APPENDIX M

INLAND RAIL

Surface Water Quality Technical Report

PART 2 OF 2

Appendices A to G

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

ARTC

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

APPENDIX M

Surface Water Quality Technical Report

Appendix A Surface water quality monitoring equipment calibration certificates

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 8 August, 2018
Calibration Date: 7 August, 2018
Next Calibration Due: 7 February, 2019

Call ID: 00221210

Job / SO Number: 232072

Customer: Aurecon Australia Pty Ltd **Type:** Water Meter

Model: WATERMETER **Serial No:** 10C101386

Description: Generic water meter

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Ph		Rowe Scientific Ph4	NIST	307927		Ph
Ph		Rowe Scientific Ph7	NIST	307928		Ph
Dissolved Oxygen		Air	NIST	N/A		%
Dissolved Oxygen		Sodium Sulphite	NIST	5253		%
EC		Electro solution	NIST	304153		ms
Redox		Zobell 231	NIST	311901/311902		mV

Completed by: *Sen Philip* **Signed:** Sen Philip

Australian Standard Alarm Levels ☐

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 20 February, 2018
Calibration Date: 20 February, 2018
Next Calibration Due: 20 August, 2018

Call ID: 00215089

Job / SO Number: 228942.

Customer: Aurecon Aust Pty Ltd
Type: Water Meter
Model: WATERMETER
Serial No: U7602
Description: TPS WP88

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Turbidity		Distilled Water	NIST	N/A	0.00	NTU
Turbidity		50NTU Turbidity Solu	NIST	NH1310	50	NTU
Turbidity		360NTU Turbidity Sol	NIST	305542	360	NTU

Completed by: *Daniel Crampsie* **Signed:**

Australian Standard Alarm Levels ☐

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 15 September, 2017
Calibration Date: 15 September, 2017
Next Calibration Due: 15 March, 2018

Call ID: **00210490**

Job / SO Number:

Customer: Aurecon Aust Pty Ltd
Type: Water Meter
Model: WATERMETER
Serial No: U7602
Description: TPS WP88

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Turbidity		Distilled Water	NIST	N/A	0.0	NTU
Turbidity		50NTU Turbidity Sol	NIST	NH1310	50	NTU
Turbidity		360NTU Turbidity Sol	NIST	305542	360	NTU

Completed by: *Daniel Crampsie*
Signed:

Australian Standard Alarm Levels ☐

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 8 August, 2018
Calibration Date: 7 August, 2018
Next Calibration Due: 7 February, 2019

Call ID: 00221211

Job / SO Number: 232072

Customer:	Aurecon Aust Pty Ltd	**Type:**	Water Meter
Model:	WATERMETER	**Serial No:**	U7602
Description:	TPS WP88		

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Turbidity		Distilled Water	NIST	N/A	0.0	NTU
Turbidity		100NTU Turbidity Sol	NIST	322306	100	NTU
Turbidity		360NTU Turbidity Sol	NIST	305542	360	NTU

Completed by: *Sen Philip* **Signed:** Senthilp

Australian Standard Alarm Levels ☐

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 20 February, 2018
Calibration Date: 20 February, 2018
Next Calibration Due: 20 August, 2018

Call ID: 00215092

Job / SO Number:

Customer: Aurecon Australia Pty Ltd
Type: Water Meter
Model: WATERMETER
Serial No: 10C101386
Description: Generic water meter

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Ph		Rowe Scientific Ph4	NIST	307927	4.00	Ph
Ph		Rowe Scientific Ph7	NIST	307928	7.00	Ph
Dissolved Oxygen		Do Solution	NIST	5253	0.00	%
Dissolved Oxygen		Air	NIST	AIR	100	%
EC		Electro solution	NIST	304153	2655	ms
Redox		Zobell 231	NIST	300321, 311902	233	mV

Completed by: *Daniel Crampsie* **Signed:**

Australian Standard Alarm Levels ☐

AirMet Scientific P/L
7-11 Ceylon Street
Nunawading
Victoria 3131, Australia

Calibration Certificate

This document hereby certifies that this instrument detailed has been calibrated to the parameters listed below.

Certificate Print Date: 15 September, 2017
Calibration Date: 15 September, 2017
Next Calibration Due: 15 March, 2018

Call ID: 00210491

Job / SO Number: 226343.

Customer: Aurecon Australia Pty Ltd
Type: Water Meter
Model: WATERMETER
Serial No: 10C101386
Description: Generic water meter

Sensor	Serial No	Standard Solutions	Certified	Solution # (Bottle #)	Instrument Reading	Units
Ph		Rowe Scientific Ph4	NIST	299742	4.00	Ph
Ph		Rowe Scientific Ph7	NIST	295218	7.00	Ph
Dissolved Oxygen		Air	NIST	N/A	100	%
Dissolved Oxygen		Sodium Sulphite	NIST	4955	0.00	%
EC		Electro solution	NIST	300739	2444	ms
Redox		Zobell 231	NIST	298242, 295477	242	mV

Completed by: *Daniel Crampsie* **Signed:**

Australian Standard Alarm Levels ☐

airmet
Work with Confidence

Calibration Certificate

AirMet Scientific P/L
51 Ross Street (via Durong Street)
Newstead
QLD 4006, Australia
Tel: 07 3220 8600
Fax: 07 3220 8686

This document certifies that the instrument detailed has been calibrated to the parameters

Certificate Print Date: 21-Feb-2019
Calibration Date: 20-Feb-2019
Next Calibration Due: 19-Aug-2019

Call ID: 235490
Job Number: S2354900002

Customer: Aurecon Australia Pty Ltd-ID 403401 **Serial No:** U0529
Description: TPS WP-88 Turbidity Meter

Calibration Summary

Frequency: 180 Days **Temp:** 24°C **As Found:** Out of Tolerance **Result:** Pass
Humidity: 60% **Certificate:** S2354900002

Desc	As Found Actual	As Found Result	As Left (Cal Status) Actual	As Left (Cal Status) Result
0 NTU	1.5	Fail	0.0	Pass
100 NTU	97.0	Fail	100.0	Pass
1000 NTU	995.0	Fail	1000.0	Pass

Standard Used

Equip ID	Description	Valid Until	Cert
330217	1000NTU Turbidity	01/06/2019	
322306	Turbidity: 100 NTU Standard Turbidity Solution	29/11/2019	

Completed By: Sen Philip **Signed:** Sen Philip

airmet
Work with Confidence

Calibration Certificate

AirMet Scientific P/L
51 Ross Street (via Durong Street)
Newstead
QLD 4006, Australia
Tel: 07 3220 8600
Fax: 07 3220 8686

This document certifies that the instrument detailed has been calibrated to the parameters

Certificate Print Date: 21-Feb-2019
Calibration Date: 20-Feb-2019
Next Calibration Due: 19-Aug-2019

Call ID: 235490
Job Number: S2354900001

Customer: Aurecon Australia Pty Ltd-ID 403401 **Serial No:** 10C101386
Description: Watermeter

Calibration Summary

Frequency: 180 Days **Temp:** 24°C **As Found:** Out of Tolerance **Result:** Pass
Humidity: 60% **Certificate:** S2354900001

Desc	As Found Actual	As Found Result	As Left (Cal Status) Actual	As Left (Cal Status) Result
DO Zero	0.4	Pass	0.0	Pass
DO 100%	92.0	Fail	100.0	Pass
EC @22 °C	2900.0	Fail	2602.0	Pass
ORP @ 22°C	235.6	Pass	236.0	Pass
pH 7	7.16	Pass	7.0	Pass
pH 4	4.14	Pass	4.0	Pass

Standard Used

Equip ID	Description	Valid Until	Cert
322349	Conductivity (2760 us/cm @ 25 deg)	29/12/2019	
325420	Zobel A: 1/50 mole K3Fe(CN) 6 in 0.1molar KCl	26/08/2023	
320612	PH4 (pH = 4.01 +/- 0.02 @ 25 deg)	29/10/2019	
320613	PH7 (pH = 7.00 +/- 0.02 @ 25 deg)	29/10/2019	
325421	Zobel B: 1/50 mole K4Fe(CN) 6 in 0.1molar KCl	26/08/2023	
5928	DO Powder (Sodium Suplphite Solution)	01/03/2020	

Completed By: Sen Philip **Signed:** Sen Philip

APPENDIX M

Surface Water Quality Technical Report

Appendix B Surface water quality site investigation laboratory results

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

Appendix B – Raw laboratory results for three sampling rounds

Parameter	C2K 1A ALT	C2K 2A	C2K 3A	C2K 5A (1)	C2K 5A	C2K 5A	C2K 5A	C2K 6A	C2K 6A	C2K 6A	C2K 7A	C2K 7A	C2K 7A (ALT)	C2K 8A	C2K 8A	C2K 9A	C2K 9A	C2K 10A	C2K 10A	C2K 10A	C2K 11A	C2K 12A	C2K 12A	C2K 13A	C2K 13A	C2K 13A	C2K 14A	C2K DUP 1	C2K TRIP	C2K DUPLICATE 3	C2K TRIP_1	C2K DUPLICATE_1	C2K DUPLICATE_2
Date	Oct-17	Mar-18	Oct-17	Mar-18	Oct-17	Mar-18	Mar-19	Oct-17	Mar-18	Mar-19	Oct-17	Mar-18	Mar-18	Oct-17	Mar-18	Oct-17	Mar-18	Oct-17	Mar-18	Mar-19	Oct-17	Oct-17	Mar-18	Oct-17	Mar-18	Mar-19	Mar-18	Mar-18	Mar-18	Mar-19	Oct-17	Oct-17	Oct-17
Ammonia (as N)	0.04	0.07	< 0.01	0.19	0.08	0.28	< 0.01	0.02	0.02	0.67	0.03	0.03	< 0.01	0.06	0.02	0.04	0.03	0.02	0.02	< 0.01	< 0.01	0.89	0.07	0.03	< 0.01	< 0.01	0.02	0.15	0.23	< 0.01	0.1	0.03	0.09
Chlorophyll a	33	< 5	< 10	< 5	< 5	11	32	< 10	< 5	< 5	< 5	< 5	< 5	< 10	< 5	< 5	< 5	< 5	6	< 5	580	12	< 5	< 5	< 5	20	< 5	19	19	< 5	< 10	< 5	< 5
Conductivity (at 25Â°C)	910	200	980	130	280	270	380	2800	250	3400	1500	180	140	1200	180	940	160	990	470	2700	100	5400	180	2100	200	2000	220	270	260	2700	240	1000	280
Dissolved Oxygen	10	5.8	9.1	2.8	9.1	7.4	9.1	9.2	7.3	8.5	9.1	8.3	8.4	9.1	7.9	9	7.5	9	7.9	9	8	8.8	7.3	9	7.4	8.9	7.7	7.9	7.2	9	9.1	9.8	9.9
Dissolved Oxygen (% Saturation)	110	65	100	32	100	82		100	80		100	92	93	100	87	99	83	100	88		89	97	81	100	82		85	87	80		100	110	110
Nitrate & Nitrite (as N)	< 0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	0.07	< 0.05	< 0.05	0.07	< 0.05	0.06	0.1	< 0.05	< 0.05	< 0.05	< 0.05	0.19	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1	< 0.05
Nitrate (as N)	0.03	0.05	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.06	< 0.02	0.07	< 0.02	< 0.02	0.06	< 0.02	0.04	0.09	< 0.02	< 0.02	< 0.02	< 0.02	0.19	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.1	0.03
Nitrite (as N)	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	1	0.7	0.4	1.1	1.4	1.2	1.6	0.6	0.7	1.2	0.7	0.9	0.5	0.5	0.7	0.7	0.8	0.4	0.5	0.29	2.3	1.6	0.6	0.3	0.6	0.59	0.7	1.2	1.2	0.34	1.6	0.7	1.6
pH	8.1	7.4	8.3	6.8	8.1	8.5	9.1	8.1	7.6	8.3	8	7.7	7.4	7.9	7.6	8.2	7.4	7.8	8	8.2	6.9	8.1	7.3	8.2	7.6	8.4	7.6	8.9	8.9	8.4	8.1	7.8	7.9
Phosphate total (as P)	0.17	0.54	0.07	0.12	0.19	0.07	0.01	< 0.05	0.08	0.02	< 0.05	0.09	0.07	< 0.05	0.07	< 0.05	0.08	< 0.05	0.06	0.01	< 0.05	0.25	0.08	< 0.05	0.07	0.01	0.09	0.06	0.05	< 0.01	0.22	< 0.05	0.19
Phosphorus reactive (as P)	0.11	0.36	0.05	0.07	0.12	< 0.05	0.01	< 0.05	< 0.05	0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.01	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.01	< 0.05	< 0.05	< 0.05	0.1	0.12	< 0.05	0.12
Salinity (determined from EC)*	450	100	480	65	130	130	180	1400	120	1800	750	90	70	600	90	460	80	490	230	1400	51	2900	90	1100	95	1000	110	130	125	1400	120	490	130
Suspended Solids	14	49	3.5	17	8	25	36	4.9	26	42	9.9	14	10	12	7.7	15	45	6.8	14	13	110	11	6.4	3.8	20	24	9.3	10	12	10	15	7.7	5
Total Kjeldahl Nitrogen (as N)	1	0.8	0.4	1.1	1.5	1.5	1.6	0.6	0.7	1.9	0.7	0.9	0.5	0.6	0.7	0.7	0.8	0.4	0.5	0.3	2.3	2.5	0.7	0.3	0.6	0.6	0.7	1.4	1.4	0.3	1.7	0.7	1.7
Total Nitrogen (as N)	1	0.85	0.4	1.1	1.5	1.5	1.6	0.6	0.7	1.9	0.7	0.97	0.5	0.6	0.77	0.7	0.86	0.4	0.5	0.29	2.3	2.5	0.89	0.3	0.6	0.59	0.7	1.4	1.4	0.34	1.7	0.7	1.7
Turbidity	5.9	95	1.1	56	8.4	7.9	21	3.2	98	34	7.3	120	90	6.6	99	5.2	140	5	9	7.4	35	2.4	97	1	120	9.7	62	6.9	7	5.2	5.7	5.5	5.7
Arsenic (filtered)	0.002	< 0.001	< 0.001	< 0.001	0.003	0.002	0.002	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.006	< 0.001	0.002	0.002	< 0.001	0.003	< 0.001	0.003
Cadmium (filtered)	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.0002	< 0.00002	< 0.0002	< 0.0002
Chromium (filtered)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Parameter	C2K 1A ALT	C2K 2A	C2K 3A	C2K 5A (1)	C2K 5A	C2K 5A	C2K 5A	C2K 6A	C2K 6A	C2K 6A	C2K 7A	C2K 7A	C2K 7A (ALT)	C2K 8A	C2K 8A	C2K 9A	C2K 9A	C2K 10A	C2K 10A	C2K 10A	C2K 11A	C2K 12A	C2K 12A	C2K 13A	C2K 13A	C2K 13A	C2K 14A	C2K DUP 1	C2K TRIP	C2K DUPLICATE 3	C2K TRIP_1	C2K DUPLICATE_1	C2K DUPLICATE_2
Copper (filtered)	< 0.001	0.004	< 0.001	0.003	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001
Lead (filtered)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.0001	< 0.00001	< 0.0001	< 0.0001
Nickel (filtered)	0.003	0.004	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.003	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	< 0.001	0.001	0.002	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc (filtered)	< 0.005	< 0.005	< 0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	< 0.005	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.011	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Acenaphthene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Parameter	C2K 1A ALT	C2K 2A	C2K 3A	C2K 5A (1)	C2K 5A	C2K 5A	C2K 5A	C2K 6A	C2K 6A	C2K 6A	C2K 7A	C2K 7A	C2K 7A (ALT)	C2K 8A	C2K 8A	C2K 9A	C2K 9A	C2K 10A	C2K 10A	C2K 10A	C2K 11A	C2K 12A	C2K 12A	C2K 13A	C2K 13A	C2K 13A	C2K 14A	C2K DUP 1	C2K TRIP	C2K DUPLICATE 3	C2K TRIP_1	C2K DUPLICATE_1	C2K DUPLICATE_2
Fluorene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
p-Terphenyl-d14 (surr.)	74	83	109	113	111	64	50	148	118	57	93	60	108	55	81	122	58	119	78	78	128	144	58	122	64	79	88	132	117	80	149	143	64
2-Fluorobiphenyl (surr.)	78	77	75	79	77	53	53	101	79	51	74	60	81	57	81	89	59	89	69	74	67	94	55	117	99	67	68	105	84	79	110	84	81

Surface water quality results – Round 1 (September 2017)

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Eurofins | mgt Sydney Lab — Unit F3 Building F, 16 Mars Road, Lane Cove West, NSW 2066 — P : +61 2 9900 8400 — E : EnviroSampleNSW@eurofins.com.au

☑ Eurofins | mgt Brisbane Lab — Unit 1, 21 Smallwood Place, Murarrie, QLD 4172 — P : +61 7 3902 4600 — E : EnviroSampleQLD@eurofins.com.au

☐ Eurofins | mgt Melbourne Lab — 2 Kingston Town Close, Oakleigh, VIC 3166 — P : +61 3 8564 5000 — F : +61 3 8564 5090 — E : EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	500569	Project Manager	Leesa Leathbridge
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail
Contact Name	Leesa Leathbridge				
Contact Phone №	07 3173 8730				
Special Direction	*4 esky's in total				
Relinquished by (Signature)	Leesa Leathbridge.				
(Time / Date)	12:15 29/09/17				

Project Name	Baseline Surface Water Monitoring
Electronic Results Format	
Email for Results	leesa.leathbridge@aurecongroup.com
Turn Around Requirements	☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* (* Surcharges apply) ☑ 5 DAY (Std.) ☐ Other ( )

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual & Specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)
✓ 1	C2K 11A	25/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 2	C2K 10A	25/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 3	C2K 9A	25/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 4	C2K 13A	26/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 5	C2K 5A	26/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 6	C2K 8A	27/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 7	C2K 7A.	27/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 8	C2K 12A	28/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 9	C2K 6A	28/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 10	C2K 3A	28/09/17	W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 11	C2K Trip 1		W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ 12	C2K Duplicate 1		W	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Containers

№	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	60 ml plastic	500 ml plastic	Sample Comments / DG Hazard Warning
1				1			2	2	
2				1			2	2	
3				1			2	2	
4				1			2	2	
5				1			2	2	
6				1			2	2	
7				1			2	2	
8				1			2	2	
9				1			2	2	
10				1			2	2	
11				1			2	2	
12				1			2	2	

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

Laboratory Use Only								
Received By	Daniel Clancy	SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	29/9/17	Time	12:15	Signature	Temperature	18.2°C
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	__/__/__	Time	__:__	Signature	Report №	

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ **Eurofins | mgt Sydney Lab** — Unit F3 Building F, 16 Mars Road, Lane Cove West, NSW 2066 | P : +61 2 9900 8400 | E : EnviroSampleNSW@eurofins.com.au

☑ **Eurofins | mgt Brisbane Lab** — Unit 1, 21 Smallwood Place, Murarrie, QLD 4172 | P : +61 7 3902 4600 | E : EnviroSampleQLD@eurofins.com.au

☐ **Eurofins | mgt Melbourne Lab** — 2 Kingston Town Close, Oakleigh, VIC 3166 | P : +61 3 8564 5000 F : +61 3 8564 5090 | E : EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	500569	Project Manager	Leesa Leathbridge
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail
Contact Name	Leesa Leathbridge				
Contact Phone №	07 3173 8730				
Special Direction	*4 esties in total				
Relinquished by (Signature)	Leesa Leathbridge				
(Time / Date)	12:15 29/09/17				

Project Name	Baseline Surface Water Monitoring
Electronic Results Format	
Email for Results	leesa.leathbridge@aurecongroup.com
Turn Around Requirements	☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* (* Surcharges apply) ☑ 5 DAY (Std.) ☐ Other ( )

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual + Specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)
1	C2K Dup 2		W	✓	✓	✓	✓	✓	✓	—	✓	✓	✓	✓	✓	✓
2	C2K 1A Alt	29.09.17	W	✓	✓	✓	✓	✓	✓	—	✓	✓	✓	✓	—	—
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																

Containers

№	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	60mL plastic	500mL plastic
1				1			2	2
2				1			2	2

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

Sample Comments / DG Hazard Warning

Laboratory Use Only

Received By	Daniel Clancy	SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	29/9/17	Time	12:15	Signature		Temperature 18.2°c
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	__/__/__	Time	__:__	Signature		Report №

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Certificate of Analysis

Aurecon Australia (BRIS) Pty Ltd
Level 14, 32 Turbot St
Brisbane
QLD 4001

NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **LEESA LEATHBRIDGE**

Report **565568-W**
Project name BASLINE SURFACE WATER MONITORING
Project ID INLAND RAIL
Received Date Sep 29, 2017

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**C2K 11A** **Water** **B17-Se36606** **Sep 25, 2017**	**C2K 10A** **Water** **B17-Se36621** **Sep 25, 2017**	**C2K 9A** **Water** **B17-Se36622** **Sep 25, 2017**	**C2K 13A** **Water** **B17-Se36623** **Sep 26, 2017**
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	67	89	89	117
p-Terphenyl-d14 (surr.)	1	%	128	119	122	122
Ammonia (as N)	0.01	mg/L	< 0.01	0.02	0.04	0.03
Chlorophyll a	5	ug/L	580	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	100	990	940	2100
Dissolved Oxygen	0.01	mg/L	8.0	9.0	9.0	9.0
Dissolved Oxygen (% Saturation)		%	89	100	99	100
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	0.10	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	0.09	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	2.3	0.4	0.7	0.3
pH	0.1	pH Units	6.9	7.8	8.2	8.2
Phosphate total (as P)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Salinity (determined from EC)*	20	mg/L	51	490	460	1100
Suspended Solids	1	mg/L	110	6.8	15	3.8
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	2.3	0.4	0.7	0.3

Client Sample ID			C2K 11A	C2K 10A	C2K 9A	C2K 13A
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			B17-Se36606	B17-Se36621	B17-Se36622	B17-Se36623
Date Sampled			Sep 25, 2017	Sep 25, 2017	Sep 25, 2017	Sep 26, 2017
Test/Reference	LOR	Unit				
Total Nitrogen (as N)	0.2	mg/L	2.3	0.4	0.7	0.3
Turbidity	1	NTU	35	5.0	5.2	1.0
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			C2K 5A	C2K 8A	C2K 7A	C2K 12A
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			B17-Se36624	B17-Se36625	B17-Se36626	B17-Se36627
Date Sampled			Sep 26, 2017	Sep 27, 2017	Sep 27, 2017	Sep 28, 2017
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	77	57	74	94
p-Terphenyl-d14 (surr.)	1	%	111	55	93	144
Ammonia (as N)	0.01	mg/L	0.08	0.06	0.03	0.89
Chlorophyll a	5	ug/L	< 5	< 10	< 5	12
Conductivity (at 25°C)	1	uS/cm	280	1200	1500	5400
Dissolved Oxygen	0.01	mg/L	9.1	9.1	9.1	8.8
Dissolved Oxygen (% Saturation)		%	100	100	100	97
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	1.4	0.5	0.7	1.6
pH	0.1	pH Units	8.1	7.9	8.0	8.1

Client Sample ID			C2K 5A	C2K 8A	C2K 7A	C2K 12A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B17-Se36624**	**B17-Se36625**	**B17-Se36626**	**B17-Se36627**
Date Sampled			**Sep 26, 2017**	**Sep 27, 2017**	**Sep 27, 2017**	**Sep 28, 2017**
Test/Reference	LOR	Unit				
Phosphate total (as P)	0.05	mg/L	0.19	< 0.05	< 0.05	0.25
Phosphorus reactive (as P)	0.05	mg/L	0.12	< 0.05	< 0.05	< 0.05
Salinity (determined from EC)*	20	mg/L	130	600	750	2900
Suspended Solids	1	mg/L	8.0	12	9.9	11
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.5	0.6	0.7	2.5
Total Nitrogen (as N)	0.2	mg/L	1.5	0.6	0.7	2.5
Turbidity	1	NTU	8.4	6.6	7.3	2.4
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.003	< 0.001	< 0.001	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			C2K 6A	C2K 3A	C2K TRIP_1	C2K DUPLICATE_1
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B17-Se36628**	**B17-Se36629**	**B17-Se36630**	**B17-Se36631**
Date Sampled			**Sep 28, 2017**	**Sep 28, 2017**	**Sep 28, 2017**	**Sep 28, 2017**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	101	75	110	84
p-Terphenyl-d14 (surr.)	1	%	148	109	149	143
Ammonia (as N)	0.01	mg/L	0.02	< 0.01	0.10	0.03
Chlorophyll a	5	ug/L	< 10	< 10	< 10	< 5
Conductivity (at 25°C)	1	uS/cm	2800	980	240	1000
Dissolved Oxygen	0.01	mg/L	9.2	9.1	9.1	9.8

Client Sample ID			C2K 6A	C2K 3A	C2K TRIP_1	C2K DUPLICATE_1
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B17-Se36628**	**B17-Se36629**	**B17-Se36630**	**B17-Se36631**
Date Sampled			**Sep 28, 2017**	**Sep 28, 2017**	**Sep 28, 2017**	**Sep 28, 2017**
Test/Reference	LOR	Unit				
Dissolved Oxygen (% Saturation)		%	100	100	100	110
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.10
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	0.10
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.6	0.4	1.6	0.7
pH	0.1	pH Units	8.1	8.3	8.1	7.8
Phosphate total (as P)	0.05	mg/L	< 0.05	0.07	0.22	< 0.05
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	0.05	0.12	< 0.05
Salinity (determined from EC)*	20	mg/L	1400	480	120	490
Suspended Solids	1	mg/L	4.9	3.5	15	7.7
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.6	0.4	1.7	0.7
Total Nitrogen (as N)	0.2	mg/L	0.6	0.4	1.7	0.7
Turbidity	1	NTU	3.2	1.1	5.7	5.5
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	0.003	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			C2K DUPLICATE_2	C2K 1A ALT
Sample Matrix			**Water**	**Water**
Eurofins | mgt Sample No.			**B17-Se36632**	**B17-Se36633**
Date Sampled			**Sep 28, 2017**	**Sep 29, 2017**
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	0.001	mg/L	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	81	78
p-Terphenyl-d14 (surr.)	1	%	64	74

Client Sample ID			C2K DUPLICATE_2	C2K 1A ALT
Sample Matrix			**Water**	**Water**
Eurofins | mgt Sample No.			**B17-Se36632**	**B17-Se36633**
Date Sampled			**Sep 28, 2017**	**Sep 29, 2017**
Test/Reference	LOR	Unit		
Ammonia (as N)	0.01	mg/L	0.09	0.04
Chlorophyll a	5	ug/L	< 5	33
Conductivity (at 25°C)	1	uS/cm	280	910
Dissolved Oxygen	0.01	mg/L	9.9	10
Dissolved Oxygen (% Saturation)		%	110	110
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	0.03	0.03
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	1.6	1.0
pH	0.1	pH Units	7.9	8.1
Phosphate total (as P)	0.05	mg/L	0.19	0.17
Phosphorus reactive (as P)	0.05	mg/L	0.12	0.11
Salinity (determined from EC)*	20	mg/L	130	450
Suspended Solids	1	mg/L	5.0	14
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.7	1.0
Total Nitrogen (as N)	0.2	mg/L	1.7	1.0
Turbidity	1	NTU	5.7	5.9
Heavy Metals				
Arsenic (filtered)	0.001	mg/L	0.003	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.003
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Melbourne	Oct 06, 2017	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Water by GCMS			
Chlorophyll a	Melbourne	Oct 03, 2017	2 Day
- Method: APHA Method 10200H			
Conductivity (at 25°C)	Melbourne	Oct 03, 2017	28 Day
- Method: LTM-INO-4030			
Dissolved Oxygen	Melbourne	Oct 04, 2017	1 Day
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
Dissolved Oxygen (% Saturation)	Melbourne	Oct 04, 2017	1 Day
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH	Melbourne	Oct 03, 2017	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Phosphate total (as P)	Melbourne	Oct 03, 2017	28 Day
- Method: APHA 4500-P E. Phosphorous			
Phosphorus reactive (as P)	Melbourne	Oct 03, 2017	2 Day
- Method: APHA4500-PO4			
Salinity (determined from EC)*	Melbourne	Oct 03, 2017	0 Day
Suspended Solids	Melbourne	Oct 03, 2017	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Turbidity	Melbourne	Oct 03, 2017	2 Day
- Method: LTM-INO-4140 Turbidity by Nephelometric Method			
Metals M8 filtered	Melbourne	Oct 05, 2017	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Nitrogens (speciated)			
Ammonia (as N)	Melbourne	Oct 03, 2017	28 Day
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Oct 03, 2017	28 Day
- Method: APHA 4500-NO3/NO2 Nitrate-Nitrite Nitrogen by FIA			
Nitrate (as N)	Melbourne	Oct 03, 2017	7 Day
- Method: APHA 4500-NO3 Nitrate Nitrogen by FIA			
Nitrite (as N)	Melbourne	Oct 03, 2017	2 Day
- Method: APHA 4500-NO2 Nitrite Nitrogen by FIA			
Organic Nitrogen (as N)	Melbourne	Sep 29, 2017	7 Day
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Oct 03, 2017	7 Day
- Method: APHA 4500 TKN			

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Company Name: Aurecon Australia (BRIS) Pty Ltd
Address: Level 14, 32 Turbot St
Brisbane
QLD 4001

Project Name: BASLINE SURFACE WATER MONITORING
Project ID: INLAND RAIL

Order No.: 500569
Report #: 565568
Phone: 07 3173 8000
Fax: +61 7 3173 8001

Received: Sep 29, 2017 12:15 PM
Due: Oct 9, 2017
Priority: 5 Day
Contact Name: LEESA LEATHBRIDGE

Eurofins | mgt Analytical Services Manager : Ryan Gilbert

Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (determined from EC)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																		
Brisbane Laboratory - NATA Site # 20794																		
Perth Laboratory - NATA Site # 23736																		
External Laboratory																		
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**													
1	C2K 11A	Sep 25, 2017		Water	B17-Se36606	X	X	X	X	X	X	X	X	X	X	X	X	X
2	C2K 10A	Sep 25, 2017		Water	B17-Se36621	X	X	X	X	X	X	X	X	X	X	X	X	X
3	C2K 9A	Sep 25, 2017		Water	B17-Se36622	X	X	X	X	X	X	X	X	X	X	X	X	X
4	C2K 13A	Sep 26, 2017		Water	B17-Se36623	X	X	X	X	X	X	X	X	X	X	X	X	X
5	C2K 5A	Sep 26, 2017		Water	B17-Se36624	X	X	X	X	X	X	X	X	X	X	X	X	X
6	C2K 8A	Sep 27, 2017		Water	B17-Se36625	X	X	X	X	X	X	X	X	X	X	X	X	X
7	C2K 7A	Sep 27, 2017		Water	B17-Se36626	X	X	X	X	X	X	X	X	X	X	X	X	X
8	C2K 12A	Sep 28, 2017		Water	B17-Se36627	X	X	X	X	X	X	X	X	X	X	X	X	X
9	C2K 6A	Sep 28, 2017		Water	B17-Se36628	X	X	X	X	X	X	X	X	X	X	X	X	X

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Company Name:	Aurecon Australia (BRIS) Pty Ltd	**Order No.:**	500569	**Received:**	Sep 29, 2017 12:15 PM
Address:	Level 14, 32 Turbot St Brisbane QLD 4001	**Report #:**	565568	**Due:**	Oct 9, 2017
		Phone:	07 3173 8000	**Priority:**	5 Day
		Fax:	+61 7 3173 8001	**Contact Name:**	LEESA LEATHBRIDGE
Project Name:	BASLINE SURFACE WATER MONITORING				
Project ID:	INLAND RAIL				

Eurofins | mgt Analytical Services Manager : Ryan Gilbert

Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (determined from EC)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																		
Brisbane Laboratory - NATA Site # 20794																		
Perth Laboratory - NATA Site # 23736																		
10	C2K 3A	Sep 28, 2017		Water	B17-Se36629	X	X	X	X	X	X	X	X	X	X	X	X	X
11	C2K TRIP_1	Sep 28, 2017		Water	B17-Se36630	X	X	X	X	X	X	X	X	X	X	X	X	X
12	C2K DUPLICATE_1	Sep 28, 2017		Water	B17-Se36631	X	X	X	X	X	X	X	X	X	X	X	X	X
13	C2K DUPLICATE_2	Sep 28, 2017		Water	B17-Se36632	X	X	X	X	X	X	X	X	X	X	X	X	X
14	C2K 1A ALT	Sep 29, 2017		Water	B17-Se36633	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						14	14	14	14	14	14	14	14	14	14	14	14	14

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Dissolved Oxygen (% Saturation)	%	100				N/A	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.05			0.05	Pass	
Phosphorus reactive (as P)	mg/L	< 0.05			0.05	Pass	
Suspended Solids	mg/L	< 1			1	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Turbidity	NTU	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	95			70-130	Pass	
Acenaphthylene	%	109			70-130	Pass	
Anthracene	%	82			70-130	Pass	
Benz(a)anthracene	%	127			70-130	Pass	
Benzo(a)pyrene	%	98			70-130	Pass	
Benzo(b&j)fluoranthene	%	118			70-130	Pass	
Benzo(g.h.i)perylene	%	80			70-130	Pass	
Benzo(k)fluoranthene	%	119			70-130	Pass	
Chrysene	%	98			70-130	Pass	
Dibenz(a.h)anthracene	%	83			70-130	Pass	
Fluoranthene	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluorene	%	106			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	81			70-130	Pass	
Naphthalene	%	83			70-130	Pass	
Phenanthrene	%	110			70-130	Pass	
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	94			70-130	Pass	
Nitrate & Nitrite (as N)	%	97			70-130	Pass	
Nitrate (as N)	%	97			70-130	Pass	
Nitrite (as N)	%	96			70-130	Pass	
Phosphate total (as P)	%	99			70-130	Pass	
Phosphorus reactive (as P)	%	129			70-130	Pass	
Suspended Solids	%	109			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	97			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	100			80-120	Pass	
Cadmium (filtered)	%	104			80-120	Pass	
Chromium (filtered)	%	102			80-120	Pass	
Copper (filtered)	%	100			80-120	Pass	
Lead (filtered)	%	103			80-120	Pass	
Mercury (filtered)	%	102			70-130	Pass	
Nickel (filtered)	%	99			80-120	Pass	
Zinc (filtered)	%	104			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M17-Se36877	NCP	%	94			70-130	Pass	
Nitrate & Nitrite (as N)	M17-Se36877	NCP	%	96			70-130	Pass	
Nitrate (as N)	M17-Se36877	NCP	%	96			70-130	Pass	
Nitrite (as N)	M17-Se36877	NCP	%	94			70-130	Pass	
Phosphorus reactive (as P)	P17-Se36730	NCP	%	125			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	B17-Se36606	CP	%	104			70-130	Pass	
Cadmium (filtered)	B17-Se36606	CP	%	107			70-130	Pass	
Chromium (filtered)	B17-Se36606	CP	%	106			70-130	Pass	
Copper (filtered)	B17-Se36606	CP	%	104			70-130	Pass	
Lead (filtered)	B17-Se36606	CP	%	107			70-130	Pass	
Mercury (filtered)	B17-Se36606	CP	%	105			70-130	Pass	
Nickel (filtered)	B17-Se36606	CP	%	103			70-130	Pass	
Zinc (filtered)	B17-Se36606	CP	%	110			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	B17-Se36621	CP	%	89			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B17-Se36626	CP	%	100			70-130	Pass	
Acenaphthylene	B17-Se36626	CP	%	110			70-130	Pass	
Anthracene	B17-Se36626	CP	%	126			70-130	Pass	
Benz(a)anthracene	B17-Se36626	CP	%	123			70-130	Pass	
Benzo(a)pyrene	B17-Se36626	CP	%	121			70-130	Pass	
Benzo(b&j)fluoranthene	B17-Se36626	CP	%	113			70-130	Pass	
Benzo(g.h.i)perylene	B17-Se36626	CP	%	98			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	B17-Se36626	CP	%	115			70-130	Pass	
Chrysene	B17-Se36626	CP	%	120			70-130	Pass	
Dibenz(a.h)anthracene	B17-Se36626	CP	%	96			70-130	Pass	
Fluoranthene	B17-Se36626	CP	%	119			70-130	Pass	
Fluorene	B17-Se36626	CP	%	124			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B17-Se36626	CP	%	99			70-130	Pass	
Naphthalene	B17-Se36626	CP	%	106			70-130	Pass	
Phenanthrene	B17-Se36626	CP	%	130			70-130	Pass	
Pyrene	B17-Se36626	CP	%	117			70-130	Pass	
Spike - % Recovery									
				Result 1					
Total Kjeldahl Nitrogen (as N)	B17-Se36630	CP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	B17-Se36630	CP	%	102			70-130	Pass	
Cadmium (filtered)	B17-Se36630	CP	%	106			70-130	Pass	
Chromium (filtered)	B17-Se36630	CP	%	103			70-130	Pass	
Copper (filtered)	B17-Se36630	CP	%	107			70-130	Pass	
Lead (filtered)	B17-Se36630	CP	%	104			70-130	Pass	
Mercury (filtered)	B17-Se36630	CP	%	99			70-130	Pass	
Nickel (filtered)	B17-Se36630	CP	%	102			70-130	Pass	
Zinc (filtered)	B17-Se36630	CP	%	109			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M17-Se36877	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Conductivity (at 25°C)	B17-Se36606	CP	uS/cm	100	99	2.0	30%	Pass	
Dissolved Oxygen	B17-Se36606	CP	mg/L	8.0	7.8	3.0	30%	Pass	
Dissolved Oxygen (% Saturation)	B17-Se36606	CP	%	89	86	3.0	30%	Pass	
Nitrate & Nitrite (as N)	M17-Se36877	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrate (as N)	M17-Se36877	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Nitrite (as N)	M17-Se36877	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
pH	B17-Se36606	CP	pH Units	6.9	6.9	pass	30%	Pass	
Phosphate total (as P)	B17-Se36606	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Total Kjeldahl Nitrogen (as N)	M17-Se37102	NCP	mg/L	1.7	1.5	13	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	B17-Se36606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	B17-Se36606	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	B17-Se36606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	B17-Se36606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	B17-Se36606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	B17-Se36606	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	B17-Se36606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	B17-Se36606	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chlorophyll a	B17-Se36621	CP	ug/L	< 5	< 5	<1	30%	Pass	
Turbidity	B17-Se36621	CP	NTU	5.0	5.0	1.0	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	B17-Se36625	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B17-Se36625	CP	uS/cm	1200	1200	1.0	30%	Pass	
pH	B17-Se36625	CP	pH Units	7.9	8.0	pass	30%	Pass	
Suspended Solids	B17-Se36625	CP	mg/L	12	12	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen	B17-Se36626	CP	mg/L	9.1	9.2	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B17-Se36629	CP	uS/cm	980	990	1.0	30%	Pass	
Dissolved Oxygen (% Saturation)	B17-Se36629	CP	%	100	100	<1	30%	Pass	
pH	B17-Se36629	CP	pH Units	8.3	8.3	pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B17-Se36630	CP	uS/cm	240	270	12	30%	Pass	
pH	B17-Se36630	CP	pH Units	8.1	8.1	pass	30%	Pass	
Phosphate total (as P)	B17-Se36630	CP	mg/L	0.22	0.23	3.3	30%	Pass	
Salinity (determined from EC)*	B17-Se36630	CP	mg/L	120	130	12	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	B17-Se36630	CP	mg/L	0.003	0.003	3.0	30%	Pass	
Cadmium (filtered)	B17-Se36630	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	B17-Se36630	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	B17-Se36630	CP	mg/L	0.001	0.001	8.0	30%	Pass	
Lead (filtered)	B17-Se36630	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	B17-Se36630	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	B17-Se36630	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	B17-Se36630	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphorus reactive (as P)	B17-Se36632	CP	mg/L	0.12	0.12	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ryan Gilbert	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Alex Petridis	Senior Analyst-Organic (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Surface water quality results – Round 2 (March 2018)

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

CHAIN OF CUSTODY RECORD

ABN: 50 005 085 521

Eurofins | mgt Sydney Lab — Unit 3 Building F, 16 Mars Road, Lane Cove West NSW 2066, P: +61 2 9900 8400, E: EnviroSampleSYD@eurofins.com.au

☑ Eurofins | mgt Brisbane Lab — Unit 13, 33 Sheppard Street, Murarrie QLD 4172, P: +61 7 3902 4600, E: EnviroSampleBNE@eurofins.com.au

☐ Eurofins | mgt Melbourne Lab — 2 Kingston Town Close, Oakleigh VIC 3166, P: +61 3 8564 5000, F: +61 3 8564 5099, E: EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	23200	Project Manager	Leesa Leathbridge
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail Project
Contact Name	Leesa Leathbridge				
Contact Phone №	07 3173 8730				
Special Direction	# 6 eskies in total				
Relinquished by					
(Signature)					
(Time / Date)	13.34 2/3/2018				

Project Name: Baseline Surface Water Monitoring

Electronic Results Format:

Email for Results: leesa.leathbridge@aurecongroup.com

Turn Around Requirements: ☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* ☑ 5 DAY (Std.) ☐ Other ( )

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

№	Client Sample ID	Date	Matrix	Analysis (Note: Where metals are requested please specify "Total" or "Filtered")	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual and specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	250mL Amber Glass	40mL vial	125mL Amber Glass	Jar	60 ml plastic	Sample Comments / DG Hazard Warning
1	G2H 1A	01/03/2018	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
2	G2H DUP1	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
3	G2H ~~TRIP~~ TRIP1	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
4	G2H2A	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
5	~~Copy~~ G2H 3A	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
6	~~G2~~ H2C 2A	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
7	H2C 1BA	02/03/2018	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
8	H2C 14A	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
9	H2C 17A	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
10	C2K 1A (Alt)	"	W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
11			W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	
12			W		X	X	X	X	X	X	X	X	X	X	X	X	X			2					1	2	

Laboratory Use Only

Received By: E. Palacios — SYD \| (BNE) \| MEL \| PER \| ADL \| NEW \| DAR — Date: 2/3/18 — Time: 1.40 — Signature:

Received By: — SYD \| BNE \| MEL \| PER \| ADL \| NEW \| DAR — Date: __/__/__ — Time: ____ — Signature:

Temperature: 13.2

Report №:

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | mgt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | mgt Standard Terms and Conditions is available on request

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Eurofins | mgt Sydney Lab — Unit F4 Building F, 16 Mars Road, Lane Cove West NSW 2066 P: +61 2 9900 8400 E: EnviroSampleNSW@eurofins.com.au

☑ Eurofins | mgt Brisbane Lab — Unit 1, 21 Smallwood Place, Murarrie QLD 4172 P: +61 7 3902 4600 E: EnviroSampleQLD@eurofins.com.au

☐ Eurofins | mgt Melbourne Lab — 2 Kingston Town Close, Oakleigh VIC 3166 P: +61 3 8564 5000 F: +61 3 8564 5090 E: EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	23200	Project Manager	Leesa Leathbridge
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail Project
Contact Name	Leesa Leathbridge				
Contact Phone №	07 3173 8730				
Special Direction	# 6 eskies in total				
Relinquished by (Signature)					
(Time / Date)	13:34 23/2/2018				

Project Name: Baseline Surface Water Monitoring

Electronic Results Format:

Email for Results: leesa.leathbridge@aurecongroup.com

Turn Around Requirements: ☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* ☑ 5 DAY (Std.) ☐ Other ( )

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

Analysis (Note: Where metals are requested please specify "Total" or "Filtered"): pH; Suspended Solids (SS); Turbidity; Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen); Electrical conductivity (Actual and specific); M8 - 8 metals; Total Phosphorus; Reactive Phosphorus; Chlorophyll a; Polycyclic aromatic hydrocarbons (PAH); Salinity (ppt); Dissolved oxygen (% saturation); Dissolved oxygen (mg/L)

Containers: 1L Plastic; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL Vial; 125mL Amber Glass Jar; 60 ml plastic

№	Client Sample ID	Date	Matrix	pH	SS	Turb	Nitrogens	EC	M8	TP	RP	Chl a	PAH	Sal	DO %	DO mg/L	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL Vial	125mL Amber Glass Jar	60 ml plastic	Sample Comments / DG Hazard Warning
1	C2K11A	27/02/18	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
2	C2K10A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
3	C2K9A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
4	C2K7A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
5	C2K8A	28/02/18	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
6	C2K7A (Alt)	28/02/18	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
7	C2K 13A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
8	C2K 6A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
9	C2K 12A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
10	C2K 5A (1)	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
11	C2K 5A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	
12	C2K DUP1	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X		2		1			2	

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Received By: E. Valenbos — SYD \| BNE \| MEL \| PER \| ADL \| NEW \| DAR — Date: 23/2/18 — Time: 1:40 — Signature:

Temperature: 13.2

Received By: — SYD \| BNE \| MEL \| PER \| ADL \| NEW \| DAR — Date: __/__/__ — Time: ____ — Signature:

Report №:

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CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

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☐ Eurofins | mgt Melbourne Lab — 6 Monterey Road, Dandenong South, VIC 3175 — P +61 3 8564 5000 — E EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	23200	Project Manager	Leesa Leathbridge
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail Project
Contact Name	Leesa Leathbridge				
Contact Phone №	07 3173 8730				
Special Direction	# 6 eskies in total				
Relinquished by (Signature)					
(Time / Date)	13 34 2/3/2018				

Project Name: Baseline Surface Water Monitoring

Electronic Results Format:

Email for Results: leesa.leathbridge@aurecongroup.com

Turn Around Requirements: ☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* (* Surcharges apply) ☑ 5 DAY (Std) ☐ Other ( )

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

№	Client Sample ID	Date	Matrix	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual and specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass Jar	60 ml plastic	Sample Comments / DG Hazard Warning
1	C2K TRIP	28/02/18	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
2	C2K 14 A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
3	C2K 2A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
4	H2C 11A	01/03/18	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
5	H2C 15A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
6	G2H 10A (AIF)	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
7	G2H 9A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
8	G2H 8A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
9	G2H 7A (AIF)	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
10	G2H 6A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
11	G2H 5A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	
12	G2H 4A	"	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1				2	

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Received By: — SYD | BNE | MEL | PER | ADL | NEW | DAR — Date: __/__/__ — Time: __:__ — Signature:

Temperature: 13.2

Report №:

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QS3009_R4 Modified by S. Keyte Approved by T. Lakeland Approved on 13 August 2015

Certificate of Analysis

Aurecon Australia (BRIS) Pty Ltd
Level 14, 32 Turbot St
Brisbane
QLD 4001

NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **LEESA LEATHBRIDGE**

Report **587469-W**
Project name BASELINE SURFACE WATER MONITORING
Project ID INLAND RAIL PROJECT
Received Date Mar 02, 2018

Client Sample ID **Sample Matrix** **Eurofins | mgt Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**G2H 1A** **Water** **B18-Ma02442** **Mar 01, 2018**	**G2H DUP1** **Water** **B18-Ma02443** **Mar 01, 2018**	**G2H TRIP1** **Water** **B18-Ma02444** **Mar 01, 2018**	**G2H 2A** **Water** **B18-Ma02446** **Mar 01, 2018**
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	101	50	60	66
p-Terphenyl-d14 (surr.)	1	%	95	53	54	87
Ammonia (as N)	0.01	mg/L	0.04	0.17	0.03	0.04
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	760	770	760	430
Dissolved Oxygen	0.01	mg/L	8.0	7.6	7.9	8.2
Dissolved Oxygen (% Saturation)		%	88	85	87	91
Nitrate & Nitrite (as N)	0.05	mg/L	1.9	1.9	1.8	1.3
Nitrate (as N)	0.02	mg/L	1.9	1.9	1.8	1.2
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	0.02
Organic Nitrogen (as N)	0.2	mg/L	1.3	0.6	1.2	0.7
pH (at 25°C)	0.1	pH Units	8.0	7.9	8.1	8.3
Phosphate total (as P)	0.05	mg/L	1.2	1.3	1.1	0.11
Phosphorus reactive (as P)	0.05	mg/L	0.92	0.90	0.92	< 0.05
Salinity (determined from EC)*	20	mg/L	370	380	370	210
Suspended Solids	1	mg/L	2.0	3.2	3.5	2.6
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.3	0.8	1.2	0.7

Client Sample ID			G2H 1A	G2H DUP1	G2H TRIP1	G2H 2A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02442**	**B18-Ma02443**	**B18-Ma02444**	**B18-Ma02446**
Date Sampled			**Mar 01, 2018**	**Mar 01, 2018**	**Mar 01, 2018**	**Mar 01, 2018**
Test/Reference	LOR	Unit				
Total Nitrogen (as N)	0.2	mg/L	2.2	2.7	3.0	2.0
Turbidity	1	NTU	2.8	2.5	2.4	3.1
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	0.011	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.008	0.009	0.008	0.002
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.003	0.007	0.003	0.001
Zinc (filtered)	0.005	mg/L	0.052	0.054	0.051	< 0.005

Client Sample ID			G2H 3A	H2C 2A	H2C 13A	H2C 14A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02447**	**B18-Ma02448**	**B18-Ma02449**	**B18-Ma02450**
Date Sampled			**Mar 01, 2018**	**Mar 01, 2018**	**Mar 02, 2018**	**Mar 02, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	73	79	56	63
p-Terphenyl-d14 (surr.)	1	%	83	112	52	61
Ammonia (as N)	0.01	mg/L	< 0.01	0.03	0.04	0.02
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	410	3600	310	300
Dissolved Oxygen	0.01	mg/L	8.4	7.2	6.9	7.1
Dissolved Oxygen (% Saturation)		%	93	80	77	78
Nitrate & Nitrite (as N)	0.05	mg/L	1.4	37	0.14	0.22
Nitrate (as N)	0.02	mg/L	1.4	37	0.13	0.20
Nitrite (as N)	0.02	mg/L	< 0.02	0.34	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.8	1.9	0.6	0.5
pH (at 25°C)	0.1	pH Units	8.1	7.9	8.0	8.1

Client Sample ID			G2H 3A	H2C 2A	H2C 13A	H2C 14A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02447**	**B18-Ma02448**	**B18-Ma02449**	**B18-Ma02450**
Date Sampled			**Mar 01, 2018**	**Mar 01, 2018**	**Mar 02, 2018**	**Mar 02, 2018**
Test/Reference	LOR	Unit				
Phosphate total (as P)	0.05	mg/L	0.24	0.32	0.44	0.40
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	0.13	0.25	0.21
Salinity (determined from EC)*	20	mg/L	200	1900	150	140
Suspended Solids	1	mg/L	5.9	2.8	13	11
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.8	1.9	0.6	0.5
Total Nitrogen (as N)	0.2	mg/L	2.2	43	0.74	0.72
Turbidity	1	NTU	2.8	1.7	17	14
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.001	0.004	0.003	0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002	0.006	0.006	0.002
Zinc (filtered)	0.005	mg/L	0.006	< 0.005	< 0.005	0.012

Client Sample ID			H2C 17A	C2K 1A (ALT)	C2K 11A	C2K 10A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02451**	**B18-Ma02452**	**B18-Ma02453**	**B18-Ma02454**
Date Sampled			**Mar 02, 2018**	**Mar 02, 2018**	**Feb 27, 2018**	**Feb 27, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	69	57	72	69
p-Terphenyl-d14 (surr.)	1	%	87	70	83	78
Ammonia (as N)	0.01	mg/L	0.02	0.02	0.05	0.02
Chlorophyll a	5	ug/L	< 5	< 5	< 5	6.0
Conductivity (at 25°C)	1	uS/cm	340	290	49	470
Dissolved Oxygen	0.01	mg/L	7.8	6.8	4.1	7.9
Dissolved Oxygen (% Saturation)		%	87	75	45	88

Client Sample ID			H2C 17A	C2K 1A (ALT)	C2K 11A	C2K 10A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02451**	**B18-Ma02452**	**B18-Ma02453**	**B18-Ma02454**
Date Sampled			**Mar 02, 2018**	**Mar 02, 2018**	**Feb 27, 2018**	**Feb 27, 2018**
Test/Reference	LOR	Unit				
Nitrate & Nitrite (as N)	0.05	mg/L	0.19	0.25	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	0.16	0.20	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	0.03	0.05	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.3	1.0	0.6	0.5
pH (at 25°C)	0.1	pH Units	8.3	7.7	6.8	8.0
Phosphate total (as P)	0.05	mg/L	0.39	0.48	0.18	0.06
Phosphorus reactive (as P)	0.05	mg/L	0.20	0.32	< 0.05	< 0.05
Salinity (determined from EC)*	20	mg/L	160	140	30	230
Suspended Solids	1	mg/L	21	22	33	14
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.3	1.0	0.6	0.5
Total Nitrogen (as N)	0.2	mg/L	0.49	1.3	0.6	0.5
Turbidity	1	NTU	8.4	58	32	9.0
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	0.003	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.001	0.004	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	0.008	< 0.005	< 0.005

Client Sample ID			C2K 9A	C2K 7A	C2K 8A	C2K 7A (ALT)
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02455**	**B18-Ma02456**	**B18-Ma02457**	**B18-Ma02458**
Date Sampled			**Feb 27, 2018**	**Feb 27, 2018**	**Feb 28, 2018**	**Feb 28, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	59	60	81	81
p-Terphenyl-d14 (surr.)	1	%	58	60	81	108

Client Sample ID			C2K 9A	C2K 7A	C2K 8A	C2K 7A (ALT)
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02455**	**B18-Ma02456**	**B18-Ma02457**	**B18-Ma02458**
Date Sampled			**Feb 27, 2018**	**Feb 27, 2018**	**Feb 28, 2018**	**Feb 28, 2018**
Test/Reference	LOR	Unit				
Ammonia (as N)	0.01	mg/L	0.03	0.03	0.02	< 0.01
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	160	180	180	140
Dissolved Oxygen	0.01	mg/L	7.5	8.3	7.9	8.4
Dissolved Oxygen (% Saturation)		%	83	92	87	93
Nitrate & Nitrite (as N)	0.05	mg/L	0.06	0.07	0.07	< 0.05
Nitrate (as N)	0.02	mg/L	0.04	0.07	0.06	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	0.03
Organic Nitrogen (as N)	0.2	mg/L	0.8	0.9	0.7	0.5
pH (at 25°C)	0.1	pH Units	7.4	7.7	7.6	7.4
Phosphate total (as P)	0.05	mg/L	0.08	0.09	0.07	0.07
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Salinity (determined from EC)*	20	mg/L	80	90	90	70
Suspended Solids	1	mg/L	45	14	7.7	10
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.8	0.9	0.7	0.5
Total Nitrogen (as N)	0.2	mg/L	0.86	0.97	0.77	0.5
Turbidity	1	NTU	140	120	99	90
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.002	0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002	0.001	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	0.009	< 0.005	0.010	< 0.005

Client Sample ID			C2K 13A	C2K 6A	C2K 12A	C2K 5A (1)
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02459**	**B18-Ma02460**	**B18-Ma02461**	**B18-Ma02462**
Date Sampled			**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			C2K 13A	C2K 6A	C2K 12A	C2K 5A (1)
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02459**	**B18-Ma02460**	**B18-Ma02461**	**B18-Ma02462**
Date Sampled			**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	99	79	55	79
p-Terphenyl-d14 (surr.)	1	%	64	118	58	113
Ammonia (as N)	0.01	mg/L	< 0.01	0.02	0.07	0.19
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	200	250	180	130
Dissolved Oxygen	0.01	mg/L	7.4	7.3	7.3	2.8
Dissolved Oxygen (% Saturation)		%	82	80	81	32
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	0.19	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	0.19	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.6	0.7	0.6	1.1
pH (at 25°C)	0.1	pH Units	7.6	7.6	7.3	6.8
Phosphate total (as P)	0.05	mg/L	0.07	0.08	0.08	0.12
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.07
Salinity (determined from EC)*	20	mg/L	95	120	90	65
Suspended Solids	1	mg/L	20	26	6.4	17
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.6	0.7	0.7	1.1
Total Nitrogen (as N)	0.2	mg/L	0.6	0.7	0.89	1.1
Turbidity	1	NTU	120	98	97	56
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.001	0.001	0.002	0.003
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.001	0.001	0.001	0.002
Zinc (filtered)	0.005	mg/L	0.011	0.006	< 0.005	0.009

Client Sample ID			C2K 5A	C2K DUP1	C2K TRIP	C2K 14A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02463**	**B18-Ma02464**	**B18-Ma02465**	**B18-Ma02466**
Date Sampled			**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**	**Feb 28, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			C2K 5A	C2K DUP1	C2K TRIP	C2K 14A
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			B18-Ma02463	B18-Ma02464	B18-Ma02465	B18-Ma02466
Date Sampled			Feb 28, 2018	Feb 28, 2018	Feb 28, 2018	Feb 28, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	53	105	84	68
p-Terphenyl-d14 (surr.)	1	%	64	132	117	88
Ammonia (as N)	0.01	mg/L	0.28	0.15	0.23	0.02
Chlorophyll a	5	ug/L	11	19	19	< 5
Conductivity (at 25°C)	1	uS/cm	270	270	260	220
Dissolved Oxygen	0.01	mg/L	7.4	7.9	7.2	7.7
Dissolved Oxygen (% Saturation)		%	82	87	80	85
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	1.2	1.2	1.2	0.7
pH (at 25°C)	0.1	pH Units	8.5	8.9	8.9	7.6
Phosphate total (as P)	0.05	mg/L	0.07	0.06	0.05	0.09
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Salinity (determined from EC)*	20	mg/L	130	130	125	110
Suspended Solids	1	mg/L	25	10	12	9.3
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.5	1.4	1.4	0.7
Total Nitrogen (as N)	0.2	mg/L	1.5	1.4	1.4	0.7
Turbidity	1	NTU	7.9	6.9	7.0	62
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.002	0.002	0.002	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			C2K 2A	H2C 11A	G2H 10A (ALT)	G2H 9A
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			B18-Ma02467	B18-Ma02468	B18-Ma02470	B18-Ma02471
Date Sampled			Feb 28, 2018	Mar 01, 2018	Mar 01, 2018	Mar 01, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			C2K 2A	H2C 11A	G2H 10A (ALT)	G2H 9A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02467**	**B18-Ma02468**	**B18-Ma02470**	**B18-Ma02471**
Date Sampled			**Feb 28, 2018**	**Mar 01, 2018**	**Mar 01, 2018**	**Mar 01, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	77	73	96	76
p-Terphenyl-d14 (surr.)	1	%	83	104	127	94
Ammonia (as N)	0.01	mg/L	0.07	< 0.01	0.19	< 0.01
Chlorophyll a	5	ug/L	< 5	29	12	< 5
Conductivity (at 25°C)	1	uS/cm	200	1100	510	810
Dissolved Oxygen	0.01	mg/L	5.8	5.9	4.6	5.9
Dissolved Oxygen (% Saturation)		%	65	64	51	65
Nitrate & Nitrite (as N)	0.05	mg/L	0.05	< 0.05	0.23	< 0.05
Nitrate (as N)	0.02	mg/L	0.05	< 0.02	0.21	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.7	0.7	0.6	0.3
pH (at 25°C)	0.1	pH Units	7.4	8.5	7.8	8.0
Phosphate total (as P)	0.05	mg/L	0.54	0.19	0.25	0.09
Phosphorus reactive (as P)	0.05	mg/L	0.36	< 0.05	0.06	< 0.05
Salinity (determined from EC)*	20	mg/L	100	500	250	400
Suspended Solids	1	mg/L	49	53	170	4.0
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.8	0.7	0.8	0.3
Total Nitrogen (as N)	0.2	mg/L	0.85	0.7	1.0	0.3
Turbidity	1	NTU	95	32	420	2.8
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	0.001	0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.004	< 0.001	0.003	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004	0.002	0.009	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.005	< 0.005

Client Sample ID			G2H 7A (ALT)	G2H 6A	G2H 5A	G2H 4A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B18-Ma02473**	**B18-Ma02474**	**B18-Ma02475**	**B18-Ma02476**
Date Sampled			**Mar 01, 2018**	**Mar 01, 2018**	**Mar 01, 2018**	**Mar 01, 2018**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	70	104	81	86
p-Terphenyl-d14 (surr.)	1	%	96	147	107	120
Ammonia (as N)	0.01	mg/L	0.02	0.03	0.11	< 0.01
Chlorophyll a	5	ug/L	< 5	< 5	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	570	800	950	1000
Dissolved Oxygen	0.01	mg/L	5.7	6.8	8.4	6.7
Dissolved Oxygen (% Saturation)		%	64	75	93	74
Nitrate & Nitrite (as N)	0.05	mg/L	0.46	0.31	0.18	0.13
Nitrate (as N)	0.02	mg/L	0.41	0.30	0.17	0.12
Nitrite (as N)	0.02	mg/L	0.05	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	1.2	0.4	0.3	0.3
pH (at 25°C)	0.1	pH Units	7.6	8.1	8.6	8.4
Phosphate total (as P)	0.05	mg/L	0.09	0.12	0.17	0.25
Phosphorus reactive (as P)	0.05	mg/L	< 0.05	< 0.05	0.06	0.08
Salinity (determined from EC)*	20	mg/L	280	400	460	490
Suspended Solids	1	mg/L	89	18	18	30
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.2	0.4	0.4	0.3
Total Nitrogen (as N)	0.2	mg/L	1.7	0.7	0.58	0.43
Turbidity	1	NTU	210	28	11	19
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.002	< 0.001	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	0.006	0.001	0.002	0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.006	0.004	0.003	0.003
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	0.011	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 08, 2018	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Water by GCMS			
Chlorophyll a	Melbourne	Mar 06, 2018	2 Day
- Method: APHA Method 10200H			
Conductivity (at 25°C)	Melbourne	Mar 05, 2018	28 Day
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Melbourne	Mar 05, 2018	1 Day
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
Dissolved Oxygen (% Saturation)	Melbourne	Mar 05, 2018	1 Day
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25°C)	Melbourne	Mar 05, 2018	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Phosphate total (as P)	Melbourne	Mar 05, 2018	28 Day
- Method: APHA 4500-P E. Phosphorous			
Phosphorus reactive (as P)	Melbourne	Mar 05, 2018	2 Day
- Method: APHA4500-PO4			
Salinity (determined from EC)*	Brisbane	Mar 08, 2018	0 Day
Suspended Solids	Melbourne	Mar 05, 2018	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Turbidity	Melbourne	Mar 06, 2018	2 Day
- Method: LTM-INO-4140 Turbidity by Nephelometric Method			
Metals M8 filtered	Melbourne	Mar 05, 2018	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			
Nitrogens (speciated)			
Ammonia (as N)	Melbourne	Mar 05, 2018	28 Day
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Mar 05, 2018	28 Day
- Method: APHA 4500-NO3/NO2 Nitrate-Nitrite Nitrogen by FIA			
Nitrate (as N)	Melbourne	Mar 05, 2018	7 Day
- Method: APHA 4500-NO3 Nitrate Nitrogen by FIA			
Nitrite (as N)	Melbourne	Mar 05, 2018	2 Day
- Method: APHA 4500-NO2 Nitrite Nitrogen by FIA			
Organic Nitrogen (as N)	Melbourne	Mar 02, 2018	7 Day
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 05, 2018	7 Day
- Method: APHA 4500 TKN			

Repeat Samples

Description	Testing Site	Extracted	Holding Time
Nitrogens (speciated)			
Nitrate & Nitrite (as N)	Melbourne	Mar 08, 2018	28 Day
- Method: APHA 4500-NO3/NO2 Nitrate-Nitrite Nitrogen by FIA			
Nitrate (as N)	Melbourne	Mar 08, 2018	7 Day
- Method: APHA 4500-NO3 Nitrate Nitrogen by FIA			
Nitrite (as N)	Melbourne	Mar 08, 2018	2 Day
- Method: APHA 4500-NO2 Nitrite Nitrogen by FIA			

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Site # 23736

Company Name:	Aurecon Australia (BRIS) Pty Ltd	**Order No.:**	23200	**Received:**	Mar 2, 2018 1:40 PM
Address:	Level 14, 32 Turbot St Brisbane QLD 4001	**Report #:**	587469	**Due:**	Mar 9, 2018
		Phone:	07 3173 8000	**Priority:**	5 Day
		Fax:	+61 7 3173 8001	**Contact Name:**	LEESA LEATHBRIDGE
Project Name:	BASELINE SURFACE WATER MONITORING				
Project ID:	INLAND RAIL PROJECT				

Eurofins | mgt Analytical Services Manager : Ryan Gilbert

Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (expressed as TDS)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																		
Brisbane Laboratory - NATA Site # 20794																		
Perth Laboratory - NATA Site # 23736																		
External Laboratory																		
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**													
1	G2H 1A	Mar 01, 2018		Water	B18-Ma02442	X	X	X	X	X	X	X	X	X	X	X	X	X
2	G2H DUP1	Mar 01, 2018		Water	B18-Ma02443	X	X	X	X	X	X	X	X	X	X	X	X	X
3	G2H TRIP1	Mar 01, 2018		Water	B18-Ma02444	X	X	X	X	X	X	X	X	X	X	X	X	X
4	G2H 2A	Mar 01, 2018		Water	B18-Ma02446	X	X	X	X	X	X	X	X	X	X	X	X	X
5	G2H 3A	Mar 01, 2018		Water	B18-Ma02447	X	X	X	X	X	X	X	X	X	X	X	X	X
6	H2C 2A	Mar 01, 2018		Water	B18-Ma02448	X	X	X	X	X	X	X	X	X	X	X	X	X
7	H2C 13A	Mar 02, 2018		Water	B18-Ma02449	X	X	X	X	X	X	X	X	X	X	X	X	X
8	H2C 14A	Mar 02, 2018		Water	B18-Ma02450	X	X	X	X	X	X	X	X	X	X	X	X	X
9	H2C 17A	Mar 02, 2018		Water	B18-Ma02451	X	X	X	X	X	X	X	X	X	X	X	X	X

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Company Name: Aurecon Australia (BRIS) Pty Ltd
Address: Level 14, 32 Turbot St
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Project Name: BASELINE SURFACE WATER MONITORING
Project ID: INLAND RAIL PROJECT

Order No.: 23200
Report #: 587469
Phone: 07 3173 8000
Fax: +61 7 3173 8001

Received: Mar 2, 2018 1:40 PM
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Contact Name: LEESA LEATHBRIDGE

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Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (expressed as TDS)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																		
Brisbane Laboratory - NATA Site # 20794																		
Perth Laboratory - NATA Site # 23736																		
10	C2K 1A (ALT)	Mar 02, 2018		Water	B18-Ma02452	X	X	X	X	X	X	X	X	X	X	X	X	X
11	C2K 11A	Feb 27, 2018		Water	B18-Ma02453	X	X	X	X	X	X	X	X	X	X	X	X	X
12	C2K 10A	Feb 27, 2018		Water	B18-Ma02454	X	X	X	X	X	X	X	X	X	X	X	X	X
13	C2K 9A	Feb 27, 2018		Water	B18-Ma02455	X	X	X	X	X	X	X	X	X	X	X	X	X
14	C2K 7A	Feb 27, 2018		Water	B18-Ma02456	X	X	X	X	X	X	X	X	X	X	X	X	X
15	C2K 8A	Feb 28, 2018		Water	B18-Ma02457	X	X	X	X	X	X	X	X	X	X	X	X	X
16	C2K 7A (ALT)	Feb 28, 2018		Water	B18-Ma02458	X	X	X	X	X	X	X	X	X	X	X	X	X
17	C2K 13A	Feb 28, 2018		Water	B18-Ma02459	X	X	X	X	X	X	X	X	X	X	X	X	X
18	C2K 6A	Feb 28, 2018		Water	B18-Ma02460	X	X	X	X	X	X	X	X	X	X	X	X	X
19	C2K 12A	Feb 28, 2018		Water	B18-Ma02461	X	X	X	X	X	X	X	X	X	X	X	X	X
20	C2K 5A (1)	Feb 28, 2018		Water	B18-Ma02462	X	X	X	X	X	X	X	X	X	X	X	X	X
21	C2K 5A	Feb 28, 2018		Water	B18-Ma02463	X	X	X	X	X	X	X	X	X	X	X	X	X

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Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (expressed as TDS)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																		
Brisbane Laboratory - NATA Site # 20794																		
Perth Laboratory - NATA Site # 23736																		
22	C2K DUP1	Feb 28, 2018		Water	B18-Ma02464	X	X	X	X	X	X	X	X	X	X	X	X	X
23	C2K TRIP	Feb 28, 2018		Water	B18-Ma02465	X	X	X	X	X	X	X	X	X	X	X	X	X
24	C2K 14A	Feb 28, 2018		Water	B18-Ma02466	X	X	X	X	X	X	X	X	X	X	X	X	X
25	C2K 2A	Feb 28, 2018		Water	B18-Ma02467	X	X	X	X	X	X	X	X	X	X	X	X	X
26	H2C 11A	Mar 01, 2018		Water	B18-Ma02468	X	X	X	X	X	X	X	X	X	X	X	X	X
27	G2H 10A (ALT)	Mar 01, 2018		Water	B18-Ma02470	X	X	X	X	X	X	X	X	X	X	X	X	X
28	G2H 9A	Mar 01, 2018		Water	B18-Ma02471	X	X	X	X	X	X	X	X	X	X	X	X	X
29	G2H 7A (ALT)	Mar 01, 2018		Water	B18-Ma02473	X	X	X	X	X	X	X	X	X	X	X	X	X
30	G2H 6A	Mar 01, 2018		Water	B18-Ma02474	X	X	X	X	X	X	X	X	X	X	X	X	X
31	G2H 5A	Mar 01, 2018		Water	B18-Ma02475	X	X	X	X	X	X	X	X	X	X	X	X	X
32	G2H 4A	Mar 01, 2018		Water	B18-Ma02476	X	X	X	X	X	X	X	X	X	X	X	X	X

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Eurofins | mgt Analytical Services Manager : Ryan Gilbert

Sample Detail	Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	Dissolved Oxygen (% Saturation)	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (expressed as TDS)*	Suspended Solids	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271	X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217													
Brisbane Laboratory - NATA Site # 20794													
Perth Laboratory - NATA Site # 23736													
Test Counts	32	32	32	32	32	32	32	32	32	32	32	32	32

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

ug/L: micrograms per litre

ppb: Parts per billion

org/100mL: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	Units	Result	Repeat				Qualifying Code
Repeat Analysis								
Nitrate & Nitrite (as N)	B18-Ma02448	mg/L	37	41				
Nitrate (as N)	B18-Ma02448	mg/L	37	41				
Nitrite (as N)	B18-Ma02448	mg/L	0.34	< 0.4				
Test		**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Method Blank								
Polycyclic Aromatic Hydrocarbons								
Acenaphthene		mg/L	< 0.001			0.001	Pass	
Acenaphthylene		mg/L	< 0.001			0.001	Pass	
Anthracene		mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene		mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene		mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene		mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene		mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene		mg/L	< 0.001			0.001	Pass	
Chrysene		mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene		mg/L	< 0.001			0.001	Pass	
Fluoranthene		mg/L	< 0.001			0.001	Pass	
Fluorene		mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene		mg/L	< 0.001			0.001	Pass	
Naphthalene		mg/L	< 0.001			0.001	Pass	
Phenanthrene		mg/L	< 0.001			0.001	Pass	
Pyrene		mg/L	< 0.001			0.001	Pass	
Method Blank								
Ammonia (as N)		mg/L	< 0.01			0.01	Pass	
Chlorophyll a		ug/L	< 5			5	Pass	
Dissolved Oxygen (% Saturation)		%	98				N/A	
Nitrate & Nitrite (as N)		mg/L	< 0.05			0.05	Pass	
Nitrate (as N)		mg/L	< 0.02			0.02	Pass	
Nitrite (as N)		mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)		mg/L	< 0.05			0.05	Pass	
Phosphorus reactive (as P)		mg/L	< 0.05			0.05	Pass	
Suspended Solids		mg/L	< 1			1	Pass	
Total Kjeldahl Nitrogen (as N)		mg/L	< 0.2			0.2	Pass	
Turbidity		NTU	< 1			1	Pass	
Method Blank								
Heavy Metals								
Arsenic (filtered)		mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)		mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)		mg/L	< 0.001			0.001	Pass	
Copper (filtered)		mg/L	< 0.001			0.001	Pass	
Lead (filtered)		mg/L	< 0.001			0.001	Pass	
Mercury (filtered)		mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)		mg/L	< 0.001			0.001	Pass	
Zinc (filtered)		mg/L	< 0.005			0.005	Pass	
LCS - % Recovery								
Polycyclic Aromatic Hydrocarbons								
Acenaphthene		%	106			70-130	Pass	
Acenaphthylene		%	110			70-130	Pass	
Anthracene		%	96			70-130	Pass	
Benz(a)anthracene		%	96			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(a)pyrene	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	%	76			70-130	Pass	
Benzo(g.h.i)perylene	%	89			70-130	Pass	
Benzo(k)fluoranthene	%	84			70-130	Pass	
Chrysene	%	84			70-130	Pass	
Dibenz(a.h)anthracene	%	120			70-130	Pass	
Fluoranthene	%	80			70-130	Pass	
Fluorene	%	109			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	124			70-130	Pass	
Naphthalene	%	95			70-130	Pass	
Phenanthrene	%	102			70-130	Pass	
Pyrene	%	104			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	109			70-130	Pass	
Nitrate & Nitrite (as N)	%	103			70-130	Pass	
Nitrate (as N)	%	83			70-130	Pass	
Nitrite (as N)	%	110			70-130	Pass	
Phosphate total (as P)	%	89			70-130	Pass	
Phosphorus reactive (as P)	%	106			70-130	Pass	
Suspended Solids	%	98			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	91			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	90			80-120	Pass	
Cadmium (filtered)	%	92			80-120	Pass	
Chromium (filtered)	%	92			80-120	Pass	
Copper (filtered)	%	93			80-120	Pass	
Lead (filtered)	%	96			80-120	Pass	
Mercury (filtered)	%	102			70-130	Pass	
Nickel (filtered)	%	93			80-120	Pass	
Zinc (filtered)	%	94			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	M18-Ma03965	NCP	%	92			70-130	Pass	
Cadmium (filtered)	M18-Ma03965	NCP	%	96			70-130	Pass	
Chromium (filtered)	M18-Ma03965	NCP	%	97			70-130	Pass	
Copper (filtered)	M18-Ma03965	NCP	%	92			70-130	Pass	
Lead (filtered)	M18-Ma03965	NCP	%	100			70-130	Pass	
Mercury (filtered)	P18-Ma01481	NCP	%	81			70-130	Pass	
Nickel (filtered)	M18-Ma03965	NCP	%	96			70-130	Pass	
Zinc (filtered)	M18-Ma03965	NCP	%	96			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B18-Ma02448	CP	%	101			70-130	Pass	
Nitrite (as N)	B18-Ma02448	CP	%	106			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B18-Ma02451	CP	%	78			70-130	Pass	
Acenaphthylene	B18-Ma02451	CP	%	90			70-130	Pass	
Anthracene	B18-Ma02451	CP	%	84			70-130	Pass	
Benz(a)anthracene	B18-Ma02451	CP	%	86			70-130	Pass	
Benzo(a)pyrene	B18-Ma02451	CP	%	74			70-130	Pass	
Benzo(b&j)fluoranthene	B18-Ma02451	CP	%	106			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g.h.i)perylene	B18-Ma02451	CP	%	72			70-130	Pass	
Benzo(k)fluoranthene	B18-Ma02451	CP	%	119			70-130	Pass	
Chrysene	B18-Ma02451	CP	%	86			70-130	Pass	
Dibenz(a.h)anthracene	B18-Ma02451	CP	%	100			70-130	Pass	
Fluoranthene	B18-Ma02451	CP	%	98			70-130	Pass	
Fluorene	B18-Ma02451	CP	%	74			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B18-Ma02451	CP	%	92			70-130	Pass	
Naphthalene	B18-Ma02451	CP	%	112			70-130	Pass	
Phenanthrene	B18-Ma02451	CP	%	82			70-130	Pass	
Pyrene	B18-Ma02451	CP	%	100			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B18-Ma02451	CP	%	95			70-130	Pass	
Nitrate & Nitrite (as N)	B18-Ma02451	CP	%	94			70-130	Pass	
Nitrate (as N)	B18-Ma02451	CP	%	93			70-130	Pass	
Nitrite (as N)	B18-Ma02451	CP	%	120			70-130	Pass	
Phosphate total (as P)	B18-Ma02451	CP	%	85			70-130	Pass	
Spike - % Recovery									
				Result 1					
Phosphorus reactive (as P)	B18-Ma02453	CP	%	89			70-130	Pass	
Spike - % Recovery									
				Result 1					
Phosphorus reactive (as P)	B18-Ma02463	CP	%	90			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B18-Ma02467	CP	%	77			70-130	Pass	
Acenaphthylene	B18-Ma02467	CP	%	83			70-130	Pass	
Anthracene	B18-Ma02467	CP	%	85			70-130	Pass	
Benz(a)anthracene	B18-Ma02467	CP	%	86			70-130	Pass	
Benzo(a)pyrene	B18-Ma02467	CP	%	78			70-130	Pass	
Benzo(b&j)fluoranthene	B18-Ma02467	CP	%	75			70-130	Pass	
Benzo(g.h.i)perylene	B18-Ma02467	CP	%	86			70-130	Pass	
Benzo(k)fluoranthene	B18-Ma02467	CP	%	78			70-130	Pass	
Chrysene	B18-Ma02467	CP	%	85			70-130	Pass	
Dibenz(a.h)anthracene	B18-Ma02467	CP	%	82			70-130	Pass	
Fluoranthene	B18-Ma02467	CP	%	106			70-130	Pass	
Fluorene	B18-Ma02467	CP	%	78			70-130	Pass	
Indeno(1.2.3-cd)pyrene	B18-Ma02467	CP	%	77			70-130	Pass	
Naphthalene	B18-Ma02467	CP	%	90			70-130	Pass	
Phenanthrene	B18-Ma02467	CP	%	83			70-130	Pass	
Pyrene	B18-Ma02467	CP	%	104			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	B18-Ma02468	CP	%	110			70-130	Pass	
Nitrate & Nitrite (as N)	B18-Ma02468	CP	%	82			70-130	Pass	
Nitrate (as N)	B18-Ma02468	CP	%	82			70-130	Pass	
Nitrite (as N)	B18-Ma02468	CP	%	119			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B18-Ma02442	CP	uS/cm	760	760	<1	30%	Pass	
pH (at 25°C)	B18-Ma02442	CP	pH Units	8.0	8.0	pass	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	M18-Ma04999	NCP	mg/L	0.066	0.066	1.0	30%	Pass	
Cadmium (filtered)	M18-Ma04999	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	M18-Ma04999	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	M18-Ma04999	NCP	mg/L	0.046	0.046	<1	30%	Pass	
Lead (filtered)	M18-Ma04999	NCP	mg/L	0.003	0.003	1.0	30%	Pass	
Mercury (filtered)	M18-Ma04999	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	M18-Ma04999	NCP	mg/L	0.016	0.016	2.0	30%	Pass	
Zinc (filtered)	M18-Ma04999	NCP	mg/L	0.11	0.11	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen (% Saturation)	B18-Ma02447	CP	%	93	93	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	B18-Ma02448	CP	mg/L	0.03	0.03	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen	B18-Ma02449	CP	mg/L	6.9	7.1	2.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	B18-Ma02450	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	B18-Ma02451	CP	mg/L	0.02	0.02	12	30%	Pass	
Conductivity (at 25°C)	B18-Ma02451	CP	uS/cm	340	350	2.0	30%	Pass	
Nitrate & Nitrite (as N)	B18-Ma02451	CP	mg/L	0.19	0.20	7.0	30%	Pass	
Nitrate (as N)	B18-Ma02451	CP	mg/L	0.16	0.18	11	30%	Pass	
Nitrite (as N)	B18-Ma02451	CP	mg/L	0.03	0.03	17	30%	Pass	
pH (at 25°C)	B18-Ma02451	CP	pH Units	8.3	8.3	pass	30%	Pass	
Turbidity	B18-Ma02451	CP	NTU	8.4	8.0	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphorus reactive (as P)	B18-Ma02453	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen (% Saturation)	B18-Ma02457	CP	%	87	88	1.0	30%	Pass	
Suspended Solids	B18-Ma02457	CP	mg/L	7.7	9.3	20	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen	B18-Ma02459	CP	mg/L	7.4	7.4	1.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B18-Ma02461	CP	uS/cm	180	180	1.0	30%	Pass	
pH (at 25°C)	B18-Ma02461	CP	pH Units	7.3	7.4	pass	30%	Pass	
Turbidity	B18-Ma02461	CP	NTU	97	96	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphorus reactive (as P)	B18-Ma02463	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	B18-Ma02466	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen (% Saturation)	B18-Ma02467	CP	%	65	67	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	B18-Ma02468	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Nitrate & Nitrite (as N)	B18-Ma02468	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Nitrate (as N)	B18-Ma02468	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Nitrite (as N)	B18-Ma02468	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen	B18-Ma02470	CP	mg/L	4.6	4.4	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Phosphate total (as P)	B18-Ma02473	CP	mg/L	0.09	0.09	3.0	30%	Pass	
Total Kjeldahl Nitrogen (as N)	B18-Ma02473	CP	mg/L	1.2	1.5	22	30%	Pass	
Turbidity	B18-Ma02473	CP	NTU	210	210	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (at 25°C)	B18-Ma02475	CP	uS/cm	950	960	1.0	30%	Pass	
pH (at 25°C)	B18-Ma02475	CP	pH Units	8.6	8.6	pass	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chlorophyll a	B18-Ma02476	CP	ug/L	< 5	< 5	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Comments

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ryan Gilbert	Analytical Services Manager
Alex Petridis	Senior Analyst-Metal (VIC)
Jonathon Angell	Senior Analyst-Inorganic (QLD)
Joseph Edouard	Senior Analyst-Organic (VIC)
Michael Brancati	Senior Analyst-Inorganic (VIC)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Surface water quality results – Round 3 (March 2019)

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Eurofins | mgt Sydney Lab — Unit F3 Building F, 16 Mars Road, Lane Cove West, NSW 2066 P: +61 2 9900 8400 E: EnviroSampleNSW@eurofins.com.au

☑ Eurofins | mgt Brisbane Lab — Unit 1, 21 Smallwood Place, Murarrie, QLD 4172 P: +61 7 3902 4600 E: EnviroSampleQLD@eurofins.com.au

☐ Eurofins | mgt Melbourne Lab — 2 Kingston Town Close, Oakleigh, VIC 3166 P: +61 3 8564 5000 F: +61 3 8564 5090 E: EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	23200	Project Manager	Shannah Brown
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail Project
Contact Name	James Bone				
Contact Phone №	james.bone@aurecongroup.com				
Special Direction	#3 eskies in total				
Relinquished by (Signature)					
(Time / Date)	5:20 13/3/19				

Project Name	Baseline Surface Water Monitoring
Electronic Results Format	
Email for Results	james.bone@aurecongroup.com gabriella.singh@aurecongroup.com
Turn Around Requirements	☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* * Surcharges apply ☑ 5 DAY (Std.) ☐ Other ( )

Containers — Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

№	Client Sample ID	Date	Matrix	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual and specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	60 ml plastic	Sample Comments / DG Hazard Warning
1	G2H 1A	11/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
2	G2H 2A	11/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
3	G2H 3A	11/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
4	G2H 9A	11/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
5	G2H Duplicate 1	11/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
6	H2C 4A	12/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
7	H2C Duplicate 2	12/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
8	H2C 3A	12/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
9	H2C 18A	12/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
10	C2K 5A	13/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
11	C2K 6A	13/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	
12	C2K 13A	13/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2		1					2	

Laboratory Use Only						
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	13/3/19	Time	17:29	Signature		Temperature	22.2 °C
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	__/__/__	Time	__:__	Signature		Report №	645158

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Eurofins | mgt Sydney Lab — Unit F3 Building F, 16 Mars Road, Lane Cove West, NSW 2066 — P : +61 2 9900 8400 — E : EnviroSampleNSW@eurofins.com.au

☑ Eurofins | mgt Brisbane Lab — Unit 1, 21 Smallwood Place, Murarrie, QLD 4172 — P : +61 7 3902 4600 — E : EnviroSampleQLD@eurofins.com.au

☐ Eurofins | mgt Melbourne Lab — 2 Kingston Town Close, Oakleigh, VIC 3166 — P : +61 3 8564 5000 — F : +61 3 8564 5090 — E : EnviroSampleVic@eurofins.com.au

Company	Aurecon	Purchase Order	23200	Project Manager	Shannah Brown
Address	Level 14, 32 Turbot Street, Brisbane, QLD	Eurofins | mgt Quote №	160329AUR	Project №	Inland Rail Project
Contact Name	James Bone				
Contact Phone №	james.bone@aurecongroup.com				
Special Direction	# 3 eskies in total				
Relinquished by (Signature)					
(Time / Date)	5:29 13/3/19				

Project Name	Baseline Surface Water Monitoring
Electronic Results Format	
Email for Results	james.bone@aurecongroup.com gabriella.singh@aurecongroup.com
Turn Around Requirements	☐ 1 DAY* ☐ 2 DAY* ☐ 3 DAY* (* Surcharges apply) ☑ 5 DAY (Std.) ☐ Other ( )

Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")

№	Client Sample ID	Date	Matrix	pH	Suspended Solids (SS)	Turbidity	Speciated nitrogens (ammonia, nitrate, nitrite, organic nitrogen, oxidised nitrogen, total kjeldahl nitrogen, total nitrogen)	Electrical conductivity (Actual and specific)	M8 - 8 metals	Total Phosphorus	Reactive Phosphorus	Chlorophyll a	Polycyclic aromatic hydrocarbons (PAH)	Salinity (ppt)	Dissolved oxygen (% saturation)	Dissolved oxygen (mg/L)	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL vial	125mL Amber Glass	Jar	60 ml plastic	Sample Comments / DG Hazard Warning
1	C2K 10A	13/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
2	C2K duplicate 3	13/3/19	W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
3			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
4			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
5			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
6			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
7			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
8			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
9			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
10			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
11			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	
12			W	X	X	X	X	X	X	X	X	X	X	X	X	X	2			1				2	

Method of Shipment: ☐ Courier (#) ☑ Hand Delivered ☐ Postal

Laboratory Use Only							
Received By		SYD | (BNE) | MEL | PER | ADL | NEW | DAR	Date	13/3/19	Time	17:29	Signature
Received By		SYD | BNE | MEL | PER | ADL | NEW | DAR	Date	__/__/__	Time	__:__	Signature

Temperature: 22.2c

Report №: 645158

Aurecon Australia (BRIS) Pty Ltd
Level 14, 32 Turbot St
Brisbane
QLD 4001

NATA Accredited
Accreditation Number 1261
Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **James Bone**

Report **645158-W**
Project name BASELINE SURFACE WATER MONITORING
Project ID INLAND RAIL PROJECT
Received Date Mar 13, 2019

Client Sample ID			**G2H1A**	**G2H 2A**	**G2H 3A**	**G2H 9A**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15933**	**B19-Ma15934**	**B19-Ma15935**	**B19-Ma15936**
Date Sampled			**Mar 11, 2019**	**Mar 11, 2019**	**Mar 11, 2019**	**Mar 11, 2019**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	50	65	64	52
p-Terphenyl-d14 (surr.)	1	%	123	62	65	54
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01	< 0.01	0.04
Chlorophyll a	5	ug/L	< 5	< 5	< 5	7.5
Conductivity (at 25°C)	1	uS/cm	920	440	380	1800
Dissolved Oxygen	0.01	mg/L	9.1	9.2	9.0	9.0
Nitrate & Nitrite (as N)	0.05	mg/L	2.1	0.71	1.1	< 0.05
Nitrate (as N)	0.02	mg/L	2.1	0.70	1.0	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	1.1	< 0.2	1.2	0.42
pH (at 25°C)	0.1	pH Units	8.3	8.5	8.3	8.4
Phosphate total (as P)	0.01	mg/L	0.12	0.04	0.06	0.01
Phosphorus reactive (as P)	0.01	mg/L	0.10	0.02	0.03	0.01
Salinity (determined from EC)*	20	mg/L	450	210	180	930
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.1	< 0.2	1.2	0.5
Total Nitrogen (as N)	0.2	mg/L	3.2	0.71	1.3	0.46
Total Suspended Solids Dried at 103–105°C	1	mg/L	13	3.8	4.9	13
Turbidity	1	NTU	2.5	1.8	2.1	7.1

Client Sample ID			G2H1A	G2H 2A	G2H 3A	G2H 9A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15933**	**B19-Ma15934**	**B19-Ma15935**	**B19-Ma15936**
Date Sampled			**Mar 11, 2019**	**Mar 11, 2019**	**Mar 11, 2019**	**Mar 11, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.001	0.001	< 0.001
Zinc (filtered)	0.005	mg/L	0.025	< 0.005	< 0.005	< 0.005

Client Sample ID			G2H DUPLICATE 1	H2C 4A	H2C DUPLICATE 2	H2C 3A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15937**	**B19-Ma15938**	**B19-Ma15939**	**B19-Ma15940**
Date Sampled			**Mar 11, 2019**	**Mar 12, 2019**	**Mar 12, 2019**	**Mar 12, 2019**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	56	54	59	112
p-Terphenyl-d14 (surr.)	1	%	53	51	56	108
Ammonia (as N)	0.01	mg/L	0.06	< 0.01	< 0.01	0.18
Chlorophyll a	5	ug/L	7.5	6.4	21	< 5
Conductivity (at 25°C)	1	uS/cm	1700	480	490	710
Dissolved Oxygen	0.01	mg/L	9.0	9.0	9.0	9.0
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.35	0.67	0.71	0.70
pH (at 25°C)	0.1	pH Units	8.4	8.7	8.7	9.1
Phosphate total (as P)	0.01	mg/L	< 0.01	0.10	0.06	0.06
Phosphorus reactive (as P)	0.01	mg/L	0.01	0.01	0.03	0.05
Salinity (determined from EC)*	20	mg/L	880	230	240	340

Client Sample ID			G2H DUPLICATE 1	H2C 4A	H2C DUPLICATE 2	H2C 3A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15937**	**B19-Ma15938**	**B19-Ma15939**	**B19-Ma15940**
Date Sampled			**Mar 11, 2019**	**Mar 12, 2019**	**Mar 12, 2019**	**Mar 12, 2019**
Test/Reference	LOR	Unit				
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.4	0.7	0.7	0.9
Total Nitrogen (as N)	0.2	mg/L	0.41	0.67	0.71	0.88
Total Suspended Solids Dried at 103–105°C	1	mg/L	12	67	49	11
Turbidity	1	NTU	6.6	42	24	2.9
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.002	< 0.001	< 0.001	0.002
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	0.002	0.002	0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	0.005

Client Sample ID			H2C 18A	C2K 5A	C2K 6A	C2K 13A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15941**	**B19-Ma15942**	**B19-Ma15943**	**B19-Ma15944**
Date Sampled			**Mar 12, 2019**	**Mar 13, 2019**	**Mar 13, 2019**	**Mar 13, 2019**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	71	53	51	67
p-Terphenyl-d14 (surr.)	1	%	74	50	57	79
Ammonia (as N)	0.01	mg/L	0.20	< 0.01	0.67	< 0.01
Chlorophyll a	5	ug/L	18	32	< 5	20
Conductivity (at 25°C)	1	uS/cm	3000	380	3400	2000
Dissolved Oxygen	0.01	mg/L	8.7	9.1	8.5	8.9
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05	0.06	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	0.06	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02

Client Sample ID			H2C 18A	C2K 5A	C2K 6A	C2K 13A
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15941**	**B19-Ma15942**	**B19-Ma15943**	**B19-Ma15944**
Date Sampled			**Mar 12, 2019**	**Mar 13, 2019**	**Mar 13, 2019**	**Mar 13, 2019**
Test/Reference	LOR	Unit				
Organic Nitrogen (as N)	0.2	mg/L	1.3	1.6	1.2	0.59
pH (at 25°C)	0.1	pH Units	6.3	9.1	8.3	8.4
Phosphate total (as P)	0.01	mg/L	0.01	0.01	0.02	0.01
Phosphorus reactive (as P)	0.01	mg/L	0.01	0.01	0.01	0.01
Salinity (determined from EC)*	20	mg/L	1600	180	1800	1000
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	1.3	1.6	1.9	0.6
Total Nitrogen (as N)	0.2	mg/L	1.3	1.6	1.9	0.59
Total Suspended Solids Dried at 103–105°C	1	mg/L	21	36	42	24
Turbidity	1	NTU	18	21	34	9.7
Heavy Metals						
Arsenic (filtered)	0.001	mg/L	0.002	0.002	0.001	0.006
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	0.004	< 0.001	0.003	0.002
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005

Client Sample ID			C2K 10A	C2K DUPLICATE 3
Sample Matrix			**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15945**	**B19-Ma15946**
Date Sampled			**Mar 13, 2019**	**Mar 13, 2019**
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	0.001	mg/L	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	74	79
p-Terphenyl-d14 (surr.)	1	%	78	80

Client Sample ID			C2K 10A	C2K DUPLICATE 3
Sample Matrix			**Water**	**Water**
Eurofins | mgt Sample No.			**B19-Ma15945**	**B19-Ma15946**
Date Sampled			**Mar 13, 2019**	**Mar 13, 2019**
Test/Reference	LOR	Unit		
Ammonia (as N)	0.01	mg/L	< 0.01	< 0.01
Chlorophyll a	5	ug/L	< 5	< 5
Conductivity (at 25°C)	1	uS/cm	2700	2700
Dissolved Oxygen	0.01	mg/L	9.0	9.0
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	< 0.05
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02
Nitrite (as N)	0.02	mg/L	< 0.02	< 0.02
Organic Nitrogen (as N)	0.2	mg/L	0.29	0.34
pH (at 25°C)	0.1	pH Units	8.2	8.4
Phosphate total (as P)	0.01	mg/L	0.01	< 0.01
Phosphorus reactive (as P)	0.01	mg/L	0.01	0.10
Salinity (determined from EC)*	20	mg/L	1400	1400
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.3	0.3
Total Nitrogen (as N)	0.2	mg/L	0.29	0.34
Total Suspended Solids Dried at 103–105°C	1	mg/L	13	10
Turbidity	1	NTU	7.4	5.2
Heavy Metals				
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001
Cadmium (filtered)	0.0002	mg/L	< 0.0002	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001
Nickel (filtered)	0.001	mg/L	< 0.001	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Melbourne	Mar 15, 2019	7 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Chlorophyll a	Melbourne	Mar 20, 2019	2 Day
- Method: LTM-INO-4340 Chlorophyll a in Waters			
Conductivity (at 25°C)	Melbourne	Mar 18, 2019	28 Day
- Method: LTM-INO-4030 Conductivity			
Dissolved Oxygen	Melbourne	Mar 16, 2019	1 Day
- Method: LTM-INO-4130 Determination of Dissolved Oxygen using a DO meter			
pH (at 25°C)	Melbourne	Mar 18, 2019	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Phosphate total (as P)	Melbourne	Mar 15, 2019	28 Day
- Method: APHA 4500-P E. Phosphorus			
Phosphorus reactive (as P)	Melbourne	Mar 15, 2019	2 Day
- Method: APHA4500-PO4			
Salinity (determined from EC)*	Melbourne	Mar 18, 2019	0 Day
- Method: LTM-INO-4030			
Total Suspended Solids Dried at 103–105°C	Melbourne	Mar 15, 2019	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Turbidity	Melbourne	Mar 20, 2019	2 Day
- Method: Turbidity by classical using APHA 2130B (LTM-INO-4140)			
Metals M8 filtered	Brisbane	Mar 14, 2019	28 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Nitrogens (speciated)			
Ammonia (as N)	Melbourne	Mar 15, 2019	28 Day
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Mar 15, 2019	28 Day
- Method: APHA 4500-NO3/NO2 Nitrate-Nitrite Nitrogen by FIA			
Nitrate (as N)	Melbourne	Mar 15, 2019	28 Day
- Method: APHA 4500-NO3 Nitrate Nitrogen by FIA			
Nitrite (as N)	Melbourne	Mar 15, 2019	2 Day
- Method: APHA 4500-NO2 Nitrite Nitrogen by FIA			
Organic Nitrogen (as N)	Melbourne	Mar 13, 2019	7 Day
- Method: APHA 4500 Organic Nitrogen (N)			
Total Kjeldahl Nitrogen (as N)	Melbourne	Mar 15, 2019	7 Day
- Method: LTM-INO-4040 Phosphate and Nitrogen in waters by Continuous Flow Analysis (CFA)			

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Project ID: INLAND RAIL PROJECT

Order No.: 23200
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Received: Mar 13, 2019 5:29 PM
Due: Mar 20, 2019
Priority: 5 Day
Contact Name: James Bone

Eurofins | mgt Analytical Services Manager : Ryan Gilbert

Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (determined from EC)*	Total Suspended Solids Dried at 103–105°C	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X		X
Sydney Laboratory - NATA Site # 18217																	
Brisbane Laboratory - NATA Site # 20794																X	
Perth Laboratory - NATA Site # 23736																	
External Laboratory																	
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
1	G2H1A	Mar 11, 2019		Water	B19-Ma15933	X	X	X	X	X	X	X	X	X	X	X	X
2	G2H 2A	Mar 11, 2019		Water	B19-Ma15934	X	X	X	X	X	X	X	X	X	X	X	X
3	G2H 3A	Mar 11, 2019		Water	B19-Ma15935	X	X	X	X	X	X	X	X	X	X	X	X
4	G2H 9A	Mar 11, 2019		Water	B19-Ma15936	X	X	X	X	X	X	X	X	X	X	X	X
5	G2H DUPLICATE 1	Mar 11, 2019		Water	B19-Ma15937	X	X	X	X	X	X	X	X	X	X	X	X
6	H2C 4A	Mar 12, 2019		Water	B19-Ma15938	X	X	X	X	X	X	X	X	X	X	X	X
7	H2C DUPLICATE 2	Mar 12, 2019		Water	B19-Ma15939	X	X	X	X	X	X	X	X	X	X	X	X
8	H2C 3A	Mar 12, 2019		Water	B19-Ma15940	X	X	X	X	X	X	X	X	X	X	X	X

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Received: Mar 13, 2019 5:29 PM
Due: Mar 20, 2019
Priority: 5 Day
Contact Name: James Bone

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Sample Detail						Chlorophyll a	Conductivity (at 25°C)	Dissolved Oxygen	pH (at 25°C)	Phosphate total (as P)	Phosphorus reactive (as P)	Salinity (determined from EC)*	Total Suspended Solids Dried at 103–105°C	Turbidity	Polycyclic Aromatic Hydrocarbons	Metals M8	Nitrogens (speciated)
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X	X	X	X		X
Sydney Laboratory - NATA Site # 18217																	
Brisbane Laboratory - NATA Site # 20794																X	
Perth Laboratory - NATA Site # 23736																	
9	H2C 18A	Mar 12, 2019		Water	B19-Ma15941	X	X	X	X	X	X	X	X	X	X	X	X
10	C2K 5A	Mar 13, 2019		Water	B19-Ma15942	X	X	X	X	X	X	X	X	X	X	X	X
11	C2K 6A	Mar 13, 2019		Water	B19-Ma15943	X	X	X	X	X	X	X	X	X	X	X	X
12	C2K 13A	Mar 13, 2019		Water	B19-Ma15944	X	X	X	X	X	X	X	X	X	X	X	X
13	C2K 10A	Mar 13, 2019		Water	B19-Ma15945	X	X	X	X	X	X	X	X	X	X	X	X
14	C2K DUPLICATE 3	Mar 13, 2019		Water	B19-Ma15946	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						14	14	14	14	14	14	14	14	14	14	14	14

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure, April 2011 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.2 2018
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.2 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chlorophyll a	ug/L	< 5			5	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Phosphorus reactive (as P)	mg/L	0.01			0.01	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103–105°C	mg/L	< 1			1	Pass	
Turbidity	NTU	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	81			70-130	Pass	
Acenaphthylene	%	80			70-130	Pass	
Anthracene	%	74			70-130	Pass	
Benz(a)anthracene	%	104			70-130	Pass	
Benzo(a)pyrene	%	119			70-130	Pass	
Benzo(b&j)fluoranthene	%	118			70-130	Pass	
Benzo(g.h.i)perylene	%	121			70-130	Pass	
Benzo(k)fluoranthene	%	121			70-130	Pass	
Chrysene	%	119			70-130	Pass	
Dibenz(a.h)anthracene	%	114			70-130	Pass	
Fluoranthene	%	95			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluorene	%	89			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	71			70-130	Pass	
Naphthalene	%	70			70-130	Pass	
Phenanthrene	%	92			70-130	Pass	
Pyrene	%	93			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	100			70-130	Pass	
Nitrate & Nitrite (as N)	%	100			70-130	Pass	
Nitrate (as N)	%	100			70-130	Pass	
Nitrite (as N)	%	119			70-130	Pass	
Phosphate total (as P)	%	113			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	91			70-130	Pass	
Total Suspended Solids Dried at 103–105°C	%	108			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	89			80-120	Pass	
Cadmium (filtered)	%	88			80-120	Pass	
Chromium (filtered)	%	90			80-120	Pass	
Copper (filtered)	%	89			80-120	Pass	
Lead (filtered)	%	88			80-120	Pass	
Mercury (filtered)	%	94			70-130	Pass	
Nickel (filtered)	%	90			80-120	Pass	
Zinc (filtered)	%	89			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M19-Ma16921	NCP	%	92			70-130	Pass	
Nitrate & Nitrite (as N)	M19-Ma16921	NCP	%	92			70-130	Pass	
Nitrate (as N)	M19-Ma16921	NCP	%	92			70-130	Pass	
Nitrite (as N)	M19-Ma16921	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	B19-Ma15933	CP	%	100			70-130	Pass	
Cadmium (filtered)	B19-Ma15933	CP	%	99			70-130	Pass	
Chromium (filtered)	B19-Ma15933	CP	%	83			70-130	Pass	
Copper (filtered)	B19-Ma15933	CP	%	80			70-130	Pass	
Lead (filtered)	B19-Ma15933	CP	%	81			70-130	Pass	
Mercury (filtered)	B19-Ma15933	CP	%	82			70-130	Pass	
Nickel (filtered)	B19-Ma15933	CP	%	83			70-130	Pass	
Zinc (filtered)	B19-Ma15933	CP	%	82			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	B19-Ma15938	CP	%	98			70-130	Pass	
Acenaphthylene	B19-Ma15938	CP	%	94			70-130	Pass	
Anthracene	B19-Ma15938	CP	%	85			70-130	Pass	
Benz(a)anthracene	B19-Ma15938	CP	%	96			70-130	Pass	
Benzo(a)pyrene	B19-Ma15938	CP	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	B19-Ma15938	CP	%	104			70-130	Pass	
Benzo(g.h.i)perylene	B19-Ma15938	CP	%	89			70-130	Pass	
Benzo(k)fluoranthene	B19-Ma15938	CP	%	77			70-130	Pass	
Chrysene	B19-Ma15938	CP	%	78			70-130	Pass	
Dibenz(a.h)anthracene	B19-Ma15938	CP	%	80			70-130	Pass	
Fluoranthene	B19-Ma15938	CP	%	74			70-130	Pass	
Fluorene	B19-Ma15938	CP	%	92			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Indeno(1.2.3-cd)pyrene	B19-Ma15938	CP	%	70			70-130	Pass	
Naphthalene	B19-Ma15938	CP	%	76			70-130	Pass	
Phenanthrene	B19-Ma15938	CP	%	86			70-130	Pass	
Pyrene	B19-Ma15938	CP	%	75			70-130	Pass	
Spike - % Recovery									
				Result 1					
Phosphate total (as P)	B19-Ma15943	CP	%	102			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	B19-Ma15943	CP	%	94			70-130	Pass	
Cadmium (filtered)	B19-Ma15943	CP	%	96			70-130	Pass	
Chromium (filtered)	B19-Ma15943	CP	%	96			70-130	Pass	
Copper (filtered)	B19-Ma15943	CP	%	94			70-130	Pass	
Lead (filtered)	B19-Ma15943	CP	%	86			70-130	Pass	
Mercury (filtered)	B19-Ma15943	CP	%	89			70-130	Pass	
Nickel (filtered)	B19-Ma15943	CP	%	94			70-130	Pass	
Zinc (filtered)	B19-Ma15943	CP	%	93			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M19-Ma16921	NCP	mg/L	1.7	1.7	1.0	30%	Pass	
Chlorophyll a	B19-Ma15933	CP	ug/L	< 5	< 5	<1	30%	Pass	
Conductivity (at 25°C)	B19-Ma15933	CP	uS/cm	920	910	<1	30%	Pass	
Nitrate & Nitrite (as N)	M19-Ma16921	NCP	mg/L	0.45	0.44	2.0	30%	Pass	
Nitrate (as N)	M19-Ma16921	NCP	mg/L	0.45	0.44	2.0	30%	Pass	
Nitrite (as N)	M19-Ma16921	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
pH (at 25°C)	B19-Ma15933	CP	pH Units	8.3	8.3	pass	30%	Pass	
Phosphate total (as P)	B19-Ma15933	CP	mg/L	0.12	0.12	1.0	30%	Pass	
Salinity (determined from EC)*	M19-Ma16795	NCP	mg/L	630	650	3.0	30%	Pass	
Total Kjeldahl Nitrogen (as N)	B19-Ma15933	CP	mg/L	1.1	1.3	19	30%	Pass	
Turbidity	M19-Ma21125	NCP	NTU	1.8	1.8	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103–105°C	B19-Ma15675	NCP	mg/L	40	37	8.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	B19-Ma15937	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Dissolved Oxygen	B19-Ma15937	CP	mg/L	9.0	8.8	2.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	B19-Ma15942	CP	mg/L	0.002	0.002	2.0	30%	Pass	
Cadmium (filtered)	B19-Ma15942	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	B19-Ma15942	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	B19-Ma15942	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	B19-Ma15942	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	B19-Ma15942	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	B19-Ma15942	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	B19-Ma15942	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ryan Gilbert	Analytical Services Manager
Joseph Edouard	Senior Analyst-Organic (VIC)
Julie Kay	Senior Analyst-Inorganic (VIC)
Steven Trout	Senior Analyst-Metal (QLD)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

APPENDIX M

Surface Water Quality Technical Report

Appendix C General field assessment water quality conditions

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

Table C1 **Summary of the general conditions for the water quality C2K sampling sites (September 2017 to March 2019)**

Monitoring location and waterbody	Date	Water flow (none/ low/mod/ high/ flood/dry)	Turbidity (clear/ slight/ turbid/ opaque/ other)	Odour (normal/ sewage/ hydrocarbon/ chemical)	Surface condition (none/ dust/oily/ leafy/ algae)	Algae cover (none/ some/ lots)	Visual observation/ comments
C2K 1A Western Creek	Dry at time of sample						
	Dry at time of sample						
	Dry at time of sample						
C2K 1A (alt) Western Creek	29/09/2017	None	Slight	None	Leafy/dusty and oil sheen	Some (10-35%)	Bridge crossing Litter and debris
	02/03/2018	None (pool)	Turbid	None	None	None	-
	11/03/2019	No access at time of sample					
C2K 2A Bremer River	29/09/2017	Dry at time of sample					
	28/02/2018	Low	Turbid	None	None	None	-
	11/03/2019	Dry at time of sample					
C2K 3A Warrill Creek	28/09/2017	None	Clear	None	None	Some	Pump present
	28/02/2018	Dry time of sample					
	13/3/2019	No access at time of sample					
C2K 5A Impoundment	26/09/2017	None	Clear	Normal	None	None	Farm dam Water birds present Turtles
	28/02/2018	None	Slight	None	Pollen	None	Pollen on surface, ducks present
	13/03/2019	None (dam)	Opaque	Normal	None (minimal algae)	Minimal	Farm dam Water birds present
C2K 5A (1) Un-named watercourse	26/09/2017	Dry at time of sample					
	28/02/2018	None	Slight	None	None	None	-
	13/03/2019	Dry at time of sample					
C2K 6A Un-named tributary of Purga Creek	28/09/2017	None	Slight	Normal	Dusty/ leafy, slight sheen	None	Highly eroded banks Rock apron at culvert Stock grazing in road reserve
	28/02/2018	Moderate	Turbid	Normal	None	None	-
	13/03/2019	None (pool)	Turbid	Normal	Leafy/dusty	Minimal	Isolated pool

Monitoring location and waterbody	Date	Water flow (none/ low/mod/ high/ flood/dry)	Turbidity (clear/ slight/ turbid/ opaque/ other)	Odour (normal/ sewage/ hydrocarbon/ chemical)	Surface condition (none/ dust/oily/ leafy/ algae)	Algae cover (none/ some/ lots)	Visual observation/ comments
C2K 7A Dugandan Creek	27/09/2017	None	Turbid	None	Dusty/ oil sheen	Some	Highly eroded banks Cattle watering at site
	27/02/2018	High	Turbid	Normal	None	None	-
	13/03/2019	Dry at time of sample					
C2K 7A (alt) Un-named watercourse	27/09/2017	Dry at time of sample					
	28/02/2018	Moderate	Turbid	Normal	None	None	-
	13/03/2019	Dry at time of sample					
C2K 8A Dugandan Creek	27/09/2017	None	Opaque	Normal	Normal oily sheen, dusty and leafy	Some	-
	28/02/2018	High	Turbid	Normal	None	None	-
	13/03/2019	Dry at time of sample					
C2K 9A Woollaman Creek	25/09/2017	None	Clear	Normal	None	Some	In a road reserve Small bridge crossing
	27/02/2018	High	Turbid	Normal	None	None	-
	13/03/2019	Dry at time of sample (small pool under the bridge, considered too small and stagnant to be representative)					
C2K 10A Teviot Brook	25/08/2017	None	Opaque	None	Leafy/dusty	Some	Water truck pumping
	27/02/2018	High	Clear	Normal	None	None	Rusted car in bank of creek
	13/03/2019	None (pooled)	Turbid	Normal	None	Some	Typha present 3 RCP culvert
C2K 11A Impoundment	25/09/2017	None	Clear	None	None – with lily pads	Some	Farm dam Stock access
	27/02/2018	Moderate	Turbid	Normal	Slight dust and lily pads	None	-
	13/03/2019	No access at time of sample					
C2K 12A Un-named watercourse	28/09/2017	None	Opaque	None	Dusty/leafy	None	Eroded banks (high), stock access, lantana present
	28/02/2018	Moderate	Turbid	None	None	None	-
	13/03/2019	Dry at time of sample					

Monitoring location and waterbody	Date	Water flow (none/ low/mod/ high/ flood/dry)	Turbidity (clear/ slight/ turbid/ opaque/ other)	Odour (normal/ sewage/ hydrocarbon/ chemical)	Surface condition (none/ dust/oily/ leafy/ algae)	Algae cover (none/ some/ lots)	Visual observation/ comments
C2K 13A Un-named tributary of Purga Creek	26/09/2017	None	Clear	Normal	Leafy/dusty	Some	Adjacent road/ culvert - 1 round culvert pipe (30cm) with road cement apron
	28/02/2018	Moderate	Turbid	Normal	None	None	Road reserve
	13/03/2019	None (pooled)	Turbid	Normal	Leafy/pond weed present	Minimal	Isolated pool
C2K 14A Un-named tributary of Purga Creek	28/09/2017	Dry at time of sample					
	28/02/2018	Moderate	Slight	None	None	None	-
	13/03/2019	Dry at time of sample					

Table C2 **Site description with indicative photos indicating physical habitat change between field assessment (September 2017) and field assessment 3 (March 2019).**

Site ID	Site description	
Site 1A (alt)	The site is located on an un-named tributary of Western Creek, upstream of the Project alignment. Artificial bank protection measures present, which include a timber wall associated with the bridge crossing. Riparian vegetation surrounded the site.	
	 Photo from field assessment 1	No access during field sample 3
2A	The site is located on the Bremer River, at the proposed Project alignment waterway crossing location. At the time of assessment (October 2017 and March 2019), the channel was dry. Artificial bank protection measures were present in the form of a dam wall.	
	 Photo from field assessment 1	 Photo from field assessment 3
3A	The site is located on Warrill Creek, at the proposed Project alignment waterway crossing location. No artificial bank protected measures were present. Riparian offtake infrastructure was present, indicating potential pooled habitat and a scour point at high flow.	
	 Photo from field assessment 1	No access during field sample 3

Site ID	Site description
5A	The site is located in a private rural farm dam located downstream of the Project alignment. Artificial bank protection measures were present in the form of concrete channel lining along the bank.
	 Photo from field assessment 1  Photo from field assessment 3
5A (1)	The site is located on an unnamed watercourse downstream of the proposed alignment crossing. The creek was dry at the time of assessment. There were no artificial bank protection measures present. Bed level crossing, grazing and fences were present along the creek. The riparian zone was highly disturbed.
	 Photo from field assessment 1  Photo from field assessment 3
6A	The site is located on the un-named tributary of Purga Creek, downstream of the Project alignment. Banks were eroded, potentially affected by cleared vegetation, stock access, human access and the road crossing with the associated culvert (approximately 30cm in diameter). Artificial bank measures include a rock layer associated with the road crossing.
	 Photo from field assessment 1  Photo from field assessment 3

Site ID	Site description
7A	The site was located on Dugandan Creek, upstream of the Project alignment. Banks were highly eroded, potentially affected by cleared vegetation, stock access and human access. There were no artificial bank protection measures present at site. Cattle was present and using the site at the time of assessment.
	 Photo from field assessment 1  Photo from field assessment 3
7A (alt)	The site was located on an un-named watercourse, upstream of the Project alignment. At the time of assessment, the waterway was dry (October 2017 and March 2019). There were no artificial bank protection measures present.
	 Photo from field assessment 1  Photo from field assessment 3
8A	The site was located on Dugandan Creek, upstream of the proposed crossing location. The bank was highly eroded potentially affected by stock and human access. There were no artificial bank protection measures present.
	 Photo from field assessment 1  Photo from field assessment 3

Site ID	Site description
9A	The site was located on the Woollaman Creek, upstream of the Project alignment in a road crossing over a small bridge. Bank stability was potentially affected by cleared vegetation and stock access (cattle were noted drinking at the site). Additionally, rip rap was present along the bank as a protection measure.
	 Photo from field assessment 1  Photo from field assessment 3
10A	The site was located on the Teviot Brook over a road crossing, downstream of the Project alignment. Artificial bank measures were present in the form of a rock wall, fence structures and remains of a sediment fence were present. Three reinforced concrete pipes (RCP) were presented associated with the bridge crossing. The banks were highly eroded, potentially affected by cleared vegetation, stock and human access.
	 Photo from field assessment 1  Photo from field assessment 3
11A	The site was located in a private rural farm dam, downstream of the Project alignment. Site is flat with minimal vegetation present. The dam was used by stock.
	 Photo from field assessment 1 No access during sampling round 3

Site ID	Site description
12A	The site was located on an un-named tributary, upstream of the Project alignment. The banks were eroded, potentially affected by feral animals, stock and human access. There were no artificial bank protection measures present.
	 Photo from field assessment 1  Photo from field assessment 3
13A	The site was located on the un-named tributary of Purga Creek, 40 metres upstream of the proposed alignment crossing. A single RCP culvert design was present. Further an additional rock layer associated with the road crossing was present as a potential artificial bank measure and concrete channel lining.
	 Photo from field assessment 1  Photo from field assessment 1
14A	The site was located on un-named tributary of Purga Creek, downstream of the Project alignment. Modifications were present in the form of concrete and rocks associated with Allans Road crossing. Six box culvert design was present at the road crossing with rock reinforcement. It was noted that there was some vegetation and debris on the floor surface creating potential barriers to flow.
	 Photo from field assessment 1  Photo from field assessment 3

Table notes:

1 Field photos are provided for illustrative purposes to indicate charge of physical site characteristics throughout the field assessments. Field photos (a) show water quality sample site as of 9 to 13 October 2017, while field photos (b) show water quality sample site as of 11 March to 13 March 2019.

2 Vantage reference point for photos differed between sample assessments due to land access and water availability

APPENDIX M

Surface Water Quality Technical Report

Appendix D Database interrogation data

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

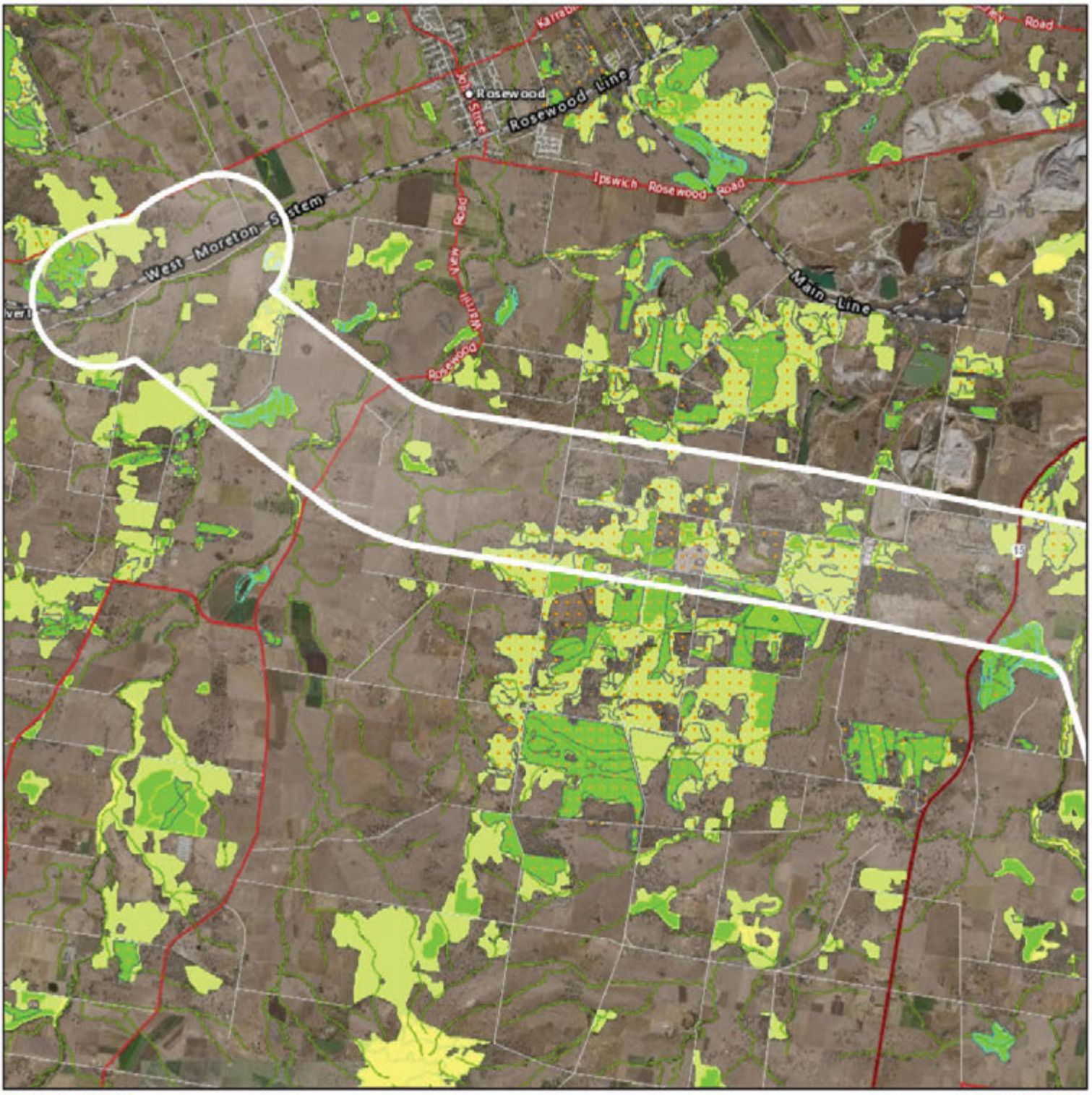
Table D-1 Water Access relevant to the Project water quality study area

Nominal Entitlement ML	Water Sources List	Management Subgroup Code List	Management Subgroup List	Management Group Code List	Management Group List
42	Warrill Creek	WVNSD	Unsupplemented Diversions	WVWMA	Warrill Valley Water Management Area
71	Warrill Creek	WVNSD	Unsupplemented Diversions	WVWMA	Warrill Valley Water Management Area
123	Warrill Creek East Branch	WVNSD	Unsupplemented Diversions	WVWMA	Warrill Valley Water Management Area
183	Warrill Creek	WVNSD	Unsupplemented Diversions	WVWMA	Warrill Valley Water Management Area

Referable wetlands

27°37'32"S 152°31'23"E

27°37'32"S 152°40'54"E



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27°45'57"S 152°40'54"E

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Queensland Government

Department of Natural Resources, Mines and Energy

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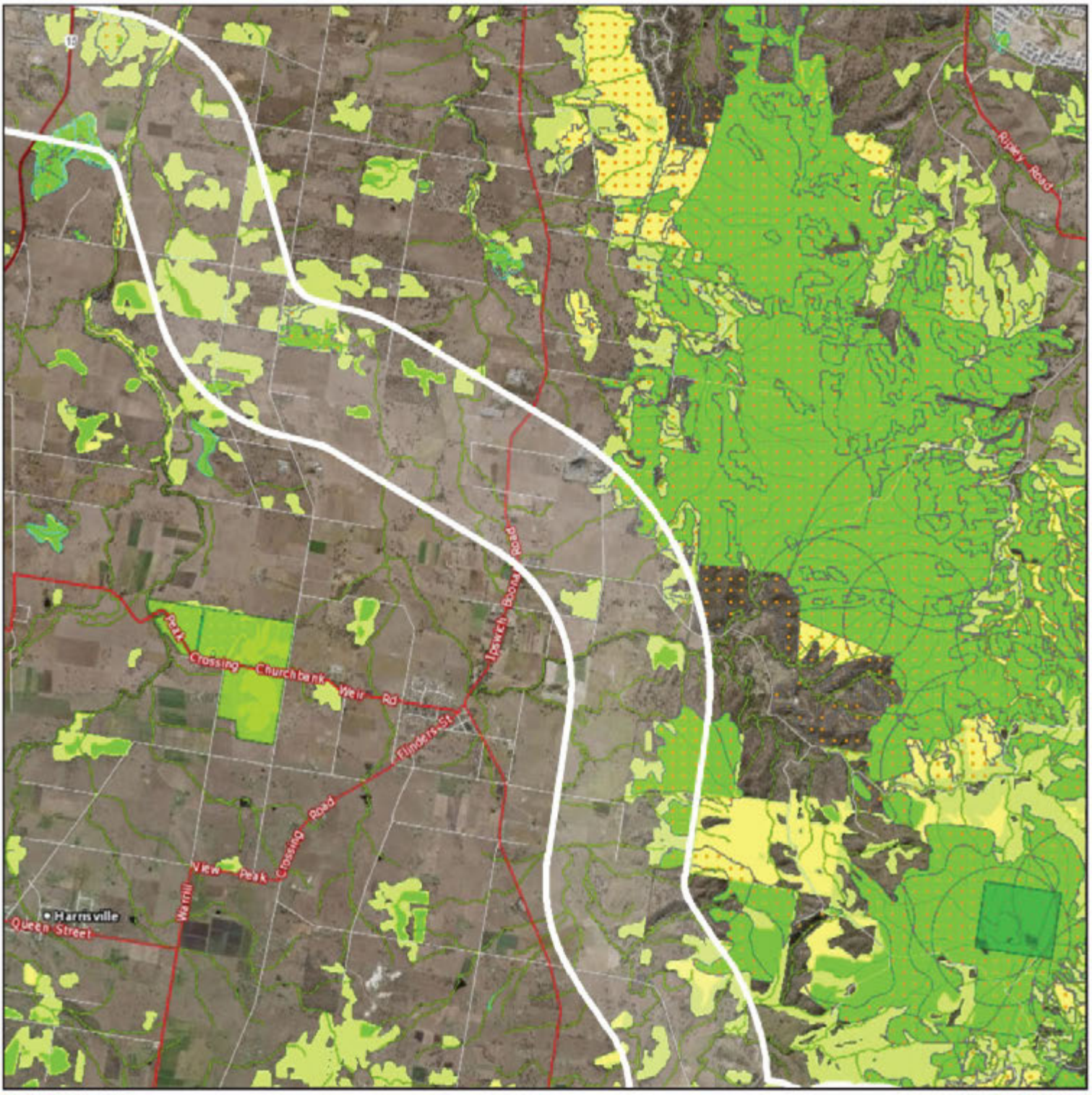
27°41'30"S 152°49'14"E



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27°49'55"S 152°49'14"E

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Queensland Government

Department of Natural Resources, Mines and Energy

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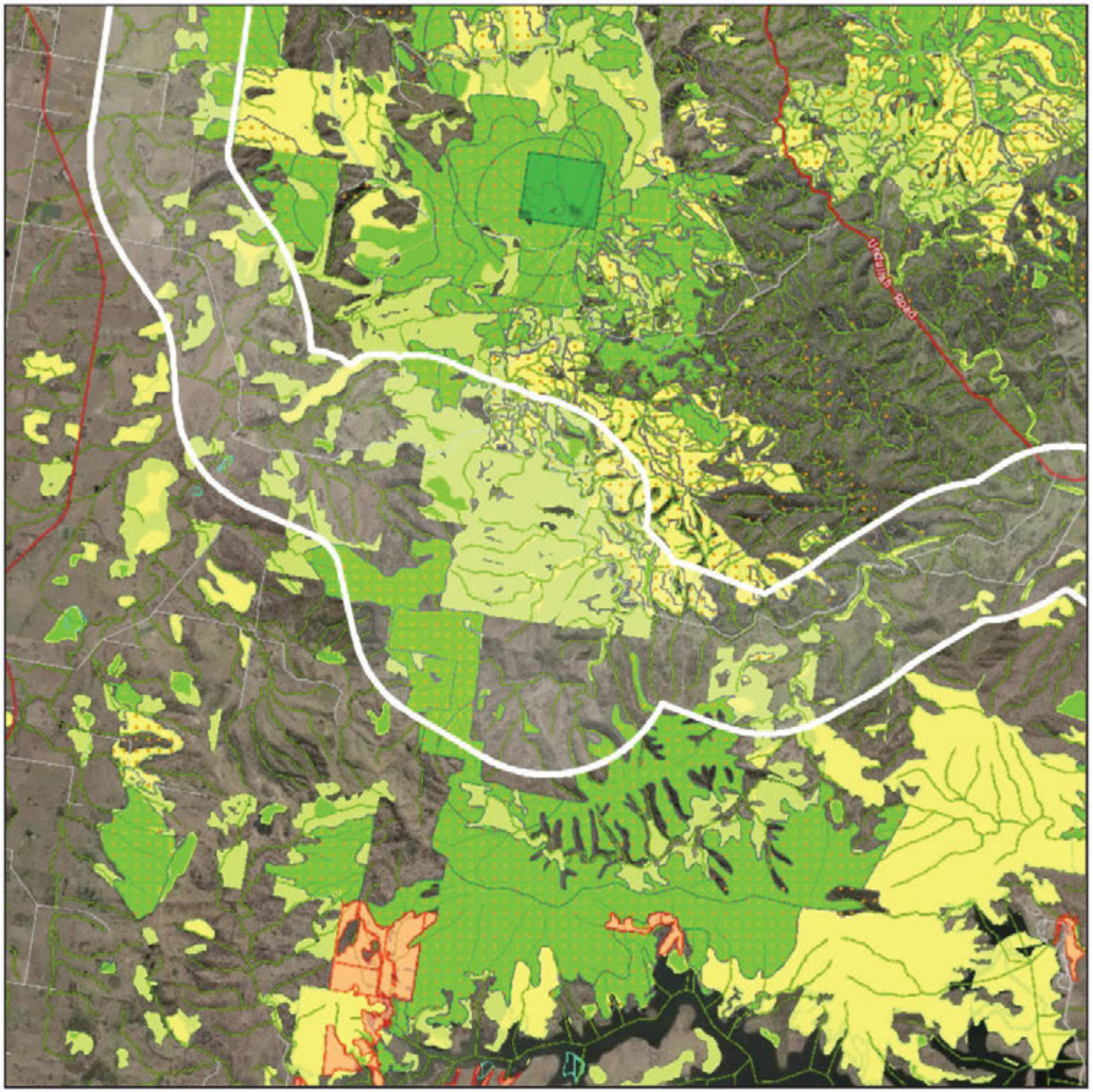
27°47'11"S 152°53'16"E



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27°55'36"S 152°53'16"E

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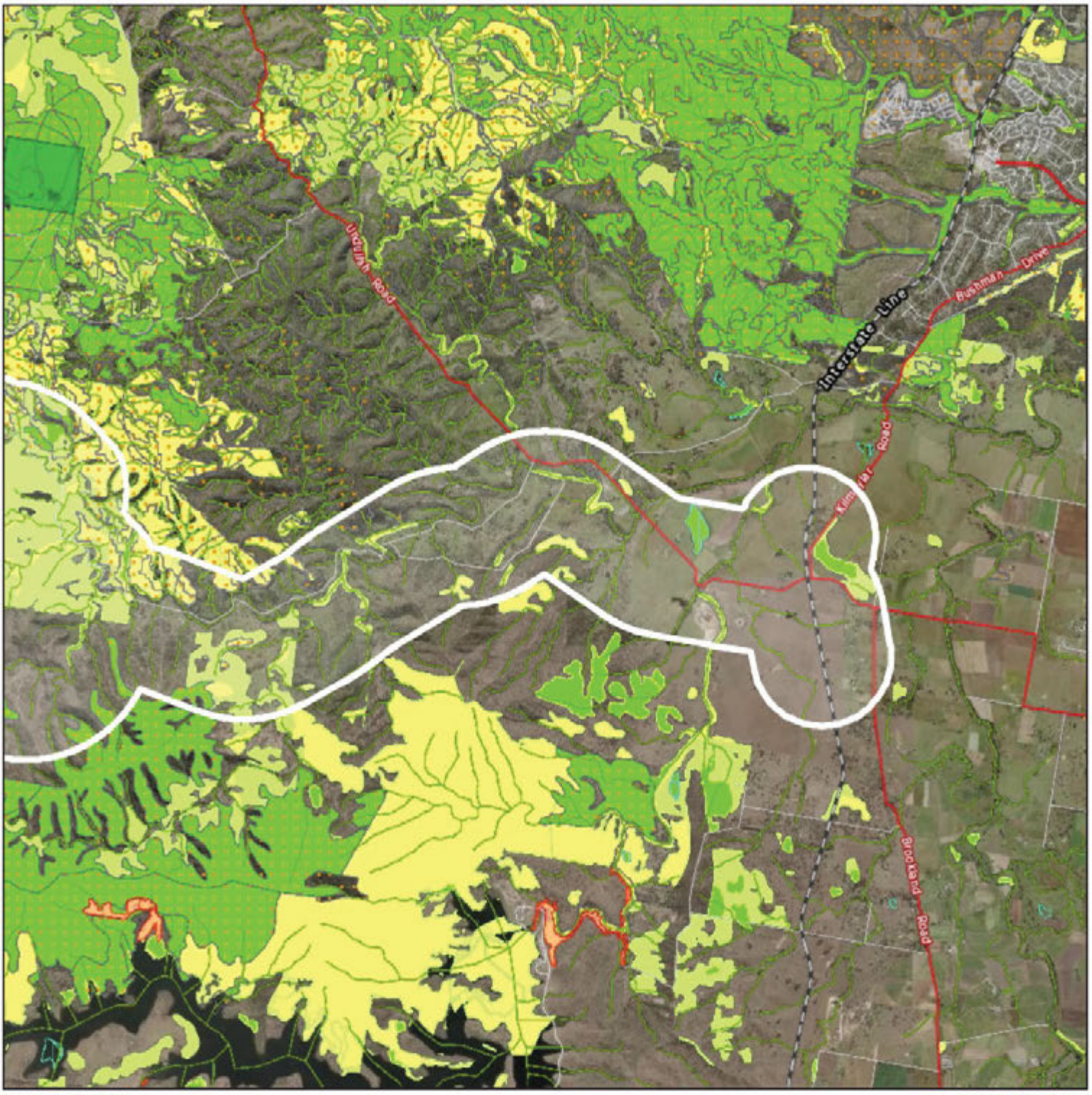
27°47'19"S 152°57'51"E



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27°55'43"S 152°57'51"E

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Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

MSES protected area [estates]

MSES protected area [nature refuges]

MSES marine park [highly protected]

MSES declared fish habitat area [A and B areas]

MSES legally secured offset area [offset register]

MSES legally secured offset area [vegetation offsets]

MSES regulated vegetation [defined watercourse]

MSES declared high ecological value waters [watercourse]

MSES high ecological significance wetlands

MSES strategic environmental area [designated precinct]

MSES wildlife habitat [threatened and special least concern animal]

MSES regulated vegetation [category B - endangered or of concern]

MSES regulated vegetation [category C- endangered or of concern]

MSES regulated vegetation [category R- GBR riverine]

MSES regulated vegetation [essential habitat]

MSES regulated vegetation [100m from wetland]

Wetlands of high ecological significance

Attribution

MSES declared high ecological value waters [wetland]

Railway

Road

- Highway
- Main
- Local
- Private

Cities and Towns

Waterways

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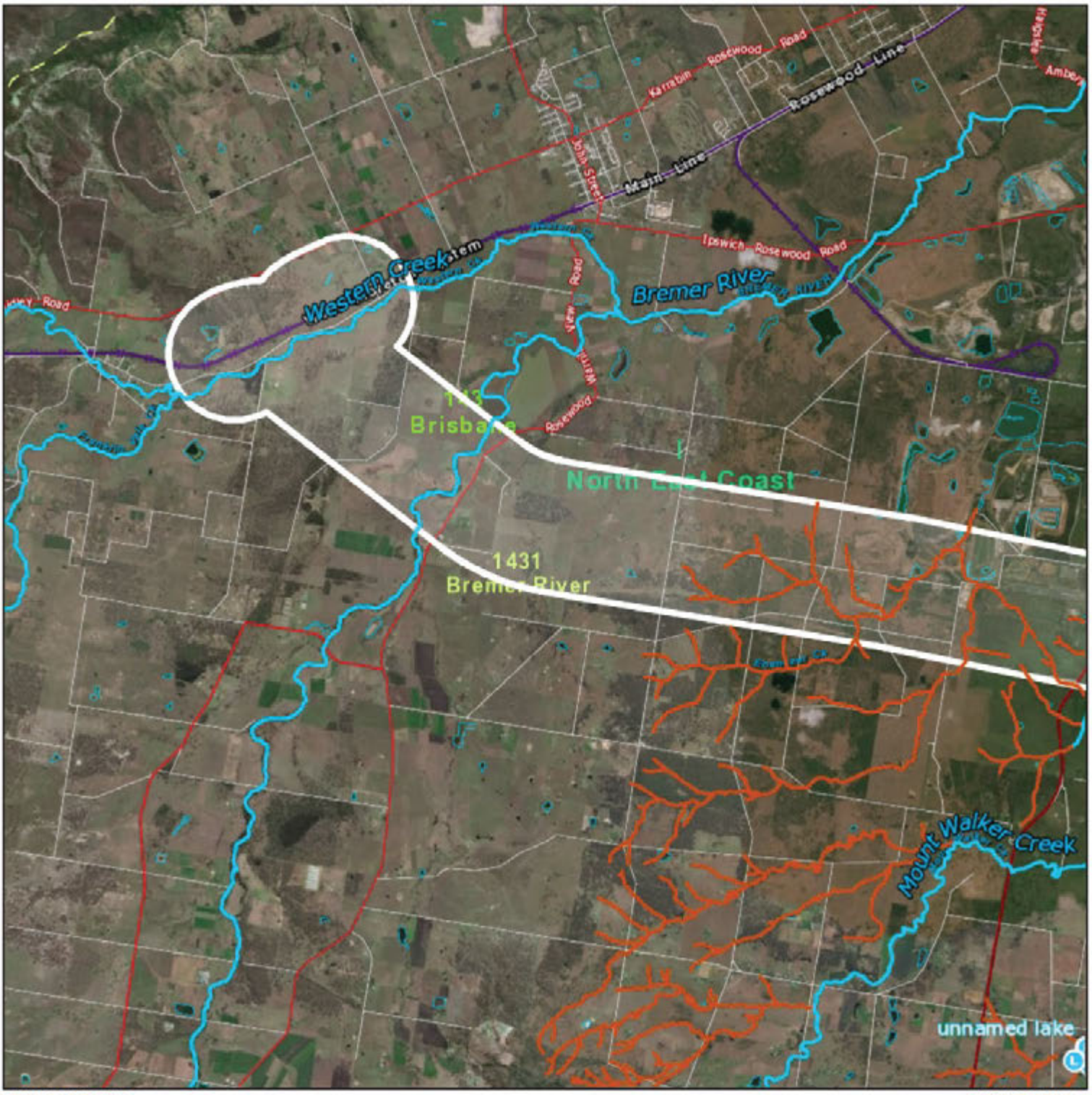
27°36'58"S 152°40'6"E



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Queensland Government
Department of Natural Resources, Mines and Energy

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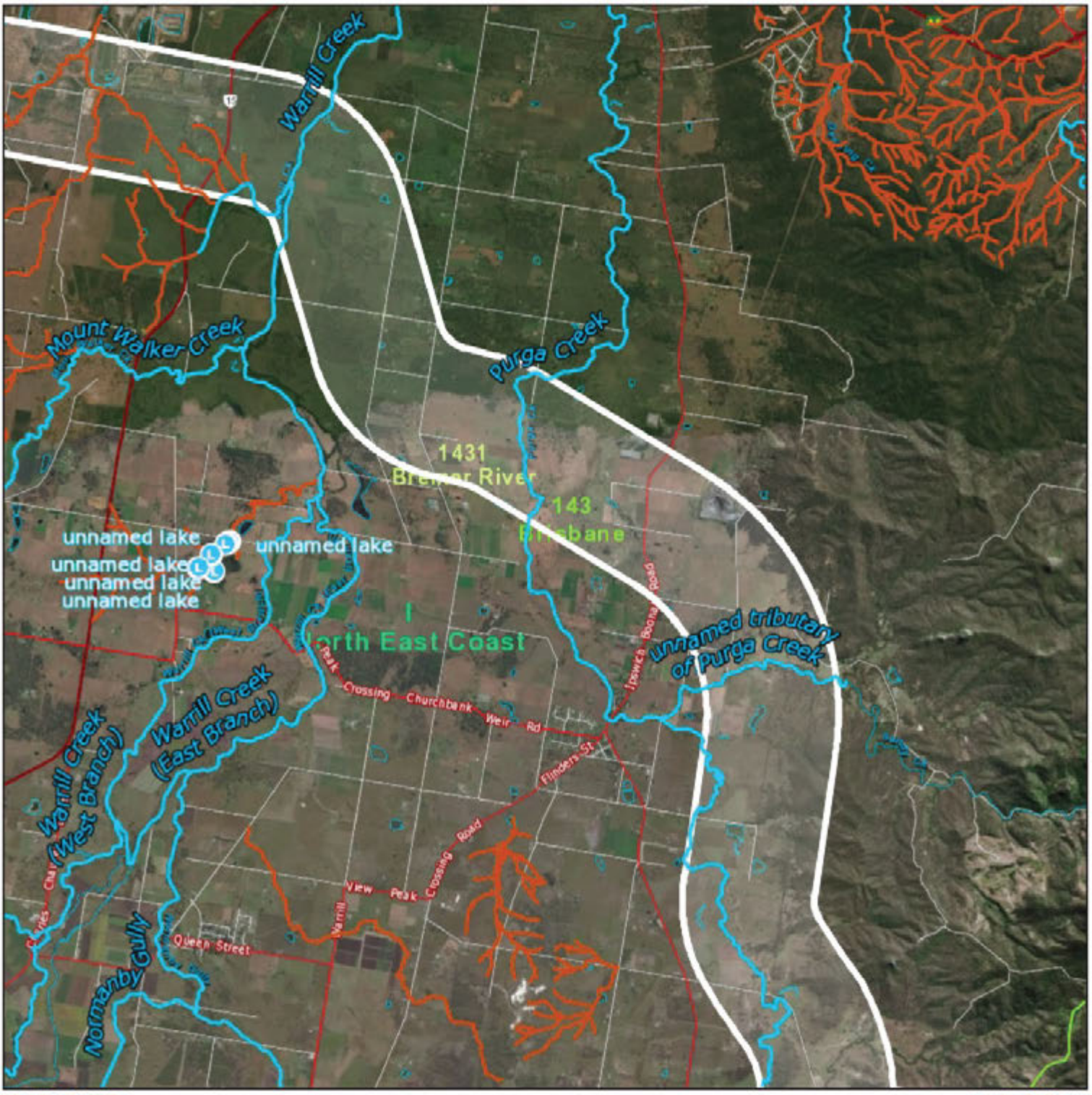
27°41'0"S 152°48'13"E



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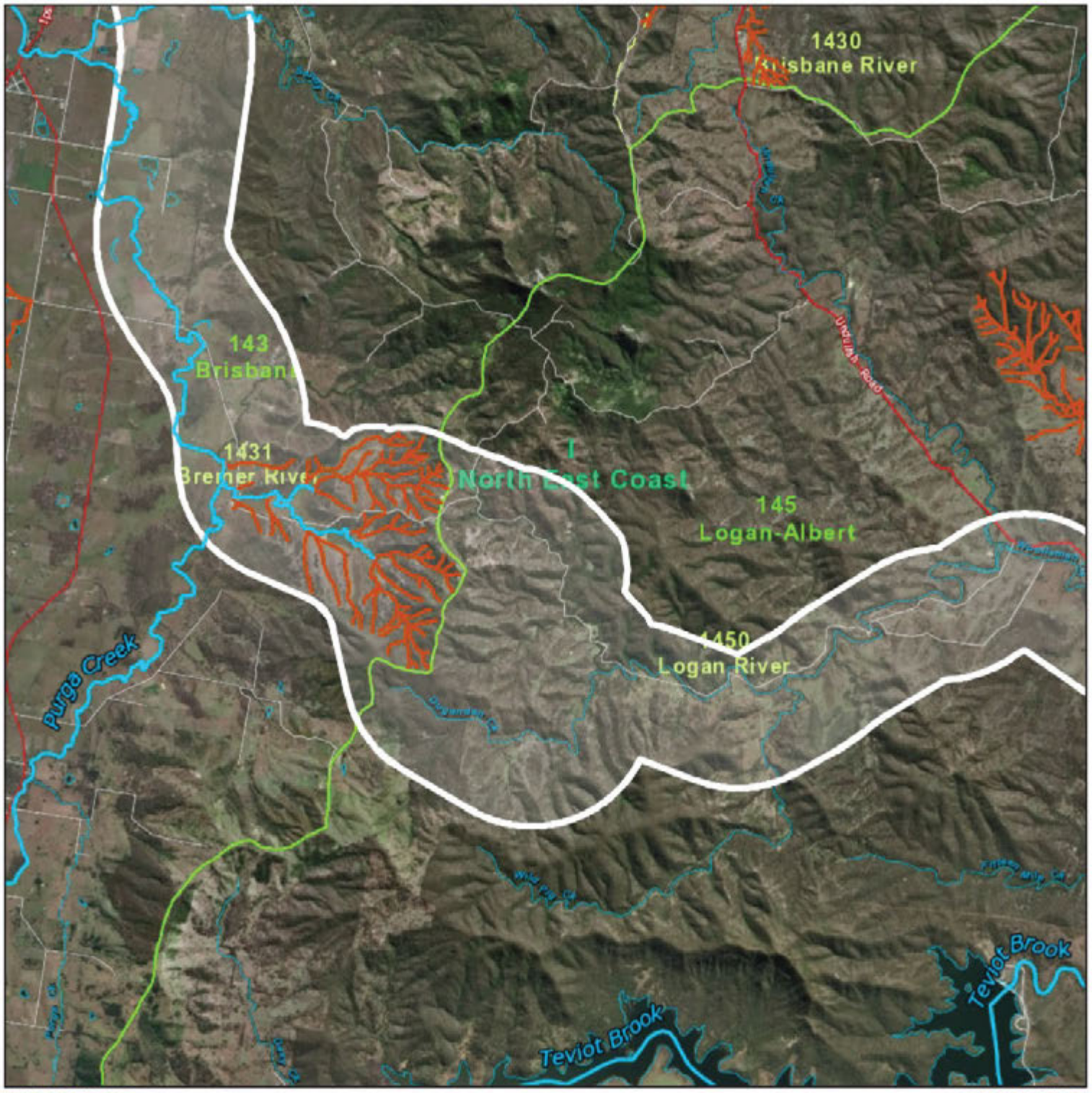
27°46'27"S 152°53'39"E



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27°55'18"S 152°53'39"E

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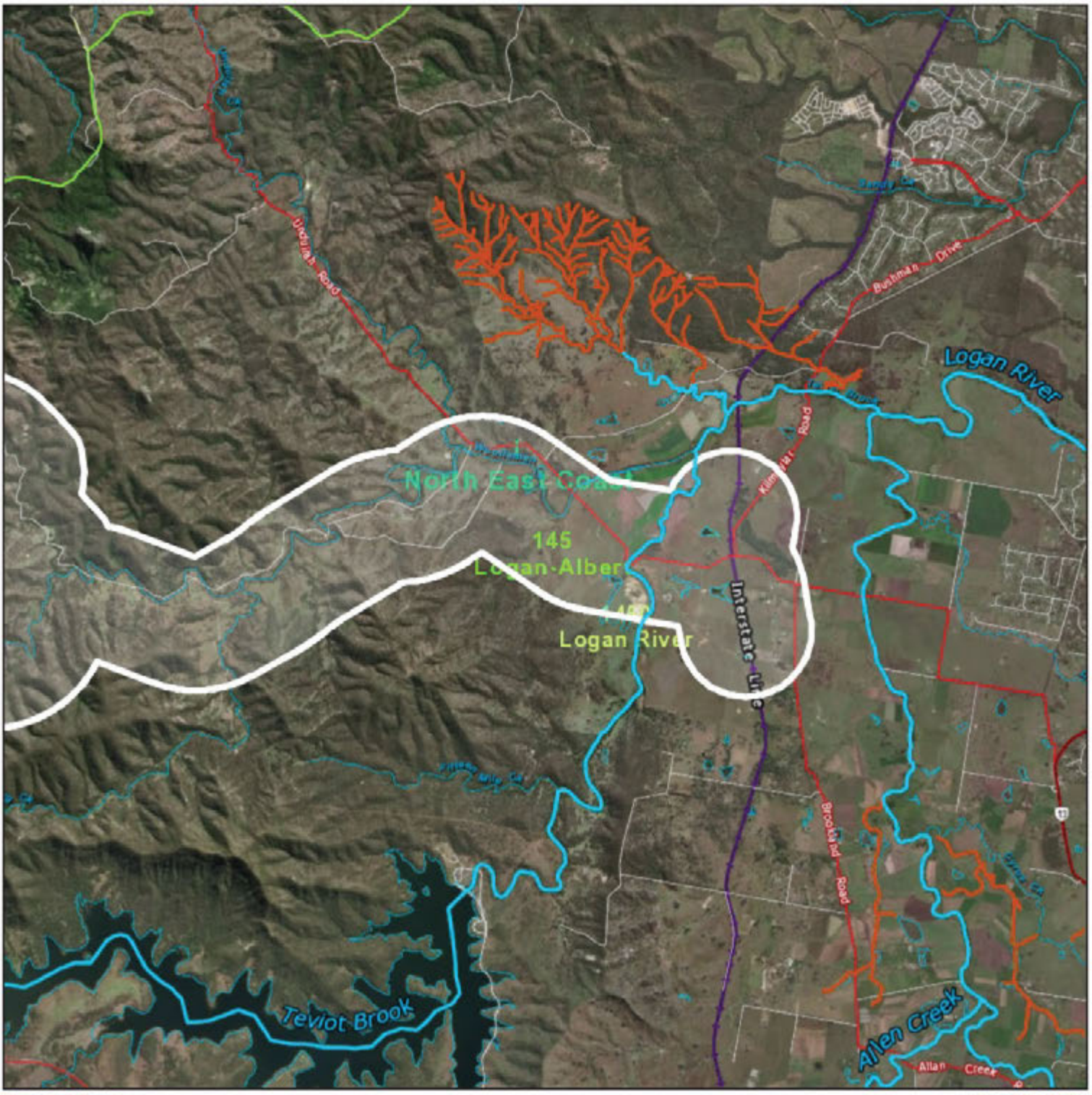
27°47'16"S 152°58'40"E



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27°56'6"S 152°58'40"E

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Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Railway

Railway [detail]

- Government, electrified
- Government, non electrified
- Private, electrified
- Private, non electrified

Railway [under construction]

Railway [proposed]

Drainage Divisions

Drainage Basins

Drainage Sub-basins

Coastline

Lake

Reservoir

Canal area

Watercourse line

- Major Watercourse
- Minor Watercourse
- Major Culvert
- Minor Culvert

Watercourse area

Water area edge

Road

- Highway
- Main
- Local
- Private

Spring [defined by Water Act 2000]

Attribution

Lake [defined by Water Act 2000]

Downstream limit [defined by Water Act 2000]

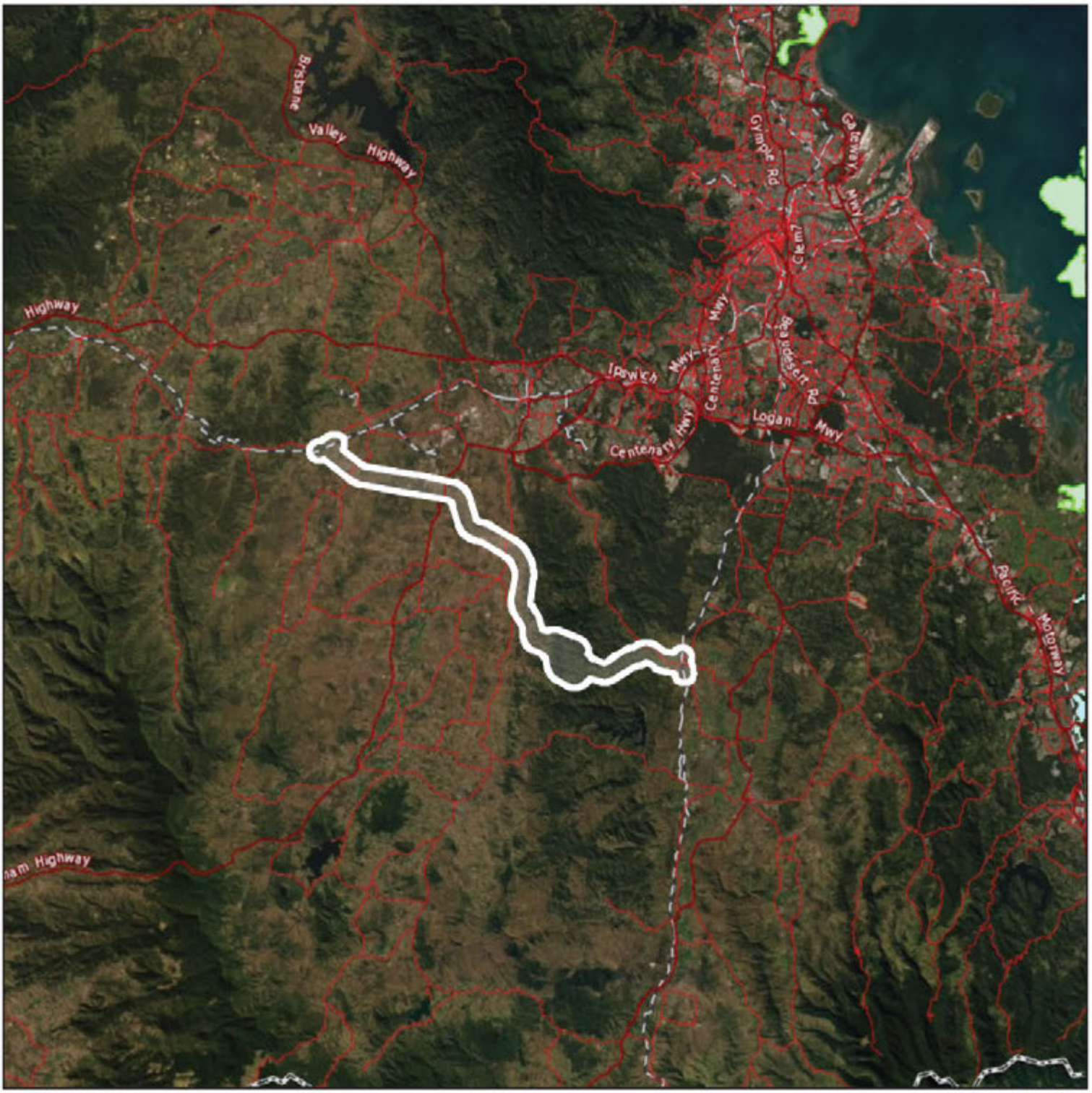
Watercourse [defined by Water Act 2000]

Drainage feature [defined by Water Act 2000]

Fish habitat areas

27°14'37"S 152°12'11"E

27°14'37"S 153°21'4"E



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28°15'34"S 153°21'4"E

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Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Railway

Instream structure

Fish habitat area

- Management A boundary
- Management B boundary

Road

- Highway
- Main
- Local
- Private

Attribution

Earthstar Geographics

Matters of State Environmental Significance

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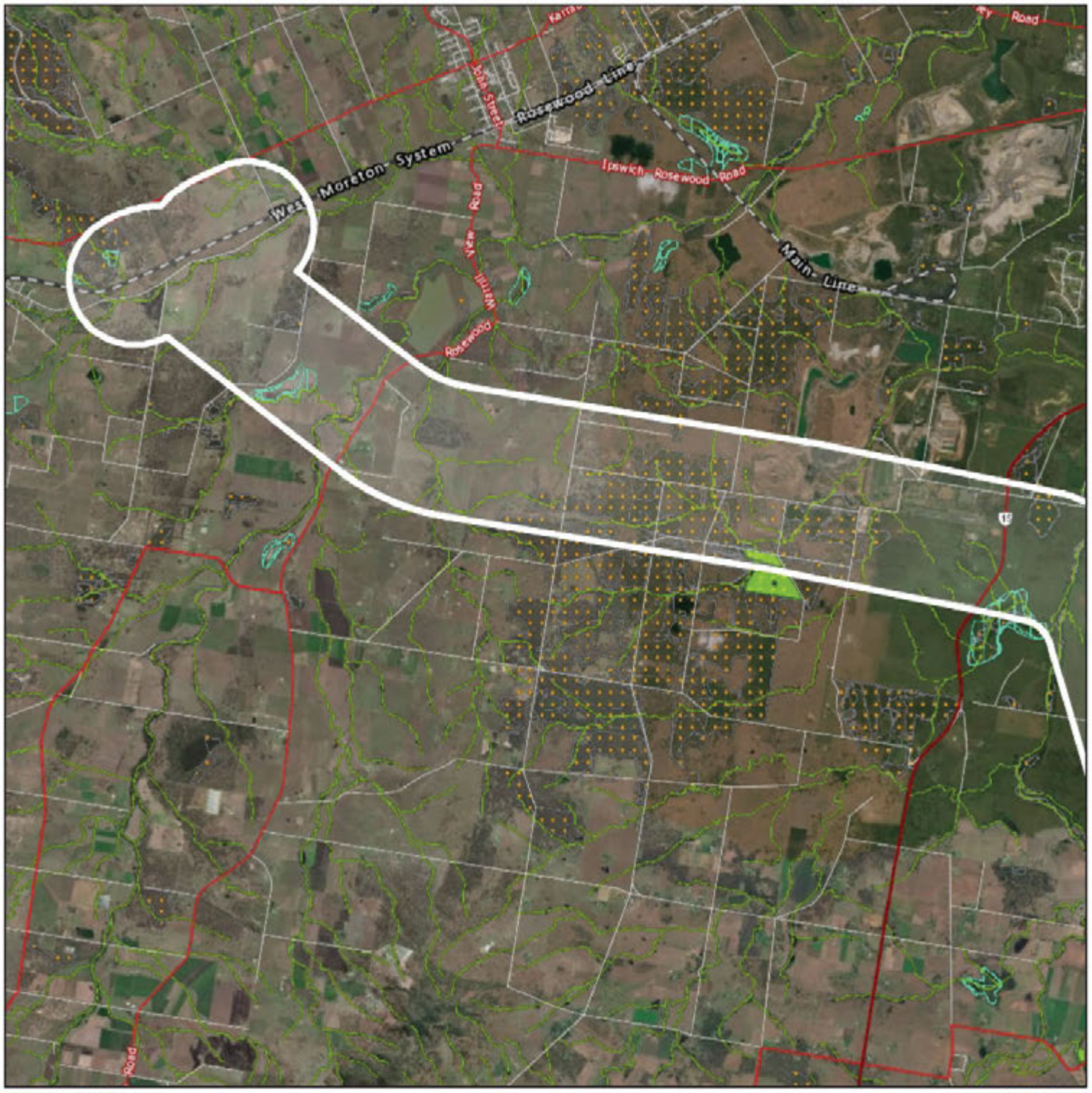

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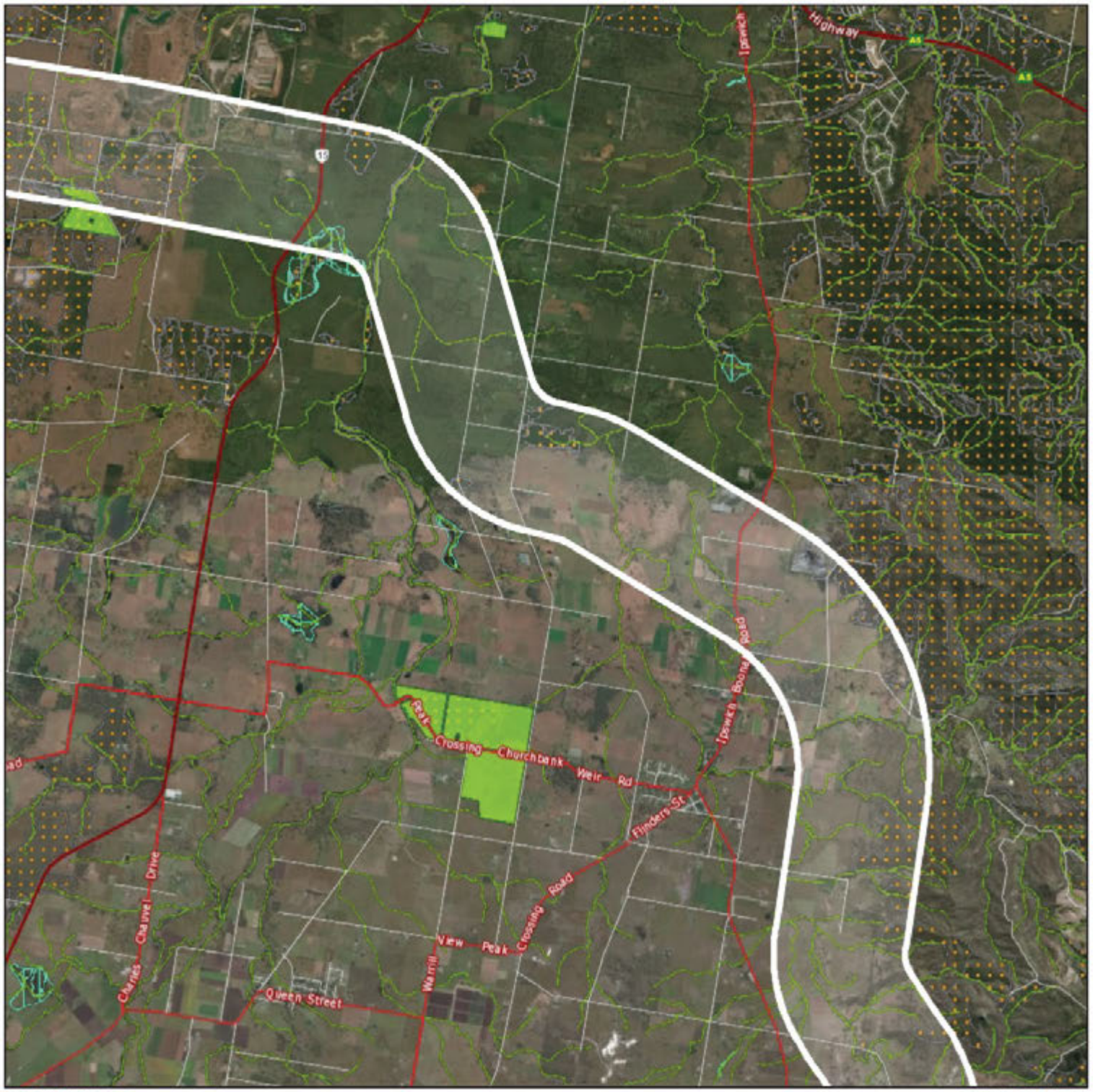

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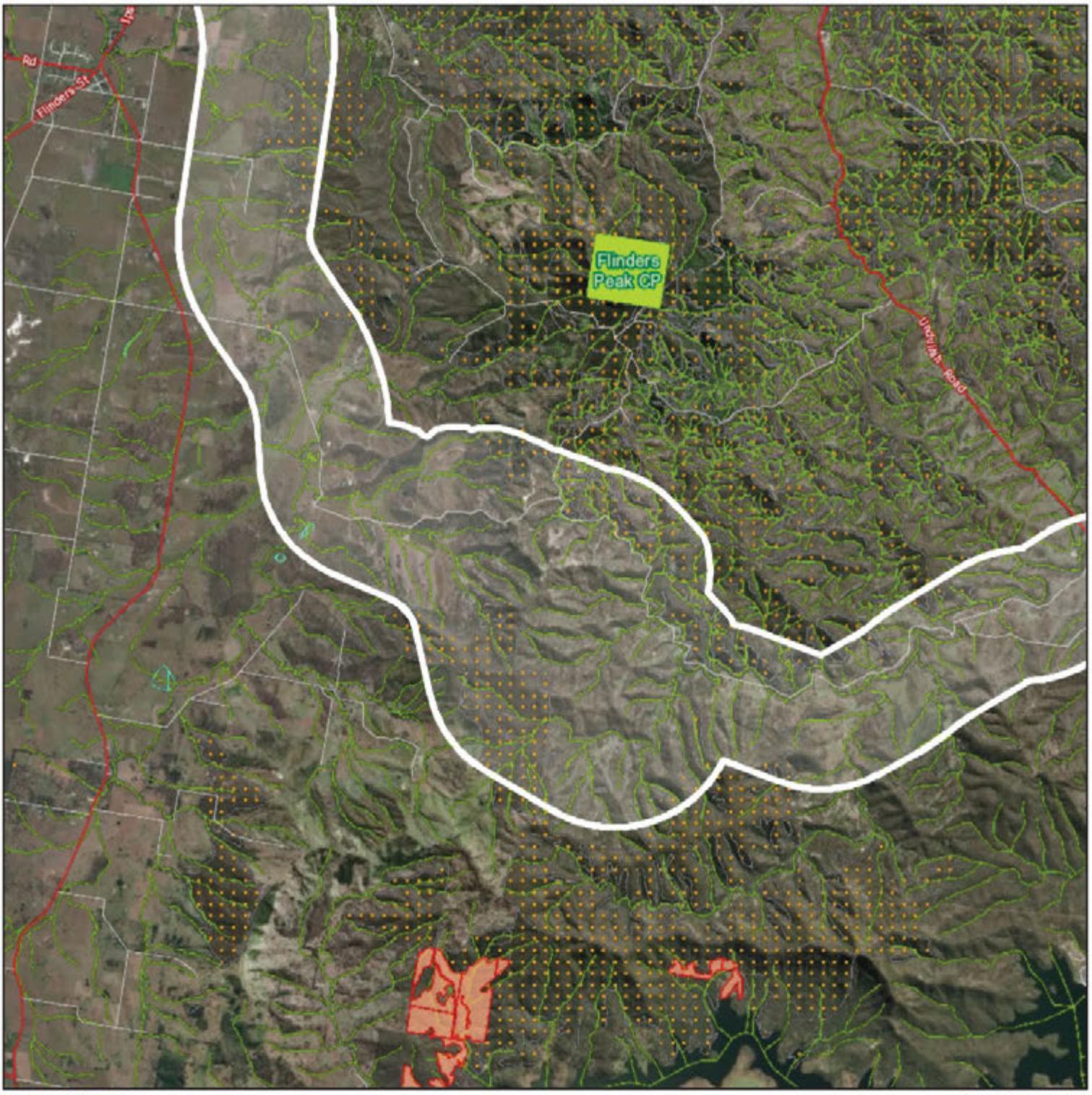
27°46'28"S 152°52'53"E



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27°55'18"S 152°52'53"E

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Queensland Globe

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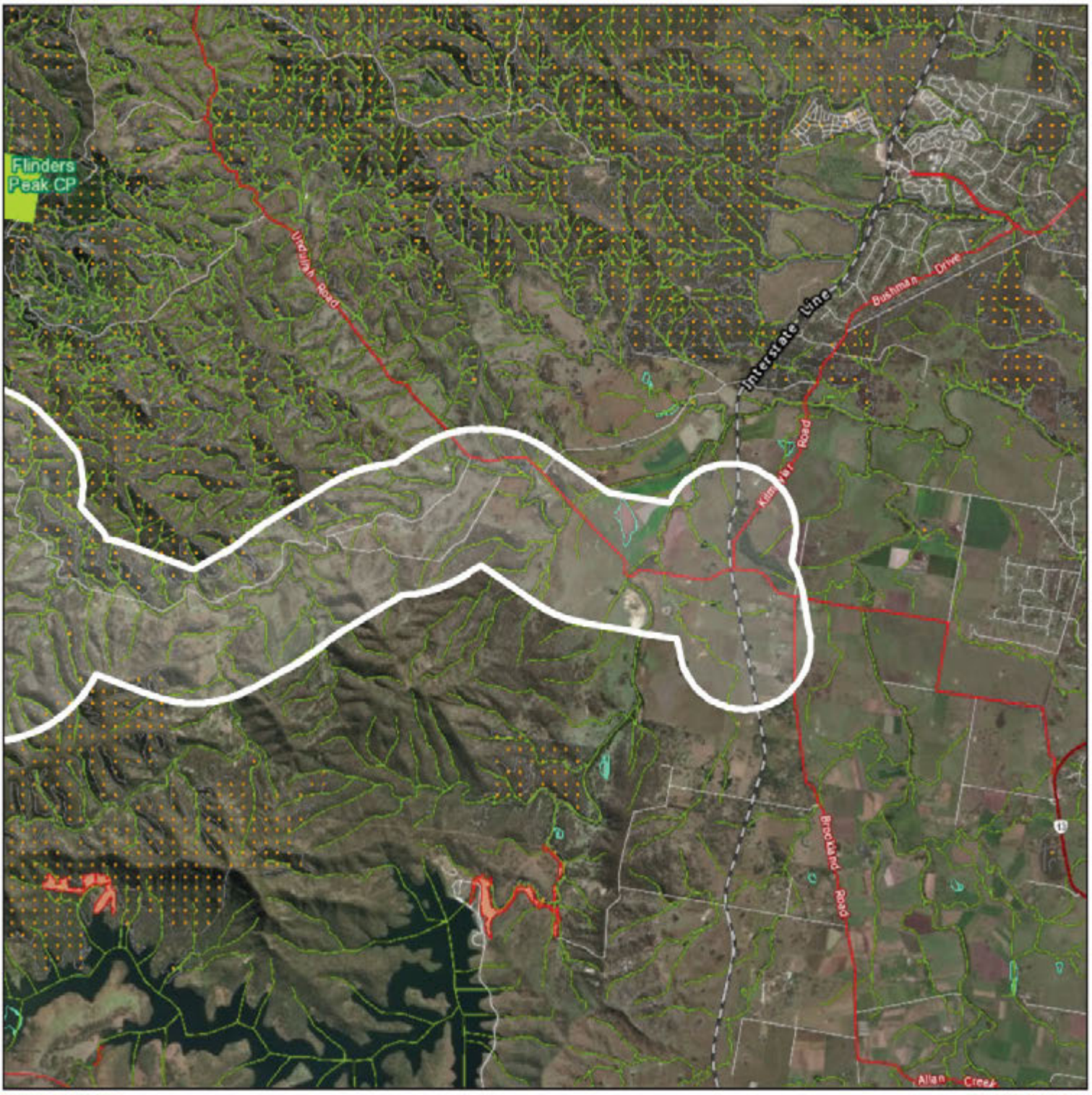
27°47'10"S 152°58'41"E



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27°56'0"S 152°58'41"E

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Queensland Globe

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Scale: 1:93708

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Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Great Barrier Reef coast zoning

- General use
- Habitat protection
- Conservation park
- Buffer
- Scientific research
- Marine national park
- Preservation
- Estuarine conservation

Moreton Bay zoning

- Conservation park
- General use
- Habitat protection
- Marine national park

Moreton Bay artificial reef sites

Railway

MSES protected area [estates]

Moreton Bay designated area

- Go slow area - turtles and dugong
- Go slow area [vessels >8m]
- Go slow area - natural values
- Grey nurse shark area
- No anchoring
- Works area
- Mooring area
- Disposal and extraction area
- Material extraction area
- Material disposal area

MSES protected area [nature refuges]

MSES marine park [highly protected]

MSES declared fish habitat area [A and B areas]

MSES legally secured offset area [offset register]

MSES legally secured offset area [vegetation offsets]

Attribution

DigitalGlobe, Earthstar Geographics

Legend

MSES regulated vegetation [defined watercourse]

MSES declared high ecological value waters [watercourse]

MSES declared high ecological value waters [wetland]

MSES high ecological significance wetlands

MSES strategic environmental area [designated precinct]

MSES wildlife habitat [threatened and special least concern animal]

Road

- Highway
- Main
- Local
- Private

Wetlands of high ecological significance

Trigger area

Protected areas of Queensland

- National park
- National park (scientific)
- National park (Cape York Peninsula Aboriginal land)
- Conservation park
- Resources reserve
- Forest reserve
- State forest
- Timber reserve

Queensland land use mapping program

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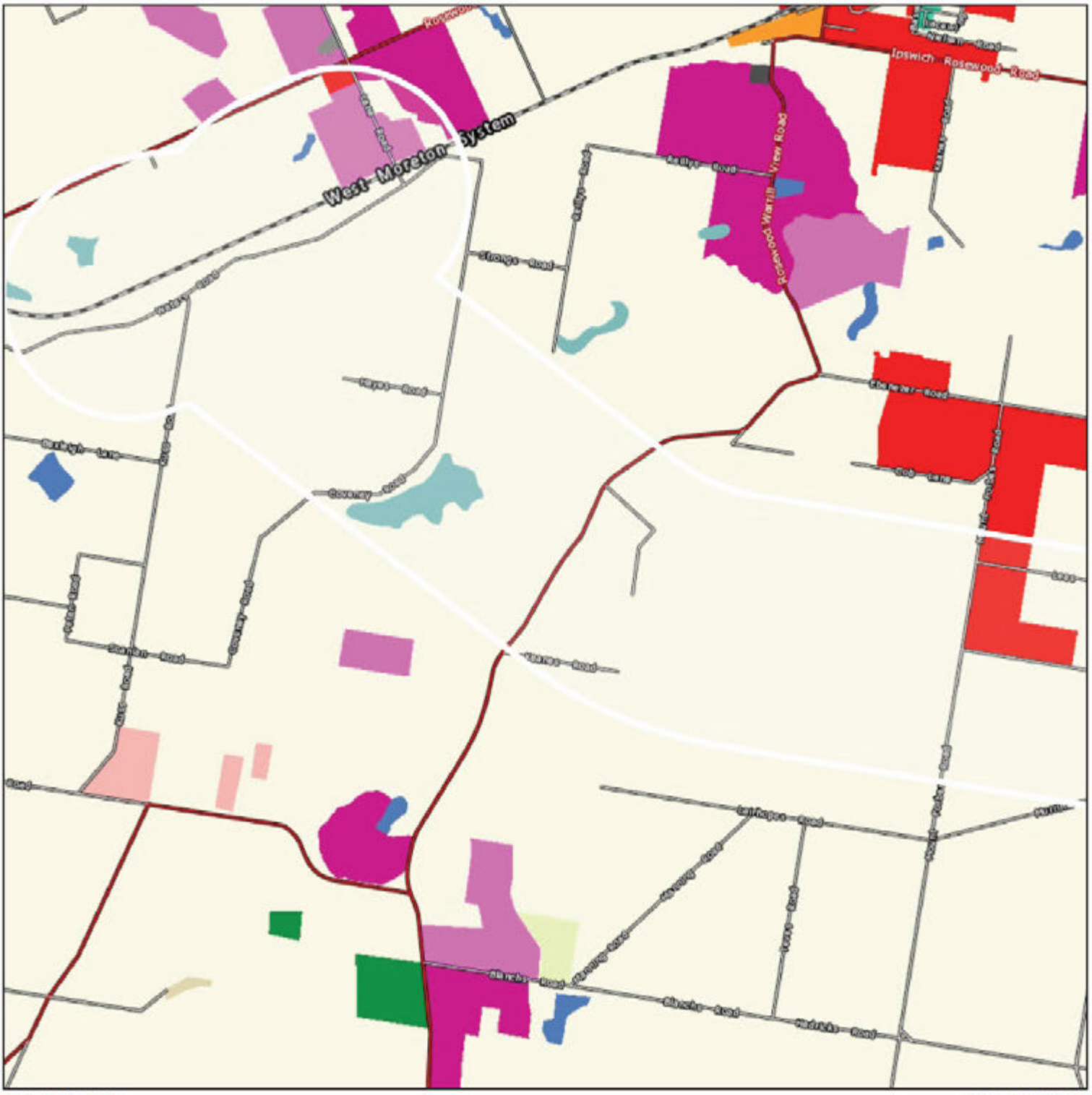
27°38'35"S 152°36'53"E



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27°43'14"S 152°36'53"E

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Queensland Globe

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For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

27°39'55"S 152°36'29"E

27°39'55"S 152°41'44"E

27°44'34"S 152°36'29"E

27°44'34"S 152°41'44"E

A product of

Queensland Globe

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Scale: 1:49130

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

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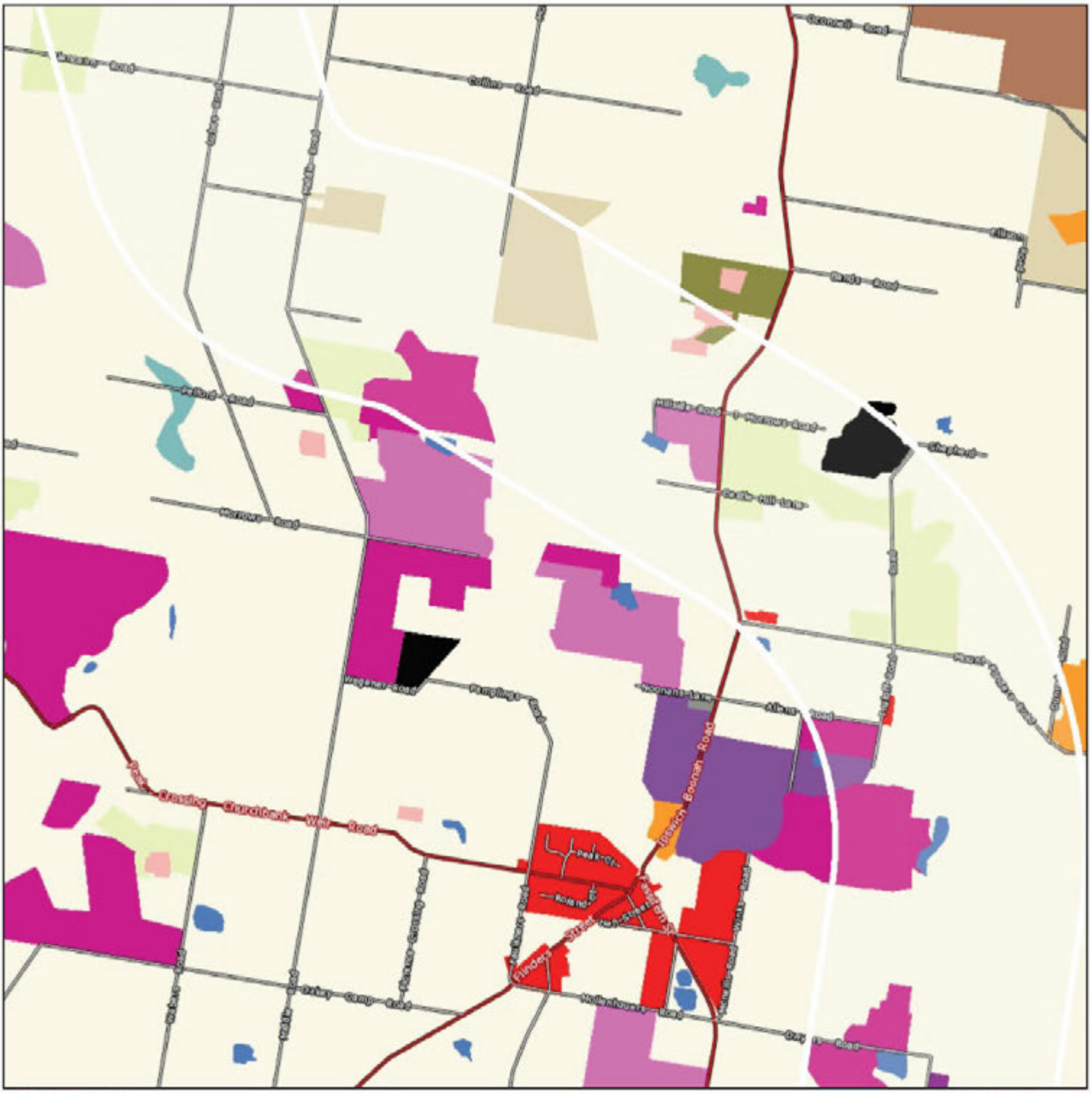
Department of Natural Resources, Mines and Energy

27°43'13"S 152°40'41"E

27°43'13"S 152°45'56"E



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A product of

Queensland Globe

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Scale: 1:49130

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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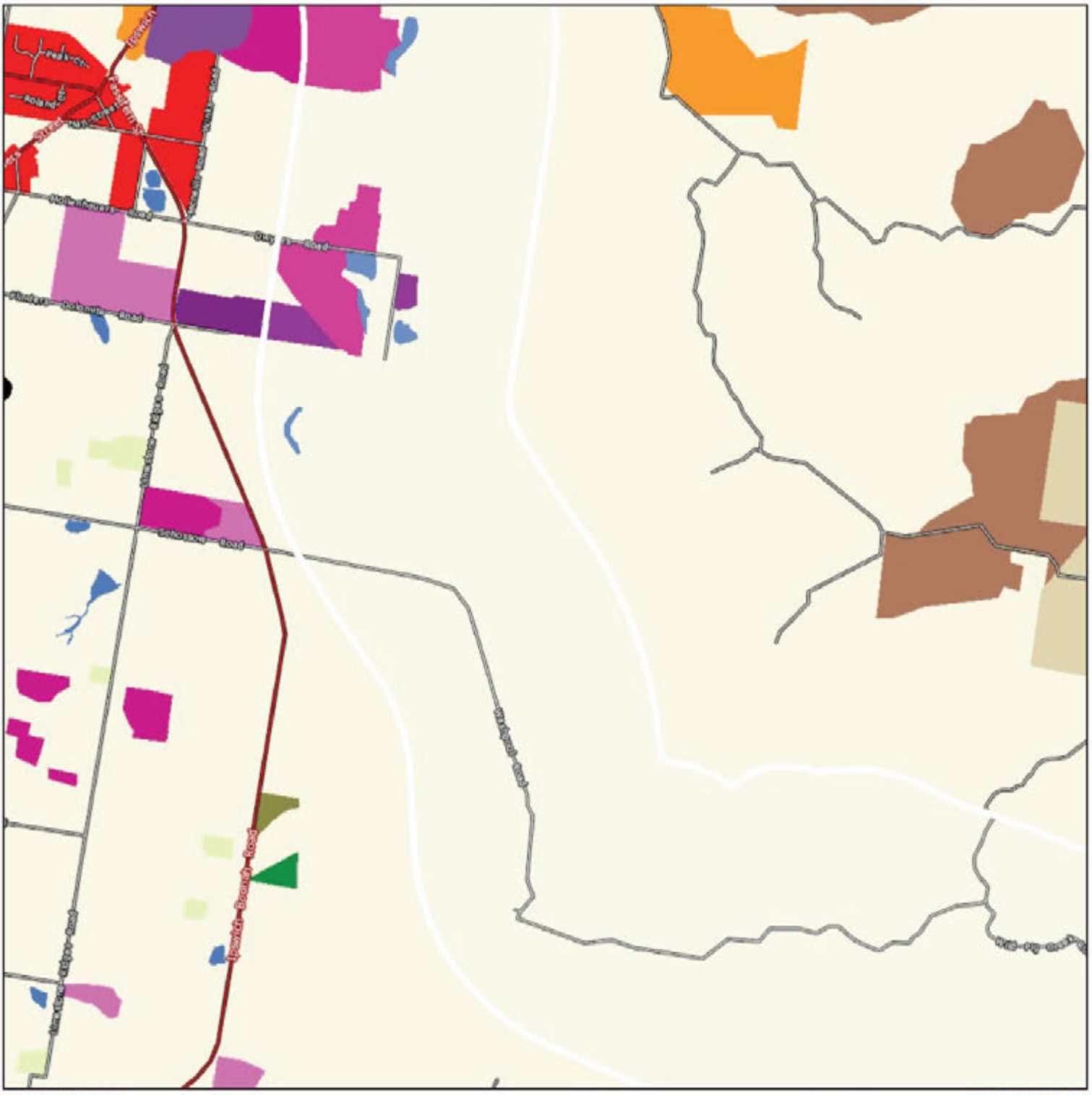
27°46'38"S 152°48'30"E



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Printed at: A4

Print date: 15/1/2020

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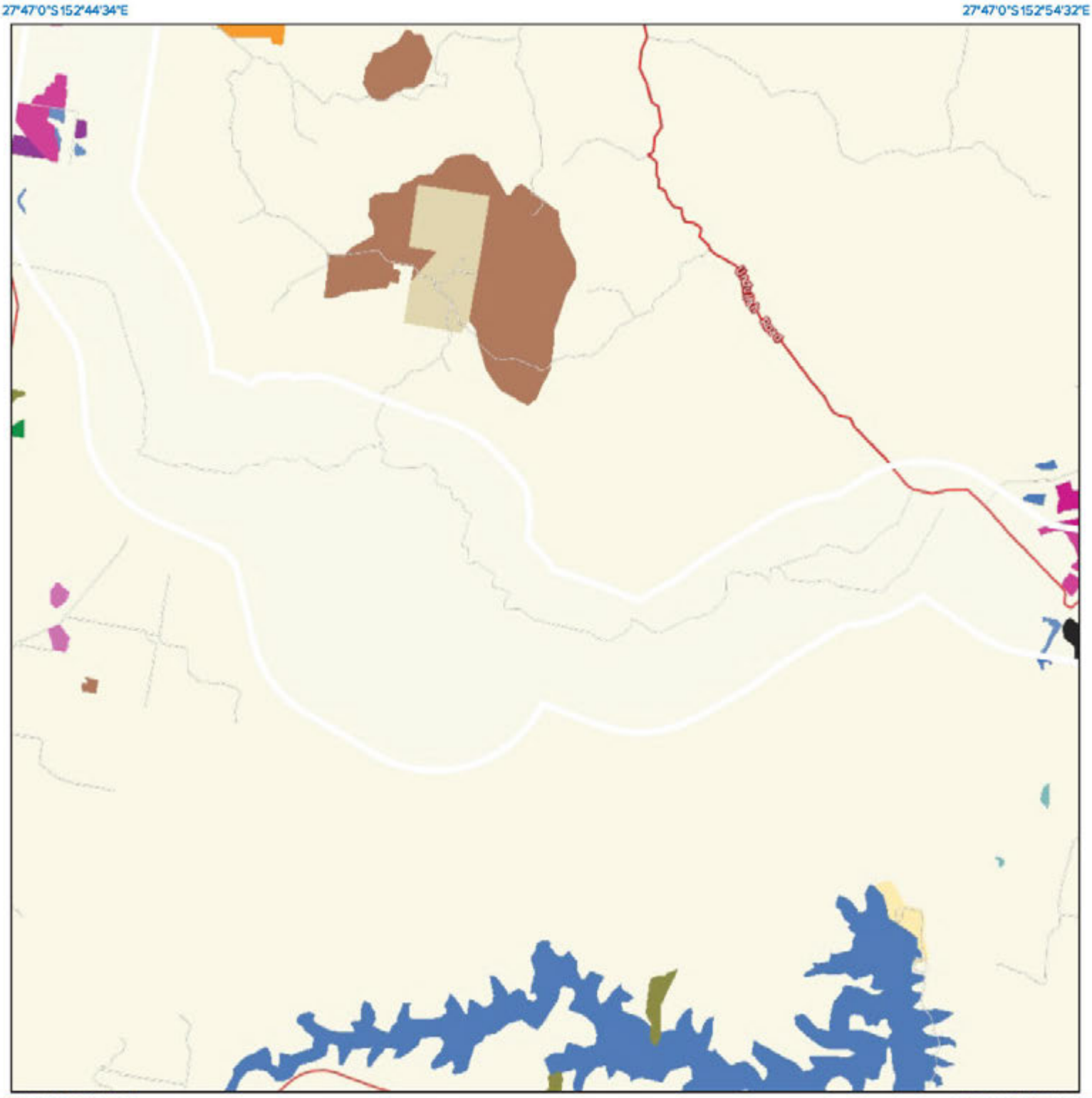
Queensland Government

Department of Natural Resources, Mines and Energy



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Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

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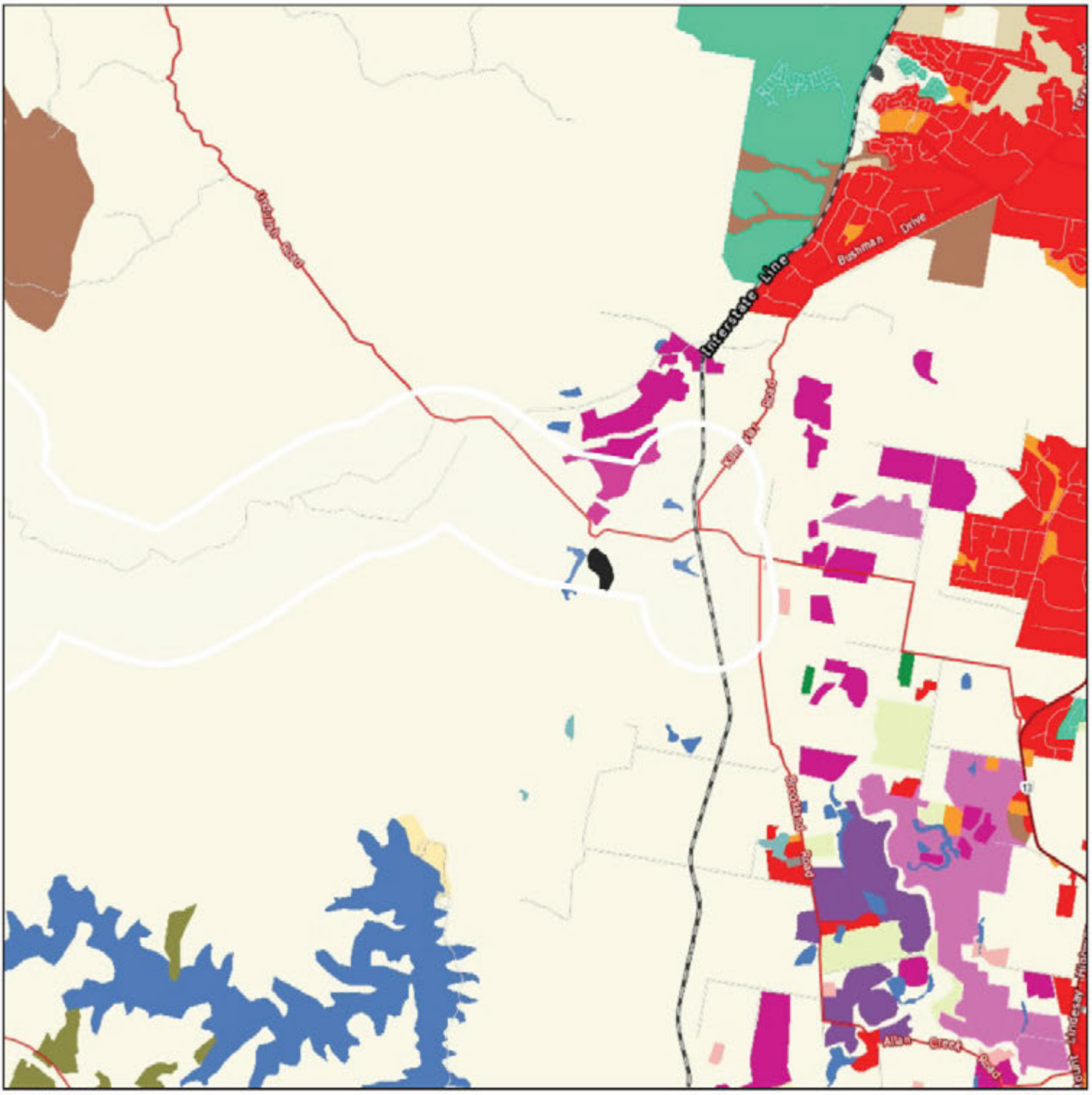
Queensland Government
Department of Natural Resources, Mines and Energy

27°47'30"S 152°49'1"E

27°47'30"S 152°59'0"E



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Print date: 15/1/2020

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Queensland Government
Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Road

- Highway
- Main
- Local
- Private

Railway

Cities and Towns

Queensland Land Use - Current

- Nature conservation
- Managed resource protection
- Other minimal use
- Grazing native vegetation
- Production forestry
- Plantation forestry
- Grazing modified pastures
- Cropping
- Perennial horticulture
- Seasonal horticulture
- Land in transition
- Irrigated plantation forestry
- Irrigated modified pastures
- Irrigated cropping
- Irrigated perennial horticulture
- Irrigated seasonal horticulture
- Irrigated land in transition
- Intensive horticulture
- Intensive animal husbandry
- Manufacturing and industrial
- Residential
- Services
- Utilities
- Transport and communication
- Mining
- Waste treatment and disposal

Attribution

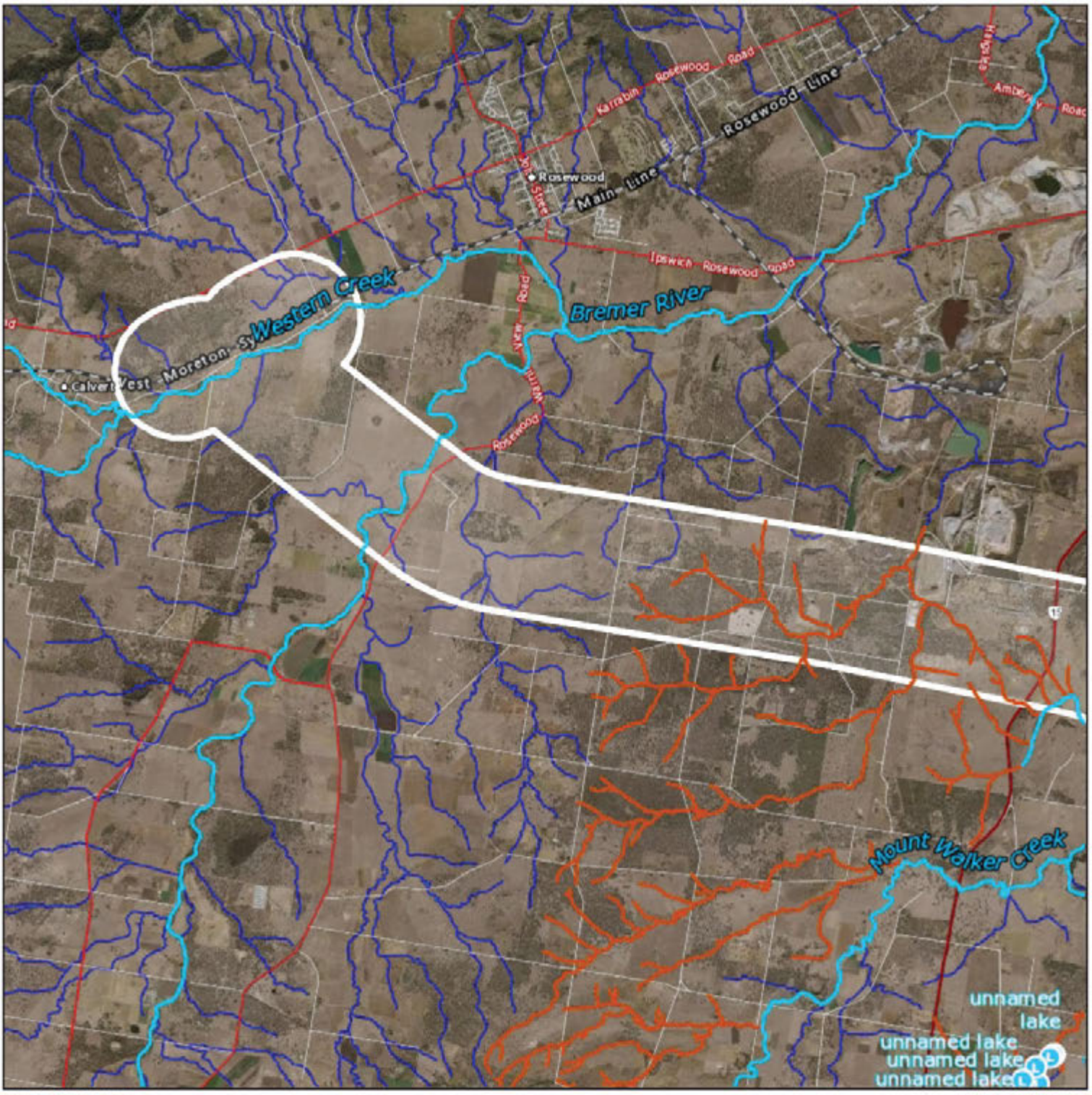
Queensland Land Use - Current (cont)

- Lake
- Reservoir/dam
- River
- Channel/aqueduct
- Marsh/wetland
- Estuary/coastal waters

Digital drainage

27°36'49"S 152°30'37"E

27°36'49"S 152°40'35"E



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27°45'39"S 152°40'35"E

A product of Queensland Globe

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Scale: 1:93489

Printed at: A4

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Queensland Government

Department of Natural Resources, Mines and Energy

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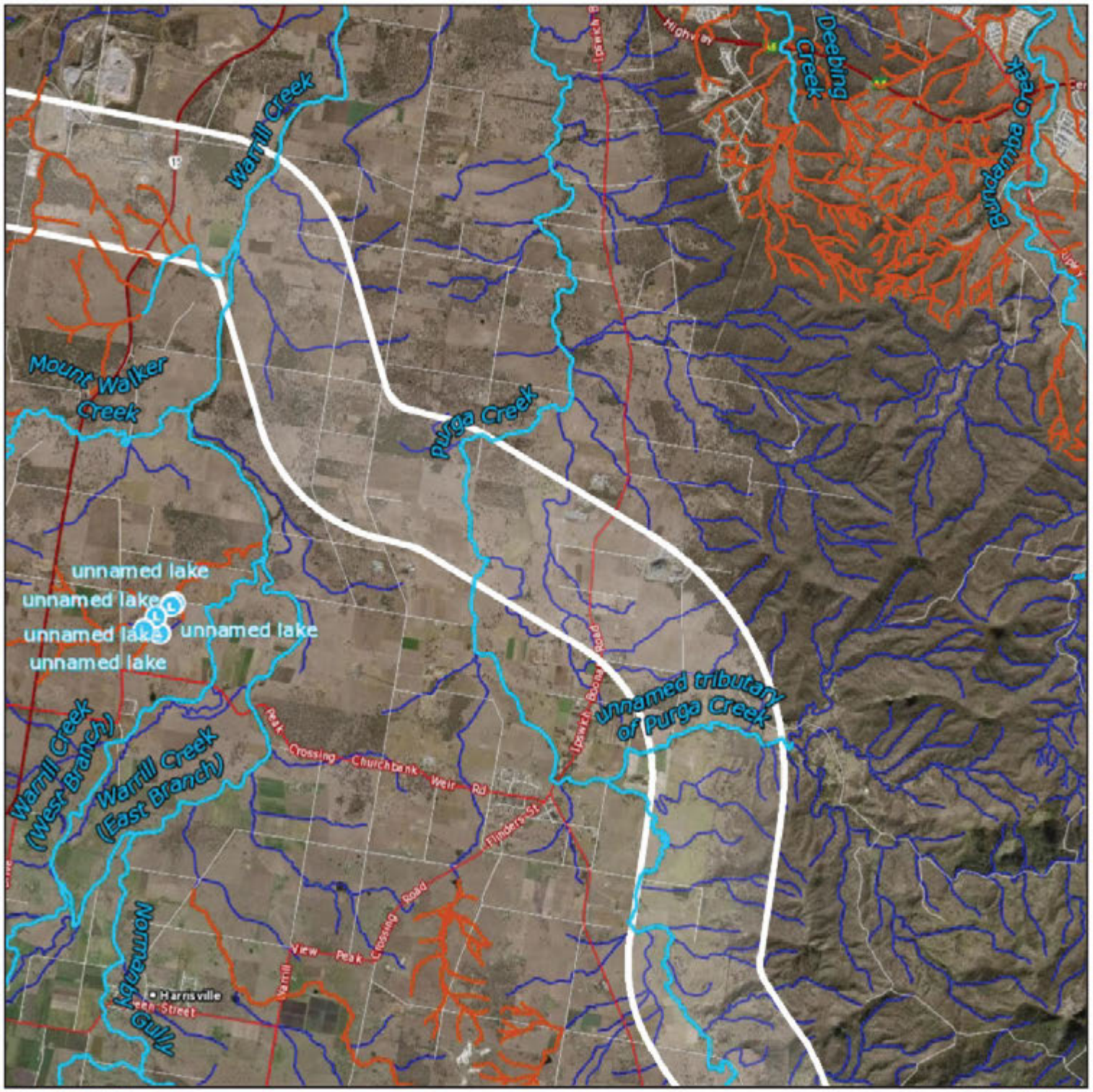
27°40'30"S 152°48'43"E



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A product of

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Scale: 1:93489

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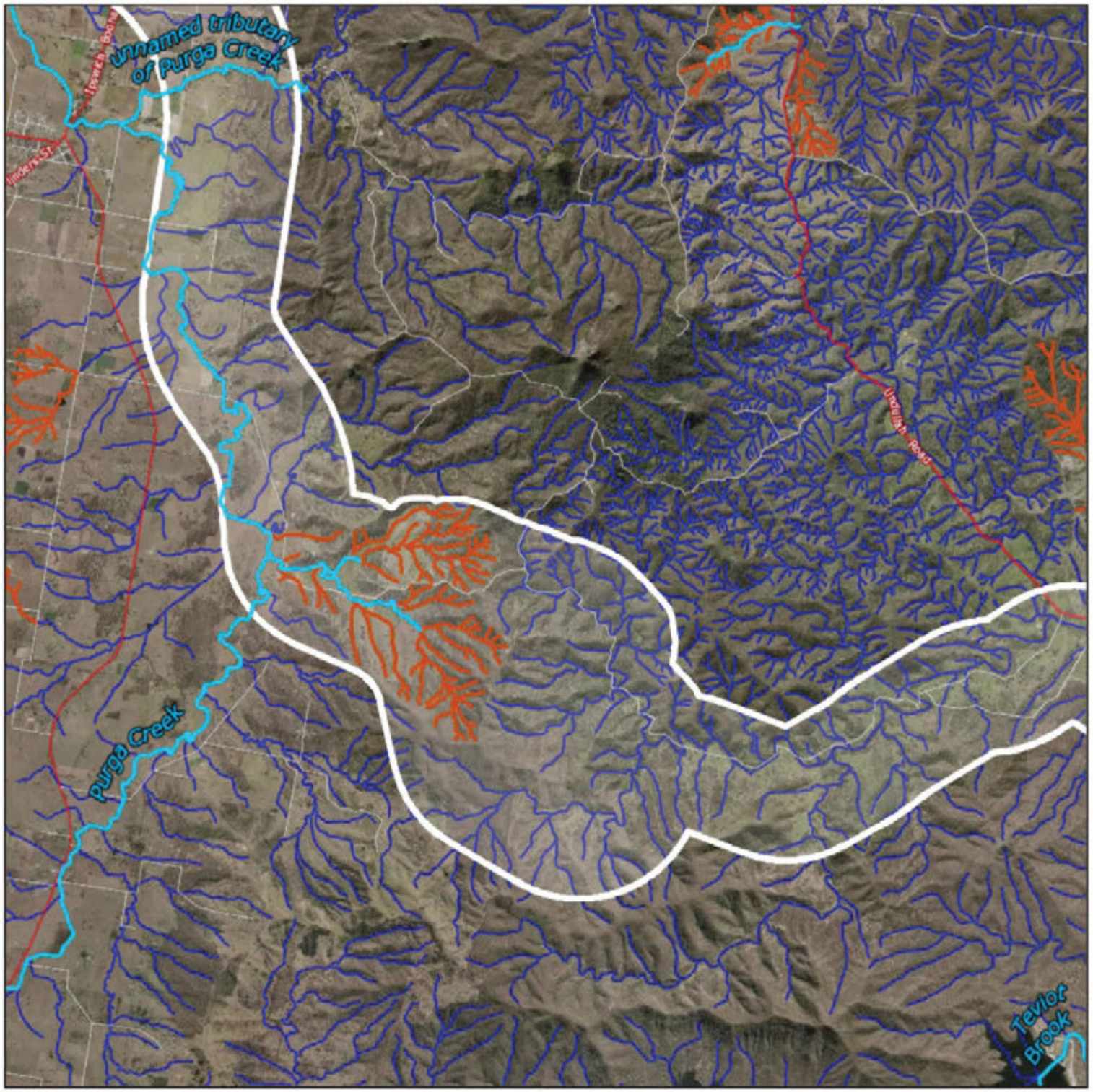
Queensland Government

Department of Natural Resources, Mines and Energy

27°45'53"S 152°43'14"E

27°45'53"S 152°53'12"E



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27°54'42"S 152°53'12"E

A product of

Queensland Globe

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0 2.5 km

Scale: 1:93489

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

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Queensland Government

Department of Natural Resources, Mines and Energy

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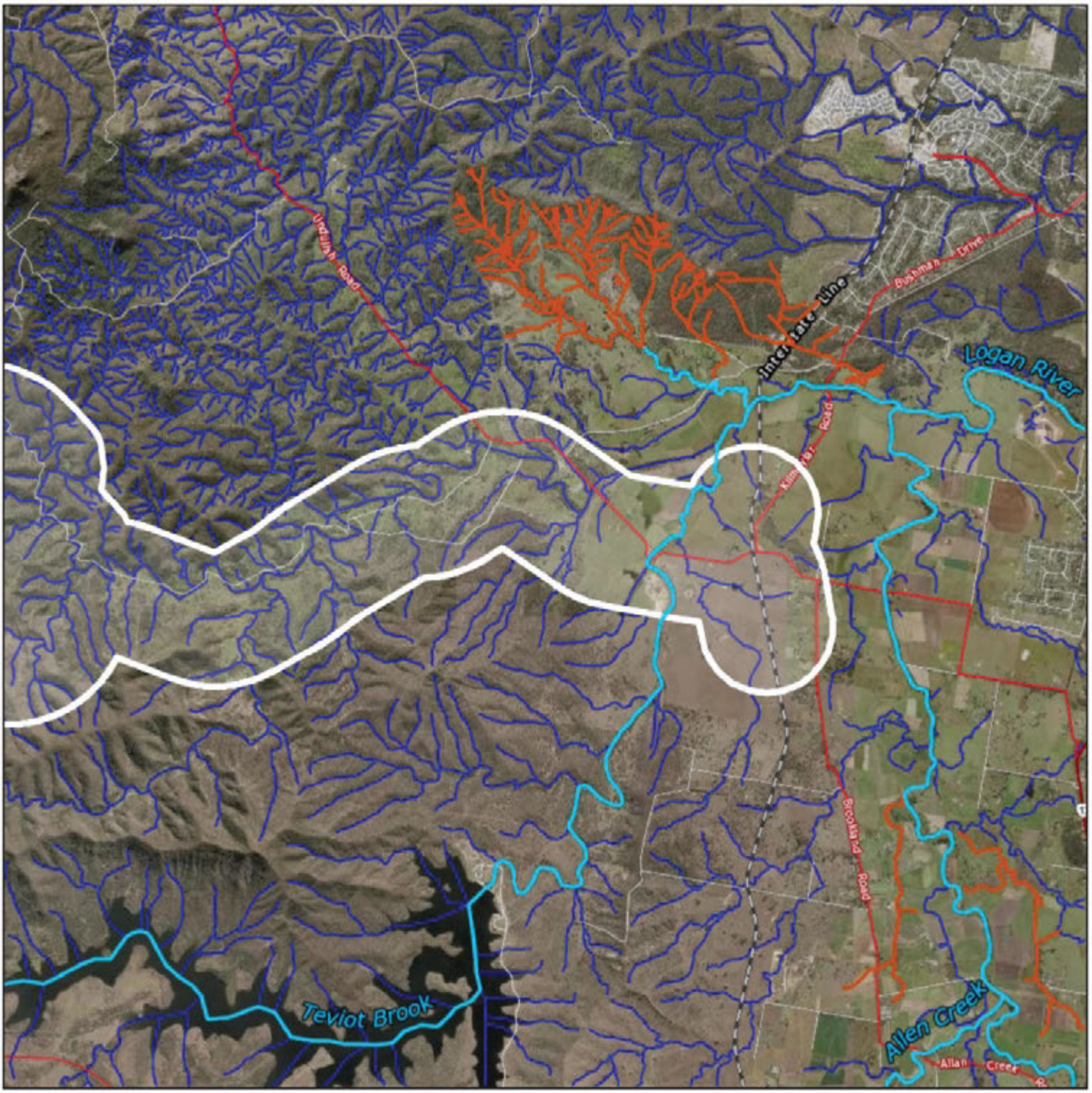
27°47'18"S 152°58'28"E



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27°56'7"S 152°58'28"E

A product of

Queensland Globe

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N

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Scale: 1:93489

Printed at: A4

Print date: 15/1/2020

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Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Spring [defined by Water Act 2000]

Lake [defined by Water Act 2000]

Downstream limit [defined by Water Act 2000]

Watercourse [defined by Water Act 2000]

Drainage feature [defined by Water Act 2000]

VM watercourse/drainage feature - 1:100 000 and 1:250 000

VM watercourse/drainage - 1:25 000

Road

- Highway
- Main
- Local
- Private

Railway

Cities and Towns

Attribution

DigitalGlobe, Earthstar Geographics

Water plans

27°37'15"S 152°30'48"E

27°37'15"S 152°40'46"E

27°46'5"S 152°30'48"E

27°46'5"S 152°40'46"E

A product of Queensland Globe

Legend located on next page

N

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Scale: 1:93489

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

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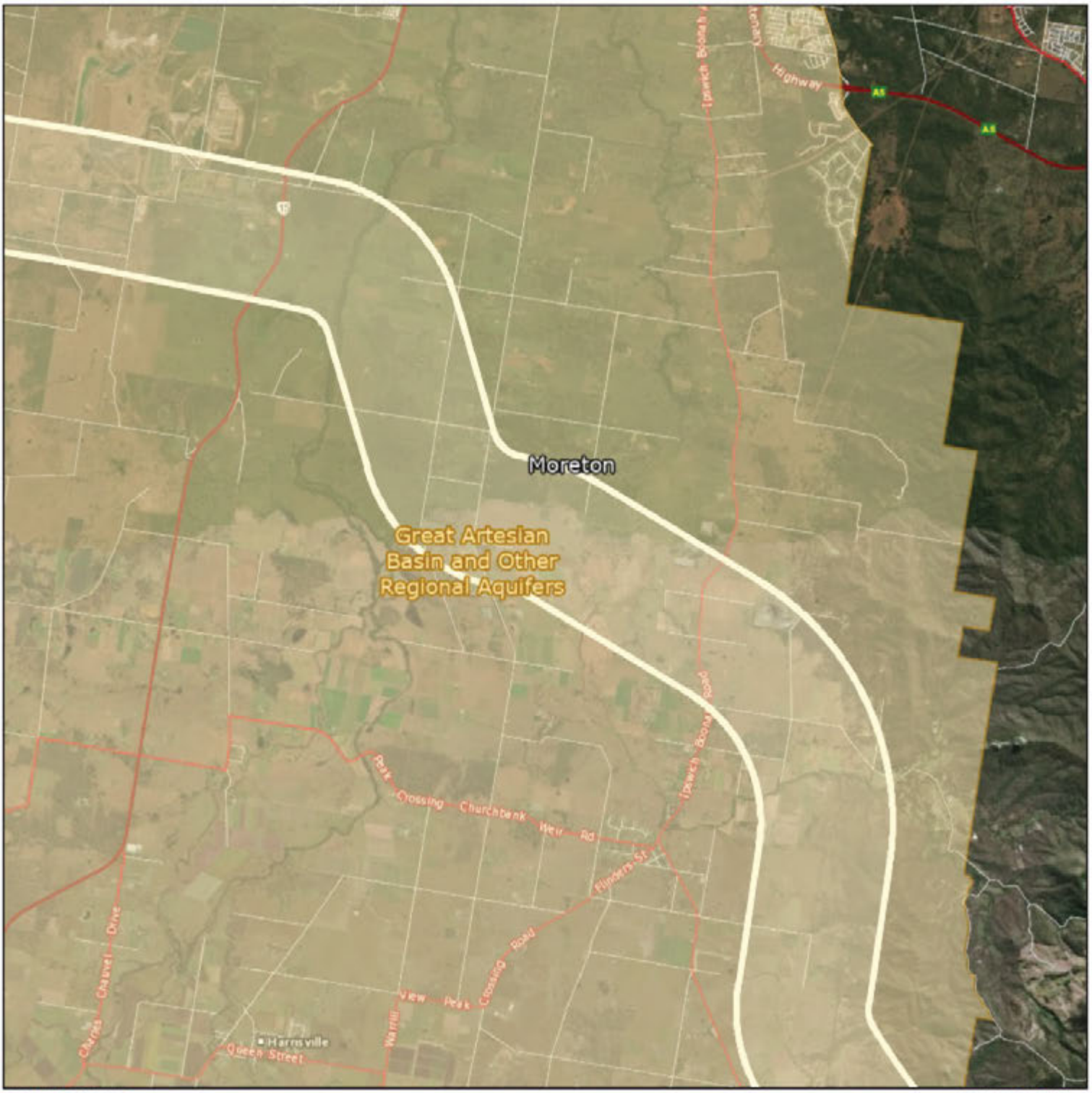
Queensland Government

Department of Natural Resources, Mines and Energy

27°40'8"S 152°37'44"E

27°40'8"S 152°47'42"E



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Queensland Globe

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Scale: 1:93489

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

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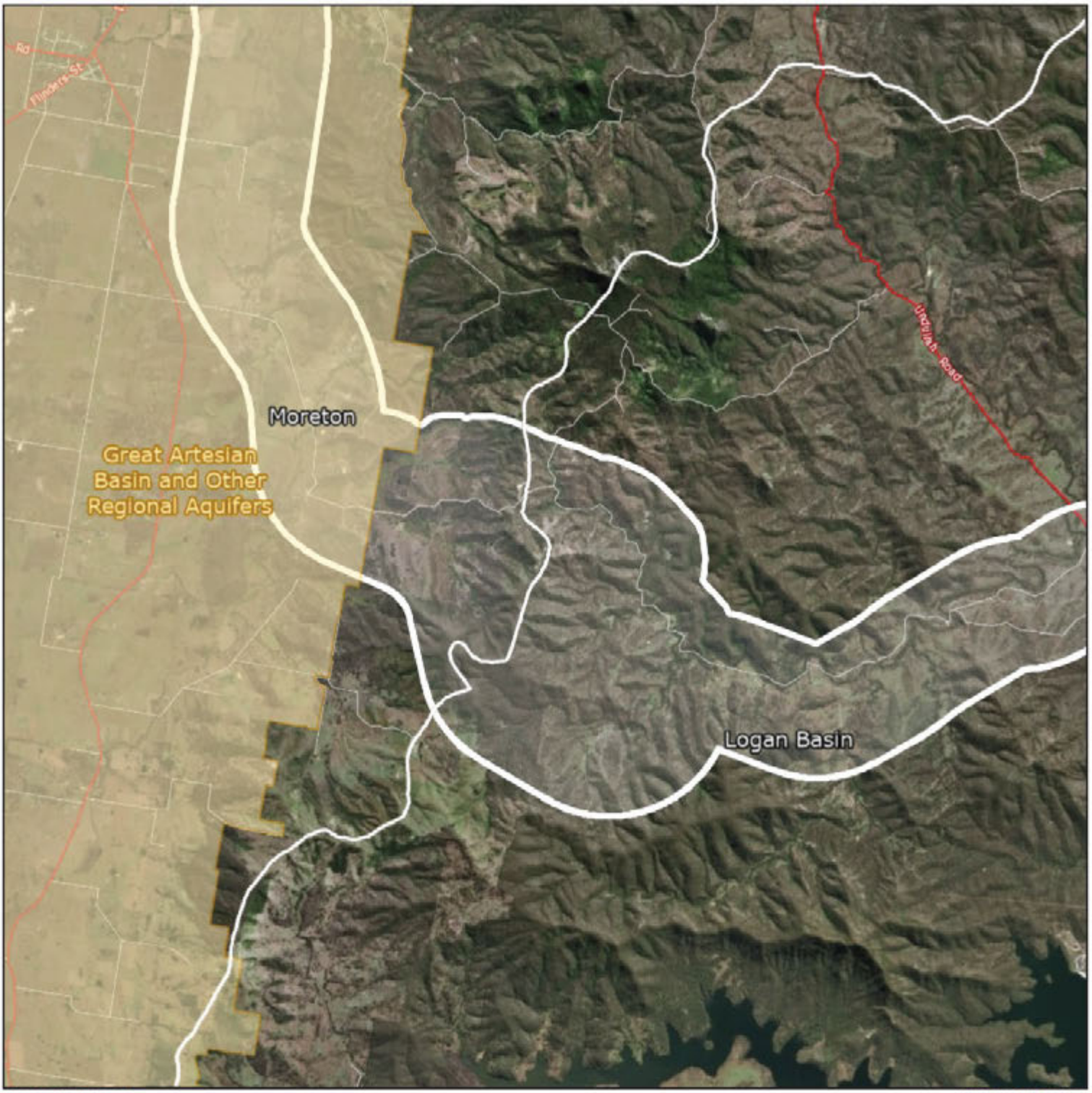
Queensland Government

Department of Natural Resources, Mines and Energy

27°46'34"S 152°42'57"E

27°46'34"S 152°52'55"E



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A product of

Queensland Globe

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Scale: 1:93489

Printed at: A4

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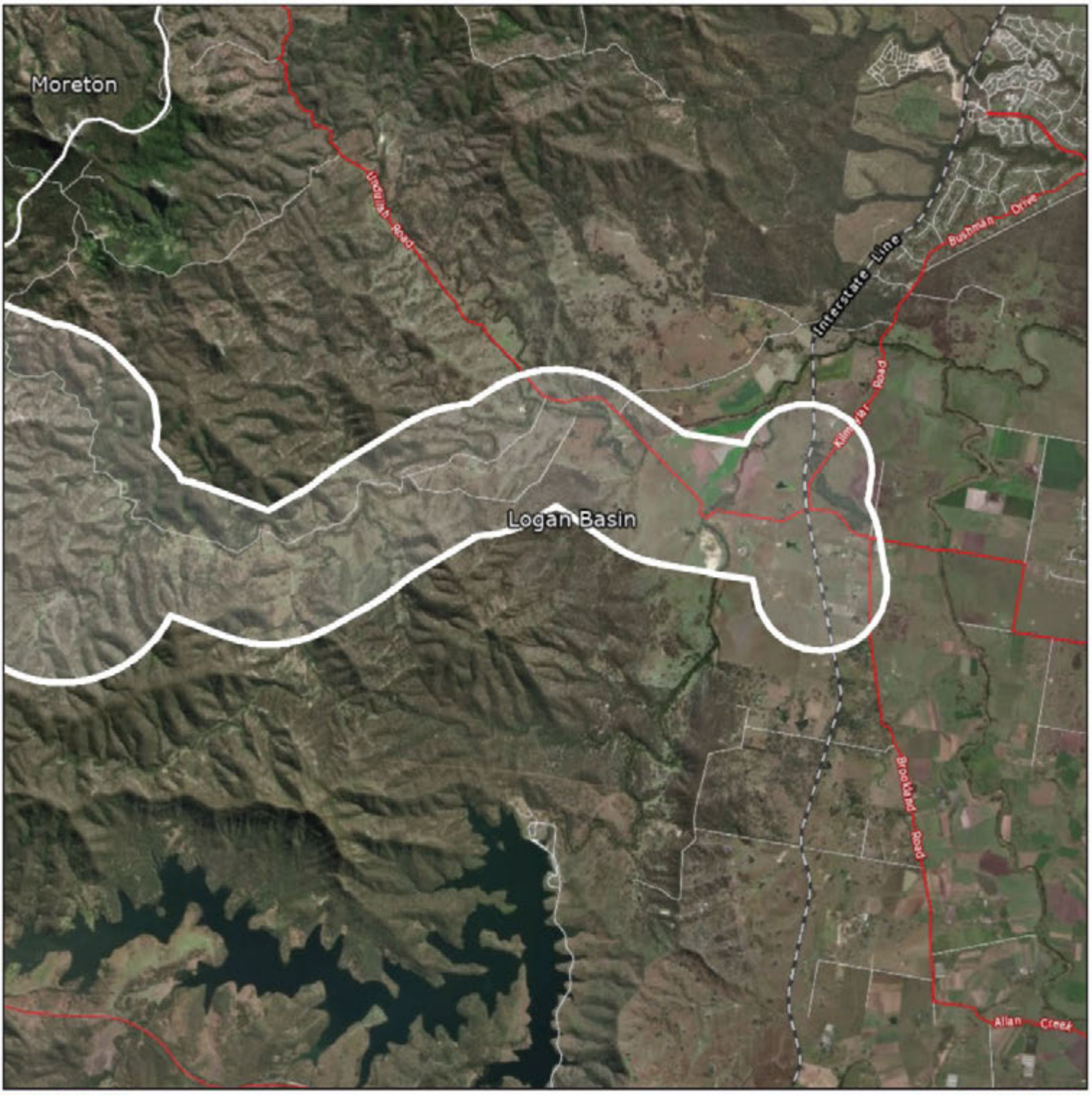
Queensland Government

Department of Natural Resources, Mines and Energy

27°47'39"S 152°48'0"E

27°47'39"S 152°57'58"E



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Queensland Globe

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Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Water plan areas except GABORA

Water plan area Great Artesian Basin and Other Regional Aquifers [GABORA]

Road

- Highway
- Main
- Local
- Private

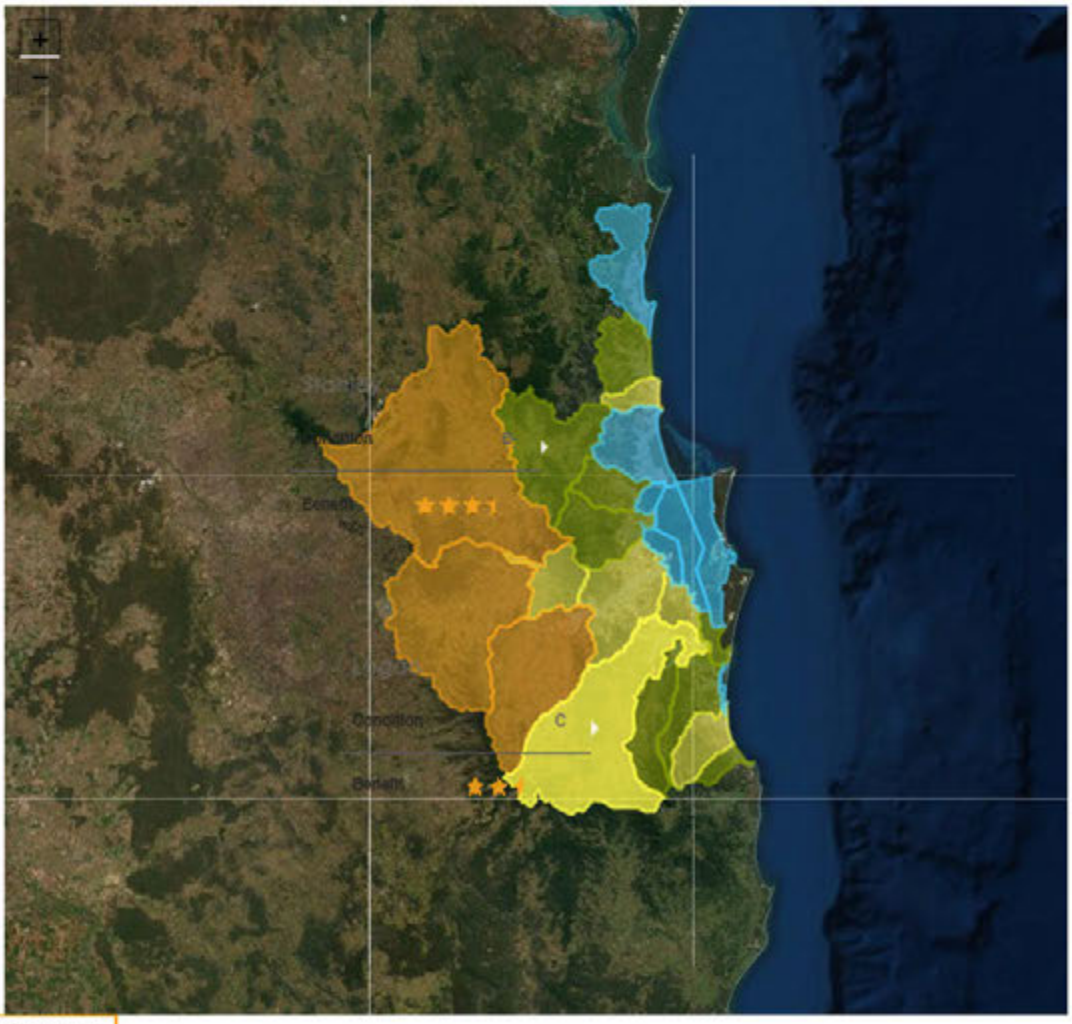
Cities and Towns

Railway

Attribution

DigitalGlobe, Earthstar Geographics

Healthy waterways report card - Logan



CLOSE ALL −

Logan

The headwaters of the Logan River catchment rise in Mt Barney National Park and are in relatively pristine condition. The upper catchment has been extensively cleared for agriculture, grazing and dairying. Mid and lower reaches flow through rural residential and urban areas. Several aquaculture facilities are located along the banks of the Logan River near its mouth.

For more information see the Logan Catchment Story

Environmental Condition Grade 2019

A B **C** D F

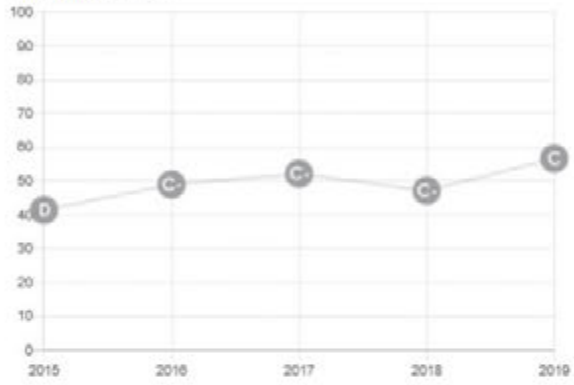
Catchment condition improved slightly though remains fair.

Why?

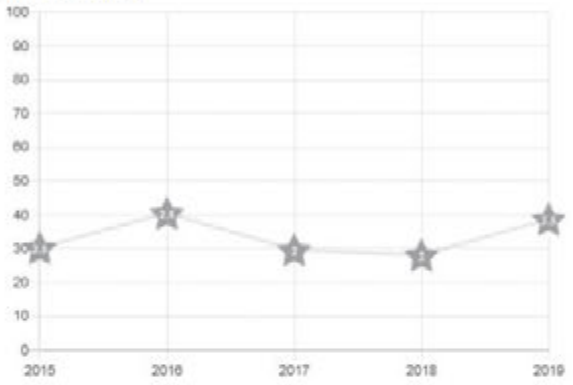
Pollutant loads significantly reduced from very high to very low, with a reduction in sediment (mud) and nutrients (702 to 34 kg/ha of sediment).
Freshwater health has declined and remains in poor condition predominantly due to a decrease in fish community health across most sites. Whilst macroinvertebrates improved slightly, they remain poor across the mid to lower catchment with declines at several sites.
Stream bank vegetation and wetland extent remains fair across the freshwater reaches of the catchment. The extent of wetland habitat in the estuary also remains fair.
Estuarine health remains fair due to increased algae in the upper reaches offset by improve water clarity and decreased nitrogen. Salinity levels were higher than last year particularly during summer indicating much drier conditions.

Changes Over Time

Condition Grade



Benefit Rating



Select regions to compare

Pimpama-Coomera Tallebudgera-Currumbin Nerang Albert
Redland Lower Brisbane Mid Brisbane Pine Caboolture
Noosa Maroochy Mooloolah Stanley Upper Brisbane
Lockyer Bremer Logan Pumicestone Catchment Broadwater
Southern Bay Central Bay Western Bay Eastern Bay

Waterway Benefit Rating 2019

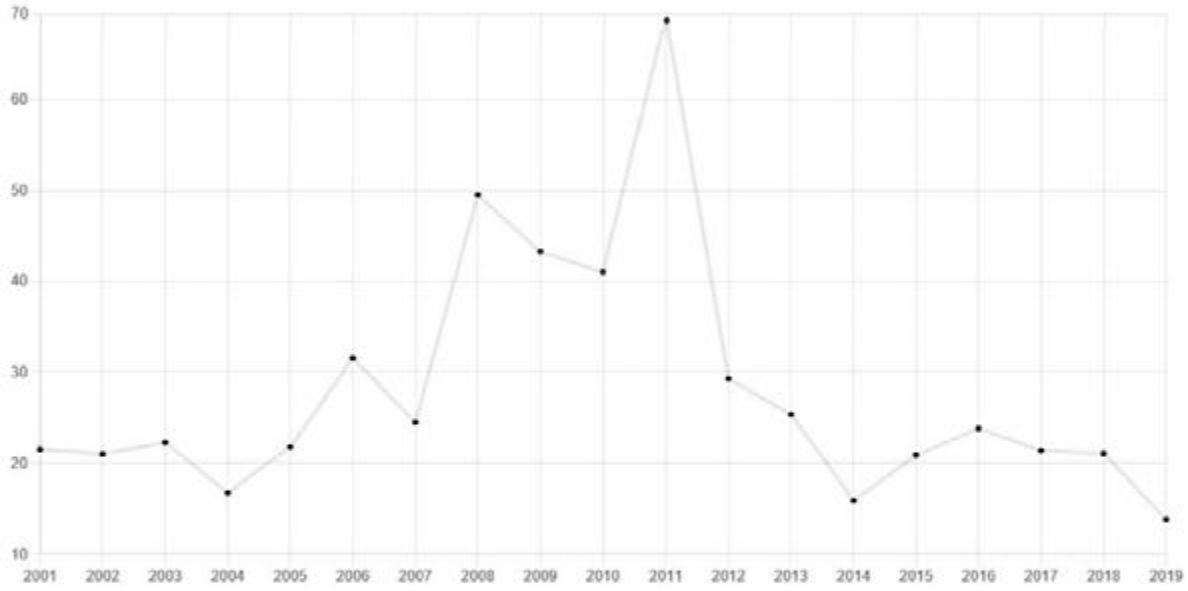
The fair catchment condition results in only moderate numbers of residents (50%) satisfied with the usability and accessibility of their local waterways (compared with 64% for all of SEQ).
Despite this, residents report they do value their local waterways for recreation. 31% of people recreate in or alongside their local waterway on a monthly basis or more. The top activities include walking or running (21 days/year), enjoying nature (10 days/year), picnicking (4 days/year) and cycling (2 days/year).
A decrease in pollutant loads generated from the catchment this year means that the amount of mud removed from drinking water at the Beaudesert treatment plant decreased (406 kg/ML to 352 kg/ML).

Ways To Improve Waterway Health And Benefits

- Protecting streambank vegetation and wetlands from clearing and weed infestation is key to maintaining catchment condition in the face of projected increasing population and development. Over the next 25 years, Logan City Council is projected to be one of the fastest growing urbanised areas in SEQ, with a 78% expansion in the urban footprint. 69% of streambanks in the Logan catchment have vegetation and 27% has never been cleared.
- Protecting existing habitat is critical for maintaining the catchment's existing recreational and commercial fisheries values. 71% of mangrove and saltmarsh habitat remains in the Logan estuary.
- Improving access and use of waterways increases the community's connection with their waterways and motivation to protect them. 70% of residents feel nature in general is an important part of their lives, however less than half are motivated to protect their local waterways (29%) or feel it is their personal responsibility (27%). Similarly, only 50% are satisfied with the usability and accessibility of waterways. Projects such as the Logan River Vision are improving the accessibility and usability of the Logan River.
- Campaigns to highlight the value of waterways to the community can improve feelings of responsibility and willingness to engage in or support waterway protection activities. High numbers of residents (40%) in the Logan catchment feel they know very little about their local waterways.

Trends

Turbidity (NTU)



Select regions to compare

Catchments

Pimpama-Coomera Tallebudgera-Currumbin Nerang Albert
Redland Lower Brisbane Mid Brisbane Pine Caboolture
Noosa Maroochy Mooloolah Stanley Upper Brisbane
Lockyer Bremer Logan Pumicestone Catchment

Estuaries

Logan Estuary Albert Estuary Bremer Estuary Brisbane Estuary
Cabbage Tree Estuary Caboolture Estuary Coomera Estuary
Currumbin Estuary Maroochy Estuary Mooloolah Estuary
Nerang Estuary Noosa Estuary Oxley Estuary Pimpama Estuary
Pine Estuary Pumicestone Estuary Tallebudgera Estuary
Tingalpa Estuary Eprapah Estuary

Bays

Broadwater Southern Bay Central Bay Western Bay
Bramble Bay Eastern Bay Eastern Banks Waterloo Bay
Deception Bay

Select indicator to view trend

Benefit

- Access & use
- Satisfaction
- Drinking water
- Connection
- Personal benefits
- Recreational use

Estuarine/marine

- Turbidity
- Chlorophyll-a
- Total nitrogen
- Total phosphorus
- Dissolved oxygen

Freshwater

- Ecosystem processes
- Fish
- Bugs
- Physical chemical

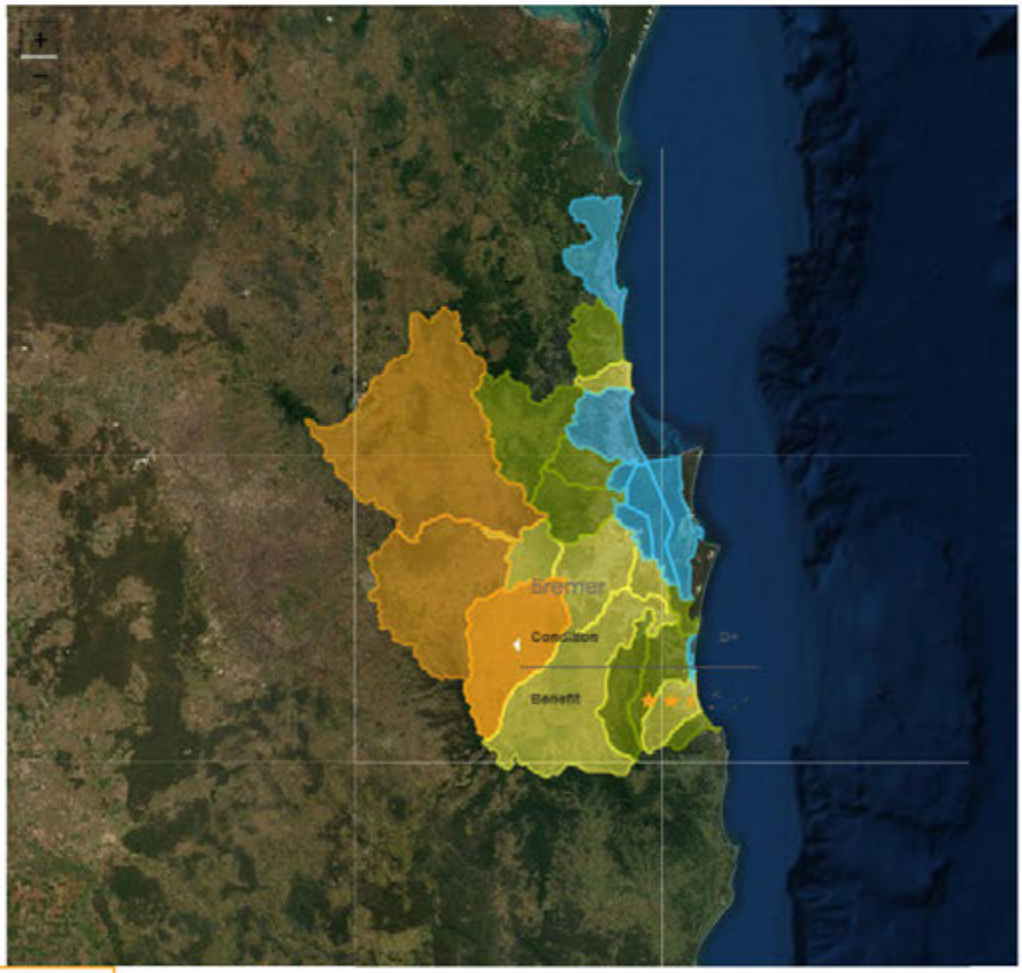
Habitat

- Estuarine wetlands
- Riparian extent
- Freshwater wetlands

Pollutant

- Sediment load
- Nitrogen load
- Phosphorus load

Healthy waterways report card - Bremer



CLOSE ALL −

Bremer

The Bremer River catchment is located west of Brisbane and flows into the Brisbane River. It is mostly urbanised with areas of rural landuse the majority of which has been cleared for cattle grazing. Some areas of natural bush remain in the upper catchment. Riparian vegetation is significantly modified with little vegetation remaining. Widespread channel and gully erosion occurs in the river and its tributaries. Four waste water treatment plants and other point sources discharge to the catchments waterways contributing to sediment and nutrient loads.

For more information see the Bremer Catchment Story

Environmental Condition Grade 2019

A B C **D+** F

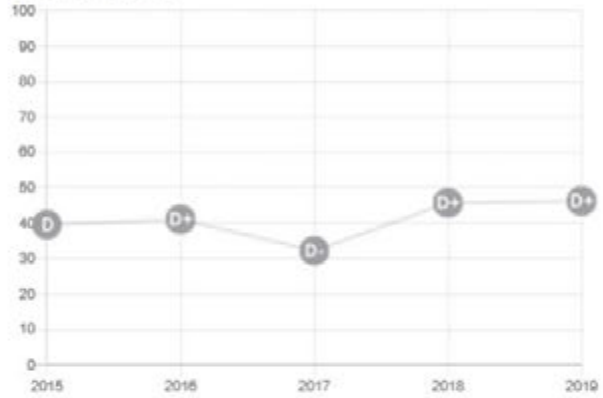
The catchment remains in poor condition.

Why?

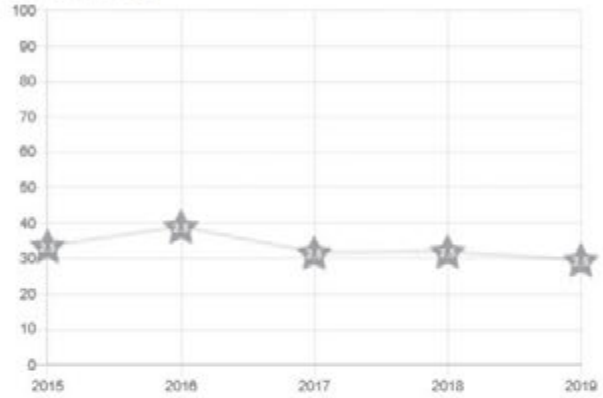
Pollutant loads remain very low in the Bremer catchment. However, it was one of only three catchments where pollutant loads increased this year. Pollutant loads also increased in the Maroochy and Mooloolah catchments. A slight increase in sediment (mud) and reduction in nutrients occurred, particularly nitrogen (2.2 to 0.5 kg/ha generated from the land).
Freshwater health continues to decline and remains in poor condition due to a decrease across most indicators particularly water quality and fish community health.
The extent of stream bank vegetation throughout the catchment remains very poor, with only 56% of streambanks vegetated.
Estuarine health improved significantly from poor to good due to improved water clarity and dissolved oxygen, however total phosphorus increased. Salinity levels were higher than last year particularly during spring and summer indicating drier conditions, increasing the accumulation of nutrients within the estuary.

Changes Over Time

Condition Grade



Benefit Rating



Select regions to compare

Pimpama-Coomera | Tallebudgera-Currumbin | Nerang | Albert | Redland | Lower Brisbane | Mid Brisbane | Pine | Caboolture | Noosa | Maroochy | Mooloolah | Stanley | Upper Brisbane | Lockyer | Bremer | Logan | Pumicestone Catchment | Broadwater | Southern Bay | Central Bay | Western Bay | Eastern Bay

Waterway Benefit Rating 2019

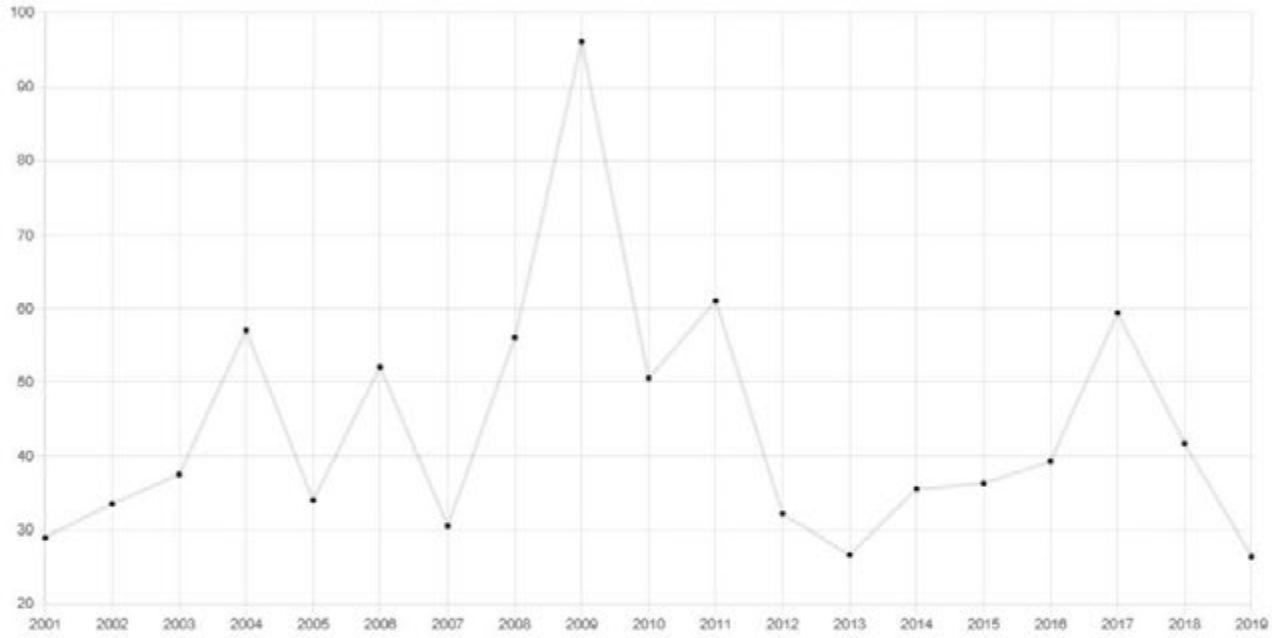
Poor catchment condition, results in only moderate numbers of residents (48%) that are satisfied with the usability and accessibility of their local waterways (compared with 64% for all of SEQ).
Despite this, residents report they do value their local waterways for recreation. 23% recreate in or alongside their local waterway on a monthly basis. Residents reported their recreational use of local waterways was predominantly walking or running (20 days/year) and enjoying nature (15 days/year). They picnicked or camped on average 4 days/year, and rarely participated in other activities.
Slightly higher pollutant loads in the catchment this year meant the amount of mud removed from drinking water at the Boonah-Kalbar treatment plant was significantly higher (2154 kg/ML) compared to last year (557 kg/ML).

Ways To Improve Waterway Health And Benefits

- Protecting streambank vegetation and wetlands from clearing and weed infestation is key to maintaining catchment condition in the face of projected increasing population and development. Over the next 25 years Ipswich City Council area is projected to be one of the fastest growing urbanised areas in SEQ, with a 75% expansion in the urban footprint. 56% of streambanks in the Bremer catchment have vegetation and the retention of these will be critical for mitigating the increasing pressures that come with expansion.
- The naturalisation of creek channels in the urban landscape, such as the Small Creek project, increases the accessibility and usability of local waterways. In turn this improves the community's emotional connection with their local waterways and their motivation to use and protect them.
- Improving access and use of waterways increases the community's motivation to protect them. 71% of residents feel nature in general is an important part of their lives, however only a very small number are motivated to protect their local waterways (20%) or feel it is their personal responsibility (30%).
- Campaigns to highlight the value of waterways to the community can improve feelings of responsibility and willingness to engage in or support waterway protection activities. Events such as the Ipswich City Council Fishing and Water Fest aim to celebrate local waterways and increase awareness and value of the Bremer River catchment.
- Focus future campaigns around resident's top environmental concerns to increase traction, which are Litter, water pollution, extinctions of local plants and animals, and loss of natural beauty.

Trends

Turbidity (NTU)



Select regions to compare

Catchments

Pimpama-Coomera Tallebudgera-Currumbin Nerang Albert
Redland Lower Brisbane Mid Brisbane Pine Caboolture Noosa
Maroochy Mooloolah Stanley Upper Brisbane Lockyer Bremer
Logan Pumicestone Catchment

Estuaries

Logan Estuary Albert Estuary Bremer Estuary Brisbane Estuary
Cabbage Tree Estuary Caboolture Estuary Coomera Estuary
Currumbin Estuary Maroochy Estuary Mooloolah Estuary Nerang Estuary
Noosa Estuary Oxley Estuary Pimpama Estuary Pine Estuary
Pumicestone Estuary Tallebudgera Estuary Tingalpa Estuary
Eprapah Estuary

Bays

Broadwater Southern Bay Central Bay Western Bay Bramble Bay
Eastern Bay Eastern Banks Waterloo Bay Deception Bay

Select indicator to view trend

Benefit

Access & use
Satisfaction
Connection
Personal benefits
Recreational use

Estuarine/marine

Turbidity
Chlorophyll-a
Total nitrogen
Total phosphorus
Dissolved oxygen

Freshwater

Ecosystem processes
Fish
Bugs
Physical chemical

Habitat

Riparian extent
Freshwater wetlands

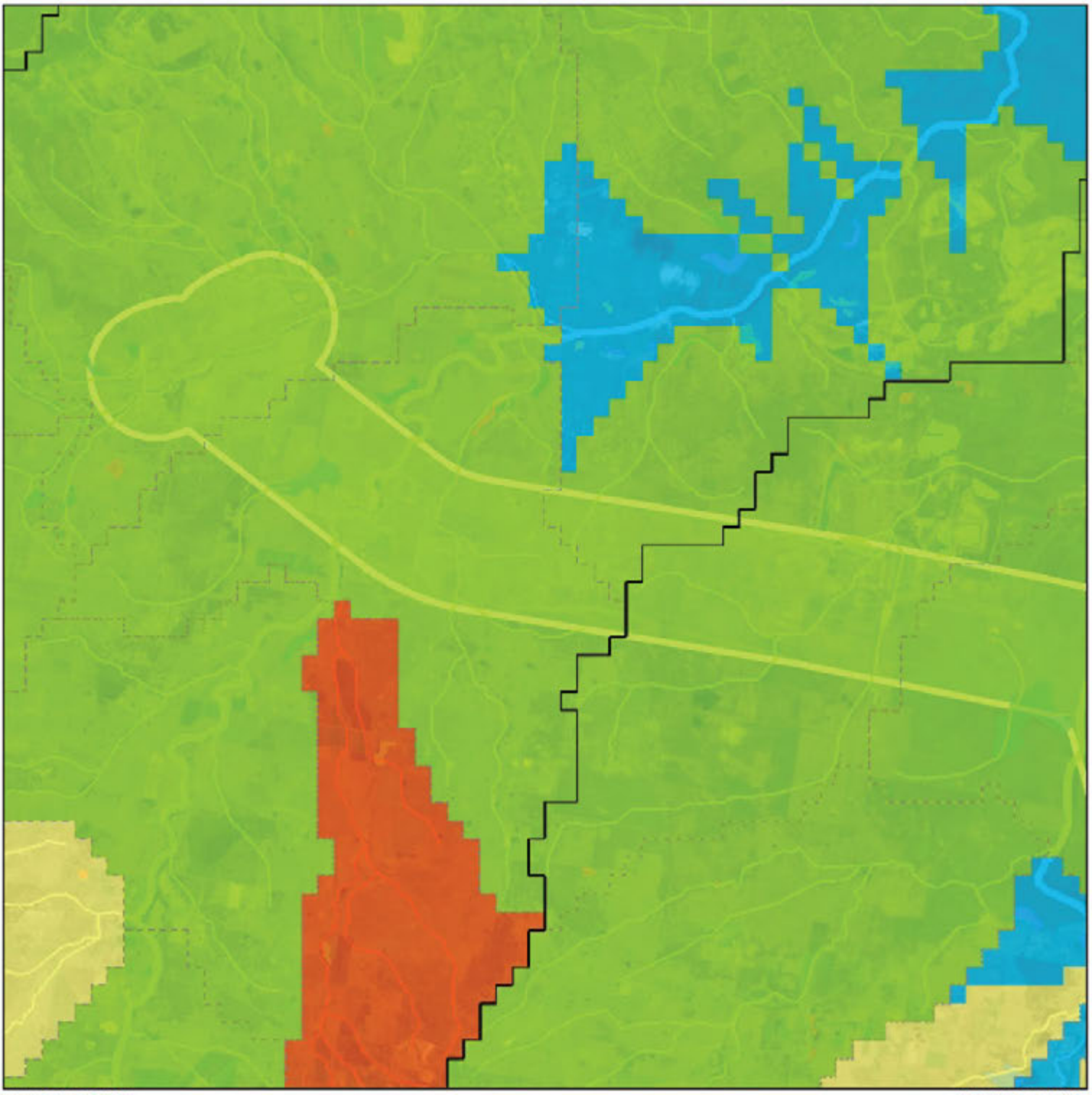
Pollutant

Sediment load
Nitrogen load
Phosphorus load

Aquatic Conservation Assessment

27°36'49"S 152°30'50"E

27°36'49"S 152°40'50"E



27°45'40"S 152°30'50"E

27°45'40"S 152°40'50"E

A product of

Queensland Globe

Legend located on next page

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0 2.5 km

Scale: 1:93708

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Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

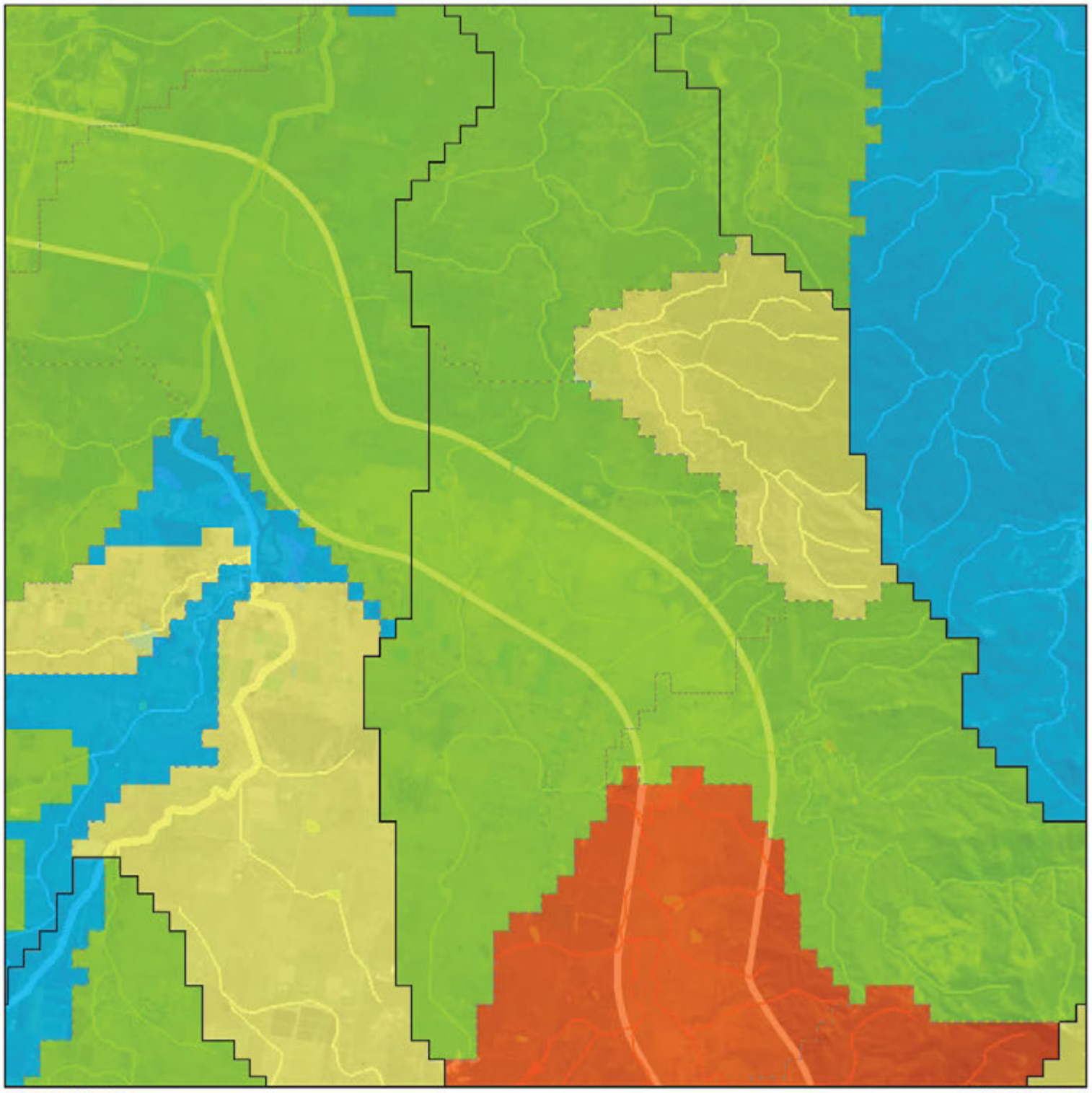
For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

27°40'24"S 152°38'49"E

27°40'24"S 152°48'49"E



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27°49'15"S 152°48'49"E

A product of

Queensland Globe

Legend located on next page

N

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Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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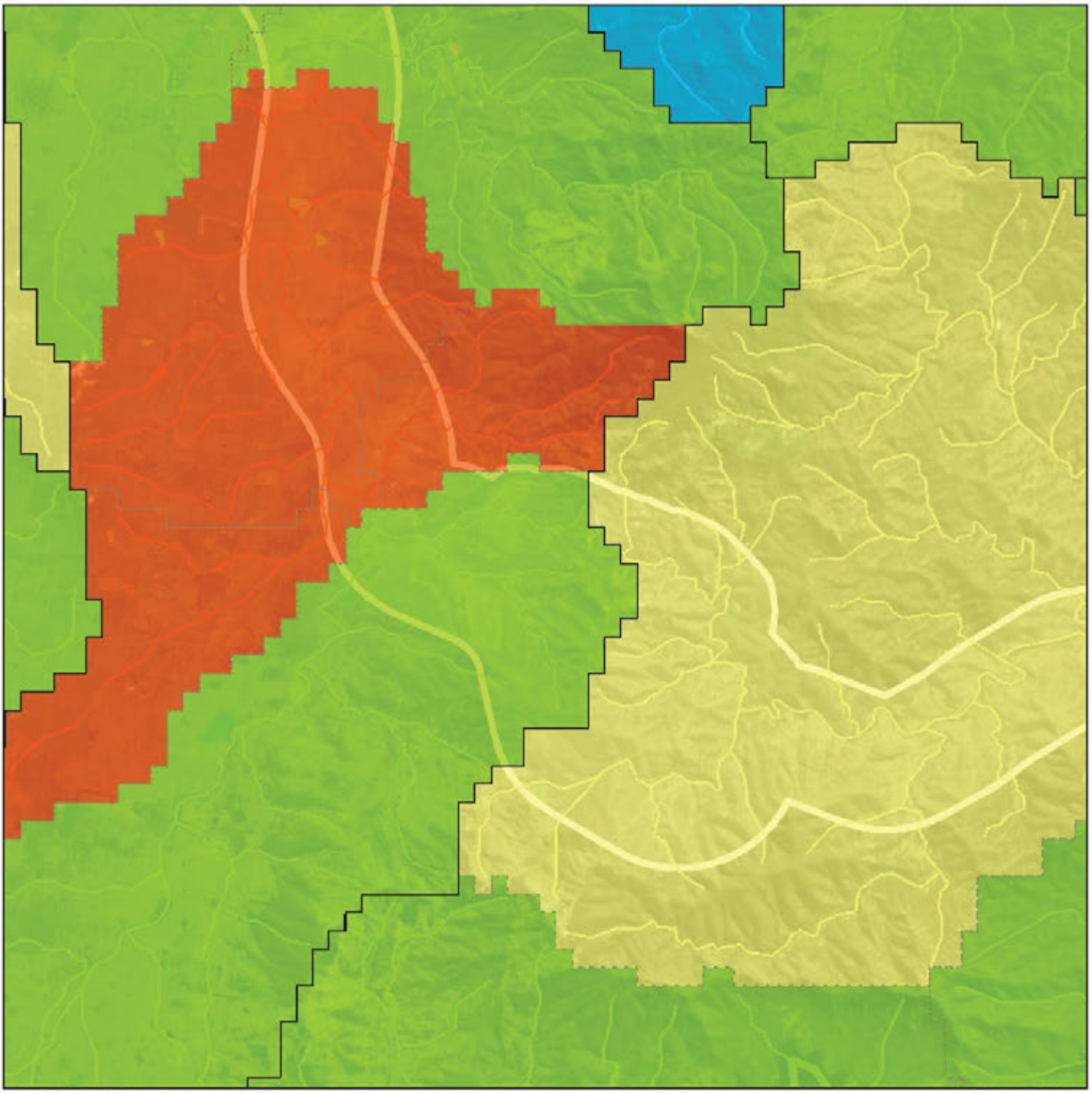
27°46'7"S 152°52'17"E



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A product of

Queensland Globe

Legend located on next page

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Scale: 1:93708

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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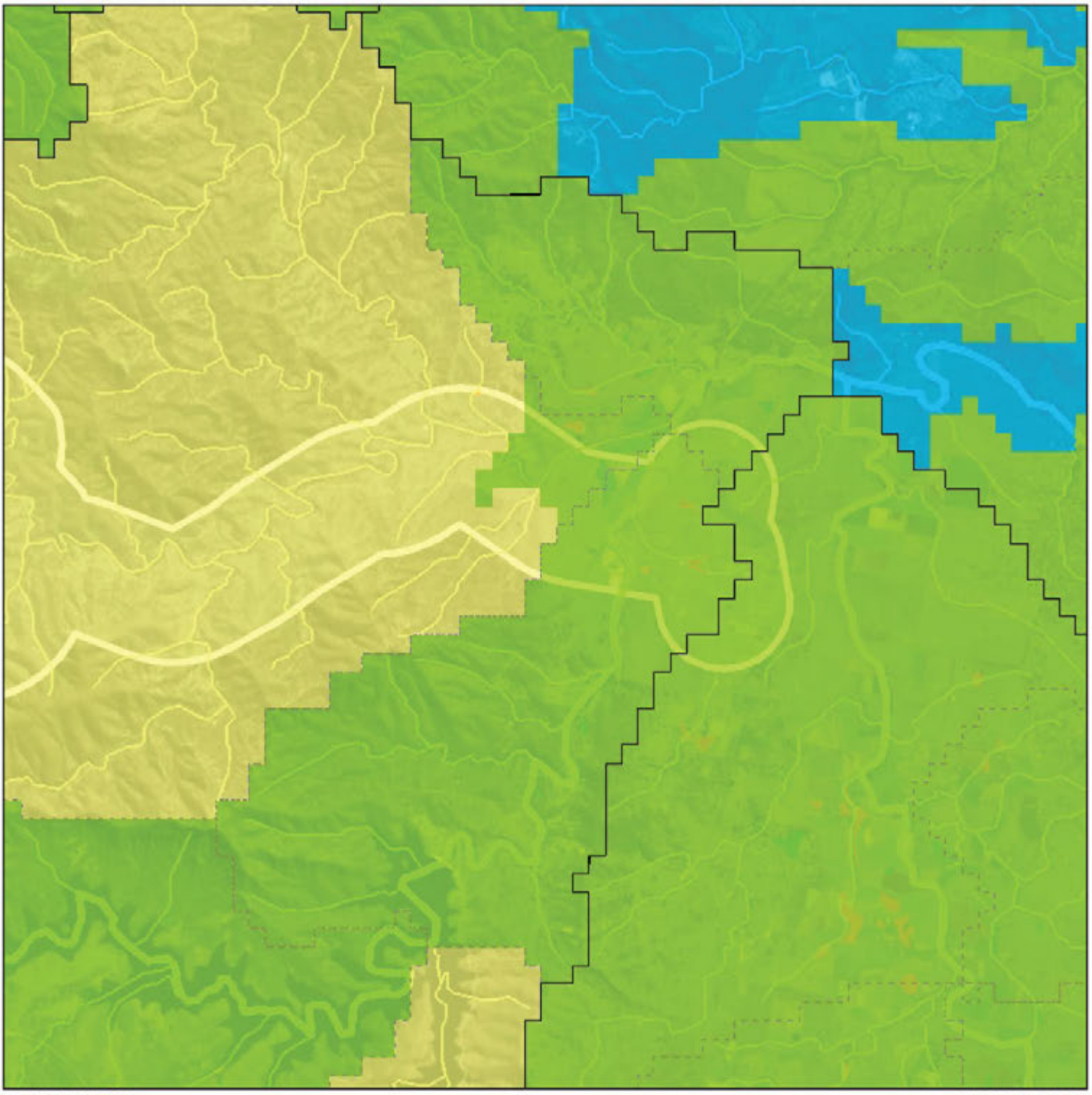
27°47'30"S 152°58'53"E



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27°56'20"S 152°58'53"E

A product of

Queensland Globe

Legend located on next page

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Scale: 1:93708

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Riverine subcatchments

Riverine subsections

Buffered streams - conservation significance

- Very High
- High
- Medium
- Low
- Very Low

Riverine spatial units - conservation significance

- Very High
- High
- Medium
- Low
- Very Low

Non-riverine subcatchments

Non-riverine subsections

Springs - conservation significance

- Very High
- High
- Medium
- Very Low

Non-riverine wetlands - conservation significance

- Very High
- High
- Medium
- Low
- Very Low

Attribution

Queensland springs

27°29'51"S 152°24'11"E

27°29'51"S 153°0'17"E

28°1'48"S 152°24'11"E

28°1'48"S 153°0'17"E

A product of Queensland Globe

Legend located on next page

N

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Scale: 1:338516

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Active springs

- Permanently active spring
- Intermittently active spring

Inactive springs

GAB spring net sites

Springs - conservation significance

- Very High
- High
- Medium
- Very Low

GABORA groundwater dependent ecosystem springs

Cities and Towns

Attribution

Earthstar Geographics

Queensland GDE database search

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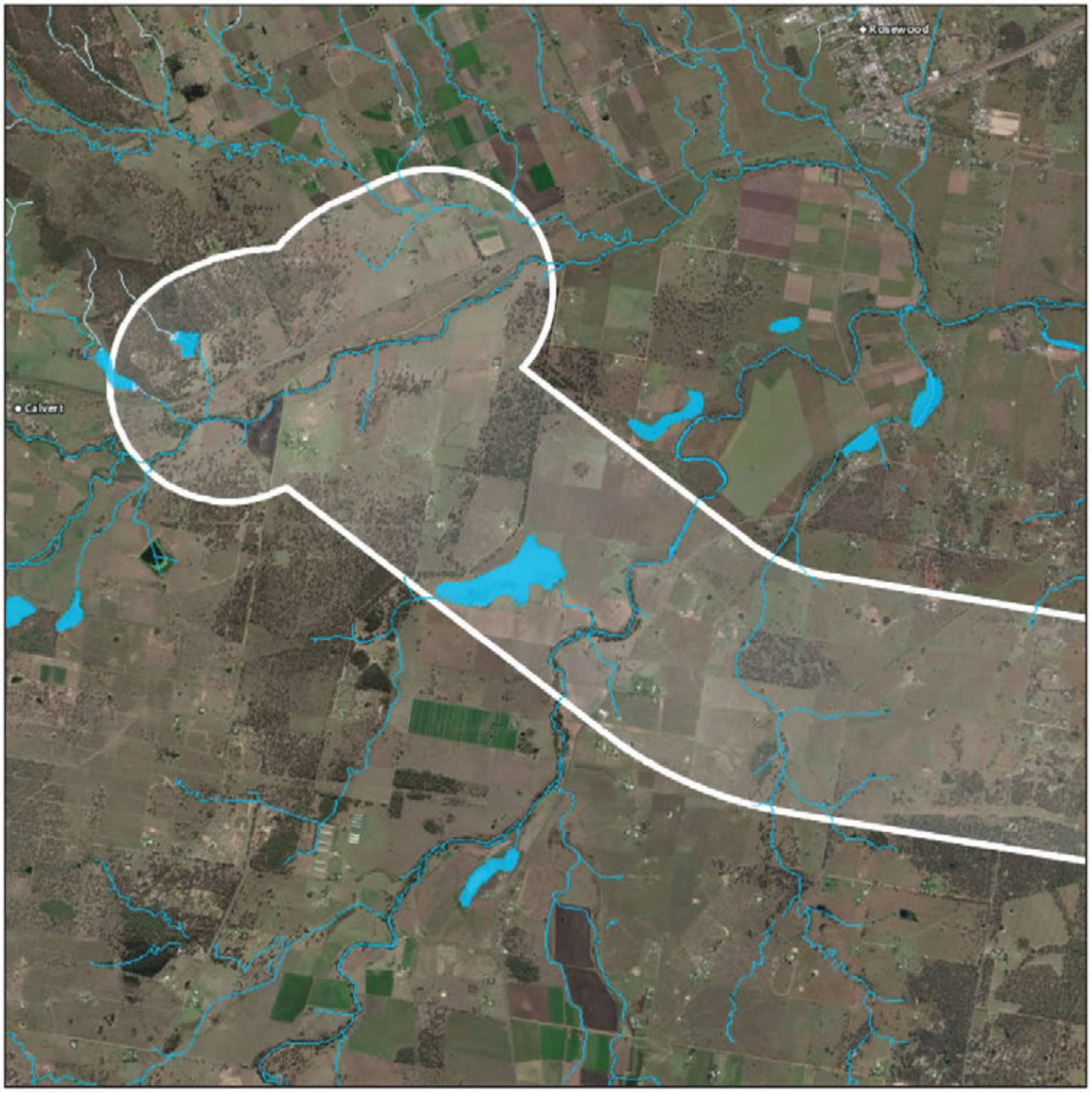
27°38'7"S 152°36'37"E



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27°43'0"S 152°36'37"E

A product of

Queensland Globe

Legend located on next page

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Scale: 1:51638

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

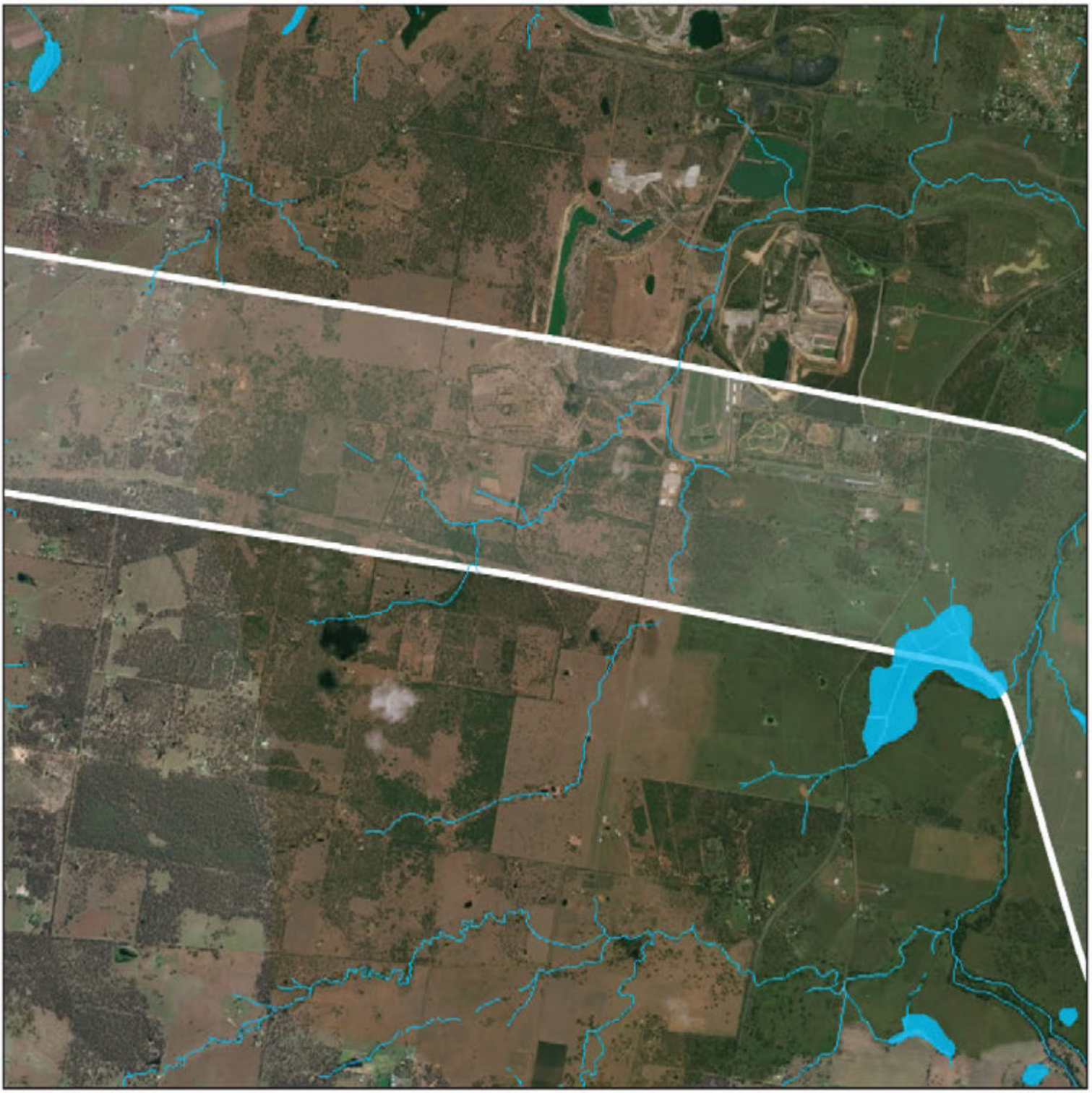
For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

27°39'38"S 152°35'36"E

27°39'38"S 152°41'6"E



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27°44'31"S 152°41'6"E

A product of

Queensland Globe

Legend located on next page

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Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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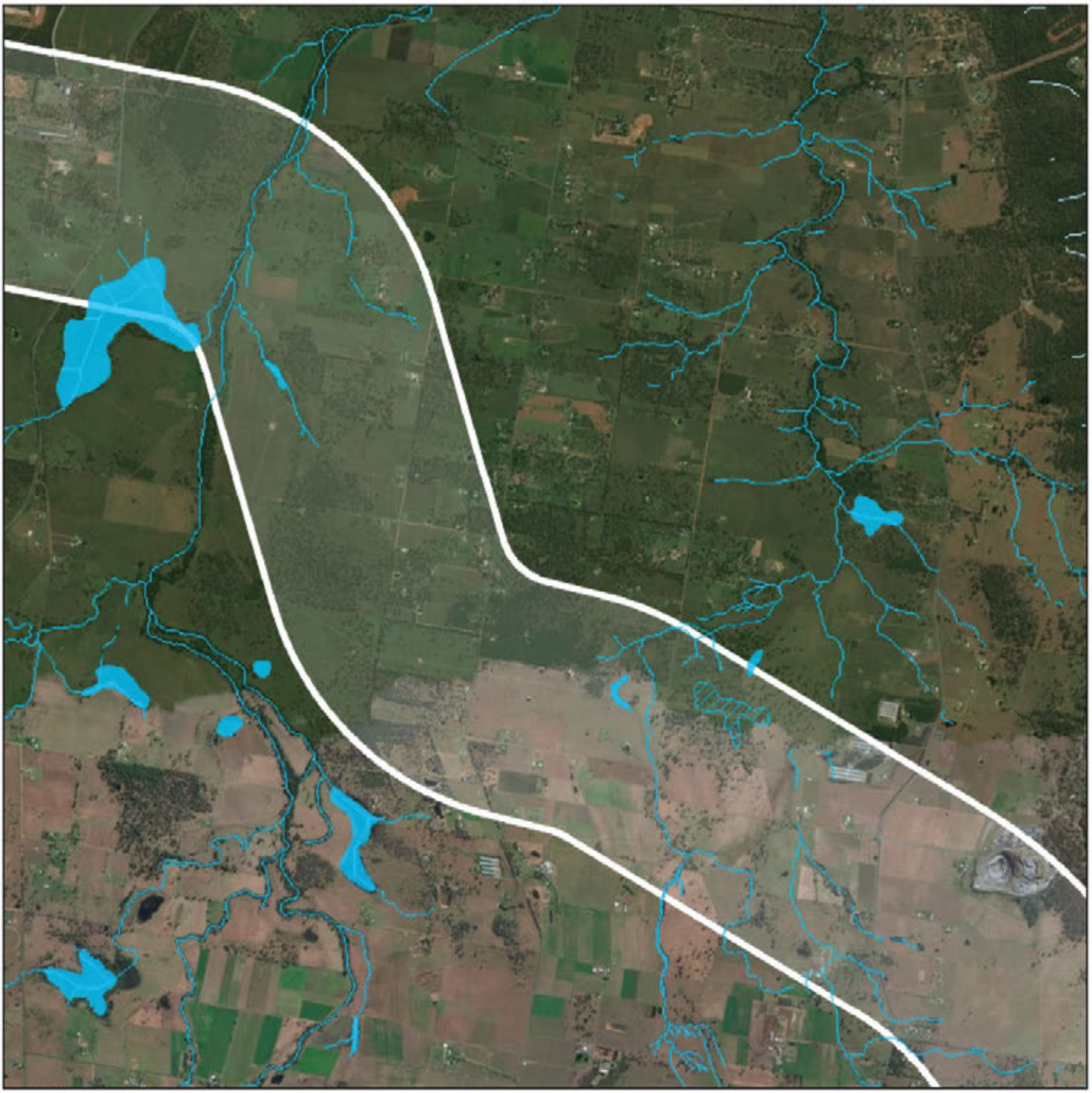
27°41'12"S 152°45'13"E



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27°46'5"S 152°45'13"E

A product of

Queensland Globe

Legend located on next page

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Scale: 1:51638

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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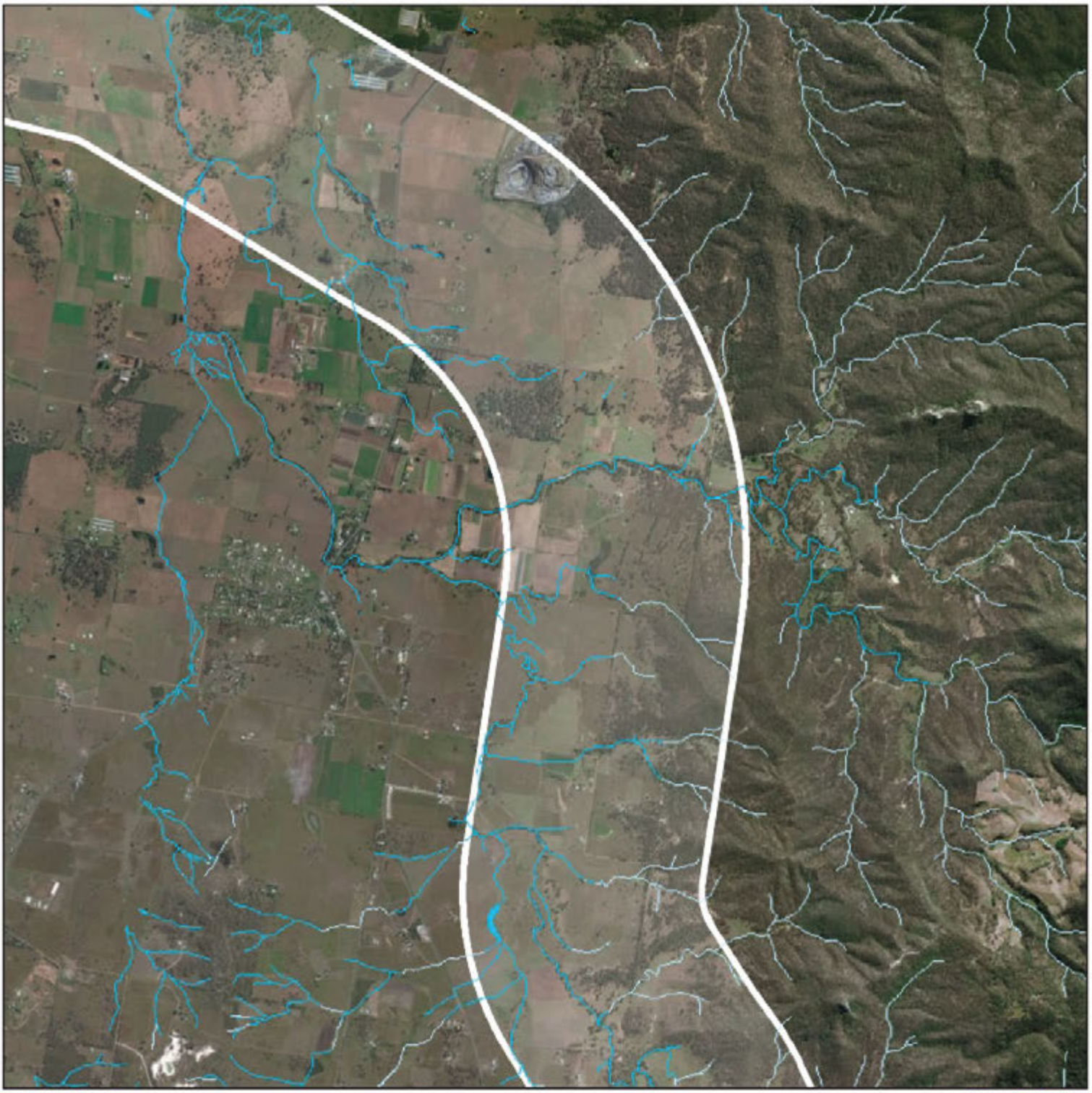
27°44'20"S 152°47'40"E



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27°49'12"S 152°47'40"E

A product of

Queensland Globe

Legend located on next page

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0 1 km

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Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

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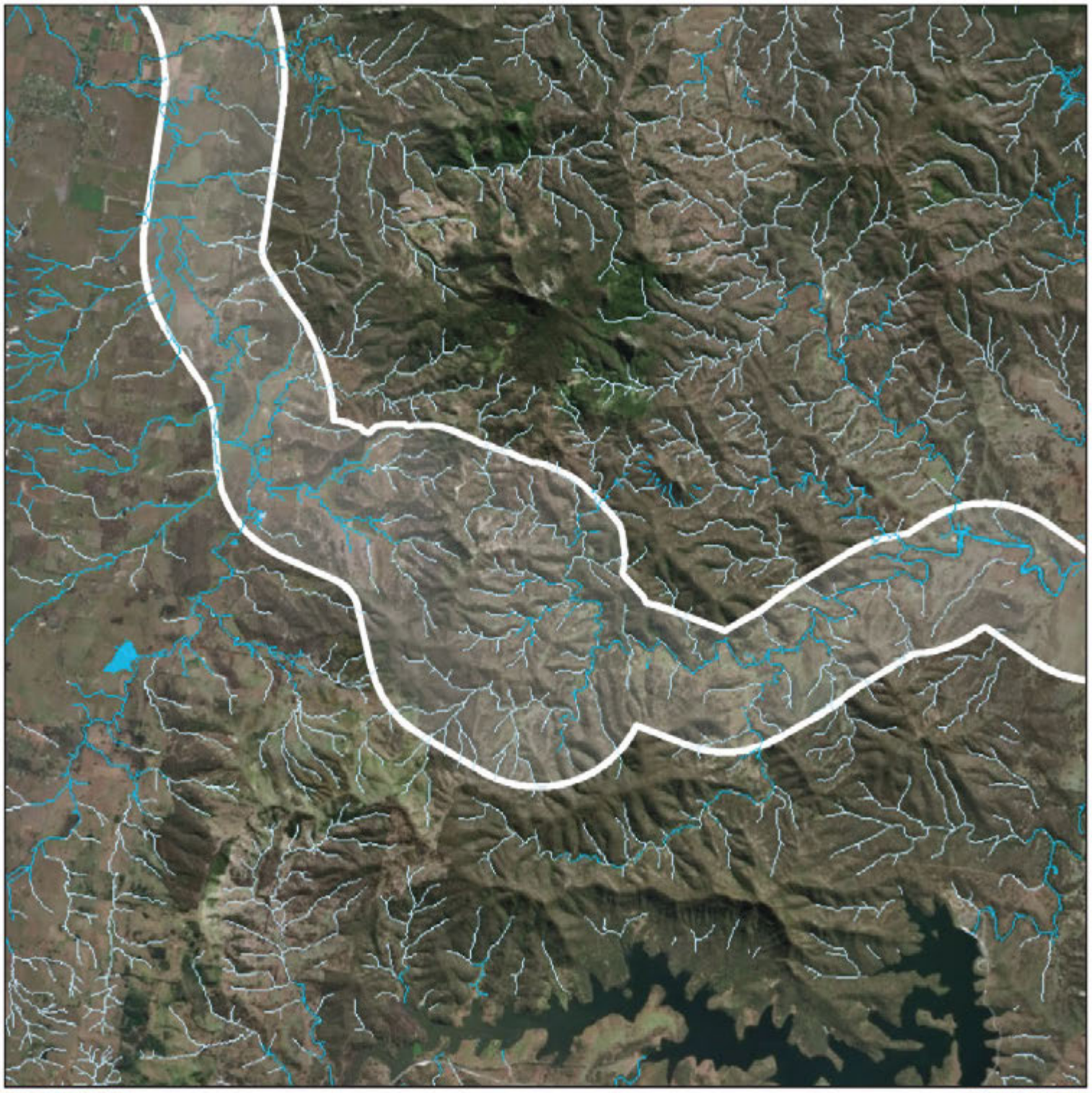
27°46'8"S 152°54'6"E



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27°55'52"S 152°54'6"E

A product of

Queensland Globe

Legend located on next page

N

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Scale: 1:103277

Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

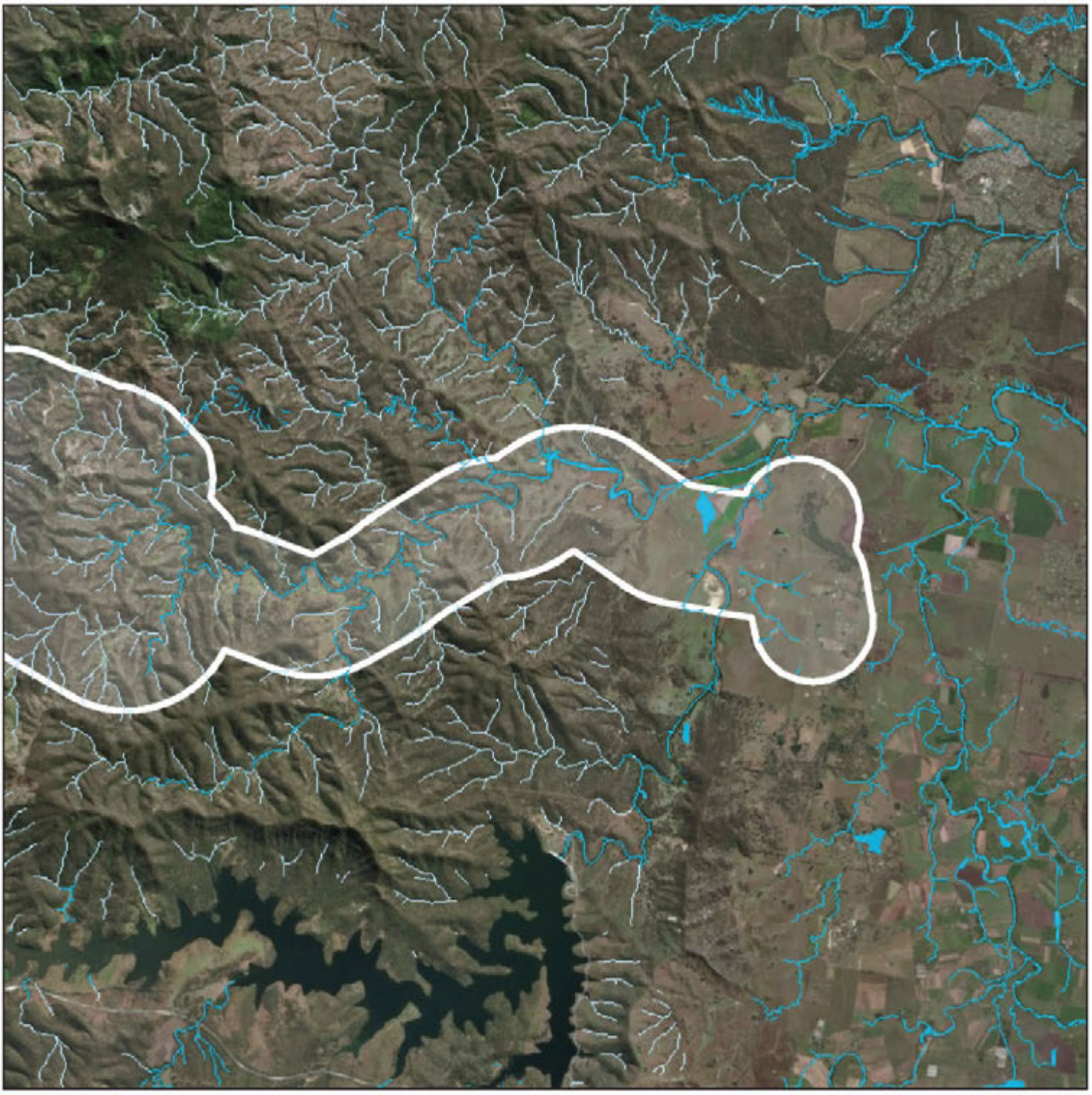
For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

27°46'49"S 152°47'17"E

27°46'49"S 152°58'18"E



27°56'34"S 152°47'17"E

27°56'34"S 152°58'18"E

A product of

Queensland Globe

Legend located on next page

N

0 2.5 km

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Printed at: A4

Print date: 15/1/2020

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

Queensland Government

Department of Natural Resources, Mines and Energy

Legend

Water quality study area .zip - poly

Cities and Towns

Surface GDE points [spring ecosystems]

- Known GDE
- Derived GDE - moderate confidence

Surface GDE lines

- Known GDE
- Derived GDE - high confidence
- Derived GDE - moderate confidence
- Derived GDE - low confidence

Surface GDE areas

- 81-100% Known GDE
- 81-100% Derived GDE - high confidence
- 81-100% Derived GDE - moderate confidence
- 81-100% Derived GDE - low confidence
- 01-80% Derived GDE - high confidence
- 01-80% Derived GDE - moderate confidence
- 01-80% Derived GDE - low confidence

Attribution

APPENDIX M

Surface Water Quality Technical Report

Appendix E Gauging station seasonality plots

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

Appendix E

Gauging station seasonality plots

Warrill Creek at Amberley (143108A)

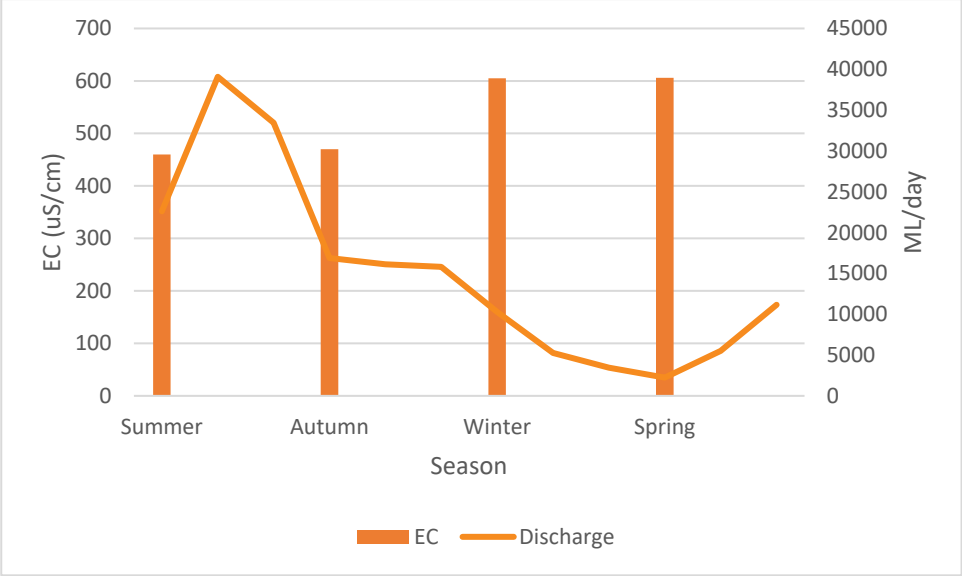

Figure E-1 **Electrical conductivity seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1962 - 2019
Summer (n=32), Autumn (n=36), Winter (n=32) and Spring (n=32)

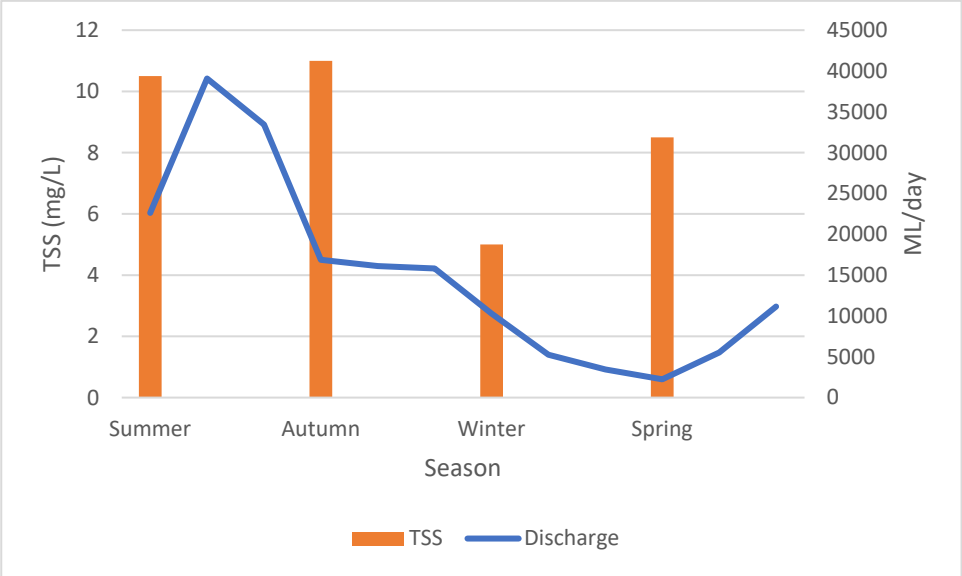

Figure E-2 **Total suspended solids (mg/L) seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1962 - 2019
Summer (n=27), Autumn (n=29), Winter (n=25) and Spring (n=25)

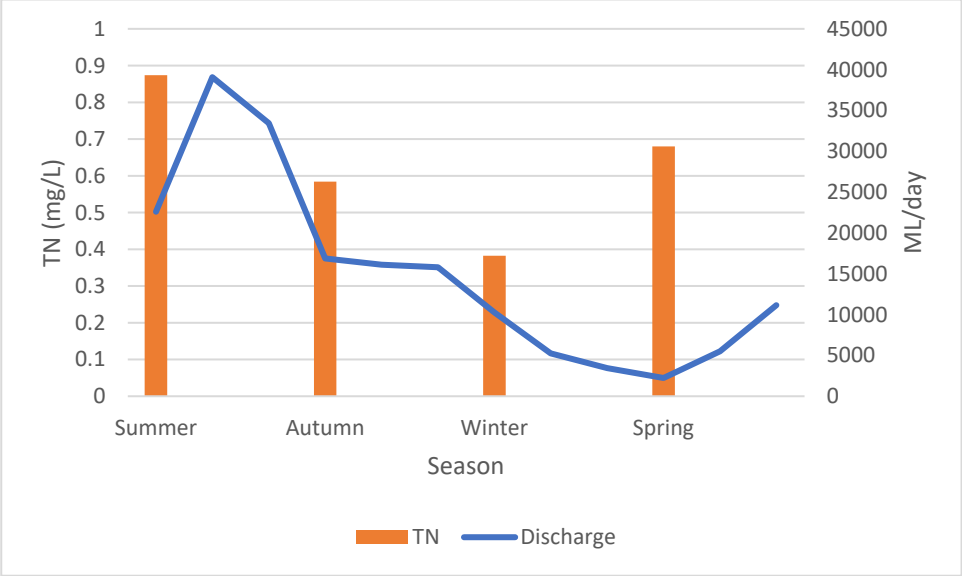

Figure E-3 **Total nitrogen seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1962 - 2019
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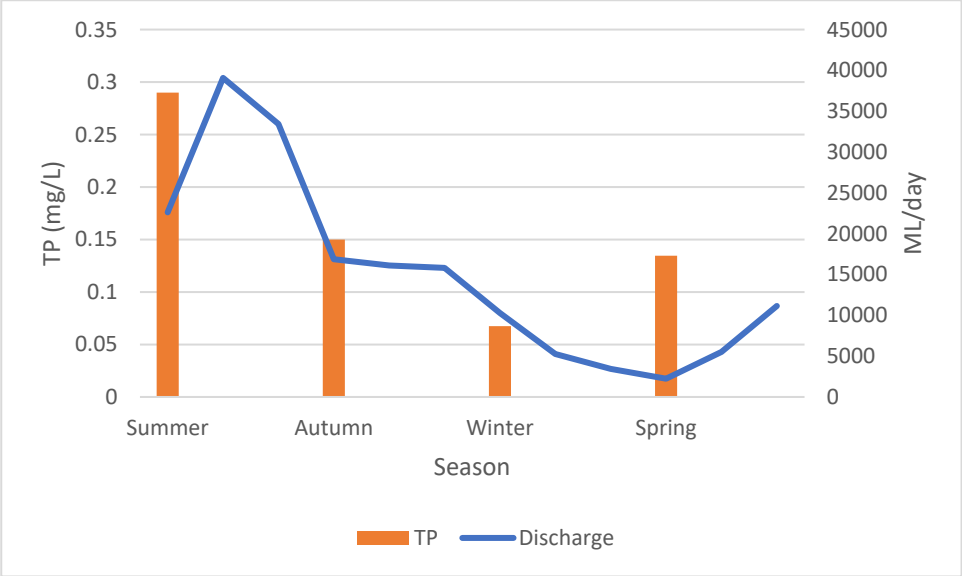


Figure E-4 **Total phosphorus seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1962 - 2019
Summer (n=18), Autumn (n=26), Winter (n=18) and Spring (n=16)

Purga Creek at Loamside (143113A)

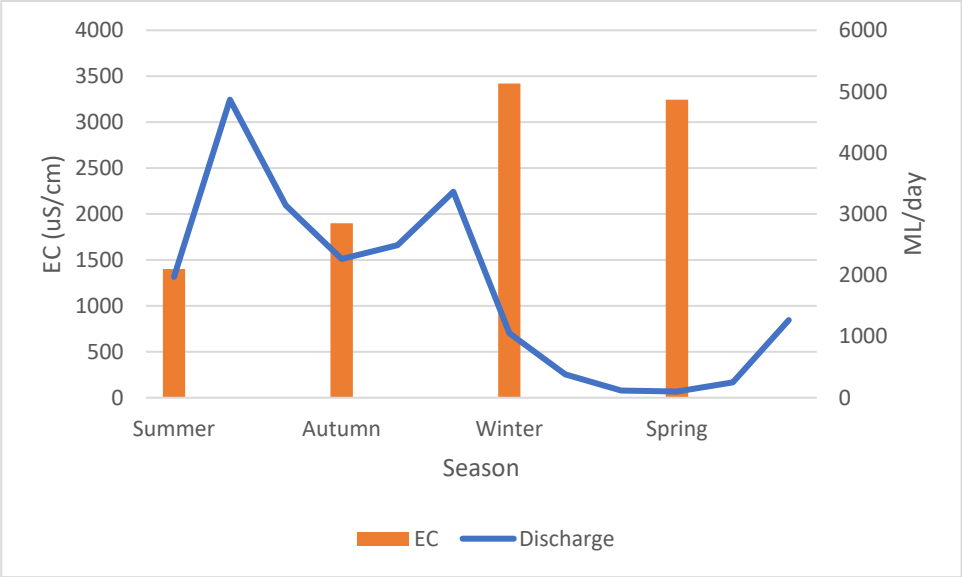


Figure E-5 **Electrical conductivity seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1974 - 2019
Summer (n=19), Autumn (n=20), Winter (n=21) and Spring (n=16)

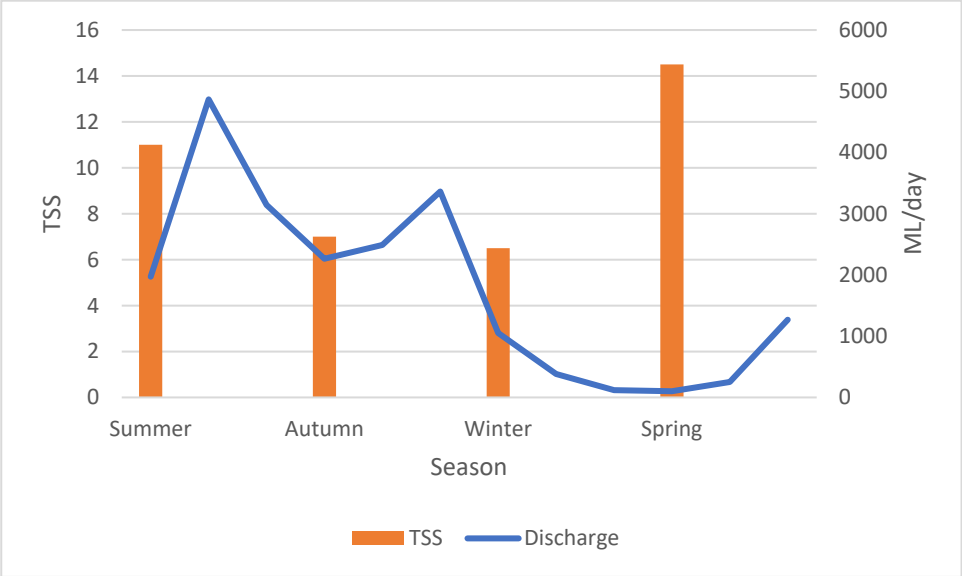


Figure E-6 **Total suspended solids seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1974 - 2019
Summer (n=18), Autumn (n=18), Winter (n=15) and Spring (n=15)

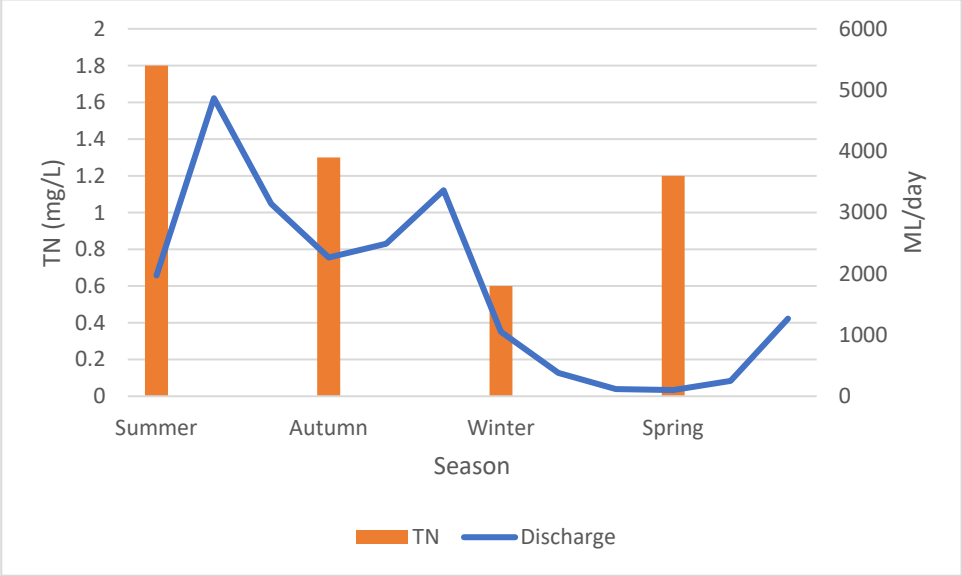


Figure E-7 **Total nitrogen seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1974 - 2019
Summer (n=9), Autumn (n=12), Winter (n=8) and Spring (n=7)

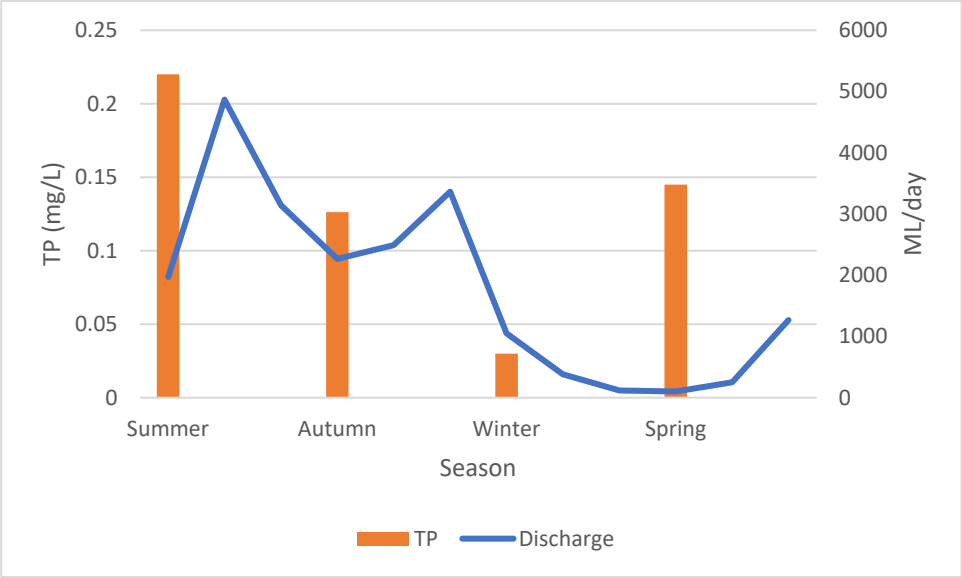


Figure E-8 **Total phosphorus seasonality data (median) relative to seasonal discharge**

Figure note:

Data available from period of 1974 - 2019
Summer (n=10), Autumn (n=12), Winter (n=8) and Spring (n=8)

APPENDIX M

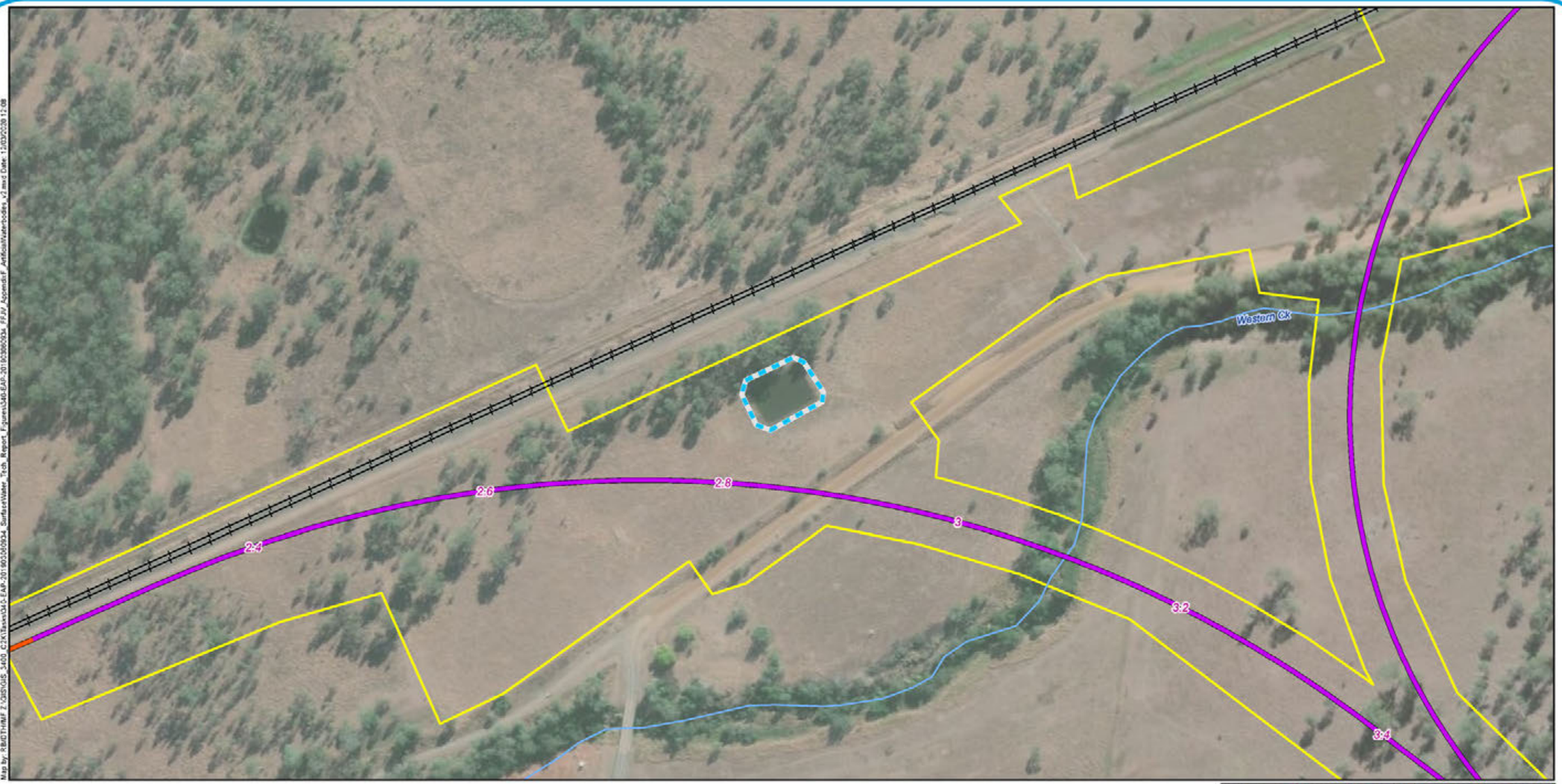
Surface Water Quality Technical Report

Appendix F Artificial waterbodies

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381

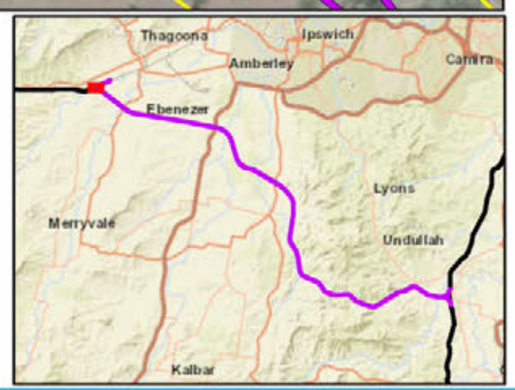
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Map by: RB/DTH/MF Z:\GIS\GIS_3400_C2K\Issues\345-EAP-20190306\0934_FF\V_AppendixF_Artificial\Waterbodies_v2.mxd Date: 12/03/2020 12:08

Legend

- 5 Chainage (km)
- Existing rail
- H2C project alignment
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



A3 scale: 1:3,500
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Future Freight
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru
Appendix F: Artificial/constructed waterbodies

Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies

A3 scale: 1:3,500

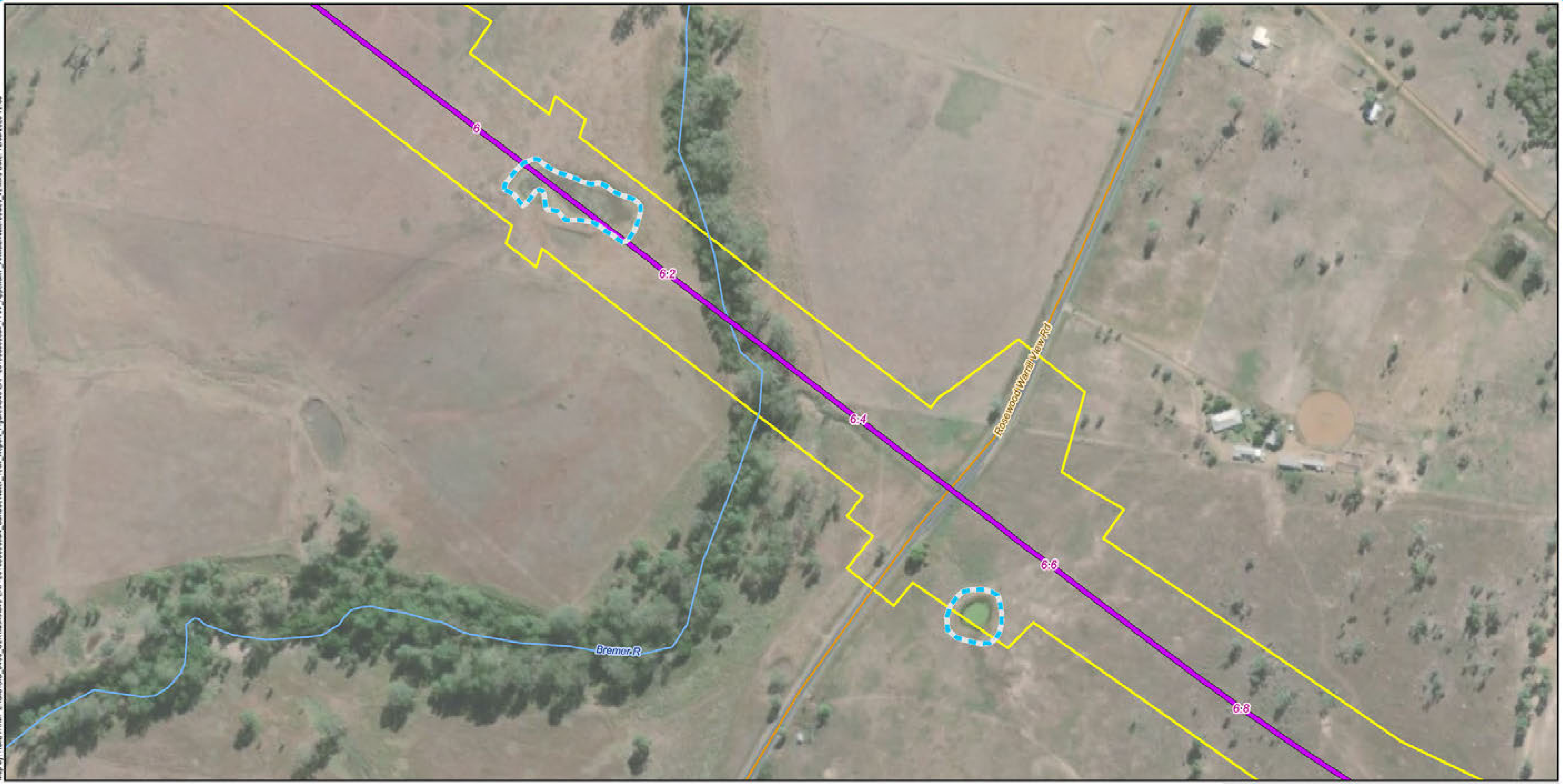
0 20 40 60 80 100m

Future Freight
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru

Appendix F: Artificial/constructed waterbodies



Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies

A3 scale: 1:3,500

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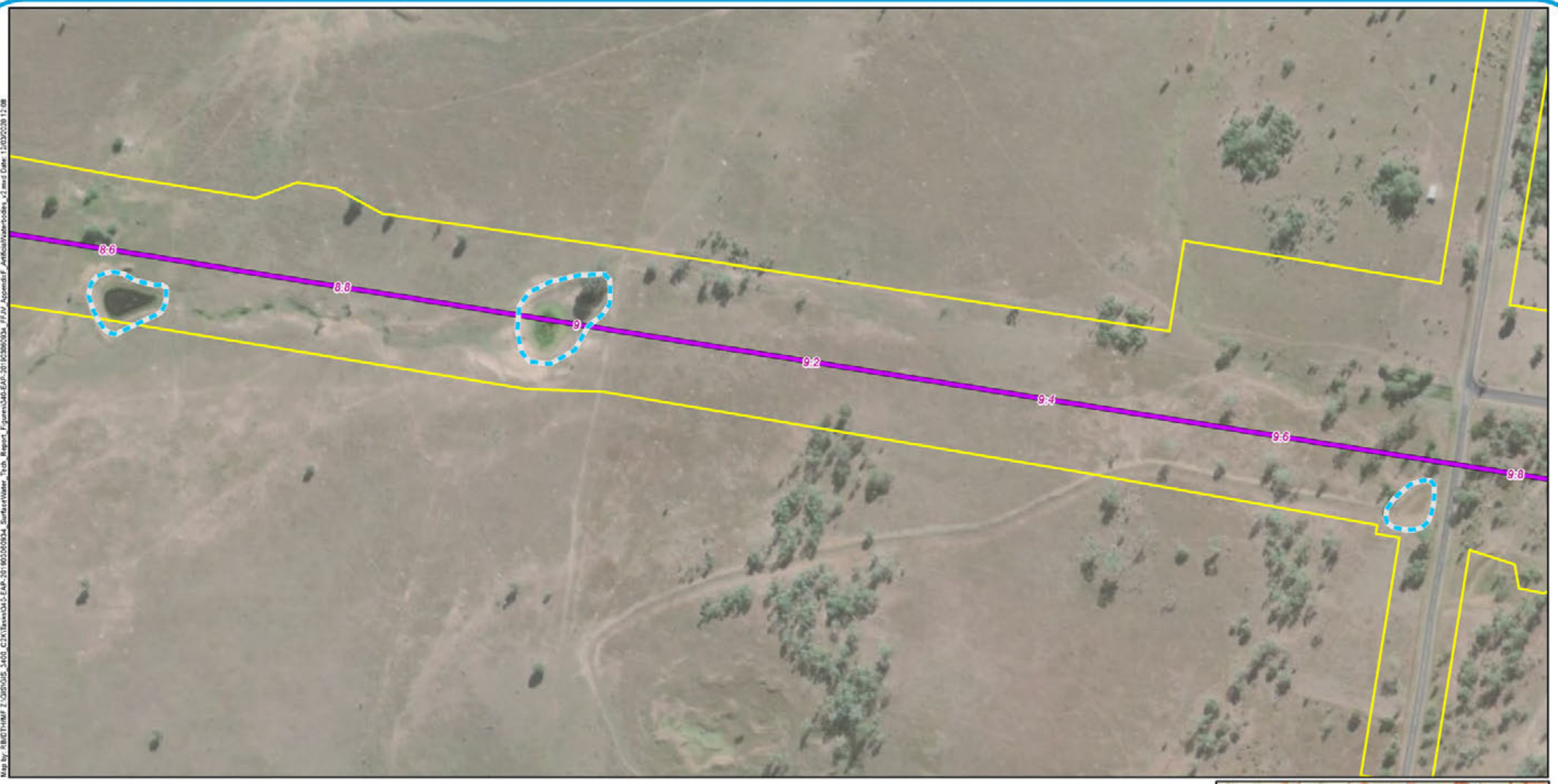
Future Freight
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru

Appendix F: Artificial/constructed waterbodies



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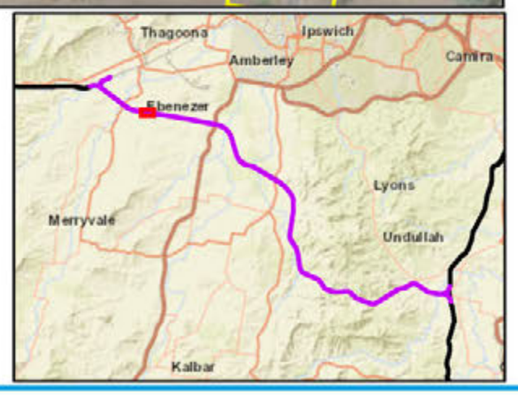
Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies



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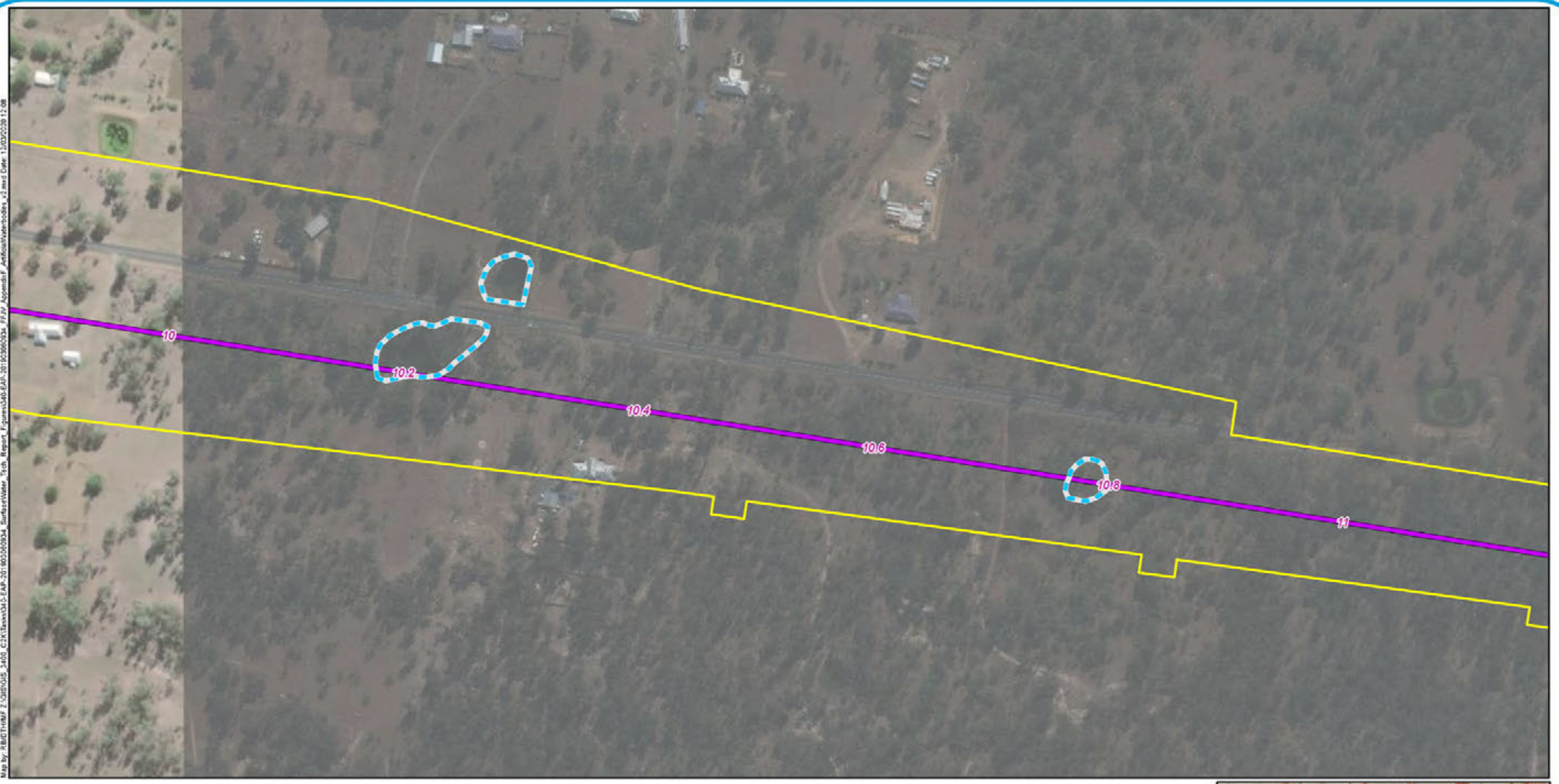
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru

Appendix F: Artificial/constructed waterbodies



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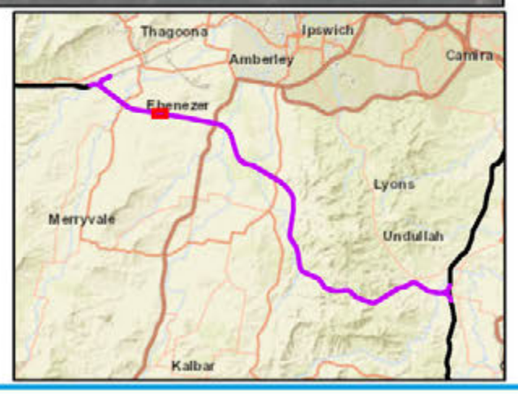
Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies



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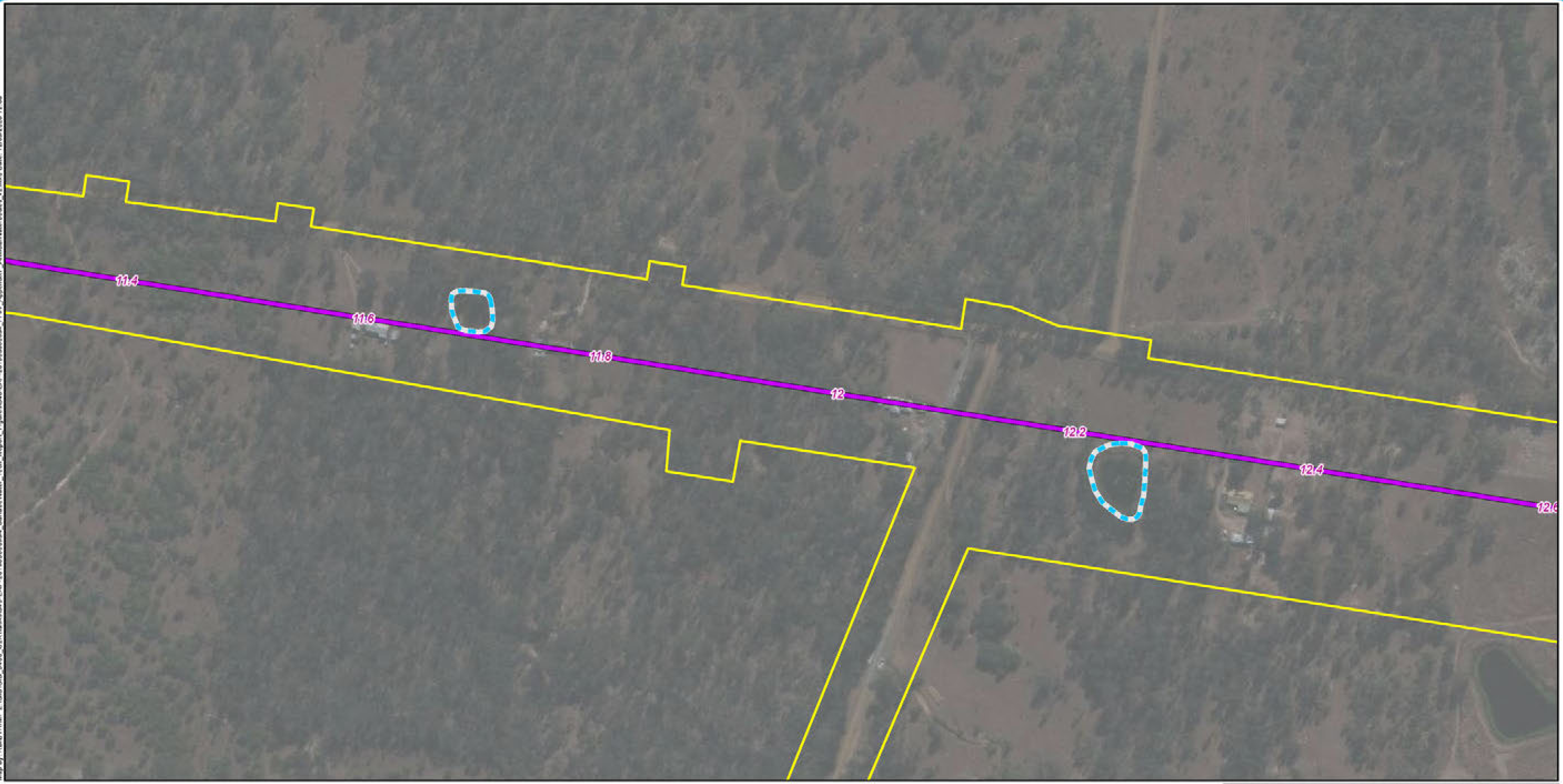
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru

Appendix F: Artificial/constructed waterbodies



Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies

A3 scale: 1:3,500

0 20 40 60 80 100m

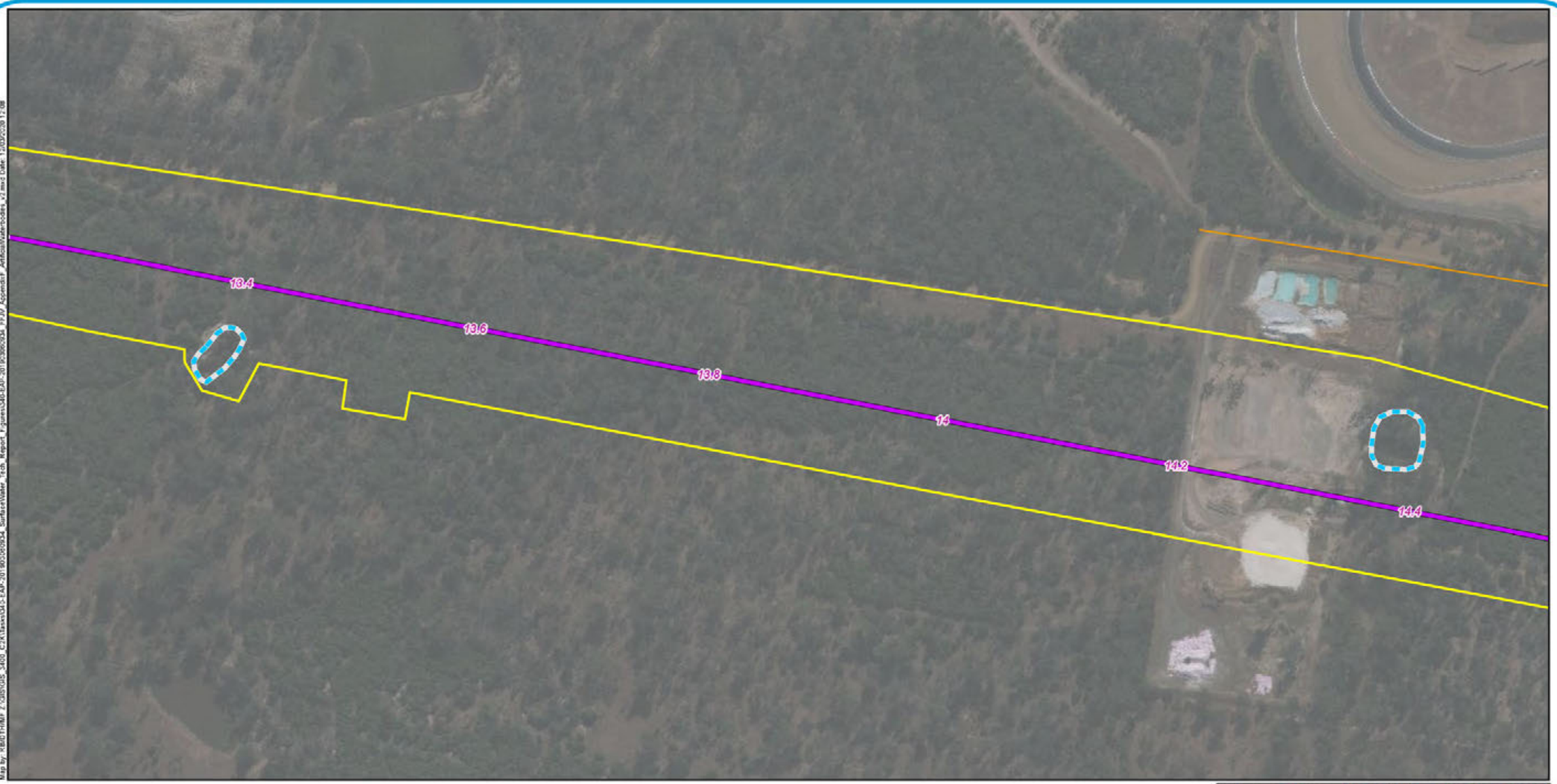
Future Freight
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru

Appendix F: Artificial/constructed waterbodies

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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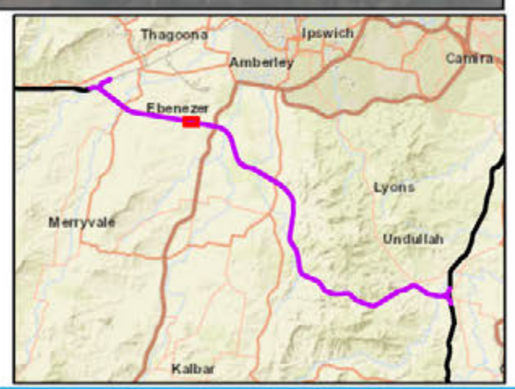
Legend

- 5 Chainage (km)
- C2K project alignment
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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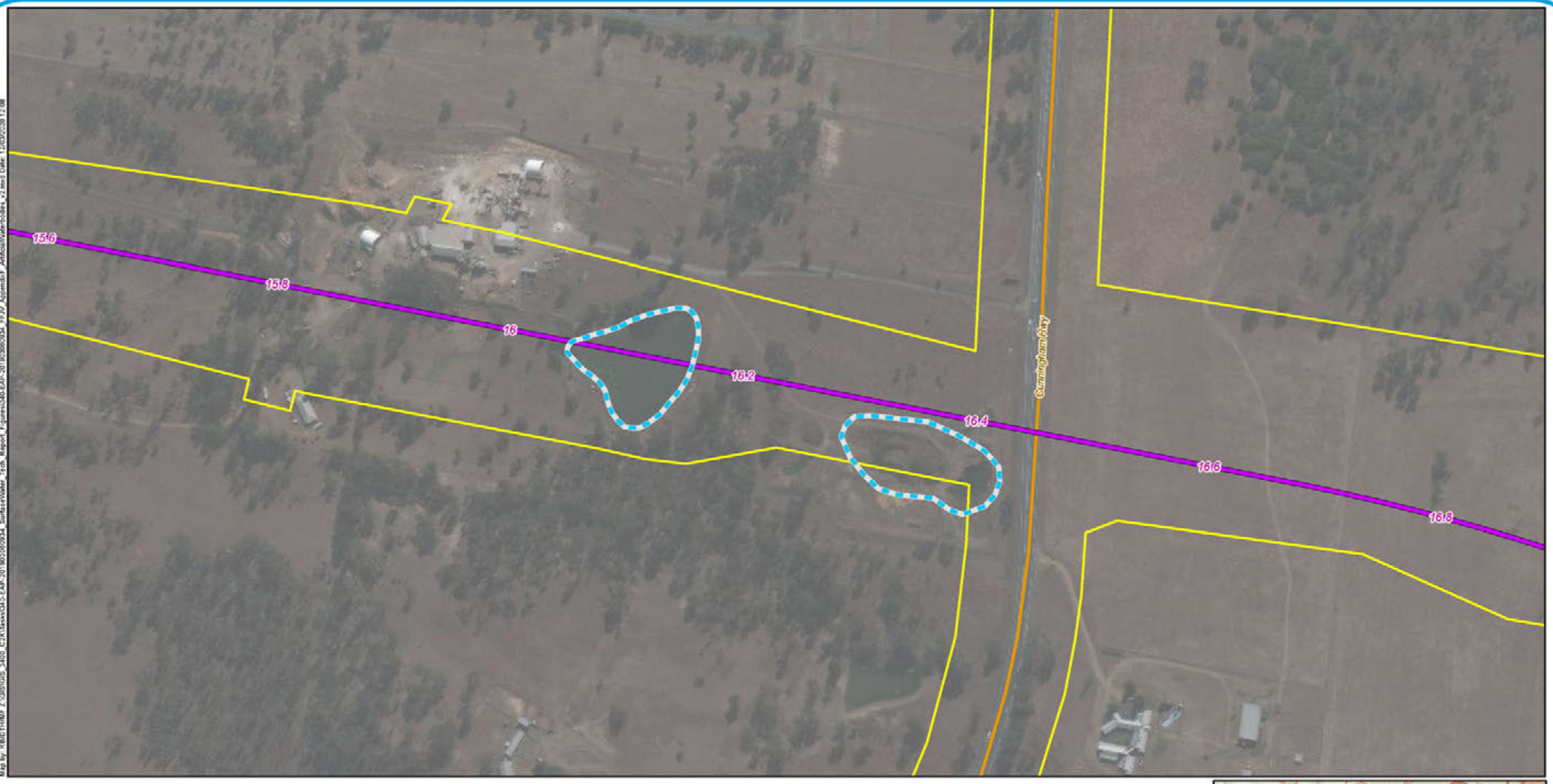
Future Freight
Integrating Community, Environment and Engineering

Issue date: 12/03/2020 Version: 1
Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru
Appendix F: Artificial/constructed waterbodies

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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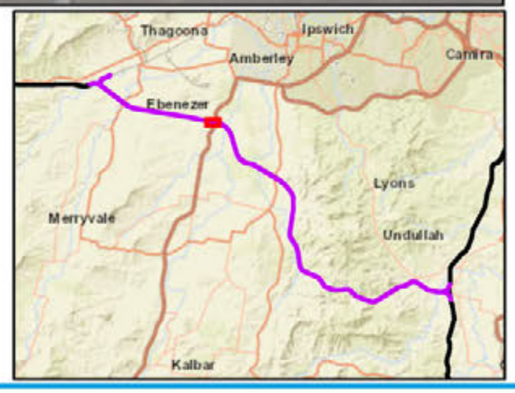
Legend

- 5 Chainage (km)
- C2K project alignment
- Major roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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Coordinate System: GDA 1994 MGA Zone 56

Calvert to Kagaru
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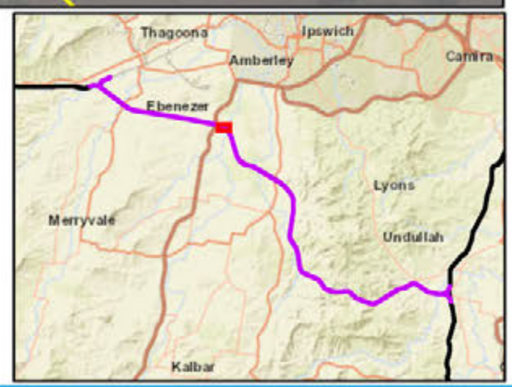
Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



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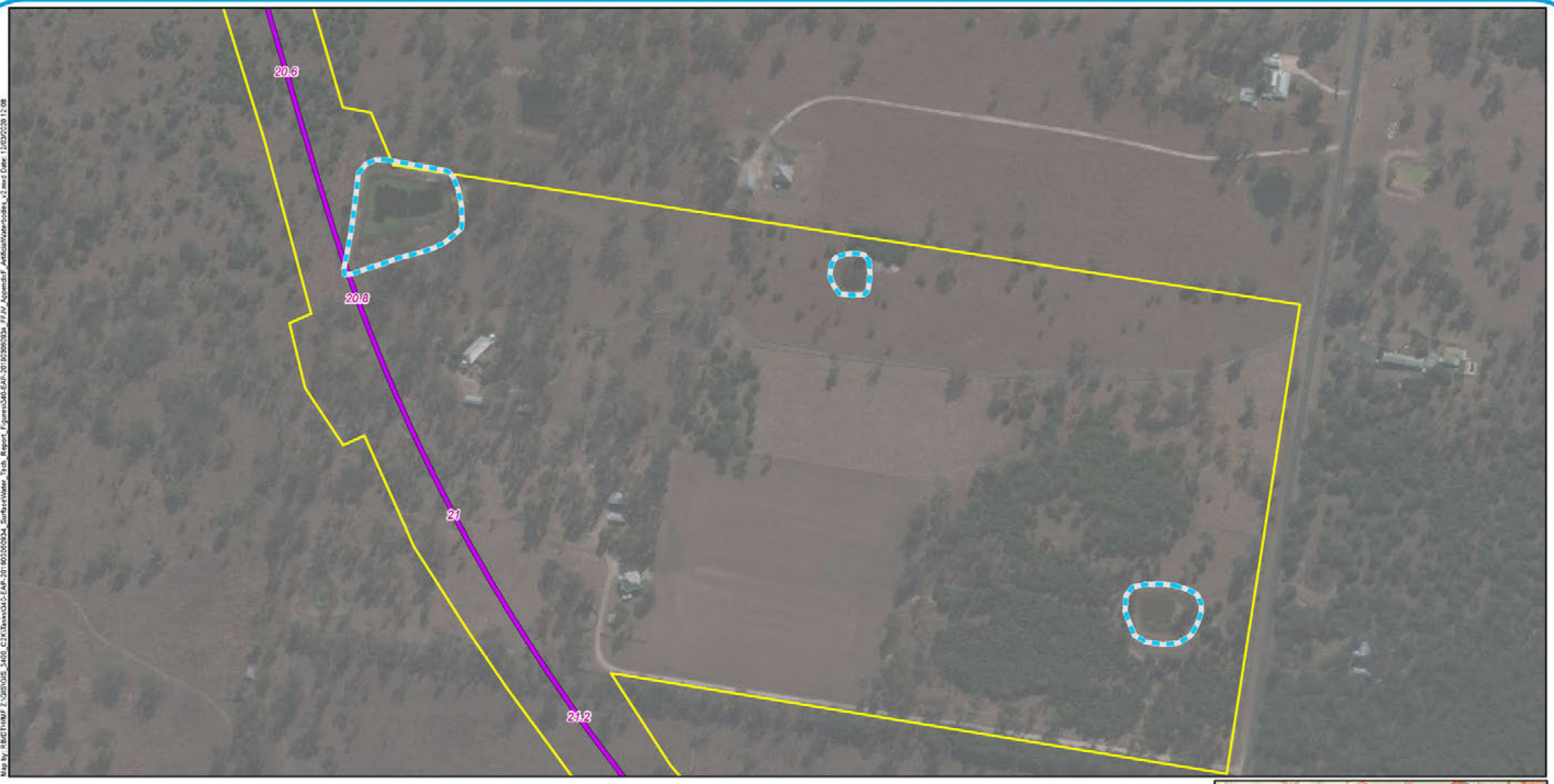

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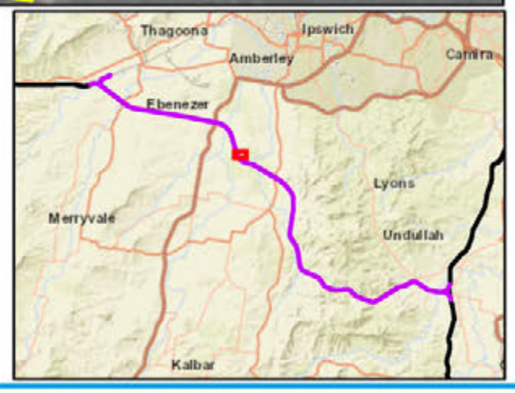
Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies



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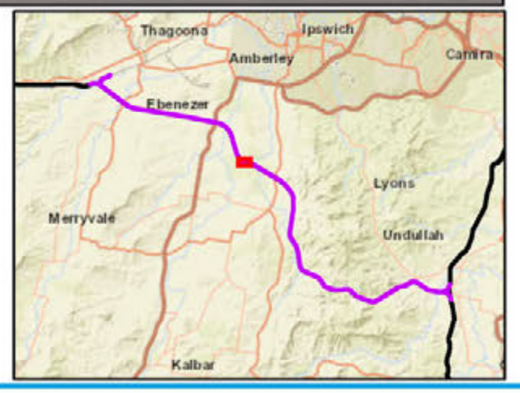
Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies



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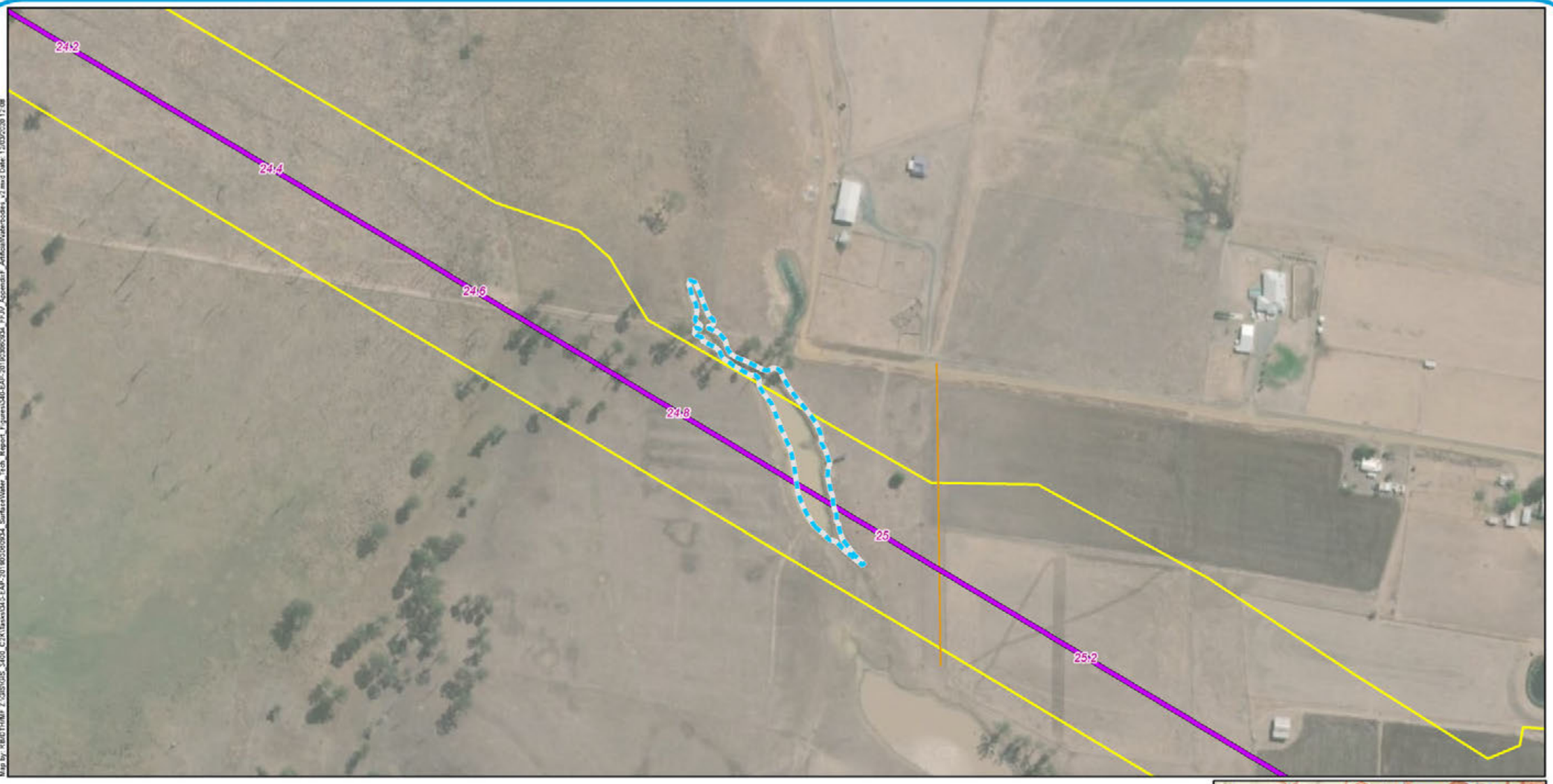
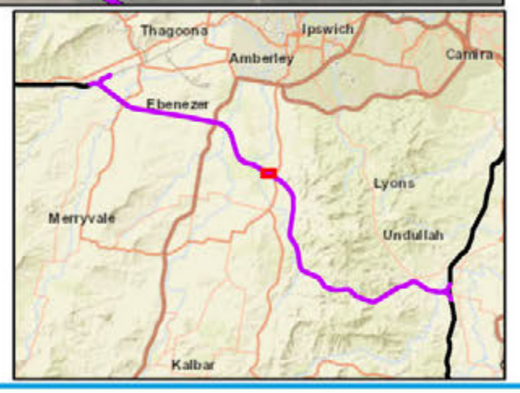


Legend

- 5 Chainage (km)
- C2K project alignment
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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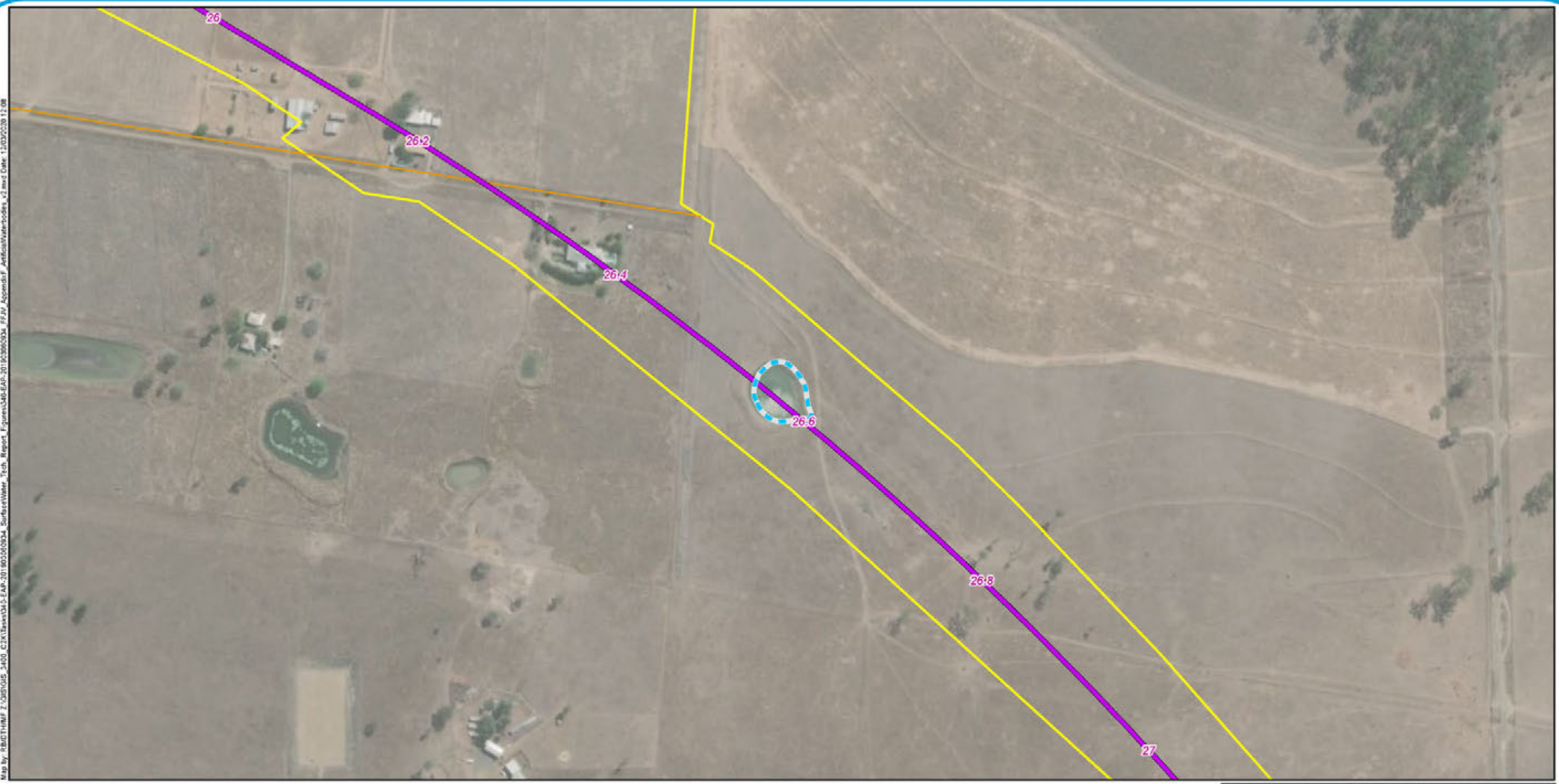

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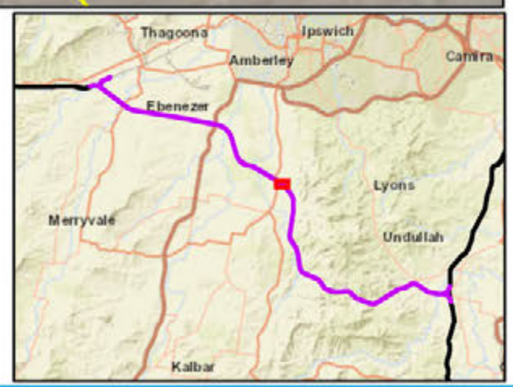
Legend

- 5 Chainage (km)
- C2K project alignment
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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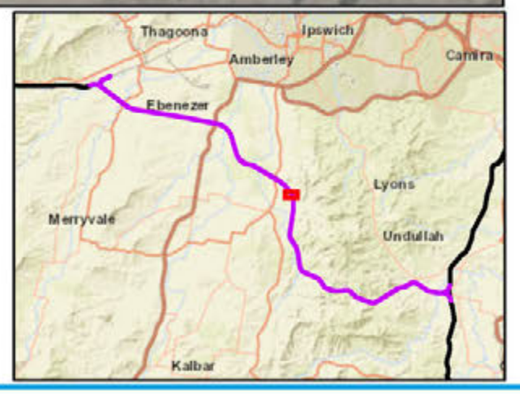
Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies



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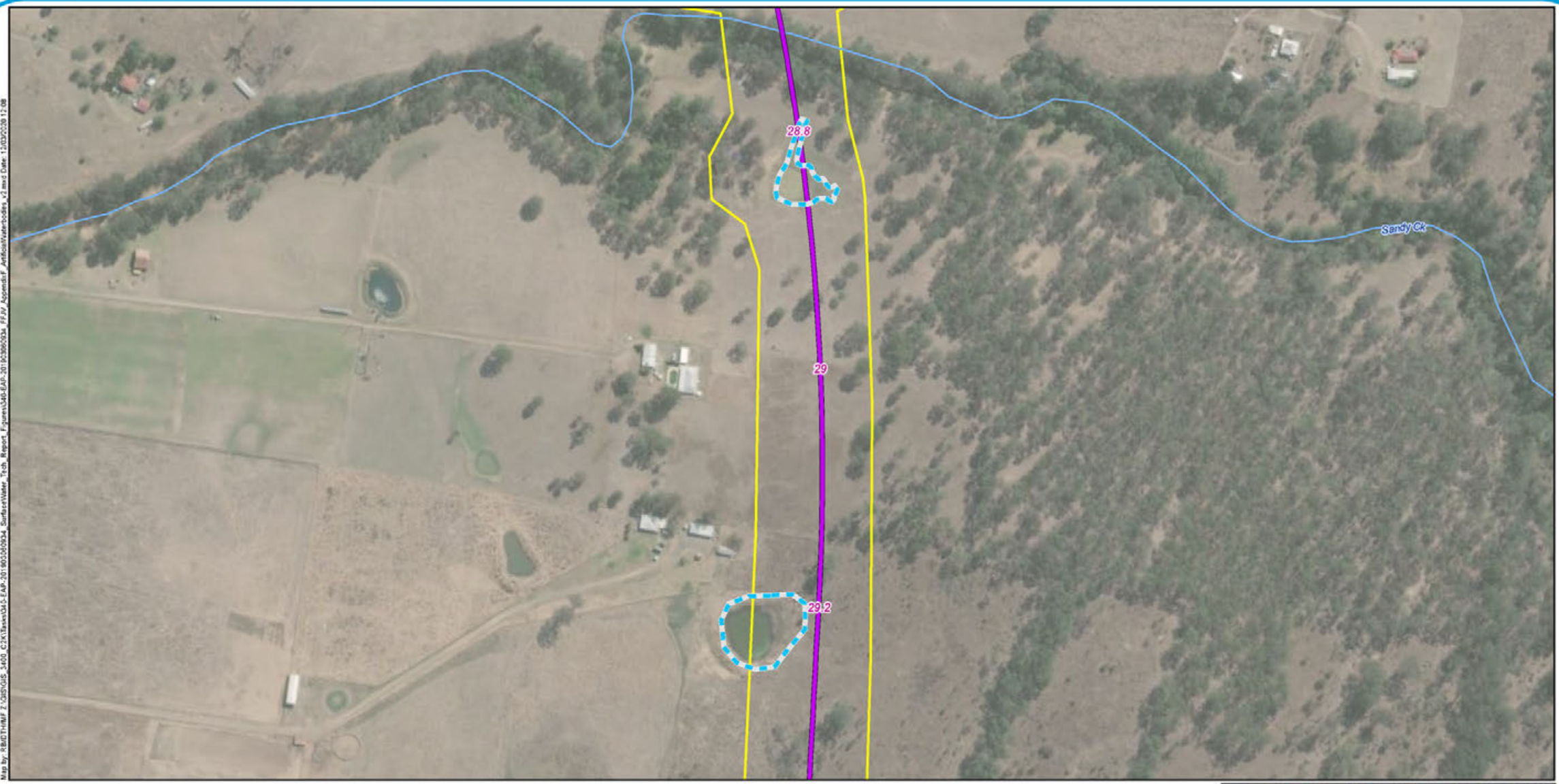

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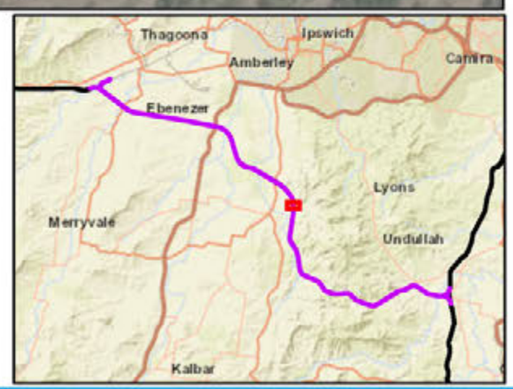
Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



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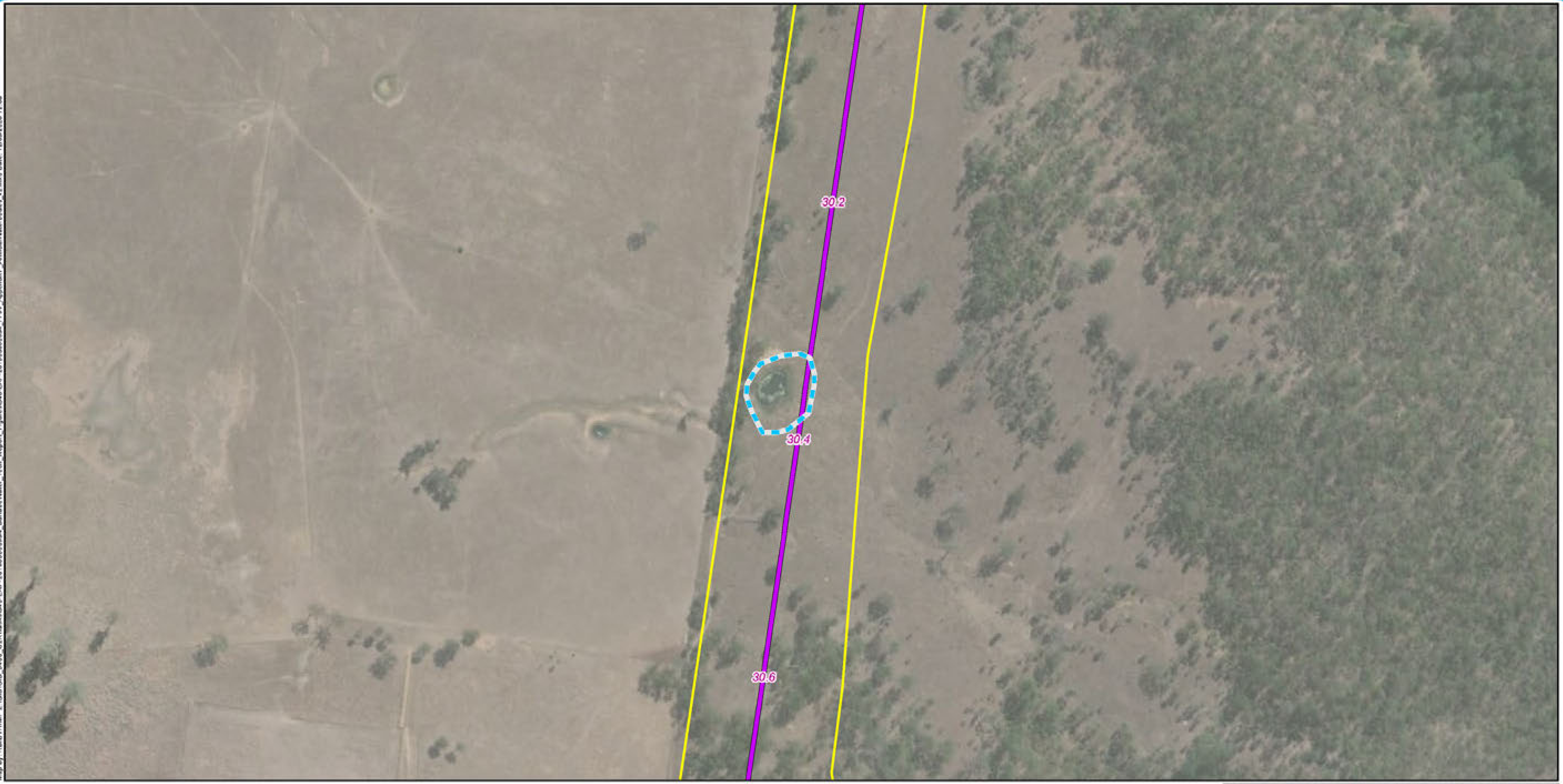

Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
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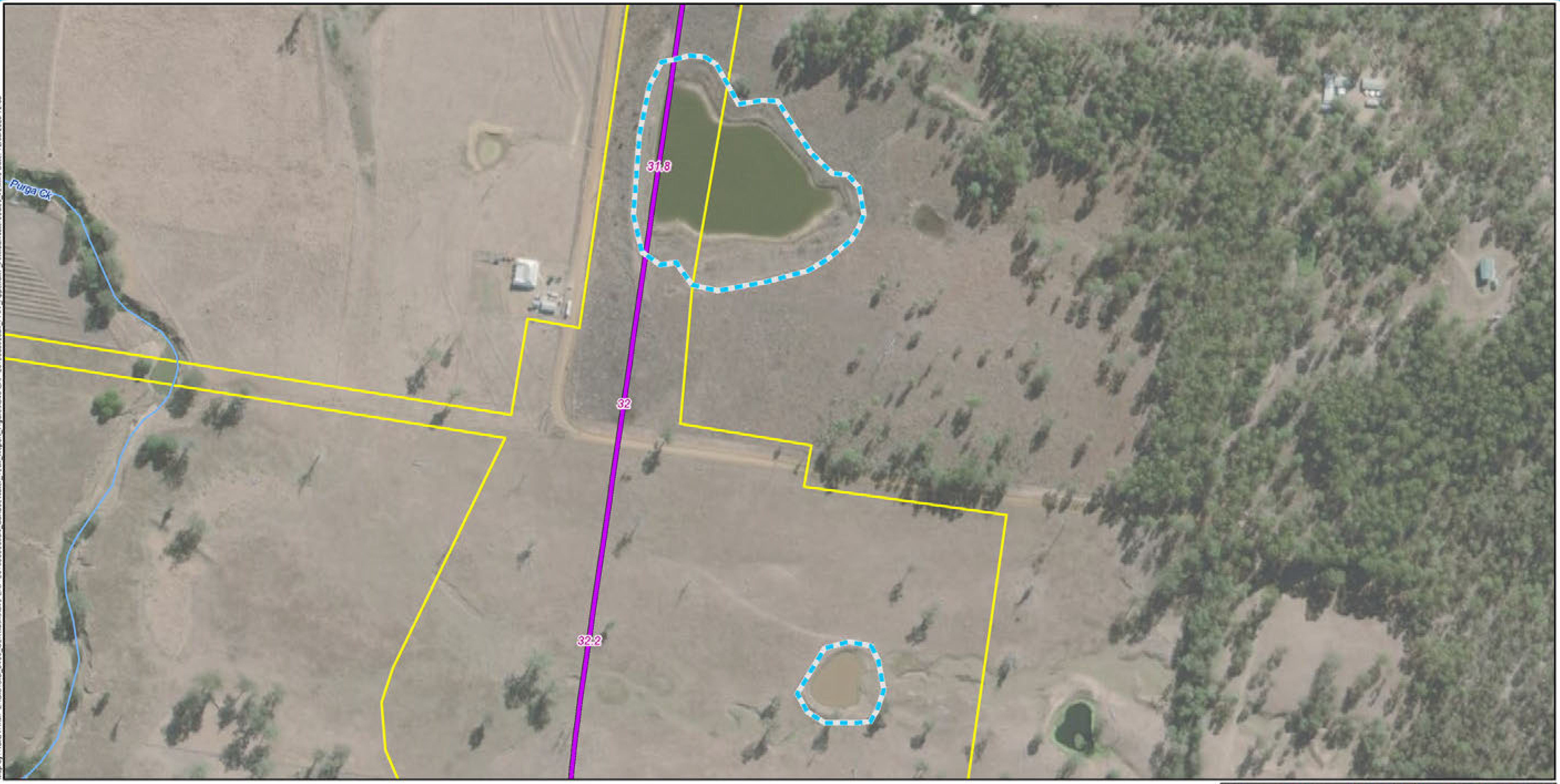

Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies

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Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies

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Calvert to Kagaru

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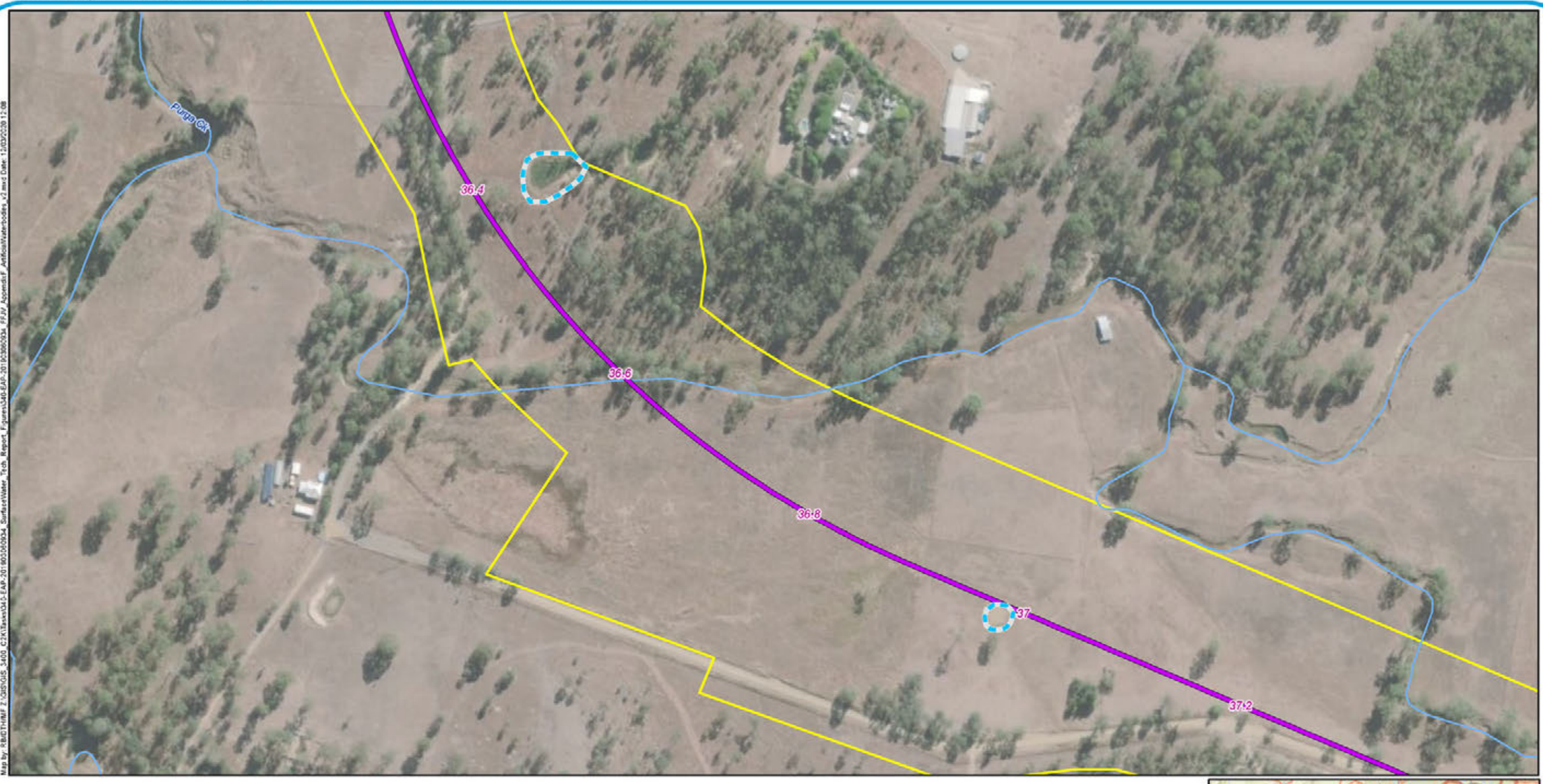

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Legend

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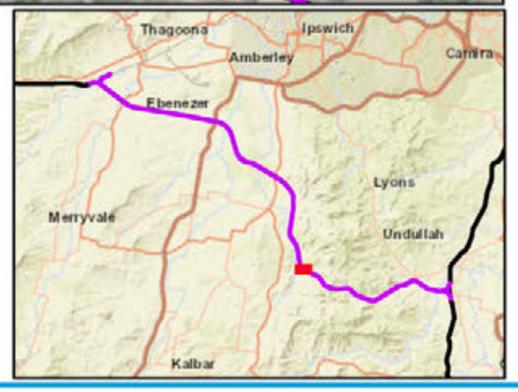
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



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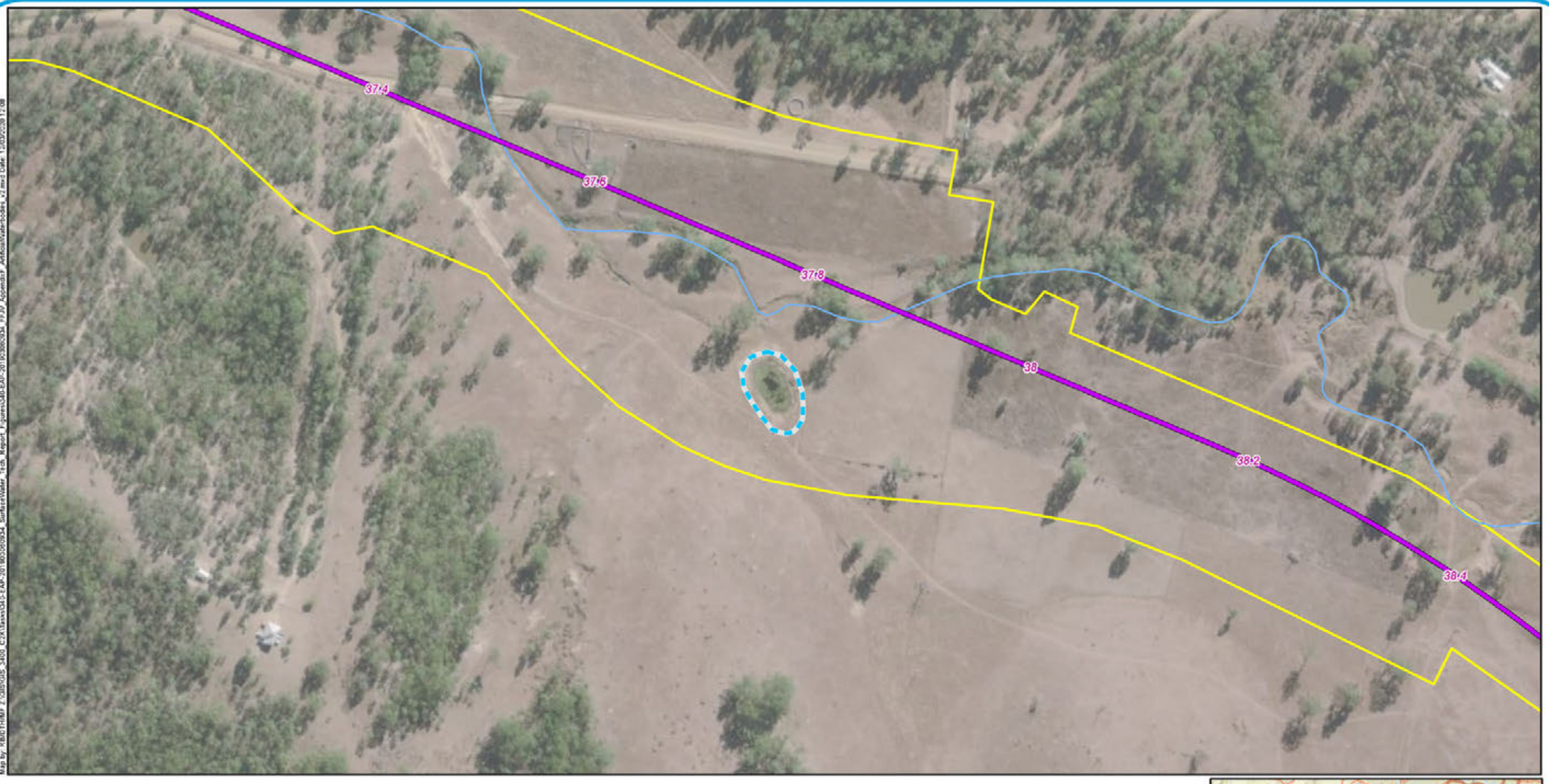

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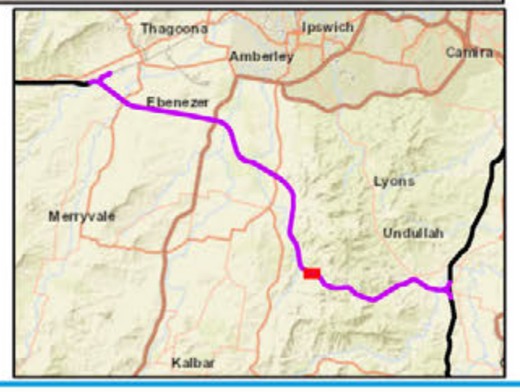
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



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Appendix F: Artificial/constructed waterbodies

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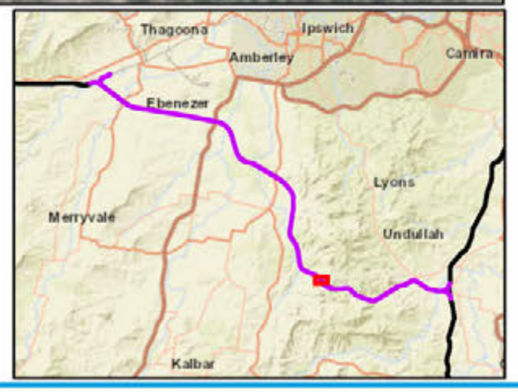
Legend

- 5 Chainage (km)
- C2K project alignment
- Defined watercourses (Water Act 2000)
- EIS disturbance footprint
- Artificial/constructed waterbodies



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Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies

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Legend

- 5 Chainage (km)
- C2K project alignment
- EIS disturbance footprint
- Artificial/constructed waterbodies

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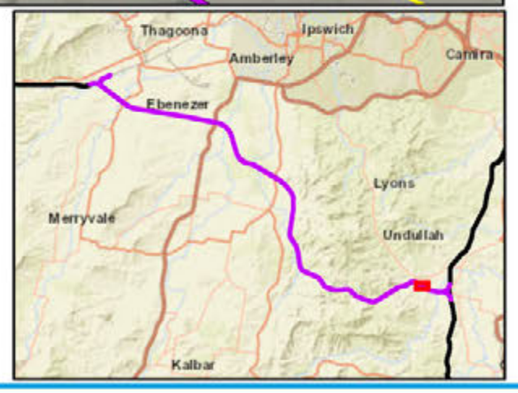
Legend

- 5 Chainage (km)
- C2K project alignment
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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Appendix F: Artificial/constructed waterbodies

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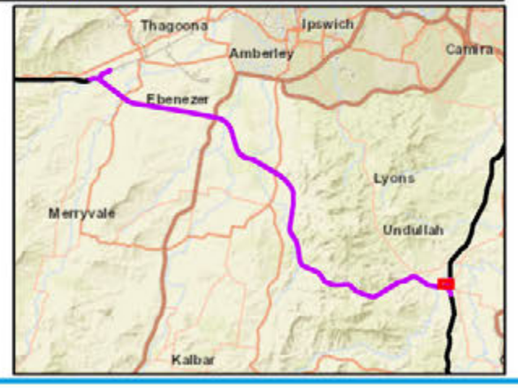
Legend

- 5 Chainage (km)
- Localities
- Existing rail
- C2K project alignment
- K2ARB project alignment
- Defined watercourses (Water Act 2000)
- Minor roads
- EIS disturbance footprint
- Artificial/constructed waterbodies



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Legend

- 5 Chainage (km)
- Existing rail
- C2K project alignment
- K2ARB project alignment
- Minor roads
- EIS disturbance footprint
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Appendix F: Artificial/constructed waterbodies

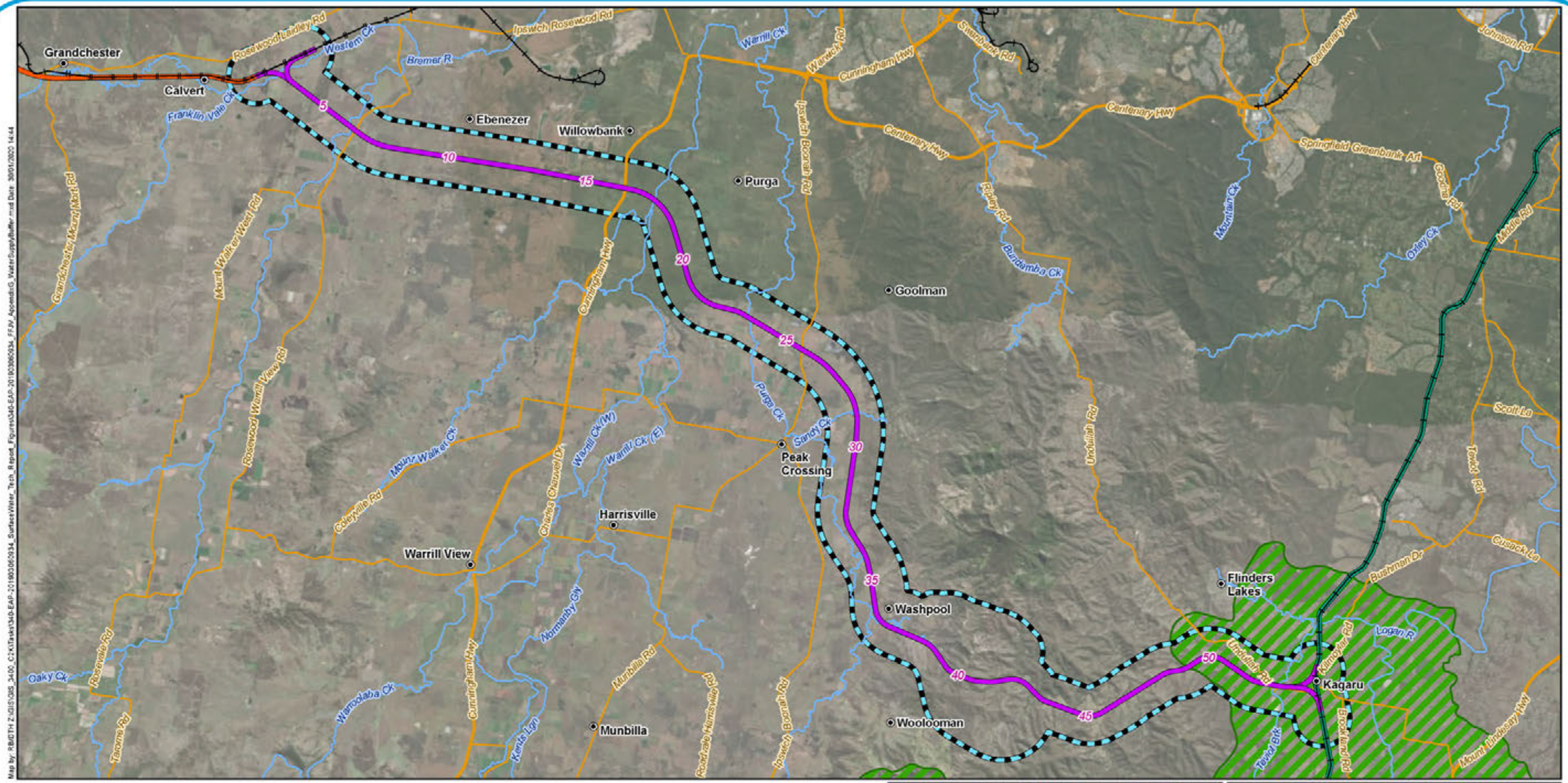
APPENDIX M

Surface Water Quality Technical Report

Appendix G South-east Queensland water supply buffer area

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT

IR_1381



Legend

- 5 Chainage (km)
- Localities
- Existing rail
- H2C project alignment
- C2K project alignment
- K2ARB project alignment
- Watercourses
- Major roads
- Minor roads
- Water quality study area
- Water Supply Buffer Area (SPP)

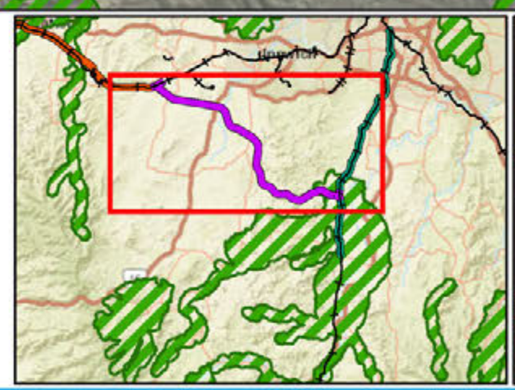
A3 scale: 1:150,000

0 1 2 3 4 5km

An approximation of the "Environment & Heritage > Water Quality > Water Supply Buffer Areas" layer on the publicly viewable Queensland Government State Planning Policy Interactive Mapping System viewed on 16-Jan-2020 has been superimposed for this figure.

Please refer to the interactive webmap to view the official published data.

https://spp.dsdip.esriaustraliaonline.com.au/geoviewer/map/planmaking



Future Freight
Integrating Community, Environment and Engineering

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Calvert to Kagaru
Appendix G:
Proximity to Water Supply Buffer Area