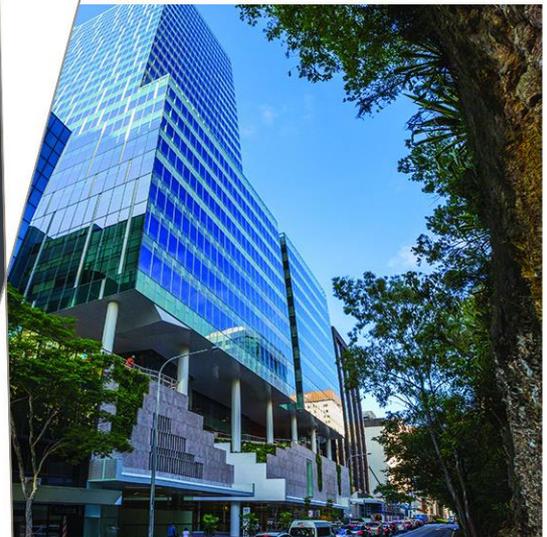


# LAHC Wagga Wagga - Multi Dwelling Residential Housing Development

18-22 Spring Street & 21-25 North Parade – Flood Impact Assessment



Prepared for  
NSW Land and Housing Corporation

11 November 2022



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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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# 1 Introduction

As part of the proposed development upon 21 – 25 North Parade (Stage 1) and 18 – 22 Spring Street (Stage 2), an investigation was undertaken into the impact of flooding on the subject site. Using flood mapping information supplied by Wagga Wagga City Council (WWCC), both Stage 1 and Stage 2 of the development is not expected to experience riverine flooding during a 1% AEP Flood Event and therefore is not within the WWCC Riverine Flood Planning Area (FPA). Refer to **Figure 1-1**. Stage 1 and Stage 2 are however, affected by the 1% AEP Major Overland Flows and is within the Major Overland Flow Flood Study (MOFFS) FPA. Refer to **Figure 1-2**.

Figure 1-1 Wagga Wagga Riverine Flood Planning Area (Source: WWCC Intramaps)

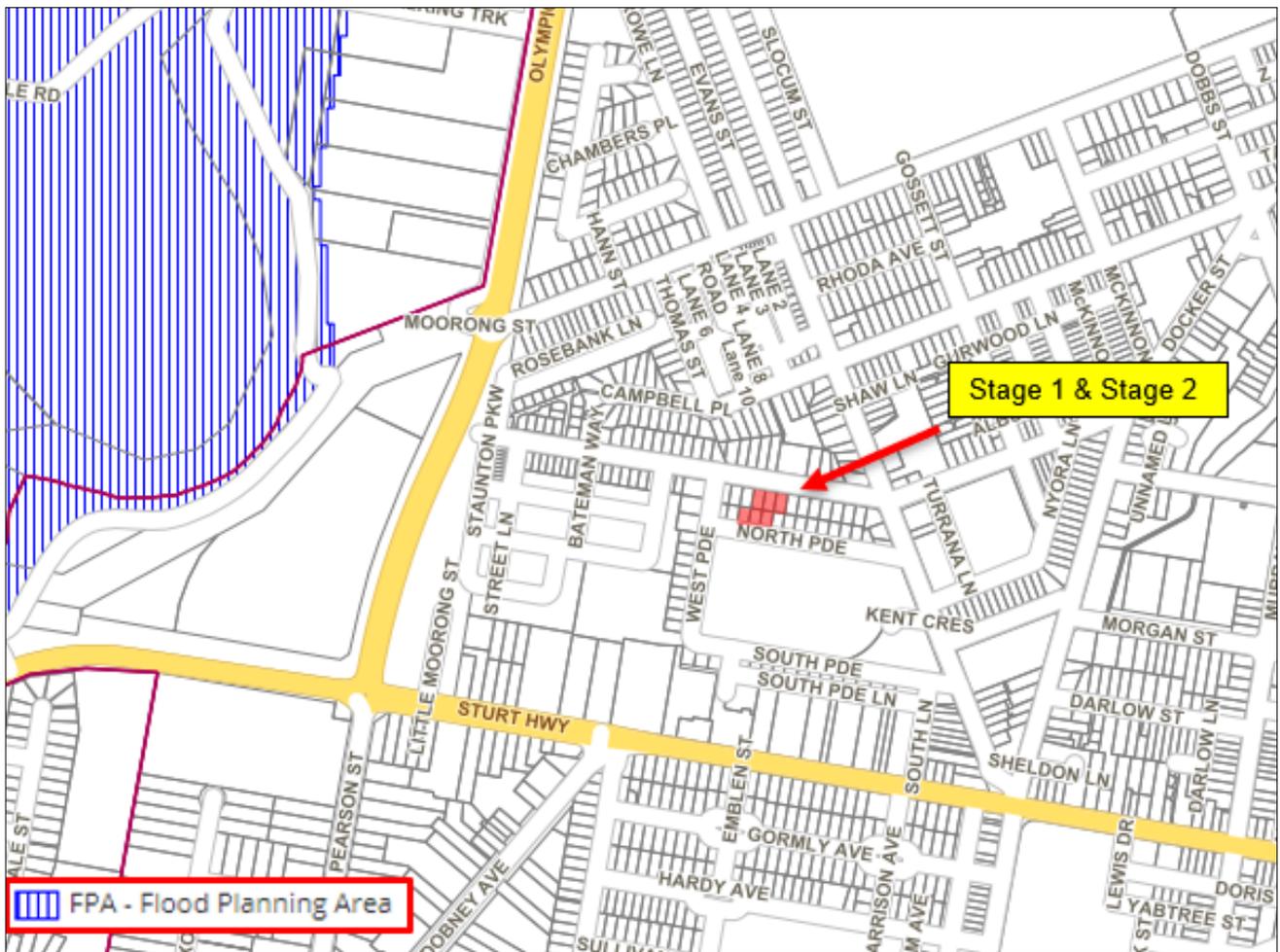
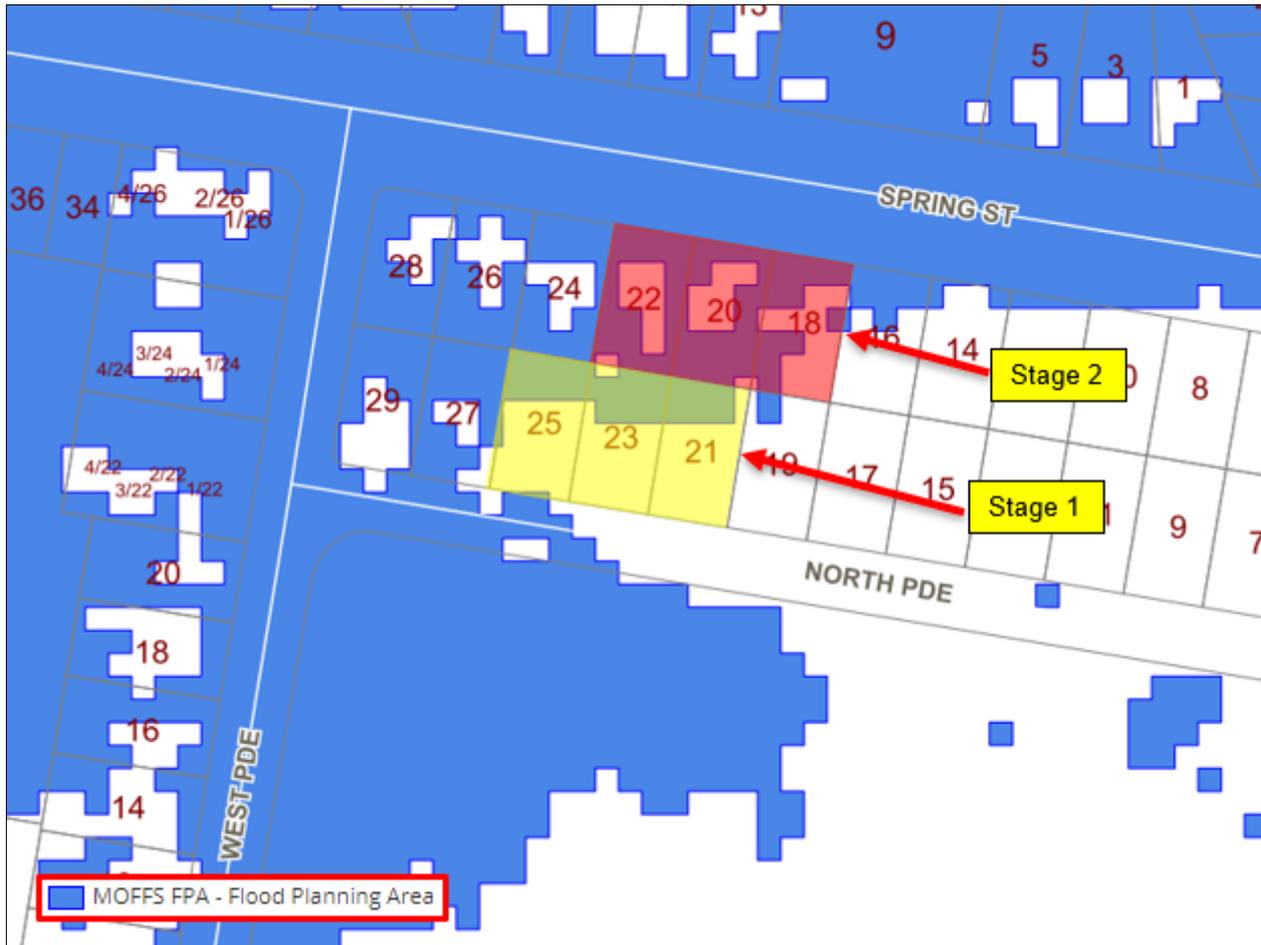


Figure 1-2 Wagga Wagga MOFFS Flood Planning Area (Source: WWCC Intramaps)



The purpose of this report is to summarise the mitigation measures that have been considered for this development to manage the impact of the flooding and ensure the safety of the occupants of the proposed development in accordance with the Clause 5.21 of the Wagga Wagga Local Environmental Plan 2010 (LEP).

### 1.1 Wagga Wagga LEP

Under Clause 5.21 Flood Planning, of the Wagga Wagga LEP, the following objectives are required for developments within the FPA:

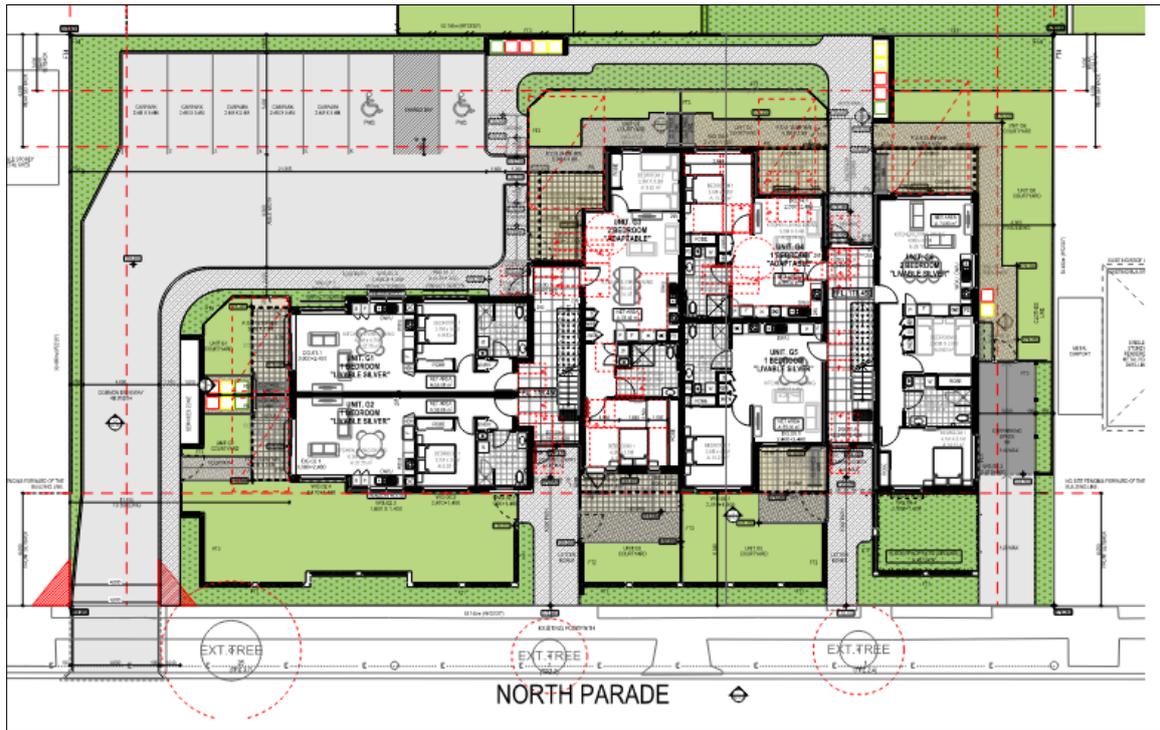
- > Minimise the flood risk to life and property associated with the use of the land,
- > Allow the development on land that is compatible with the flood function and behaviour of the land, taking into account projected changes as a result of climate change,
- > Avoid adverse or cumulative impacts on flood behaviour and the environment,
- > Enable the safe occupation and efficient evacuation of people in the event of a flood.

### 1.2 Proposed Development

#### 1.2.1 Stage 1

It is understood that the three existing dwellings and all other structures and trees within Stage 1 are to be demolished/removed. A new 2-storey structure is to be constructed, containing eight 1-bedroom units and four 2-bedroom units for a total of 12 units within the site. The ground floor layout of the proposed development is shown in **Figure 1-3** below.

Figure 1-3 Proposed Ground Floor Layout – Stage 1



1.2.2 Stage 2

It is understood that the three existing dwellings and all other structures and trees within Stage 2 are to be demolished/removed. A new 2-storey structure is to be constructed, containing eight 1-bedroom units and four 2-bedroom units for a total of 12 units within the site. The ground and first floor layout of the proposed development is shown in Figure 1-4.

Figure 1-4 Proposed Ground Floor Layout – Stage 2



## 2 Mitigation Measures

### 2.1 Finished Floor Levels

In order to ensure that the development remains habitable, and the occupants remain safe during 1% AEP events, the Finished Floor Level (FFL) of the development has been designed to be 300mm above the maximum MOFFS level across each of the stages. This is in accordance with WWCC’s Engineering Guidelines. From flooding information supplied by WWCC (**Figure 2-1**), the maximum MOFFS level within Stage 1 is AHD 178.15, therefore, the proposed development has been designed to have an FFL of AHD 178.45. For Stage 2, the maximum MOFFS level within the site is AHD 178.14, therefore, the proposed development has been designed to have an FFL of AHD 178.44.

By raising the FFL of the developments 300mm above the maximum MOFFS level, it ensures that the properties and the occupants will not become inundated during the 1% AEP event, allowing them to safely wait in the buildings until the waters recede. Additionally, the 300mm freeboard ensures adequate room for any increases in the 1% AEP level due to climate change or other climate related events.

Figure 2-1 Overland Flow Levels, Depths and Velocities (Source: 2021 Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan)



### 2.2 Building Footprint

In order to ensure that the proposed development did not result in any significant flooding impacts downstream of the site, the building footprints of the proposed developments were designed to be approximately equal to the combined footprint of the existing buildings within the site. As can be seen in **Figure 2-1**, the MOFFS Study was undertaken prior to number 21 North Parade being demolished, therefore the footprint of this building had to be taken into consideration.

For Stage 1, the approximate total footprint of the dwelling and sheds on the site is 435m<sup>2</sup>, while the proposed development has a footprint of approximately 480m<sup>2</sup>, an increase of 45m<sup>2</sup>. For Stage 2, the existing building

footprint for the site is approximately 440m<sup>2</sup>, while the proposed development has a footprint of approximately 420m<sup>2</sup>, a decrease of 20m<sup>2</sup>.

Considering that the depths and velocities of the 1% AEP Overland Flows provided in **Figure 2-1**, the net increase of only 25m<sup>2</sup> is considered minor and is not expected to result in any significant impacts on the infrastructure downstream of the development.

### 2.3 Low Hazard Area

As discussed in the 2021 Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan, there are size levels of hydraulic hazard classification that are used to assess the floodplain risk management of a development. These are ranked H1 to H6 with H1 being the lowest hazard rating and H6 being the highest hazard rating. The level of the hazard is determined from a combination of the depth and velocity of the flood waters. Each level of hazard represents an increasing safety risk for people, vehicles, and buildings. The hazard levels and their associated risks area:

- > H1 – No constraints
- > H2 – Unsafe for small vehicles
- > H3 – Unsafe for all vehicles, children, and the elderly
- > H4 – Unsafe for all people and all vehicles
- > H5 – Unsafe for all people and all vehicles. Buildings require special engineering design and construction\
- > H6 – Unsafe for people and vehicles. All building types considered vulnerable to failure

The MOFFS data supplied by WWCC also identified the Hazard Level of the overland flows within and around the development sites. As can be seen in **Figure 2-2**, the hazard across Stage 1 is predominately all H1, with one section of H2 in the north-west corner. Therefore, the 1% AEP overland flows are unlikely to impact on the safety of the building, nor is it likely to prevent the occupants of the building evacuating safely if they desire. If the occupants do wish to evacuate, Duke of Kent Oval, on the south side of North Parade (**Figure 2-4**), is outside the FPA and identified as not being impacted by the MOFFS, providing a safe evacuation point that is close by.

Similarly for Stage 2, majority of the site is considered H1, with some areas close to Spring St reaching H2, refer to **Figure 2-3**. Therefore, the 1% AEP overland flows are unlikely to impact the safety of the building, nor is it likely to prevent the occupants of the building evacuating the area safely if desired. If the occupants do wish to evacuate, Shaw Street to the east as well as Duke of Kent Oval to the south (**Figure 2-4**) are both outside of the FPA and not identified as being impacted by the MOFFS, providing safe evacuation points nearby

Figure 2-2 Stage 1 Hazard Levels (Source: 2021 Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan)



Figure 2-3 Stage 2 Hazard Levels (Source: 2021 Wagga Wagga Major Overland Flow Floodplain Risk Management Study and Plan)

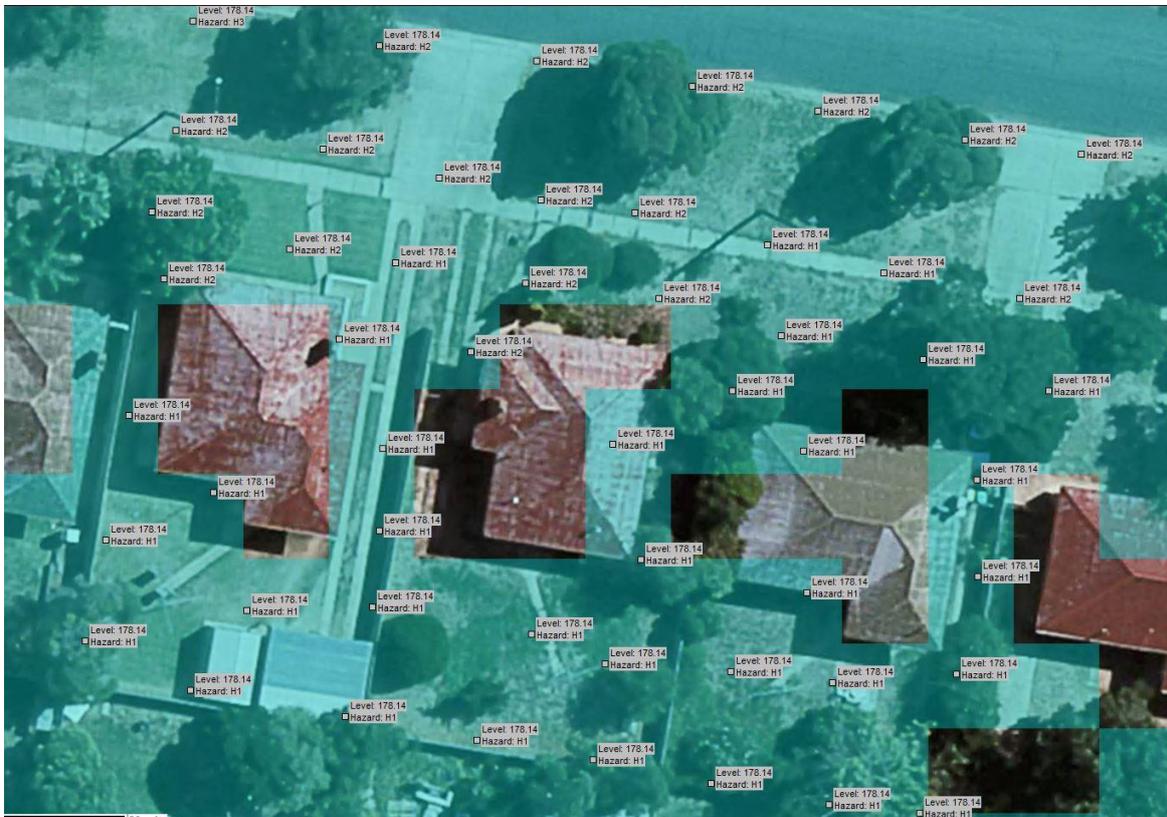


Figure 2-4 Evacuation Areas (Source: WWCC Intramaps)

