Lithgow City Council
180 Mort Street
LITHGOW NSW 2790

Job No. DT532

Attn: Mr Matthew Johnson

21 September 2021

Re: Burton Street Footbridge Flood Impact Assessment

Dear Sir

As requested, we have undertaken an assessment into the impact that the construction of two footbridges, one on the main arm of Farmers Creek adjacent to Burton Street (**Burton Street Footbridge**) and the other on State Mine Creek adjacent to Guy Street (**Guy Street Footbridge**) (collectively referred to herein as "**the two footbridges**") has had on flood behaviour.

1. Background

Lithgow City Council (**Council**) recently installed the two footbridges, the locations of which are shown on **Figure 1**. **Annexure A** of this letter contains a set of engineering design drawings showing details of the two footbridges, while **Annexure B** contains a similar set of drawings for the Guys Street Footbridge. **Annexure C** of this letter contains a photo showing the in-situ position of the Burton Street Footbridge absent the raised approaches which had yet be constructed at the time the photo was taken.

Following several complaints from local residents stating that the Burton Street Footbridge will have an adverse impact on flood behaviour, Council requested that an investigation be undertaken to confirm or otherwise whether this will be the case.

The two-dimensional (in plan) hydraulic (TUFLOW) model that was originally developed as part of the *Lithgow Flood Study Review* (Lyall & Associates, 2017) and later updated as part of the *Lithgow Floodplain Risk Management Study and Plan* (***Lithgow FRMS&P***) which is currently being prepared by Lyall & Associates (**Farmers Creek TUFLOW Model**) formed the basis of the present investigation.

A separate one-dimensional cross sectional based hydraulic (HEC-RAS) model was also developed as part of the present investigation in order to verify results of the Farmers Creek TUFLOW Model (**Farmers Creek HEC-RAS Model**). **Figure 1** shows the location of the cross sections which comprise the Farmers Creek HEC-RAS Model.

2. Definition of Pre-Footbridge Flood Behaviour

As mentioned, the Farmers Creek TUFLOW Model was recently updated as part of the *Lithgow FRMS&P*, noting that the main update comprised the adoption of the procedures set out in the 2019 edition of *Australian Rainfall and Runoff* for design flood estimation. Further definition was incorporated into the Farmers Creek TUFLOW Model as part of the present investigation to more accurately define the inbank area of Farmers Creek and State Mine Creek in the immediate vicinity of the two footbridges (**Pre-Footbridge TUFLOW Model**).

The Pre-Footbridge TUFLOW Model was run for design flood events with Annual Exceedance Probabilities (**AEPs**) of 20% (1 in 5), 10% (1 in 10), 5% (1 in 20), 2% (1 in 50) and 1% (1 in 100). It is noted that unlike the approach that was adopted as part of the *Lithgow FRMS&P* whereby the full ensemble of design storm events were run through the hydrologic and hydraulic models, only the storm duration which was critical for maximising peak flood levels in Farmers Creek and the temporal pattern which was closest to the median peak flood level in the vicinity of the Burton Street Footbridge was run through the Pre-Footbridge TUFLOW Model. The results presented in the *Lithgow FRMS&P* also included provision for a partial blockage of major hydraulic structures throughout the catchment, whereas the present investigation assumes ideal flow conditions in these structures.

The result of the above approach is that the extents and depths of inundation under Pre-Footbridge conditions, as well as the assessment of the number of dwellings that are subject to above-floor inundation varies from that presented in the progress reports that have been issued for the *Lithgow FRMS&P*. As the present scope is limited to a flood impact assessment, the adoption of the simplified approach to defining the nature of flooding would not alter the key findings of the present investigation in terms of the impact that the two footbridges will have on flood behaviour.

Figures 2 to **6** attached to this letter show the indicative extent and depth of inundation, as well as peak water surface elevation contours in the vicinity of the two footbridges for design flood events with AEPs of 20% (1 in 5), 10% (1 in 10), 5% (1 in 20), 2% (1 in 50) and 1% (1 in 100). Also shown on **Figures 2** to **6** are the locations of existing dwellings that would experience above-floor inundation for the five assessed design flood events.

The key features of flood behaviour in the vicinity of the two footbridges under pre-Footbridge conditions are as follows:

i. While floodwater is generally confined to the inbank area of Farmers Creek during a 20% AEP flood event, it does extend into the rear of several residential properties that are located on either side of the watercourse upstream of the Burton Street Footbridge and to the west of the Guy Street Bridge.

ii. Floodwater commences to break out of the northern bank of Farmers Creek upstream of the Atkinson Street road bridge during a 10% AEP flood.

iii. A total of two dwellings that are located on Laidley Street, east (upstream) of the Atkinson Street road bridge are subject to above-floor inundation during a 5% AEP flood event.

iv. Floodwater which breaks out of Farmers Creek upstream of the Atkinson Street road bridge will inundate the intersection of Atkinson Street and Laidley Street during a 2% AEP flood event.

v. A total of seven dwellings would experience above-floor inundation during a 2% AEP flood event, five of which are located on Laidley Street, east (upstream) of the Atkinson Street road bridge and the remaining one located a short distance downstream of the bridge crossing.

vi. A total of nine dwellings that are located on Laidley are subject to above-floor inundation during a 1% AEP flood event, with three dwellings located on Guy Street and a single dwelling located on Burton Street also subject to above-floor inundation during a flood of this magnitude.

Table 1 at the end of this letter gives the peak flood levels and depths of above-floor inundation for the abovementioned flood affected dwellings.

3. Impact of Burton Street Footbridge on Flood Behaviour

Details of the two footbridges were incorporated into the Pre-Footbridge TUFLOW Model based on the engineering drawings contained in **Annexures A** and **B** of this letter (**Post-Footbridge TUFLOW Model**).

It is noted that while the balustrade on the two footbridges is designed to collapse during a flood event, Council advised that the water level would need to rise to a height of 1.065 m and 1.185 m above the deck level of the Burton Street and Guy Street footbridges, respectively before this would occur. Based on this advice, it was assumed that the balustrade on the two footbridges would form an obstruction to flow up to these heights.

The Post-Footbridge TUFLOW Model was run for the five design flood events and the resulting flood behaviour compared to pre-footbridge conditions. The Farmers Creek HEC-RAS Model was also run for the same five design flood events for both pre- and post-footbridge conditions.

Figures 7 to **11** show the impact that the two footbridges have had on flood behaviour for events with AEPs of between 20% and 1%, while **Figure 12** (2 sheets) shows design water surface profiles for the 20%, 5% and 1% AEP flood events as derived by the Farmers Creek HEC-RAS Model for pre- and post-footbridge conditions. Also shown on **Figures 7** to **11** are the locations of existing dwellings that would experience above-floor inundation for the five assessed design flood events.

Table 1 at the end of this letter gives the peak flood level and depth of above-floor inundation that would be experienced in existing residential development under post-footbridge conditions, while **Table 2**, also at the end of this letter sets out the increase in the depth of above-floor inundation that is attributable to the construction of the Burton Street Footbridge, noting that the investigation found that the Guy Street Footbridge would not adversely impact flood behaviour in private property (refer below for further discussion).

The key findings of the investigation in regards the impact that the construction of the two footbridges has had on flood behaviour are as follows:

i. The Guy Street Footbridge is located in an area where flood levels are elevated due to backwater flooding from Farmers Creek. As a result, the bridge would not affect peak flood levels in the case where there is coincident flooding on both Farmers Creek and State Mine Creek.

   A check was undertaken whereby it was assumed that flooding occurred on State Mine Creek in the absence of any significant flow in Farmers Creek (i.e. absent any backwater flooding). The assessment found that while the Guy Street Footbridge would have a minor impact on a flood behaviour, no adverse flooding conditions would be experienced in private property.

ii. Both the extent and depth of inundation has been increased as a result of the Burton Street Footbridge for floods as frequent as 20% AEP.

iii. The impacts of the Burton Street Footbridge extend upstream of the Atkinson Street road bridge a maximum distance of about 180 m for floods up to 1% AEP in magnitude, with peak flood levels increased by a maximum of about 0.5 m on the upstream side of the Burton Street Footbridge.

iv. The redistribution of flow onto the overbank area of Farmers Creek resulting from the blocking effects of the Burton Street Footbridge increases both the extent and depth of inundation downstream its location.

v. The depth of above-floor inundation would be increased in the eleven of the thirteen dwellings that are presently impacted by floodwater at the 1% AEP level of flooding (refer green highlighted properties in **Table 2**).

vi. Six dwellings that presently don't experience above-floor inundation during storms up to 1% AEP in intensity will now be inundated during a 1% AEP flood event (refer orange highlighted properties in **Table 2**).

vii. One dwelling that presently experience above-floor inundation during a 1% AEP flood event is now subject to above-floor inundation during a 2% AEP flood event (refer orange highlighted property in **Table 2**).

viii. The results of running the Farmers Creek HEC-RAS Model support the finding that the Burton Street Footbridge has resulted in an increase in peak flood levels upstream of its location.

We trust that the findings of the present investigation will assist Council in its assessment of the two footbridges. However, please do not hesitate to contact me should you have any queries or wish to discuss any aspect of our submission.

Yours faithfully
Lyall & Associates Consulting Water Engineers

Scott Button
Principal

TABLE 1
DEPTH OF ABOVE-FLOOR INUNDATION IN EXISTING RESIDENTIAL DEVELOPMENT
PRE- AND POST-FOOTBRIDGE CONDITIONS[1]

Property Identifier[2]	Street Address	Estimated Floor Level (m AHD)	Pre-Footbridge Conditions										Post-Footbridge Conditions									
			Peak Flood Level (m AHD)[3]					Depth of Above-Floor Inundation (m)					Peak Flood Level (m AHD)[3]					Depth of Above-Floor Inundation (m)				
			20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP
FC_0644	2 Banksia St	918.88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FC_3249	18 Guy St	917.89	-	917.13	917.32	917.61	917.94	-	-	-	-	0.05	-	917.13	917.32	917.61	917.93	-	-	-	-	0.04
FC_3282	16 Guy St	917.99	-	-	917.43	917.71	918.01	-	-	-	-	0.02	-	-	917.43	917.71	918.01	-	-	-	-	0.02
FC_3363	10 Burton St	919.22	-	-	-	-	919.12	-	-	-	-	-	-	-	-	919.04	919.36	-	-	-	-	0.14
FC_3367	19 Guy St	919.06	-	918.15	918.40	918.81	919.17	-	-	-	-	0.11	-	918.40	918.67	919.06	919.41	-	-	-	< 0.01	0.35
FC_3368	12 Burton St	918.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	919.08	-	-	-	-	0.39
FC_3372	12 Guy St	918.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	919.00	-	-	-	-	0.18
FC_3374	7 Burton St	919.17	-	918.58	918.79	919.18	919.53	-	-	-	0.01	0.36	-	918.68	918.92	919.32	919.67	-	-	-	0.15	0.50
FC_3378	17 Guy St	919.25	-	-	-	918.83	919.17	-	-	-	-	-	-	-	-	919.07	919.40	-	-	-	-	0.15
FC_3379	15 Guy St	919.20	-	-	-	918.84	919.18	-	-	-	-	-	-	-	-	919.07	919.40	-	-	-	-	0.20
FC_3393	25 Laidley St	919.85	-	-	-	919.88	920.22	-	-	-	0.03	0.37	-	-	919.54	919.92	920.27	-	-	-	0.07	0.42
FC_3394	27 Laidley St	920.14	-	-	-	919.83	920.16	-	-	-	-	0.02	-	-	-	919.88	920.22	-	-	-	-	0.08
FC_3397	19 Laidley St	919.98	-	919.81	920.05	920.39	920.75	-	-	0.07	0.41	0.77	-	919.83	920.06	920.41	920.78	-	-	0.08	0.43	0.80
FC_3399	17 Laidley St	919.91	-	919.87	920.15	920.50	920.87	-	-	0.24	0.59	0.96	-	919.89	920.16	920.51	920.89	-	-	0.25	0.60	0.98
FC_3402	18 Laidley St	920.22	-	-	-	920.39	920.69	-	-	-	0.17	0.47	-	-	-	920.40	920.71	-	-	-	0.18	0.49
FC_3403	29 Laidley St	920.13	-	-	-	919.79	920.08	-	-	-	-	-	-	-	-	919.82	920.14	-	-	-	-	0.01
FC_3410	16 Laidley St	920.33	-	-	-	920.51	920.83	-	-	-	0.18	0.50	-	-	-	920.52	920.84	-	-	-	0.19	0.51
FC_3412	15 Laidley St	920.37	-	919.94	920.26	920.65	921.03	-	-	-	0.28	0.66	-	919.96	920.27	920.66	921.04	-	-	-	0.29	0.67
FC_3418	14 Laidley St	920.73	-	-	-	-	920.85	-	-	-	-	0.12	-	-	-	-	920.86	-	-	-	-	0.13
FC_3428	13 Laidley St	921.00	-	-	920.27	920.72	921.11	-	-	-	-	0.11	-	-	920.29	920.73	921.13	-	-	-	-	0.13

1. While the two footbridges were incorporated in the Post-Footbridge TUFLOW Model, only the Burton Street Footbridge was found to have an adverse impact on flood behaviour in private property.
2. Refer **Figures 2** to **11** for location of flood affected dwellings.
3. Peak flood levels quoted in **Table 1** are not to be used for planning purposes. Rather, refer updated flood modelling which forms part of the *Lithgow FRMS&P* for contemporaneous peak flood levels at each property.

TABLE 2
IMPACT OF BURTON STREET FOOTBRIDGE ON DEPTH OF ABOVE-FLOOR INUNDATION IN EXISTING RESIDENTIAL DEVELOPMENT

Property Identifier[1]	Street Address	Increase in Depth of Above-Floor Inundation Attributable to Burton Street Footbridge (m)				
		20% AEP	10% AEP	5% AEP	2% AEP	1% AEP
FC_0644	2 Banksia St	-	-	-	-	-
FC_3249	18 Guy St	-	-	-	-	-0.01
FC_3282	16 Guy St	-	-	-	-	0.00
FC_3363	10 Burton St	-	-	-	-	0.14
FC_3367	19 Guy St	-	-	-	< 0.01	0.24
FC_3368	12 Burton St	-	-	-	-	0.39
FC_3372	12 Guy St	-	-	-	-	0.18
FC_3374	7 Burton St	-	-	-	0.14	0.14
FC_3378	17 Guy St	-	-	-	-	0.15
FC_3379	15 Guy St	-	-	-	-	0.2
FC_3393	25 Laidley St	-	-	-	0.04	0.05
FC_3394	27 Laidley St	-	-	-	-	0.06
FC_3397	19 Laidley St	-	-	0.01	0.02	0.03
FC_3399	17 Laidley St	-	-	0.01	0.01	0.02
FC_3402	18 Laidley St	-	-	-	0.01	0.02
FC_3403	29 Laidley St	-	-	-	-	0.01
FC_3410	16 Laidley St	-	-	-	0.01	0.01
FC_3412	15 Laidley St	-	-	-	0.01	0.01
FC_3418	14 Laidley St	-	-	-	-	0.01
FC_3428	13 Laidley St	-	-	-	-	0.02

1. Refer **Figures 2** to **11** for location of flood affected dwellings.

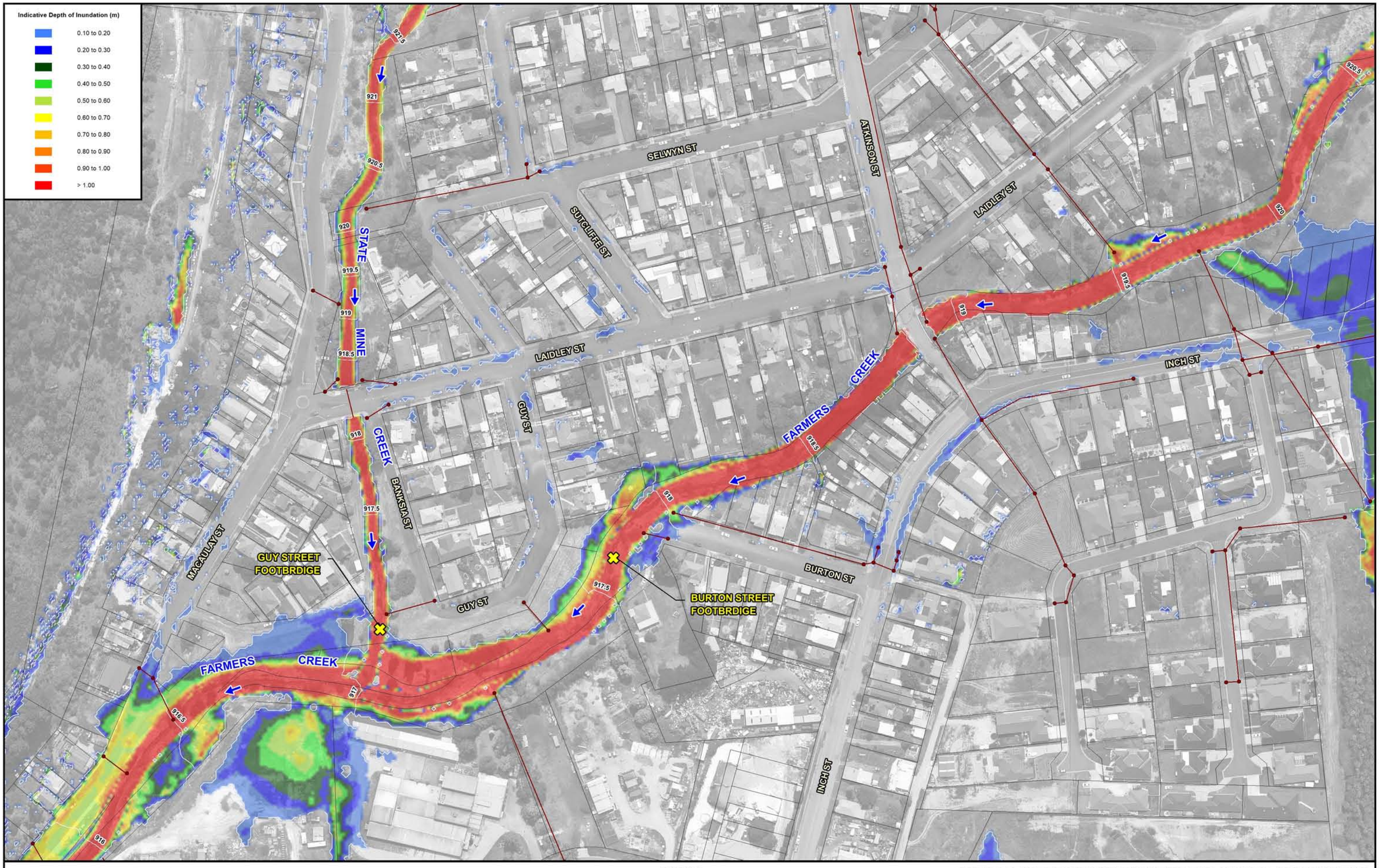
	Dwelling already experiences above-floor inundation under pre-footbridge conditions		Dwelling only experiences above-floor inundation as a result of the Burton Street Footbridge

FIGURES

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 1

LOCATION PLAN AND FARMERS CREEK HEC-RAS MODEL LAYOUT



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Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Location of Footbridge
- Stormwater Network
- 918 Water Surface Elevation Contours (m AHD)

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 2

INDICATIVE EXTENT AND DEPTH OF INUNDATION
PRE-FOOTBRIDGE CONDITIONS - 20% AEP

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

STATE MINE CREEK
FARMERS CREEK
SELWYN ST
SUTCLIFFE ST
ATKINSON ST
LAIDLEY ST
INCH ST
GUY ST
BANKSIA ST
MACAULAY ST
BURTON ST
GUY STREET FOOTBRDIGE
BURTON STREET FOOTBRDIGE
921.5
921
920.5
919.5
919
918.5
918
917.5
917
916.5

N

20 0 20 40 60

Scale: 1:2,000

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LEGEND

- Location of Footbridge
- Stormwater Network
- 918 Water Surface Elevation Contours (m AHD)

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 3

INDICATIVE EXTENT AND DEPTH OF INUNDATION
PRE-FOOTBRIDGE CONDITIONS - 10% AEP

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

SELWYN ST
ATKINSON ST
LAIDLEY ST
SUTCLIFFE ST
STATE MINE CREEK
GUY ST
BANKSIA ST
MACAULAY ST
FARMERS CREEK
INCH ST
BURTON ST
GUY STREET FOOTBRIDGE
BURTON STREET FOOTBRIDGE
FC_3399
FC_3397
922
921.5
921
920.5
920
919.5
919
918.5
918
917.5
917
916.5

N

20 0 20 40 60

Scale: 1:2,000

Lyall & Associates

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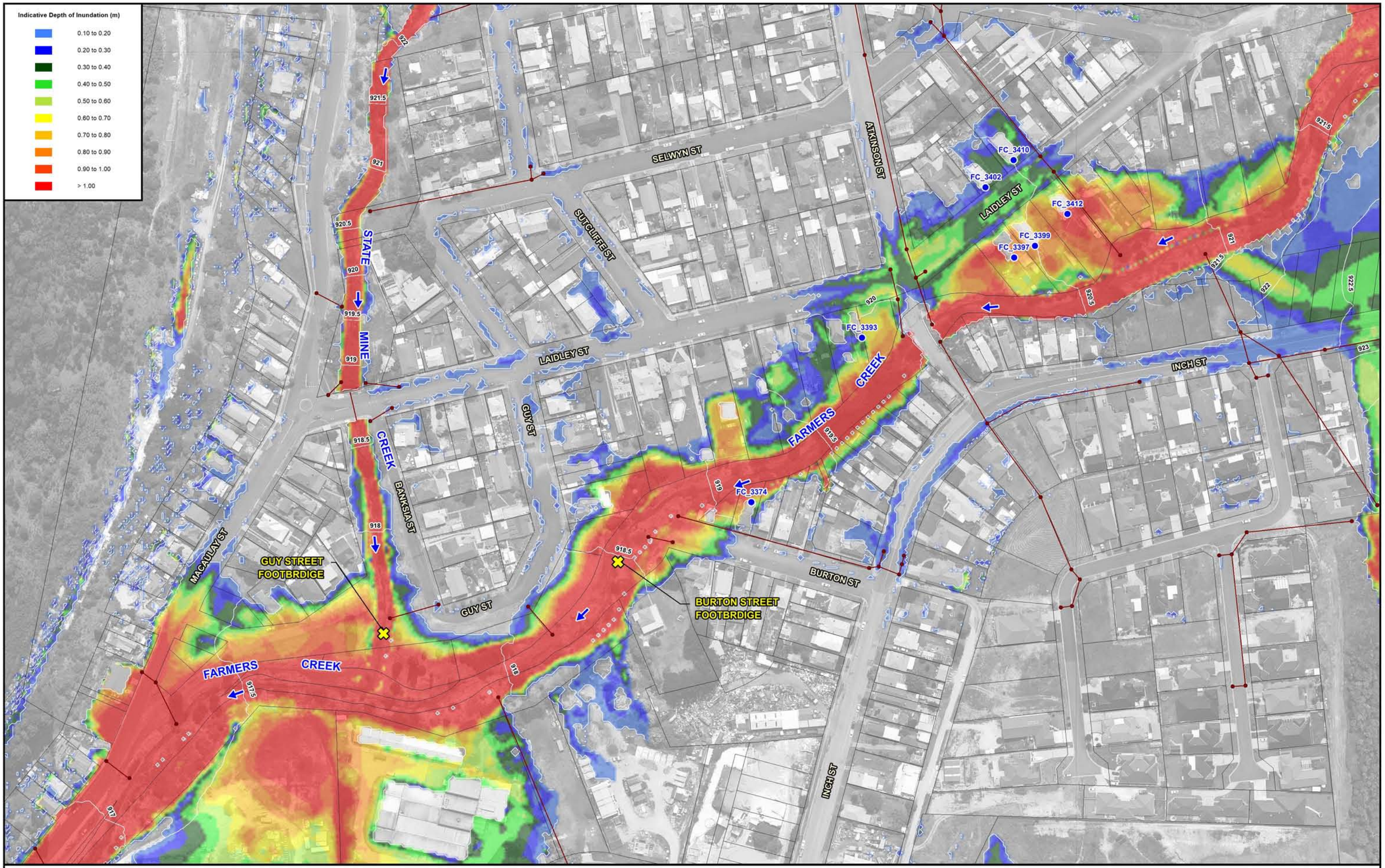
LEGEND

- Location of Footbridge
- Stormwater Network
- 918 Water Surface Elevation Contours (m AHD)
- FC_3397 Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 4

INDICATIVE EXTENT AND DEPTH OF INUNDATION
PRE-FOOTBRIDGE CONDITIONS - 5% AEP



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Lyall & Associates

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LEGEND

- Location of Footbridge
- Stormwater Network
- 918 Water Surface Elevation Contours (m AHD)
- FC_3397 Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 5

INDICATIVE EXTENT AND DEPTH OF INUNDATION
PRE-FOOTBRIDGE CONDITIONS - 2% AEP

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

SELWYN ST
ATKINSON ST
SUTCLIFFE ST
LAIDLEY ST
INCH ST
GUY ST
BANKSIA ST
MACAULAY ST
BURTON ST
STATE MINE CREEK
FARMERS CREEK
GUY STREET FOOTBRDIGE
BURTON STREET FOOTBRDIGE
FC_3418
FC_3410
FC_3402
FC_3428
FC_3412
FC_3399
FC_3397
FC_3393
FC_3394
FC_3367
FC_3374
FC_3249
FC_3282
922
921.5
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920
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919
918.5
918
917.5
923
922.5

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Scale: 1:2,000

Lyall & Associates

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LEGEND

- Location of Footbridge
- Stormwater Network
- 918 Water Surface Elevation Contours (m AHD)
- FC_3397 Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 6

INDICATIVE EXTENT AND DEPTH OF INUNDATION
PRE-FOOTBRIDGE CONDITIONS - 1% AEP

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

SELWYN ST
ATKINSON ST
SUTCLIFFE ST
LAIDLEY ST
STATE MINE
LAIDLEY ST
INCH ST
GUY ST
CREEK
BANKSIA ST
FARMERS CREEK
MACAULAY ST
GUY STREET FOOTBRDIGE
GUY ST
BURTON ST
BURTON STREET FOOTBRDIGE
FARMERS CREEK
INCH ST

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Scale: 1:2,000

Lyall & Associates

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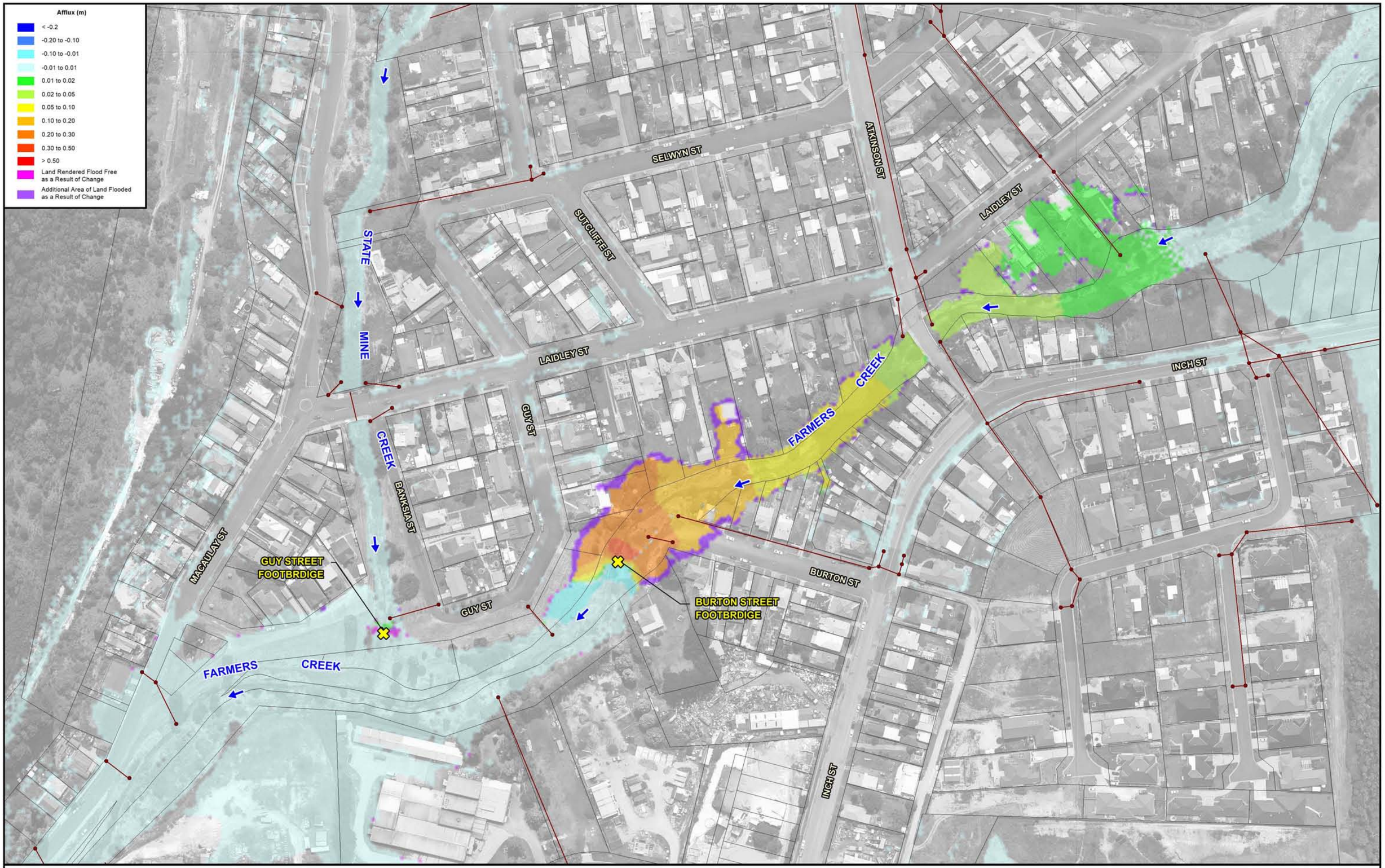
LEGEND

- Location of Footbridge
- Stormwater Network

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 7

IMPACT OF FOOTBRIDGES ON FLOOD BEHAVIOUR
20% AEP



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Lyall & Associates

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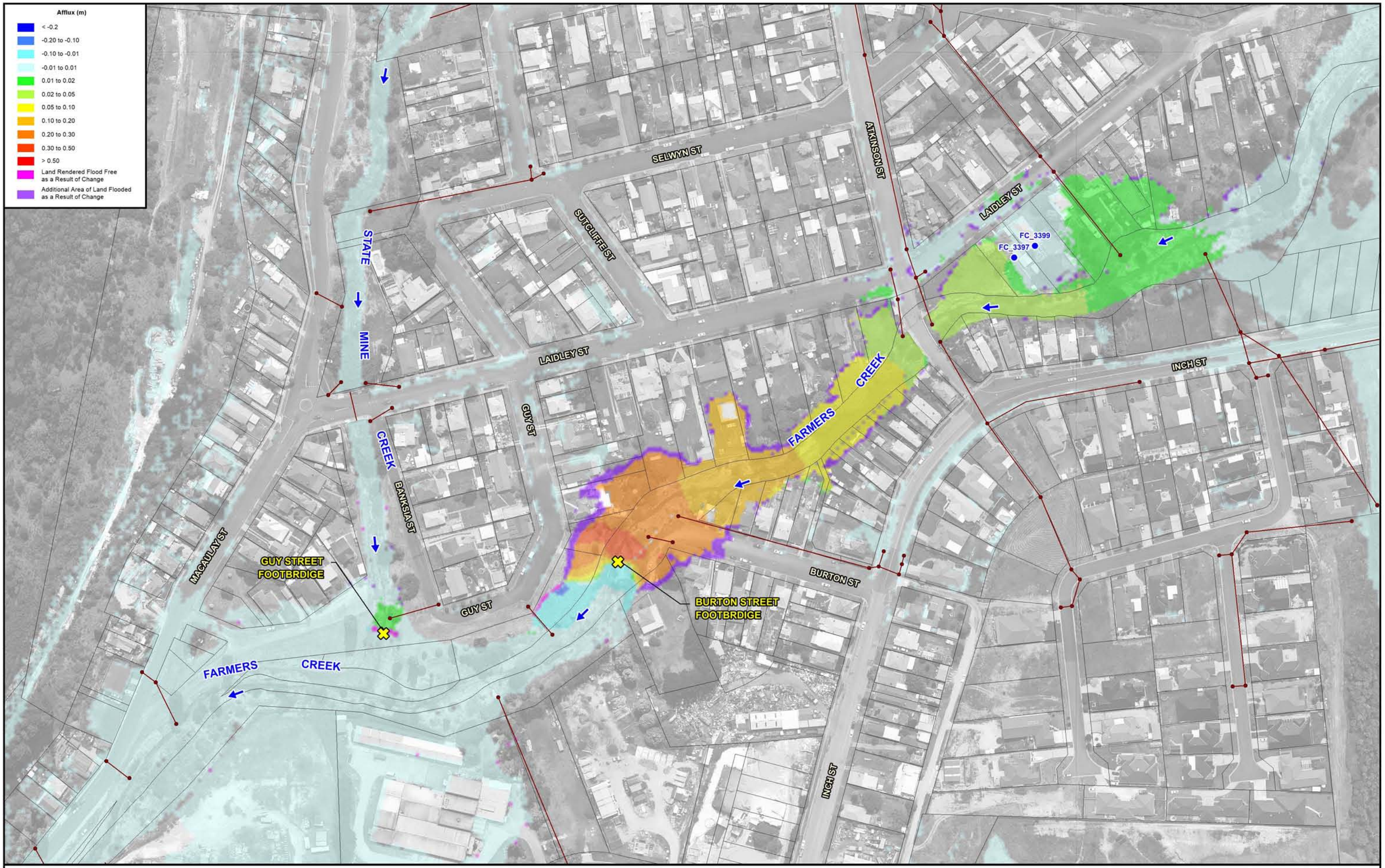
LEGEND

- Location of Footbridge
- Stormwater Network

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 8

IMPACT OF FOOTBRIDGES ON FLOOD BEHAVIOUR
10% AEP



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Lyall & Associates

NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Location of Footbridge
- Stormwater Network
- FC_3397 — Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 9

IMPACT OF FOOTBRIDGES ON FLOOD BEHAVIOUR
5% AEP

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

SELWYN ST
ATKINSON ST
SUTCLIFFE ST
STATE MINE
LAIDLEY ST
GUY ST
BANKSIA ST
MACAULAY ST
INCH ST
BURTON ST
FARMERS CREEK
CREEK
GUY STREET FOOTBRDIGE
BURTON STREET FOOTBRDIGE
FC_3410
FC_3402
FC_3412
FC_3399
FC_3397
FC_3393
FC_3374
FC_3367

N

20 0 20 40 60

Scale: 1:2,000

Lyall & Associates

NOTE:
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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

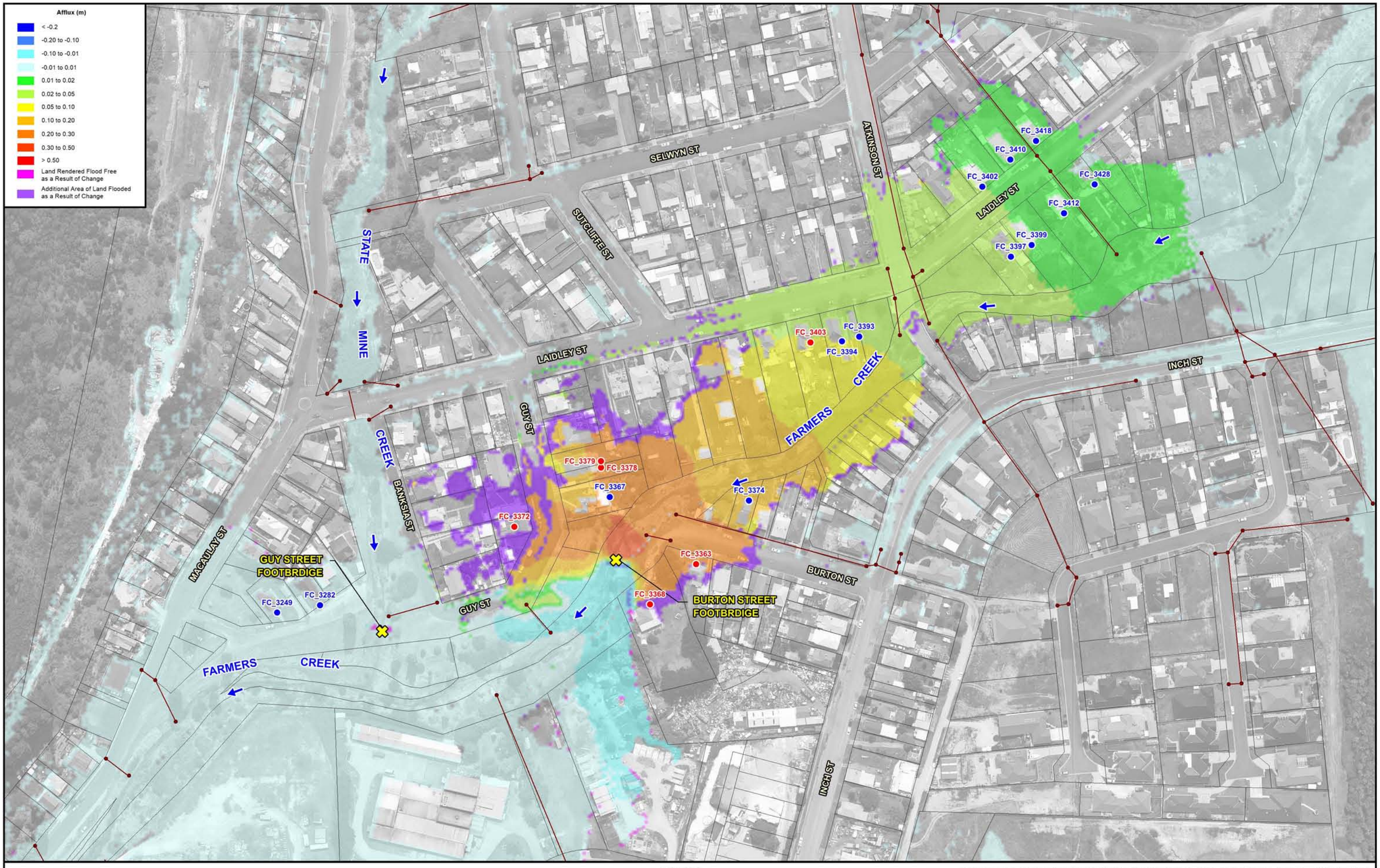
LEGEND

- Location of Footbridge
- Stormwater Network
- FC_3397 — Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier
- FC_3367 — Additional Property Subject to Above-Floor Inundation under Post-Burton Street Footbridge Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 10

IMPACT OF FOOTBRIDGES ON FLOOD BEHAVIOUR
2% AEP



N

20 0 20 40 60

Scale: 1:2,000

Lyall & Associates

NOTE:
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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Location of Footbridge
- Stormwater Network
- FC_3397 — Property Subject to Above-Floor Inundation under Present Day Conditions and Identifier
- FC_3379 — Additional Property Subject to Above-Floor Inundation under Post-Burton Street Footbridge Conditions and Identifier

BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 11

IMPACT OF FOOTBRIDGES ON FLOOD BEHAVIOUR
1% AEP

Farmers_Creek DS FC Confl.

Farmers_Creek US FC Confl.

Elevation (m)

920
919
918
917
916
915
914
913
912

-6 -5 -4 -3 -2 -1 0 1 2 3 4 6 7 8 9 10 11

River Station Identifier (RS)

0 100 200 300 400 500

Main Channel Distance (m)

LEGEND

	20% AEP	5% AEP	1% AEP
Present Day	.....	– – –	———
Post-Footbridge	.....	– – –	———

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BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 12
(Sheet 1 of 2)

DESIGN WATER SURFACE PROFILES
PRE- VERSUS POST-FOOTBRIDGE CONDITIONS

Farmers_Creek DS FC Confl.

State Mine Ck Guy_Brg

Elevation (m)

919
918
917
916
915
914
913
912

-6 -5 -4 -3 0 1 2 3 4 5 6 7

River Station Identifier (RS)

0 50 100 150 200 250 300 350

Main Channel Distance (m)

LEGEND

	20% AEP	5% AEP	1% AEP
Present Day	.....	— — —	———
Post-Footbridge	.....	— — —	———

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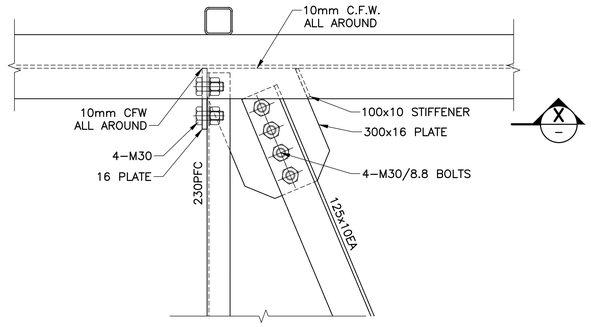
BURTON STREET FOOTBRIDGE FLOOD IMPACT ASSESSMENT

Figure 12
(Sheet 2 of 2)

DESIGN WATER SURFACE PROFILES
PRE- VERSUS POST-FOOTBRIDGE CONDITIONS

ANNEXURE A



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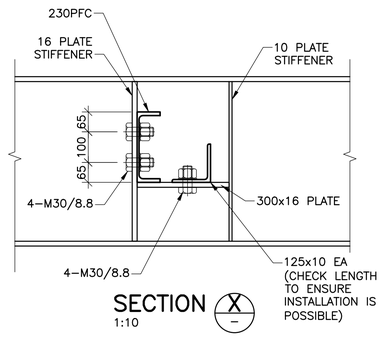
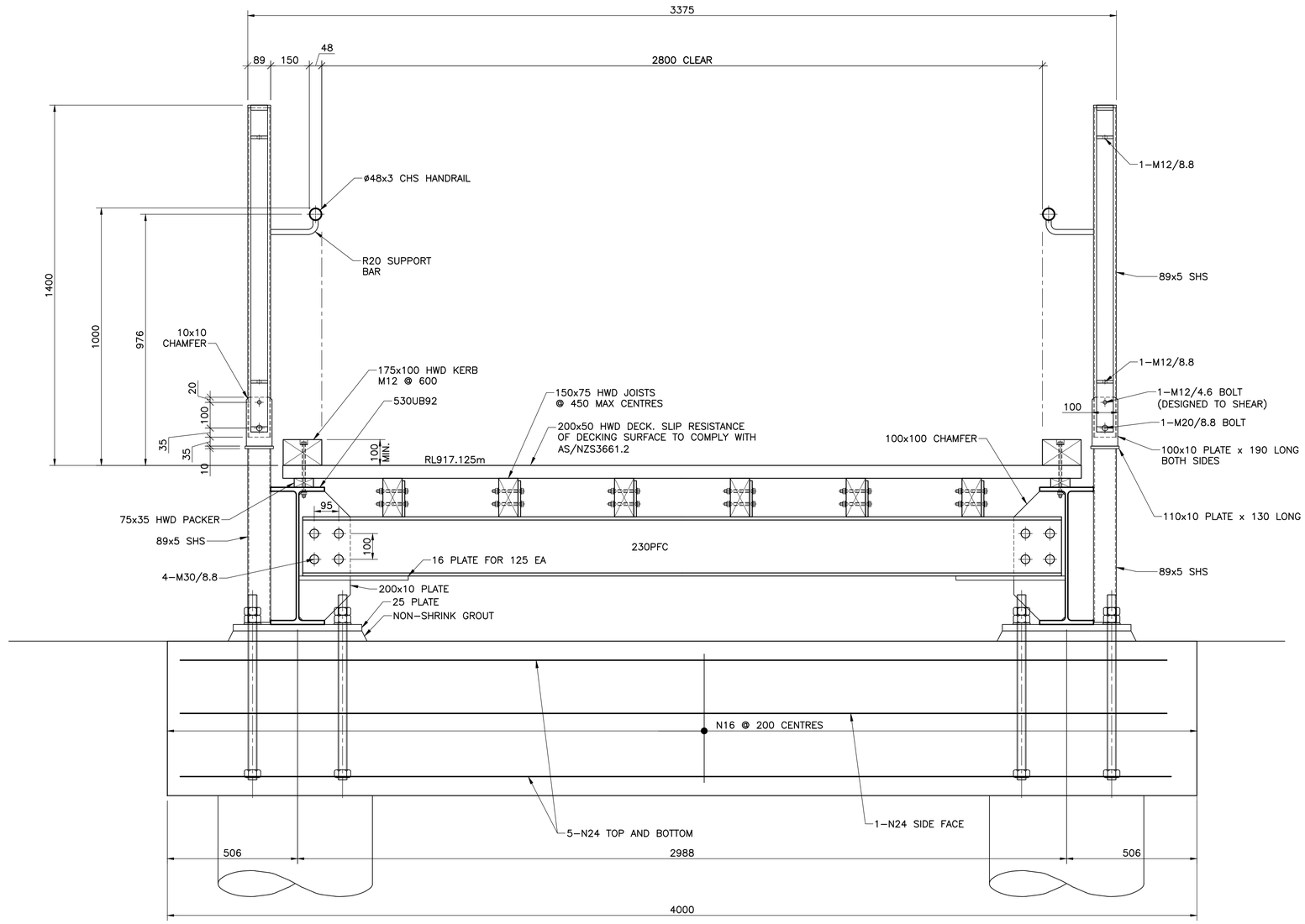


SECTION X/– 1:10



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Sheet size: A1
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–	Original Issue	19/06/18

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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
FARMERS CREEK

SECTIONS AND DETAILS

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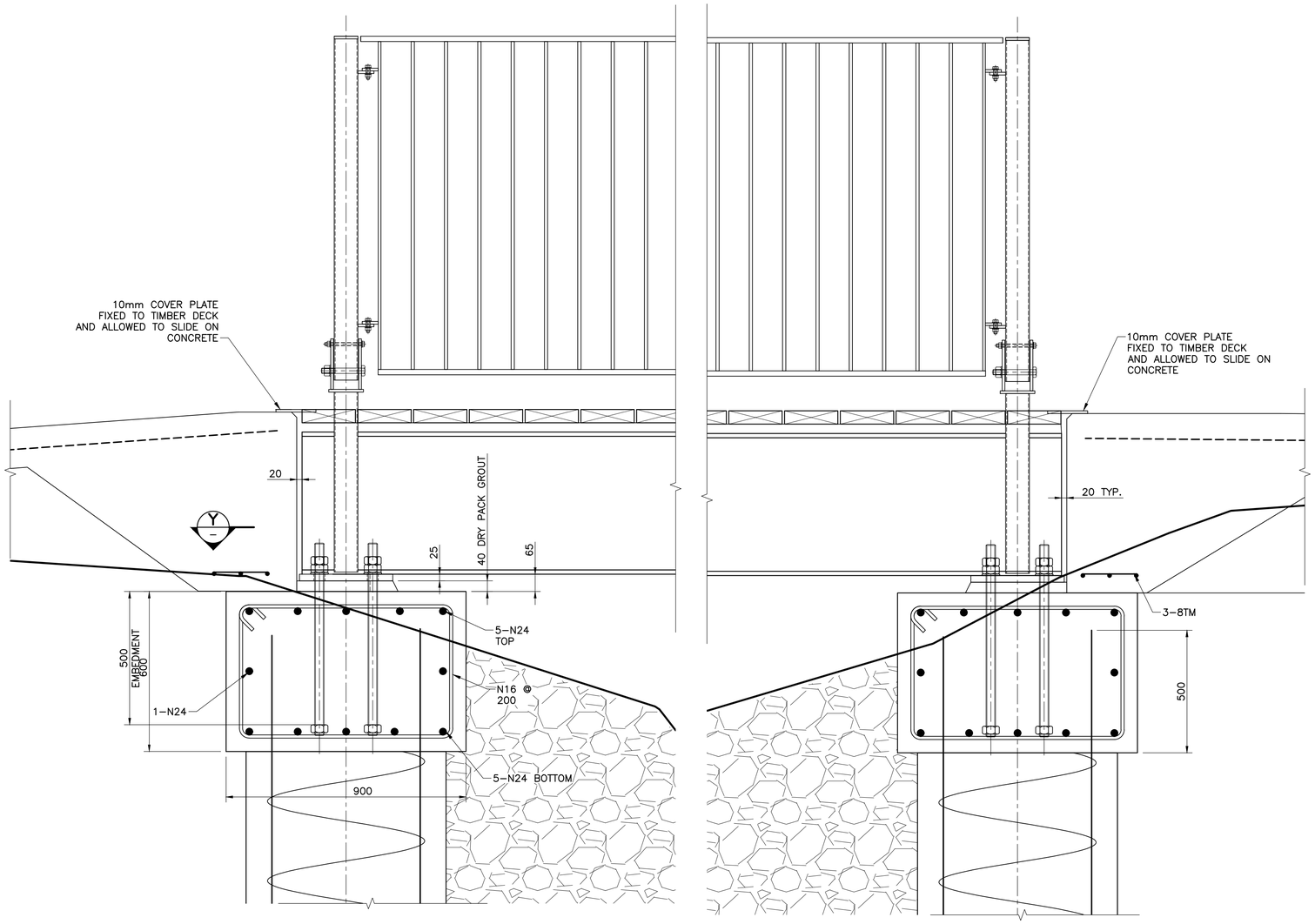
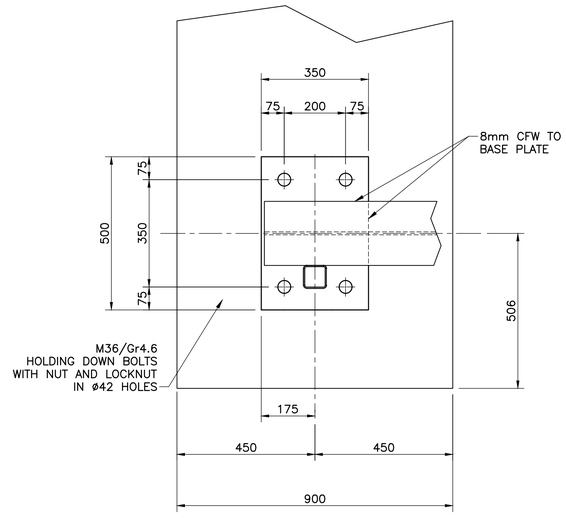
Designed: A.Miller | Checked: P. Brown
Sheet: 12of18
BR18–0402/F04/A



DETAIL 1/02
1:10

DETAIL 2/02
1:10



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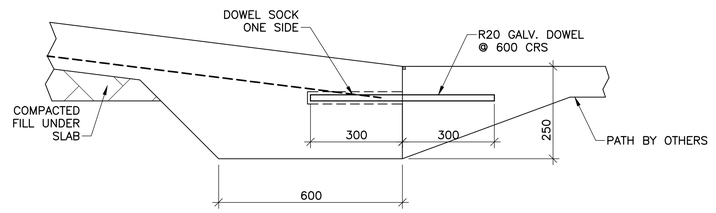

DETAIL 4/02
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PROPOSED BRIDGE
FARMERS CREEK

SECTIONS AND DETAILS

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Designed: A.Miller	Checked: P. Brown
Sheet: 13of18	BR18–0402/F05/A

LOCALITY PLAN
1:2500

1:2500 0 25 50 75 100m

Sheet size: A1	
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LITHGOW CITY COUNCIL
PROPOSED BRIDGES

LOCALITY PLAN

Drawn: M.Allen	Approved: P. Brown
Designed: A.Miller	Checked: P. Brown
Sheet: 1of18	BR18–0402/01/A

GENERAL

1.1. MAX. PEDESTRIAN DESIGN LOAD = 5kPa (LIVE LOAD)
1.2. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED TO CARRY A CONCENTRATED LOAD OF 20KN DUE TO ACCESS OF LIGHT VEHICLE NOT EXCEEDING 4.5 TONNES TO AS5100
1.3. VEHICLE COLLISION LOAD IS NOT TAKEN AS DESIGN LOAD
1.4. DESIGN WIND SPEED, Vu = 40m/s (ULTIMATE)
1.5. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED TO AS5100 FOR A FLOOD IMMUNITY LEVEL ARI OF 10 YEARS.
1.6. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED FOR A FLOOD WATER FLOW VELOCITY SM=2.1m/s, FC=4.3m/s, AND CB=8.0m/s
1.7. PEDESTRIAN BRIDGE DESIGN LIFE = 100 YEARS

2. DECK DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO FABRICATION, MAX. SPAN 1.5m BETWEEN PFC SUPPORTS

3. ALL STEELWORK AND BOLTS TO BE HOT DIPPED GALVANIZED.

4. GEOTECHNICAL ENGINEER WITH APPROPRIATE EXPERIENCE SHALL BE PRESENT DURING CONSTRUCTION OF PILE SOCKETS TO CONFIRM FOUNDATION REQUIREMENTS HAVE BEEN ACHIEVED.

5. BORED PILE CONCRETE STRENGTH SHALL BE VR400/40MPa

6. THE BASE SHALL BE CLEANED OUT OF ALL LOOSE AND DISTURBED MATERIAL PRIOR TO PLACING CONCRETE. CASTING OF CONCRETE SHALL BE CARRIED OUT WITHIN 24 HOURS.

7. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS.

8. STRIP THE AREA UNDER THE SLAB ON GROUND OF VEGETATION AND TOPSOIL.

9. BUILDER TO VERIFY SITE DIMENSIONS PRIOR TO COMMENCEMENT OF WORK.

10. OSBORN CONSULTING DRAWINGS ARE NOT SHOP DRAWINGS. REFER TO SHOP DRAWINGS FOR FABRICATION DIMENSIONS.

11. REFER ANY DISCREPANCY IN THESE DRAWINGS TO THE ENGINEER BEFORE PROCEEDING WITH WORK.

12. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION, WITH NO PART OVERSTRESSED.

13. SAFETY IN DESIGN:
a. NOTICE TO PERSONS WHO COMMISSIONED THE DESIGN WORK DEPICTED IN THESE DOCUMENTS:–
THIS NOTICE IS ALSO RELEVANT TO ALL THOSE INVOLVED IN THE CONSTRUCTION OF THE WORKS, ITS OPERATION, AND ITS DEMOLITION.
b. ACTIVITIES WHICH INVOLVE SOME RISK TO THE HEALTH AND SAFETY OF THOSE INVOLVED OCCUR
   – DURING THE CONSTRUCTION OF THESE WORKS INCLUDING THOSE NOT INVOLVED IN THE CONSTRUCTION BUT WHO ENTER THE CONSTRUCTION SITE.
   – DURING THE OPERATION OF THESE WORKS.
   – DURING THE MAINTENANCE REQUIRED TO MAINTAIN THE INITIAL LEVEL OF SAFETY.
   – DURING THE EVENTUAL DEMOLITION OF THESE WORKS.
c. PLEASE CONTACT OSBORN CONSULTING ENGINEERS FOR INFORMATION AND ASSISTANCE WITH MINIMISING THESE RISKS.

FOUNDATION NOTES:–

1. FOOTING DESIGN BASED ON FIRM NATURAL GROUND OF 150kPa ALLOWABLE BEARING CAPACITY AND A SOIL SHEAR STRENGTH Cu=75kPA.

2. NON–SHRINKAGE GROUT TO ACHIEVE 60MPa MINIMUM STRENGTH FOR ALL BASE PLATES.

3. ALL HOLDING DOWN BOLTS SHALL BE GRADE 4.6/S (AS1111), GALVANISED, U.N.O.

CONCRETE

C1.
CONSTRUCT ALL CONCRETE WORKS IN ACCORDANCE WITH AS3600. CONCRETE SHALL BE MANUFACTURED IN ACCORDANCE WITH AS1379.

C2.
FORMWORK SHALL COMPLY WITH AS3610. EXCEPT WHERE NOTED OTHERWISE, CONCRETE EXPOSED TO VIEW IN THE FINISHED PROJECT SHALL HAVE A CLASS 3 SURFACE FINISH WITH A 20x20 CHAMFER ON EXTERNAL CORNERS.

C3.
REINFORCING SHALL COMPLY WITH AS/NZS 4671.

C4.
WHERE NOT SPECIFIED ON THE DRAWINGS, CONCRETE STRENGTH GRADE SHALL BE:

FOOTINGS AND SLABS ON GROUND	GRADE N25
COLUMNS, SUSPENDED SLABS AND TILT–UP	GRADE N32
PILE FOOTINGS AND HEADSTOCK	GRADE N40
RELIEVING SLAB	GRADE N40

C5.
COVER TO REINFORCING, WHERE NOT NOTED ON THE DRAWING, SHALL BE:

FOOTINGS	60mm
INTERIOR SURFACES, PROTECTED FROM RAIN	20mm
EXTERIOR SURFACES, EXPOSED TO RAIN	40mm

C6.
CONDUITS, PIPES ETC MUST NOT BE PLACED IN COVER CONCRETE.

C7.
ALL REINFORCEMENT IS TO BE SUPPORTED ON CHAIRS OR HANGERS. FABRIC IS TO BE SUPPORTED AT 800mm CENTRES BOTH WAYS.

C8.
BAR LAPS, UNLESS NOTED OTHERWISE:

N12	500mm
N16	800mm
N20	1100mm
N24	1400mm
N28	1700mm
N32	2100mm
N36	2600mm

C9.
WHERE SLAB REINFORCING IS SHOWN ON THE DRAWINGS AS IN ONE DIRECTION ONLY, PROVIDE N12@400 IN THE OTHER DIRECTION.

C10.
ALL REINFORCEMENT IS TO BE FIXED IN POSITION AND INSPECTED BY THE ENGINEER BEFORE ANY CONCRETE IS PLACED.

C11.
ALL CONCRETE SHALL BE VIBRATED, EXCEPT SLABS ON GROUND, OF 125MM THICKNESS OR LESS.

C12.
SLURRY USED TO LUBRICATE CONCRETE PUMP LINES SHALL NOT BE PUMPED INTO ANY STRUCTURAL MEMBERS. WATER SHALL NOT BE ADDED TO PRE–MIXED CONCRETE ONCE IT HAS LEFT THE BATCHING PLANT.

C13.
CURE ALL EXPOSED CONCRETE SURFACES, WITHIN ONE HOUR OF FINAL TROWELING. WITH A CURING AGENT WHICH HAS A MINIMUM EFFICIENCY OF 80% WHEN MEASURED IN ACCORDANCE WITH AS 3799. CURE FORMED SURFACES BY LEAVING FORMWORK IN PLACE FOR AT LEAST 7 DAYS.

C14.
FORMWORK MAY BE STRIPPED AFTER 7 DAYS, BUT BEAM AND SLABS MUST REMAIN PROPPED FOR 21 DAYS AFTER CASTING.

STEELWORK NOTES

1. ALL CHS/RHS/SHS SHALL COMPLY WITH AS/NZS1163 (GR. 350MPa U.N.O.). ALL UB/UC/PFC SHALL COMPLY WITH AS/NZS 3679.1 (GR.300MPa U.N.O.). OTHER STEEL COMPONENTS GRADE 250MPa, U.N.O. STEEL PLATE TO AS/NZS 3678. FLAT BAR AND ROUND BAR TO AS/NZS 3679.1

2. FABRICATE AND ERECT STRUCTURAL STEELWORK IN ACCORDANCE WITH AS/NZS5131, CONSTRUCTION CATEGORY 2, ARCHITECTURALLY EXPOSED STRUCTURAL STEELWORK CATEGORY 2. EXCEPT WHERE SPECIFIED ON THESE DRAWINGS, COMPLIANCE WITH THE CODE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

3. CLOSED SECTIONS SHALL BE ADEQUATELY VENTED FOR GALVANISING, WHERE APPLICABLE.

4. ALL CONNECTING BOLTS SHALL BE GRADE 8.8/S (AS/NZS 1252), U.N.O. HOLD DOWN GRADE 4.6 BOLTS TO AS1111.1, STANDARD NUTS CLASS 5 TO AS1112.1, THIN NUTS CLASS 5 TO AS1112.4 AND WASHERS FOR CLASS 4.6 BOLTS TO AS1237

5. ALL BOLTS AND NUTS TO BE HOT DIP GALVANISED TO AS1214

6. JOIN ALL SECTIONS WITH GENERAL PURPOSE 6mm CONTINUOUS FILLET WELD (E48XX/W50X ELECTRODES), U.N.O. ALL WELDING TO AS/NZS1554.1 WELDING CONSUMABLES TO BE IN ACCORDANCE WITH AS/NZS4855.

7. STEELWORKS CORROSION PROTECTION HOT DIP GALVANISED. PRIOR TO GALVANISING ALL WELD SPLATTER AND WELDING SLAG IS TO BE REMOVED. MEMBERS TO BE BRANDED WITH SUITABLE TYPE NUMBER AFTER FABRICATION.

TIMBER NOTES:–

1. ALL TIMBER SHALL BE NATURAL DURABILITY CLASS OF HEARTWOOD (OUTSIDE ABOVE GROUND) CLASS 1 OR 2 TO AS5604.

2. SAPWOOD SHALL BE PROTECTIVE TREATED TO CLASS H3.

3. TIMBER WITH TREATED SAPWOOD CUT OR DRILLED ON SITE SHALL BE LIBERALLY COATED WITH A CONCENTRATED SOLUTION OF NAPTHENATE PENTACHLOROPHENAL OR APPROVED EQUIVALENT.

4. TIMBER DECKING AND HANDRAILS SHALL BE SPOTTED GUM, TALLOWWOOD OR IRONBARK. THEY SHALL BE STRUCTURAL GRADE 1 OR 2 TO AS2082, AND THE TOP FACE SHALL BE FREE OF UNSOUND KNOTS, TERMITE GALLERIES OR BARK.

5. SLIP RESISTANCE OF DECKING SURFACE TO COMPLY WITH AS/NZS3661.2.

6. DECKING SHALL BE LAID WITH CUPPED FACE DOWN.

7. TIMBER JOISTS TO BE UNSEASONED HARDWOOD (F17) IN ACCORDANCE WITH AS/NZS1748.

B

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A	REVISED FOR REVISED FLOOD LOADING	27/09/18
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LITHGOW CITY COUNCIL
PROPOSED BRIDGES

STANDARD NOTES

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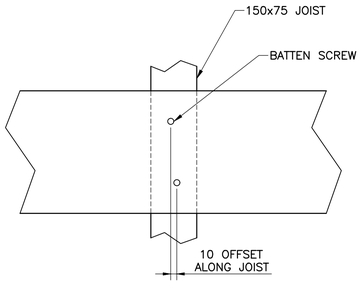

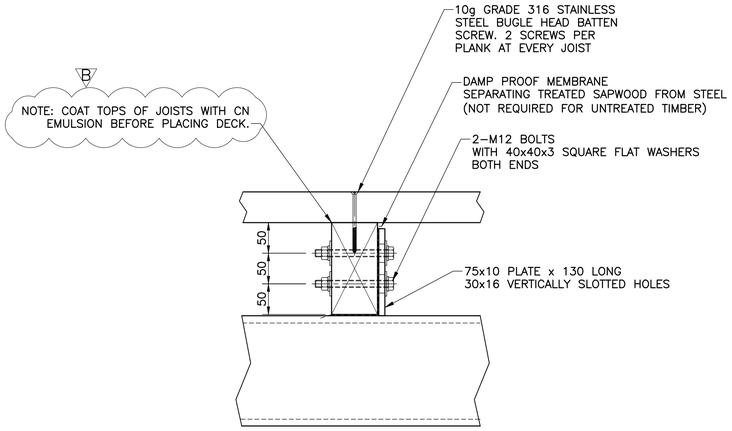

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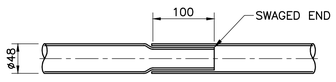

HANDRAIL SPLICE JOINTS
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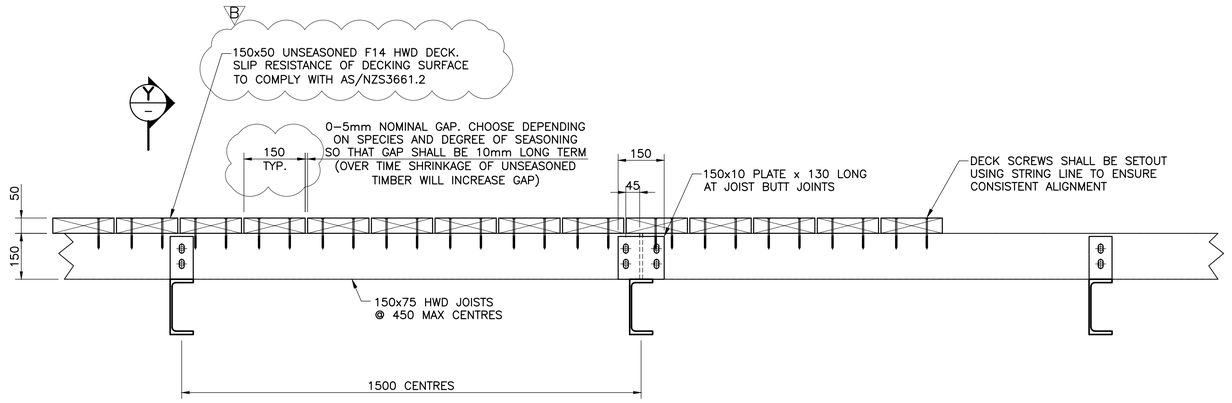

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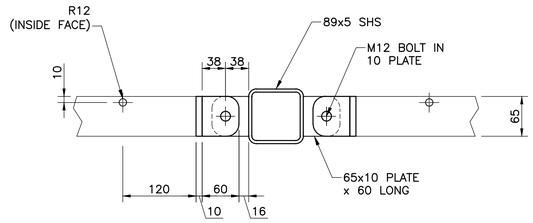

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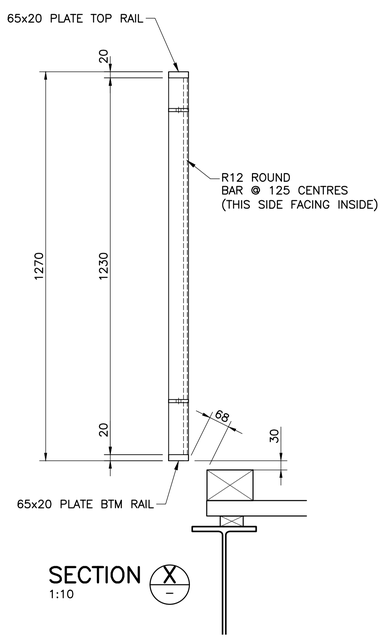

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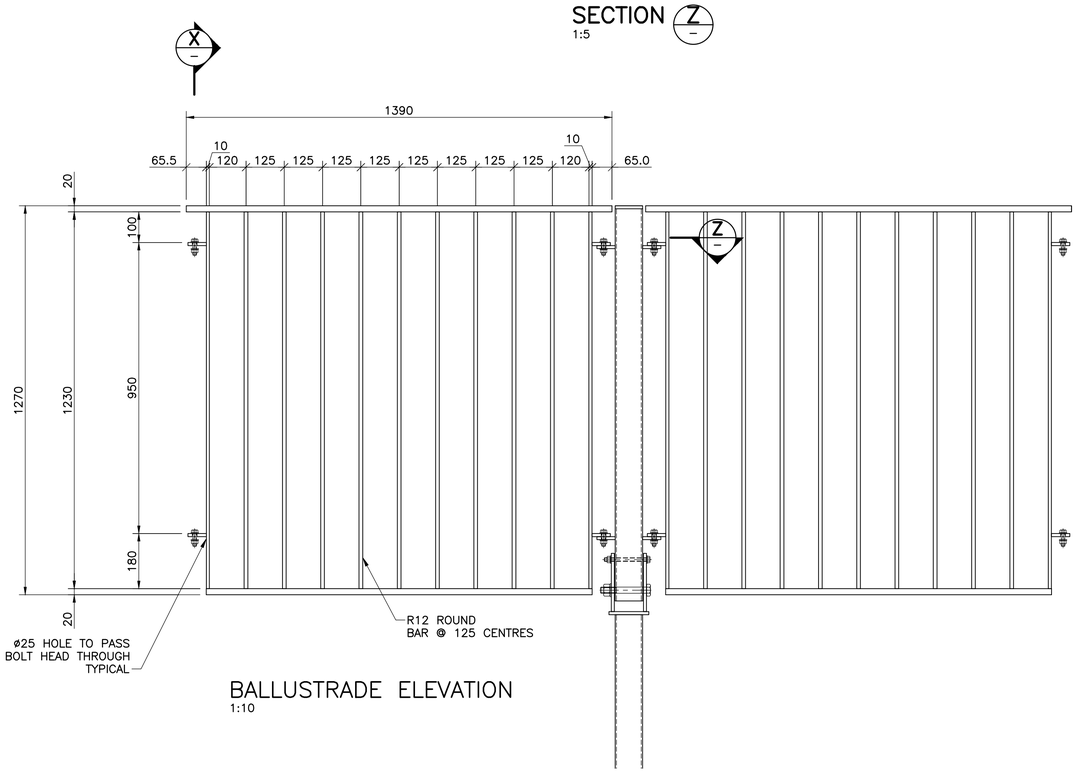

BALLUSTRADE ELEVATION
1:10

1:10 0 100 200 300 400mm

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–	Original Issue	28/06/18

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LITHGOW CITY COUNCIL
PROPOSED BRIDGES

TYPICAL SECTIONS AND DETAILS

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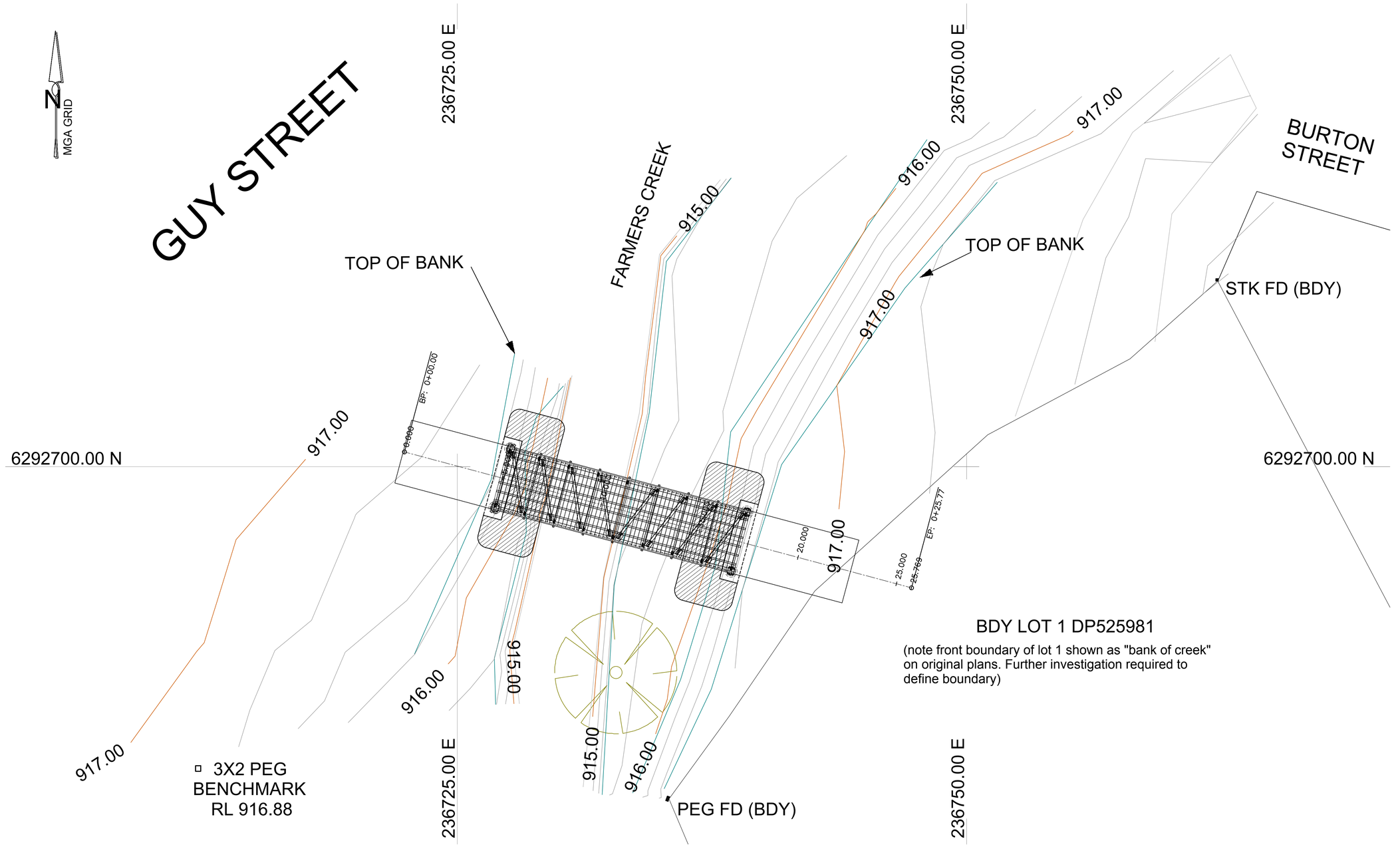

SITE PLAN
1:100

1:100 0 1 2 3 4m

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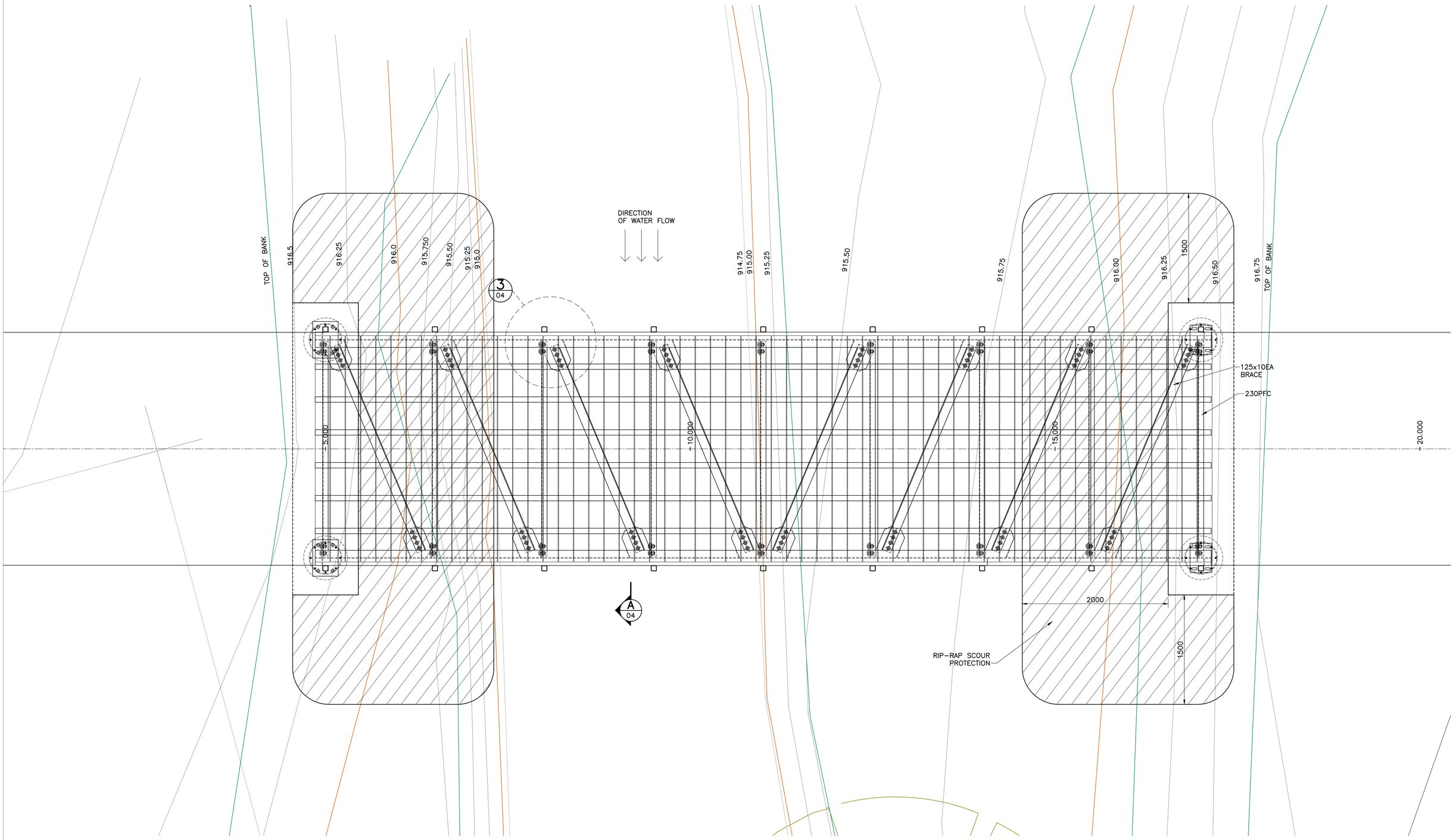
LITHGOW CITY COUNCIL
PROPOSED BRIDGE
FARMERS CREEK

SITE PLAN AND NOTES

Drawn: M.Allen	Approved: P Brown
Designed: A.Miller	Checked: P. Brown
Sheet: 9of18	BR18–0402/F01/A



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A1 scale:	As Shown
A3 scale:	HALF

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–	Original Issue	19/06/18

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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
FARMERS CREEK

PLAN

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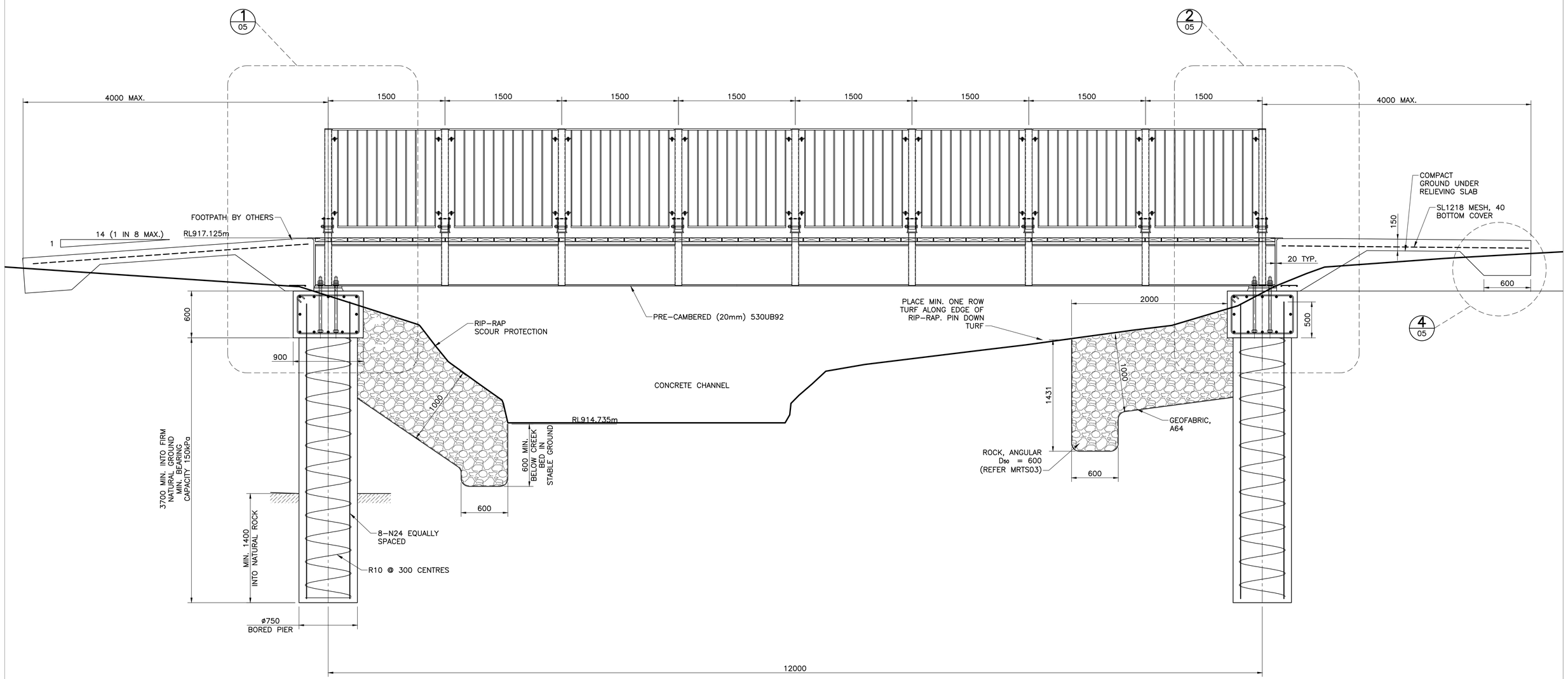

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1:25

1:25 0 500 1000mm

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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
FARMERS CREEK

ELEVATION

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ANNEXURE B

GENERAL

1.1. MAX. PEDESTRIAN DESIGN LOAD = 5kPa (LIVE LOAD)
1.2. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED TO CARRY A CONCENTRATED LOAD OF 20KN DUE TO ACCESS OF LIGHT VEHICLE NOT EXCEEDING 4.5 TONNES TO AS5100
1.3. VEHICLE COLLISION LOAD IS NOT TAKEN AS DESIGN LOAD
1.4. DESIGN WIND SPEED, Vu = 40m/s (ULTIMATE)
1.5. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED TO AS5100 FOR A FLOOD IMMUNITY LEVEL ARI OF 10 YEARS.
1.6. PEDESTRIAN BRIDGES HAVE BEEN DESIGNED FOR A FLOOD WATER FLOW VELOCITY SM=2.1m/s, FC=4.3m/s, AND CB=8.0m/s
1.7. PEDESTRIAN BRIDGE DESIGN LIFE = 100 YEARS

2. DECK DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO FABRICATION, MAX. SPAN 1.5m BETWEEN PFC SUPPORTS

3. ALL STEELWORK AND BOLTS TO BE HOT DIPPED GALVANIZED.

4. GEOTECHNICAL ENGINEER WITH APPROPRIATE EXPERIENCE SHALL BE PRESENT DURING CONSTRUCTION OF PILE SOCKETS TO CONFIRM FOUNDATION REQUIREMENTS HAVE BEEN ACHIEVED.

5. BORED PILE CONCRETE STRENGTH SHALL BE VR400/40MPa

6. THE BASE SHALL BE CLEANED OUT OF ALL LOOSE AND DISTURBED MATERIAL PRIOR TO PLACING CONCRETE. CASTING OF CONCRETE SHALL BE CARRIED OUT WITHIN 24 HOURS.

7. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS.

8. STRIP THE AREA UNDER THE SLAB ON GROUND OF VEGETATION AND TOPSOIL.

9. BUILDER TO VERIFY SITE DIMENSIONS PRIOR TO COMMENCEMENT OF WORK.

10. OSBORN CONSULTING DRAWINGS ARE NOT SHOP DRAWINGS. REFER TO SHOP DRAWINGS FOR FABRICATION DIMENSIONS.

11. REFER ANY DISCREPANCY IN THESE DRAWINGS TO THE ENGINEER BEFORE PROCEEDING WITH WORK.

12. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION, WITH NO PART OVERSTRESSED.

13. SAFETY IN DESIGN:
a. NOTICE TO PERSONS WHO COMMISSIONED THE DESIGN WORK DEPICTED IN THESE DOCUMENTS:–
THIS NOTICE IS ALSO RELEVANT TO ALL THOSE INVOLVED IN THE CONSTRUCTION OF THE WORKS, ITS OPERATION, AND ITS DEMOLITION.
b. ACTIVITIES WHICH INVOLVE SOME RISK TO THE HEALTH AND SAFETY OF THOSE INVOLVED OCCUR
   – DURING THE CONSTRUCTION OF THESE WORKS INCLUDING THOSE NOT INVOLVED IN THE CONSTRUCTION BUT WHO ENTER THE CONSTRUCTION SITE.
   – DURING THE OPERATION OF THESE WORKS.
   – DURING THE MAINTENANCE REQUIRED TO MAINTAIN THE INITIAL LEVEL OF SAFETY.
   – DURING THE EVENTUAL DEMOLITION OF THESE WORKS.
c. PLEASE CONTACT OSBORN CONSULTING ENGINEERS FOR INFORMATION AND ASSISTANCE WITH MINIMISING THESE RISKS.

FOUNDATION NOTES:–

1. FOOTING DESIGN BASED ON FIRM NATURAL GROUND OF 150kPa ALLOWABLE BEARING CAPACITY AND A SOIL SHEAR STRENGTH Cu=75kPA.

2. NON–SHRINKAGE GROUT TO ACHIEVE 60MPa MINIMUM STRENGTH FOR ALL BASE PLATES.

3. ALL HOLDING DOWN BOLTS SHALL BE GRADE 4.6/S (AS1111), GALVANISED, U.N.O.

CONCRETE

C1.
CONSTRUCT ALL CONCRETE WORKS IN ACCORDANCE WITH AS3600. CONCRETE SHALL BE MANUFACTURED IN ACCORDANCE WITH AS1379.

C2.
FORMWORK SHALL COMPLY WITH AS3610. EXCEPT WHERE NOTED OTHERWISE, CONCRETE EXPOSED TO VIEW IN THE FINISHED PROJECT SHALL HAVE A CLASS 3 SURFACE FINISH WITH A 20x20 CHAMFER ON EXTERNAL CORNERS.

C3.
REINFORCING SHALL COMPLY WITH AS/NZS 4671.

C4.
WHERE NOT SPECIFIED ON THE DRAWINGS, CONCRETE STRENGTH GRADE SHALL BE:

FOOTINGS AND SLABS ON GROUND	GRADE N25
COLUMNS, SUSPENDED SLABS AND TILT–UP	GRADE N32
PILE FOOTINGS AND HEADSTOCK	GRADE N40
RELIEVING SLAB	GRADE N40

C5.
COVER TO REINFORCING, WHERE NOT NOTED ON THE DRAWING, SHALL BE:

FOOTINGS	60mm
INTERIOR SURFACES, PROTECTED FROM RAIN	20mm
EXTERIOR SURFACES, EXPOSED TO RAIN	40mm

C6.
CONDUITS, PIPES ETC MUST NOT BE PLACED IN COVER CONCRETE.

C7.
ALL REINFORCEMENT IS TO BE SUPPORTED ON CHAIRS OR HANGERS. FABRIC IS TO BE SUPPORTED AT 800mm CENTRES BOTH WAYS.

C8.
BAR LAPS, UNLESS NOTED OTHERWISE:

N12	500mm
N16	800mm
N20	1100mm
N24	1400mm
N28	1700mm
N32	2100mm
N36	2600mm

C9.
WHERE SLAB REINFORCING IS SHOWN ON THE DRAWINGS AS IN ONE DIRECTION ONLY, PROVIDE N12@400 IN THE OTHER DIRECTION.

C10.
ALL REINFORCEMENT IS TO BE FIXED IN POSITION AND INSPECTED BY THE ENGINEER BEFORE ANY CONCRETE IS PLACED.

C11.
ALL CONCRETE SHALL BE VIBRATED, EXCEPT SLABS ON GROUND, OF 125MM THICKNESS OR LESS.

C12.
SLURRY USED TO LUBRICATE CONCRETE PUMP LINES SHALL NOT BE PUMPED INTO ANY STRUCTURAL MEMBERS. WATER SHALL NOT BE ADDED TO PRE–MIXED CONCRETE ONCE IT HAS LEFT THE BATCHING PLANT.

C13.
CURE ALL EXPOSED CONCRETE SURFACES, WITHIN ONE HOUR OF FINAL TROWELING. WITH A CURING AGENT WHICH HAS A MINIMUM EFFICIENCY OF 80% WHEN MEASURED IN ACCORDANCE WITH AS 3799. CURE FORMED SURFACES BY LEAVING FORMWORK IN PLACE FOR AT LEAST 7 DAYS.

C14.
FORMWORK MAY BE STRIPPED AFTER 7 DAYS, BUT BEAM AND SLABS MUST REMAIN PROPPED FOR 21 DAYS AFTER CASTING.

STEELWORK NOTES

1. ALL CHS/RHS/SHS SHALL COMPLY WITH AS/NZS1163 (GR. 350MPa U.N.O.). ALL UB/UC/PFC SHALL COMPLY WITH AS/NZS 3679.1 (GR.300MPa U.N.O.). OTHER STEEL COMPONENTS GRADE 250MPa, U.N.O. STEEL PLATE TO AS/NZS 3678. FLAT BAR AND ROUND BAR TO AS/NZS 3679.1

2. FABRICATE AND ERECT STRUCTURAL STEELWORK IN ACCORDANCE WITH AS/NZS5131, CONSTRUCTION CATEGORY 2, ARCHITECTURALLY EXPOSED STRUCTURAL STEELWORK CATEGORY 2. EXCEPT WHERE SPECIFIED ON THESE DRAWINGS, COMPLIANCE WITH THE CODE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

3. CLOSED SECTIONS SHALL BE ADEQUATELY VENTED FOR GALVANISING, WHERE APPLICABLE.

4. ALL CONNECTING BOLTS SHALL BE GRADE 8.8/S (AS/NZS 1252), U.N.O. HOLD DOWN GRADE 4.6 BOLTS TO AS1111.1, STANDARD NUTS CLASS 5 TO AS1112.1, THIN NUTS CLASS 5 TO AS1112.4 AND WASHERS FOR CLASS 4.6 BOLTS TO AS1237

5. ALL BOLTS AND NUTS TO BE HOT DIP GALVANISED TO AS1214

6. JOIN ALL SECTIONS WITH GENERAL PURPOSE 6mm CONTINUOUS FILLET WELD (E48XX/W50X ELECTRODES), U.N.O. ALL WELDING TO AS/NZS1554.1 WELDING CONSUMABLES TO BE IN ACCORDANCE WITH AS/NZS4855.

7. STEELWORKS CORROSION PROTECTION HOT DIP GALVANISED. PRIOR TO GALVANISING ALL WELD SPLATTER AND WELDING SLAG IS TO BE REMOVED. MEMBERS TO BE BRANDED WITH SUITABLE TYPE NUMBER AFTER FABRICATION.

TIMBER NOTES:–

1. ALL TIMBER SHALL BE NATURAL DURABILITY CLASS OF HEARTWOOD (OUTSIDE ABOVE GROUND) CLASS 1 OR 2 TO AS5604.

2. SAPWOOD SHALL BE PROTECTIVE TREATED TO CLASS H3.

3. TIMBER WITH TREATED SAPWOOD CUT OR DRILLED ON SITE SHALL BE LIBERALLY COATED WITH A CONCENTRATED SOLUTION OF NAPTHENATE PENTACHLOROPHENAL OR APPROVED EQUIVALENT.

4. TIMBER DECKING AND HANDRAILS SHALL BE SPOTTED GUM, TALLOWWOOD OR IRONBARK. THEY SHALL BE STRUCTURAL GRADE 1 OR 2 TO AS2082, AND THE TOP FACE SHALL BE FREE OF UNSOUND KNOTS, TERMITE GALLERIES OR BARK.

5. SLIP RESISTANCE OF DECKING SURFACE TO COMPLY WITH AS/NZS3661.2.

6. DECKING SHALL BE LAID WITH CUPPED FACE DOWN.

7. TIMBER JOISTS TO BE UNSEASONED HARDWOOD (F17) IN ACCORDANCE WITH AS/NZS1748.

B

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A	REVISED FOR REVISED FLOOD LOADING	27/09/18
–	Original Issue	28/06/18

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LITHGOW CITY COUNCIL
PROPOSED BRIDGES

STANDARD NOTES

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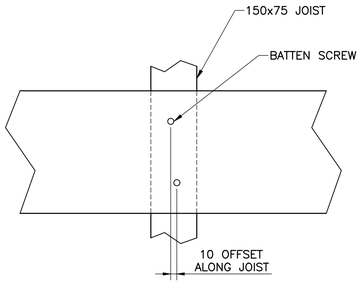

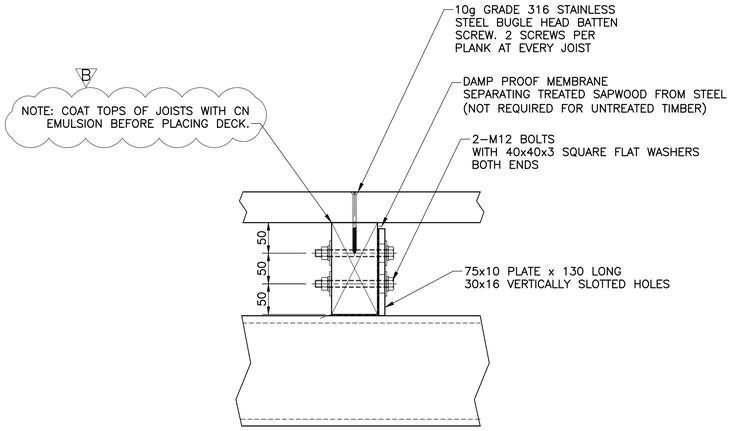

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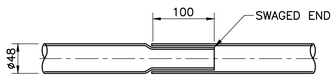

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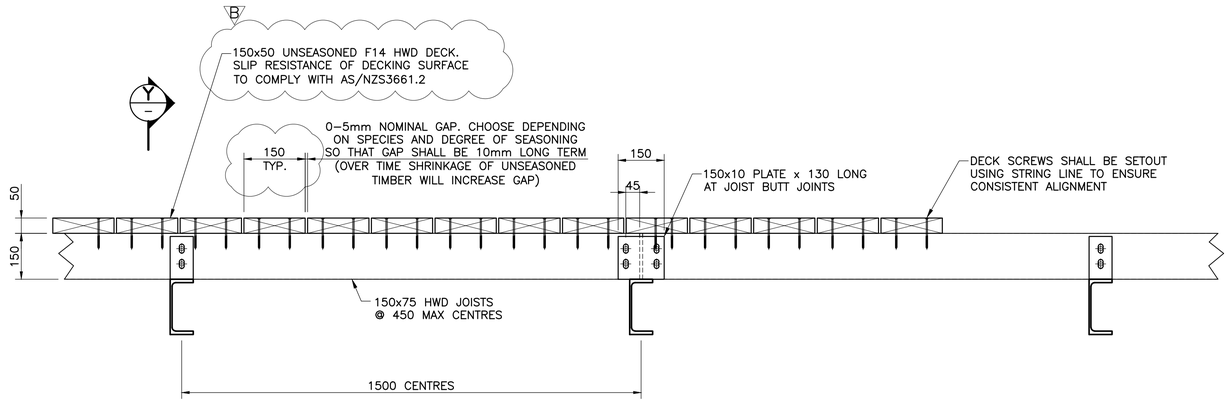

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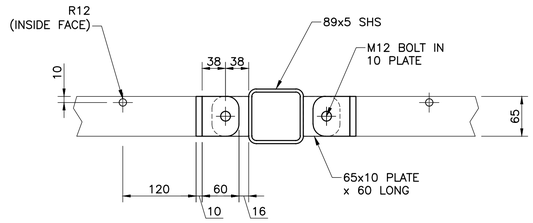

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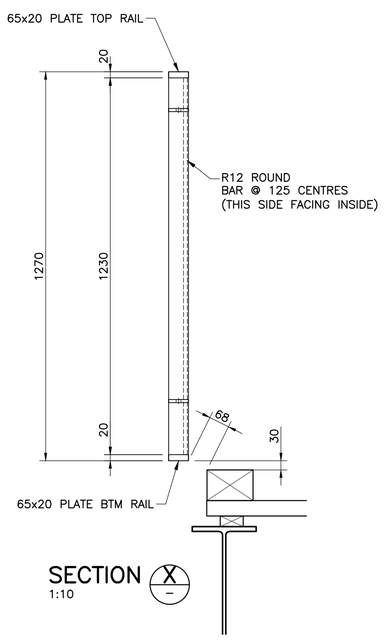

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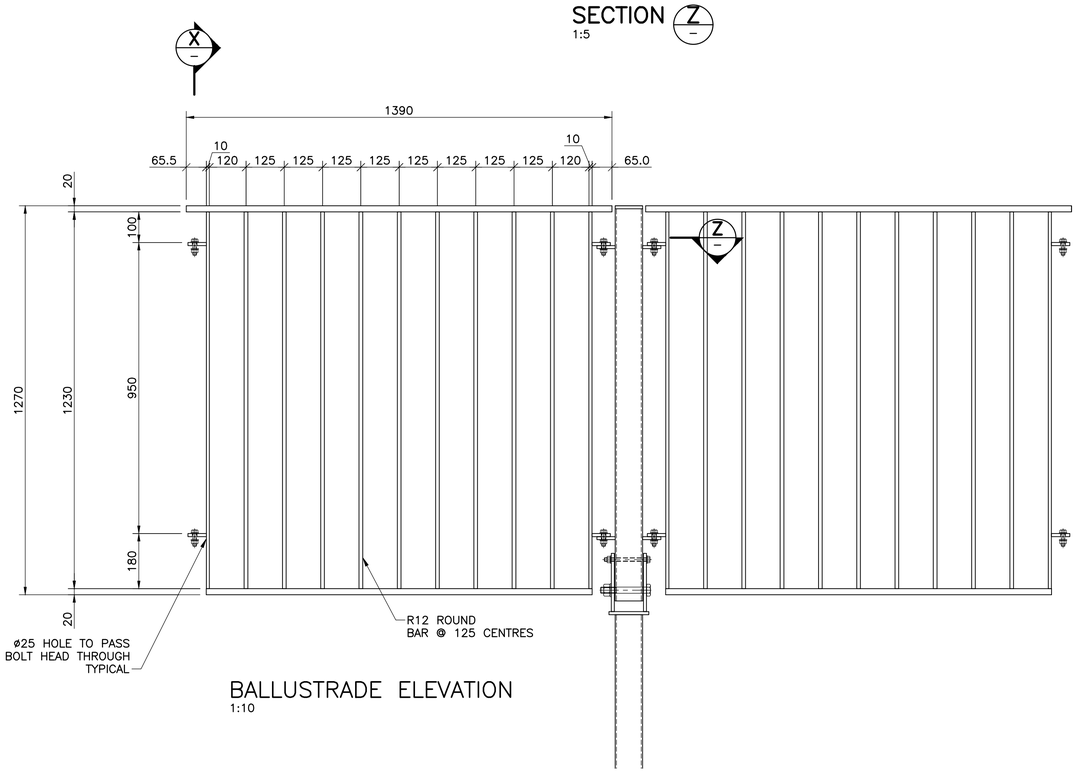

BALLUSTRADE ELEVATION
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PROPOSED BRIDGES

TYPICAL SECTIONS AND DETAILS

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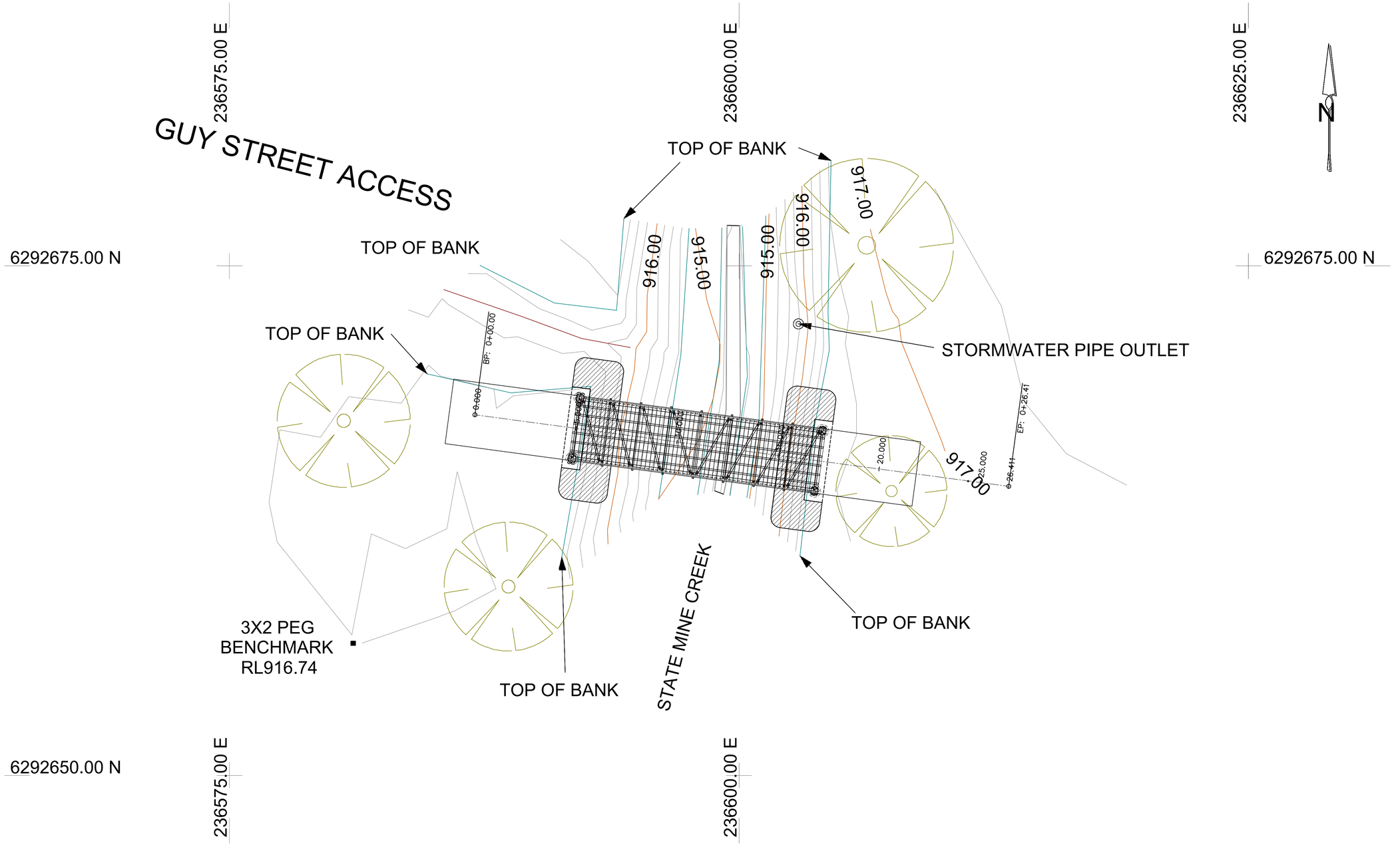

SITE PLAN
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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
STATE MINE CREEK

SITE PLAN AND NOTES

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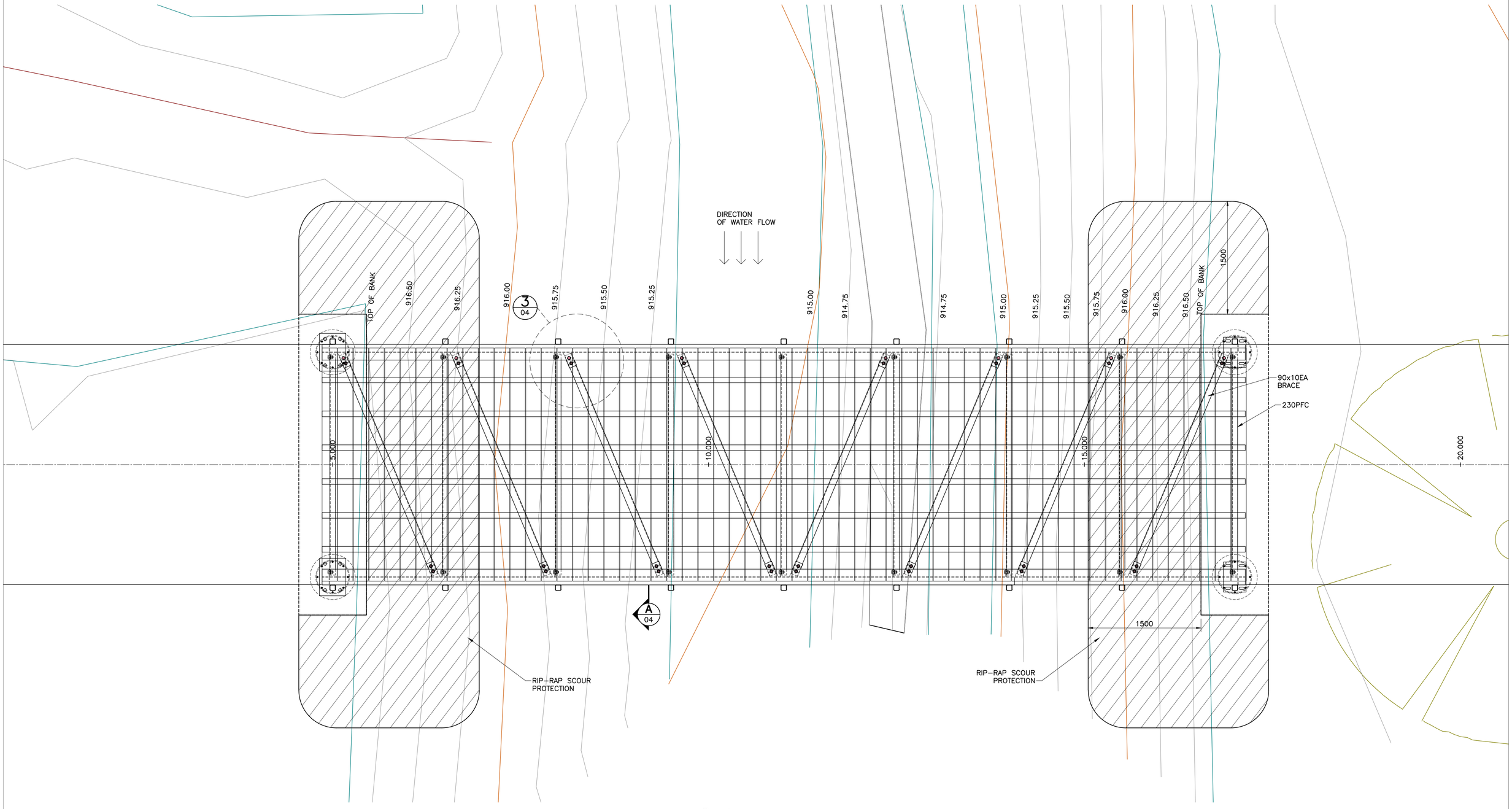

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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
STATE MINE CREEK

PLAN

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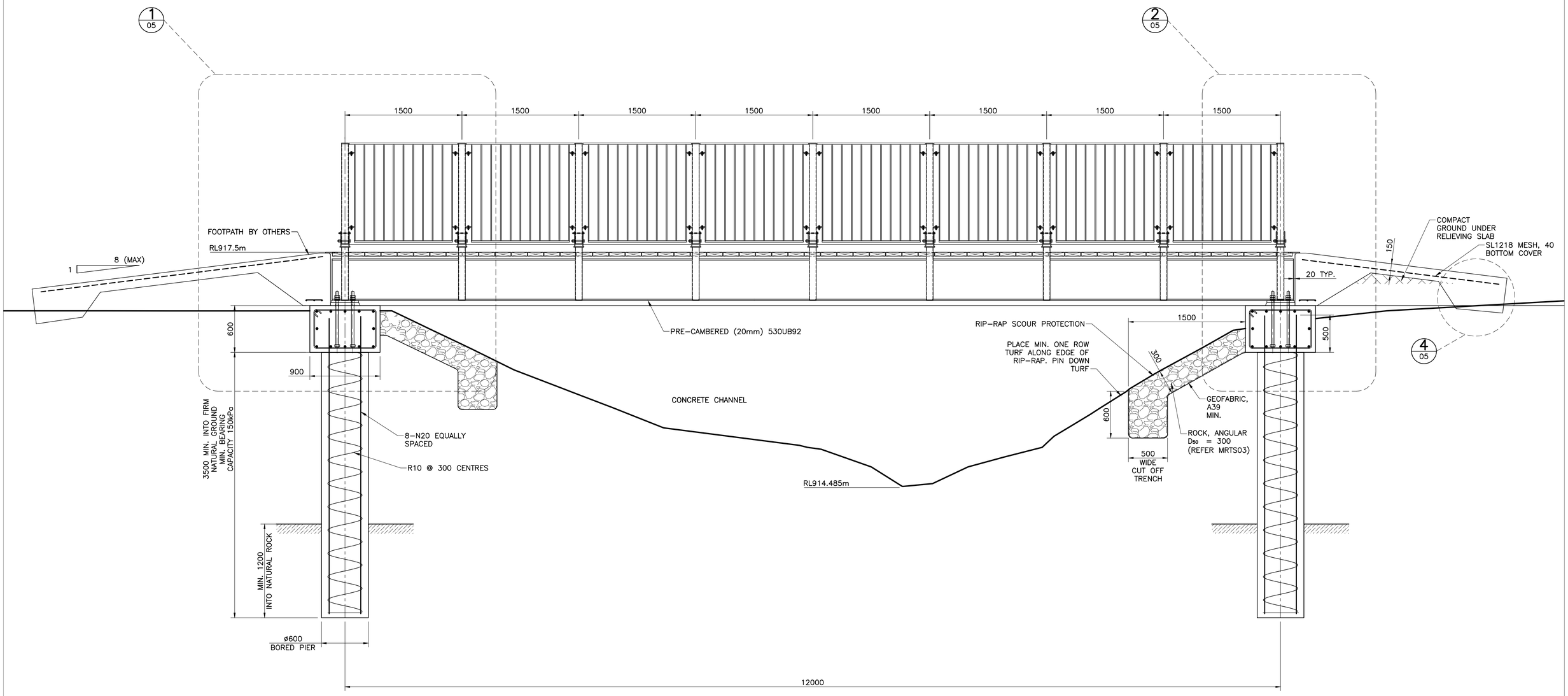
BR18-0402/S02/A



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LITHGOW CITY COUNCIL
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STATE MINE CREEK

PLAN AND ELEVATION

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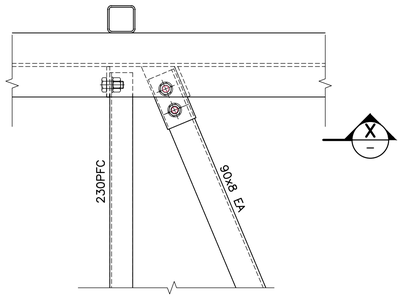

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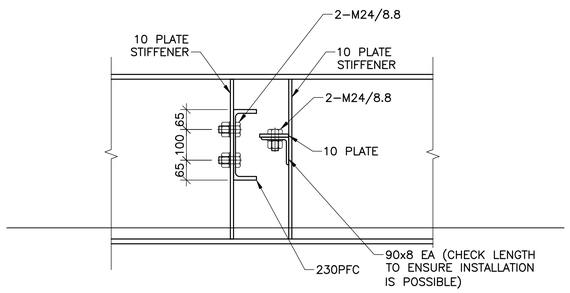

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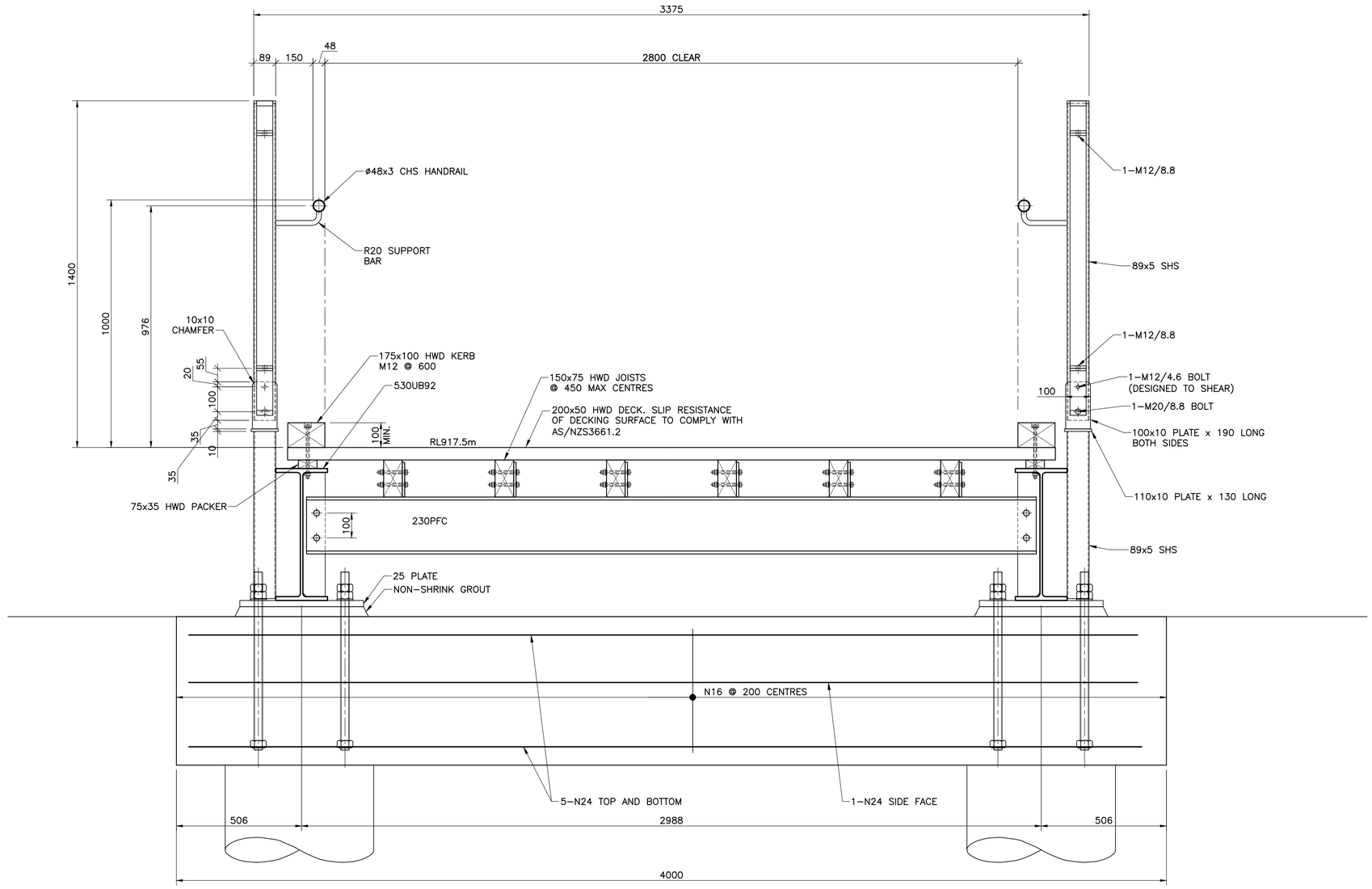

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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
STATE MINE CREEK

SECTIONS AND DETAILS

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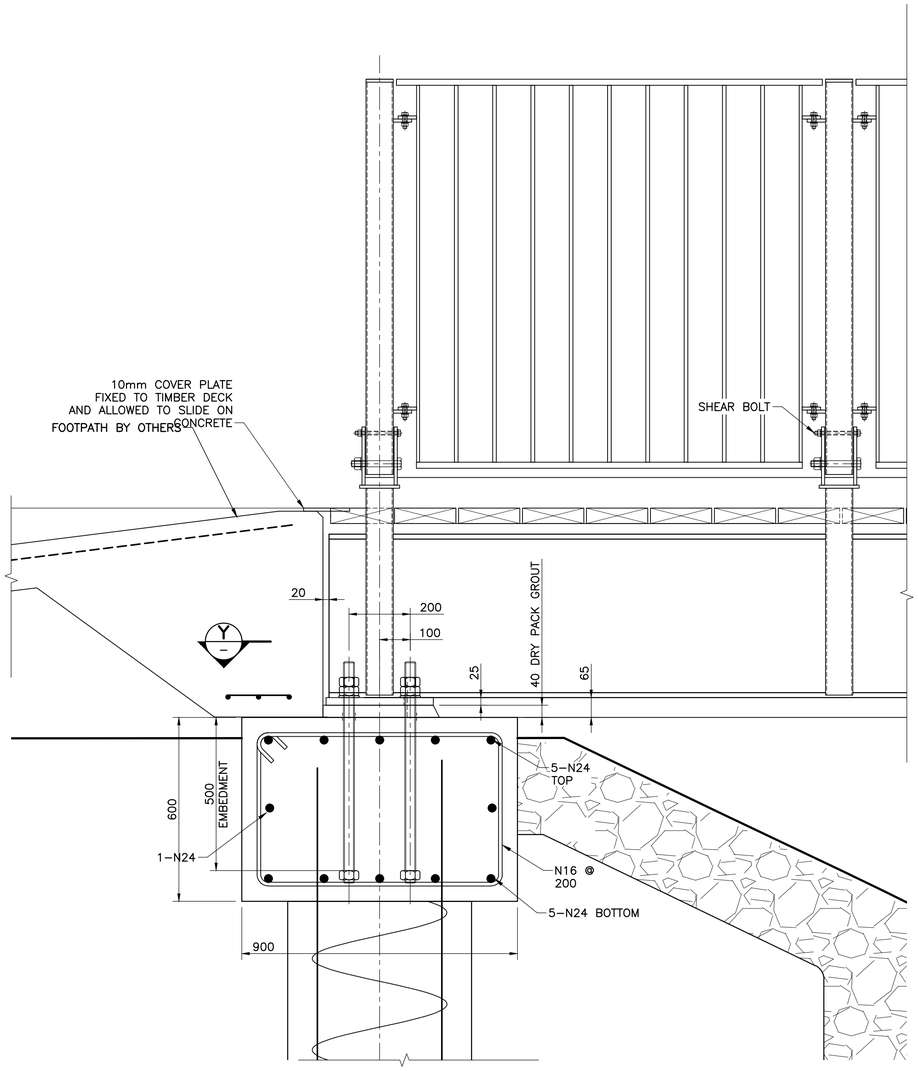

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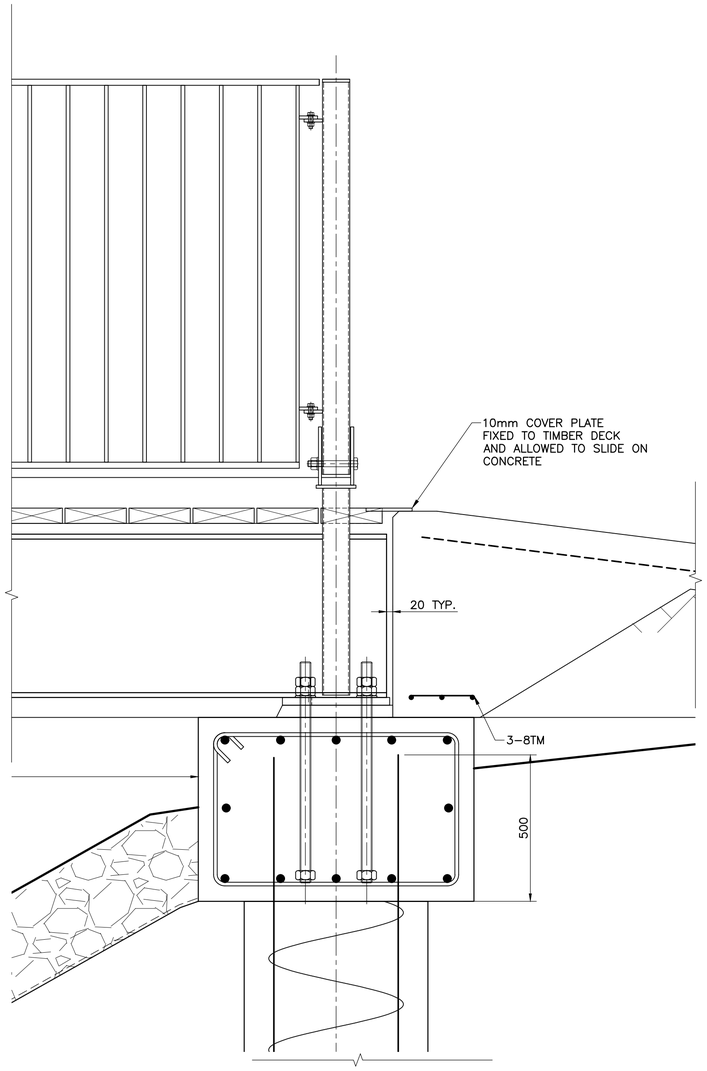

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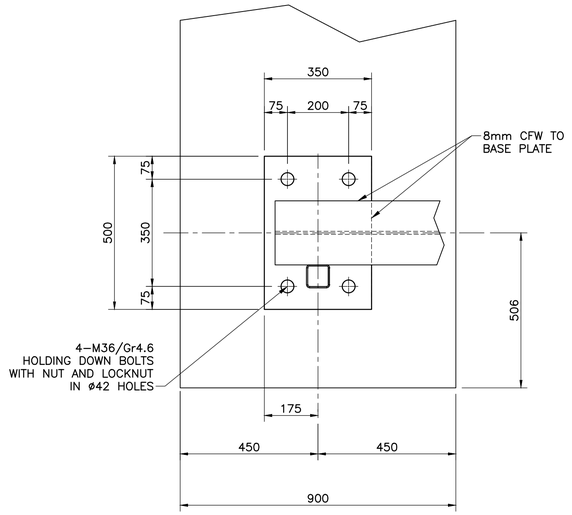
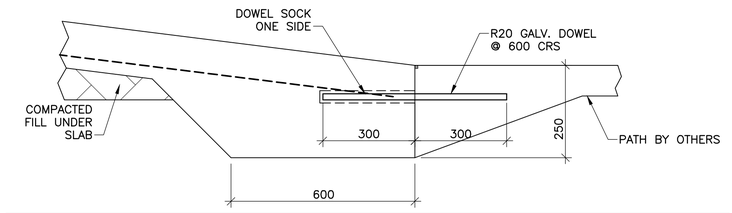


SECTION Y/–
1:10



DETAIL 4/02
1:10

1:10 0 100 200 300 400mm

Sheet size: A1
A1 scale: As Shown
A3 scale: HALF

NOTES :-
1. Builder to verify all information & dimensions on site prior to commencement of construction
2. DO NOT SCALE DRAWINGS
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LITHGOW CITY COUNCIL
PROPOSED BRIDGE
STATE MINE CREEK

SECTIONS AND DETAILS

Drawn: M.Allen | Approved: P Brown
Designed: A.Miller | Checked: P. Brown
Sheet: 18of18
BR18–0402/S05/A

LOCALITY PLAN
1:2500

1:2500 0 25 50 75 100m

Sheet size: A1	
A1 scale: As Shown	
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–	Original Issue	28/06/18

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LITHGOW CITY COUNCIL
PROPOSED BRIDGES

LOCALITY PLAN

Drawn: M.Allen	Approved: P. Brown
Designed: A.Miller	Checked: P. Brown
Sheet: 1of18	BR18–0402/01/A

ANNEXURE C

Photo taken looking upstream from the western bank of Farmers Creek