FLOOD RISK ASSESSMENT

STAGE 1 OF PROPOSED RURALRESIDENTIAL SUBDIVISION (1 INTO 23 LOTS)174 Adare Road Adare QLD 4343

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Recipients are responsible for eliminating all superseded documents in their possession.

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1 Contents

1 Introduction

Van der Meer Consulting has been commissioned to prepare a Flood Risk Assessment for the proposed rural residential subdivision at 174 Adare Road, Adare. This report will focus on Stage 1 of the subdivision which involves 23 new lots being created. This report will be lodged to Lockyer Valley Regional Council to satisfy the Development Approval Requirement for this development.

The scope of this report includes an assessment of the flood risk for the proposed development from both local and regional sources.

1.1 Planning and Policy Background

The Council policies and plans are relevant to the development, and are addressed in this report:

- Lockyer Valley Regional Council (LVRC) Temporary Local Planning Instrument 2022 Flood Regulation.
- AS/NZ ISO 31000:2009 - Risk Management - principles and guidelines
- Queensland Government's Evacuation: Responsibilities, Arrangements and Management Manual – M.1.190

1.2 Existing Site

The subject site area is approximately 120 hectares and has frontage to Redbank Creek Road to the south and Adare Road to the West. Currently, the site is undeveloped and lightly forested with several dams and watercourses. The site lies within the "investigation area" of the LVRC Flood Regulation TLIP overlay maps G1 and G2. The location of the subject site is shown in Figure 1.1 below.

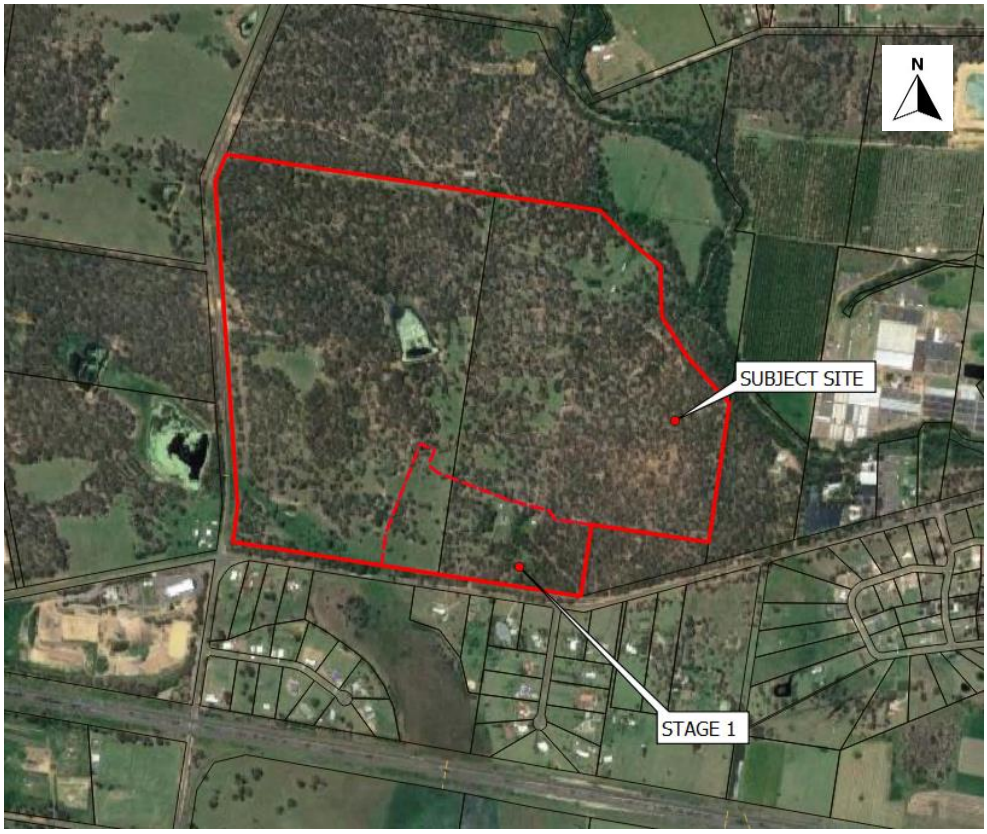

Figure 1.1 – Site Location (Google, 2022)

1.3 Proposed Works

The proposed development consists of a residential subdivision as depicted in Figure 1.2. This report is concerned solely with the works proposed within Stage 1 and will be updated over time to reflect future stages.

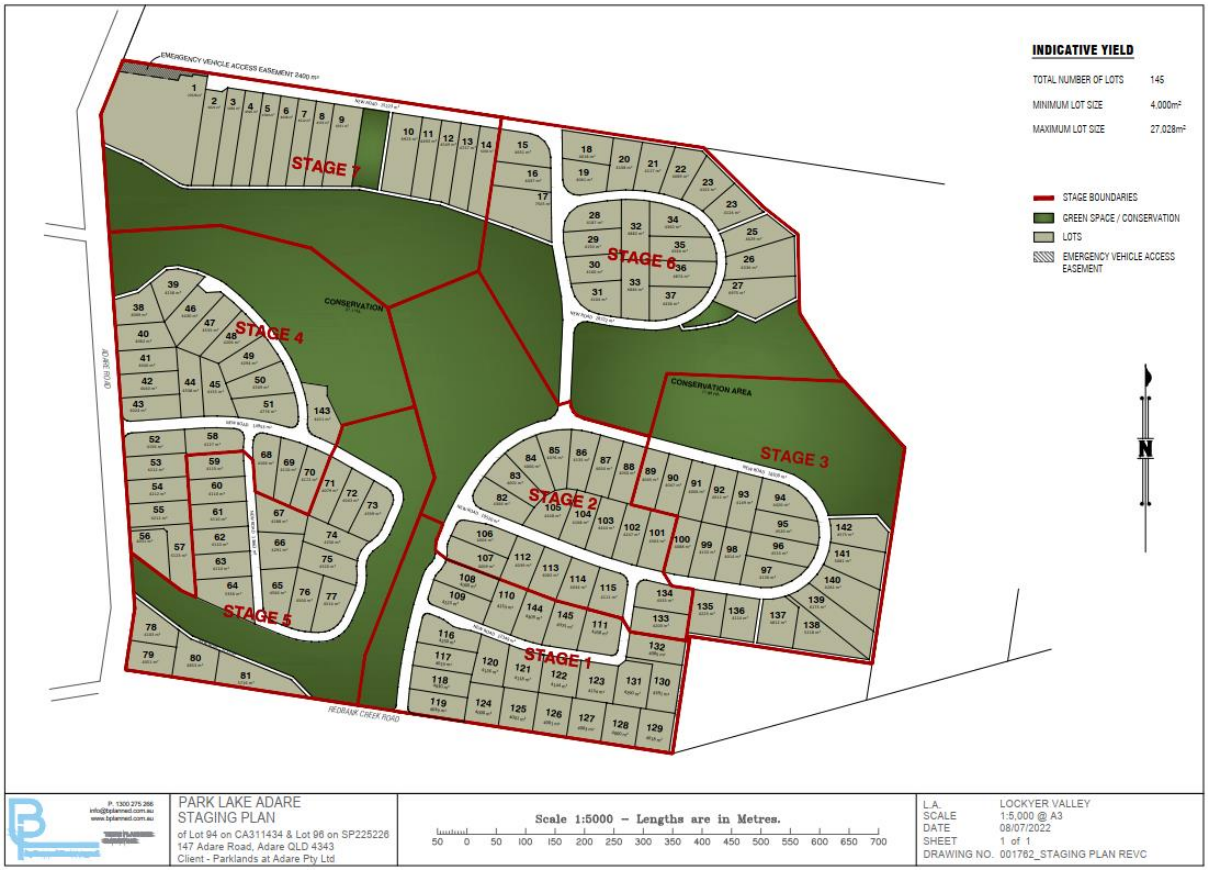

Figure 1.2 – Proposed Layout

2 Flooding

The subject site is susceptible to two flood sources:

- The southern portion of the site is affected by regional flooding of Lockyer Creek; and
- Two local watercourses which pass through the site.

The following table shows the flood data sourced from the regional model is the 2021 Lockyer Creek model originally developed by WMA and a 2D TUFLOW model to determine the flood levels of the local watercourses. Refer to BR222025 – Flood Management Report for details.

Flood Source	Peak flood level in 1% AEP
Regional flood – Lockyer Creek	100.57mAHD
Local watercourse	107.5mAHD – 117.0mAHD mitigated within swales

2.1 Applicable Design Levels

The Defined Flood Event is the higher of the 1% AEP events for Flood (regional or local flood source). In this instance the regional flood is the governing flood source. The applicable flood planning level varies across the site between 99.63mAHD – 100.57m AHD.

In line with Lockyer Valley Regional Council flood hazard overlay code, a minimum of 1500m^2 in area (exclusive of access handle) with a minimum dimension of 20m needs to be located above the defined flood level. The existing contour demonstrates that a 1500m^2 building envelopes 300mm above the defined flood event can be provided to all lots within stage 1. Therefore, compliance of the LVRC flood code has been achieved.

However, during a 2% AEP flood event, the flood inundation on proposed Road 1 will exceed 300mm and therefore is non-trafficable. As egress is hindered for Stage 1 during the defined flood event, this causes isolation of these properties.

Therefore, a flood risk assessment has been undertaken to alleviate future flood risks associated with this road inundation and isolation.

3 Flood Risk Assessment

A flood risk assessment for the proposed reconfiguring of lot has been undertaken to support the development application. The assessment has been completed generally in accordance with the National Emergency Risk Assessment Guidelines (NERAG).

The flood risk assessment has been conducted following these steps:

- Identification of risk;
- Analysis and evaluation of risk;
- Identification and evaluation of treatment options.

3.1. Risk Identification

The flood risks associated with the development have been identified in Table 3-1 below.

Table 3-1 – Risk Identification

Hazard	Hazard Category	Risks	Possible Consequences
Flooding	Public	• Residents entering flood waters	• Sickness/injury/death
	Access & egress	• Access to or egress from site is cutoff by flood waters	• Sickness/injury/death • Burden on emergency services for rescue

3.2. Risk Analysis

All risks associated with flooding have been summarised in a risk matrix in which details the likelihood and consequences of the hazard occurrence, both before and after controls are implemented. The criteria for the assessment of likelihood and consequence can be determined using quantitative and qualitative methods. The criteria adopted to determine the likelihood of hazard occurrence is detailed in the below tables.

Table 3-2 – Consequence definitions

Severity	Level	Qualitative Description
Catastrophic	5	• Loss of life • Unrecoverable cost to the owner • Permanent destruction of the surrounding environment
Major	4	• Long-term injuries • Major cost/ damage to the owner • Severe damage to the surrounding environment
Moderate	3	• Hospitalisation and injuries having short term impacts • Significant cost/ damage to the owner • Significant damage to the surrounding environment
Minor	2	• Minor injuries requiring medical attention off-site

		• Minor cost/ damage to the owner • Minor damage to the surrounding environment
Insignificant	1	• Minor or no injuries requiring on-site treatment. • Little or no cost/ damage to owner • Negligible impact on the environment

Table 3-3 – Likelihood definitions

Likelihood	Level	Quantitative Description
Almost Certain	5	The event is expected to occur at least once a year
Likely	4	The event is expected to occur once every 10 years
Unlikely	3	The event is expected to occur once every 100 years
Rare	2	The event is expected to occur once every 1,000 years
Very Rare	1	The event is expected to occur once every 10,000 years

Table 3-4 – Risk Assessment Matrix

Likelihood	Consequences				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
5 Almost Certain	5 Medium	10 High	15 High	20 Extreme	25 Extreme
4 Likely	4 Medium	8 Medium	12 High	16 High	20 Extreme
3 Unlikely	3 Low	6 Medium	9 Medium	12 High	15 High
2 Rare	2 Low	4 Medium	6 Medium	8 Medium	10 High
1 Very Rare	1 Low	2 Low	3 Low	4 Medium	5 Medium

3.3. Risk Evaluation

The risks identified as a part of the development have been analysed based on consequences and likelihood within the following risk analysis matrix.

Table 3-5 – Risk Evaluation

Hazard Category	Risks	Likelihood Rating	Consequence Rating	Risk Rating
Public	Residents entering flood waters	Unlikely	Major	High (12)
Access & Egress	Flood waters restrict vehicular/pedestrian entry and exit from the site	Likely	Major	High (16)

3.4. Flood Risk Management Measures

A flood risk management plan has been prepared to mitigate the risks identified above. Treatment options proposed for the identified risks have been evaluated to determine if the treatment option has mitigated the risk to an appropriate level.

The following factors have been assessed and incorporated into the flood risk management solutions:

- **Passive mitigation measures** – measures which require no human intervention or power

3.4.1. Signage

Signage at the intersection of Redbank Creek Road and proposed Road 1 shall be installed. It is recommended that signs should be erected, visible to all cars coming into the Estate, which states;

"This road is prone to flooding. Do not attempt to drive through flood waters"

This is to ensure that residents and visitors are aware that the road is subject to flood in extreme weather event.

3.4.2. Evacuation Routes

The lots that are fronting Redbank Creek Road can egress from their lots and continue east to avoid the flood inundated area of the road. The lots which are proposed fronting Road 1 and Road 2 cannot currently achieve a flood free egress.

It is proposed that as part of Stage 1, an interim solution is proposed utilising the balance lot and bushfire trail 1 to evacuate pedestrian and vehicle to Redbank Creek Road. Refer to Figure 3-1.

Information on this evacuation route shall be provided to all lot owners and signage at the bushfire trail shall also be provided.

It has also been noted that based on the flood modelling undertaken, the access onto Redbank Creek Road for these lots will be isolated for less than 5 hours. Given the short period of isolation and the proposed evacuation route, this is considered sufficient to mitigate the risks associated with the road inundation.

Once all stages are established, flood free access and egress routes will be available to residents and visitors of stage 1 via the emergency Vehicle Access Easement to the north of Stage 7 during major flood event.

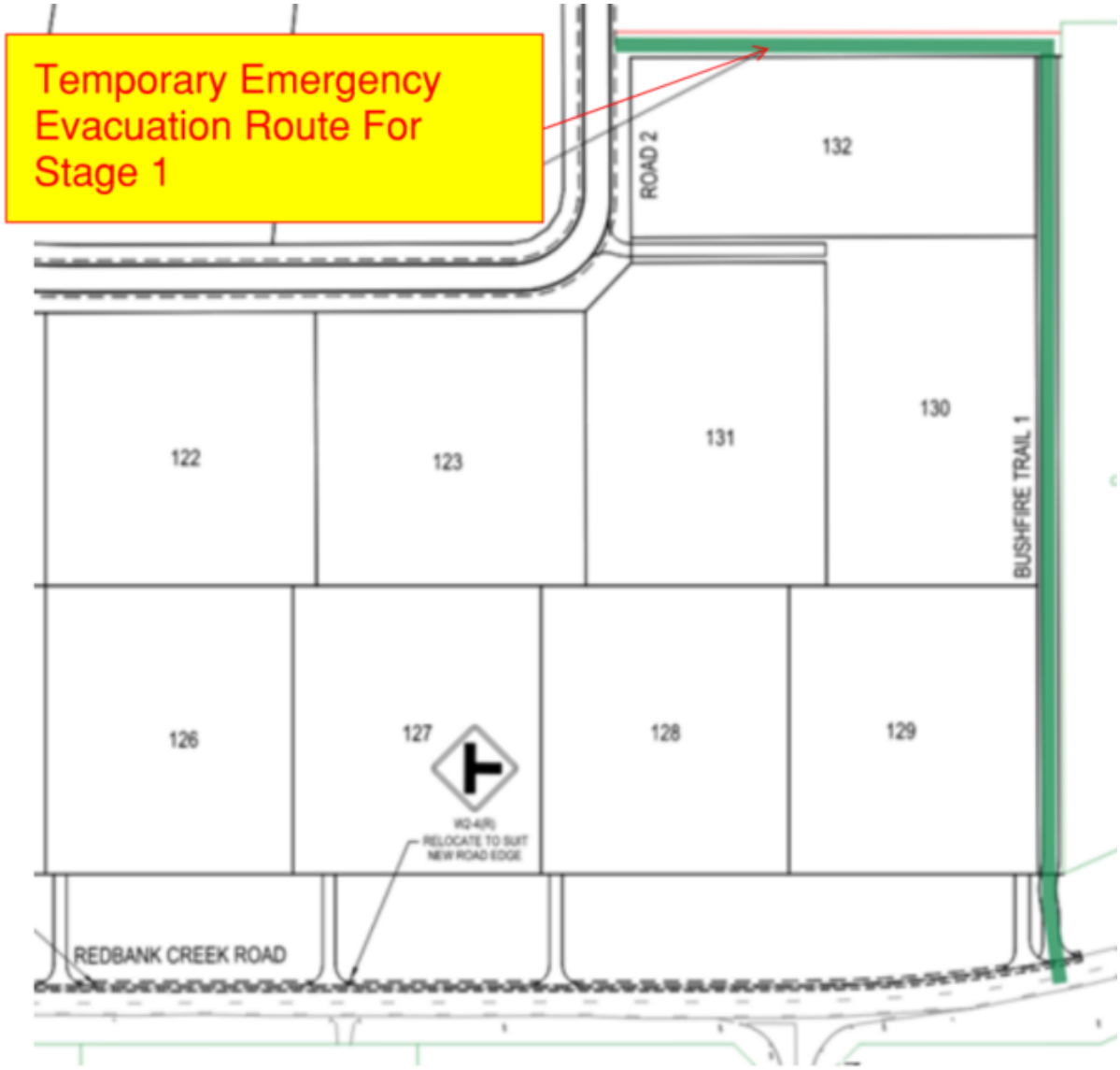

Figure 3-1 Temporary emergency evacuation route

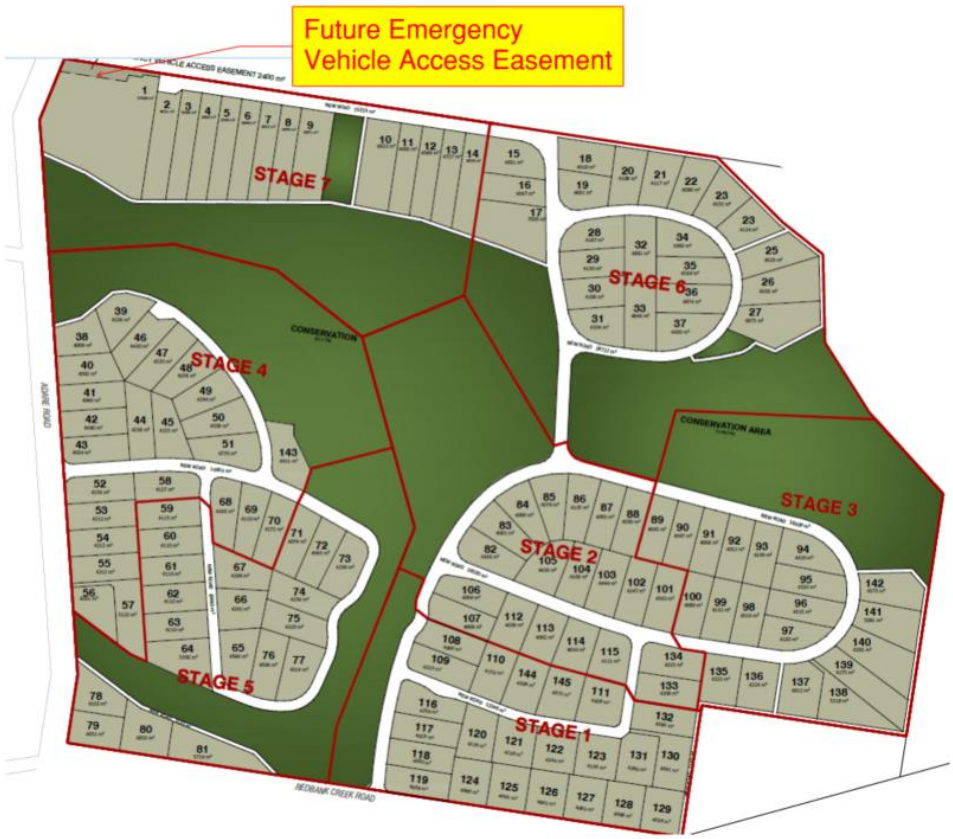

Figure 3-2 Emergency Vehicle Access

3.5. Risk Treatment and Evaluation

Hazard Category	Risks	Risk Rating	Treatment	Mitigated Risk Rating	Evaluation
Public	Residents entering flood waters	High (12)	Proposed building envelope has been set 300mm above the flood level	Medium (4)	The likelihood of people entering flood waters can be reduced by convey the overland flow path and propose a building pad 300mm above the flood level
Access & Egress	Flood waters restrict vehicular/pedestrian entry and exit from the site	High (16)	Signage to be installed and a temporary emergency evacuation route is made available utilising the balance lot and bushfire trail 1	Medium (4)	The likelihood of people being stranded on site can be reduced by evacuating through the temporary emergency evacuation route.

4 Conclusion

This report provides a formal means of identifying the risk of flooding of Stage 1 of the proposed reconfiguration of lot at 174 Adare Road, Adare (the subject site). The site was flagged by LVRC to be susceptible to inundation from the Lockyer Creek and local watercourse flooding.

The existing contours demonstrates that a 1500m2 building envelopes 300mm above the defined flood event can be provided to all lots within stage 1. However, during a 2% AEP flood event, the flood inundation on proposed Road 1 will exceed 300mm which lead to isolation of the lots which rely on this access.

A flood risk management has been undertaken to assess the risks and propose mitigation measures to reduce the risks associated with the flooding. These have been summarised below:

- Signage at the intersection of Redbank Creek Road and proposed Road 1 shall be installed to ensure residents and visitors are aware of the potential flood inundation on Road 1.
- A temporary evacuation route is provided to the north of lot 132 utilising the balanced lot and bushfire trail 1.
- Once all stages are established, flood free access and egress routes will be available to residents and visitors of stage 1 via the emergency Vehicle Access Easement to the north of Stage 7 during major flood event.

Provided that the flood risk management strategies are implemented, the proposed development on site can comply with LVRC's flood hazard overlay code from a flooding perspective.

5 References

Lockyer Valley Regional Council (July, 2022) - Temporary Local Planning Instrument Flood Regulation

QUDM 4th Edition (2016)