ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

Dated: 11 June 2019

WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

SITE PLAN

1901 DA-001 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

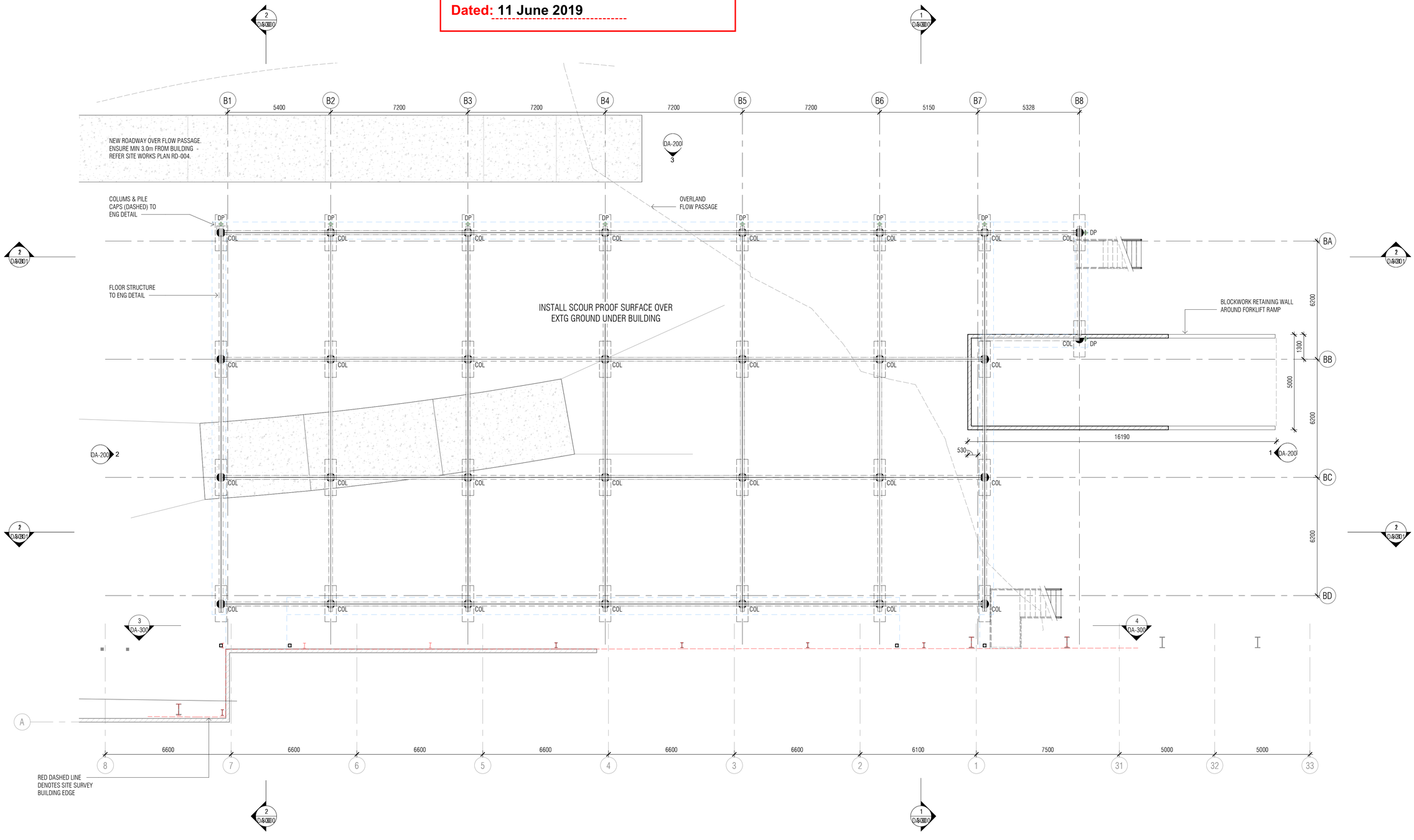
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

Dated: 11 June 2019



WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

GROUND LEVEL PLAN

1901 DA-100 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

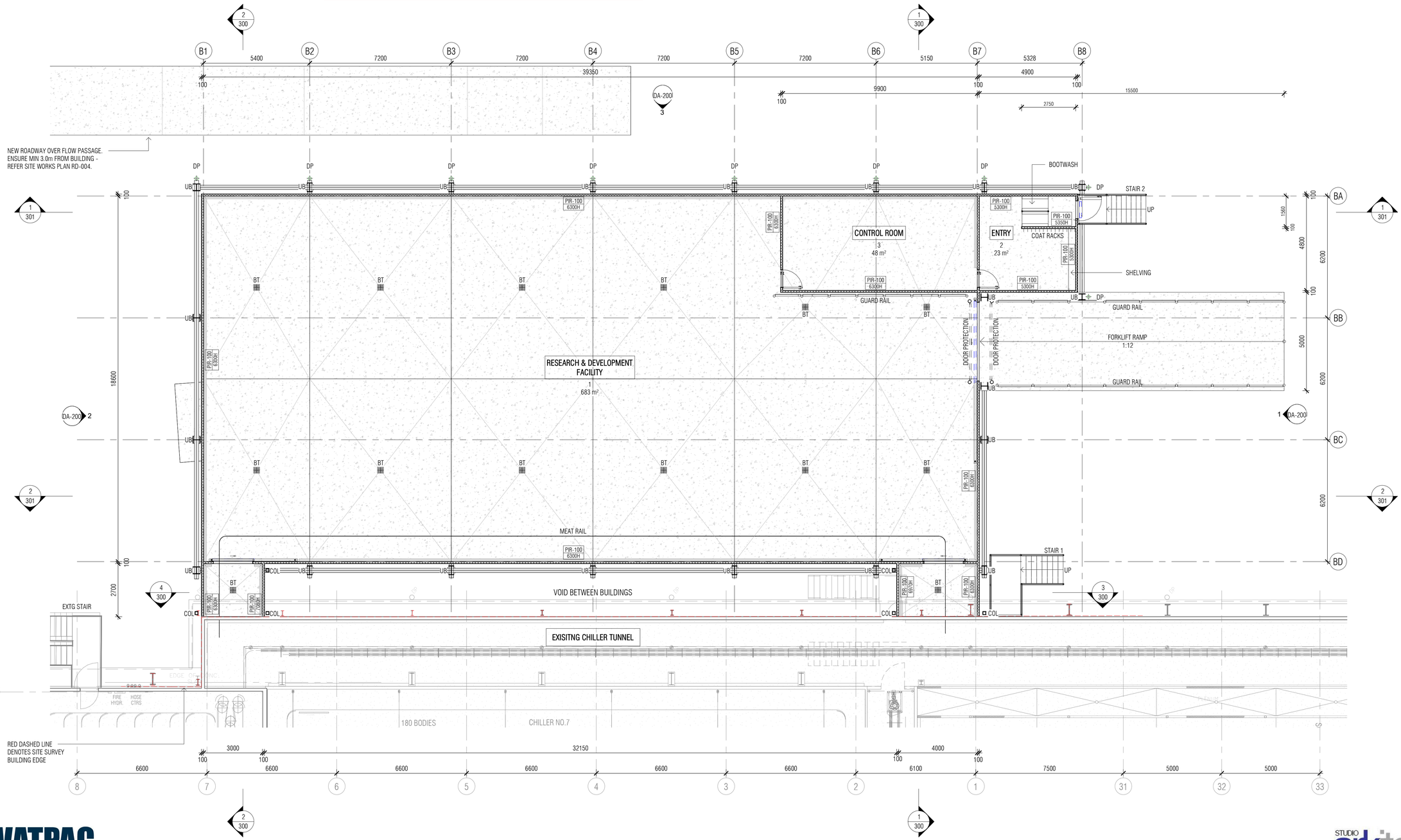
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

Dated: 11 June 2019



WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

FLOOR PLAN

1901 DA-101 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

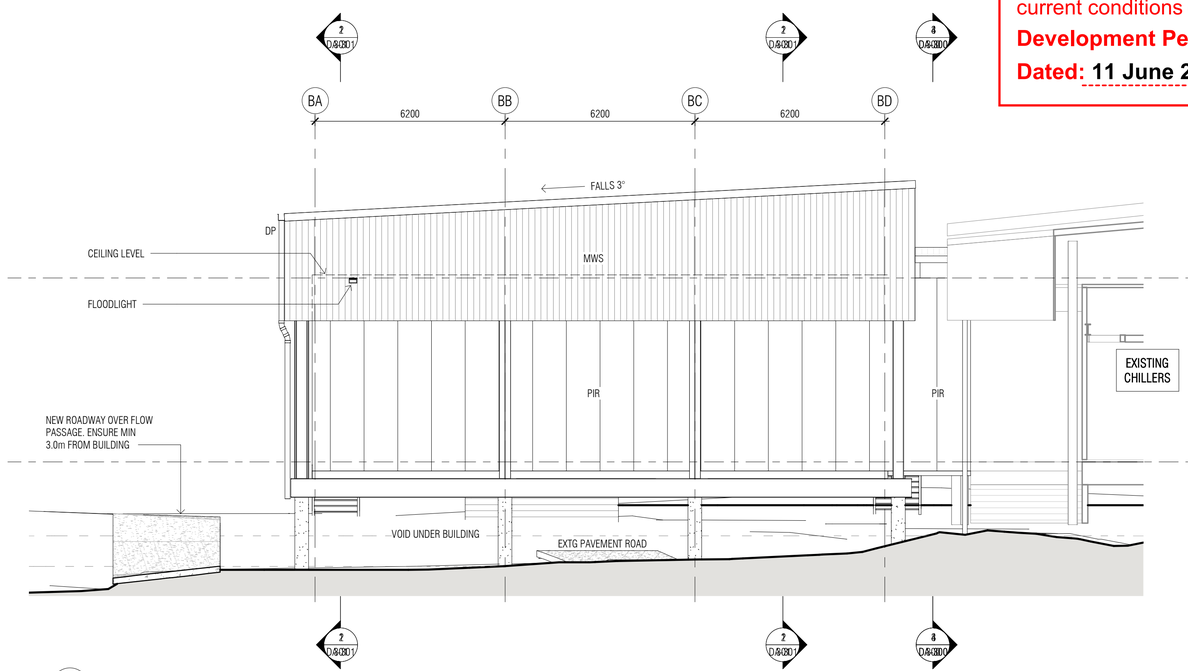
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

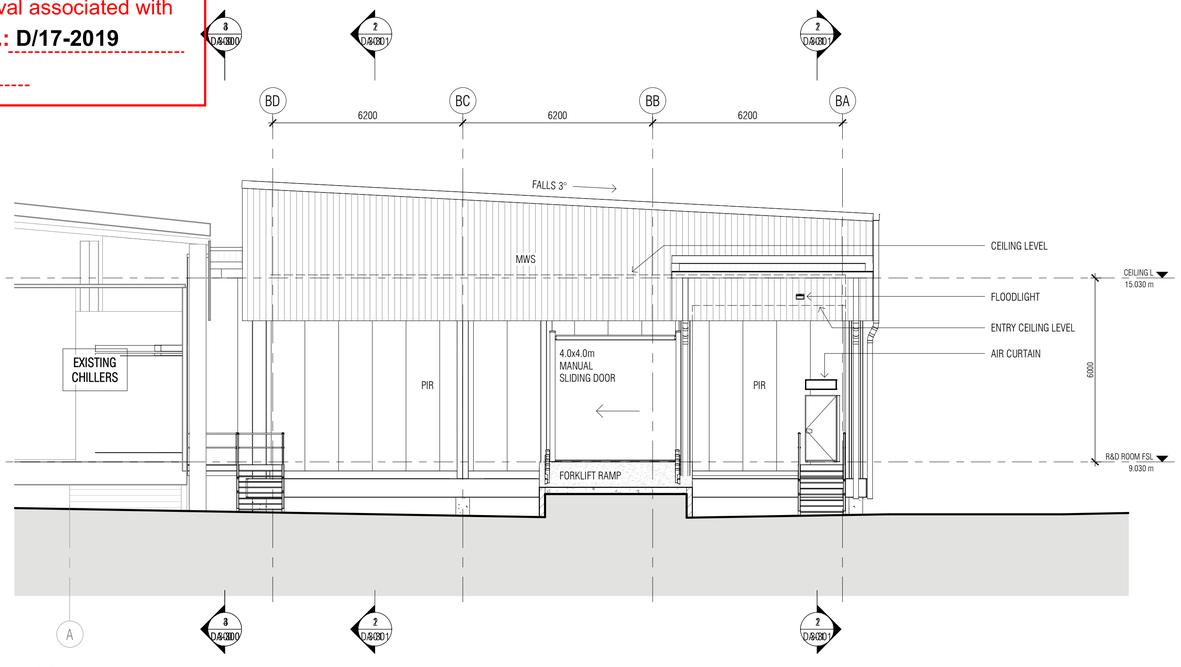
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

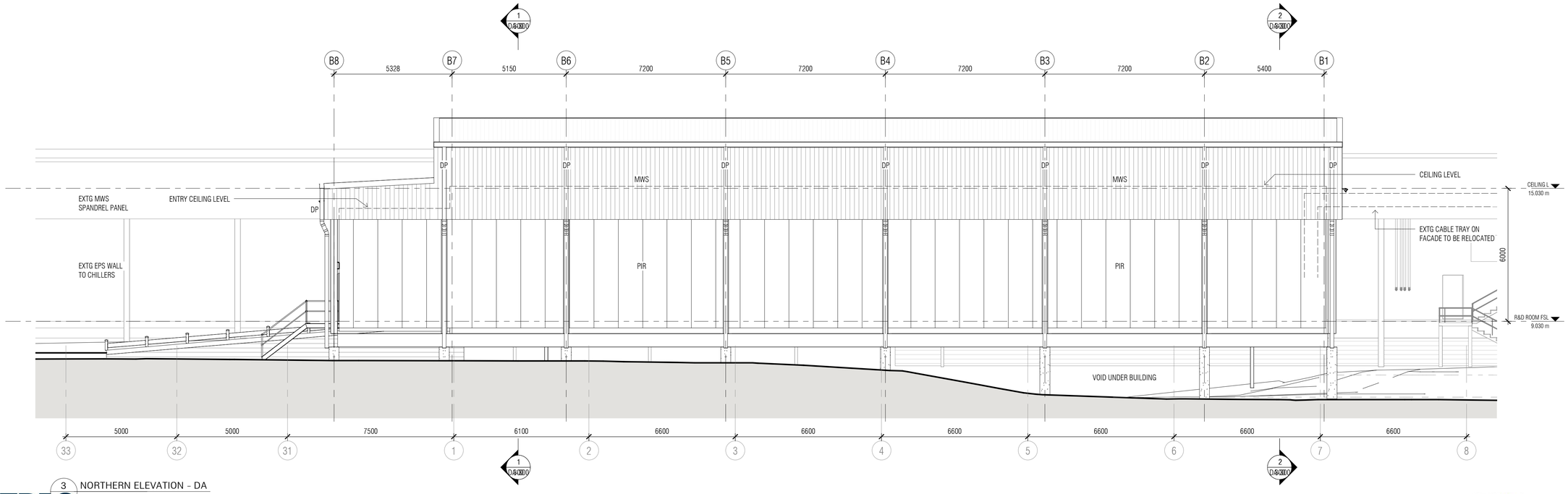
Dated: 11 June 2019



2 101 WESTERN ELEVATION - DA
SCALE 1 : 100



1 101 EASTERN ELEVATION - DA
SCALE 1 : 100



3 NORTHERN ELEVATION - DA
SCALE 1 : 100

WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

ELEVATIONS

1901 DA-200 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

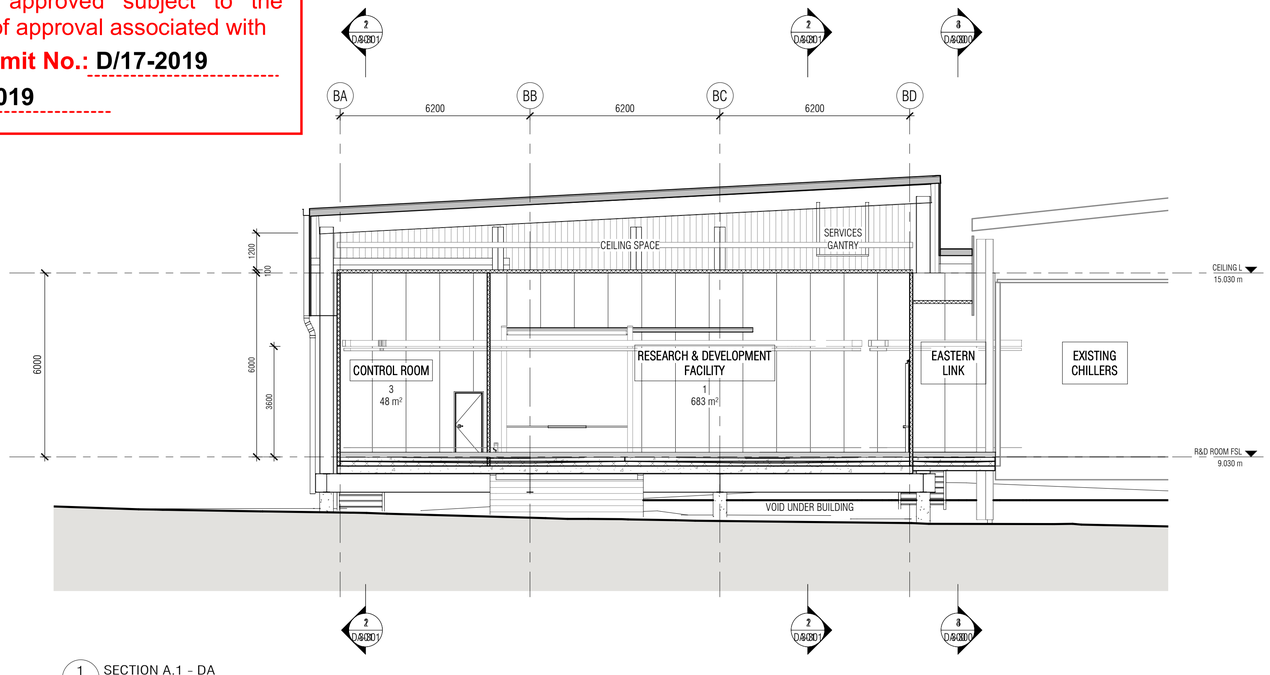
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

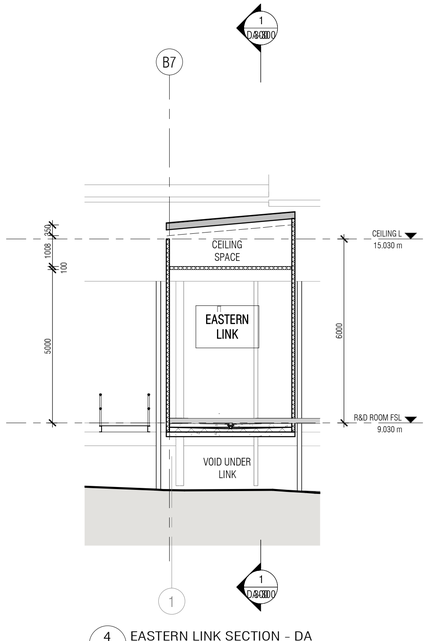
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

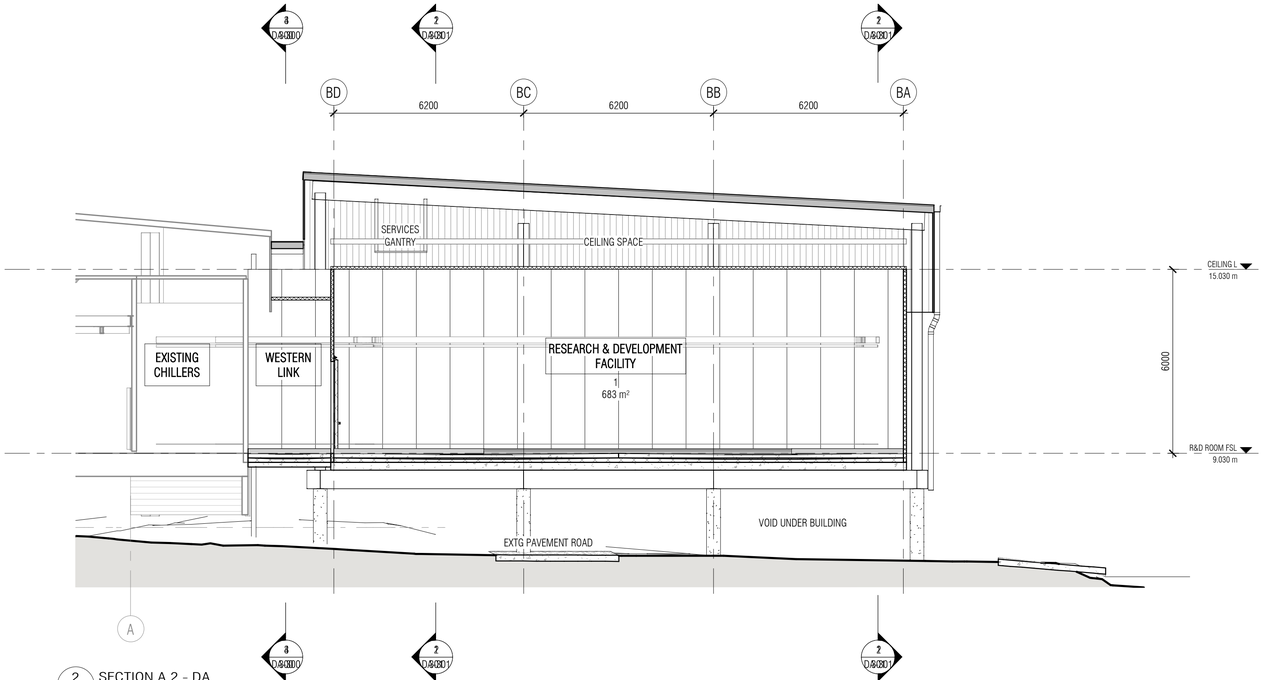
Dated: 11 June 2019



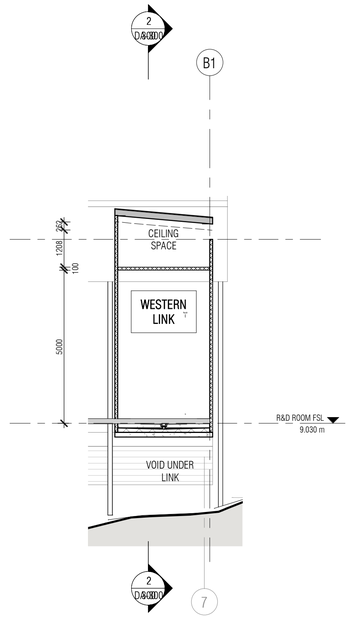
1 / 103 SECTION A.1 - DA
SCALE 1 : 100



4 / 103 EASTERN LINK SECTION - DA
SCALE 1 : 100



2 / 103 SECTION A.2 - DA
SCALE 1 : 100



3 / 103 WESTERN LINK SECTION - DA
SCALE 1 : 100

WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

SECTIONS

1901 DA-300 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

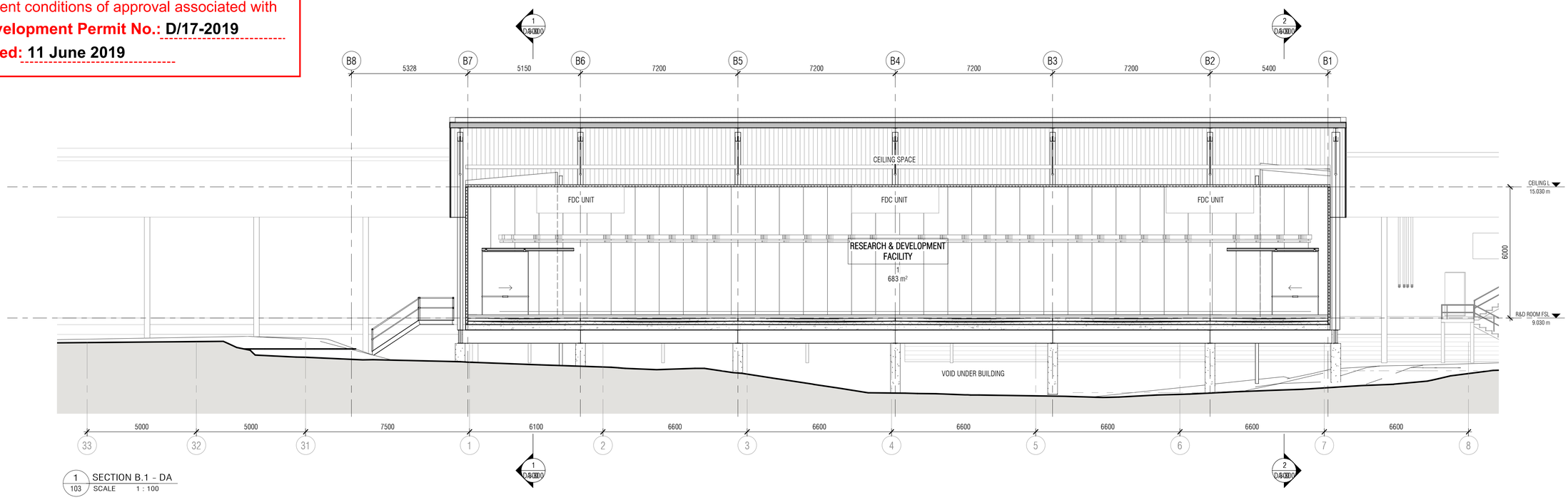
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

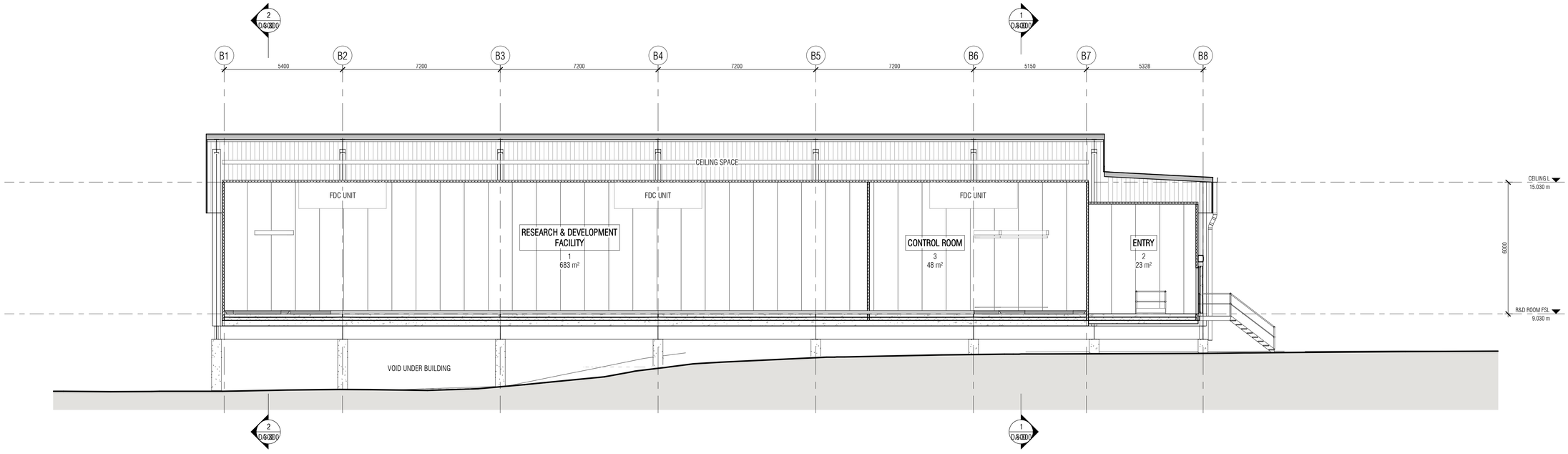
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

Dated: 11 June 2019



1 / 103 SECTION B.1 - DA
SCALE 1 : 100



2 / 103 SECTION B.2 - DA
SCALE 1 : 100

WATPAC CONSTRUCTION
Level 1, 12 Commercial Rd, Newstead Qld 4006
Phone : (07) 3251 6300

STUDIO arkitecture
199 WATERWORKS RD ASHGROVE 4060
E mw.ark@bigpond.com T 07 3366 8983

SECTIONS

1901 DA-301 DATE - 18/02/19

TEYS ROCKHAMPTON INDUSTRY R&D FACILITY

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/17-2019

Dated: 11 June 2019

FLOOD STUDY REPORT

Teys Rockhampton - 484 Lakes Creek Road, Koongal

8 March 2019

Storm Water Consulting Pty Ltd

ACN 105 078 377

5/541 Old Cleveland Rd, CAMP HILL QLD 4152

Ph (07) 3398 4992 Fax (07) 3398 4993

www.stormw.com.au

Job No: 6670 v 1.0

Job Name: Teys Rockhampton - 484 Lakes Creek Road, Koongal

Report Name	Date	Report No.
Flood Study Report	8 March 2019	6670 v 1.0

Project Engineer: Steve Hughes
BE Civil, MIEAust
E steve@stormw.com.au

Reviewed By: Darren Rogers
BE Civil (Hons), MIE Aust, RPEQ
Director
E darren@stormw.com.au

Downloadable Files:
Report File 6670 Report 1.0.pdf
TUFLOW File Available on request

Download Location: www.stormw.com.au/jobs/6670/1.0
Username: 6670
Password: Teys6670

Table of Contents

1.0 INTRODUCTION

Storm Water Consulting Pty Ltd was commissioned to prepare a Flood Study Report for the property at 484 Lakes Creek Road, Koongal.

This report has been prepared to demonstrate that the proposed new building would not create an adverse impact to neighbouring properties. Minimum finished floor levels for the new building are also presented in this report.

2.0 SITE CONDITIONS

2.1 Existing Site

The site is used as an abattoir facility and contains multiple buildings. The site is bordered by a railway line and Lakes Creek Road to the north east, the Fitzroy River to the south west and undeveloped land to the north west and south east. Lakes Creek flows through a set of culverts located under Lakes Creek Road and under the suspended railway line before entering the site. The creek flows through the site passing under several buildings and bridge crossings before discharging into the Fitzroy River. An old bridge crossing is located on the upstream side of the Lakes Creek flow path through the site. An existing site plan is presented in Figure 2, Appendix A.

The site is also impacted by flooding from the Fitzroy River. Council's documented flood level (for the Fitzroy River) impacting the site is RL7.29m AHD.

2.2 Developed Site

It is proposed to construct a new building on the north eastern side of the site. The building will be constructed on a suspended floor and will be located over the top of the Lakes Creek flow path. The location of the new building is shown in Figure 3, Appendix A. The old bridge crossing will be demolished as part of the development.

3.0 HYDROLOGIC ANALYSIS

The catchment contributing flows to the north eastern boundary of the site is presented in Figure 1, Appendix A. An URBS model was set up to create inflow boundary condition for the TUFLOW model (discussed in Section 4.0). The inflow boundary condition is located upstream of Lakes Creek Road. The URBS model was simulated using default alpha and beta values of 1.2 and 0.8 respectively. An initial loss of 15mm was used for the 39%-2% AEP events and an initial loss of 0mm was used for the 1% AEP event. A continuing loss of 2.5mm/hr was used for all events. A schematic of the URBS model layout is presented in Figure 4, Appendix A. The inflow boundary condition location is presented in Figure 5, Appendix A.

A summary of the resulting URBS flows at each inflow boundary condition are presented in Table 3.1 below.

Table 3.1 – URBS Peak Discharges – 90min Storm Duration

AEP %	Inflow-1 m^3/s
39	9.4
18	19.2
10	25.5
5	34.7
2	47.8
1	79.6

4.0 HYDRAULIC MODELLING

A TUFLOW 2D hydrodynamic model was prepared to model the extent of inundation across the site and to determine the impacts of the proposed development. The model setup and parameters are discussed in Section 4.1 below.

4.1 Existing Model

The TUFLOW model was based on a 1m grid size with elevation data assigned from the ALS survey data sourced from the Department of Natural Resources and Mines and level and detail site survey. The peak discharges presented in Section 3.0 were used for their respective AEP events. The location of the boundary condition is presented in Figure 5, Appendix A. A global Manning's value of n=0.10 was used throughout the model. The culverts located under Lakes Creek road were input into the model as a 1-D element. The buildings and bridges spanning over the flow path through the site were modelled using the 2-D bridge flow constriction (2d_lfcsh) method so that the support columns could be modelled. The existing scenario 2% AEP inundation plan is presented in Figure 5, Appendix A. Existing flood contour plots, depth plots and velocity plots for each AEP event are presented in Figures 9 to 23, Appendix A.

4.2 Developed Model

The existing model was modified by removing the old bridge crossing (upstream of the new building) and inputting a new 2-D bridge flow construction layer which represents the proposed building. Developed flood contour plots, depth plots and velocity plots for each AEP event are presented in Figures 24 to 41, Appendix A. Flood depth and velocity impact plots for each AEP event are presented in Figures 42 to 53.

Results from the impact plots show that the proposed development would reduce the flood levels on neighbouring properties for all events except the 39% AEP event. The reduction in flood levels provides a benefit to the upstream railway line and Lakes Creek Road. The 39% AEP event shows a 5mm increase in flood levels on the upstream neighbouring property (under the suspended railway line). The flood level on the upstream neighbouring property is below the level of the railway tracks and is located within the flow path. The small increase does not create an adverse impact to the neighbouring land and it is anticipated that the reduced flood levels for all other AEP events is far more beneficial than the small 5mm increase in flood levels for the minor AEP event.

4.3 Finished Floor Levels

The proposed floor level for the new building is RL8.93m AHD. Rockhampton City Council's Planning Scheme Policy requires the floor level of the new building to be set 0.5m above the 1% AEP flood level on site. The 1% AEP flood level (at the location of the new building) from Lakes Creek is RL7.9m AHD. The 1% AEP flood level from the Fitzroy River is RL7.29m AHD. The proposed finished floor level therefore provides the required flood immunity.

5.0 CONCLUSIONS

This report has been prepared to demonstrate that the proposed new building would not create an adverse impact to neighbouring properties. Minimum finished floor levels for the new building are also presented in this report.

It is proposed to construct a new building on the north eastern side of the site. The building will be constructed on a suspended floor and will be located over the top of the Lakes Creek flow path. The location of the new building is shown in Figure 3, Appendix A. The old bridge crossing will be demolished as part of the development.

A TUFLOW 2D hydrodynamic model was prepared to model the extent of inundation across the site and to determine the impacts of the proposed development. Results from the TUFLOW analysis show that the proposed development would reduce the flood levels on neighbouring properties for all events except the 39% AEP event. The 39% AEP event shows a 5mm increase in flood levels on the upstream neighbouring property (under the suspended railway line). The flood level on the upstream neighbouring property is below the level of the railway tracks and is located within the flow path. The small increase does not create an adverse impact to the neighbouring land and it is anticipated that that the reduced flood levels for all other AEP events is far more beneficial than the small 5mm increase in flood levels for the minor AEP event.

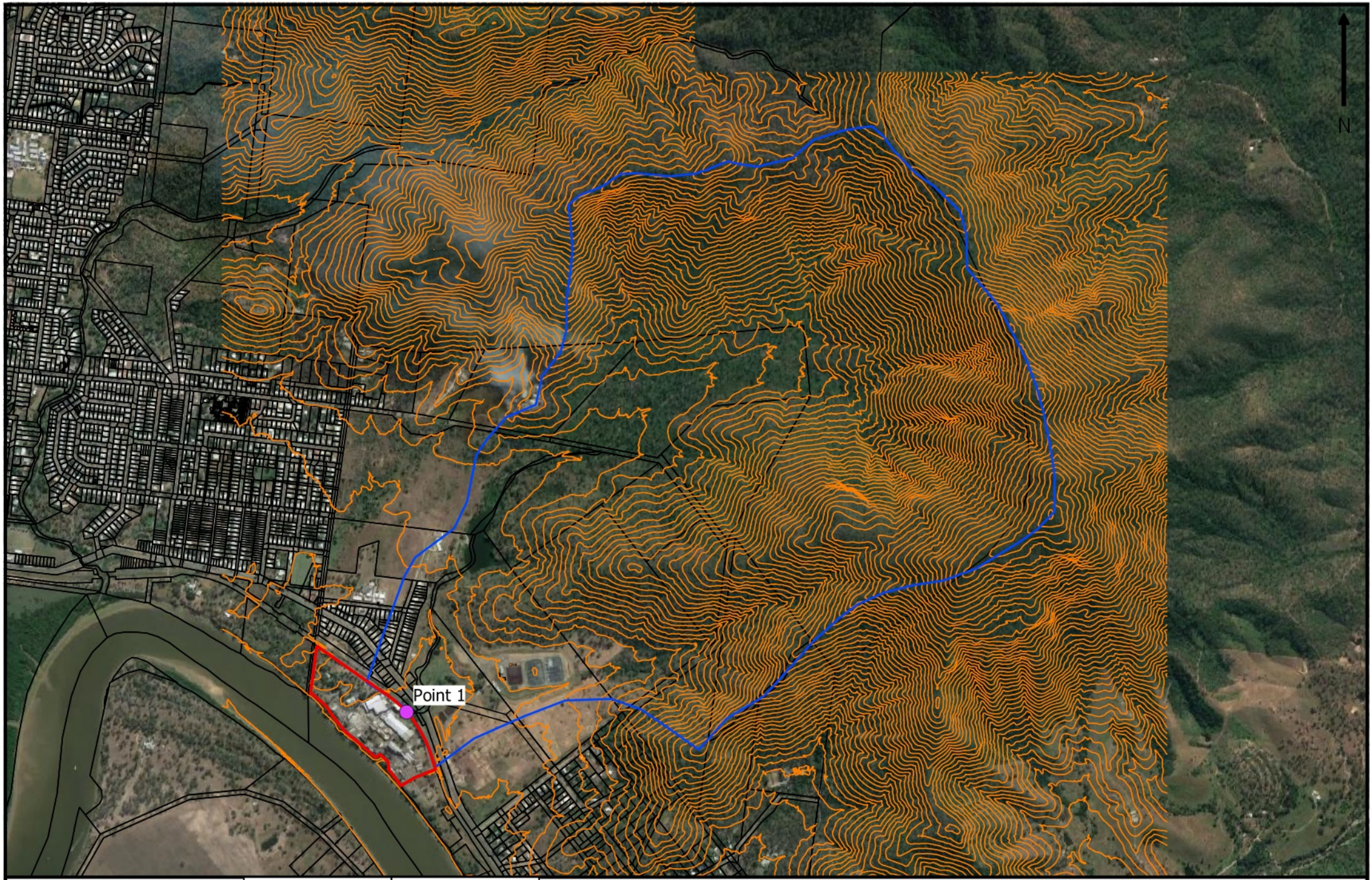
Footing and foundations should be designed to withstand the hydrostatic, hydrodynamic and debris impact loads associated with the flow velocities and depths affecting the new building.

Darren Rogers
BE Civil (Hons), MIE Aust, RPEQ 5016
Director

LIST OF APPENDICIES

APPENDIX A

Figures



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:20,000

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 1
Catchment Plan

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 2
Existing Site Plan

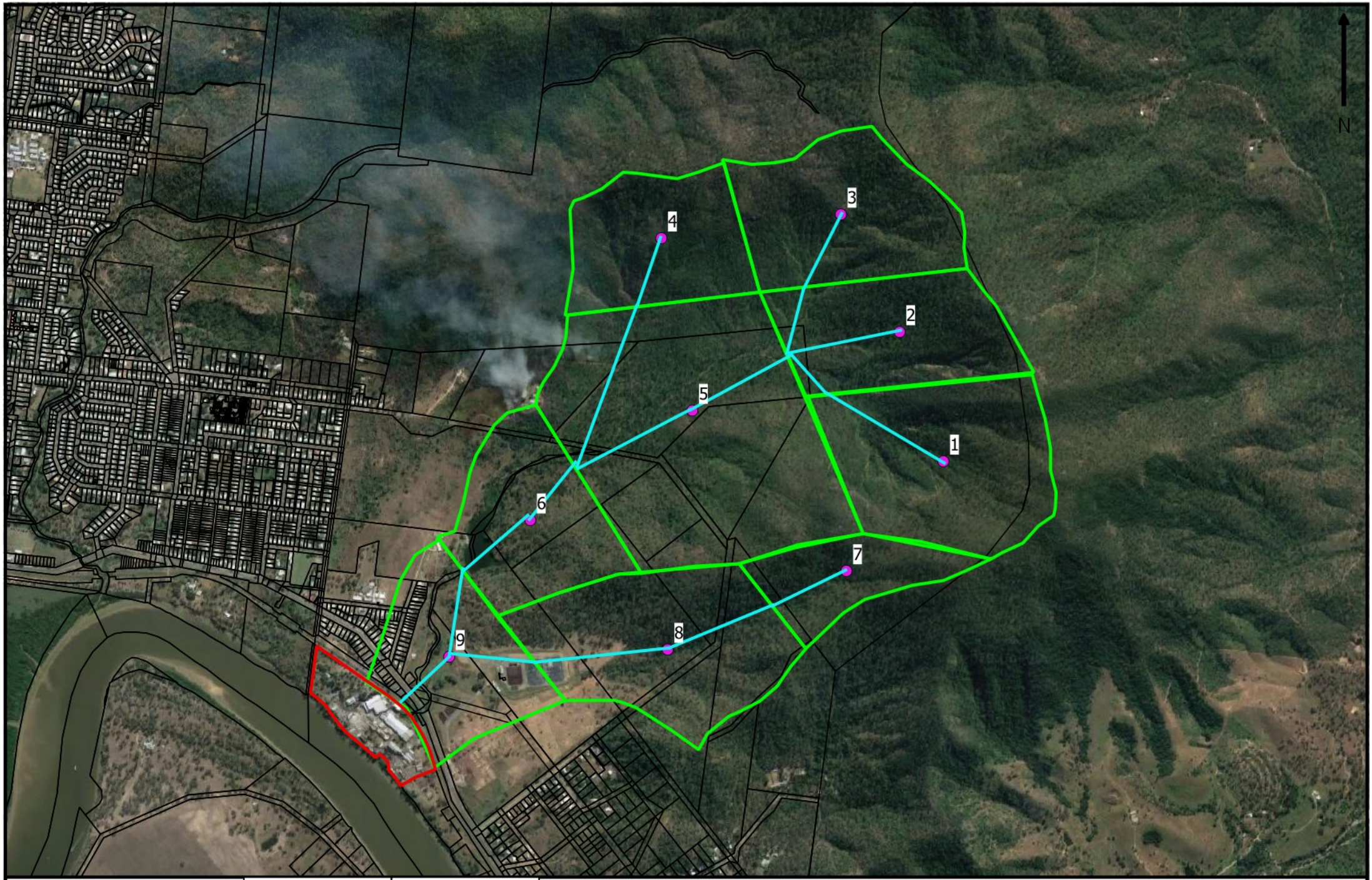
STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 3
Developed Site Plan



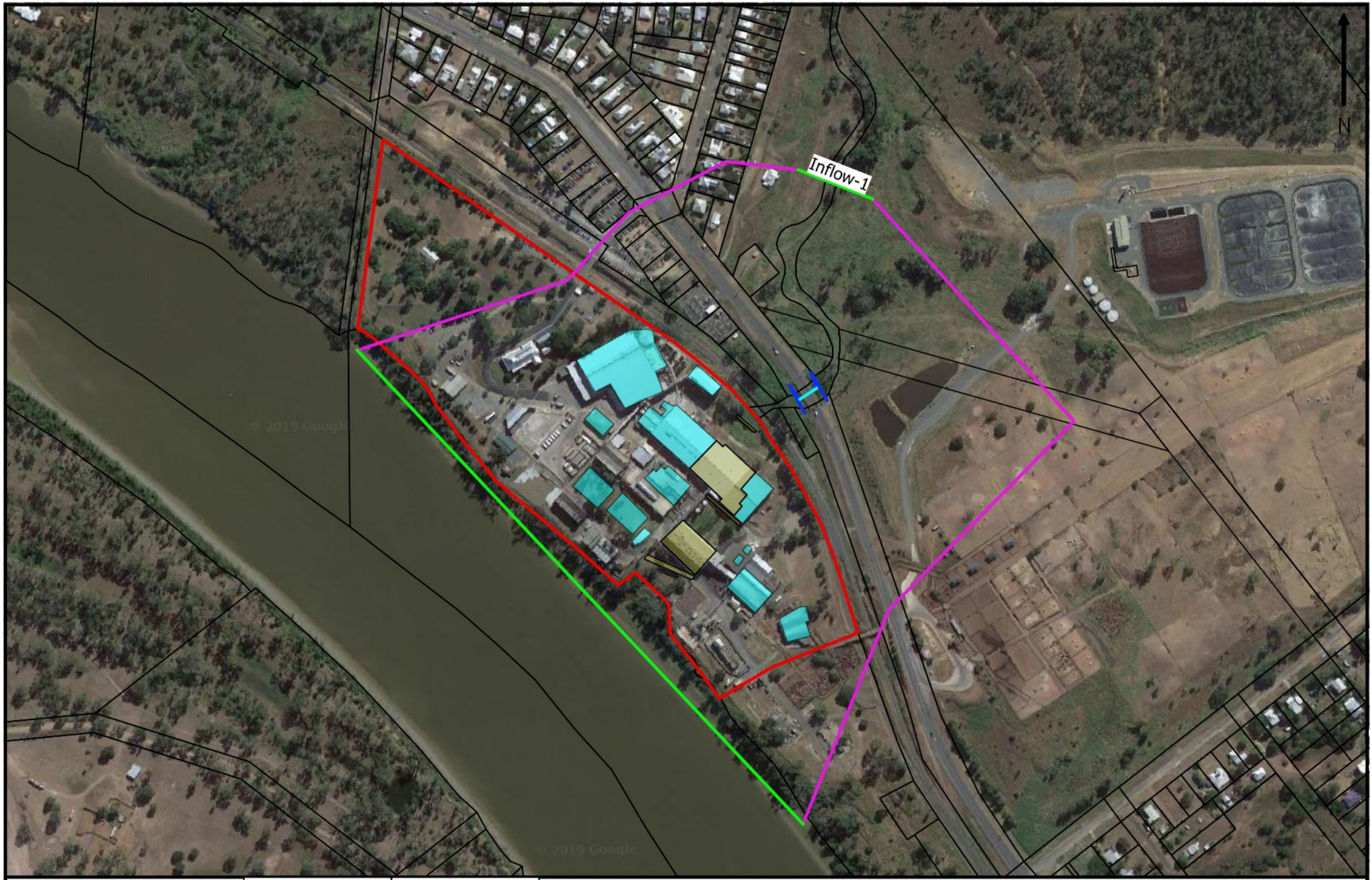
STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:20,000

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 4
URBS Model Schematic



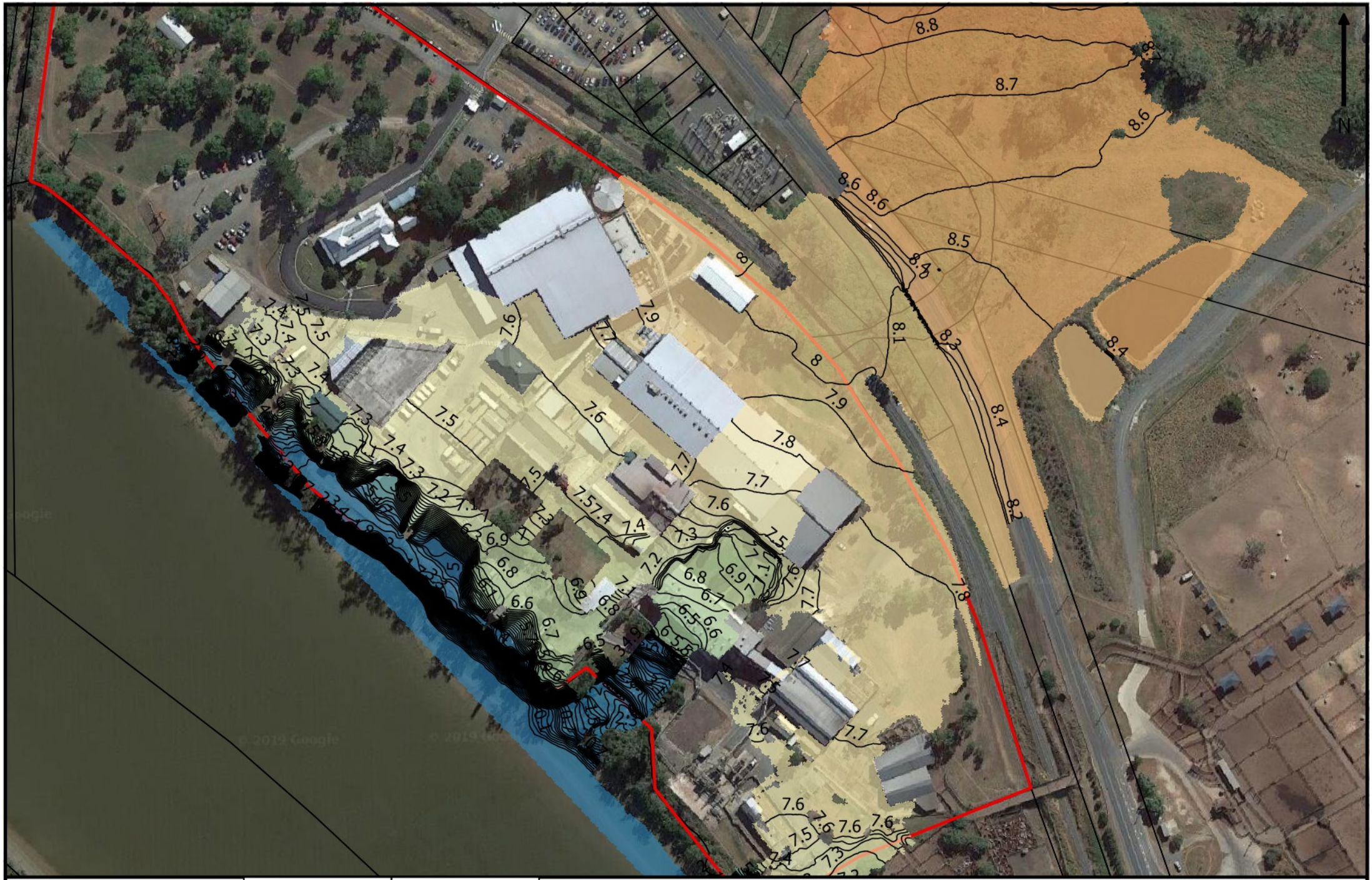
STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:5,000

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 5
TUFLOW Model Schematic



STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 6
	Checked	DWR		
	Date	8/3/19		
	Scale	1:2,500	Job No. J6670	Existing Scenario 1% AEP Flood Contours

STORM Water Consulting

5/541 Old Cleveland Rd, Camp Hill, QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500
Job No.	J6670

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 7

Existing Scenario 2% AEP Flood Contours

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

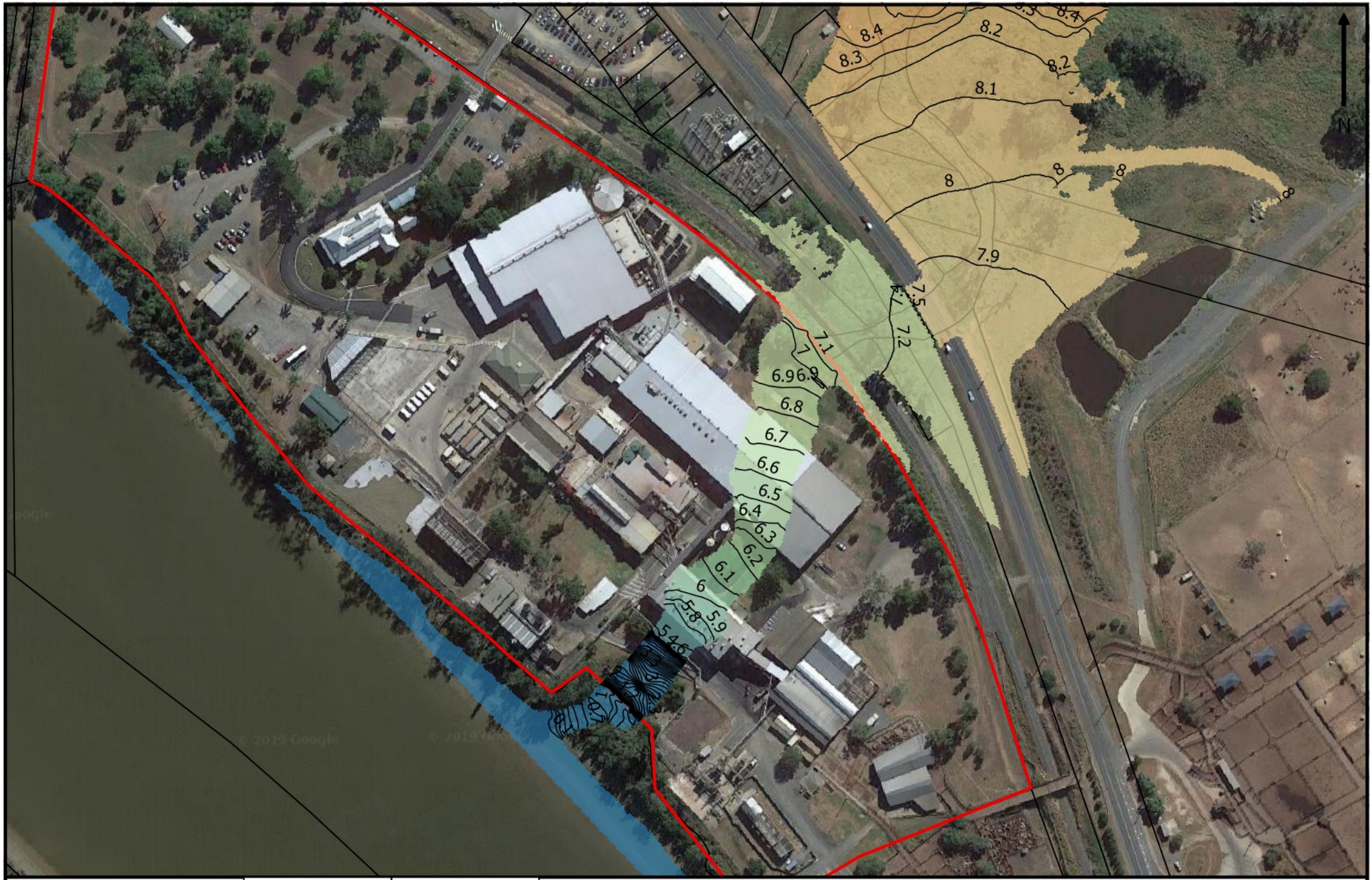
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 8

Existing Scenario 5% AEP Flood Contours

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

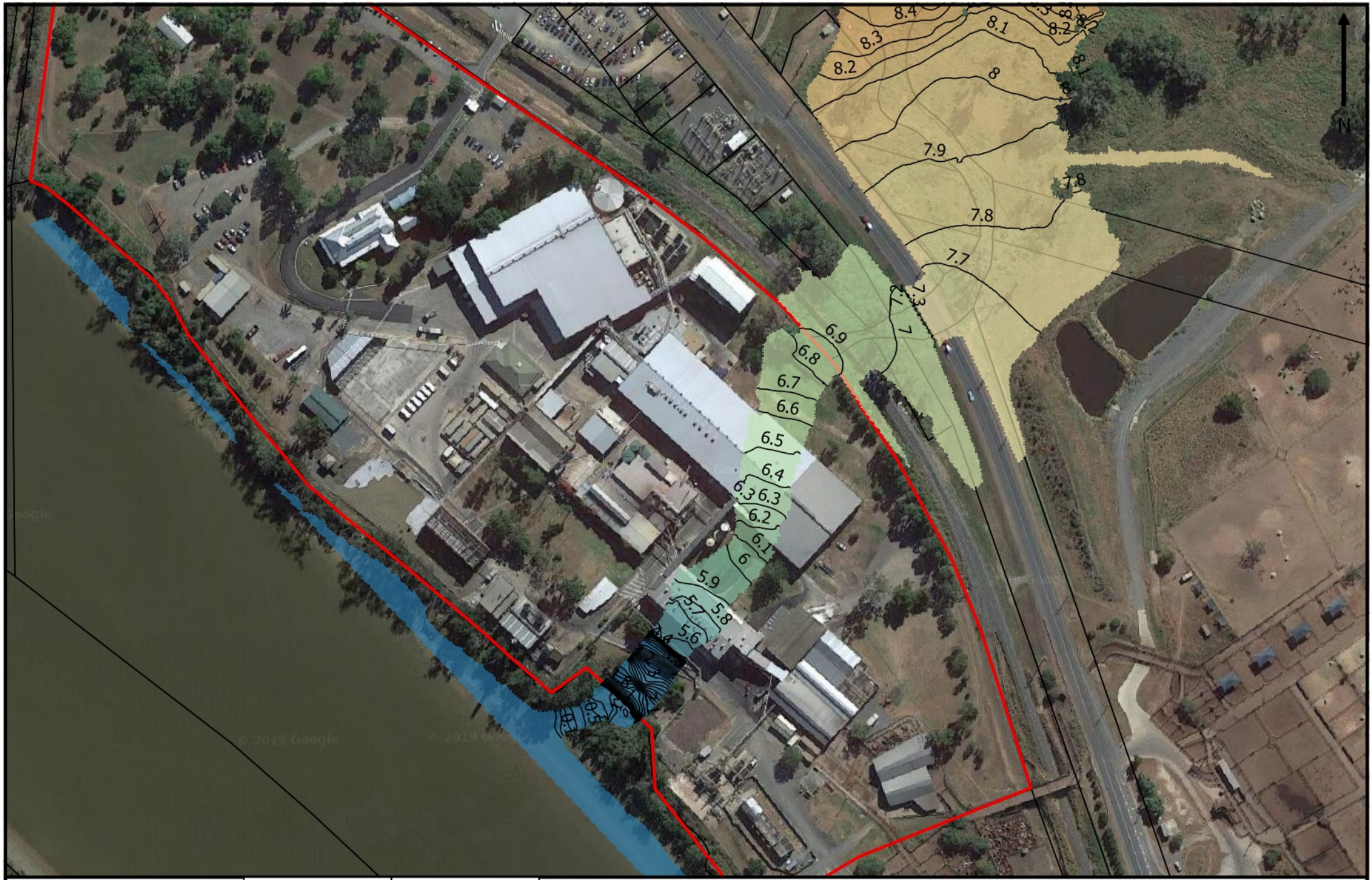
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 9

Existing Scenario 10% AEP Flood Contours

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

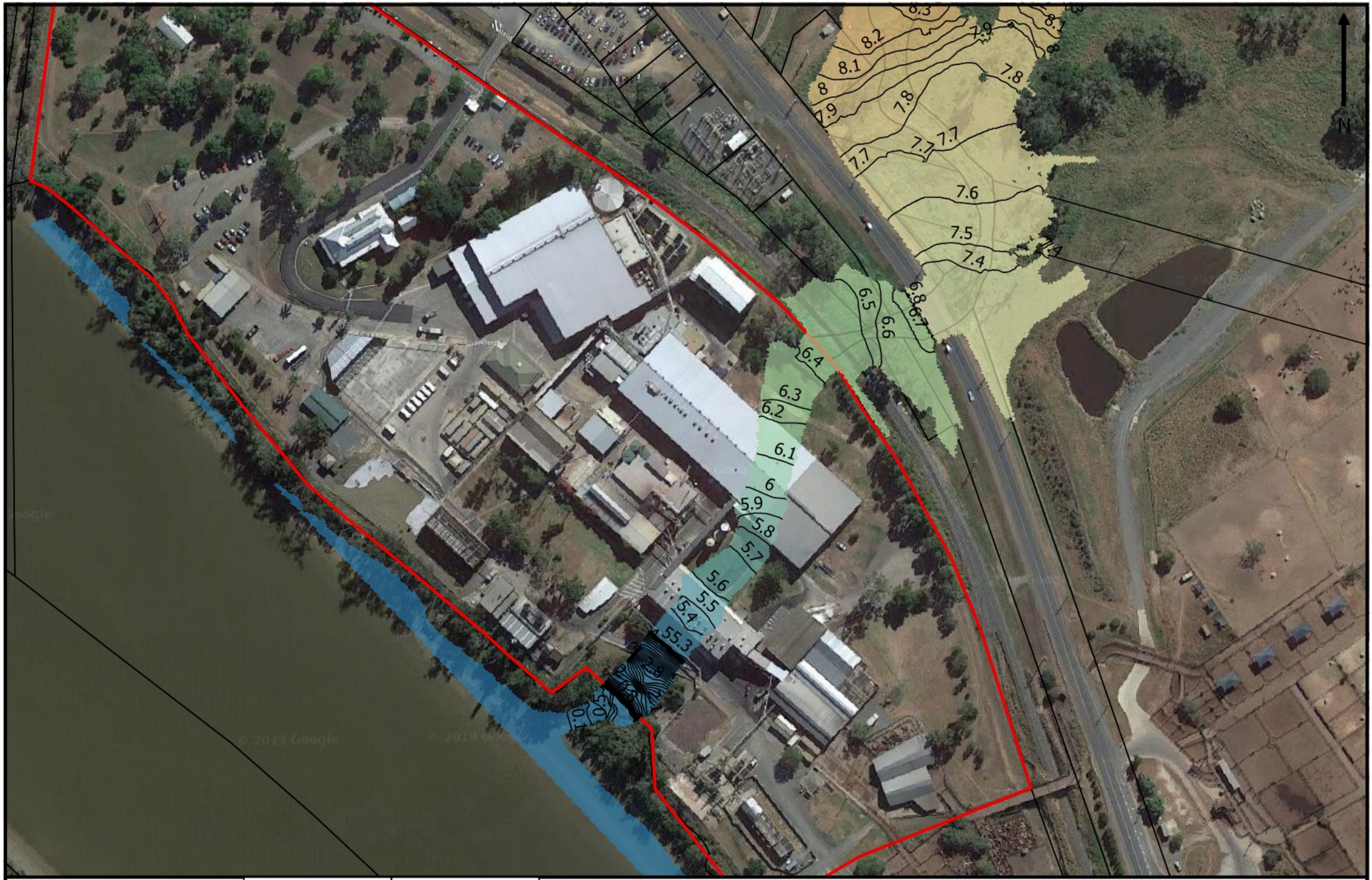
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

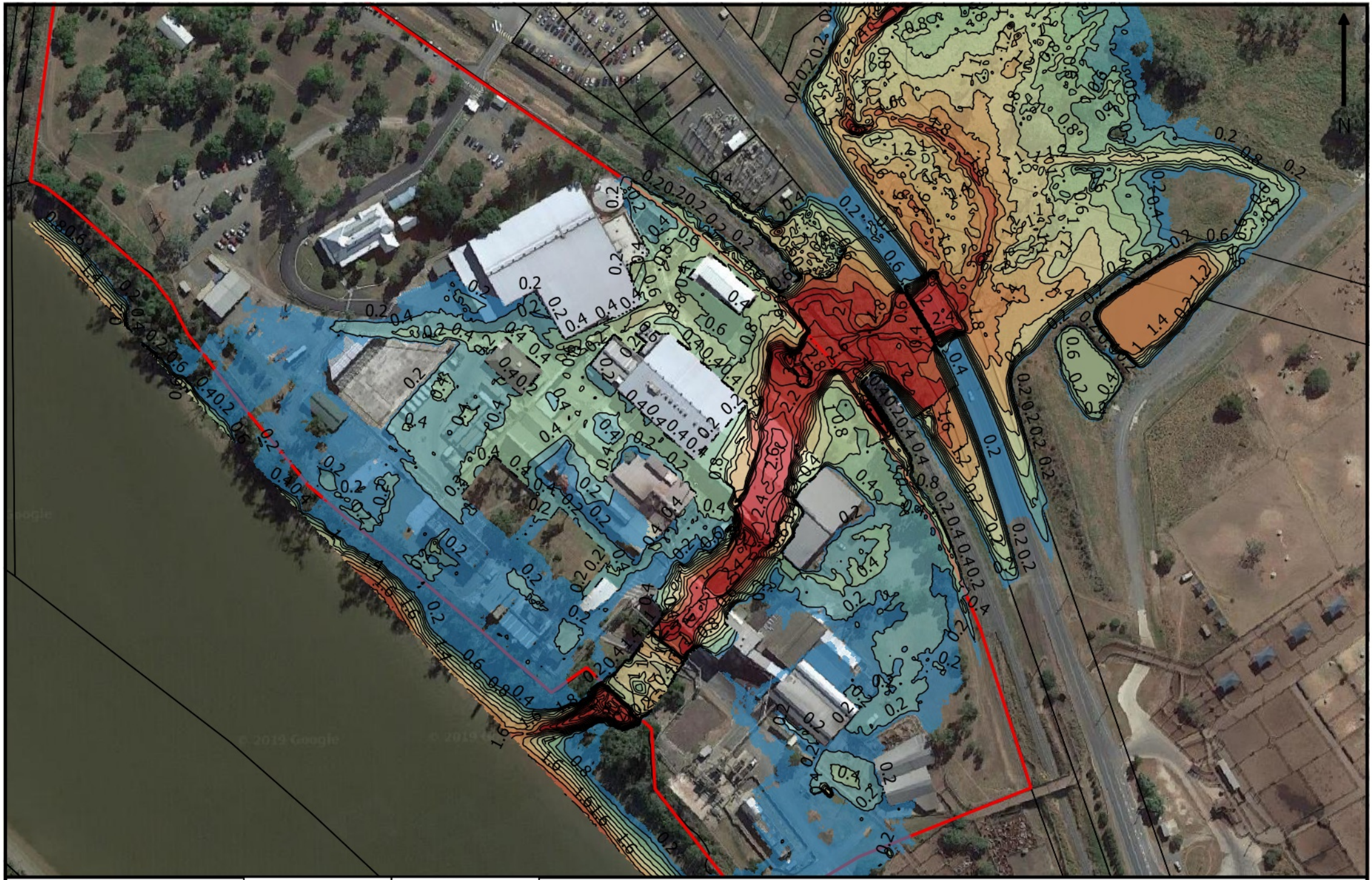
Figure 10

Job No. J6670

Existing Scenario 18% AEP Flood Contours



STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 11
	Checked	DWR		
	Date	8/3/19		
	Scale	1:2,500	Job No. J6670	Existing Scenario 39% AEP Flood Contours



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

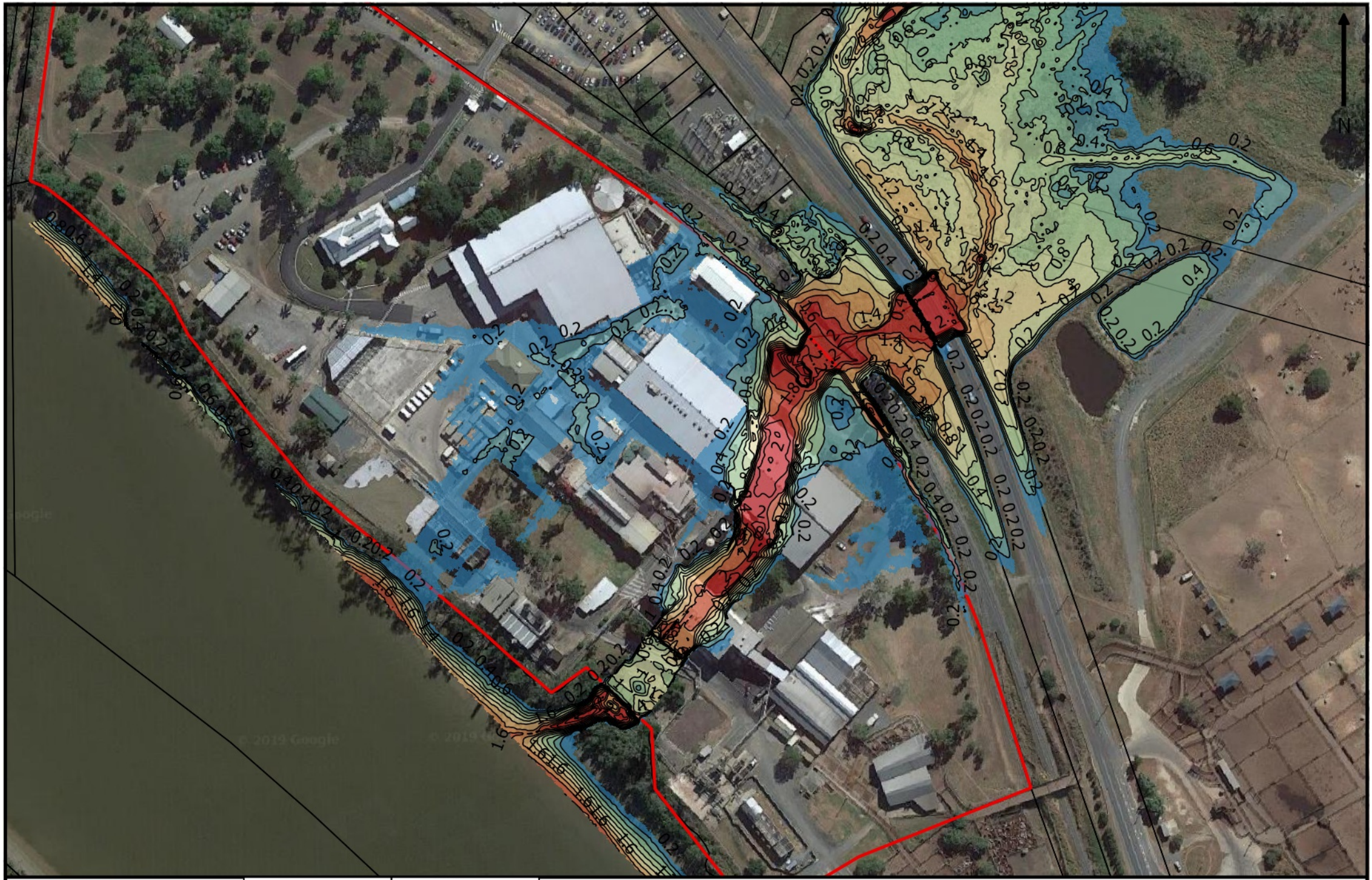
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 12

Existing Scenario 1% AEP Flood Depths (m)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

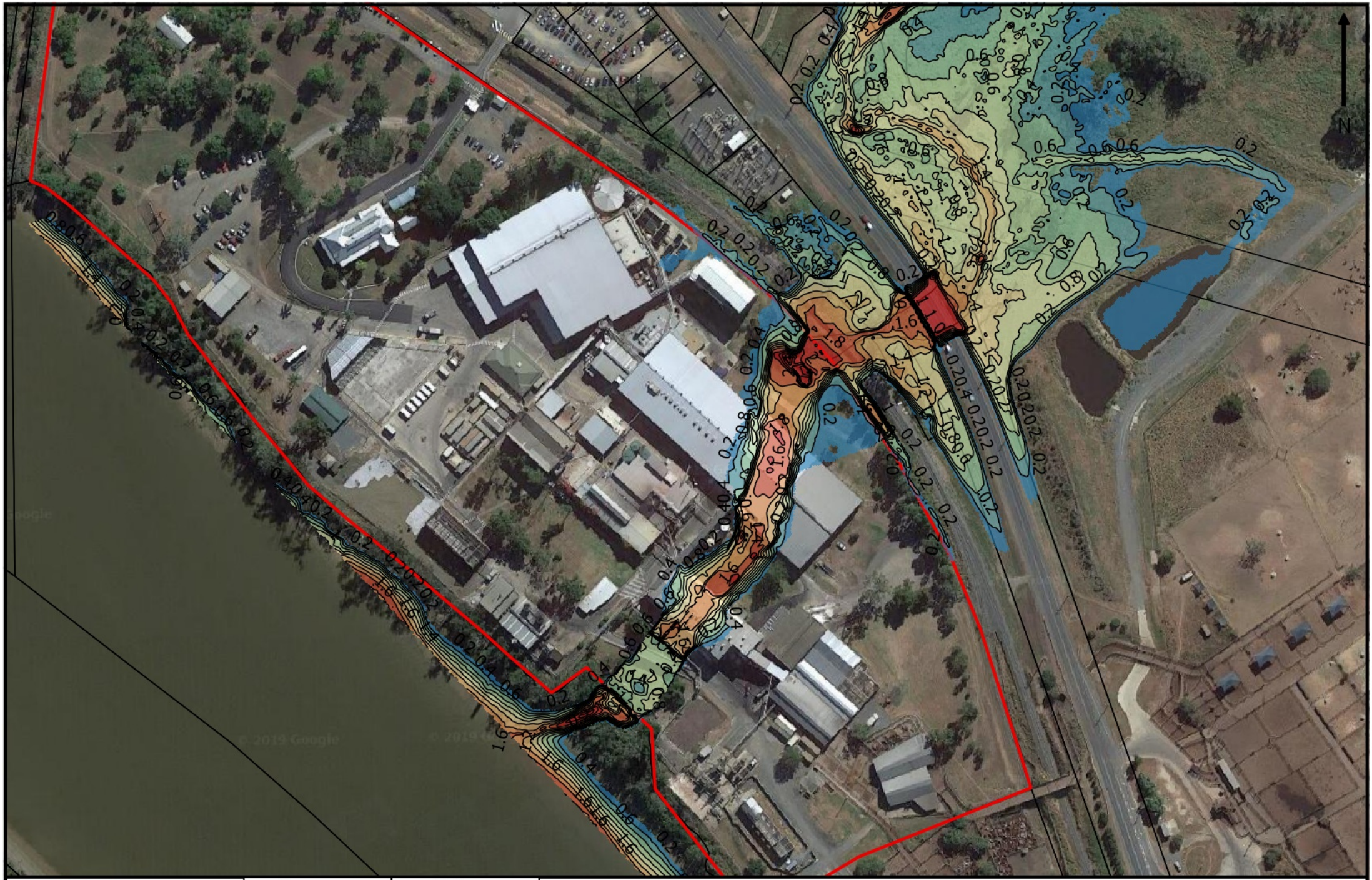
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 13

Existing Scenario 2% AEP Flood Depths (m)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

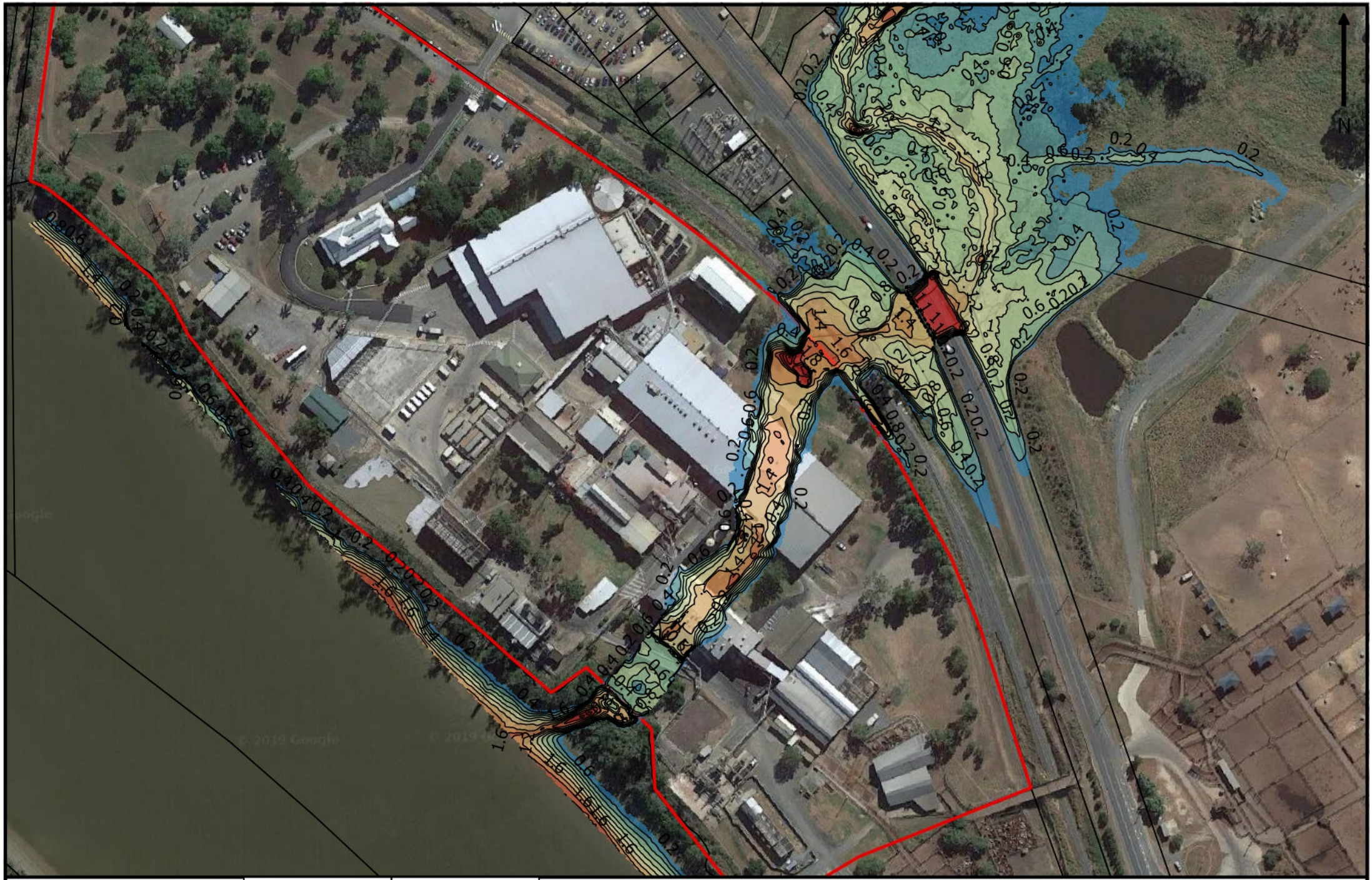
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 14

Existing Scenario 5% AEP Flood Depths (m)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

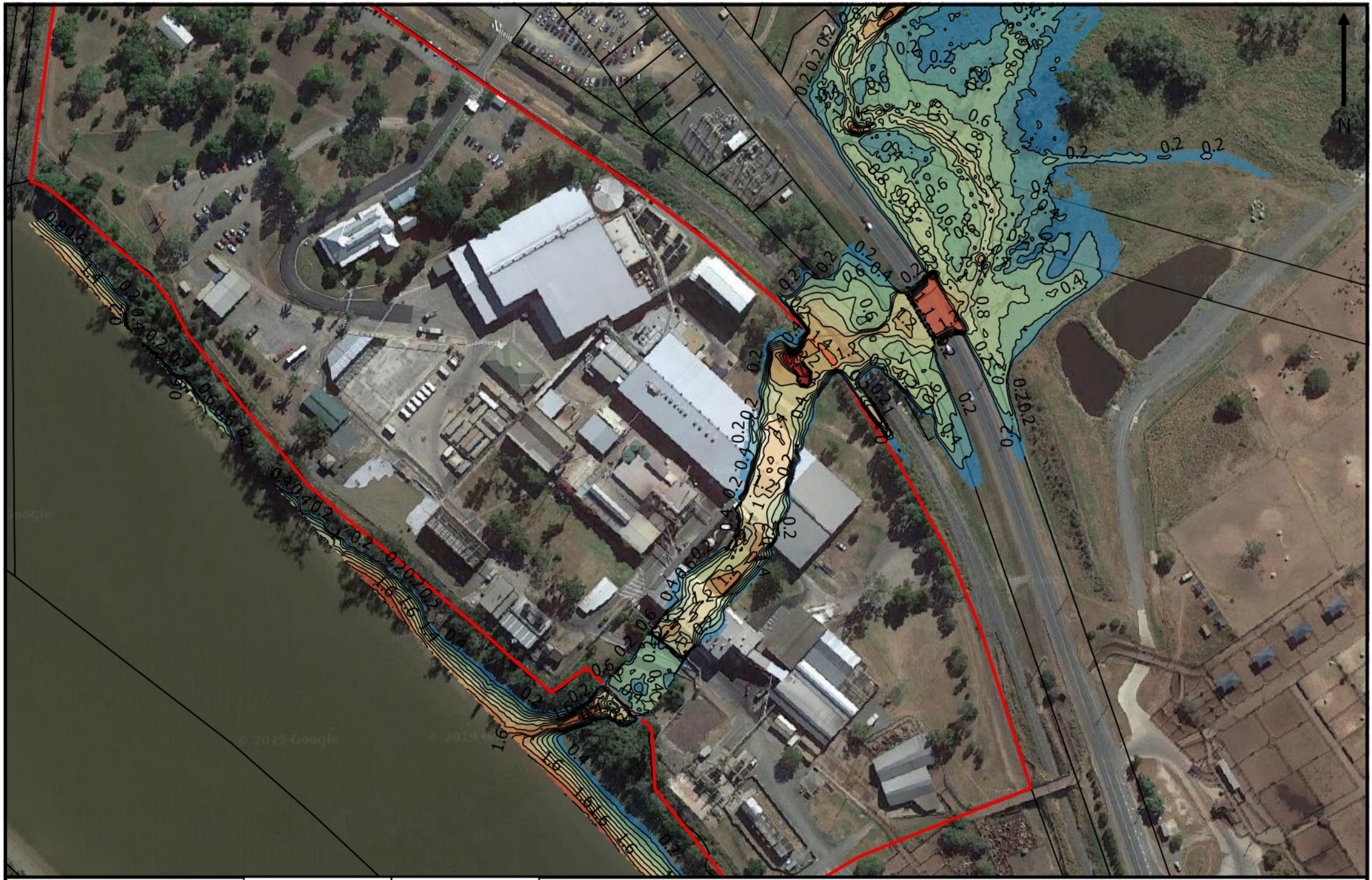
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 15

Existing Scenario 10% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 16

Existing Scenario 18% AEP Flood Depths (m)

Job No.	J6670

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

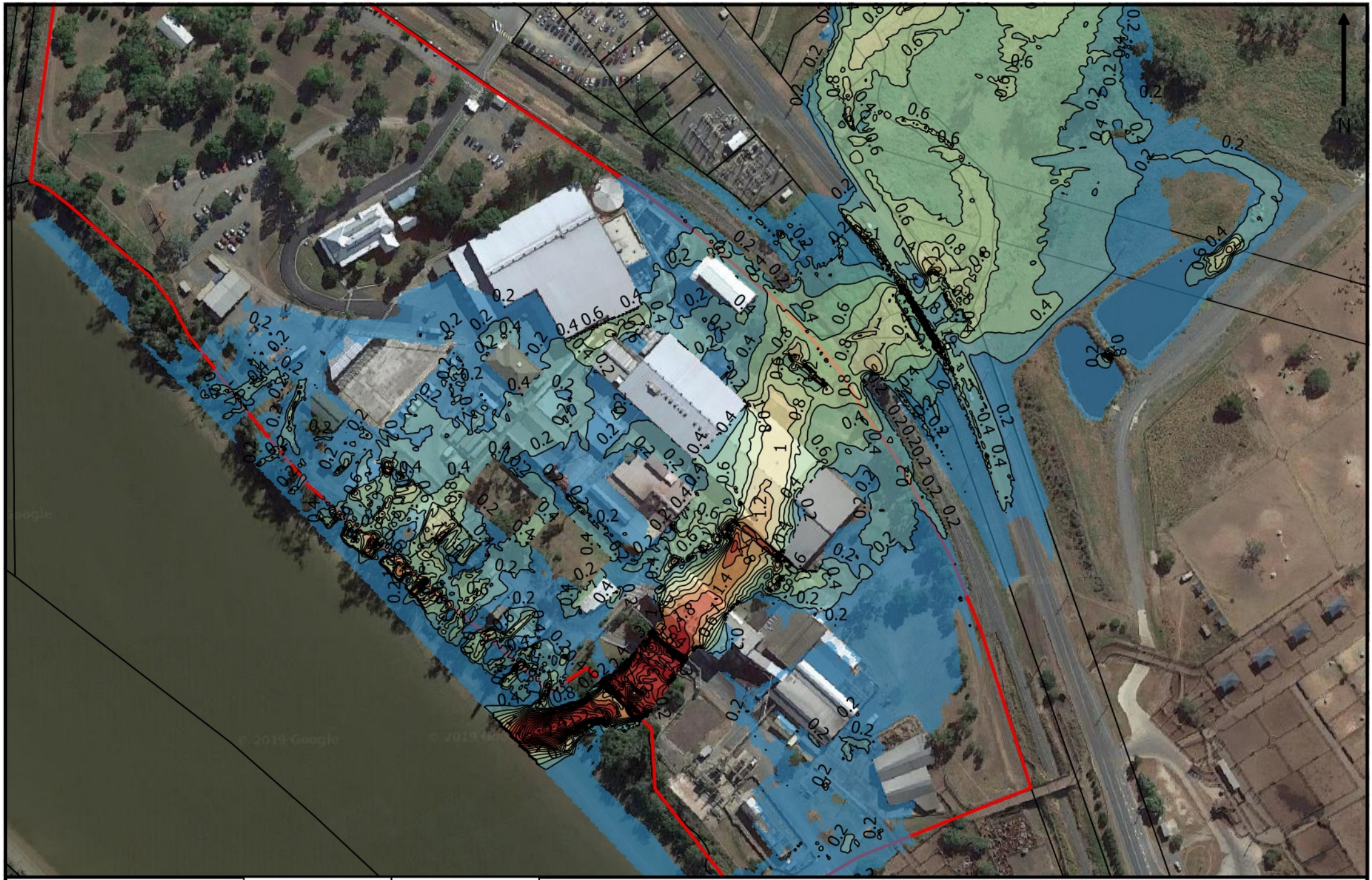
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 17

Existing Scenario 39% AEP Flood Depths (m)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

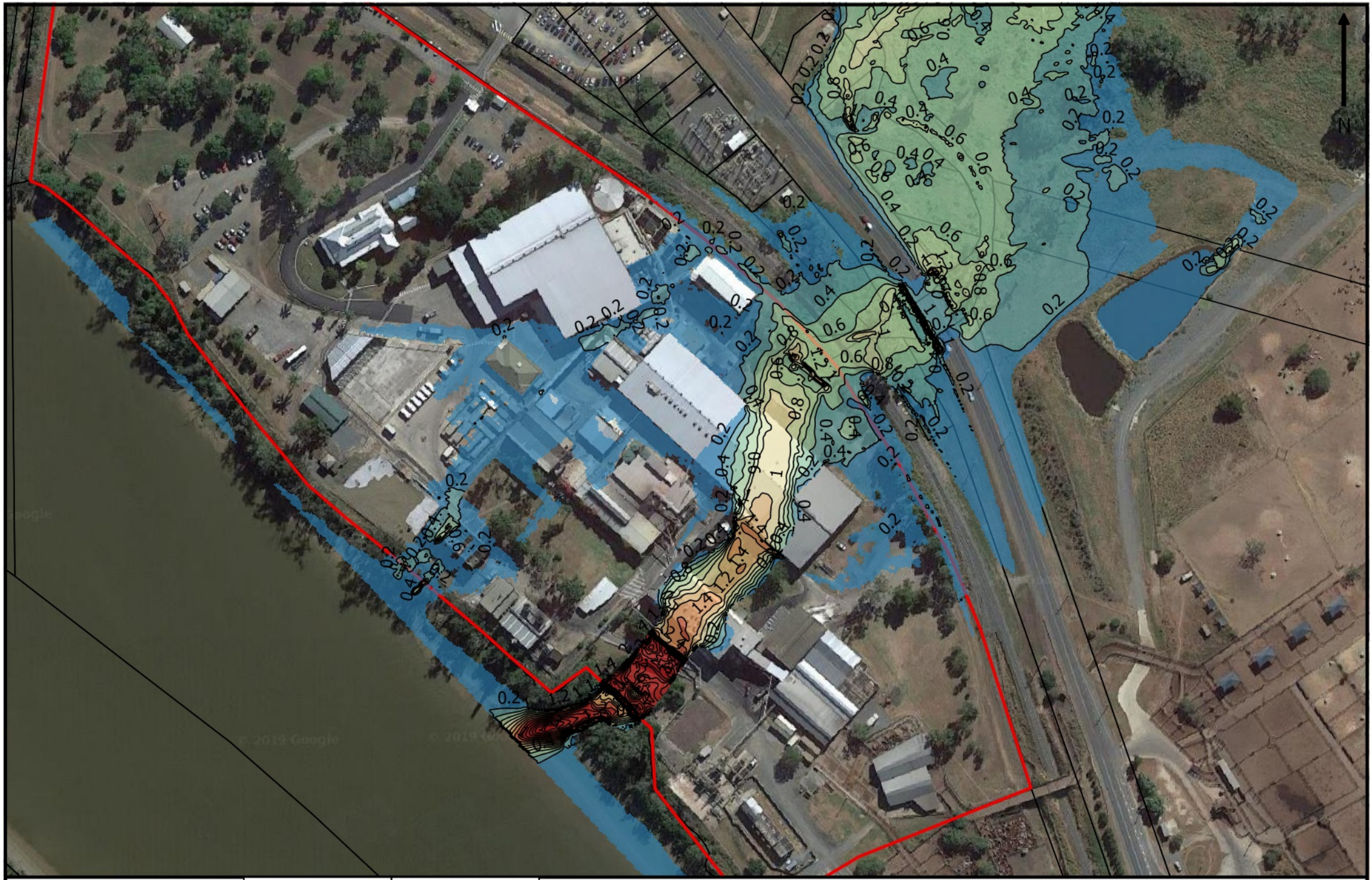
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 18

Existing Scenario 1% AEP Flow Velocities (m/s)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

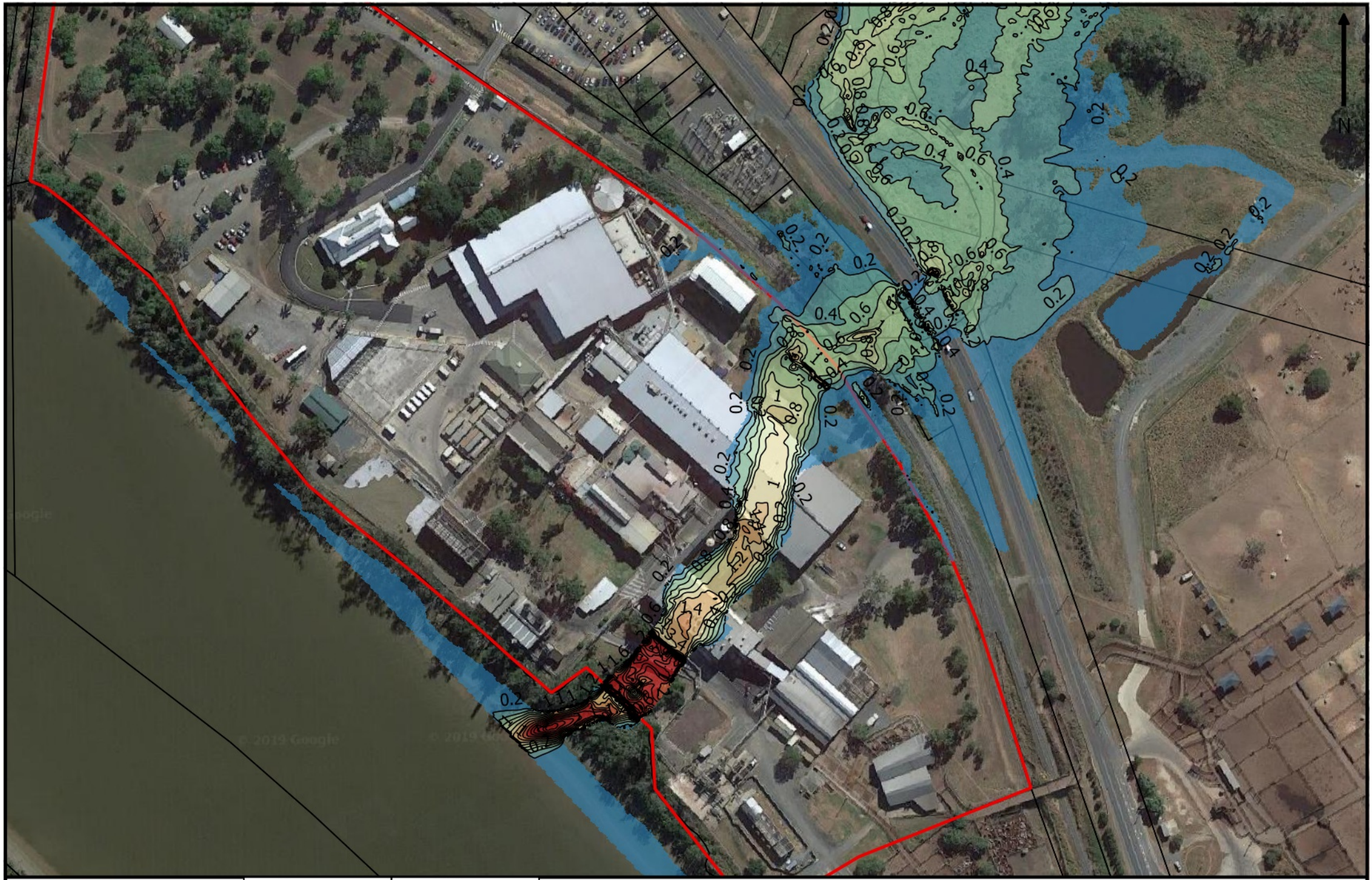
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 19

Existing Scenario 2% AEP Flow Velocities (m/s)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 20

Existing Scenario 5% AEP Flow Velocities (m/s)

Job No.	J6670

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

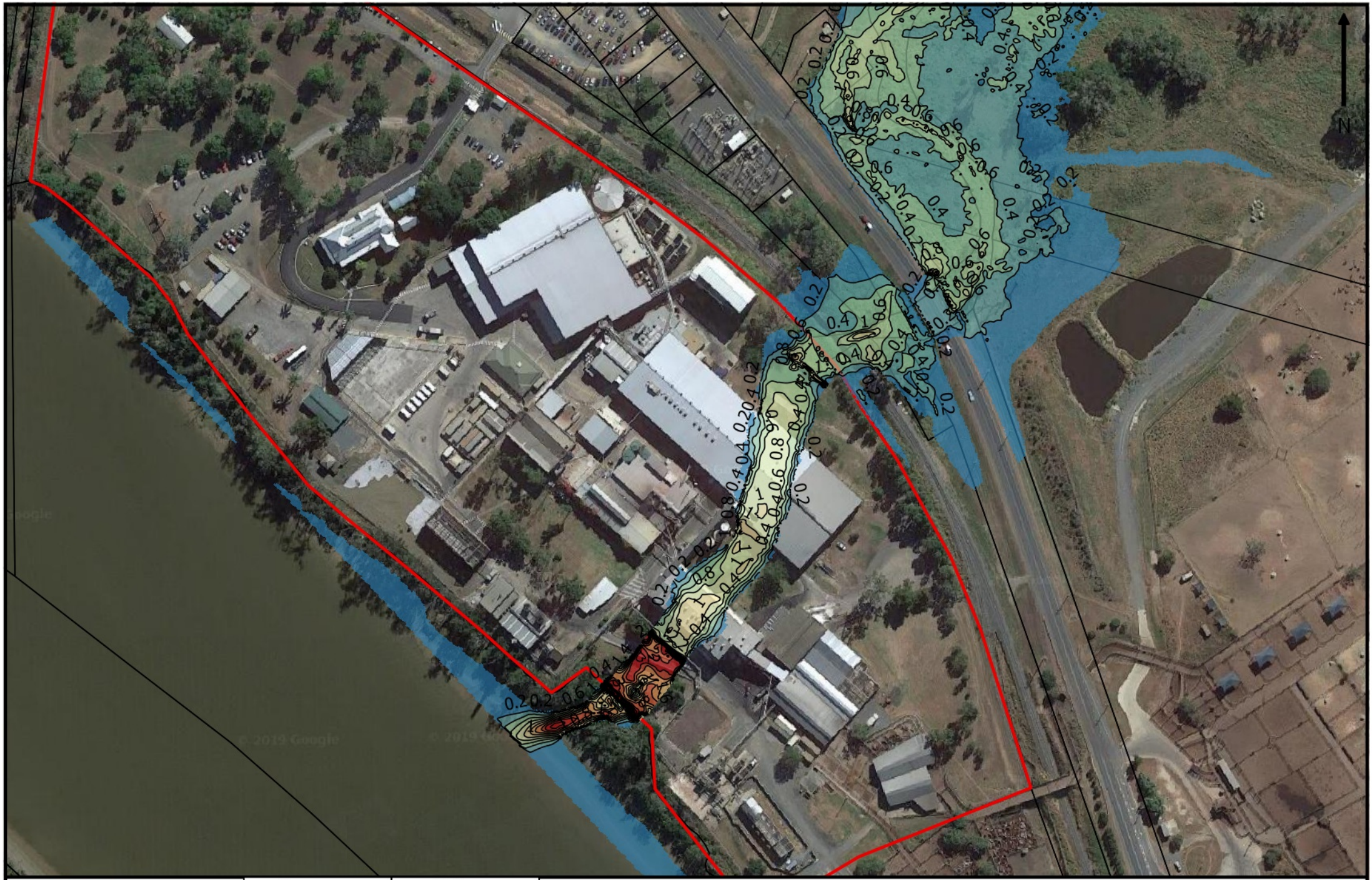
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 21

Job No. J6670

Existing Scenario 10% AEP Flow Velocities (m/s)



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 22

Job No. J6670

Existing Scenario 18% AEP Flow Velocities (m/s)

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

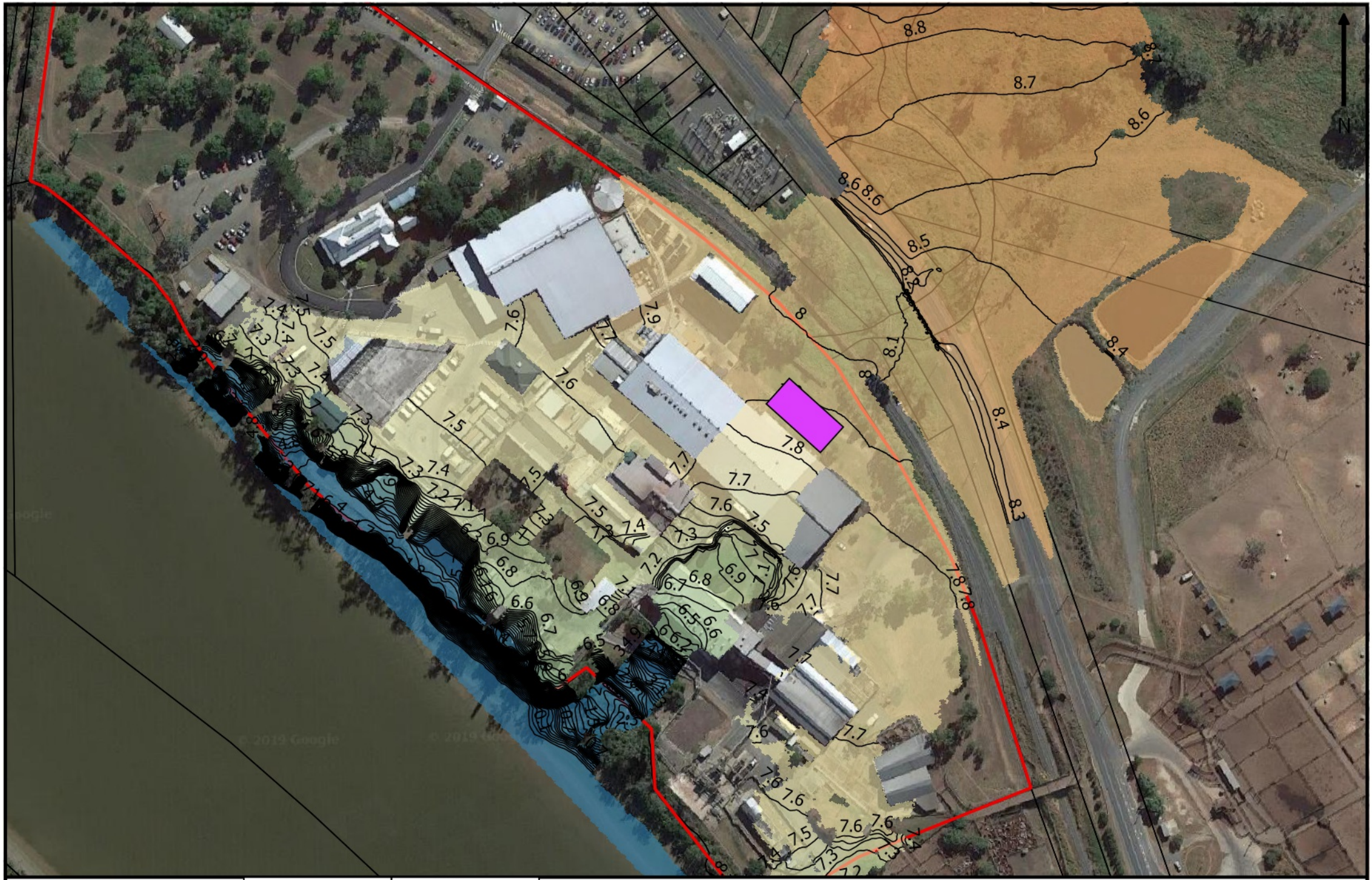
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

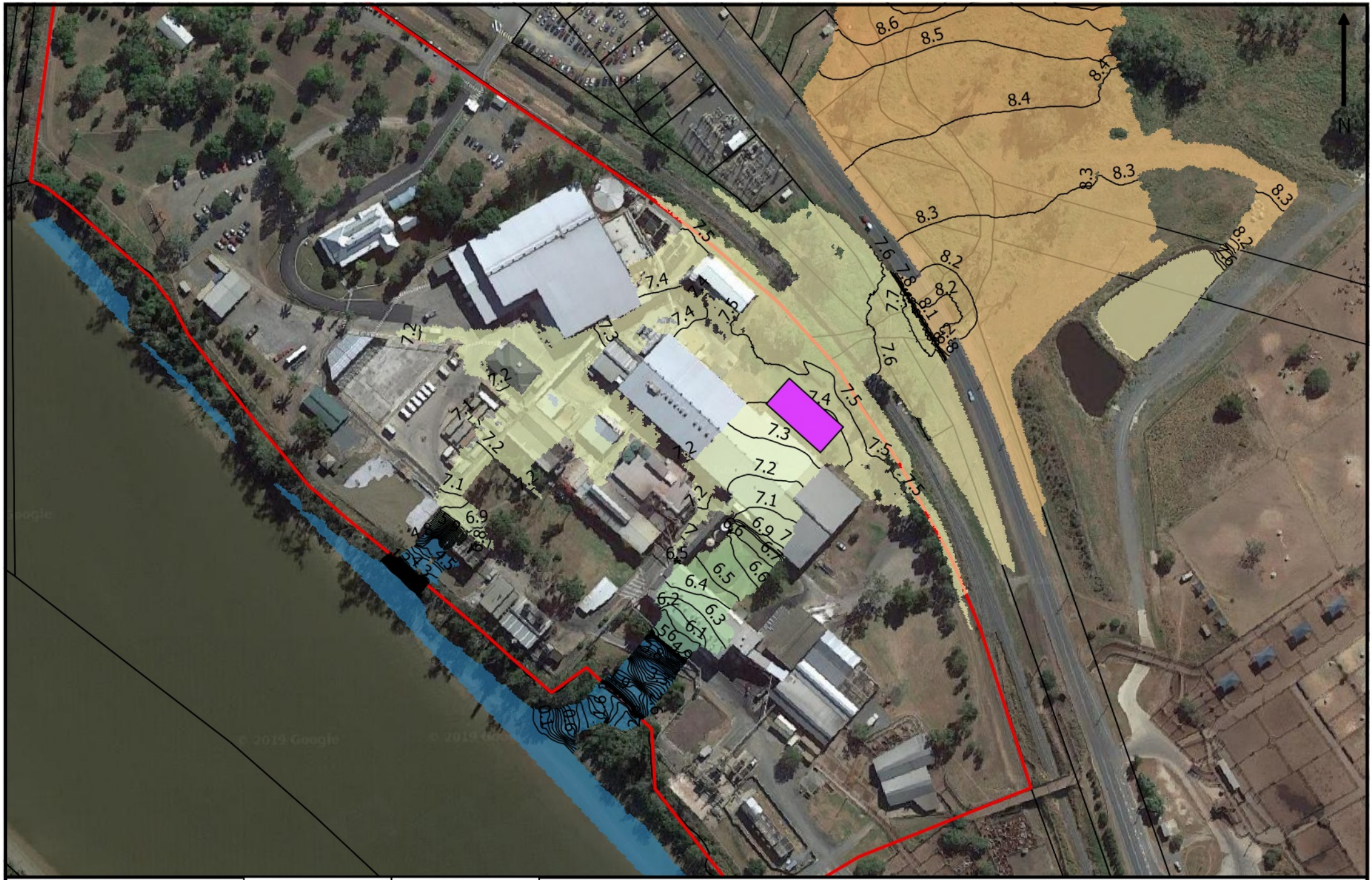
Figure 23

Job No. J6670

Existing Scenario 39% AEP Flow Velocities (m/s)

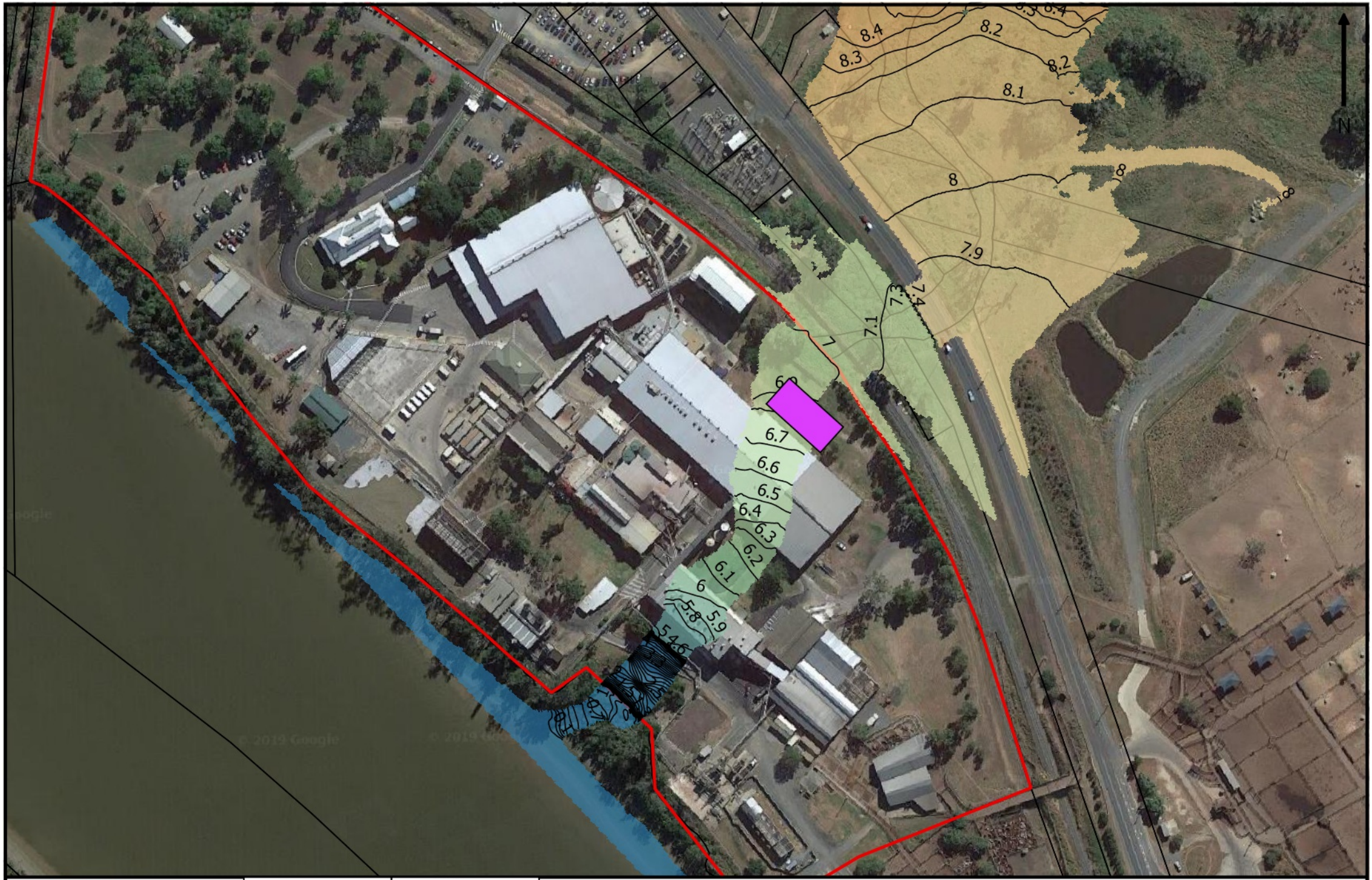


STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 24
	Checked	DWR		
	Date	8/3/19		
	Scale	1:2,500	Job No. J6670	Developed Scenario 1% AEP Flood Contours

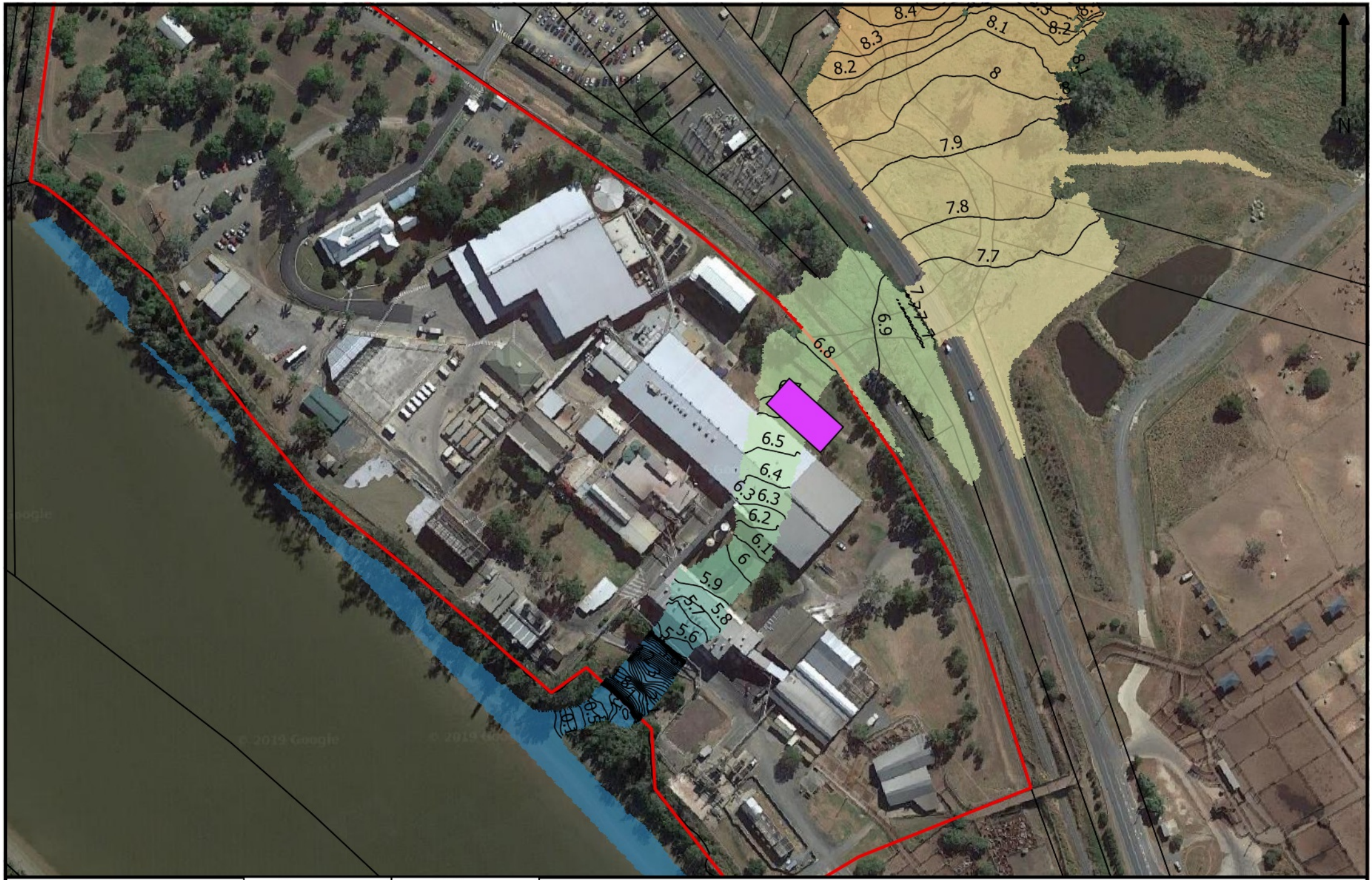


STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal Developed Scenario 2% AEP Flood Contours
	Checked	DWR	Figure 25
	Date	8/3/19	
	Scale	1:2,500	Job No. J6670

STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 26
	Checked	DWR		
	Date	8/3/19		
	Scale	1:2,500	Job No. J6670	Developed Scenario 5% AEP Flood Contours



STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 27
	Checked	DWR		
	Date	8/3/19		
	Scale	1:2,500	Job No. J6670	Developed Scenario 10% AEP Flood Contours



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

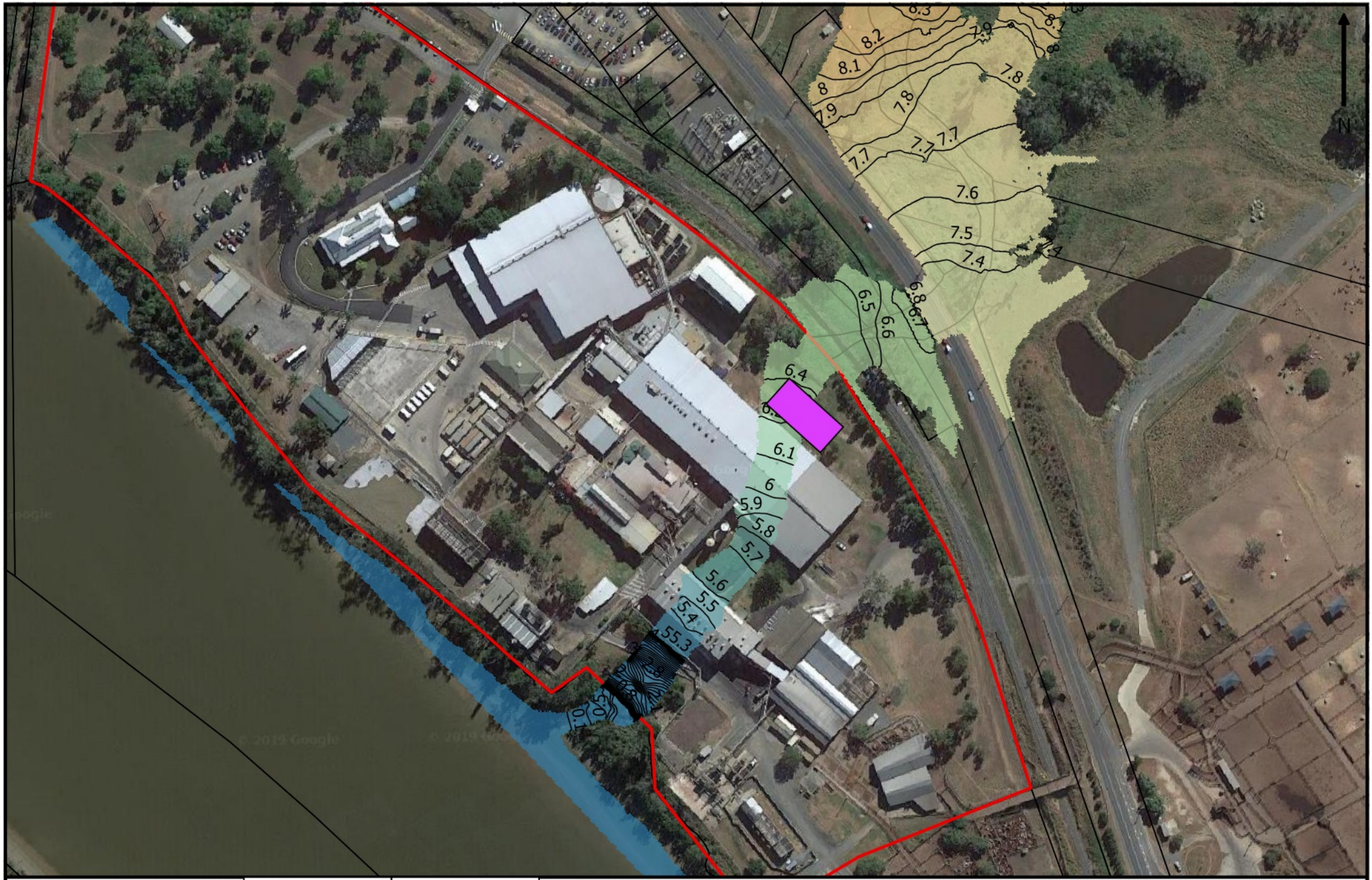
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

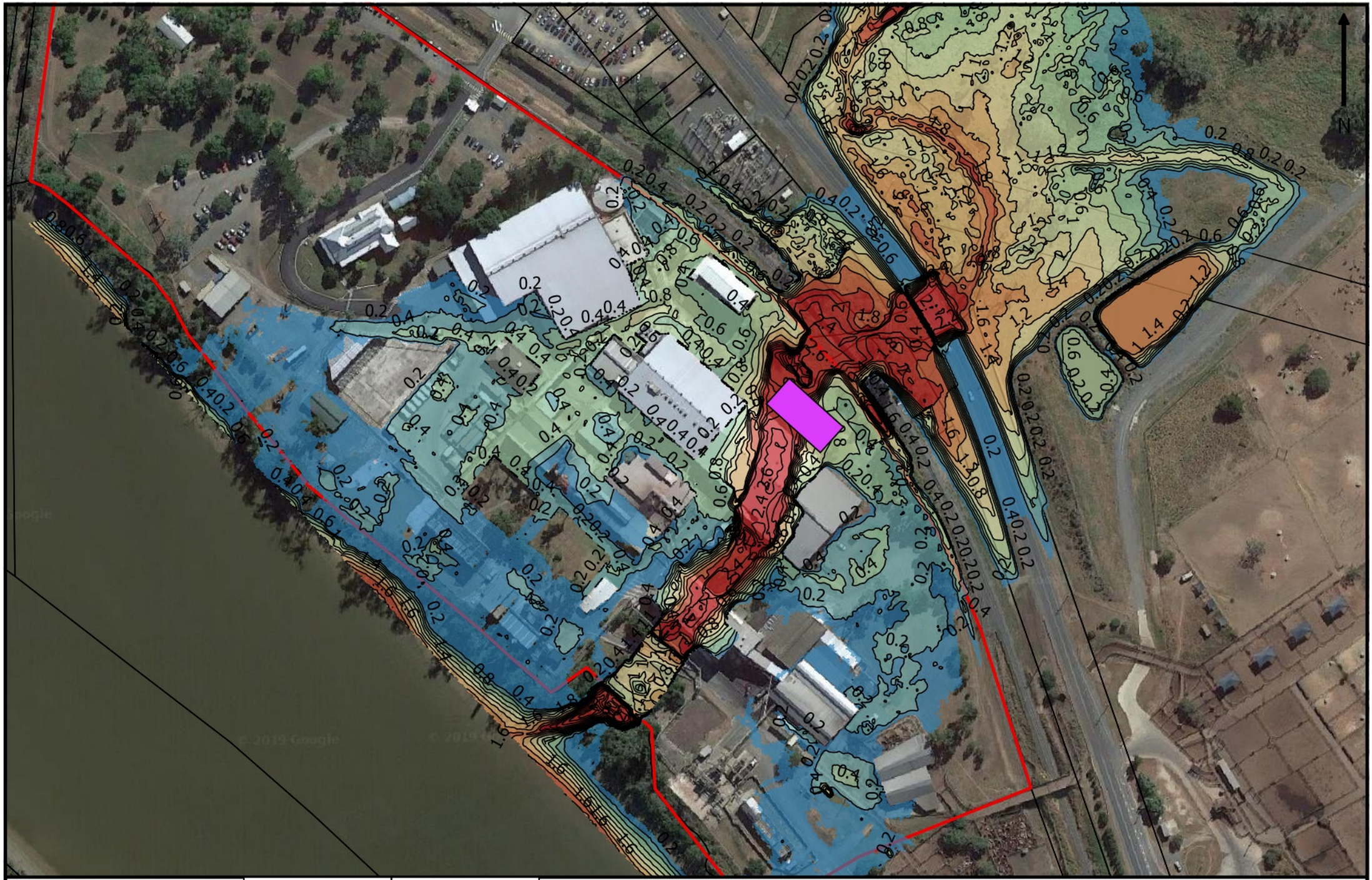
Figure 28

Developed Scenario 18% AEP Flood Contours

Job No.	J6670



STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal
	Checked	DWR	Figure 29
	Date	8/3/19	Developed Scenario 39% AEP Flood Contours
	Scale	1:2,500	Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

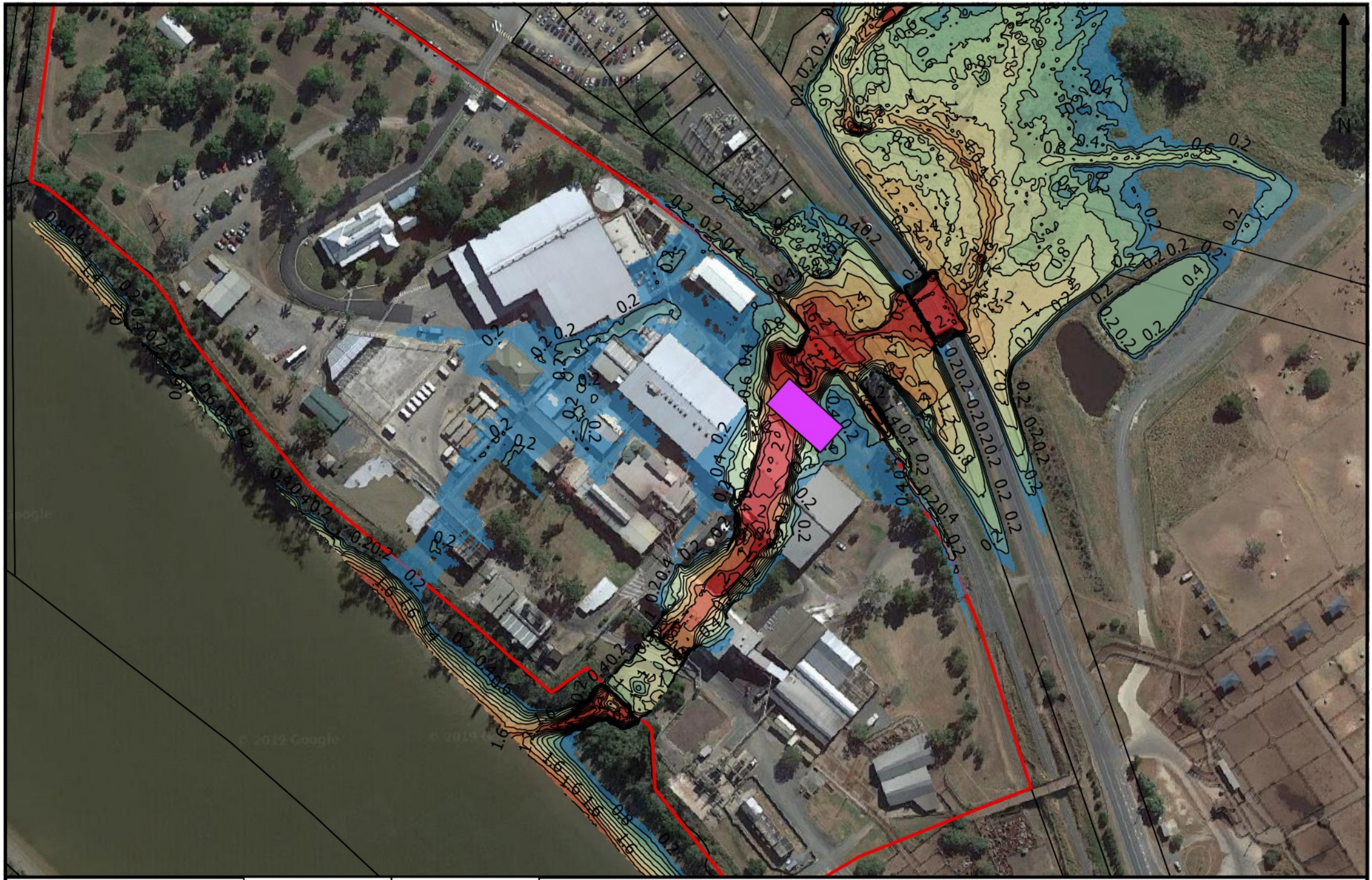
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 30

Developed Scenario 1% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

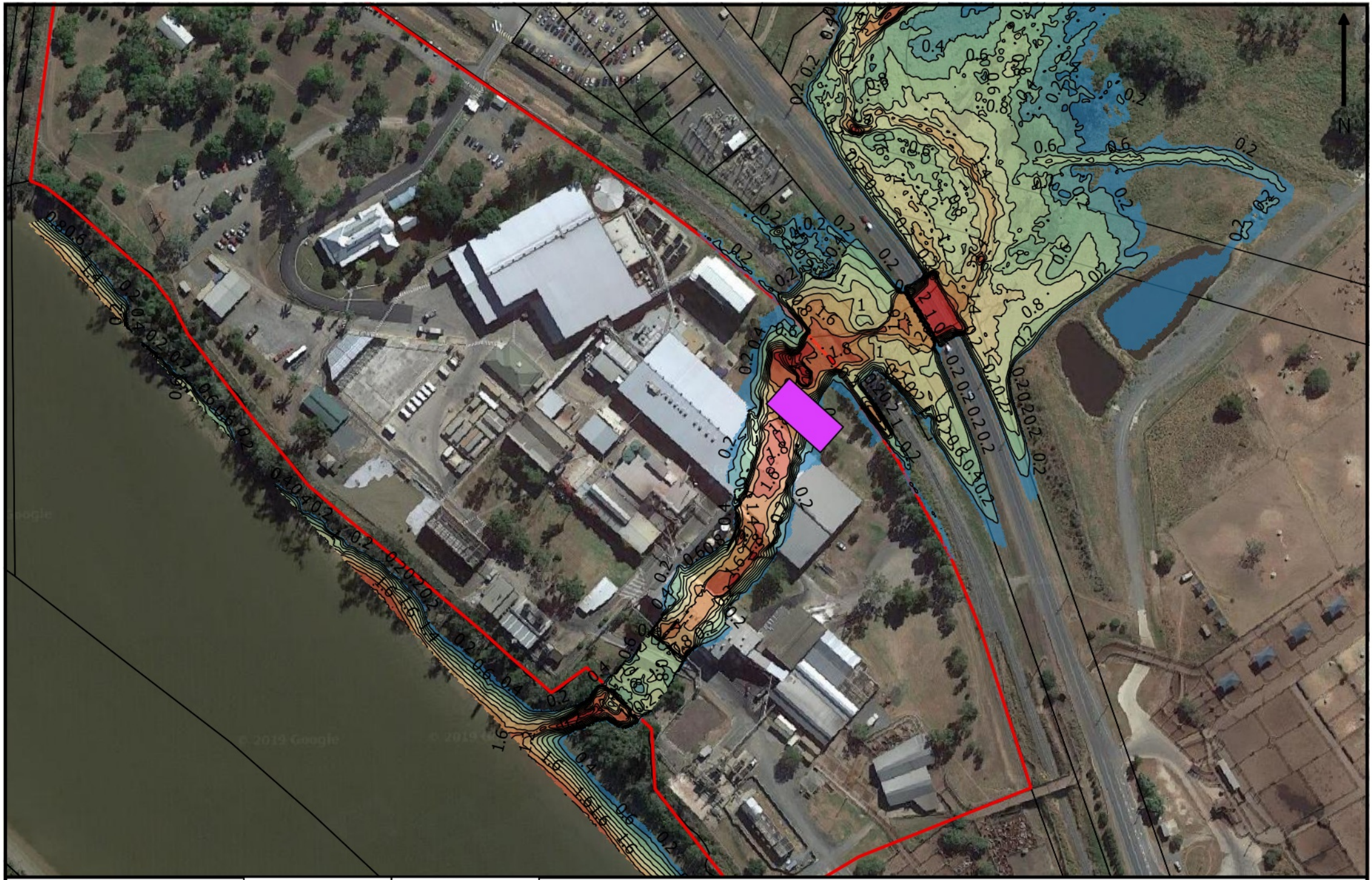
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 31

Developed Scenario 2% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

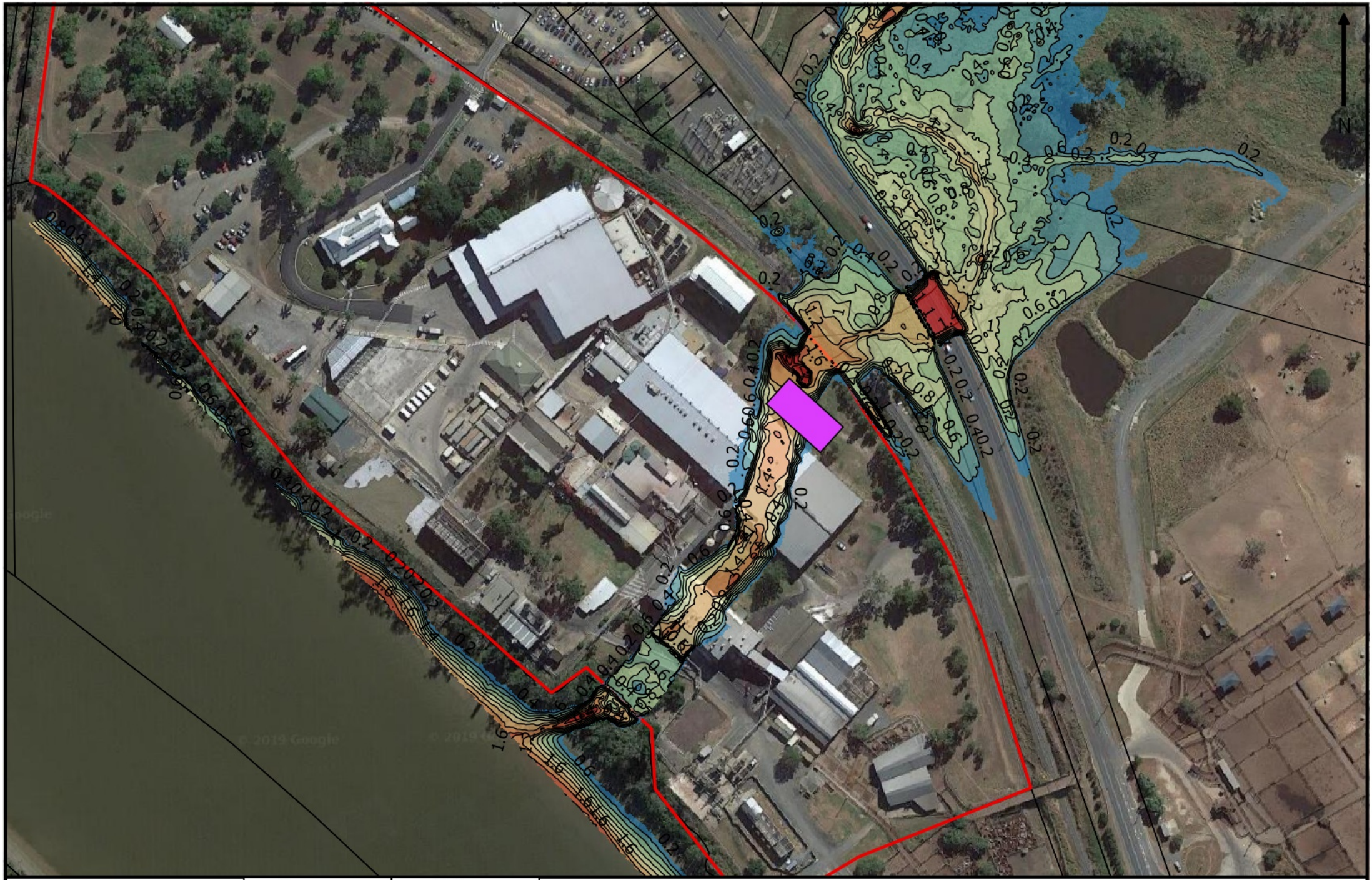
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 32

Developed Scenario 5% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

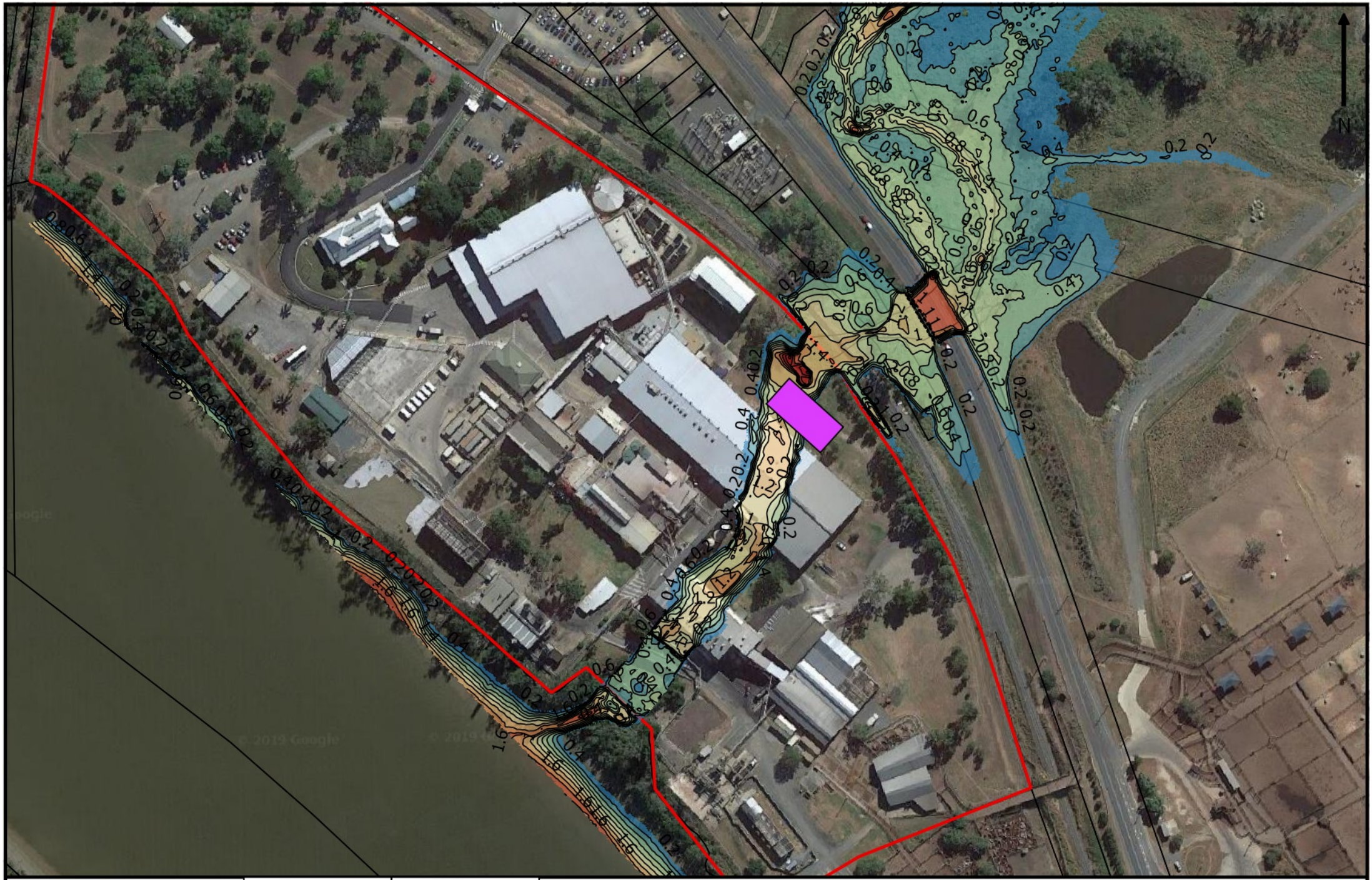
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 33

Developed Scenario 10% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 34

Developed Scenario 18% AEP Flood Depths (m)

Job No. J6670

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

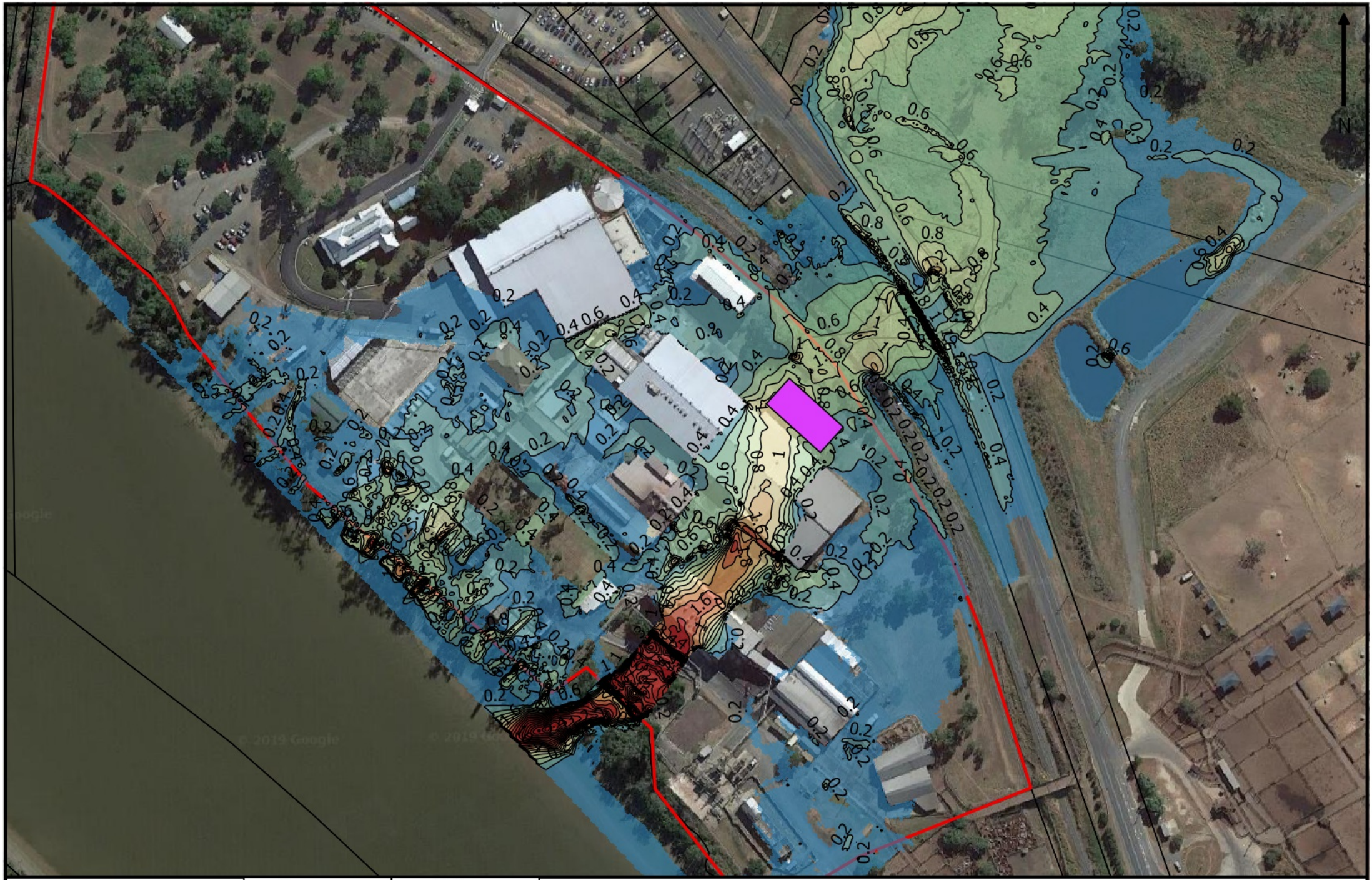
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 35

Developed Scenario 39% AEP Flood Depths (m)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

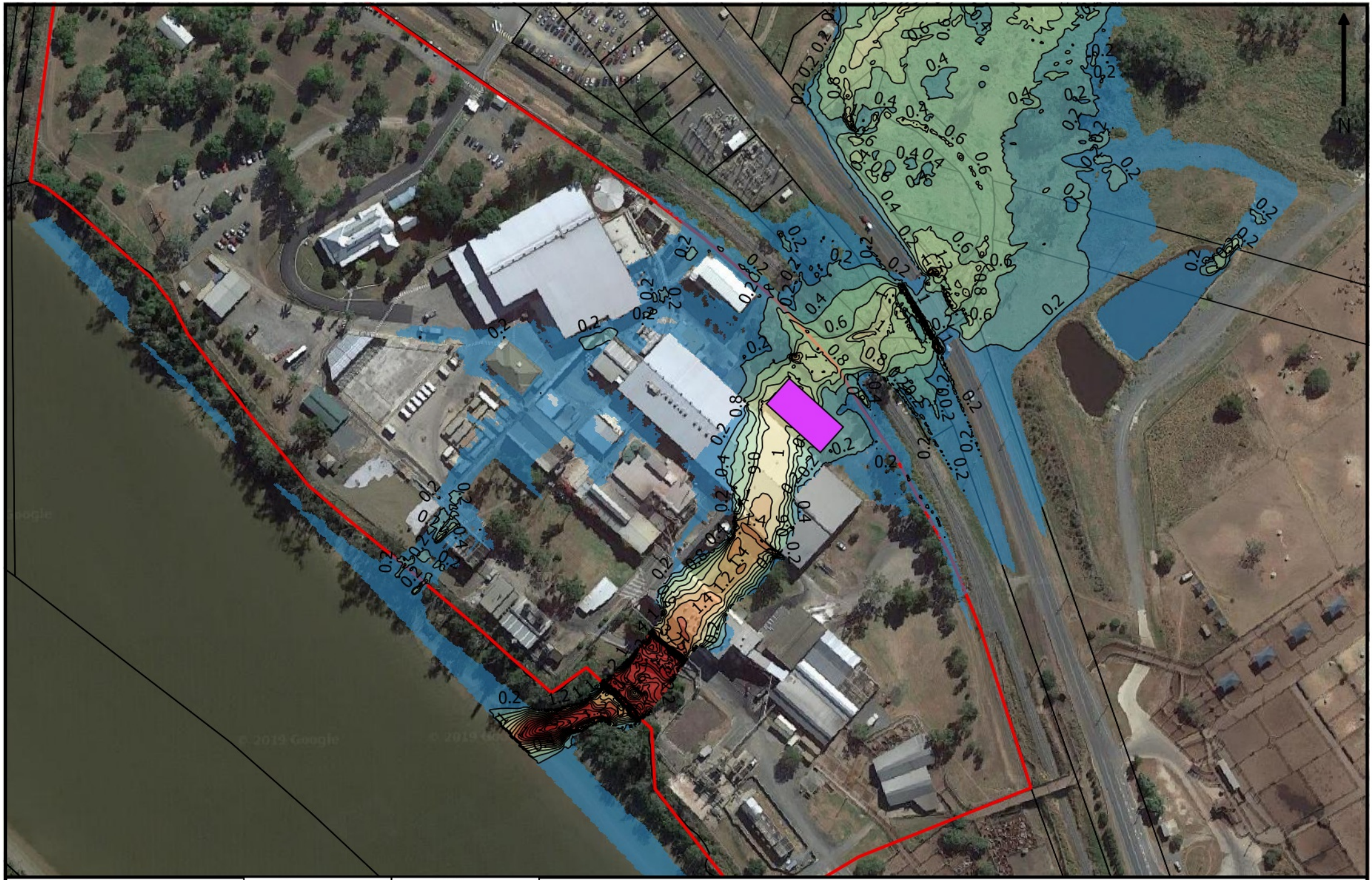
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 36

Developed Scenario 1% AEP Flow Velocities (m/s)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

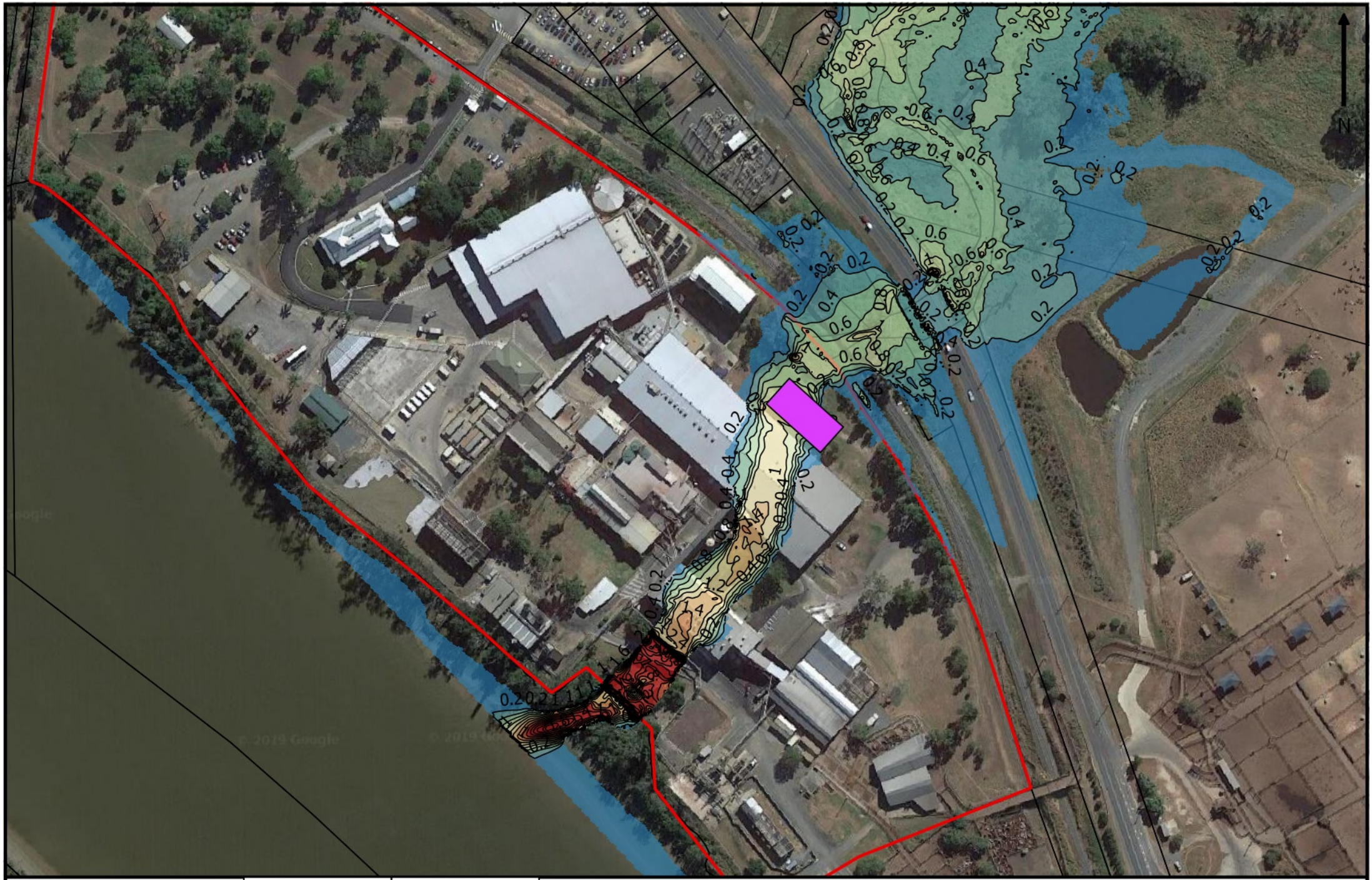
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 37

Developed Scenario 2% AEP Flow Velocities (m/s)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

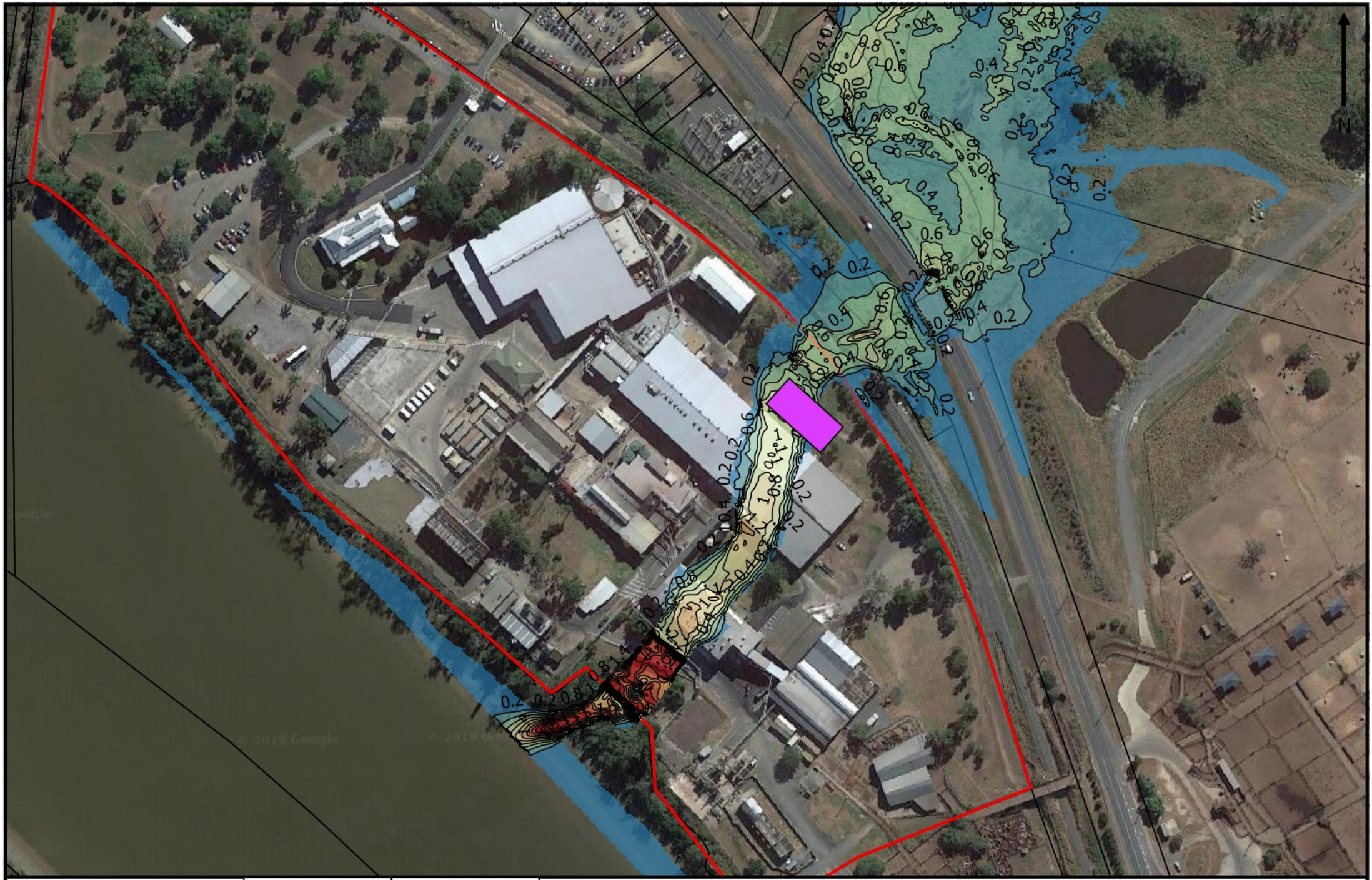
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 38

Developed Scenario 5% AEP Flow Velocities (m/s)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

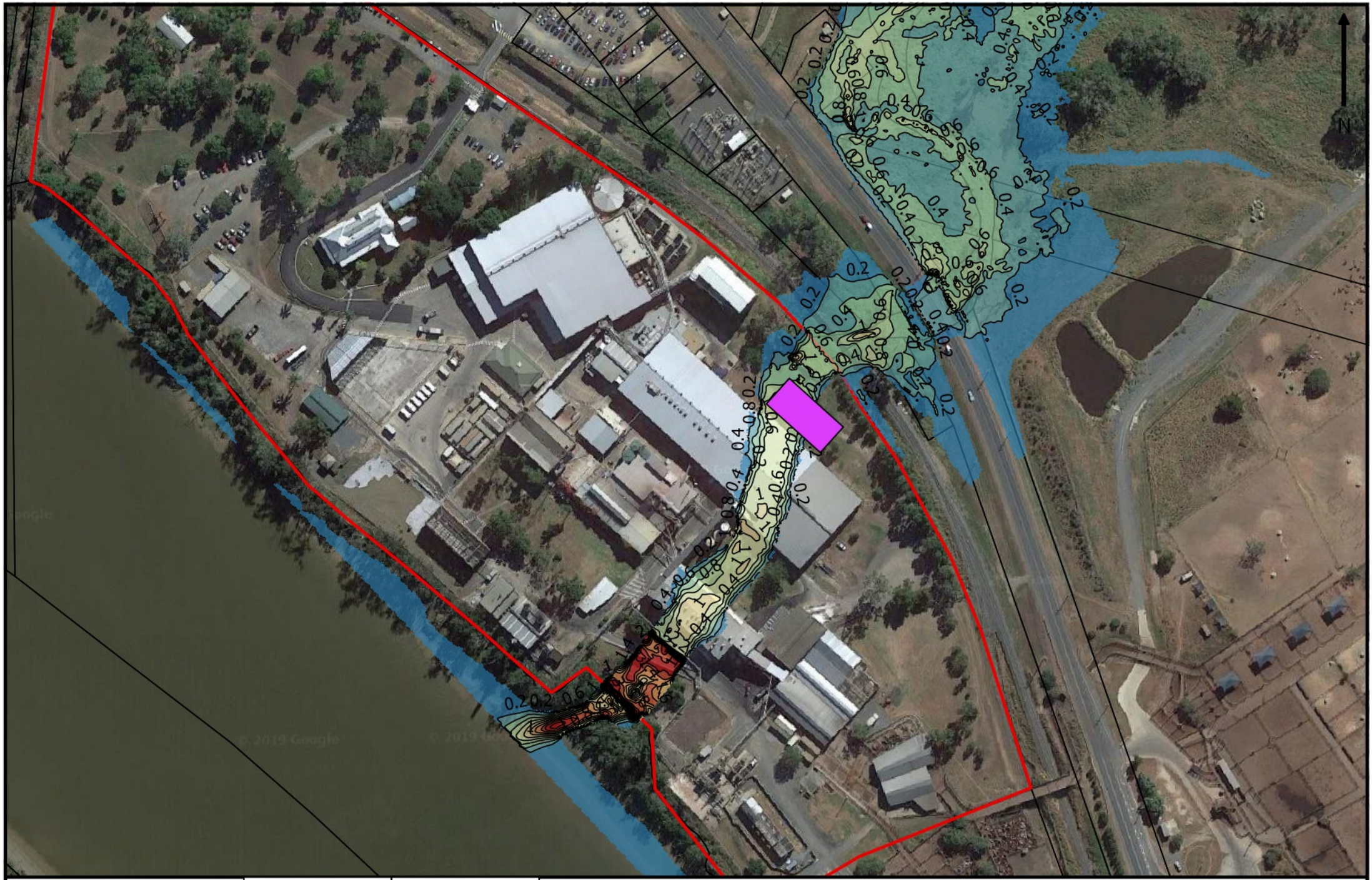
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 39

Developed Scenario 10% AEP Flow Velocities (m/s)

Job No. J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 40

Developed Scenario 18% AEP Flow Velocities (m/s)

Job No. J6670

STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

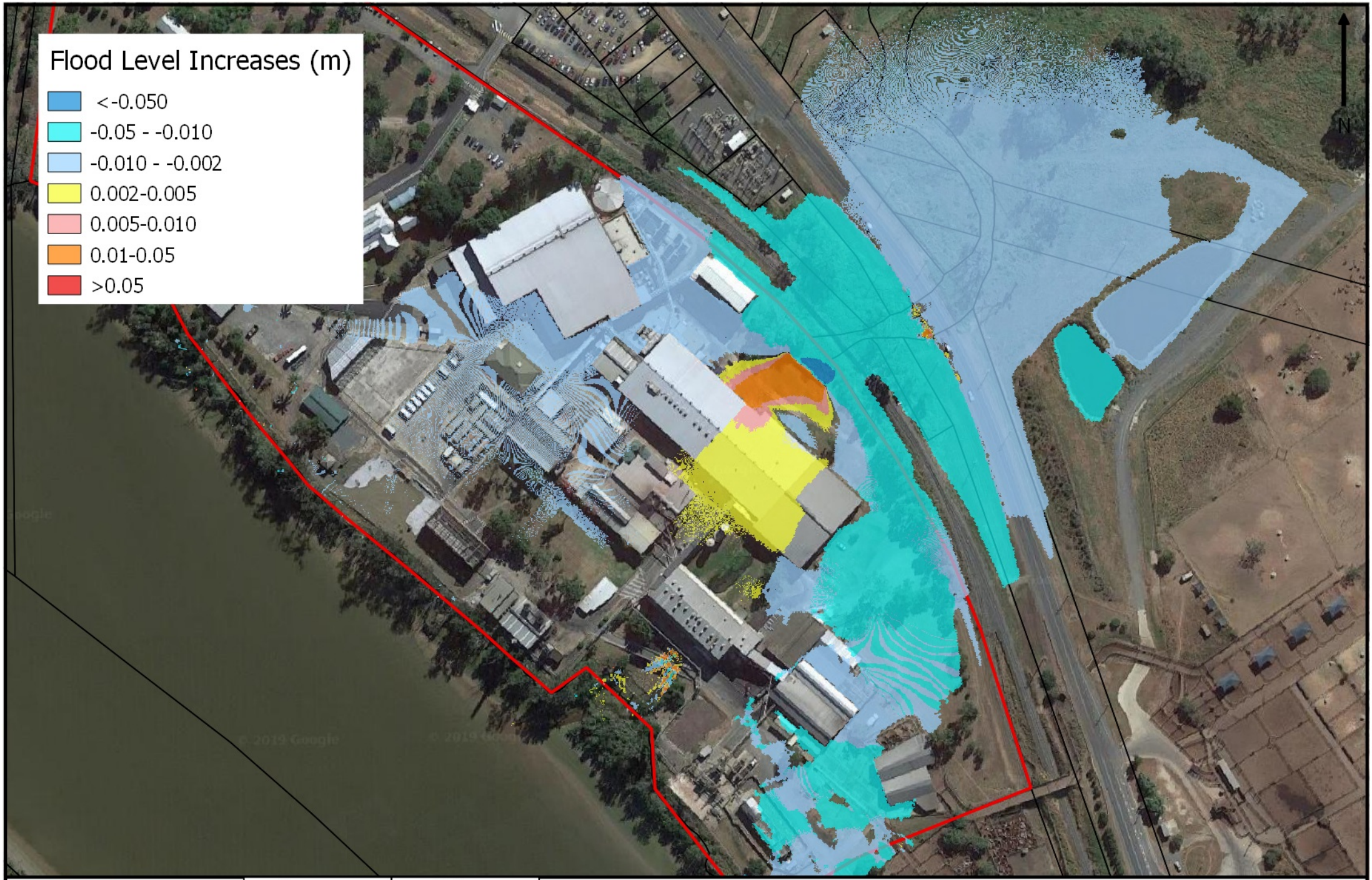
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 41

Developed Scenario 39% AEP Flow Velocities (m/s)

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

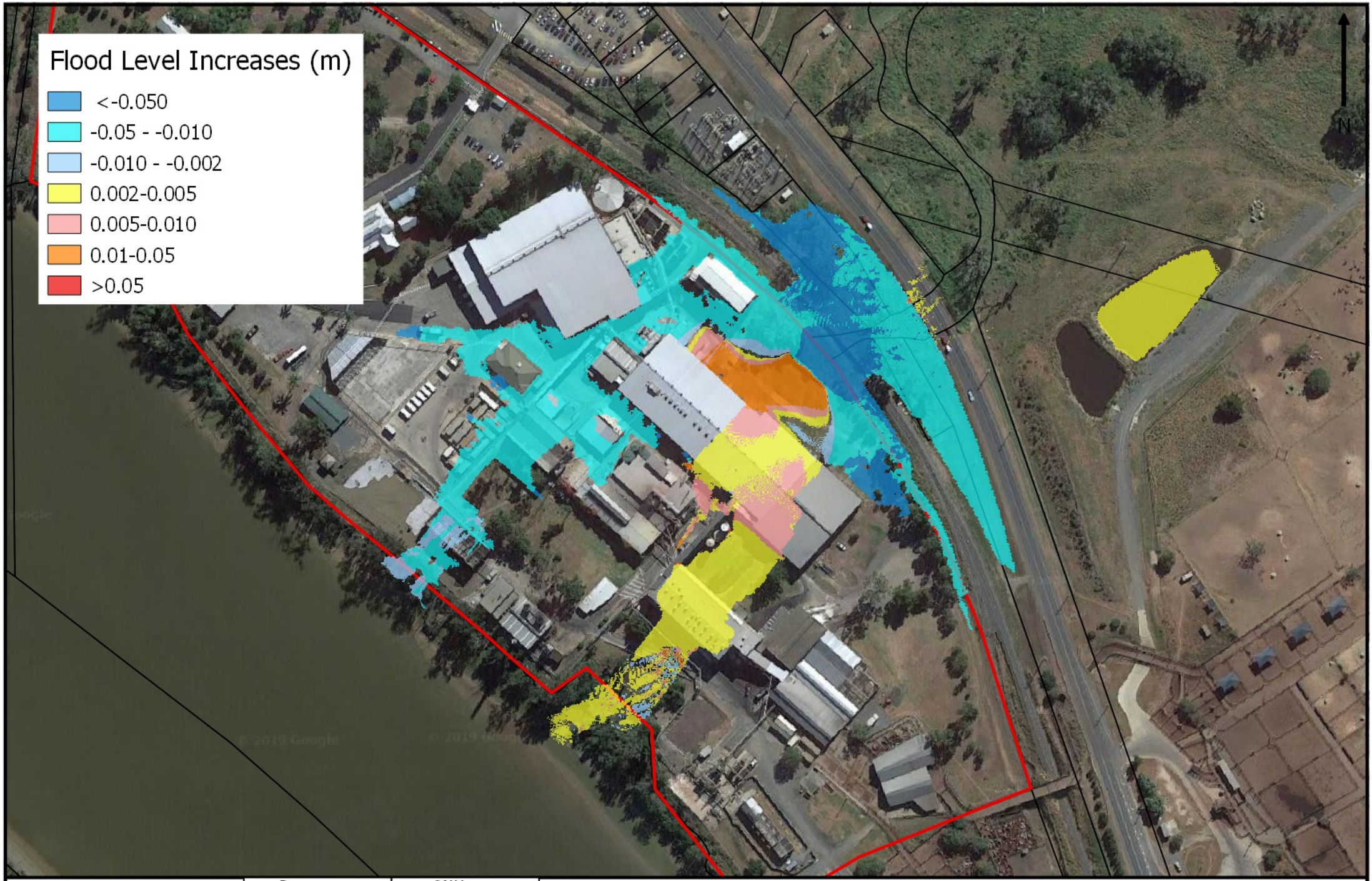
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 42

1% AEP Impacts Plot



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

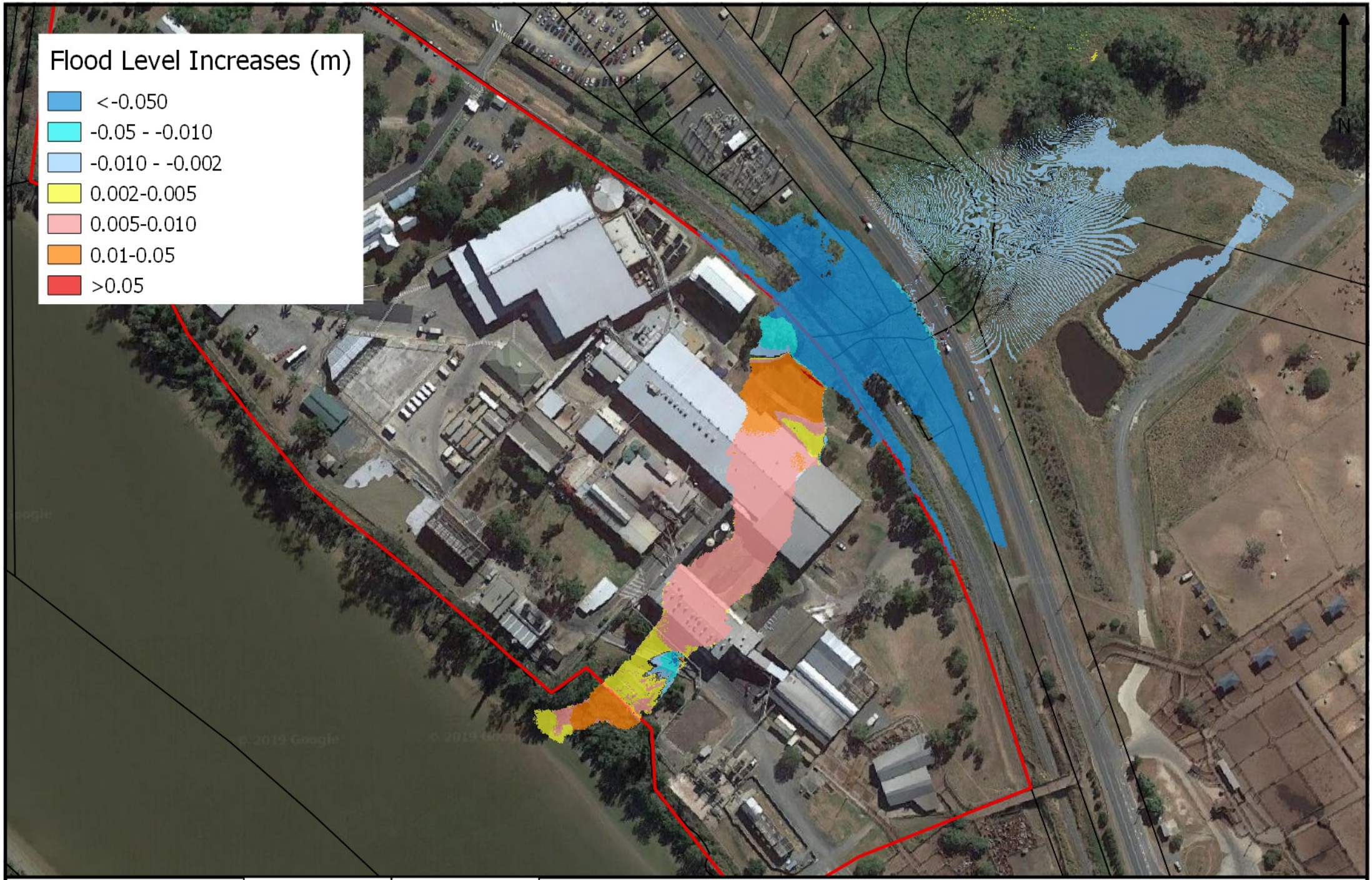
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 43

2% AEP Impacts Plot



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

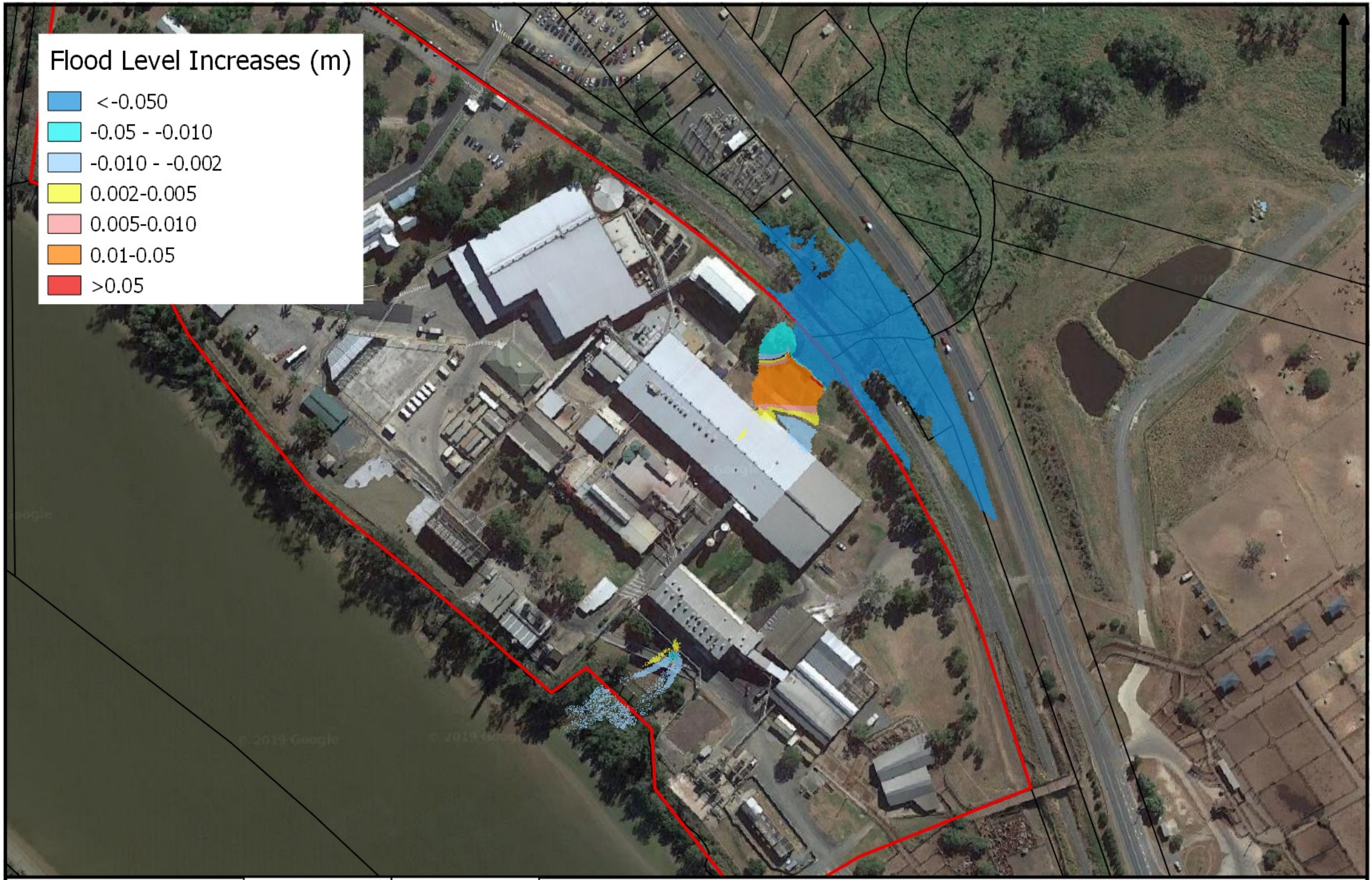
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 44

5% AEP Impacts Plot



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

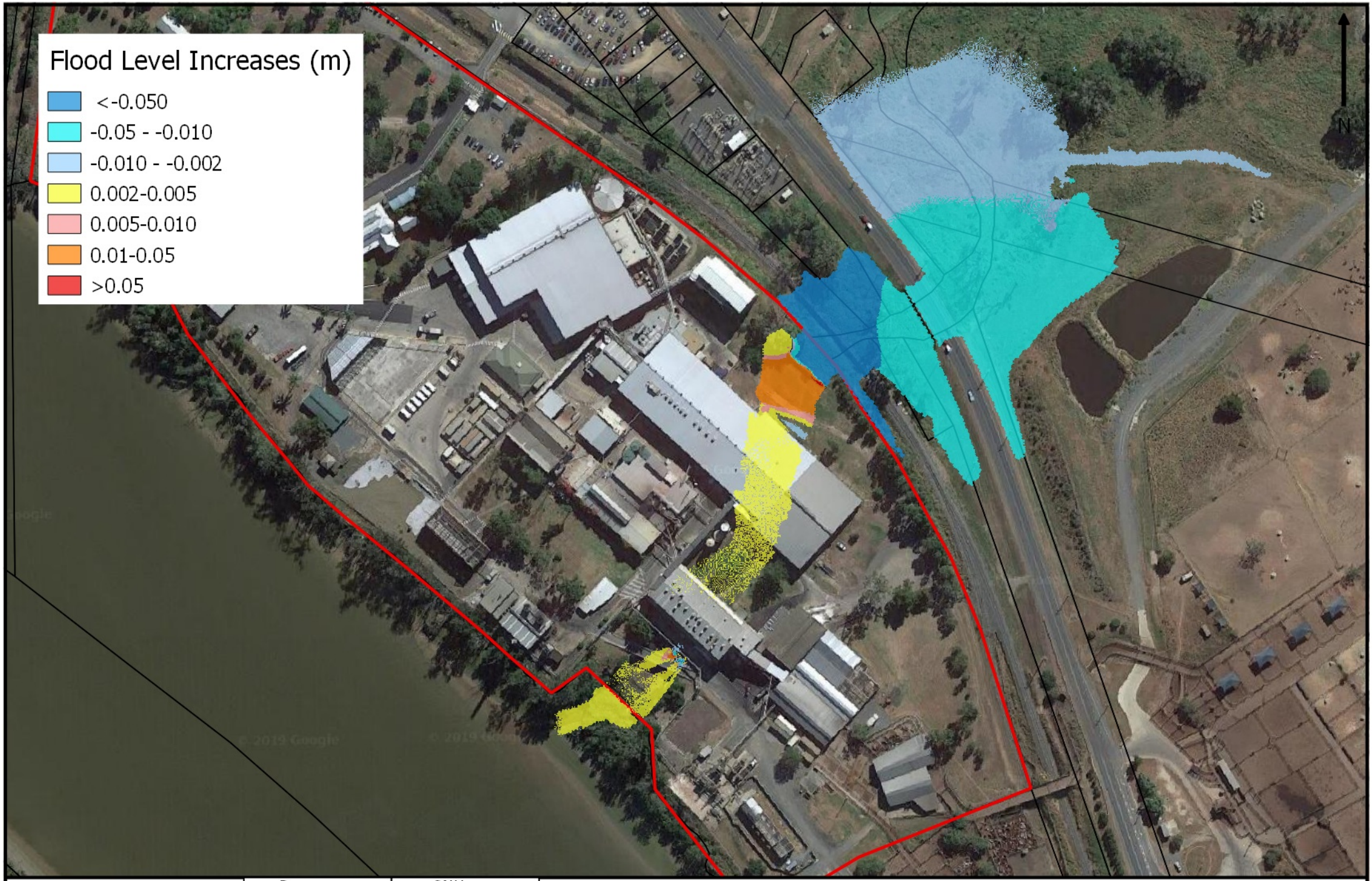
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 45

10% AEP Impacts Plot



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

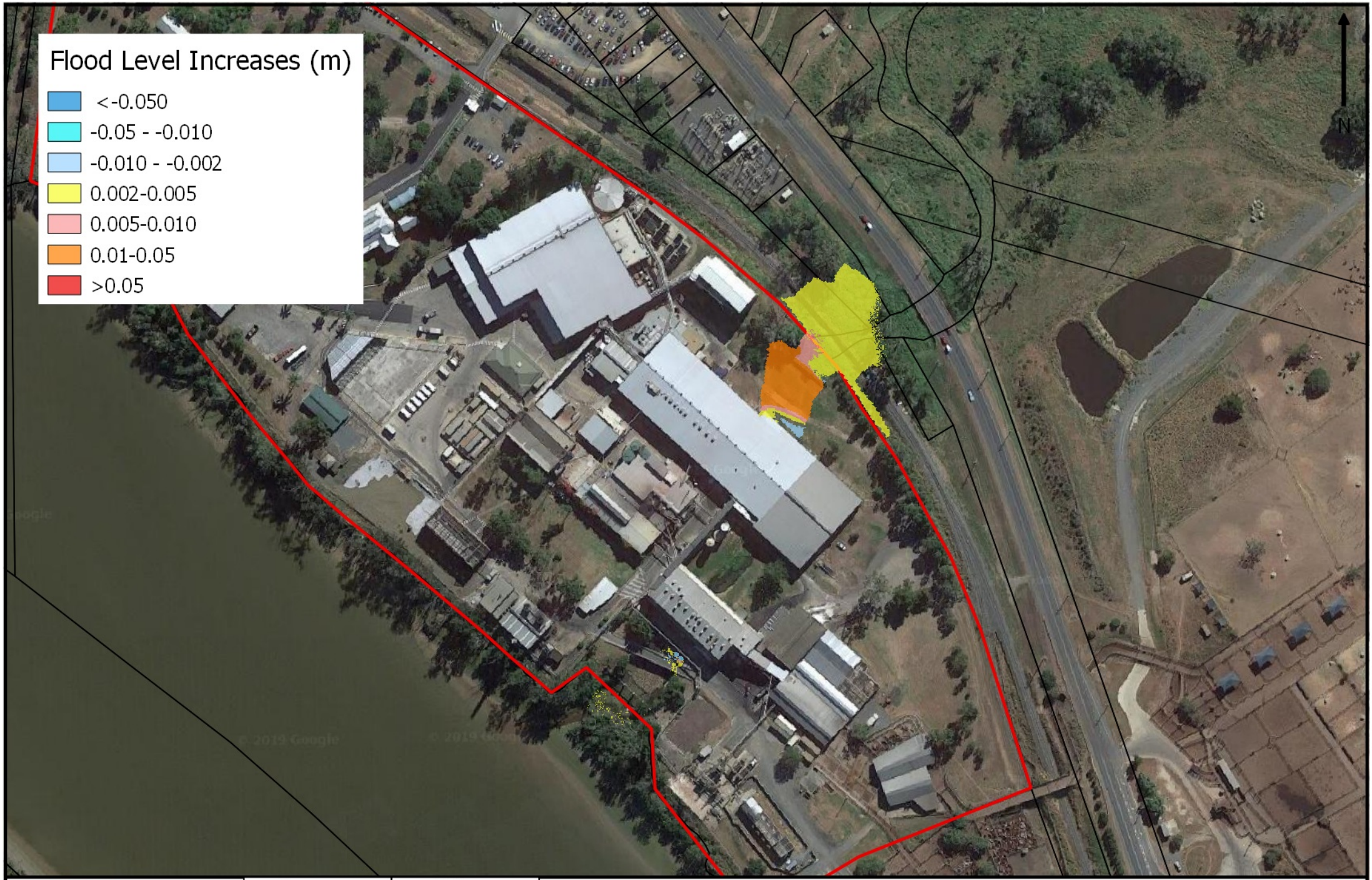
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

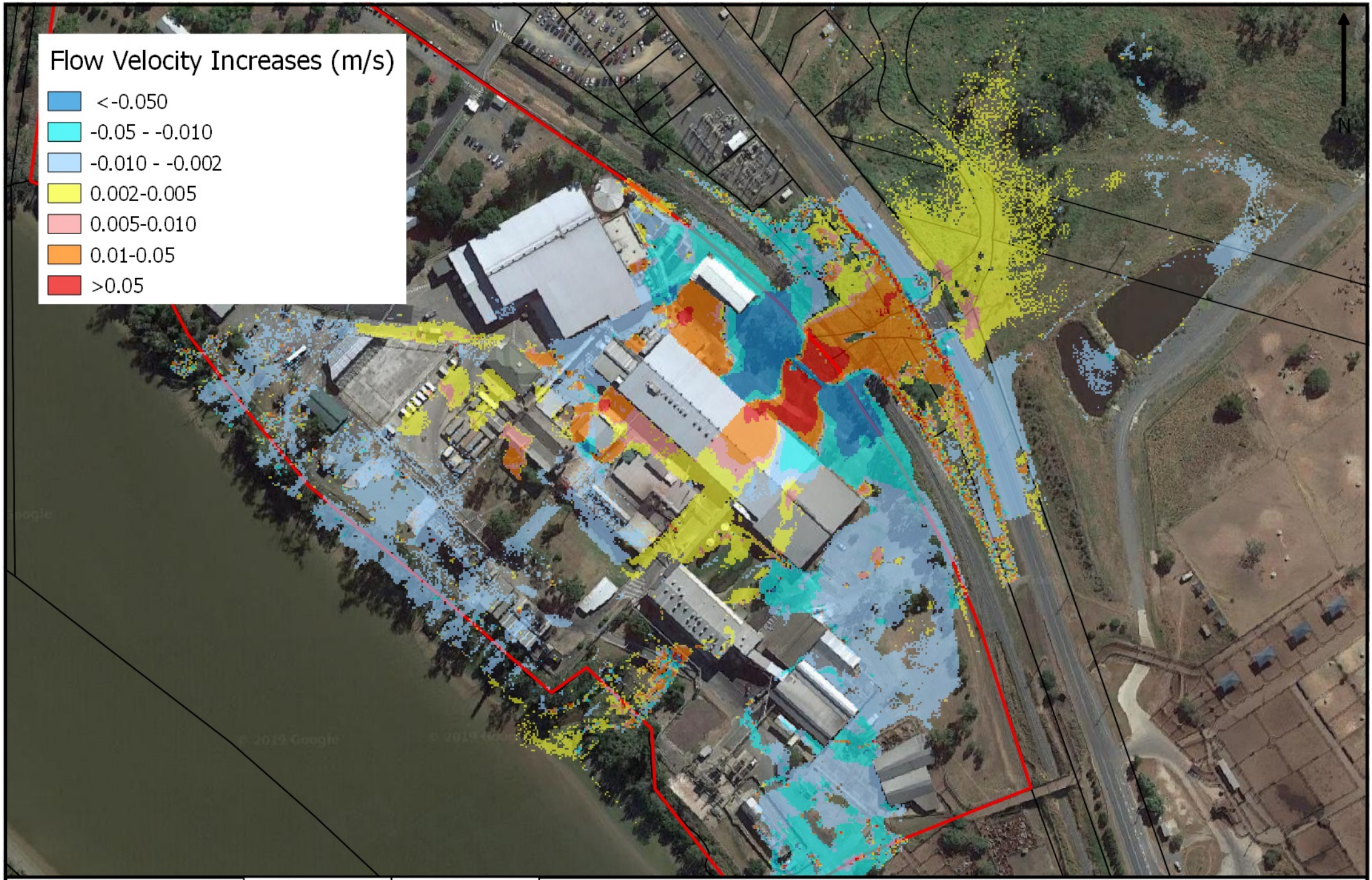
Job No. J6670

Figure 46

18% AEP Impacts Plot



STORM Water Consulting 5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992	Drawn	SNH	Teys Rockhampton - 484 Lakes Creek Road, Koongal	Figure 47
	Checked	DWR		
	Date	8/3/19		39% AEP Impacts Plot
	Scale	1:2,500	Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

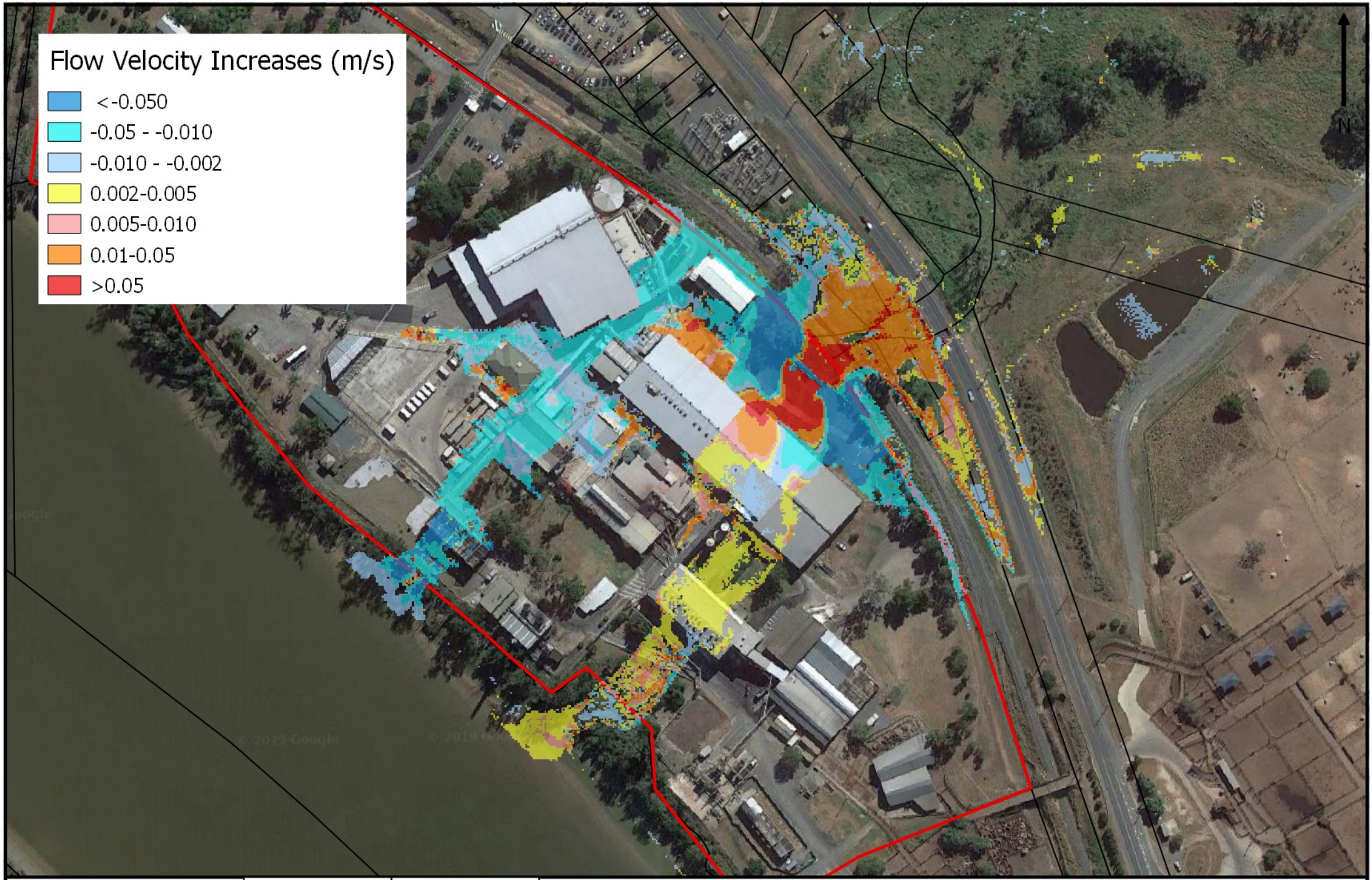
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 48

1% AEP Velocity Impacts Plot

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

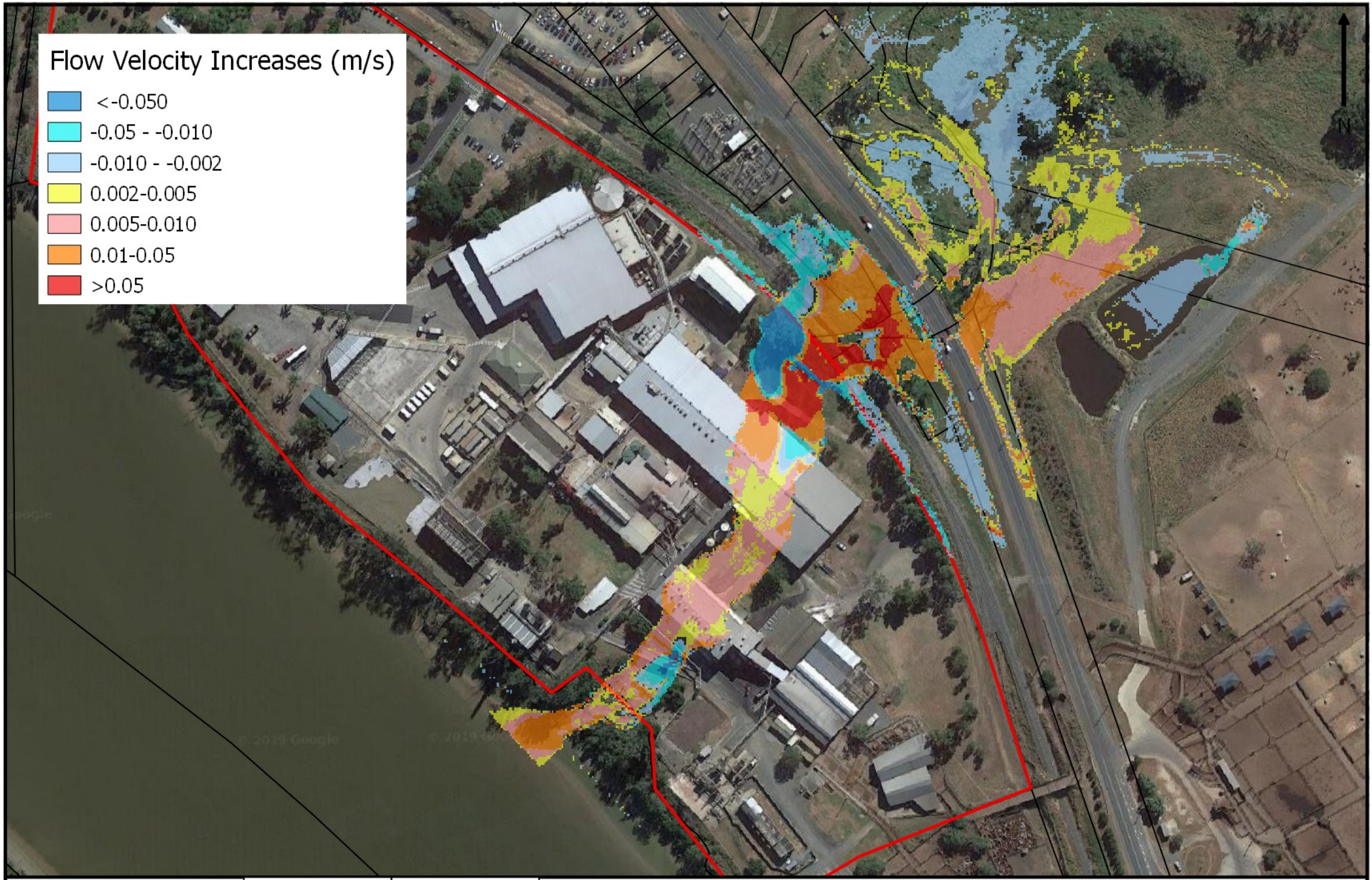
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 49

2% AEP Velocity Impacts Plot

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

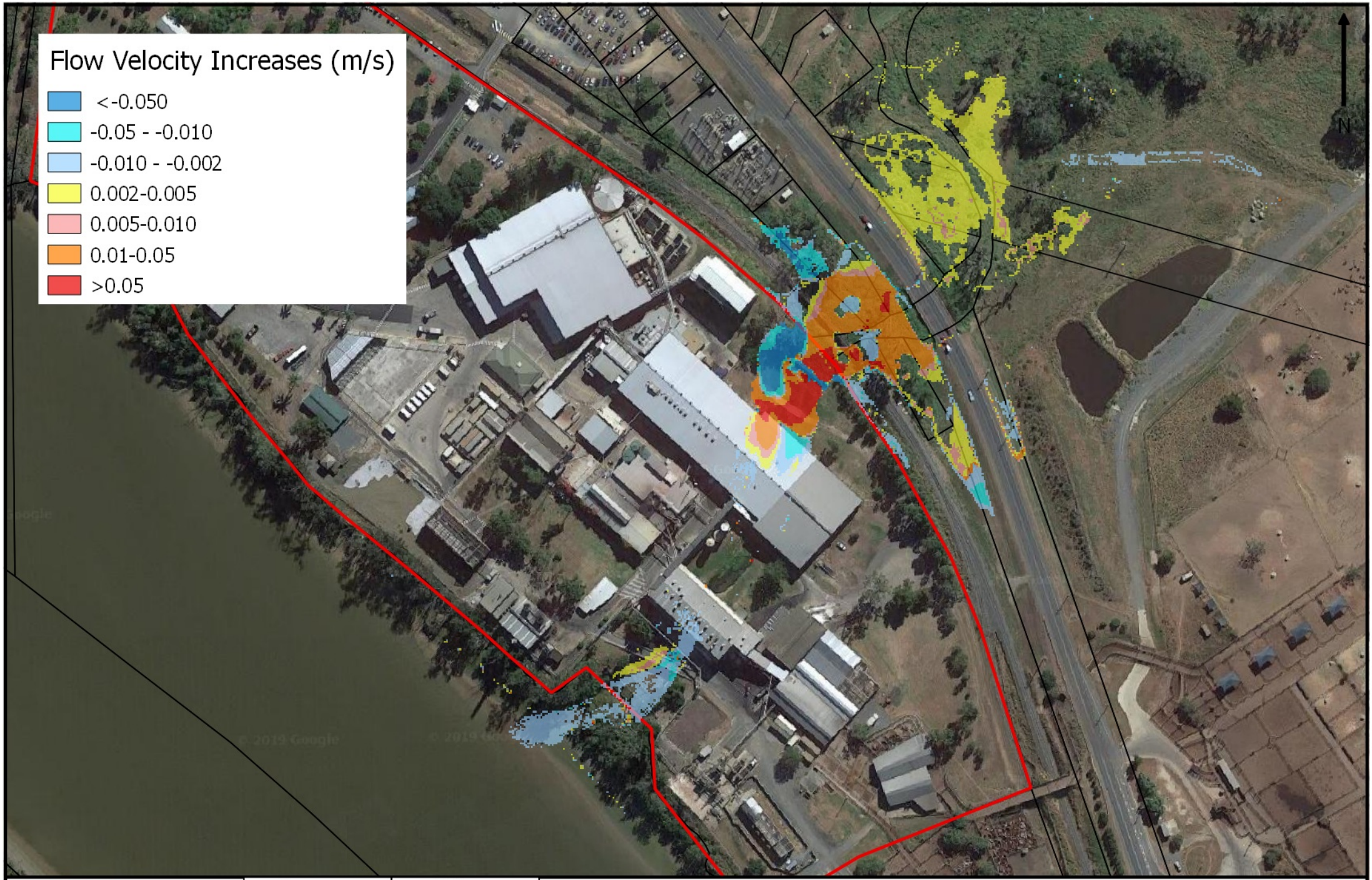
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 50

5% AEP Velocity Impacts Plot

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill,
QLD, 4152, Phone (07)3398 4992

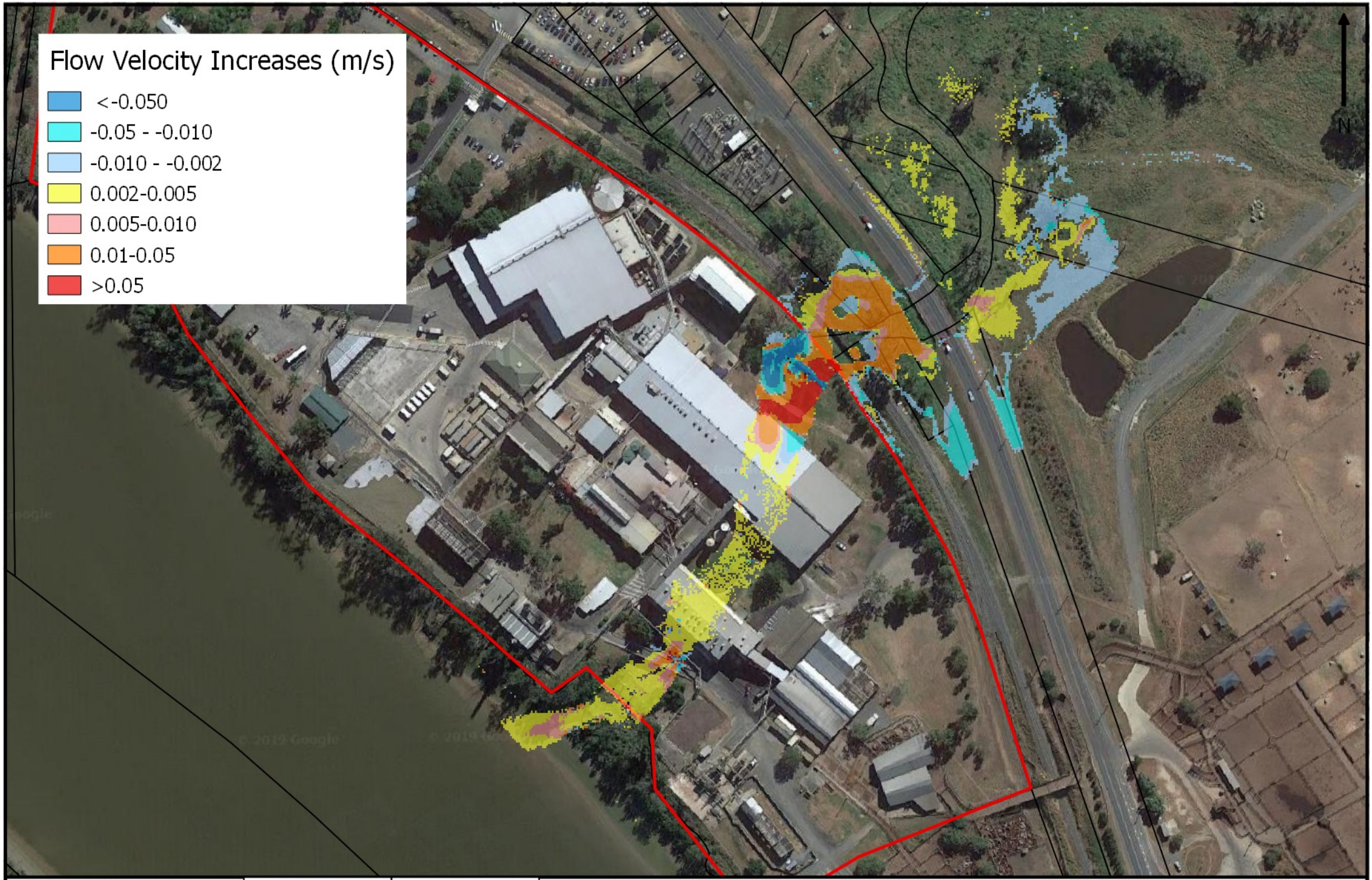
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Figure 51

10% AEP Velocity Impacts Plot

Job No.	J6670



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992

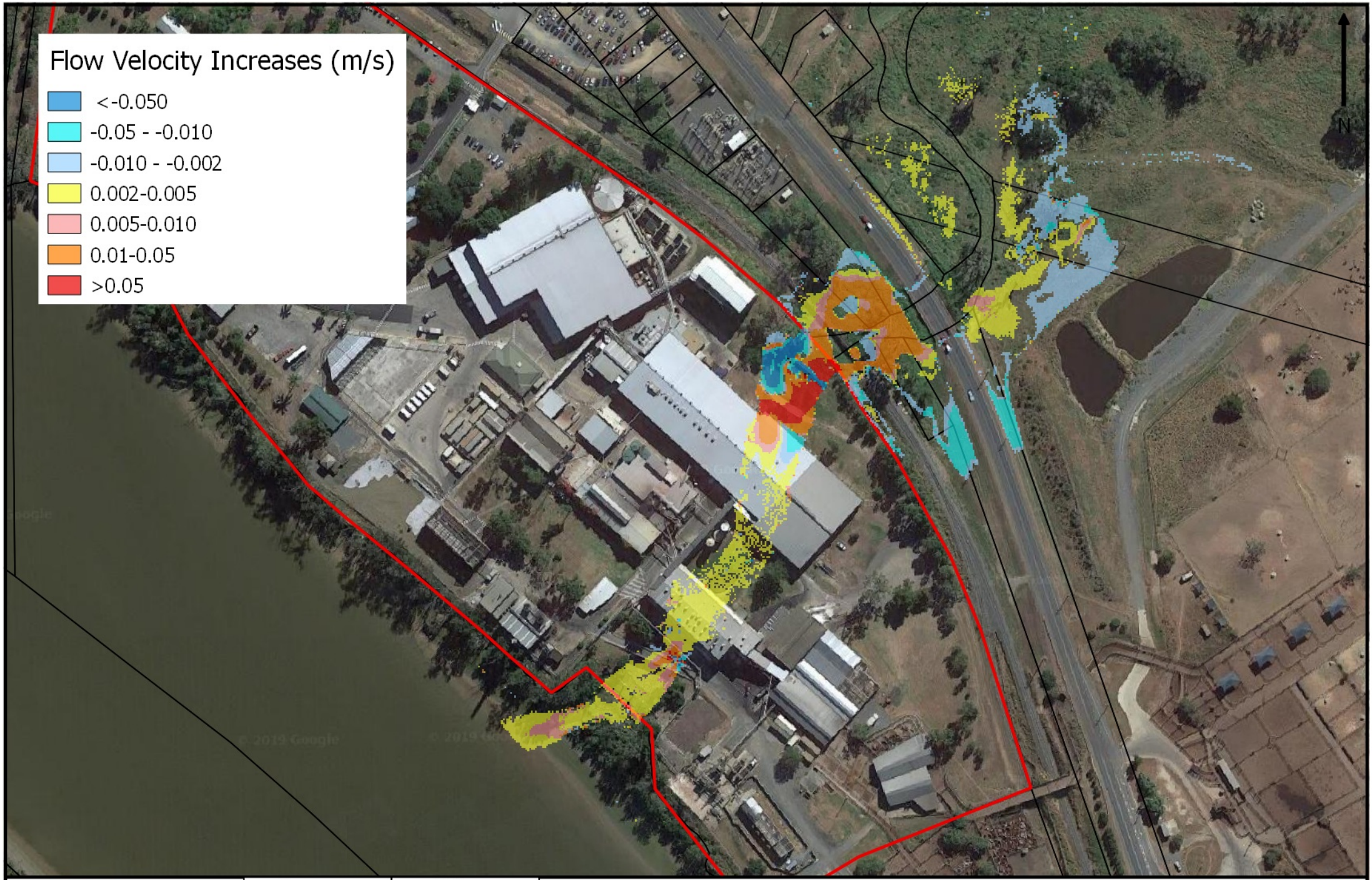
Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 52

18% AEP Velocity Impacts Plot



STORM Water Consulting
5/541 Old Cleveland Rd,Camp Hill, QLD, 4152, Phone (07)3398 4992

Drawn	SNH
Checked	DWR
Date	8/3/19
Scale	1:2,500

Teys Rockhampton - 484 Lakes Creek Road, Koongal

Job No. J6670

Figure 53

39% AEP Velocity Impacts Plot

APPENDIX B

Photographs

Photograph 1- Looking at the old bridge crossing.

Photograph 2- Looking at the location of the new building.

APPENDIX C

URBS Data

```
"Index","Area","UR","UF","I"
#1,0.61261,0.00,1.00,0.00
#2,0.43844,0.00,1.00,0.00
#3,0.49988,0.00,1.00,0.00
#4,0.39497,0.00,1.00,0.00
#5,1.12407,0.00,1.00,0.00
#6,0.41959,0.00,1.00,0.00
#7,0.23503,0.00,1.00,0.00
#8,0.61634,0.00,1.00,0.00
#9,0.41003,1.00,0.00,0.05

Inflow - Existing
MODEL: Basic
USES: L, U
Default Parameters: alpha=1.20 m=0.8
Catchment File=6670_Ex.dat

Rain    #1      L=0.579
Route thru      #2      L=0.217
Store.
Rain    #2      L=0.491
Store.
Rain    #3      L=0.358
Route thru      #2      L=0.281
Get.
Get.
Route thru      #5      L=0.486
Add Rain        #5      L=0.536
Store.
Rain    #4      L=0.302
Route thru      #5      L=0.725
Get.
Route thru      #6      L=0.311
Add Rain        #6      L=0.360
Route thru      #9      L=0.374
Store.
Rain    #7      L=0.344
Route thru      #8      L=0.473
Add Rain        #8      L=0.572
Route thru      #9      L=0.365
Get.
Add Rain        #9      L=0.281
Print. inflow-1
end of catchment details.
```