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CIVIL

Flood Assessment Report

for

Grand Saddles Lodge - 231 Pacific Highway, Mount White

for John Singleton Group

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Acronyms and Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARR	Australian Rainfall and Runoff
BoM	Bureau of Meteorology
CCC	Central Coast Council
CC	Climate Change
DCP	Development Control Plan
FPL	Flood Planning Level
ha	Hectares – Measure of Area
LEP	Local Environmental Plan
LGA	Local Government Area
LiDAR	Light Detection and Ranging
m	Measure of length / height / distance (metres)
m AHD	Meters above Australian High Datum
m/s	Measure of velocity (metres per second)
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
SES	NSW State Emergency Service
TUFLOW	A 1D and 2D hydraulic modelling software

Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged to prepare a Flood Assessment Report to support the Planning Proposal for the proposed development of 231 Pacific Highway, Mount White, herein referred to as the subject site. The subject site locality is presented in Figure 1 overleaf.

This flood assessment report aims to outline the flood behaviour at the subject site and review the Planning Proposal with respect to the NSW Ministerial Direction and Council's Local Environmental Plan (LEP), and Development Control Plan (DCP).

This assessment has been prepared with consideration to the following documents and guidelines:

- Australian Rainfall and Runoff (2019) Guidelines (AR&R 2019)
- NSW Floodplain Development Manual (NSW Government 2005)
- The NSW Government Ministerial Local Planning Direction 4.1 – Flooding
- NSW Government Guidelines "Considering Flooding in Landuse Planning" dated July 2021
- Australian Rainfall and Runoff Guidelines – Project 15 – Two-dimensional Modelling in Urban and Rural Floodplains, dated November 2012
- Central Coast Council Local Environmental Plan (LEP) 2022
- Central Coast Council Development Control Plan (DCP) 2022

Included herein is a description of the methodology for our assessment, a description of the subject site and proposed development, an overview of the existing and developed flood behaviour and a review of the proposed development with respect to the flooding related Ministerial Direction, LEP and DCP requirements.

Legend

Subject Site

0 400 800 Metres

1:20,000

Figure 1

Locality

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, NSW Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_1.qgz

Methodology

The subject site is currently not located within a region currently covered by the existing flood studies prepared for Central Coast Council. As such a site-specific flood model has been prepared herein to review the flood behaviour at the subject site.

The following provides a summary of the methodology used in preparation of the site-specific flood model.

- Desktop review of available data, investigations and information including design plans, aerial imagery, survey information, site visit and LiDAR elevation data.
- Digitise upstream catchment extent using surrounding LiDAR elevation data.
- Preparation of a two-dimensional hydraulic TUFLOW model utilising a rainfall on grid hydrology. Preparation of the model included:
    - Addition of surrounding hydraulic structures (culverts) as identified by site survey.
    - Delineation of surface roughness and land use based on aerial imagery.
    - Site survey and design surfaces with surrounding LiDAR elevation data.
- Run the existing and developed case scenarios for the 1% AEP, 1% AEP plus climate change and PMF design storm events for a range of durations to determine the critical duration.
- Preparation of an existing case one-dimensional DRAINS model to verify and compare peak flows generated by the TUFLOW two-dimensional model.
- Process and review results of the existing and developed case and prepare a comparison to review potential flood impacts of the proposed development.
- Review and recommend future mitigation and control measures for the subject site based on Council's Flood related Development Controls.
- Review the proposed development with respect to the flood related NSW Ministerial Direction and Central Coast Council LEP and DCP requirements.

This plan has been prepared with consideration to the following plans and documents:

- Architectural Plans prepared by White and Dickson Architects
- Detailed survey prepared by Central Coast Surveyors (Ref: 20H4077-01 Dated 19/05/21)

Subject Site and Proposed Development

Subject Site

The subject site contained within Lot 1 DP 207158 is bound by rural residential land to the north, Ashbrookes Road to the east, the Pacific Highway to the south and Calverts Creek to the west.

The existing site previously contained an existing dwelling, tennis court, swimming pool and miscellaneous structures and storage sheds/carports.

The site has an area of approximately 3.48ha with elevations ranging from approximately 174.5m AHD to 166.2m AHD with slopes falling towards the south with average grades of 3-6%. A second order water course traverses through the northern portion of the site draining from east to west connecting to Calverts Creek. Calverts Creek also runs along the western boundary of the subject site in a southerly direction.

Proposed Development

The development proposes to construct a new bed and breakfast dwelling with additional carparking facilities which is intended to be repurposed to restaurant and spa facilities as part of the planning proposal.

The planning proposal seeks to allow additional permitted uses of hotel or motel accommodation, restaurant or café, small bar and business premises (to permit a day spa), with maximum floor area limits for each use. It is important to note that the Planning Proposal does not seek to change the underlying RU1 Primary Production zoning of the land.

The proposed development includes 20 self-contained accommodation villas, new restaurant and day spa facilities as well as ancillary structures such as on-grade carparking, swimming pool, yoga shala and on-site services including potable water storage and on-site effluent disposal.

Refer to the architectural plans prepared by White+Dickson Architects, provided in Appendix B, for additional details.

Model Parameters

Hydrology

Direct Rainfall (rainfall-on-grid) hydrology, coupled with the initial and continuing loss model, has been adopted for this assessment. As per the latest AR&R 2019 guidelines, initial loss, continuing loss, pre-burst and burst rainfall have been considered as part of this study.

Rainfall

Rainfall intensities have been obtained from the Bureau of Meteorology (BoM) website for a location over the catchment centroid. The following Table 1 presents the Intensity-Duration-Frequency (IFD) used for the study.

Rainfall intensities for the Climate Change scenario have been increased based on the worst-case Representative Concentration Pathway (RCP) of 8.5 and year 2090. The ARR Data Hub suggests during this worst-case scenario, a predicted increase in rainfall depths of up to 19.7% can be expected.

Table 1 - IFD Rainfall Depths

Duration (min)	1% AEP (mm)	PMF (mm)
10	37.7	-
15	47.3	180
20	54.5	-
25	60.1	-
30	64.8	250
45	75.5	320
60	83.5	370
90	95.8	470
120	106	550
180	122	680
270	143	-
360	161	-
540	192	-
720	219	-
1080	264	-
1440	302	-

Burst Losses

As mentioned above, the initial and continuing loss model has been adopted for this study. Losses adopted are summarised in the below Table 2 and Table 3. Probability Neutral Burst Initial Losses have been used in accordance with the latest ARR 2019 NSW Specific advice.

Initial and continuing losses were reduced to 0 during the PMF design storm event to conservatively assume wet antecedent conditions.

Table 2 - Loss Parameters

Parameter	Value	Comment
Pervious initial loss (mm)	Variable	Probability Neutral Burst Initial Loss (Table 3)
Pervious continuing loss (mm/hr)	1.0	Factored by 0.4 from ARR data hub values
Impervious initial loss (mm)	1.5	
Impervious continuing loss (mm/hr)	0.0	

Table 3 - Probability Neutral Burst Initial Loss (mm)

Duration (mins)	1% AEP (mm)	1% AEP + CC (mm)
10	14.6	14.6
15	14.6	14.6
20	14.6	14.6
25	14.6	14.6
30	14.6	14.6
45	14.6	14.6
60	14.6	14.6
90	12.5	12.5
120	12.1	12.1
180	10.3	10.3
270	9.9	9.9
360	9.5	9.5
540	10.1	10.1
720	10.7	10.7
1080	9.4	9.4
1440	14.8	14.8

Hydraulic Model

Two-Dimensional Grid Extent and Size

The latest TUFLOW version 2020-01-AD with HPC GPU module was used for the analysis.

A grid size of 2m was adopted for the two-dimensional model to adequately represent flows through the creeks, across the site and through overland flow paths.

The two-dimensional grid extent is shown in Figure 2 overleaf. The grid extends from just south of the Pacific Highway, to the end of Ashbrookes Road in the north, and from Ernbrook Road in the west to the ridge line of the small mountains in the east.

Boundary Conditions

The model boundary conditions are presented in **Error! Reference source not found.** overleaf. As mentioned previously, rainfall on grid hydrology has been adopted with flows applied directly to all cells across the two-dimensional grid.

An outlet head boundary has been entered into the two-dimensional model approximately 350m downstream of the Pacific Highway. The model was extended downstream far enough so as the outlet conditions would not influence the flood impacts. Similarly, a free outfall tailwater condition was conservatively adopted so as to not influence flood impact results.

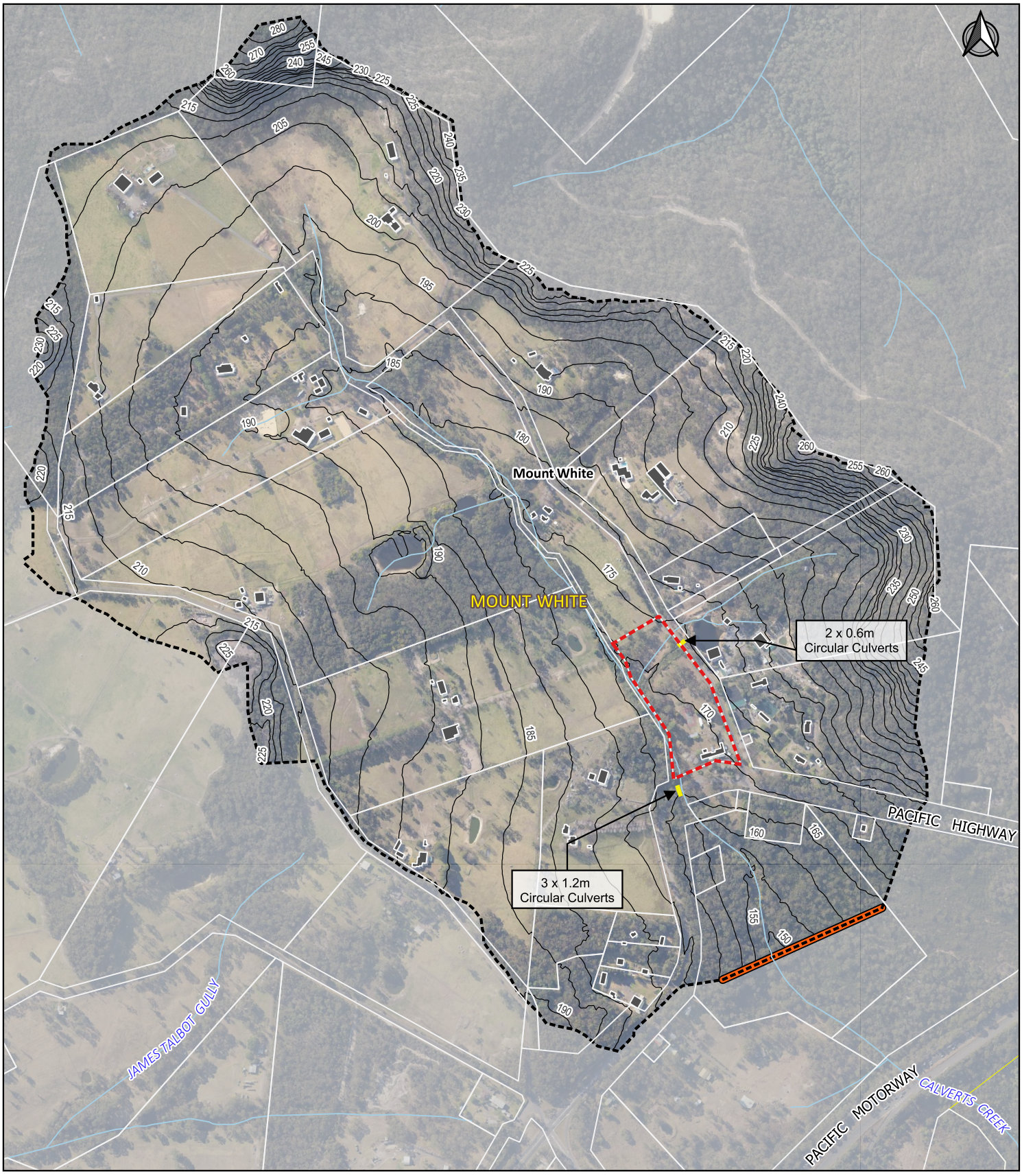
Catchment Roughness

Catchment roughness was based on a review of hydraulic literature (including ARR 2019 – Project 15), aerial imagery and observations made during the site visit.

Figure 3 and Figure 4 presented overleaf show the land use type for the existing and developed case scenarios respectively. The following Table 4 presents the surface roughness values adopted for each land use.

Table 4 - Land use Roughness (Manning's)

Landuse	Manning's Roughness Value
Grass	0.060
Creeks	0.045
High/Dense Vegetation	0.080
Sealed Roads	0.020
Buildings	0.700
Open Water	0.025



Legend

- Subject Site
- Model Extent
- Outflow Boundary
- Buildings
- Culverts
- 5m Ground Contours(mAHD)
- Cadastre
- Stream Lines

0 200 400 Metres

1:10,000

Figure 2

TUFLOW Model Setup

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, NSW Imagery - Aerial

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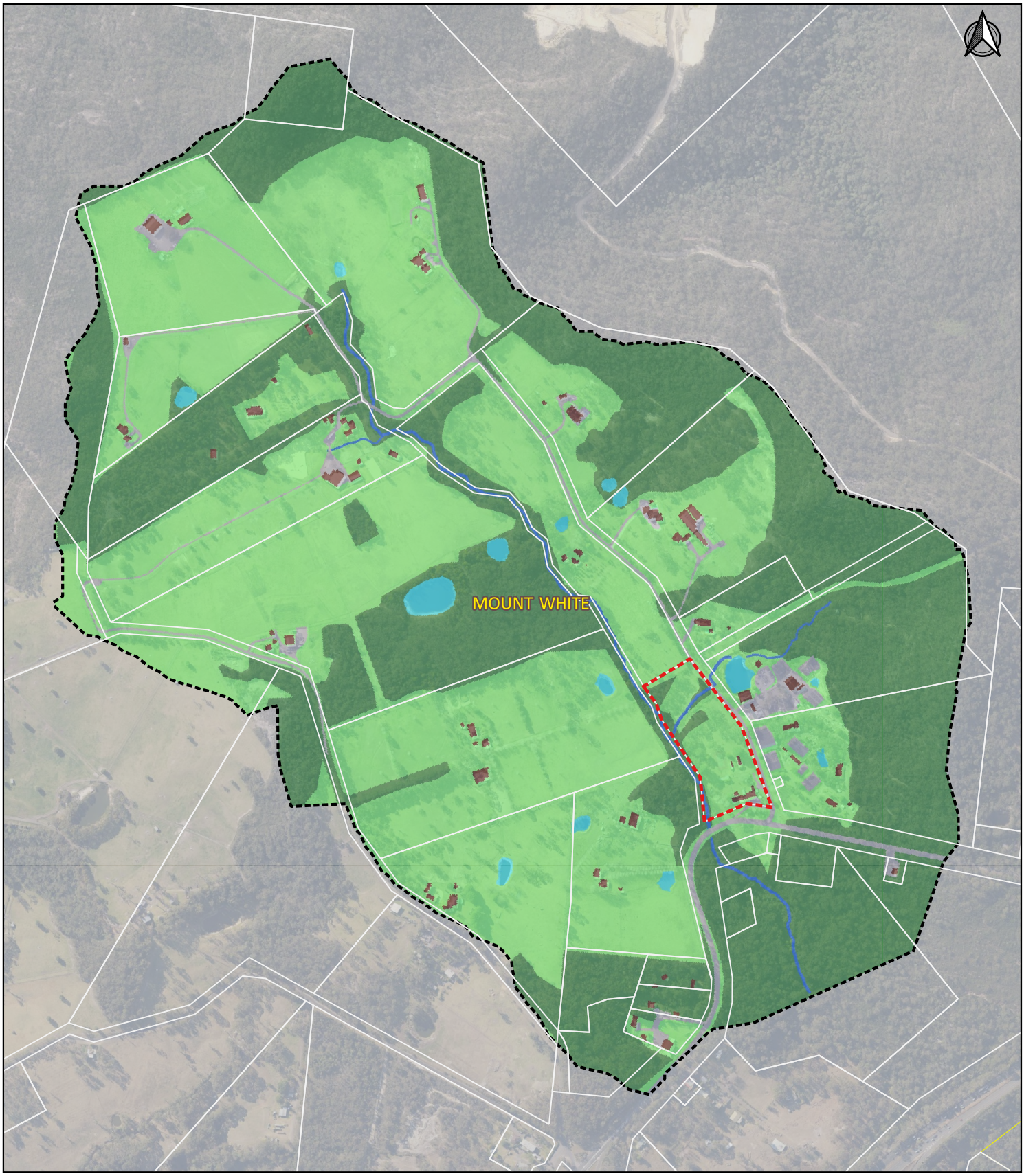


Legend

- Subject Site

Manning's Roughness

- Grass (0.060)
- Creek (0.045)
- Dense Vegetation (0.080)
- Sealed Roads (0.020)
- Buildings (0.700)
- Open Water (0.025)

0 200 400 Metres

1:10,000

Figure 3

Manning's Roughness
Pre-Existing (2020) Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, NSW Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_3.qgz

Legend

- Subject Site

Manning's Roughness

- Grass (0.060)
- Creek (0.045)
- Dense Vegetation (0.080)
- Sealed Roads (0.020)
- Buildings (0.700)
- Open Water (0.025)

0 40 80 Metres

1:2,000

Figure 4

Manning's Roughness
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, NSW Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_4.qgz

Terrain

Terrain data used in the development of the model includes a combination of LiDAR elevation data and detailed survey and a preliminary design surface prepared using 12D software. Additional manual amendments have been made with the swale along the eastern boundary burnt into the detailed developed case surface, upstream of the proposed development.

Similarly, a review of the quality of the LiDAR elevation data in the creek suggests the potential for vegetation to be picked up in some areas. As such, some minor amendments through the creek invert were made to ensure a continuous path of travel.

It is anticipated further detailed surface modelling will be prepared during a future detailed design phase. Terrain data used for both the Existing and Developed case scenarios is presented in Figure 5 and Figure 6 respectively.

Infrastructure

Due to limited available information, the magnitude of the events considered, and to remain conservative for the purposes of this assessment, below ground infrastructure outside of the immediate subject site as identified on the detailed survey, has not been included in the hydraulic model. Proposed site drainage infrastructure for the subject site was included in the developed case scenario.

Road culverts were modelled as one-dimensional (1D elements) dynamically linked with 2D domain and were modelled with 0% Blockage. A blockage sensitivity test has been performed assuming 50% blockage for the existing infrastructure to review site sensitivity to blockage. This is presented in the discussion section of this report.

Legend

- Subject Site
- Cadastre
- Buildings
- Contour (1m)
- Contour (0.2m)

Topography (mAHD)

185
160

0 40 80 Metres

1:2,000

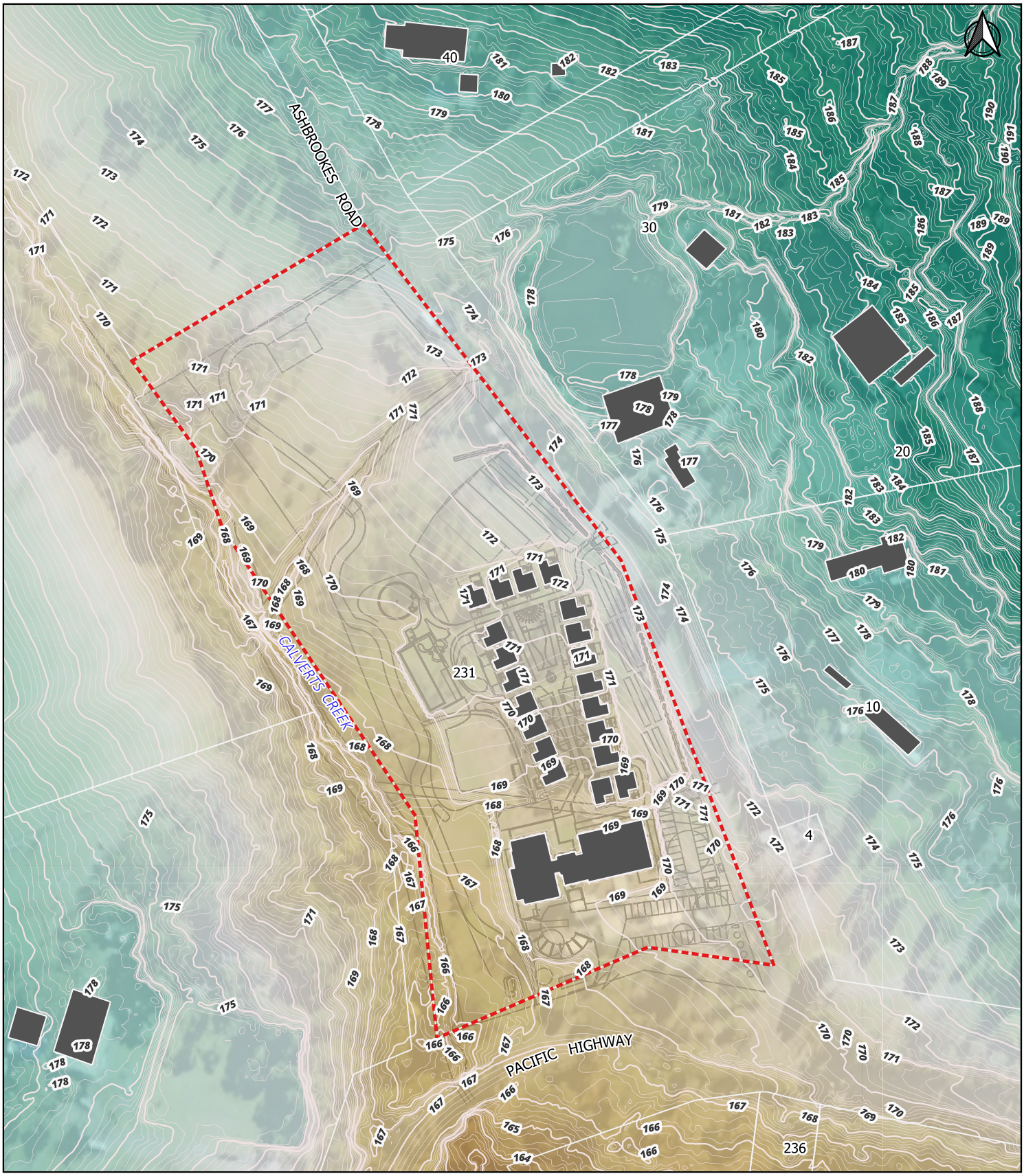
Figure 5

Ground Elevation
Pre-Existing (2020) Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial



Legend

- Subject Site
- Cadastre
- Buildings
- Contour (1m)
- Contour (0.2m)

Topography (mAHD)

185
160

0 40 80 Metres

1:2,000

Figure 6

Ground Elevation
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_6.qgz

Results

Critical Duration

To determine the critical storm duration for the subject site and vicinity the guidance provided in the latest AR&R 2019 guidelines was considered as summarised below:

- Classification of the median value of the ten temporal patterns for each storm duration.
- Selection of the duration that produces the maximum median value for each return interval.

A water elevation parameter was used in this investigation to define the median value.

Durations from 10-minute to 12-hour were used to define 1% AEP critical duration. The two-dimensional TUFLOW modelling indicates that the **25-minute duration, temporal pattern 1** is critical for 1% AEP for the area in the vicinity of the subject site. A 25-minute critical duration was confirmed with the verification DRAINS model.

The **15-minute duration** as determined to be the critical event for the PMF event.

Existing Case Flood Behaviour

Existing case flood depth and elevation contours for the 1% AEP design storm and PMF are presented in **Figures A1 and A2** located in Appendix A. As a rainfall on grid methodology was adopted, a 100mm depth cut-off value was adopted to better represent areas subject to flooding or flood flows.

It is observed that in the 1% AEP the majority of the flooding on the site is derived from Calverts Creek in the north flowing towards the pacific highway culvert crossing to the south of the site. Additional flow from the east is also observed to traverse the site via the watercourse, with the flow generally contained within the top of bank.

The observed flood behaviour is similar in the PMF event, with the extent of inundation increased from the main creek line, extending to cover approximately half of the subject site. Flows running through the watercourse from the east are shown to breach the creek bank capacity.

Developed Case Flood Behaviour

Developed case flood depths an elevation for the 1% AEP and PMF design storms are presented in **Figures A3 and A6** of Appendix A respectively. It is observed that the flood extents in the 1% AEP are similar to the existing site conditions, with the proposed development footprint being located generally outside of the Calvert's Creek inundation area. Additional flows are observed to be conveyed through the subject site via the proposed drainage swales from Ashbrook's Road towards Calvert's Creek.

The PMF flood extent is observed to cover the proposed main structure as well as up to four additional accommodation villas. The carpark and remaining site areas are observed to be flood free during the PMF event. It is noted that a rising path for evacuation to Ashbrooks Road is available for the proposed development as shown in Figure A6.

Flood Hazard & Categorisation

Flood hazard conditions have been assessed based on the latest AR&R 2019 hazard categories as presented in Figure 7. Flood hazard conditions for the developed case 1% AEP and PMF storm events are presented in **Figures A4 and A7** of Appendix A respectively. Hazard categories of up to H5 are observed in the 1% AEP within the main creek line reducing to H1 for the proposed development area except for a small localised H3 extent within the proposed drainage swale through the site.

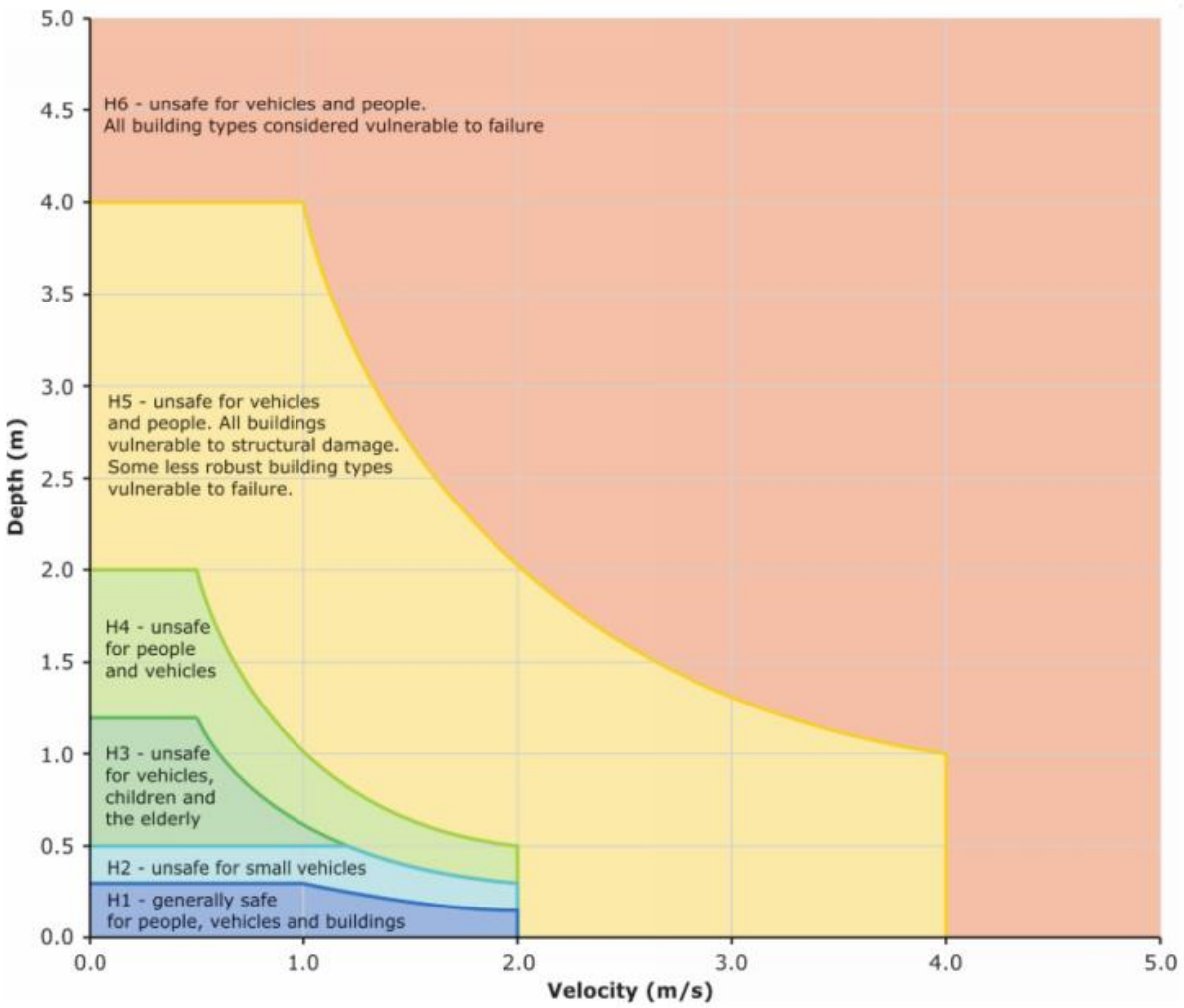


Figure 7 - Flood Hazard Categories (ARR 2019)

Flood hydraulic categories for the developed case 1% AEP event is presented in **Figure A5** of Appendix A. Flood hydraulic categories were adopted based on the following criteria:

- **Floodway** is defined as areas where:
  - The peak value of velocity multiplied by depth (V x D) > 0.25m^2/s, **AND** peak velocity > 0.25m/s, **OR**
  - Peak velocity > 0.6 m/s **AND** peak death >0.3 m
- **Flood Storage** comprises areas outside the Flood Conveyance zone where peak depth exceeds 0.5m.
- **Flood Fringe** comprises areas outside the Flood Conveyance zone where peak depths are less than 0.5m.

It is noted that the proposed development and buildings are located outside the extent of floodway.

Flood Impacts

A comparison of the existing and developed case flood depths during the 1% AEP design storm event is presented in Figure B1 of Appendix A.

Two minor areas of increased flood elevations are observed outside the extent of the subject site. The first is a 20mm increase located within Calverts Creek, adjacent to the proposed development. This is expected to be created by a small amount of fill located within the extent of the Calverts Creek 1% AEP flood extent. Given the location of the observed increase (generally contained within the creek extent), and the relative depth of flows within the creek (>2m), this increase is not expected to create a significant adverse impact.

The second is a 35mm increase located in Ashbrookes Road at the location of the new vehicle crossing. This increase is expected to be created by some minor regrading at the driveway entrance to the proposed facility. The total depth of flow over the increase is less than 100mm and as such this increase is not expected to affect the existing trafficability of the road.

As such, the proposed development is not expected to create a significant adverse impact within adjacent properties. It is recommended future detailed design remain sympathetic to the existing flood behaviour to ensure the proposed development does not create a significant adverse impact.

Climate Change Sensitivity

A climate change sensitivity of the developed case is presented in Figure C1 of Appendix A. It is observed that the flood depths increase throughout the catchment as a result of the increased rainfall intensity, range from 90 to 250mm within Calverts Creek adjacent to the subject site.

This is less than the expected freeboard for the proposed facility and as such, no amendments to necessary Flood Planning Levels are proposed.

Discussion

Hydrology Verification

As the flood model utilised rainfall on grid hydrology, a separate hydrological model was prepared to verify the results of the TUFLOW model.

The site was divided into a number of sub catchments as presented in Figure 9 overleaf. An initial and continuing loss hydrological model was developed using the run-off routing software DRAINS with the same rainfall data as adopted for the TUFLOW model.

Figure 8 presents a comparison of peak flow hydrograph measured within the main creek line adjacent to the subject site for the critical storm event for the 1% AEP.

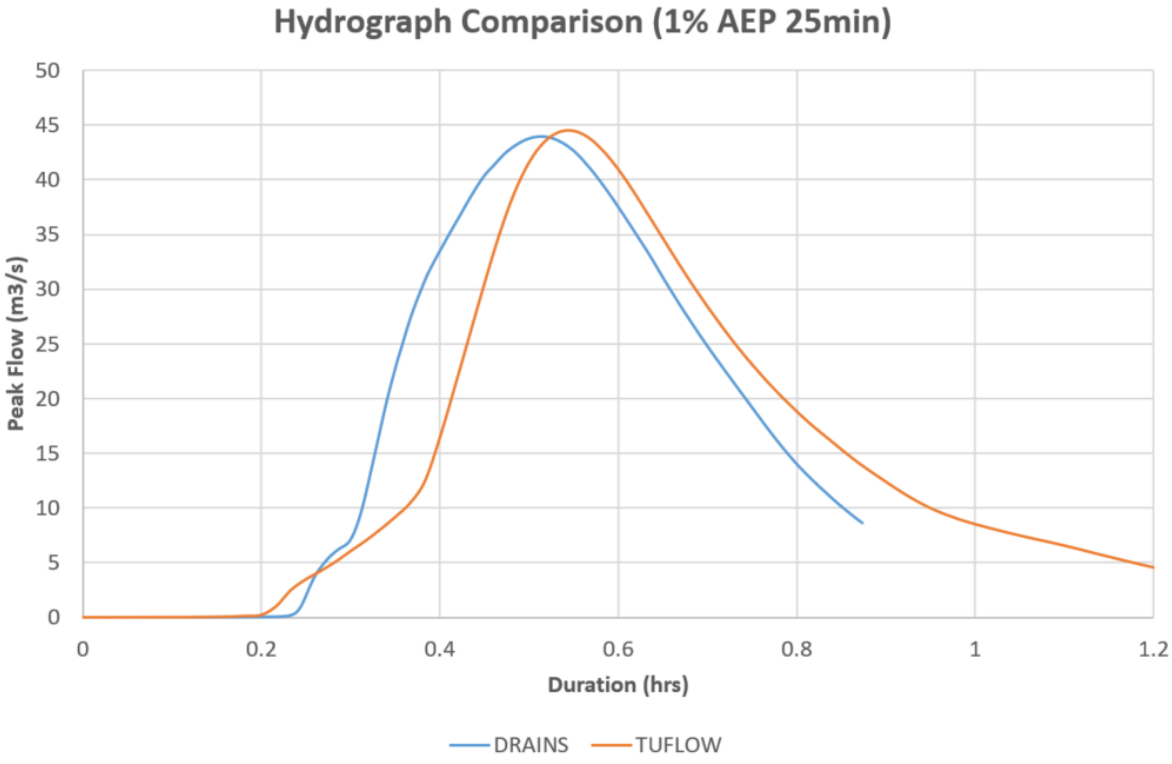
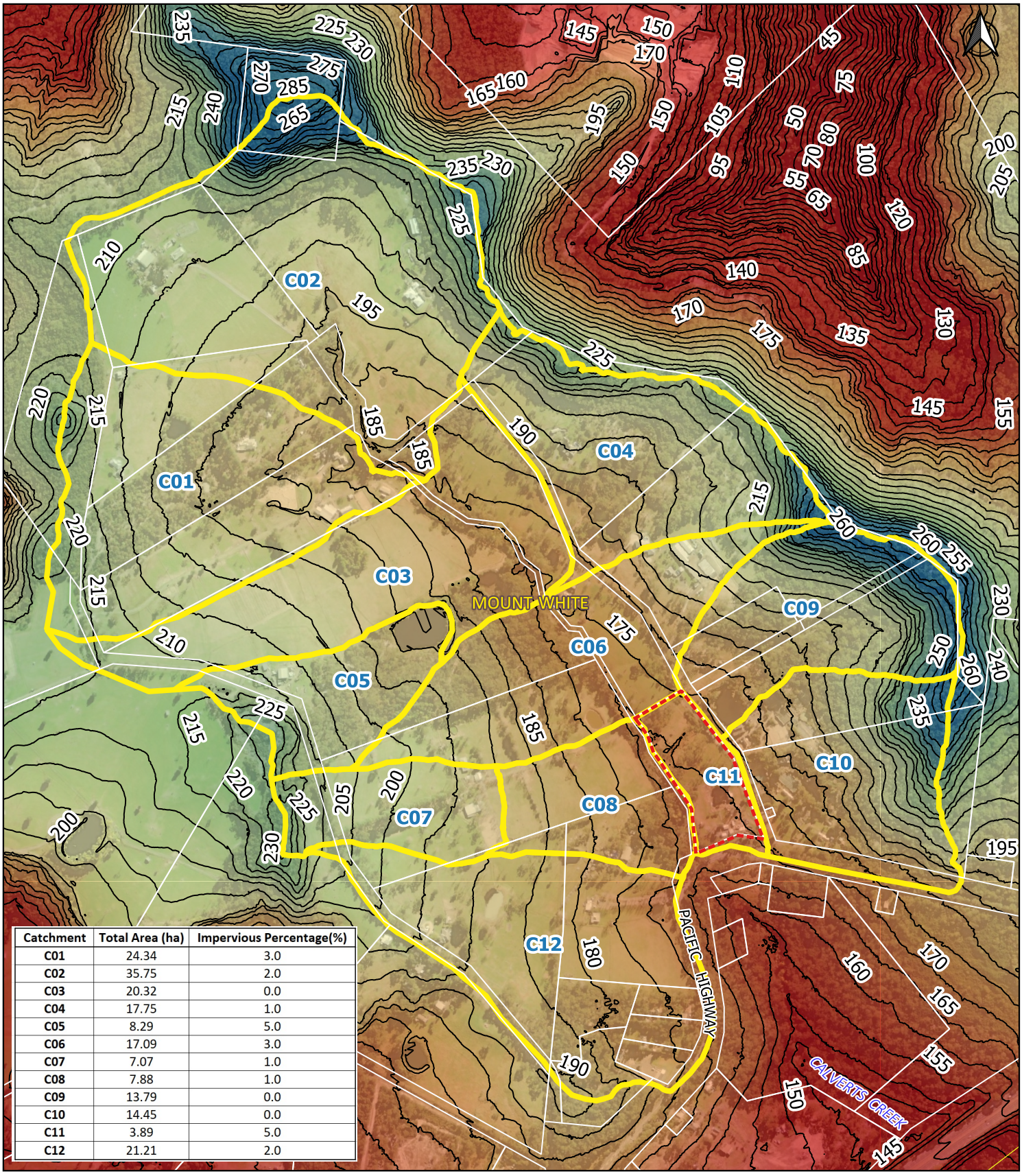


Figure 8 - Hydrograph Comparison

The peak flow calculated from the DRAINS model was determined to be **43.9m3/s**, and the peak flow from the TUFLOW model was found to be **44.5m^3/s**. As observed in the above graph and the peak flow rates as noted, the flows and behaviour from both hydrological models are very similar, with a slightly increased response from the Drains Model.

From the comparison it can be concluded that the TUFLOW hydrological model is an appropriate representation of the catchment hydrology, and provides a suitable level of consistency for the purposes of this assessment.



Catchment	Total Area (ha)	Impervious Percentage(%)
C01	24.34	3.0
C02	35.75	2.0
C03	20.32	0.0
C04	17.75	1.0
C05	8.29	5.0
C06	17.09	3.0
C07	7.07	1.0
C08	7.88	1.0
C09	13.79	0.0
C10	14.45	0.0
C11	3.89	5.0
C12	21.21	2.0

Legend

Subject Site

Catchments

Terrain Contours (5m)

Terrain (m AHD)

250

150

0 200 400 Metres

1:10,000

Figure 9

DRAINS Catchments

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, NSW Imagery and Nearmap - Aerial; NSW LPI - LiDAR

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Flood Mitigation Measures and Development Controls

Development controls are outlined in the Central Coast Council (CCC) Development Control Plan (DCP) in particular Chapter 3.1 Floodplain Management/Water Cycle Management.

Under Section 3.1.11.6 Flooding Targets, the proposed development type is considered to be most represented as Commercial and Industrial land use. As such Table 5 presents the required flood control target matrix applicable to this type of development.

Table 5 – Central Coast Council DCP Controls

Requirement	Response
A – Floor Levels	
Habitable floor levels are to be above the Flood Planning Level (FPL) for all new structures.	The flood elevations for the developed case 1% AEP can be observed in Figure A3 in appendix A. The floor level of the main building is proposed to be FFL168.85m which is above the adjacent flood level observed to be RL168.12 + 500mm freeboard. The proposed floor level of all additional structures is above the 1% AEP plus freeboard. Refer to the Concept Civil Engineering Plans for proposed levels and grading found in Appendix C.
C– Food Impacts i) Floodplain Risk Management Plan	
If the subject land falls within the area of an existing Floodplain Risk Management Plan, then the development must comply with the specific conditions of the plan.	No existing Floodplain Risk Management Plan has been prepared for the subject site.
C– Food Impacts ii) Flood Impacts	
The development must not affect the safe occupation of any flood prone land.	The proposed development footprint is generally located within H1 hazard during the 1% AEP event as shown on Figure A4 in Appendix A. Localised areas of H3 hazard are observed within dedicated drainage swales and the associated risk will be managed as part of the detailed design. Rising path egress from the site is available to the east towards the Ashbrookes Road in the event of a PMF, if required.
The development must not be sited on the land such that flood risk is increased.	The proposed development footprint is located generally outside the extent of the 1% AEP flood and all proposed building are located above the FPL.

Requirement	Response
The development must not adversely affect flood behaviour by raising predevelopment flood level by more than 10mm.	A flood depth comparison during the 1% AEP is presented in Figure B1 of Appendix A. An increase of approximately 20mm is observed within a small zone of Calverts Creek adjacent to the proposed development. Similarly, a minor increase of up to approximately 35mm is observed identified within Ashbrooks Road. As discussed in the Flood Impacts section of the report above, the these increases are not expected to have significant impact in adjacent public or private properties.
The development must not result in an increase in the potential of flooding detrimentally affecting other development or properties.	See above.
The development must not significantly alter flow distributions and velocities to the detriment of other properties or the environment of the floodplain.	See above.
The development must not significantly and detrimentally affect the floodplain environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of any riverbank or water course.	The proposed development is located adjacent to Calverts Creek, with the extent of works limited to minimise impact within the riparian corridor. Runoff will be conveyed through the site and discharged as sheet flow towards Calverts Creek to mimic existing site conditions. WSUD devices will also be considered at DA stage to manage the quality of stormwater runoff from the subject site.
The development must not be likely to result in unsustainable social and economic costs to the flood affected community or general community as a consequence of flooding (including; damage to public property and infrastructure such as roads, stormwater, water supply, sewerage, and utilities).	The proposed development, including onsite infrastructure is located above the FPL. As such, social and economic costs will be minimised.

Requirement	Response
The development must not be incompatible with the flow of floodwaters on flood prone and (considering any structures, filing, excavation, landscaping, clearing, fences or any other works.	The proposed development is considered compatible with the flow of floodwaters as the development footprint is generally located outside the 1% AEP flood extent.
The development must not cause or increase any potential flood hazard (considering the number of people, their frailty, as well as emergency service and welfare personnel.	The proposed development does not increase the potential flood hazard despite an increase in the number of people expected on site as the development footprint is located within H1 hazard and rising road egress for evacuation can be achieved via Ashbrookes Road and the Pacific Highway to the east.
C– Food Impacts iii) Building Components	
Limit use to that which is compatible with the flood hazard (considering likelihood and consequences of flooding).	All building materials and components are located above the FPL.
Building components located below FPL are to maintain strength and durability when wet, facilitate easy cleaning after inundation, and resist the forces of floodwater, debris and buoyancy.	See above.
All electrical fixtures (including meter box) to be above the FPL.	See above.
The sewer gully trap is to be located at or above the 100 year ARI flood level (without freeboard). All other internal sewer fixtures (Floor waste, WC pans, rim of shower, bath, laundry tub, and basins) are to be located at least 150mm above this level.	Sewer is proposed to be managed via on-site effluent disposal systems. Diversion swales are proposed around the irrigation beds to ensure they are protected during the 1% AEP flood event.
Free standing rainwater tanks are to be elevated above the 100 year ARI flood level (without freeboard) or anchored to resist buoyancy and impact forces.	The proposed rainwater tank is below ground. Refer to Concept Civil Engineering Plans for additional details.

Requirement	Response
C– Food Impacts iv) Local Overland Flooding	
If any part of the and is affected by Local Overland Flooding then hydraulic calculations (by a skilled flood specialist) will be required as follows:	The two main overland flow paths are the within Calverts Creek, and the contributing watercourse from the east. Due to the nature of the existing watercourse and vegetation, no major works are proposed to alter these existing riparian corridors. The following sections below are in reference to the overland drainage that is provided for the proposed development to manage local runoff through the site.
Along all overland flow paths that convey significant overland flows (> 0.5m^3/s or deeper than 0.3m), flow depths, velocities and flow rates must be shown on the water cycle management plan.	The main overland flow path traversing the site is shown on the stormwater management plans. The flow rates, velocities and depths are to be determined in conjunction with the landscape design as part of future detailed design. Despite the depths exceeding 0.3m, the local overland flows that are to be managed and conveyed through the developed site are considered to not be significant overland flows based on the criteria provided, with the exceptions as noted above.
Overland flow paths shall be designed to limit 100y ARI flood velocities to a maximum of 2 metres per second. This may require provision of regular drop structures (such as rough placed rock weirs) to reduce velocities.	Local overland flow paths will be designed to limit velocities to less than 2m/s or armoured appropriately. Additional details will be provided during detailed design for the development.
Flow conveyance along these overland flow paths may be achieved through a combination of the following: naturally functioning streams, open channels incorporating natural features (i.e. pool & riffle sequences consisting of reeds, rocks and native vegetation), stream buffer zones and swales. Details must be shown on the Water Cycle Management Plan	Additional details for local overland flow paths for the development footprint will be provided during detailed design.

Requirement	Response
Pipes are typically prone to blockage. A minimum 50% blockage factor shall be applied to all pipe and culvert capacities as part of hydraulic calculations. As such pipes are considered appropriate for managing low flows, with the bulk of flood flows travelling safely overland.	Design of the local overland drainage shall assume 50% blockage of any pit and pipe network provided. A sensitivity assessment has been performed to assess site sensitivity to 50% blockage of major trunk drainage culverts. The results are presented in Figure C2 of Appendix A. The results suggest the nearby trunk culverts are not sensitive to blockage during the 1% AEP, with an increase of up to 40mm observed across the Pacific Highway.
Overland flow paths must not be obstructed by parked cars, retaining walls, landscaping, and where side passages are use, they are to be kept clear of obstructions such as hot water heaters, air conditioners, fencing, rainwater tanks and garbage bins.	Not Applicable.
Where significant overland flow crosses a property boundary (>0.5m^3/s or deeper than 0.3m), flow through fencing (pool type fencing) is to be provided in the bottom part of the fencing to a height required to pass the flow. The width and height of flow-through fencing shall make allowance for 50% blockage. The overland flow paths shall be dispersed where possible to limit the concentrate impact on downstream or down slope properties.	Not Applicable.
Significant overland flow paths may be classified as creeks, whereby minimum setbacks must be observed between buildings and water courses.	The architectural plans have been developed in collaboration with the project ecologist to ensure the proposed development complies with the relevant requirements for riparian corridor offsets to both Calverts Creek and the contributing watercourse that traverses through the subject site.
C– Food Impacts v) Filling	

Requirement	Response
Filling is not to be undertaken within the Flood Planning Area without Council's approval, including any cut and fill works on-site.	Filling for the proposed development has been assessed herein. The results suggest no significant adverse impact in adjacent public and private properties. It is recommended future detailed design remain sympathetic to flood behaviour with flood impacts be assessed if there is any further encroachment into Calverts Creek 1% AEP extent.
Filling of the land within the Flood Planning Area is not permitted unless: 1) It is allowable as part of an adopted Floodplain Risk Management Plan 2) Or it can be demonstrated (by a skilled flood specialist) that the cumulative effect of filing the area would not raise the flood level by more than 10mm and the land can be considered 'flood fringe'.	A flood depth comparison during the 1% AEP is presented in Figure B1 of Appendix A. An increase of approximately 20mm is observed within a small zone of Calverts Creek adjacent to the proposed development. Similarly, a minor increase of up to approximately 35mm is observed identified within Ashbrooks Road. As discussed in the Flood Impacts section of the report above, the these increases are not expected to have significant impact in adjacent public or private properties.
Unless a Floodplain Risk Management Plan has been adopted, which allows filling to occur, filling in flood prone areas in not permitted unless a report from a suitably qualified civil engineer is submitted to Council that certifies the development will not increase flood affectation elsewhere.	See above

Requirement	Response
Filling of individual sites in isolation, without consideration of the cumulative effects is not permitted. The NSW Government's Floodplain Development Manual states that a case-by-case decision making approach cannot take into account the cumulative impact of flooding behaviour and associated risks, caused by individual developments. Any proposal to fill a site must be accompanied by an analysis of the effect on flood levels of similar filling of developable sites in the area.	Flood impacts due to fill have been assessed herein. Refer to the Flood Impacts section above for more details.
C– Food Impacts vi) Sea Level Rise	
For low-lying land below RL4.0m AHD the development applications must assess the ongoing viability of the land, including the viability of road access to the land, associated with the adopted sea level rise figure for planning purposes of +0.9m by the year 2100, assuming a design life for the development. This will be particularly relevant for low-lying coast or estuarine development.	Not Applicable.
E – Access and Parking in 100 year ARI Flood Event	
All access roads and driveways, and external parking areas are to be above the 100 year ARI Flood Level (FPL less 0.5m) to provide the ability to safely receive and evacuate occupants or contents without having to cross floodwaters in most flood events (assuming 50% blockage of any pipes, culverts or bridges).	As shown in Figure A3, the proposed carparking and formal access roads are located above the 1% AEP design storm event. Rising path evacuation is available to Ashbrookes Road for events up to and including the PMF design storm event.
G – Fencing	

Requirement	Response
Fencing within a floodway will not be permissible except for security/permeable/open type/safety fences of a type approved by Council. Fencing in certain areas by also be restricted by current Floodplain Risk Management Plans.	No additional fencing within the 1% AEP flood extent is proposed as part of the proposal.
Council will require a Development Application for all new solid (nonporous) and continuous fences above 0.6m high, within the 100 year ARI storm events unless otherwise stated by exempt and complying development provisions which may be incorporated into in State Environment Planning Policies or Councils Environmental Planning Instruments from time to time.	See above.

Central Coast Council Local Environmental Plan (2022)

Due to its flood affectation during the 1% AEP, the subject site is expected to be located within the CCC LEP defined Flood Planning Area. As such, the provisions outlined in the CCC LEP (2022), in particular Section 5.21 – Flood Planning, are applicable. These items are summarised in Table 6 below.

For the purposes of the investigation, the Flood Planning Area is defined as the 1% AEP + 500mm. This is generally consistent with the Floodplain Development Manual (2005) as required in the CCC LEP (2022).

Table 6 - CCB LEP (2013) Requirements

Requirement	Response
5.21 (1) The objectives of this clause are as follows:	
(a) to minimise the flood risk to life and property associated with the use of land.	The development footprint is generally located within H1 hazard noting that the hazard increases towards the creek line up to H5 in the 1% AEP and H6 in the PMF. Rising road access towards the east is provided to Ashbrookes Road and the Pacific Highway in the event evacuation is required for extreme flood events. As such, the proposed development is not expected to increase the risk to life on the subject site.
(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change.	The proposed development is considered to be compatible with the flood function of the land.
(c) to avoid adverse or cumulative impacts on flood behaviour and the environment.	Flood impacts due to fill have been assessed herein. Refer to the Flood Impacts section above for more details.
(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.	A maximum of H1 hazard is observed on the proposed site roads during the 1% AEP (Ashbrookes Road & Pacific Highway heading east), and increases to H2 during a PMF event. Isolated areas of H5 are observed along the sides of Ashbrookes Road but are not likely to impact evacuation. The 1% AEP and PMF flood hazard categories are presented in Figure A4 and A7 of Appendix A respectively.

Requirement	Response
5.21 (2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development	
(a) is compatible with the flood function and behaviour on the land.	The proposed development is considered to be compatible with the flood function of the land. The modelling presented herein demonstrates that the flood hazard can be limited to H1 in trafficable areas on the subject site during the 1% AEP with the opportunity for egress to flood free land located towards the east (either on-site or off-site).
(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties.	Flood impacts due to fill have been assessed herein. Refer to the Flood Impacts section above for more details.
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood.	The increase in the number of people on-site is not expected to exceed the capacity of the evacuation routes (Pacific Highway) given the egress route is a major road. If required, it is observed that areas of the site will remain flood free during a the PMF flood event where refuge can be sought in an emergency.
(d) incorporates appropriate measures to manage risk to life in the event of a flood.	A maximum of H1 hazard is presented within the proposed footprint during the 1% AEP. Finished floor levels are to be sited at or above the FPL and evacuation is available to Ashbrookes Road and the Pacific Highway during major and extreme events. As such, the proposed development is considered to incorporate appropriate measures to manage risk to life in the event of a flood.
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	The proposed development is located adjacent to Calverts Creek, with the extent of works limited to minimise impact within the riparian corridor. Runoff will be conveyed through the site and discharged as sheet flow towards Calverts Creek to mimic existing site conditions.

Requirement	Response
	Appropriate WSUD devices will also be considered at DA stage to manage the quality of stormwater runoff from the subject site.
5.21 (3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters	
(a) the impact of the development on projected changes to flood behaviour as a result of climate change,	A sensitivity assessment was performed to account for climate change with increased rainfall intensity. The results of the sensitivity assessment are presented in Figure C1 of Appendix A. It is observed that the increased rainfall intensity results in increased flood depths ranging from 90 to 250mm across the subject site. This is less than the expected freeboard for the proposed facility and as such, no amendments to necessary Flood Planning Levels are proposed
(b) the intended design and scale of buildings resulting from the development.	The proposed facility is considered appropriate with changes to flood behaviour assessed which were determined to not create a significant adverse impact.
(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood.	A maximum of H1 hazard is presented within the proposed footprint during the 1% AEP. Finished floor levels are to be sited at or above the FPL and evacuation is available to Ashbrookes Road and the Pacific Highway during major and extreme events. As such, the proposed development is considered to incorporate appropriate measures to manage risk to life in the event of a flood.
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	The site is not located within a coastal region. Flood mitigation measures and controls as outlined in the CCC DCP are expected to be feasible, limiting the requirement to modify, relocate or remove the proposed future building due to local catchment flooding.

Ministerial Directions Requirements and Response

The subject site has been assessed based on the NSW Ministerial Direction, in particular Direction 4.1 Flooding. The assessment requirements outlined in the Direction and the development response are summarised Table 7 below.

Table 7 – NSW Ministerial Direction 4.1 – Flood Requirements and Response

Requirement	Response
4.1.1 A planning proposal must include provisions that give effect to and are consistent with:	
a) The NSW Flood Prone Land Policy.	The subject site is located within the Flood Planning Area and as such, the provisions of the NSW Flood Prone Land Policy and Floodplain Development Manual are applicable. The principles of the NSW Flood Prone Land Policy are expected to be satisfied through adoption of appropriate flood mitigation and controls. Review of CCC DCP requirements suggest these controls are expected to be feasible for the proposed development and are expected to be further assessed at Development Application phase.
b) The principles of the Floodplain Development Manual 2005.	The principles of the Floodplain Development Manual (2005) are expected to be achievable through the implementation of the necessary development controls outlined in CCC DCP. This is expected to be further reviewed at Development Application Phase.
c) The considering Flooding in land use planning guideline 2021, and	The recommendations contained within this guideline are included under the CCC LEP 2022. It is noted, CCC LEP has not captured any additional “Special Flood Considerations” outlined by this guideline. Key flood constraints outlined in this guideline are summarised as; • Flood Function • Flood Hazard • Flood Extent and Behaviour; and • Risk to Life These elements have all been discussed in this assessment.

Requirement	Response
d) Any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council.	As no existing flood study exists for the subject site, a localised flood model was prepared in accordance with the key principles of the Floodplain Development Manual 2005.
4.1.2 A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Business, Industrial or Special Purpose Zones.	**The planning proposal does not propose to rezone Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Business, Industrial or Special Purpose Zones.**
4.1.3 A planning proposal must not contain provisions that apply to the flood planning area which:	
a) Permit development in floodway areas,	Hydraulic categories presented in **Figure A5 of Appendix A** demonstrate the proposed buildings are not located in a floodway during the 1% AEP design storm event**.** Figure A5 suggests the majority of the subject site is flood fringe during the 1% AEP.
b) Permit development that will result in significant flood impacts to other properties,	Flood impacts due to fill have been assessed herein. Refer to the Flood Impacts section above for more details.
c) Permit development for the purpose of residential accommodation in high hazard areas.	As shown in Figure A4 of Appendix A, the proposed development footprint is located outside H5 and H6 hazard conditions during the 1% AEP event.
d) Permit a significant increase in the development and/or dwelling density of that land.	High hazard flow conditions are not observed within the development footprint during the 1% AEP. Access to flood free land or off-site evacuation is available during the 1% AEP event, and up to H2 hazard evacuation route is available in the PMF event.

Requirement	Response
e) Permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and senior housing, in areas where the occupants of the development cannot effectively evacuate,	The proposed development and planning proposal does not include the listed items.
f) permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent,	Not applicable.
g) are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or	The proposed development is not expected to result in significant additional government spending for the purposes of flood mitigation, and emergency response measures.
h) permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.	The proposal is not expected to include hazardous industries.
4.1.5 For the purposes of preparing a planning proposal, the flood planning area must be consistent with the principles of the Floodplain Development Manual 2005 or as otherwise determined by a Floodplain Risk Management Study or Plan adopted by the relevant council.	**The definition of Flood Planning Area in CCC LEP (2013) is consistent with the NSW Floodplain Development Manual (2005). As such, the Flood Planning Area for the subject site is expected the be defined as the 1% AEP + 500mm.**

Conclusion

Northrop Consulting Engineers were engaged by John Singleton Group to prepare a Flood Assessment Report for the planning proposal submission at 231 Pacific Highway, Mount White.

Development of the subject site has been reviewed with respect to the flooding related NSW Ministerial Directions as well as Central Coast Council's LEP and DCP. We believe development of the subject site is expected to be feasible and generally in accordance with the requirements outlined in these planning policies.

It is anticipated the proposed development will be further assessed at Development Application Phase and during design development.

Limitation Statement

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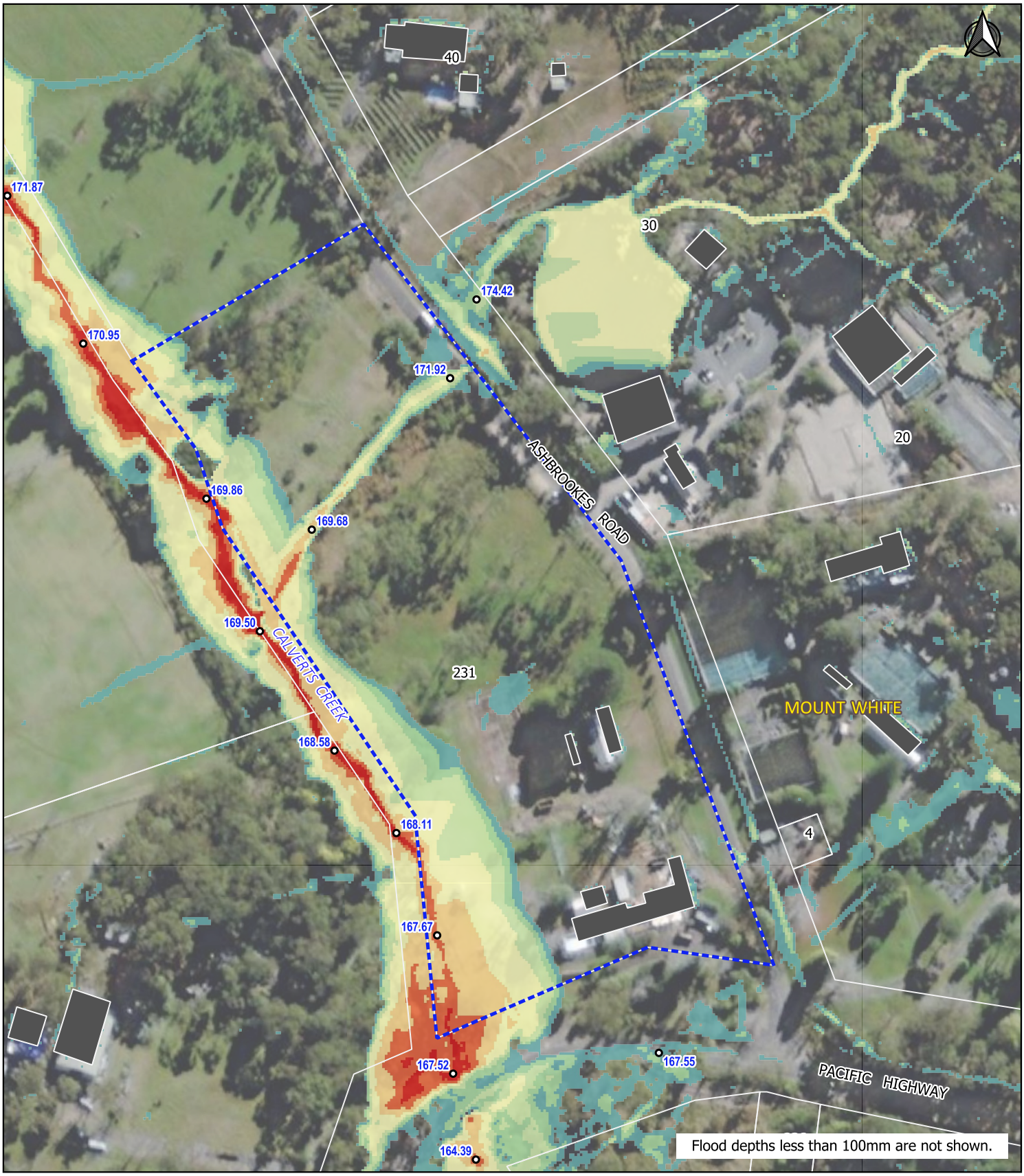
Document Register

Rev	Status	Prepared	Approved	Date
1	For Approval	RS	GB	26 October 2022
A	For Approval	RS	LG	11 November 2022

Appendix A – Flood Figures



Legend

- Subject Site
- Cadastre
- Buildings
- Water Level (mAHD)

Depth(m)

- <= 0.1
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 >

0 40 80 Metres

1:2,000

Figure A1

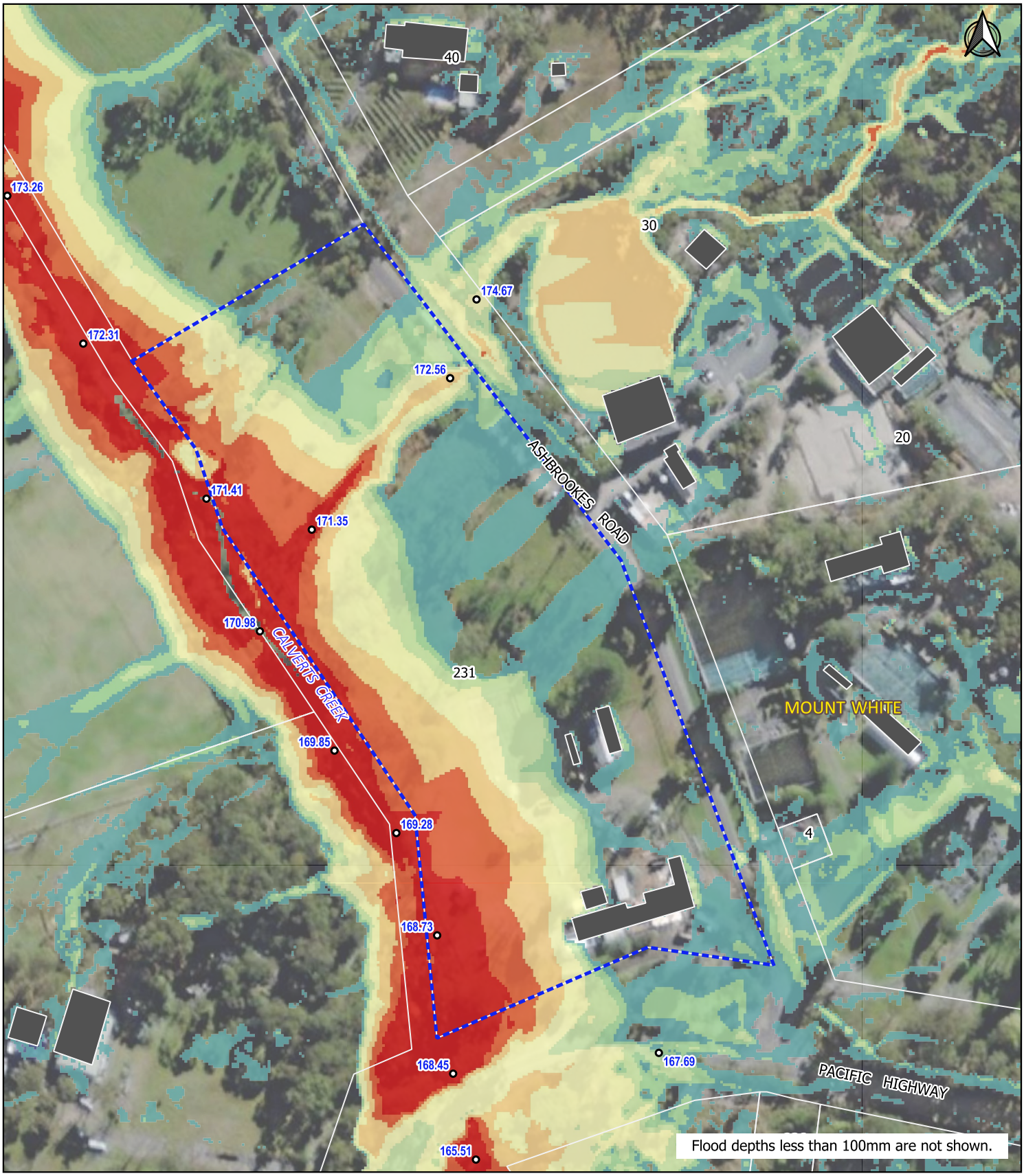
1% AEP Flood Depth and Elevation
Pre-Existing (2020) Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_A1.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Water Level (mAHD)

Depth(m)

- <= 0.1
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 >

0 40 80 Metres

1:2,000

Figure A2

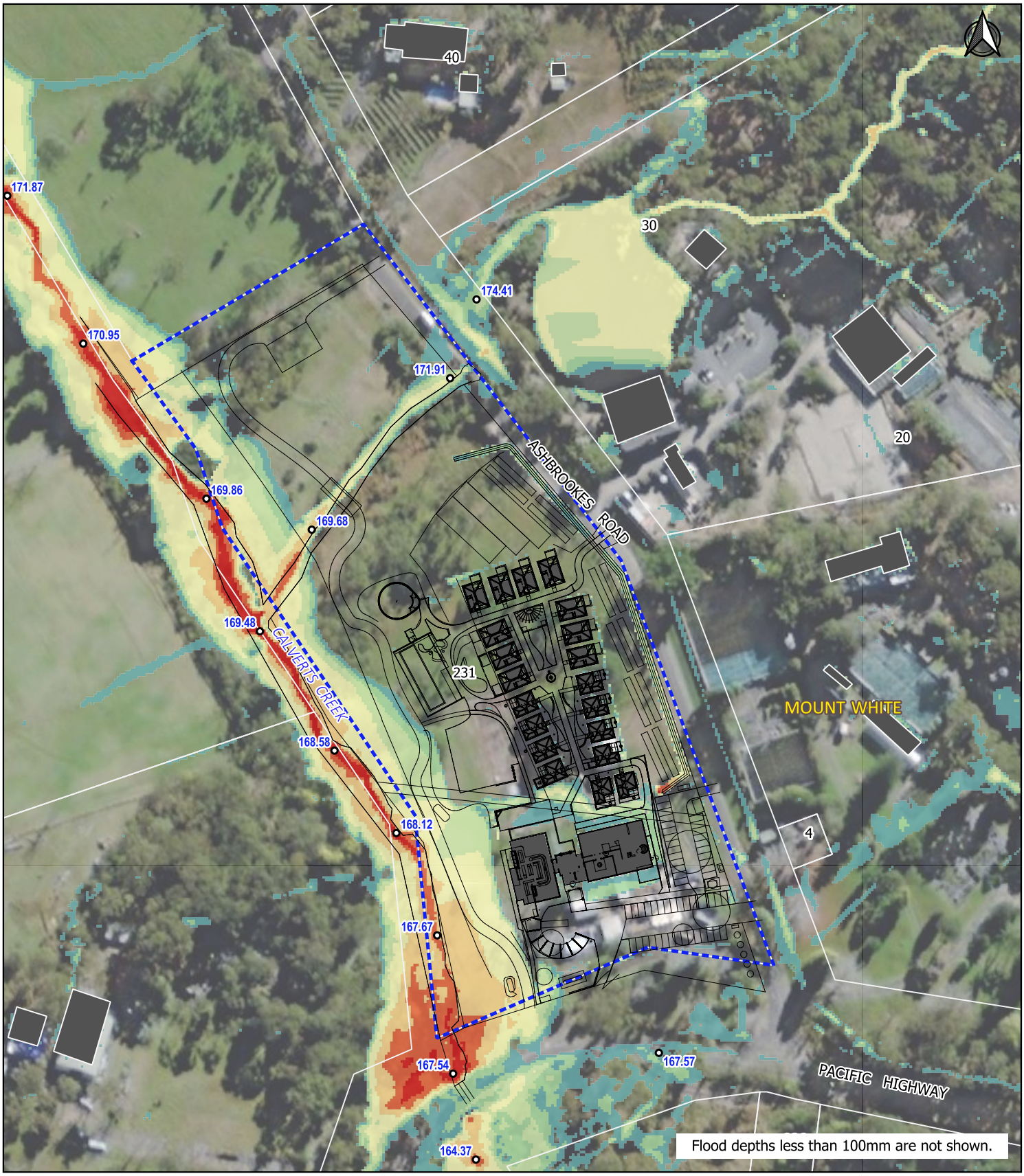
PMF Flood Depth and Elevation
Pre-Existing (2020) Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_A2.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout
- Water Level (mAHD)

Depth(m)

- <= 0.1
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 >

0 40 80 Metres

1:2,000

Figure A3

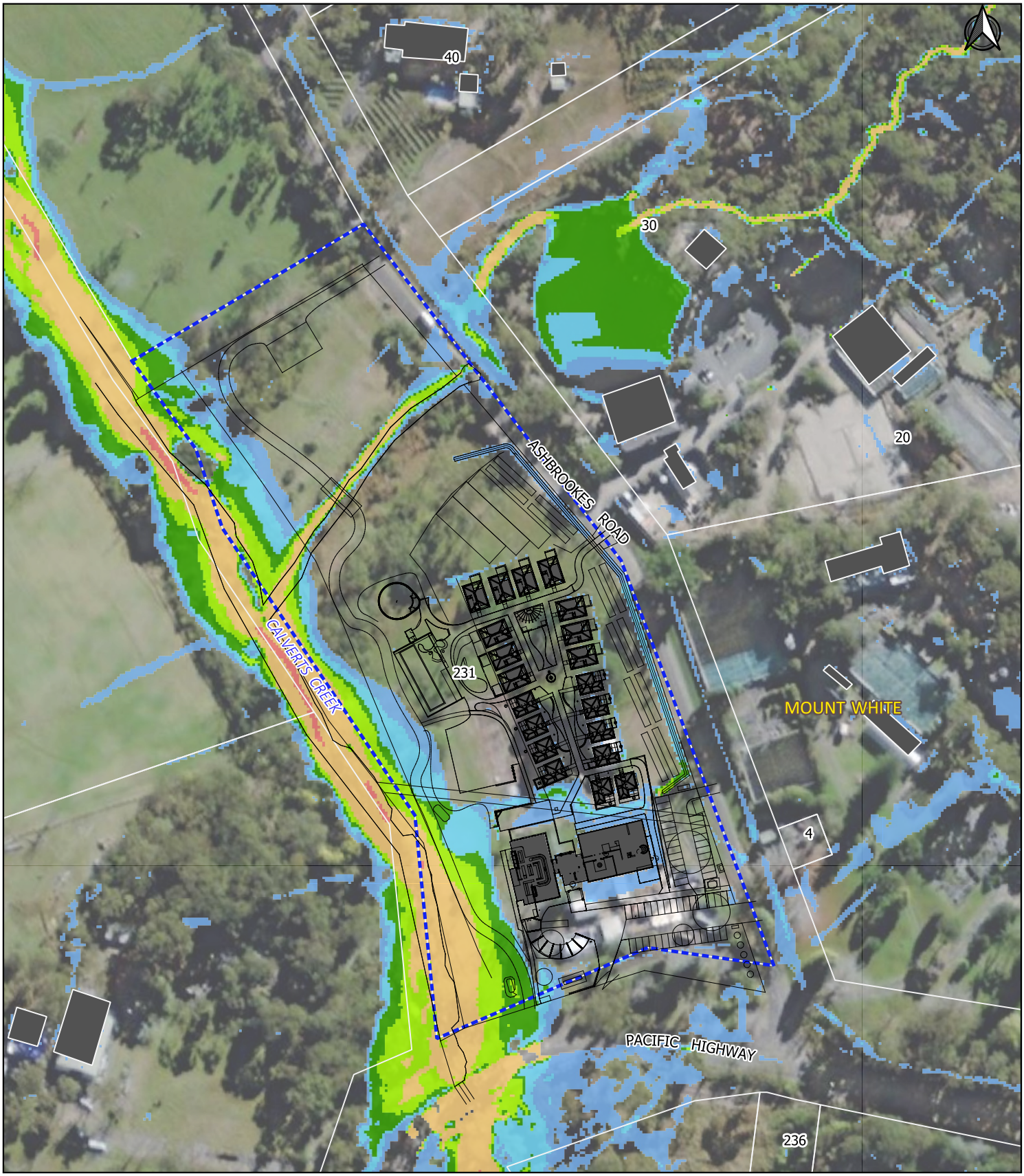
1% AEP Flood Depth and Elevation
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_A3.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 40 80 Metres

1:2,000

Figure A4

1% AEP Flood Hazard
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

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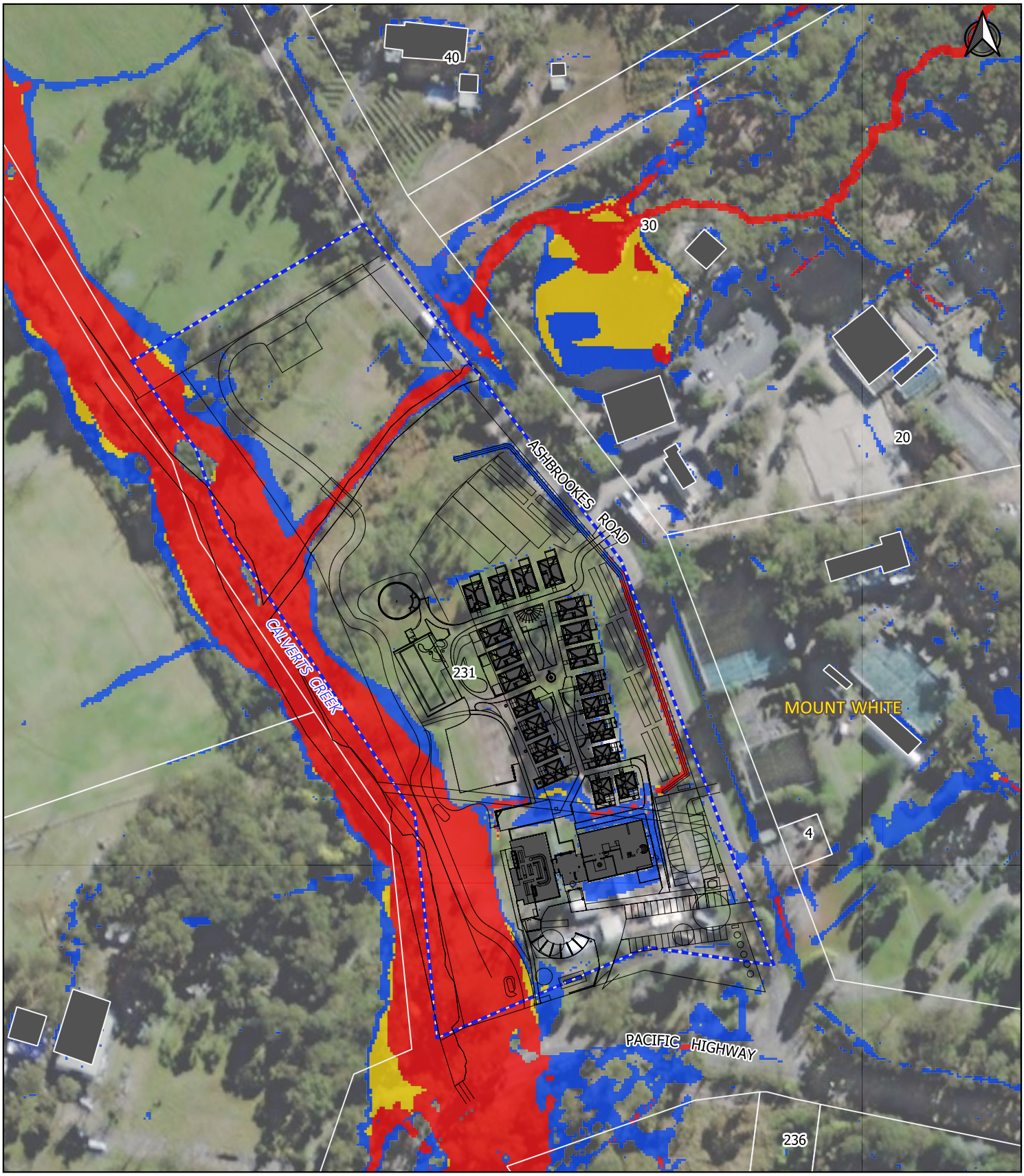

Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Hydraulic Categories

- Floodway
- Flood Storage
- Flood Fringe

0 40 80 Metres

1:2,000

Figure A5

1% AEP Hydraulic Categories
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

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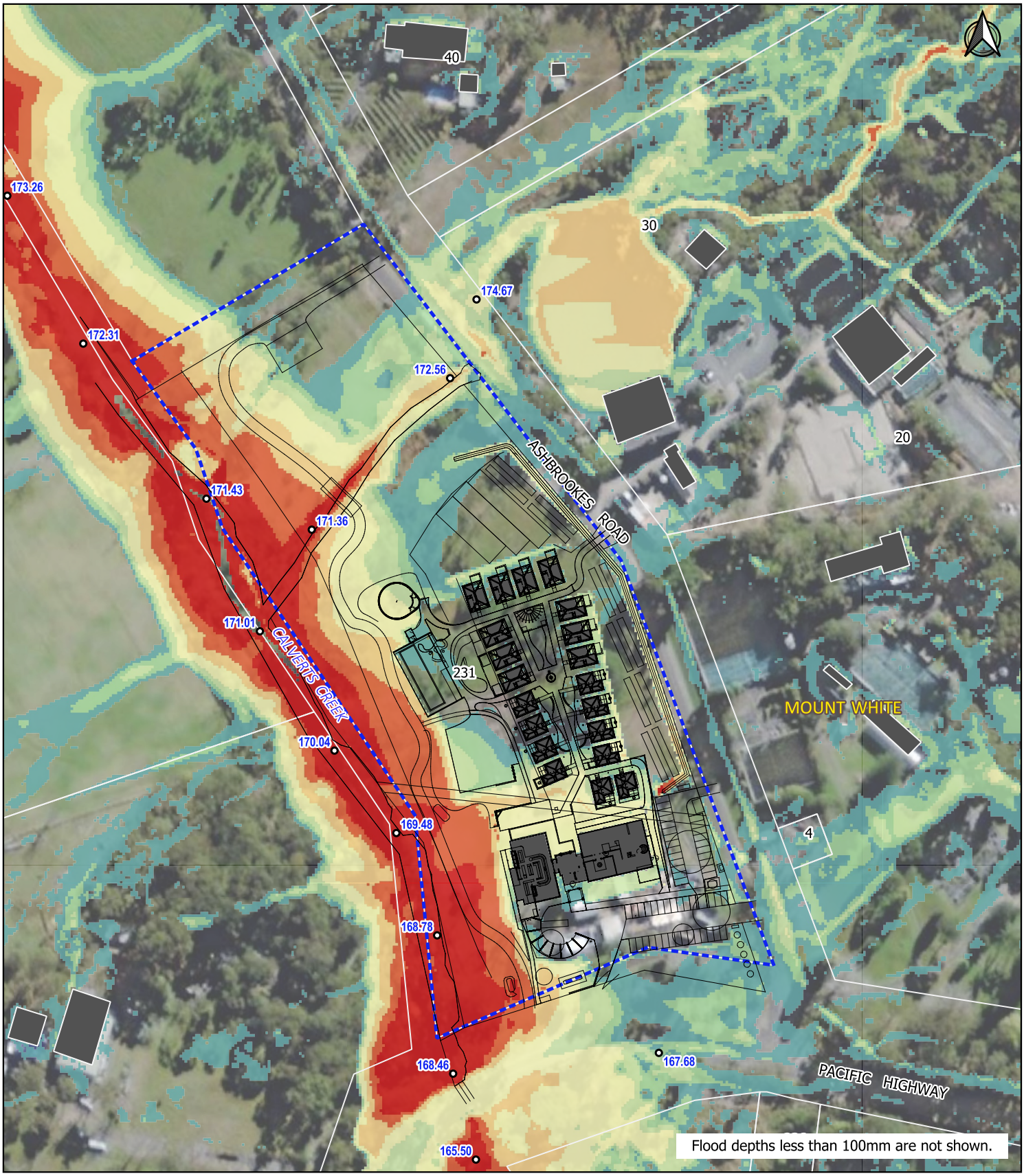


Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout
- Water Level (mAHD)

Depth(m)

- <= 0.1
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.50
- 0.50 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 >

0 40 80 Metres

1:2,000

Figure A6

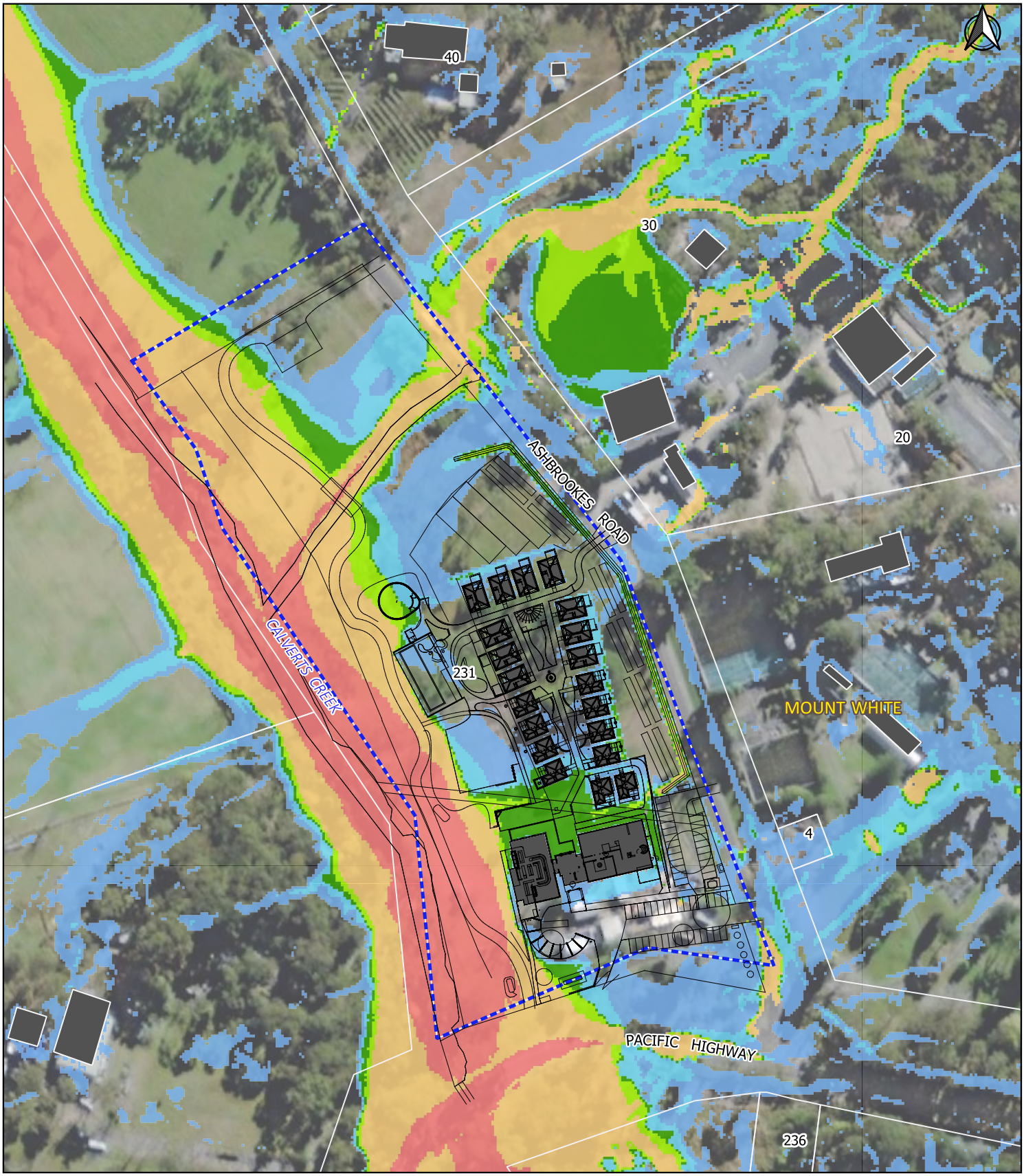
PMF Flood Depth and Elevation
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_A6.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6

0 40 80 Metres

1:2,000

Figure A7

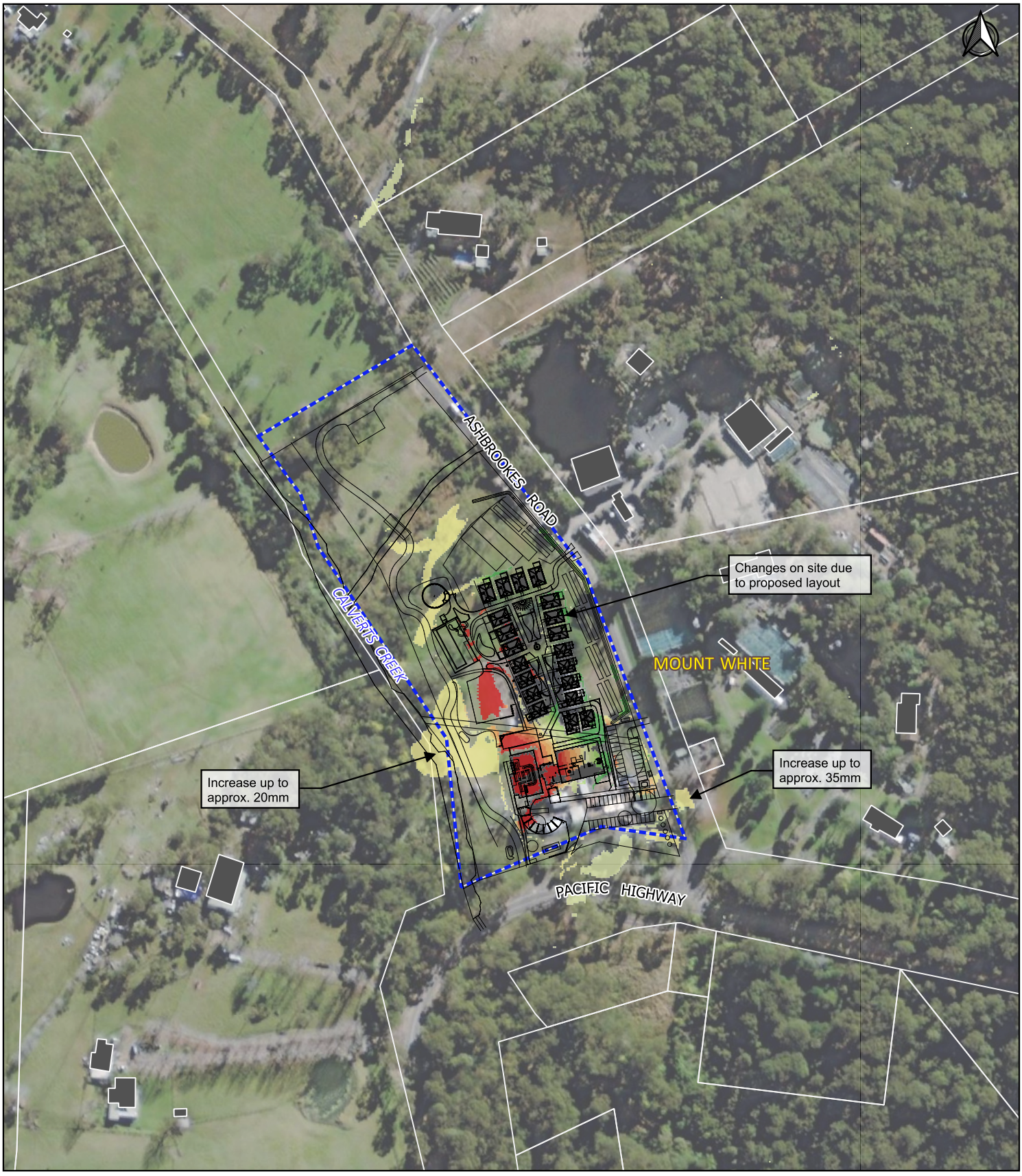
PMF Flood Hazard
Developed Conditions

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_A7.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Elevation Difference (m)

- <= -0.50
- -0.50 - -0.40
- -0.40 - -0.30
- -0.30 - -0.20
- -0.20 - -0.10
- -0.10 - -0.01
- -0.01 - 0.01
- 0.01 - 0.10
- 0.10 - 0.20

0 60 120 Metres

1:3,000

Figure B1

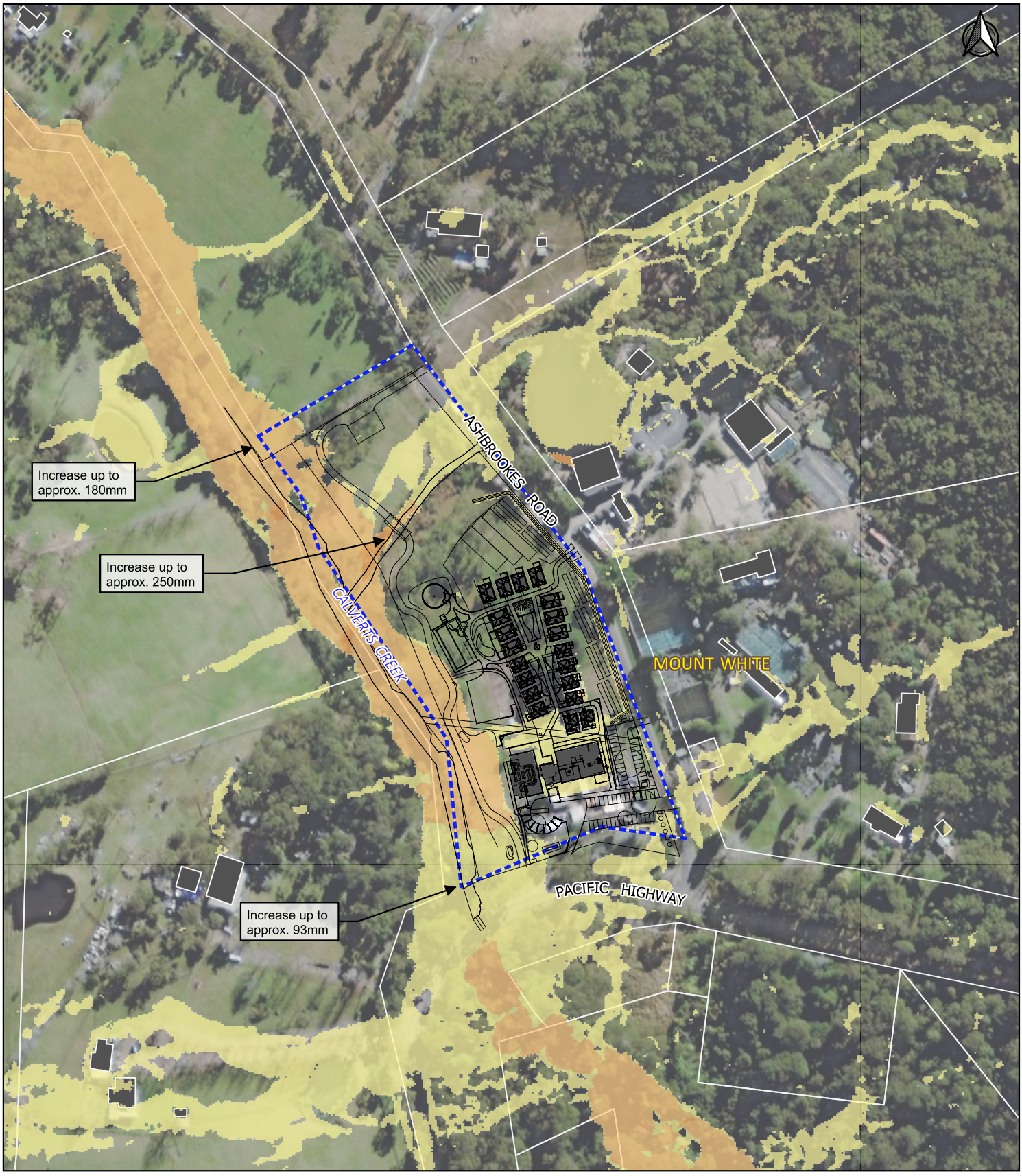
1% AEP Flood Impacts
Elevation Difference

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_B1.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Elevation Difference (m)

- <= -0.50
- -0.50 - -0.40
- -0.40 - -0.30
- -0.30 - -0.20
- -0.20 - -0.10
- -0.10 - -0.01
- -0.01 - 0.01
- 0.01 - 0.10
- 0.10 - 0.20

0 60 120 Metres

1:3,000

Figure C1

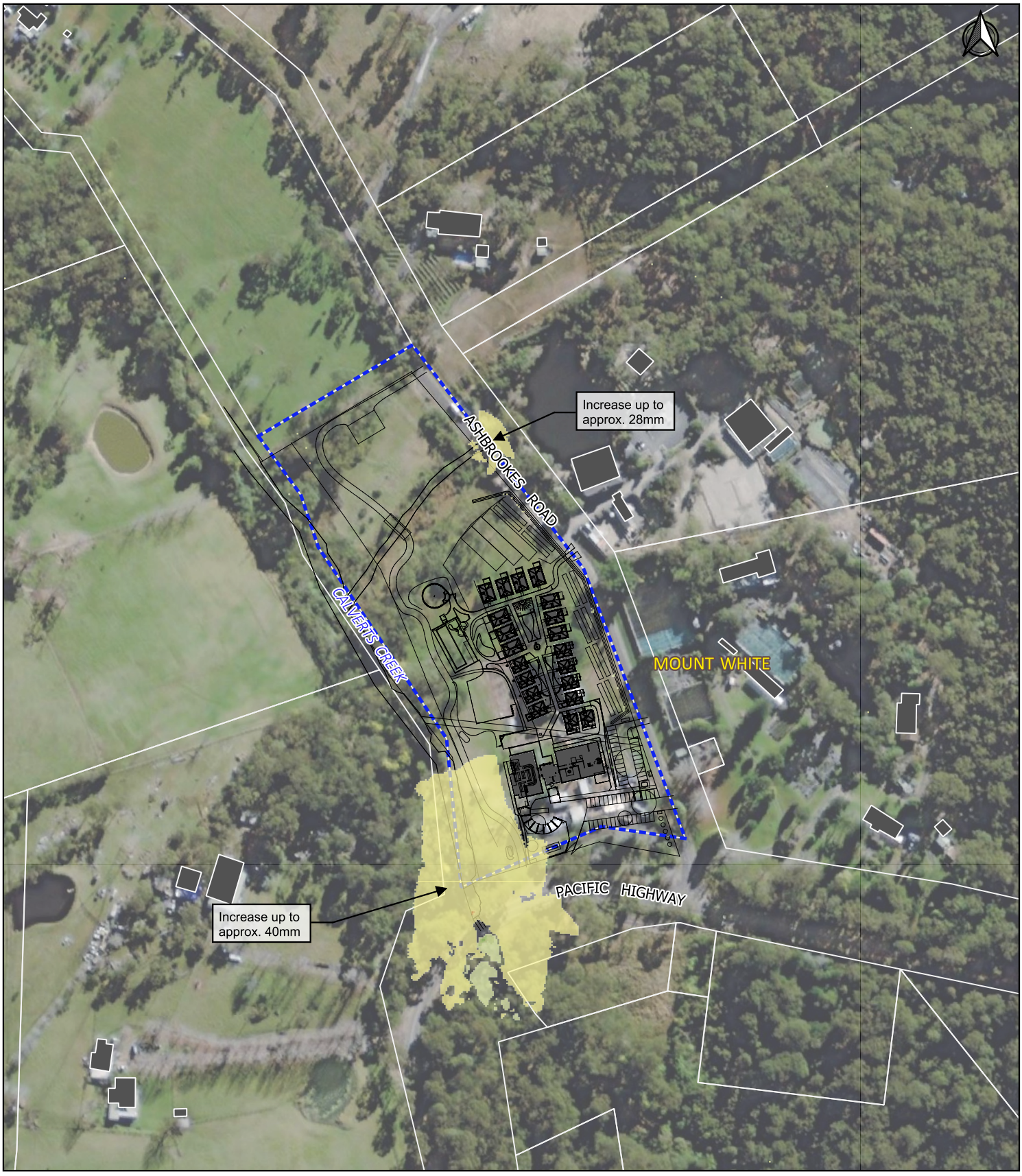
1% AEP Climate Change Sensitivity

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_C1.qgz



Legend

- Subject Site
- Cadastre
- Buildings
- Site Layout

Elevation Difference (m)

- <= -0.50
- -0.50 - -0.40
- -0.40 - -0.30
- -0.30 - -0.20
- -0.20 - -0.10
- -0.10 - -0.01
- -0.01 - 0.01
- 0.01 - 0.10
- 0.10 - 0.20

0 60 120 Metres

1:3,000

Figure C2

1% AEP Blockage Sensitivity

231 Pacific Highway, Mount White

NORTHROP

Data Source: NSW LPI - Cadastre, Virtual Earth Imagery - Aerial

11/11/2022 X:\PROJECTS\CENTRAL COAST\Year 2020\NL203092_231 Pacific Highway Mt White\FIGURES\QMAP\Figure_C2.qgz

Appendix B – Architectural Site Plan

GRAND SADDLES LODGE

preliminary - not for construction

Rev.	Description	Date
SK01	Preliminary Masterplan Coordination Issue	12.07.2022
SK02	Preliminary Masterplan Coordination Issue	26.07.2022
DDprelimE	Preliminary Coordination Issue	28.09.2022
DDprelimF	Preliminary Coordination Issue	30.09.2022
DDprelimH	Preliminary Coordination Issue	17.10.2022

John Singleton GROUP

MICHELLE LESLIE
Spaces designed for life.

Michael Cooke GARDEN DESIGN

White + Dickson Architects.

PO Box 4371 East Gosford NSW 2250
Tel: +61 2 4324 3632
Nominated Architect: Andrew Dickson RAIA (Arch Registration No.7657)

former Hawkesbury Inn

231 Pacific Highway, Mount White NSW
Lot 1 in DP207158

Presentation Site Plan

Scale @ A1 1:500	July 2022	Issue: DDprelimH
Project: 2016	Plot Date: 30.09.2022	DD.1.1

Appendix C – Concept Civil Engineering Plans

TRANSMITTAL

NORTHROP

Suite 4, 257-259 Central Coast Highway
Erina NSW 2250

T (02) 4365 1668 F (02) 4367 6555

E centralcoast@northrop.com.au ABN 81 094 433 100

Job No:	Job Name:	Pages:
NL203092	231 PACIFIC HIGHWAY, MT WHITE	1 of 1

From	Robert Suckling

Description	Date														
GRAND SADDLES LODGE	Day	14	20	06											
231 PACIFIC HWY, MOUNT WHITE	Month	09	09	10											
INTERNAL CIVIL WORKS – STAGE 2	Year	22	22	22											

Doc No.	Document Title	Current Revision	Revision												
C30.1	COVER SHEET	A	1		A										
C31.1	CONCEPT SEDIMENT & EROSION CONTROL PLAN	A	1		A										
C31.2	SEDIMENT & EROSION CONTROL DETAILS	A	1		A										
C31.3	BULK EARTHWORKS PLAN	A		1	A										
C32.1	STORMWATER MANAGEMENT & LEVELS PLAN – SHEET 1	A	1		A										
C32.2	STORMWATER MANAGEMENT & LEVELS PLAN – SHEET 2	A			A										
C35.1	CIVIL DETAILS – SHEET 1	A	1		A										
C36.1	VEHICLE SWEPT PATHS	A			A										
	CONCEPT STORMWATER MANAGEMENT PLAN	A			A										

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STEVENS CONSTRUCTIONS	1	1	1											

PURPOSE	I = Information A = Approval T = Tender C = Construction M = Amendment	I	I	A										
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SIZE	A0/A1/A2/A3/A4 etc	A1	A1	A1										
METHOD	C = Courier H = Hand E = Email F = Facsimile P = Post	E	E	E										
SENT BY		RS	RS	RS										

GRAND SADDLES LODGE - STAGE 2

LOT 1 DP207158, 231 PACIFIC HWY, MOUNT WHITE
INTERNAL CIVIL WORKS

LOCALITY PLAN

APPROXIMATE LOCATION OF SITE

NORTHROP

DRAWING SCHEDULE

DWG No.	DRAWING TITLE
C30.1	COVER SHEET
C31.1	CONCEPT SEDIMENT & EROSION CONTROL PLAN
C31.2	SEDIMENT & EROSION CONTROL DETAILS
C31.3	BULK EARTHWORKS PLAN
C32.1	STORMWATER MANAGEMENT & LEVELS PLAN
C35.1	CIVIL DETAILS - SHEET 1
C36.1	VEHICLE SWEPT PATHS

DRAWN: KATHLEEN TURTON DESIGNED: ROBERT SUCKLING JOB MANAGER: DANIEL HOLLAND VERIFIER:

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	PRELIMINARY	KT			14.09.22
A	DEVELOPMENT APPLICATION	KT			06.10.22

CLIENT: John Singleton GROUP

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NORTHROP
Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
COVER SHEET

JOB NUMBER: NL203092

DRAWING NUMBER: C30.1

REVISION: A

DRAWING SHEET SIZE = A1

LEGEND

- DENOTES SITE BOUNDARY LINE
- DENOTES EASEMENT LINE, REFER TO SURVEY FOR DETAILS
- DENOTES COMBINED SITE/SILT FENCE 'SILTMASTER' OR SIMILAR, INSTALLED IN ACCORDANCE WITH DETAIL SD6-8 OF THE BLUEBOOK.
- DENOTES TEMPORARY CONTRACTORS VEHICULAR ACCESS POINT. CONSTRUCT A STABILISED SITE ACCESS IN ACCORDANCE WITH DETAIL SD6-14 OF THE BLUE BOOK OR PROVIDE A SHAKEDOWN CATTLE GRID AT ENTRANCE POINT TO REDUCE LIKELIHOOD OF SEDIMENT BEING TRAFFICKED OFF-SITE
- DENOTES GEOTEXTILE INLET FILTER INSTALLED IN ACCORDANCE WITH DETAIL SD6-12 OF THE BLUE BOOK
- INDICATES MESH & GRAVEL INLET FILTER INSTALLED IN ACCORDANCE WITH DETAILS SD6-11 OF THE BLUE BOOK
- DENOTES STAKED STRAW BALES IN ACCORDANCE WITH DETAIL SD6-7 OF THE BLUE BOOK
- DENOTES ROCK CHECK DAM INSTALLED IN ACCORDANCE WITH DETAIL SD5-4 OF THE BLUE BOOK

SEDIMENT BASIN SIZING CALCULATION

THE SITE IS LOCATED WITHIN THE SOMERSBY SOIL LANDSCAPE AND PRIMARILY CONSISTS OF SANDY CLAY, WHICH HAS THE FOLLOWING PROPERTIES (IN ACCORDANCE WITH TABLE C17 OF THE 'BLUE BOOK'.

SITE PARAMETERS	
CONSTRAINT	VALUE
SEDIMENT TYPE	C
SOIL HYDROLOGY GROUP	B
K = SOIL ERODIBILITY (K-FACTOR)	0.041
R = RAINFALL EROSIVITY (R-FACTOR)	1716
S = 2 YEAR, 6 HOUR STORM INTENSITY	8.6mm/hr (MOUNT WHITE)
LS = SLOPE LENGTH/GRADIENT	0.85 (70m SLOPE @ 4% GRADE)
P = EROSION CONTROL PRACTICE (P-FACTOR)	1.3 (TYPICAL)
C = GROUND COVER (C-FACTOR)	0.65 (10% GRASS COVER)
A = AREA	1.240 Ha
SOIL LOSS (RUSLE METHOD) (tonnes/yr)	50.5m³/Yr
EROSION HAZARD (TABLE 4.2 BLUE BOOK)	VERY LOW
TOTAL SITE RUN-OFF IS LESS THAN 150m³/Yr. BASIN/TANKS NOT REQUIRED.	

PROVIDE PIT PROTECTION INSTALLED IN ACCORDANCE WITH DETAILS SD6-11 OR SD6-12 (AS APPROPRIATE) OF THE BLUE BOOK (TYPICAL)

PROVIDE TEMPORARY CONTRACTORS VEHICULAR ACCESS POINT. CONSTRUCT A STABILIZED SITE ACCESS IN ACCORDANCE WITH DETAIL SD6-14 OF THE BLUE BOOK, OR ALTERNATIVELY PROVIDE A SHAKEDOWN CATTLE GRID' AT THE ENTRANCE POINT TO REDUCE THE LIKELIHOOD OF SEDIMENT BEING TRAFFICKED OFF-SITE.

DENOTES INDICATIVE LOCATION OF STOCKPILE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH DETAIL SD4-1 OF THE BLUE BOOK

DISTURBED AREA = 12,400m² (APPROX)

EXTENT OF STAGE 1 WORKS (SUBJECT TO SEPARATE DA APPROVAL)

INSTALL SEDIMENT PROTECTION AT HEADWALL OUTLET UNTIL NEW PAVEMENT IS ESTABLISHED

INSTALL STAKED STRAW BALES IN ACCORDANCE WITH DETAIL SD6-7 OF THE BLUE BOOK.

LOCALLY INSTALL SILT FENCE 'SILTMASTER' OR SIMILAR TO LOW SIDE OF FIRE TRAIL PAVEMENT UNTIL PAVEMENT IS ESTABLISHED. INSTALLED IN ACCORDANCE WITH DETAIL SD6-8 OF THE BLUEBOOK.

INSTALL ROCK CHECK DAMS IN EXISTING OPEN CHANNEL, INSTALLED IN ACCORDANCE WITH DETAIL SD5-4 OF THE BLUEBOOK.

SEDIMENT & EROSION CONTROL NOTES

1. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT ORDINANCES AND REGULATIONS; NOTE IN PARTICULAR THE REQUIREMENTS OF LANDCOMS MANAGING URBAN STORMWATER; SOILS AND CONSTRUCTION' (THE 'BLUE BOOK').
2. INSTALL SEDIMENT PROTECTION FILTERS ON ALL NEW AND EXISTING STORMWATER INLET PITS IN ACCORDANCE WITH EITHER THE MESH AND GRAVEL INLET FILTER DETAIL SD6-11 OR THE GEOTEXTILE INLET FILTER DETAIL SD6-12 OF THE 'BLUE BOOK'.
3. ESTABLISH ALL REQUIRED SEDIMENT FENCES IN ACCORDANCE WITH DETAIL SD6-8 OF THE 'BLUE BOOK'.
4. INSTALL SEDIMENT FENCING AROUND INDIVIDUAL BUILDING ZONES/AREAS AS REQUIRED AND AS DIRECTED BY THE SUPERINTENDENT.
5. ALL TRENCHES INCLUDING ALL SERVICE TRENCHES AND SWALE EXCAVATION SHALL BE SIDE-CAST TO THE HIGH SIDE AND CLOSED AT THE END OF EACH DAYS WORK.
6. THE CONTRACTOR SHALL ENSURE THAT ALL VEGETATION (TREE, SHRUB & GROUND COVER) WHICH IS TO BE RETAINED SHALL BE PROTECTED DURING THE DURATION OF CONSTRUCTION. REFER ARCHITECTS PLANS FOR TREES TO BE KEPT.
7. ALL VEGETATION TO BE REMOVED SHALL BE MULCHED ONSITE AND SPREAD/STOCKPILED AS DIRECTED BY THE SUPERINTENDENT.
8. STRIP TOPSOIL IN AREAS DESIGNATED FOR STRIPPING AND STOCKPILE FOR RE-USE AS REQUIRED. ANY SURPLUS MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH EPA GUIDELINES.
9. CONSTRUCT AND MAINTAIN ALL MATERIAL STOCKPILES IN ACCORDANCE WITH DETAIL SD4-1 OF THE 'BLUE BOOK' (INCLUDING CUT-OFF SWALES TO THE HIGH SIDE AND SEDIMENT FENCES TO THE LOW SIDE).
10. ENSURE STOCKPILES DO NOT EXCEED 2.0m HIGH. PROVIDE WIND AND RAIN EROSION PROTECTION AS REQUIRED IN ACCORDANCE WITH THE 'BLUE BOOK'.
11. PROVIDE WATER TRUCKS OR SPRINKLER DEVICES DURING CONSTRUCTION AS REQUIRED TO SUPPRESS DUST.
12. ONCE CUT/FILL OPERATIONS HAVE BEEN FINALIZED ALL DISTURBED AREAS THAT ARE NOT BEING WORKED ON SHALL BE RE-VEGETATED AS SOON AS IS PRACTICAL.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING A DETAILED WRITTEN RECORD OF ALL EROSION & SEDIMENT CONTROLS ON-SITE DURING THE CONSTRUCTION PERIOD. THIS RECORD SHALL BE UPDATED ON A DAILY BASIS & SHALL CONTAIN DETAILS ON THE CONDITION OF CONTROLS AND ANY/ ALL MAINTENANCE, CLEANING & BREACHES. THIS RECORD SHALL BE KEPT ON-SITE AT ALL TIMES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE PRINCIPAL CERTIFYING AUTHORITY AND THE SUPERINTENDENT DURING NORMAL WORKING HOURS.

THE CONTRACTOR SHALL ENSURE COUNCIL ASSETS AND THE UTILITIES ARE PROTECTED AT ALL TIMES. ANY AND ALL DAMAGES TO COUNCIL ASSETS AND/OR UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SPECIFICATION OF COUNCIL AND THE UTILITIES AUTHORITY AND AT NO COST TO THE PRINCIPAL OR NORTHROP CONSULTING ENGINEERS.

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

NOT FOR CONSTRUCTION

DESIGNED ROBERT SUCKLING
DRAWN KATHLEEN TURTON
JOB MANAGER DANIEL HOLLAND
VERIFIER

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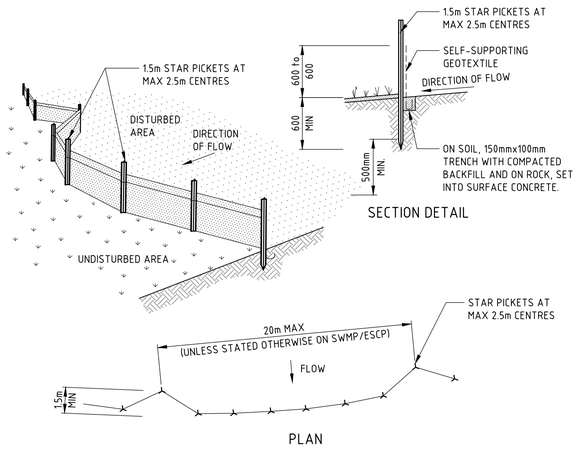
PLANS 1:500@A1 0 5 10 15 20 25m

NORTHROP
Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
CONCEPT SEDIMENT & EROSION CONTROL PLAN

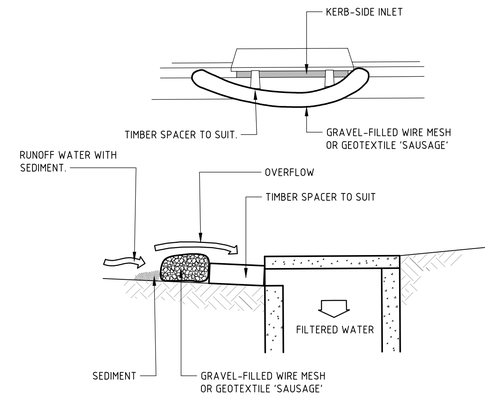
JOB NUMBER: NL203092
DRAWING NUMBER: C31.1
REVISION: A
DRAWING SHEET SIZE = A1



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE (SD 6-8)

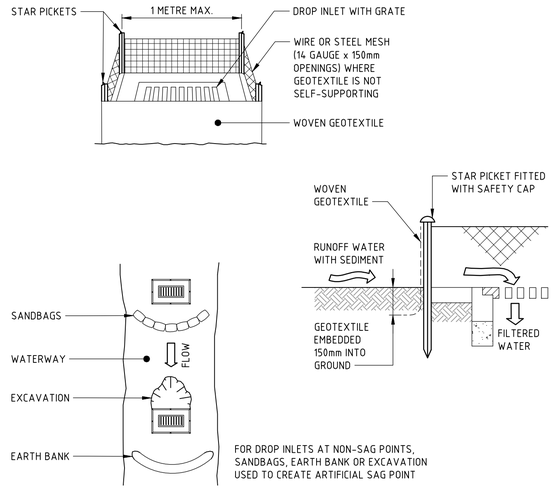


NOTE:THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

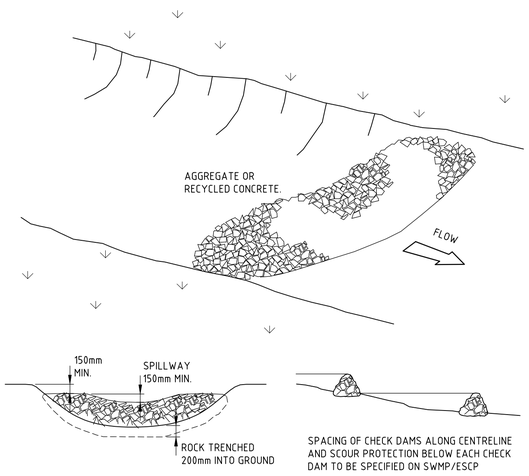
MESH AND GRAVEL INLET FILTER (SD 6-11)



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

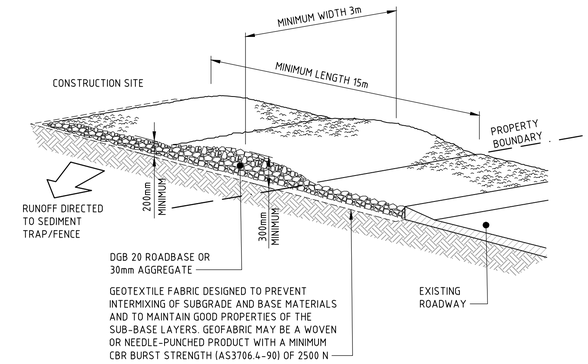
GEOTEXTILE INLET FILTER (SD 6-12)



CONSTRUCTION NOTES

1. CHECK DAMS CAN BE BUILT WITH VARIOUS MATERIALS, INCLUDING ROCKS, LOGS, SANDBAGS AND STRAW BALES. THE MAINTENANCE PROGRAM SHOULD ENSURE THEIR INTEGRITY IS RETAINED, ESPECIALLY WHERE CONSTRUCTED WITH STRAW BALES. IN THE CASE OF BALES, THIS MIGHT REQUIRE THEIR REPLACEMENT EACH TWO TO FOUR MONTHS.
2. TRENCH THE CHECK DAM 200mm INTO THE GROUND ACROSS ITS WHOLE WIDTH. WHERE ROCK IS USED, FILL THE TRENCHES TO AT LEAST 100mm ABOVE THE GROUND SURFACE TO REDUCE THE RISK OF UNDERCUTTING.
3. NORMALLY, THEIR MAXIMUM HEIGHT SHOULD NOT EXCEED 600mm ABOVE THE GULLY FLOOR. THE CENTRE SHOULD ACT AS A SPILLWAY, BEING AT LEAST 150mm LOWER THAN THE OUTER EDGES.
4. SPACE THE DAMS SO THE TOE OF THE UPSTREAM DAM IS LEVEL WITH THE SPILLWAY OF THE NEXT DOWNSTREAM DAM.

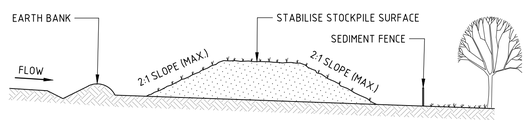
ROCK CHECK DAM (SD 5-4)



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

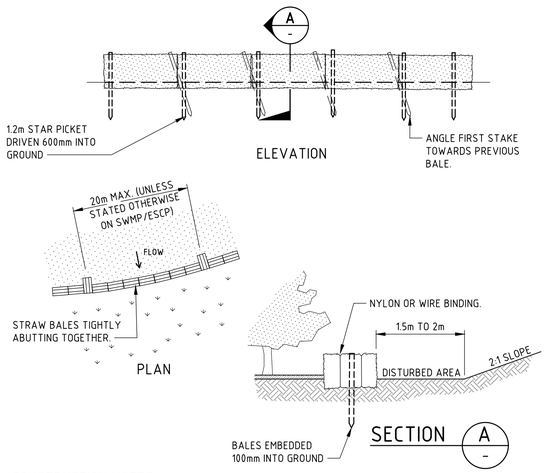
STABILISED SITE ACCESS (SD 6-14)



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

STOCKPILES (SD 4-1)



CONSTRUCTION NOTES

1. CONSTRUCT THE STRAW BALE FILTER AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS ARE TO BE PLACED PARALLEL TO GROUND.
3. ENSURE THAT THE MAXIMUM HEIGHT OF THE FILTER IS ONE BALE.
4. EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS OR STAKES. ANGLE THE FIRST STAR PICKET OR STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE THEM 600mm INTO THE GROUND AND, IF POSSIBLE, FLUSH WITH THE TOP OF THE BALES. WHERE STAR PICKETS ARE USED AND THEY PROTRUDE ABOVE THE BALES, ENSURE THEY ARE FITTED WITH SAFETY CAPS.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER, ENSURE THE BALES ARE PLACED 1 TO 2 METRES DOWNSLOPE FROM THE TOE.
6. ESTABLISH A MAINTENANCE PROGRAM THAT ENSURES THE INTEGRITY OF THE BALES IS RETAINED - THEY COULD REQUIRE REPLACEMENT EACH TWO TO FOUR MONTHS.

STRAW BALE FILTER (SD 6-7)

DESIGNED ROBERT SUCKLING
DRAWN KATHLEEN TURTON
JOB MANAGER DANIEL HOLLAND
VERIFIER

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PROJECT: **GRAND SADDLES LODGE**
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: **INTERNAL CIVIL WORKS - STAGE 2**
SEDIMENT & EROSION CONTROL DETAILS

JOB NUMBER: **NL203092**
DRAWING NUMBER: **C31.2**
REVISION: **A**
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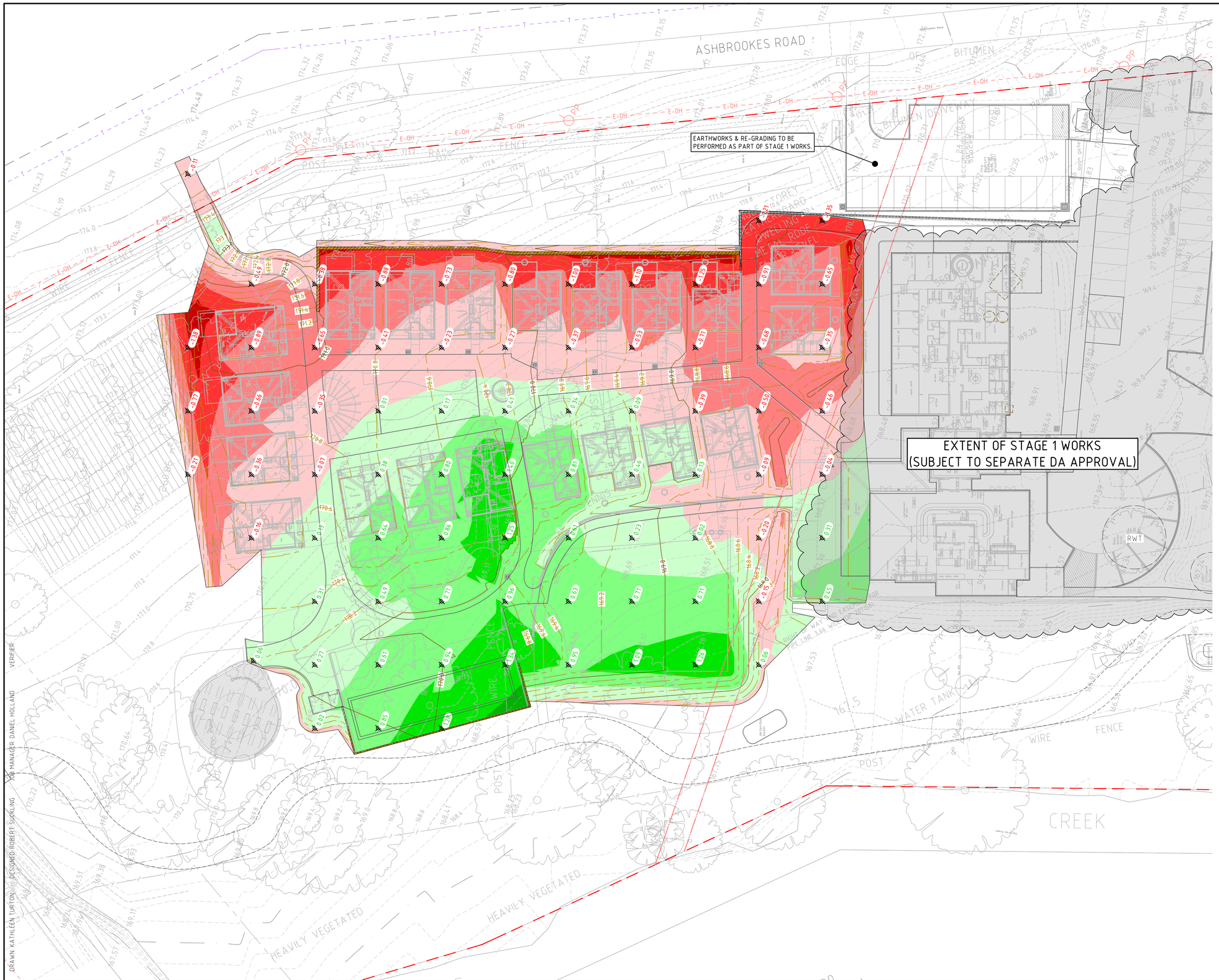

BULK EARTHWORKS PLAN

170.4 — DENOTES EXISTING CONTOUR LINES

171.0 — DENOTES BULK EARTHWORKS SURFACE CONTOUR LINES

0.17 — DENOTES DEPTH OF PROPOSED CUT (-VE) OR FILL (+VE)

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	Volume (m3)
1		-2.000	-1.500	4.9
2		-1.500	-1.000	157.8
3		-1.000	-0.500	684.0
4		-0.500	0.000	1560.1
5		0.000	0.500	1655.8
6		0.500	1.000	674.8
7		1.000	1.500	102.4
8		1.500	2.000	0.5

BULK EARTHWORKS NOTES

1. BULK EARTHWORKS LEVELS SHOWN ARE BASED ON THE FOLLOWING PAVEMENT THICKNESSES AND ALLOWANCES:
   - TRAFFICABLE CONCRETE PAVEMENT 300mm
   - STRUCTURAL BUILDING SLAB 300mm
   - LANDSCAPE TOPSOIL & TURF 300mm
2. THE EXISTING GROUND SURFACE WAS LOWERED BY 150mm UNIFORMLY TO ACCOUNT FOR THE REMOVAL OF VEGETATION AND TOP SOIL.
   - THIS VOLUME IS ESTIMATED (BASED ON THE TOTAL SITE AREA OF 7,586m^2) TO BE APPROXIMATELY 1,138m^3 (TOPSOIL - CUT)
3. BULKING FACTORS OF 1.0 WAS USED FOR BOTH CUT AND FILL MATERIAL.
4. THE APPROXIMATE SITE EARTHWORKS VOLUMES BASED ON THE NOTED PAVEMENT THICKNESSES ARE OUTLINED BELOW:
   - CUT: 2,256m^3
   - FILL: 2,107m^3
   - NET: 149m^3 (CUT) + (1,138m^3 TOPSOIL - CUT)
5. THE ABOVE VOLUMES ARE TO BE ASSESS NOTING THE FOLLOWING:
   - NO ALLOWANCE HAS BEEN MADE FOR DETAILED EXCAVATIONS SUCH AS FOOTINGS, SET DOWNS, BIO-RETENTION BASINS, SERVICES TRENCHING ETC.
   - NO ALLOWANCE HAS BEEN MADE FOR TEMPORARY CONSTRUCTION PLATFORMS OR RETAINING WALL BACK FILL
6. THIS PLAN HAS BEEN PREPARED FOR INFORMATION PURPOSES ONLY, BASED ON PRELIMINARY GRADING AND IS INDICATIVE IN NATURE. THE EARTHWORKS CONTRACTOR IS TO VERIFY ALL LEVELS AND QUANTITIES AND PERFORM THEIR OWN BULK EARTHWORKS ASSESSMENT.

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

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PLANS 1:300@A1 0 3 6 9 12 15m

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Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
BULK EARTHWORKS PLAN

JOB NUMBER: NL203092

DRAWING NUMBER: C31.3

REVISION: A

DRAWING SHEET SIZE = A1

DENOTES 1.5m WIDE x 0.2m DEEP UPSTREAM CUT-OFF SWALE TO INTERCEPT UPSTREAM RUNOFF AND DIVERT AROUND ON-SITE EFFLUENT IRRIGATION BEDS.

DENOTES 1.0m WIDE x 0.15m DEEP UPSTREAM CUT-OFF SWALE AT TOP OF RETAINING WALL

DENOTES LETTERBOX INLET PIT

RECONSTRUCT PIT COVER LEVEL TO MATCH NEW PAVEMENT LEVEL

BELOW GROUND FIRE TANK TO BE CONSTRUCTED AS PART OF STAGE 1 WORKS.

BELOW GROUND POTABLE WATER TANK TO BE CONSTRUCTED AS PART OF STAGE 1 WORKS.

DENOTES 1V:3H LANDSCAPED BATTER TO EXISTING

DENOTES 1.5m WIDE x 0.15m DEEP SWALE

DENOTES 1.5m WIDE x 0.2m DEEP SWALE WITH 1% MIN LONGITUDINAL SWALE

EXTENT OF STAGE 1 WORKS (SUBJECT TO SEPARATE DA APPROVAL)

FFL168.85

DENOTES LEVEL SPREADER MOUND TO DISPERSE RUNOFF AS SHEET FLOW

CONNECT ROOF DOWNPIPE LINES TO EXISTING 150kL BELOW GROUND RAINWATER TANK.

DENOTES RAISED SUSPENDED STRUCTURE

DENOTES 1V:3H LANDSCAPED BATTER TO EXISTING

DENOTES BIO-RETENTION BASIN CONSTRUCTED AS PART OF STAGE 1 WORKS

DENOTES LEVEL SPREADER MOUND TO DISPERSE RUNOFF AS SHEET FLOW TOWARDS CREEK TO MINIMISE IMPACT TO RIPARIAN CORRIDOR.

DENOTES INDICATIVE SUBSOIL DRAINAGE LINE FROM BIO-RETENTION BASIN TO DISCHARGE RUNOFF. PIPE TO BE HAND TRENCHED AND DAYLIGHT UPSTREAM OF NATIVE VEGETATION ZONE.

DENOTES BIO-FILTRATION BASIN WITH 20m² FILTRATION AREA AND 300mm EXTENDED STORAGE.

FIRE TRAIL PAVEMENT TO MATCH EXISTING SURFACE LEVELS

FOR CONTINUATION REFER TO SHEET 2
JOIN LINE

REFER TO DRAWING C32.2 FOR LEGEND

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

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NOT FOR CONSTRUCTION

DRAWN KATHLEEN TURTON DESIGNED ROBERT SURKLING JOB MANAGER DANIEL HOLLAND VERIFIER

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	PRELIMINARY	KT			14.09.22
A	DEVELOPMENT APPLICATION	KT			06.10.22

CLIENT: John Singleton GROUP

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ARCHITECT: White + Dickson Architects.

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PLANS 1:300@A1 0 3 6 9 12 15m

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Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
STORMWATER MANAGEMENT
& LEVELS PLAN - SHEET 1

JOB NUMBER: NL203092

DRAWING NUMBER: C32.1

REVISION: A

DRAWING SHEET SIZE = A1

EXISTING (x2) Φ600 PIPES AND HEADWALL TO BE RETAINED

DENOTES EXISTING OPEN CHANNEL

DENOTES PROPOSED CULVERT AND CULVERT CROSSING TO PROVIDE ACCESS FOR FIRE TRAIL. CULVERTS TO BE SIZED TO CONVEY THE 1% AEP PEAK FLOW DURING DETAILS DESIGN

FIRE TRAIL PAVEMENT TO MATCH EXISTING SURFACE LEVELS

JOIN LINE

FOR CONTINUATION REFER TO SHEET 1

LEGEND

- DENOTES SITE BOUNDARY LINE
- DENOTES EASEMENT LINE, REFER TO SURVEY FOR DETAILS
- FK — DENOTES FLUSH KERB, REFER TO DETAIL
- FFL168.85 — DENOTES PROPOSED FINISHED FLOOR LEVEL
- PL 9.23 — DENOTES PROPOSED FINISHED SURFACE LEVEL
- EX 169.00 — DENOTES EXISTING SURFACE LEVEL
- MTE — DENOTES MATCH TO EXISTING LEVELS
- 169 — DENOTES EXISTING CONTOURS
- 170.0 — DENOTES DESIGN CONTOURS
- RW — DENOTES RETAINING WALL
- DENOTES PROPOSED STORMWATER PIT. NOTE: ALL SURFACE INLET PITS WITH BE FITTED WITH ENVIROPOD FILTER INSERTS OR APPROVED EQUIVALENT. INSERTS TO BE INSTALLED & MAINTAINED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATION. NOTE: ON-GRADE PITS ARE TO HAVE GRATES SET ON-GRADE TO MATCH SURFACE GRADING.
- DENOTES CONCRETE HEADWALL WITH SCOUR PROTECTION, REFER TO DETAIL
- DENOTES PROPOSED STORMWATER LINE
- DENOTES EXISTING STORMWATER PIPE TO BE RETAINED
- DENOTES uPVC DOWNPIPE LINE, LAID & JOINTED IN ACCORDANCE WITH THE MANUFACTURERS WRITTEN INSTRUCTIONS. MINIMUM GRADE TO BE 1% WITH 300mm MIN COVER
- DP — DENOTES APPROXIMATE DOWNPIPE LOCATION, REFER TO ARCHITECTURAL & HYDRAULIC ENGINEERS DRAWINGS TO CONFIRM LOCATIONS.
- DENOTES GRASS LINED SWALE, REFER TO DETAIL
- DENOTES OVERLAND FLOW PATH
- E-OH — DENOTES APPROXIMATE LOCATION OF EXISTING (OVERHEAD) ELECTRICITY LINE
- G — DENOTES APPROXIMATE LOCATION OF EXISTING GAS MAIN
- T — DENOTES APPROXIMATE LOCATION OF EXISTING TELECOMMUNICATION LINE
- S — DENOTES APPROXIMATE LOCATION OF EXISTING SEWER MAIN

LOCATIONS OF EXISTING SERVICES ARE APPROXIMATE ONLY & MAY NOT BE COMPLETE. THE BUILDER IS RESPONSIBLE FOR LOCATING EXISTING INFRASTRUCTURE (CULVERTS, PITS, PIPES, SERVICES, INVERT & COVER LEVELS ETC) PRIOR TO COMMENCING CONSTRUCTION.

THE BUILDER SHALL ALLOW TO MODIFY ALL EXISTING SERVICE COVERS TO MATCH THE NEW PAVEMENTS, IN ACCORDANCE WITH THE RELEVANT AUTHORITIES REQUIREMENTS.

PROVIDE TEMPORARY TRAFFIC CONTROL IN ACCORDANCE WITH STATE & FEDERAL STATUTORY REQUIREMENTS AND LOCAL COUNCIL SPECIFICATIONS/REQUIREMENTS

DRAWINGS TO BE READ IN CONJUNCTION WITH CONCEPT STORMWATER MANAGEMENT REPORT

NOTE THAT ORIGINAL DRAWING IS IN COLOUR

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	DEVELOPMENT APPLICATION	KT			06.10.22

CLIENT: John Singleton Group

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PLANS 1:300@A1 — 0 3 6 9 12 15m

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Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

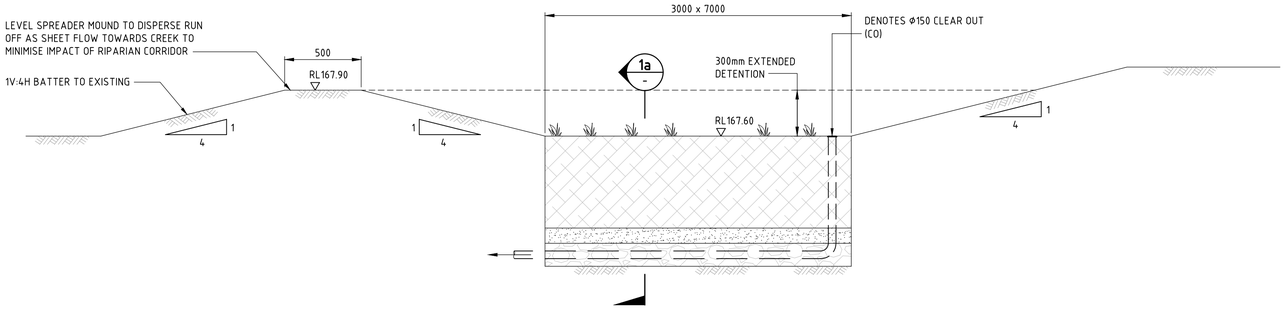
DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
STORMWATER MANAGEMENT
& LEVELS PLAN - SHEET 2

JOB NUMBER: NL203092

DRAWING NUMBER: C32.2

REVISION: A

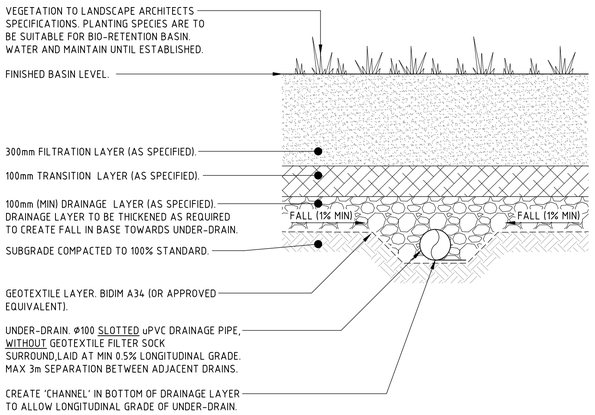
DRAWING SHEET SIZE = A1



BIO-RETENTION BASIN (MIN 20m² SURFACE AREA OF FILTER MEDIA WITH 300mm EXTENDED STORAGE)

SECTION 1 / C32.1

NOTE: FILTRATION LAYERS, SUBSOIL DRAINAGE AND PLANTING IN BASINS ARE TO BE INSTALLED AFTER SITE AREAS HAVE BEEN SEALED/PLANTED TO AVOID CONSTRUCTION SEDIMENT RUNOFF EFFECTING PERFORMANCE OF BIO-FILTRATION BASINS



BIO-RETENTION MATERIAL SPECIFICATION

FILTRATION LAYER

HYDRAULIC CONDUCTIVITY – 200-300mm/hr

PARTICLE SIZE DISTRIBUTION

CLAY AND SILT	– 3%	(<0.05mm)
VERY FINE SAND	– 5-30%	(0.05-0.15mm)
FINE SAND	– 10-30%	(0.15-0.25mm)
MEDIUM TO COARSE SAND	– 40-60%	(0.25-1.0mm)
COARSE SAND	– 7-10%	(1.0-2.0mm)
FINE GRAVEL	– <3%	(2.0-3.4mm)

SOIL-BASED FILTER MEDIA PROPERTIES

TOTAL NITROGEN (TN) CONTENT	– <800 mg/kg
ORTHOPHOSPHATE (PO_4^{3-}) CONTENT	– <55 mg/kg
ORGANIC MATTER CONTENT	– >3%
pH	– 5.5-7.5
ELECTRICAL CONDUCTIVITY (EC)	– <1.2 dS/m

TRANSITION LAYER

CLEAN, WELL-GRADED SAND / COARSE SAND MATERIAL.

% PASSING	– 1.4mm 100%
	– 1.0mm 80%
	– 0.7mm 44%
	– 0.5mm 8.4%

DRAINAGE LAYER

CLEAN, FINE GRAVEL (2-5mm WASHED SCREENINGS)

(REF: GUIDELINE SPECIFICATIONS FOR FILTER MEDIA IN BIORETENTION SYSTEMS, FACILITY FOR ADVANCING WATER BIOFILTRATION (2009))

BIO-RETENTION SYSTEM TYPICAL SECTION

SECTION 1a / -

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A	DEVELOPMENT APPLICATION	KT			06.10.22

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DETAILS 1:20@A1 0 200 400 600 800 1000

DETAILS 1:10@A1 0 100 200 300 400 500

NORTHROP
Central Coast
Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
Ph (02) 4365 1668 Fax (02) 4367 6555
Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
CIVIL DETAILS
SHEET 1

JOB NUMBER: NL203092

DRAWING NUMBER: C35.1

REVISION: A

DRAWING SHEET SIZE = A1

HRV - Heavy Rigid Vehicle	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

NOTE: THE TURNING PATHS/TEMPLATES PROVIDED HAVE BEEN PRODUCED USING SIMULATION SOFTWARE AND ARE TO BE USED AS A GUIDE ONLY. THESE SIMULATIONS MAY NOT REFLECT ACTUAL DRIVER BEHAVIOUR AND/OR EXPERIENCE UNDER ACTUAL DRIVING CONDITIONS.

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PLANS 1:500@A1 0 5 10 15 20 25m

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Suite 4, 257-259 Central Coast Hwy, Erina NSW 2250
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Email centralcoast@northrop.com.au ABN 81 094 433 100

PROJECT: GRAND SADDLES LODGE
231 PACIFIC HWY, MOUNT WHITE

DRAWING TITLE: INTERNAL CIVIL WORKS - STAGE 2
VEHICLE SWEPT PATHS

JOB NUMBER: NL203092

DRAWING NUMBER: C36.1 | REVISION: A

DRAWING SHEET SIZE = A1