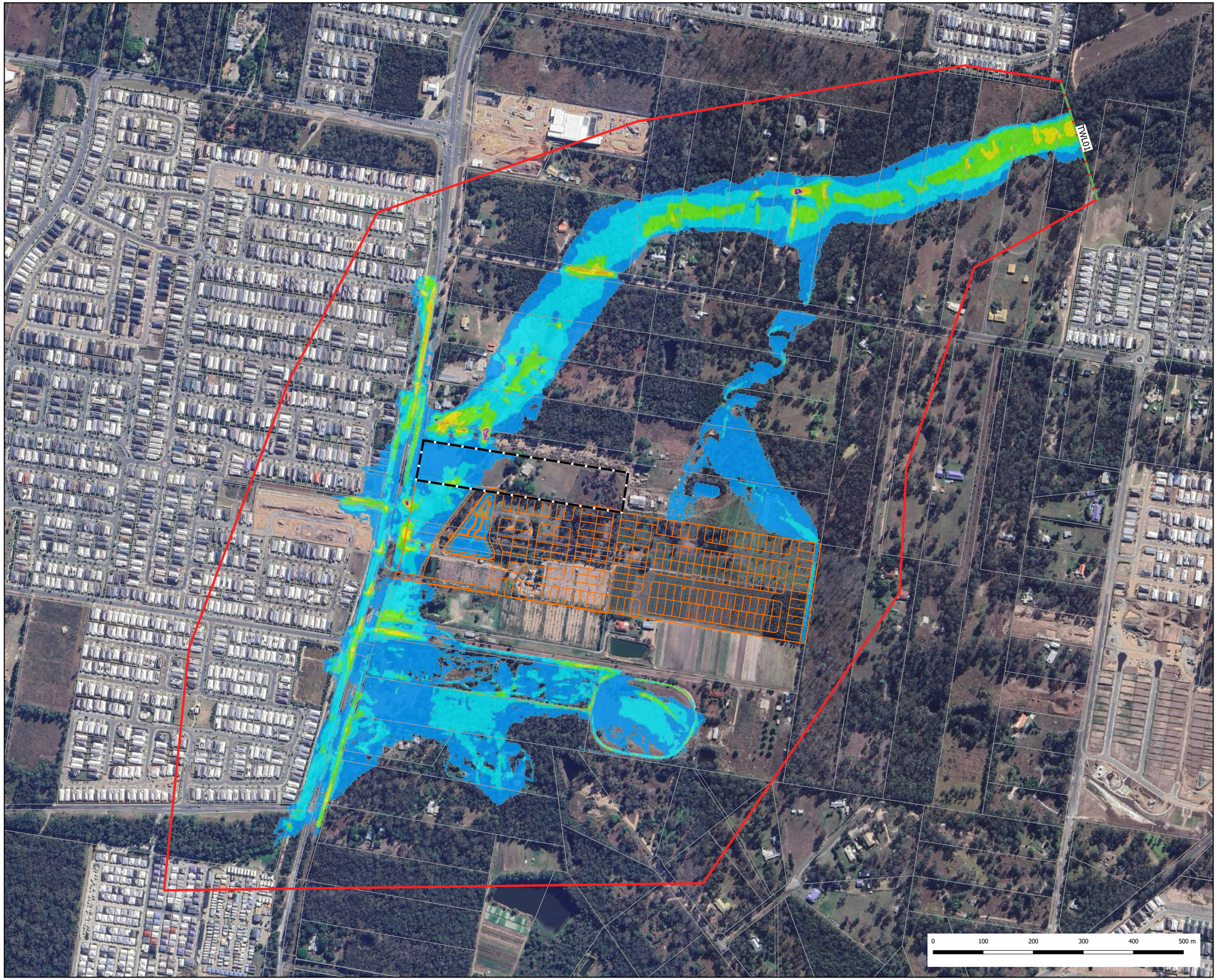
BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



530 Chambers Flat Rd

FIG 03 PRE DEVELOPMENT
1% AEP
FLOOD WATER VELOCITY



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Velocity (m/s)

- below 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- above 4.0

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

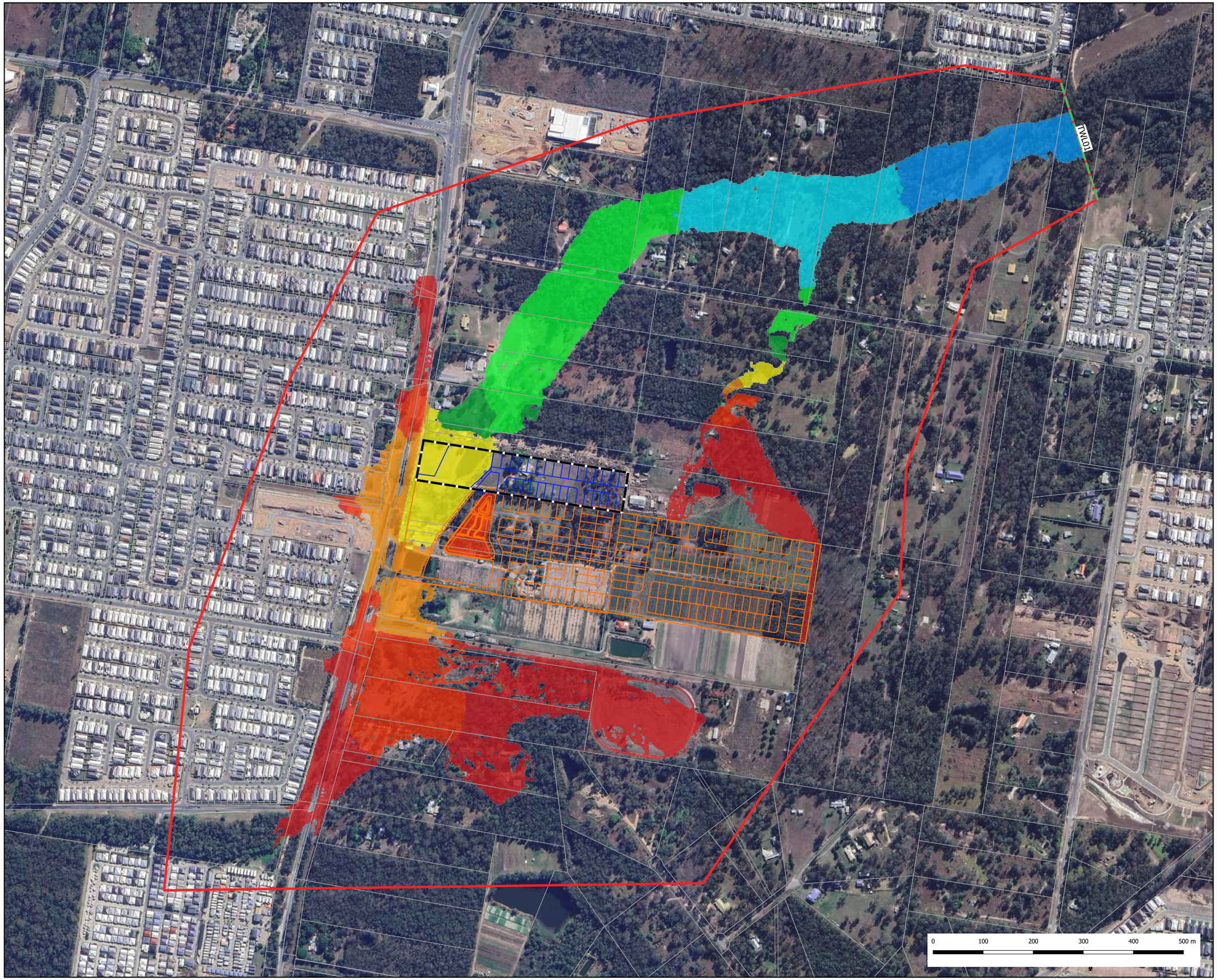
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 04 POST DEVELOPMENT
1% AEP
FLOOD WATER LEVEL





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

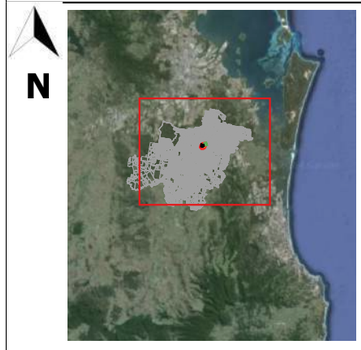
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 05 POST DEVELOPMENT
1% AEP
FLOOD WATER DEPTH



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- above 0.8

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

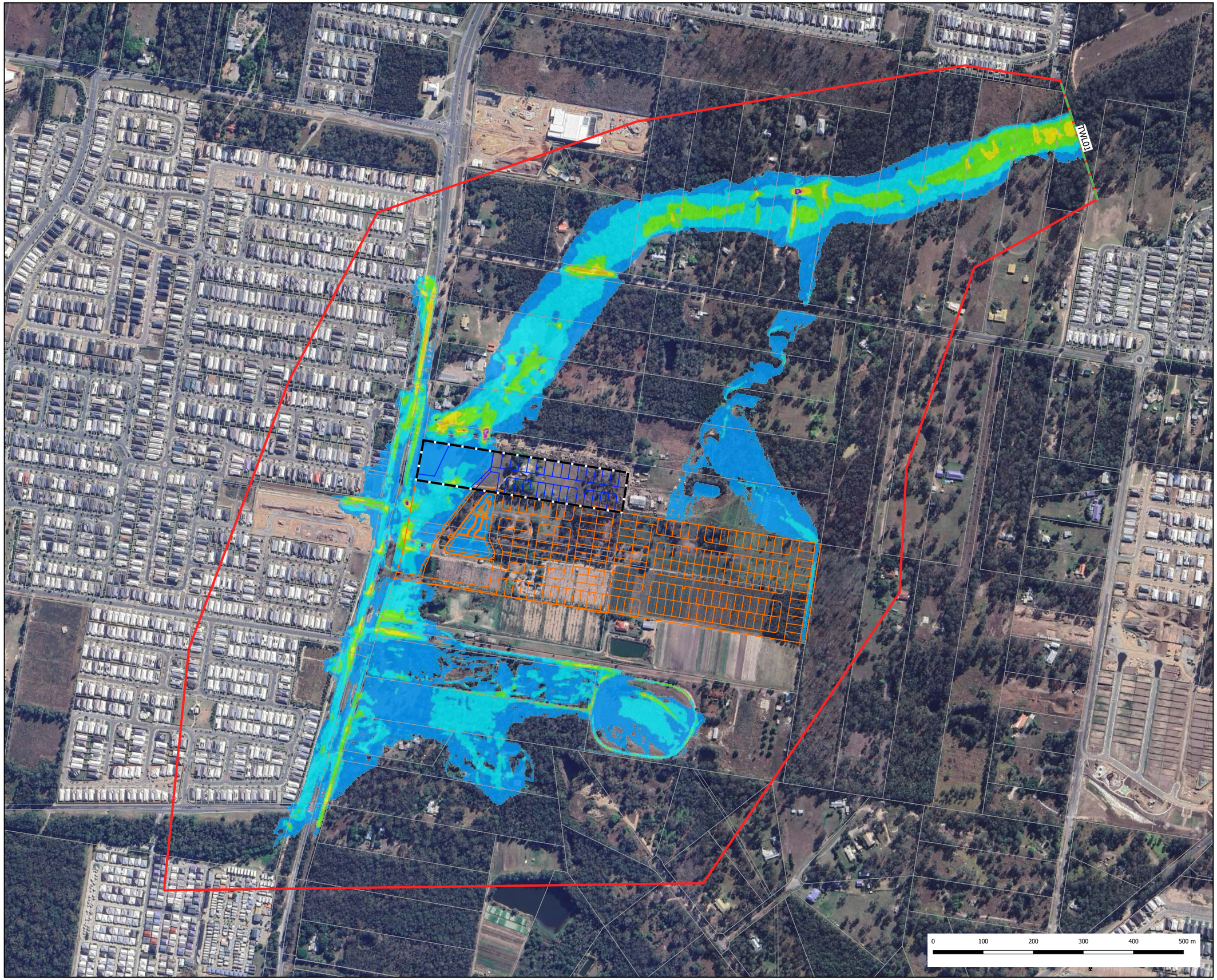
BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



530 Chambers Flat Rd

FIG 06 POST DEVELOPMENT
1% AEP
FLOOD WATER VELOCITY



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Velocity (m/s)

- below 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- above 4.0

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 07 POST DEVELOPMENT
2% AEP
FLOOD WATER DEPTH

TWL01

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- above 0.8

0 100 200 300 400 500 m

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

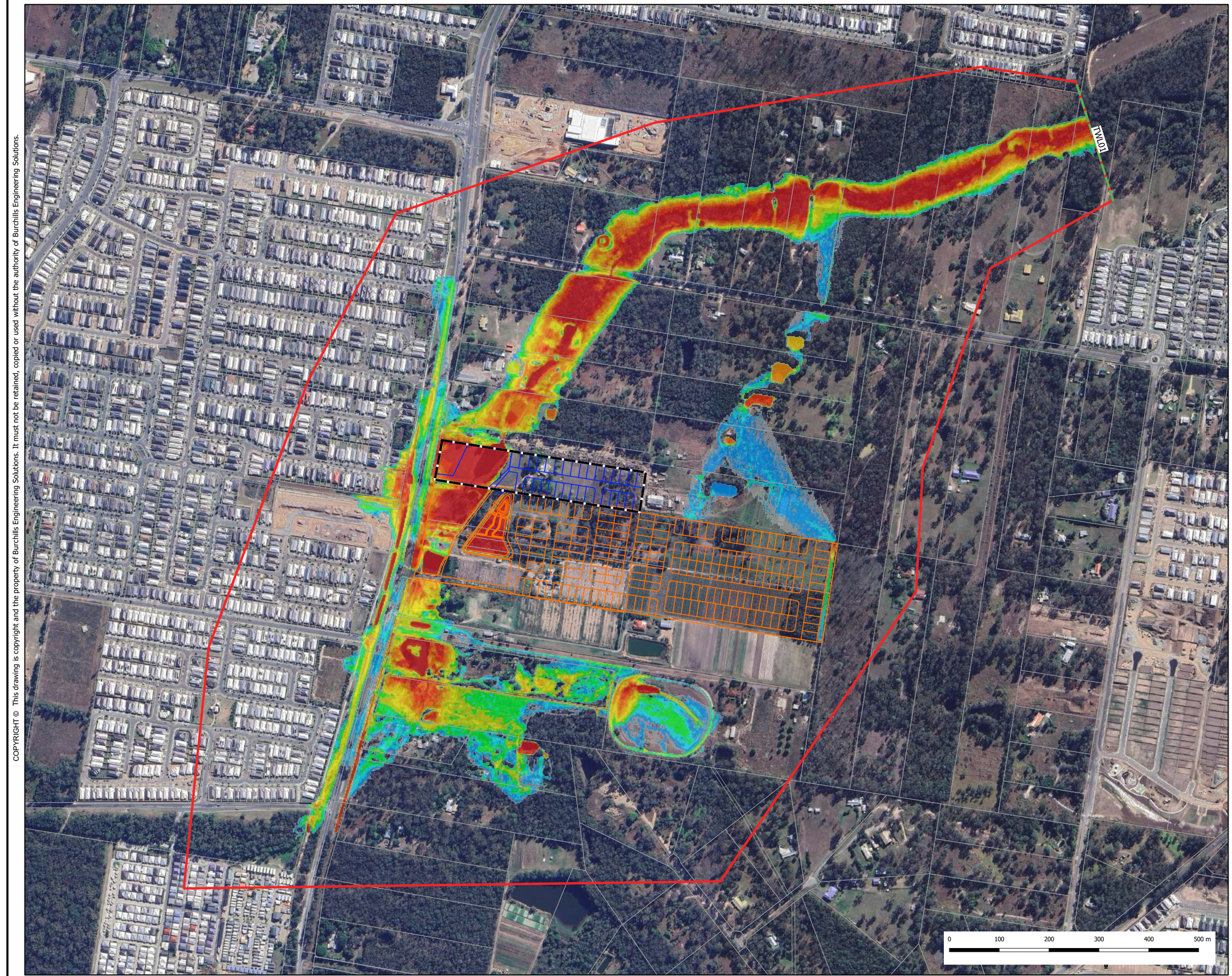
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 08 POST DEVELOPMENT
5% AEP
FLOOD WATER DEPTH





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- above 0.8

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

TWL01

0 100 200 300 400 500 m

530 Chambers Flat Rd

FIG 09 POST DEVELOPMENT
1% AEP
FLOOD WATER LEVEL AFFLUX

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 10 POST DEVELOPMENT
2% AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS
ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 11 POST DEVELOPMENT
5% AEP
FLOOD WATER LEVEL AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

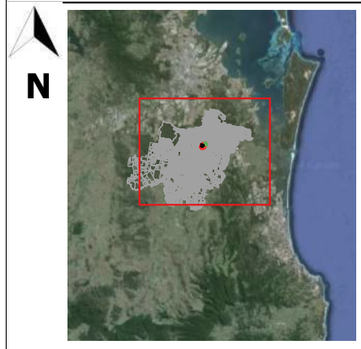
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 12 POST DEVELOPMENT
10% AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 13 POST DEVELOPMENT
18% AEP
FLOOD WATER LEVEL AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 14 POST DEVELOPMENT
39% AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 15 POST DEVELOPMENT
1% AEP
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

0 100 200 300 400 500 m

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 16 POST DEVELOPMENT
2% AEP
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

TWL01

0 100 200 300 400 500 m

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 17 POST DEVELOPMENT
5% AEP
FLOOD WATER VELOCITY AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 18 POST DEVELOPMENT
10% AEP
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

TWL01

0 100 200 300 400 500 m

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



530 Chambers Flat Rd

FIG 19 POST DEVELOPMENT
18% AEP
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

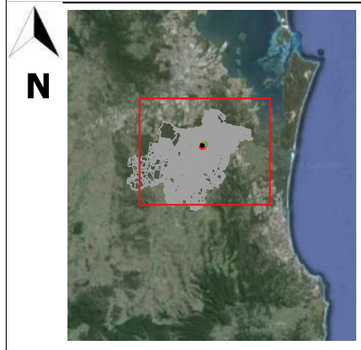
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 20 POST DEVELOPMENT
39% AEP
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

TWL01

0 100 200 300 400 500 m

Project: BE220612

Date: 10/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

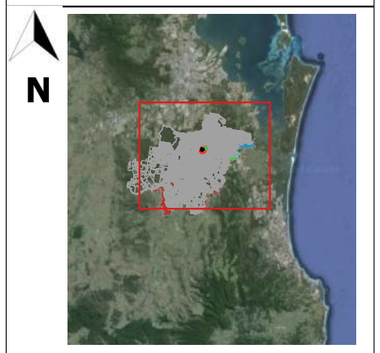
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

Appendix C - Flood Result Mapping (PMF, 0.2% AEP & 0.5% AEP)

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 01 PRE DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER LEVEL



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

0 100 200 300 400 500 m

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

TWL01

0 100 200 300 400 500 m

530 Chambers Flat Rd

FIG 02 PRE DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER DEPTH

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Depth (m)

- below 0.02
- 0.02 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- above 9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

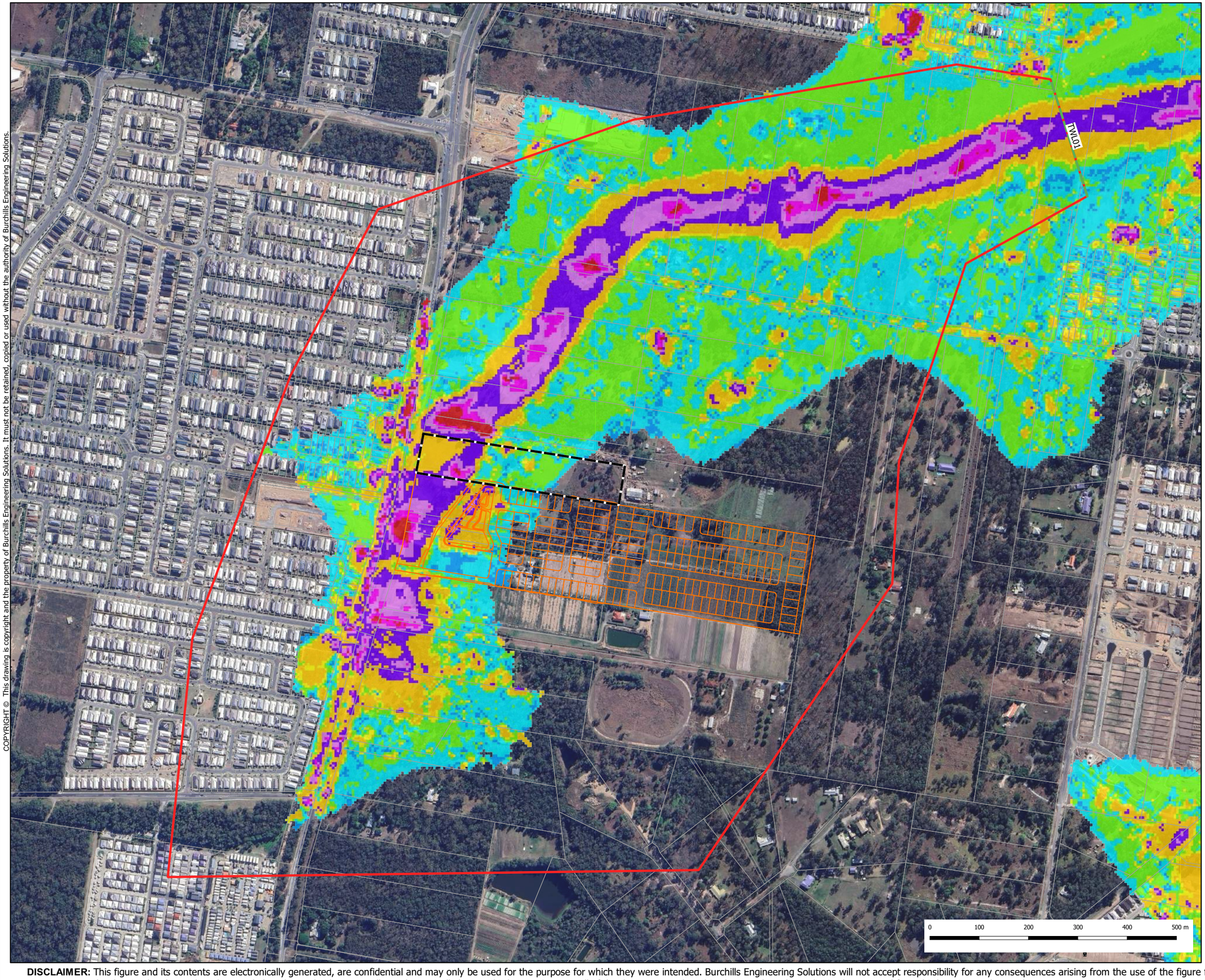
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 03 PRE DEVELOPMENT
PMPDF FLODD EVENT
FLOOD WATER VELOCITY





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

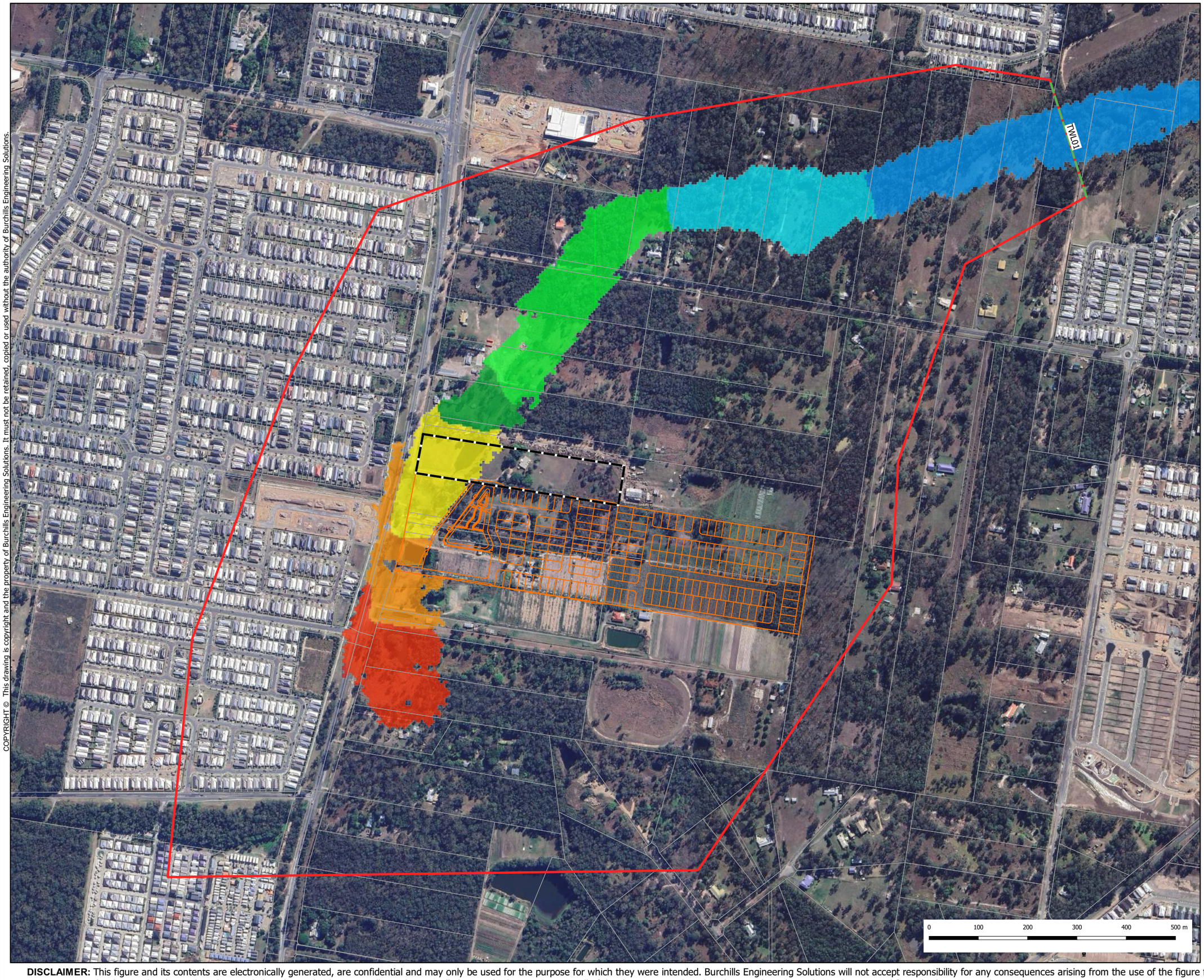
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 04 PRE DEVELOPMENT
0.2% AEP
FLOOD WATER LEVEL





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS
ENGINEERING SOLUTIONS

FOR

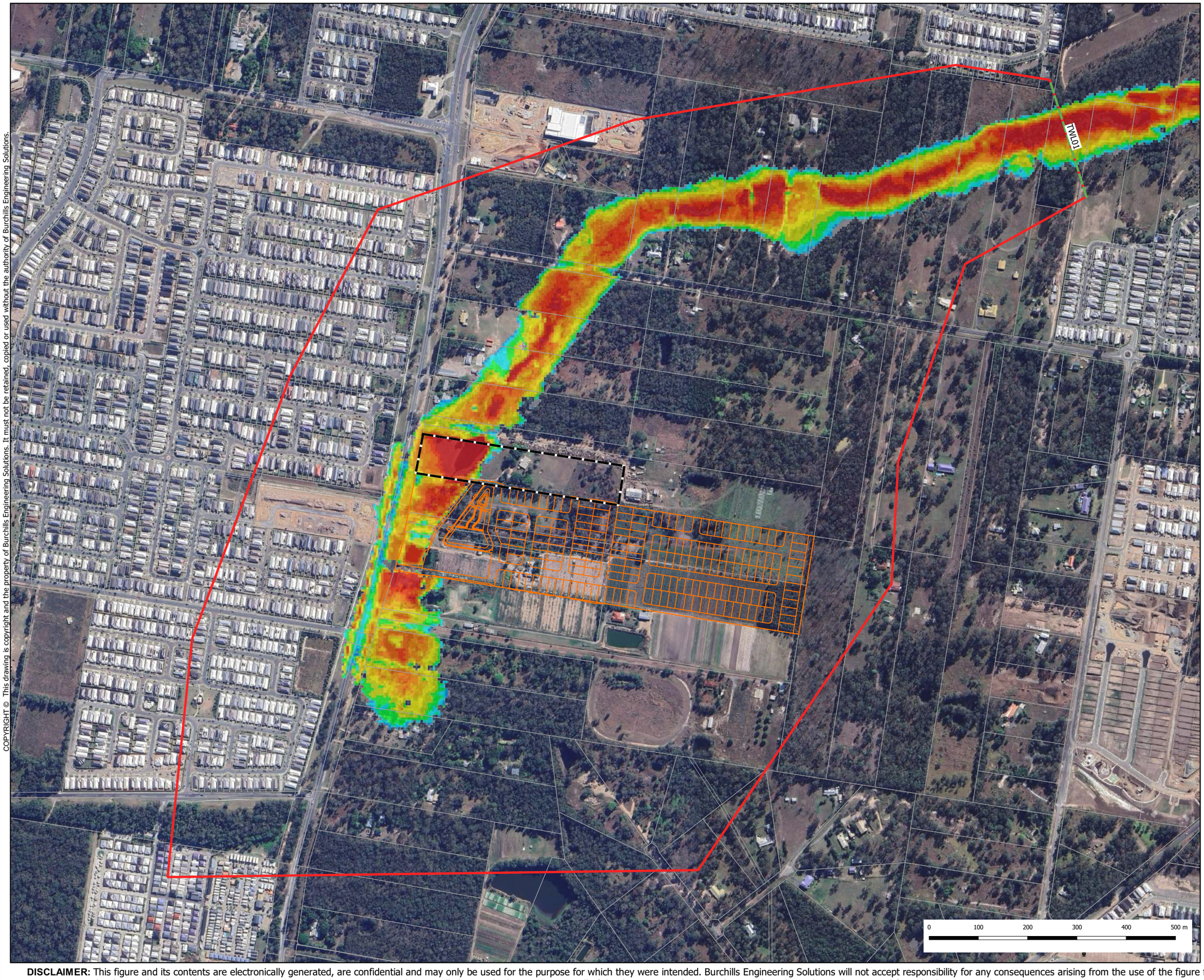
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 05 PRE DEVELOPMENT
0.2% AEP
FLOOD WATER DEPTH





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Depth

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.3 - 0.45
- 0.45 - 0.6
- 0.6 - 0.75
- 0.75 - 0.9
- 0.9 - 1.05
- 1.05 - 1.2
- above 1.2

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

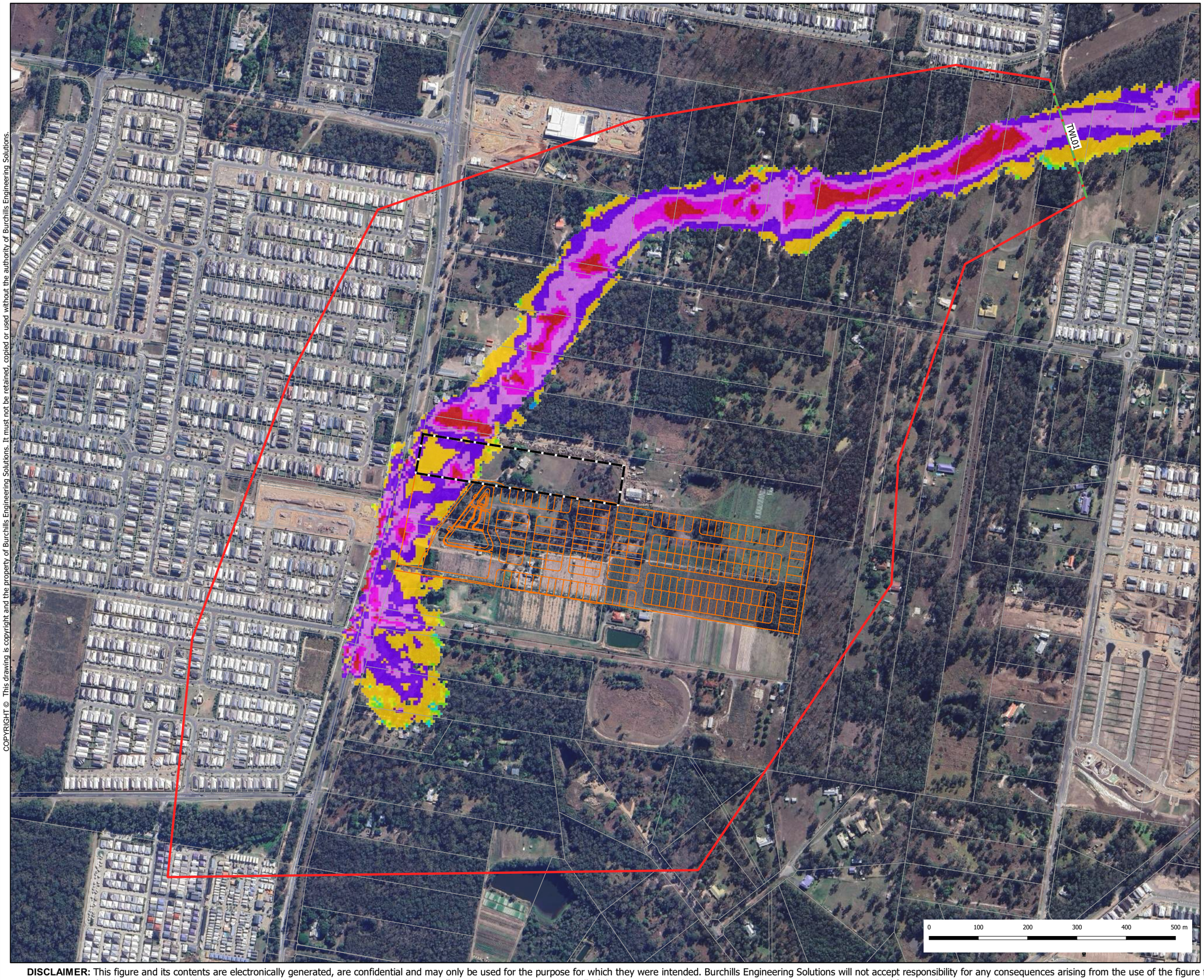
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 06 PRE DEVELOPMENT
0.2% AEP
FLOOD WATER VELOCITY





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

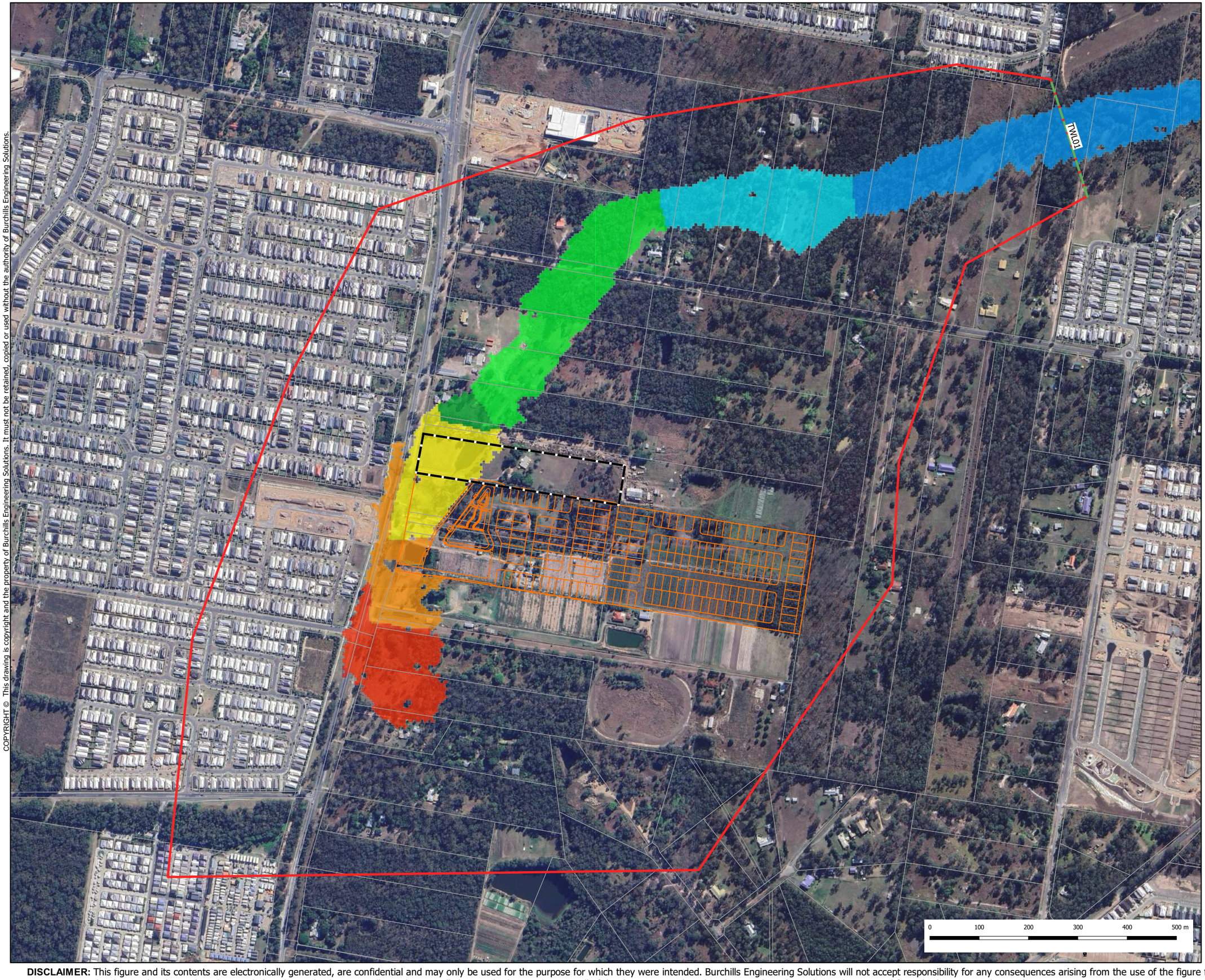
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 07 PRE DEVELOPMENT
0.5% AEP
FLOOD WATER LEVEL





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS
ENGINEERING SOLUTIONS

FOR

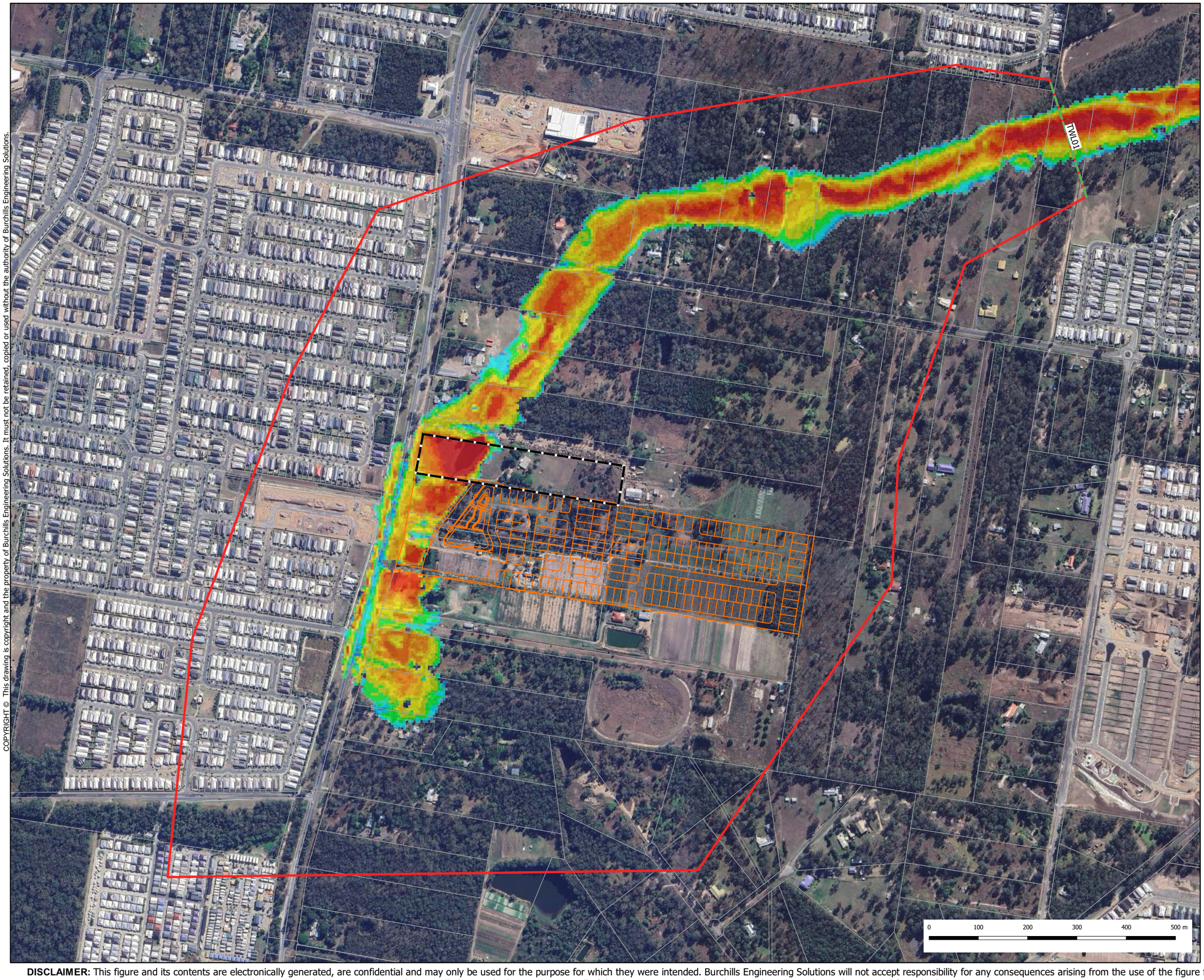
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 08 PRE DEVELOPMENT
0.5% AEP
FLOOD WATER DEPTH





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Depth

- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.3 - 0.45
- 0.45 - 0.6
- 0.6 - 0.75
- 0.75 - 0.9
- 0.9 - 1.05
- 1.05 - 1.2
- above 1.2

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

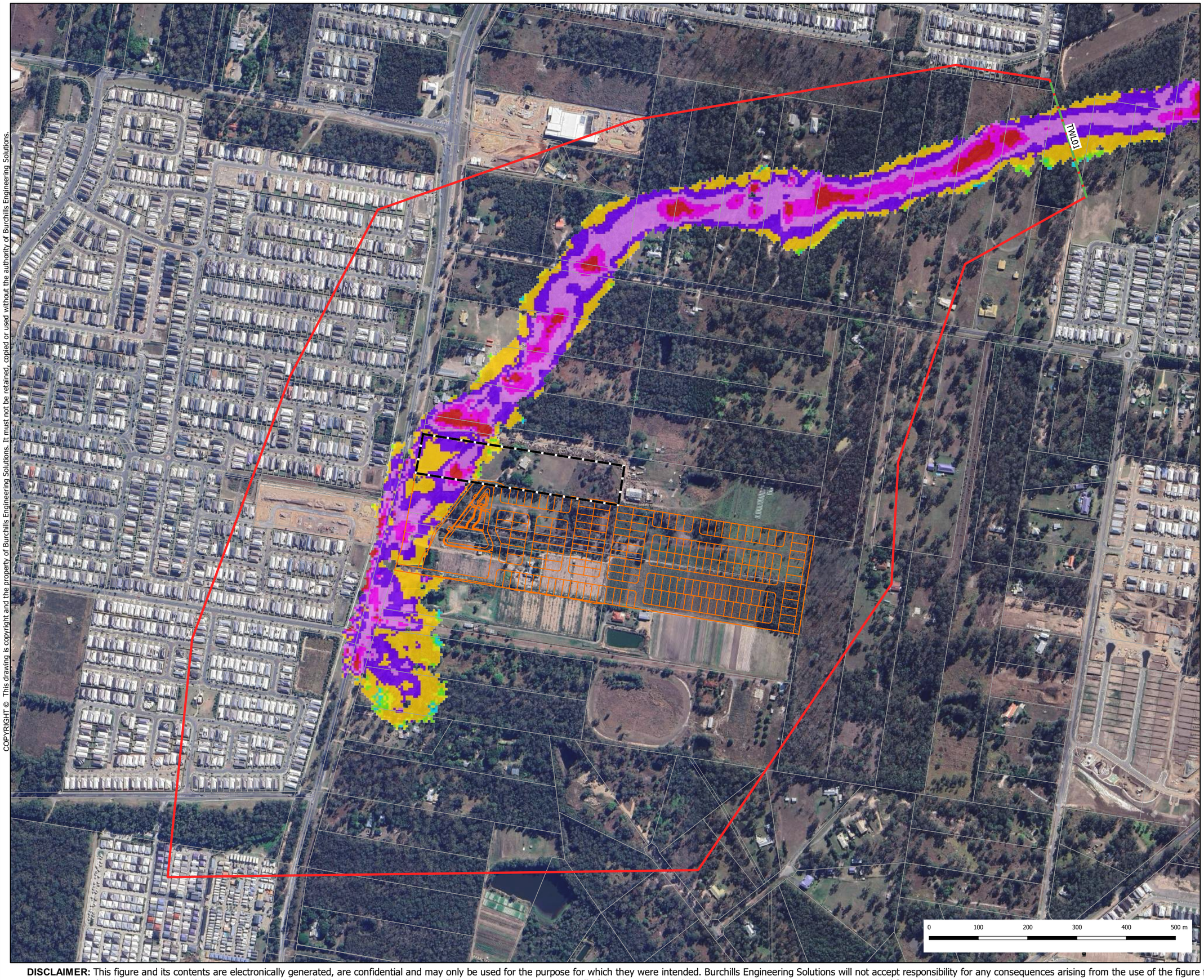
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 09 PRE DEVELOPMENT
0.5% AEP
FLOOD WATER VELOCITY





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 10 POST DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER LEVEL



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

TWL01

0 100 200 300 400 500 m

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 11 POST DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER DEPTH



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)
- below 0.02
- 0.02 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- above 9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

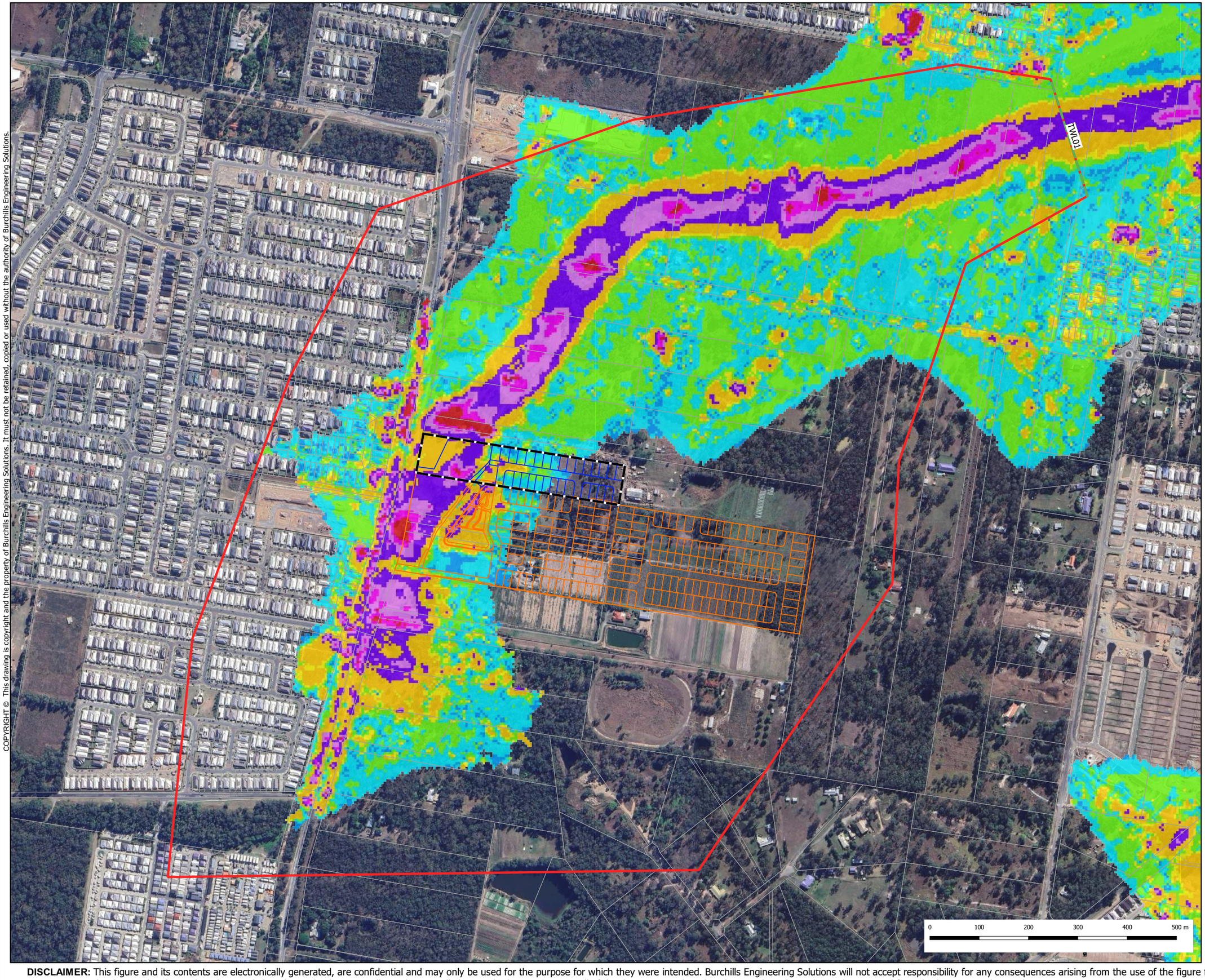
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 12 POST DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER VELOCITY





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

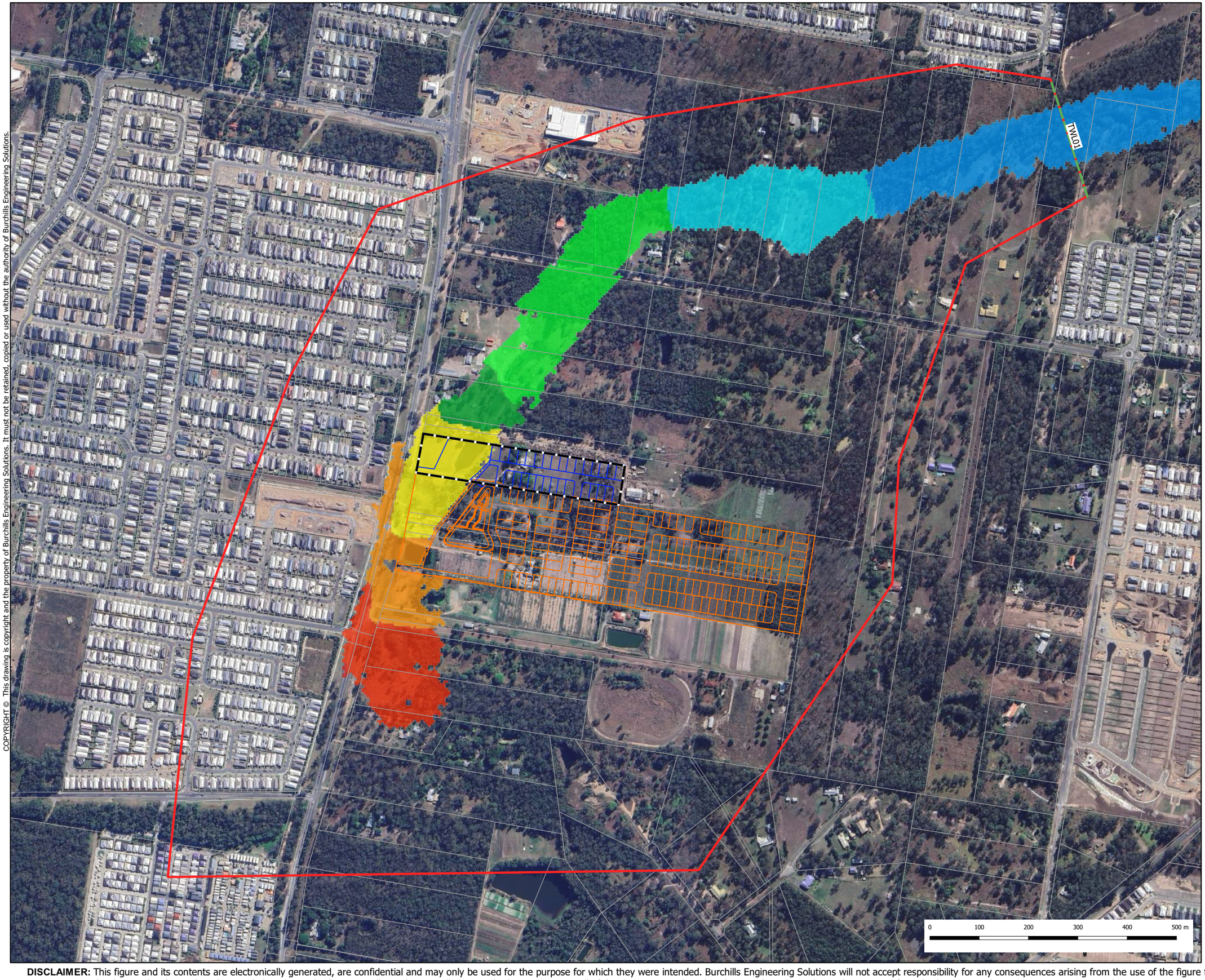
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 13 POST DEVELOPMENT
0.2% AEP
FLOOD WATER LEVEL





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 14 POST DEVELOPMENT
0.2% AEP
FLOOD WATER DEPTH

TWL01

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)
- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.3 - 0.45
- 0.45 - 0.6
- 0.6 - 0.75
- 0.75 - 0.9
- 0.9 - 1.05
- 1.05 - 1.2
- above 1.2

0 100 200 300 400 500 m

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

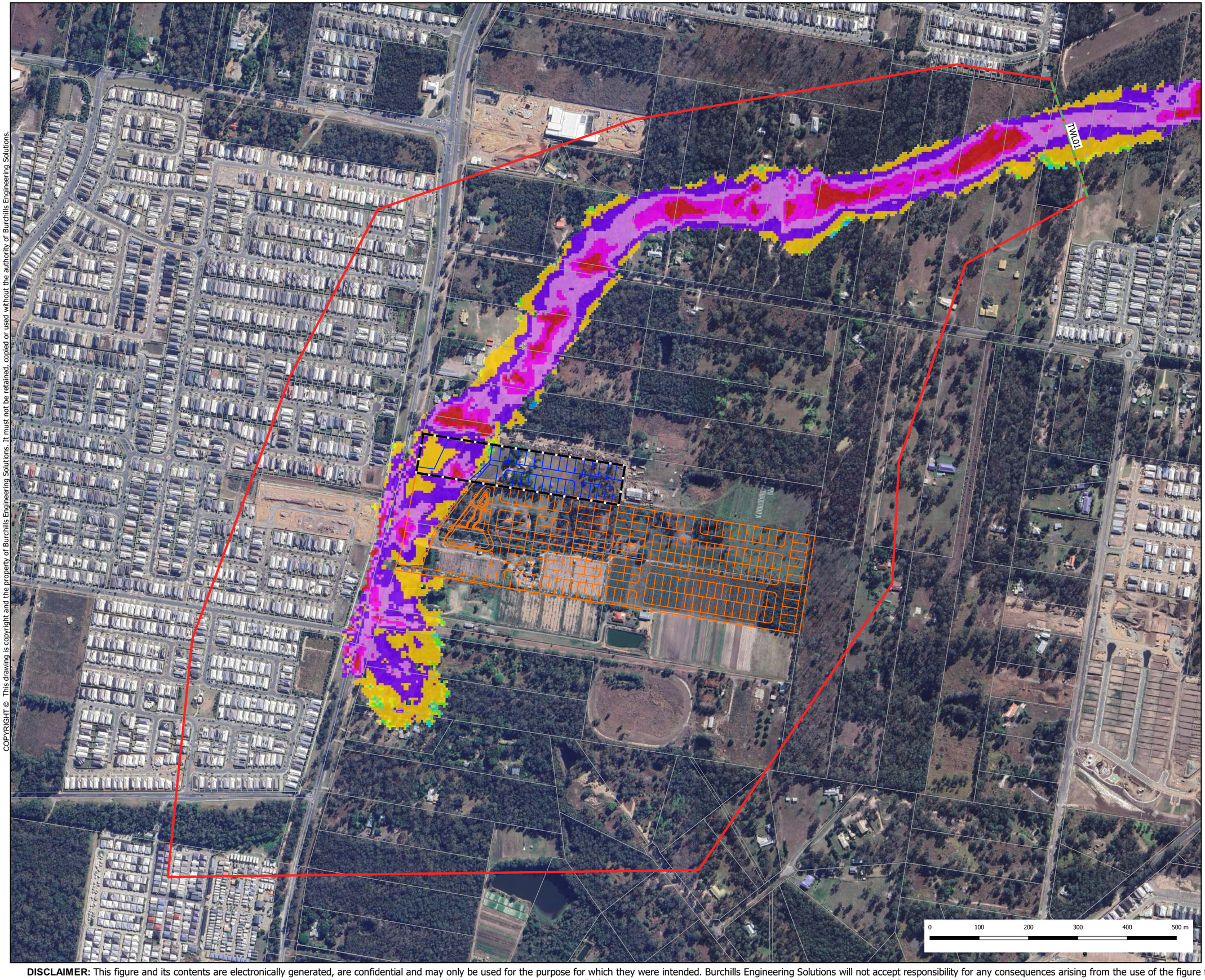
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 15 POST DEVELOPMENT
0.2% AEP
FLOOD WATER VELOCITY





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

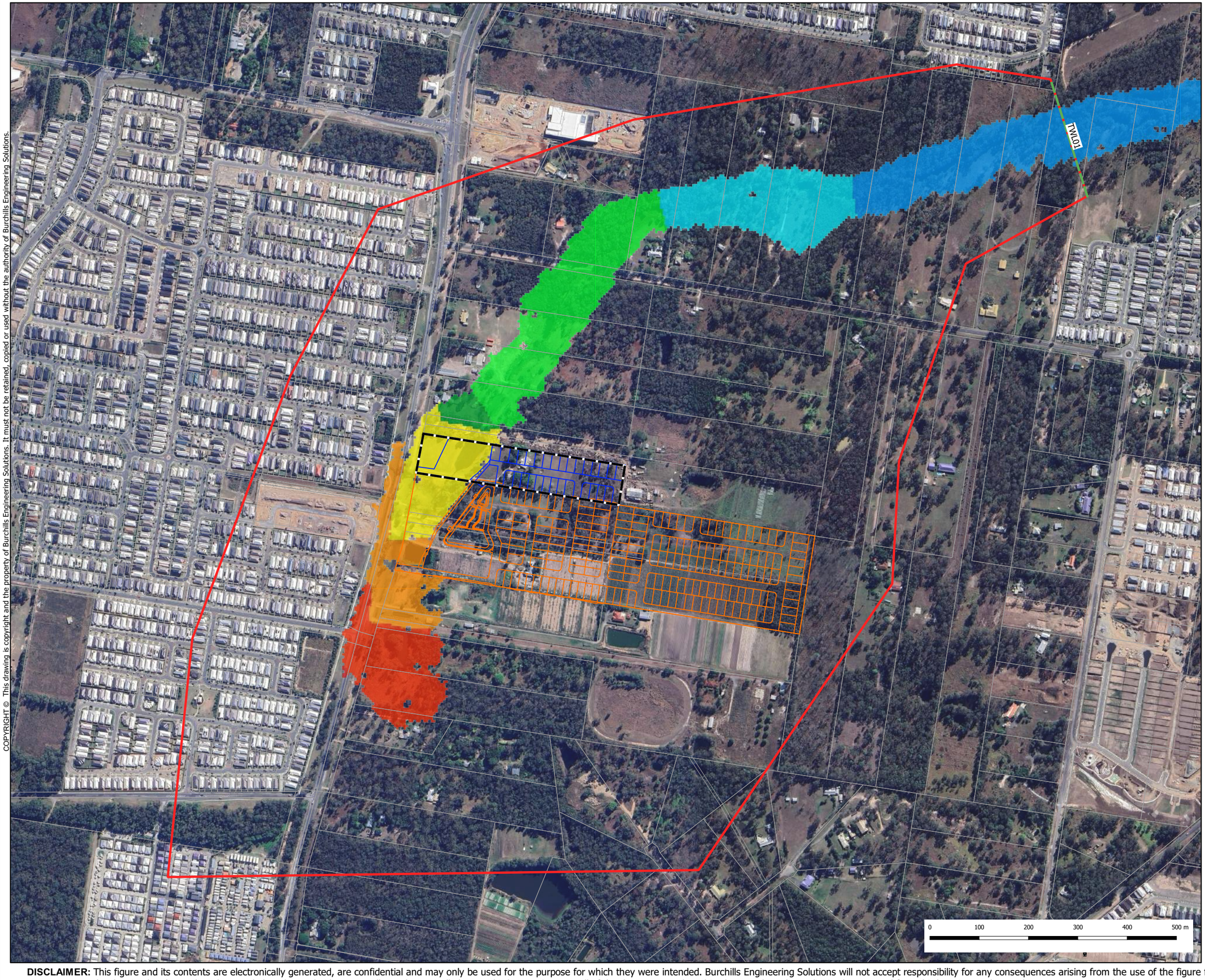
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 16 POST DEVELOPMENT
0.5% AEP
FLOOD WATER LEVEL





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level (mAHD)

- below 10.0
- 10.0 - 12.0
- 12.0 - 14.0
- 14.0 - 15.0
- 15.0 - 16.0
- 16.0 - 17.0
- 17.0 - 18.0
- above 18

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

TWL01

0 100 200 300 400 500 m

530 Chambers Flat Rd

FIG 17 POST DEVELOPMENT
0.5% AEP
FLOOD WATER DEPTH

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Depth (m)
- below 0.02
- 0.02 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.3 - 0.45
- 0.45 - 0.6
- 0.6 - 0.75
- 0.75 - 0.9
- 0.9 - 1.05
- 1.05 - 1.2
- above 1.2

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 18 POST DEVELOPMENT
0.5% AEP
FLOOD WATER VELOCITY



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Velocity (m/s)

- below 0.025
- 0.025 - 0.05
- 0.05 - 0.075
- 0.075 - 0.1
- 0.1 - 0.3
- 0.3 - 0.5
- 0.5 - 0.7
- 0.7 - 0.9
- above 0.9

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

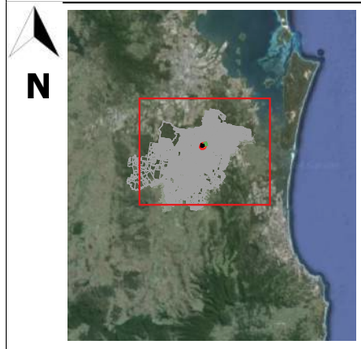
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 19 POST DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 20 POST DEVELOPMENT
0.2% AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

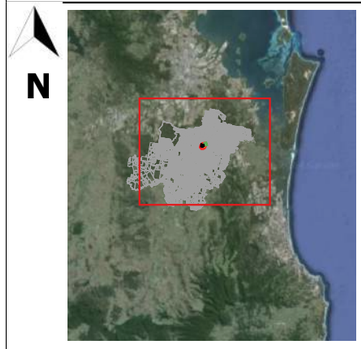
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 21 POST DEVELOPMENT
0.5% AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Water Level Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet To Dry

- Was Wet Now Dry
- Was Dry Now Wet

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

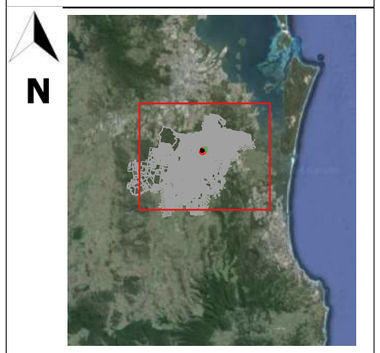
GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

530 Chambers Flat Rd

FIG 22 POST DEVELOPMENT
PMPDF FLOOD EVENT
FLOOD WATER VELOCITY AFFLUX



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

0 100 200 300 400 500 m

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

TWL01

0 100 200 300 400 500 m

530 Chambers Flat Rd

FIG 23 POST DEVELOPMENT
0.2% AEP
FLOOD WATER VELOCITY AFFLUX

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

TWL01

0 100 200 300 400 500 m

530 Chambers Flat Rd

FIG 24 POST DEVELOPMENT
0.5% AEP
FLOOD WATER VELOCITY AFFLUX

N



Location of the site within the City of Gold Coast

Legend

- Model Extent
- Cadastre_LGC
- Site
- Downstream Boundary
- Existing Neighbouring Lot Layout
- Proposed Site Layout

Velocity Afflux (m/s)

- <-0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

Project: BE220612

Date: 13/05/2024

Scale: 1:7000 at A3

Projection: GDA 94/ MGA zone 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GCDEV6 Pty Ltd

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

Appendix D – Burchills Hydraulic Impact Assessment for 532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve (BE210264-RP-HIA-03)

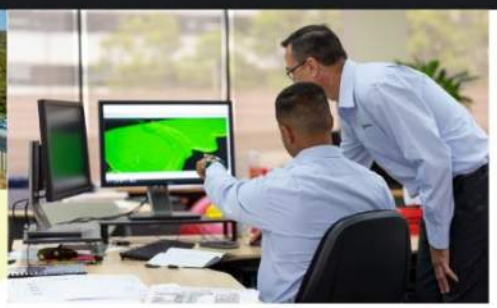
BURCHILLS
ENGINEERING SOLUTIONS






The experience **you deserve**



532-550 Chambers Flat Road, Logan Reserve

Hydraulic Impact Assessment

Client: GDM Property
GC DEV 6 Pty Ltd
Project No: BE210264
Document No: BE210264-RP-HIA-03

June 2023

Document Control Record

Prepared by:	Joshua Micallef
Position:	Civil & Water Engineer
Signed:	
Date:	13/06/23

Approved by:	Lucas Faulkner
Position:	Project Director – Urban & Infrastructure
Signed:	 RPEQ 8093
Date:	13/06/23

Version No.	Description	Date	Prepared	Approved
00	Initial Issue	15/07/2022	JM	LF
01	RFI Response	7/11/2022	JM	LF
02	Amended Layout	30/03/23	JM	LF
03	Further RFI Response	13/06/23	JM	LF

Recipients are responsible for eliminating all superseded documents in their possession

Coote Burchills Engineering Pty Ltd ACN: 166 942 365

Level 2, 26 Marine Parade SOUTHPORT QLD 4215
PO Box 3766, Australia Fair SOUTHPORT QLD 4215
Telephone: +61 7 5509 6400

Level 14, 167 Eagle Street BRISBANE QLD 4000
PO Box 83, BRISBANE QLD 4000
Telephone: +61 7 3606 0201

Email: admin@burchills.com.au

RELIANCE, USES and LIMITATIONS

This report is copyright and is to be used only for its intended purpose by the intended recipient, and is not to be copied or used in any other way. The report may be relied upon for its intended purpose within the limits of the following disclaimer.

This study, report and analyses have been based on the information available to Burchills Engineering Solutions at the time of preparation. Burchills Engineering Solutions accepts responsibility for the report and its conclusions to the extent that the information was sufficient and accurate at the time of preparation. Burchills Engineering Solutions does not take responsibility for errors and omissions due to incorrect information or information not available to Burchills Engineering Solutions at the time of preparation of the study, report or analyses.

Executive Summary

Burchills Engineering Solutions were engaged by GDM Property to prepare a Hydraulic Impact Assessment (HIA) to be considered as part of a Development Application for a 1 into 185 Lot Reconfiguration over 532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve, properly described as Lots 6-9 on RP97736.

This HIA aims to show that the proposed development meets the requirements set out by the Logan Planning Scheme (2015). This has been achieved through hydraulic modelling of the pre and post-development scenario.

This HIA has made the following conclusions relating to flooding at the subject site:

- The conveyance of the existing overland flow path is generally maintained;
- The temporary access has been designed to be flood free in the 1% AEP event, and trafficable under a 50% blockage scenario;
- Impacts in the order of 150mm are caused on the property (Lot 5 RP97736) immediately upstream of the proposed temporary site access. Approval of this afflux has been received in the form of a consent letter from the property owner.
- The modelling results have indicated that the development does not cause any actionable impact to occur on any residential dwellings.

Table of Contents

1. Introduction 1
1.1 Request For Information Response - COM/60/2022 - 25/08/2022 1
1.2 Further Request to Information Response - COM/60/2022 – 5/05/23 (Via Email) 3
1.3 Further Request to Information Response - COM/60/2022 – 2/06/23 (Via Email) 4
1.4 Scope 5
1.5 Development Description 5
1.6 Overland Flow Path 6
1.7 Temporary Site Access – Cross Drainage 6
2. Hydraulic Impact Requirements 8
2.1 Hydraulic Impact Assessment 8
2.2 Regulatory Requirements and Technical Guidelines 8
3. Hydrology Model 9
3.1 Overview 9
3.1.1 XP-SWMM 9
3.1.2 Scope 9
3.2 Catchment Delineation 9
3.2.1 Catchment Parameters 11
3.3 Design Rainfall 11
3.4 Design Losses 11
3.5 Peak Flow Estimation 12
3.5.1 Assessment Method – AR&R 2019 12
3.5.2 Statistical Analysis 12
3.6 Peak Flow Validation 13
3.7 Climate Change Provisions 13
4. Hydraulic Model 14
4.1 Overview 14
4.2 Hydraulic Modelling Parameters 14
5. Results 21
5.1 Flood Behaviour Pre-Development 21
5.2 Flood Behaviour Post-Development 22
5.2.1 Temporary Access Culvert Performance 22
5.2.2 Hydraulic Impact Analysis 22
5.2.3 Climate Change Scenario 29

5.3 Sensitivity Analysis - Blockage Scenario 31
6. Upstream Property – Owners Consent 34
7. Conclusion 35
8. General Issues and Uncertainty 36
9. References 38

Tables

Table 3-1 Catchment Parameters 11
Table 3-2 Land Use Types and Losses 11
Table 3-3 Critical Storm Duration at Proposed Sites Access Cross-Drainage 12
Table 3-4 XPSWMM-Rational Method Validation 13
Table 4-1 Hydraulic Modelling Parameters 14
Table 5-1 Model Noise Interrogation 25
Table 5-2 QUDM Flow Limits - Major Storm 31
Table 5-3 Peak Flows – Temporary Access Road – Blockage Scenario 33
Pre-Development Hydrology 42

Figures

Figure 1.1 Proposed Site Plan 6
Figure 1.2 Logan City Council Waterway Overlay Map 6
Figure 1.3 Proposed Cross Drainage Culverts Location 7
Figure 1.4 Proposed Cross Drainage Culverts Cross Section 7
Figure 3.1 Existing Scenario - Catchment Map 10
Figure 3.2 Developed Scenario - Catchment Map 10
Figure 3.3 Assessment Methodology Summary 12
Figure 4.1 Model Topography Map 16
Figure 4.2 Proposed Development DEM 17
Figure 4.3 Model Inflow and Boundary Locations 18
Figure 4.4 Model Inflow and Boundary Locations Post- Development 19
Figure 4.5 Manning's Roughness Map 20
Figure 5.1 Depth Plot - 1% AEP Pre-Development 21
Figure 5.2 Velocity Plot - 1% AEP Pre-Development 22
Figure 5.3 Water Level Afflux Plot - 1% AEP Event 23
Figure 5.4 Velocity Afflux Plot - 1% AEP Event 24
Figure 5.5 Water Level Afflux Plot - 39% AEP Event 28
Figure 5.6 Velocity Afflux Plot - 39% AEP Event 29
Figure 5.7 Depth Plot - 1% AEP Post-Developed Climate Change 30
Figure 5.8 Water Level Afflux Plot - 1% AEP Post-Development Climate Change 30

Figure 5.9 Velocity Afflux Plot - 1% AEP Post-Development Climate Change 31
Figure 5.10 Depth Plot - 1% AEP Post-Development Blockage Scenario 32
Figure 5.11 Velocity Plot - 1% AEP Post-Development Blockage Scenario..... 32

Appendices

Appendix A Further Information and Methods
Appendix B Burchills Engineering Civil Design Drawings
Appendix C Time of Concentration and Rational Method Calculations
Appendix D Chambers Flat Road Upgrade – Drainage Design Drawings
Appendix E Hydraulic Model Features
Appendix F Hydraulic Mapping Results

1. Introduction

Burchills Engineering Solutions were engaged by GDM Property to prepare a Hydraulic Impact Assessment (HIA) to be considered as part of a Development Application for a 1 into 185 Lot Reconfiguration over 532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve, properly described as Lots 6-9 on RP97736.

This HIA will detail the impacts of the proposed works on the existing overland flow regime in relation to the subject site.

1.1 Request For Information Response - COM/60/2022 - 25/08/2022

Item	Response
5.12 Amend the hydraulic report to confirm the fraction impervious anticipated for the site (i.e., Cat_5 and Cat_8a) in the developed scenario	Post developed flows have been mitigated to pre-developed levels as demonstrated by the Stormwater Quantity Section in Burchill's CSMP. Therefore, in order to represent the post-development flow regime in the model it was deemed appropriate to use pre-developed hydrology to represent the developed, mitigated flows for the Hydraulic Impact Assessment. On this basis, the developed scenario impervious fraction has not been amended in the hydraulic modelling.
5.13 Confirm if Cat_8a has been accounted for in the TUFLOW model.	Post Catchment 8a has been accounted for. Pre-developed Catchment 8a flows have been adopted in the assessment, this is considered conservative as post-developed flows from this catchment have been reduced. Refer to CSMP for additional information.
5.14 Amend the TUFLOW modelling to use more up-to-date LIDAR information	Latest available LiDAR has been used. (2017)
5.15 Amend the TUFLOW modelling to adopt a climate change allowance	Tailwater conditions (HQ boundary) remain unchanged in the local flood model for the climate chance scenario. An increase in rainfall of 10% has been included in the hydrology model to allow for provision for the climate change scenario. The climate change scenario has been run independently from the other design events and sensitivity scenario..
5.16 Amend the TUFLOW modelling to adopt a fully developed external catchment to size up the	As it is expected that future Development is required to mitigate peak flows to the pre-

culvert crossing as per the requirements of QUDM.	development level, it was deemed appropriate that upstream catchments are represented as existing conditions.
5.17 Amend the TUFLOW modelling to consider the external catchment that falls on to its eastern boundary (Ext_01).	It is proposed that an external cut-off channel and level spreader device be used to convey runoff from Ext_01 to the sites north-eastern boundary. Runoff from the EXT_01 has been represented as a uniformly distributed Source Area inflow that is considered consistent with the manner in which discharged flows will operate in this area. Please refer to civil drawings for further details on proposed level spreader devices.
5.18 Provide an amended hydraulic report which includes change in velocity flood mapping.	Velocity afflux mapping has been included in the report.
5.19 Provide the rationale for the inclusion of the upgrades to Chambers Flat Road and information on how this was incorporated into the modelling	The Chambers Flat Road upgrade will be the ultimate development condition therefore it was deemed appropriate to include in the assessment. The design TIN and culvert upgrades were represented in the model as discussed in the report, refer to Section 4.2 and Appendix D.
5.20 Amend the TUFLOW modelling to incorporate any deceleration lane or works within Chambers Flat Road.	The Design DEM for the Chamber Flat Road widening has been incorporated in the updated model. It is noted that this DEM caused modelling 'noise' please refer to Section 5.2.2 for further detail on reduction of 'noise'.
5.21 Provide a design and updated TUFLOW modelling that includes extra conveyance capacity to optimise the flood impacts between the immediate downstream and upstream of the proposed culvert crossing.	The proposed culvert system on the temporary access to the development achieves QUDM safety requirements. Approval of this afflux has been received owner of the upstream property.
5.22 Provide additional TUFLOW modelling that includes a sensitivity analysis for the 1% AEP with culvert blockage to determine if the temporary access will remain trafficable, especially in the 1% AEP event	Additional TUFLOW modelling completed. Modelling results indicate that the temporary access will remain trafficable in the 1% AEP event. Further details provided in Section 5.3 of this report.
5.23 Provide a copy of all TUFLOW modelling.	Modelling files provided with submission.
5.24 Provide an alternative outcome for managing afflux as the owners consent provided in relation to Lot 5 on RP for afflux on the property is not supported. Advice Note: Affluxes up to 130mm are estimated on the property to the south. This is significant even though it is within a flow path. Unless this impacted area is zoned and dedicated as drainage easement, owner's consent will not warrant that the future owner/s	Approval of this afflux has been received by the owner of the upstream property.

will accept these impacts. Additionally, it is hard to administer such transfer of consent as part of a land purchase. Additionally, the owner's consent only states likely flood impacts in the order of 50-100mm which is not an accurate reflection of the maximum 130mm estimate in the 1% AEP event assessed. Lastly, the owner's consent is signed by a developer and not the listed owner of the property	

1.2 Further Request to Information Response - COM/60/2022 – 5/05/23 (Via Email)

Item	Response
1.1 The decision to maintain the pre-developed impervious fraction in the post-developed scenario is not supported. The analysis is to be updated to correctly reflect the change in fraction impervious to verify and confirm there are no implications on afflux to adjoining properties. ***Advice Note:*** *Maintaining the pre-developed impervious fraction in the post-developed scenario ignores the potential influence of combined peak flows, from a timing perspective, in the flood analysis.*	Modelled hydrology has been updated to represent post developed catchment. The proposed detention basin has also been included in the updated hydraulic model.
1.2 Provide the Post Development Catchment Plan that reflects the proposed modifications to cat_8a and the redirection of runoff towards the proposed detention basin (to be consistent with the information provided in the Conceptual Stormwater Management Plan). ***Advice Note:*** *Fig 01 in Appendix E appears to only consider the pre-developed catchment areas.*	This has been provided in Figure 3.2 within the report and Fig 04 in Appendix E.
1.3 The boundary condition at TWL_01 is to be amended to address regional flooding characteristics. ***Advice Note:*** *The application of a HQ boundary is an unrealistic function given the regional flood conditions at the location of the boundary. To address this, the implementation of a fixed head boundary, which will represent the backwater conditions that apply to this area, of RL 14.6m AHD is required*.	As per advice from council downstream HQ boundary slope has been amended to 0.3%.

1.4 Amend Section D on Drawing No. C213 of the Conceptual Civil Engineering Drawings to detail the relationship to the external property.	Please refer to Drawing No. C213-E which has been amended as requested.
1.5. An additional section showing the conceptual relationship to the future collector road is required to ensure that an appropriate interface can be achieved at the time of removal of the cut-off channel and level spreader.	Details are depicted on the Future Collector Road Plan and Cross Sections, Drawing No's SK05-SK08 included in the Civil Engineering Report.
1.6. Amend the flood model outputs to incorporate the flows traversing through the rear of the site.	Flood model outputs have been updated to include flows traversing the rear of the site.
1.7 Update all depth, velocity, and afflux mapping to reflect all other amendments.	Hydraulic mapping results have been updated to account for changes made to the model.
1.8 The owner's consent letter, dated 1 July 2022, specifically nominated a maximum depth of afflux to be 100mm. The final output prepared prior to this further information request is now greater than this depth. Provide an updated letter confirming acceptance of the final depth of afflux that will affect the upstream property. ***Advice Note**: The owner's consent must be signed by the listed owner of the property.*	Owners Consent Letter has been provided to council with previous response to RFI. We confirm that the entity that has signed the landowner's consent letter is the listed owner of the property. It should be noted that the owner of the property has consented as they are the one of the proponents of this application.
1.9 A copy of the updated TUFLOW modelling will be required with all amendments addressing this further information request.	Please refer to Tuflow model files provided with this response.

1.3 Further Request to Information Response - COM/60/2022 – 2/06/23 (Via Email)

Item	Response
1. A review of the afflux plans however indicates that there is afflux immediately adjacent to an existing dwelling to the north of the site during the 2% AEP that will need to be reviewed. This may have the potential to result in an adverse impact to the structure, which is not included in the application. The following screenshot highlights the location of the afflux, which is from FIG C02 Post Development 2% AEP Flood Water Level Afflux.	The Afflux has been reviewed and determined to be model noise resulting from the inclusion of the Chambers Flat Road Upgrade Design Surface. The model noise has been discussed in detail in section 5.2.2 of this report.

1.4 Amend Section D on Drawing No. C213 of the Conceptual Civil Engineering Drawings to detail the relationship to the external property.	Please refer to Drawing No. C213-E which has been amended as requested.
1.5. An additional section showing the conceptual relationship to the future collector road is required to ensure that an appropriate interface can be achieved at the time of removal of the cut-off channel and level spreader.	Details are depicted on the Future Collector Road Plan and Cross Sections, Drawing No's SK05-SK08 included in the Civil Engineering Report.
1.6. Amend the flood model outputs to incorporate the flows traversing through the rear of the site.	Flood model outputs have been updated to include flows traversing the rear of the site.
1.7 Update all depth, velocity, and afflux mapping to reflect all other amendments.	Hydraulic mapping results have been updated to account for changes made to the model.
1.8 The owner's consent letter, dated 1 July 2022, specifically nominated a maximum depth of afflux to be 100mm. The final output prepared prior to this further information request is now greater than this depth. Provide an updated letter confirming acceptance of the final depth of afflux that will affect the upstream property. ***Advice Note**: The owner's consent must be signed by the listed owner of the property.*	Owners Consent Letter has been provided to council with previous response to RFI. We confirm that the entity that has signed the landowner's consent letter is the listed owner of the property. It should be noted that the owner of the property has consented as they are the one of the proponents of this application.
1.9 A copy of the updated TUFLOW modelling will be required with all amendments addressing this further information request.	Please refer to Tuflow model files provided with this response.

1.3 Further Request to Information Response - COM/60/2022 – 2/06/23 (Via Email)

Item	Response
1. A review of the afflux plans however indicates that there is afflux immediately adjacent to an existing dwelling to the north of the site during the 2% AEP that will need to be reviewed. This may have the potential to result in an adverse impact to the structure, which is not included in the application. The following screenshot highlights the location of the afflux, which is from FIG C02 Post Development 2% AEP Flood Water Level Afflux.	The Afflux has been reviewed and determined to be model noise resulting from the inclusion of the Chambers Flat Road Upgrade Design Surface. The model noise has been discussed in detail in section 5.2.2 of this report.

1.4 Amend Section D on Drawing No. C213 of the Conceptual Civil Engineering Drawings to detail the relationship to the external property.	Please refer to Drawing No. C213-E which has been amended as requested.
1.5. An additional section showing the conceptual relationship to the future collector road is required to ensure that an appropriate interface can be achieved at the time of removal of the cut-off channel and level spreader.	Details are depicted on the Future Collector Road Plan and Cross Sections, Drawing No's SK05-SK08 included in the Civil Engineering Report.
1.6. Amend the flood model outputs to incorporate the flows traversing through the rear of the site.	Flood model outputs have been updated to include flows traversing the rear of the site.
1.7 Update all depth, velocity, and afflux mapping to reflect all other amendments.	Hydraulic mapping results have been updated to account for changes made to the model.
1.8 The owner's consent letter, dated 1 July 2022, specifically nominated a maximum depth of afflux to be 100mm. The final output prepared prior to this further information request is now greater than this depth. Provide an updated letter confirming acceptance of the final depth of afflux that will affect the upstream property. ***Advice Note**: The owner's consent must be signed by the listed owner of the property.*	Please find attached the amended Owners Consent Letter is attached to this response. We confirm that the entity that has signed the landowner's consent letter is the listed owner of the property.
1.9 A copy of the updated TUFLOW modelling will be required with all amendments addressing this further information request.	Please refer to Tuflow model files provided with this response.

1.3 Further Request to Information Response - COM/60/2022 – 2/06/23 (Via Email)

Item	Response
1. A review of the afflux plans however indicates that there is afflux immediately adjacent to an existing dwelling to the north of the site during the 2% AEP that will need to be reviewed. This may have the potential to result in an adverse impact to the structure, which is not included in the application. The following screenshot highlights the location of the afflux, which is from FIG C02 Post Development 2% AEP Flood Water Level Afflux.	The Afflux has been reviewed and determined to be model noise resulting from the inclusion of the Chambers Flat Road Upgrade Design Surface. The model noise has been discussed in detail in section 5.2.2 of this report.

	
2. We are also keen to see the influence of the rear cut-off drain and downstream by-pass flows as noted in Item 1.6 of the information request. We acknowledge that this area has been assessed in isolation to broadly verify freeboard, however it has not been presented in relation to overland flow impacts downstream within the TUFLOW modelling.	Please refer to updated mapping attached in Appendix F of the report which demonstrates that the inclusion of the proposed channel within the model does not result in downstream impacts.

1.4 Scope

This HIA has been undertaken using the following scope:

- Model Development
  - Construct a TUFLOW model to ensure impact is assessed at a detailed level
- Review of Model Results
  - Review of modelling results, including water level impacts, velocity impacts, hazards and modelling inefficiencies.
- Report and Mapping
  - Presentation of pre-development and post-development flow extents, depths, and velocities (where applicable);
  - Impact assessment including afflux contours and risk assessment; and
  - Review of any impacts resulting from the proposal in the context of whether such afflux may give rise to potential actionable damage to surrounding properties.

1.5 Development Description

The proposal seeks to reconfigure the subject site, creating a total of 185 residential allotments ranging in size from 500m^2 – 640m^2. The development allows for the construction of a new internal road with access gained from Chambers Flat Road. Approximately 10,000m^2 of the site has been allocated to park land and 6,655m^2 for stormwater management devices.

Figure 1.1 below shows the proposed development layout. For further details regarding the proposed layout, please refer to the complete site layout plan attached within Appendix B.

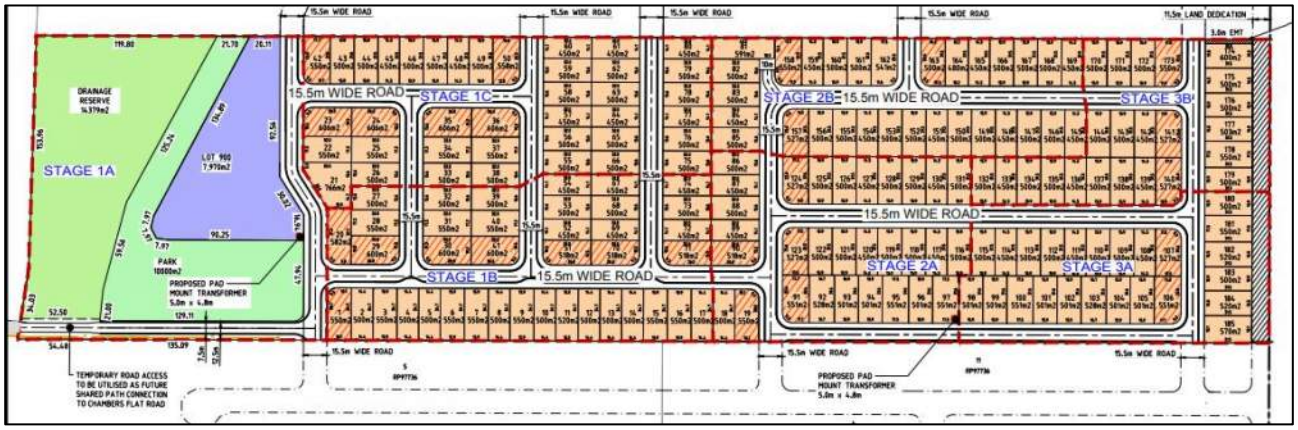


Figure 1.1 Proposed Site Plan

1.6 Overland Flow Path

The Logan Planning Scheme (2015) Waterway Corridor and Wetlands Trigger Overlay shows a 'Medium Waterway' traversing the site's western extents. Figure 1.2 (below) provides an extract of the Waterway Corridor and Wetlands Trigger Overlay.

Describe contributing catchment (ha), refer following sections, build context



Figure 1.2 Logan City Council Waterway Overlay Map

1.7 Temporary Site Access – Cross Drainage

It is proposed that temporary access to the development will be acquired via a proposed road connecting to Chambers Flat Road. It is proposed that 10 x 3m wide x 1.2m deep culverts are

installed beneath the roadway to safely convey 1% AEP event limiting impacts to acceptable limits. Shown below in Figure 1.4 & Figure 1.4 is the proposed location of the culverts and cross section respectively.

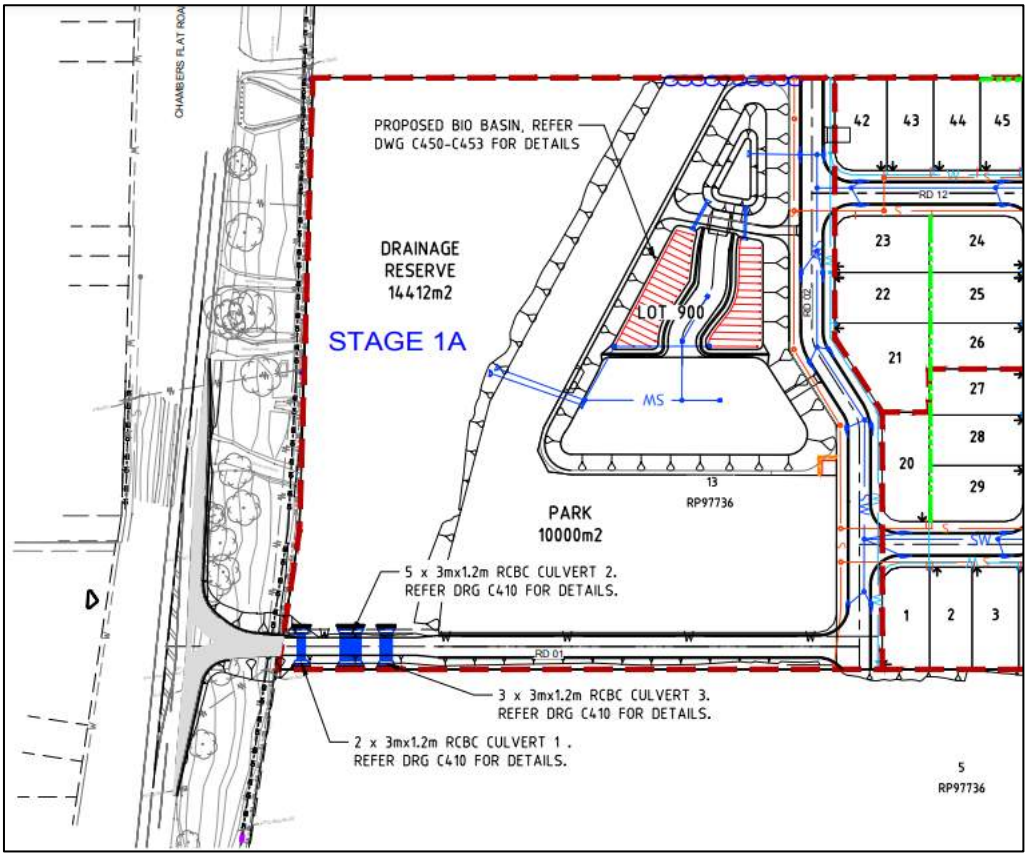


Figure 1.3 Proposed Cross Drainage Culverts Location

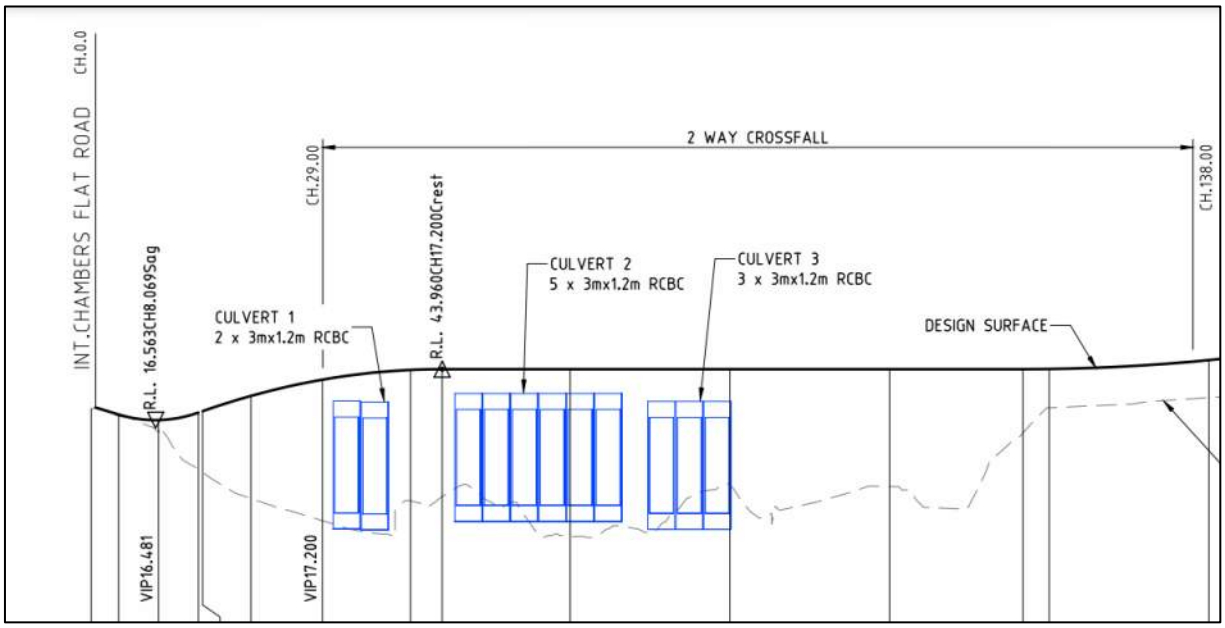


Figure 1.4 Proposed Cross Drainage Culverts Cross Section

2. Hydraulic Impact Requirements

2.1 Hydraulic Impact Assessment

The purpose of this report is to assess the hydraulic impact of the proposed development. The local flow characteristics within the catchment have been modelled to ensure that the proposed development results in no adverse impacts upon adjoining properties.

The AEP's simulated for this HIA were the 39%, 18%, 10%, 5%, 2%, and 1% AEP events. As there is a plethora of potential event durations for each AEP, the critical durations for the respective local floods were assessed.

2.2 Regulatory Requirements and Technical Guidelines

This report assesses the proposed development against the requirements set out in the pre-lodgement meeting held on the 18th of August 2021 which specifies the following:

- A hydraulic analysis is required to confirm that the existing flow characteristics will not be worsened by the proposed temporary access driveway.
- Trafficability in all design events up to and including the 1% AEP event will need to be confirmed;

This is in accordance with the Logan Planning Scheme (2015) Code:

- 8.2.12 Waterway corridors and wetlands overlay code – The proposed development is situated within the waterway assessment area and as such must meet all relevant requirements of the code.

The strategies proposed in this HIA have been developed to address the requirements of the Logan Planning Scheme (2015), and have also been prepared in accordance with the following guidelines:

- Queensland Urban Drainage Manual (QUDM) – Fourth Edition (IPWEAQ, 2017); and
- Australian Rainfall and Runoff – A Guide to Flood Estimation (Ball, et al., 2016).

3. Hydrology Model

3.1 Overview

3.1.1 XP-SWMM

XP-SWMM (version 2019.1) software was utilised to model hydrologic behaviour of the stormwater catchments derived for this assessment. This modelling software is a link-node model capable of performing hydrology and hydraulics of stormwater drainage systems simultaneously.

Laurenson's Hydrology has been adopted as the runoff routing method within XP-SWMM. Sub-catchment routing in this method is carried out using the Muskingum procedure, which is a storage routing method based on the storage equation.

Details of the assumptions and input parameters used within the XP-SWMM model inputs are included in Appendix C.

3.1.2 Scope

Outlined below is the general methodology of the hydrological modelling portion of the assessment

- Delineate stormwater catchments;
- Determine critical storms using ARR 2019 methodolgy;
- Validate peak catchment flows against rational method calculations;
- Run additional scenario which allows for a 10% increase in rainfall to account for Climate Change.

3.2 Catchment Delineation

Catchments were delineated based on available 2017 LiDAR data, Burchills Design Drawings and site survey; a catchment map Is presented below in Figure 3.1.

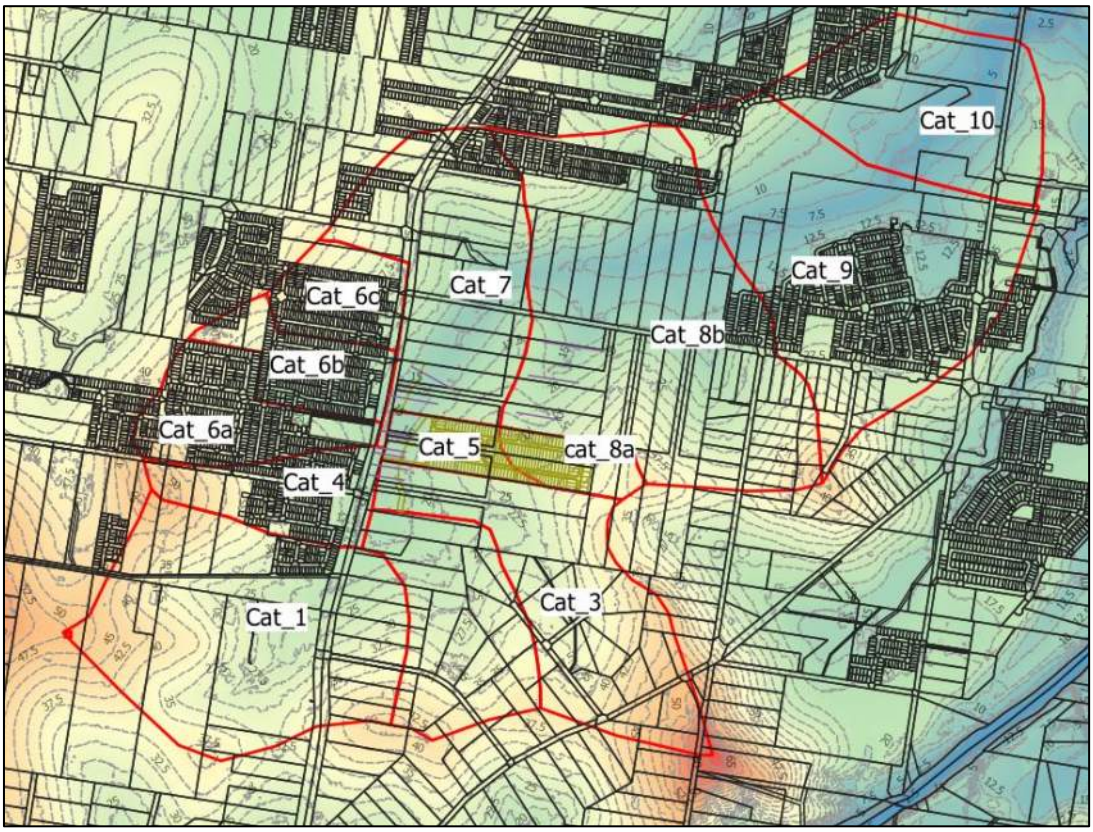


Figure 3.1 Existing Scenario - Catchment Map

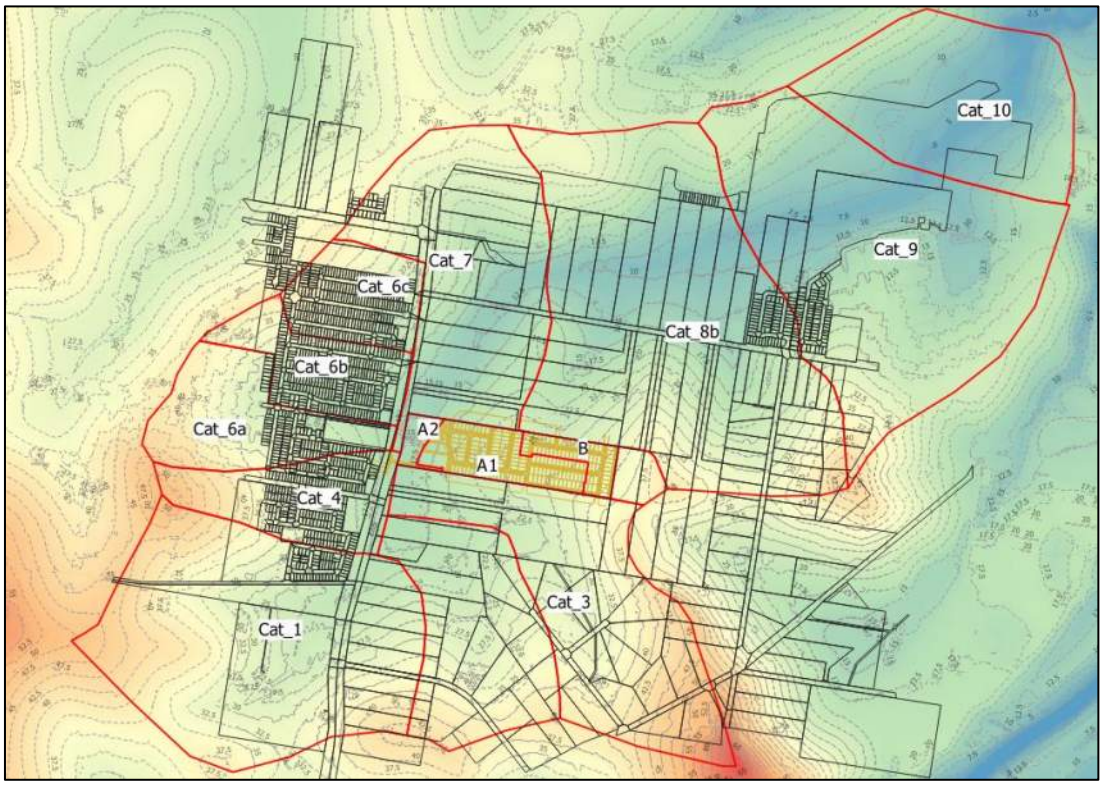


Figure 3.2 Developed Scenario - Catchment Map

3.2.1 Catchment Parameters

The following catchment parameters were adopted for the XP-SWMM Routing model.

Table 3-1 Catchment Parameters

Catchment ID	Area (ha)	Slope (%)	Impervious Percentage (%)
Cat_1	94.05	2.4	15
Cat_2	40.68	3.1	6
Cat_3	60.97	2.4	10
Cat_4	23.69	2.6	27
Cat_5	9.86	2.4	19
Cat_6a	27.13	2.8	72
Cat_6b	18.95	3.2	60
Cat_6c	17.51	3.2	36
Cat_7	61.86	2.4	14
Cat_8a	10.23	3	1
Cat_8b	123.13	2.6	6
Cat_9	103.87	3.1	29
Cat_10	53.01	2.6	4
A1	10.25	2	73
A2	2.06	2.6	0
B	4.22	2	83
Ext_01	3.35	3.3	0

Please note that in the post developed scenario Catchment B is represented as ‘Q2_Flow’ and Cat_8a_DEV in the TUFLOW model. As per Burchills CSMP - ‘BE210264-RP-CSMP-03, minor flows from catchment B will be diverted to the detention basin.

3.3 Design Rainfall

Design rainfall intensities were sourced from the IFD generation tool available on the Bureau of Meteorology (BoM) website (www.bom.gov.au) using point coordinates at the centroid of the study area (27.18S, 153.09E).

3.4 Design Losses

The initial loss and continuing loss model have been selected for this study. The initial loss and continuing loss values applied to the model are reflected through pervious and impervious areas. The adopted design loss values for the XP-SWMM hydrological model are shown in Table 3-2.

Pervious initial and continuing losses were provided by ARR guidelines which is dependent on the study area and were sourced from BOM.

Table 3-2 Land Use Types and Losses

Land Use Type	Initial Loss (mm)	Continuing Loss (mm)
Pervious	20	1.5
Impervious	1	0

3.5 Peak Flow Estimation

3.5.1 Assessment Method – AR&R 2019

In accordance with AR&R 2019 guidance the following statistical ensemble assessment method was used for the study.

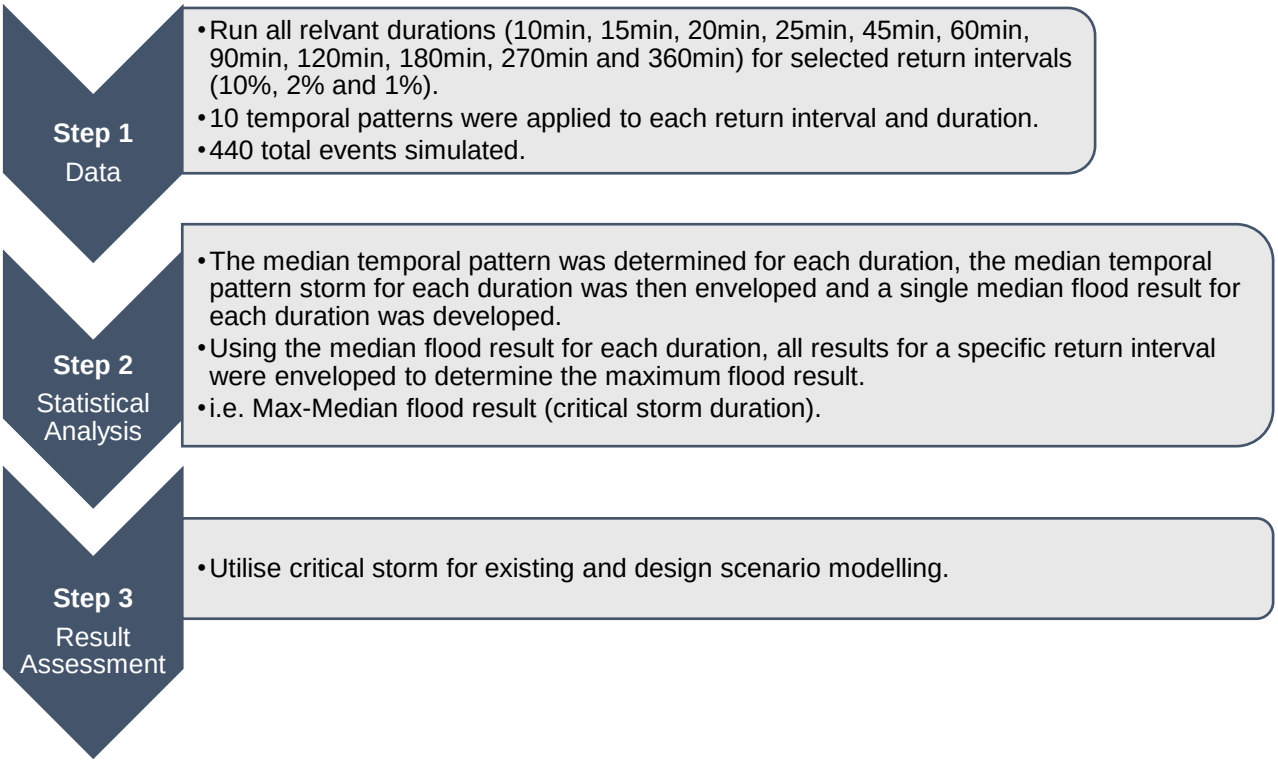


Figure 3.3 Assessment Methodology Summary

3.5.2 Statistical Analysis

Based on the statistical analysis discussed above, critical storm durations for the 0.5 EY - 1% AEP events were identified at the proposed site access cross-drainage. The critical storms for each of the assessed AEP events are shown in Table 3-3

Table 3-3 Critical Storm Duration at Proposed Sites Access Cross-Drainage

Return Interval	Critical Storm Duration (Max-Median)
1%	120-minute duration Ensemble 6
2%	90-minute duration Ensemble 5
5%	120-minute duration Ensemble 4
10%	120-minute duration Ensemble 8
0.2EY	120-minute duration Ensemble 6
0.5EY	60-minute duration Ensemble 4

3.6 Peak Flow Validation

As there was no existing flood information to calibrate the local model to, a validation process was adopted by review of the XP-SWMM peak flows in comparison to the Rational Method peak flow estimation.

The following table details the results of the validation assessment. It is shown that the XP-SWMM flow estimation is determining peak flow in-line with the peak flow predicted by the Rational Method (generally within 20%). A summary of Rational calculations has been provided in Appendix B.

Table 3-4 XPSWMM-Rational Method Validation

Catchment ID	1% AEP Peak Flow		
	XP-SWMM	Rational Method	Difference
Cat_1	16.47	19.25	14%
Cat_2	8.1	8.74	7%
Cat_3	11.2	11.48	2%
Cat_4	6.2	8.04	23%
Cat_5	2.6	3.33	22%
Cat_6a	14.8	11.37	-30%
Cat_6b	8.57	7.20	-19%
Cat_6c	5.74	6.14	7%
Cat_7	11.2	14.15	21%
cat_8a	2.82	2.52	-12%
Cat_8b	20	26.01	23%
Cat_9	23.84	21.53	-11%
Cat_10	11.15	11.71	5%
A1	5.48	5.62	3%
A2	0.80	0.80	0
B	2.62	2.62	0
		Average	3%

3.7 Climate Change Provisions

In order to account for future increase in rainfall due to climate change, rainfall inputs in the XP-SWMM hydrology model were increased by a factor of 10%. Relevant modelling results for the 1% AEP Climate Change scenario can be found in Section 5.2 of this report.

4. Hydraulic Model

4.1 Overview

The software package TUFLOW has been used to undertake the hydraulic modelling presented in this report. For further information about TUFLOW, please refer to Appendix A.

4.2 Hydraulic Modelling Parameters

A TUFLOW model was developed to represent the flow behaviour of the subject waterway and environs which is locally affected by the subject site. The details of the parameters used for the TUFLOW model are presented in Table 4-1. The pre-development and post-development model feature maps along with roughness maps are presented in Appendix C.

Chambers Flat Road is expected to undergo an upgrade prior to the development of the subject site. The upgrade has been accounted for in both the pre-development and post-development hydraulic models as a result.

Table 4-1 Hydraulic Modelling Parameters

Parameters	**Details**
Scenarios	• Pre-development; and • Post-development.
Events and Critical Durations Modelled	• 39% AEP – 1hr; • 18% AEP – 2hr • 10% AEP – 2hr • 5% AEP - 2hr • 2% AEP – 1.5hr; and • 1% AEP – 2hr.

Topography	Pre-Development & Post-Development
	• Logan City Council proposed Chambers Flat Road Design TIN (Chambers Flat Road Upgrade – Derby Road to School Road)
	• 2017 1m LiDAR – DTM (BRCFS Model)
	  ○ Vertical data: Spatial Accuracy: 0.15m @ 67 % CI (95% confidence level or 2 sigma)
	  ○ Horizontal Data: Spatial Accuracy: 0.40m @ 67 % CI (95% confidence level or 2 sigma)
	• Burchills' Design as per Appendix B

Initial Water Level	Pre-Development & Post Development • No IWL set, study area comprised of ephemeral creeks.
2D Resolution	• 2m grid.

Parameters	Details
Timestep	• Adaptive timestep. (HPC)
Inflows	• Hydrographs derived from XPSWMM hydrology model. Refer Section 3 for further detail.
Downstream Boundary Condition	• HQ Boundary (with 0.3% Slope)
Hydraulic Structures	• Existing and proposed culverts ○ See Appendix B for Burchills' Civil design drawings. ○ See appendix D for Chambers Flat Road Upgrade Culvert Details
Surface Roughness (reflected as Manning 'n')	• n = 0.020 – Road • n = 0.4 – Building • n = 0.045 – Trees • n = 0.022 – Water Body • n = 0.120 – Remaining Area – Rural Residential (0.045)

Model set up parameters are shown below in Figure 4.1 - Figure 4.5.

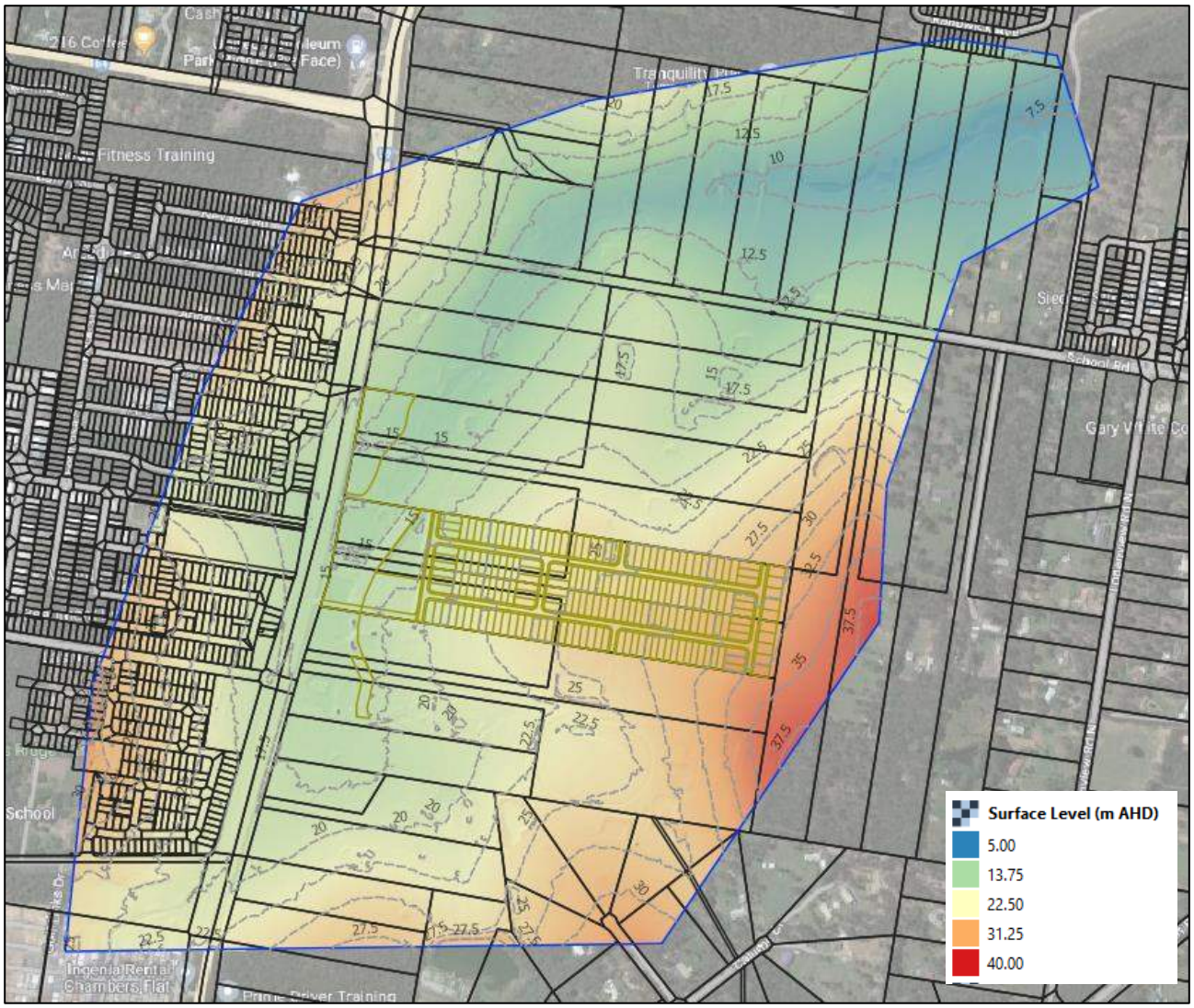


Figure 4.1 Model Topography Map

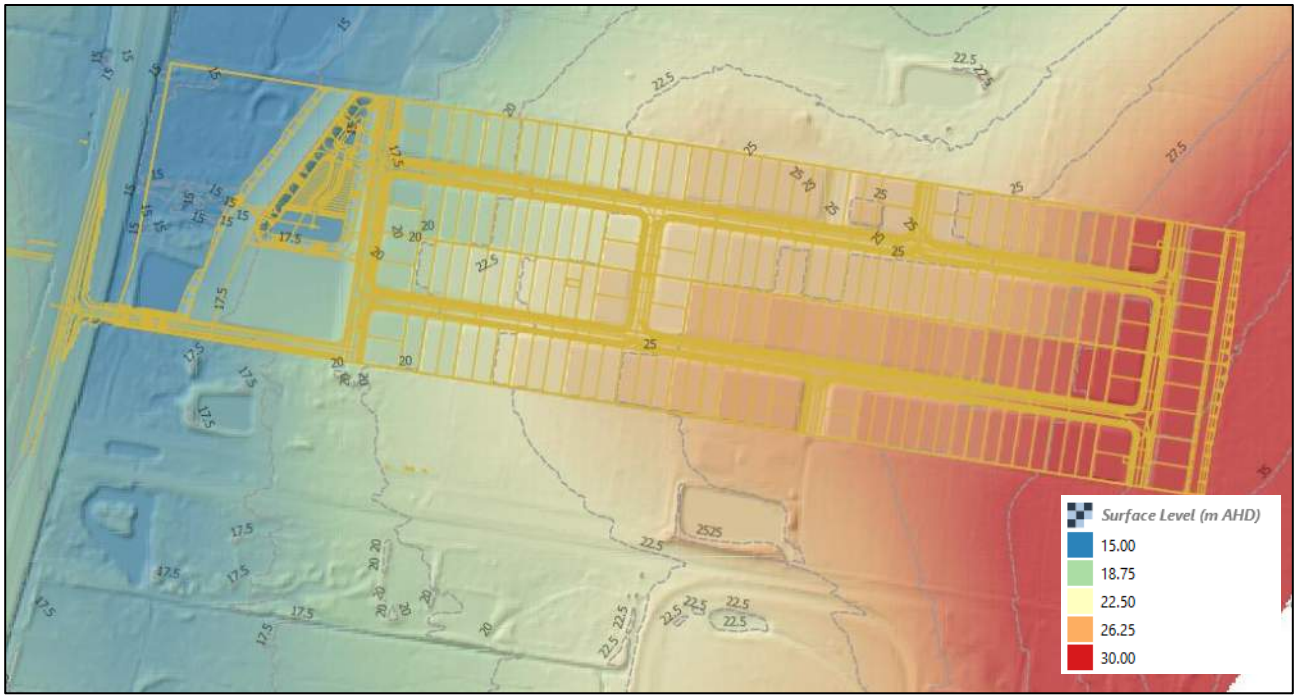


Figure 4.2 Proposed Development DEM

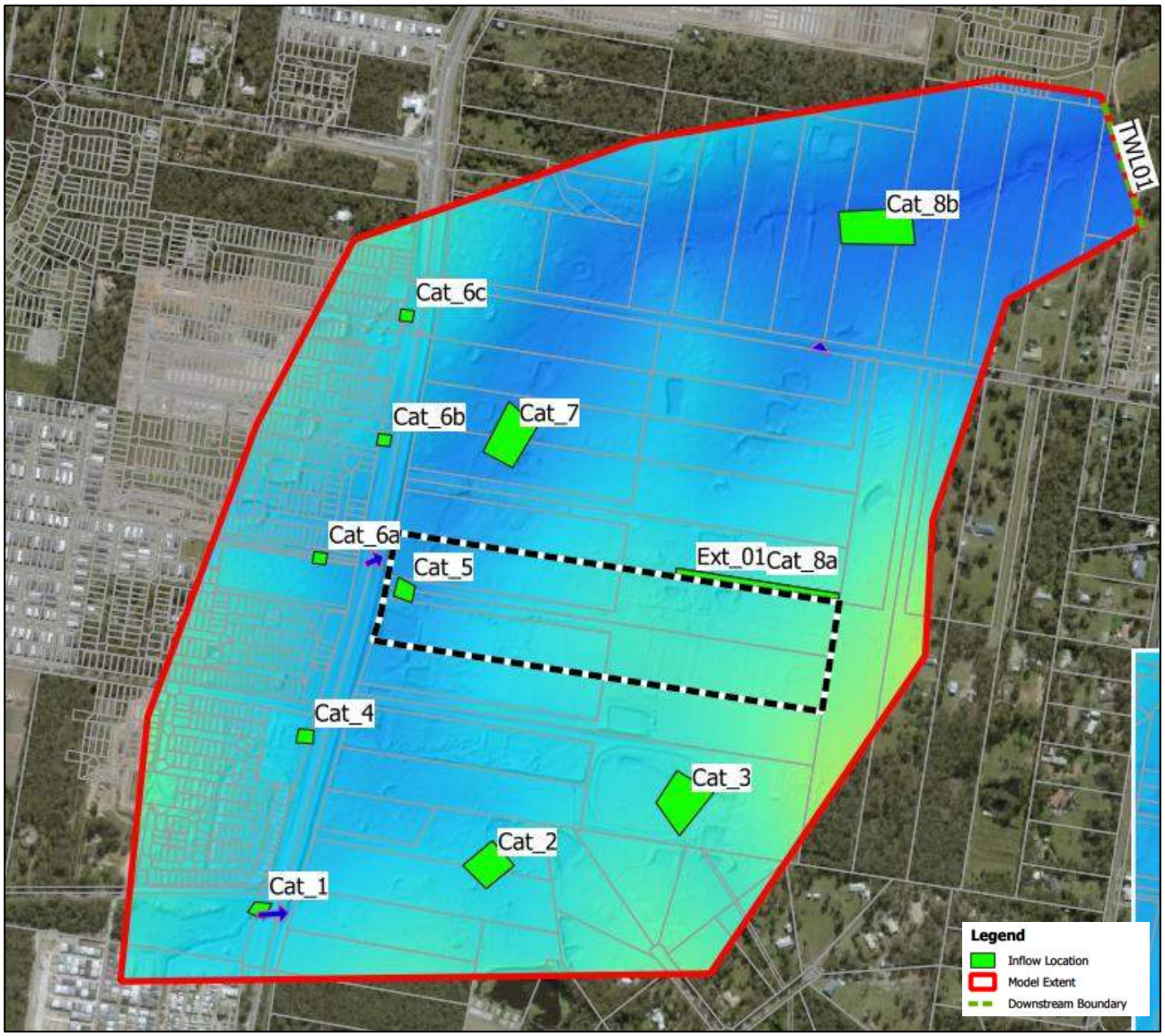


Figure 4.3 Model Inflow and Boundary Locations

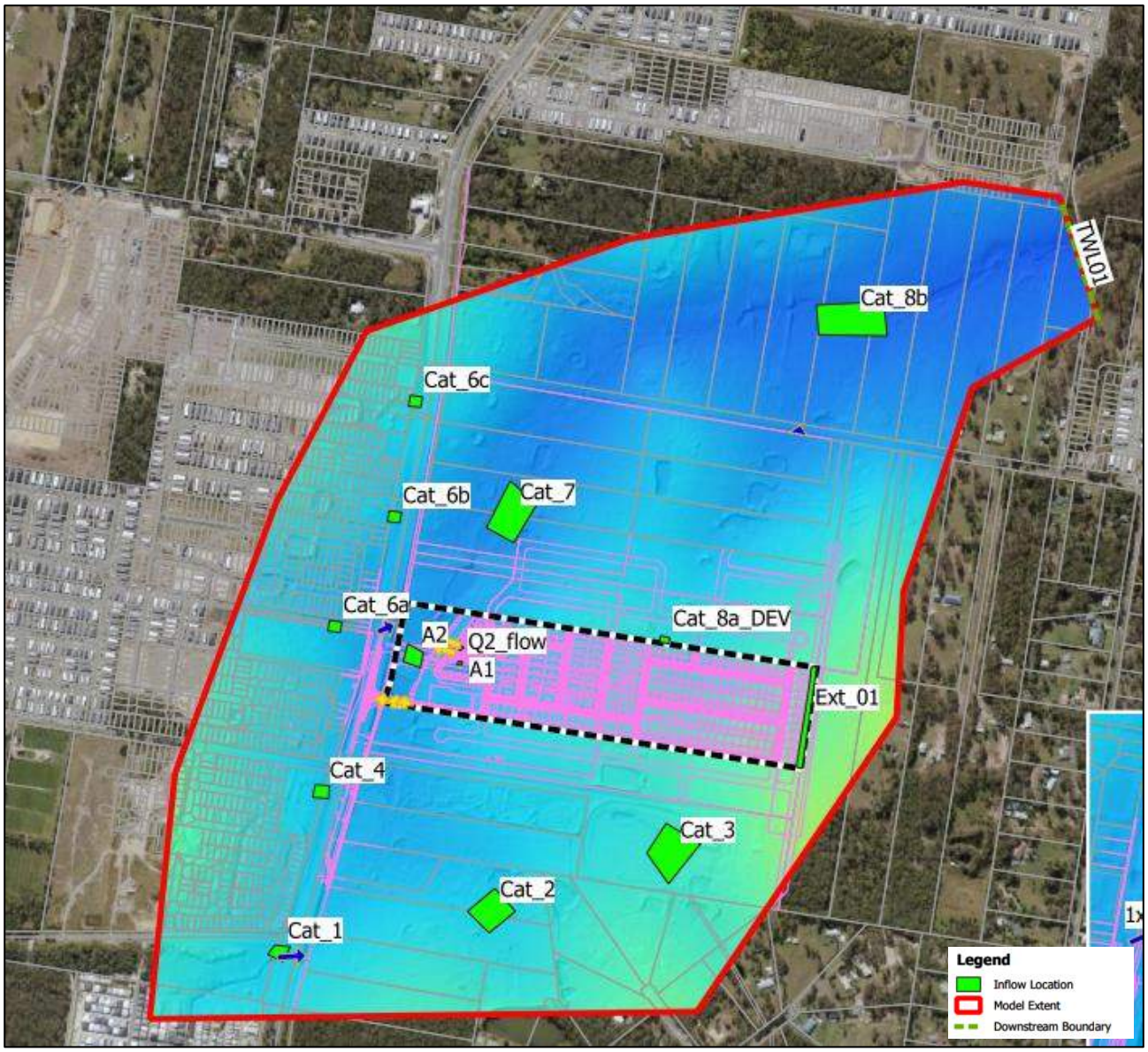


Figure 4.4 Model Inflow and Boundary Locations Post- Development

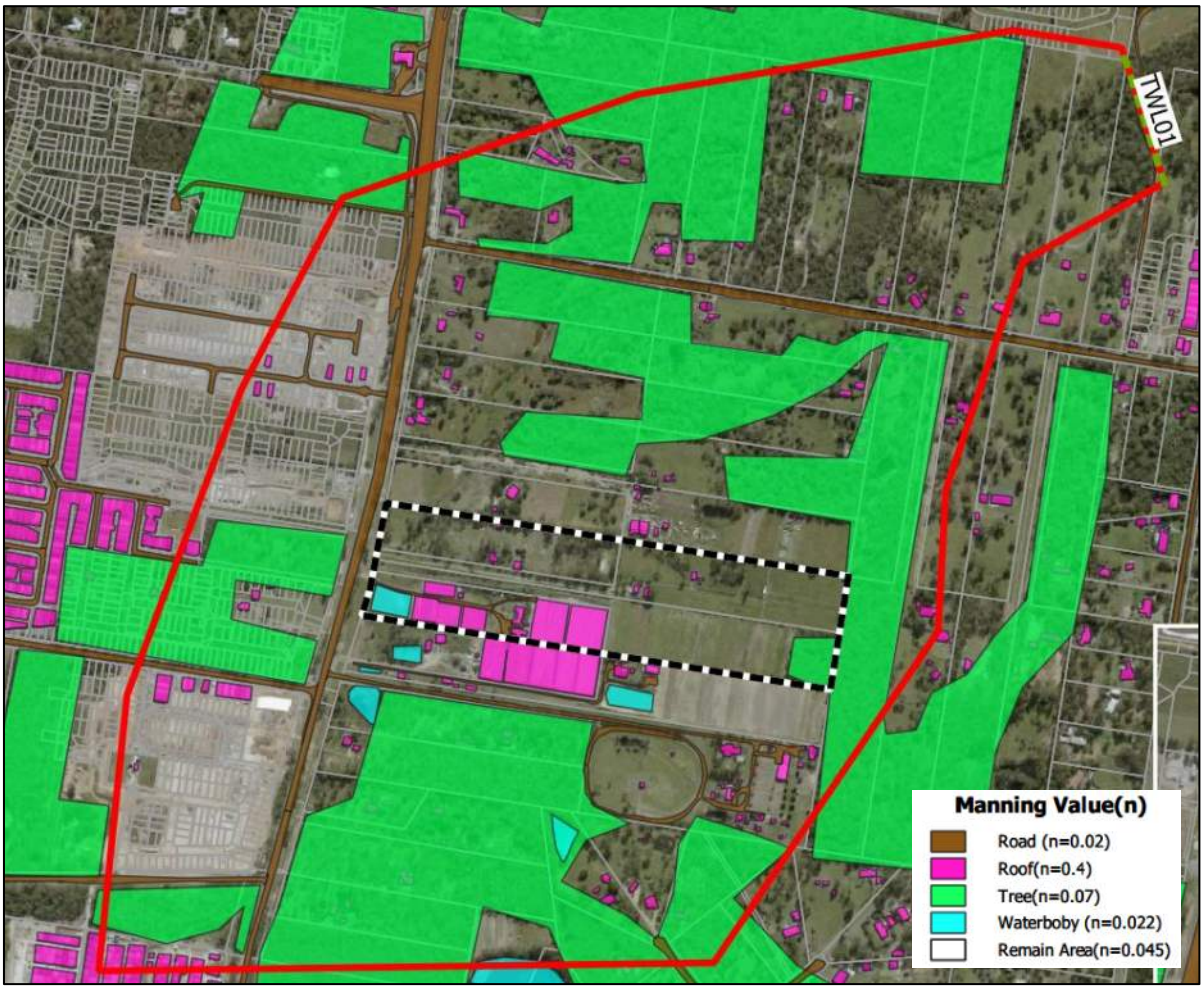


Figure 4.5 Manning's Roughness Map

5. Results

5.1 Flood Behaviour Pre-Development

The results from the TUFLOW model determined that flood waters flow through the site's western extents and continue to flow through the series of private dams, ultimately discharging into Schmidts Creek. Flooding in the 1% AEP event in the existing scenario are summarised as follows:

- Generally flooding does not occur over majority of the site;
- Peak water depths on the site range from approximately 0.5m to 1.15m;
- Peak velocities on site reach up to approximately 2 m/s;
- Peak flood depths on the portion of Chambers Flat Road fronting the site range from 0.35 – 0.45 m
- Peak flood velocities on the portion of Chambers Flat Road fronting the site range range from 0.4 – 1.6 m/s;

The effect of external development completed after the 2017 LIDAR capture have not been included in this assessment. Chambers Flat Road upgrades have been included in the assessment. Average flood depth The 1% AEP flood depth is shown below in Figure 5.1.

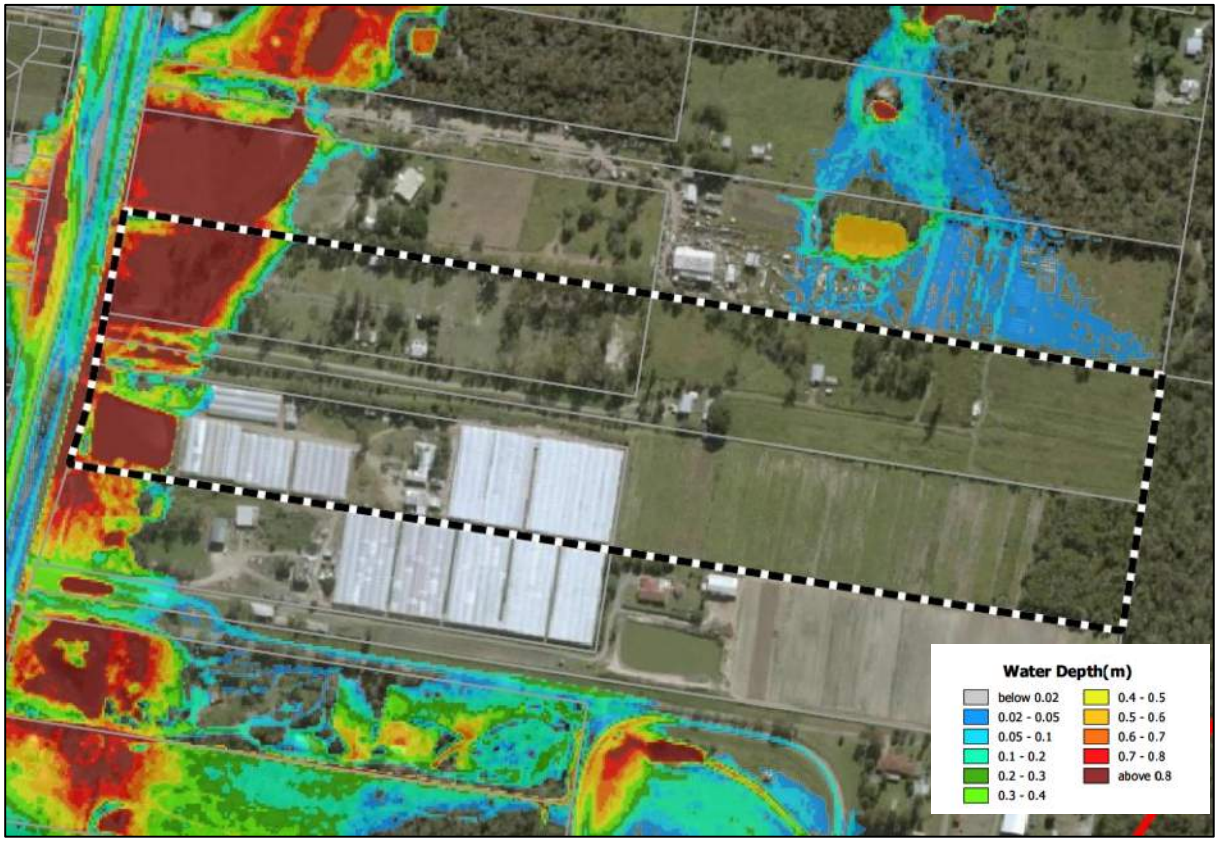


Figure 5.1 Depth Plot - 1% AEP Pre-Development

A velocity plot of the 1% AEP event is shown in Figure 5.2 below, generally low velocities are shown through the subject site, excluding those simulated in the existing overland flow path where 1% AEP velocities reach approximately 1.5 – 2 m/s. Hydraulic model result maps including flood depth, velocity, hazard and water surface level have been included in Appendix D.

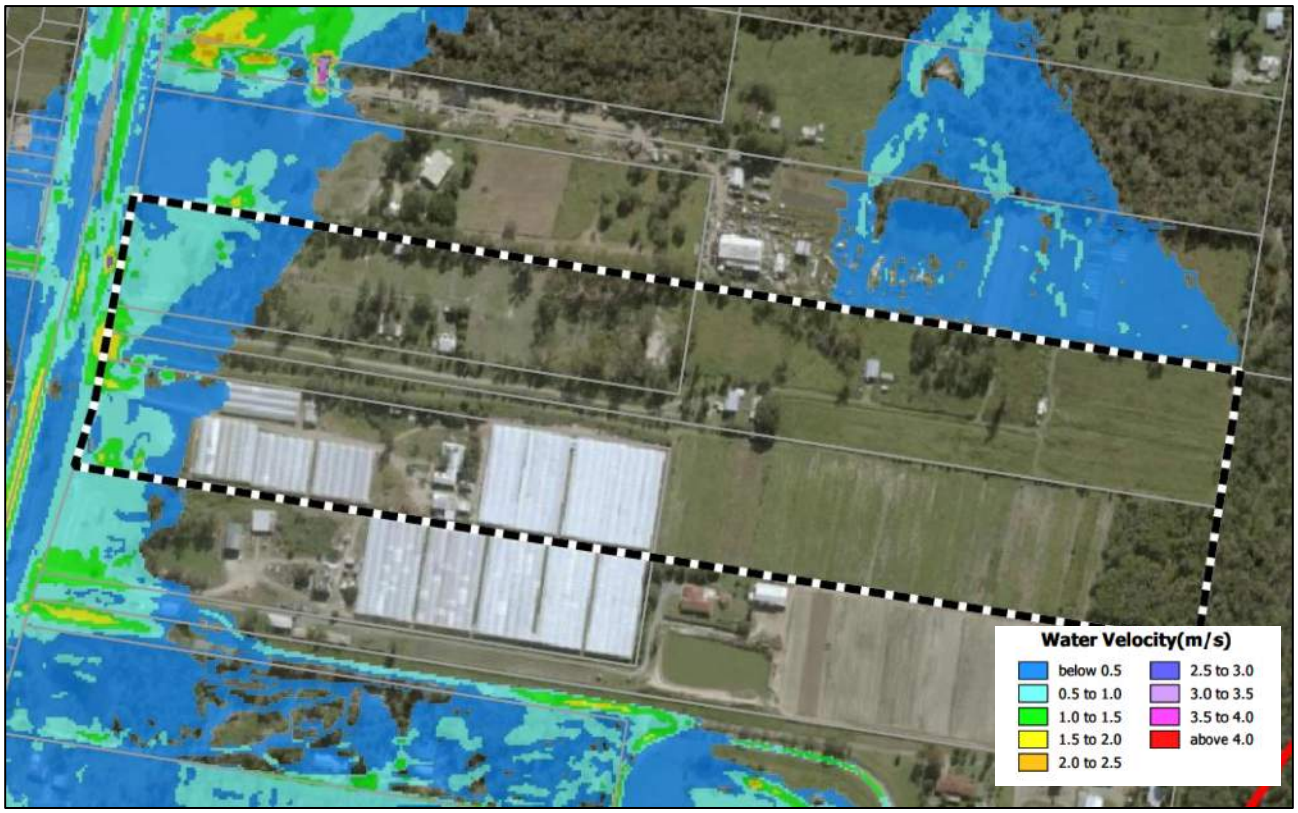


Figure 5.2 Velocity Plot - 1% AEP Pre-Development

5.2 Flood Behaviour Post-Development

The results of the TUFLOW model determined that flood behaviour external to the site in the post-development scenario was similar to that of the pre-development scenario. The proposed development earthworks create a flood free development up to the 1% AEP. The existing waterway on the west of the site remains flooded in the post-developed scenario.

5.2.1 Temporary Access Culvert Performance

Modelling results indicate a peak water level of 16.35 m AHD, given that the design surface level of the access is 17.2 mAHD, approximately 800mm free board is achieved.

5.2.2 Hydraulic Impact Analysis

Modelling results indicate that increases in water level (afflux) are experienced within the waterway to the south of the site, upstream of the proposed temporary access. The impact extends upstream of the development site onto Lot 5 RP97736 where water level increases of up to 150mm have been modelled.

Consent has been obtained from the owner of the affected property. Afflux is also experienced at the south-western corner of the site and on the eastern bank of the future drainage reserve. However, this afflux is contained within the subject site and will not impact the proposed development area nor surrounding properties.

The modelling results indicate that there is a minor amount of water level increase within roadside swales along Chambers Flat Road. This afflux is disconnected from primary areas of impact and can be classified as model noise.

Based on the hydraulic modelling, the proposed development will not have an adverse impact external to the subject site other than agreed upon by neighboring property owners.

Shown in Figure 5.3 - Figure 5.6 below is a plot of the peak water level afflux and velocity afflux modelled in the 1% AEP and 39% AEP events.

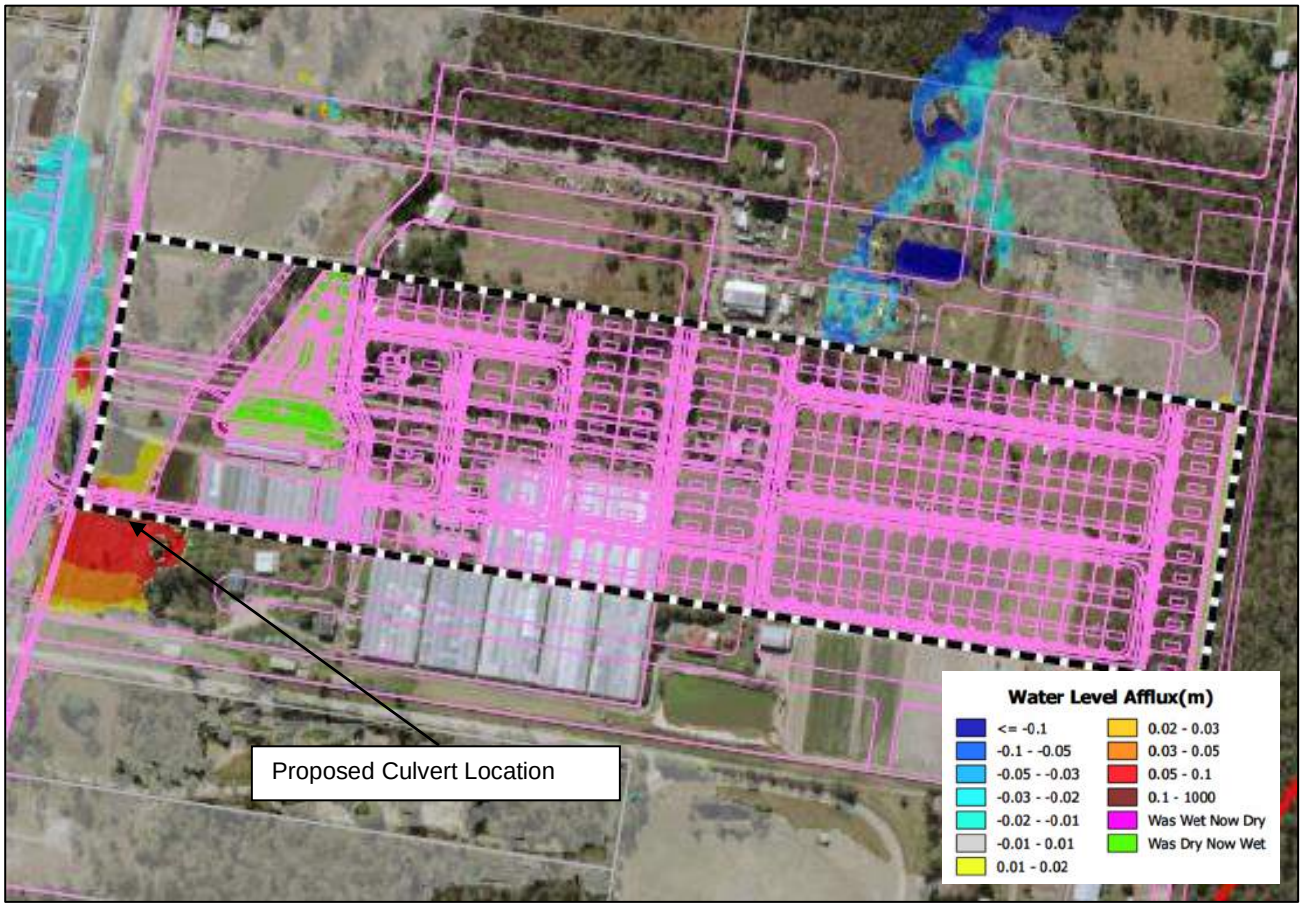


Figure 5.3 Water Level Afflux Plot - 1% AEP Event

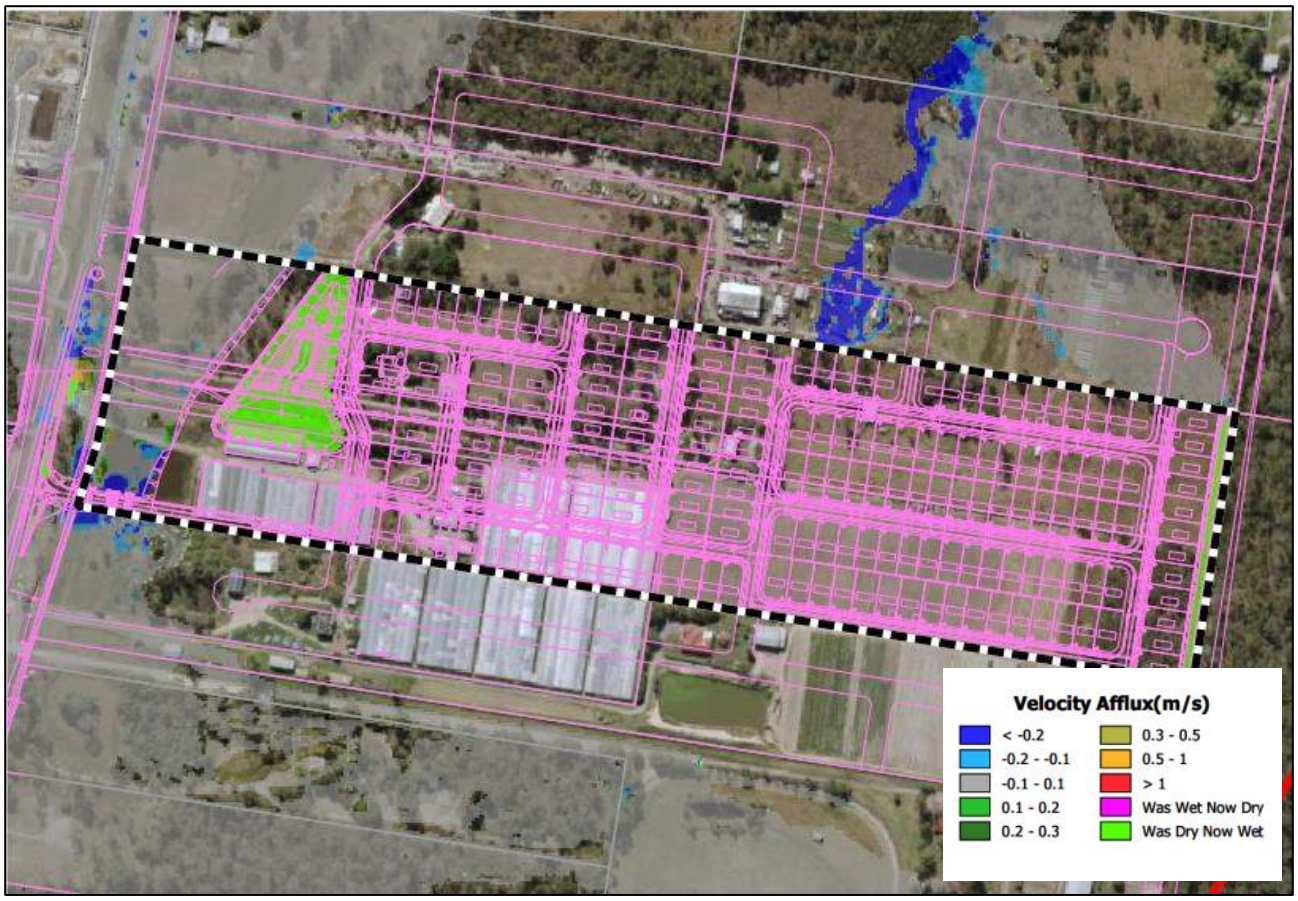
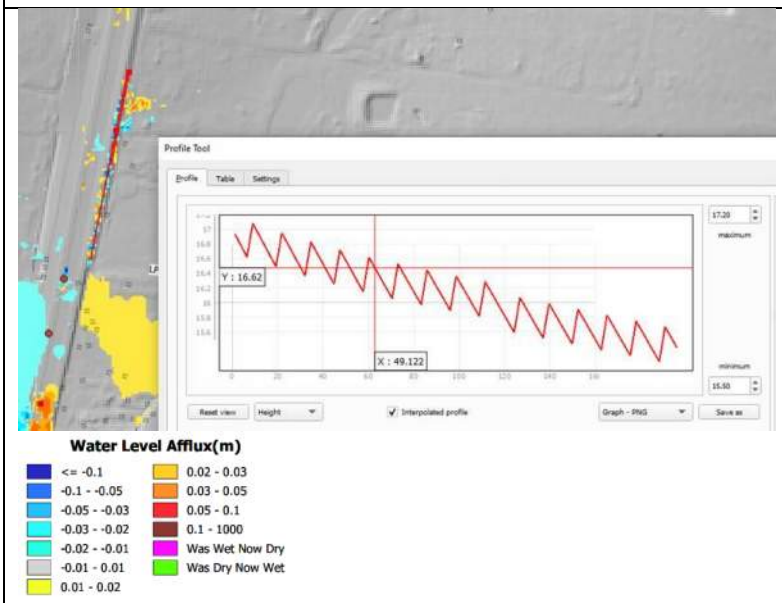
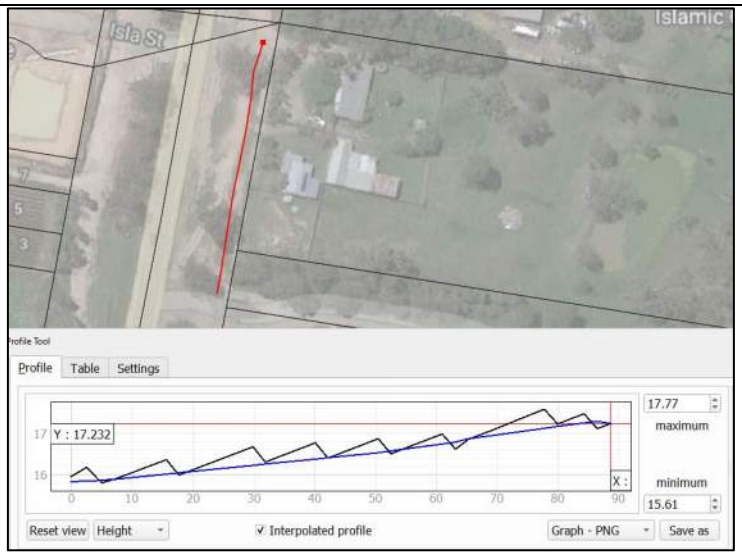
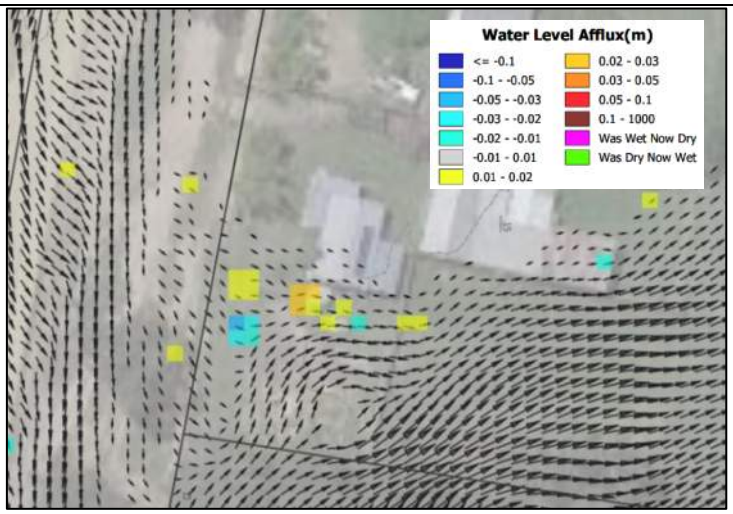
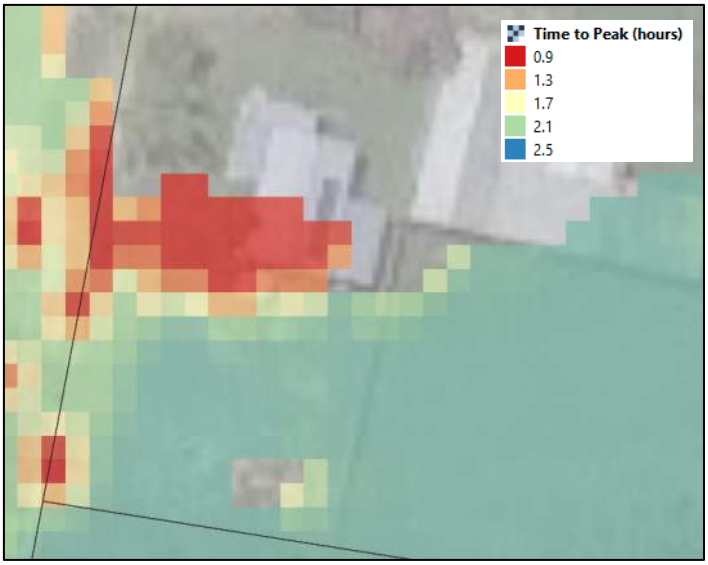
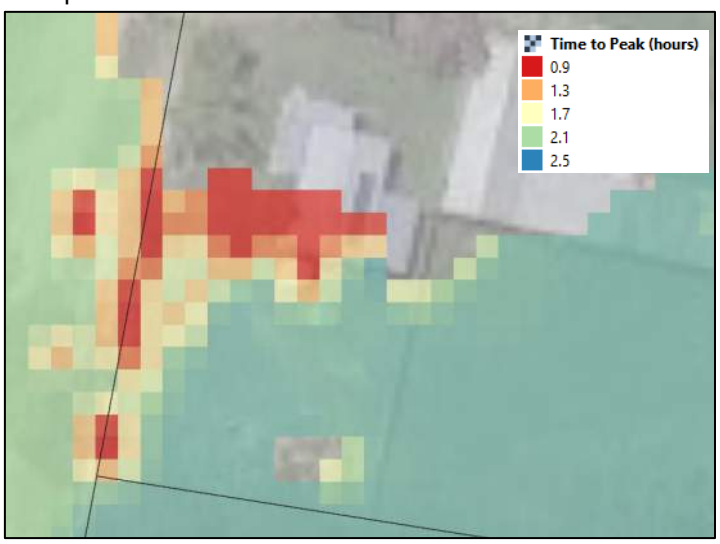


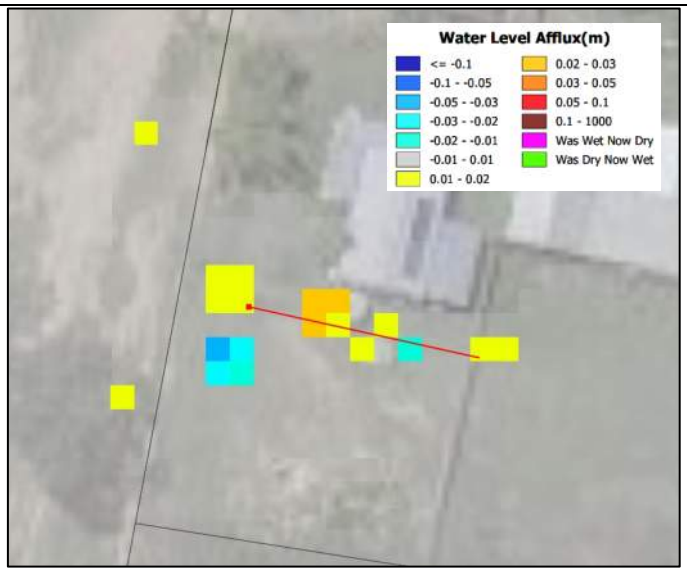
Figure 5.4 Velocity Afflux Plot - 1% AEP Event

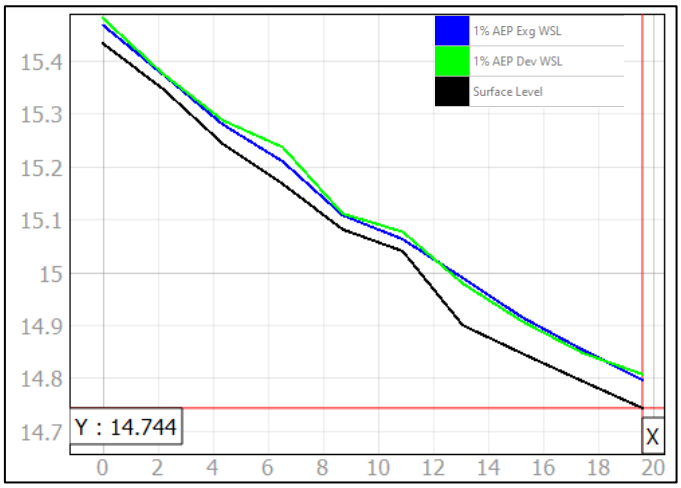
Its is acknowledged that modelling results downstream of the site have indicated water level increases adjacent to a dwelling on Lot 13 on RP97736 during major events. Upon interrogation of the results, this increase in water level can be attributed to modelling noise as a result of the Chambers Flat Road Upgrade DEM. Shown below in Table 5-1 is further information pertaining to the downstream model noise.

Table 5-1 Model Noise Interrogation

Model Review	Description
	Initial afflux results downstream of the site adjacent to the proposed Chambers Flat Road Upgrade design surface was irregular. Upon further inspection it was determined that the Road design surface and model grid did not align causing a jagged and rough surface within the model. This resulted in model noise in this location.
	Burchills have 'smoothed' the design surface with the use of Z-shapes within the TUFLOW model. Shown in this figure is a long section comparison of the 'smoothed' design surface. It is noted that some irregular topography still exists as a result of the grid orientation, leading to some minor noise along the edge of the Chambers Flat Road design surface.

	Velocity vectors indicate that flows traverse down the bank towards the existing dwelling. Due to the upstream noise caused by the misrepresented DEM, minor afflux is noted in the area adjacent to the building.
Existing:  Developed: 	At the location of the afflux, the time of peak water level is significantly different in the existing and developed model scenarios. This further confirms that the Chambers Flat Road Design DEM is causing model noise which alters the timing of flood water as it is conveyed eastward from the road reserve to the area adjacent to the building. A summary of the time to peaks in the 1% AEP event at the location of the afflux are shown below: EXG: 0.93 hr DEV: 1.90 hr





A section was interrogated at the site of the modelled water level increase. The sections indicates a small topological 'bump' in the models surface (likely the existing rainwater tank in this area).

This in conjunction with the change in flow characteristics and change to time of peak is the cause of the model noise in this location.

The resulting conclusion based on the above interrogation is that the Chambers Flat Road Design surface is causing model noise and that then alters the timing of flood water as it runs down toward the dwelling on Lot 13 on RP97736. A small topological 'bump' then causes a minor increase of water level on those cells. Given the inaccuracy of the LIDAR and the upstream noise we are able to confirm that the impact is not reflective of real afflux and should not give rise to real nuisance.

Modelling results downstream of the site in the 39% AEP indicate and increase in flood level in the order 10mm. The increase in flood level in the minor event is a result of the proposed detention basin on the development causing a coincidence in peak flow rates with the regional flow path. It should be noted that upstream detention basins located on other developments (approximately 5) have not been modelled and in reality the impact these detention basins have is likely to remove the modelled afflux as the coincidental flood peak timing will be less.

The impacts have been acknowledged by LCC (date 02/06/2023 via email) as unlikely to be realistic or cause actionable nuisance. It should be noted that this modelled increase in water level will not

result in an increase in downstream Design Flood Levels and there is no change to velocity in these areas thus reducing the chance for increased scour.

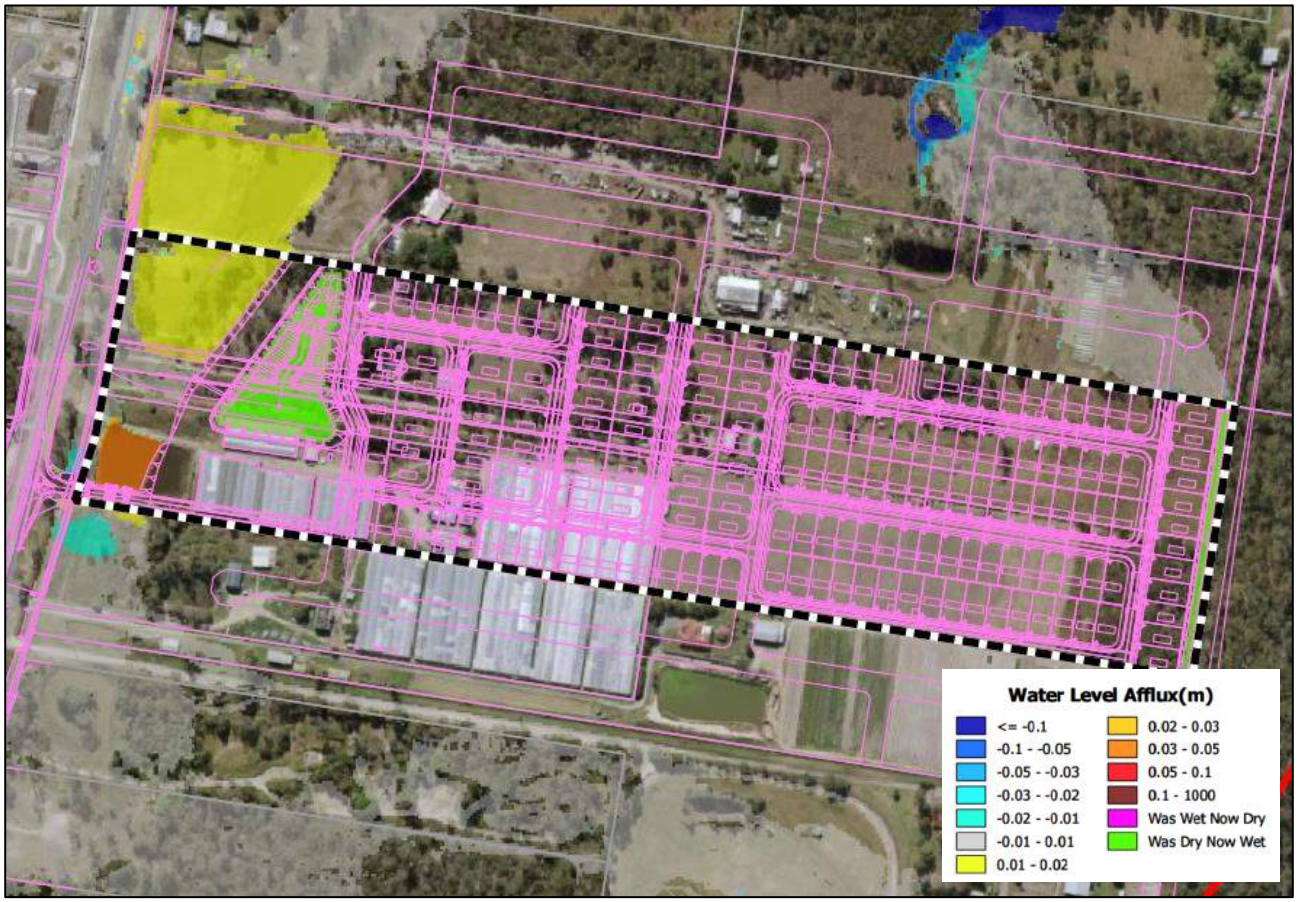


Figure 5.5 Water Level Afflux Plot - 39% AEP Event

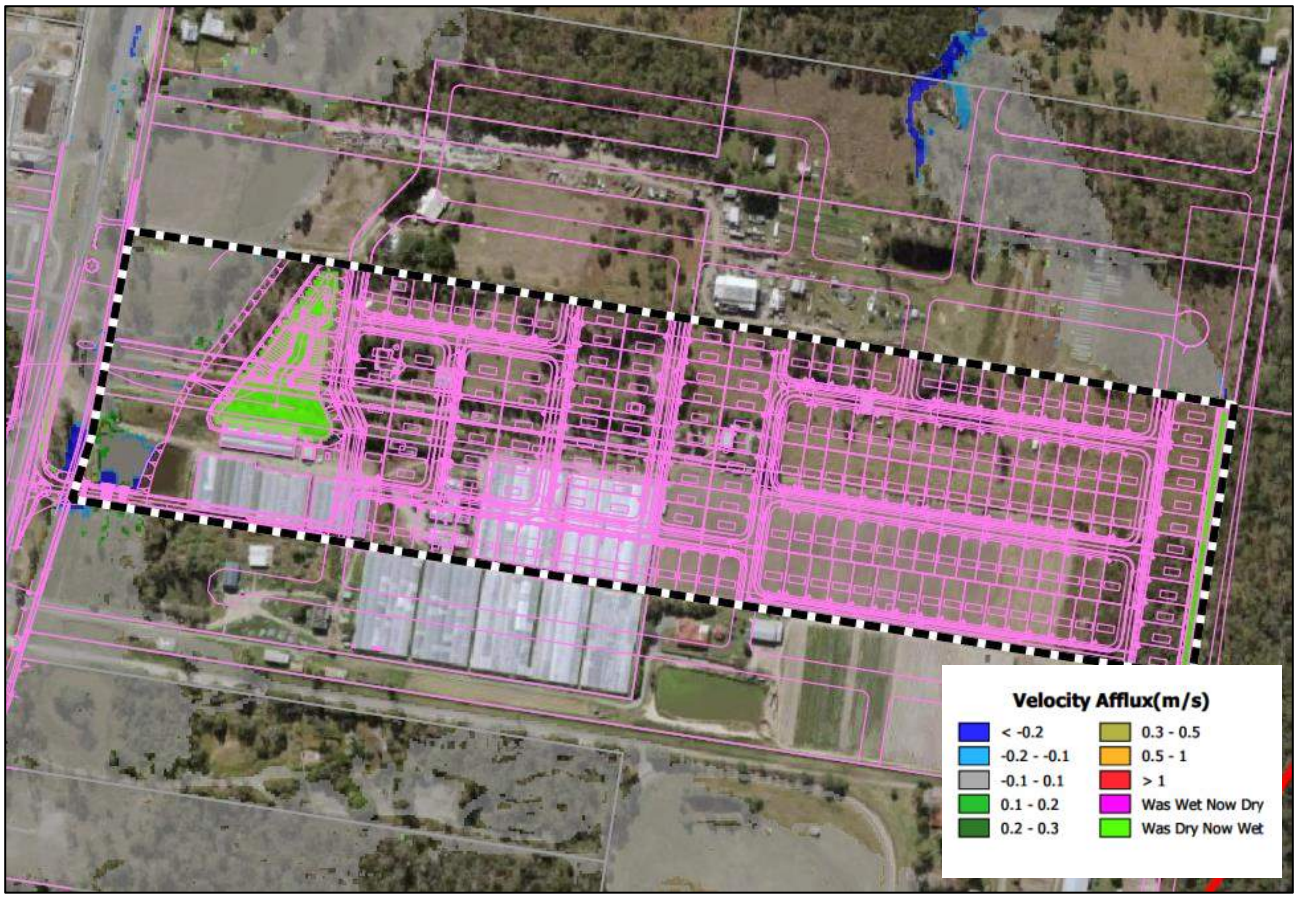


Figure 5.6 Velocity Afflux Plot - 39% AEP Event

5.2.3 Climate Change Scenario

As discussed above, an additional scenario was modelled to determine the potential flood impacts of the development under climate change conditions (assumed 10% increase in rainfall). Shown in the below figures are the 1% AEP post developed depth map, water level afflux and velocity impact map under potential climate change conditions.

Modelling results indicate that the impact on the neighbouring property is maintained as 150 mm in the climate change scenario. As per the above section of the report consent has been obtained from the owner of the affected property.

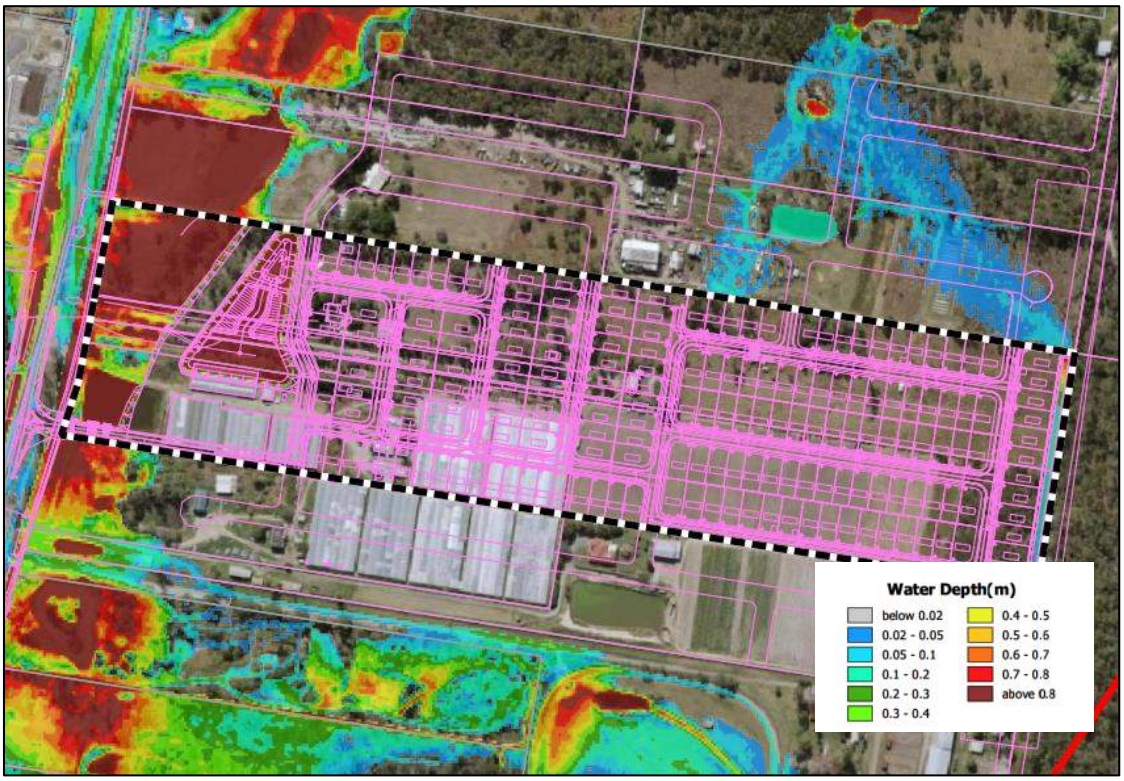


Figure 5.7 Depth Plot - 1% AEP Post-Developed Climate Change

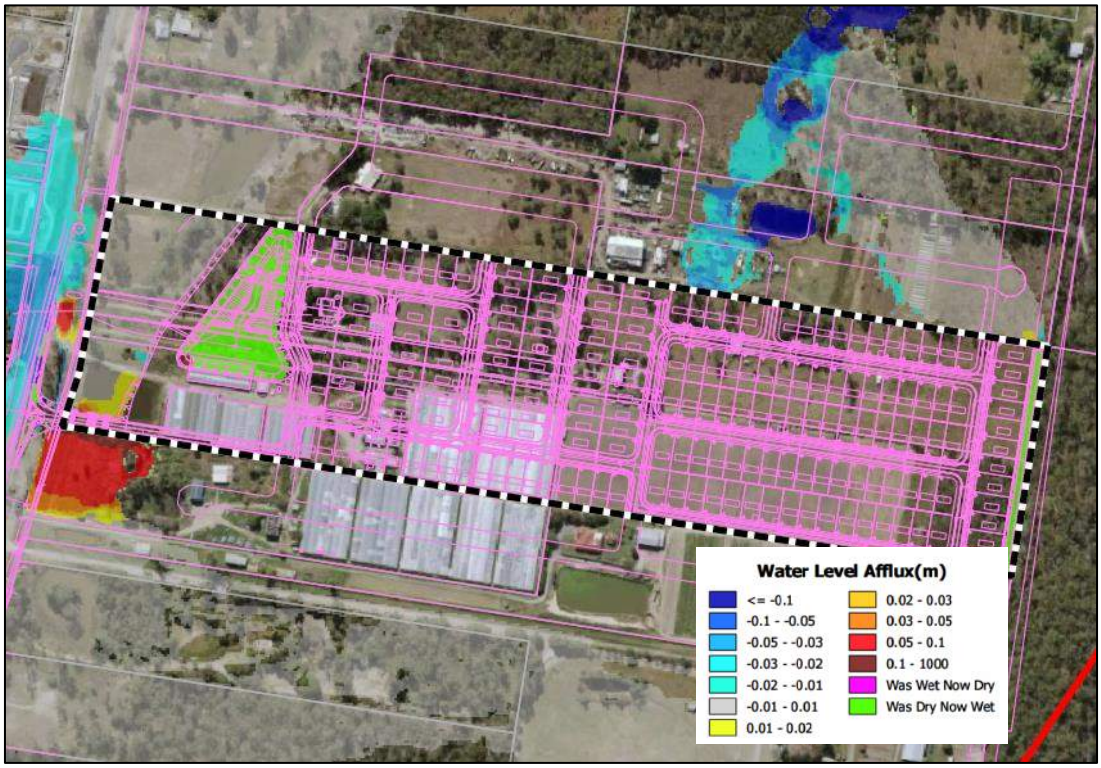


Figure 5.8 Water Level Afflux Plot - 1% AEP Post-Development Climate Change

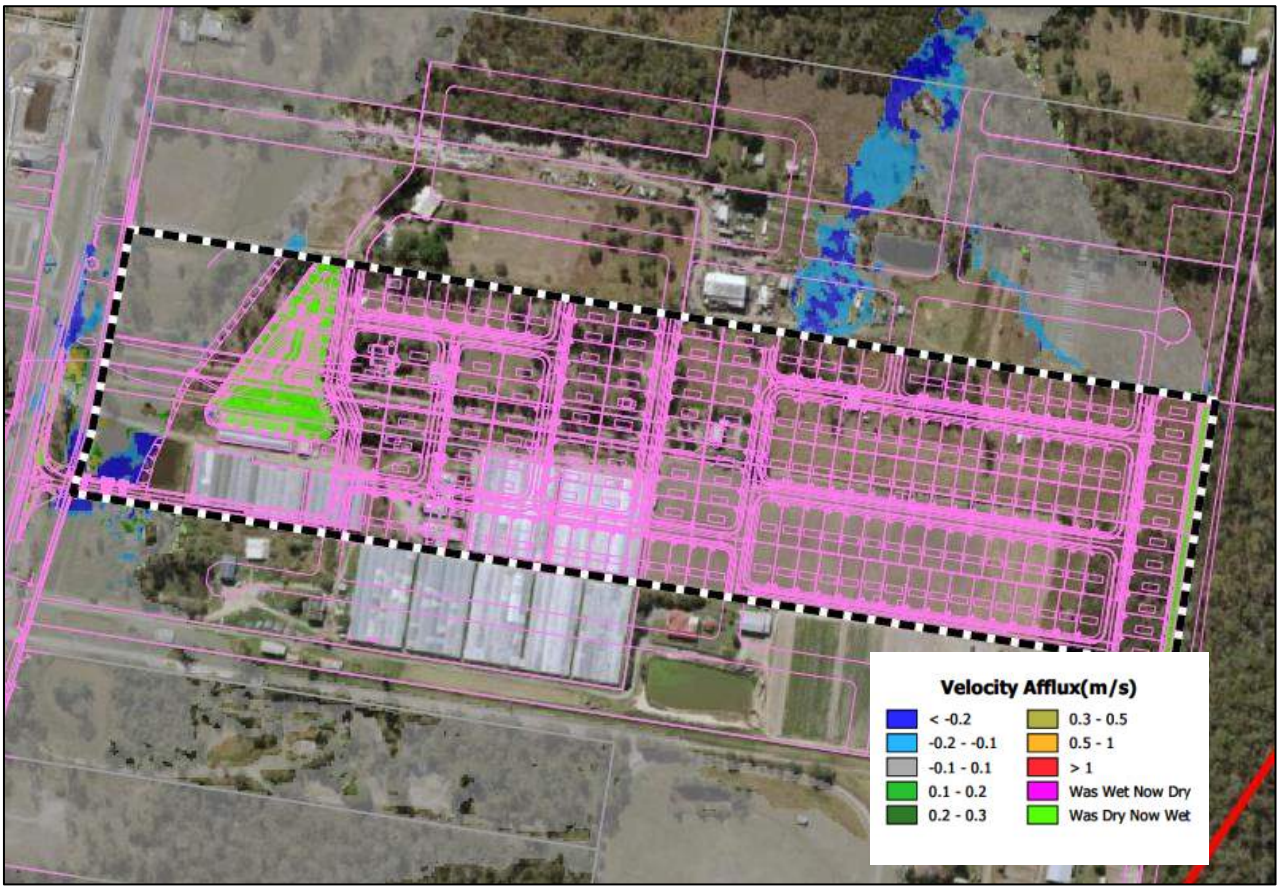


Figure 5.9 Velocity Afflux Plot - 1% AEP Post-Development Climate Change

5.3 Sensitivity Analysis - Blockage Scenario

As per requirements outlined in a pre-lodgement meeting with Logan City Council, the temporary access road must remain trafficable in all events up to and including the 1% AEP event. In the post developed scenario, modelling results indicate that the temporary access road remains flood free up to the 1 AEP event.

It was deemed necessary to model a scenario representing the proposed culvert beneath the temporary access as 50% blocked. Modelling results indicate that the temporary access road will remain trafficable in a blockage scenario. As per QUDM guidelines flow limits for 'transverse' flow during a Major Storm across a causeway are as follows:

Table 5-2 QUDM Flow Limits - Major Storm

Site Condition	Flow Depth and Width Limits
Vehicle safety: Transverse flow limits (risk to life) e.g. causeway	• Maximum flow depth, $d_g \leq 200$ mm • Depth*velocity product $d_g \cdot V_{ave} \leq 0.3$ m²/s

Shown below in Figure 5.10 and Figure 5.11 is depth and velocity plot of the 1% AEP post-developed 50% blockage scenario.

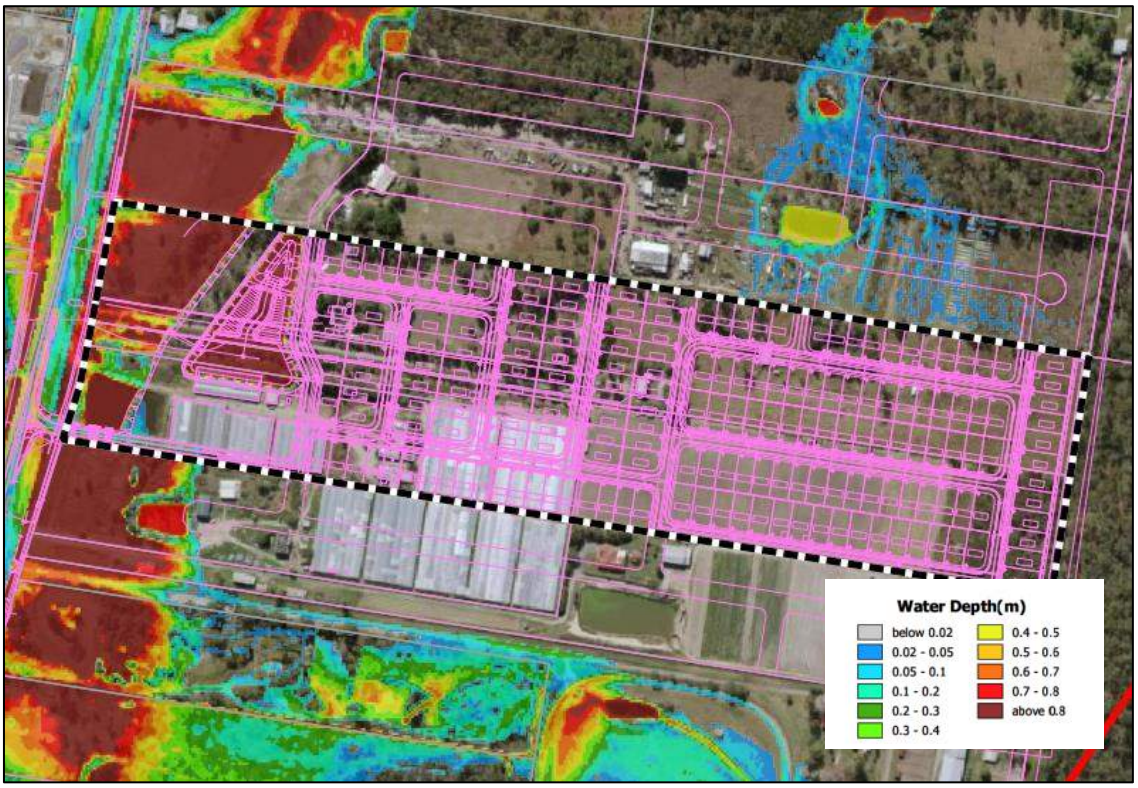


Figure 5.10 Depth Plot - 1% AEP Post-Development Blockage Scenario

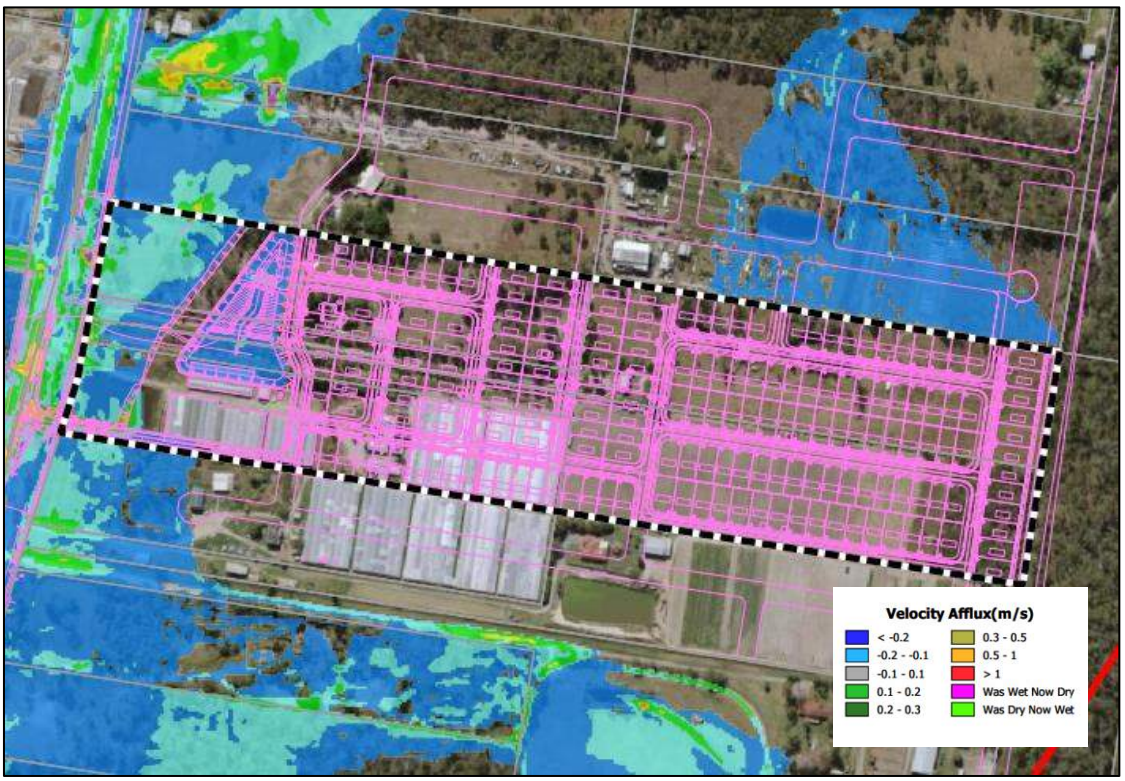


Figure 5.11 Velocity Plot - 1% AEP Post-Development Blockage Scenario

Shown below in Table 5-3 is a summary of the peak depth, velocity and d*V product over the temporary access road during the 1% AEP event, blockage scenario.

Table 5-3 Peak Flows – Temporary Access Road – Blockage Scenario

Flow Type	Peak Value
Depth	0.16 m
Velocity	1.5 m/s
d*V	0.24 m^2/s

Modelling results indicate that the temporary access road will remain trafficable in the 1% AEP critical event with the cross road culverts 50% blocked.

6. Upstream Property – Owners Consent

Given the proposed hydraulic impact on the upstream neighbouring property (Lot 5 RP97736) in the order of 150mm, consent has been sought from the property owner to allow the proposed development's change to the hydraulic behaviour on said property. An approval letter has been prepared that outlines the findings of this report. The owner of the property has consented as they are the one of the proponents of this application.

7. Conclusion

Based on the hydraulic modelling results presented in this report, the following conclusions have been made:

- The temporary access has been designed to be flood free in the 1% AEP event, and trafficable under a 50% blockage scenario;
- Impacts in the order of 150mm are caused on the property (Lot 5 RP97736) immediately upstream of the proposed temporary site access. Approval of this afflux has been obtained from the property owner.
- The modelling results have indicated that the development does not cause any actionable impact to occur on any residential dwellings.

This report has analysed the sites local flooding and modelling shows that the proposed development has no adverse impacts on flood conditions other than that identified on the neighbouring southern lot.

8. General Issues and Uncertainty

Design floods are hypothetical floods used for planning and floodplain management investigations. They are based on having a probability of occurrence specified either as:

- Annual Exceedance Probability (AEP) expressed as a percentage; or
- An Average Recurrence Interval (ARI) expressed in years.

This report uses the both ARI and AEP terminology. The table below provides a definition of AEP and the ARI equivalents mentioned in this report.

Table 8-1 AEP and ARI Terminology

	AEP	ARI	Comments
Medium to Large Floods	20%	5 year	A hypothetical flood or combination of floods which is likely to have a 20% chance of occurring in any one year or, in other words, is likely occur once every 5 years on average.
	10%	10 year	A hypothetical flood or combination of floods which is likely to have a 10% chance of occurring in any one year or, in other words, is likely occur once every 10 years on average.
	5%	20 year	A hypothetical flood or combination of floods which is likely to have a 5% chance of occurring in any one year or, in other words, is likely occur once every 20 years on average.
	2%	50 year	A hypothetical flood or combination of floods which is likely to have a 2% chance of occurring in any one year or, in other words, is likely occur once every 50 years on average.
	1%	100 year	A hypothetical flood or combination of floods which is likely to have a 1% chance of occurring in any one year or, in other words, is likely occur once every 100 years on average.
Rare to Extreme Floods	0.2%	500 year	A hypothetical flood or combination of floods which is likely to have a 0.2% chance of occurring in any one year or, in other words, is likely occur once every 500 years on average.
Probable Maximum Flood	0%	1,000,000 year[1]	A hypothetical flood or combination of floods which represent a theoretical 'worst case' scenario. It is only used for special purposes (e.g. design of a dam spillway) where a high factor of safety is recommended, or in consideration of floodplain planning (e.g. evacuation and isolation of communities).

The interpretation of the flood maps and other design modelling results presented in this report should be done with an appreciation of any limitations in their accuracy. While the points below highlight these limitations, it is important to note that the results presented provide an up-to-date reliable and accurate prediction of design flood behaviour. Key elements are:

- Hydrologically determined inflows were not used within the refined hydraulic model. Instead, flows were derived from a local flood study report and used to calibrate at gauged locations within the model.
- Recognition that no two floods behave in exactly the same manner;
- Design floods are a best estimate of an 'average' flood for their probability of occurrence;
- The DEM has been generated from ALS data with a reported vertical accuracy of +/- 0.25 metre and interpolated in areas of dense vegetation. As flood depths and flood extents are determined using the DEM, their accuracy should be interpreted accordingly;
- The purpose of the Hydraulic Impact Assessment is to represent regional flooding behaviour. Hence the resolution of the model is limited in urban areas. In particular, the flood model generally does not account for minor stormwater drainage infrastructure, such as street drainage. As such, urban areas may also experience local stormwater flooding in addition to the regional flooding presented in the flood maps; and
- The results are based on available data and numerical tools at the time of this report. Changes in technology and improved data collection may provide more accurate modelling in the future.

The accuracy of the hydrologic and hydraulic computer models is dependent on the amount and range of reliable rainfall and flood level recordings for model calibration. An uncalibrated model's results have a greater error margin than a calibrated model. The error margin in this Hydraulic Impact Assessment is regarded as 'moderate' based on the following factors:

- The model parameters are generally typical of those used elsewhere; and
- The vertical accuracy of the ALS data used to develop the DEM.

9. References

ARCEMENT, G. and SCHNEIDER, V., 1989. Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains. U.S. GEOLOGICAL SURVEY WATER-SUPPLY, PAPER 2339.

R. P. Canterford (Editor in Cheif), 1987. Australian Rainfall and Runoff: A Guide to Flood Estimation, Volume 2 The Institute of Engineers, Australia.

BMT WBM, 2010. TUFLOW User Manual, GIS Based 2D/1D Hydrodynamic Modelling. Brisbane: BMT WBM.

Department of Energy and Water Supply, 2008. Queensland Urban Drainage Manual. Brisbane: State of Queensland.

Department of Energy and Water Supply, 2013. Queensland Urban Drainage Manual. Third Edition 2013 - provisional ed. Brisbane(Queensland): State of Queensland.

Modelling Systems: Part One - Flow Through a Constriction, Conference on Hydraulic in Civil Engineering, Adelaide, 1998.

Pilgrim, D., 1987. Australian Rainfall & Runoff - A Guide to Flood Estimation. Barton, ACT: Institute of Engineers Australia.

Stelling, G.S. (1984) *On the Construction of Computational Methods for Shallow Water Flow Problems*. Rijkswaterstaat Communications, no. 35/1984, The Hague, The Netherlands.

Syme, W.J. (1991) *Dynamically Linked Two-Dimensional/One-Dimensional Hydrodynamic Modelling Program for Rivers, Estuaries and Coastal Waters,* William Syme, M.Eng.Sc (Research) Thesis, Dept of Civil Engineering, The University of Queensland, May 1991.

Appendix A Further Information and Methods

A.1 TUFLOW

The 2D hydraulic modelling software package TUFLOW has been used to undertake the hydraulic modelling undertaken as part of this report.

TUFLOW solves the full 2D shallow water equations based on the scheme developed by Stelling (1984) and improved by Syme (1991) and Syme et al (1999). The solution is based around the alternating direction implicit finite difference method. A square grid is used to define the discretisation of the computational domain.

Improvements to the Stelling scheme (Stelling, 1984), including a robust wetting and drying algorithm and greater stability at oblique boundaries, and the ability to dynamically link a quasi-2D model were developed by Syme (1991). Further improvements including the insertion of 1D elements or quasi-2D models inside a 2D model, the modelling of constrictions on flow such as bridges and large culverts and automatic switching to upstream controlled weir flow have been developed subsequently.

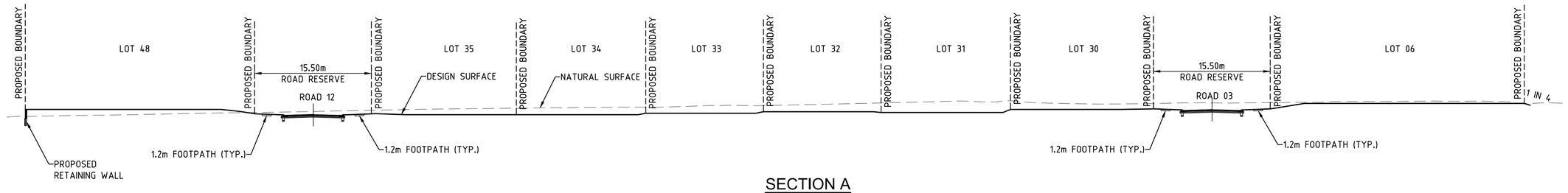
TUFLOW models have been successfully checked against rigorous test cases (Syme 1991, Syme et al 1998 and WBM 2000), and calibrated and applied to a large range of real-world tidal and flooding applications. TUFLOW has the capability to dynamically link 2D domains to quasi-2D models as well as having numerous 2D domains with varying grid sizes dynamically nested.

Hydraulic structure flows (i.e. through large culverts and bridges) are modelled in 2D and include the effects of bridge decks and submerged culvert flow. Flow over roads, levees, bunds, etc is modelled using the broad-crested weir formula when the flow is upstream controlled. For smaller hydraulic structures such as pipes, 1D elements can be inserted at any points inside the 2D model area. Flow over a bridge or culvert that is modelled in 2D can be represented using a 1D weir equation.

Setting up a hydraulic model involves:

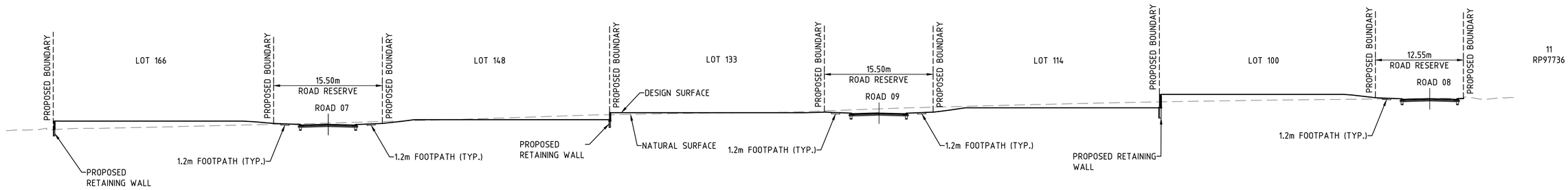
- Determining appropriate model extents;
- Creating a DEM of the model domain;
- Incorporating the post development floodplain roughness values as well as the topographic conditions post development;
- Allocation of model flow boundaries; and
- Application of appropriate flow resistance values (Manning's Coefficient of Roughness).
    - The manning's roughness coefficients are developed with respect to the information provided in Open Channel Hydraulics (Chow, 1959), Natural Channel Design (Brisbane City Council, 2003), and the Road Drainage Manual (DTMR, 2010).

Appendix B Burchills Engineering Civil Design Drawings



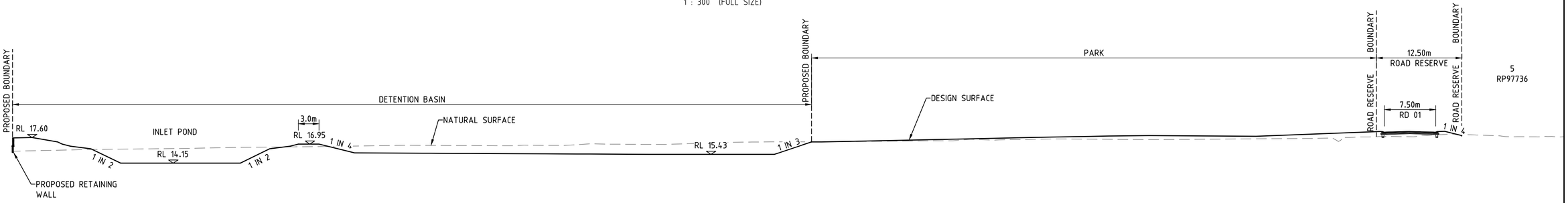
SECTION A

SCALE 5 0 5 10 15 (metres)
1 : 300 (FULL SIZE)



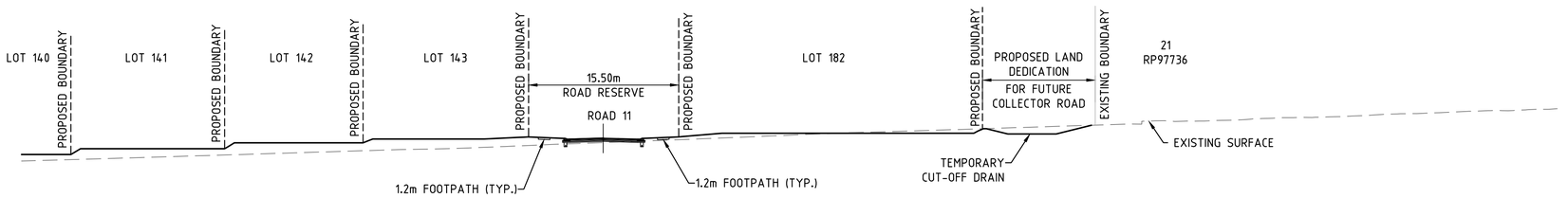
SECTION B

SCALE 5 0 5 10 15 (metres)
1 : 300 (FULL SIZE)



SECTION C

SCALE 5 0 5 10 15 (metres)
1 : 300 (FULL SIZE)



SECTION D

SCALE 5 0 5 10 15 (metres)
1 : 300 (FULL SIZE)

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE

LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD

FOR

GDM PROPERTY

AND

GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

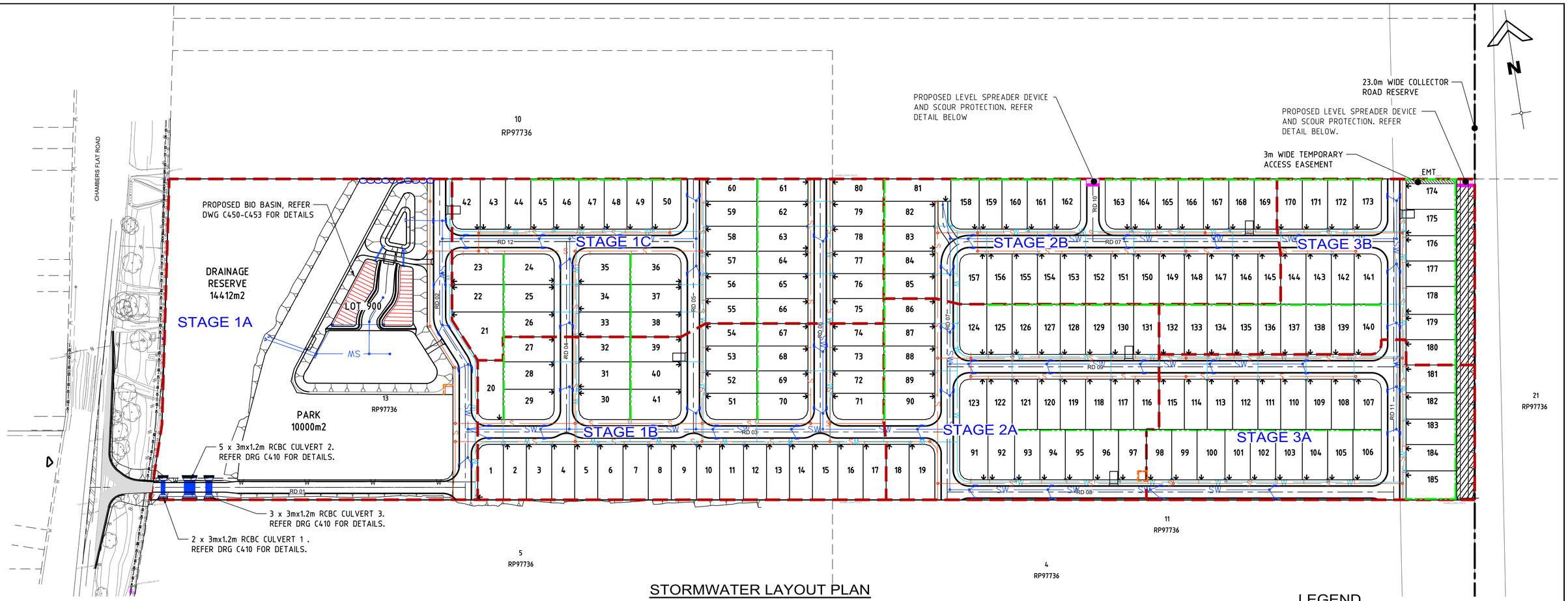
PROJECT:

PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :

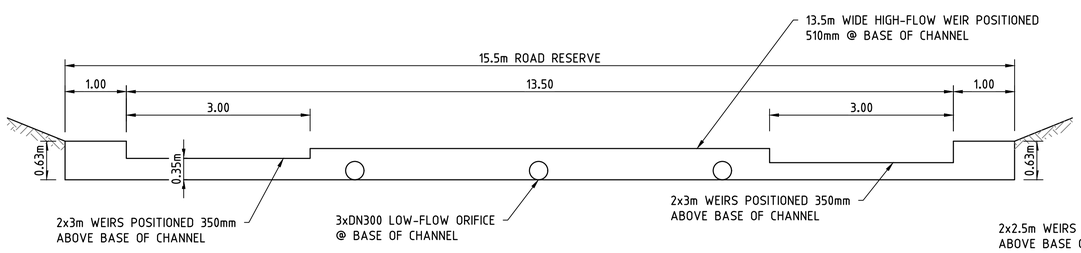
EARTHWORKS SECTIONS SHEET 1 OF 2

DEVEL. APPLIC. No. :	DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ:	
SCALE :	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C213 / VERSION: E



STORMWATER LAYOUT PLAN

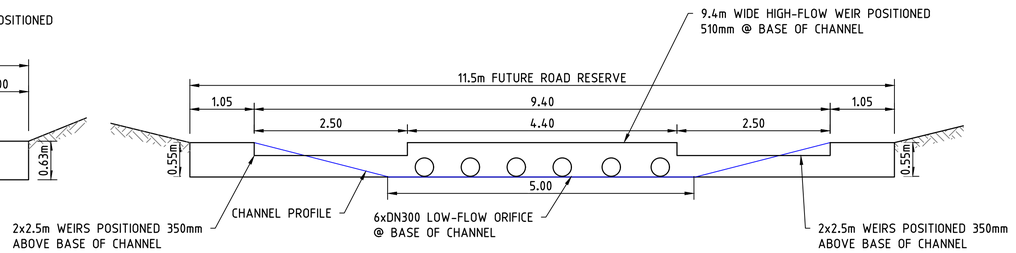
SCALE 12.5 0 12.5 25 37.5 50 62.5 (metres)
1 : 1250 (FULL SIZE)



ROAD 10 LEVEL SPREADER DEVICE DETAIL

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

NOTE: ROCK SCOUR PROTECTION IS TO BE PLACED ON DOWNSTREAM SIDE OF LEVEL SPREADER DEVICE TO DISPERSE FLOWS.



EXTERNAL CATCHMENT LEVEL SPREADER DEVICE DETAIL

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

NOTE: ROCK SCOUR PROTECTION IS TO BE PLACED ON DOWNSTREAM SIDE OF LEVEL SPREADER DEVICE TO DISPERSE FLOWS.

LEGEND

- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING STORMWATER
- EXISTING UNDERGROUND ELECTRICITY
- EXISTING TELSTRA
- FINISHED CONTOUR
- PROPOSED LOT BOUNDARY
- PROPOSED STORMWATER
- PROPOSED SEWER
- PROPOSED WATER
- PROPOSED KERB AND CHANNEL
- PROPOSED RETAINING WALL
- STAGE BOUNDARY
- PROPOSED BOULDER WALL
- PROPOSED BLOCK WALL TO ENERGEX STANDARDS

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE

LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD

FOR

GDM PROPERTY AND GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

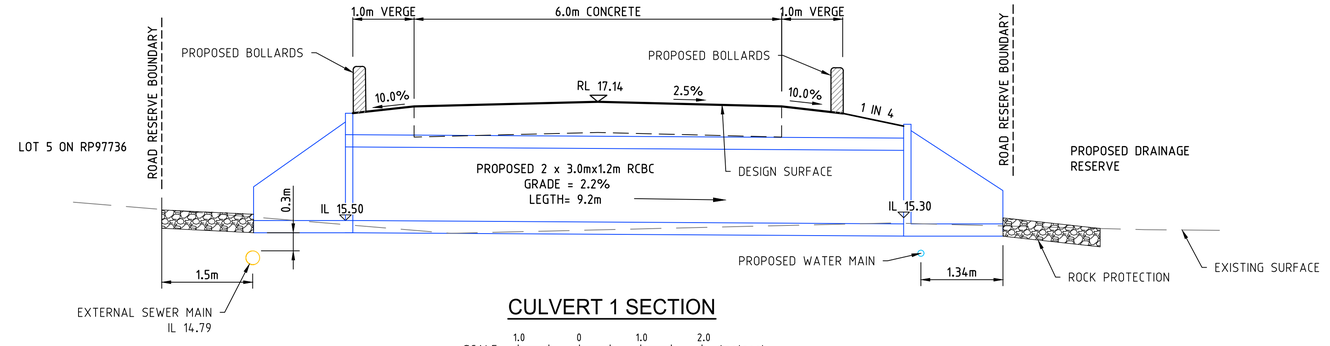
COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.
DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.
NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT: PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE : STORMWATER LAYOUT PLAN

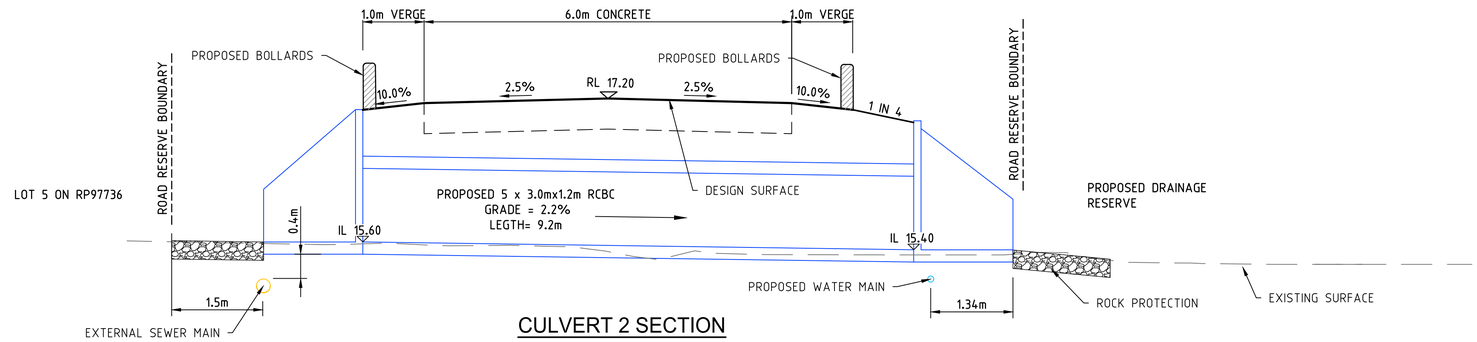
DEVEL. APPLIC. No. :			DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS		DESIGNER : THO GIAN	
DRAFTSPERSON : THO GIAN		CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365			
RPEQ:			
SCALE :	DATUM : AHD		FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C400		VERSION: E



CULVERT 1 SECTION

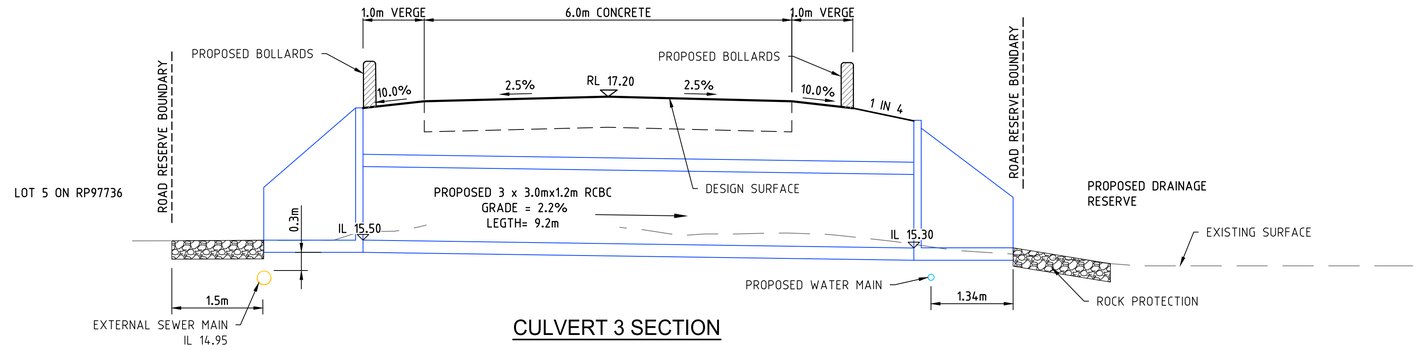
SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

NOTE:
BRIDGING STRUCTURES FOR PROPOSED SERVICES TO BE DESIGNED AT FUTURE OPW APPLICATIONS.



CULVERT 2 SECTION

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)



CULVERT 3 SECTION

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE
LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD
FOR
AND GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

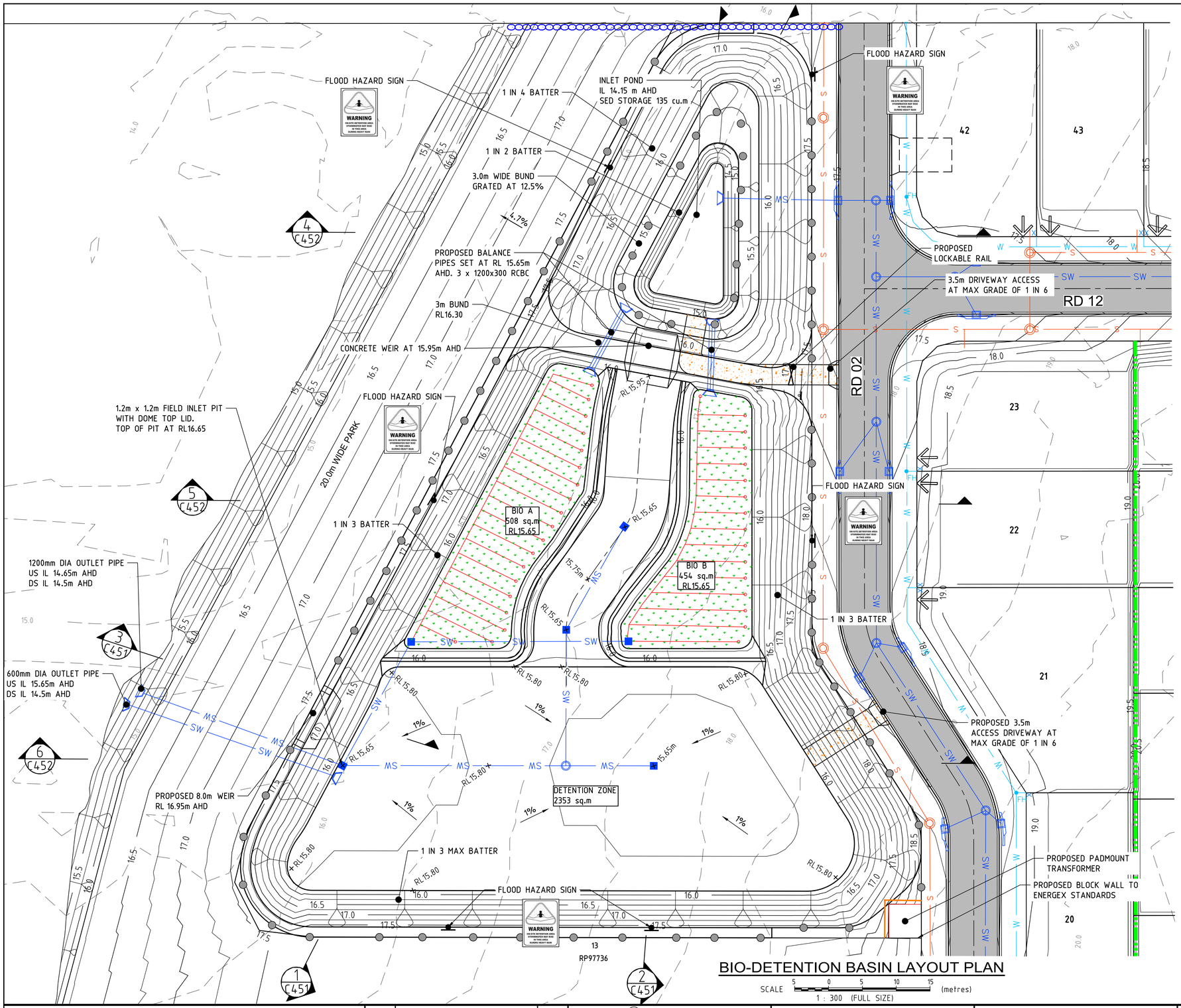
COPYRIGHT ©
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.
DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.
NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :
CULVERT SECTIONS

DEVEL. APPLIC. No. :	DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ:	
SCALE :	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C410 / VERSION: E



LEGEND

- EXISTING SEWER MAIN
- EXISTING WATER MAIN
- EXISTING STORMWATER
- EXISTING UNDERGROUND ELECTRICITY
- EXISTING TELSTRA
- FINISHED CONTOUR
- PROPOSED LOT BOUNDARY
- PROPOSED ROAD CENTRELINE
- PROPOSED KERB AND CHANNEL
- PROPOSED ASPHALT PAVEMENT
- PROPOSED SLEEPER WALL
- PROPOSED CONCRETE DRIVEWAY
- PROPOSED STORMWATER
- PROPOSED BOLLARDS
- PROPOSED BLOCK WALL TO ENERGEX STANDARDS
- PROPOSED BOULDER WALL
- PROPOSED GATE
- TEMPORARY RETAINING WALL

BIO BASIN AREA

TOTAL FILTER/TREATMENT AREA 1150 sq.m
(AT RL 15.65)

BIO-DETENTION BASIN LAYOUT PLAN

SCALE 5 0 5 10 15 (metres)
1 : 300 (FULL SIZE)

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE

LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD

FOR

GDM PROPERTY AND GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

COPYRIGHT ©
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

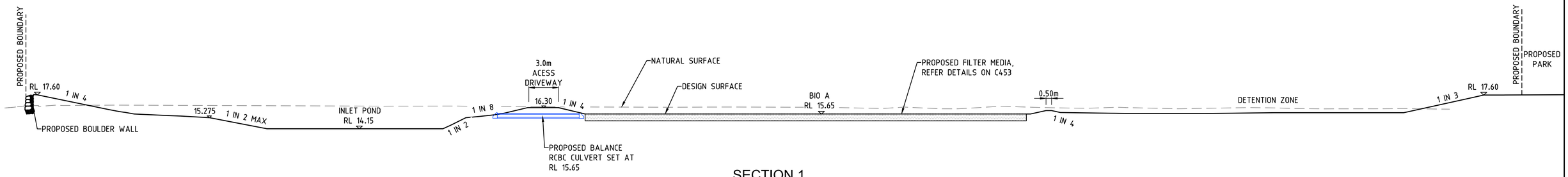
NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :
BIO-DETENTION BASIN LAYOUT PLAN

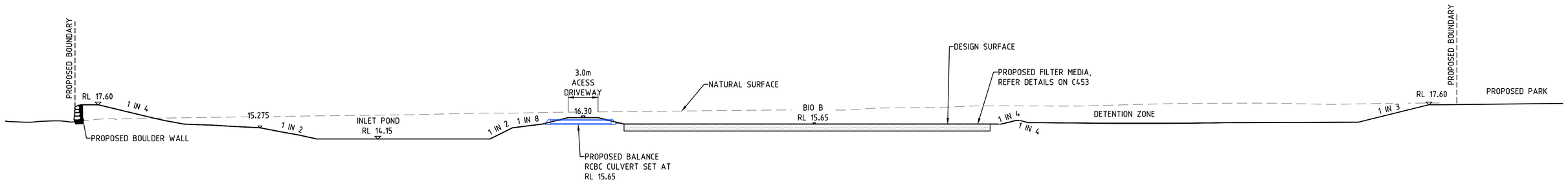
DEVEL. APPLIC. No. :	DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	RPEQ:
SCALE :	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C450 / VERSION: E



SECTION 1

SCALE 2 0 2 4 6 8 10 (metres)

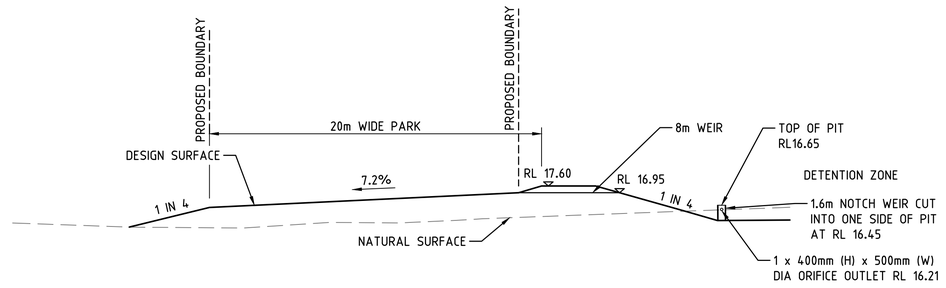
1 : 200 (FULL SIZE)



SECTION 2

SCALE 1 0 1 2 3 4 5 (metres)

1 : 100 (FULL SIZE)



SECTION 3

SCALE 1 0 1 2 3 4 5 (metres)

1 : 100 (FULL SIZE)

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE

LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD

FOR

GDM PROPERTY AND GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

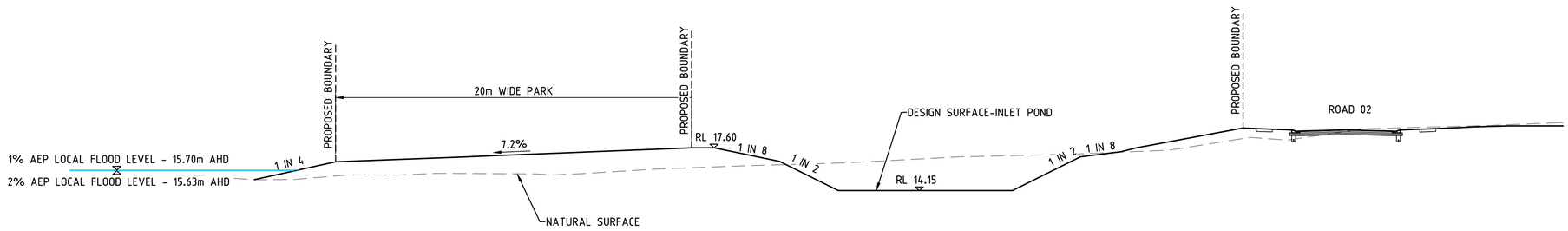
PROJECT:

PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :

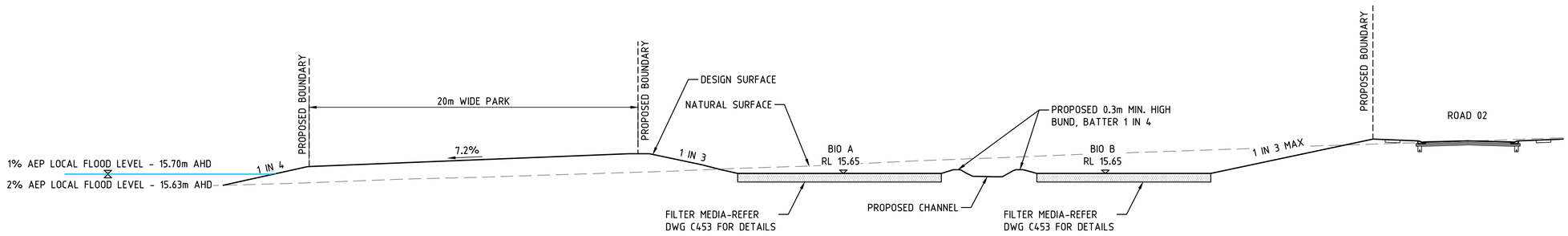
BIO BASIN SECTIONS
SHEET 1 OF 2

DEVEL. APPLIC. No. :		DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN	
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
RPEQ:		
SCALE :	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C451	VERSION: E



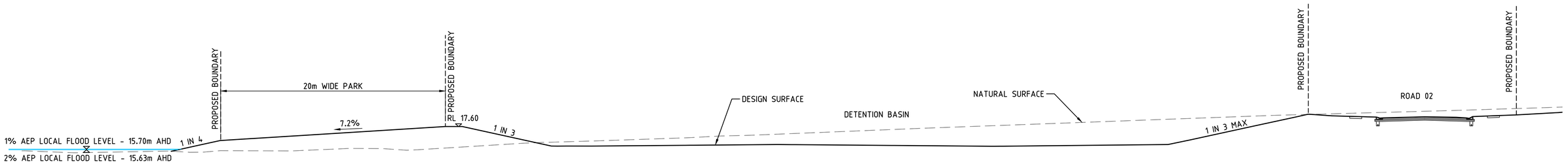
SECTION 4

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (FULL SIZE)



SECTION 5

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (FULL SIZE)



SECTION 6

SCALE 2 0 2 4 6 8 10 (metres)
1 : 200 (FULL SIZE)

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE

LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD
LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD
LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD

FOR

GDM PROPERTY

AND

GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

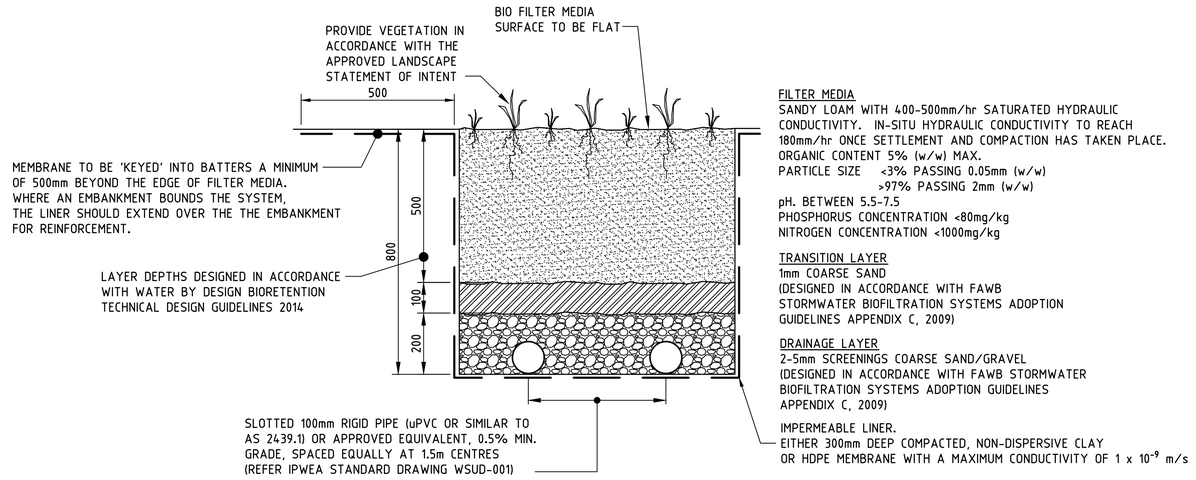
PROJECT:

PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :

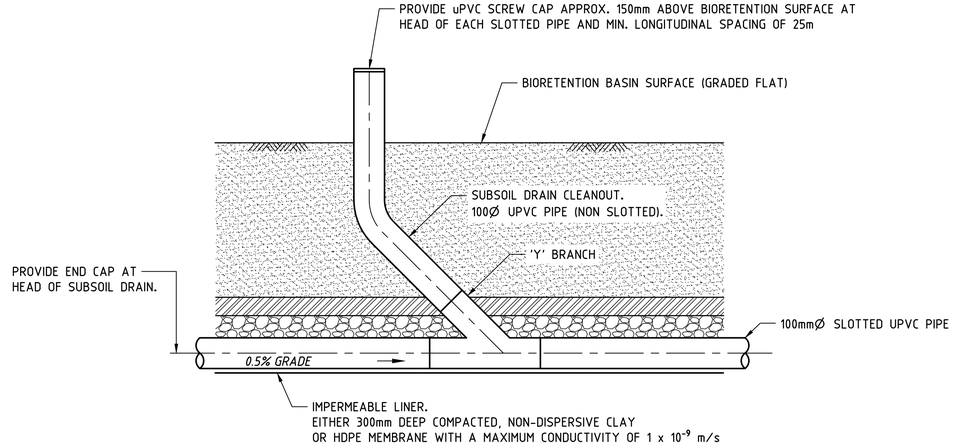
BIO BASIN SECTIONS
SHEET 2 OF 2

DEVEL. APPLIC. No. :	DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365	
RPEQ:	
SCALE :	DATUM : AHD / FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C452 / VERSION: E



TYPICAL BIO-RETENTION MEDIA CROSS SECTION

SCALE 0.1 0 0.1 0.2 0.3 0.4 0.5 (metres)
1 : 10 (FULL SIZE)



TYPICAL BIO-RETENTION BASIN SUBSOIL DRAIN CLEANOUT

NTS

PRELIMINARY

CHAMBERS FLAT ROAD LOGAN RESERVE
LOT 6 RP97736; 544-550 CHAMBERS FLAT ROAD LOT 7 RP97736; 542 CHAMBERS FLAT ROAD
LOT 8 RP97736; 540 CHAMBERS FLAT ROAD LOT 9 RP97736; 532-538 CHAMBERS FLAT ROAD
FOR
GDM PROPERTY AND GC DEV 6 PTY LTD

A1 ORIGINAL SIZE BEFORE REDUCTION

VER.	DESCRIPTION	DATE
E	RFI AMENDMENTS	04.05.23
D	RFI AMENDMENTS	28.03.23
C	LAYOUT AMENDED	06.03.23
B	COLLECTOR ROAD ADDED	10.10.22
A	ISSUE FOR INFORMATION	01.07.22

COPYRIGHT (C)
This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.
DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.
NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

BURCHILLS ENGINEERING SOLUTIONS
Gold Coast I Brisbane I Toowoomba
Ipswich I Moreton Bay
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

PROJECT:
PRELIMINARY CIVIL ENGINEERING DESIGN

DRAWING TITLE :
TYPICAL BIO-RETENTION BASIN DETAILS AND SECTIONS

DEVEL. APPLIC. No. :		DATE : 04.05.2023
PROJECT LEADER : FRASER LUCAS	DESIGNER : THO GIAN	
DRAFTSPERSON : THO GIAN	CHECKED : FRASER LUCAS	
APPROVED FOR AND ON BEHALF OF BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365		
RPEQ:		
SCALE :	DATUM : AHD	FULL SIZE : A1
PROJECT No.: BE210264	DRAWING No. : C453	VERSION: E

Appendix C Time of Concentration and Rational Method Calculations

Design storm event flows across the site were derived using the Rational Method as per the above-mentioned manuals. This involved:

- Determination of a C10 value (derived in accordance with QUDM Table 4.05.3(b) and Council guidelines).
- Adoption of design rainfall using BoM IFD data; and
- Calculation of design flows through the site for Q100, Q50, Q20, Q10, Q5, Q2, Q1 and $Q3_{month}$, where $Q3_{month}$ is deemed to be 50% of Q1.

Summaries of the hydrologic calculations are shown below

Pre-Development Hydrology

Catch.	Area (ha)	tc (min)	I_{100} (mm/hr)	C	Q_{100} (m^3/s)	I_{50} (mm/hr)	C	Q_{50} (m^3/s)	I_{20} (mm/hr)	C	Q_{20} (m^3/s)	I_{10} (mm/hr)	C	Q_{10} (m^3/s)	I_5 (mm/hr)	C	Q_5 (m^3/s)	I_2 (mm/hr)	C	Q_2 (m^3/s)	I_1 (mm/hr)	C	Q_1 (m^3/s)
1	94.13	32.39	136.37	0.54	**19.25**	121.82	0.52	**16.48**	104.25	0.47	**12.88**	90.23	0.45	**10.62**	77.63	0.43	**8.68**	61.30	0.38	**6.13**	48.56	0.36	**4.57**
2	40.71	29.26	143.08	0.54	**8.74**	127.93	0.52	**7.49**	109.63	0.47	**5.86**	95.06	0.45	**4.84**	81.84	0.43	**3.96**	64.67	0.38	**2.80**	51.25	0.36	**2.09**
3	60.74	37.76	125.99	0.54	**11.48**	112.44	0.52	**9.82**	95.84	0.47	**7.64**	82.89	0.45	**6.29**	71.18	0.43	**5.13**	56.15	0.38	**3.62**	44.45	0.36	**2.70**
4	23.71	26.93	149.59	0.82	**8.04**	133.97	0.78	**6.90**	114.75	0.71	**5.40**	99.94	0.68	**4.48**	86.02	0.65	**3.66**	68.02	0.58	**2.59**	53.90	0.54	**1.93**
5	9.86	24.79	155.77	0.78	**3.33**	139.73	0.75	**2.86**	119.64	0.68	**2.24**	104.56	0.65	**1.86**	89.99	0.62	**1.52**	71.19	0.55	**1.08**	56.41	0.52	**0.80**
6a	27.15	24.97	155.09	0.97	**11.37**	139.09	0.93	**9.77**	119.08	0.85	**7.64**	104.07	0.81	**6.36**	89.56	0.77	**5.20**	70.85	0.69	**3.68**	56.14	0.65	**2.74**
6b	18.97	28.19	146.06	0.94	**7.20**	130.69	0.90	**6.18**	111.97	0.82	**4.83**	97.29	0.78	**4.00**	83.75	0.74	**3.27**	66.20	0.66	**2.31**	52.46	0.62	**1.72**
6c	17.53	26.72	150.19	0.84	**6.14**	134.53	0.81	**5.27**	115.22	0.74	**4.12**	100.39	0.70	**3.42**	86.41	0.67	**2.80**	68.32	0.60	**1.98**	54.14	0.56	**1.48**
7	61.91	25.95	152.33	0.54	**14.15**	136.52	0.52	**12.15**	116.90	0.47	**9.50**	102.00	0.45	**7.89**	87.78	0.43	**6.45**	69.43	0.38	**4.57**	55.01	0.36	**3.41**
8a	10.23	22.37	164.47	0.54	**2.52**	147.95	0.52	**2.18**	126.89	0.47	**1.70**	110.84	0.45	**1.42**	95.55	0.43	**1.16**	75.64	0.38	**0.82**	59.94	0.36	**0.61**
8b	123.23	30.16	140.70	0.54	**26.01**	125.73	0.52	**22.27**	107.76	0.47	**17.43**	93.29	0.45	**14.37**	80.31	0.43	**11.75**	63.45	0.38	**8.31**	50.28	0.36	**6.20**
9	103.95	31.52	138.06	0.54	**21.53**	123.35	0.52	**18.43**	105.62	0.47	**14.41**	91.43	0.45	**11.88**	78.68	0.43	**9.71**	62.14	0.38	**6.86**	49.24	0.36	**5.12**
10	53.05	27.80	147.16	0.54	**11.71**	131.72	0.52	**10.04**	112.84	0.47	**7.86**	98.12	0.45	**6.51**	84.46	0.43	**5.32**	66.77	0.38	**3.76**	52.91	0.36	**2.81**

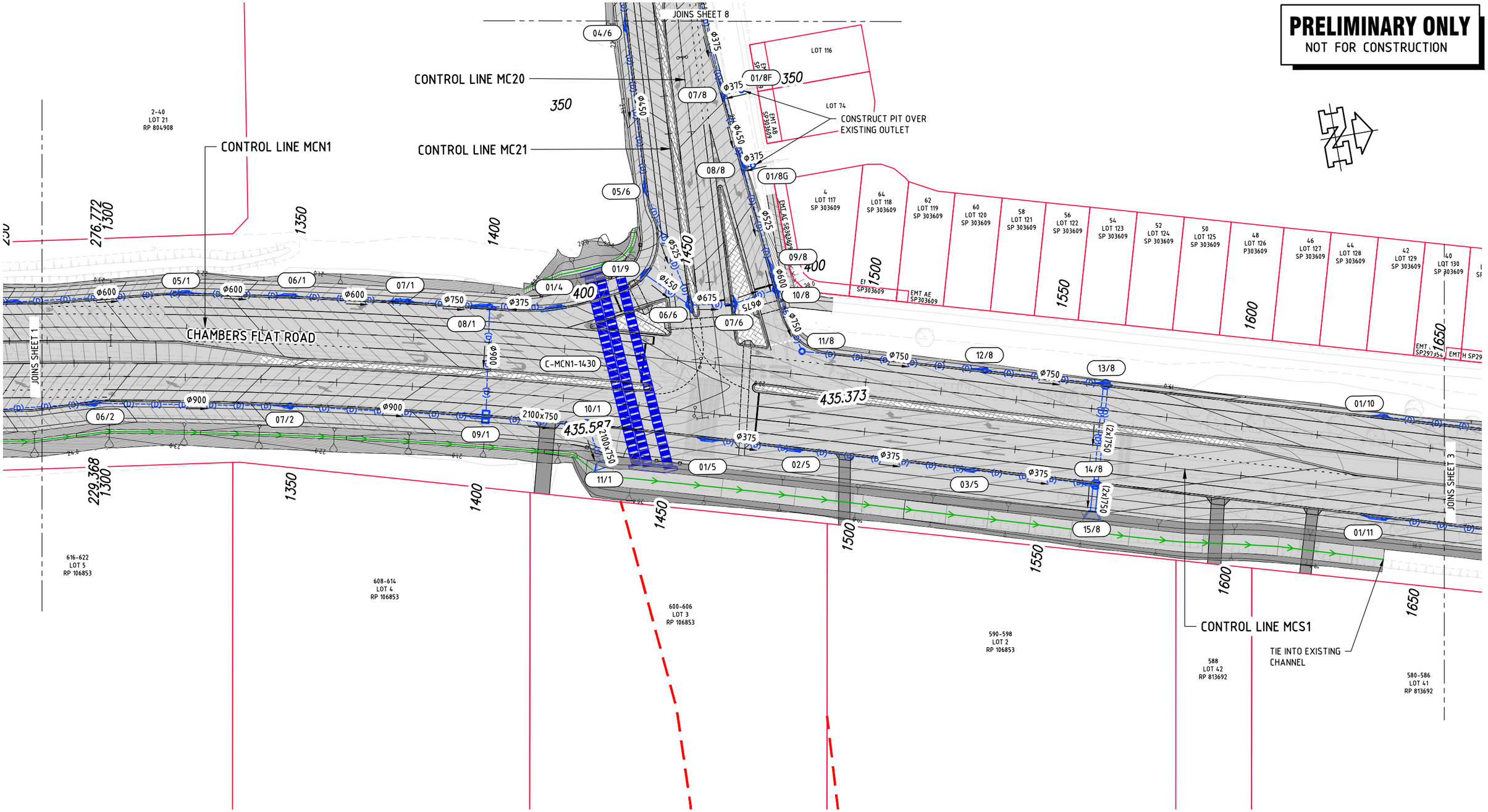
Post-Development Hydrology

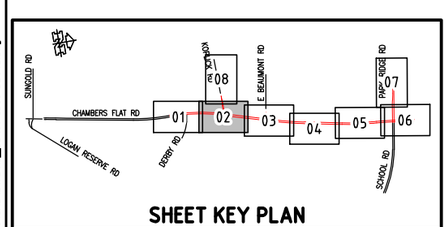
Catch.	Area (ha)	tc (min)	I_{100} (mm/hr)	C	Q_{100} (m^3/s)	I_{50} (mm/hr)	C	Q_{50} (m^3/s)	I_{20} (mm/hr)	C	Q_{20} (m^3/s)	I_{10} (mm/hr)	C	Q_{10} (m^3/s)	I_5 (mm/hr)	C	Q_5 (m^3/s)	I_2 (mm/hr)	C	Q_2 (m^3/s)	I_1 (mm/hr)	C	Q_1 (m^3/s)
A1	10.25	15.00	198.00	0.97	**5.48**	179.00	0.93	**4.75**	154.00	0.85	**3.73**	134.00	0.81	**3.09**	116.00	0.77	**2.54**	92.20	0.69	**1.81**	73.00	0.65	**1.35**
A2	2.06	15.02	198.00	0.71	**0.80**	179.00	0.68	**0.69**	154.00	0.62	**0.55**	134.00	0.59	**0.45**	116.00	0.56	**0.37**	92.20	0.50	**0.26**	73.00	0.47	**0.20**
Post B	4.22	11.50	223.20	1.00	**2.62**	202.10	0.98	**2.32**	173.60	0.89	**1.82**	150.80	0.85	**1.50**	130.70	0.81	**1.24**	103.96	0.72	**0.88**	82.17	0.68	**0.65**
Ext_1	3.35	15.45	195.76	0.71	**1.29**	176.94	0.68	**1.12**	152.21	0.62	**0.88**	132.48	0.59	**0.73**	114.66	0.56	**0.60**	91.11	0.50	**0.43**	72.14	0.47	**0.32**

Appendix D Chambers Flat Road Upgrade – Drainage Design Drawings

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

LOGAN CITY COUNCIL DM FILE NUMBER:





SHEET KEY PLAN

NOTES:

1. FOR DRAINAGE NOTES AND LEGEND REFER TO DRAWING 01-CD80-DD001.

AMENDMENTS		BY	CHKD	APPROVED	DATE
01	50% DETAILED DESIGN	EC	OW	JD	28/01/22

BAR SCALES

SCALE 1:500 5 0 10 20

SURVEY CONTROL POINTS

LOGAN CITY COUNCIL

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	CD80	
COMP. REF.		
SURVEYOR		
SURVEY REF.		
DESIGNED	JD	28/01/22
CHECKED	JG	28/01/22
DRAWN	MR	28/01/22
CHECKED	OW	28/01/22

CHAMBERS FLAT ROAD UPGRADE DERBY ROAD TO SCHOOL ROAD DRAINAGE

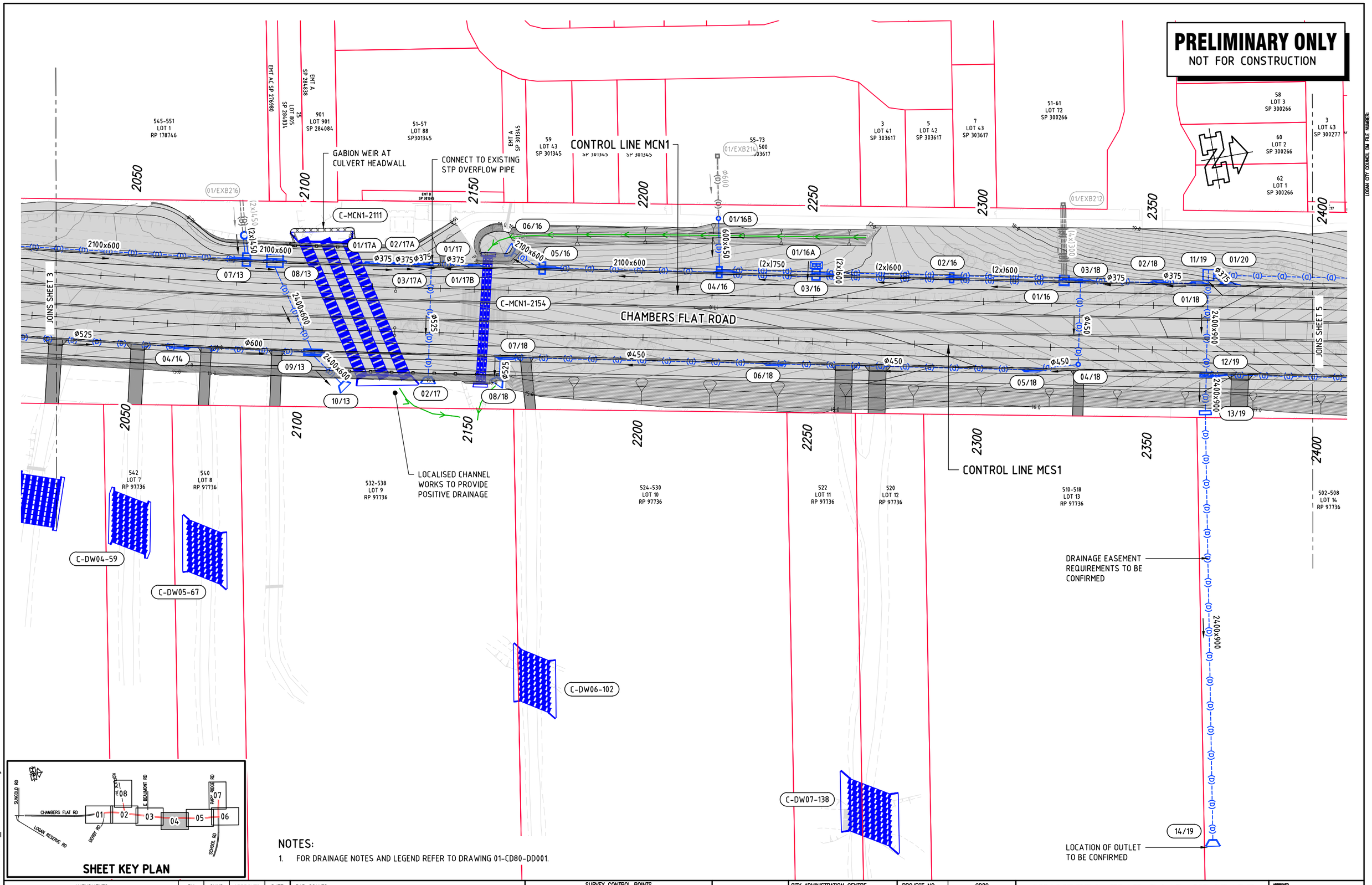
LAYOUT
SHEET 2

APPROVED
DESIGN ENGINEER DATE

SHEET 2 OF 8

DRAWING NUMBER
01-CD80-DD042

V:_Vault\Projects\3003\30033726\CAD\DWG\12_DD\01-CD80-DD042.dwg



NOTES:

1. FOR DRAINAGE NOTES AND LEGEND REFER TO DRAWING 01-CD80-DD001.

AMENDMENTS		BY	CHKD	APPROVED	DATE
01	50% DETAILED DESIGN	EC	OW	JD	28/01/22

BAR SCALES

SCALE 1:500 5 0 10 20

SURVEY CONTROL POINTS

LOGAN CITY COUNCIL

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	CD80	
COMP. REF.		
SURVEYOR		
SURVEY REF.		
DESIGNED	JD	28/01/22
CHECKED	JG	28/01/22
DRAWN	MR	28/01/22
CHECKED	OW	28/01/22

CHAMBERS FLAT ROAD UPGRADE DERBY ROAD TO SCHOOL ROAD DRAINAGE

LAYOUT
SHEET 4

APPROVED
DESIGN ENGINEER DATE

SHEET 4 OF 8

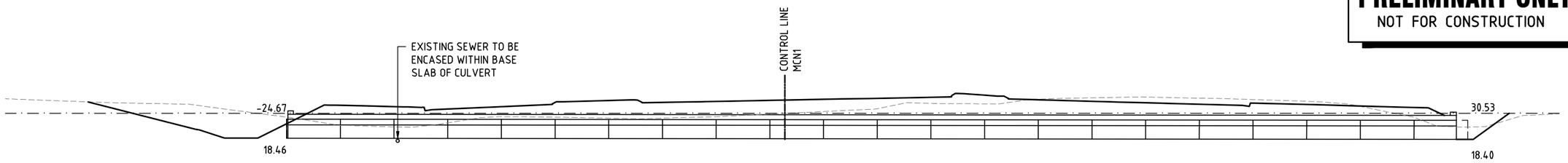
DRAWING NUMBER
01-CD80-DD044

V:_Vault\Projects\3003\3003726\CAD\DWG\12_DD\01-CD80-DD044.dwg

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

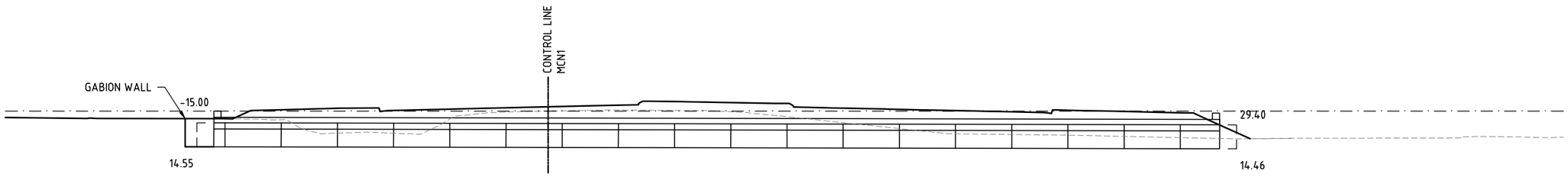
LOGAN CITY COUNCIL DM FILE NUMBER:

C-MCN1-1430



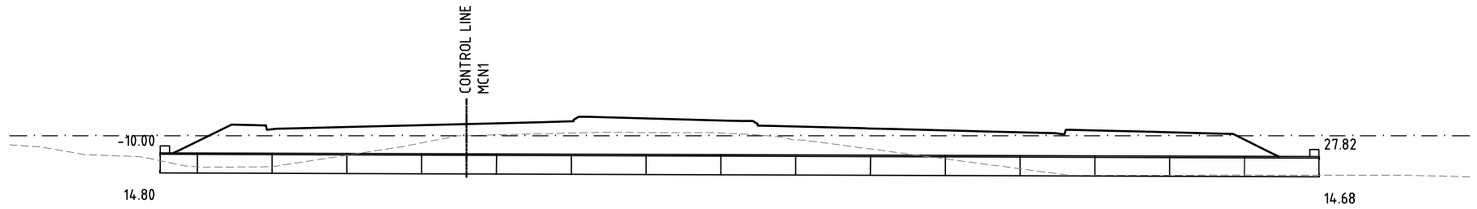
4/2400x600 SLBC (3/2400x600 RCBC + 1/2400 RCSS)
(2/1.2 66/2.4) (54.18 OUTSIDE OF WALLS) 1435.864
SKEW ANGLE 20° SKEW NUMBER 70 (55.20 OVERALL LENGTH)
STANDARD DRAWINGS - 1260, 1359

C-MCN1-2111



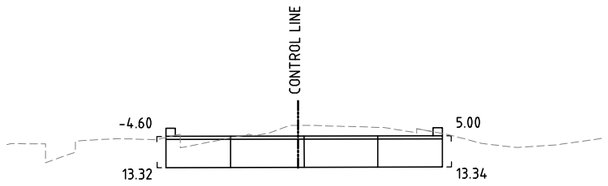
5/2700x750 SLBC (3/2700x750 RCBC + 2/2700 RCSS)
(3/1.2 54/2.4) (42.96 OUTSIDE OF WALLS) 2111.914
SKEW ANGLE 25° SKEW NUMBER 65 (44.40 OVERALL LENGTH)
STANDARD DRAWINGS - 1250, 1359

C-MCN1-2154



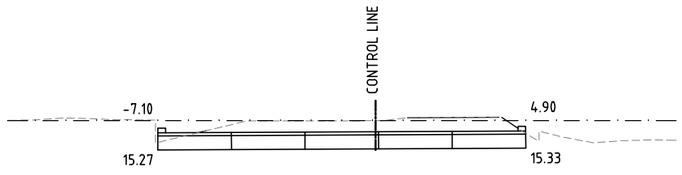
3/600 RCP (3/1.22 45/2.44) (CLASS 3, RUBBER RING) (37.79 OUTSIDE OF WALLS) 2153.473
SKEW ANGLE 2° SKEW NUMBER 92 (37.82 OVERALL LENGTH)
STANDARD DRAWINGS - 1305, 1359

C-DW01-73



10/1200x900 RCBC (40/2.4) (9.01 OUTSIDE OF WALLS)
SKEW ANGLE 23° SKEW NUMBER 113 (9.60 OVERALL LENGTH)
STANDARD DRAWINGS - 1260, 1359

C-DWD02-68



10/1200x450 RCBC (50/2.4) (12.00 OVERALL LENGTH)
STANDARD DRAWINGS - 1250, 1359

NOTES:

1. FOR DRAINAGE NOTES AND LEGEND REFER TO DRAWING 01-CD80-DD001.
2. PROVIDE OUTLET ROCK PROTECTION ON ALL CULVERTS.

AMENDMENTS		BY	CHKD	APPROVED	DATE
01	50% DETAILED DESIGN	EC	OW	JD	28/01/22

BAR SCALES
SCALE 1:100 1 0 1 2 3 4 5

SURVEY CONTROL POINTS

CITY ADMINISTRATION CENTRE
150 Wembley Road,
Logan Central, QLD 4114
Ph:(07)3412 3412
Fax:(07)3412 3444
SENIOR DESIGN ENGINEER
Ph:(07)3412 4279
Email:
Infradelivery@logan.qld.gov.au

PROJECT NO.	CD80	
COMP. REF.		
SURVEYOR		
SURVEY REF.		
DESIGNED	JD	28/01/22
CHECKED	JG	28/01/22
DRAWN	PH	28/01/22
CHECKED	OW	28/01/22

CHAMBERS FLAT ROAD UPGRADE DERBY ROAD TO SCHOOL ROAD TRANSVERSE DRAINAGE

CULVERT CROSS SECTIONS
SHEET 1

APPROVED
DESIGN ENGINEER DATE

SHEET 1 OF 2

DRAWING NUMBER
01-CD80-DD201

V:_Vault\Projects\30013033726\CAD\DWG\12_DD\01-CD80-DD201.dwg

Appendix E Hydraulic Model Features

Figure No.	Figure Name
Fig 00	Mapping Index
Fig 01	Catchment Plan
Fig 02	Pre Development - Tuflow Model Feature
Fig 03	Pre Development - Tuflow Manning Map
Fig 04	Post Development - Tuflow Model Feature
Fig 05	Post Development - Tuflow Manning Map
Fig A01	Pre Development - 1%AEP Flood Water Level
Fig A02	Pre Development - 1%AEP Flood Water Depth
Fig A03	Pre Development - 1%AEP Flood Water Velocity
Fig A04	Pre Development - 1%AEP Flood Water Hazard
Fig B01	Post Development - 1%AEP Flood Water Depth
Fig B02	Post Development - 2%AEP Flood Water Depth
Fig B03	Post Development - 5%AEP Flood Water Depth
Fig B04	Post Development - 1%AEP Cc Flood Water Depth
Fig B05	Post Development - 1%AEP(Blockage Culvert) Flood Water Depth
Fig C01	Post Development - 1%AEP Flood Water Level Afflux
Fig C02	Post Development - 2%AEP Flood Water Level Afflux
Fig C03	Post Development - 5%AEP Flood Water Level Afflux
Fig C04	Post Development - 10%AEP Flood Water Level Afflux
Fig C05	Post Development - 18%AEP Flood Water Level Afflux
Fig C06	Post Development - 39%AEP Flood Water Level Afflux
Fig C07	Post Development - 1%AEP Climate Change Flood Water Level Afflux
Fig C08	Post Development - 1%AEP Flood Water Velocity Afflux
Fig C09	Post Development - 2%AEP Flood Water Velocity Afflux
Fig C10	Post Development - 5%AEP Flood Water Velocity Afflux
Fig C11	Post Development - 10%AEP Flood Water Velocity Afflux
Fig C12	Post Development - 18%AEP Flood Water Velocity Afflux
Fig C13	Post Development - 39%AEP Flood Water Velocity Afflux
Fig C14	Post Development - 1%AEP Climate Change Flood Water Velocity Afflux

542 Chambers Flat Rd

FIG 00 MAPPING INDEX

Project: BE210264

Date: OCT 2022

Scale:1:13000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

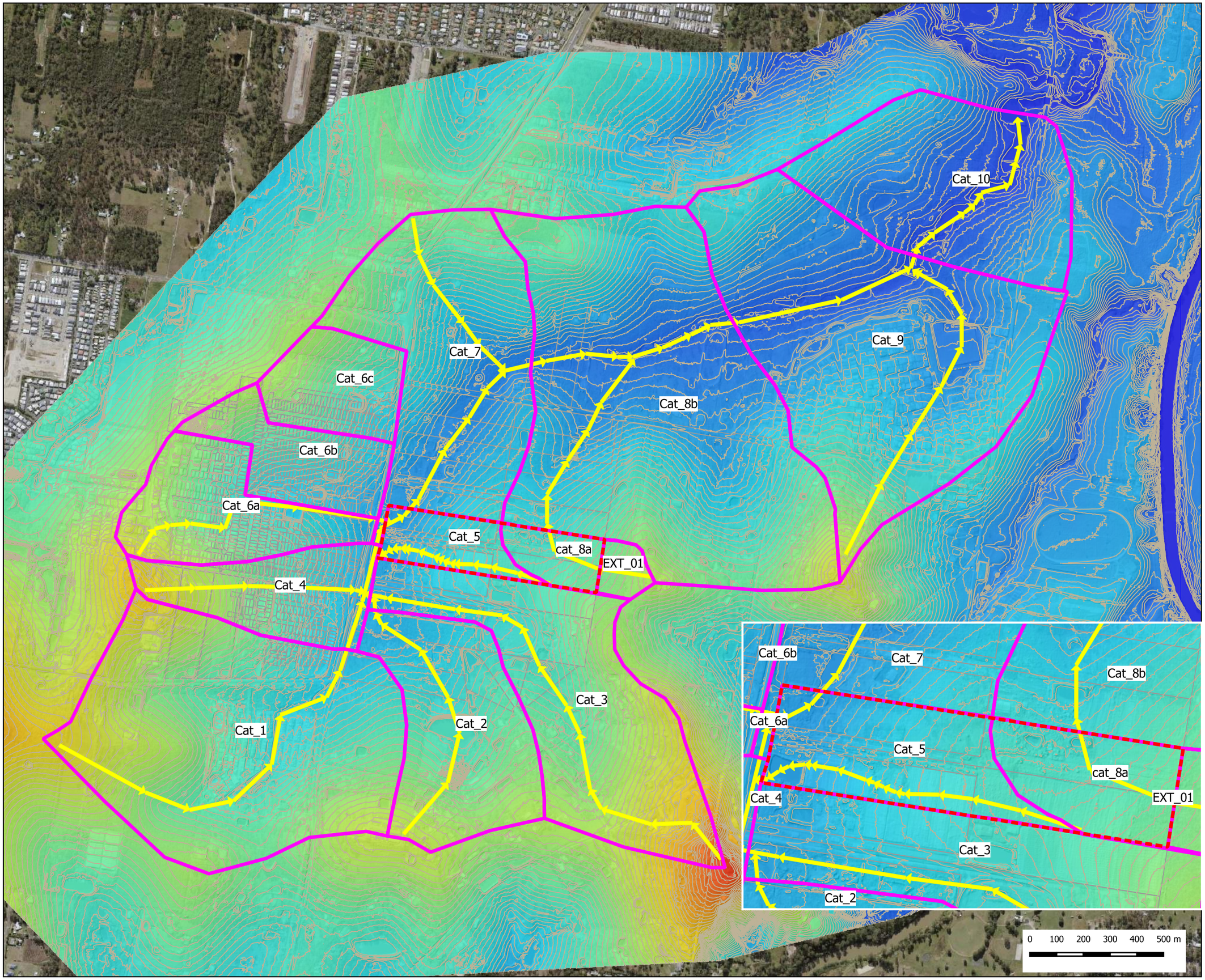
.....

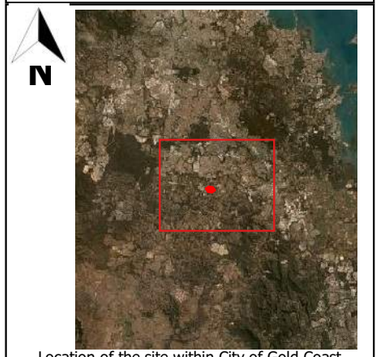
COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG 01 CATCHMENT PLAN





Location of the site within City of Gold Coast

Legend

- Cadastral
- Flowpath
- Site
- Sub catchment

Surface Elevation (mAHD)

0		40	
10		50	
20		60	
30		70	

Project: BE210264

Date: MAY 2022

Scale:1:13000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

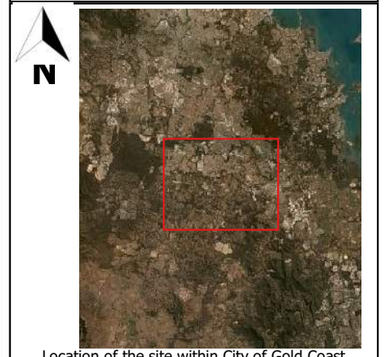
.....

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG 02 PRE DEVELOPMENT
TUFLOW MODEL FEATURE



Location of the site within City of Gold Coast

Legend

- Inflow Location
- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Hydarulic Structure

Surface Elevation (mAHD)

	0		40
	10		50
	20		60
	30		70

Project: BE210264

Date: MAY 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

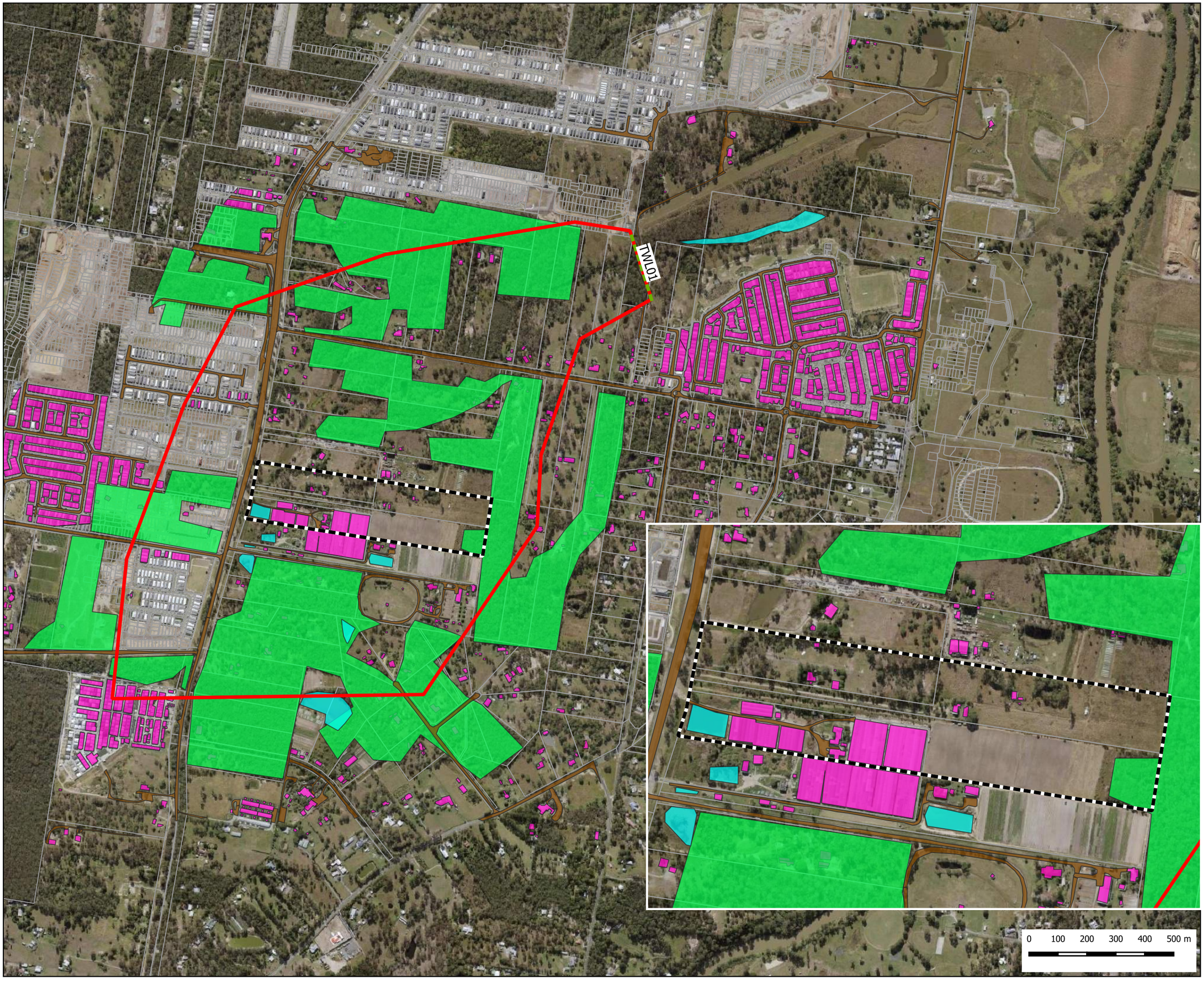
.....

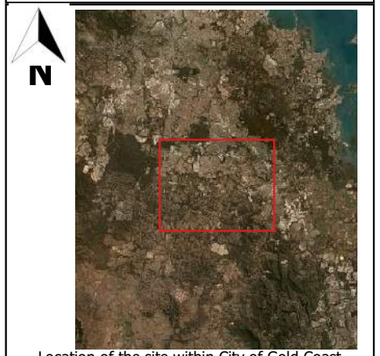
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG 03 PRE DEVELOPMENT
TUFLOW MANNING MAP





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site

Manning Value(n)

- Road (n=0.02)
- Roof(n=0.4)
- Tree(n=0.07)
- Waterboby (n=0.022)
- Remain Area(n=0.045)

Project: BE210264

Date: MAY 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

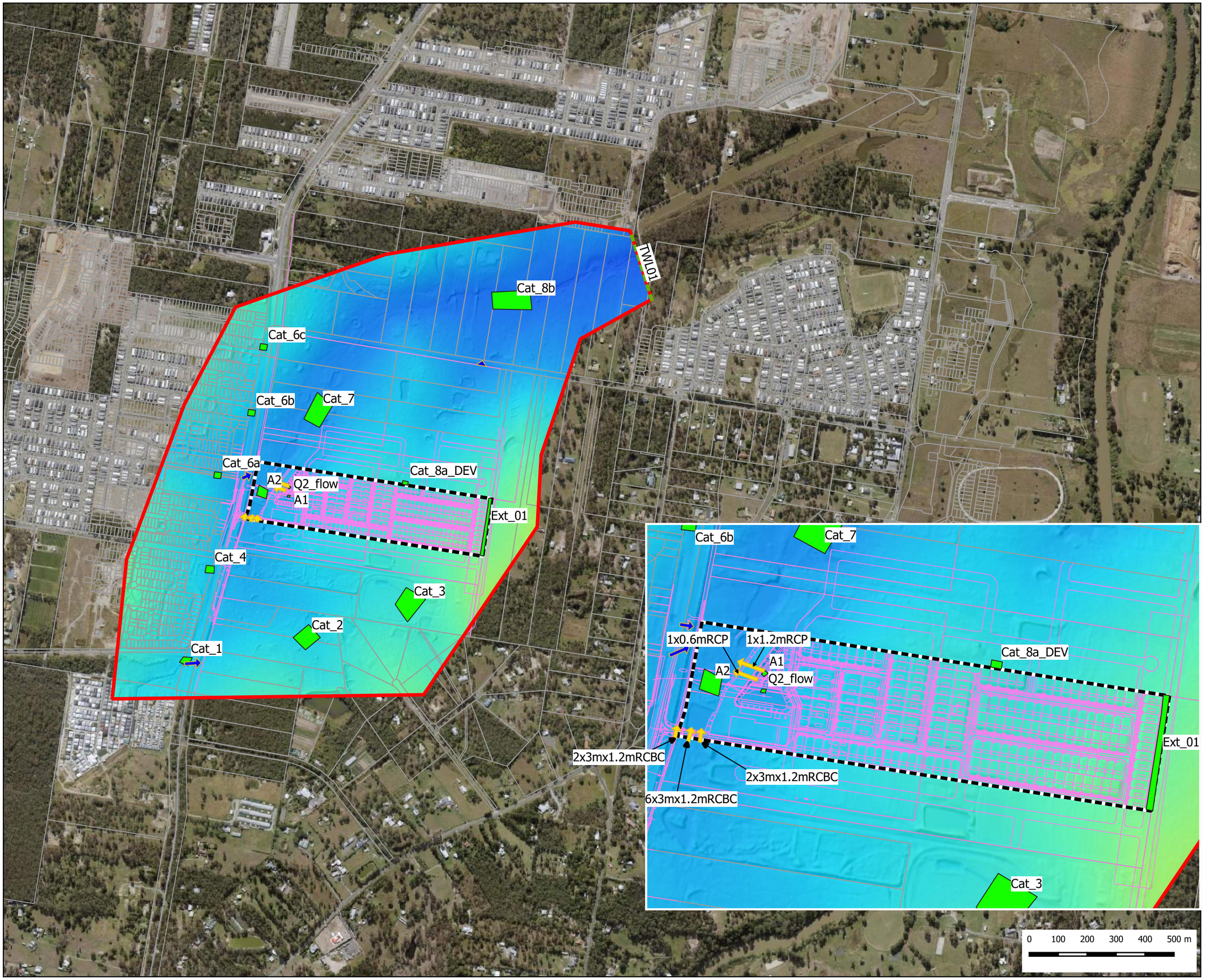
.....

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG 04 POST DEVELOPMENT
TUFLOW MODEL FEATURE





Location of the site within City of Gold Coast

Legend

- Inflow Location
- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout
- Hydraulic Structure
- Proposed Culvert

Surface Elevation (mAHD)

	0		40
	10		50
	20		60
	30		70

Project: BE210264

Date: MAY 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

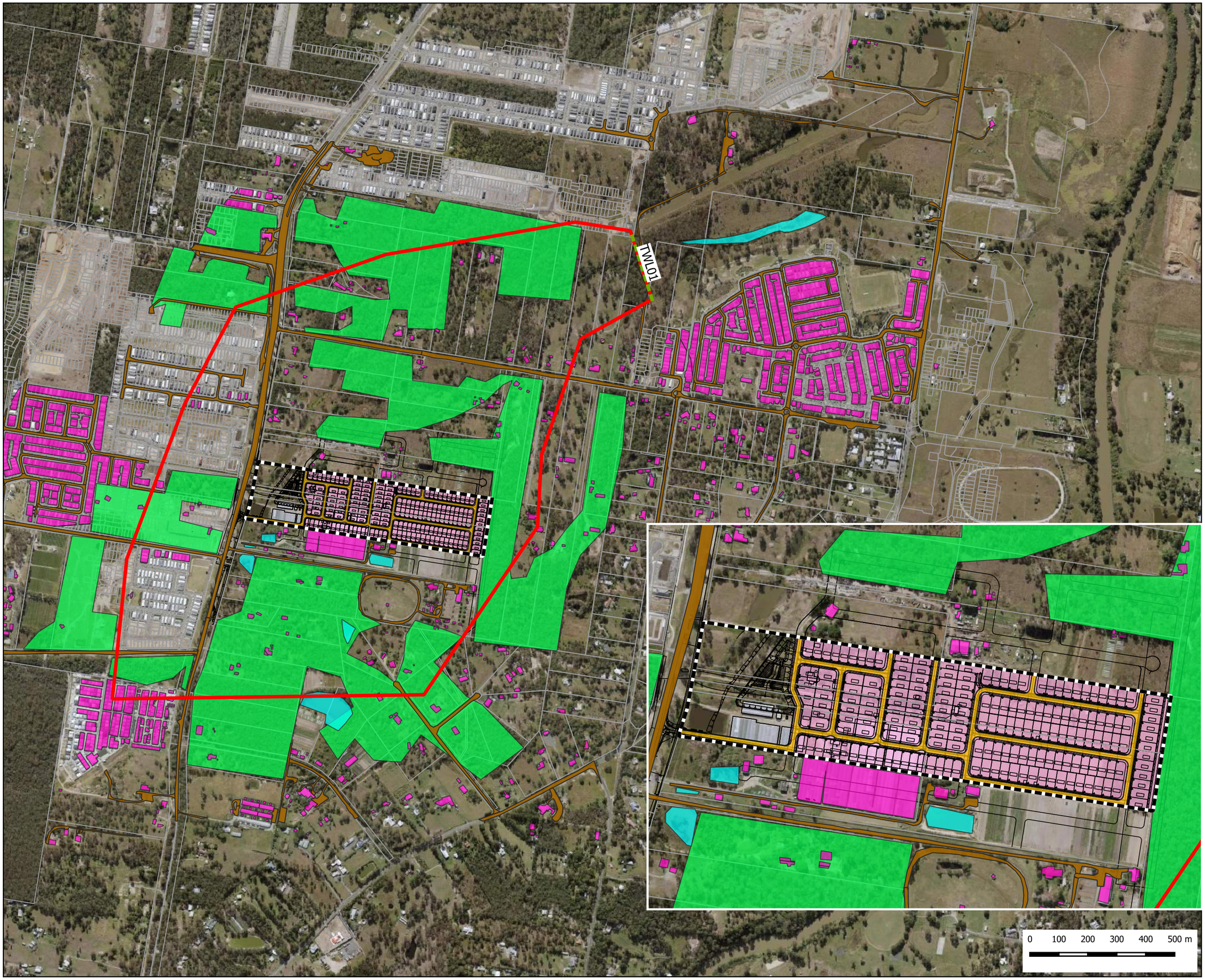
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

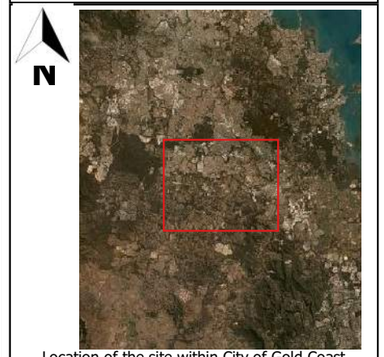
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG 05 POST DEVELOPMENT
TUFLOW MANNING MAP





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Manning Value(n)

- Road (n=0.02)
- Roof(n=0.4)
- Tree(n=0.07)
- Waterboby (n=0.022)
- Remain Area(n=0.045)
- Proposed Residential Lot (n=0.045)
- Proposed Road (n=0.02)

Project: BE210264

Date: MAY 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS
ENGINEERING SOLUTIONS

FOR

.....

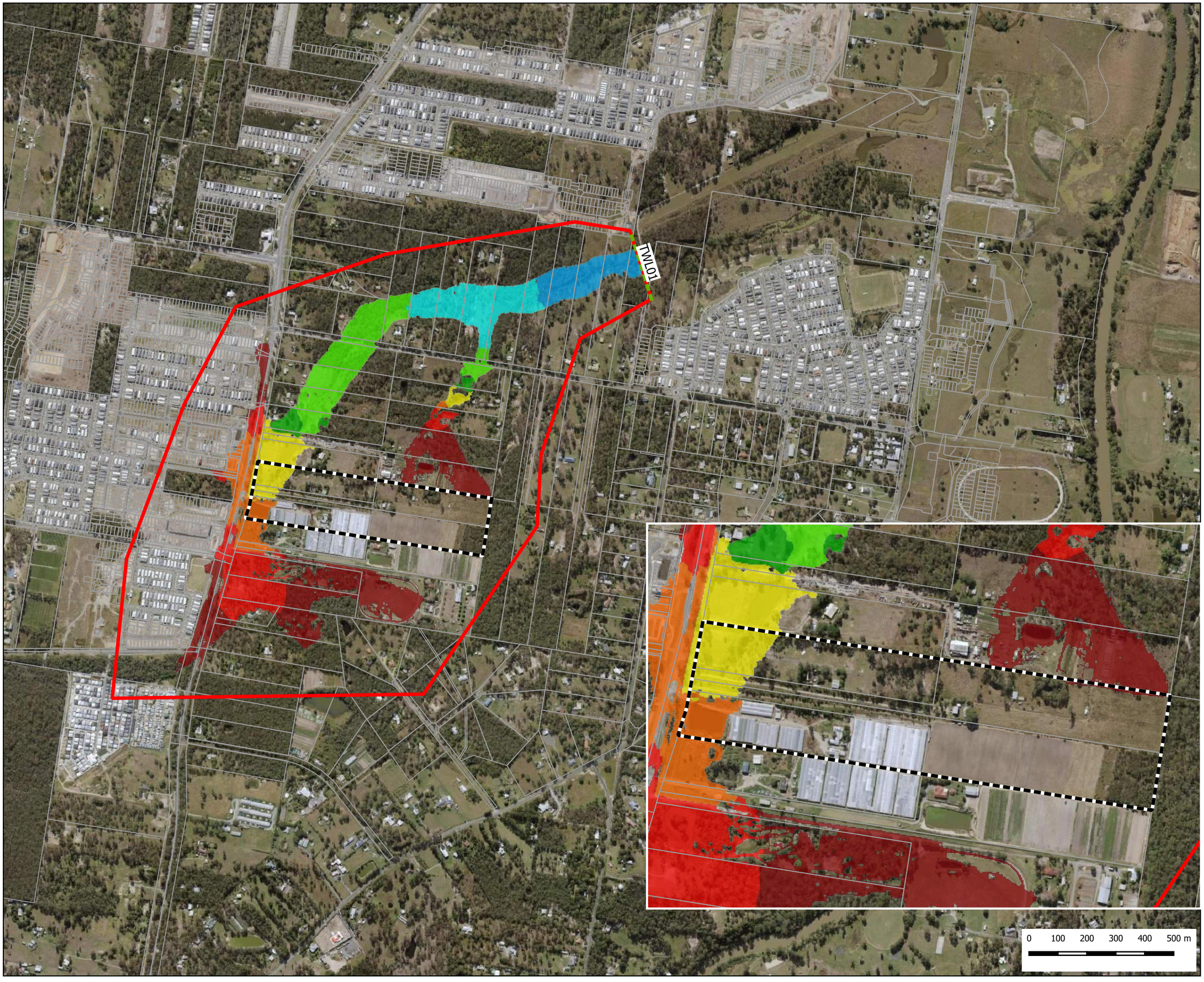
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

Appendix F Hydraulic Mapping Results

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG A01 PRE DEVELOPMENT
1%AEP
FLOOD WATER LEVEL





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site

Water Level(mAHD)

below 10.0	15.0 - 16.0
10.0 - 12.0	16.0 - 17.0
12.0 - 14.0	17.0 - 18.0
14.0 - 15.0	above 18.0

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

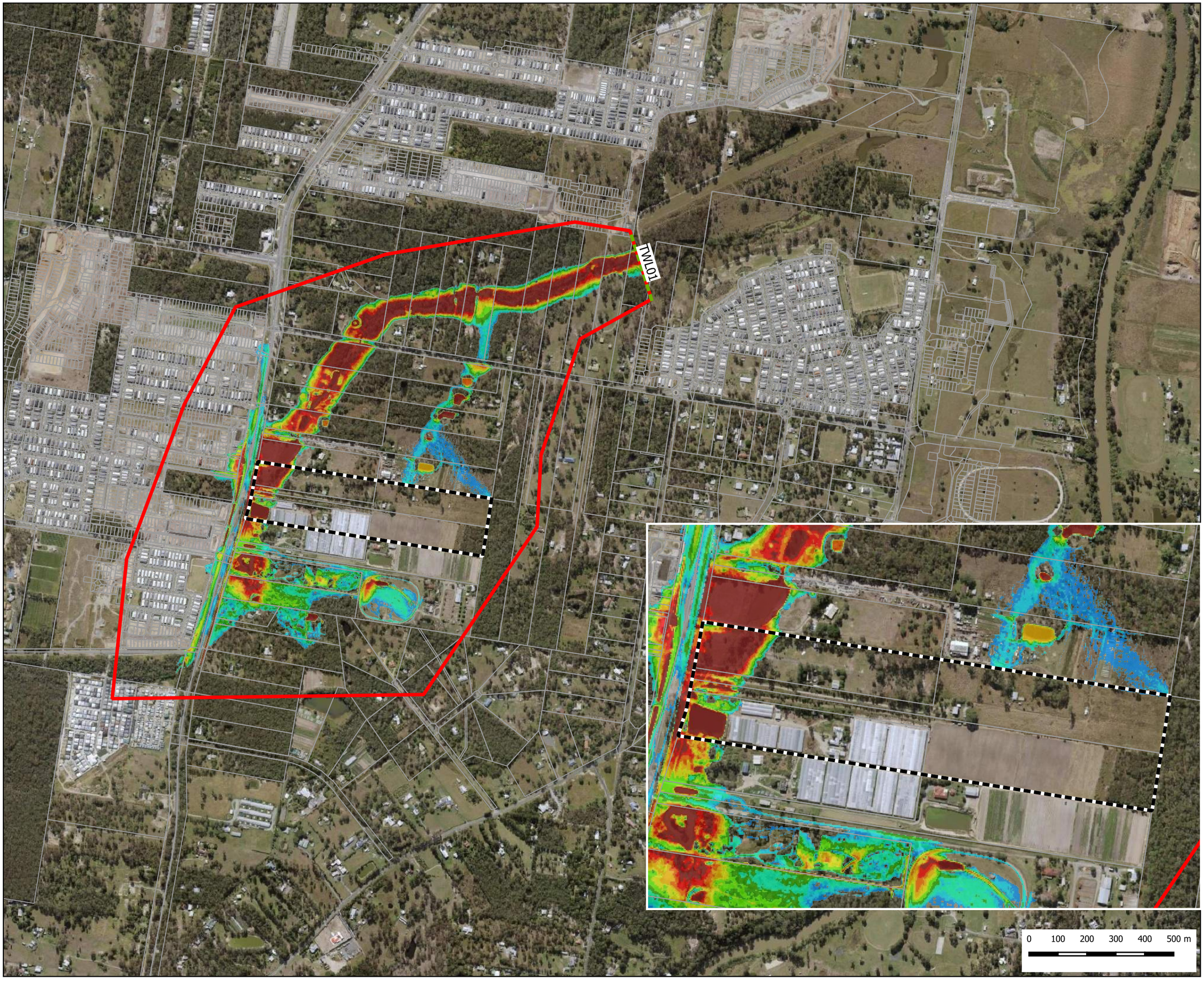
.....

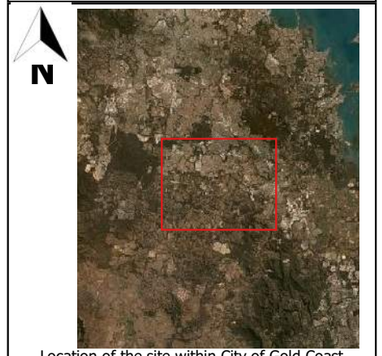
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG A02 PRE DEVELOPMENT
1%AEP
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

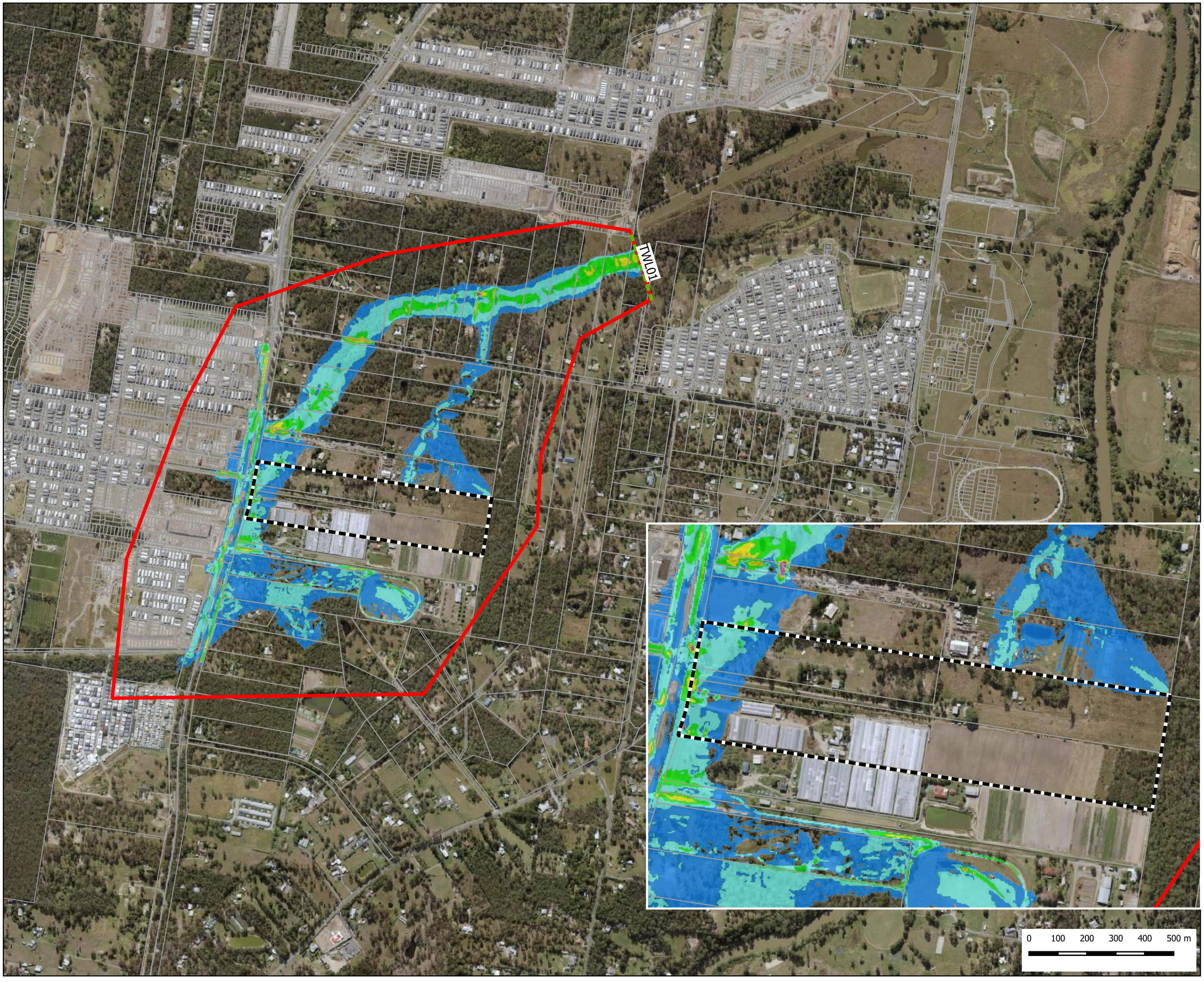
.....

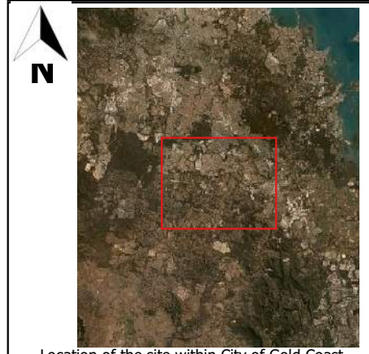
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG A03 PRE DEVELOPMENT
1%AEP
FLOOD WATER VELOCITY





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site

Water Velocity(m/s)

- below 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- 1.5 to 2.0
- 2.0 to 2.5
- 2.5 to 3.0
- 3.0 to 3.5
- 3.5 to 4.0
- above 4.0

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

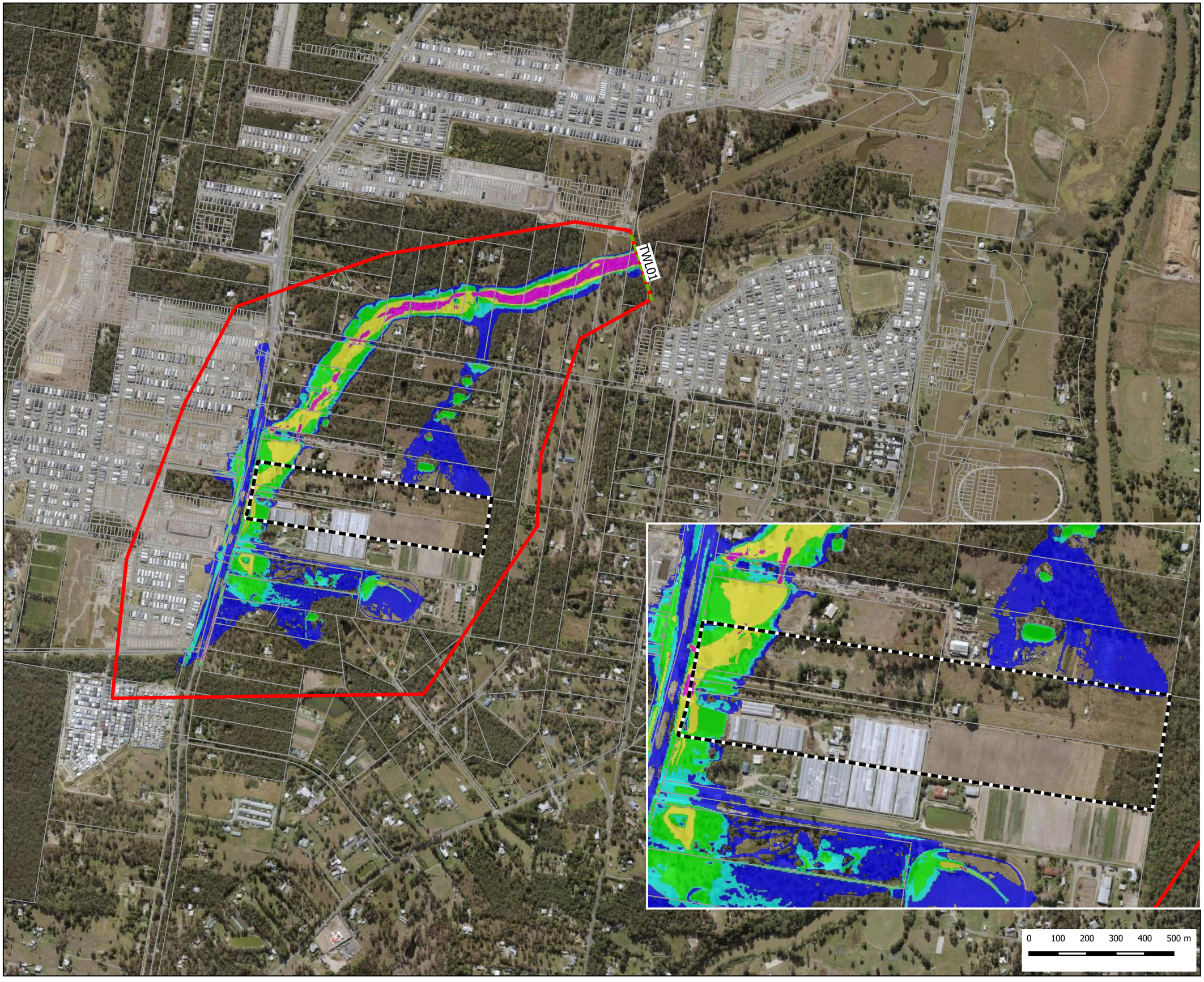
FOR

.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG A04 PRE DEVELOPMENT
1%AEP
FLOOD WATER HAZARD




Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site

Water Hazard

- H1
- H2
- H3
- H4
- H5
- H6

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

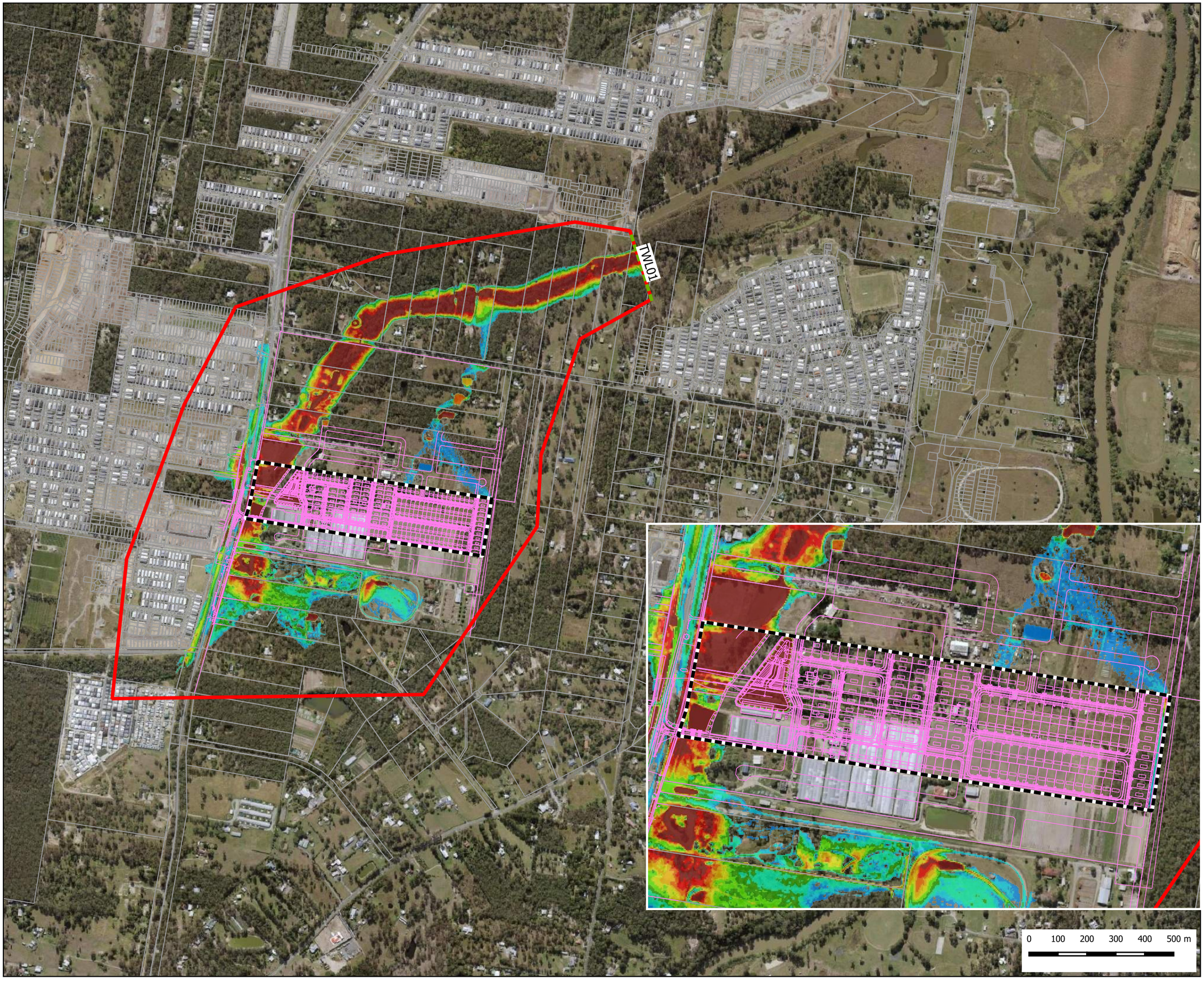
COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG B01 POST DEVELOPMENT
1%AEP
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

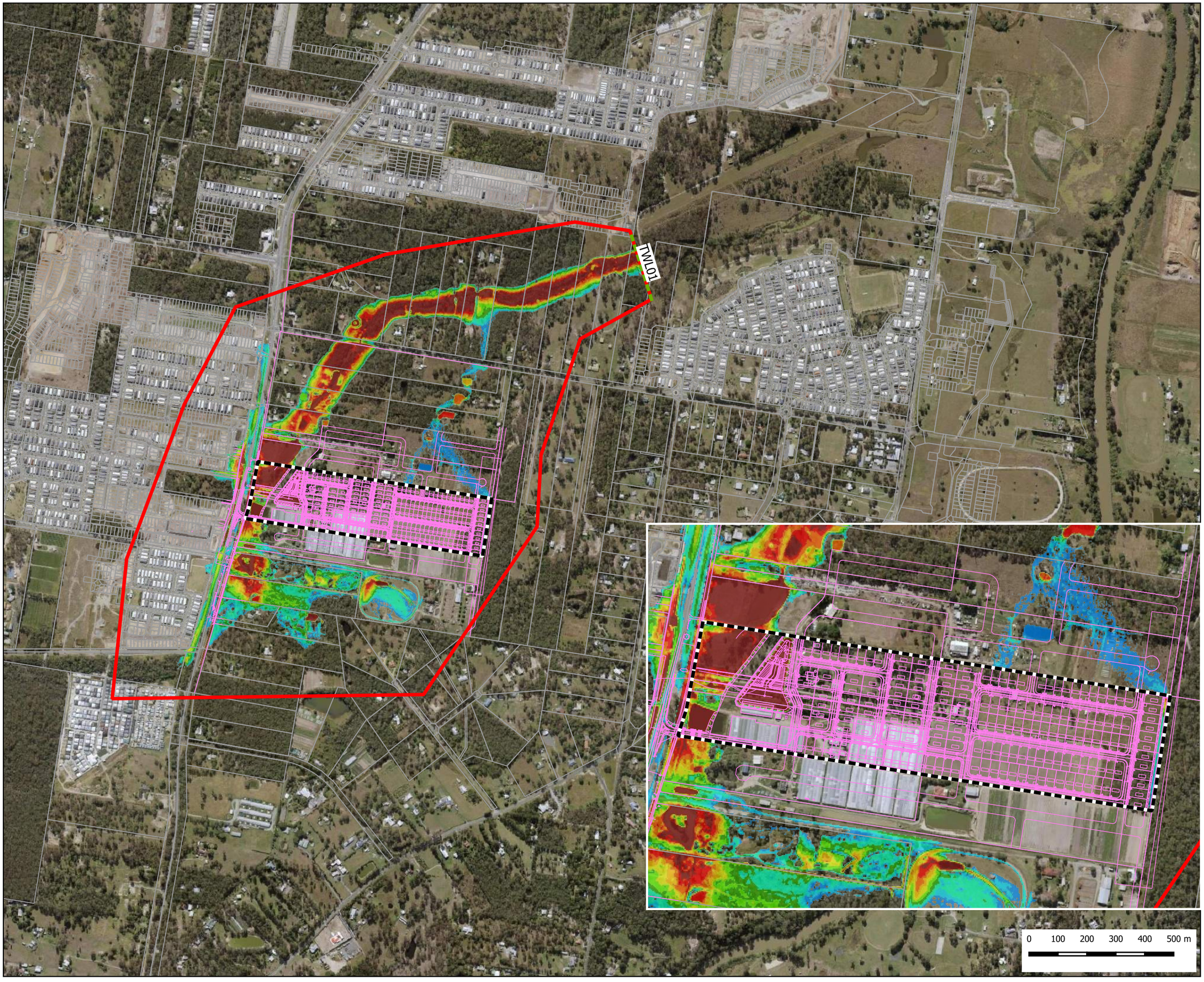
FOR

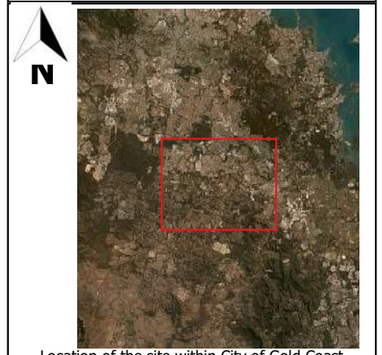
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG B02 POST DEVELOPMENT
2%AEP
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

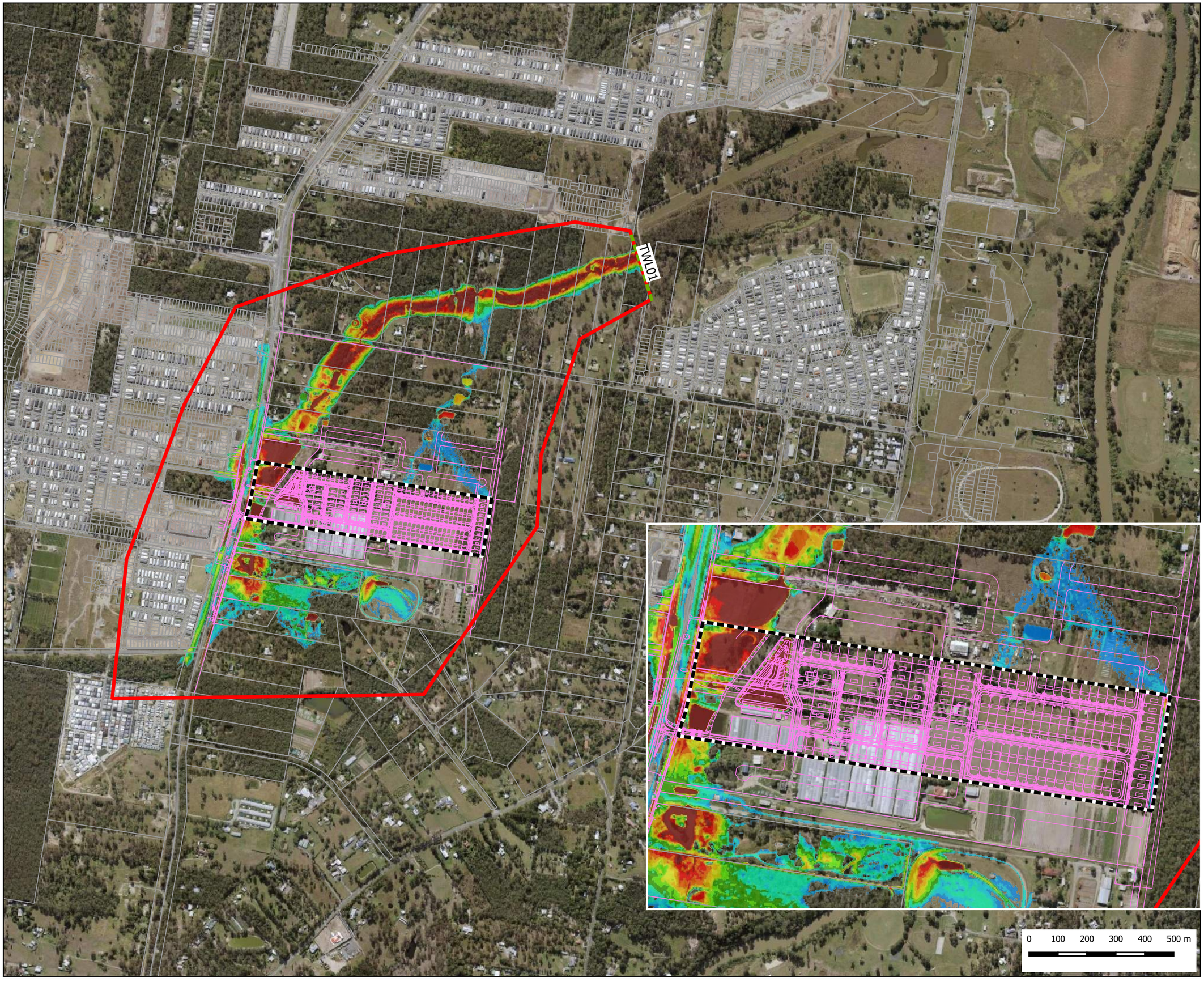
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG B03 POST DEVELOPMENT
5%AEP
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

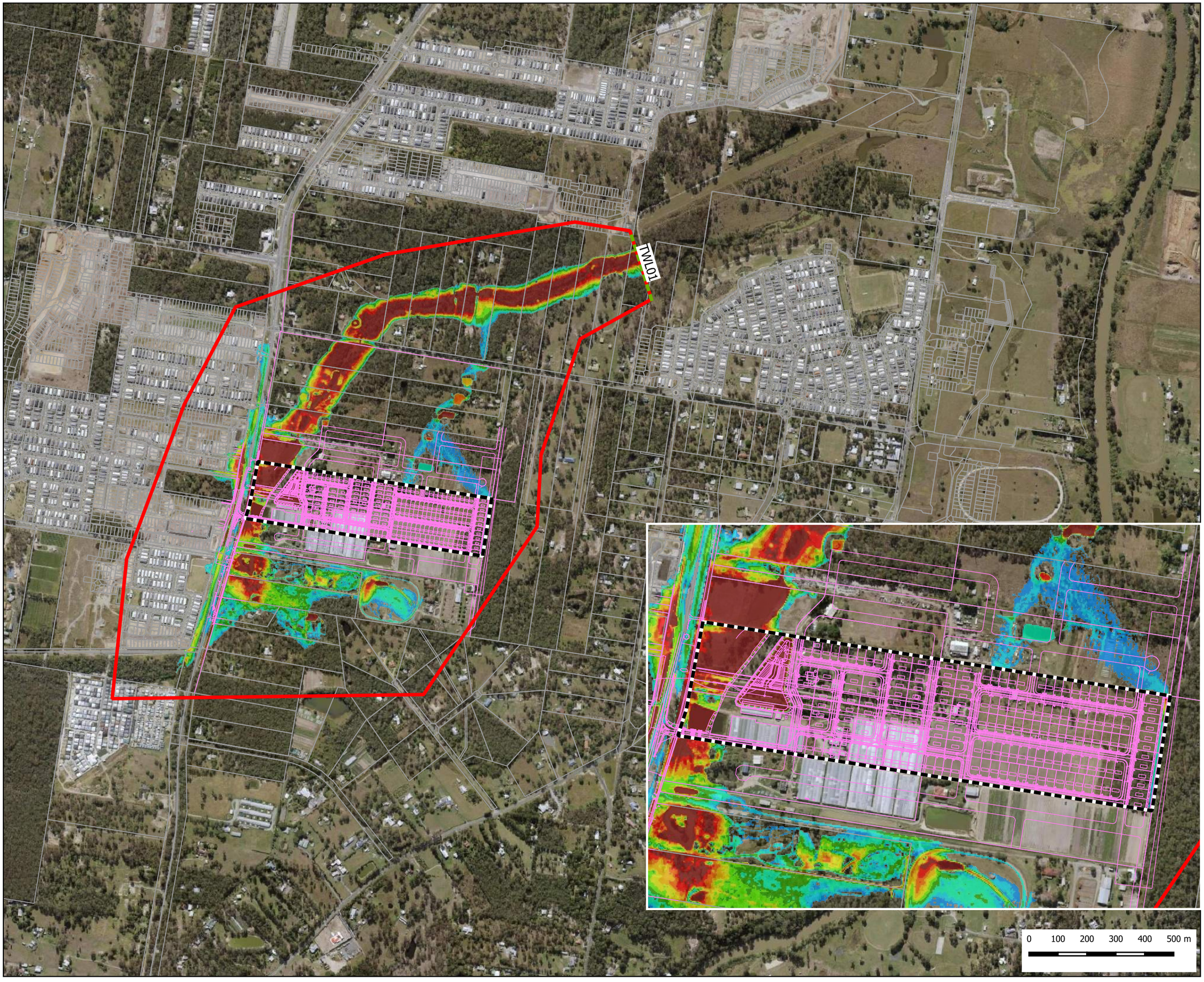
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG B04 POST DEVELOPMENT
1%AEP CLIMATE CHANGE
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

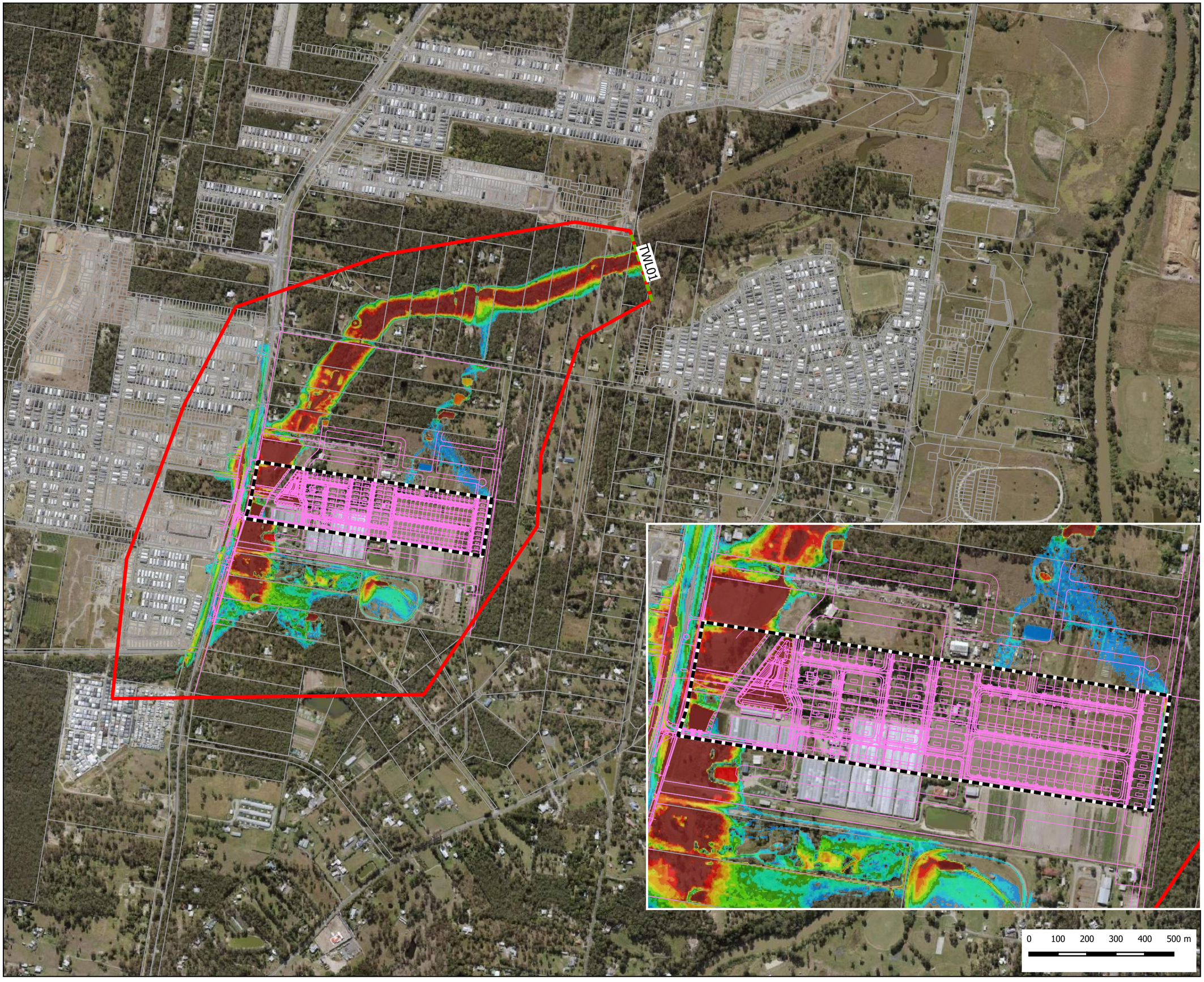
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG B05 POST DEVELOPMENT
1%AEP(BLOCKAGE)
FLOOD WATER DEPTH





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Depth(m)

below 0.02	0.4 - 0.5
0.02 - 0.05	0.5 - 0.6
0.05 - 0.1	0.6 - 0.7
0.1 - 0.2	0.7 - 0.8
0.2 - 0.3	above 0.8
0.3 - 0.4	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

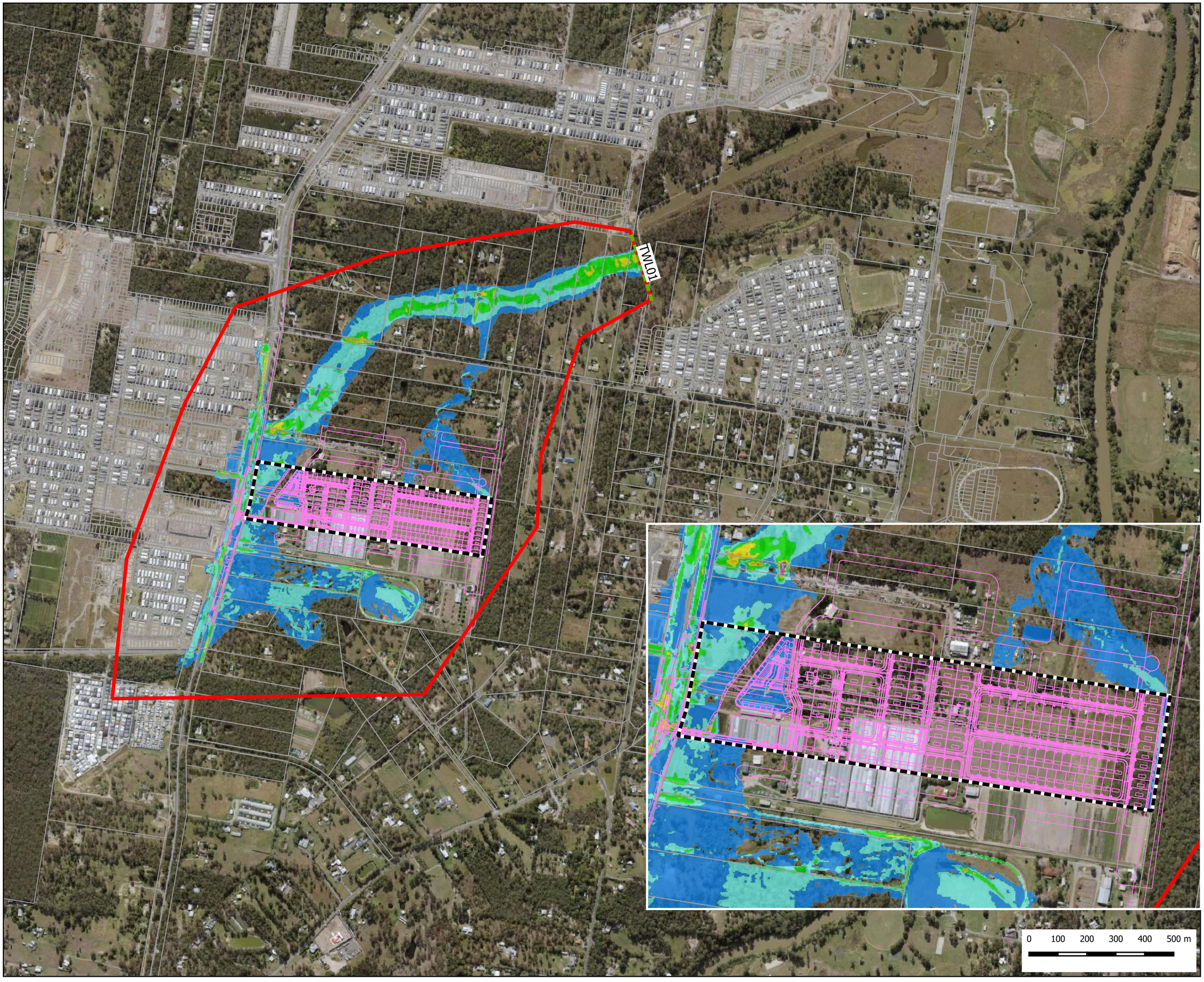
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG B06 POST DEVELOPMENT
1%AEP (BLOCKAGE)
FLOOD WATER VELOCITY





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Velocity(m/s)

below 0.5	2.5 to 3.0
0.5 to 1.0	3.0 to 3.5
1.0 to 1.5	3.5 to 4.0
1.5 to 2.0	above 4.0
2.0 to 2.5	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

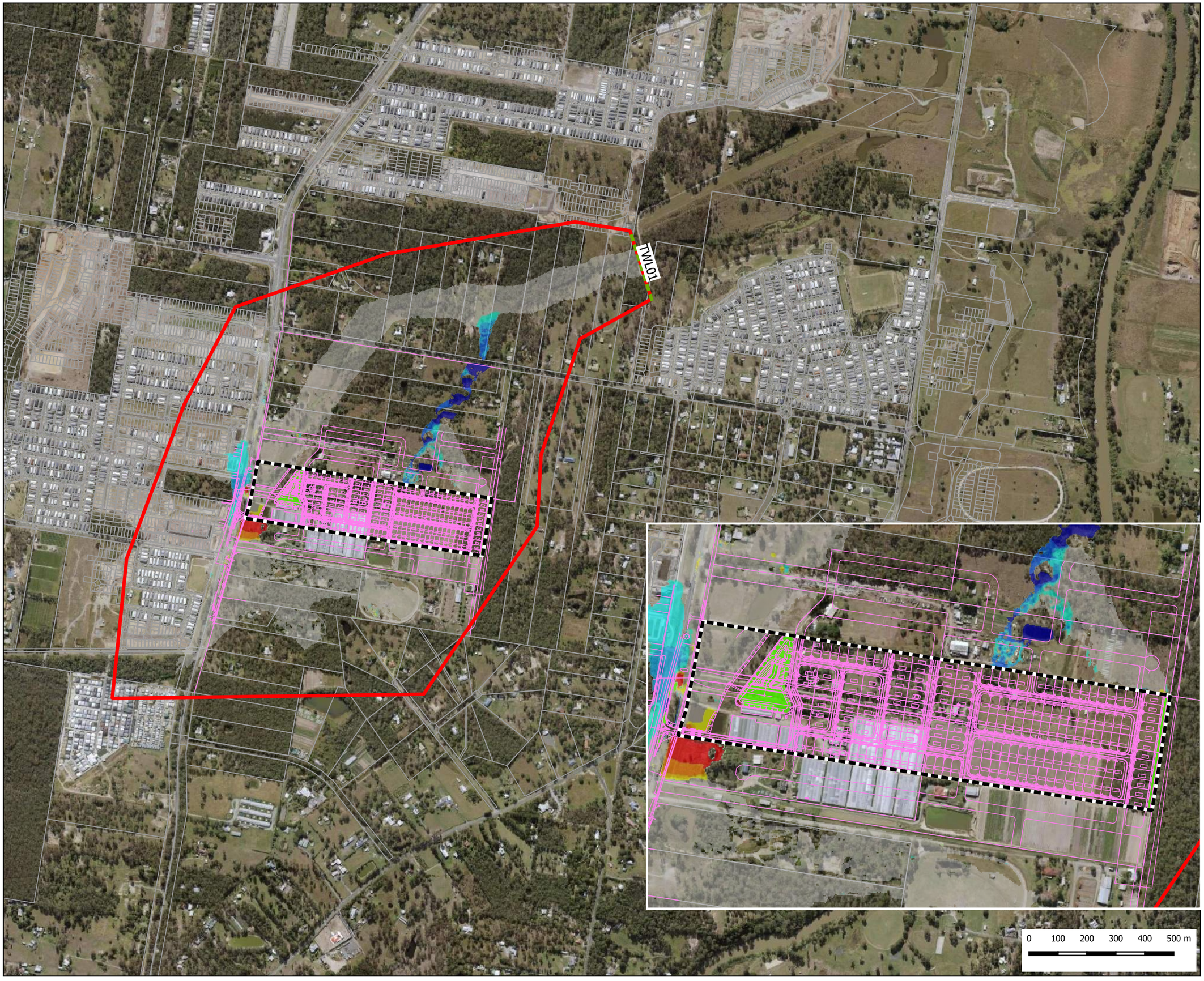
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C01 POST DEVELOPMENT
1%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

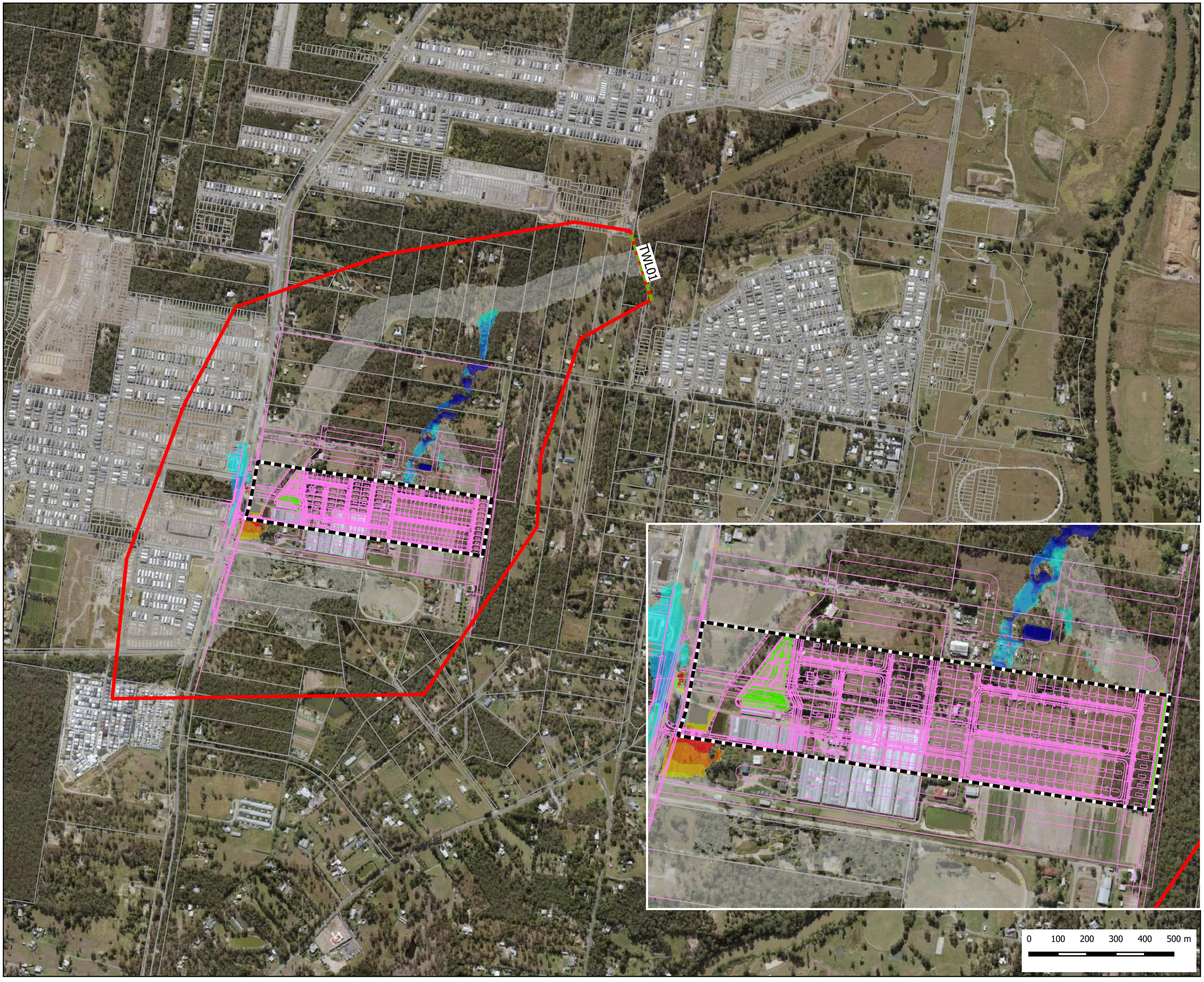
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C02 POST DEVELOPMENT
2%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

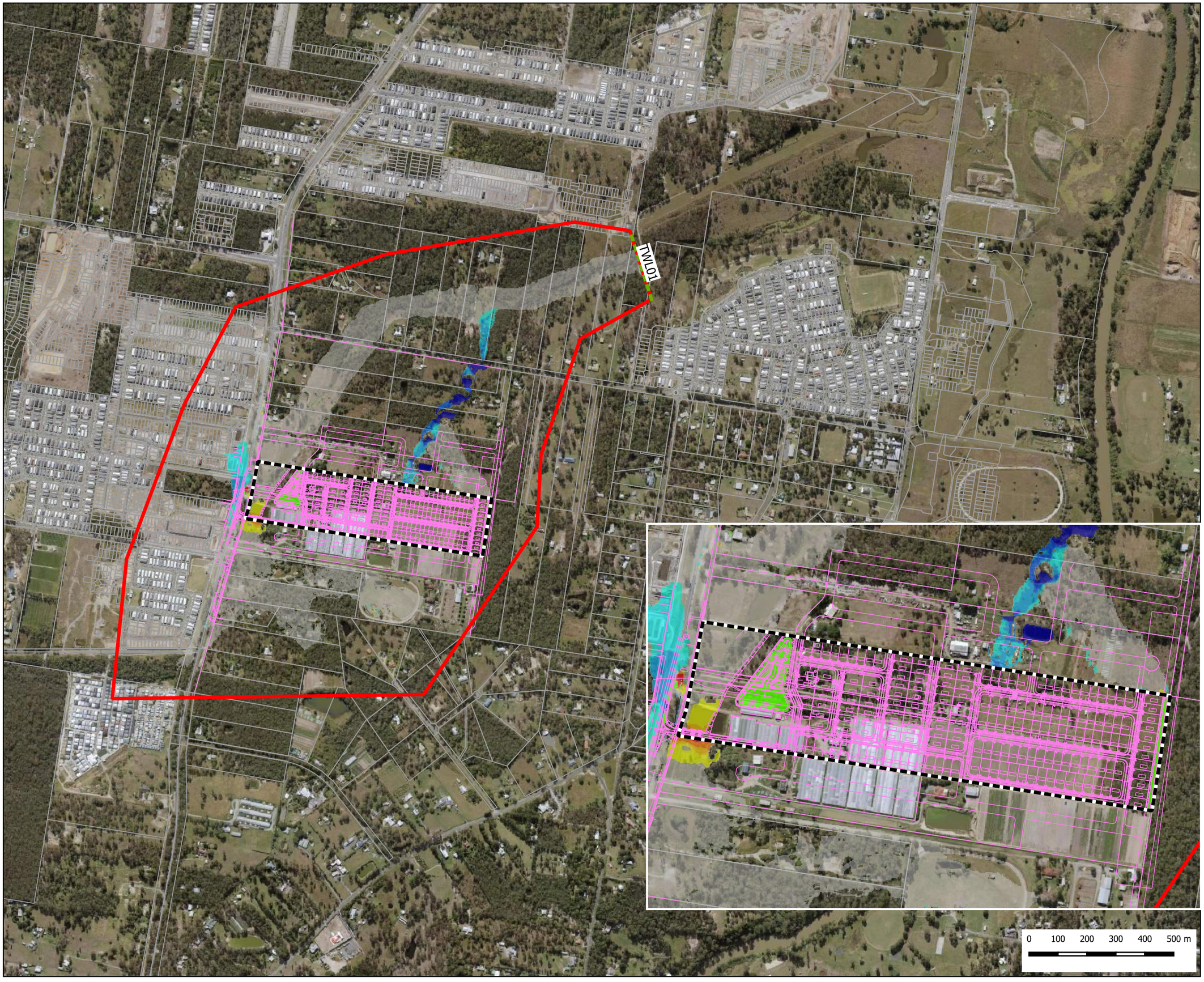
FOR

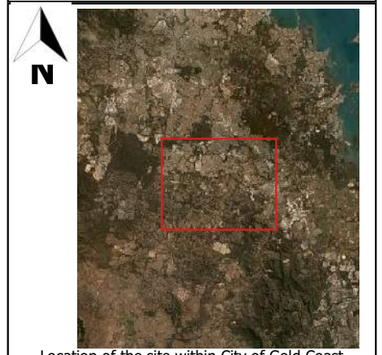
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG C03 POST DEVELOPMENT
5%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

0 100 200 300 400 500 m

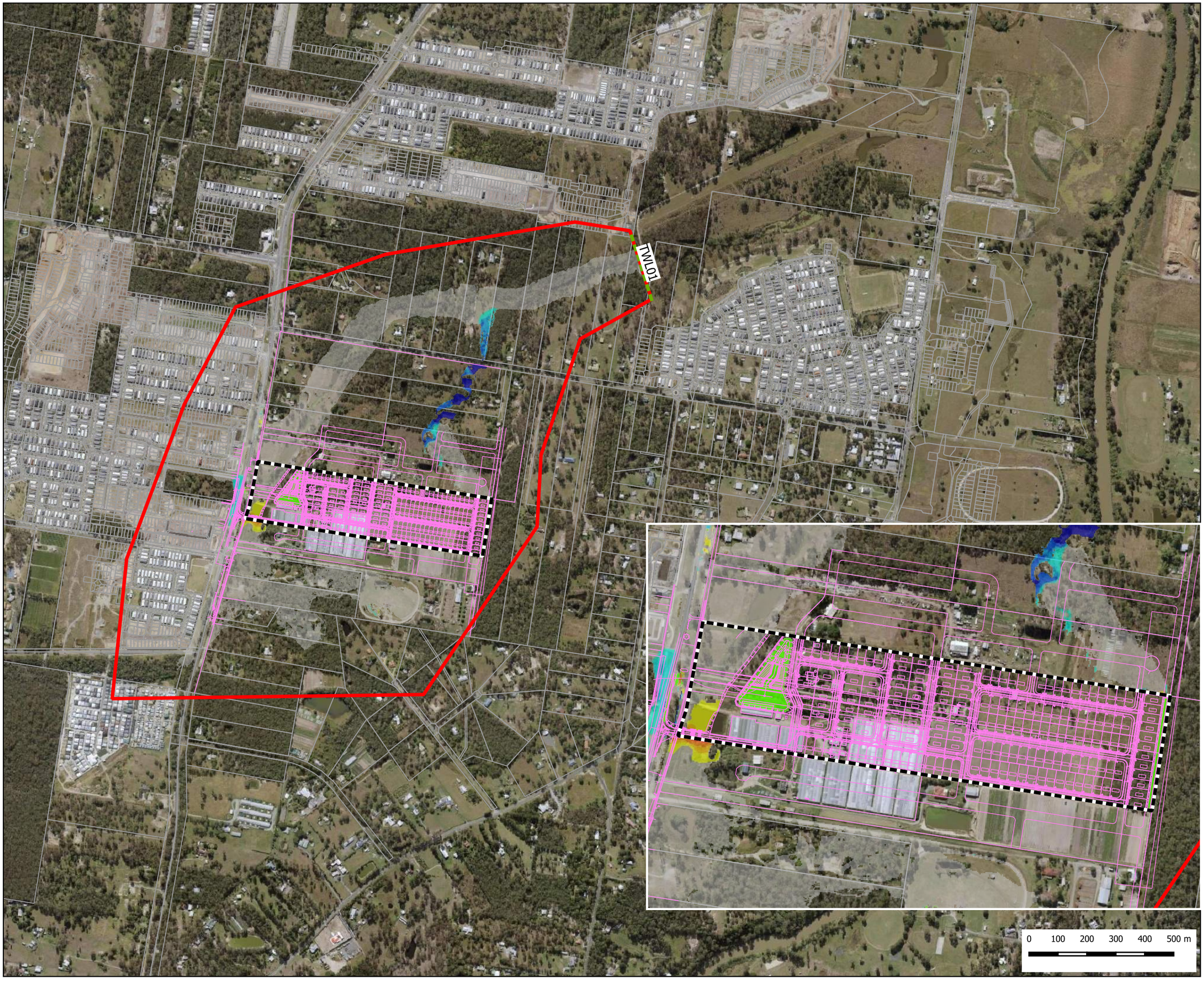
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C04 POST DEVELOPMENT
10%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

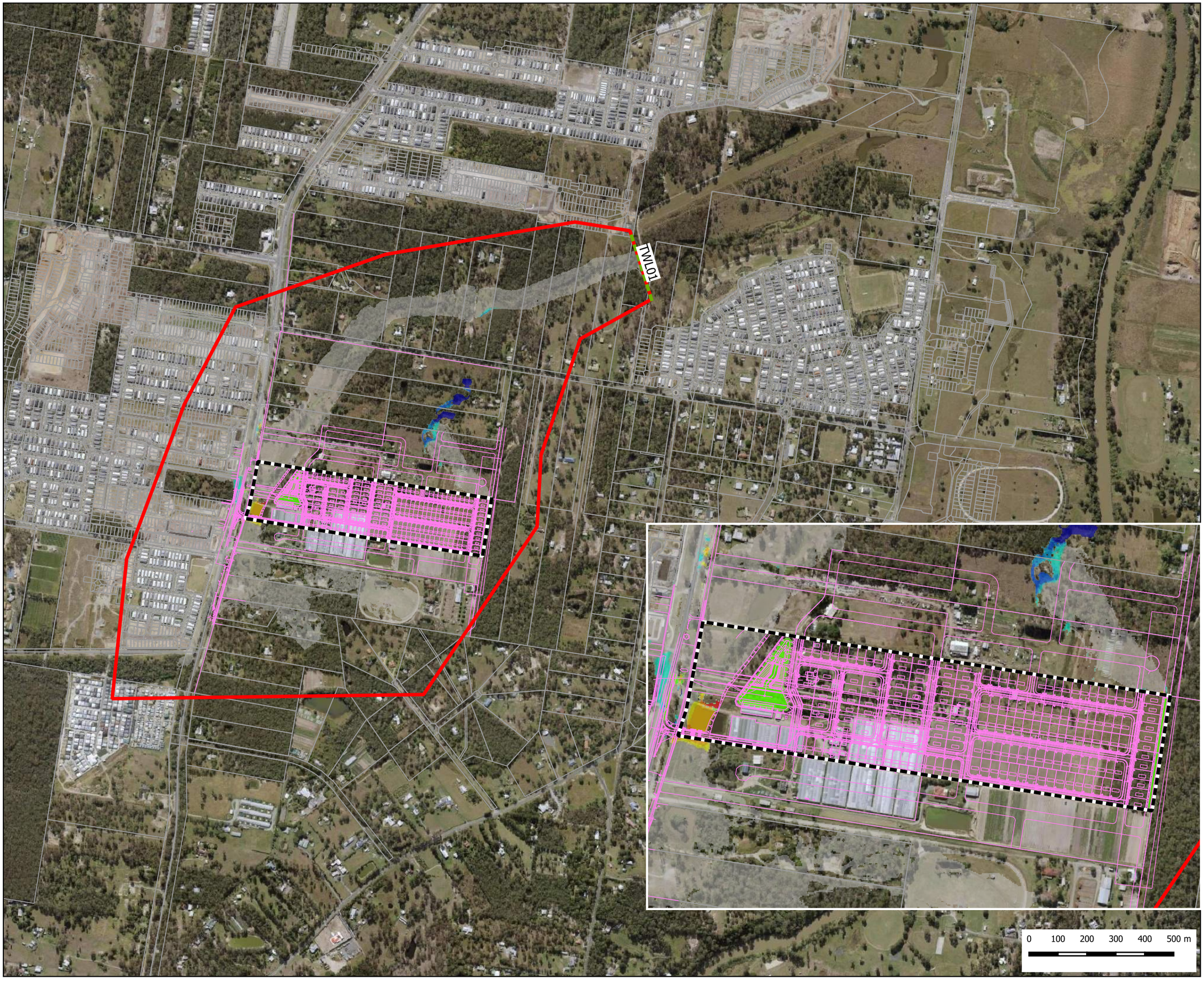
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C05 POST DEVELOPMENT
18%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

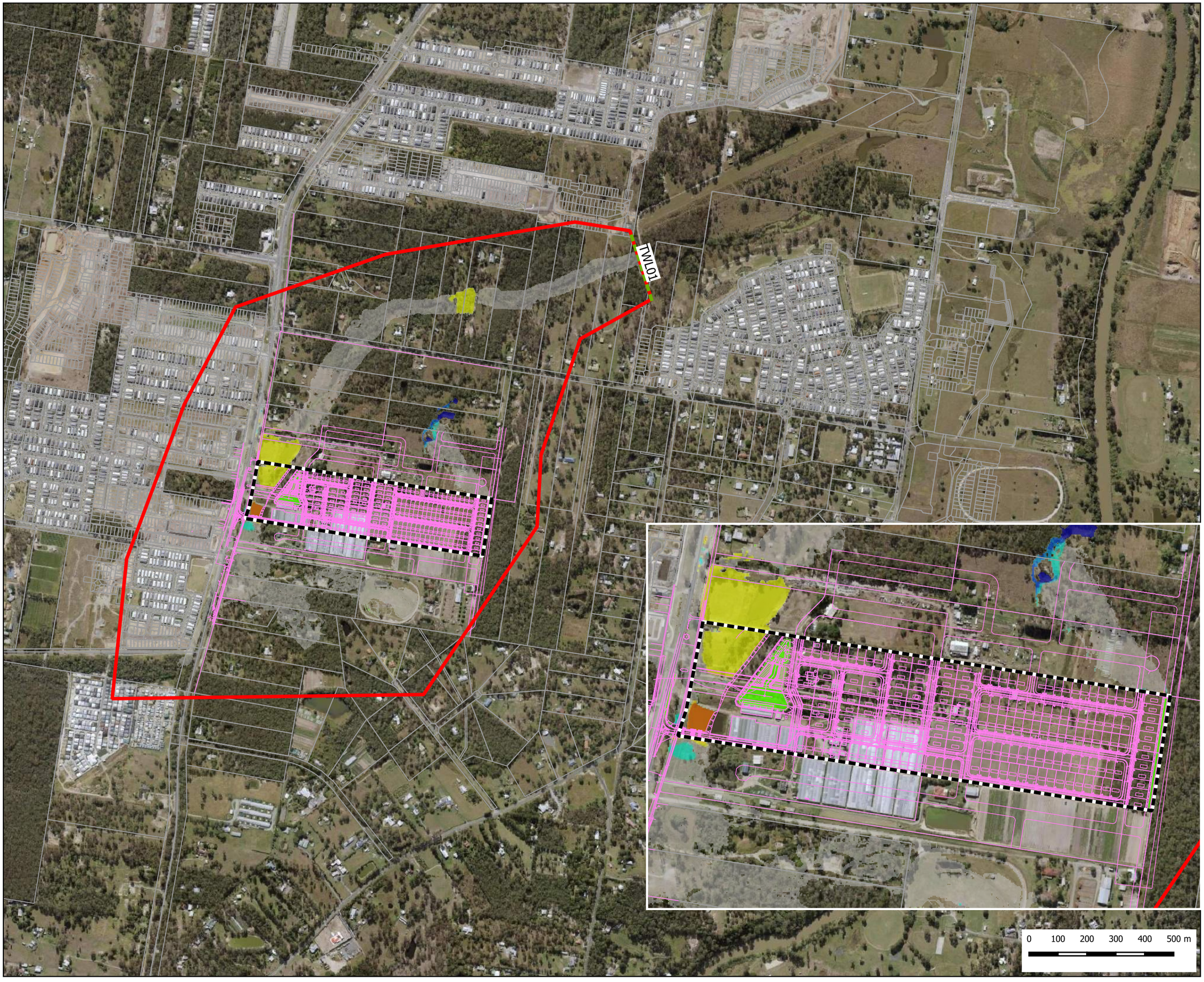
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C06 POST DEVELOPMENT
39%AEP
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

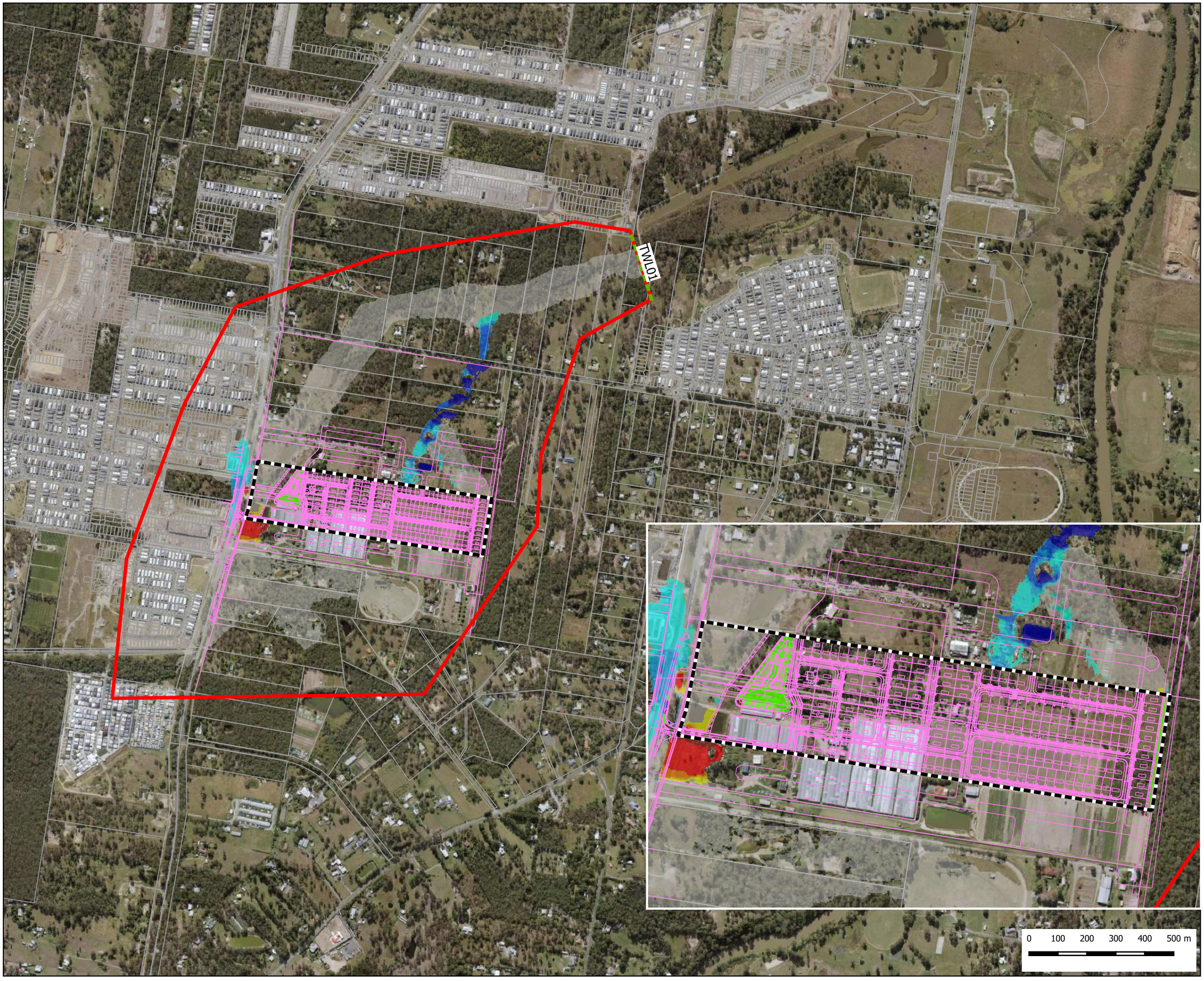
FOR

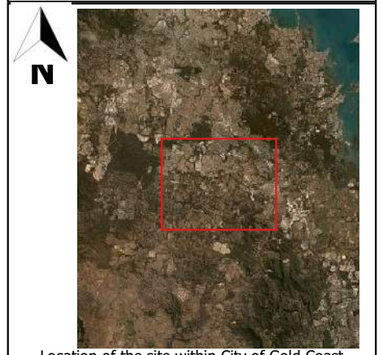
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG C07 POST DEVELOPMENT
1%AEP CLIMATE CHANGE
FLOOD WATER LEVEL AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Water Level Afflux(m)

<= -0.1	0.02 - 0.03
-0.1 - -0.05	0.03 - 0.05
-0.05 - -0.03	0.05 - 0.1
-0.03 - -0.02	0.1 - 1000
-0.02 - -0.01	Was Wet Now Dry
-0.01 - 0.01	Was Dry Now Wet
0.01 - 0.02	

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

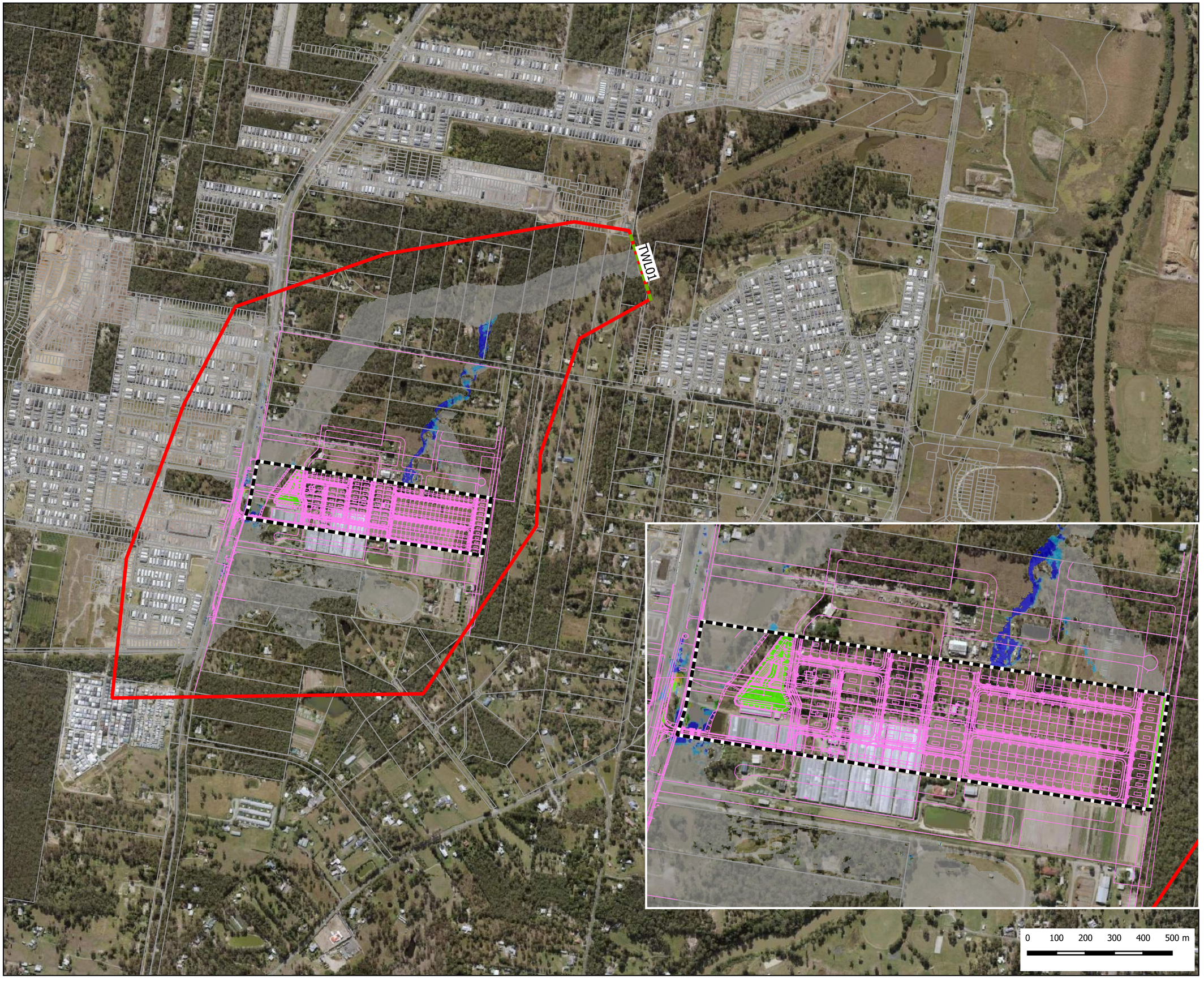
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

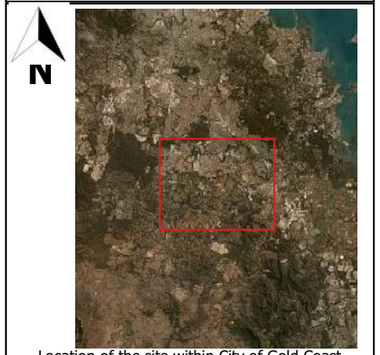
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C08 POST DEVELOPMENT
1%AEP
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

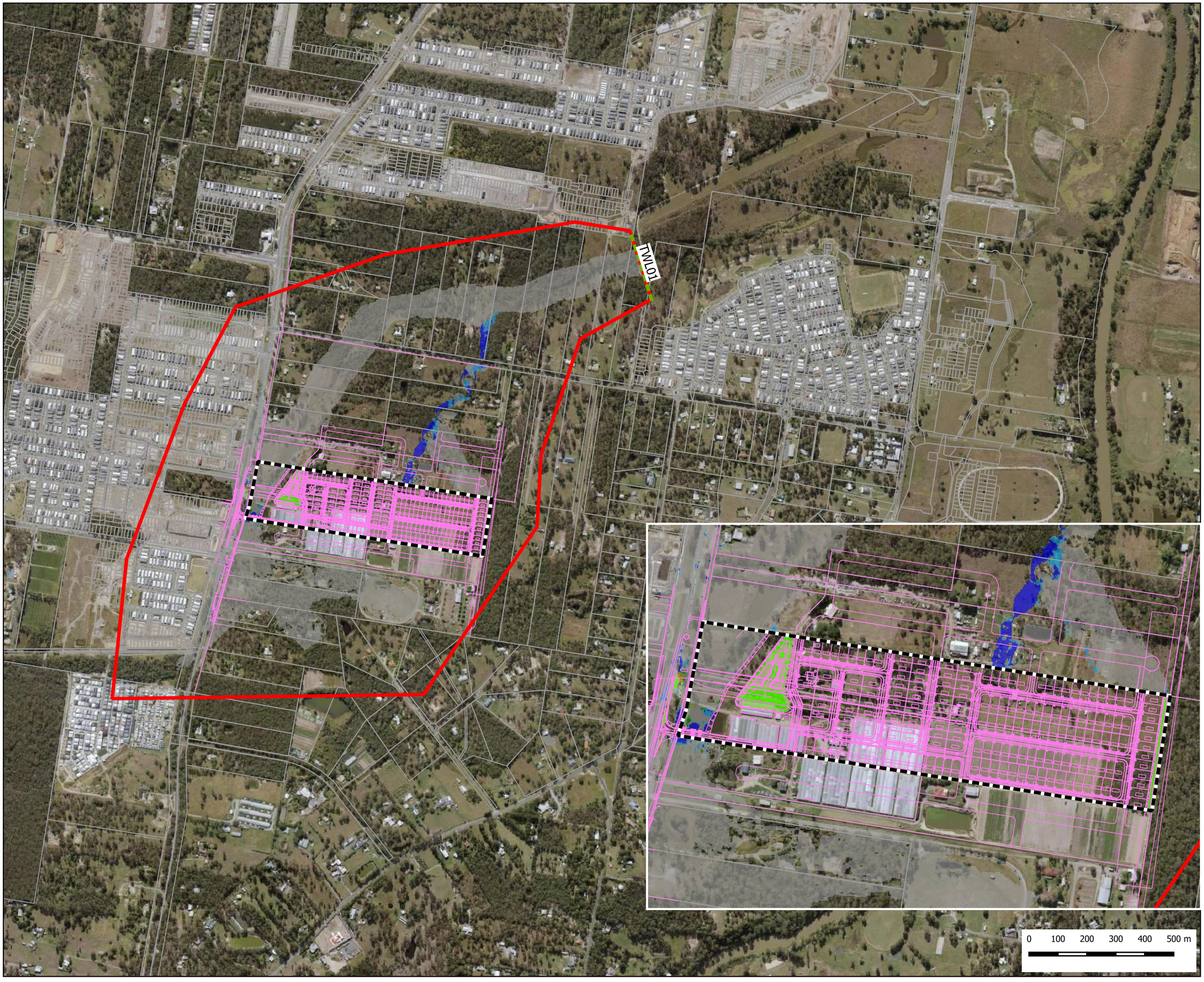
FOR

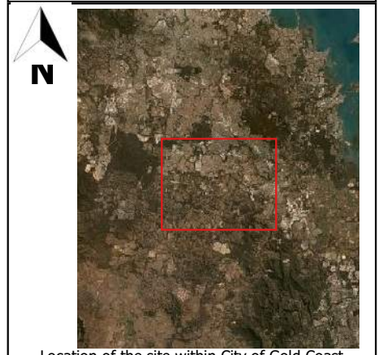
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG C09 POST DEVELOPMENT
2%AEP
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

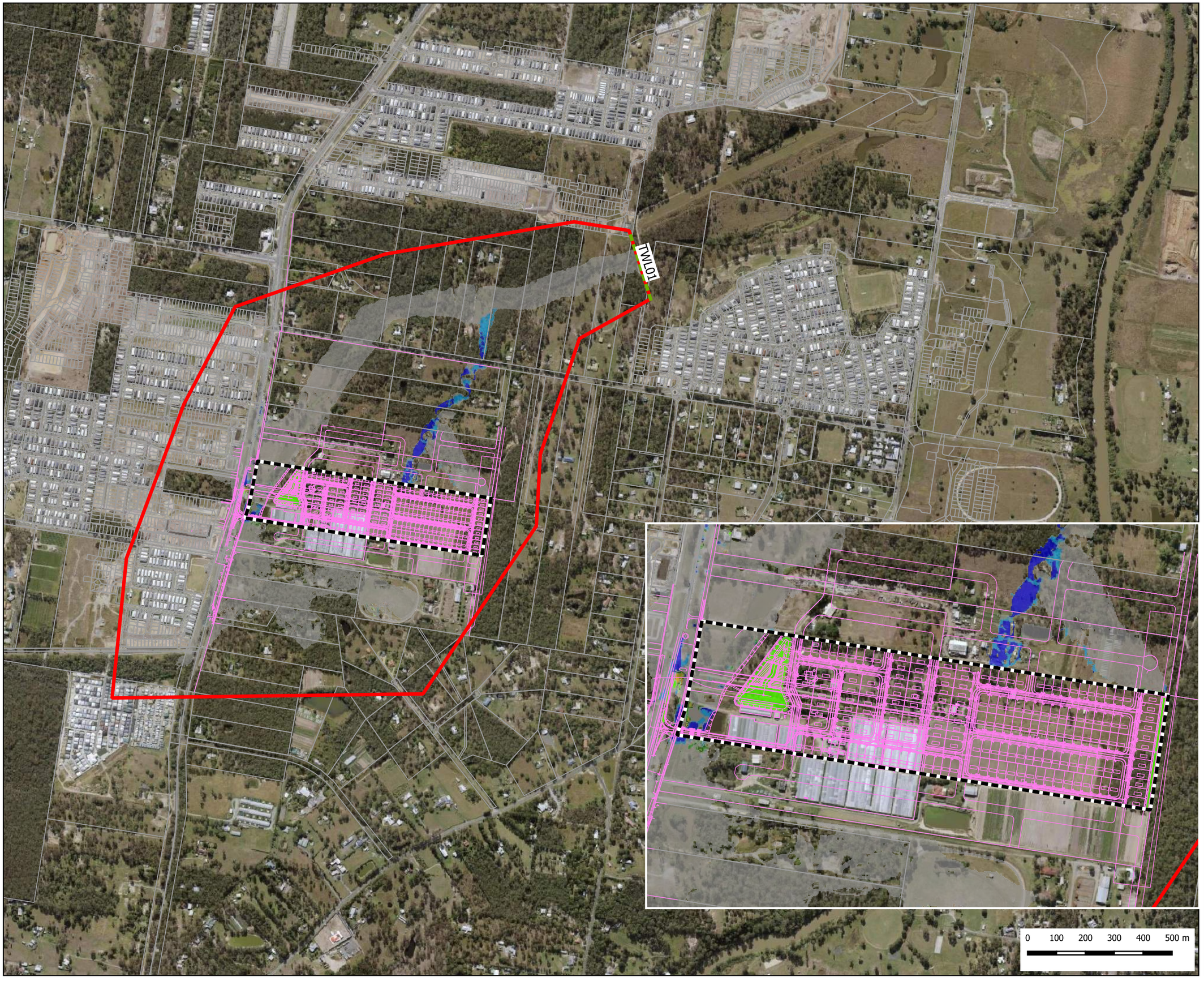
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C10 POST DEVELOPMENT
5%AEP
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

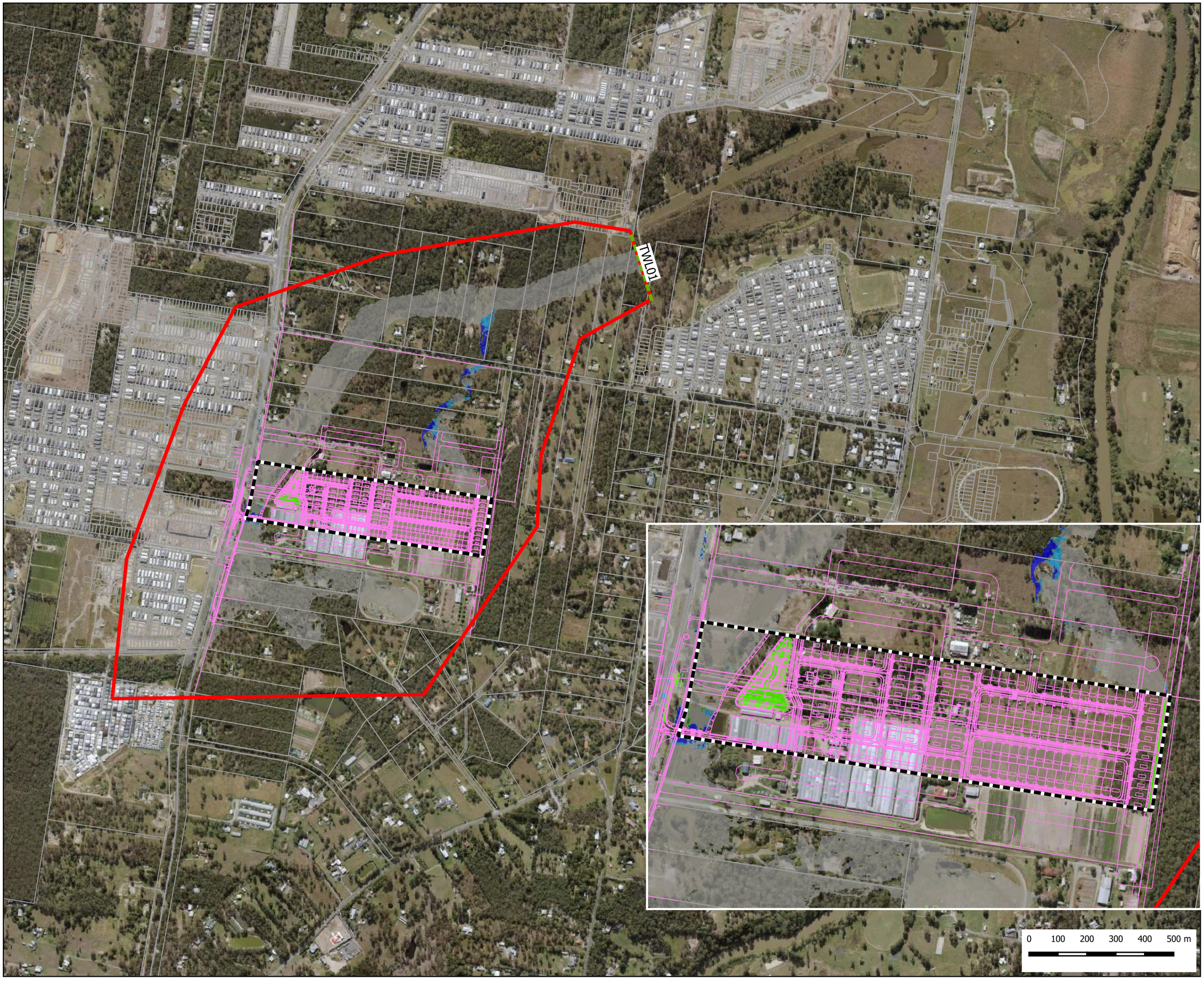
.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C11 POST DEVELOPMENT
10%AEP
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

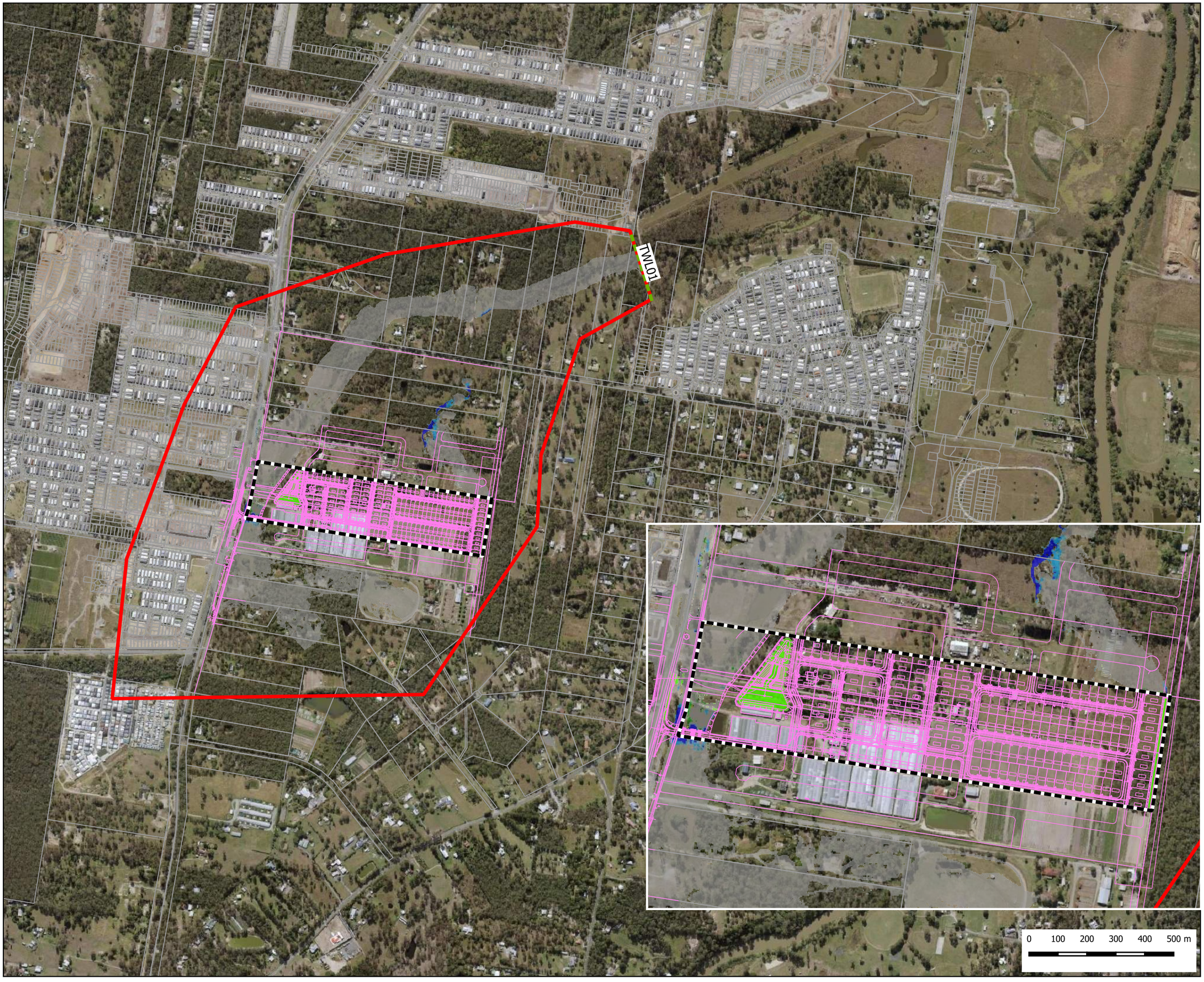
.....

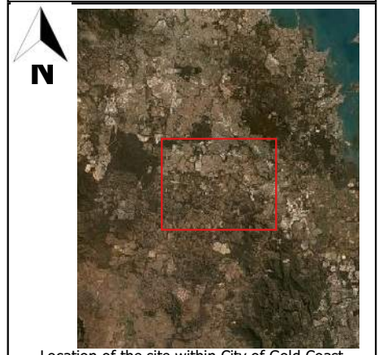
DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C12 POST DEVELOPMENT
18%AEP
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

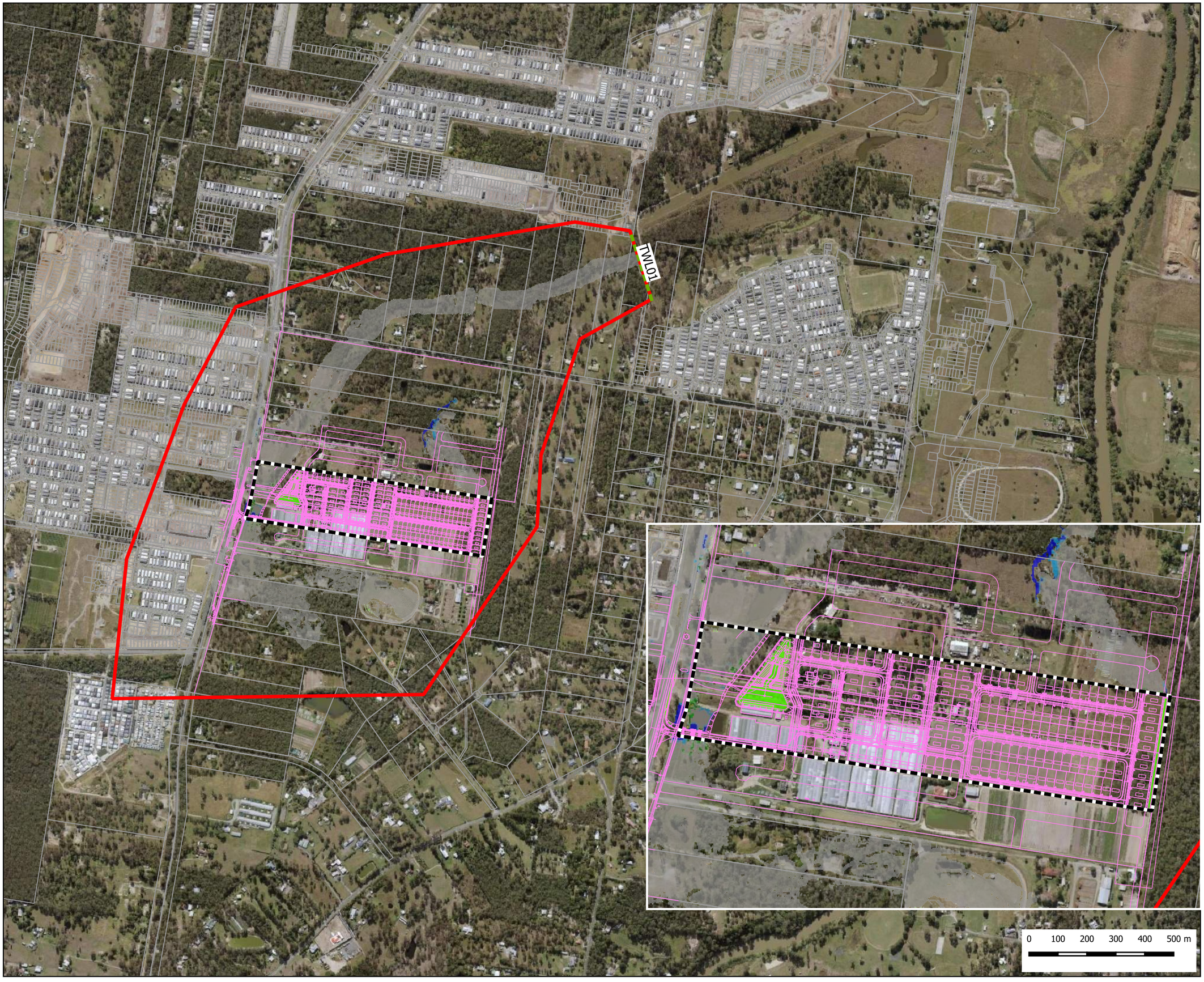
FOR

.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

542 Chambers Flat Rd

FIG C13 POST DEVELOPMENT
39%AEP
FLOOD VELOCITY AFFLUX




Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

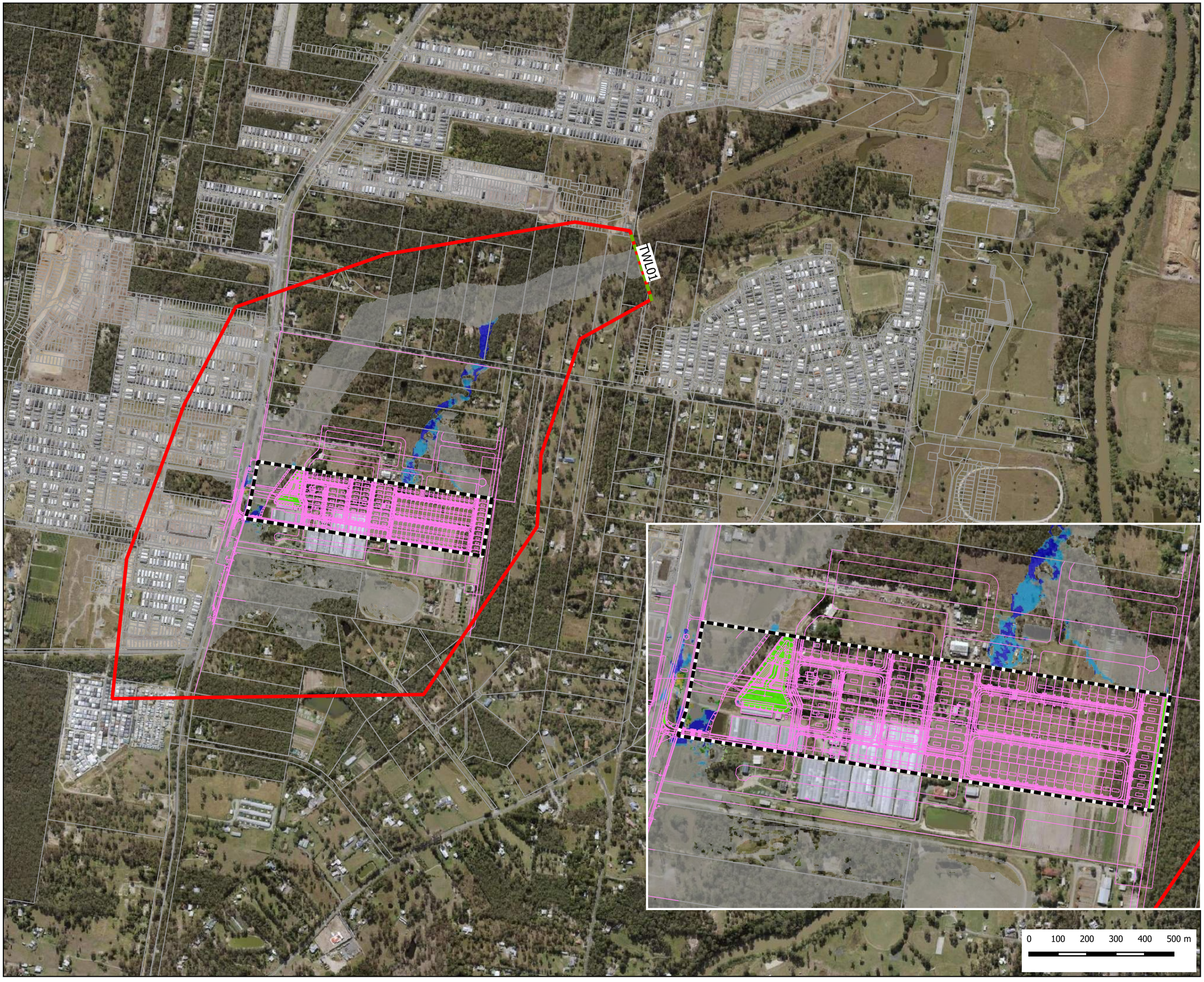
COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT© This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

542 Chambers Flat Rd

FIG C14 POST DEVELOPMENT
1%AEP CLIMATE CHANGE
FLOOD VELOCITY AFFLUX





Location of the site within City of Gold Coast

Legend

- Model Extent
- Downstream Boundary
- Cadastral_LGC
- Site
- Layout

Velocity Afflux(m/s)

< -0.2	0.3 - 0.5
-0.2 - -0.1	0.5 - 1
-0.1 - 0.1	> 1
0.1 - 0.2	Was Wet Now Dry
0.2 - 0.3	Was Dry Now Wet

Project: BE210264

Date: JUN 2022

Scale:1:12000 at A3

Projection: GDA 94/ MGA ZONE 56

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

.....

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

Appendix E – Burchills Hydraulic Impact Assessment Letter for 532-538, 540, 542 and 544-550 Chambers Flat Road, Logan Reserve (BE210264_HIA_Letter_20240123)

Our Ref: BE210264_HIA_Letter_20240123
Enquiries to: Joshua Micallef

23/01/2024

Logan City Council
150 Wembley Road
LOGAN CENTRAL QLD 4114

Attention: Nev Quak

Dear Sir

Re: LOT 9 RP 97736, LOT 8 RP 97736, LOT 7 RP 97736, LOT 6 RP 97736
Information Request Response (LCC Ref: OW/276/2023)

We refer to the Logan City Council Information Response dated 28 November 2023 regarding the above project. Please find below appropriate responses to the issues raised.

Submission

Item	Information Requested	Response
7	**FLOODING GENERAL**	
7.1	Demonstrate compliance with PO23 to PO25 of the Temporary Local Planning Instrument No. 1/2023 by undertaking additional flood modelling and assessment to demonstrate that the submitted access road design (i.e. at the culvert crossing area) will not cause further flood impacts and will result in a similar design intent of the Hydraulic Impact Assessment approved as part of COM/60/2022. *Further Advice: The submitted design set of drawings (Drawing No. C332-B) shows that the crown of the access road culvert crossing has been set at 17.50m AHD which is approximately 300mm higher than the previously approved HIA (i.e. previously adopted levels are 17.14m AHD17.20mAHD - Drawing No. C410-E as part of COM/60/2022). No further hydraulic modelling or assessment has been carried out based on the design submitted with this application. Furthermore, proposed cut and fill volume has not been provided for the area within the Moderate Flood Risk area, noting that this area is above the DFE and therefore considered to comply with the requirement of PO22. However, demonstration of compliance with PO25 is required to confirm no major increases in safety or damage for events up to the probable maximum flood.*	Compliance with PO23 and PO24 of the TLPI No. 1/2023 is demonstrated in Burchills Hydraulic Impact Assessment (BE210264-RP-HIA-03) approved as part of COM/60/2022. Further modelling has been undertaken for events larger than 1% AEP as detailed in this letter. The Peak 1% AEP water level modelled in post developed scenario is 16.31 mAHD. Increasing the crown of the access road culvert crossing by 300mm to 17.5mAHD will not have an impact on the modelling results previously reported on in BE210264-RP-HIA-03. It should be noted that the road has been designed to have 1% AEP immunity. The updated road design surface however was used within the updated modelling completed to address PO25 of the TLPI No. 1/2023. Councils Logan Albert Flood Study 2023 was used to undertake the assessment for events greater than the DFE for the site (0.5%, 0.2% and PMF). Modifications made to the model and modelled results have been included in this response letter.

1. INTRODUCTION

This letter has been prepared to address PO25 of the TLPI No.1/2023 which requires an assessment for flood events up to and including the probable maximum flood to demonstrate that the development will not cause a rapid or unexpected increase in safety risks or flood damage.

The Logan Albert Flood Study 2023 was obtained and modified to best represent the flooding conditions over the proposed development site.

2. MODEL MODIFICATIONS

Upon initial assessment of the model set up it was evident that there were no model inflows upstream of the developments proposed temporary access road and culverts. To best assess the potential impacts the temporary access road and culverts may have on the flood behaviour it was deemed appropriate to add an inflow SA upstream of the proposed temporary access road and culverts.

2.1 Inflow SA Modification

As discussed above it was necessary to include an Inflow SA upstream of the proposed temporary access to the development. The proposed site is within Catchment LR013, shown below in Figure 2.1 is the subject site locality in relation to the original SA Location. The SA was split and factors were applied in the models BC Database to proportionally distribute flows.

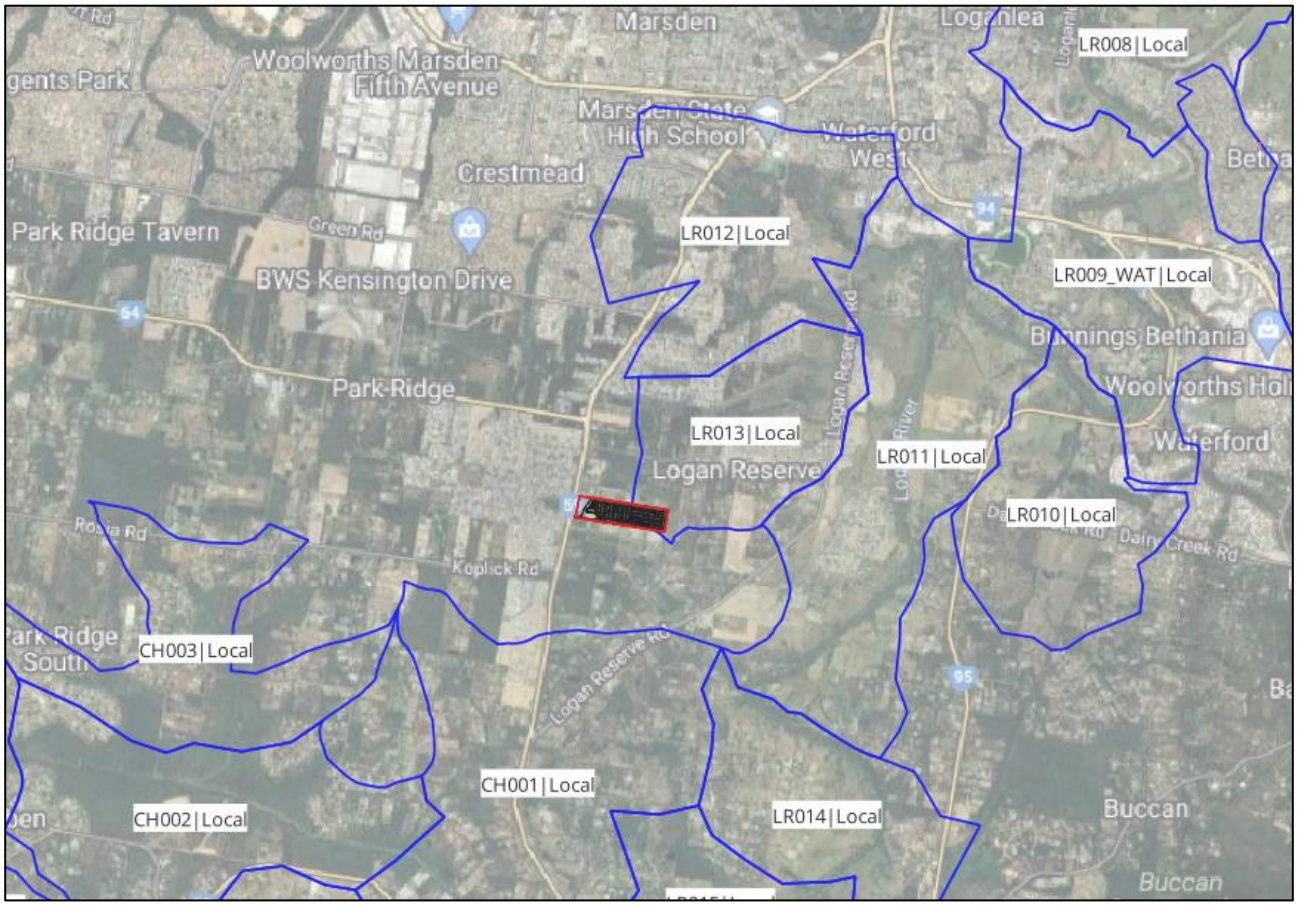


Figure 2.1 Subject Site and Original SA Location

Summarised below in Table 2-1 is the catchment area of LR013 upstream and downstream of the proposed development.

Table 2-1 Catchment Area Summary

Catchment Name	Area (ha)	% of Total (Applied in bc dbase)
LR013	648	100
LR013a (Upstream of site)	218	33.7
LR013b (Downstream of site)	430	66.3

The updated SA inflow configuration is shown below in Figure.

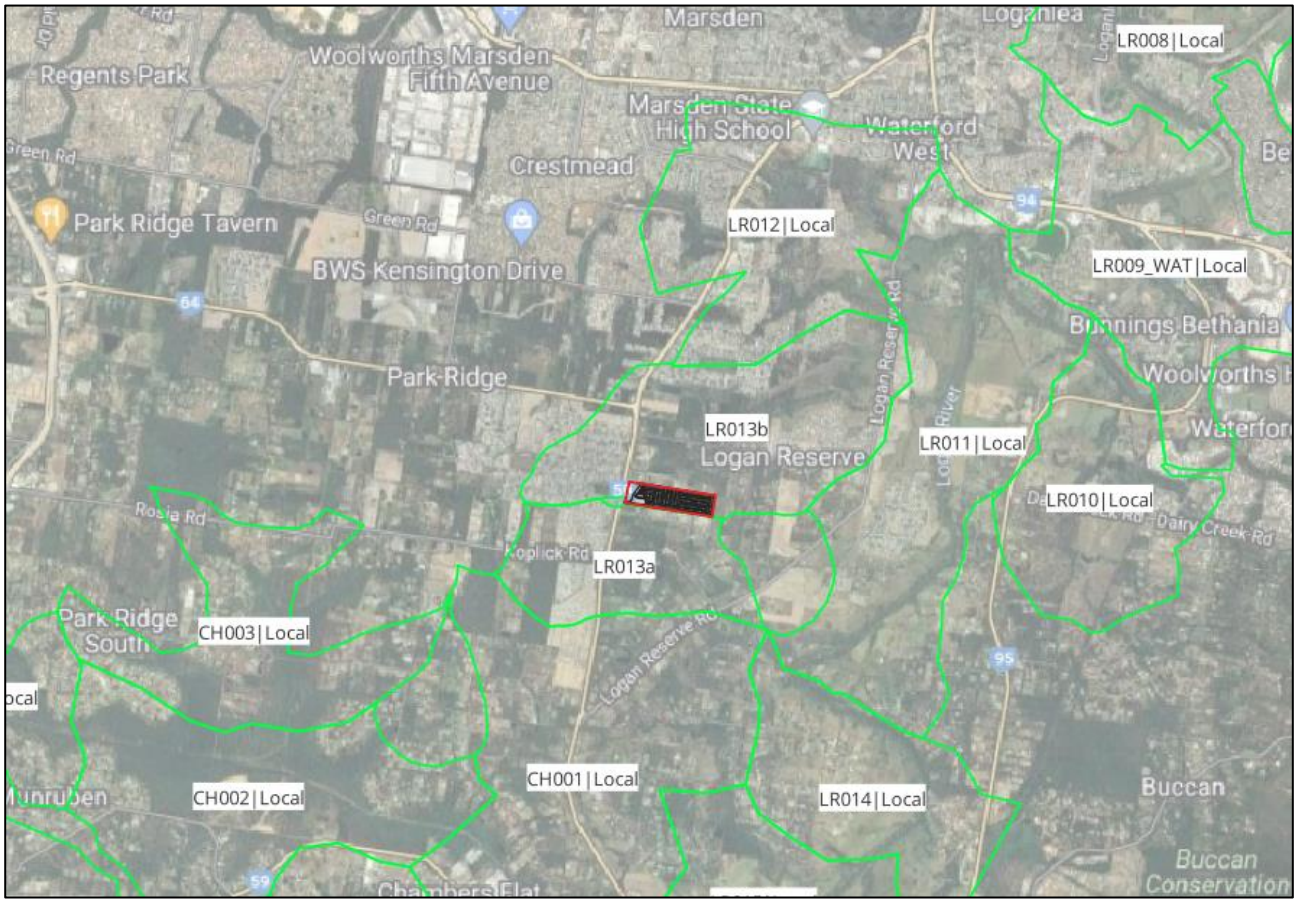


Figure 2.2 Updated SA Configuration

3. DEVELOPMENT REPRESENTATION

The proposed developed was represented in the model with the following features:

- Burchills latest design surface;
    - Please note that the proposed stormwater basin was filled to 16.95 mAHD with the assumption that it would be full at the start of the events.
- Proposed 10 x 1.2m x 3m RCBC culverts beneath the proposed temporary site access.(As per approved culvert configuration in BE210264-RP-HIA-03)

No other amendments were made to the model in the developed scenario runs.

4. MODELLED EVENTS

4.1 Critical Durations

Shown below in Table 4-1 are the critical durations modelled for the assessment. A range of durations were run for the nominated events in the existing scenario and the following durations were determined to be critical at the subject site and temporary access crossing.

Table 4-1 Critical Durations

Event	Critical Duration
PMF	36 hour TP 2
0.2% AEP (CC RCP 4.5)	1 hour TP 7
0.5% AEP (CC RCP 4.5)	1 hour TP3

5. RESULTS AND DISCUSSION

In summary, the pre and post developed modelling results were assessed to demonstrate that the development does not cause a rapid or unexpected increase in safety risks or flood damage during a flood event larger than the defined flood event (DFE).

5.1 Flood Impact

Modelling results indicate that the increase in peak water level in events larger than the DFE as a result of the proposed development are generally in accordance with the impacts reported in BE210264-RP-HIA-03. Impacts in the 0.5% AEP and 0.2% AEP events are in the order of 400-500mm namely limited to the upstream property (Lot 5 RP97736) are generally contained within the mapped waterway corridor. The Water level impact maps have been attached to this letter. No significant increase to wet areas has occurred as a result of the development.

It should be noted that no external impacts were identified during the PMF design event assessment as a result of the development.

5.2 Flood Risk

The proposed development does not increase the risk classification of flooding over the portion of Chambers Flat Road fronting the site, it should be noted that as per the results reported on in Burchills HIA (BE210264-RP-HIA-03) this portion of Chambers Flat Road fronting the site is inundated in the 1% AEP event.

TUFLOW results show that the temporary access road will be above the modelled 0.2% AEP Level and inundated in the PMF event. In the ultimate design scenario, flood free egress up to the and including the PMF event will be provided by a collector road that is proposed through eastern portion of the site which is to connect to Noffke Court to the south. It is noted that this road is yet to be constructed.

5.3 Velocity and Scour Assessment

Modelling results indicate that the velocity of flood water is generally decreased upstream of the proposed temporary access road. No major velocity increases have been modelled to occur external to the site.

Velocities at the outlet of the proposed Proposed 10 x 1.2m x 3m RCBC culverts beneath the proposed temporary site access in events larger than DFE are generally similar to 1% AEP design velocities (< 3 m/s)

6. CONCLUSION

Flood modelling results presented in this letter demonstrate that the development will not cause a rapid or unexpected increase in safety risks or flood damage in events greater than the DFE.

Prepared By



Joshua Micallef

Civil and Water Engineer

Approved By



Samuel Huddy
RPEQ 29555
Director - Urban

Enc: Burchills Flood Result Mapping

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.5% AEP
FLOOD WATER LEVEL

Legend

Water Surface Level (mAHD)

- <= 12
- 12 - 14
- 14 - 15
- 15 - 17
- > 17
- Site

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.2% AEP
FLOOD WATER LEVEL

Legend

Water Surface Level (mAHD)

- <= 12
- 12 - 14
- 14 - 15
- 15 - 17
- > 17
- Site

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

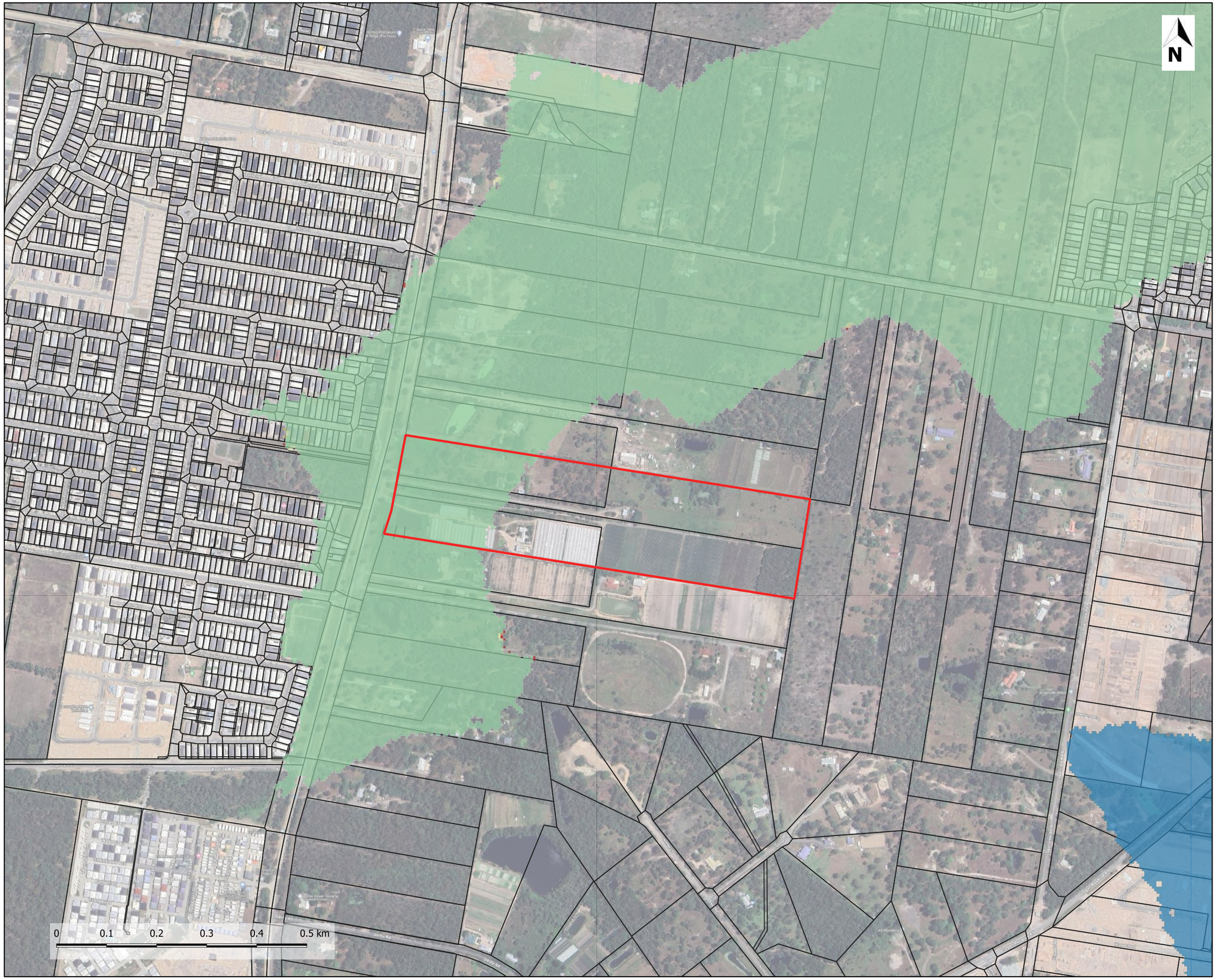
BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
PMF
FLOOD WATER LEVEL

Legend

Water Surface Level (mAHD)

20.07
20.05

Site

Project: BE210264
Date: 19/01/2024
Scale: 1:7000 at A3
Projection: MGA56 GDA2020
Data Sources: Google 2023 (Aerial)

BURCHILLS
ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.5% AEP
FLOOD WATER LEVEL

Legend

- Site
- Development Layout

Water Surface Level (mAHD)

- <= 12
- 12 - 14
- 14 - 15
- 15 - 17
- > 17

Project: BE210264
Date: 22/01/2024
Scale: 1:7000 at A3
Projection: MGA56 GDA2020
Data Sources:

BURCHILLS ENGINEERING SOLUTIONS
FOR
GC DEV 6 PTY LTD
&
GDM PROPERTY

0 0.1 0.2 0.3 0.4 0.5 km

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.2% AEP
FLOOD WATER LEVEL

Legend

- Site
- Development Layout

Water Surface Level (mAHD)

- <= 12
- 12 - 14
- 14 - 15
- 15 - 17
- > 17

Project: BE210264
Date: 22/01/2024
Scale: 1:7000 at A3
Projection: MGA56 GDA2020
Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

0 0.1 0.2 0.3 0.4 0.5 km

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

N

0 0.1 0.2 0.3 0.4 0.5 km

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
PMF
FLOOD WATER LEVEL

Legend

Site

Water Surface Level (mAHD)

20.07
20.05

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources:

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.5% AEP
Depth

Legend

- Site

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

0 0.1 0.2 0.3 0.4 0.5 km

Project:	BE210264
Date:	19/01/2024
Scale:	1:7000 at A3
Projection:	MGA56 GDA2020
Data Sources:	Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

N

0 0.1 0.2 0.3 0.4 0.5 km

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.2% AEP
Depth

Legend

- Site

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

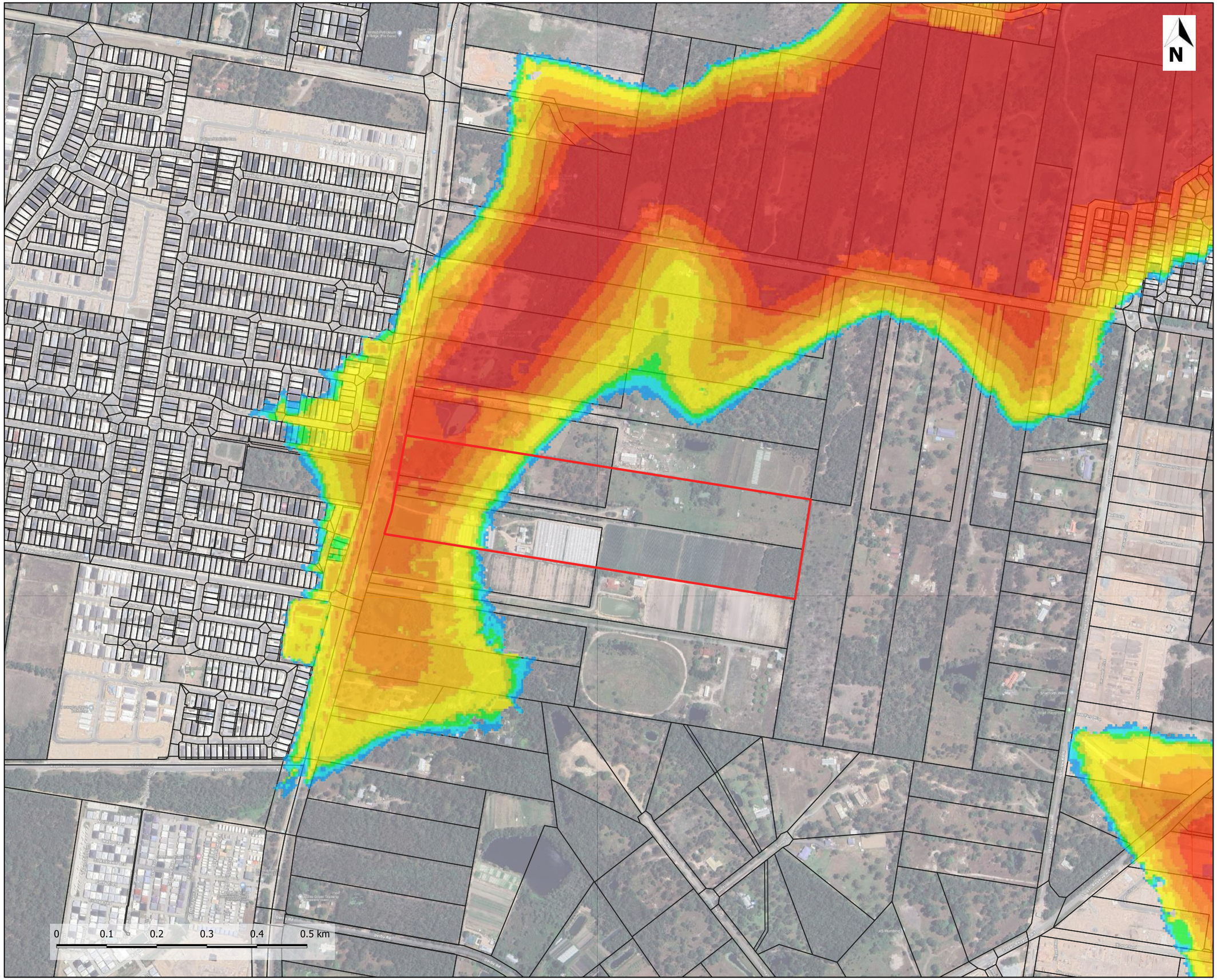
BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
PMF
Depth

Legend

- Site

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

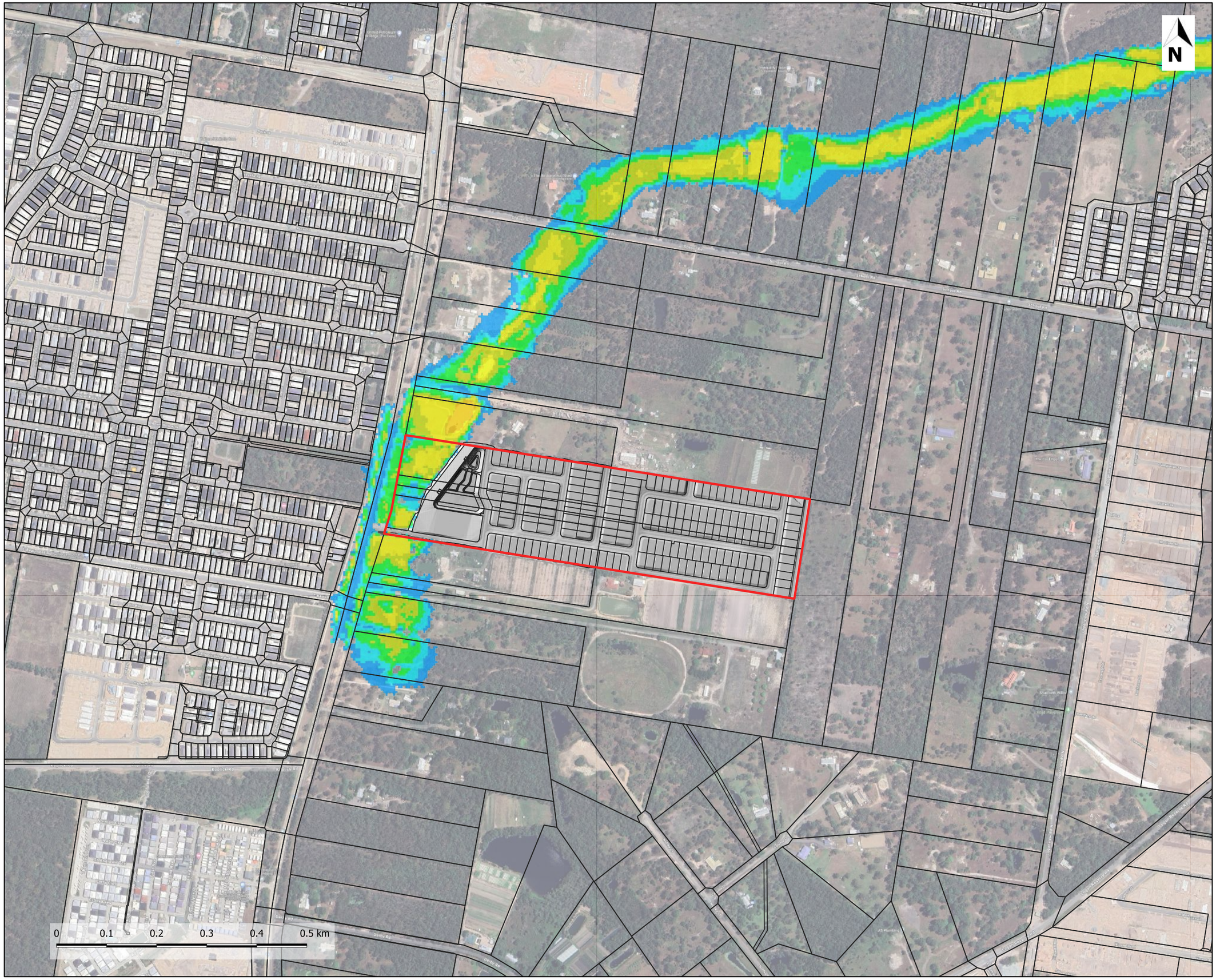
BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.5% AEP
Depth

Legend

- Site
- Development Layout

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.2% AEP
Depth

N

0 0.1 0.2 0.3 0.4 0.5 km

Legend

- Site
- Development Layout

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
PMF
Depth

Legend

- Site
- Development Layout

Depth (m)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.5% AEP
Velocity

Legend

- Site
- Velocity (m/s)
  - <= 0.25
  - 0.25 - 0.5
  - 0.5 - 1
  - 1 - 1.5
  - 1.5 - 2
  - above 2

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

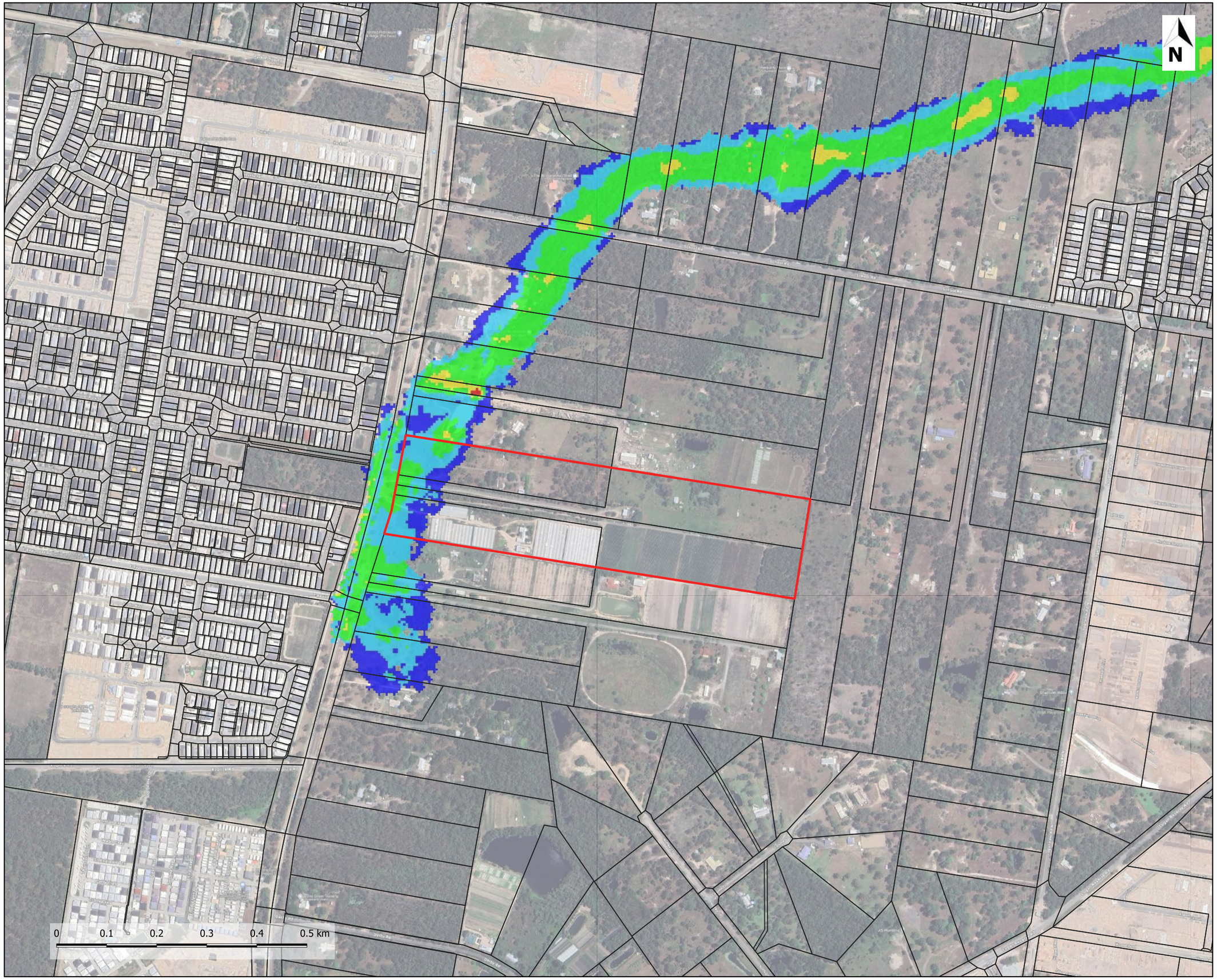
BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.2% AEP
Velocity

Legend

- Site

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
PMF
Velocity

Legend

- Site

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

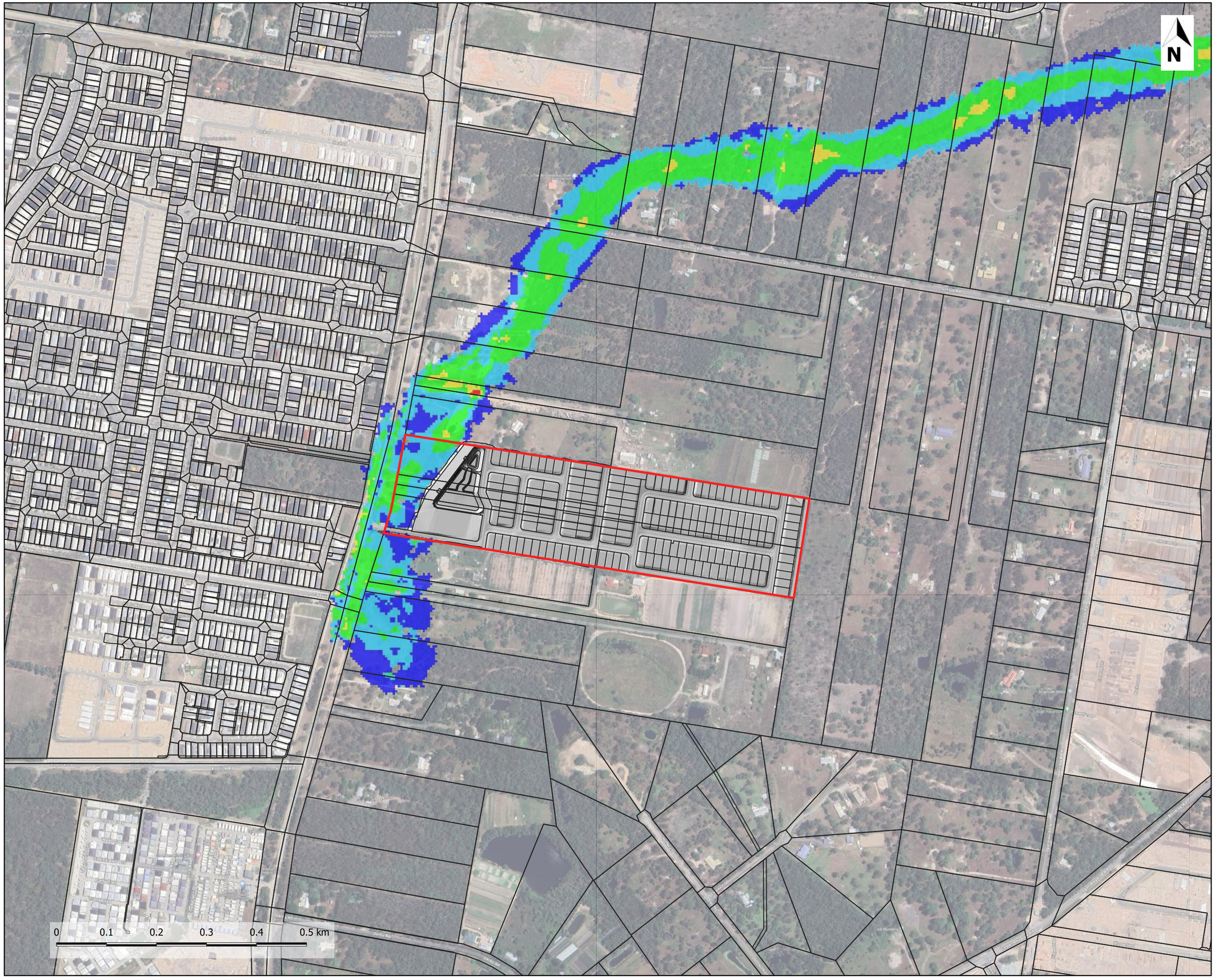
GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.5% AEP
Velocity



Legend

- Site
- Development Layout

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

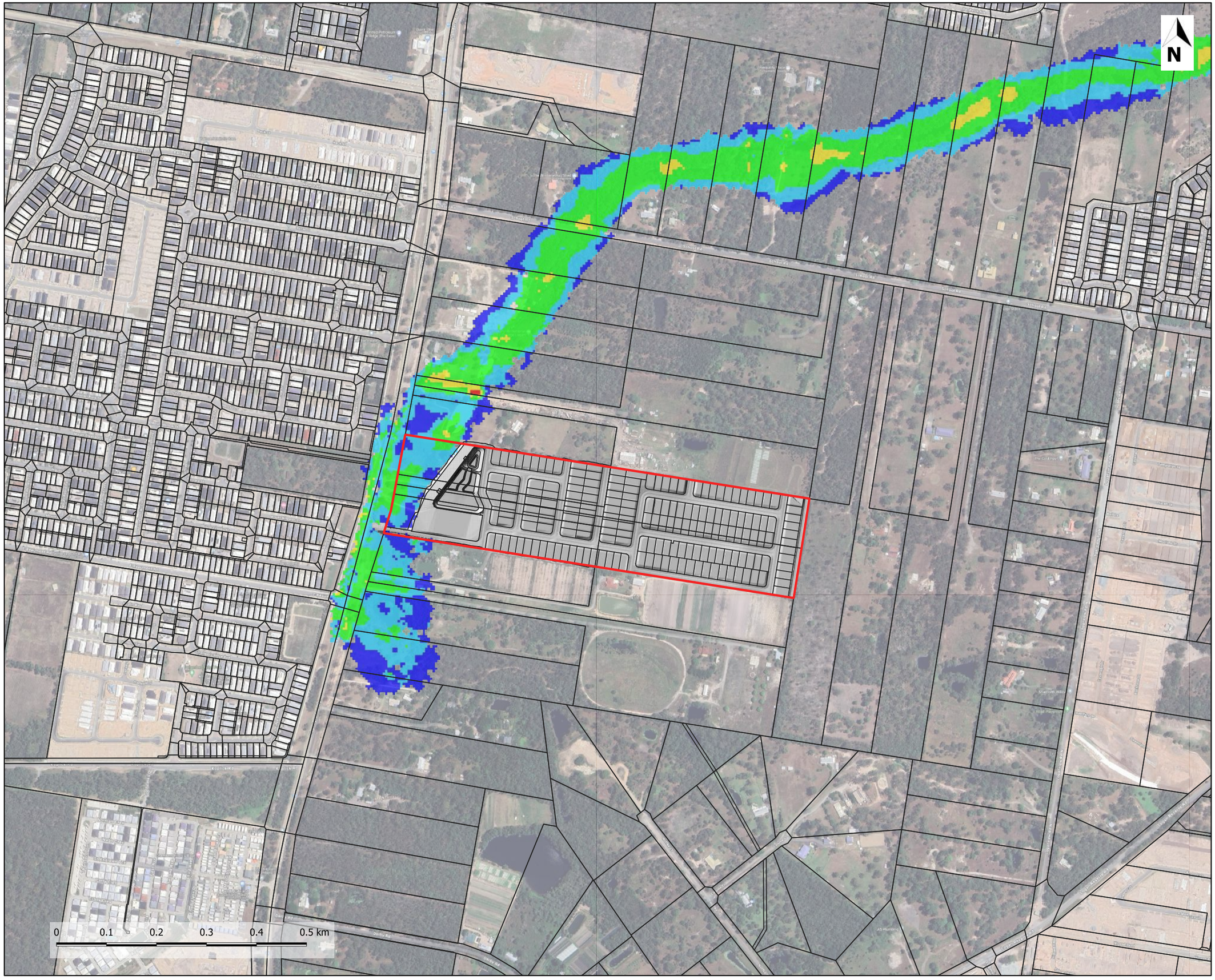
GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.2% AEP
Velocity



Legend

- Site
- Development Layout

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
PMF
Velocity

Legend

- Site
- Development Layout

Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 1.5
- 1.5 - 2
- above 2

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.5% AEP
Hazard

Legend

- Site

AIDR Hazard Classification

- H1
- H2
- H3
- H4
- H5
- H6

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
0.2% AEP
Hazard

Legend

- Site

AIDR Hazard Classification

- H1
- H2
- H3
- H4
- H5
- H6

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

N

0 0.1 0.2 0.3 0.4 0.5 km

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

PRE DEVELOPMENT
PMF
Hazard

Legend

- Site

AIDR Hazard Classification

- H1
- H2
- H3
- H4
- H5
- H6

Project: BE210264

Date: 19/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.5% AEP
Hazard

Legend

- Site
- AIDR Hazard Classification
  - H1
  - H2
  - H3
  - H4
  - H5
  - H6

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.



532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
0.2% AEP
Hazard

Legend

- Site

AIDR Hazard Classification

- H1
- H2
- H3
- H4
- H5
- H6

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS
ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

POST DEVELOPMENT
PMF
Hazard

Legend

- Site
- Development Layout

AIDR Hazard Classification

- H1
- H2
- H3
- H4
- H5
- H6

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 22/01/2024

Scale: 1:7000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERS FLAT ROAD, LOGAN RESERVE

0.5% AEP
AFFLUX

Legend

Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet to Dry

- Was Wet Now Dry
- Was Dry Now Wet
- Site

Project: BE210264
Date: 19/01/2024
Scale: 1:10000 at A3
Projection: MGA56 GDA2020
Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS
FOR
GC DEV 6 PTY LTD
&
GDM PROPERTY

0 0.1 0.2 0.3 0.4 0.5 km

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERS FLAT ROAD, LOGAN RESERVE

0.5% AEP
AFFLUX

Legend

Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet to Dry

- Was Wet Now Dry
- Was Dry Now Wet
- Site

Project: BE210264
Date: 19/01/2024
Scale: 1:10000 at A3
Projection: MGA56 GDA2020
Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

0 0.1 0.2 0.3 0.4 0.5 km

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERS FLAT ROAD, LOGAN RESERVE

PMF
AFFLUX

Legend

Afflux (m)

- <= -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.02
- -0.02 - -0.01
- -0.01 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- 0.1 - 1000

Wet to Dry

- Was Wet Now Dry
- Was Dry Now Wet
- Site

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264

Date: 19/01/2024

Scale: 1:10000 at A3

Projection: MGA56 GDA2020

Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

0.5% AEP
Velocity Afflux

Legend

- Site
- Development Layout

Velocity Afflux (m/s)

Band 1

- < -0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264
Date: 22/01/2024
Scale: 1:7000 at A3
Projection: MGA56 GDA2020
Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.

COPYRIGHT © This drawing is copyright and the property of Burchills Engineering Solutions. It must not be retained, copied or used without the authority of Burchills Engineering Solutions.

532 - 550 CHAMBERSFLAT ROAD, LOGANRESERVE

0.2% AEP
Velocity Afflux

Legend

- Site
- Development Layout

Velocity Afflux (m/s)

Band 1

- < -0.2
- -0.2 - -0.1
- -0.1 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.5
- 0.5 - 1
- > 1

N

0 0.1 0.2 0.3 0.4 0.5 km

Project: BE210264
Date: 22/01/2024
Scale: 1:7000 at A3
Projection: MGA56 GDA2020
Data Sources: Google 2023 (Aerial)

BURCHILLS ENGINEERING SOLUTIONS

FOR

GC DEV 6 PTY LTD
&
GDM PROPERTY

DISCLAIMER: This figure and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended. Burchills Engineering Solutions will not accept responsibility for any consequences arising from the use of the figure for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party. Some or all of the data presented on this plan may have been digitised or sourced from third parties, and as such may contain spatial innaccuracies.