

NSW Education
GPO Box 33
CITY NSW 2001

Job No. FS539

Attn: Mr Matthew Arnett

10 June 2022

Re: Wee Waa High School – Updated RtS Flood Impact Assessment

Dear Sir,

As requested, we have updated the flood impact assessment that is documented in our Flooding Technical Working Paper (Lyall & Associates, 2021) to reflect the following changes that formed part of NSW Education's Response to Submissions and which could potentially impact flood behaviour:

- Updated detailed ground survey of the site and also the existing engineered channel which runs from Boundary Street to the Namoi River.
- Shifting of the High Flow Conveyance / Flood Storage Area where it extended partially into the road reserve of Charles Street such that it is now contained wholly within the site.
- Modifications to finished ground levels internal to the site associated with both the proposal and flood mitigation works (**FMW**).
- Modifications to the invert levels and pit/headwall locations associated with the enclosed reaches of the FMW.
- Minor modifications to finished surface levels associated with the engineered channel that runs from Boundary Street to the Namoi River.
- Update of the fencing strategy associated with both the proposal and FMW.

The figures attached to this letter present the results of the updated flood modelling, noting that they are identical in layout to the figures which formed part of Lyall & Associates, 2021. In regards the information shown on Figure 6.27, it assumes a complete blockage of the 2.1 m high security type fencing and a partial blockage of the 1.2 m high pool type fencing given the latter's reduced likelihood of catching debris.¹

In regards the definition of flood behaviour under pre-proposal and FMW conditions, there are minor differences in the extent and depth of inundation for the full range of assessed flood events due to minor differences in natural surface levels between the available grounds surveys, and also the LiDAR survey data.

¹ While the 2.1 m high security type fencing would typically comprises larger diameter vertical bars which extend close to the ground, the 1.2 m high pool type fencing would comprise thinner vertical bars which will only extend to within 100 mm of the ground, thereby reducing its susceptibility to becoming blocked by debris.

While the impact that both the proposal and FMW would have on flood behaviour is generally consistent with the assessment that is set out in Lyall & Associates, 2021, it is noted that the recent modifications have resulted in slightly greater increases in peak 1% AEP flood levels at the eastern end of the site and in the adjacent road reserves of George Street and Mitchell Street.

Due to the modifications that have been made to the fencing strategy for the proposal and FMW, the updated flood impact assessment shows that increases in peak 1% AEP flood levels would occur in existing residential development should the 2.1 m high security type fencing experience a complete blockage during a flood event. Based on this finding, it is recommended that measures be incorporated in the design of the 2.1 m high security type fencing to reduce the likelihood that it would experience a blockage during a flood event. This could include the provision of a minimum 100 mm gap to finished ground levels so as to facilitate the free discharge of shallow overland flow.

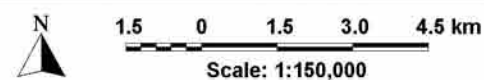
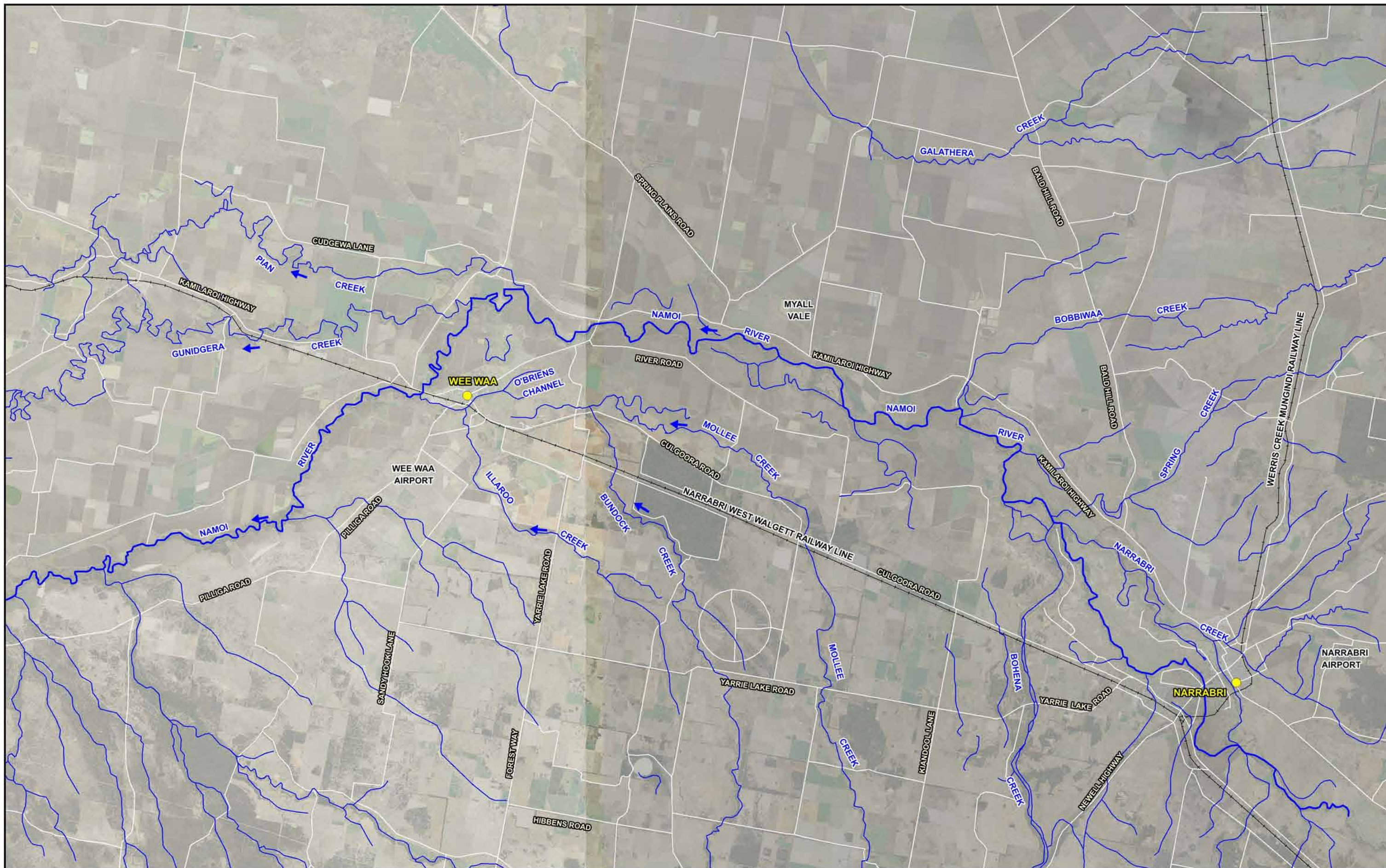
We trust that the additional information that is set out in this letter will assist both Narrabri Shire Council and the Department of Planning and Environment in their ongoing assessment of the proposal and FMW. However, please do not hesitate to contact the undersigned should you require any additional information.

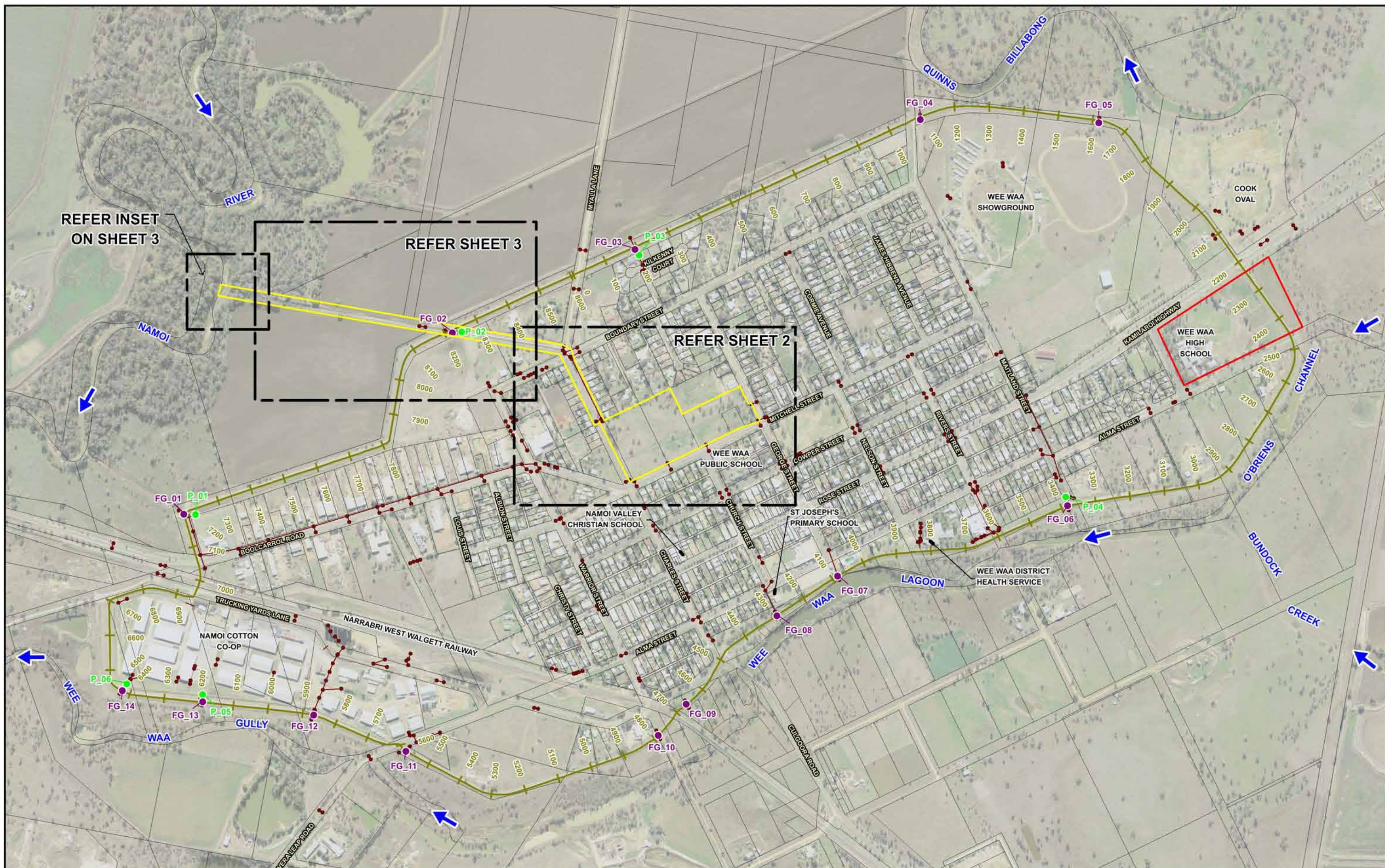
Yours faithfully

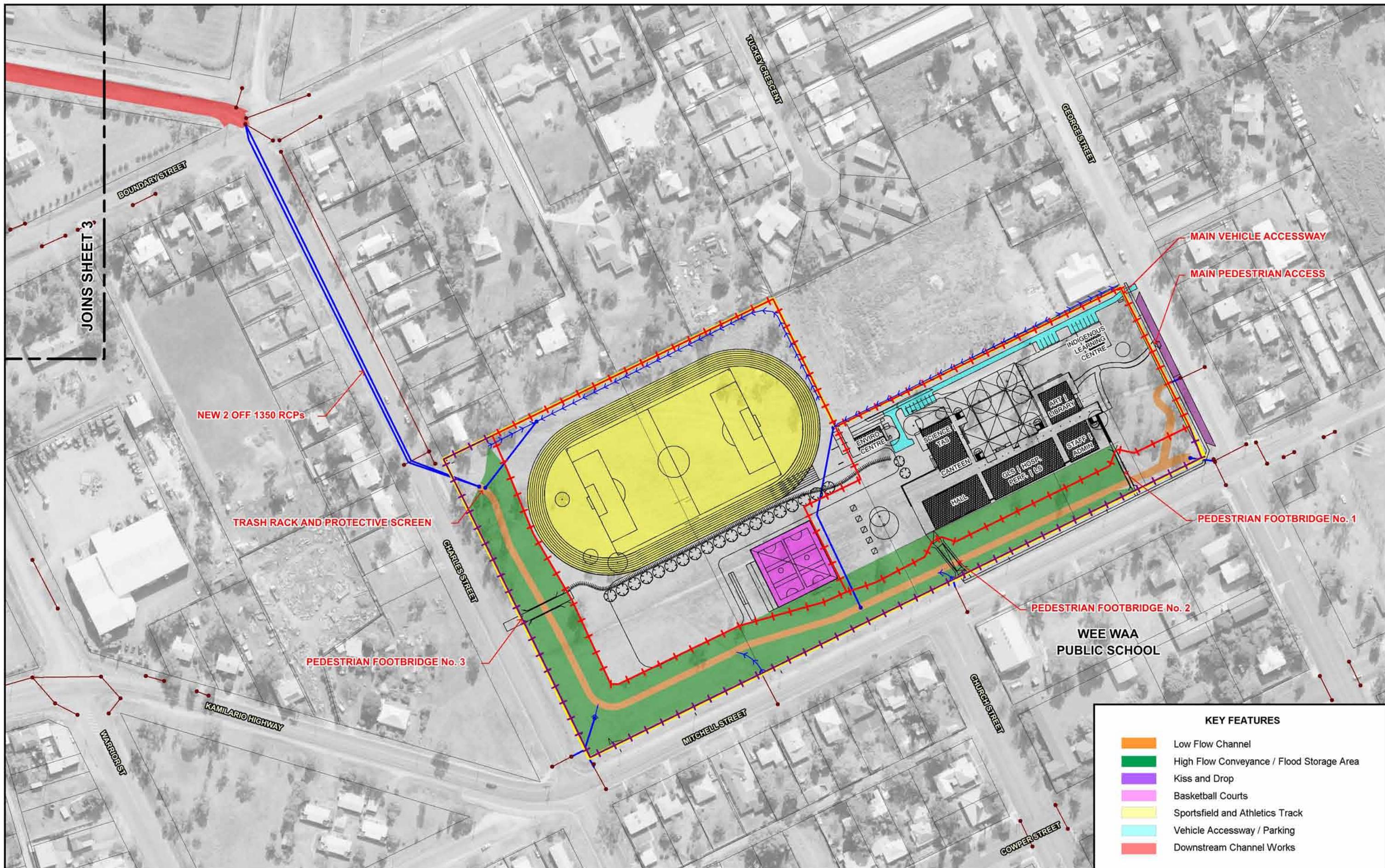
Lyall & Associates Consulting Water Engineers

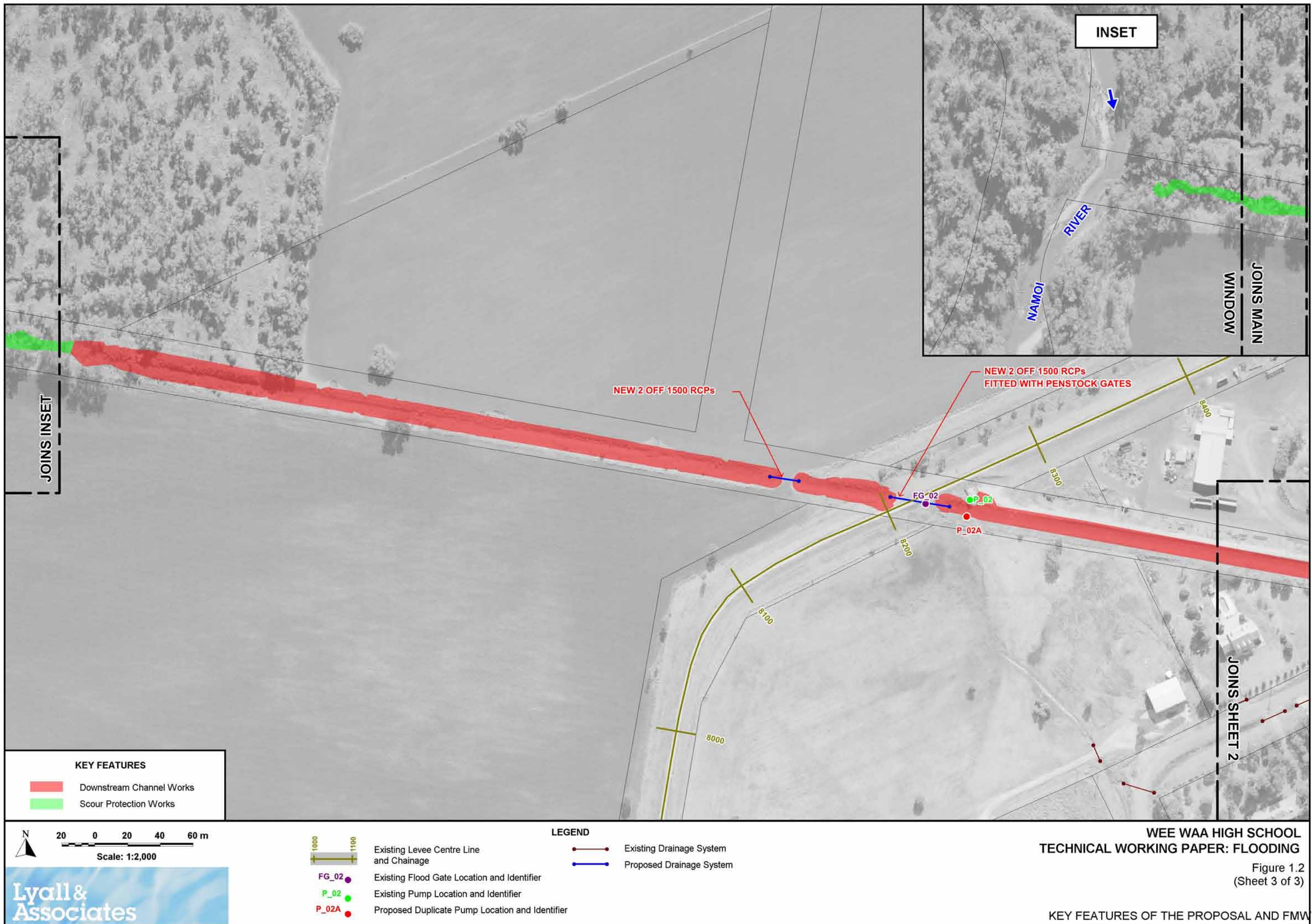


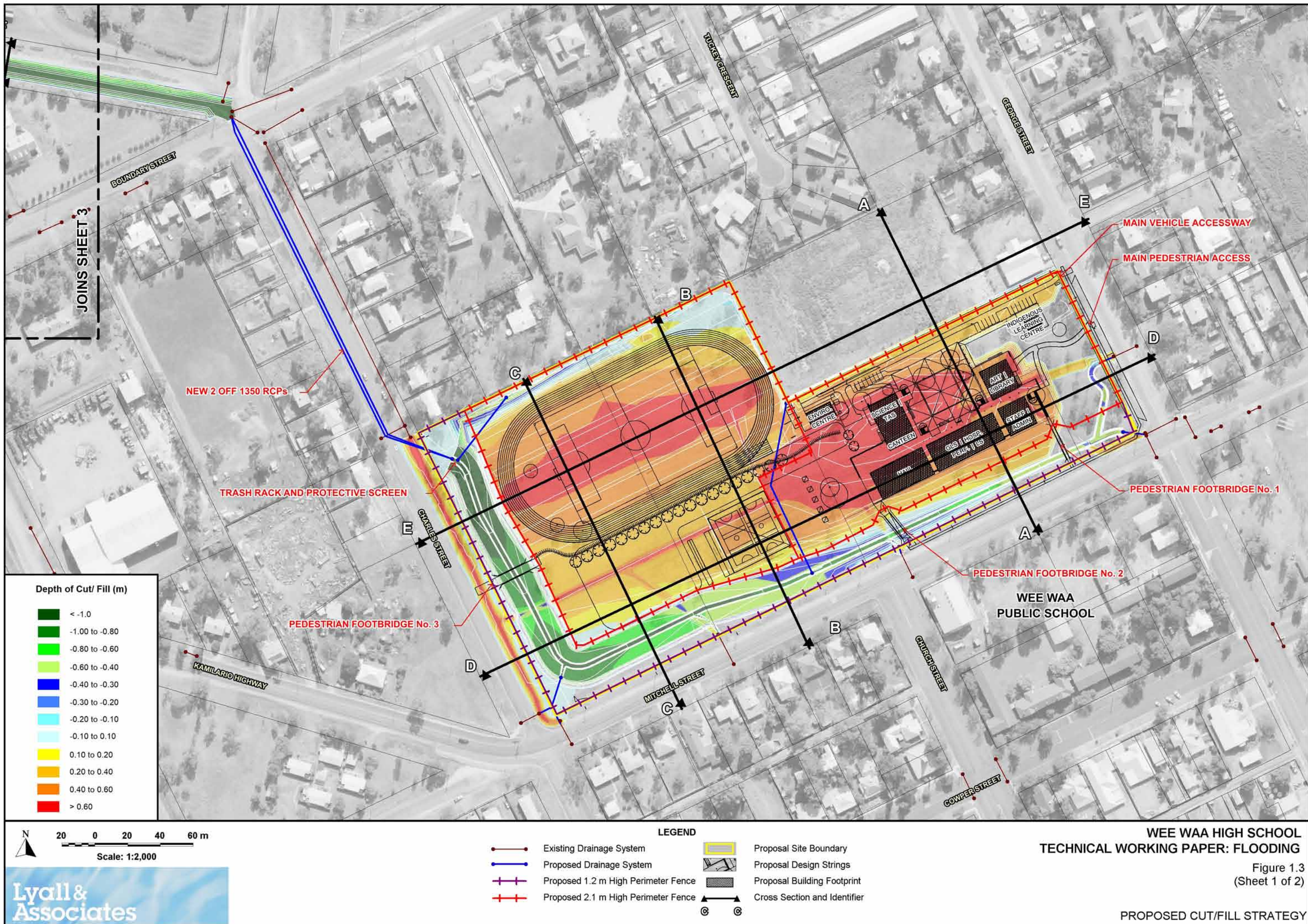
Scott Button
Principal





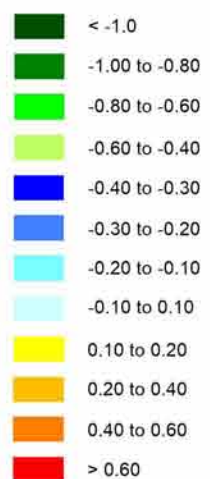








Depth of Cut/ Fill (m)



20 0 20 40 60 m
Scale: 1:2,000

Lyall &
Associates



FG_02
P_02
P_02A

Existing Levee Centre Line
and Chainage

Existing Flood Gate Location and Identifier

Existing Pump Location and Identifier

Proposed Duplicate Pump Location and Identifier

LEGEND



Existing Drainage System

Proposed Drainage System

Proposed Drainage System



Cross Section and Identifier

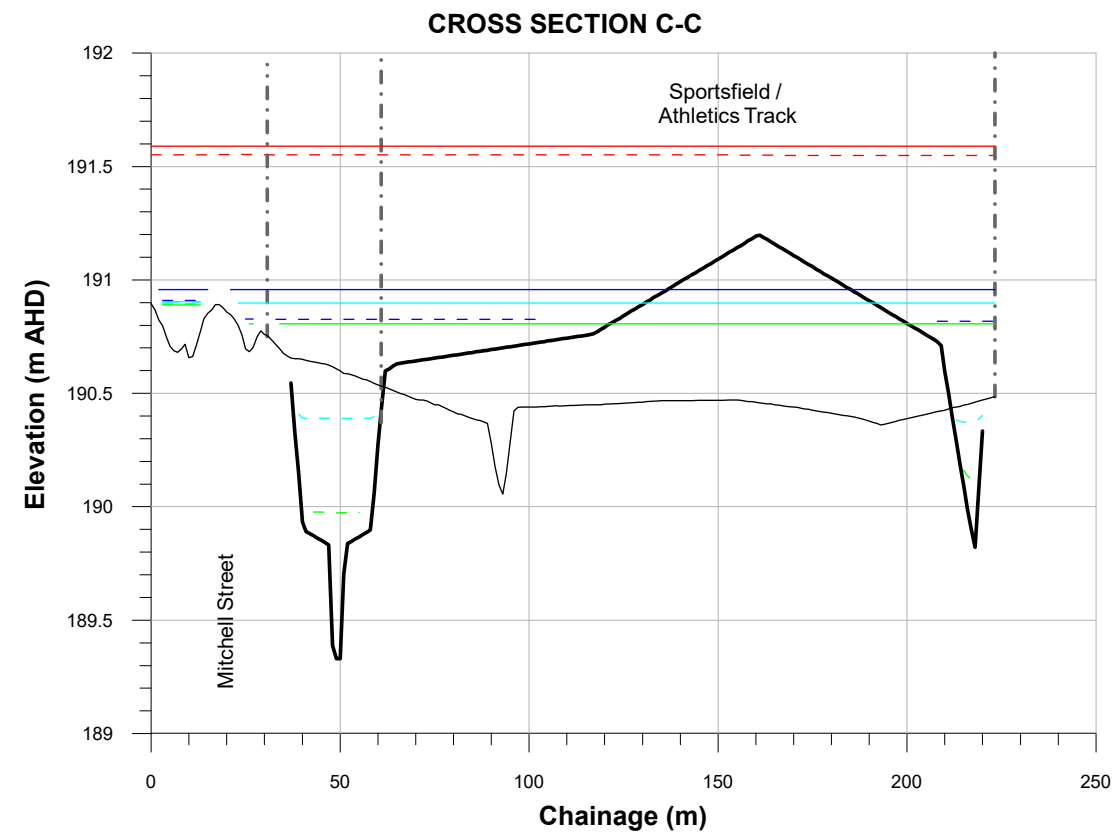
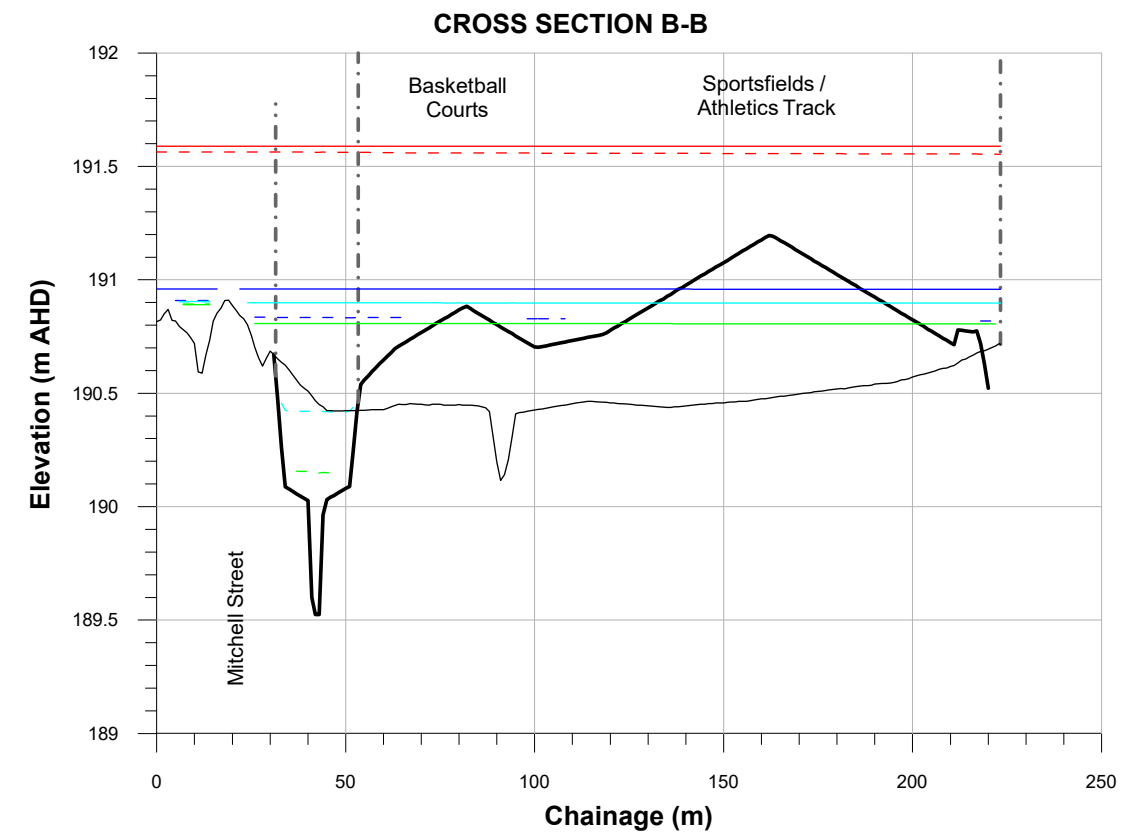
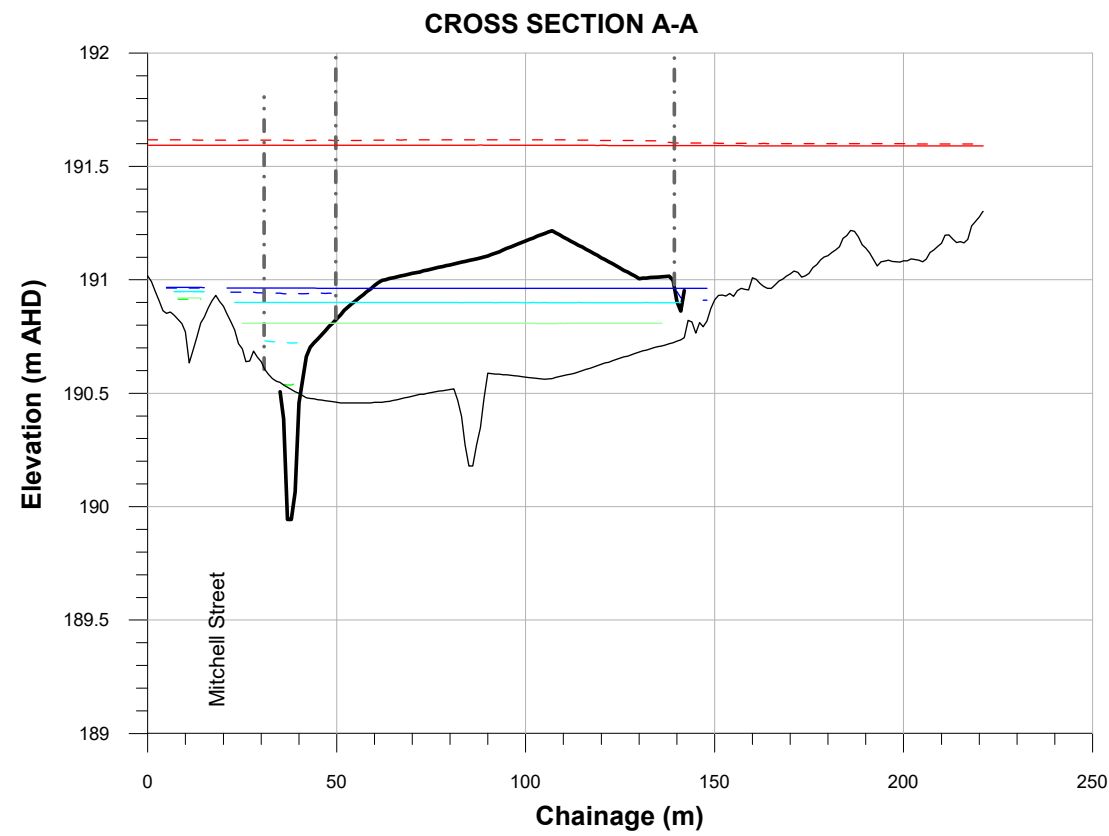
Cross Section and Identifier

Cross Section and Identifier

WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING

Figure 1.3
(Sheet 2 of 2)

PROPOSED CUT/FILL STRATEGY



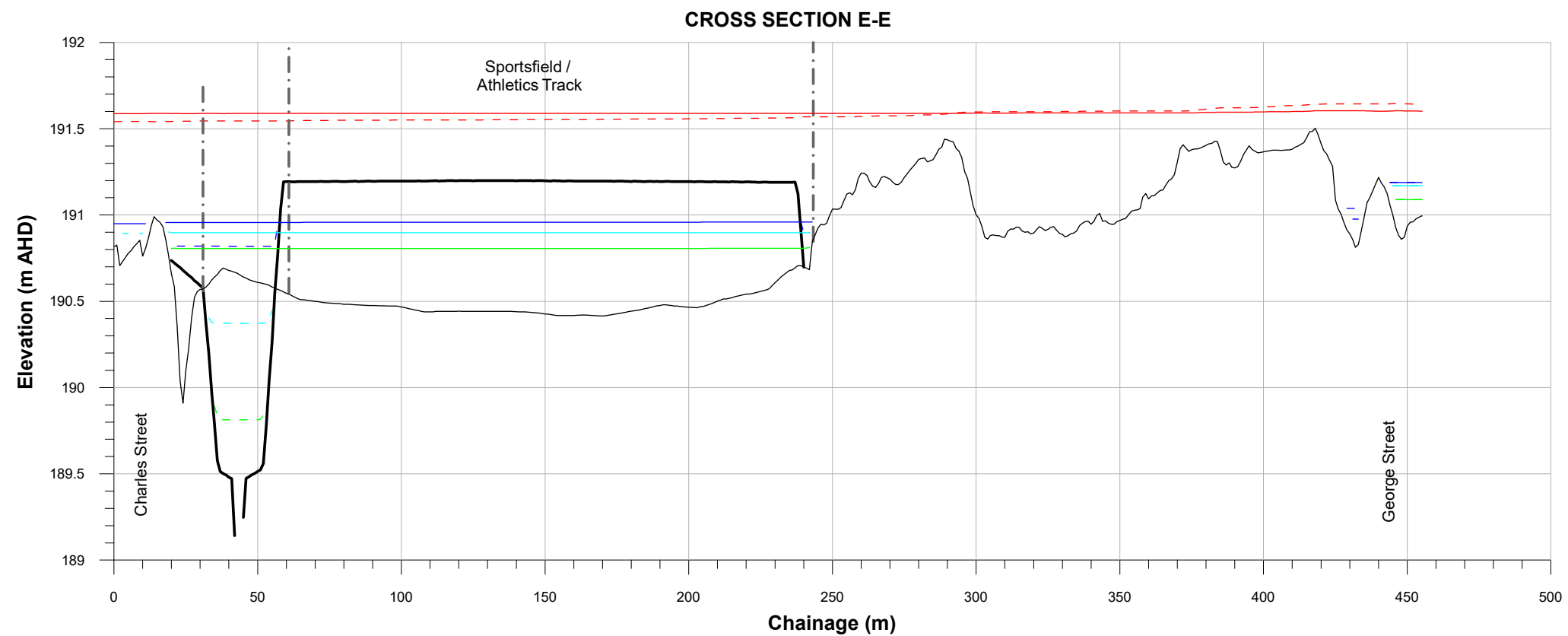
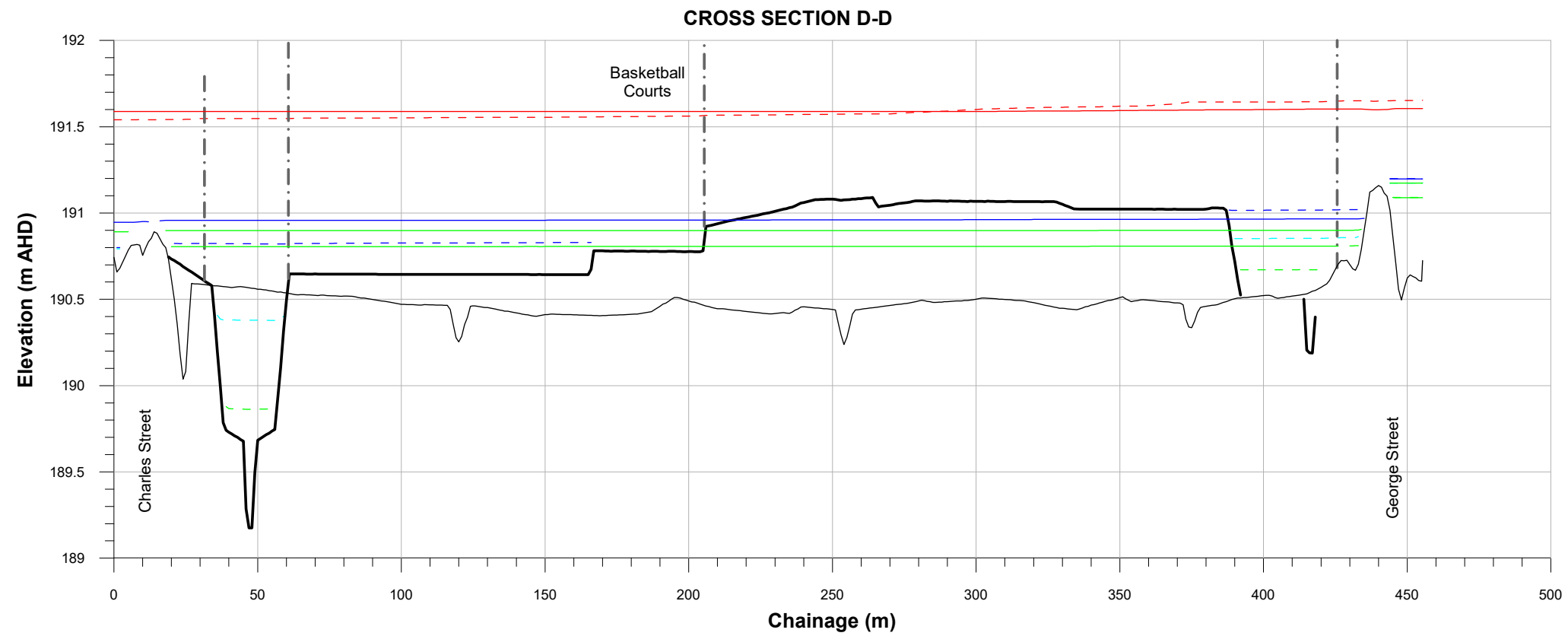
LEGEND

Pre-Proposal and FMW Conditions	Post-Proposal and FMW Conditions
Alignment of Proposed Perimeter Fence	PMF
Finished Surface	1% AEP
Existing Surface	5% AEP
	20% AEP

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Figure 1.4
(Sheet 1 of 3)

CROSS SECTIONS SHOWING EXISTING AND FINISHED SURFACE LEVELS
IN VICINITY OF THE PROPOSAL AND FMW



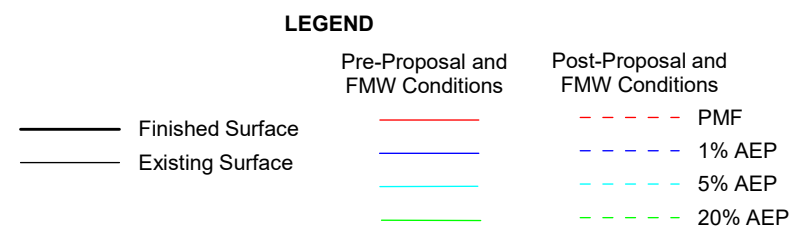
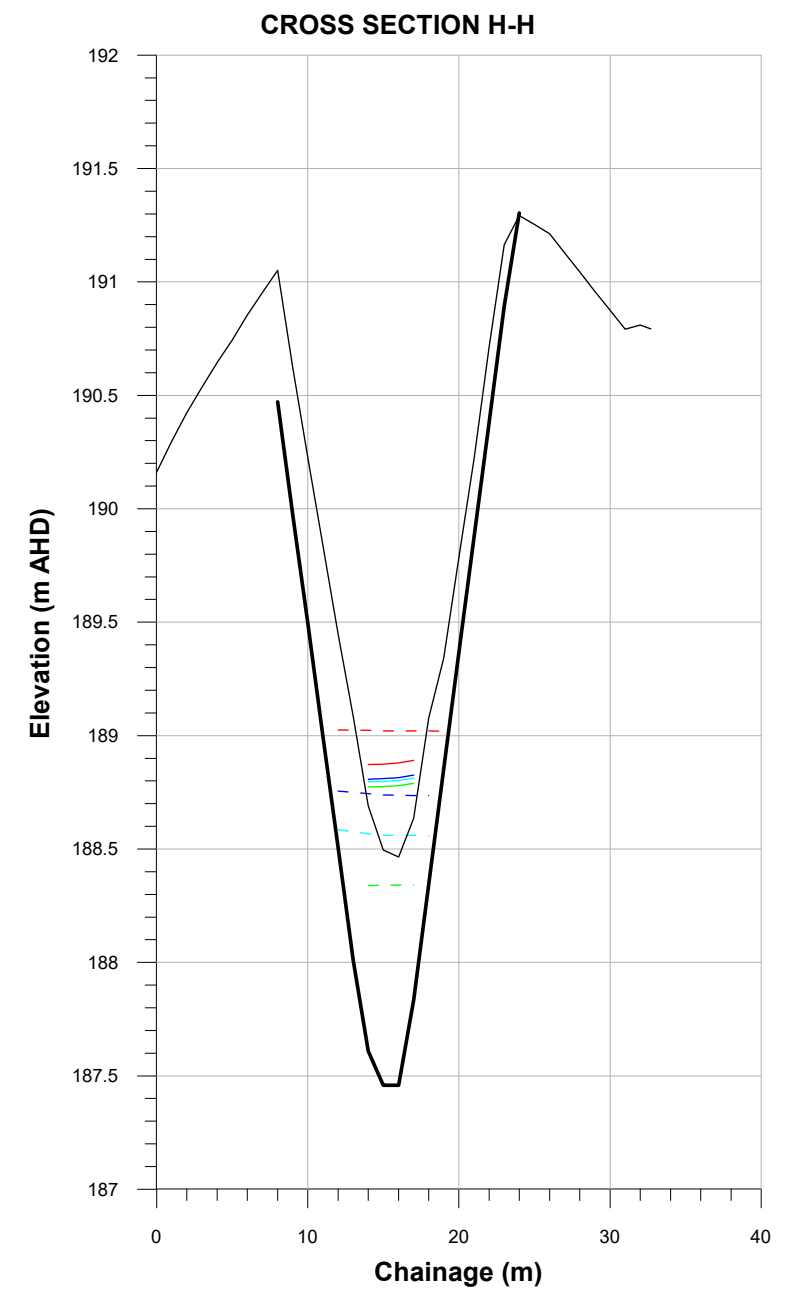
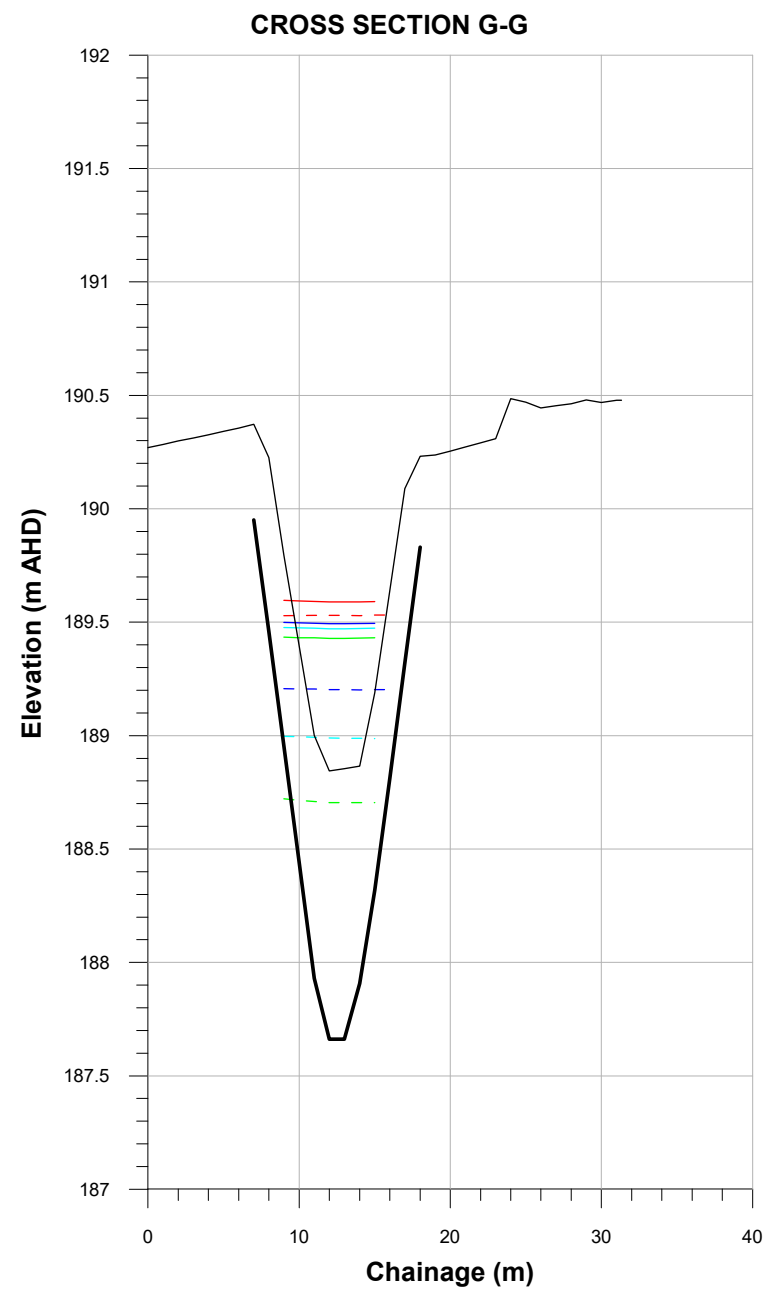
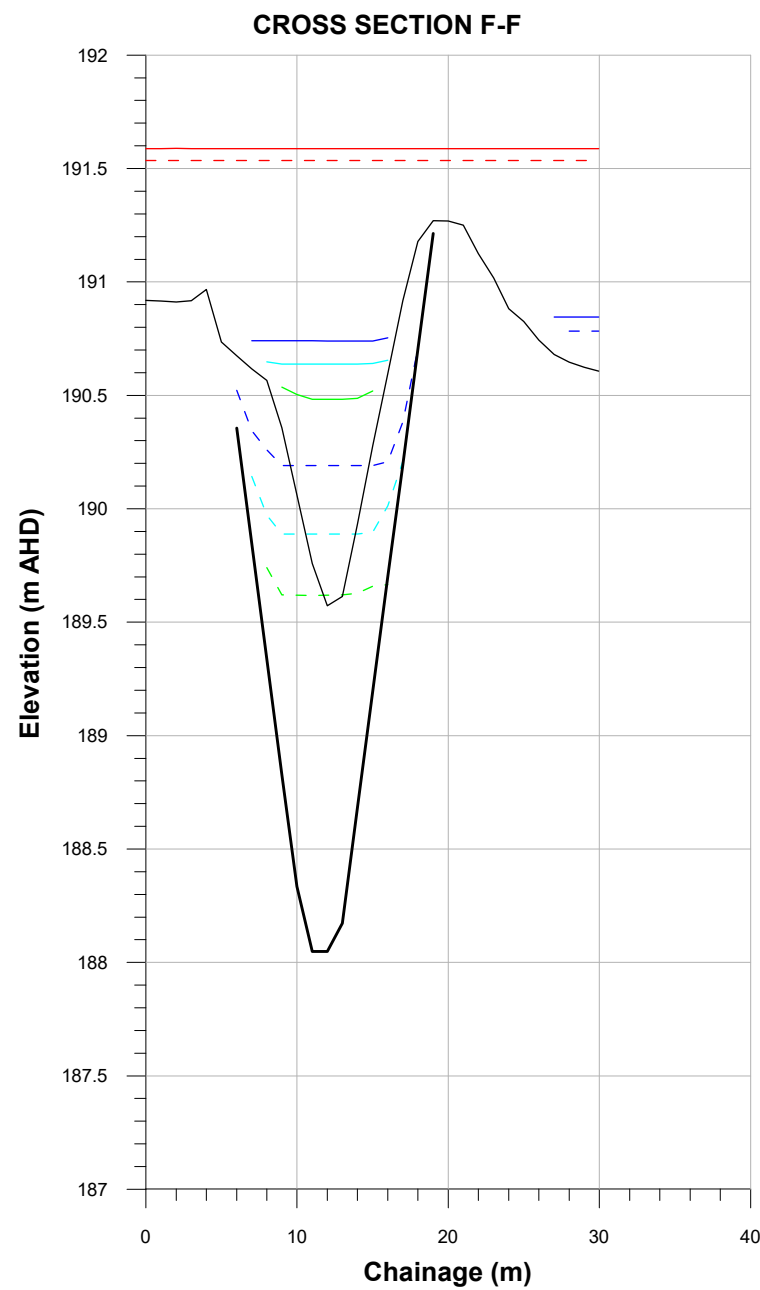
LEGEND

Pre-Proposal and FMW Conditions	Post-Proposal and FMW Conditions
--- Alignment of Proposed Perimeter Fence	--- PMF
--- Finished Surface	--- 1% AEP
--- Existing Surface	--- 5% AEP
	--- 20% AEP

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Figure 1.4
(Sheet 2 of 3)

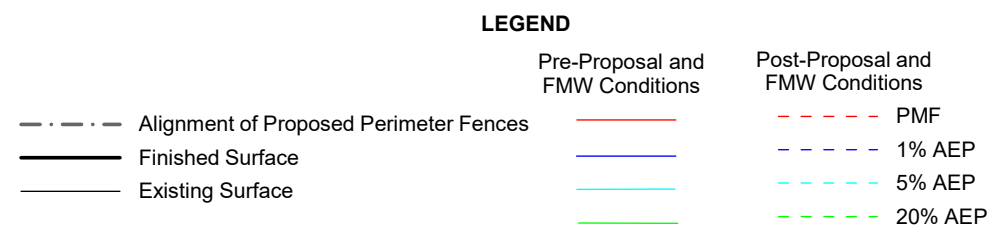
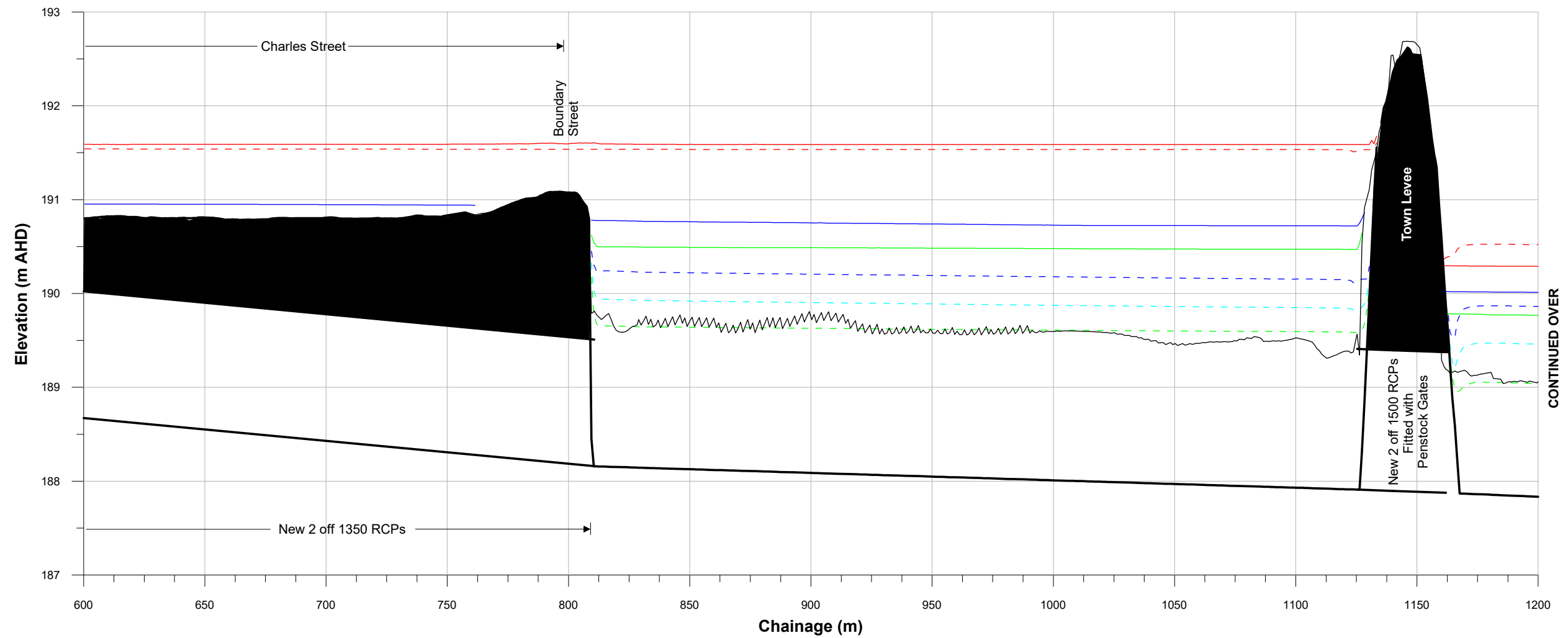
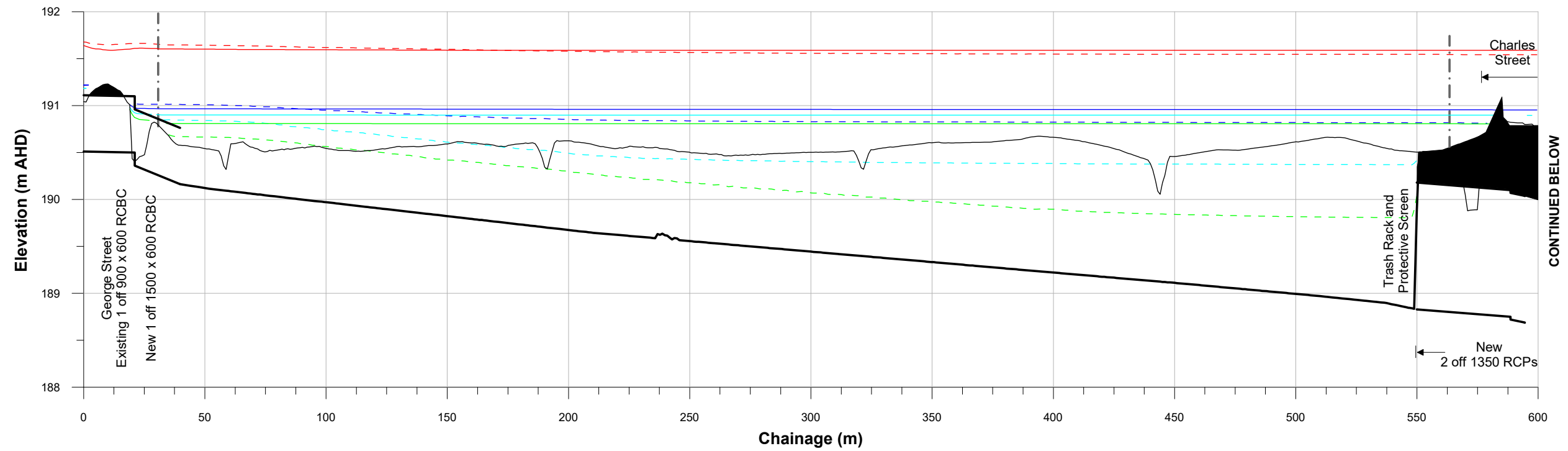
CROSS SECTIONS SHOWING EXISTING AND FINISHED SURFACE LEVELS
IN VICINITY OF THE PROPOSAL AND FMW



WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 1.4
(Sheet 3 of 3)

CROSS SECTIONS SHOWING EXISTING AND FINISHED SURFACE LEVELS
IN VICINITY OF THE PROPOSAL AND FMW

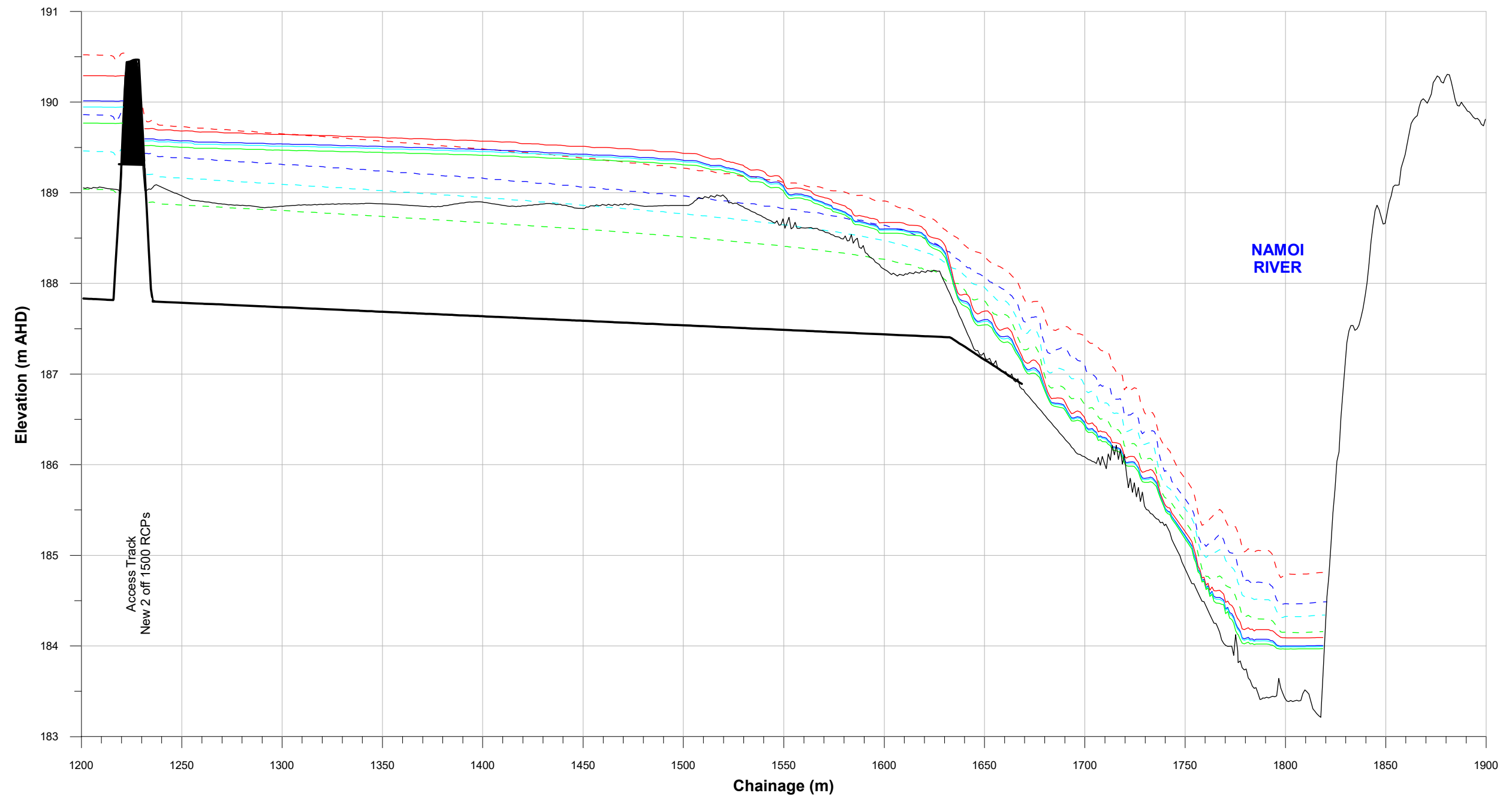


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TECHNICAL WORKING PAPER: FLOODING**

Figure 1.5
(Sheet 1 of 2)

LONGITUDINAL SECTION ALONG LINE OF ENGINEERED CHANNEL
GEORGE STREET TO NAMOI RIVER





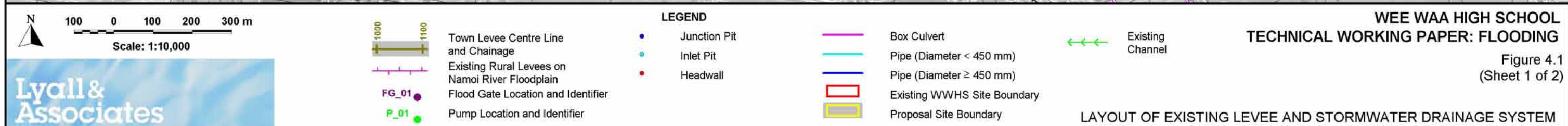
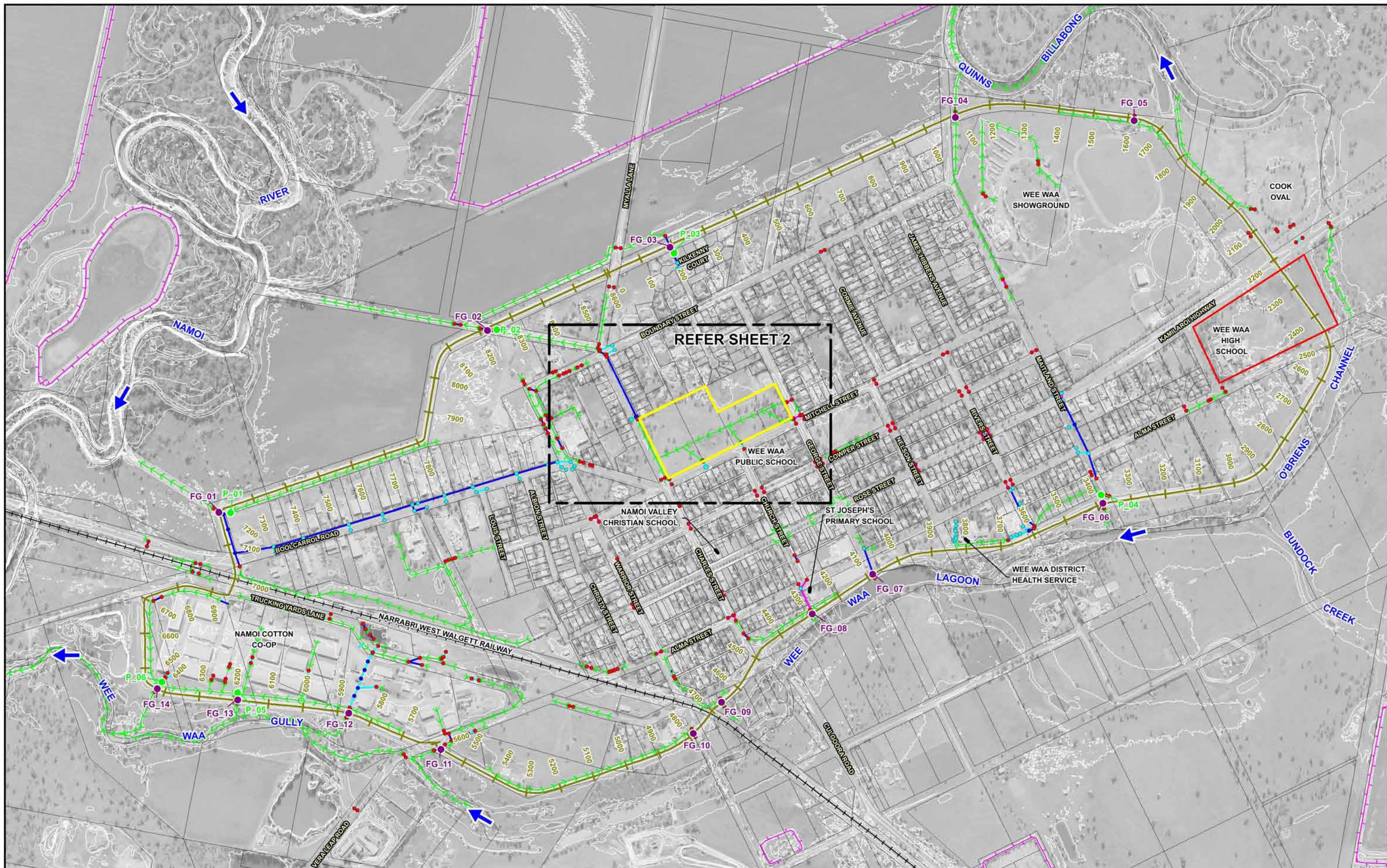
LEGEND

Pre-Proposal and FMW Conditions		Post-Proposal and FMW Conditions	
	Finished Surface		PMF
	Existing Surface		1% AEP
			5% AEP
			20% AEP

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Figure 1.5
(Sheet 2 of 2)

LONGITUDINAL SECTION ALONG LINE OF ENGINEERED CHANNEL
GEORGE STREE TO NAMOI RIVER





N

20 0 20 40 60 m

Scale: 1:2,000

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LEGEND

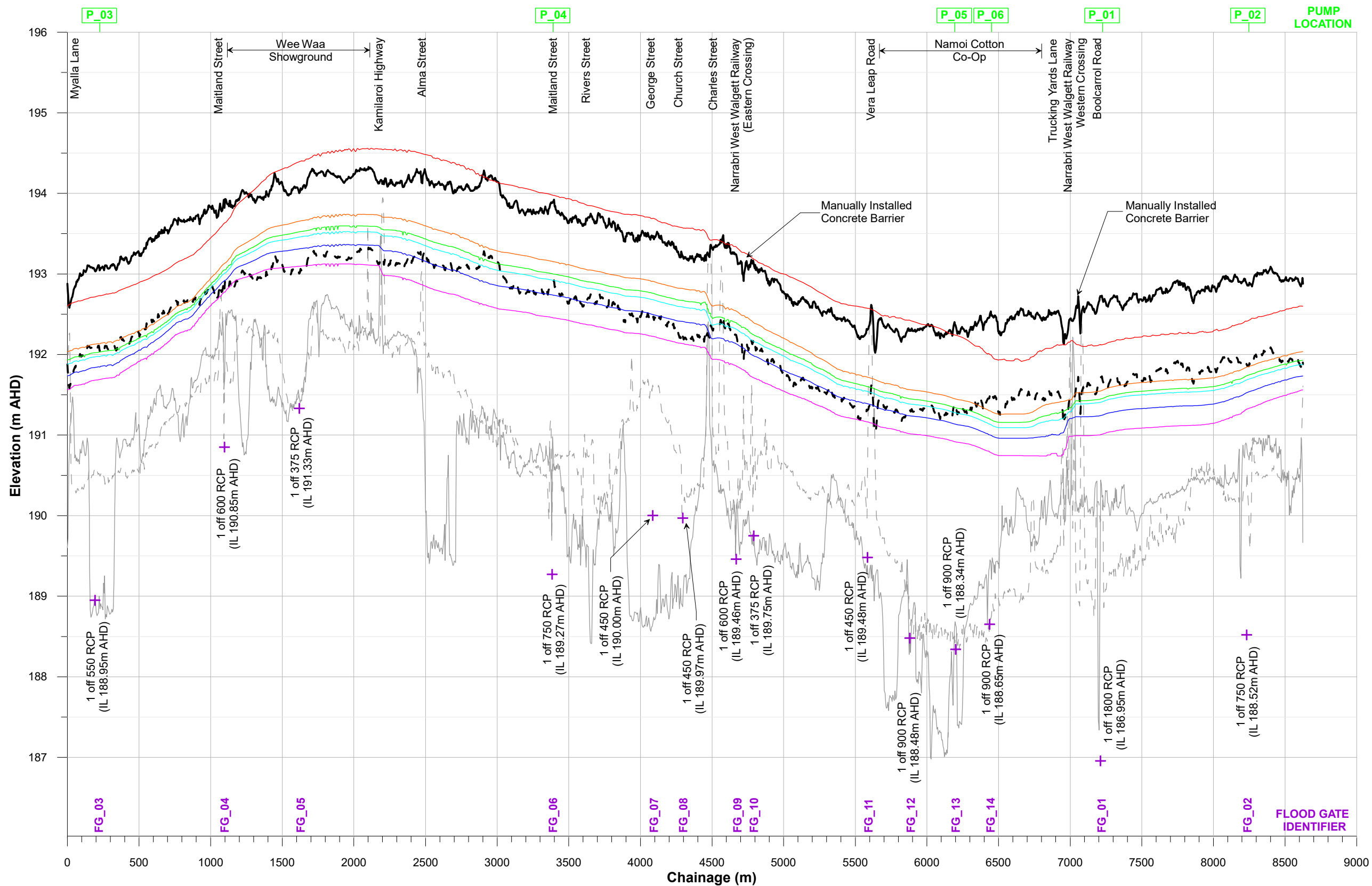
• Junction Pit	2 off 375 RCPs	1 off 300 x 225 RCBC	Existing Channel
• Inlet Pit	1 off 450 RCP	1 off 450 x 225 RCBC	Proposal Site Boundary
• Headwall	3 off 450 RCPs	1 off 500 x 225 RCBC	1 off 900 x 600 RCBC
1 off 330 RCP	2 off 600 RCPs	1 off 600 x 250 RCBC	2 off 330 RCPs
1 off 375 RCP	2 off 750 RCPs	1 off 900 x 300 RCBC	

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Figure 4.1
(Sheet 2 of 2)

LAYOUT OF EXISTING LEVEE AND STORMWATER DRAINAGE SYSTEM



WATER SURFACE PROFILES

- Extreme Flood
- 0.2% AEP
- 0.5% AEP
- 1% AEP
- 2% AEP
- 5% AEP

GROUND PROFILES

- Crest of Existing Town Levee
- Imminent Failure Flood Level
- Toe of Levee (River Side)
- Toe of Levee (Town Side)
- Invert of Pipe

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Figure 4.2

LONGITUDINAL SECTION ALONG CREST OF EXISTING TOWN LEVEE

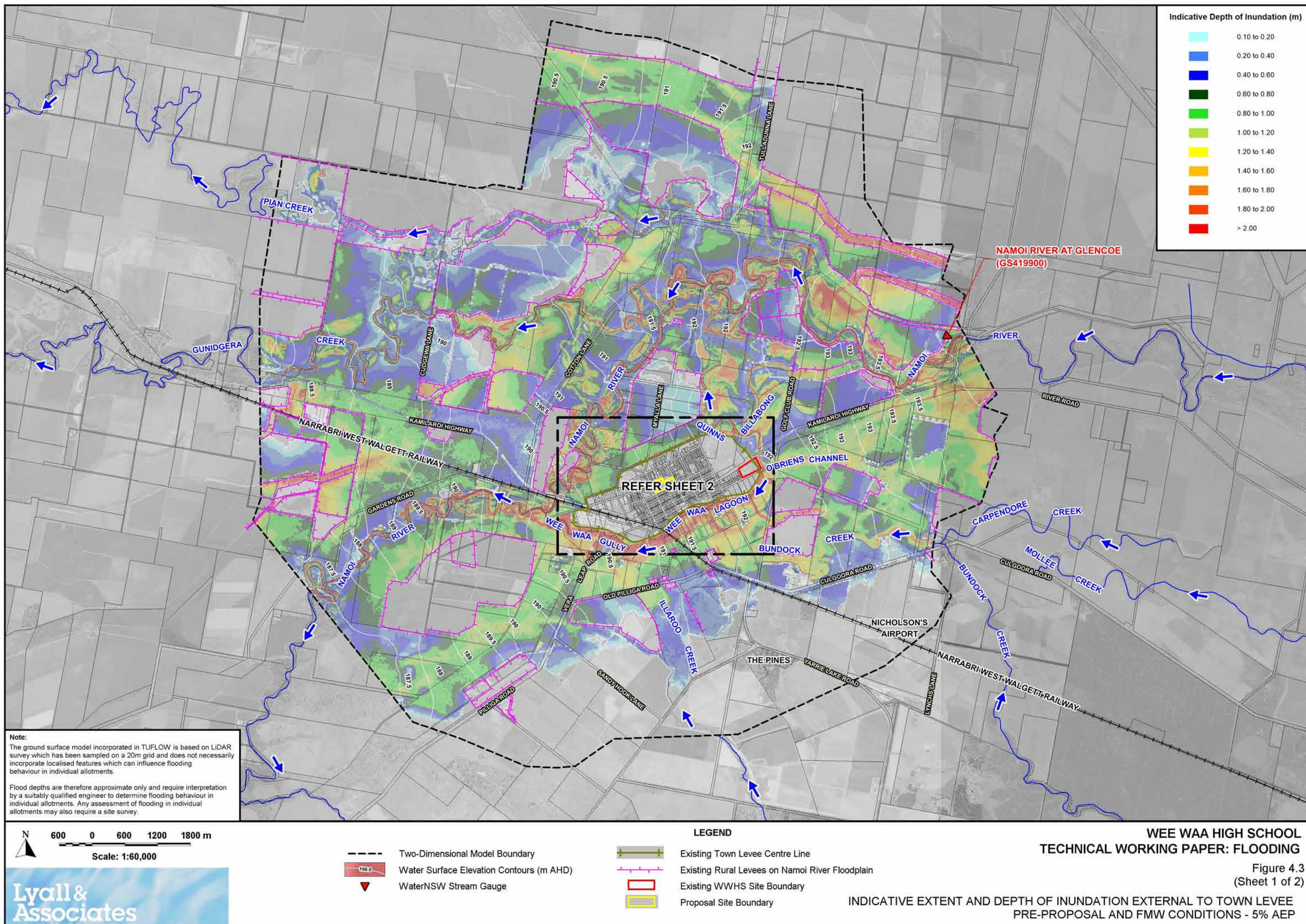
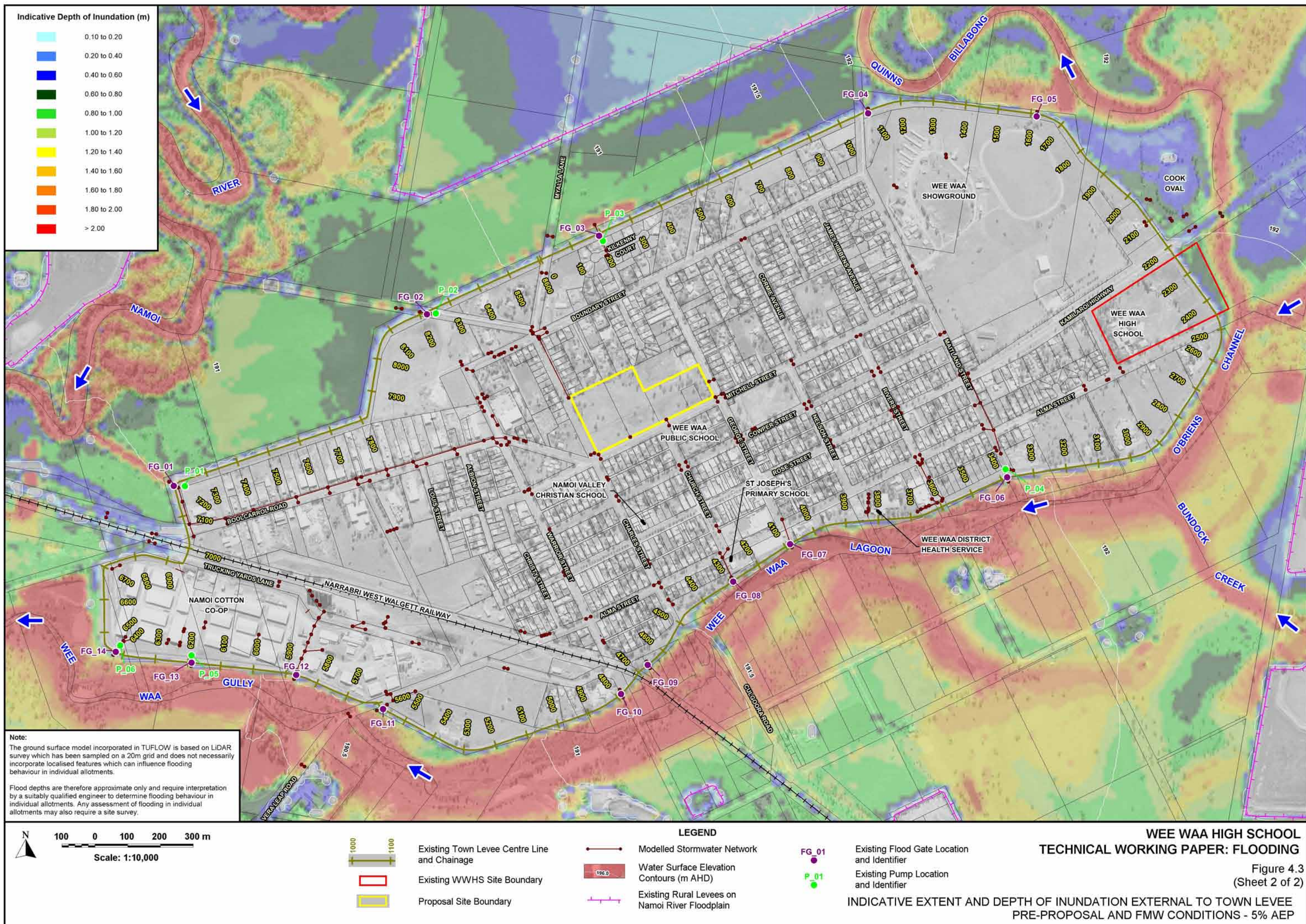
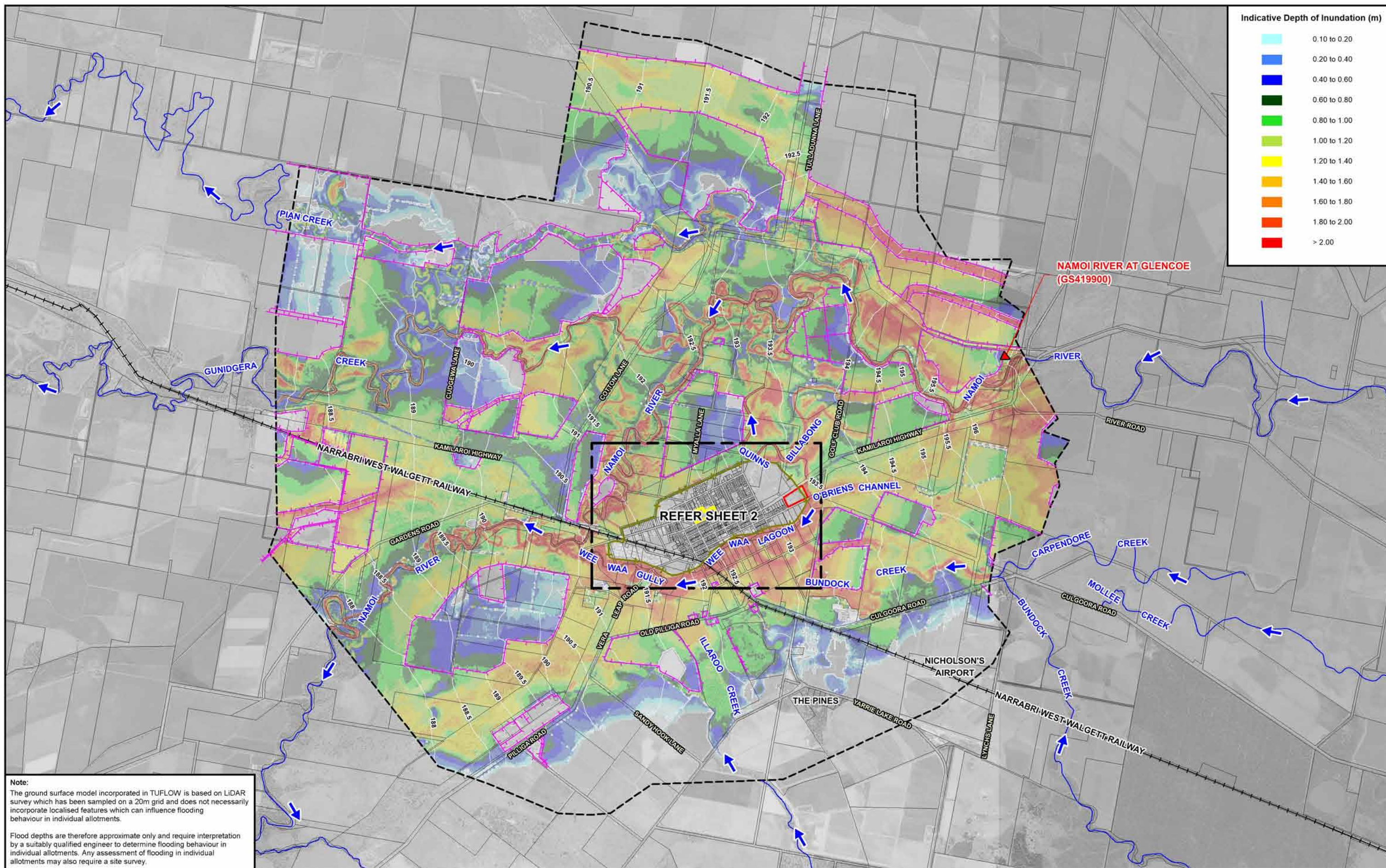


Figure 4.3
(Sheet 1 of 2)

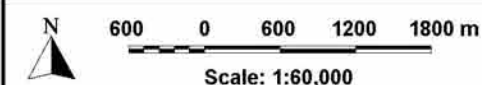




Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 20m 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.



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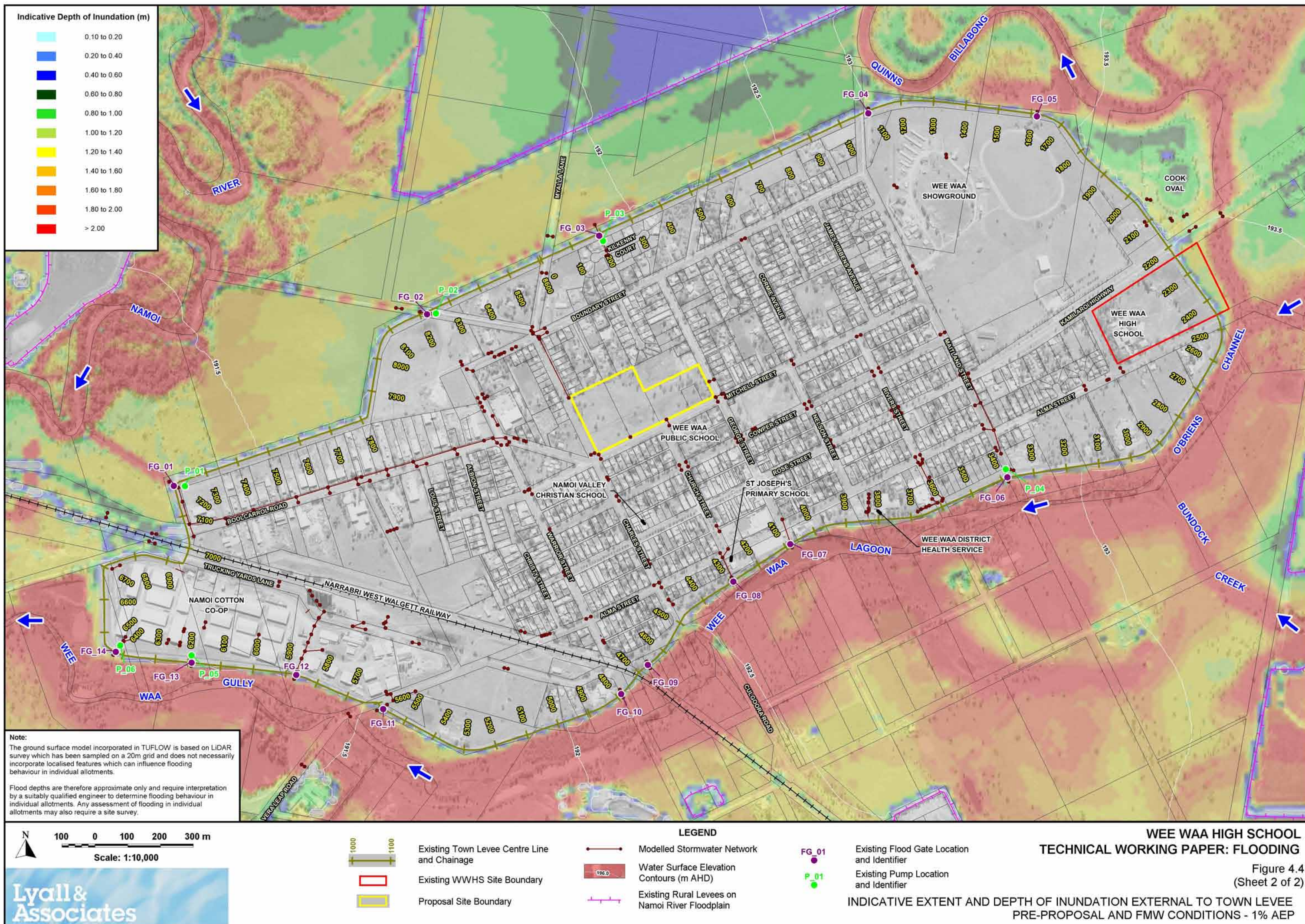
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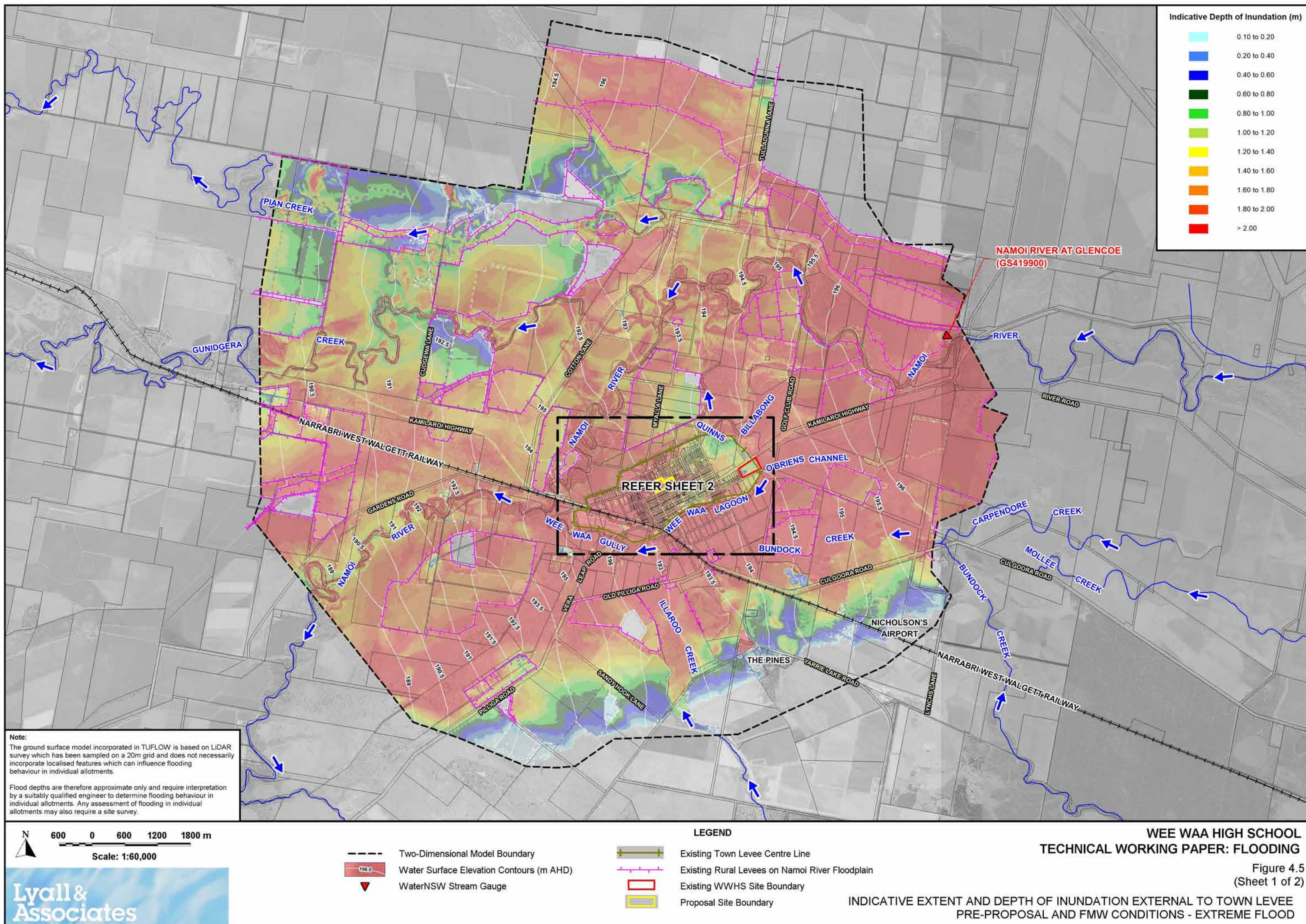
- Two-Dimensional Model Boundary
- Water Surface Elevation Contours (m AHD)
- WaterNSW Stream Gauge
- Existing Town Levee Centre Line
- Existing Rural Levees on Namoi River Floodplain
- Existing WWHS Site Boundary
- Proposal Site Boundary

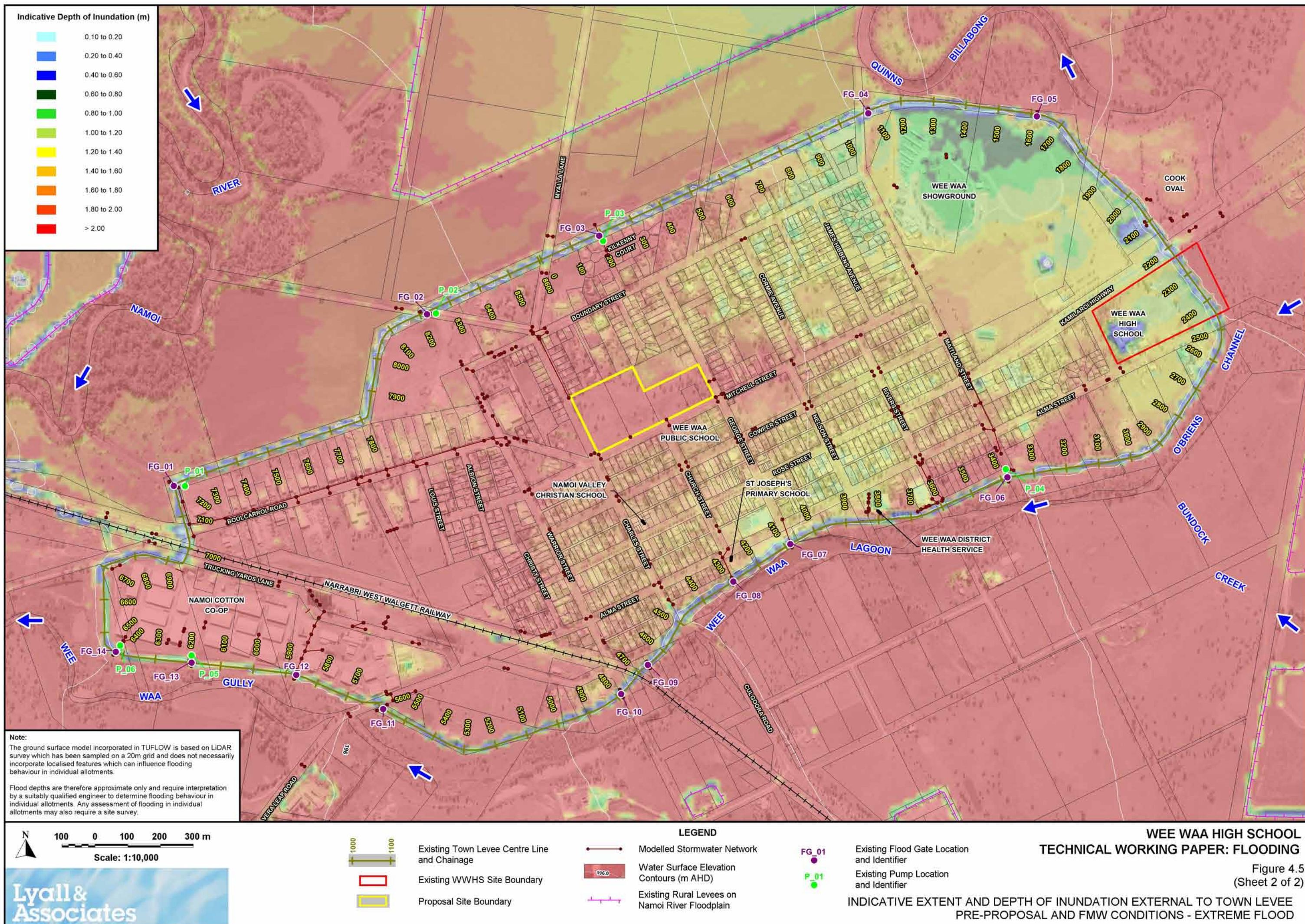
**WEW WAA HIGH SCHOOL
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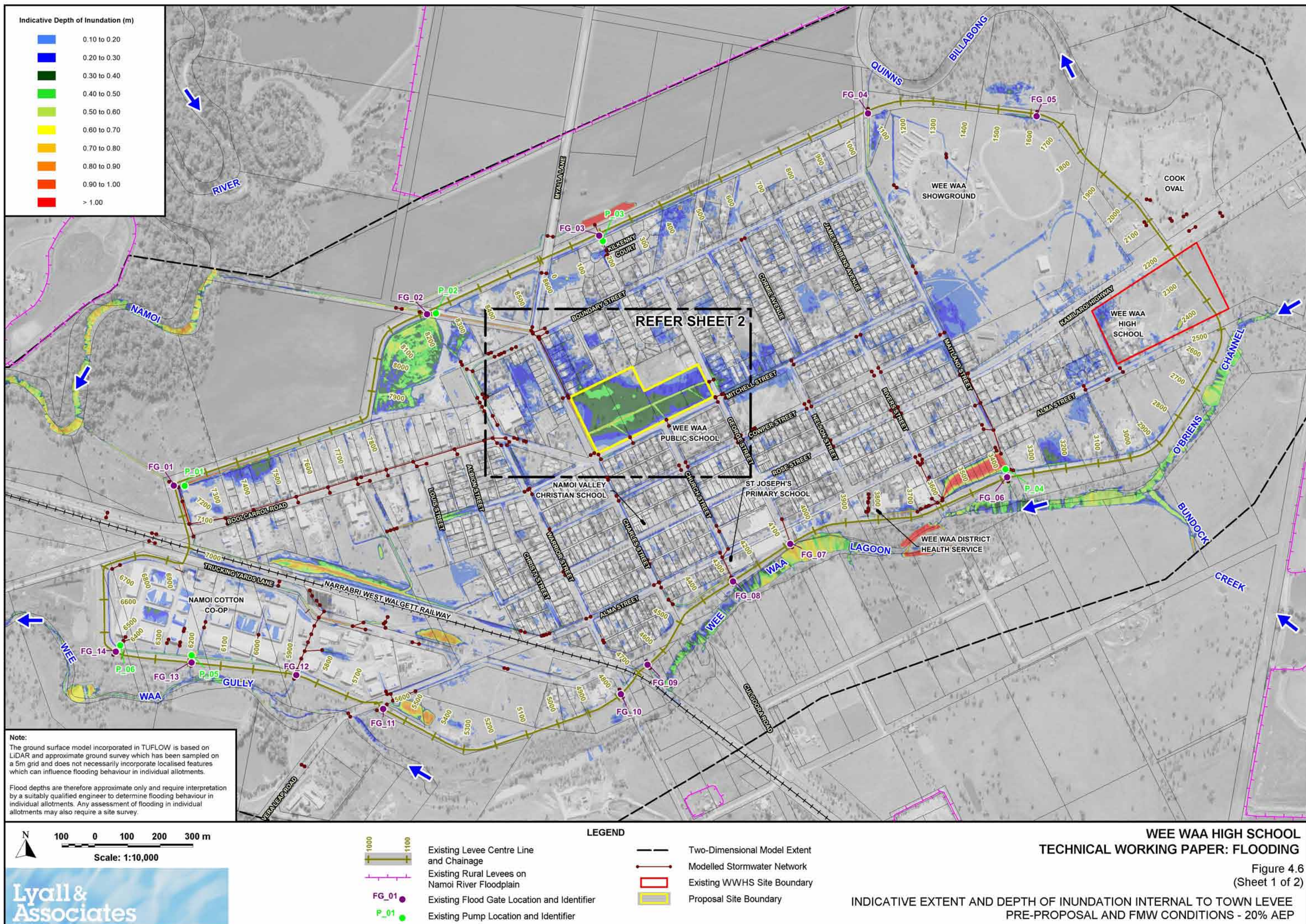
Figure 4.4
(Sheet 1 of 2)

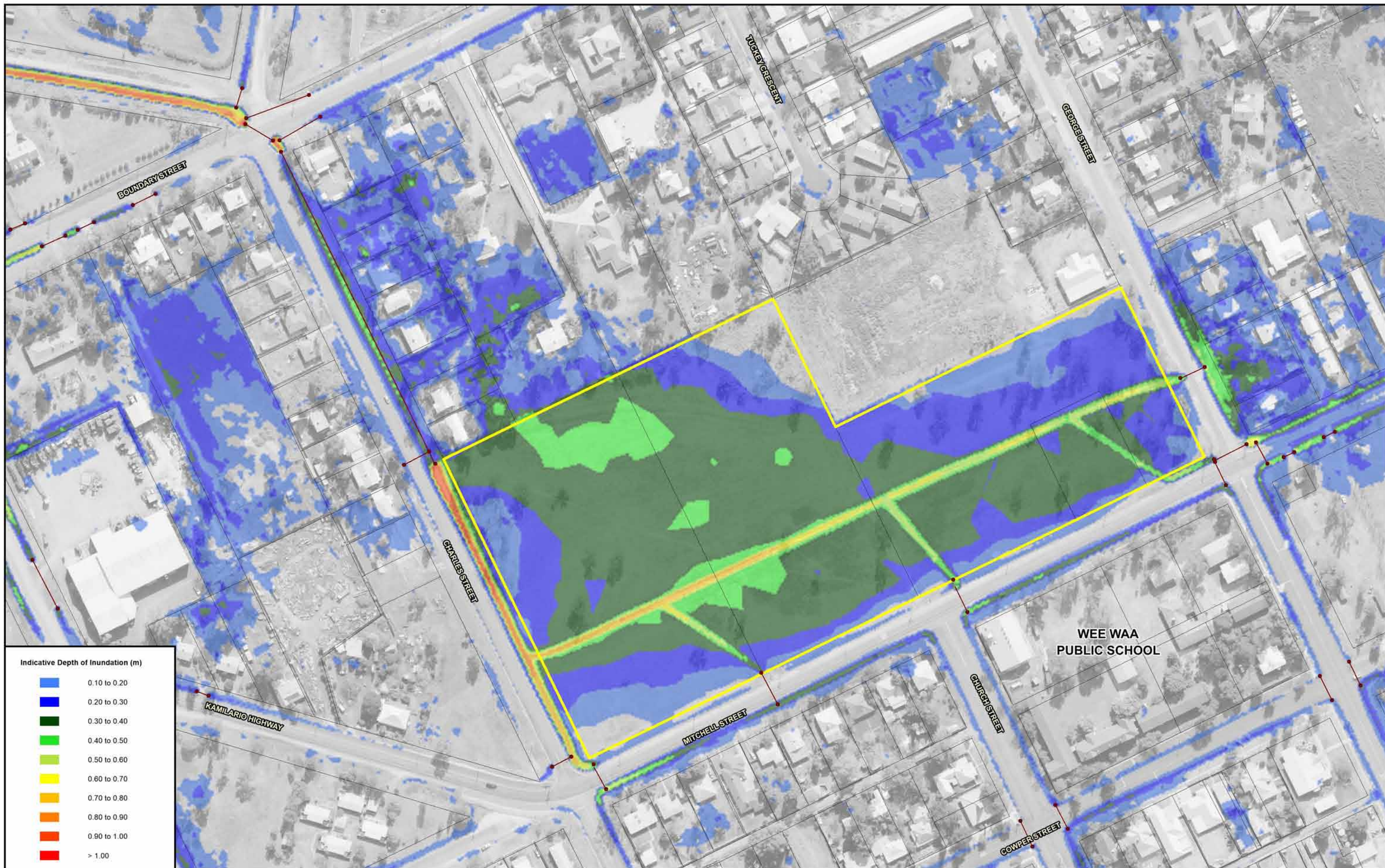
INDICATIVE EXTENT AND DEPTH OF INUNDATION EXTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP





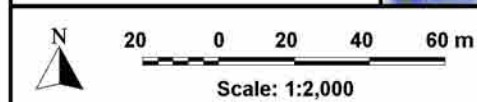






Indicative Depth of Inundation (m)

Blue	0.10 to 0.20
Dark Blue	0.20 to 0.30
Dark Green	0.30 to 0.40
Light Green	0.40 to 0.50
Yellow-Green	0.50 to 0.60
Yellow	0.60 to 0.70
Orange-Yellow	0.70 to 0.80
Orange	0.80 to 0.90
Red-Orange	0.90 to 1.00
Red	> 1.00



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Note:
The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

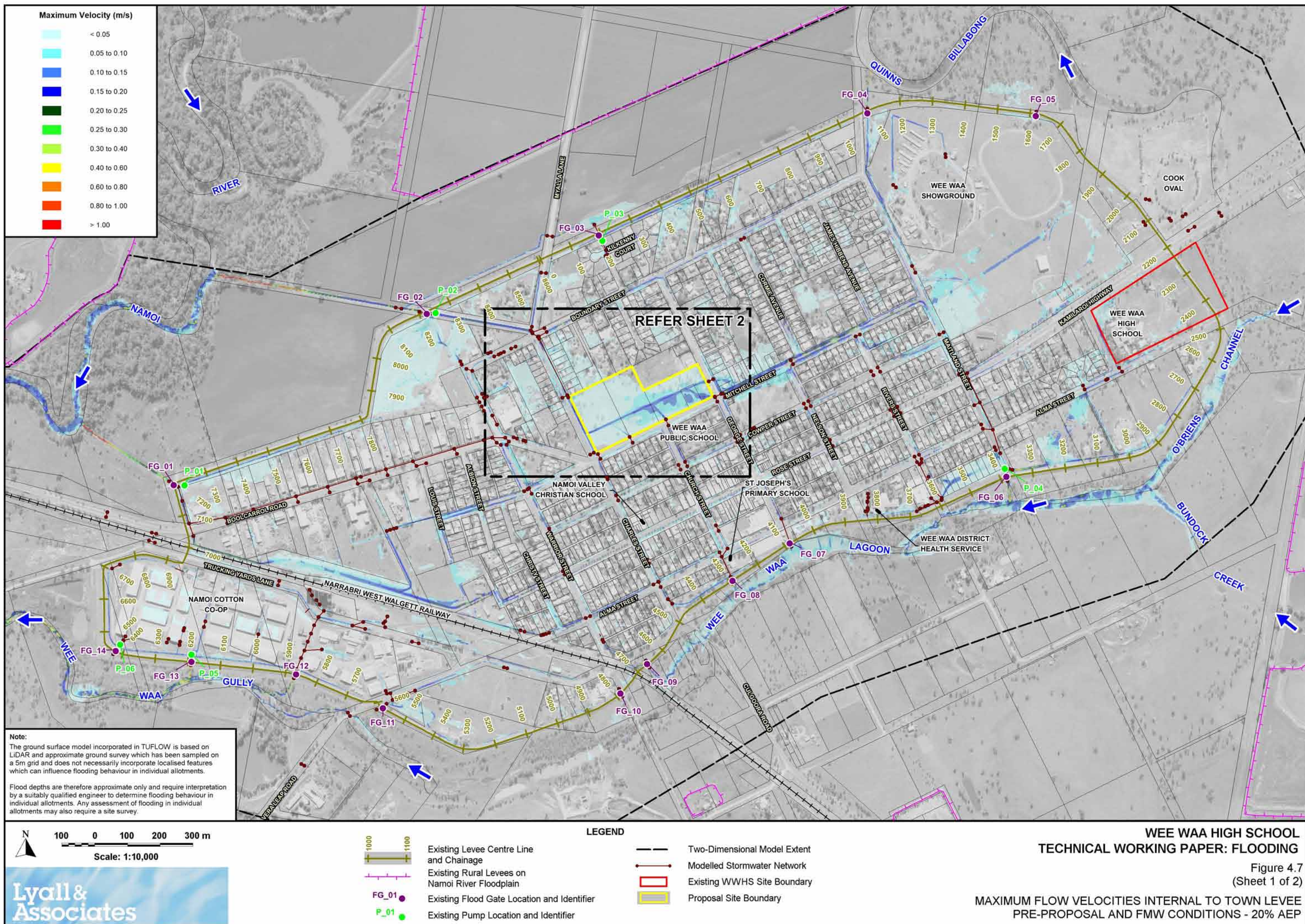
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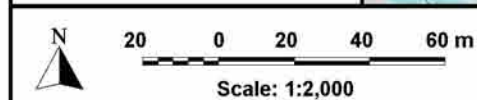
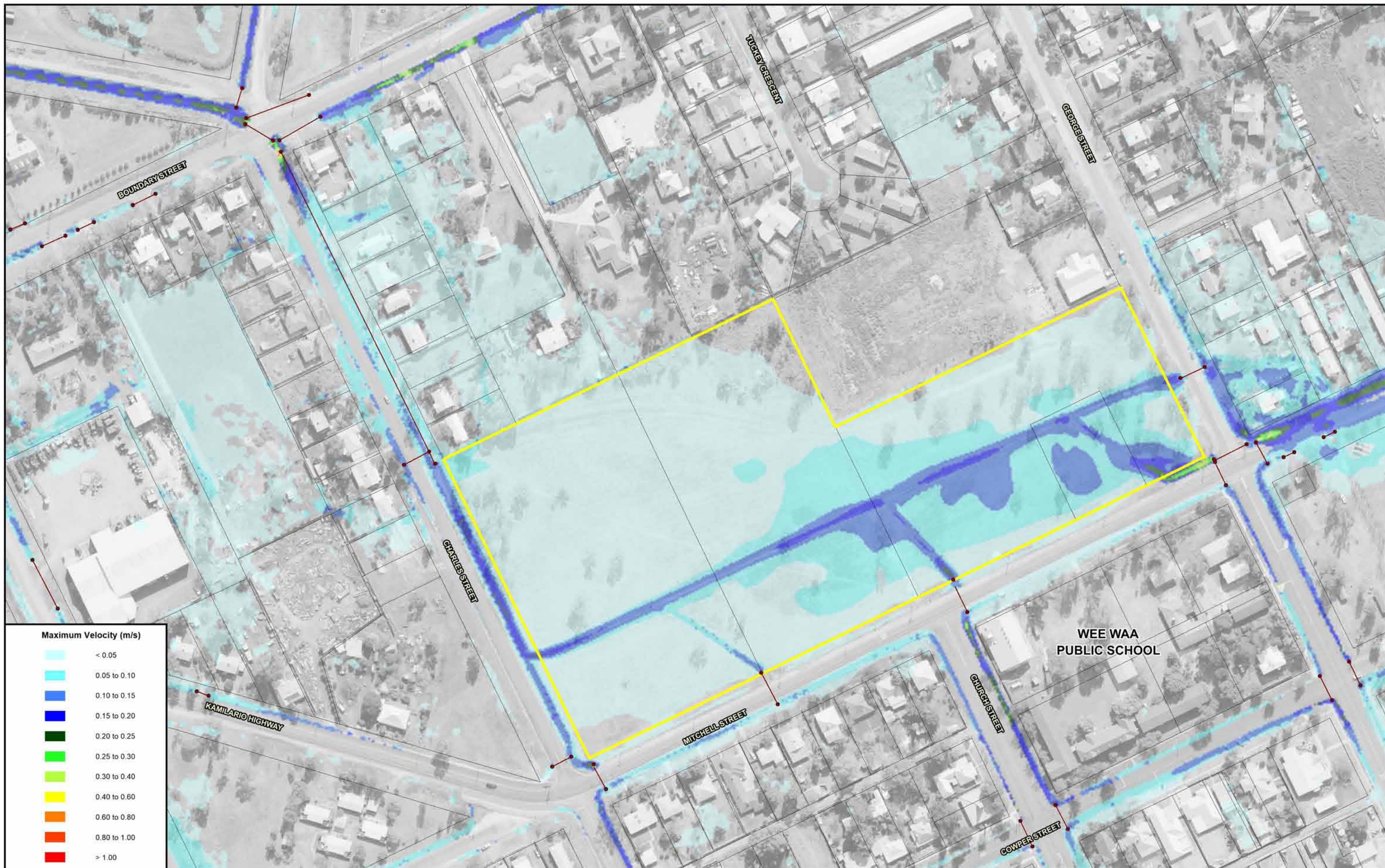
- LEGEND**
- Modelled Stormwater Network
 - Proposal Site Boundary

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Figure 4.6
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 20% AEP





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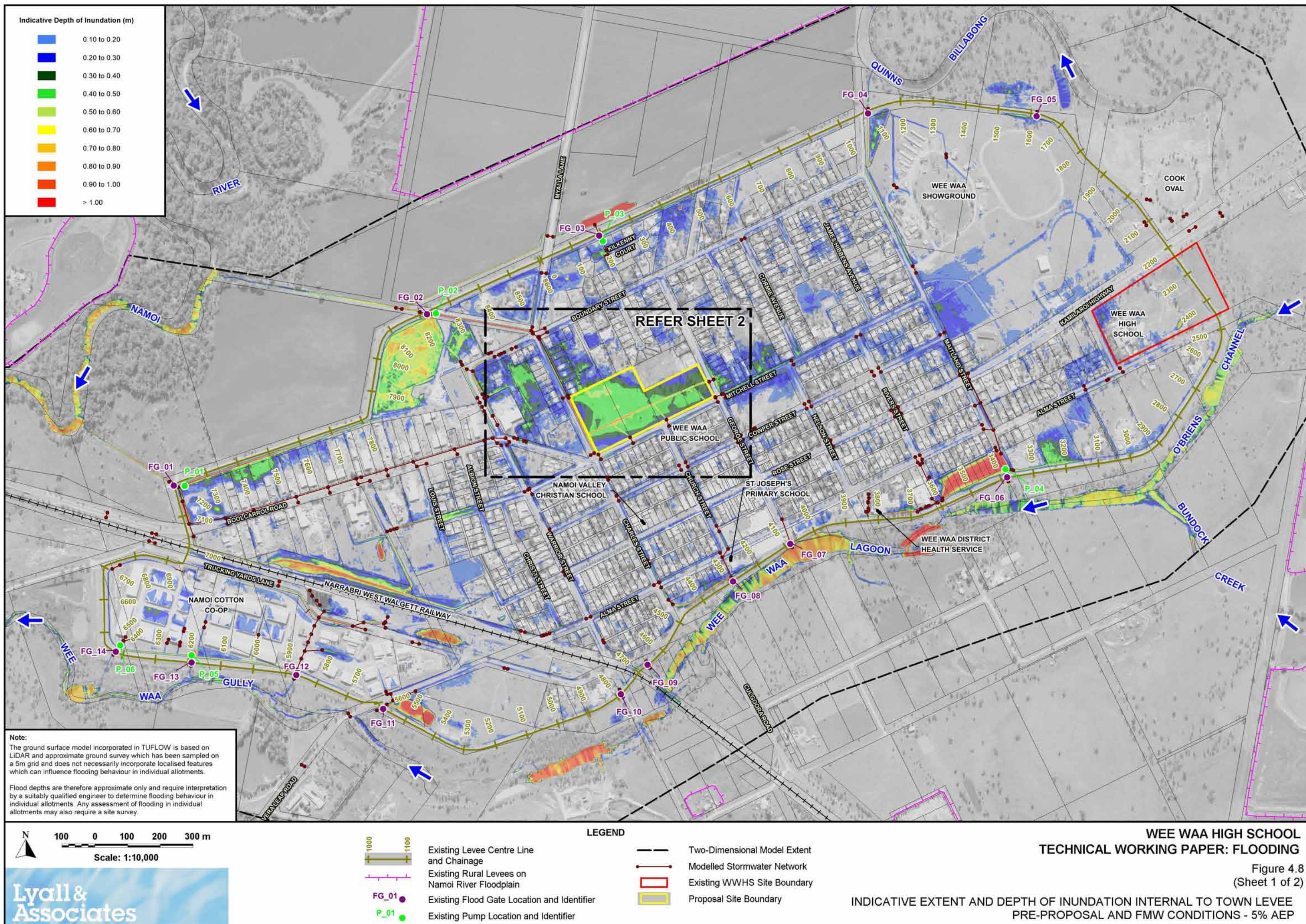
LEGEND

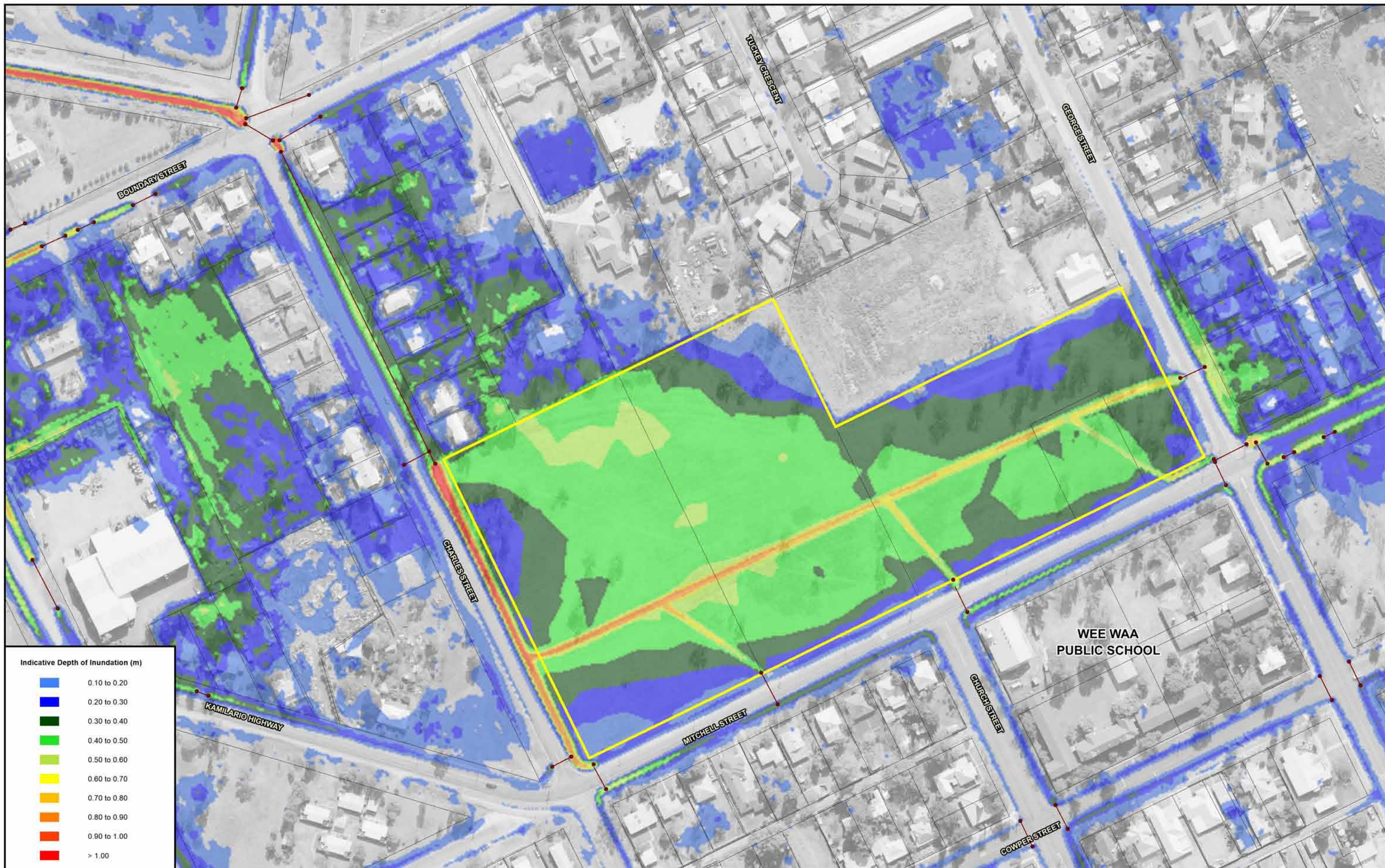
- Modelled Stormwater Network
- Proposal Site Boundary

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TECHNICAL WORKING PAPER: FLOODING**

Figure 4.7
(Sheet 2 of 2)

MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 20% AEP





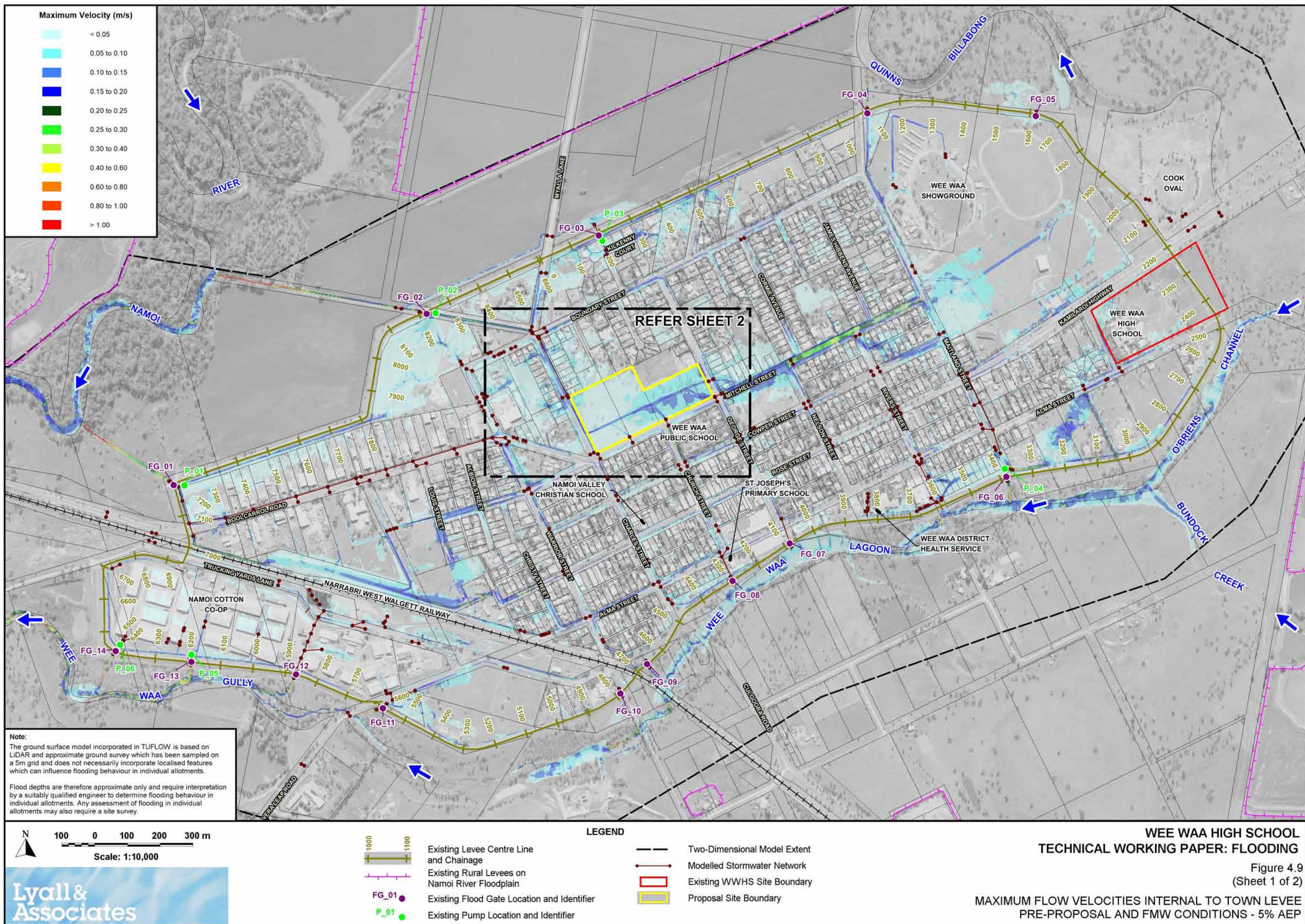
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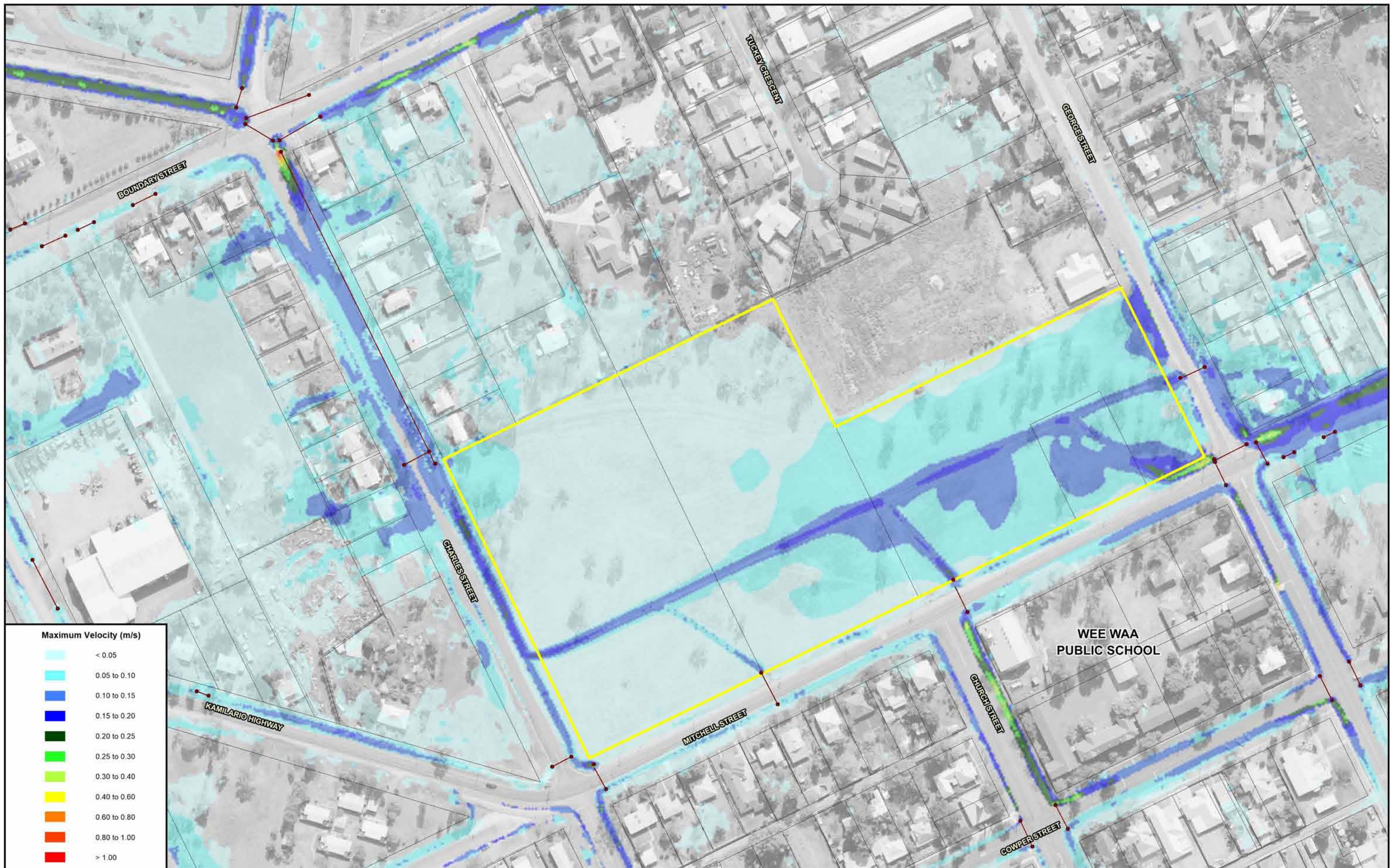
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Figure 4.8
(Sheet 2 of 2)

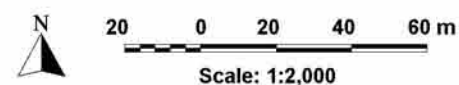
INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 5% AEP





Maximum Velocity (m/s)

■	< 0.05
■	0.05 to 0.10
■	0.10 to 0.15
■	0.15 to 0.20
■	0.20 to 0.25
■	0.25 to 0.30
■	0.30 to 0.40
■	0.40 to 0.60
■	0.60 to 0.80
■	0.80 to 1.00
■	> 1.00



Note:
The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m 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**
- Modelled Stormwater Network
 - Proposal Site Boundary

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TECHNICAL WORKING PAPER: FLOODING**

Figure 4.9
(Sheet 2 of 2)

MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 5% AEP

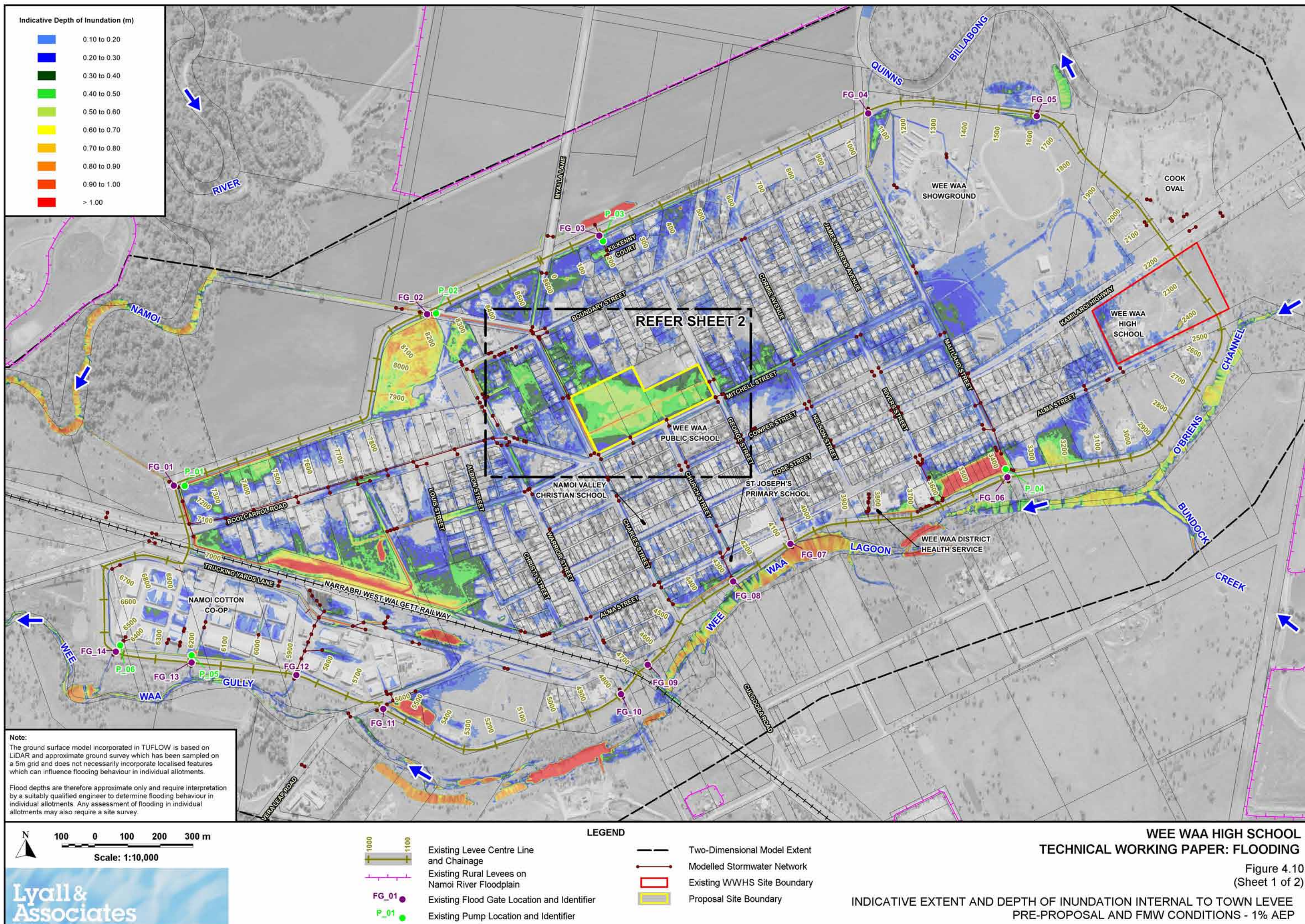
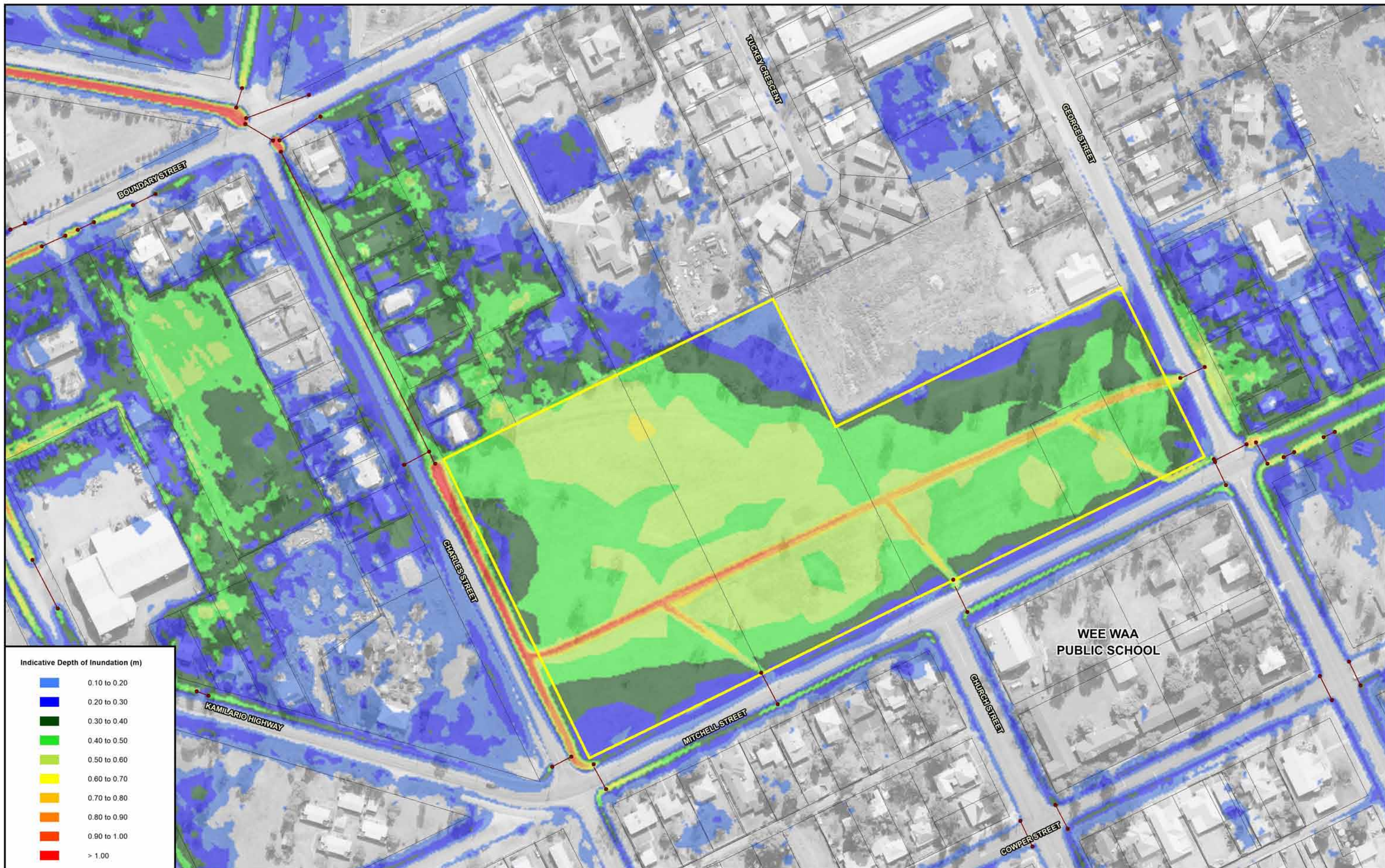


Figure 4.10
(Sheet 1 of 2)



Indicative Depth of Inundation (m)

Blue	0.10 to 0.20
Dark Blue	0.20 to 0.30
Dark Green	0.30 to 0.40
Light Green	0.40 to 0.50
Yellow-Green	0.50 to 0.60
Yellow	0.60 to 0.70
Orange	0.70 to 0.80
Dark Orange	0.80 to 0.90
Red-Orange	0.90 to 1.00
Red	> 1.00

N
20 0 20 40 60 m
Scale: 1:2,000

Note:
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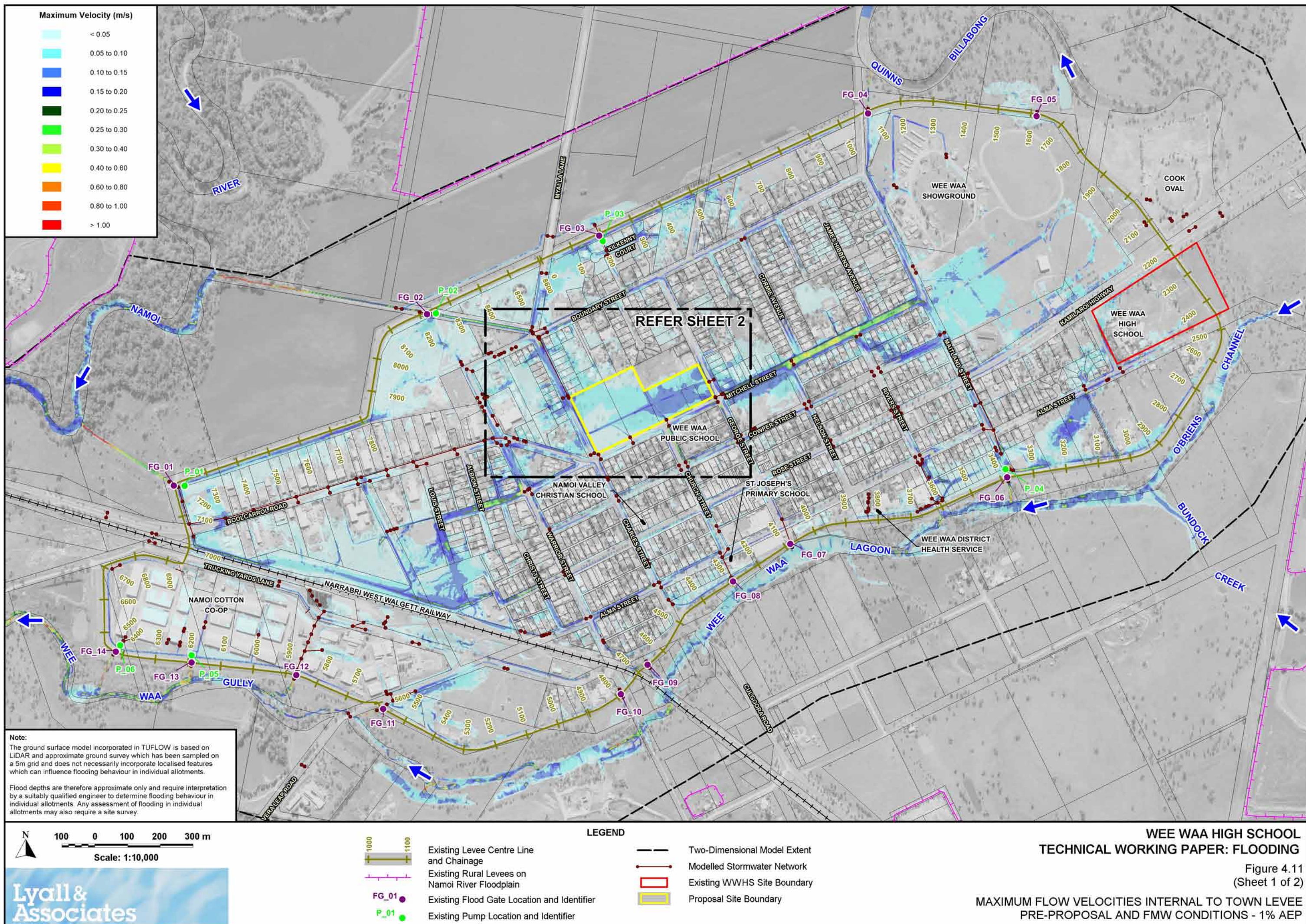
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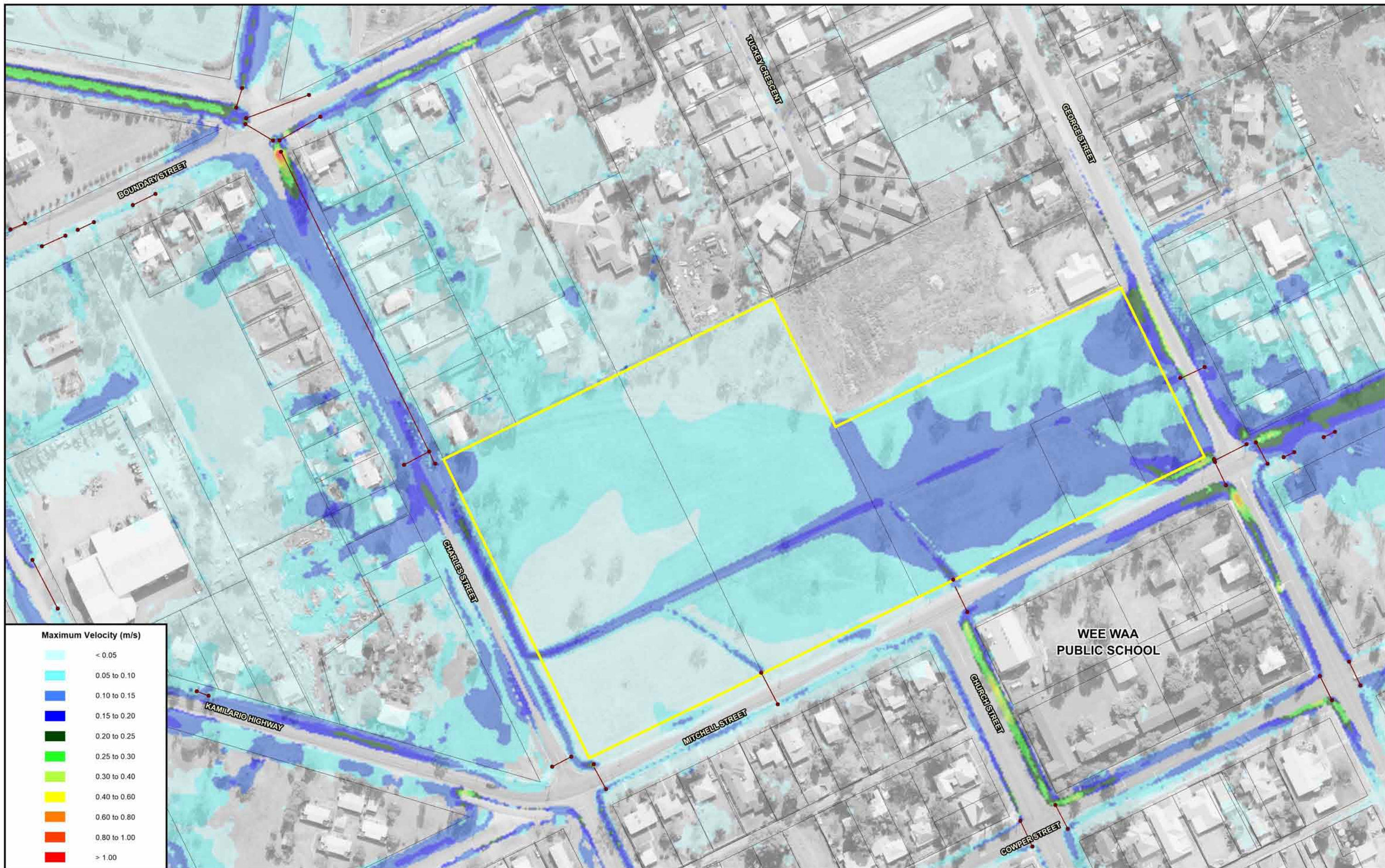
- Modelled Stormwater Network
- Proposal Site Boundary

WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 4.10
(Sheet 2 of 2)

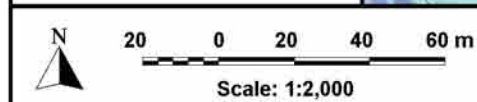
INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP





Maximum Velocity (m/s)

■	< 0.05
■	0.05 to 0.10
■	0.10 to 0.15
■	0.15 to 0.20
■	0.20 to 0.25
■	0.25 to 0.30
■	0.30 to 0.40
■	0.40 to 0.60
■	0.60 to 0.80
■	0.80 to 1.00
■	> 1.00



Note:
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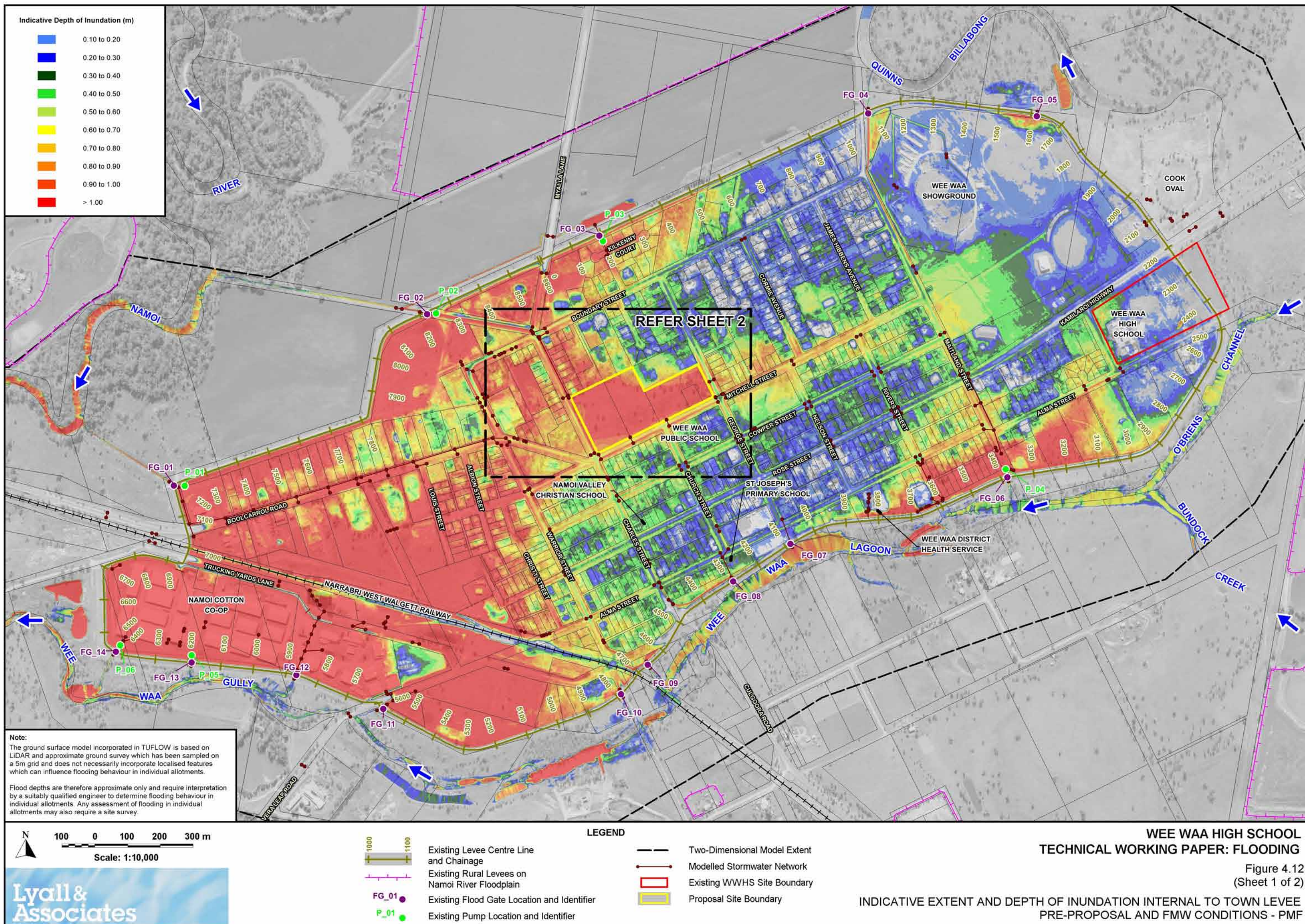
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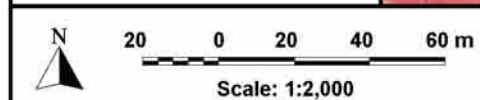
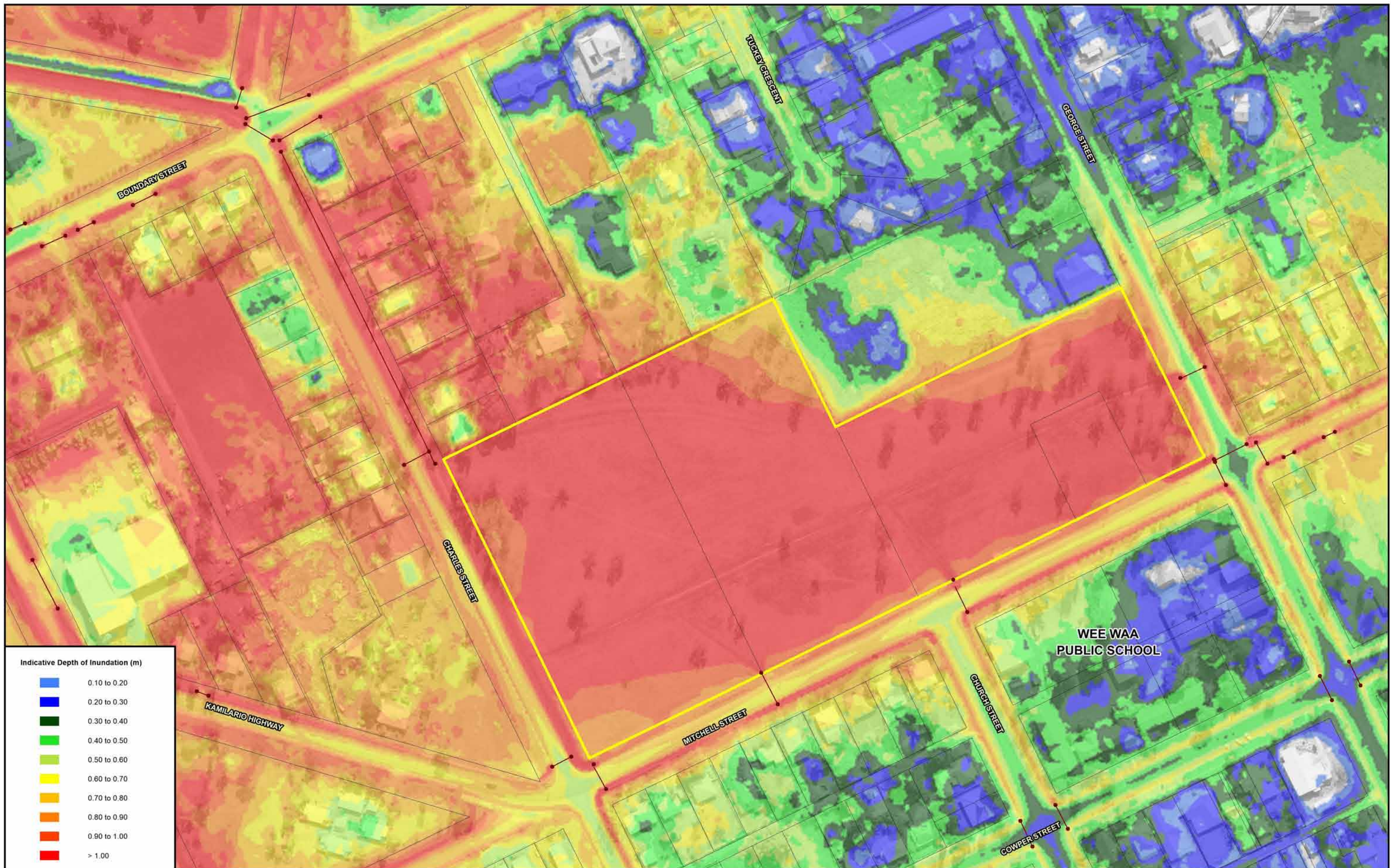
- LEGEND**
- Modelled Stormwater Network
 - Proposal Site Boundary

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Figure 4.11
 (Sheet 2 of 2)

**MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
 PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP**





Lyall & Associates

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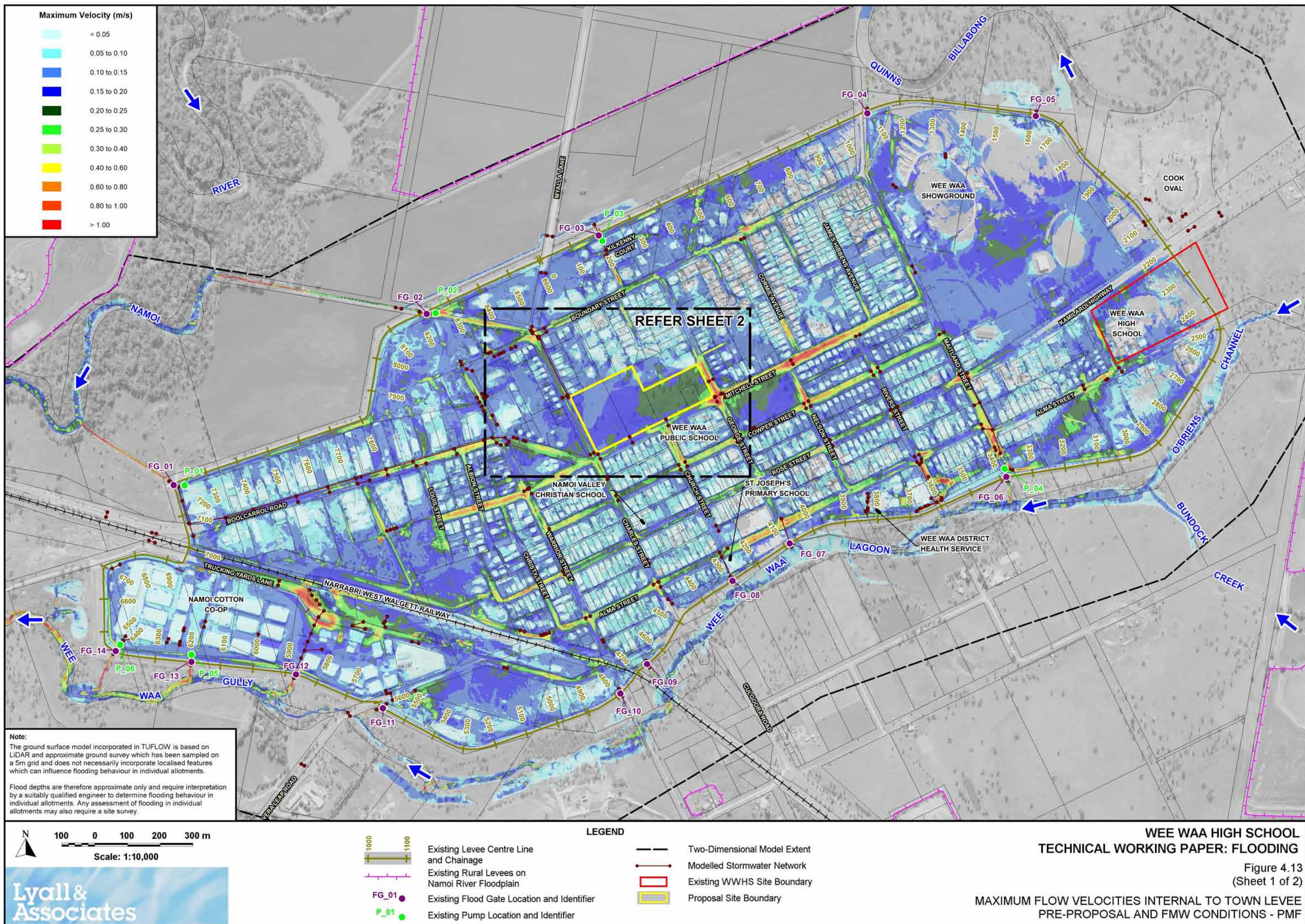
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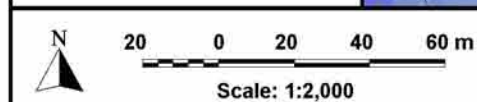
- Modelled Stormwater Network
- Proposal Site Boundary

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Figure 4.12
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - PMF





Lyll & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m 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.

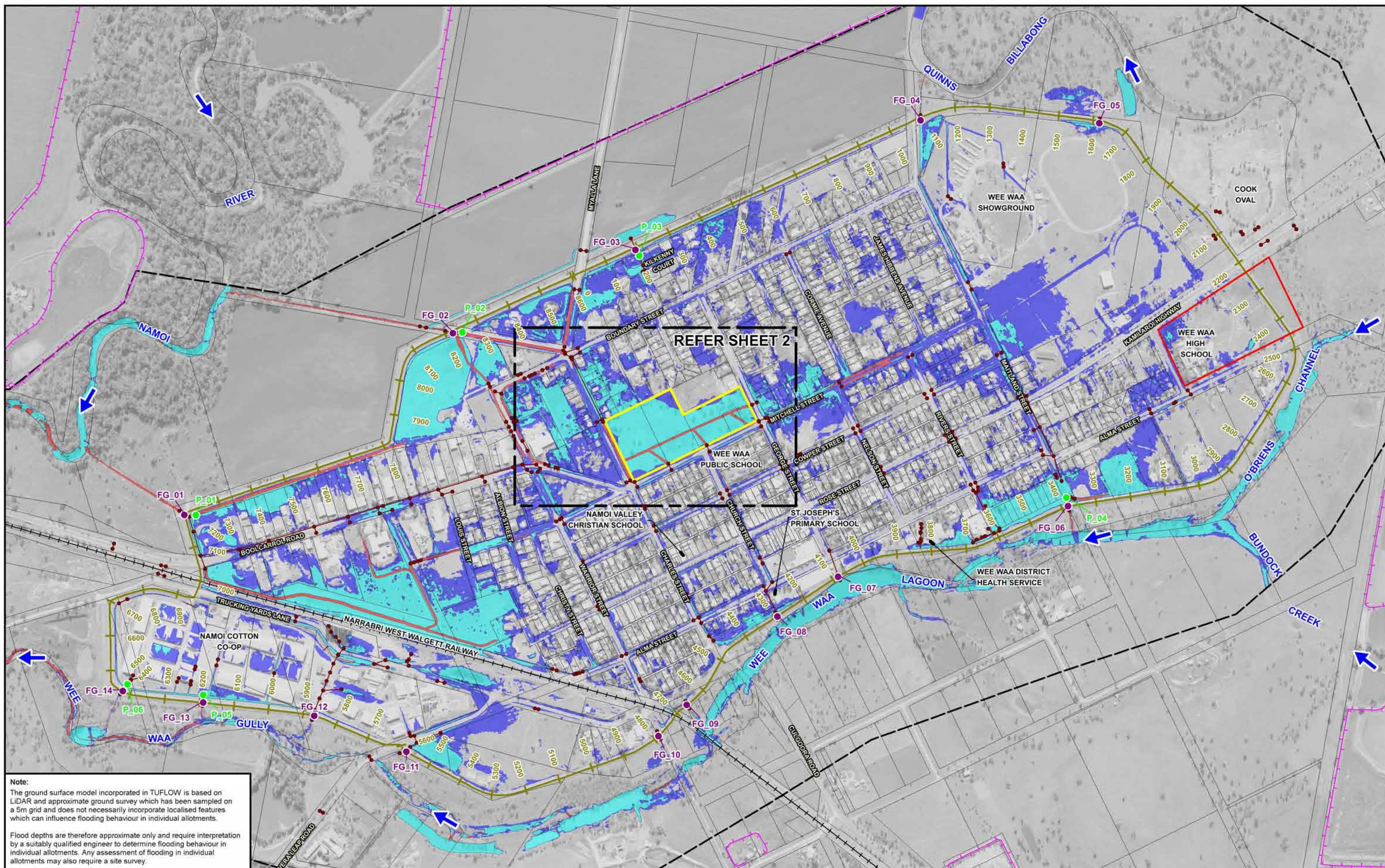
LEGEND

- Modelled Stormwater Network
- Proposal Site Boundary

**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 4.13
(Sheet 2 of 2)

MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - PMF



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N

100 0 100 200 300 m

Scale: 1:10,000

- LEGEND**
- Existing Levee Centre Line and Chainage
 - Existing Rural Levees on Namoi River Floodplain
 - Existing Flood Gate Location and Identifier
 - Existing Pump Location and Identifier

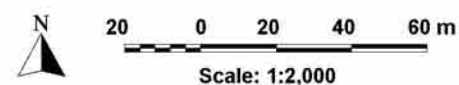
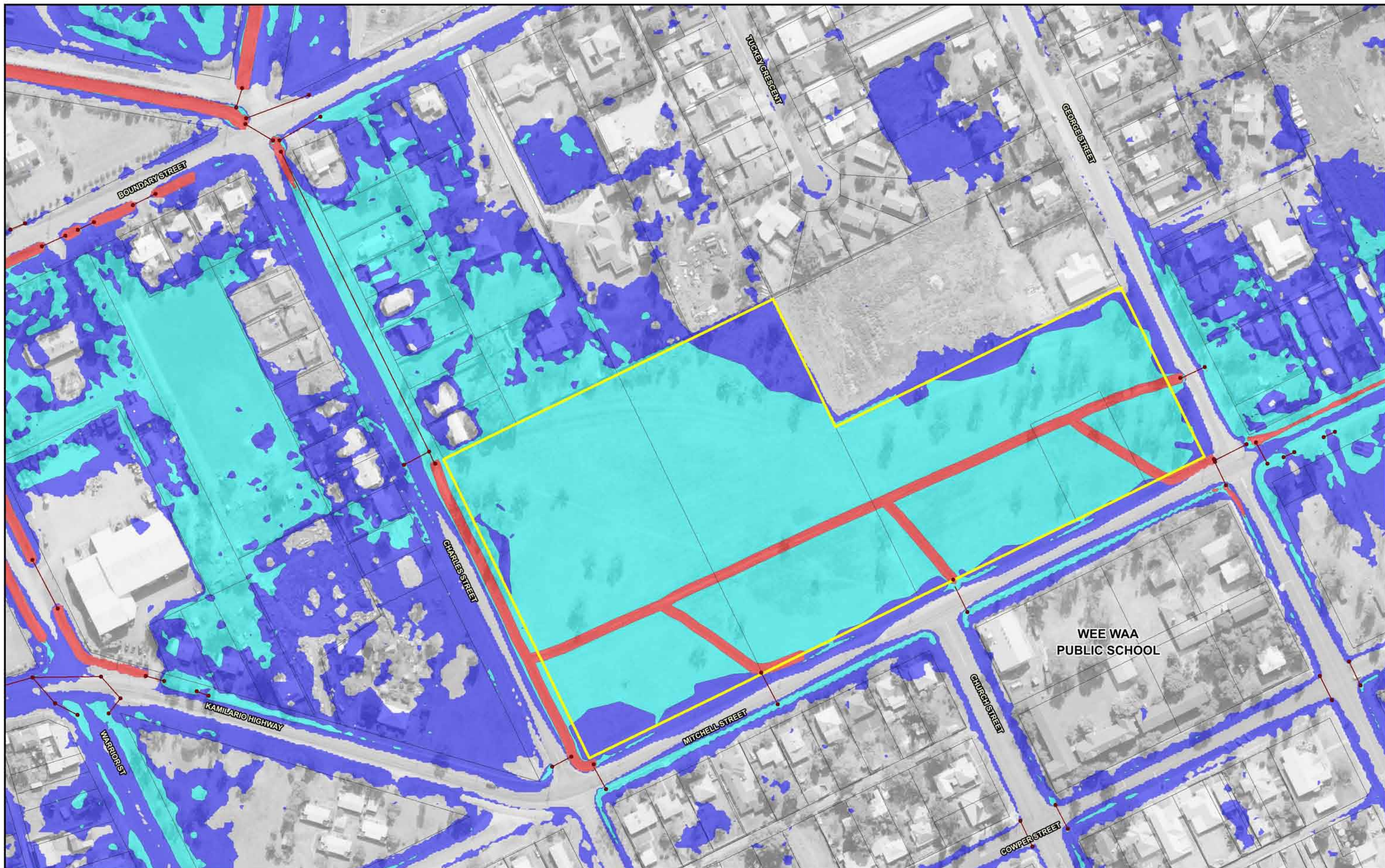
- Two-Dimensional Model Extent
- Modelled Stormwater Network
- Existing WWHS Site Boundary
- Proposal Site Boundary

- Floodway
- Flood Storage
- Flood Fringe

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TECHNICAL WORKING PAPER: FLOODING

Figure 4.14
 (Sheet 1 of 2)

HYDRAULIC CATEGORISATION IN VICINITY OF THE PROPOSAL AND FMW
 PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP



Lyall & Associates

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LEGEND

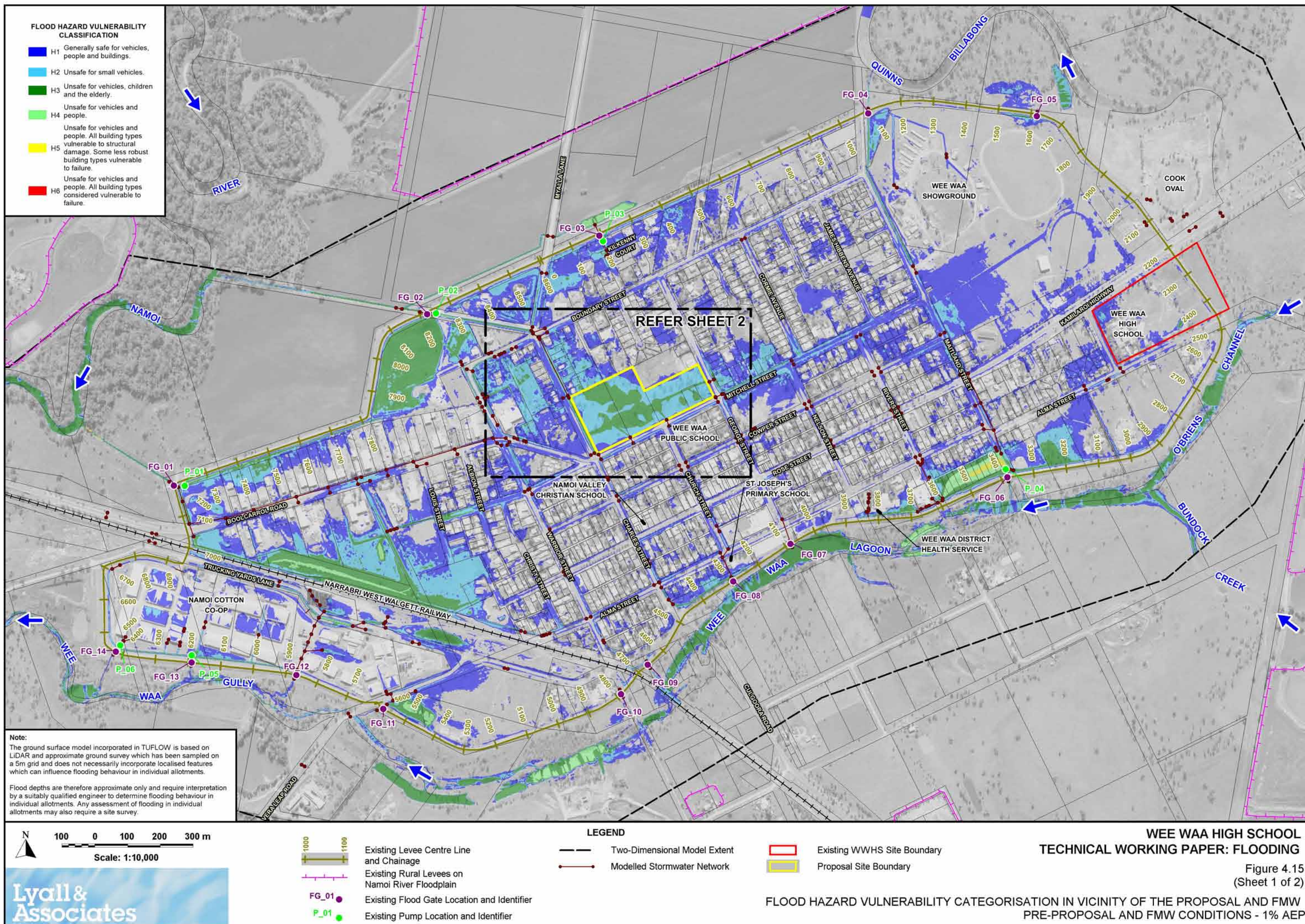
- Modelled Stormwater Network
- Proposal Site Boundary

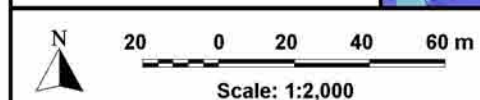
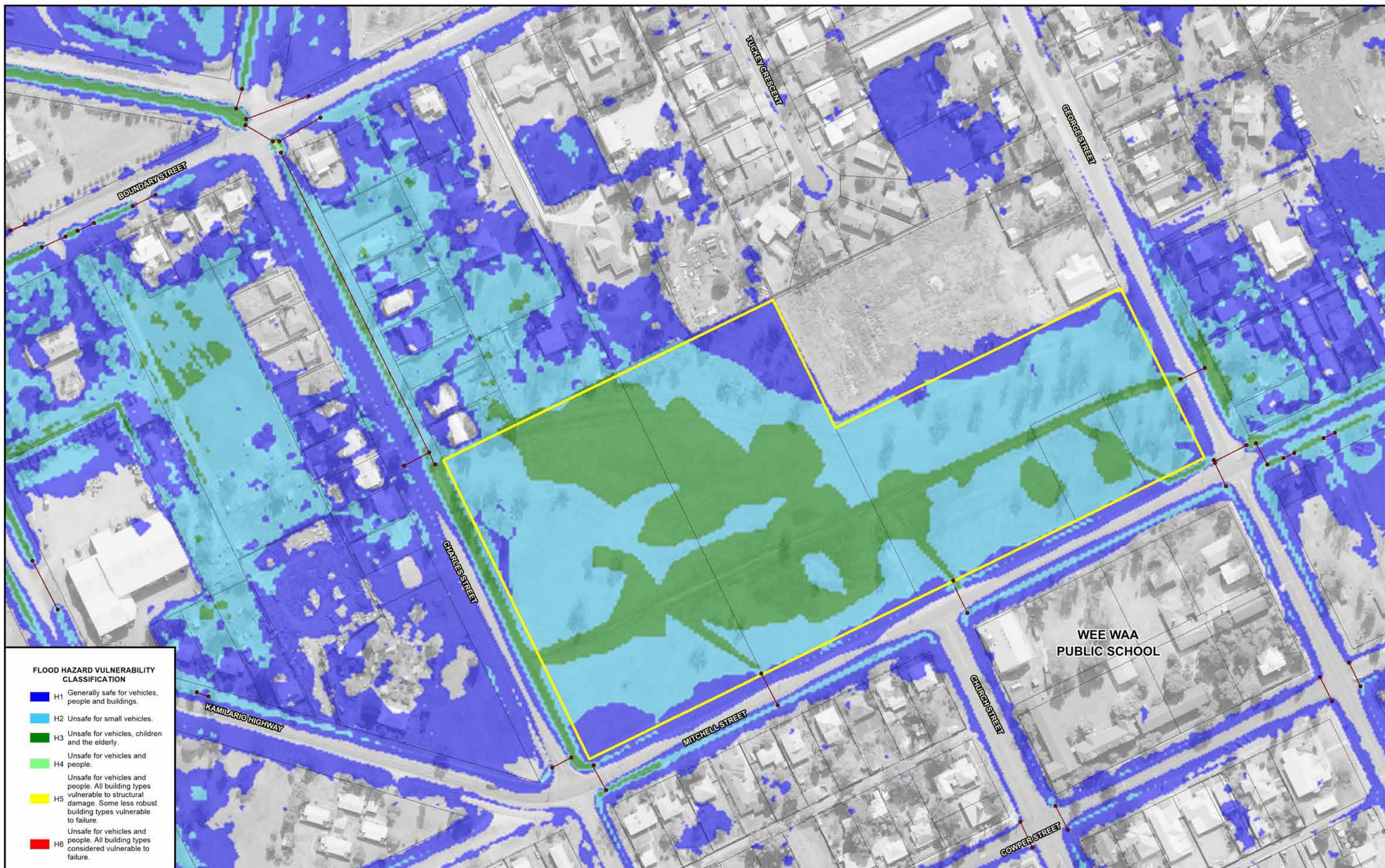
- Floodway
- Flood Storage
- Flood Fringe

WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 4.14
(Sheet 2 of 2)

HYDRAULIC CATEGORISATION IN VICINITY OF THE PROPOSAL AND FMW
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

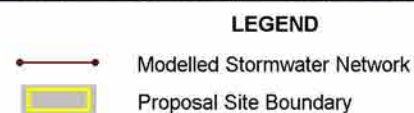




Lyall & Associates

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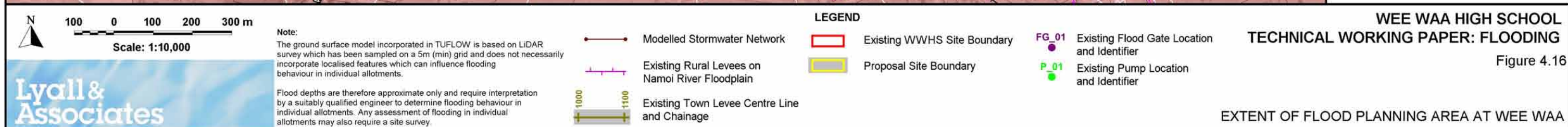
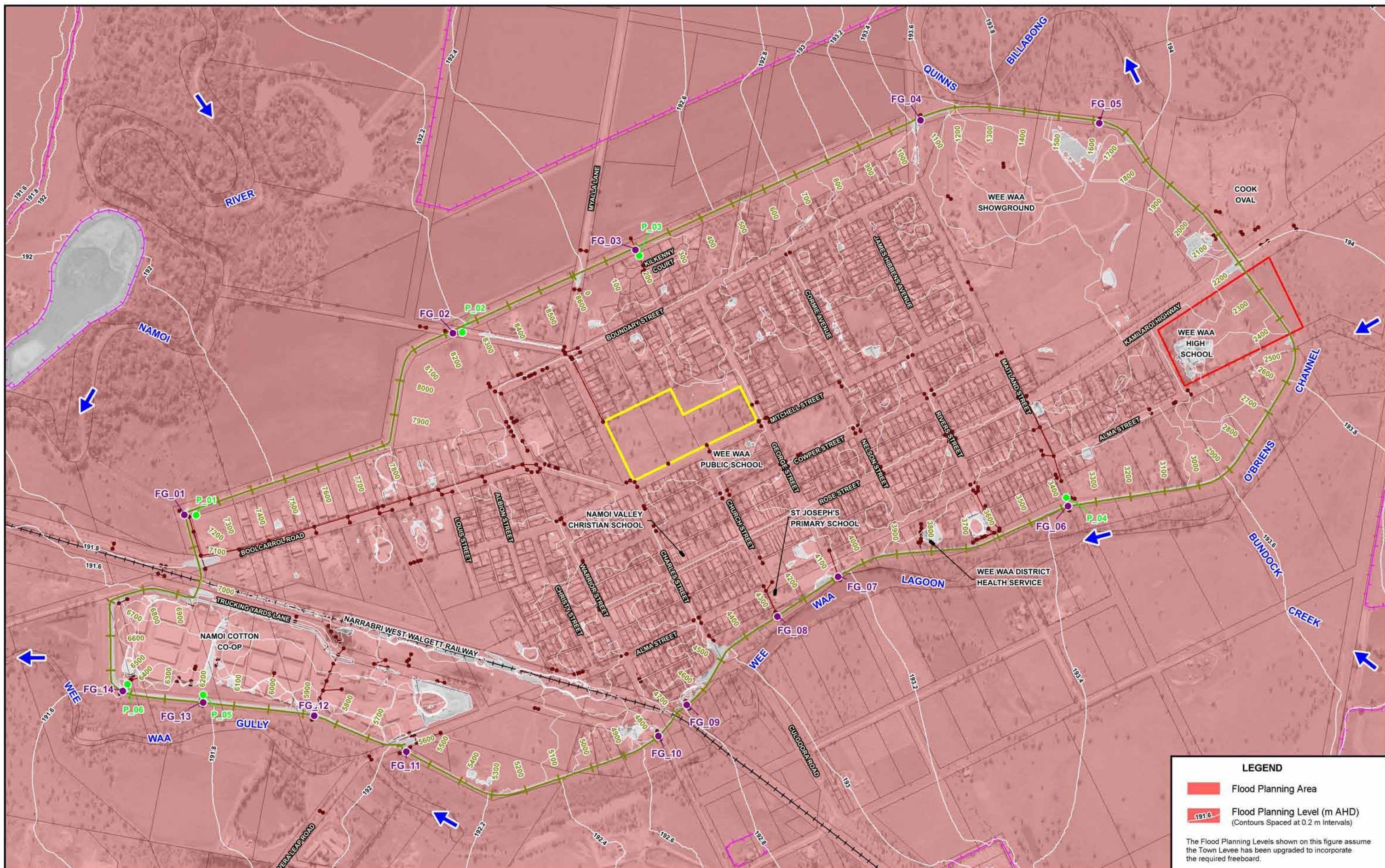
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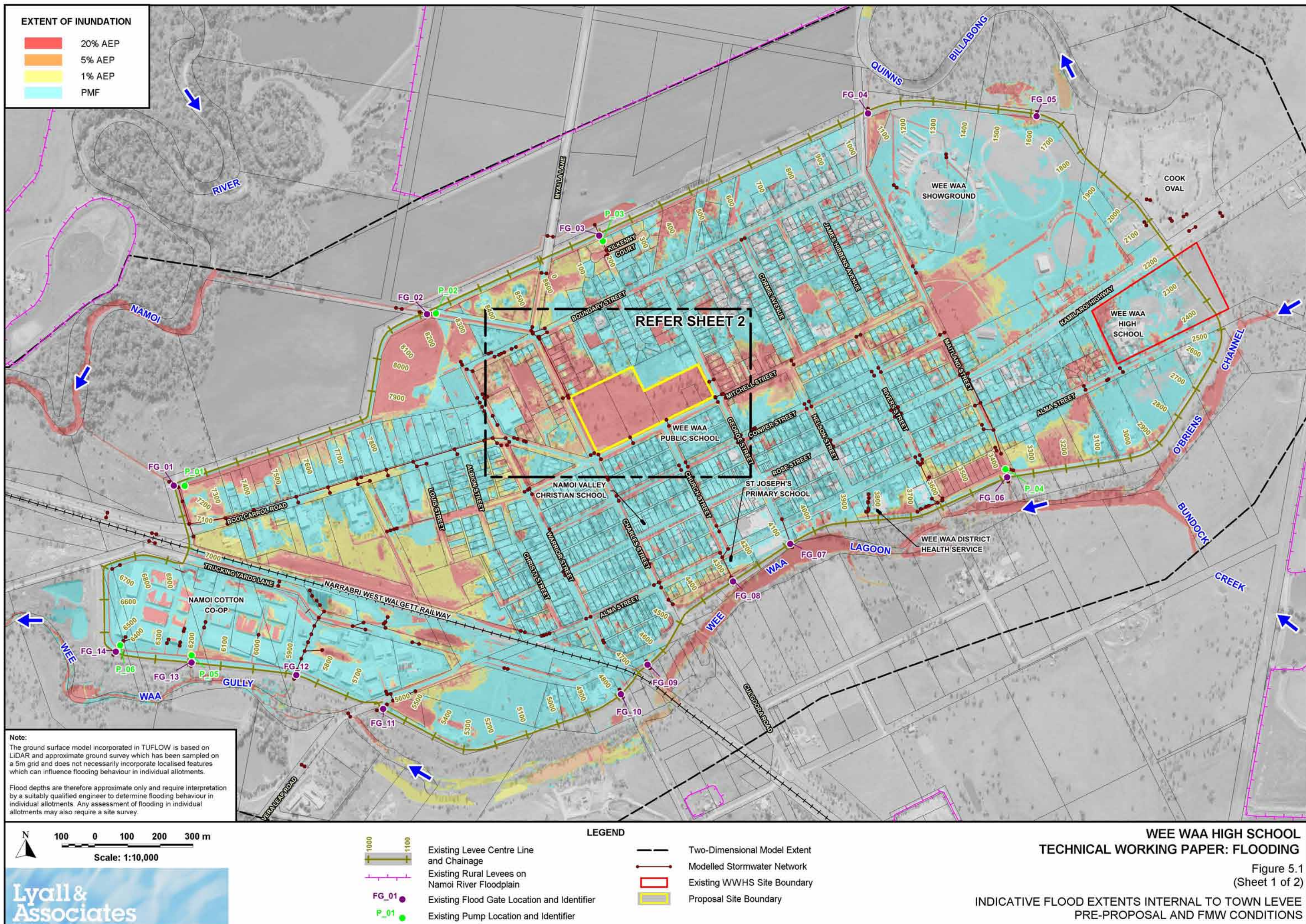


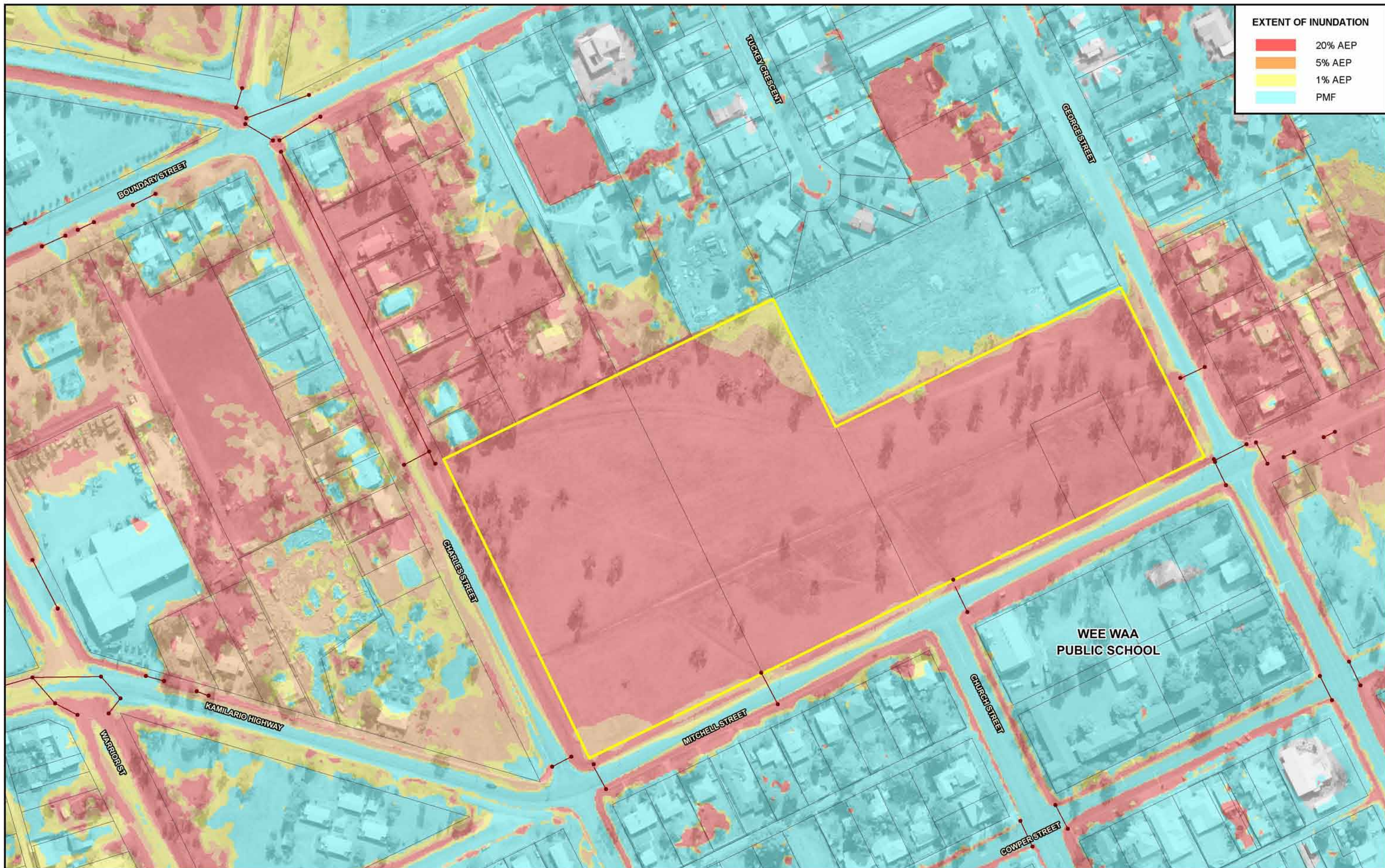
**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 4.15
(Sheet 2 of 2)

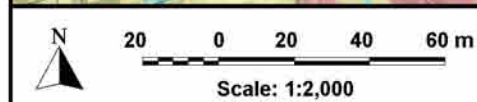
FLOOD HAZARD VULNERABILITY CATEGORISATION IN VICINITY OF THE PROPOSAL AND FMW
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP







EXTENT OF INUNDATION	
■	20% AEP
■	5% AEP
■	1% AEP
■	PMF



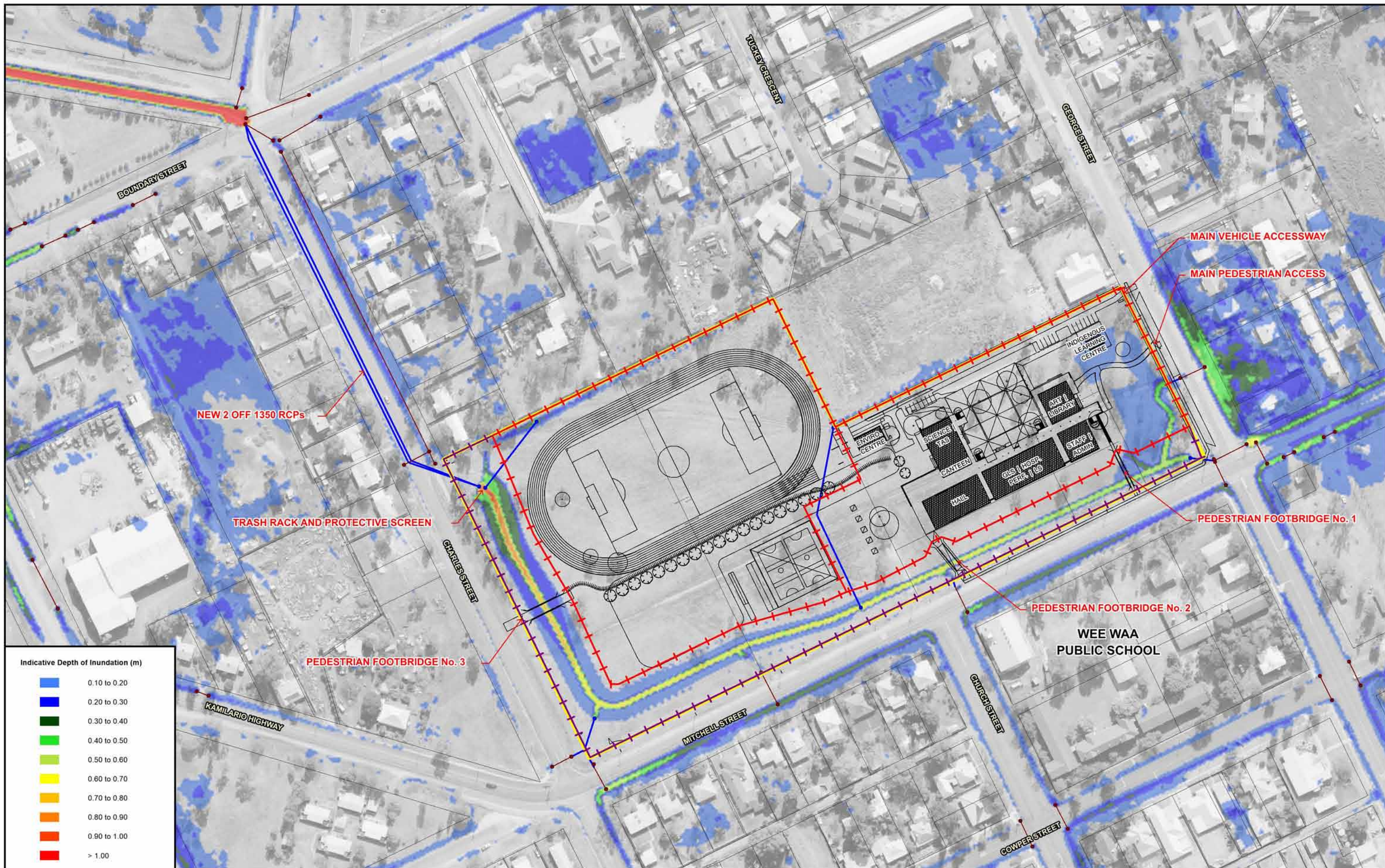
Lyll & Associates

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- LEGEND**
- Modelled Stormwater Network
 - Proposal Site Boundary

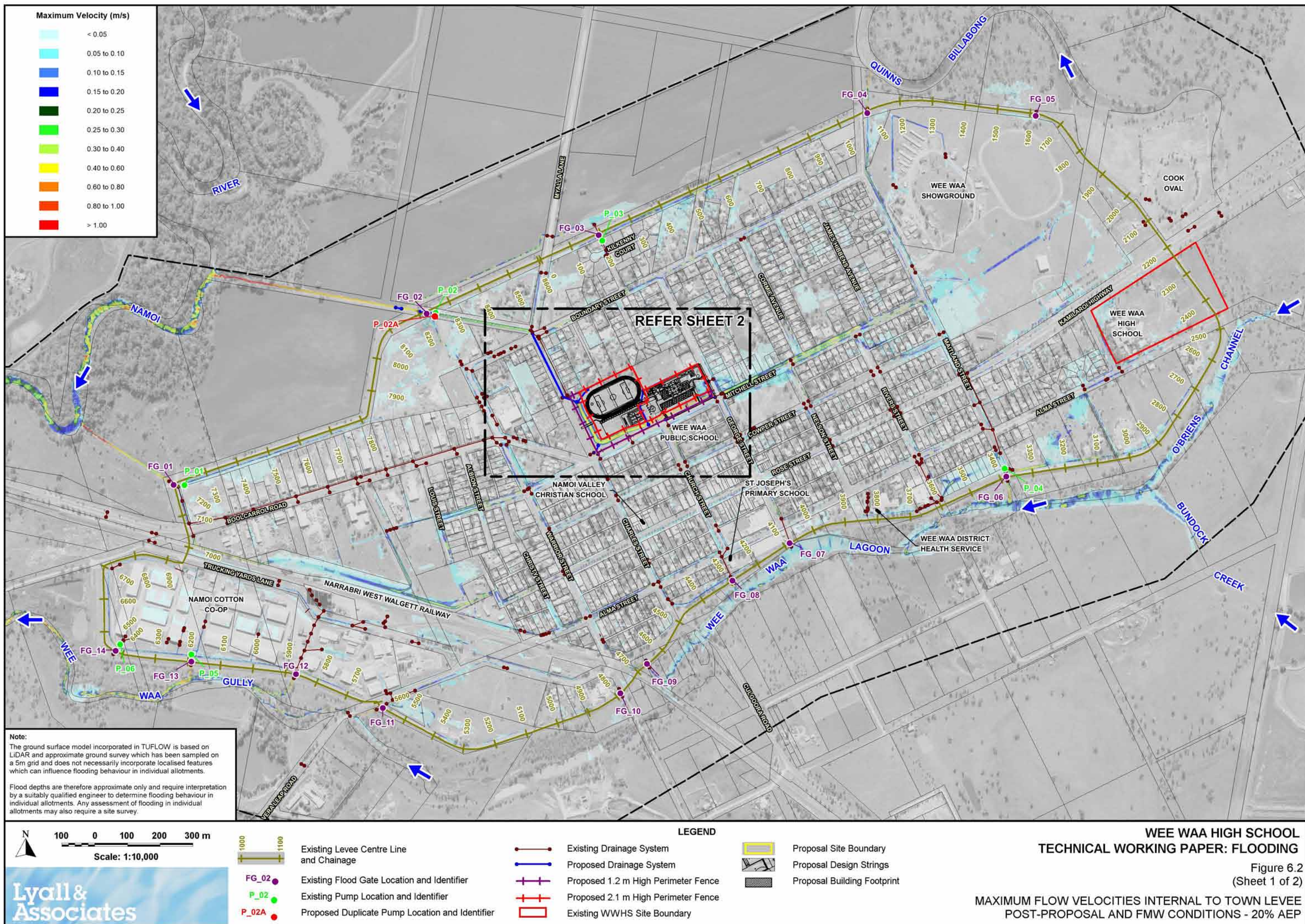
WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING
Figure 5.1
(Sheet 2 of 2)
INDICATIVE FLOOD EXTENTS INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS

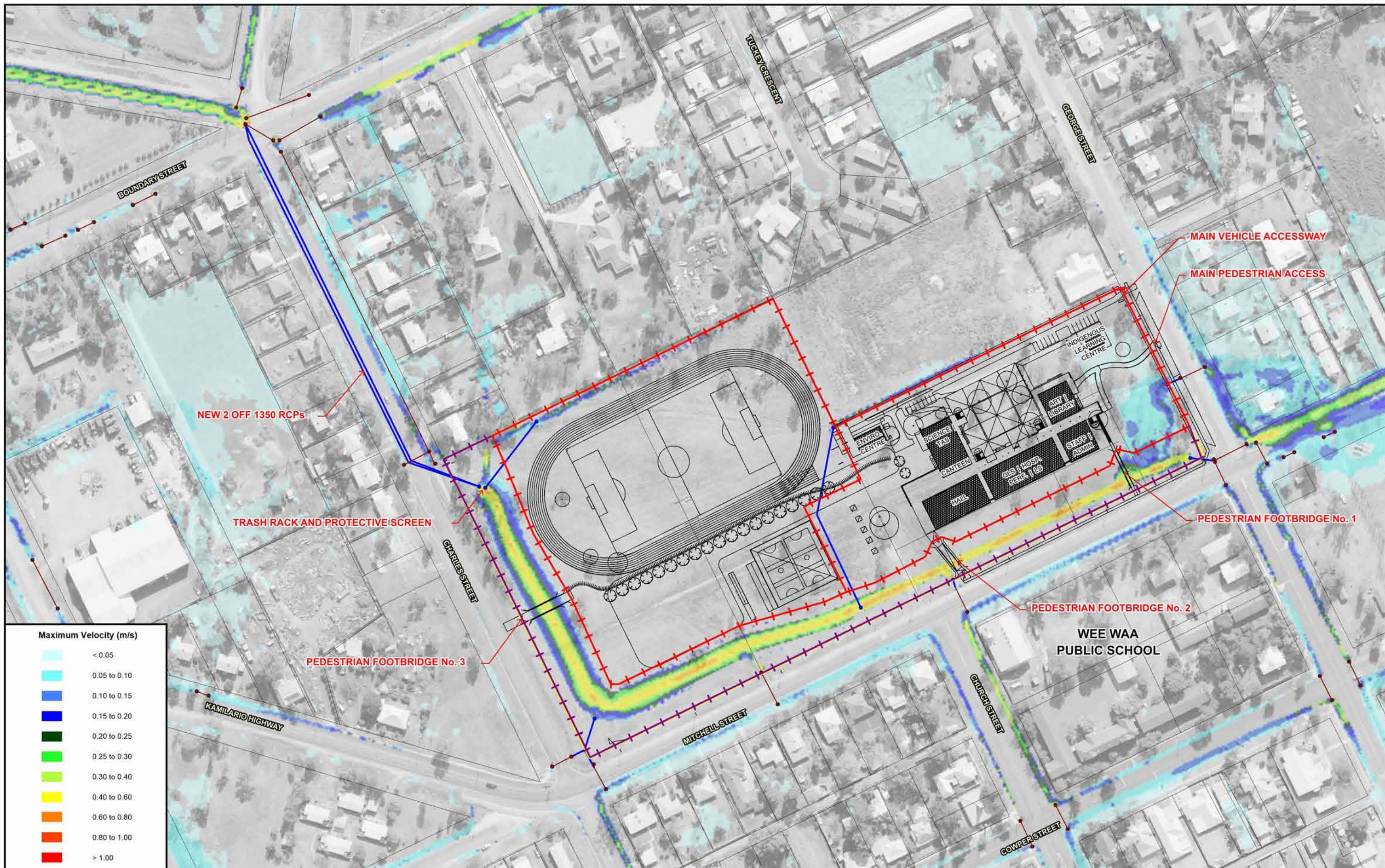


Scale: 1:2,000

Lycall & Associates

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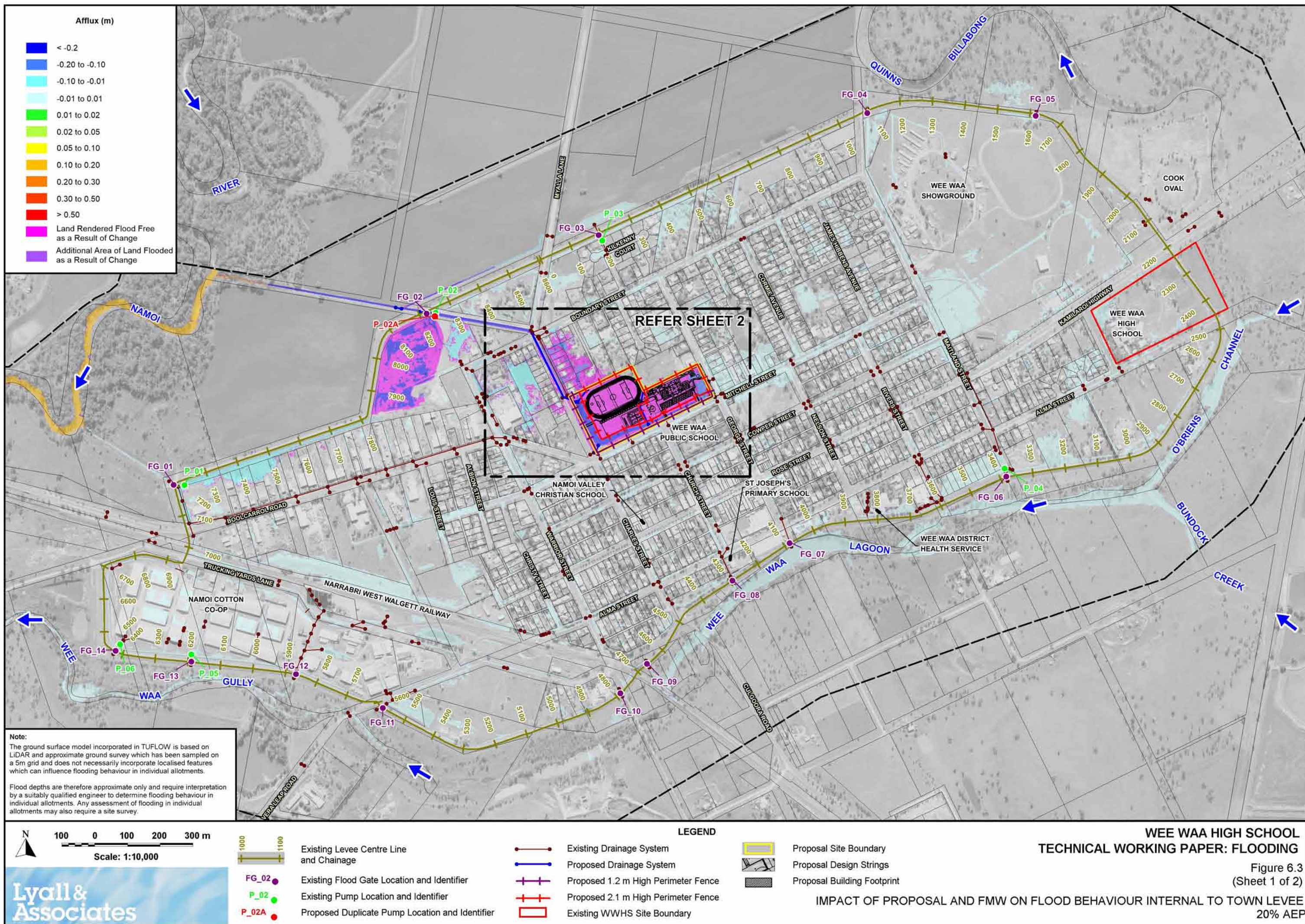


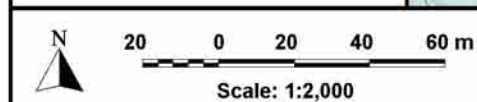
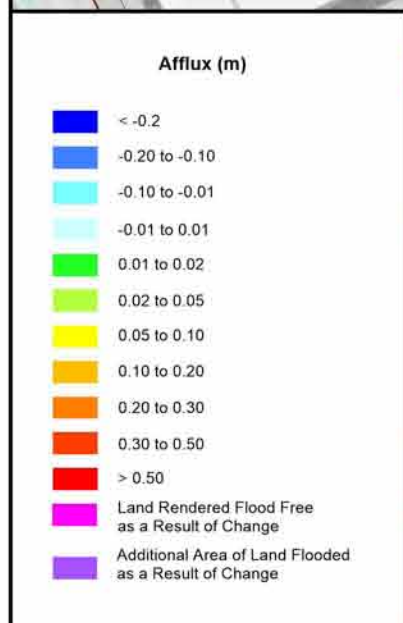
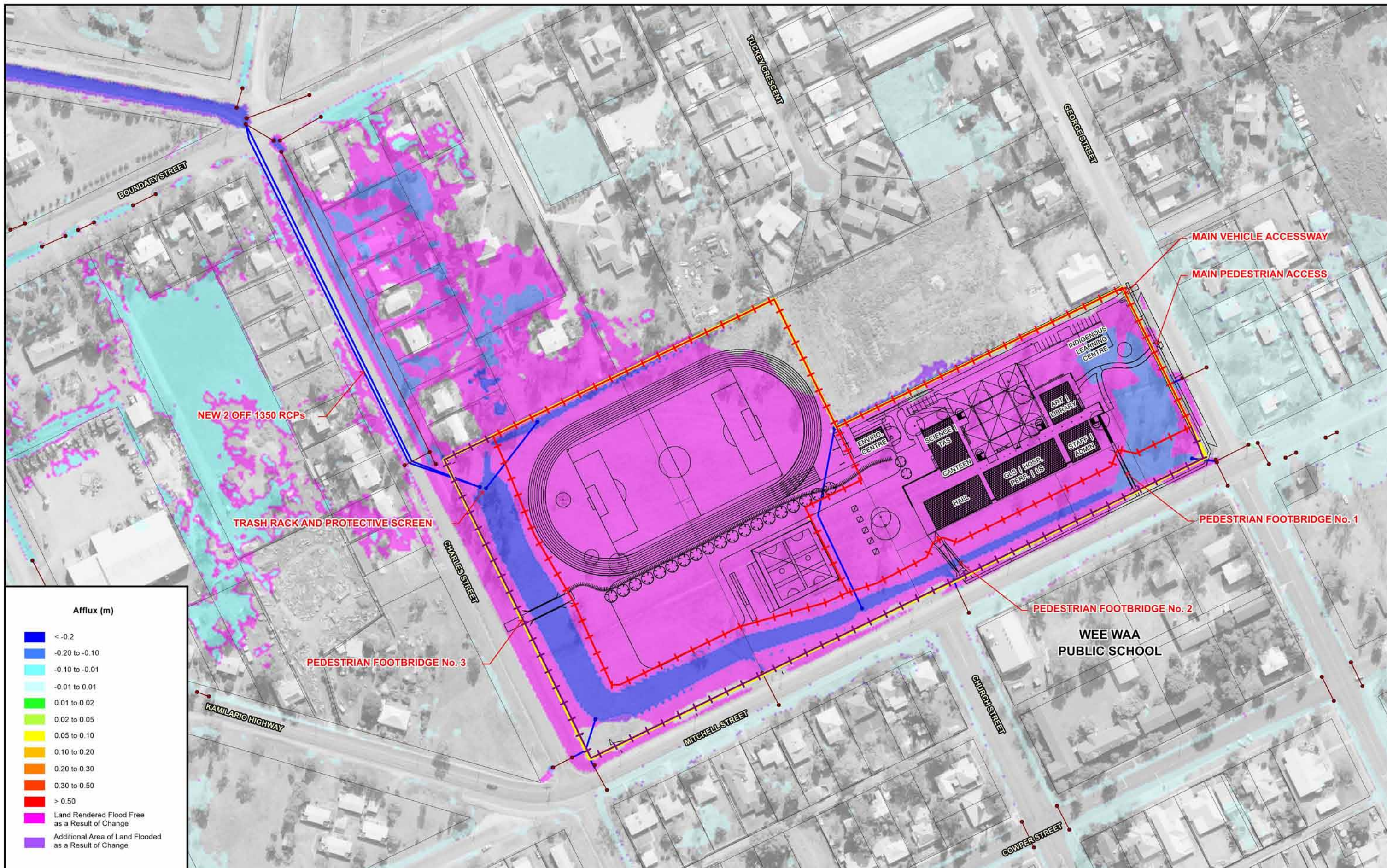


Scale: 1:2,000

Lyall & Associates

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Lyall & Associates

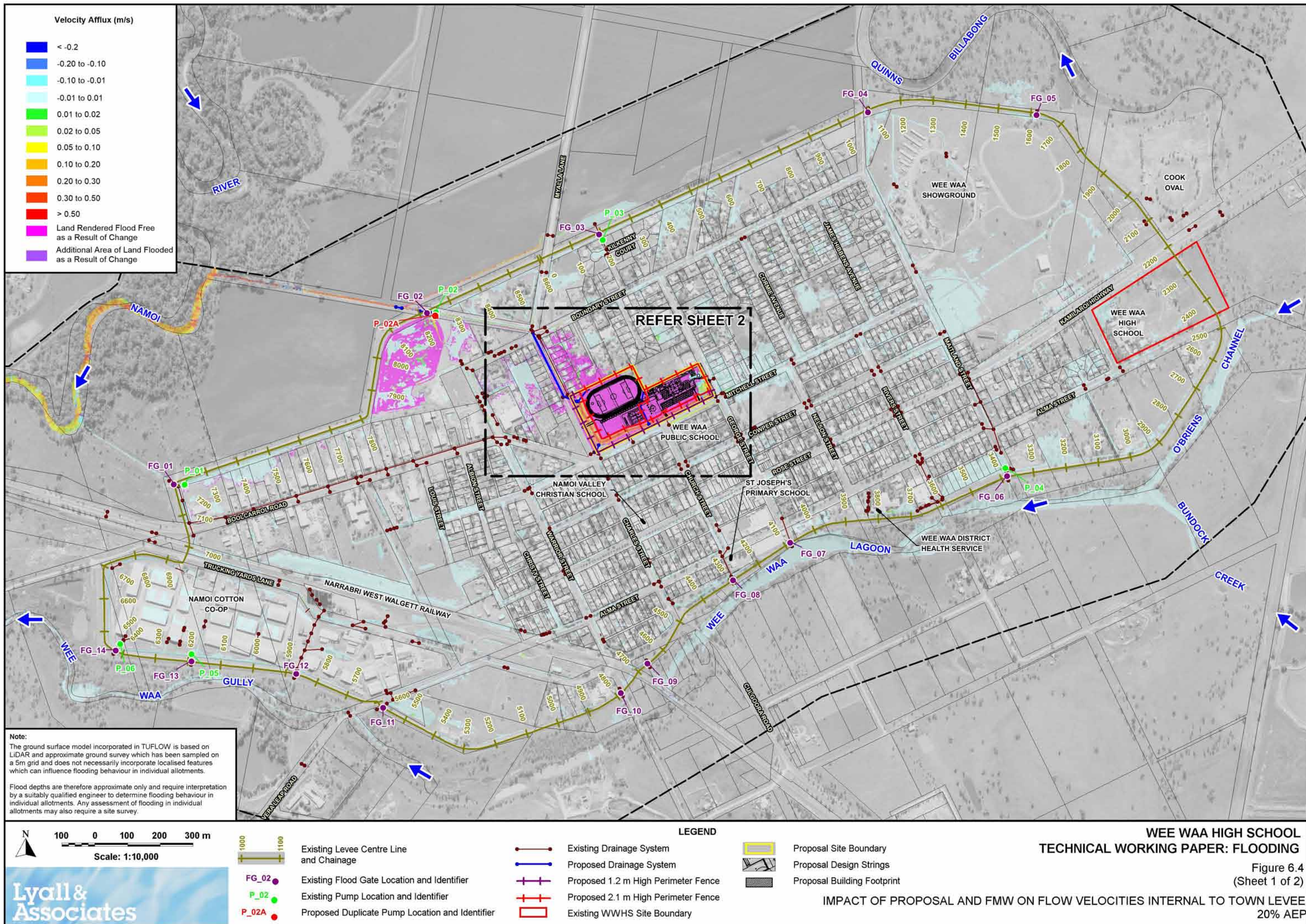
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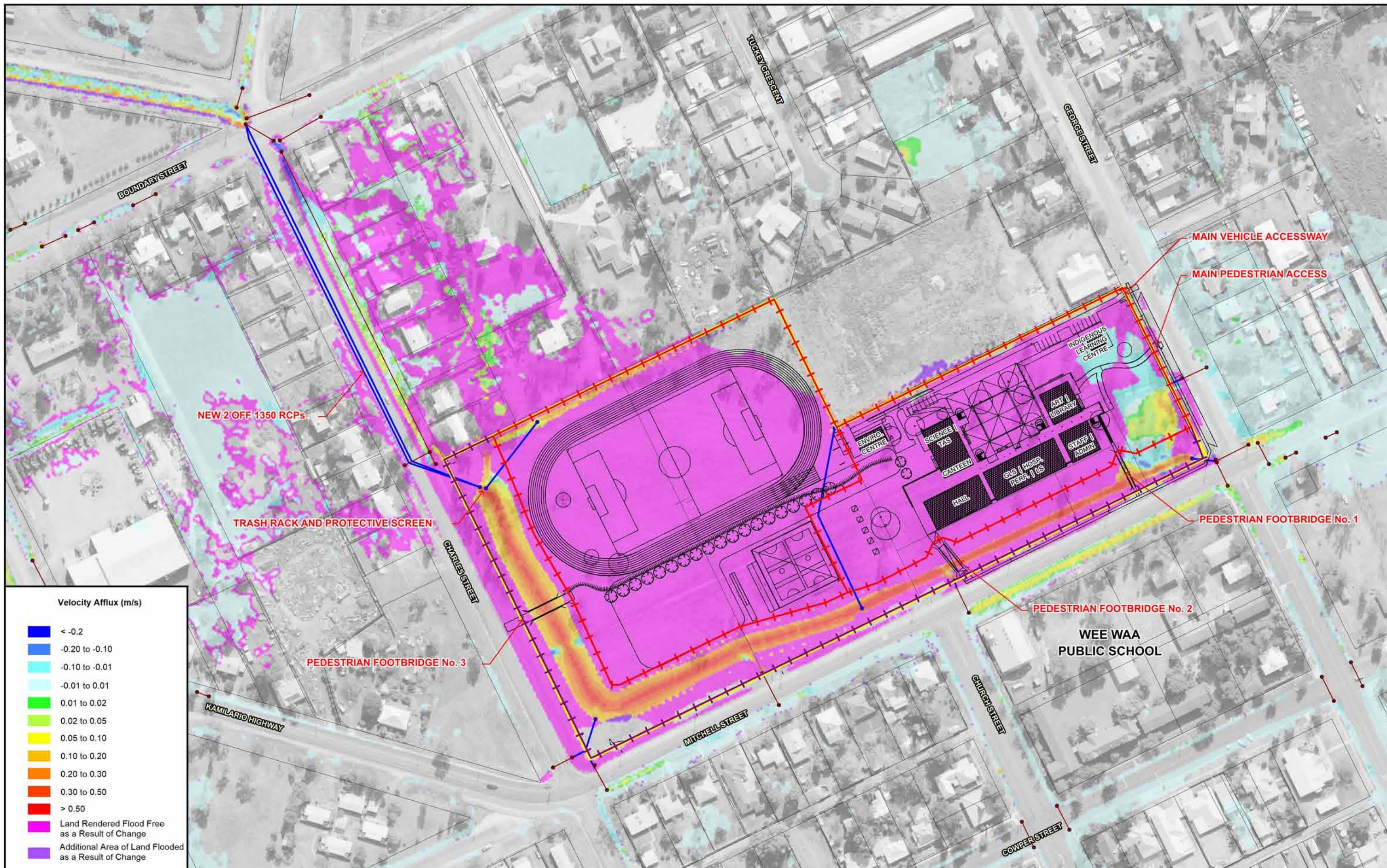
- LEGEND**
- Existing Drainage System
 - Proposed Drainage System
 - Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

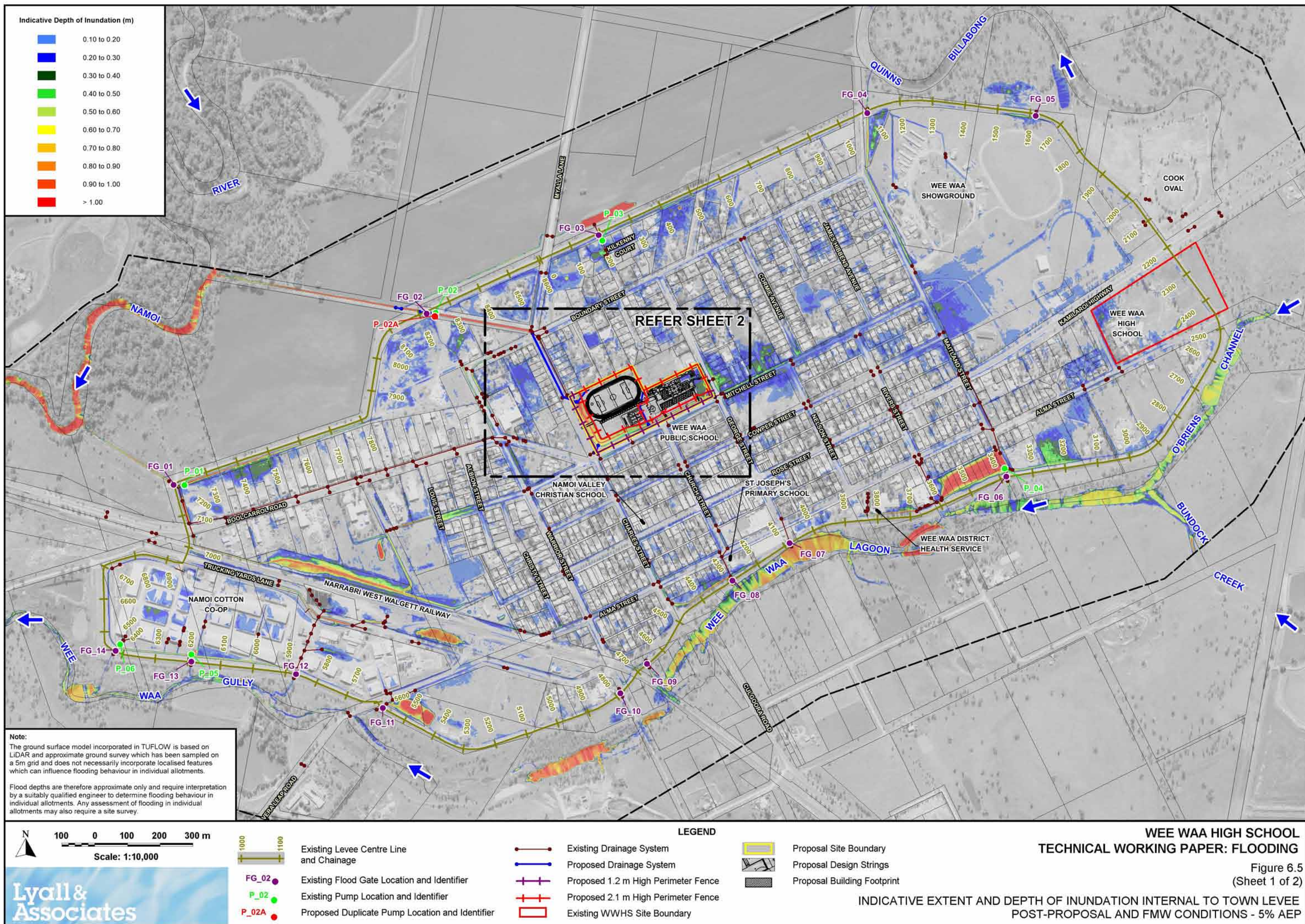
**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

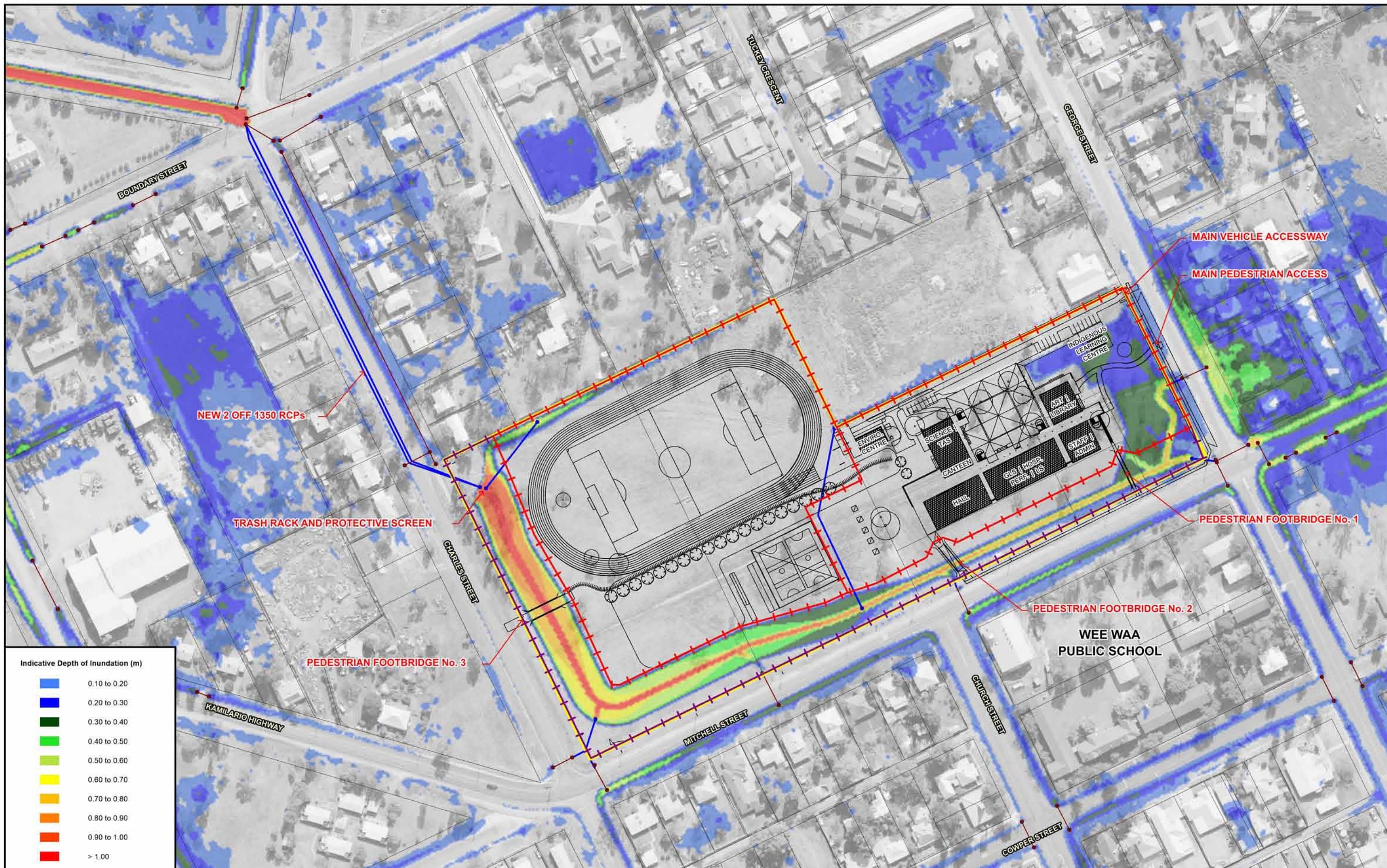
Figure 6.3
(Sheet 2 of 2)

IMPACT OF PROPOSAL AND FMW ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
20% AEP









Scale: 1:2,000

0 20 40 60 m

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Note:

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LEGEND

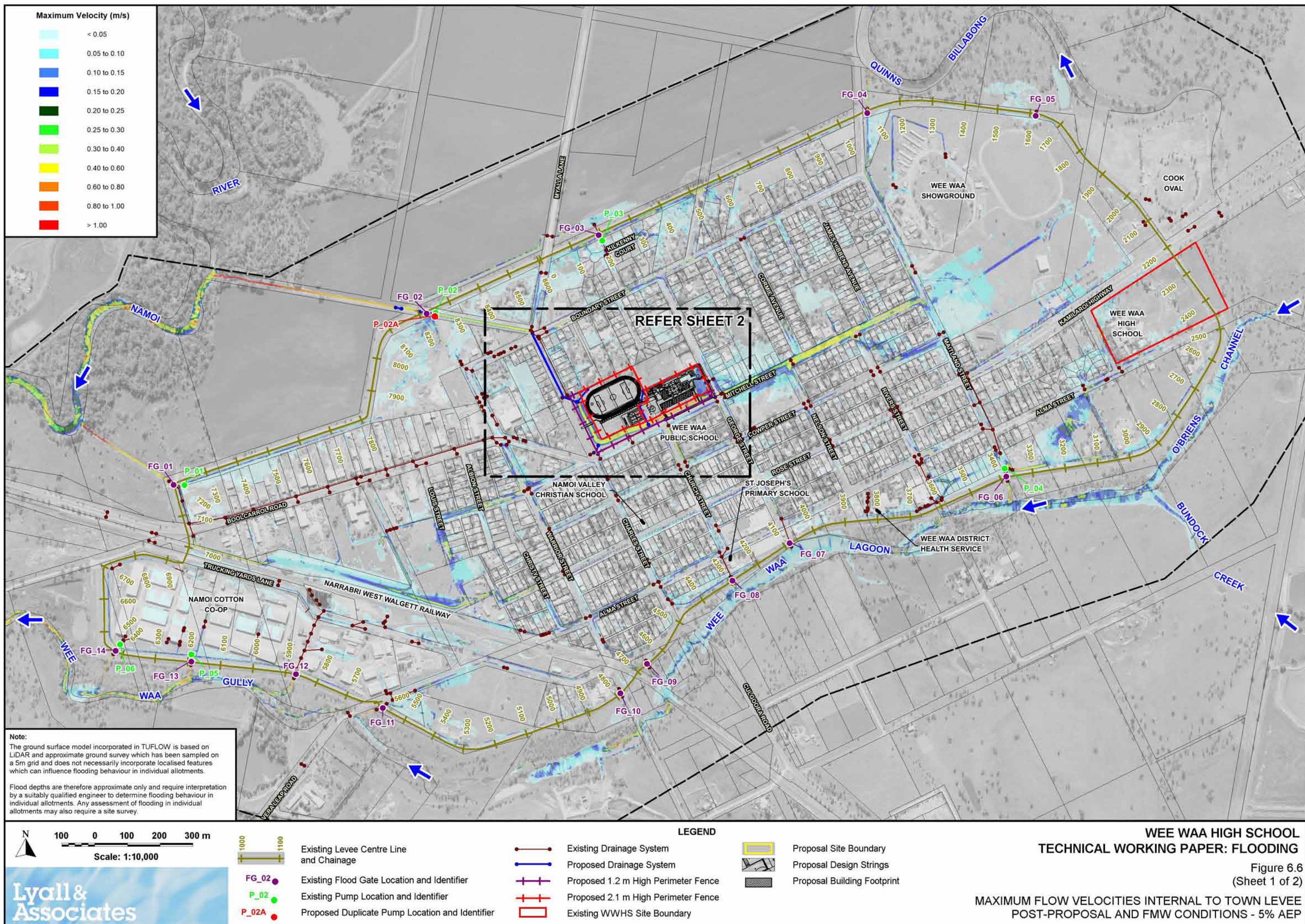
—●— Existing Drainage System	 Proposal Site Boundary
—●— Proposed Drainage System	 Proposal Design Strings
—+— Proposed 1.2 m High Perimeter Fence	 Proposal Building Footprint
—+— Proposed 2.1 m High Perimeter Fence	

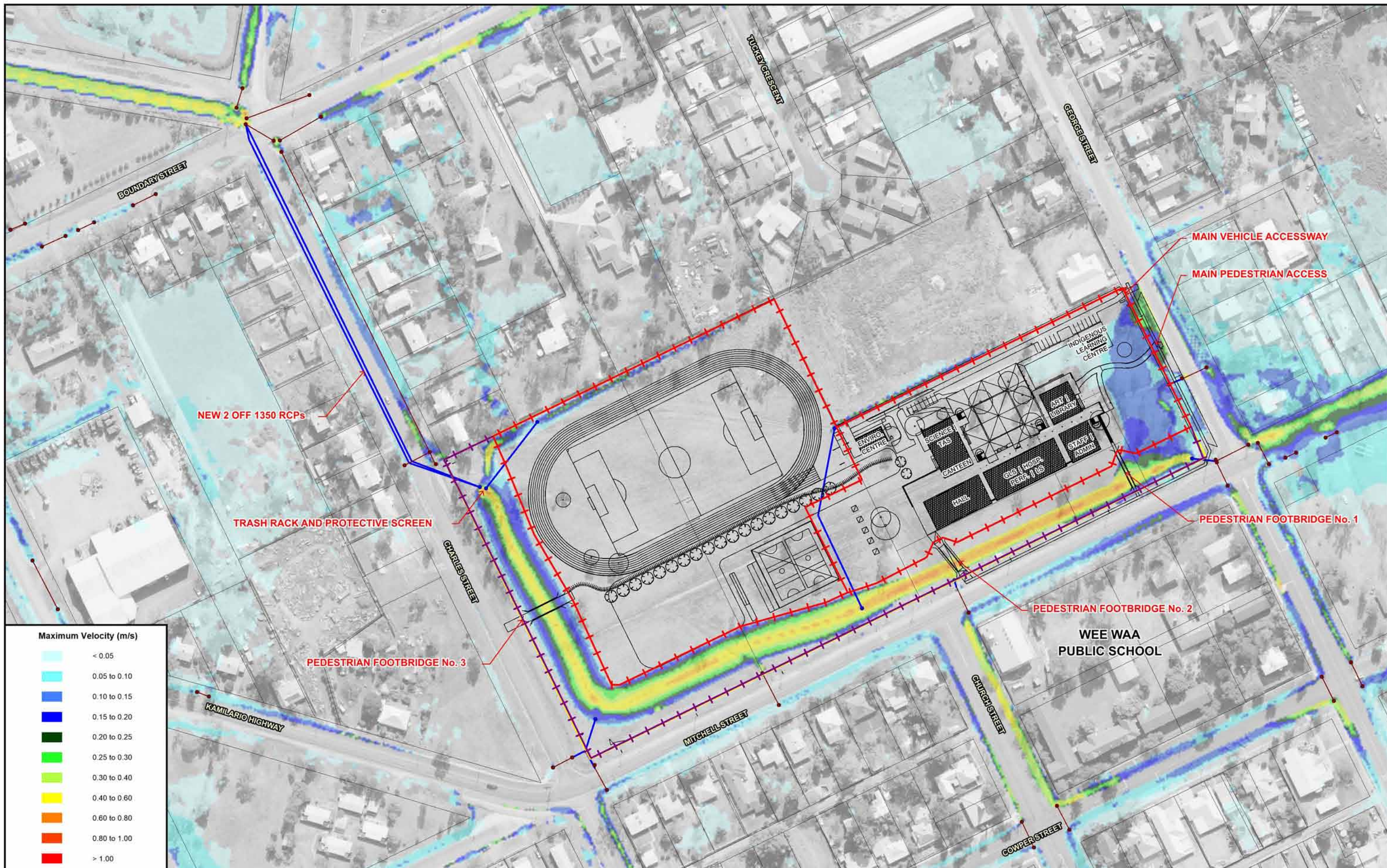
WEE WAA HIGH SCHOOL

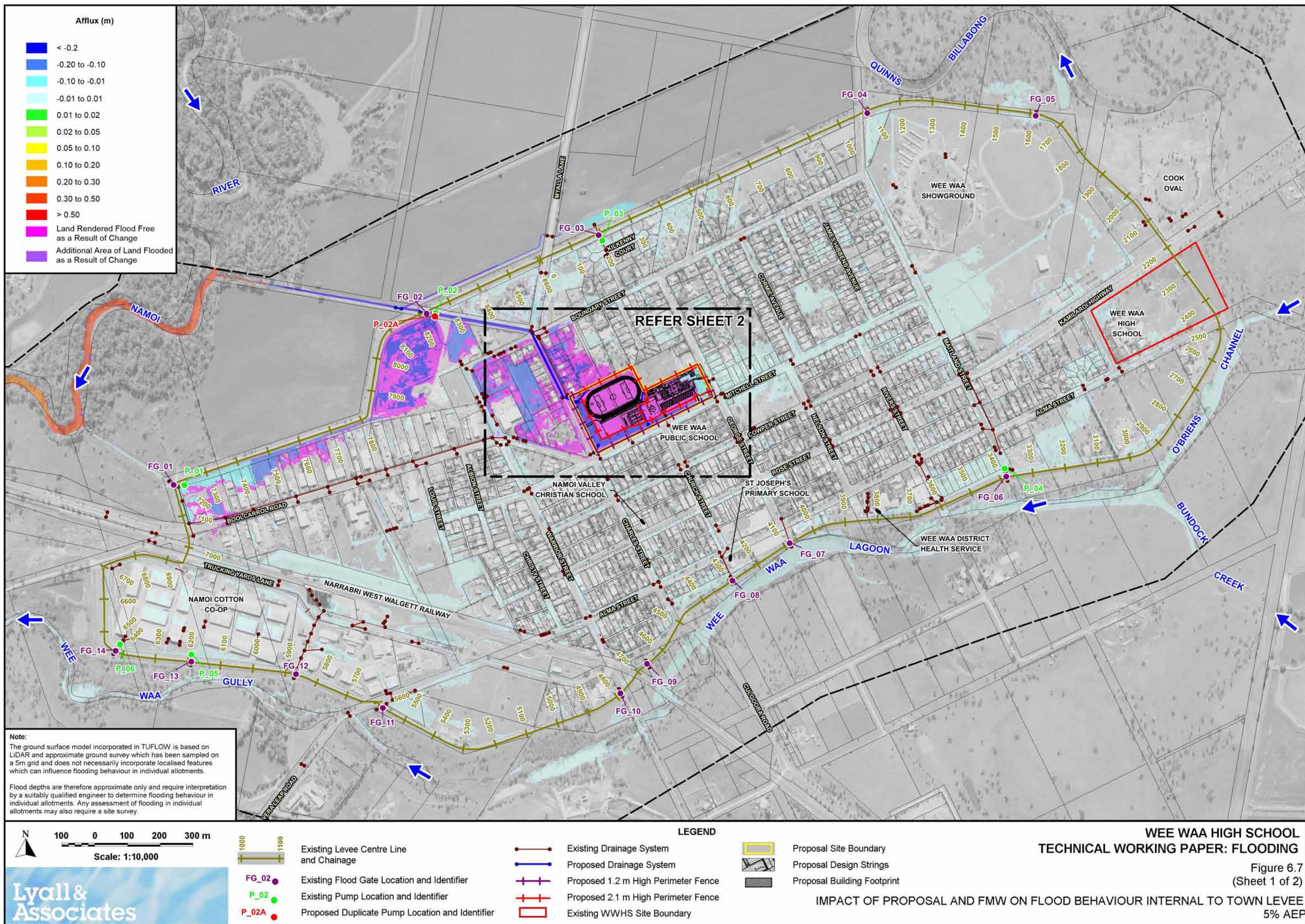
TECHNICAL WORKING PAPER: FLOODING

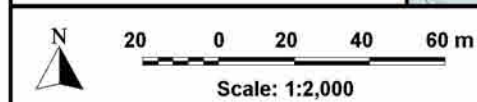
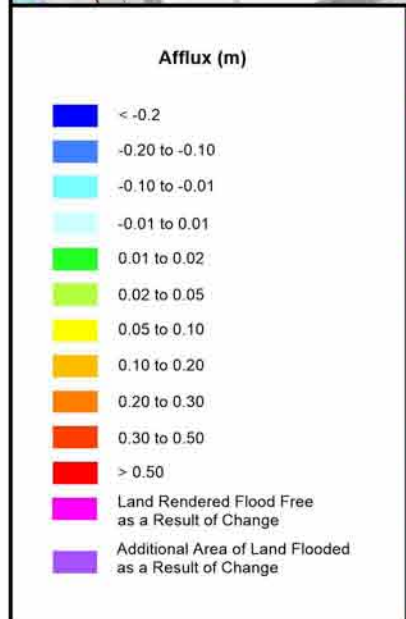
Figure 6.5
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 5% AEP









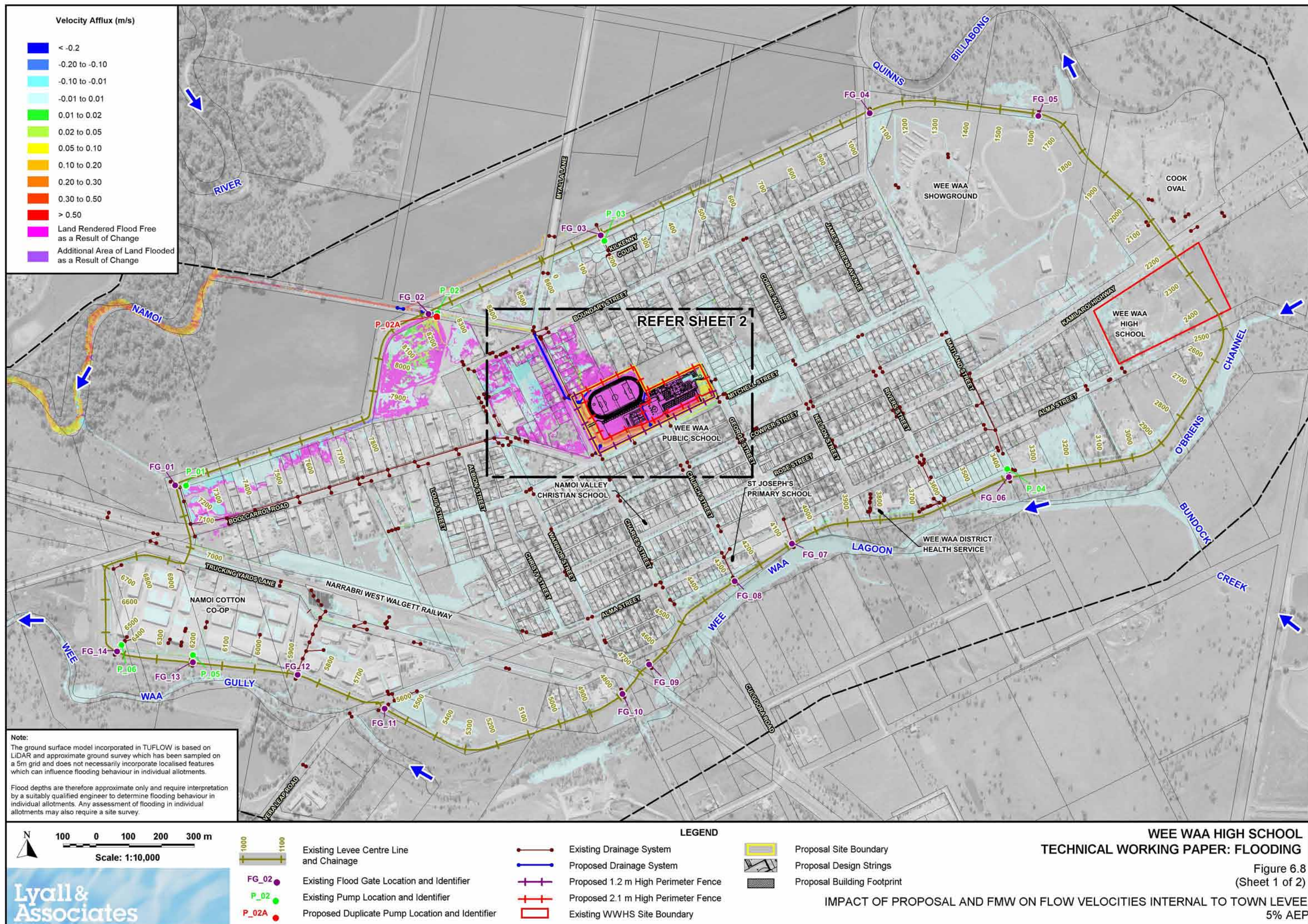
Lyall & Associates

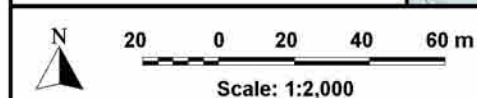
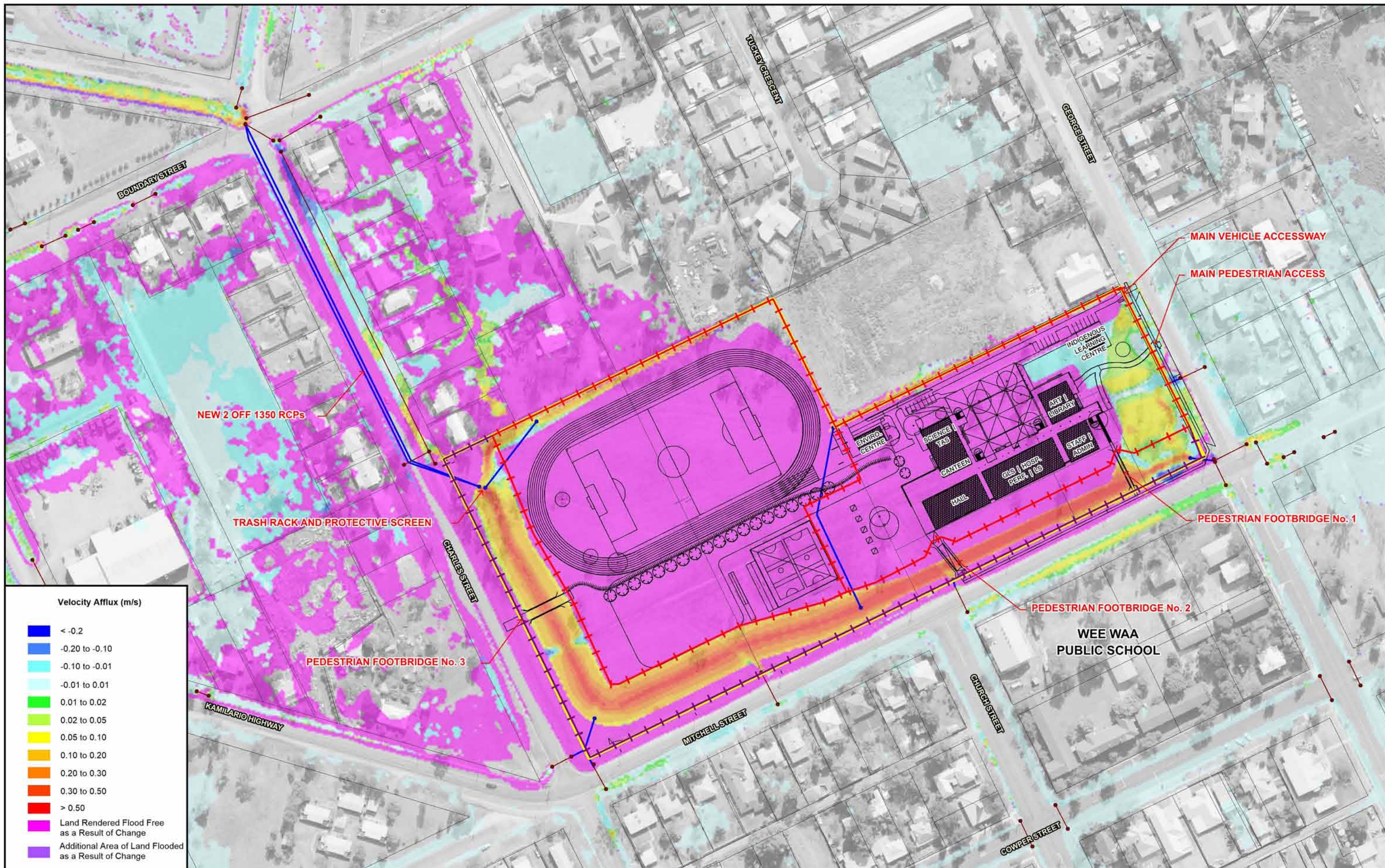
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- LEGEND**
- Existing Drainage System
 - Proposed Drainage System
 - Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

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TECHNICAL WORKING PAPER: FLOODING**

Figure 6.7
(Sheet 2 of 2)
IMPACT OF PROPOSAL AND FMW ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
5% AEP





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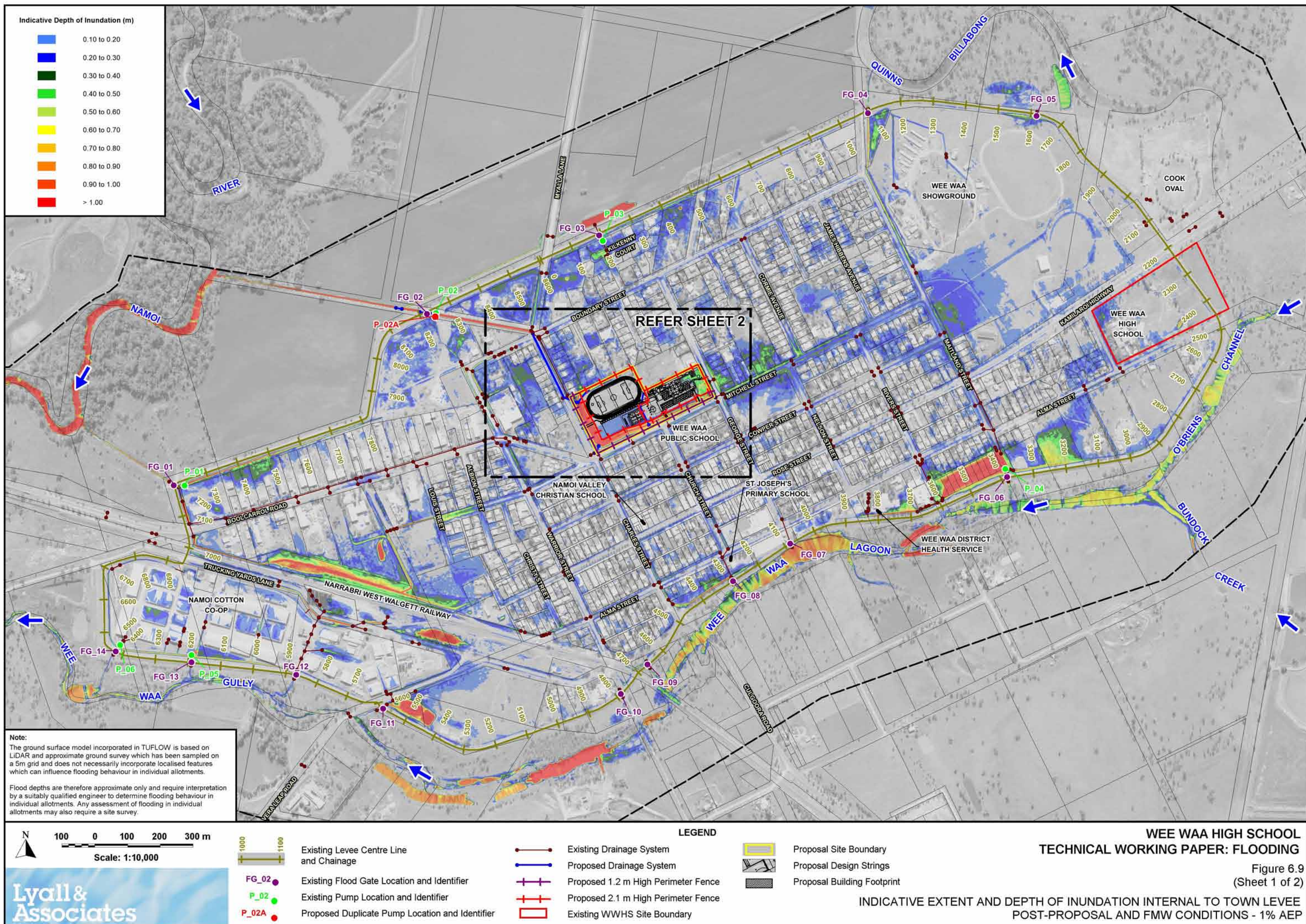
LEGEND

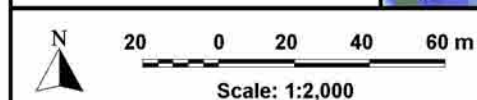
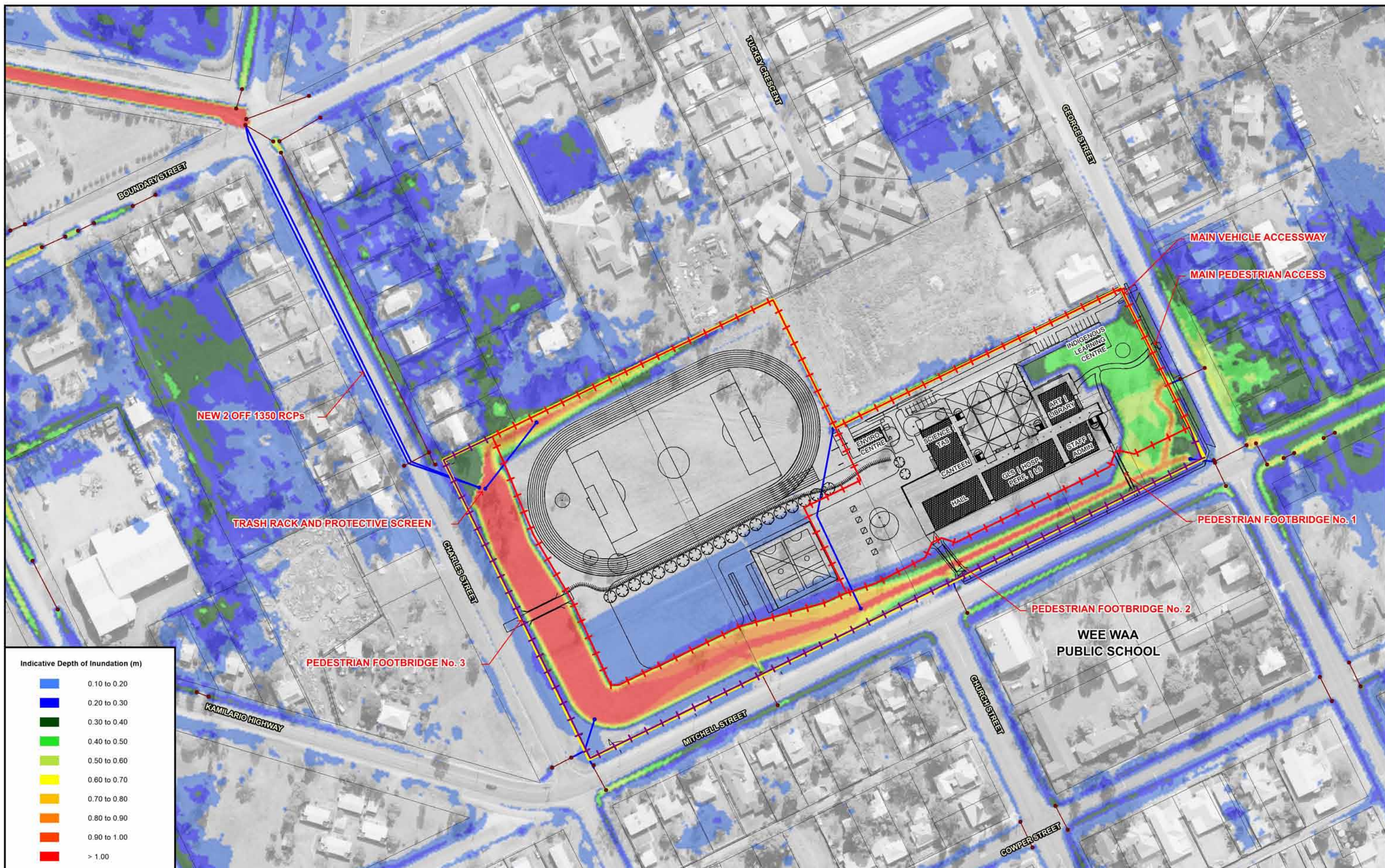
- | | | | |
|--|-------------------------------------|--|-----------------------------|
| | Existing Drainage System | | Proposal Site Boundary |
| | Proposed Drainage System | | Proposal Design Strings |
| | Proposed 1.2 m High Perimeter Fence | | Proposal Building Footprint |
| | Proposed 2.1 m High Perimeter Fence | | |

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Figure 6.8
(Sheet 2 of 2)

IMPACT OF PROPOSAL AND FMW ON FLOW VELOCITIES INTERNAL TO TOWN LEVEE
5% AEP





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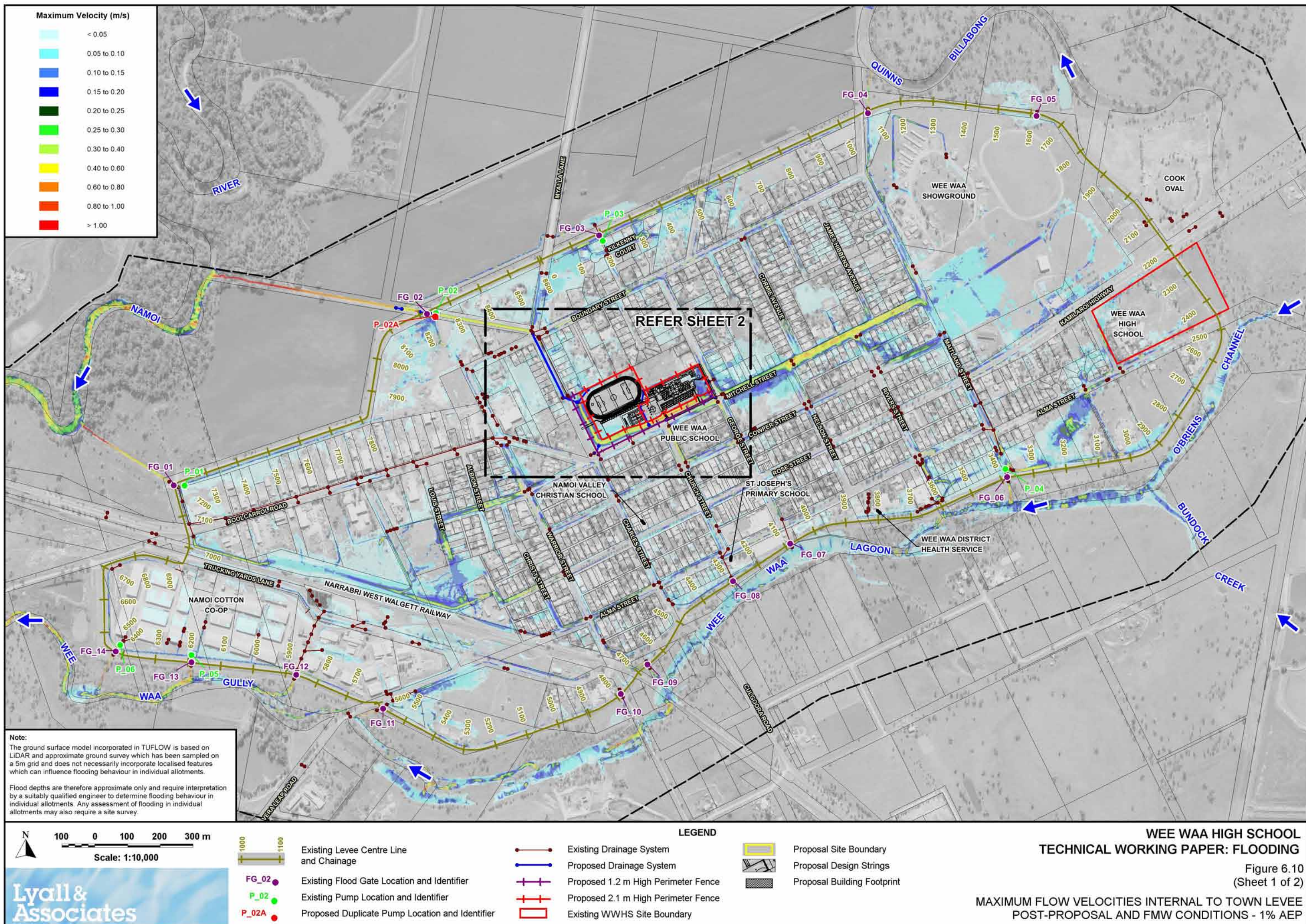
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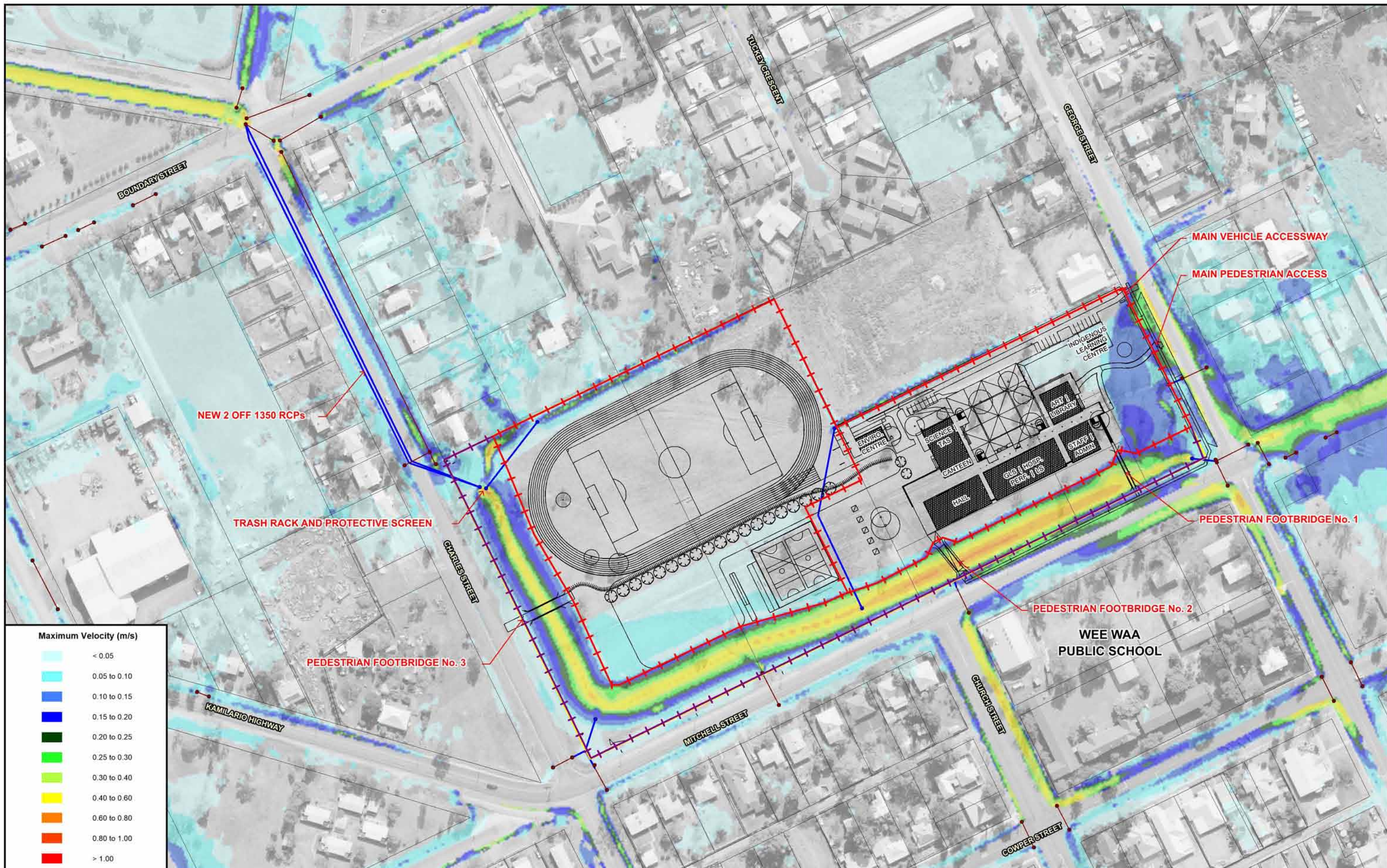
- LEGEND**
- Existing Drainage System
 - Proposed Drainage System
 - Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 6.9
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 1% AEP





Maximum Velocity (m/s)

■	< 0.05
■	0.05 to 0.10
■	0.10 to 0.15
■	0.15 to 0.20
■	0.20 to 0.25
■	0.25 to 0.30
■	0.30 to 0.40
■	0.40 to 0.60
■	0.60 to 0.80
■	0.80 to 1.00
■	> 1.00



20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

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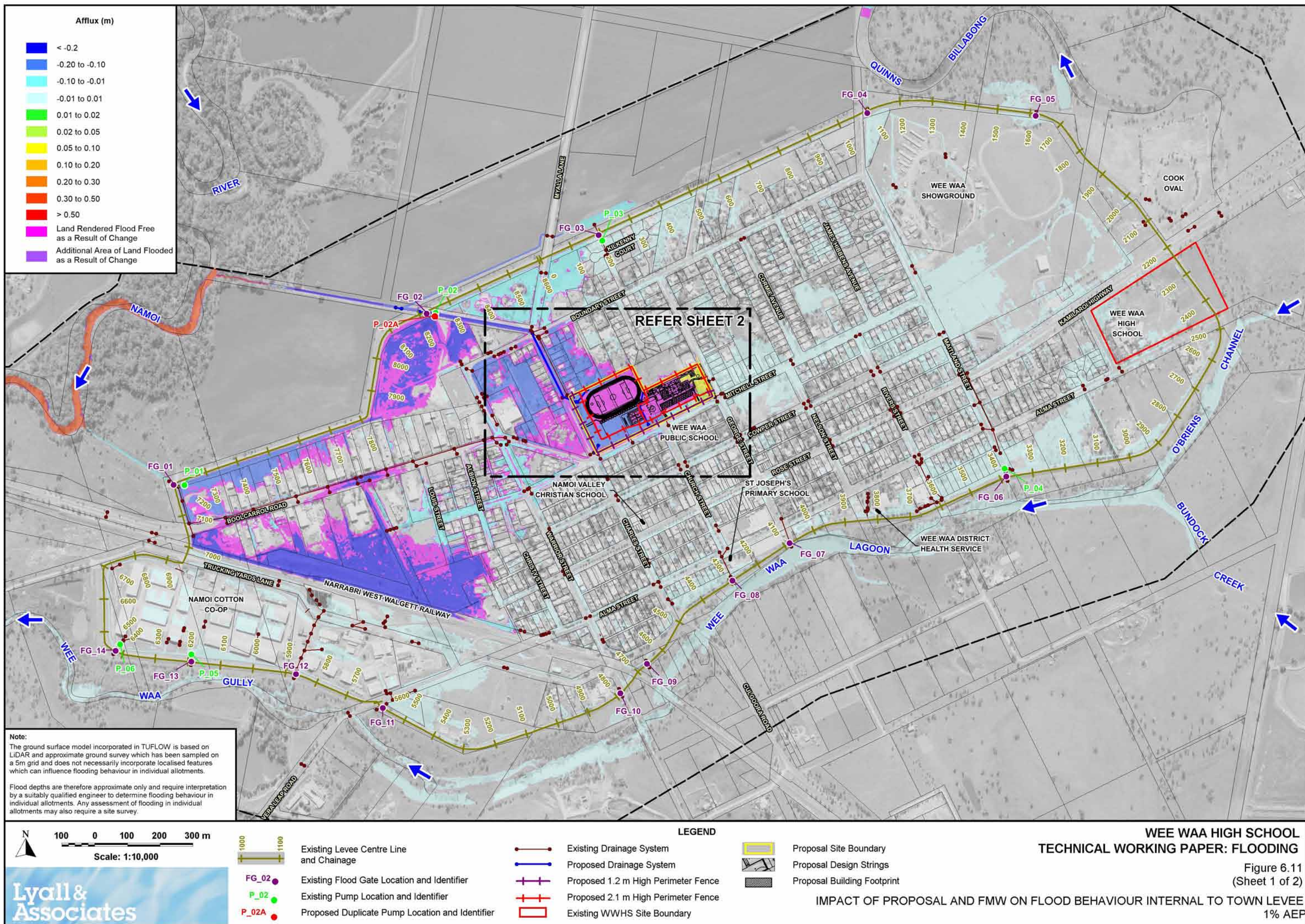
LEGEND

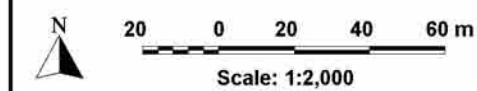
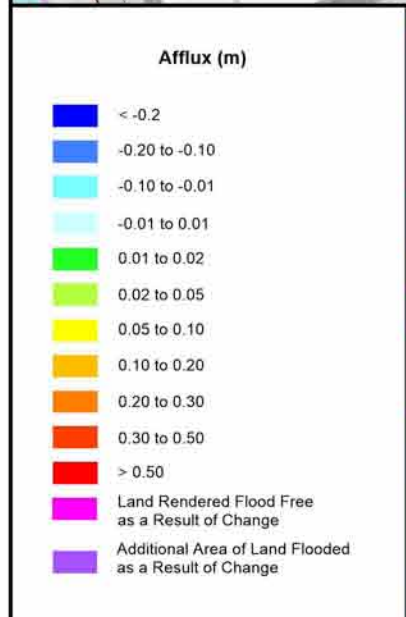
—	Existing Drainage System		Proposal Site Boundary
—	Proposed Drainage System		Proposal Design Strings
—	Proposed 1.2 m High Perimeter Fence		Proposal Building Footprint
—	Proposed 2.1 m High Perimeter Fence		

WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 6.10
(Sheet 2 of 2)

MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 1% AEP





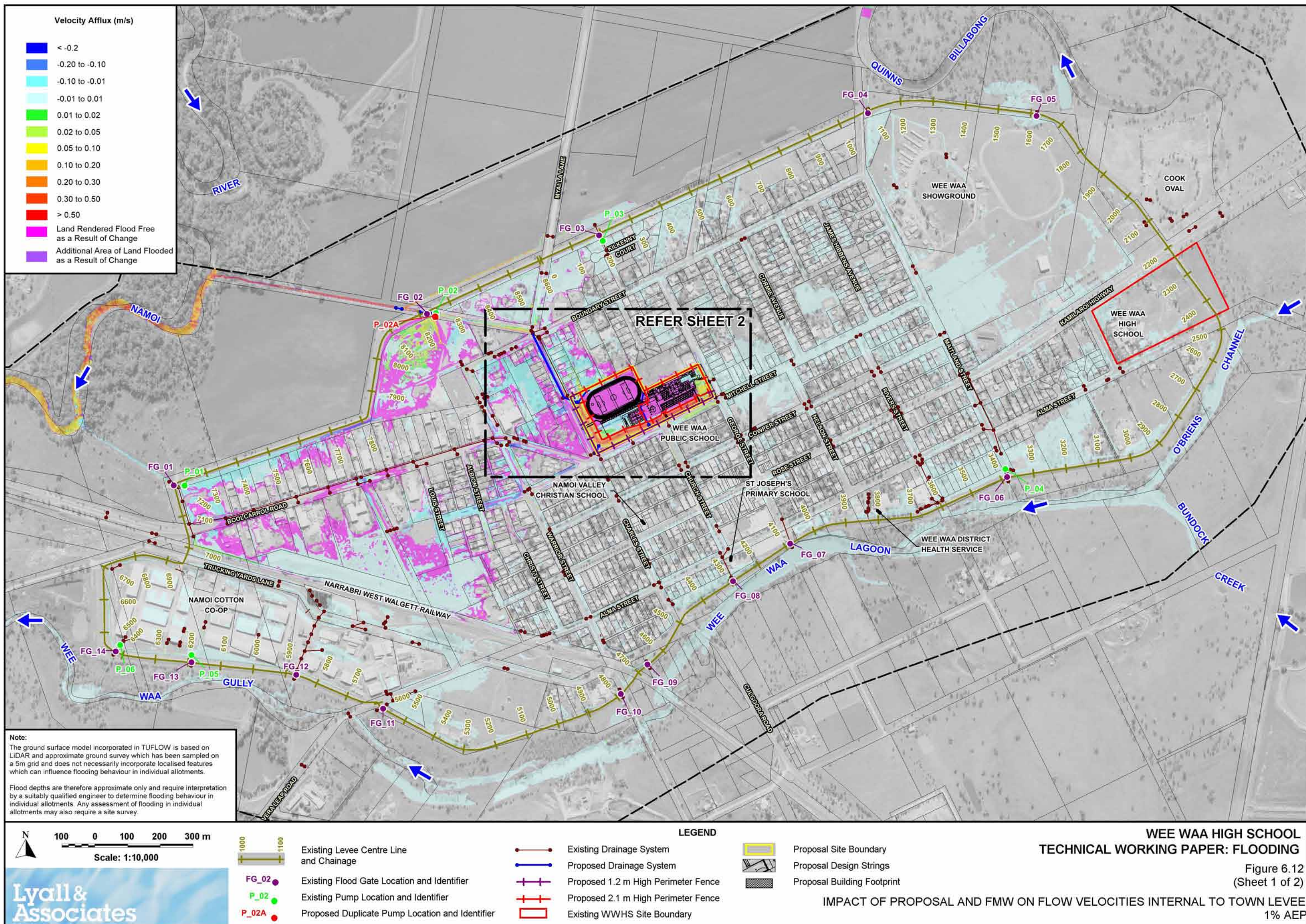
Lyall & Associates

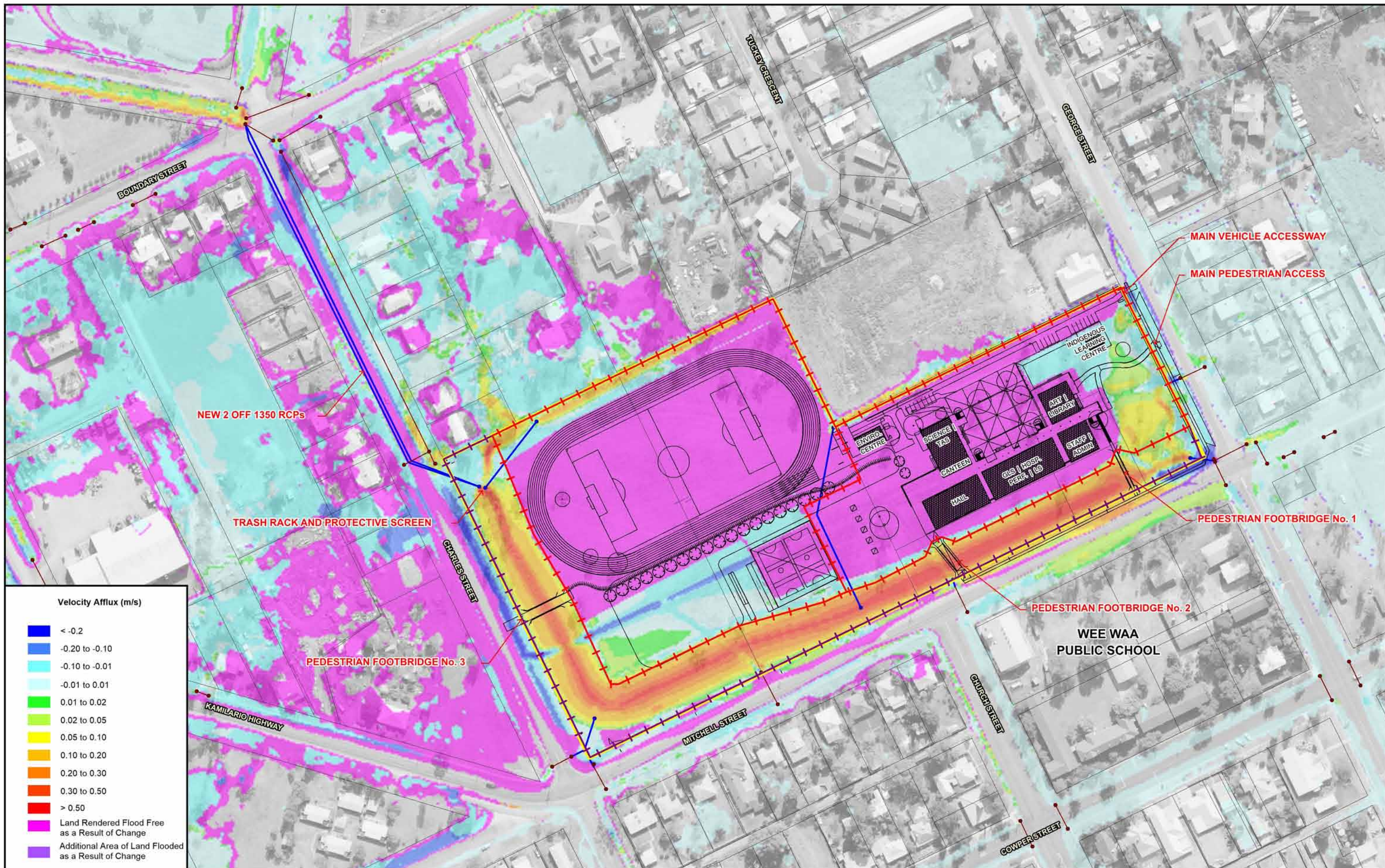
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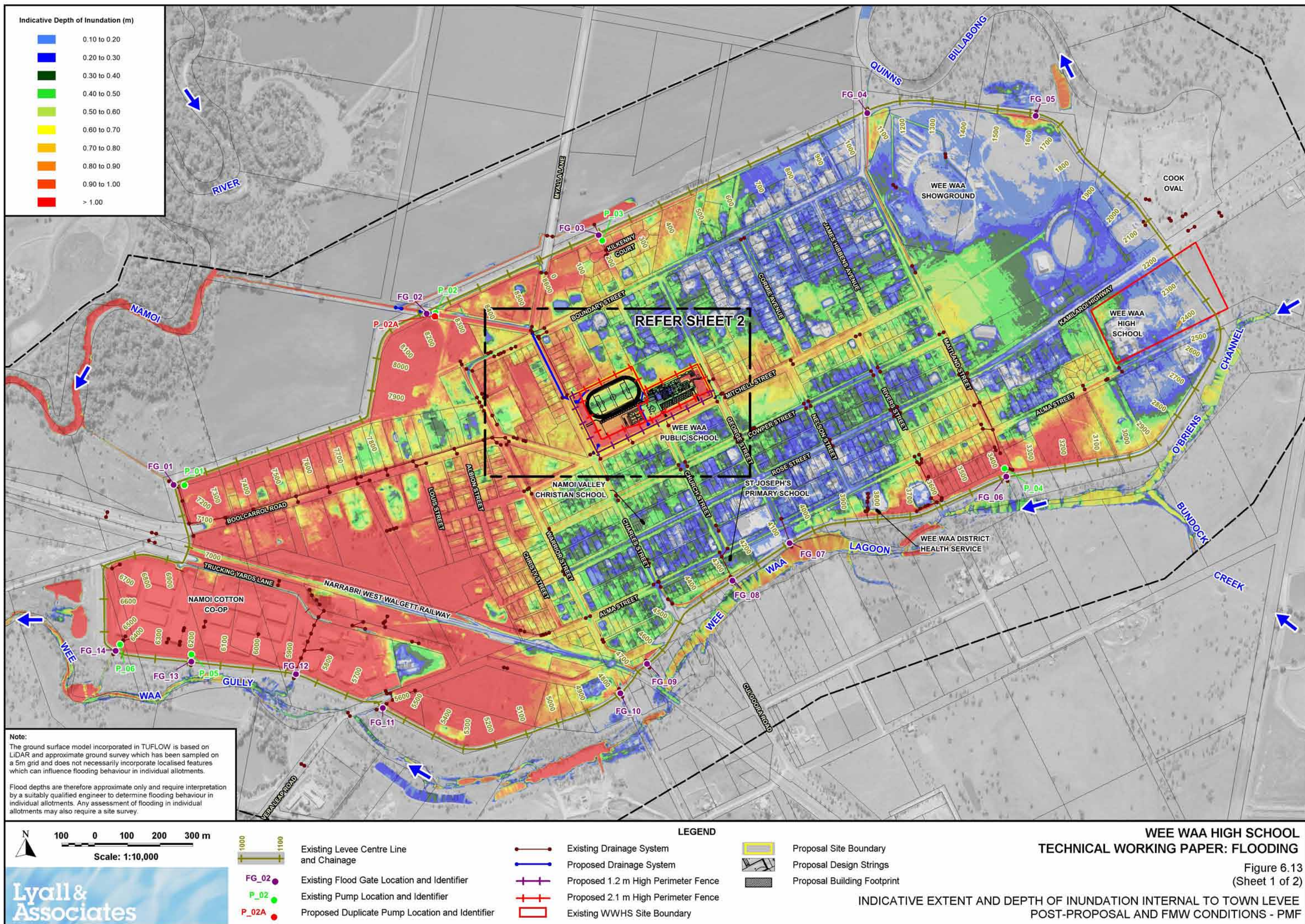
- LEGEND**
- Existing Drainage System
 - Proposed Drainage System
 - Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

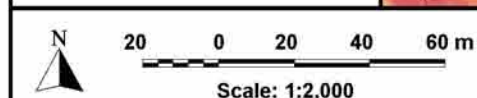
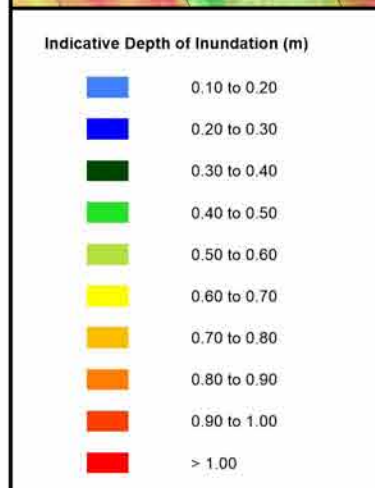
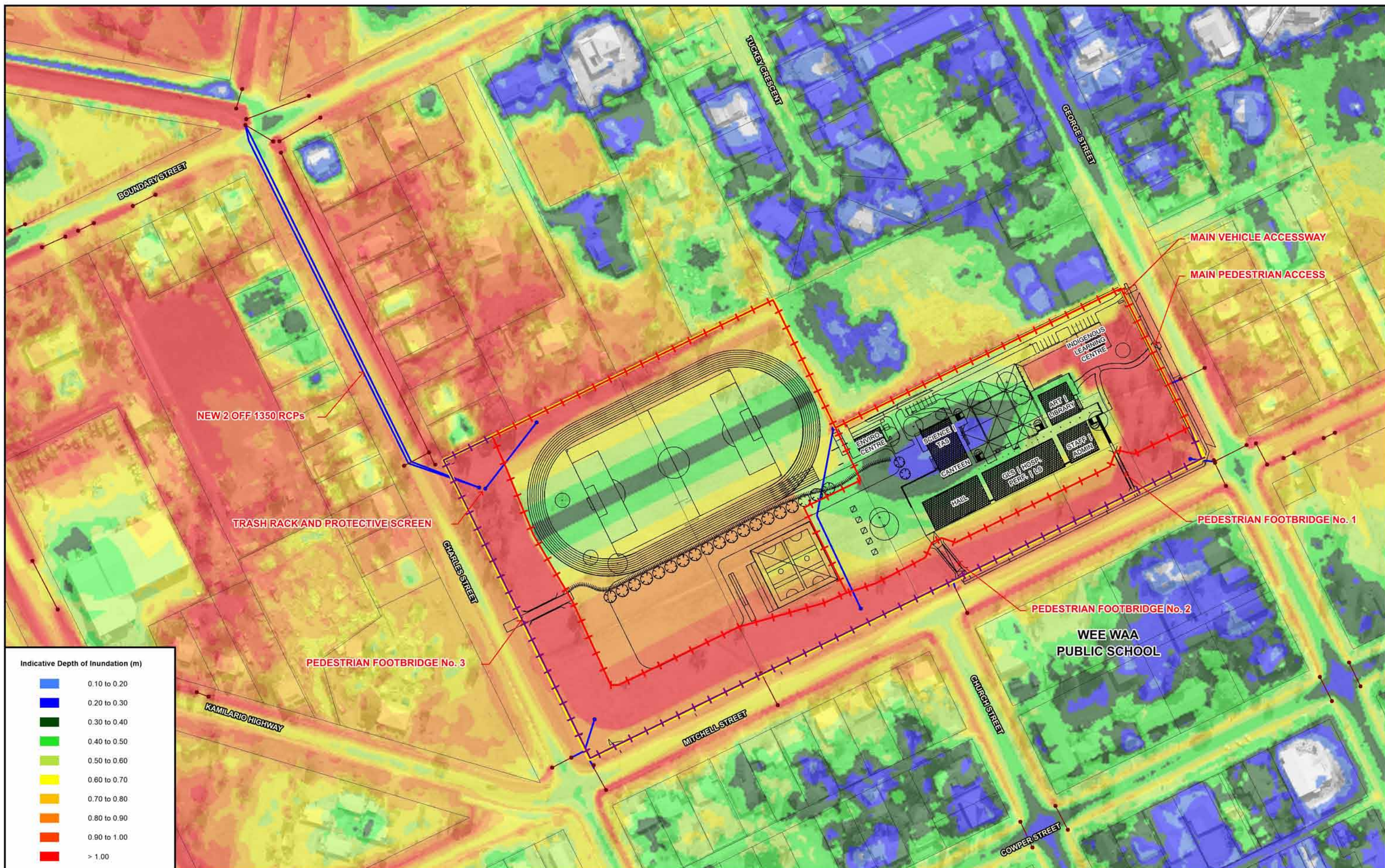
**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 6.11
(Sheet 2 of 2)
IMPACT OF PROPOSAL AND FMW ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1% AEP







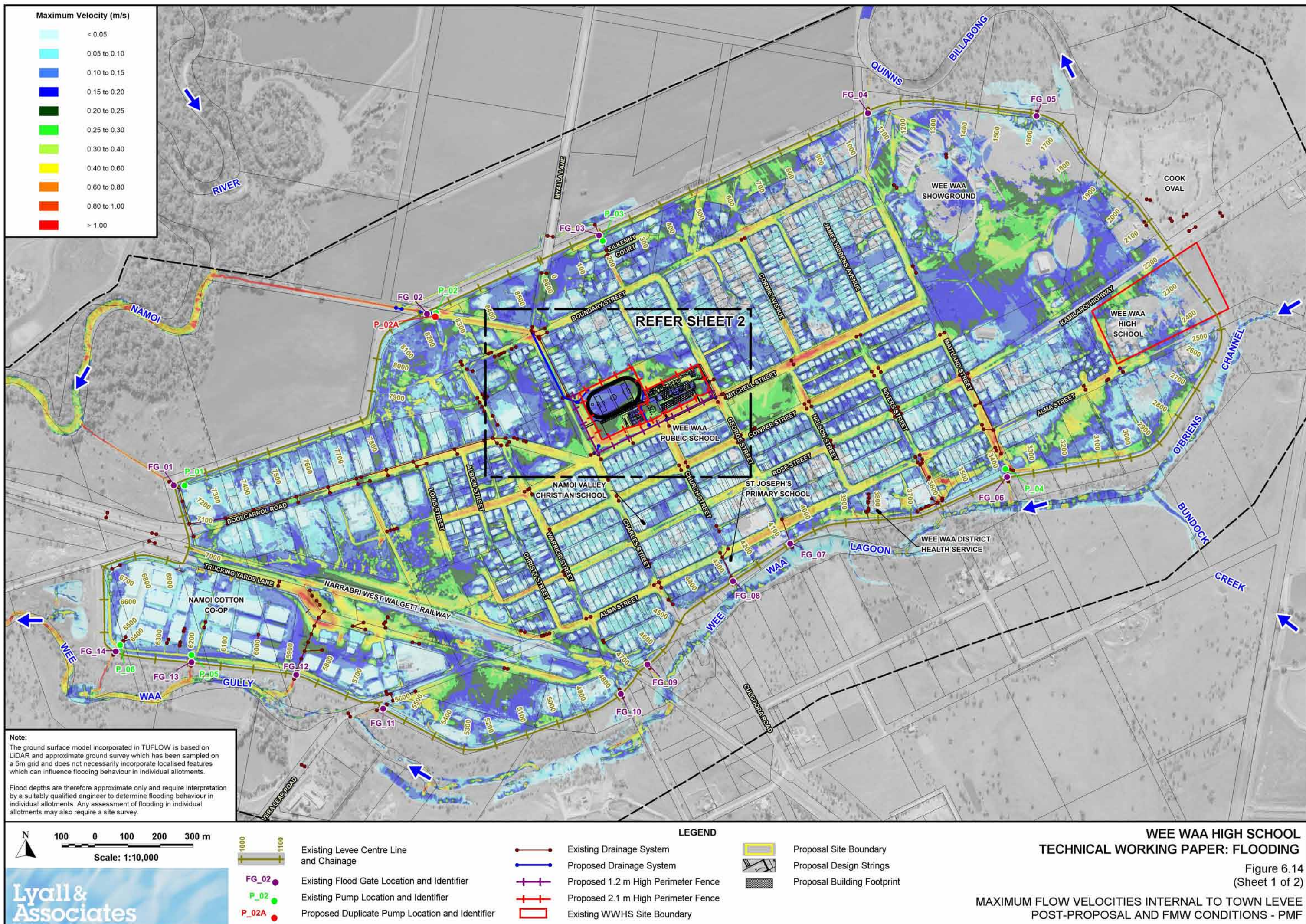


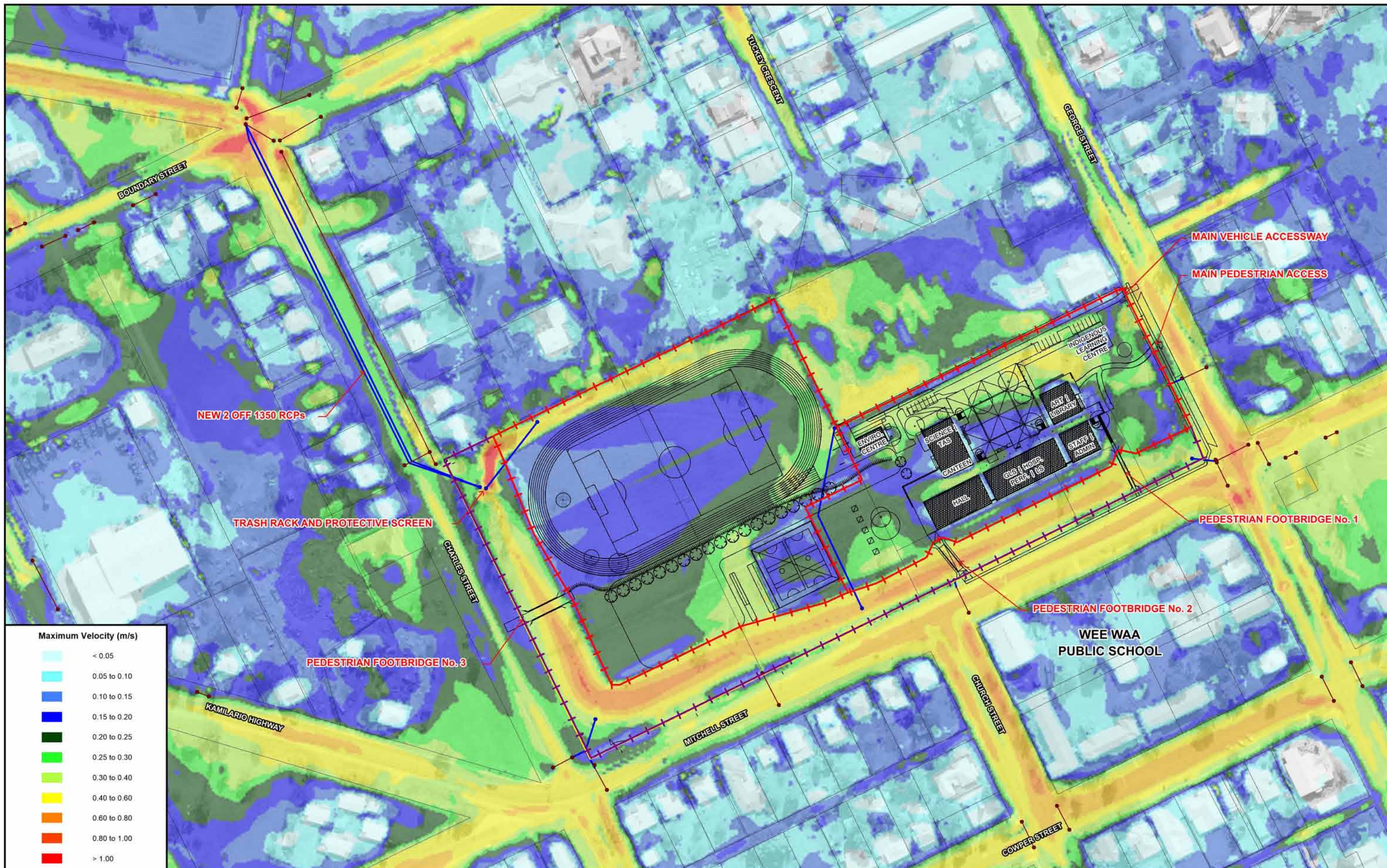
Lyall & Associates

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- LEGEND**
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 - Proposed Drainage System
 - Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING
Figure 6.13
(Sheet 2 of 2)
INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - PMF





Scale: 1:2,000

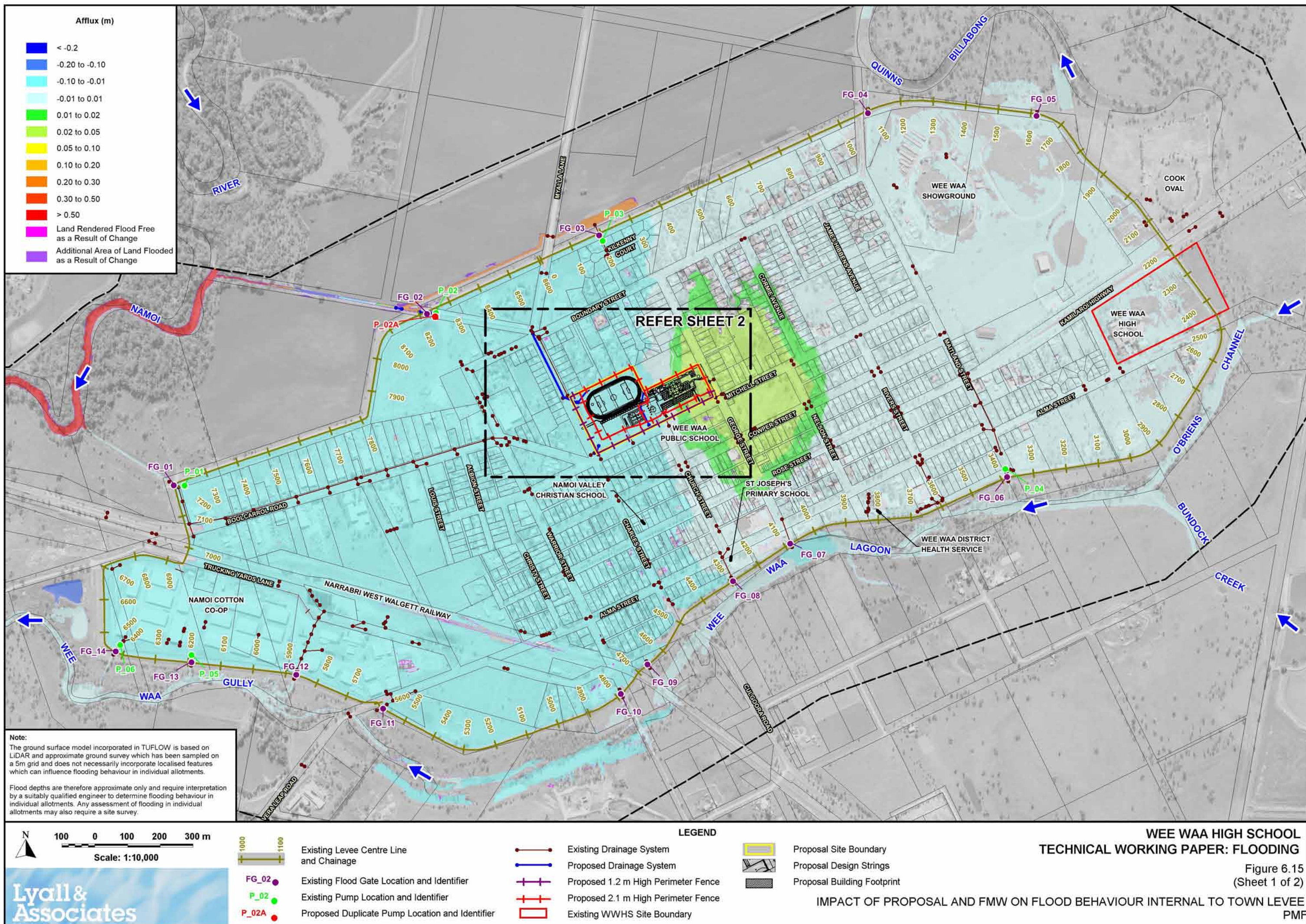
Lyall & Associates

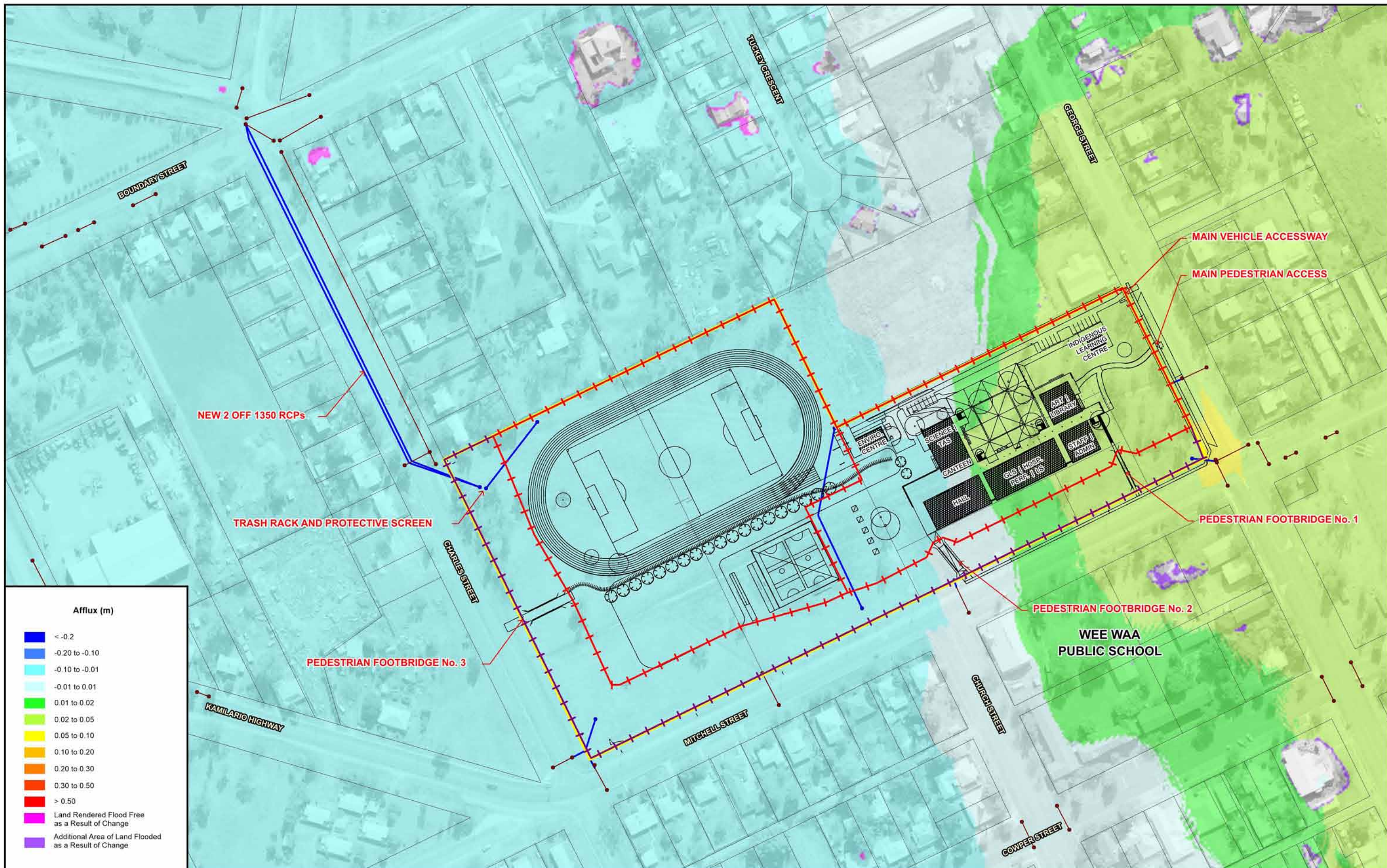
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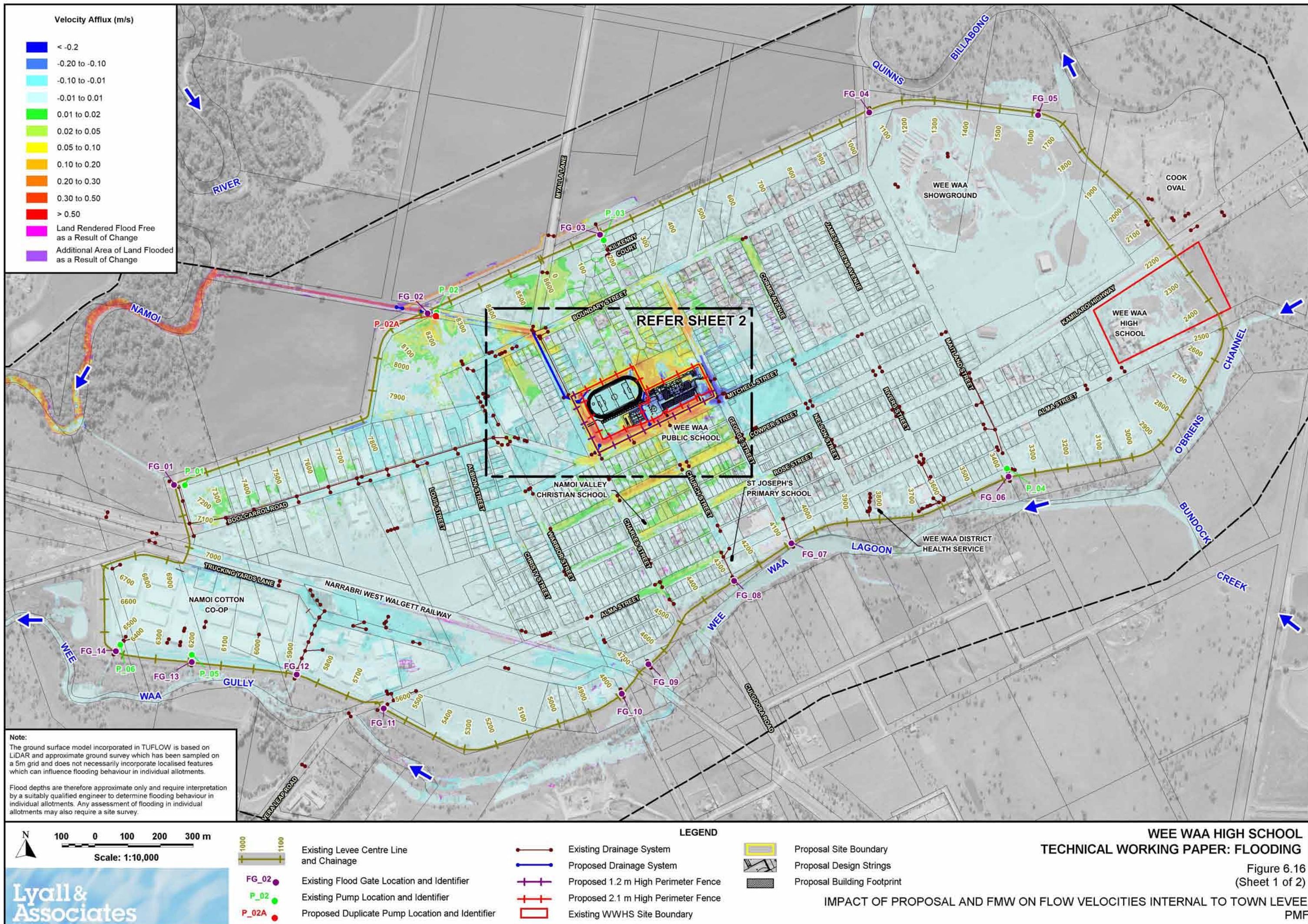
WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

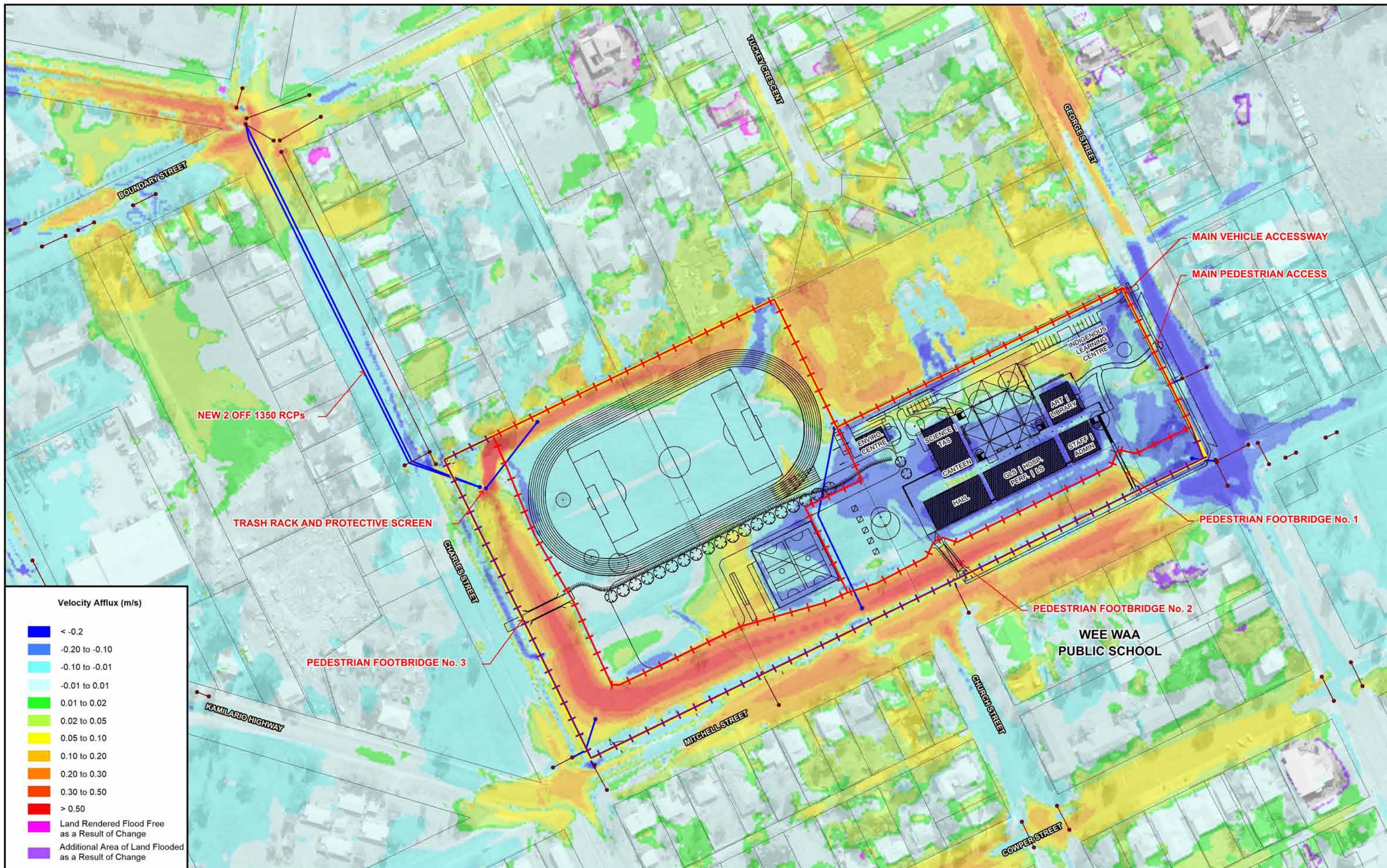
Figure 6.14
(Sheet 2 of 2)

MAXIMUM FLOW VELOCITIES INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - PMF









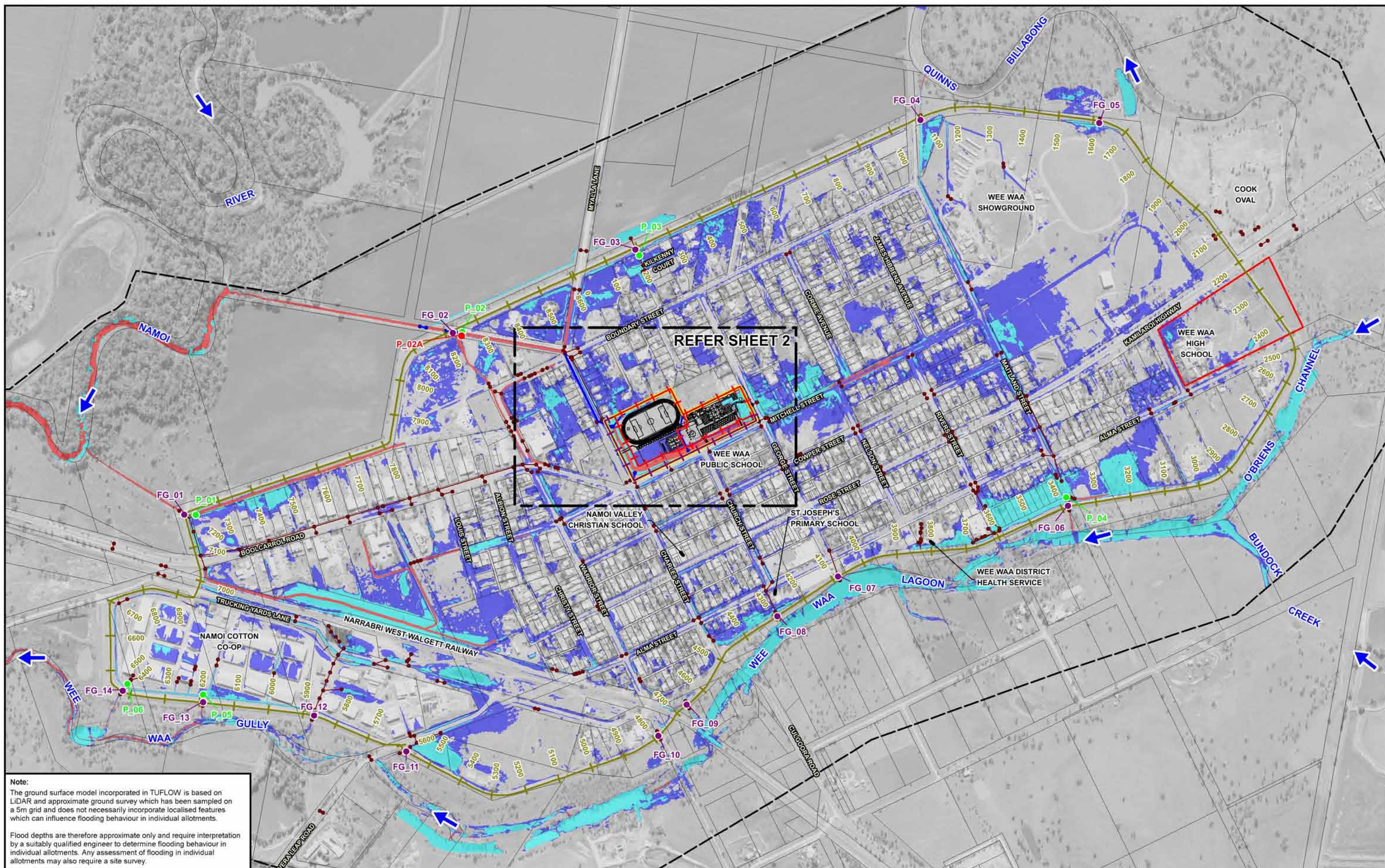
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Lyall & Associates

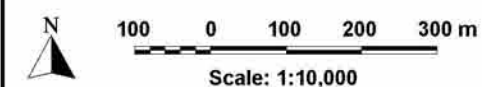
WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 6.16
(Sheet 2 of 2)

IMPACT OF PROPOSAL AND FMW ON FLOW VELOCITIES INTERNAL TO TOWN LEVEE PMF



Note:
 The ground surface model incorporated in TUFLOW is based on LIDAR and approximate ground survey which has been sampled on a 5m 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.



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- Existing Levee Centre Line and Chainage
- FG_02 Existing Flood Gate Location and Identifier
- P_02 Existing Pump Location and Identifier
- P_02A Proposed Duplicate Pump Location and Identifier

- Existing Drainage System
- Proposed Drainage System
- Proposed 1.2 m High Perimeter Fence
- Proposed 2.1 m High Perimeter Fence
- Existing WWHS Site Boundary

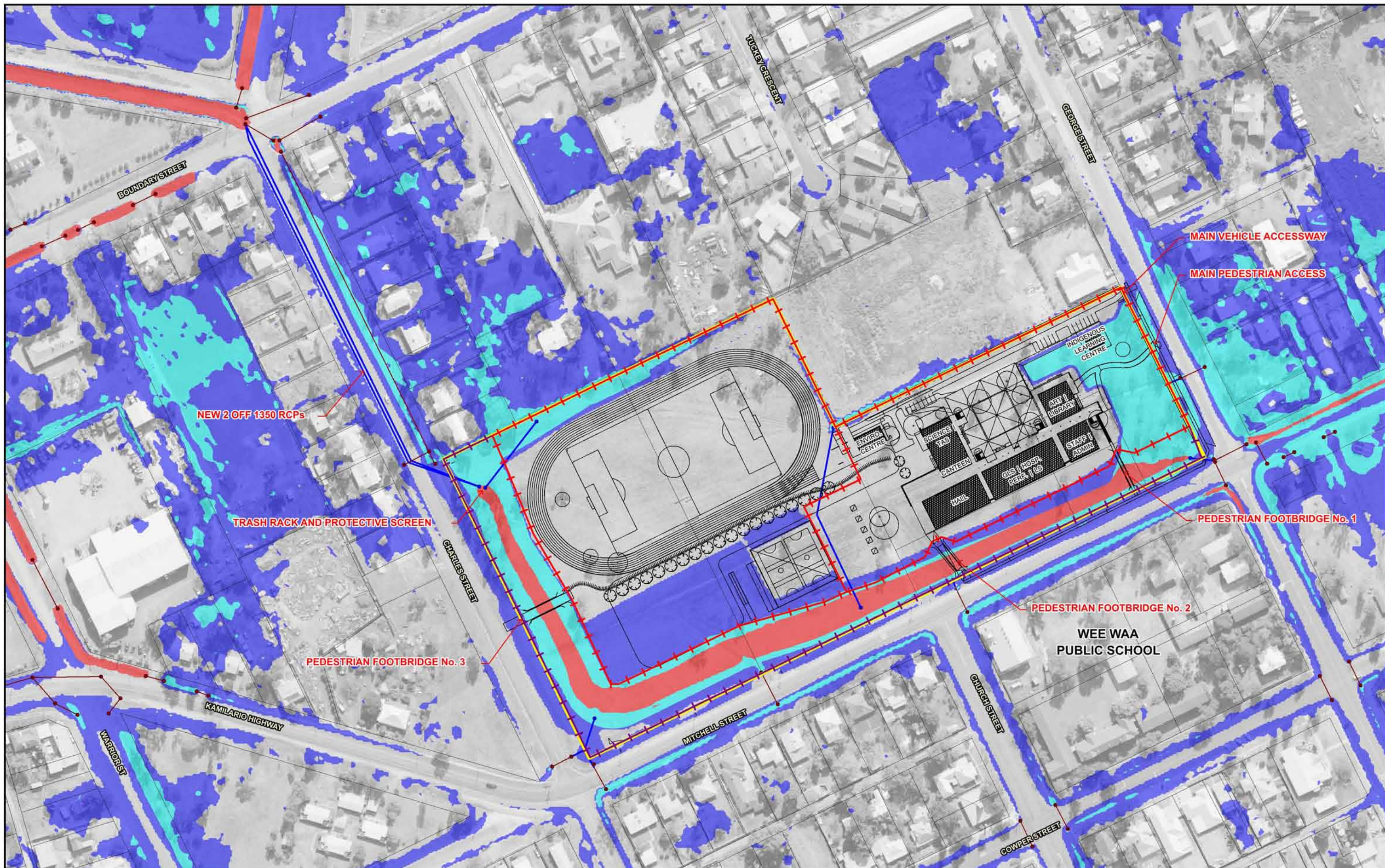
LEGEND

- Proposal Site Boundary
- Proposal Design Strings
- Proposal Building Footprint

- Floodway
- Flood Storage
- Flood Fringe

WEE WAA HIGH SCHOOL TECHNICAL WORKING PAPER: FLOODING

Figure 6.17
 (Sheet 1 of 2)
 HYDRAULIC CATEGORISATION INTERNAL TO TOWN LEVEE
 POST-PROPOSAL AND FMW CONDITIONS - 1% AEP



Scale: 1:2,000

0 20 40 60 m

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Note:

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LEGEND

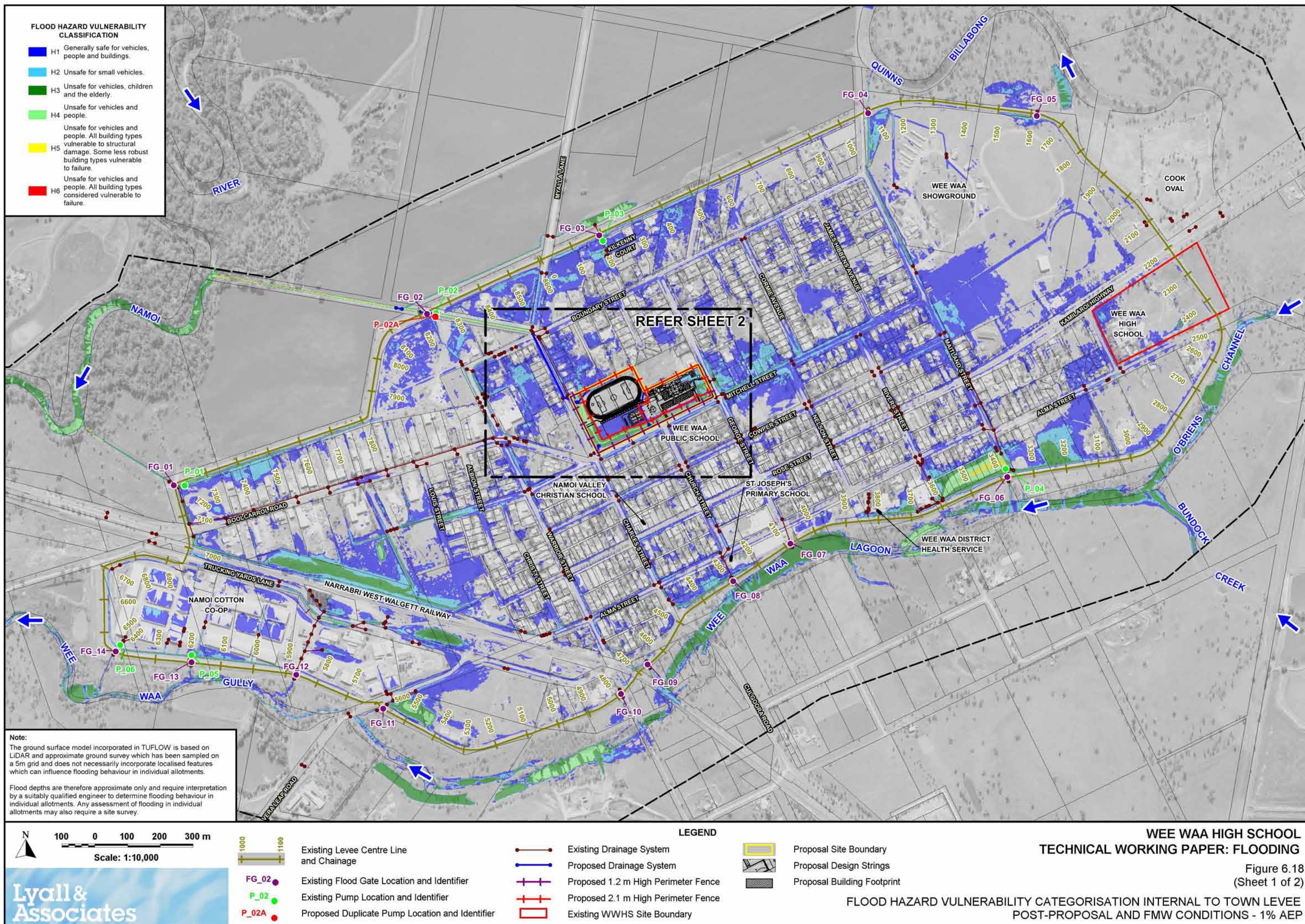
—●— Existing Drainage System	 Proposal Site Boundary	 Floodway
—●— Proposed Drainage System	 Proposal Design Strings	 Flood Storage
- - - Proposed 1.2 m High Perimeter Fence	 Proposal Building Footprint	 Flood Fringe
- - - Proposed 2.1 m High Perimeter Fence		

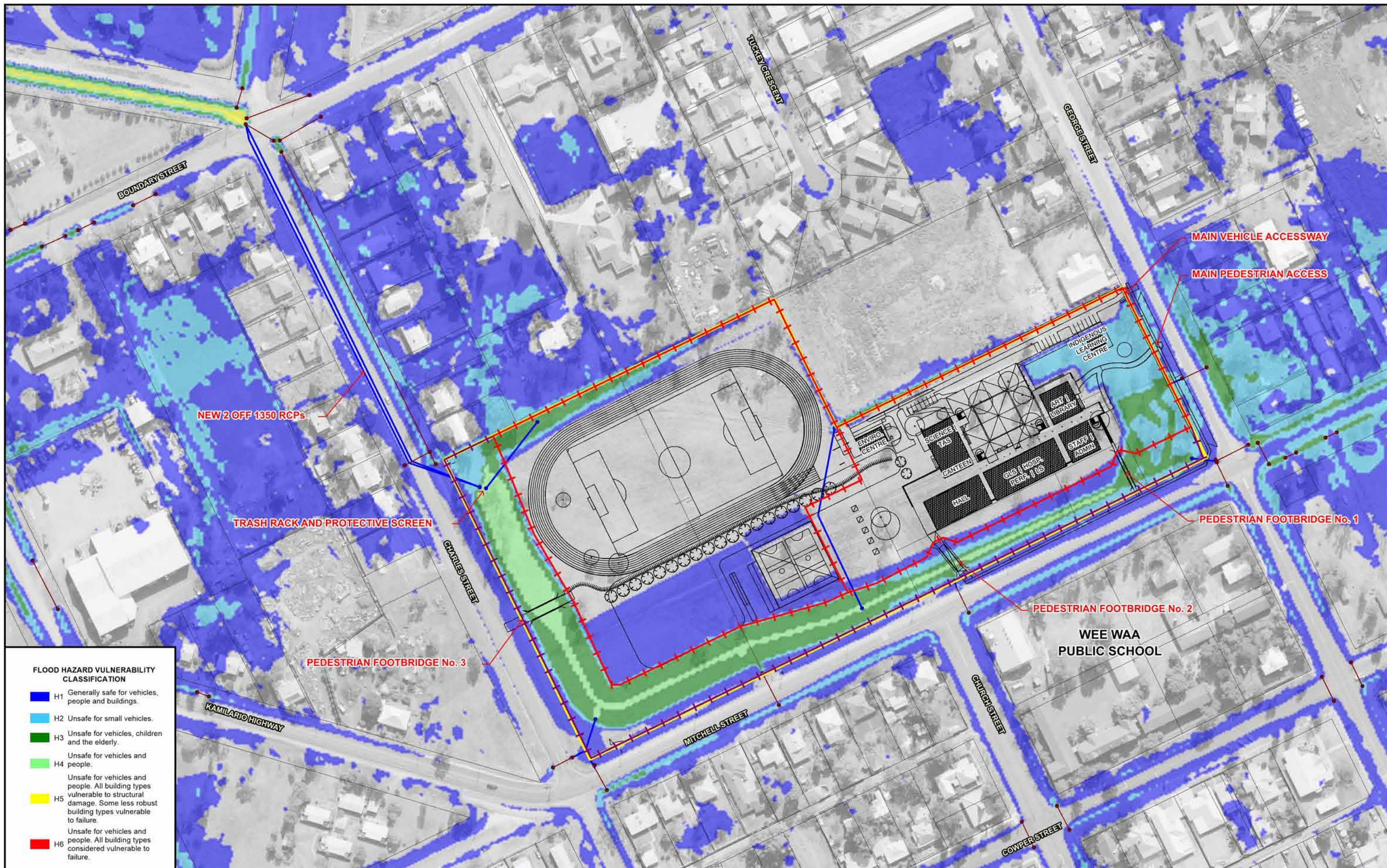
WEE WAA HIGH SCHOOL

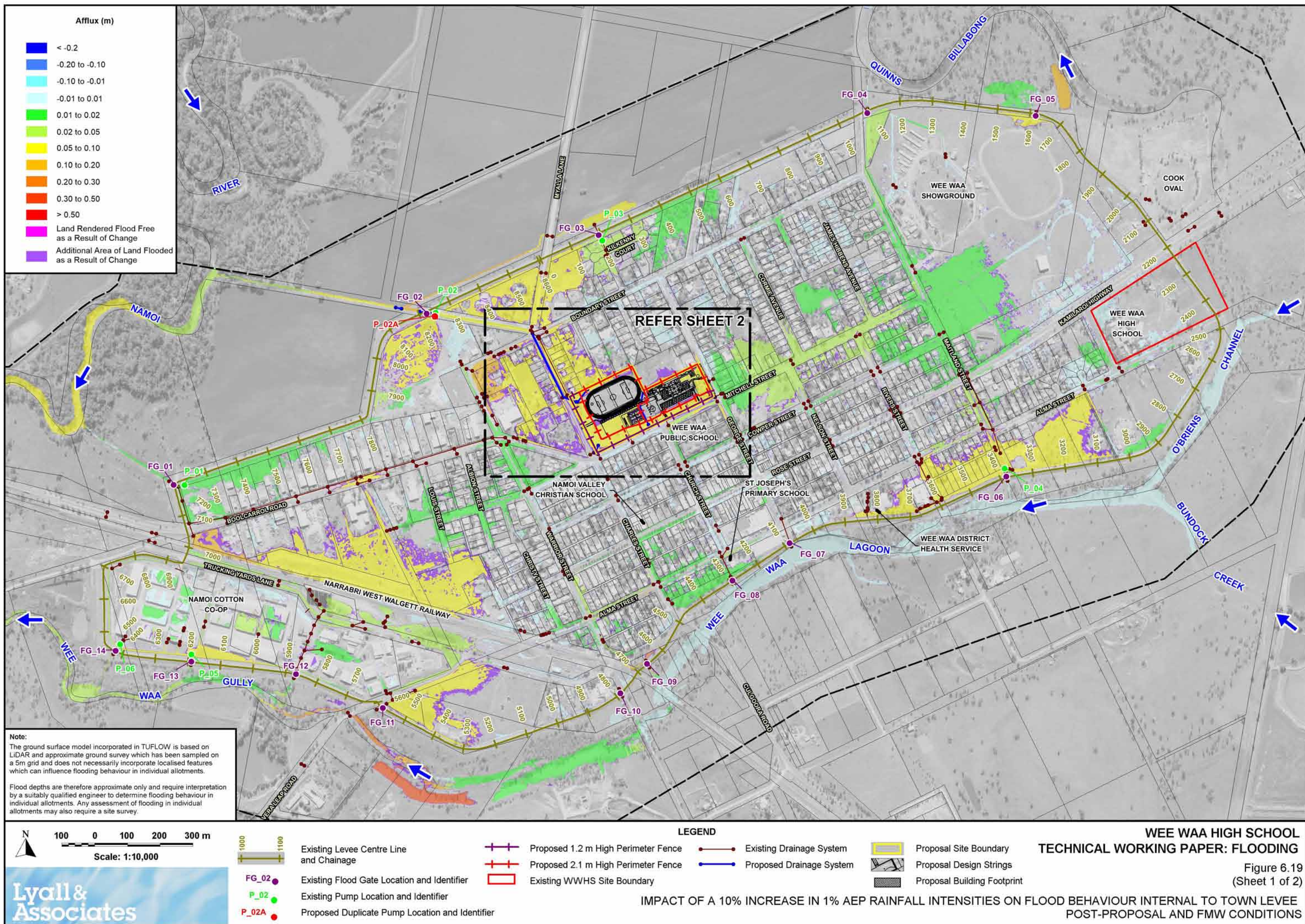
TECHNICAL WORKING PAPER: FLOODING

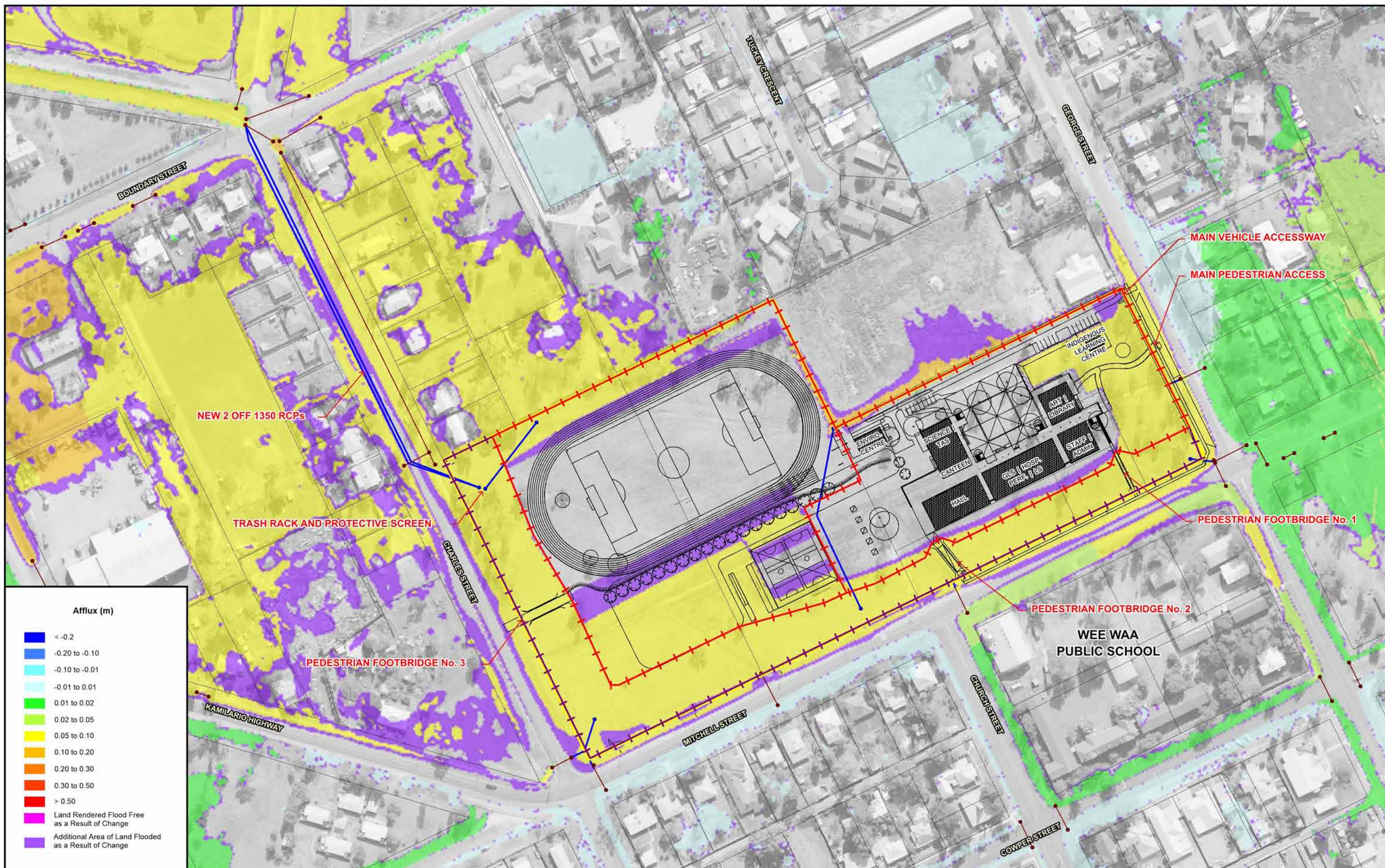
Figure 6.17
(Sheet 2 of 2)

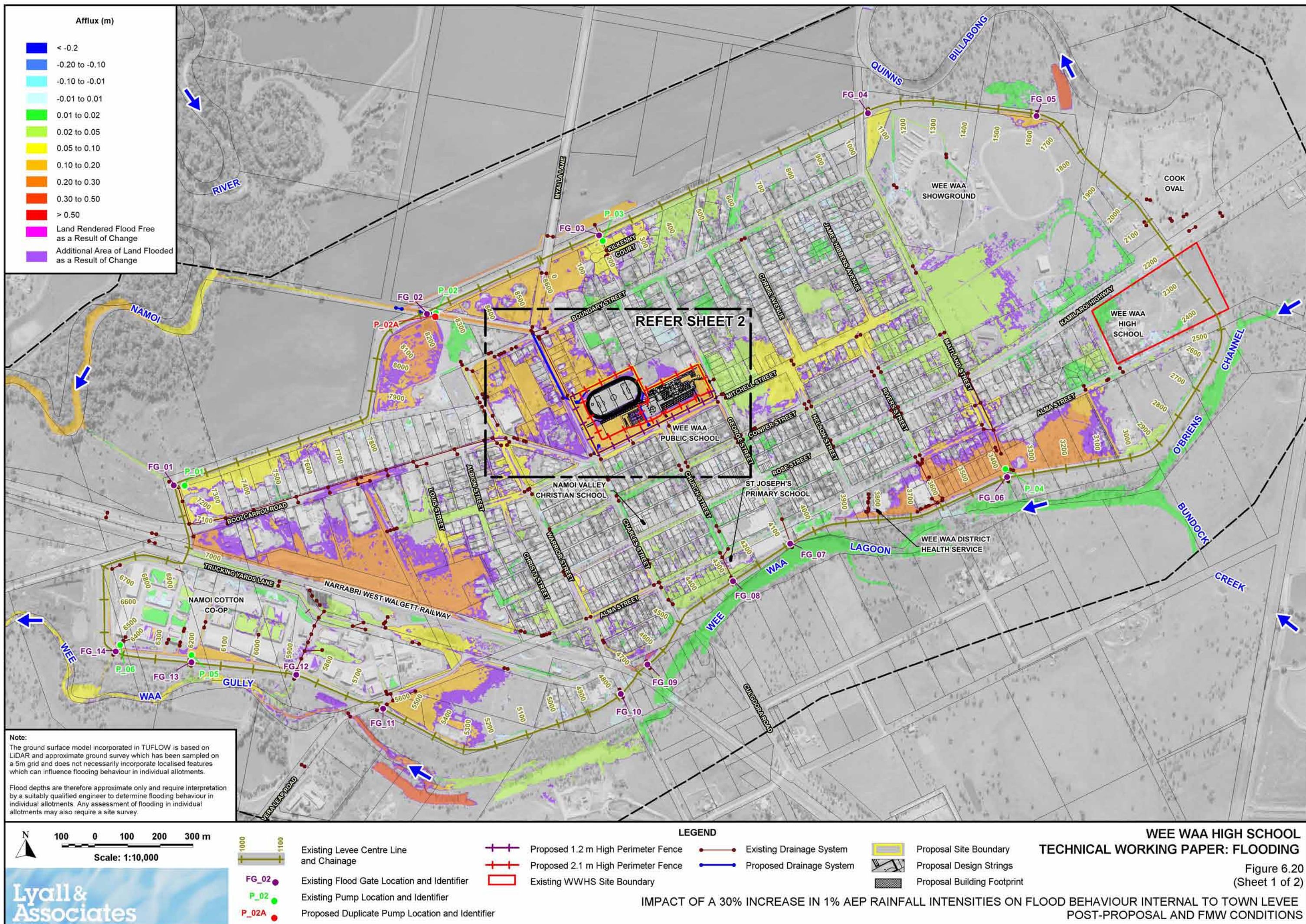
HYDRAULIC CATEGORISATION INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

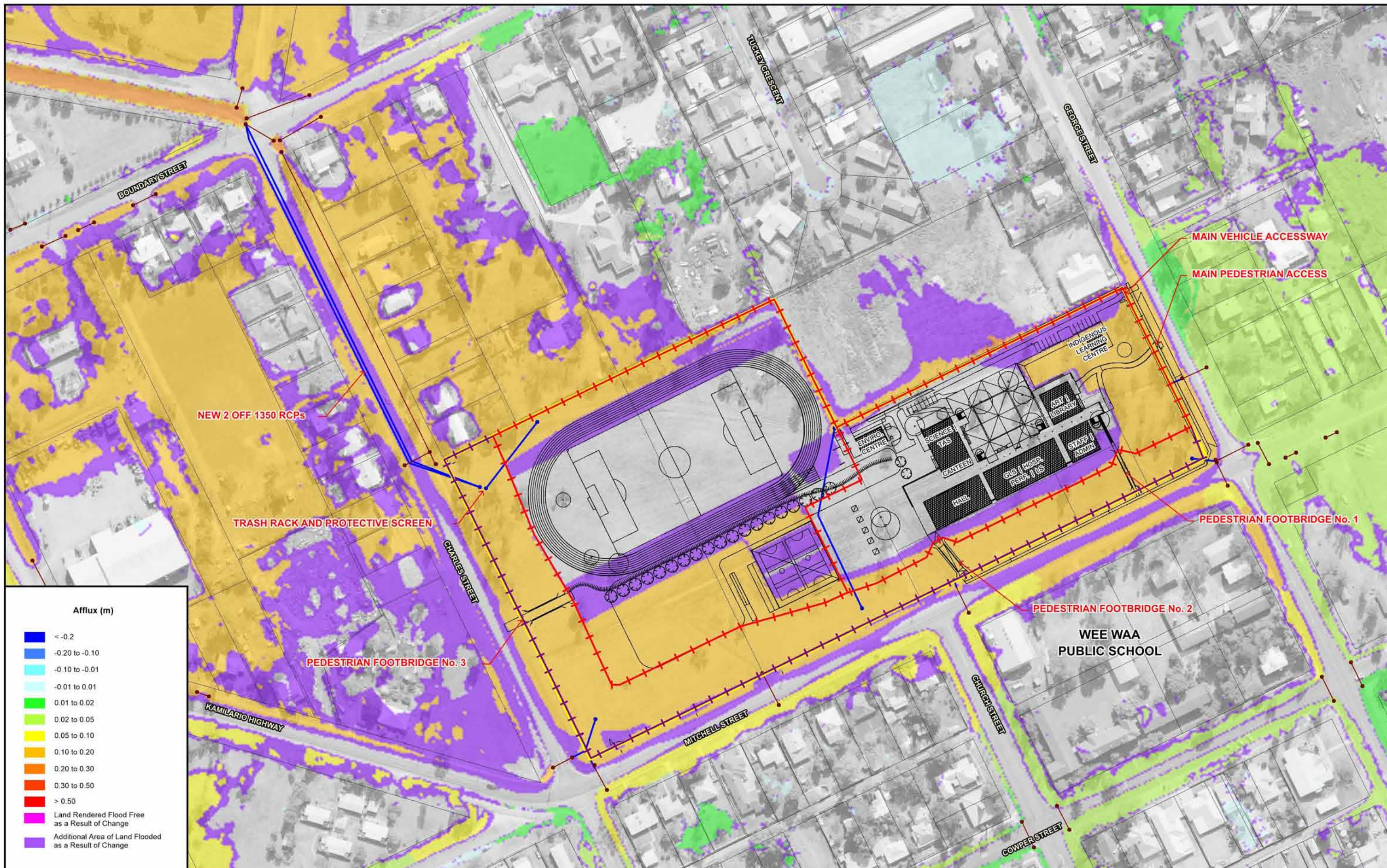


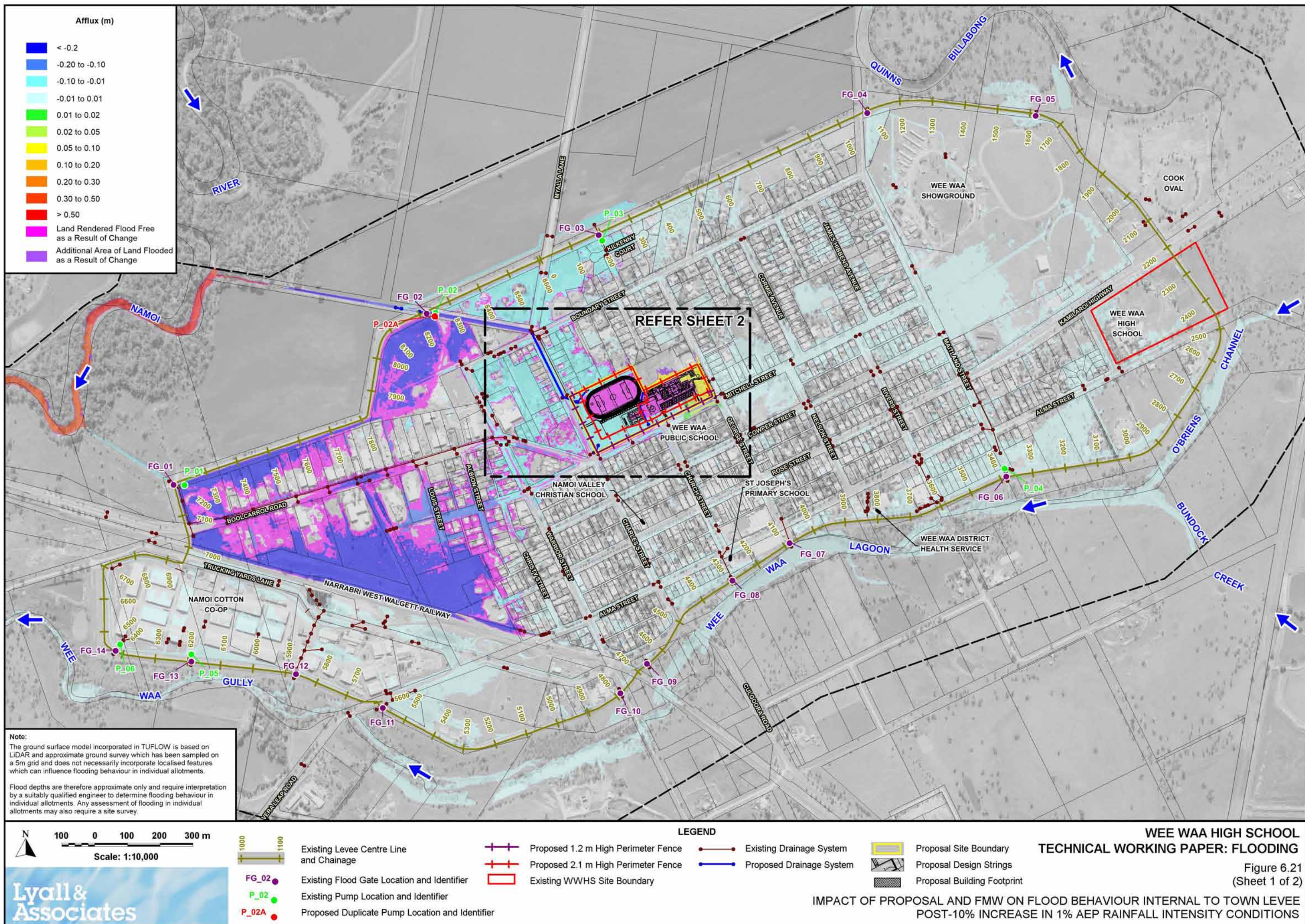


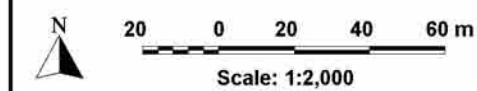
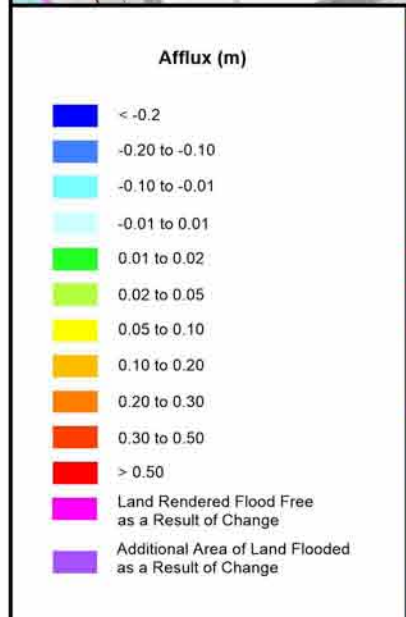
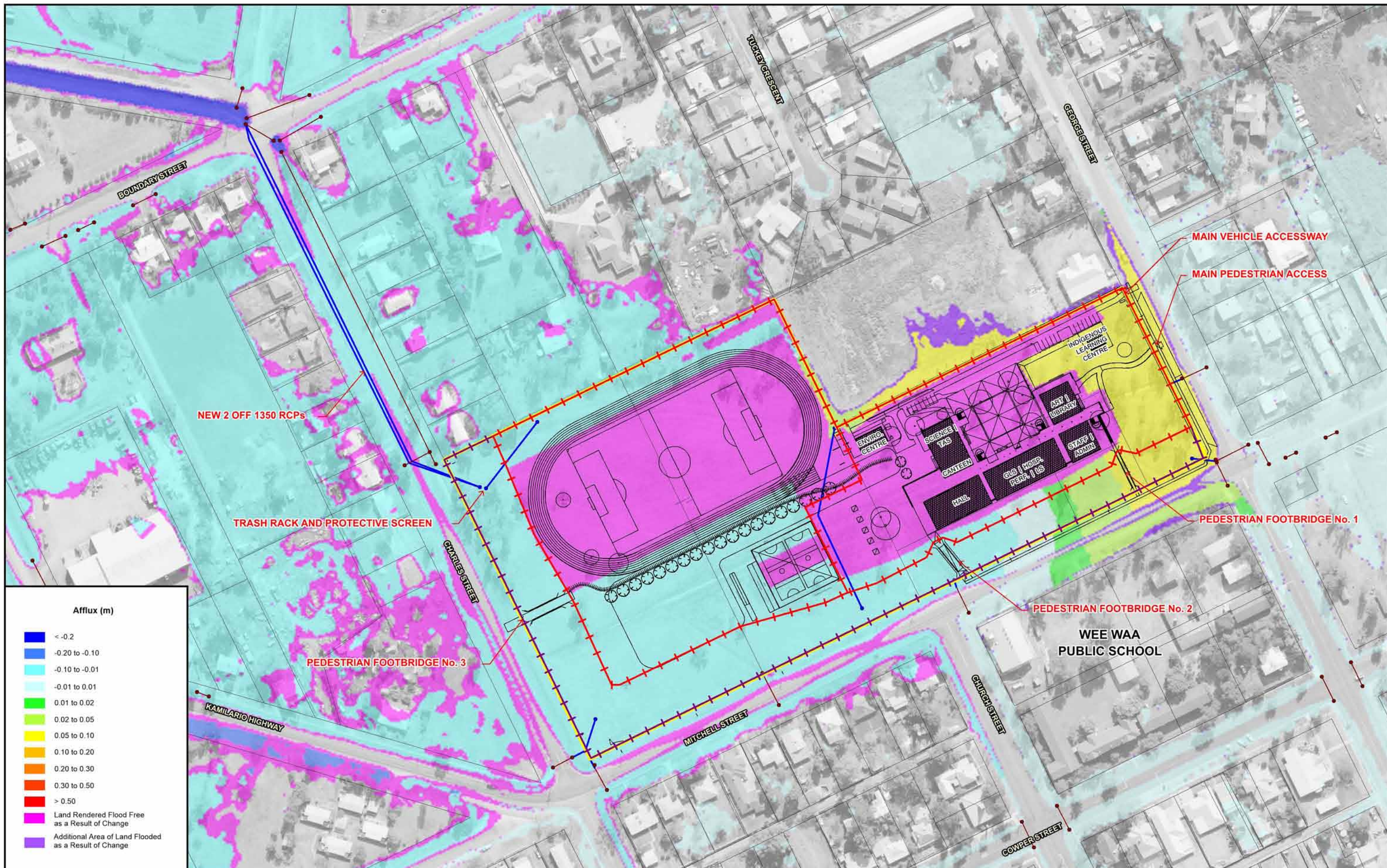












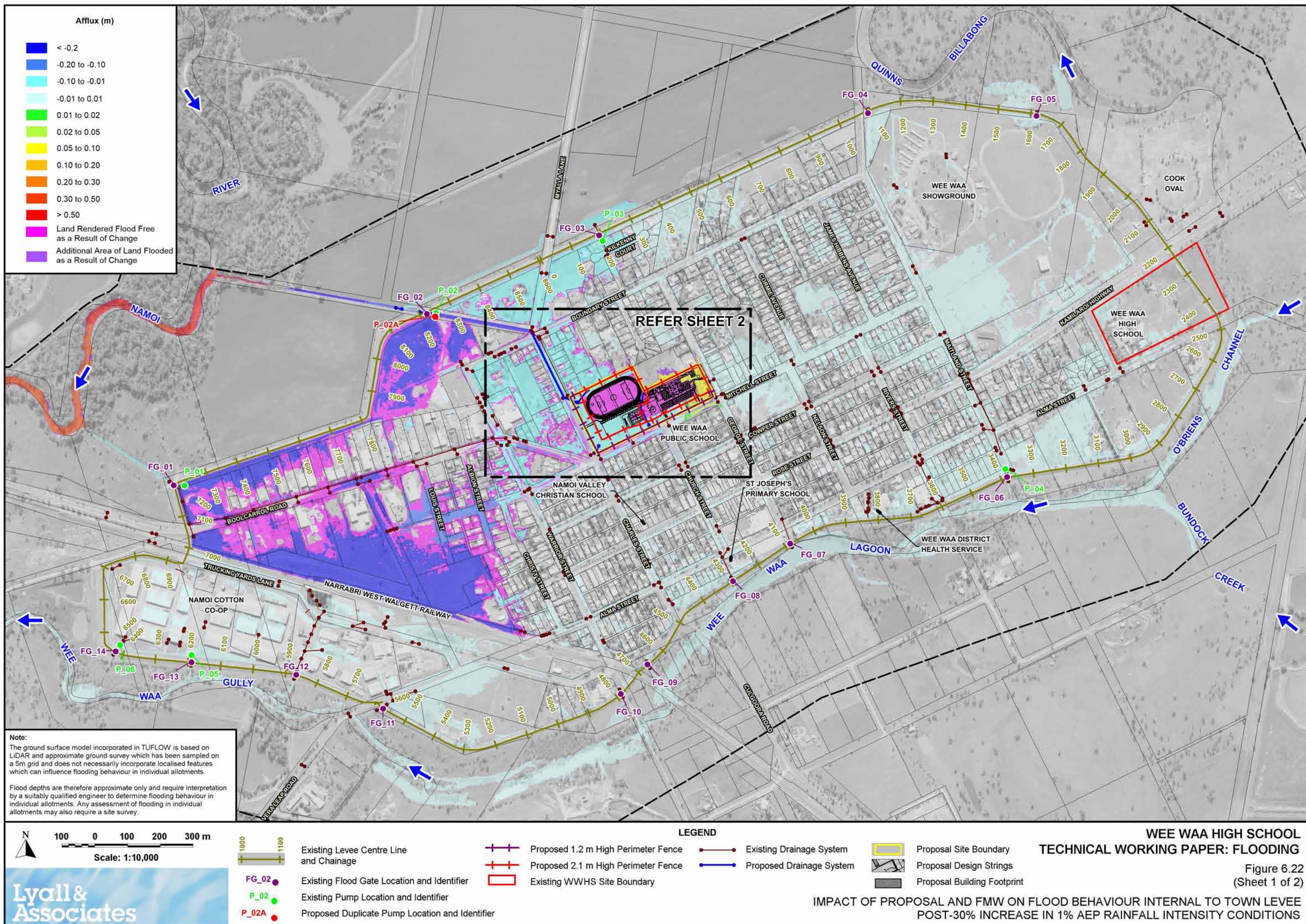
Lyall & Associates

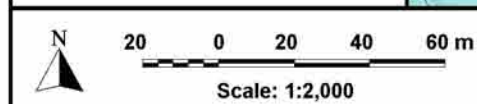
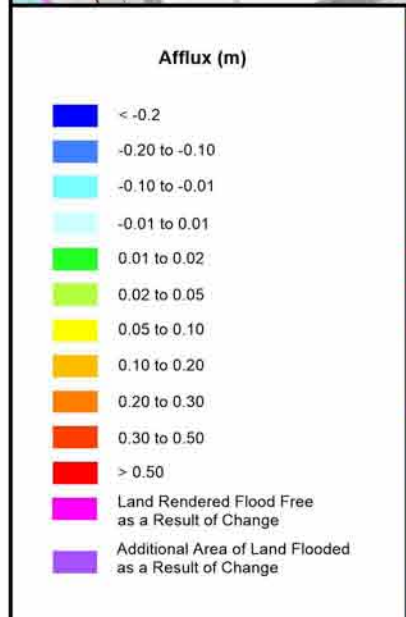
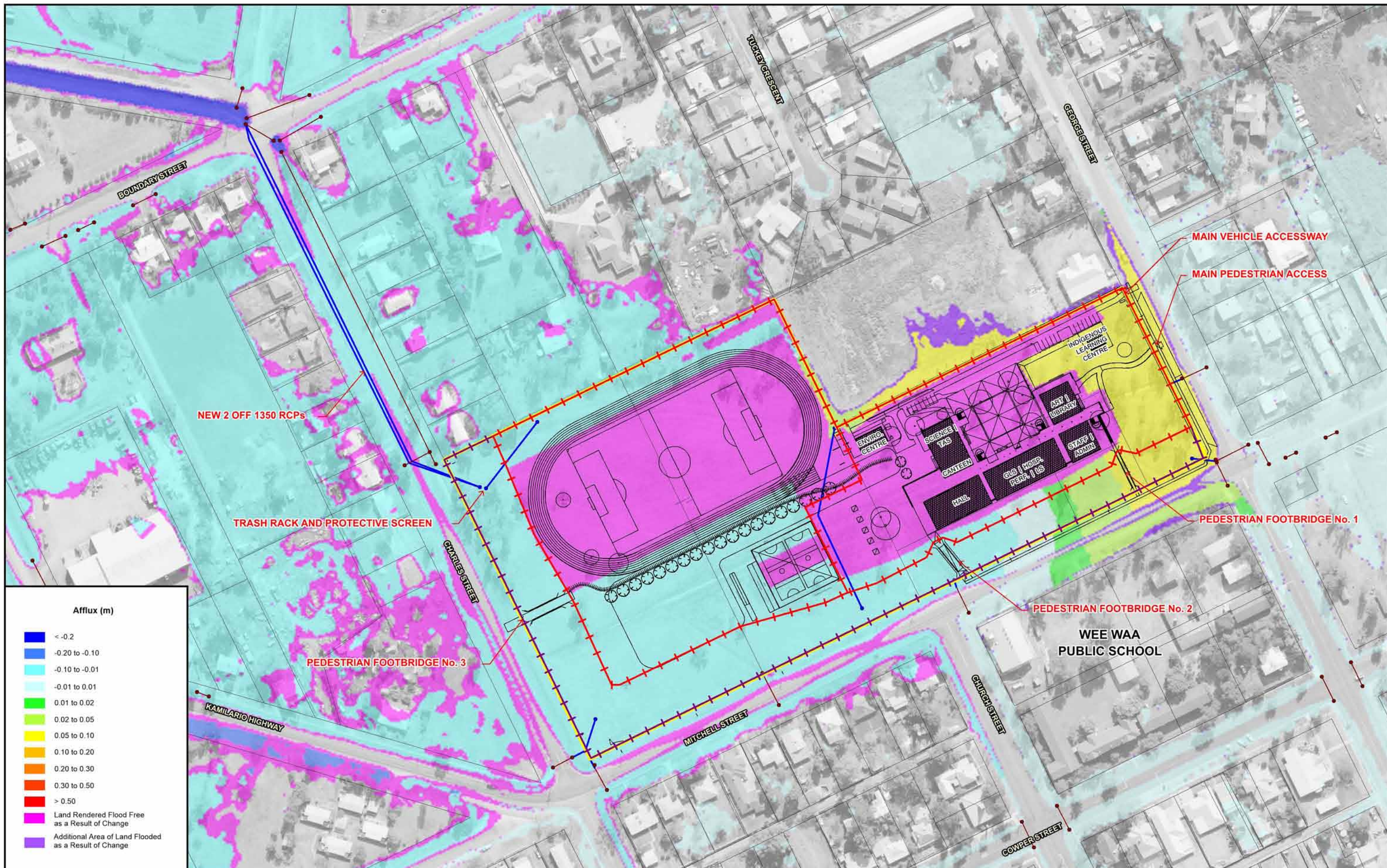
Note:
 The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.
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- LEGEND**
- Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Existing Drainage System
 - Proposed Drainage System
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

**WEE WAA HIGH SCHOOL
 TECHNICAL WORKING PAPER: FLOODING**

Figure 6.21
 (Sheet 2 of 2)
 IMPACT OF PROPOSAL AND FMW ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
 POST-10% INCREASE IN 1% AEP RAINFALL INTENSITY CONDITIONS



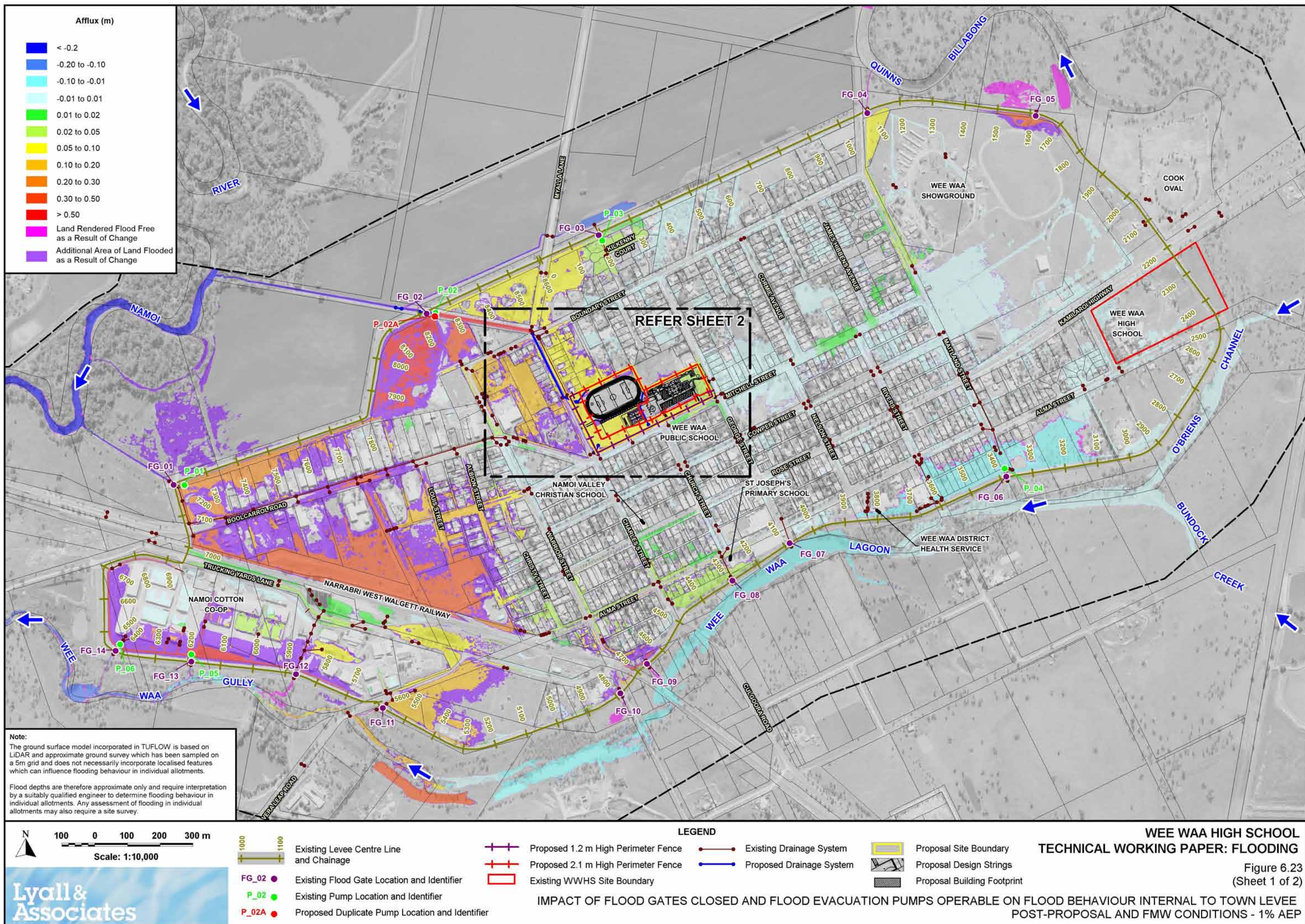


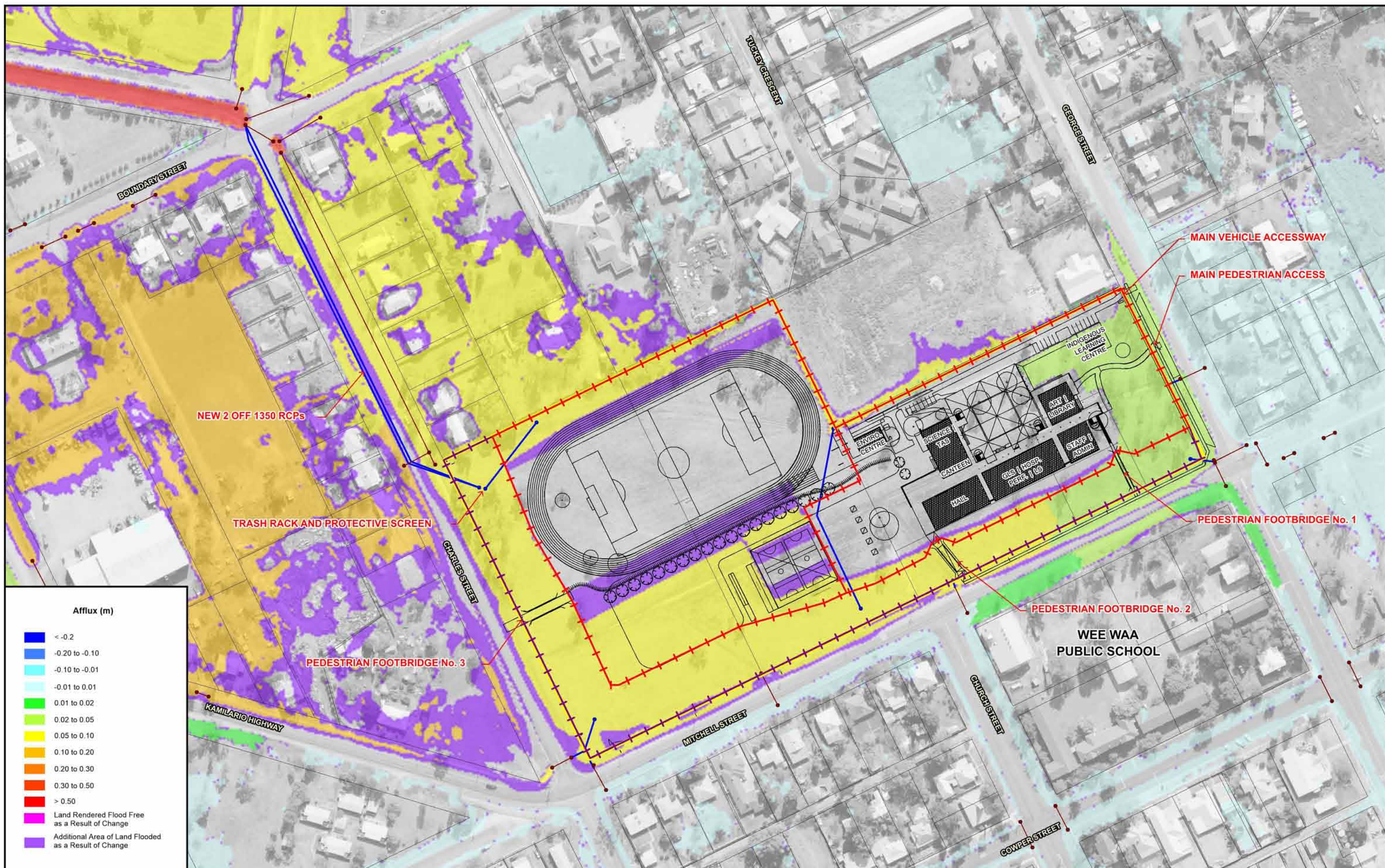
Lyall & Associates

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- LEGEND**
- Proposed 1.2 m High Perimeter Fence
 - Proposed 2.1 m High Perimeter Fence
 - Existing Drainage System
 - Proposed Drainage System
 - Proposal Site Boundary
 - Proposal Design Strings
 - Proposal Building Footprint

WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING
 Figure 6.22
 (Sheet 2 of 2)
 IMPACT OF PROPOSAL AND FMW ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
 POST-30% INCREASE IN 1% AEP RAINFALL INTENSITY CONDITIONS





Scale: 1:2,000

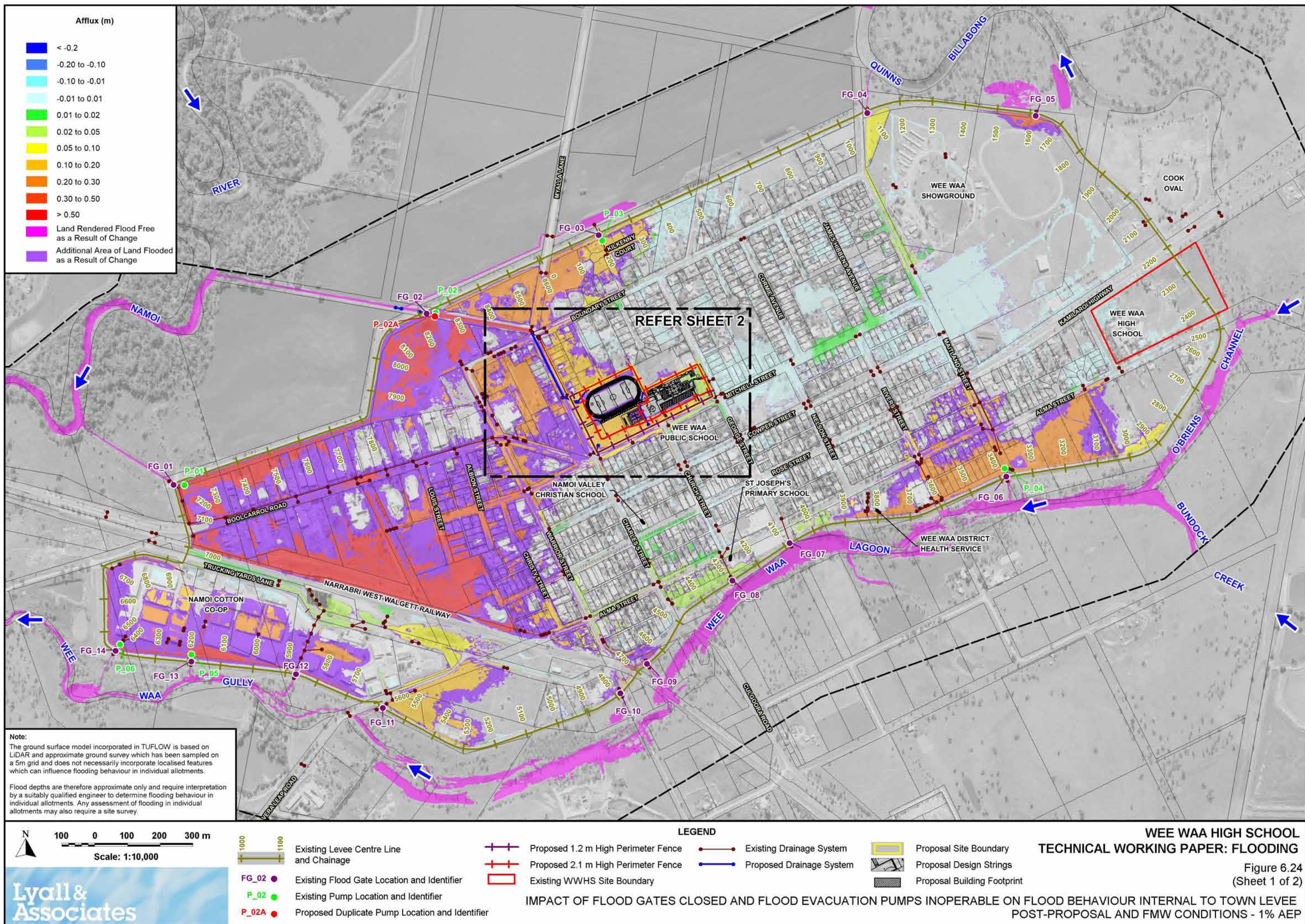
Lyall & Associates

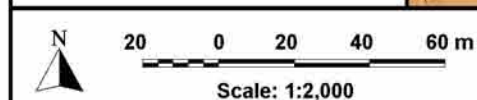
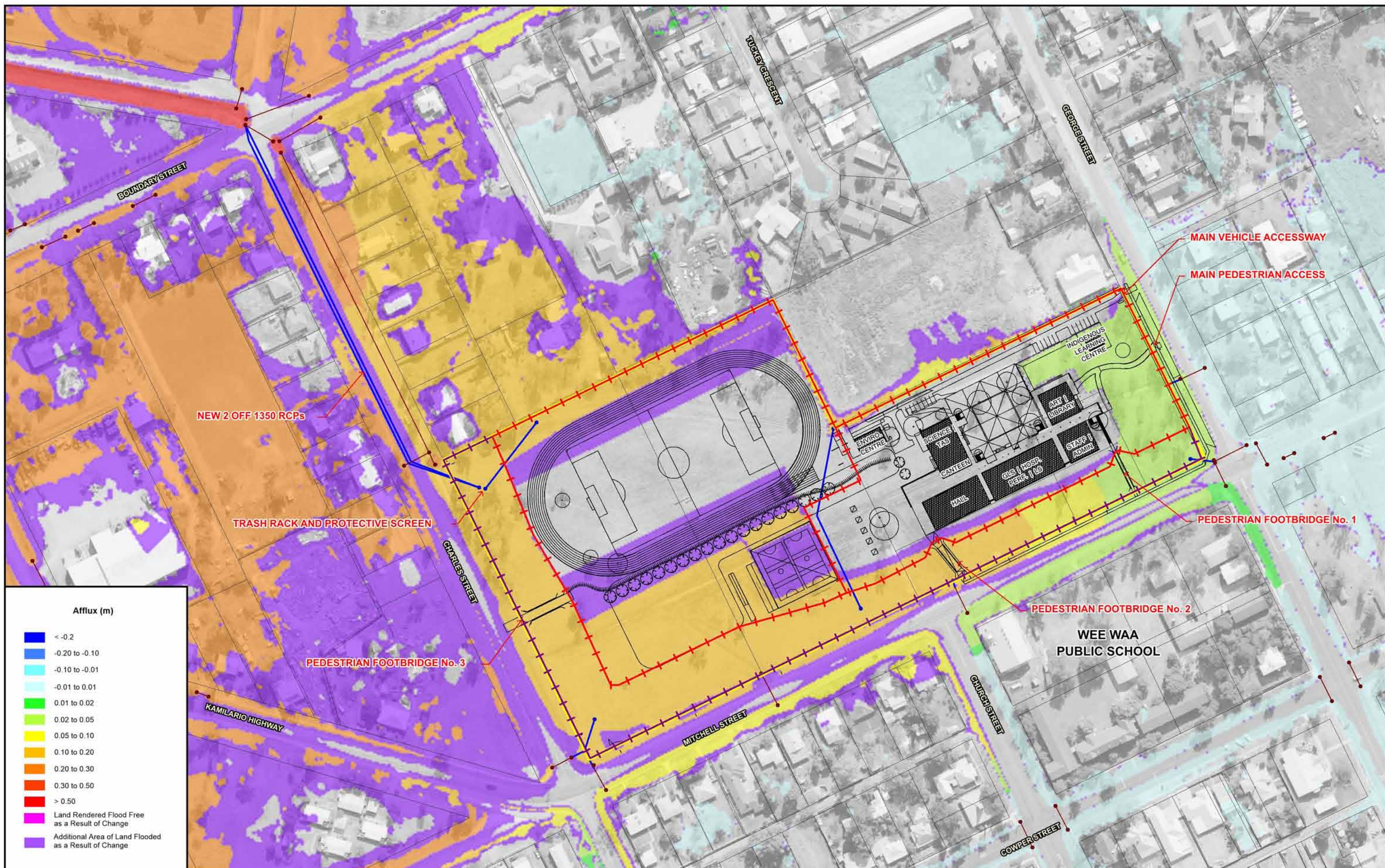
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Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

IMPACT OF FLOOD GATES CLOSED AND FLOOD EVACUATION PUMPS OPERABLE ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
 POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

Figure 6.23
 (Sheet 2 of 2)





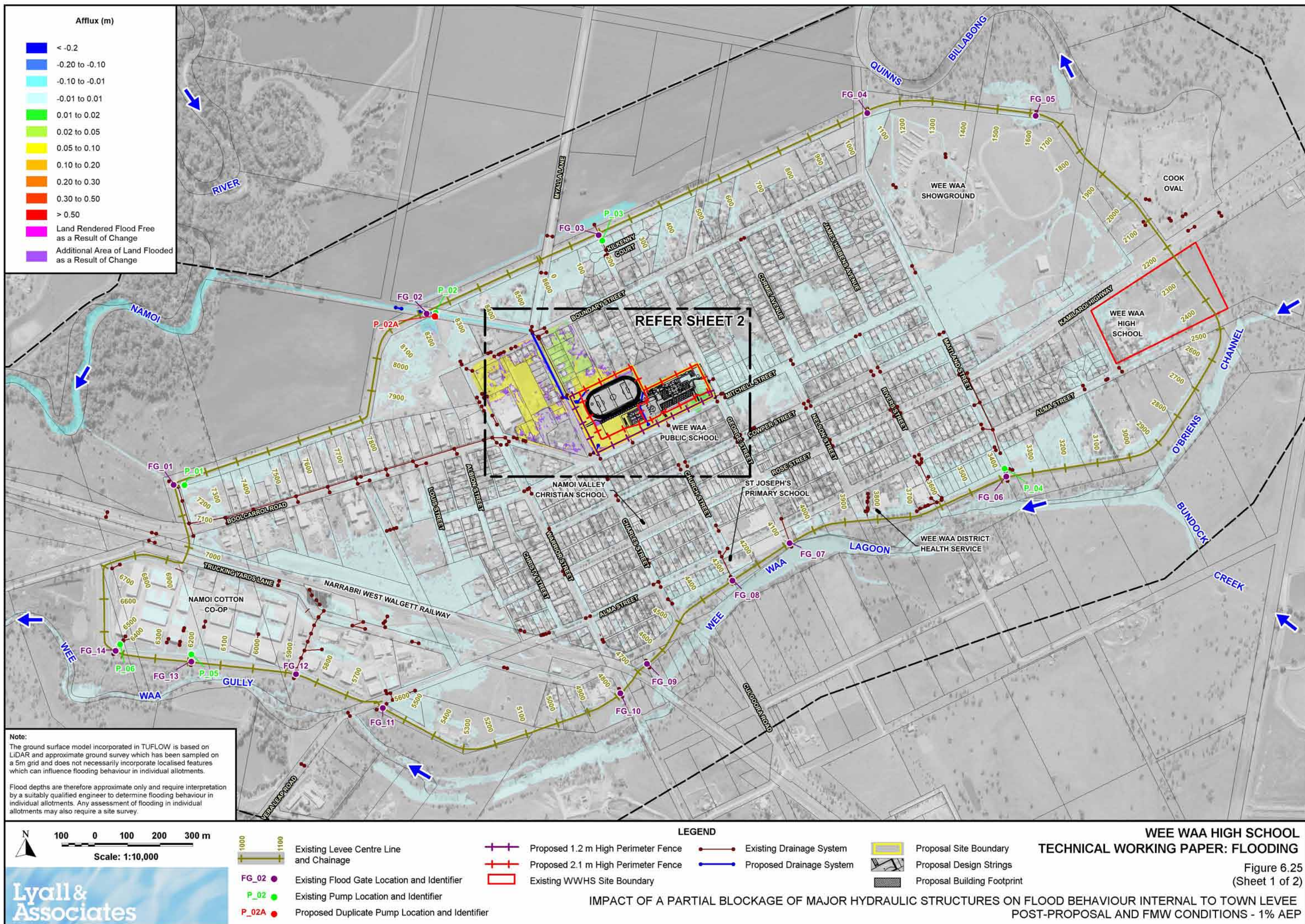
Note:
The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

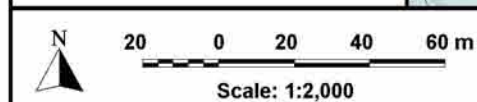
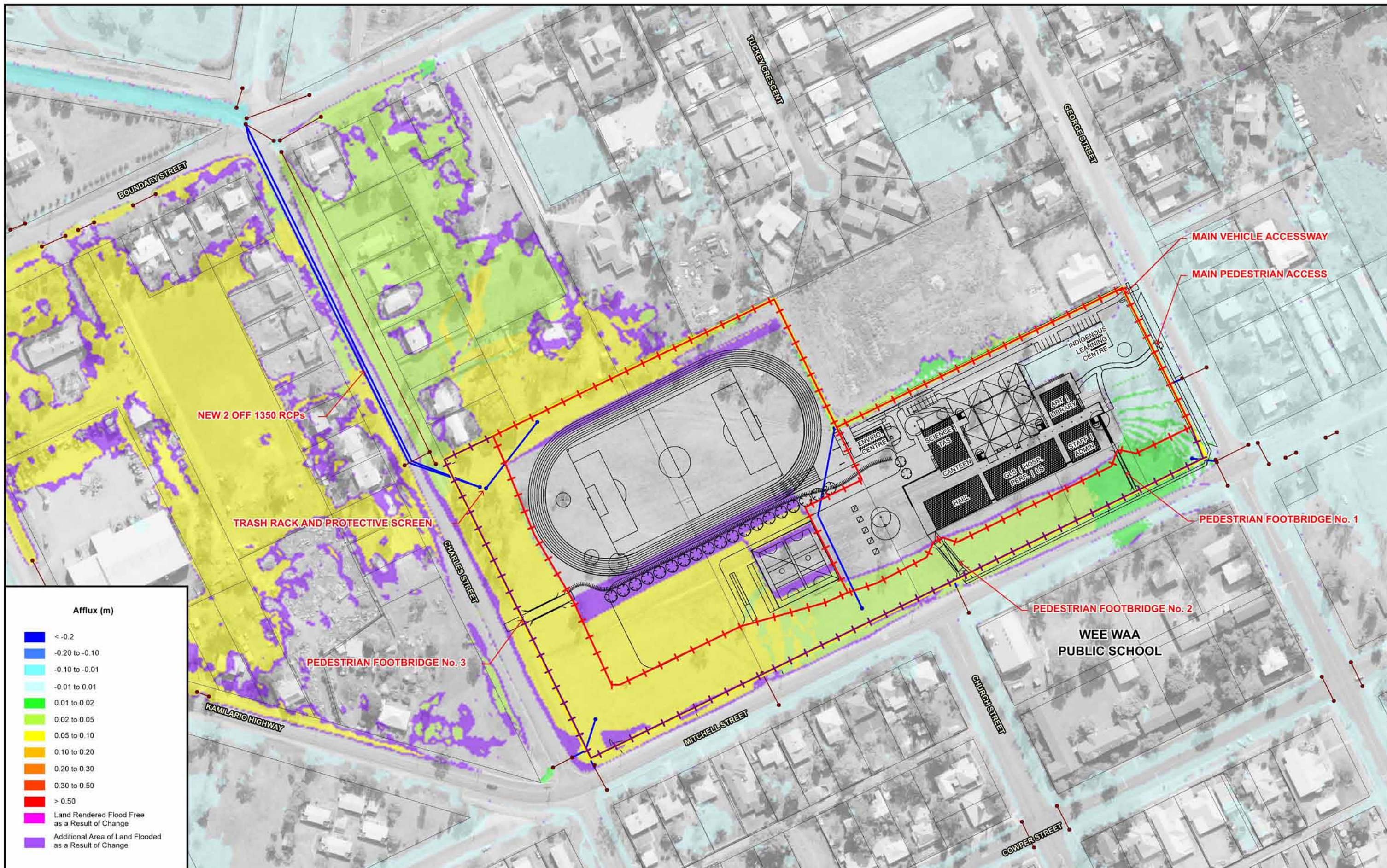
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IMPACT OF FLOOD GATES CLOSED AND FLOOD EVACUATION PUMPS INOPERABLE ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 6.24
(Sheet 2 of 2)





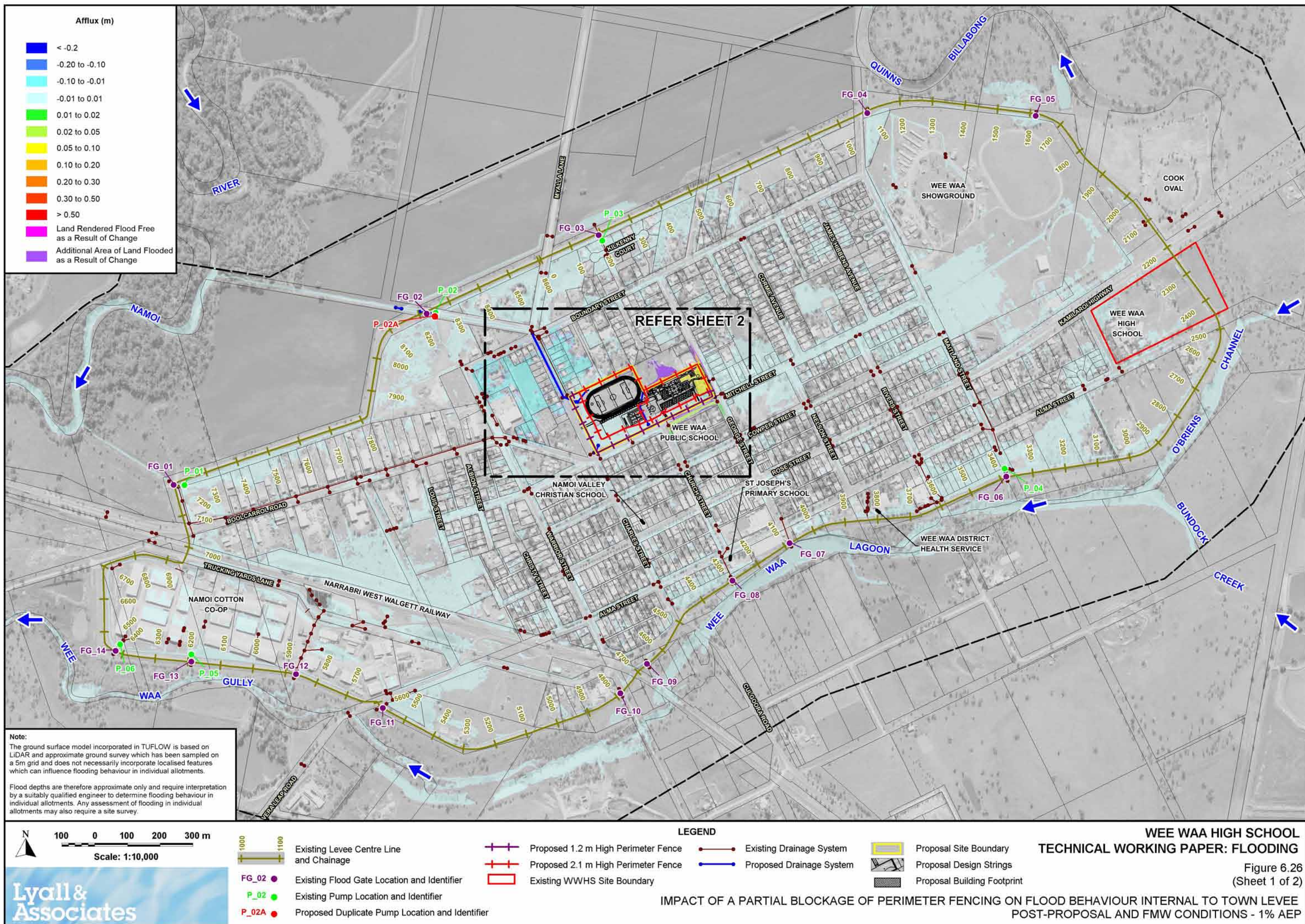
Note:
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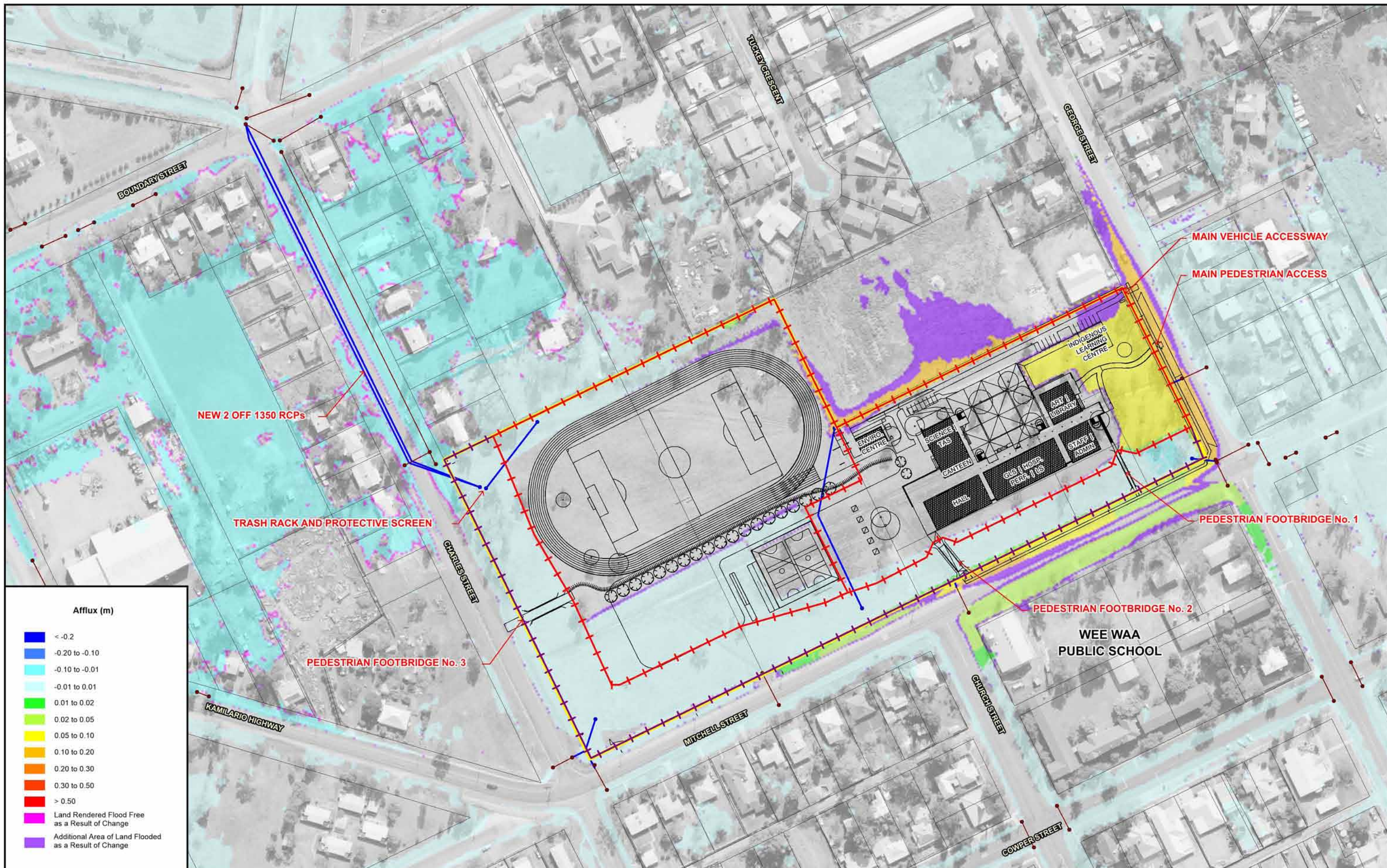
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IMPACT OF A PARTIAL BLOCKAGE OF MAJOR HYDRAULIC STRUCTURES ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

**WEE WAA HIGH SCHOOL
TECHNICAL WORKING PAPER: FLOODING**

Figure 6.25
(Sheet 2 of 2)



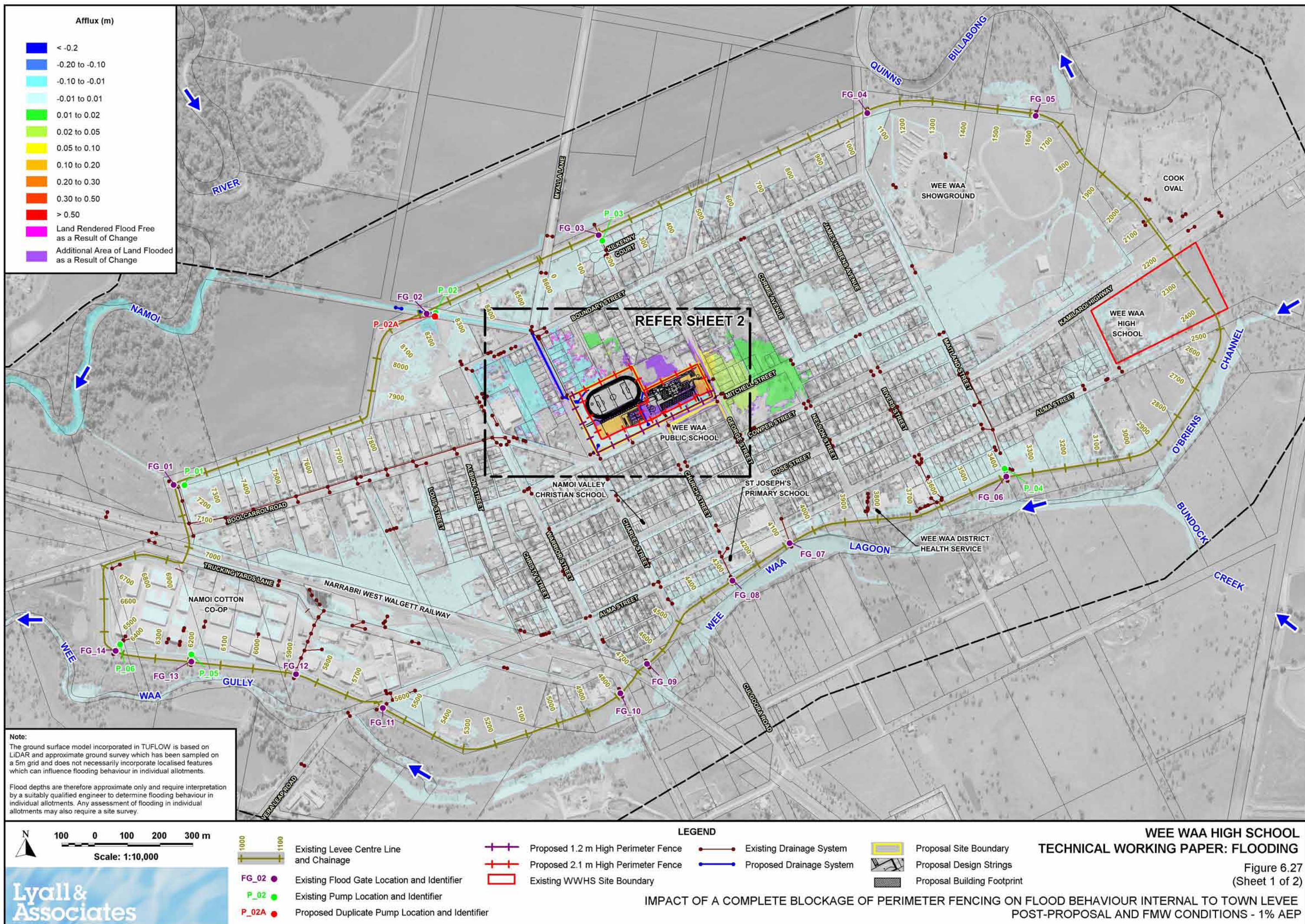


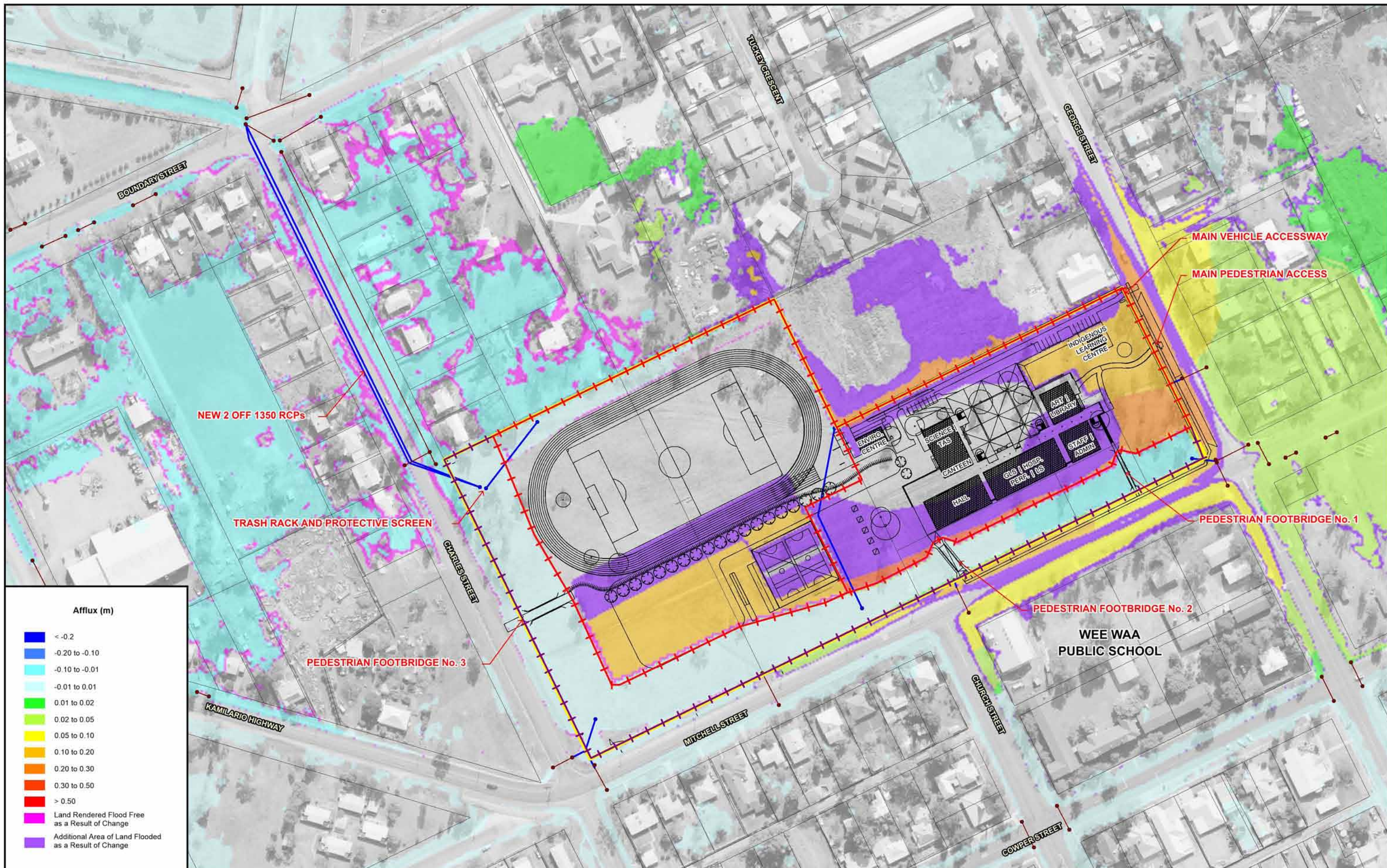
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IMPACT OF A PARTIAL BLOCKAGE OF PERIMETER FENCING ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
 POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

Figure 6.26
 (Sheet 2 of 2)





Note:
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IMPACT OF A COMPLETE BLOCKAGE OF PERIMETER FENCING ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
 POST-PROPOSAL AND FMW CONDITIONS - 1% AEP

Figure 6.27
 (Sheet 2 of 2)