



**Harness Racing New South Wales**  
**Proposed Tamworth Harness Racing Facility**  
**Hydrologic Assessment**

**February 2014**

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# 1. Introduction

## 1.1 Introduction

Harness Racing NSW has embarked on a redevelopment program for a number of existing harness racing tracks in NSW. This redevelopment program will see a number of new tracks being developed in country areas of NSW. Three towns were selected for redevelopment, given existing horse and trainer populations. In addition, these three towns represent strong areas of public participation at race meetings. Strategically, the three towns are centres of strong population growth.

The three towns are Bathurst, Wagga Wagga and Tamworth. Each track would be similar in size (1000m) and would enable country horses to 'graduate' to metropolitan tracks, particularly Menangle Park. All three tracks would be on new selected sites and not redevelopment of existing facilities. The vision for developing new track facilities at these centres is now reaching reality.

The Tamworth site is the last of the three tracks to be developed. However, to develop the new site at the corner of Burgmanns Lane and New England Highway, the land must be rezoned to permit the development.

GHD Pty Ltd has been engaged by Michael Brown Planning Strategies Pty Ltd to undertake a range of investigations to support the Planning Proposal for the rezoning of the Tamworth site.

## 1.2 Scope of work

This report has been prepared to investigate:

- The hydrological aspects of the site for the current land use
- Hydrological aspects of the proposed development
- The need and potential form of any required hydrological impact mitigation measures for inclusion into the final proposed development form

## 1.3 Background

The Tamworth site is a substantial land holding located on the outskirts of town, but close to the existing Australian Equine Centre (AEC). There are opportunities to leverage off the AEC and the site's location on the New England Highway. The site has a substantial frontage to this road of 570 metres, which allows for value adding to the site for future uses, other than harness racing.

Tamworth is a very strong equine region and therefore the provision of a new facility for harness racing strengthens the equine industry. Harness racing is extremely relevant to local strategies and objectives in meeting equine needs of the region.

Harness Racing NSW made a commitment to industry participants (trainers and drivers) to develop the site with a new track, grandstand, stable complex and ancillary facilities following purchase of the land. At the same time the development of the land would integrate with surrounding existing development and the future expansion of residential land at Tamworth South. The new track would also meet industry standards to provide improved safety and competitiveness for horses and drivers.

The vision was based on a number of desired outcomes for the Racing Precinct:

- To improve track facilities to new best practice standards
- Realise the development potential of this strategically significant location and take advantage of the site's proximity to future growth in Tamworth and the Region
- To retain the Participants within the New England Region
- Provide new grandstand and stabling facilities for the public and participants
- Improve safety for drivers and horses at Tamworth
- Realise the potential for some trainers to relocate their existing stables to on-site

#### 1.4 Scope and limitations

This report: has been prepared by GHD for Harness Racing NSW and may only be used and relied on by Harness Racing NSW for the purpose agreed between GHD and the Harness Racing NSW as set out in section 1 of this report. GHD otherwise disclaims responsibility to any person other than Harness Racing NSW arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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## 2. Project description

### 2.1 Site details

The subject site is referred to as Lot 5 DP 1048585, Burgmanns Lane, South Tamworth. The site has a total area of 41.32 hectares. The site is located on the south eastern corner of the Burgmanns Lane and Gonoo Gonoo Road (New England Highway) intersection. The site generally slopes to the east from about 419 metres Australian Height Datum (AHD), adjacent to Gonoo Gonoo Road, towards the eastern boundary at 398m AHD. The site has been predominantly cleared with only limited vegetation, in the form of isolated trees, remaining.

The site has previously been used for agricultural purposes in the past and contains infrastructure related to agricultural use including fencing, tracks and accessways, dam, sheds and shelters. A dwelling has also been constructed on the site but has been abandoned for some time.

### 2.2 Proposal

Harness Racing NSW propose to construct a 1,000 metre harness racing track and associated facilities on the site. The proposed development is detailed below:

#### ***Site facilities***

The proposed development would include the construction of:

- 1,000 metre harness racing track, located in the eastern portion of the site
- Clubhouse
- Marquee
- Stables
- Parade ring

A site plan illustrating the layout of the proposed development is contained in Appendix A.

#### ***Access and car parking***

The proposed development will be accessed from Burgmanns Lane via a roadway through the site. The intersection between the proposed access point and Burgmanns Lane would be located over 200 metres east of the Burgmanns Lane and Gonoo Gonoo Road (New England Highway) intersection.

The proposed development would provide 238 standard car parking spaces together with 42 truck and trailer parking spaces, located in the central portion of the site. All parking spaces would be located adjacent to the proposed clubhouse, stables and parade ring.

#### ***Landscaping***

The proposed development would involve landscaping in and around the trotting track, the parking areas and in and around the clubhouse and parade ring.

## 3. Background data

### 3.1 Previous reports

Existing investigations into the flooding behaviour of the area have been provided by Tamworth Regional Council. TUFLOW modelling has been conducted to ascertain the extents of flooding for the site based on LIDAR survey data. Appendix B shows the interim flood planning area, which indicates that the proposed site is not classified as such. TUFLOW modelling for the site in a 100 year ARI event can also be seen in Appendix B, displaying flows developing to depths of approximately 0.1 to greater than 0.15m.

### 3.2 Design standards

This hydrologic assessment has been carried out in accordance with the Tamworth Regional Council - Engineering Design Guidelines for Subdivisions and Developments, 2013 (EDGSD). This design guideline requires that the post-developed flows leaving the site be equal to, or less than those flows leaving the site in its pre-developed state. Rainfall data for the site has also been taken from Appendix D of the EDGSD to develop the rainfall runoff for the catchment.

Design ARI's have been adopted from Table C – Recurrence Intervals for Minor Systems, of the EDGSD. Based on the land use for the proposed site to be commercial, in the absence of a tourism/recreational land use category, a design ARI of 10 years was adopted for the minor drainage system. Council also requires that the 100 year ARI be checked to ensure the major drainage system is capable of conveying those flows safely.

The use of detention basins are only to be used if the post-developed flows are seen to exceed that of the pre-developed flows.

### 3.3 Terrain

The existing site terrain generally slopes from west to east at roughly a 3% grade. There is a slight ridge in the north-western corner which diverts runoff developing in that corner back towards the western boundary and into the swales alongside the New England Highway. Appendix A provides a plan which indicates the site landform.

Similarly, the south-western corner of the site directs runoff off the site, towards the adjacent property. The eastern boundary is seen to be the main discharge location for the catchment. There appears to be three (3) minor flow concentration paths leaving the site across this eastern boundary, but generally the flows are mostly dispersed along the entire length of the boundary.

The catchment for the site is entirely encompassed within the property boundary due to the swales along the New England Highway.

## 4. Impact assessment

### 4.1 Existing conditions

#### 4.1.1 Site conditions

In its current state, the site comprises of open grassland paddocks with several structures in the north-western corner. These structures are considered as impervious areas within the catchment.

The total catchment area was calculated to be 37.3ha with an impervious component making up 0.3% (0.1ha). Figure 4-1 indicates the adopted catchment delineation.

#### 4.1.2 Existing flow rates

An analysis of the existing catchment runoff was conducted using RAFTS to calculate the existing flow rates for the 10 year and 100 year ARI events in accordance with the EDGSD. Input properties for the catchment can be seen below in Table 4-1.

Table 4-1 RAFTS model input parameters

Parameter	Value	Comment
Catchment Area	37.3ha	Measured from survey provided
Impervious Percentage	0.3%	Roof areas
Mannings 'n'	0.035	Based on site photos and Open-Channel Hydraulics, Chow 1959, values for high grassed floodplains
Vectored Slope	3%	Measured from survey provided

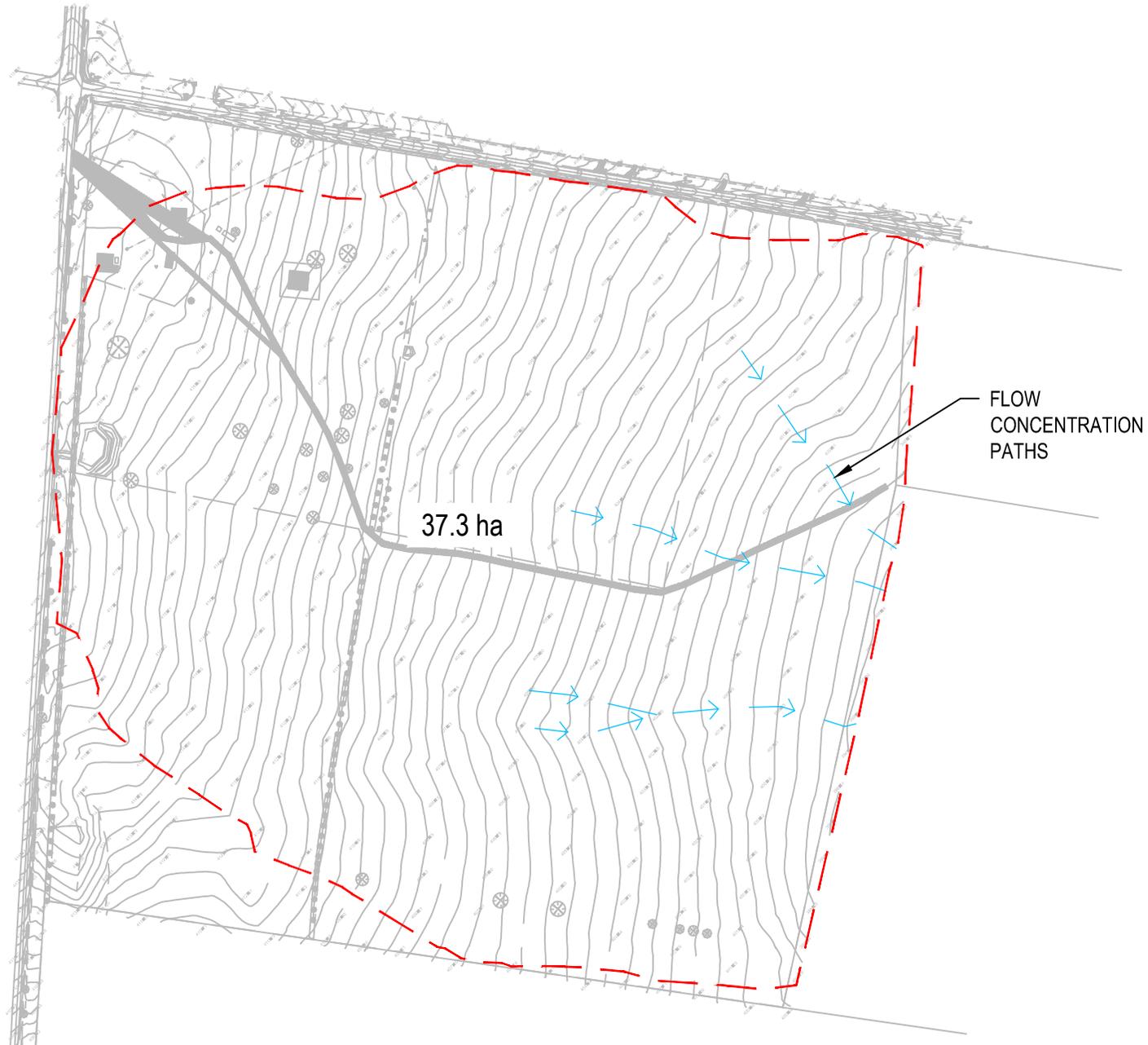
Based on these parameters, the catchment was modelled to produce pre-development flows of **2.1m<sup>3</sup>/s** and **4.1m<sup>3</sup>/s** for the 10 and 100 year ARI events respectively. These results can also be seen below in Table 4-2.

Table 4-2 Pre-developed peak flow rates

ARI (years)	Peak Flowrate (m <sup>3</sup> /s)	Critical Storm Duration (mins)
10	2.1	180
100	4.1	60

#### 4.1.3 Flooding conditions

It is apparent from the draft TUFLOW modelling conducted by Lyall & Associates that the site does not experience flooding due to the Goonoo Goonoo Creek water levels, but rather undergoes minor local flooding in the form of flow concentration of runoff from within its catchment. These flow concentration depths are modelled to be approximately 0.2-0.3m in depth in the 100 year ARI event.



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 PRE-DEVELOPMENT  
 CATCHMENT EXTENTS

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**Figure 4-1**

## 4.2 Proposed development impacts

### 4.2.1 Site conditions

The proposed development is to construct a trotting track within the site, along with various amenities buildings, carparking and trailer parking, with an access road coming from Burgmanns Lane.

For the purposes of this assessment, the following assumptions about levels have been made:

- The long section of the trotting track will be generally flat
- A -1% grade from the inside of the track to the ovals centre
- All flows coming onto the access road will be collected and diverted to the carparks
- All flows within the carparks will be intercepted via new stormwater drainage systems
- All roof water will be diverted to the new stormwater drainage system

Based on these assumptions, new catchment delineations were generated and can be seen in Figure 4-2.

### 4.2.2 Design flow rates without mitigation

An analysis was then conducted on the post-developed scenario, without any flow mitigation measures, using DRAINS. This analysis is required to check the effect of the development on the rainfall runoff for the site, specifically, to ensure that flow rates do not exceed those of the pre-developed state.

The model was set up with flows developing from the carpark catchment running directly to the eastern boundary, flows caught within the trotting track catchment being collected in a sag pit and then piped directly to the eastern boundary, with the remainder of the catchment flowing directly to the eastern boundary. This resulted in flows leaving the site at **2.9m<sup>3</sup>/s** and **5.9m<sup>3</sup>/s** for the 10 and 100 year ARI events respectively. These results can also be seen below in Table 4-3

Table 4-3 Post-developed peak flow rates without mitigation

ARI (years)	Peak Pre-Developed Flowrate (m <sup>3</sup> /s)	Peak Post-Developed Flowrate (m <sup>3</sup> /s)
10	2.1	2.9
100	4.1	5.9

As can be seen from the results, the post-developed flow rates leaving the site in both the minor and major events exceed the pre-developed flows. Therefore, it is required that flow mitigation measures be investigated.

### 4.2.3 Design flow rates with mitigation

Due to the EDGSD requiring post-developed flows to be less than or equal to the pre-developed flows, a detention system is required. The obvious solution was to utilise the available area within the trotting track for detention storage, and direct flows collected from the carpark catchment to a sag pit located within the centre of the trotting track. By varying the size and number of outlet pipes from this sag pit, flows were able to be choked and detained within the trotting track, whilst keeping the flow rate exiting the site less than the pre-developed flows.

The results of the flow mitigation are **2.1m<sup>3</sup>/s** and **3.2m<sup>3</sup>/s** for the 10 and 100 year ARI events respectively. This was achieved by using **3 x 375mm** (or equivalent cross sectional area) diameter pipes to convey the flows from the trotting track sag pit. These can also be seen below in Table 4-4.

Table 4-4 Post-developed peak flow rates with mitigation

ARI (years)	Peak Pre-Developed Flowrate (m <sup>3</sup> /s)	Peak Post-Developed Flowrate (m <sup>3</sup> /s)
10	2.1	2.1
100	4.1	3.2

### 4.2.4 Flooding conditions

In the post-developed state, the rainfall runoff leaving the site will be minor overland flows from the unaffected catchment discharging across the eastern boundary, along with the concentrated flows collected within the carpark and trotting track catchments. It is expected that during the detailed design phase, a level spreader will need to be implemented at the discharge point of the trotting track sag pit outlet. This will allow all flows captured within the post-developed catchment to be slowed down at the eastern boundary, minimising velocities and therefore the occurrence of erosion.

## 4.3 Way forward

The hydraulic assessment carried out for the proposed development indicated to concept design standard, post-developed flows can be mitigated to be less than or equal to the pre-developed flow rates. This is able to be achieved by utilising the available area within the trotting track, as a detention storage space. The solution will be refined with the advancement of the design and the subsequent levels finalised for the trotting track and associated buildings.

It is also noted that the Interim Flood Planning Area mapping includes parts of the proposed trotting track site. It is suggested that the extents of the Flood Planning area be amended to reflect the proposed changes to the site. A possible solution would be to terminate the Flood Planning Area at the eastern boundary of the site.

Water quality aspects of the proposal would be considered as part of the hydrological assessment as site planning becomes more detailed.



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Figure 4-2

## 5. Summary

A hydrological assessment has been completed for the site of the proposed Harness Racing NSW development proposed for South Tamworth.

The proposed development will be accessed from Burgmanns Lane via a roadway through the site. The proposed development would include the construction of:

- 1,000 metre harness racing track, located in the eastern portion of the site
- Clubhouse
- Marquee
- Stables
- Parade ring

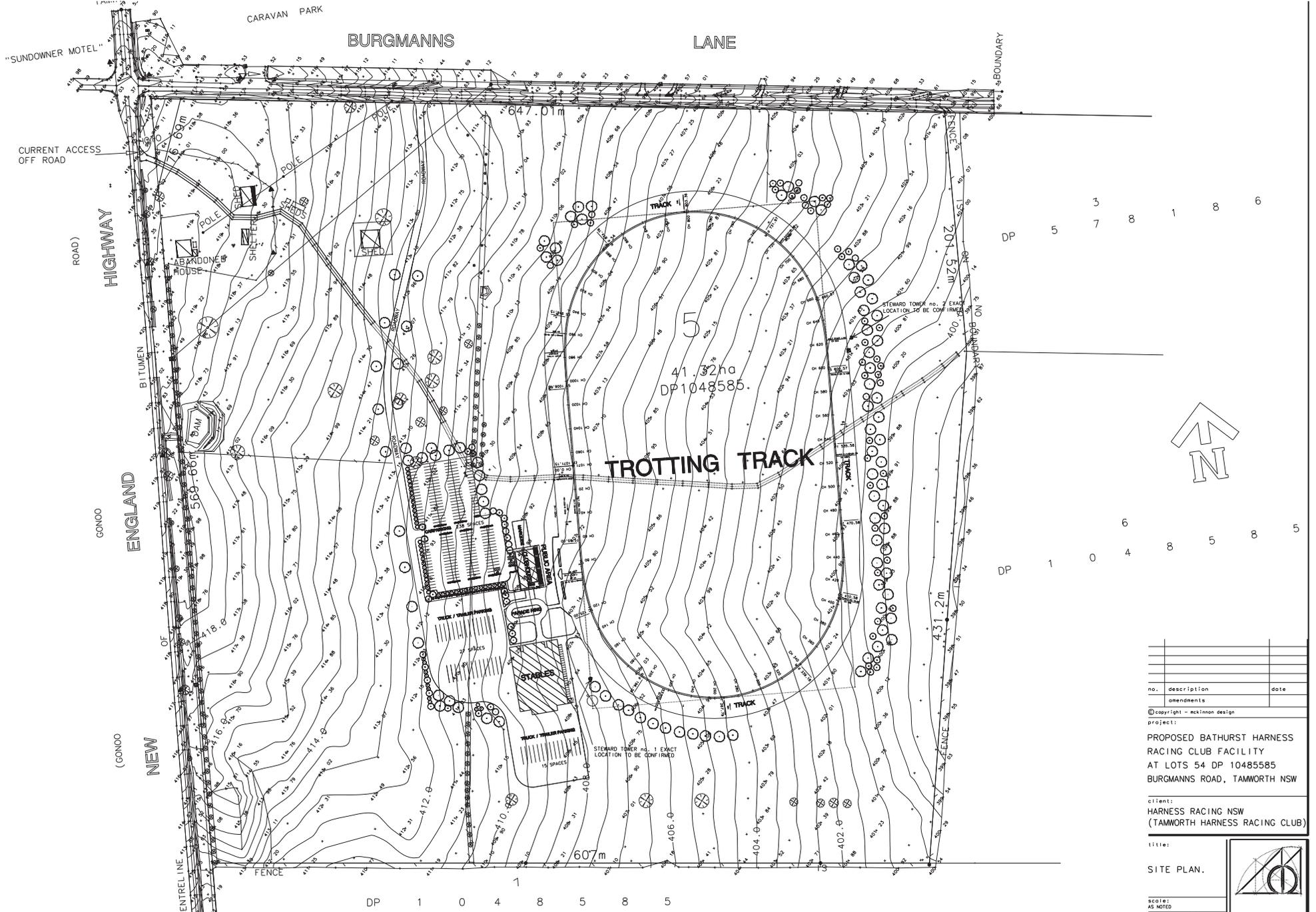
The hydrological investigation has determined that the peak 100 year ARI site runoff for the existing land use would be 4.1 m<sup>3</sup>/s and that this could increase to 5.9 m<sup>3</sup>/s without the implementation of detention storage on the development site. Incorporation of detention storage can readily reduce the identified post development flow rate down to the pre developed value.

As site planning proceeds the design form of the required detention would be refined to better integrate into the site layout.

To keep the discharge regime off the site as consistent as practical with that for the current landform it is proposed that there not be a concentrated discharge at the eastern boundary. Level spreaders would be incorporated at the discharge points from the proposed development to spread the discharging flows onto the adjacent downslope lands.

# Appendices

# Appendix A – Proposed Tamworth Harness Racing Facility Concept Plan



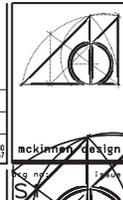
no.	description	date

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 PROPOSED BATHURST HARNESS  
 RACING CLUB FACILITY  
 AT LOTS 54 DP 1048585  
 BURGMANN'S ROAD, TAMWORTH NSW

client:  
 HARNESS RACING NSW  
 (TAMWORTH HARNESS RACING CLUB)

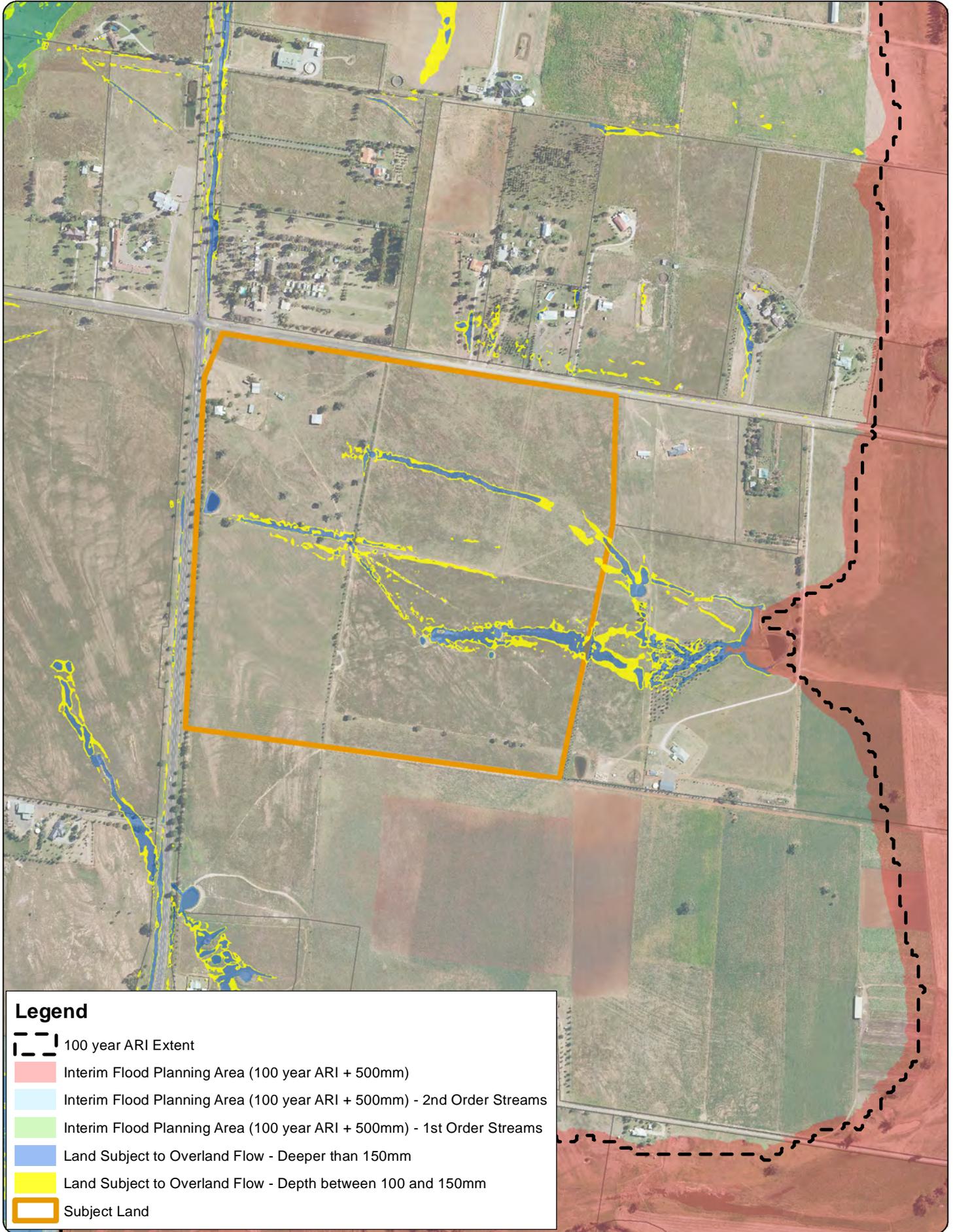
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scale:  
 AS NOTED  
 drawn:      date:  
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 547 SUMNER STREET,  
 PO BOX 1922      P 02 4363 1780  
 DUNEDIN NSW 2800      F 02 4362 8271  
 job no:  
 13088



## Appendix B – Interim flood planning area

# Interim Flood Planning Area, Goonoo Goonoo Creek



## Legend

-  100 year ARI Extent
-  Interim Flood Planning Area (100 year ARI + 500mm)
-  Interim Flood Planning Area (100 year ARI + 500mm) - 2nd Order Streams
-  Interim Flood Planning Area (100 year ARI + 500mm) - 1st Order Streams
-  Land Subject to Overland Flow - Deeper than 150mm
-  Land Subject to Overland Flow - Depth between 100 and 150mm
-  Subject Land

**Disclaimer:** This map has been produced by the Geographic Information Section of Tamworth Regional Council using information captured by Tamworth Regional Council and NSW Land and Property Information.

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0 100 200 300 M

Scale: 1:8,000 at A4 Portrait



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