Coffs Harbour City Council

Coffs Harbour Civic Space Flood Assessment

Flooding Assessment Report

June 2019

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Purpose of this report

This flood assessment report has been prepared to inform the EIS and State Significant Development Application SSDA for a new Cultural and Civic Space (All Welcome) which will be assessed under Part 4 Division 4.7 of the EP&A Act. The project involves construction of a new building and associated infrastructure to accommodate the new facility. The Proposal is summarised as follows:

- Services adjustments
- Construction of a temporary site compound and site office
- Earthworks and associated excavation for footings and basement area
- Construction of a new building to accommodate the proposed Cultural and Civic Space including a regional gallery, central library, regional museum, multi-purpose meeting rooms, co-working space, shop, café, function space (including use as Council Chambers), customer service area, Council staff office accommodation and underground car parking
- Access to and from the site in Gordon Street
- Minor adjustments to Riding Lane
- Landscaping

1.2 Site description

The proposed Cultural and Civic Space for Coffs Harbour is to be located on lands described as:

- Lot 20 DP758258
- Lot B DP346105
- Lot 123 DP 749233

The site is in the main part of the Coffs Harbour City Central Business District (CBD) which is on the Mid North Coast of NSW. The site has access from Gordon Street and Riding Lane. Other land uses in proximity to the site include the Coffs Harbour Uniting Church, the main public four-storey car park for Coffs Harbour and other commercial development, which ranges from one storey dwellings used as office space to three storey office blocks. A locality plan is shown below in Figure 1-1.

Figure 1-1 Site Location Plan

1.3 Scope and limitations

This report has been prepared by GHD for Coffs Harbour City Council and may only be used and relied on by Coffs Harbour City Council for the purpose agreed between GHD and the Coffs Harbour City Council as set out in this report. GHD otherwise disclaims responsibility to any person other than Coffs Harbour City Council 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. GHD has prepared this report on the basis of information provided by Coffs Harbour City Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has not been involved in the preparation of the Coffs Harbour Civic Centre EIS and has had no contribution to, or review of the Coffs Harbour Civic Centre EIS other than in the Preparation of the Flood Assessment Report. GHD shall not be liable to any person for any error in, omission from, or false or misleading statement in, any other part of the Coffs Harbour Civic Centre EIS.

2. Statutory requirements

The following legislation and guidelines are relevant to this report. A detailed list of the reference material is provided in Section 6 of this report.

2.1 Legislative Acts

2.1.1 Water Management Act 2000

The Water Management Act 2000, (WM Act) is administered by regulators including WaterNSW and Department of Industry: Water to manage water resources. The aim of the Act is to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It is also intended to provide formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses as well as to provide for protection of catchment conditions. Fresh water sources throughout NSW are managed by water sharing plans (WSPs) under the WM Act.

Principles of the WM Act relating to drainage and floodplain management include the need to avoid or minimise land degradation including soil erosion, compaction, geomorphic instability and waterlogging.

2.2 Policies, guidelines and standards

Key guidelines referenced in the assessment include:

- Managing Urban Stormwater: Soils and Construction Volume 1, (Landcom, 2004) (the Blue Book).
- The Floodplain Development Manual and NSW Flood Prone Land Policy , (NSW Government, 2005) - the Floodplain Development Manual.
- Australian Rainfall and Runoff, (Commonwealth Government of Australia, 2016).
- Australian Rainfall and Runoff, (Engineers Australia, 1987).

NSW Floodplain Development Manual

The Floodplain Development Manual and NSW Flood Prone Land Policy (NSW Government, 2005) concerns the management of flood-prone land within NSW. It provides guidelines in relation to the management of flood liable lands, including any development that has the potential to influence flooding, particularly in relation to increasing the flood risk to people and infrastructure. Activities of the project which have the potential to increase flood risk through, for example, increasing stormwater runoff would be subject to consideration under the Floodplain Development Manual.

Australian Rainfall and Runoff

Australian Rainfall and Runoff (ARR) (Engineers Australia, 2016) is the primary technical publication for hydrological estimates and design considerations. The draft consultation issue was finalised in November 2016 and was the result of a number of years' of updates to the previous version of Australian Rainfall and Runoff (Engineers Australia, 1987). The technical analysis and development of the original hydrologic and hydraulic models for the Cabramatta Loop project was commenced prior to finalisation of ARR 2016 and is therefore wholly based on the Engineers Australia version (1987).

3. Flood assessment

3.1 General flooding in the area of the site

Preliminary regional flood information at, and near the site, was extracted from the Coffs Creek and Park Beach Flood Study (CHCC, 2018). Referring to Appendix A, Figures 01 to 08, while the site is not inundated in the 1% AEP flood event, flooding is noted at two locations near the site. The two locations are approximately 50 m from the site boundary, as follows:

- Flooding at the Vernon Street/Gordon Street intersection is be due to overland flows and runoff from the Harbour Drive and the city centre, draining to Carralls Gully and Coffs Creek. In larger events, backwater flooding from Coffs Creek surcharges Carralls Gully, however as is noted in Appendix A Figure 04, these rising flood levels do not inundate the site for flood events up to and including the 0.2% AEP (500 Year ARI) flood event.
- Flooding at a sag pit in the Castle Street due to Coffs Creek surcharging its banks at Coffs Street near the peak of the 1% AEP flood event. The Coffs Creek and Park Beach Flood Study (CHCC, 2018) flood model does not represent street drainage (pits and pipes) in this area of the model, and flooding levels in this area of Castle Street are the result of ponded flood water which have surcharged Coffs Creek. Flooding at the Castle Street sag, does not result in flooding of the subject site for events up to the 0.2% AEP flood event.
- In the PMF flood event, flooding at the site is attributed to widespread overland flow discharging along the Coffs Creek floodplain.

On closer review of the Coffs Creek and Park Beach Flood Study flood model it was noted that while there is slightly elevated topography in the flood model between Castle Street and Riding Lane, the flood model does not include existing development which would form a physical barrier to the eastward flowing flood water. These barriers would prevent discharges from Castle Street to Riding Lane in events greater than the 0.2% AEP (500 Year ARI) flood event. The developments include:

- The Council Chambers Building, which is typically surrounded on the northern and western sides by brick walls. Beyond the brick wall, flow could enter the underground carpark and before spilling into Riding Lane. Terrestrial survey received (Appendix B) has confirmed the following levels for the Council Chambers Building:
  - A brick wall sill level to the underground carpark of 4.40 mAHD along the western edge
  - A brick wall sill level of 4.50 mAHD along the Eastern Edge
- A low concrete wall located along the Castle Street frontage of the northern extension of the Castle Street Multi Storey Carpark. Beyond the low wall, flow could enter a further underground carpark, before spilling into Riding Lane. Terrestrial survey received (Appendix B) has confirmed the following levels for the Castle Street underground carpark:
  - A low concrete wall sill level of 4.58 mAHD along the western Castle Street frontage
  - A basement level of 2.93 mAHD
  - A low concrete wall sill level of 4.99 mAHD along the western Riding Lane frontage
- A ridge, longitudinally north-south through the length of the older section of the Castle Street Multi Storey Carpark. Beyond the ridge, flow would spill in an easterly direction towards Riding Lane. Terrestrial survey received (Appendix B) has confirmed the ridge has a crest level of 5.20 mAHD.

3.2 Revised regional flood data

To include the existing development between Castle Street and Riding Lane, the Coffs Creek and Park Beach Flood Study flood model was and re-simulated to provide revised regional flood data. Flood mapping of from the revised regional flood model is provided in Appendix A.

3.2.1 Flood levels

The revised Coffs Creek and Park Beach Flood Study flood model simulations confirmed the general findings on flooding as tabulated in Table 3-1 at the site. The results show that:

- The site is free from flooding for the flood events simulated, including the 0.2% AEP (500 Year ARI) flood event. The site would be expected to be inundated in a PMF event as before.
- The 1% AEP flood level in Castle Street is less than the brick walls and concrete walls surrounding the Council Building and the Castle Street Multi Storey Carpark. It is also less than the ridge within the older section of the Castle Street Multi Storey Carpark. Even if overflow of the walls would occur, this overflow would discharge to the underground car parks associated with these buildings.

The results thus show that the site is not inundated for events up to and including the 0.2% AEP (500 Year ARI) flood event, and that overflows from Castle Street to Riding Lane are unlikely in these events. Regional flood levels at the Vernon Street/Gordon Street intersection should thus inform the development.

Table 3-1 Flood Levels at the Site

Flood Event (AEP)	Site Flood Level (mAHD)	Vernon Street/Gordon Street Flood Level (mAHD)	Castle Street Flood Level (mAHD)	Flood Depth over Site (m)
1%	N/A	3.80	4.37	not inundated
0.2%	N/A	4.27	4.89	not inundated
PMF	6.11	6.11	6.19	1.35 – 2.0 (varies)

3.2.2 Hydraulic hazard, flood risk and hydraulic function

With reference to the attached figures, flood data at the site from the revised flood mapping showed that:

- Whilst the site is noted to be above the 0.2% AEP flood level, it is however classified as “flood prone land” due to being inundated by the PMF flood event.
- Flood risk at the site and in the areas surrounding the site, is categorised as “low flood risk”
- In the 1% AEP flood event, there is no hydraulic hazard at the site.
- The site is located outside the high flood risk flood corridor.

3.2.3 Flood impacts

Since the site is not inundated in flood events up to and including the 0.2% AEP (500 Year ARI) flood event, the proposed development will not result in any flood impacts in these flood events.

A comparison of building extents of the proposed development compared to existing development at the site is shown below in Figure 3-1. From the figure, it is noted that the proposed building has a similar site coverage to the existing buildings. On this basis, it is considered that any flood impacts in the PMF will be negligible and localised. These negligible and localised flood impacts (if any) would be unlikely to pose any additional safety threat.

Combining these matters with the rarity of this cataclysmic PMF event (1 in 10,000,000) would further render the risk of adverse impacts as negligible and would not justify the significant additional cost of mitigating such a rare cataclysmic event.

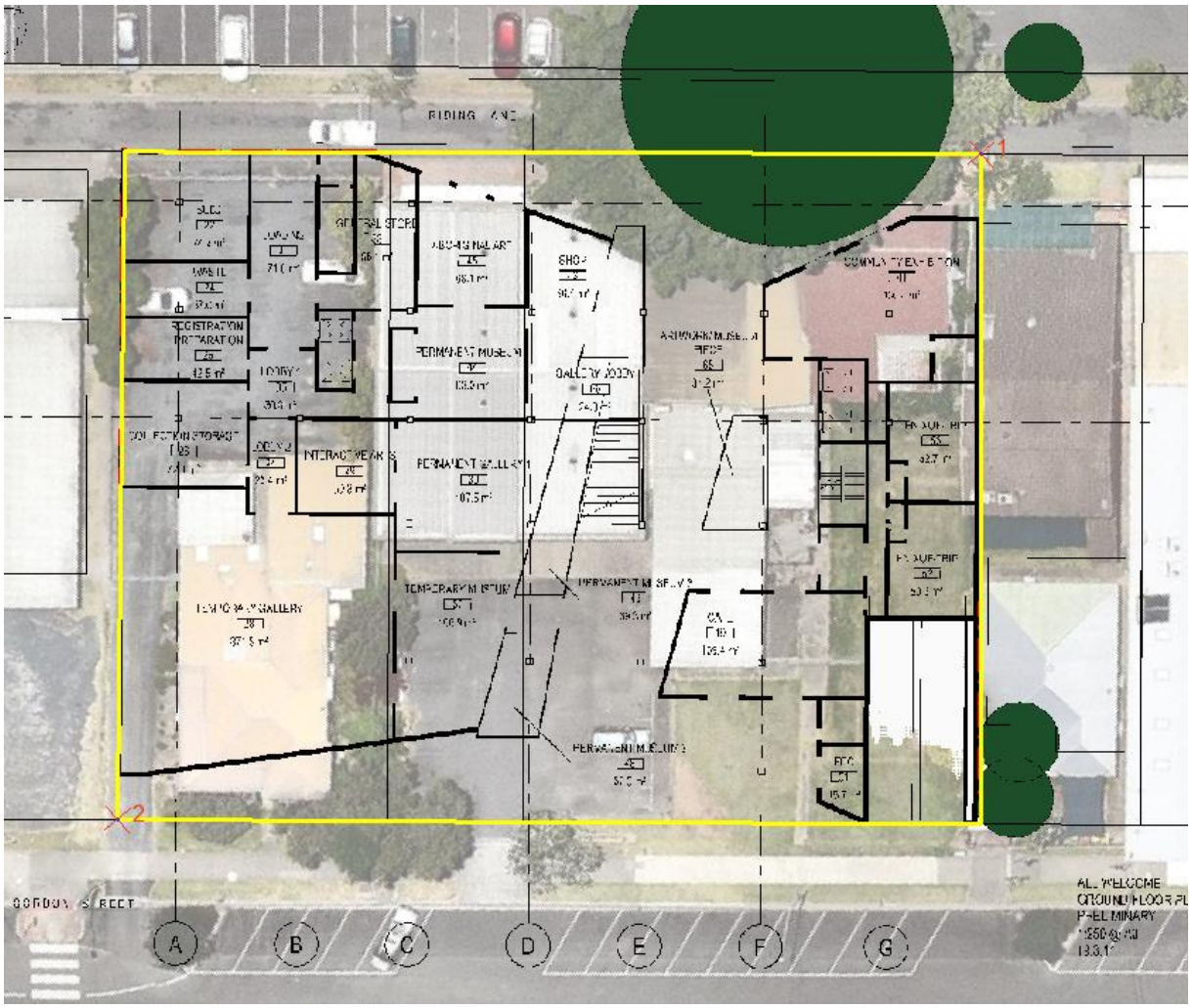


Figure 3-1 Extent of proposed development compared to existing development

3.3 Site flood evacuation

The SES Coffs Harbour Local Flood Plan (2017) identifies the Coffs Harbour Ex-servicemen's Club (C.Ex Club) as the nominated flood evacuation centre for the Coffs Harbour Town Centre area. In a 1% AEP flood event flood-free site evacuation to the centre is possible via Vernon Street. Flood evacuation routes from the site are cut-off by rising flood waters in the 0.2% AEP flood event.

The flooding in the 0.2% AEP flood event is expected to be relatively shallow and contained to south-western corner of the multi-storey public carpark structure and Castle Street/Vernon Street kerbs. Notwithstanding, flood free access is likely to still be achievable via the aerobridge by using the access ramps at the southern end of the multi-storey public carpark structure to access Vernon Street. In a PMF, the site evacuation is not possible.

A flood action plan should be prepared for the proposed development, as part of detailed design documentation.

3.4 Responses from Council and other agencies

It is noted that the Cultural and Civic Space project concept will be a State Significant Development Application. Notwithstanding, the Coffs Harbour City Council Local Environment (CHCC, LEP 2013) and Development Control Plan (CHCC, DCP 2015), provide valuable flood planning input. From a planning perspective, the proposed development includes a number of mixed use facilities which cross multiple planning categories as defined in the Councils Planning documents.

Correspondence has been sought from various agencies in order to confirm planning categorisation for the site in order to confirm flood planning requirements for the proposed development. The enquiries and responses are summarised below in the following sections.

3.4.1 Council flood enquiry

A Coffs Harbour City Council Flood Enquiry was lodged for the site and was provided with the Project Brief. The Coffs Harbour City Council Flood Enquiry, listed the flood levels in Table 3-2. The table also lists the applicable Flood Planning Level being 0.5 m above the 1% AEP flood level as defined in the CHCC DCP (2015).

It must be noted that this advice was on the basis of the Coffs Creek and Park Beach Flood Study findings which did not included the existing development between Castle Street and Riding Lane, preventing overflows in this area.

Table 3-2 Flood Planning Levels near the Site (Council Flood Enquiry)

Location	1% AEP Flood Level (mAHD)	Flood Planning Level (mAHD)	Comment
Castle Street Sag	4.37	4.87	Approximately 50 m from site boundary. Note this does not consider physical barriers to flooding between Castle Street and Riding Lane.
Vernon Street/Gordon Street Intersection	3.70 – 3.80	4.20 to 4.30	Approximately 50 m from site boundary

3.4.2 Council responses to development categorisation enquiry

Section E4 of the Coffs Harbour DCP (CHCC, 2015) lists development categories for various development types. The proposed development includes uses, which would fall under multiple categories.

Planners for the project have advised (email 25/03/2019) that the most appropriate category for the proposal would be “Commercial Development” unless the Council Offices component of the proposal provides an important contribution to the notification and evacuation of the community during flood events. If this were the case then this component of the proposal would be categorised as an Essential Facility.

Council has since provided further clarifications since the initial enquiry (email 02/04/2019) confirming that the facility is not intended for use as a flood co-ordination facility and that the development proposal should be assessed as a Commercial Development for the purpose of flood planning.

3.4.3 SES responses to evacuation enquiry

The SES has advised (personal comm. 26/03/2019) that in a flood event the Council Local Emergency Management Officer and other representatives of emergency agencies congregate at the Fire Service Control Centre near the Coffs Harbour Airport. All flood emergency response is coordinated from this location. This advice is thus issued on the basis that Coffs Harbour Civic Space will not provide an important contribution to the notification and evacuation of the community during flood events, and that the appropriate category for the proposal would be "Commercial Development".

3.5 Floor level assessments

3.5.1 Regional flooding

With reference to the CHCC DCP 2015, Table 3-3 below summarises flood levels based on the revised Coffs Creek and Park Beach Flood Study flood model simulations.

Table 3-3 Coffs Creek Flood Study – Peak Flood Levels and Finished Floor levels

Location	Development Type	Finished Floor Level Requirement	1% AEP Flood Level (mAHD)	Regional flood planning level (mAHD)
Gordon Street/ Vernon Street Intersection	Minimum Finished Floor Level (FFL) - Commercial and Industrial Development	1% AEP flood level plus 0.5 m	3.80	4.30

As discussed in Section 3.1, physical barriers to overland flooding have been identified and confirmed through terrestrial survey. The physical barriers are noted to be elevated above the flood planning level based on the Castle Street Sag flood levels (4.87 mAHD), and would therefore impede the flow of water from Castle Street towards Riding Lane. Additionally, the 0.2% AEP flood event is also noted to not "spill" towards the site from Castle Street.

On the basis of the above, and considering the commercial nature of the proposed development, a regional flood planning level of 4.30 mAHD is recommended for regional flooding, based on the flooding conditions at the Vernon Street/Gordon Street intersection.

3.5.2 Local stormwater assessments

The Coffs Creek Flood Study did not include a representation of local stormwater drainage along Riding Lane or Gordon Street within the regional flood model. Local overland stormwater flows along the Riding Lane and Gordon Street frontages of the site may result in a higher overland flow flood levels than those derived from the regional flooding information obtained from the revised Coffs Creek and Park Beach Flood Study flood model simulations.

To examine the local stormwater drainage, a DRAINS model, representing the catchment areas upstream of the site along both the Riding Land and Gordon Street frontages was compiled and simulated for the 1% AEP local design flood event. Inflow hydrographs were extracted from the DRAINS model and simulated using the site surveyed data along the frontages of each road.

For the purposes of this assessment, flood levels have been extracted from the DRAINS model and are summarised in Table 3-4. Using the Coffs Harbour City Council Development Specification Design – 0074 Stormwater Drainage Design as the applicable specification with respect to local road flooding, the minimum freeboard requirement from flood levels in roadways is 0.3 m. Minimum flood planning levels based on the local stormwater assessments are summarised below in Table 3-4.

The results of this assessment identified slightly higher local 1% AEP overland flood levels along the Riding Lane and Gordon Street frontages when compared to regional 1% AEP flood levels at the site. On the basis of the above, a local flood planning level of 4.76 mAHD is assessed for local overland flooding based on the local road flooding in Riding Lane and Gordon Street.

Table 3-4 Local Stormwater Assessment – Peak Flood Levels and Finished Floor Levels

Location	Development Type	Finished Floor Level Requirement	1% AEP Flood Level (mAHD)	Local flood planning level (mAHD)
Riding Lane Frontage – Northern Boundary	Minimum Finished Floor Level (FFL) - Commercial and Industrial Development	1% AEP flood level plus 0.3 m	4.46	4.76
Gordon Street Frontage – Northern Boundary			4.22	4.52

3.5.3 Recommended finished floor level

Based on the results of the above assessments, a minimum Finished Floor Level (FFL) of 4.76 mAHD is recommended for the proposed development. This is based on local road overland flooding along Riding Lane and Gordon Street.

3.5.4 Recommended entrance level to the underground carpark

The entrance to the underground carpark is proposed to be located in the north-east corner of the site, along the Gordon Street frontage. The underground car park entrance level requirements have been based on Coffs Harbour City Councils Development and Construction Specifications (AUSSPEC), which requires entrances to underground car parks 0.3 m above the 1% AEP flood level. On the basis of the above assessments, the recommended level for the entrance to the underground carpark is 4.52 mAHD, which is some 250 mm above the edge of the footpath based on the site survey.

4. Compliance checklists

Table 4-1 and Table 4-2 below provide an assessment of the proposed development against the requirements of the Secretary's Environmental Assessment Requirements (SEAR's) and the Coffs Harbour City Council Local Environment Plan (LEP, 2013) and Development Control Plans (DCP, 2015).

Table 4-1 SEAR's Requirements and compliance Assessment

Requirement	Compliance Statement	Compliance Evidence
The EIS shall include an assessment of the following features relevant to flooding as described in the Floodplain Development Manual 2005:		
• Flood Prone Land	Complies – has been assessed.	Refer Section 3.2 of this report
• Flood Planning Area	Complies – has been assessed.	Refer Section 3.2 of this report
• Hydraulic Categorisation	Complies – has been assessed	Refer Section 3.2 of this report
• Flood Hazard	Complies – has been assessed	Refer Section 3.2 of this report
The EIS shall include details of flood assessment and modelling undertaken in determining design flood levels for events including a minimum of the 5% AEP, 1% AEP and PMF events (or an equivalent extreme event)	Complies – has been assessed	Refer Section 3.2 of this report. Flood levels have been extracted from Councils adopted Flood model for the region. Since the site is located above the 1% AEP flood level, the 5% AEP flood levels were not assessed.
The EIS shall include flood modelling of the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:		
• Current flood behaviour of design events as detailed above. This includes the 0.5% and 0.2% AEP flood events as proxies for assessing sensitivity to an increased rainfall intensity of flood producing rainfall events due to climate change	Complies – has been assessed	Refer Section 3.2 of this report. Flood levels have been extracted from Councils adopted Flood model for the region, which has been updated to reflect terrestrial survey captured as part of this project.
The EIS shall include flood modelling which considers and documents:		
• Existing Council flood studies in the area consistent to the flood behaviour documented in these studies	Complies	Refer Section 3.2 of this report. Flood levels have been extracted from Councils adopted Flood model for the region.
• The impact on existing flood behaviour for a full range of flood events, including up to the PMF or equivalent extreme flood	Complies	Refer Section 3.2 of this report. The site is not flooded in all events up to and including the 0.2% AEP flood event. Flood impacts in the PMF are expected to be negligible given the extent of development which exists on the site prior to redevelopment, and the proposed development.

Requirement	Compliance Statement	Compliance Evidence
• Impacts of the proposed development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flood, flow velocities, flood levels, hazard categories and hydraulic categories	Complies	Refer Section 3.2 of this report. The site is not flooded in all events up to and including the 0.2% AEP flood event. Flood impacts in the PMF are expected to be negligible given the extent of development which exists on the site prior to redevelopment
• Relevant provisions of the NSW Floodplain Development Manual	Complies - The development is compatible with the hydraulic functions of the land	Refer Section 3.2 of this report
The EIS Shall include an assessment of the proposed development on flood behaviour, including:		
• Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure	Complies.	Refer Section 3.2 of this report. The site is not flooded in all events up to and including the 0.2% AEP flood event. No flood impacts are therefore expected for events up to the PMF. Flood impacts in the PMF are expected to be negligible given the extent of development which exists on the site prior to redevelopment occurring.
• Consistency with Council's floodplain risk management plan	Complies - The development is compatible with the flood hazard of the land	Refer Section 3.3 of this report. A flood action plan should be prepared for the development, subject to approval of the proposed development. The flood action plan should accompany the Construction Certificate documentation
• Consistency with any rural floodplain management plans	Not Applicable	Not Applicable - The development is not on Rural land
• Compatibility with the flood hazard of the land	Complies - The development is compatible with the flood hazard of the land	Refer Section 3.2 of this report and attached figures. The site is outside the 1% AEP flood extent. There is no flood hazard.
• Compatibility with the hydraulic functions of flood conveyance in floodway's and storage in flood storage areas of the land	Complies - The development is compatible with the hydraulic functions of the land	Refer Section 3.2 of this report and attached figures. The site is outside the 1% AEP flood extent. The site is located in flood prone land identified as "Low Flood Risk"
• Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site		Refer Section 3.2 of this report. The site is not flooded in all events up to and including the 0.2% AEP flood event. No flood impacts are therefore expected for events up to the PMF. Flood impacts in the PMF are expected to be negligible given the extent of development which exists on the site prior to redevelopment

Requirement	Compliance Statement	Compliance Evidence
• Whether there will be direct or indirect increase in erosion, siltation destruction of riparian vegetation or a reduction in the stability of river banks or watercourses	Complies	Refer Section 3.2 of this report. The site is not flooded in all events up to and including the 0.2% AEP flood event. No flood impacts are therefore expected for events up to the PMF. No impacts are expected from the proposed development with respect to erosion.
• Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW State Emergency Services (SES) and Council.	Complies	Refer Section 3.2.3 for Flood Evacuation. The proposal does not impact existing community management arrangements. Refer Section 3.4.3. for Agency Correspondence
• Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with NSW SES and Council.	Complies	Refer Section 3.2.3 for Flood Evacuation. The proposal allows for connection to the existing Council Multi-Storey Carpark, which will facilitate safe evacuation from the site. Refer Section 3.4.3. for Agency Correspondence
• Emergency management, Evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the PMF or equivalent extreme flood event). These matters are to be discussed with NSW SES and Council.	Complies	Refer Section 3.2.3 for Flood Evacuation. The proposal allows for connection to the existing Council Multi-Storey Carpark, which will facilitate safe evacuation from the site. Refer Section 3.4.3. for Agency Correspondence
• Any Impacts the development may have on the social and economic costs to the community as consequence of flooding	N/A	Not Applicable

Table 4-2 CHCC and DCP and LEP Requirements

Clause	Requirement	Compliance Statement	Compliance Evidence
LEP Requirements			
Section 7.3 (3) (a)	Development consent must not be granted to development on land which this clause applies unless the consent authority is satisfied that the development is compatible with the flood hazard of the land	The land is considered compatible with the flood hazard of the land	Refer Section 3.2 of this report
Section 7.3 (3) (b)	Development consent must not be granted to development on land which this clause applies unless the consent authority is satisfied that the development is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses	The land is flood free in events up to the 0.2% AEP. Flood impacts in the PMF event are expected to be negligible given the extent of development existing on the site.	Refer Section 3.2 of this report
Section 7.3 (3) (c)	Development consent must not be granted to development on land which this clause applies unless the consent authority is satisfied that the development incorporates appropriate measures to manage risk to life from flood	The site is flood free in all events up to the 0.2% AEP flood event. A connection to the adjacent Council Multi-Storey carpark will facilitate safe egress from the site in the event of an event rarer than the 0.2% AEP flood event occurring.	Refer Section 3.2 of this report
Section 7.3 (3) (d)	Development consent must not be granted to development on land which this clause applies unless the consent authority is satisfied that the development is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses	The site is unlikely the result in any significant flood impacts. The site is in an urban setting and is therefore also unlikely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses	Refer Section 3.2 of this report
Section 7.3 (3) (e)	Development consent must not be granted to development on land which this clause applies unless the consent authority is satisfied that the development is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.	The site is unlikely the result in any significant flood impacts. Costs to the community are therefore considered to be negligible	Refer Section 3.2 of this report
DCP Requirements			
Section E4.1 (1)	Development is to be designed and located so that it is free from any land that is at or below the 100-year Average Recurrence Interval flood level.	The site is free from the 100-year Average Recurrence Interval flood event	Refer Section 3.2 of this report
Section E4.1 (2)	Development is to be designed and located so that it is free from any floodways.	The site is free from the 100-year Average Recurrence Interval flood event and free from any floodways	Refer Section 3.2 of this report

Clause	Requirement	Compliance Statement	Compliance Evidence
Section E4.1 (3)	Development is not to comprise the external storage of any materials below the 100-year Average Recurrence Interval flood level that are potentially hazardous or that may cause pollution.	The site is free from the 100-year Average Recurrence Interval flood event	Refer Section 3.2 of this report
Section E4.1 (4)	Development is not to result in an increase in flood levels on adjoining or surround land.	The site is free from the 100-year Average Recurrence Interval flood event . Flood impacts are considered negligible due to the elevated nature of the site	Refer Section 3.2 of this report
Section E4.1 (5)	Operational access to the development is to provide a level of service commensurate with the zoning and proposed use with consideration to both on site and off site access.	The site is free from the 100-year Average Recurrence Interval flood event	Refer Section 3.2 of this report
Section E4.3 (1)	Buildings are to be designed and located so that they are free from any high hazard flood area.	The site is free from the 100-year Average Recurrence Interval flood event	Refer Section 3.2 of this report
Section E4.3 (2)	Development is to be designed and located with consideration to impacts from any high hazard flood area on access to the development and the operation of the development.	The site is free from the 100-year Average Recurrence Interval flood event . Flood impacts are considered negligible due to the elevated nature of the site	Refer Section 3.2 of this report
Section E4.3 (3)	Development applications for development at or below the 100-year Average Recurrence Interval flood level are to be accompanied by a flood study prepared by a suitably experienced and qualified engineer to substantiate that the development will not increase upstream or downstream flood levels or change flood behaviour to the detriment to any other property.	Councils Flood Study has been reviewed and flood levels adopted from the Flood Study for the purpose of this assessment. The site is free from the 100-year Average Recurrence Interval flood event . Flood impacts are considered negligible due to the elevated nature of the site	Refer Section 3.2 of this report
Section E4.3 (4)	The minimum finished floor level for buildings is to be at the height of the 100-year Average Recurrence Interval flood level plus 0.5 metre freeboard.	Floor Levels have been proposed to satisfy this requirement.	Refer to Section 3.5 of this report

5. Summary and conclusion

- This flood assessment report has been prepared to inform the EIS and State Significant Development Application SSDA for a new Cultural and Civic Space (All Welcome) which will be assessed under Part 4 Division 4.7 of the EP&A Act. The project involves construction of a new building and associated infrastructure to accommodate the new facility.
- Council's Flood Model have been reviewed and updated to include terrestrial survey captured in the immediate vicinity of the site. The revised flood model has been resimulated and flood data extracted from the flood model to determine appropriate flood planning levels for the proposed development.
- A compliance assessment has been undertaken against SEAR's requirements for the proposed development and against Coffs Harbour City Councils Local Environmental Plan (LEP) and Development Control Plan (DCP). The results of the compliance assessment are documented in this report.

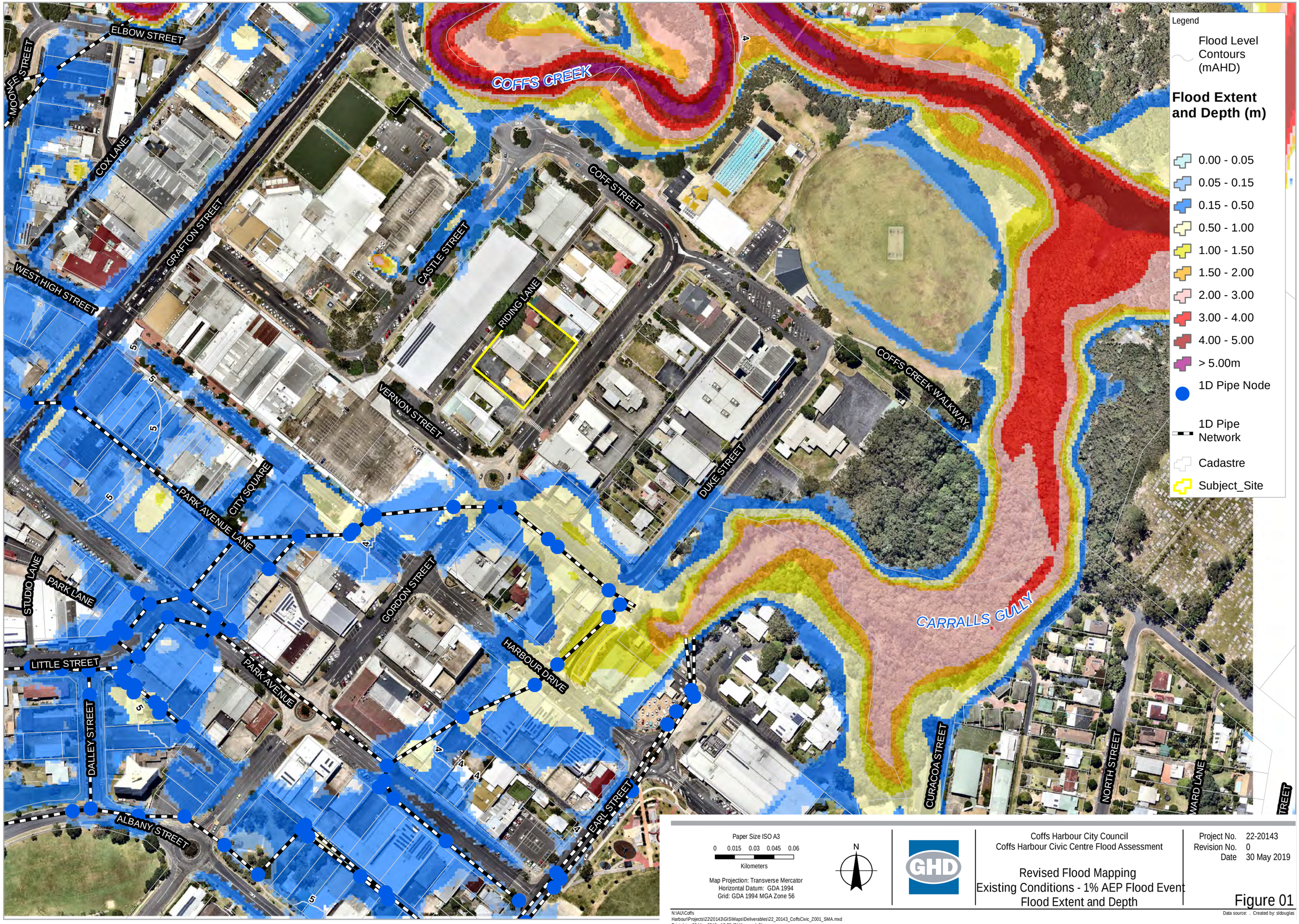
On the basis of the above, the proposed development is considered to satisfy the relevant requirements with respect to flooding.

6. References

- NSW Government, 2005, Floodplain Development Manual, Management of Flood Liable Land.
- BMT 2018, Coffs Harbour City Council, Coffs Creek and Park Beach Flood Study.
- CHCC 2015, Coffs Harbour City Council, Coffs Harbour Development Control Plan.
- CHCC 2013, Coffs Harbour City Council, Coffs Harbour Local Environmental Control Plan.
- CHCC 2009, Coffs Harbour City Council Development Specification (AUSSPEC) Design Version 1 (01 January 2009.

Appendices

Appendix A – Flood mapping



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

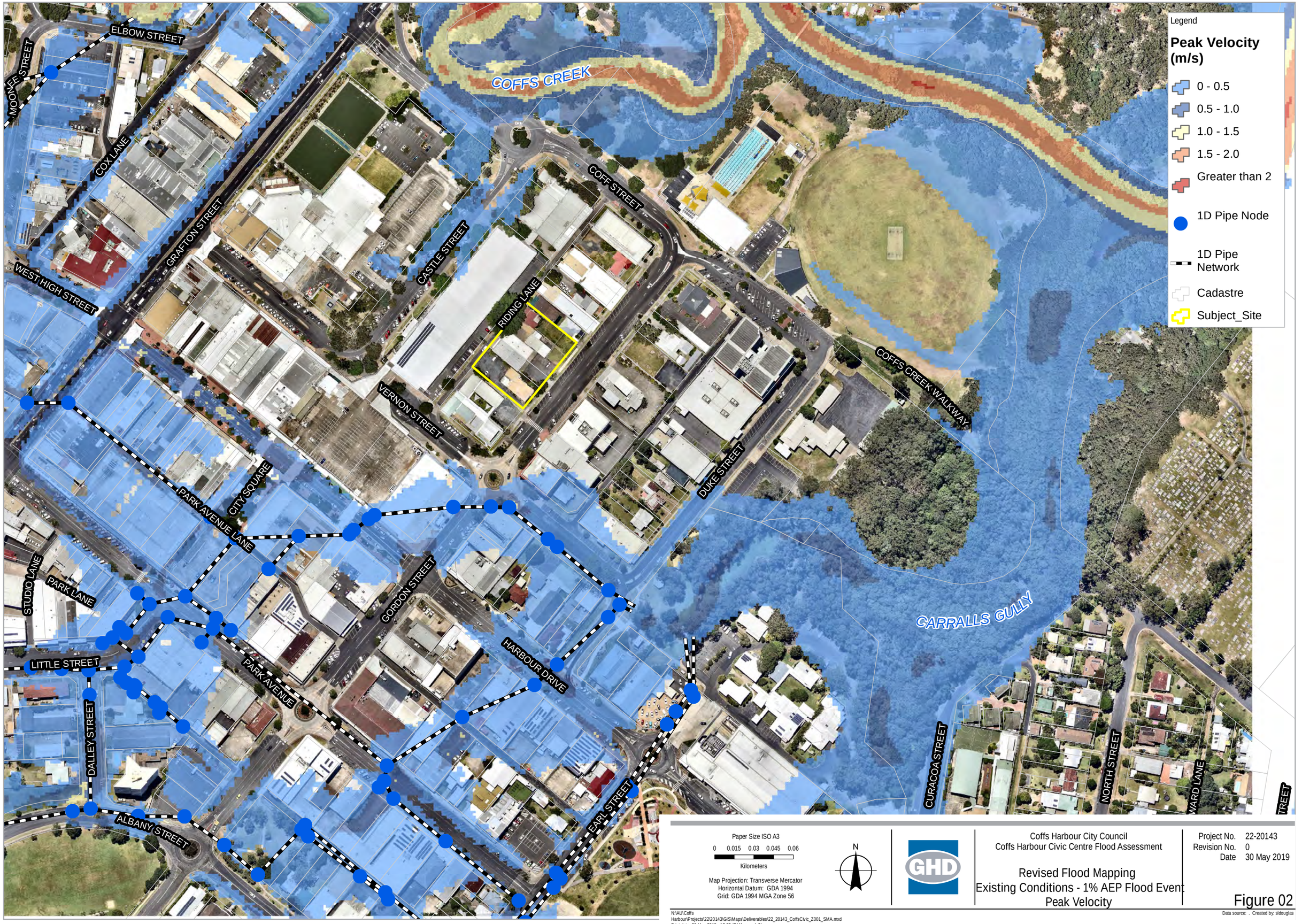
Revised Flood Mapping
Existing Conditions - 1% AEP Flood Event
Flood Extent and Depth

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 01

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:53 (SMA record: 2)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

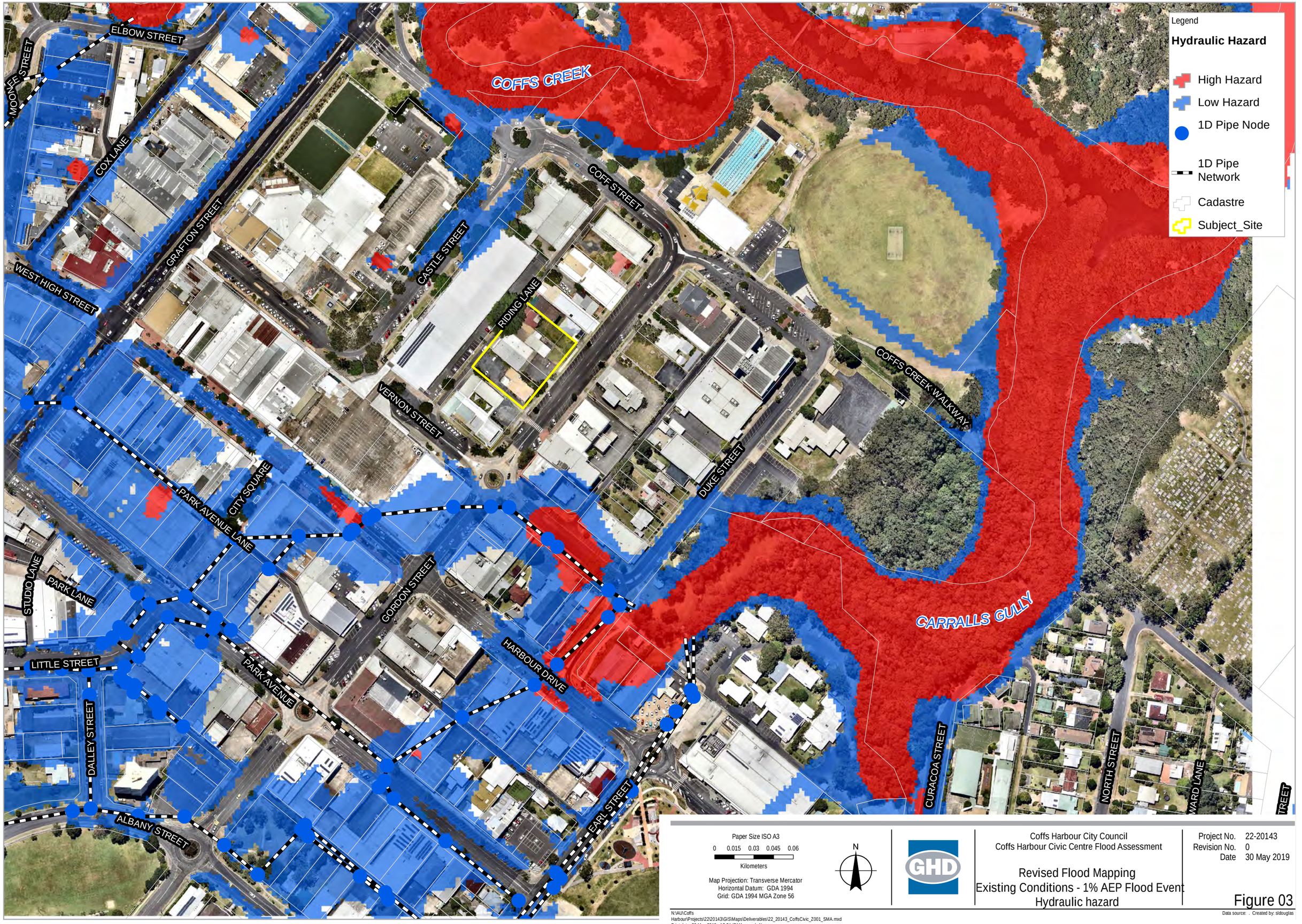
Revised Flood Mapping
Existing Conditions - 1% AEP Flood Event
Peak Velocity

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 02

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:53 (SMA record: 3)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

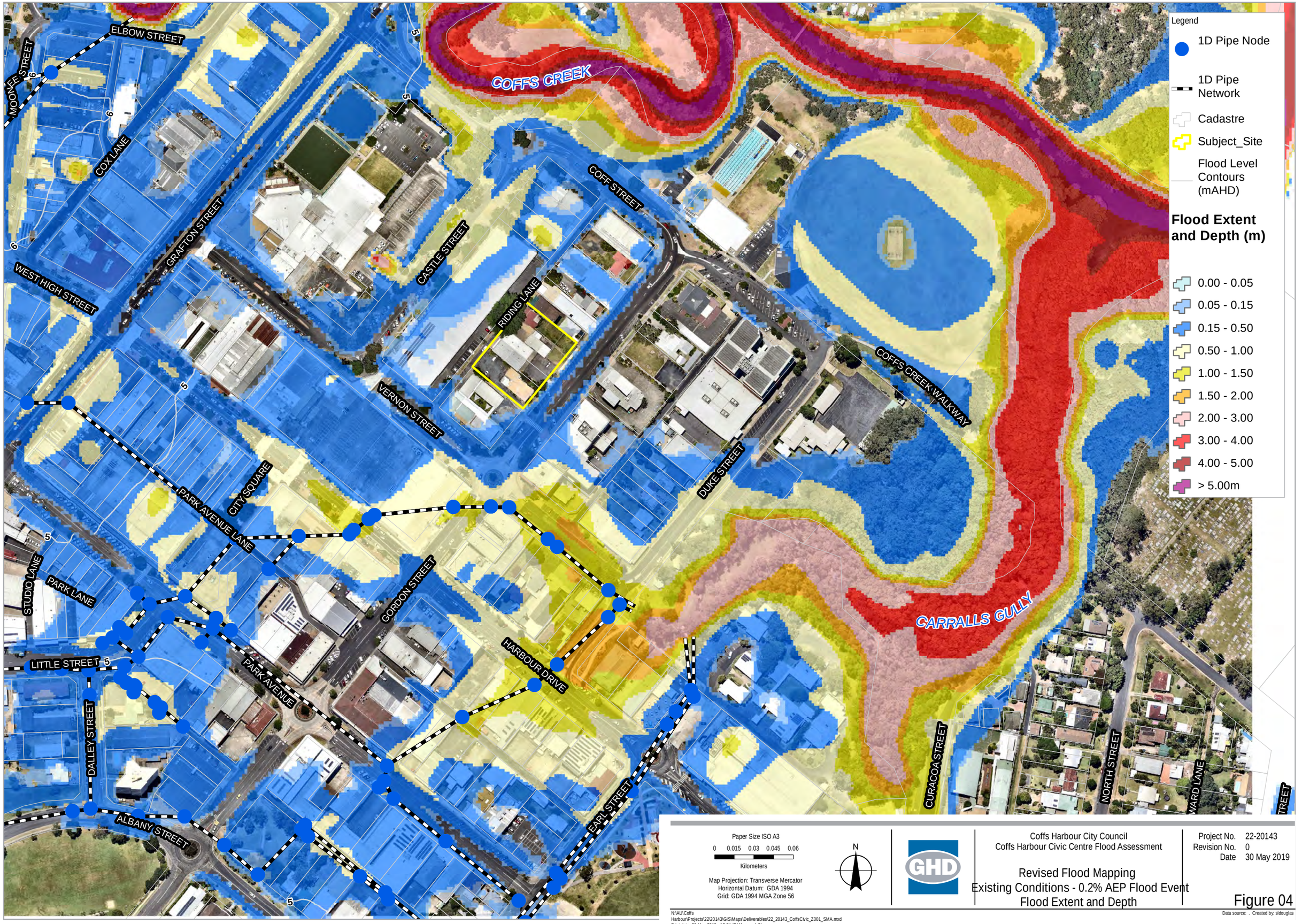
Revised Flood Mapping
Existing Conditions - 1% AEP Flood Event
Hydraulic hazard

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 03

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:54 (SMA record: 4)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

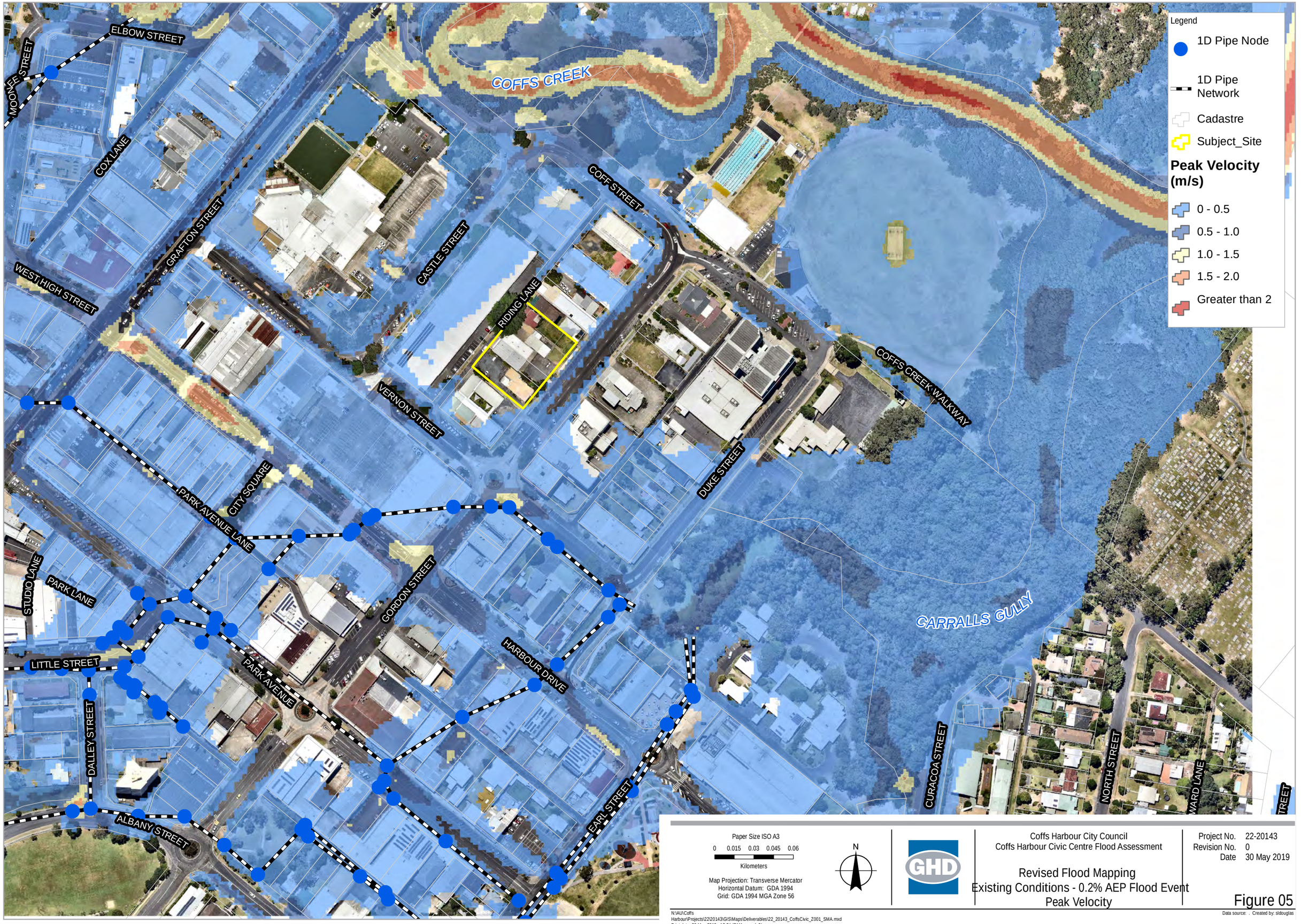
Revised Flood Mapping
Existing Conditions - 0.2% AEP Flood Event
Flood Extent and Depth

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 04

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:54 (SMA record: 5)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

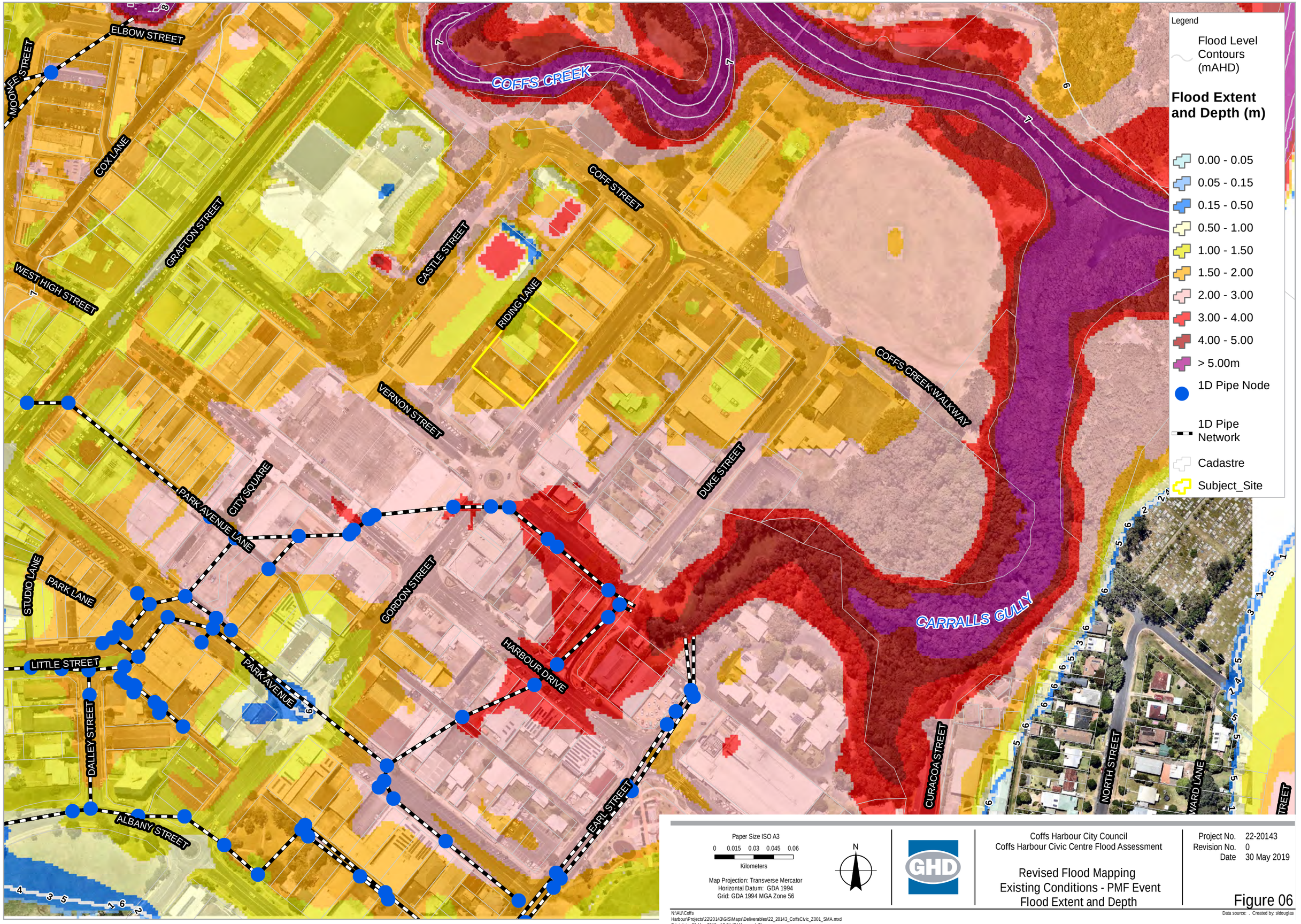
Revised Flood Mapping
Existing Conditions - 0.2% AEP Flood Event
Peak Velocity

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 05

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:54 (SMA record: 6)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

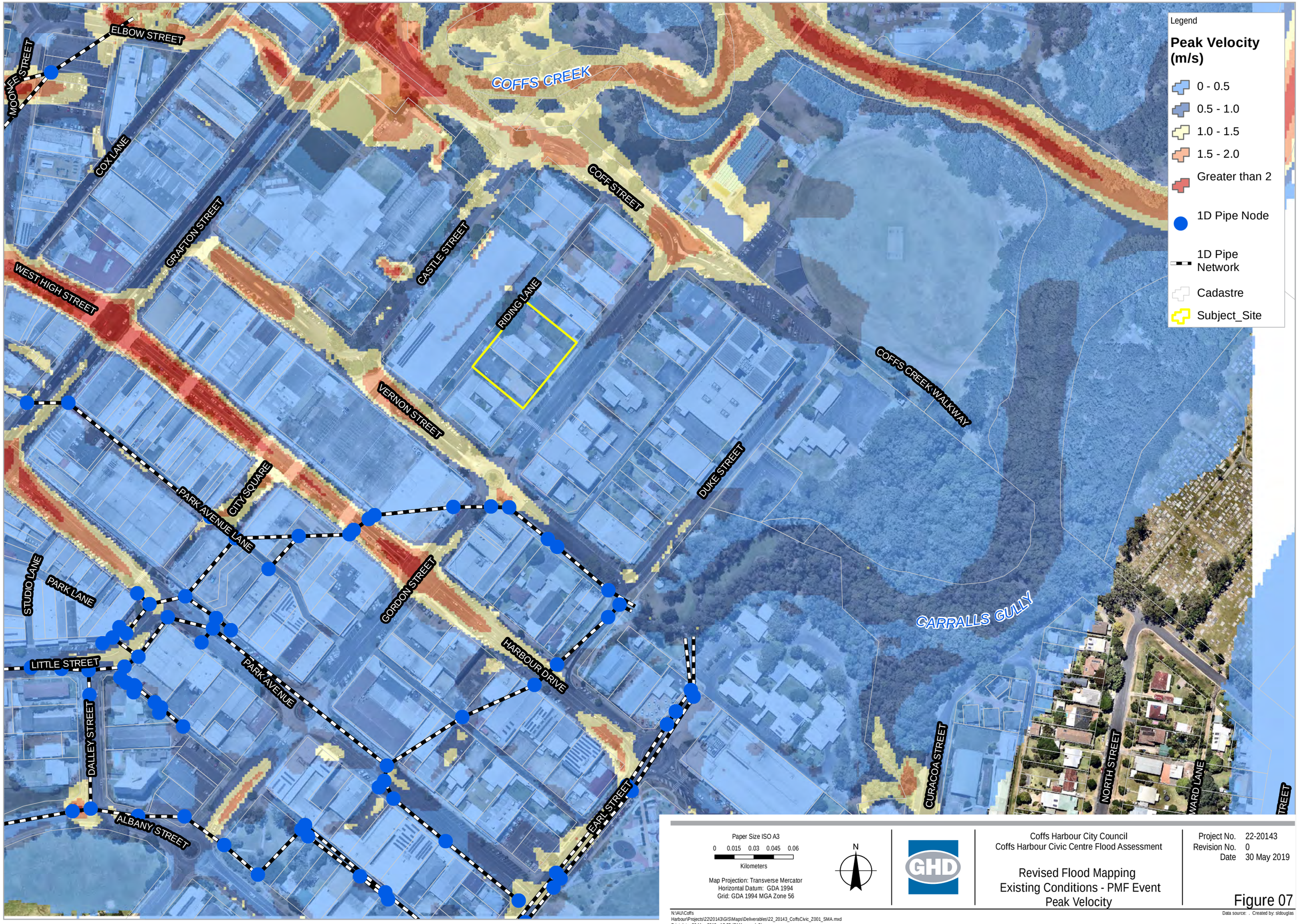
Revised Flood Mapping
Existing Conditions - PMF Event
Flood Extent and Depth

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 06

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:54 (SMA record: 7)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

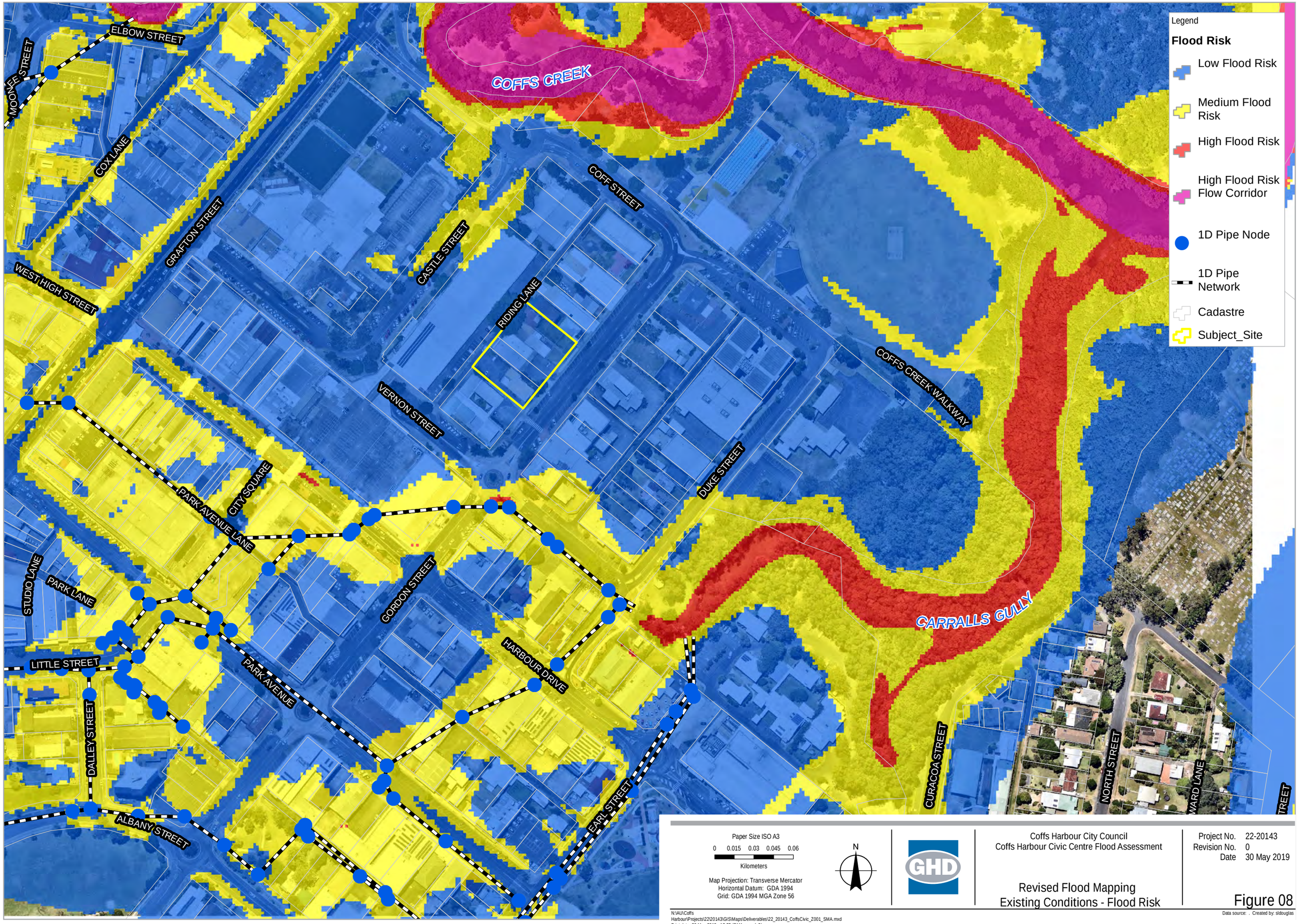
Revised Flood Mapping
Existing Conditions - PMF Event
Peak Velocity

Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 07

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:55 (SMA record: 8)

Data source: . Created by: sldouglas



Paper Size ISO A3

0 0.015 0.03 0.045 0.06

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Coffs Harbour City Council
Coffs Harbour Civic Centre Flood Assessment

Revised Flood Mapping
Existing Conditions - Flood Risk

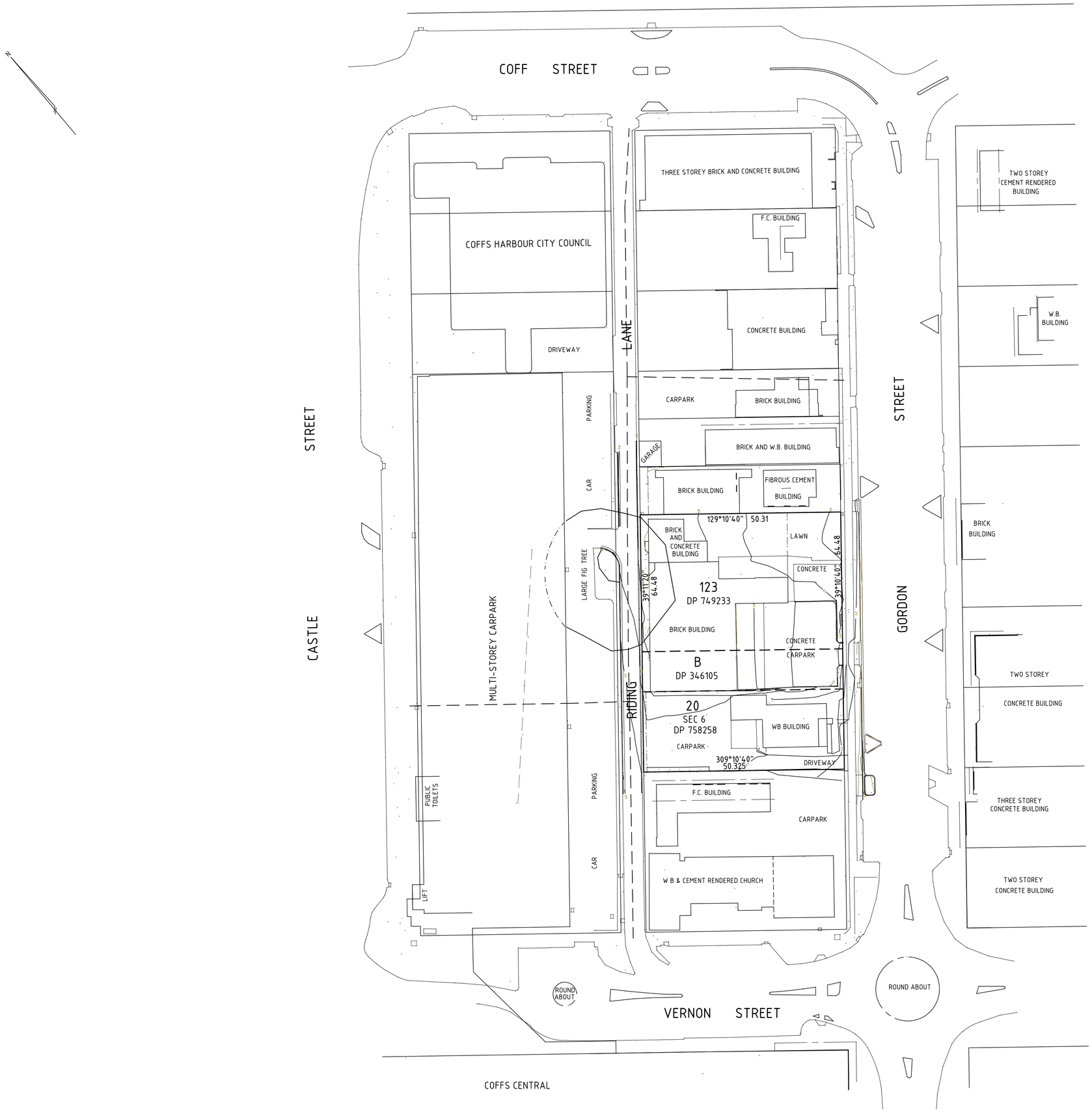
Project No. 22-20143
Revision No. 0
Date 30 May 2019

Figure 08

N:\AU\Coffs Harbour\Projects\22\20143\GIS\Maps\Deliverables\22_20143_CoffsCivic_Z001_SMA.mxd
Print date: 30 May 2019 - 13:55 (SMA record: 9)

Data source: . Created by: sldouglas

Appendix B – Terrestrial Survey



NOTES

01. This plan was prepared for the exclusive use of COFFS HARBOUR CITY COUNCIL for the purpose of designing new constructions on the land and should not be used for any other purpose. Blairlanskey Surveys accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses 02 to 05 inclusive hereof.

02. The detail survey shown hereon is not a survey defined by the Surveying and Spatial Information Act 2002. The title boundaries of the subject land were not marked at the time of survey and have been determined by title dimensions only. Prior to any development taking place it would be advisable to carry out further survey work to define and mark the subject boundaries.

03. Services shown hereon have been located by field survey where surface markers and/or structures are visible.

04. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed location of all services.

05. This plan may not be reproduced unless this note is included.

BLAIRLANSKEY SURVEYS

REGISTERED SURVEYORS ABN: 66 711 849 214

P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
190 PACIFIC HIGHWAY (NORTH)
COFFS HARBOUR 2450
Tel: (02) 6652 5090
Fax: (02) 6651 1495
Email: bls@blsurvey.com

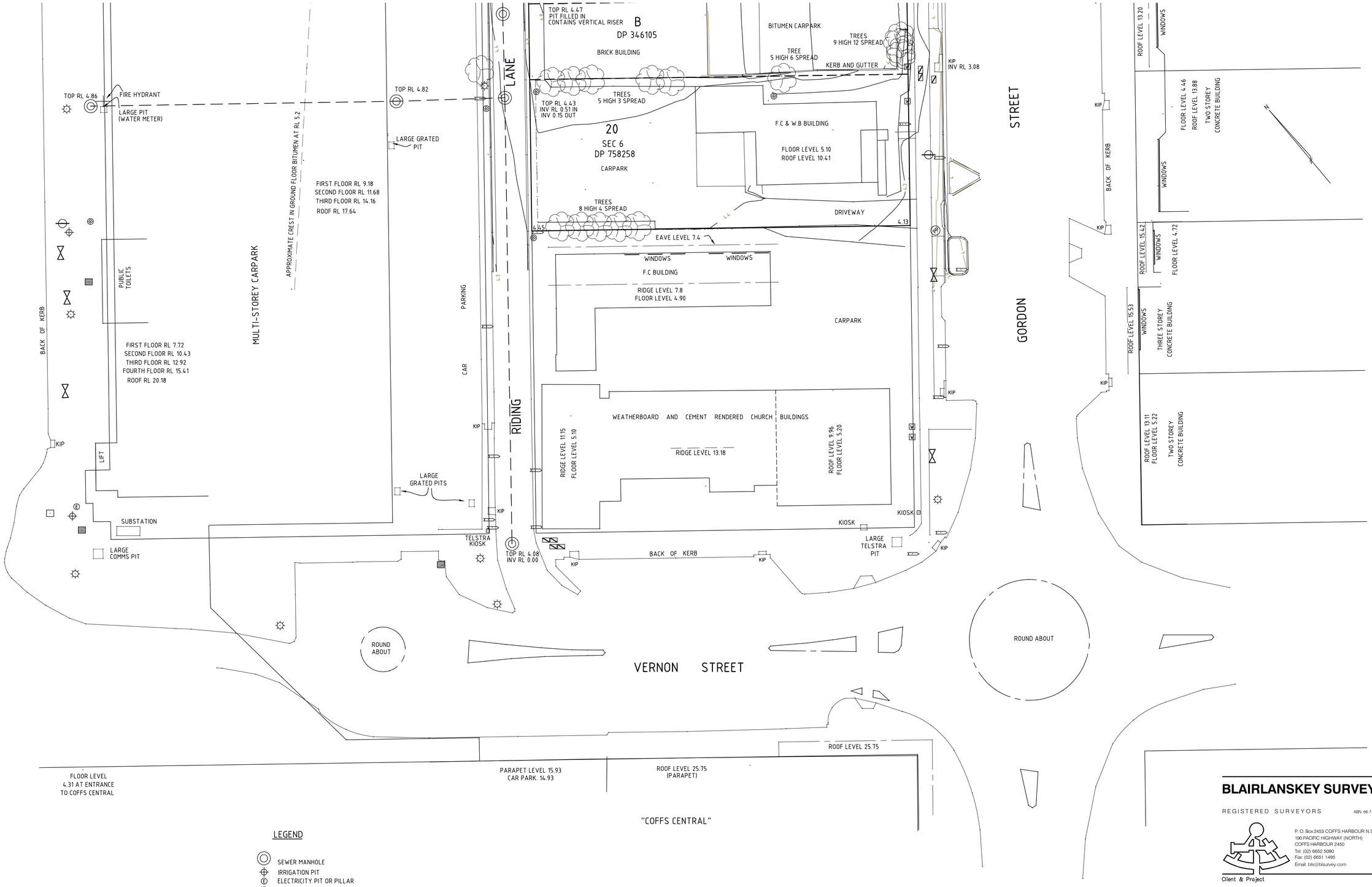
Client & Project

COFFS HARBOUR CITY COUNCIL
23-31 GORDON STREET
COFFS HARBOUR
LOT 20 SEC 6 DP 758258
LOT B DP 346105 & LOT 123 DP 749233

Drawing Title

DETAIL SURVEY

Scale at A1	Date	Approved
1 : 500	MARCH 2019	
Job No.	Datum	Datum Origin
9484	A.H.D.	.



LEGEND

- SEWER MANHOLE
- IRRIGATION PIT
- ELECTRICITY PIT OR PILLAR
- SEWER IO
- SIGN
- TELSTRA PIT OR OTHER COMMS PIT
- LIGHT
- STOP VALVE
- HYDRANT
- GRATED PIT
- UNIDENTIFIED PIT
- POWER POLE
- KIP KERB INLET PIT
- W WATER VALVE OR METER

BLAIRLANSKEY SURVEYS

REGISTERED SURVEYORS ABN: 66 711 849 214

P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
190 PACIFIC HIGHWAY (NORTH)
COFFS HARBOUR 2450
Tel: (02) 6652 5090
Fax: (02) 6651 1495
Email: bls@blsurvey.com

Client & Project

COFFS HARBOUR CITY COUNCIL
23-31 GORDON STREET
COFFS HARBOUR
LOT 20 SEC 6 DP 758258
LOT B DP 346105 & LOT 123 DP 749233

Drawing Title

DETAIL SURVEY

Scale at A1	Date	Approved
1 : 250	MARCH 2019	
Job No.	Datum	Datum Origin
9484	A.H.D.	

STREET

CASTLE

BACK OF KERB

KIP

TOP LOW WALL RL 4.58
BASEMENT CARPARK RL 2.93

LARGE PIT
UNKNOWN

TOP RL 4.86

FIRE HYDRANT

LARGE PIT
(WATER METER)

COFFS HARBOUR CITY COUNCIL

TOP RL 4.40

4.39
BASE OF STAIRS

DRIVEWAY

4.50

3.86

LOW WALL EXTENDS BENEATH
RAMP TO NORTHERN WALL

MULTI-STOREY CARPARK

APPROXIMATE CREST IN GROUND FLOOR BITUMEN AT RL 5.2

FIRST FLOOR RL 9.18
SECOND FLOOR RL 11.68
THIRD FLOOR RL 14.16
ROOF RL 17.64

TOP RL 4.82

BASEMENT CARPARK RL 2.94
SILL RL 4.99

EDGE OF
FOLIAGE

TOP RL 4.70
INV RL 0.70

APPROX. TREE
OVERHANG

TOP OF TREE
APPROX. RL 25.0

LARGE GRATED
PIT

EDGE BUTTRESS
ROOTS

LARGE TREE

LANE

RIDING

TOP RL 4.47

F.C. BUILDING

FLOOR LEVEL 5.55
RIDGE LEVEL 9.45

STAY WIRE

CONCRETE BUILDING

FLOOR LEVEL 5.03
ROOF LEVEL 10.81

TOP RL 4.66
INV RL 0.91

TOP RL 4.49

BRICK BUILDING

FLOOR LEVEL 4.78
ROOF LEVEL 10.91

BRICK AND W'BOARD BUILDING

FLOOR LEVEL 4.62
ROOF LEVEL 10.15

GARAGE

TWO STOREY
BRICK BUILDING

BALCONY
LEVEL 8.3

WINDOWS

F.C. BUILDING

RIDGE LEVEL 9.62
FLOOR LEVEL 4.92

WINDOWS

TREE
7 HIGH 5 SPREAD

4.35

4.87

ELECTRICAL
KIOSK

BRICK &
CONCRETE BLOCK
BUILDING

RL 12.9

LAWN

END OF
OVERHANGING BRANCH

FLOOR LEVEL 5.12

CONCRETE

RL 12.4

123
DP 749233

FLOOR LEVEL 5.37

KERB AND GUTTER

ELECTRICAL
FIBRE

SERVICE
SERVICE

TREE
5 HIGH 5 SPREAD

BRICK BUILDING

WATER
SERVICE

TOP RL 4.47
PIT FILLED IN
CONTAINS VERTICAL RISER

FLOOR LEVEL 5.02

B
DP 346105

BITUMEN CARPARK

TREES
9 HIGH 12 SPREAD

TREE
5 HIGH 6 SPREAD

KERB AND GUTTER

TOP RL 4.43
INV RL 0.51 IN
INV 0.15 OUT

20
SEC 6
DP 758258

F.C. BUILDING

STREET

GORDON

BACK OF KERB

N

EAVE LEVEL 9.76

W.B.
BUILDING

EAVE LEVEL 7.0

FLOOR LEVEL 4.61

EAVE LEVEL 7.35

WINDOWS

FLOOR LEVEL 4.93
ROOF LEVEL 7.8

BRICK
BUILDING

WINDOWS

ROOF LEVEL 13.20

WINDOWS

FLOOR LEVEL 4.46
ROOF LEVEL 13.88

TWO STOREY
CONCRETE BUILDING

LEGEND

- SEWER MANHOLE
- IRRIGATION PIT
- ELECTRICITY PIT OR PILLAR
- SEWER IO
- SIGN
- TELSTRA PIT OR OTHER COMMS PIT
- LIGHT
- STOP VALVE
- HYDRANT
- GRATED PIT
- UNIDENTIFIED PIT
- POWER POLE
- POWER POLE WITH LIGHT
- KERB INLET PIT
- WATER VALVE OR METER

BLAIRLANSKEY SURVEYS

REGISTERED SURVEYORS

ABN 66 711 849 214

P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
190 PACIFIC HIGHWAY (NORTH)
COFFS HARBOUR 2450
Tel: (02) 6652 5090
Fax: (02) 6651 1495
Email: bls@blsurvey.com

Client & Project

COFFS HARBOUR CITY COUNCIL

~~**23-31 GORDON STREET**~~

COFFS HARBOUR

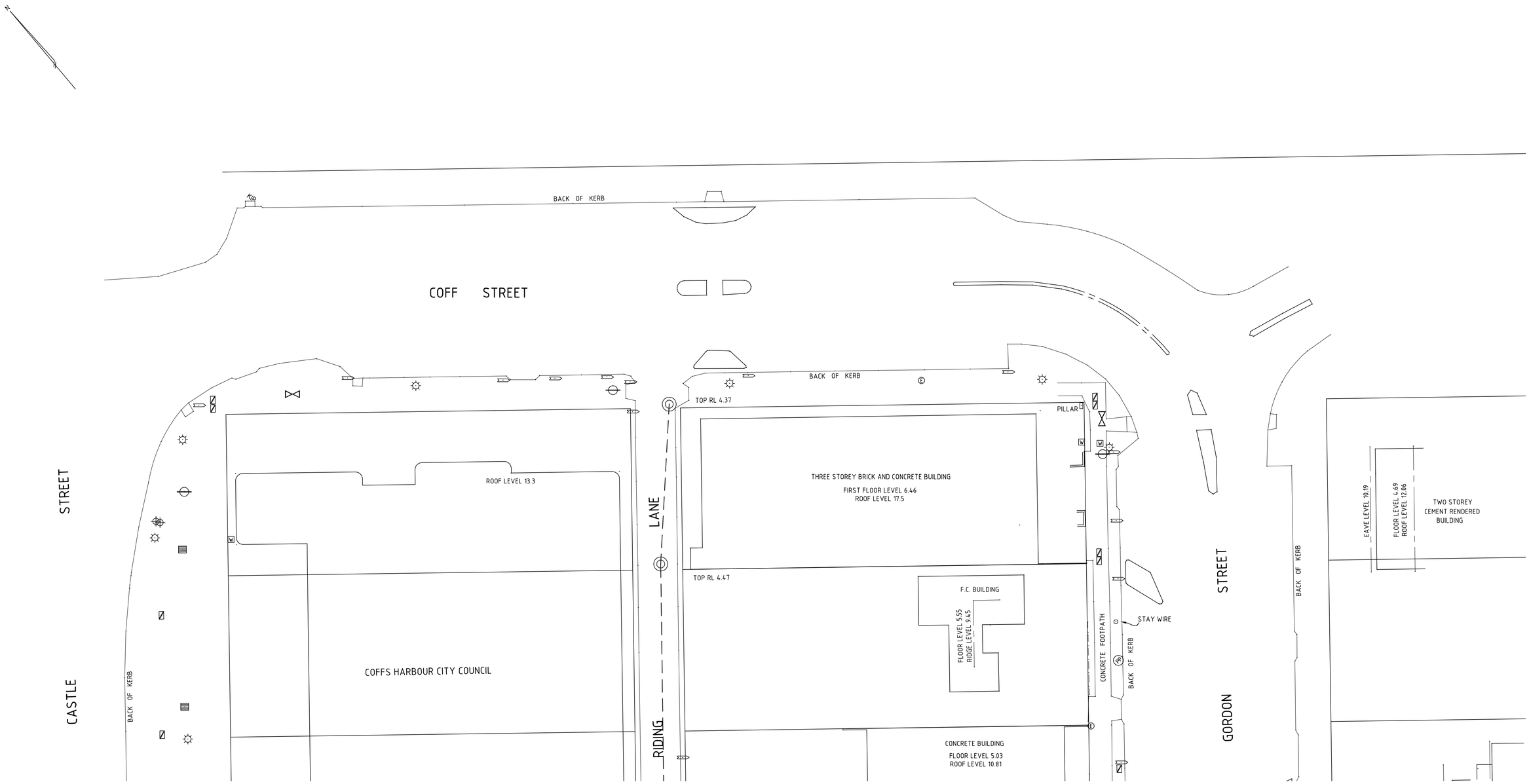
LOT 20 SEC 6 DP 758258

LOT B DP 346105 & LOT 123 DP 749233

Drawing Title

DETAIL SURVEY

Scale at A1	Date	Approved
1 : 250	MARCH 2019	
Job No.	Datum	Datum Origin
9484	A.H.D.	



LEGEND

- SEWER MANHOLE
- IRRIGATION PIT
- ELECTRICITY PIT OR PILLAR
- SEWER IO
- SIGN
- TELSTRA PIT OR OTHER COMMS PIT
- LIGHT
- STOP VALVE
- HYDRANT
- GRATED PIT
- UNIDENTIFIED PIT
- POWER POLE
- POWER POLE WITH LIGHT
- KIP KERB INLET PIT
- W WATER VALVE OR METER

BLAIRLANSKEY SURVEYS

REGISTERED SURVEYORS ABN 66 711 849 214

P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
190 PACIFIC HIGHWAY (NORTH)
COFFS HARBOUR 2450
Tel: (02) 6652 5090
Fax: (02) 6651 1495
Email: bls@blsurvey.com

Client & Project

COFFS HARBOUR CITY COUNCIL

23-31 GORDON STREET
COFFS HARBOUR
LOT 20 SEC 6 DP 758258
LOT B DP 346105 & LOT 123 DP 749233

Drawing Title

DETAIL SURVEY

Scale at A1	Date	Approved
1 : 250	MARCH 2019	
Job No.	Datum	Datum Origin
9484	A.H.D.	.

GHD

230 Harbour Drive
COFFS HARBOUR NSW 2450
T: 61 2 6650 5600 F: 61 2 6650 5601 E: cfsmail@ghd.com

22-SO-405098703-12/https://projects.ghd.com/oc/Newcastle3/floodassessmentforcu/Delivery/Documents/2220143_RPT_Flood Assessment Report.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	S. Douglas	R. Berg	*R. Berg*	R. Berg	*R. Berg*	30/05/2019
1	S. Douglas	R. Berg		R. Berg		13/06/2019

www.ghd.com