711 Hunter Street – Flood Study

Prepared for Hunter Street JV Unit Trust

October/2022
Project Number N21112

OPPORTUNITIES THROUGH EXCELLENCE
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BG&E

Contents

Appendices

Document Control				
Revision	Date	Prepared	Reviewed	Approved
A	31/10/022	Ben Collyer	L. Baxter	B. Collyer

1. Introduction

This Flood Study has been prepared by BG&E on behalf of Hunter Street JV CoP/L (the applicant). It accompanies a Statement of Environmental Effects (SEE) in support of a Development Application (DA) at 711 Hunter Street, Newcastle West (the site). This flood study assesses the development objectives against the legislated requirements for flood management.

The development has undergone an Architectural Design Competition where three competitors put forward their designs in accordance with the brief. The Plus Architecture scheme was recommended by the Jury as the winning scheme in the competitive design process. The overall outcome of the proposal aims to develop a mixed-use precinct with high quality tower forms providing a positive relationship to the immediate surrounds and acknowledging the surrounding heritage context. The proposal intends to act as a landmark for Newcastle West with a curated mix of eclectic and creative retail, food and Beveridge and commercial opportunities activating the ground levels.

The key features are summarised below:

- Demolition of the existing commercial premises and ancillary structures on-site
- Construction of a mixed-use precinct forming active ground and podium levels reaching 5 storeys of retail and commercial tenancies, with two tower forms for residential apartments reaching 26 storeys, comprising of 258 apartments
- Podium level car park for 300 cars incorporated within the podium levels
- Communal open space for residents located on level 5 and 17
- Vehicle access to the site via Little King Street
- Associated landscaping with the public domain improvements
- An urban plaza fronting National Park Street providing opportunities for activation and public art, and
- Construction of ancillary infrastructure and utilities as required.

It is noted that the overall development will form two separate concurrent DAs. Stage 1 will form the northern tower and podium elements and Stage 2 will form the southern tower and podium elements. These separate DA components are explored further below:

Stage 1:
The northern tower will include commercial and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 5 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms. A numerical breakdown of Stage 1 is shown below:

- 136 apartments including: 35 one bedroom, 74 two bedroom, 26 three bedroom, 1 four bedroom
- Total GFA: 13,581 sqm
- Floor space ratio: 5.41:1
- Total car parking spaces: 165 spaces over 4 podium levels

Stage 2:
The southern tower will include commercial and retail tenancies at ground level which will be accessible via National Park Street, Little King Street and Hunter Street. The podium levels will be situated above ground and contain car parking for both visitors and residents, accessed via Little King Street. Level 1 to Level 25 will contain a mixture of residential apartments ranging from 1 bedroom to 3 bedrooms

- 122 apartments including: 35 one bedroom, 72 two bedroom, 15 three bedroom.
- Total GFA: 12,027sqm
- Floor space ratio: 5.43:1
- Total car parking spaces: 135 spaces over 4 podium levels.

Both stages will include surrounding landscaping, public domain works and green spaces. The strata and stratum approach are detailed further in the SEE.

1.1 Site Details

Site Address	711 Hunter Street, Newcastle West
Lot/DP	Lot 1, DP 867617
Site Area	4724m^2
Boundaries:	The site has frontages of 48m to Hunter Street to the north, 113m to National Park Street to the east and 43m to King Street to the south.
Heritage Significance	Not identified as a heritage item but is adjoining an identified local heritage item to the south-west, namely the Army Drill Hall (I508) located at 498 King Street and is diagonally adjacent to the Bank Corner which is a locally listed heritage item located at 744 Hunter Street. The site is also located within the Newcastle City Centre Heritage Conservation Area

The subject site is presented in Figure 1. The subject land is currently zoned B3 (Commercial Core), in City of Newcastle (CoN) Local Environmental Plan (LEP) 2012. The stormwater design has been developed in accordance with the CoN Development Control Plan (DCP (2012) and CoN Technical Manual (2017).

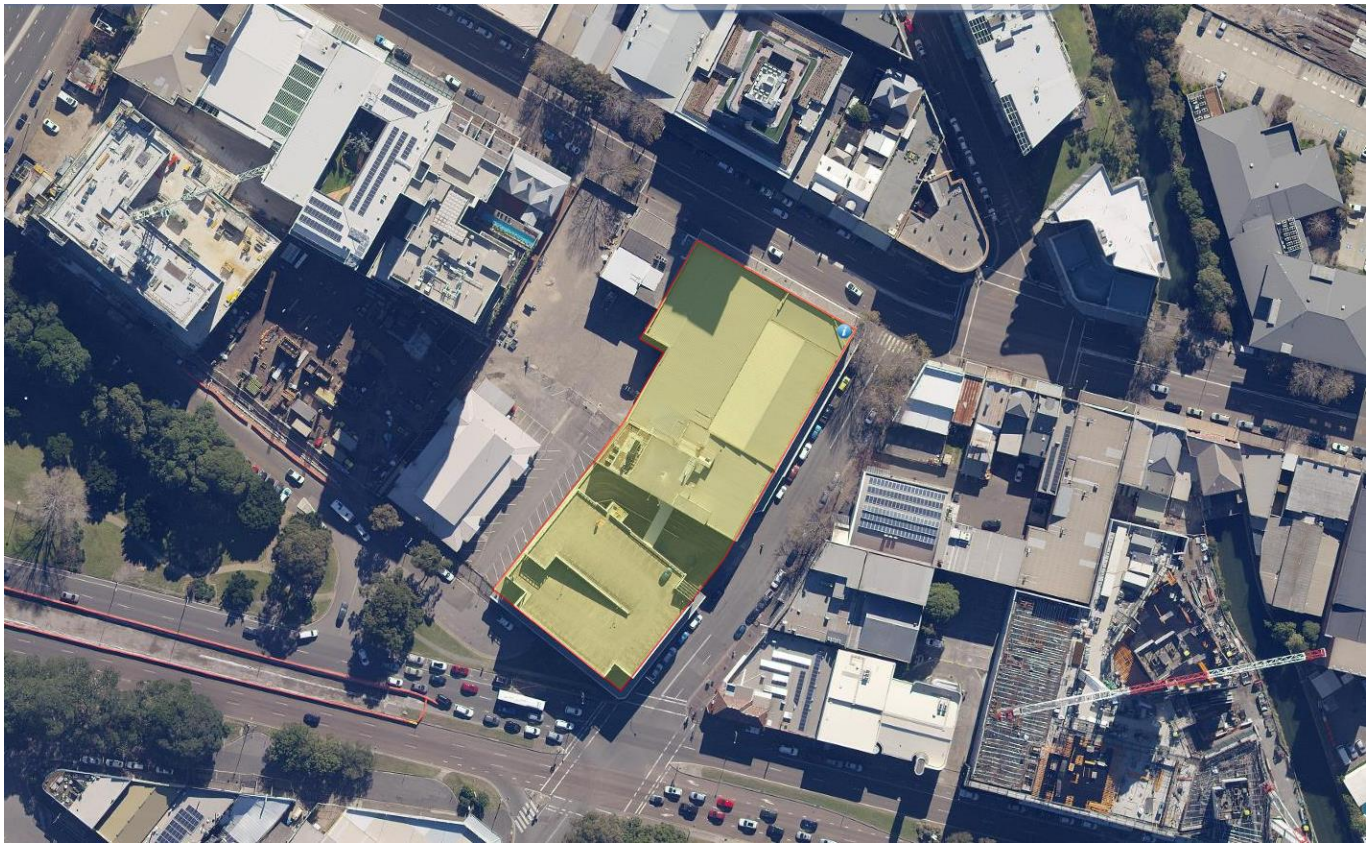

Figure 1: Site Context

1.2 Glossary of terms

FFL - Finished Floor Level
FPL – Flood Planning Level
AEP – Average Exceedance Probability
PMF – Probable Maximum Flood
CoN – City of Newcastle (Council)
DCP – Development Control Plan

AHD – Australian Height Datum
LEP – Local Environmental Plan

1.3 Proposed Development

The site is proposed to be developed into two connected residential towers, with ground floor commercial tenancies on a raised podium. Each tower will consist of 27 storeys. The development also consists of pedestrian pavement and landscaping.

The proposed architectural drawing schemes are not replicated in this report but are included with the Development Application documentation package.

1.4 Project Documents

In preparing this report, BG&E have based our findings on the following documentation:

- Honeysuckle Development Area Flood Study report, BMT WBM, March 2021
- Newcastle West Drainage Study Final Report (Revision 3), Catchment Simulation Solutions, March 2017
- Pre-DA Minutes from the City of Newcastle
- Survey Plans, Cahill and Cameron Dated 19 May 2022
- Development Proposal Plans, for ground floor layout, in Appendix D.

1.5 Available Data

Flood modelling of the catchment has been undertaken by Catchment Simulation Solutions and BMT WBM in the aforementioned flood studies which includes flood mapping. Only mapping from the reports was utilised, as flood models were not available to BG&E. The City of Newcastle provided in-principal agreement to rely on the existing flood studies for documenting the flood behaviour and hence site-specific flood modelling was not deemed necessary. This was confirmed in an email sent to Council after the Pre-DA meeting in Appendix C.

The existing flood studies are based on current (at the time of the publishing of each report) methodology consistent with the current version of Australian Rainfall and Runoff. The flood studies considered the rainfall intensity, duration and depth quantities and considered the effects of climate change on rainfall intensities as part of the flood studies. The effects of stormwater network blockages on the flood behaviour were also considered in the two studies. Given the quality of flood level information in the previous flood studies (by others), it was collectively agreed with Council that no further detailed flood modelling would be required.

2. Flood Behaviour and Flood Risk Assessment

2.1 Catchment and Site Summary

The subject site is located at the lowest end of a local area catchment that extends along Cottage Creek and includes portions of the Newcastle Metropolitan area and the suburbs of Cooks Hill, Hamilton South, The Junction, Merewether and Merewether Heights.

A flood certificate has been provided by Council for the site and is included in Appendix B. The site is subject to ocean/riverine flooding from the Hunter River and from local catchment flooding.

Riverine flooding is documented on the flood certificate to result in flood depths lower than those from the local stormwater catchment and are therefore not considered further.

Local catchment flooding is understood to comprise overland flooding when flood-flows breach the capacity of the Cottage Creek channel and flow west along King Street toward the subject site. At this point, the overland flows are understood to flow along National Park Street toward Hunter Street.

The Flood Certificate has the flood level at the site documented to RL 2.6m AHD in the 1% AEP event. The PMF event flood level is RL4.1m AHD. The flood planning level is indicated to be RL 3.1m AHD. The flood certificate has highlighted that the flood level from the June 2007 “Pasha Bulker” storm was as high as RL 3.2m AHD at the vicinity of the site. Council has stipulated in the Pre-DA advice letter that the finished floor level should adopt RL 3.2m AHD.

The Flood Certificate states that the development site is a flood storage area, and the Pre-DA advice from Council states that National Park Street and Hunter Street is a floodway.

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	Yes (entire site)
Estimated 1% Annual Exceedance Probability event level: (equivalent to the “*Defined Flood Level*” in the Building Code of Australia)	2.6m AHD
Estimated Maximum Flow Velocity of floodwaters (in the “*Defined Flood Event*” as per the Building Code of Australia)	1.0m/s
Highest Property Hazard Category	P2
Estimated Probable Maximum Flood Level	4.1m AHD (King Street side) 3.7m AHD (Hunter Street side) Velocity 0.8m/s
Highest Life Hazard Category	L4

Figure 2: Flood certificate (excerpt)

2.2 Existing Flood Behaviour

The subject site is almost entirely developed with build-form occupying 95% of the site. Whilst the flood modelling undertaken in the two previous flood studies (referenced above) exclude flows through the buildings, it is acknowledged that in flood events, flood waters could pass through openings in the buildings. The flood waters would be relatively slow-moving through the building.

The current floor levels through the existing building vary around RL 2.4 to RL 2.55m AHD. Approximately 800m^3 of floodwaters could potentially be temporarily ponded on-site to the modelled 1% AEP event RL 2.6m AHD flood level noted on the certificate.

The flood studies referenced previously indicate flood waters along King Street arrive from the east at the intersection of King Street and National Park Street, whereby flows split and flow northward along National Park Street and continue west along Little King Street. The velocity vectors from the second study (Honeysuckle Flood Study) indicates larger velocity vectors extending northward toward Hunter Street. Figures 3 and 4 provide a graphical illustration of the modelled flow depths and velocity vectors from the 1% AEP and PMF respectively provided in the provided Newcastle West Flood Study.

National Park Street is crowned in the centre with two-way crossfall to kerb and gutter either side. Peak velocity of flood waters will be centralised over the kerb and gutters. The footpath is expected to be graded at maximum 2.5% cross-fall back towards the existing kerb. Assuming the kerb levels are fixed, the boundary levels will vary from RL 2.0 to RL 2.4m AHD.

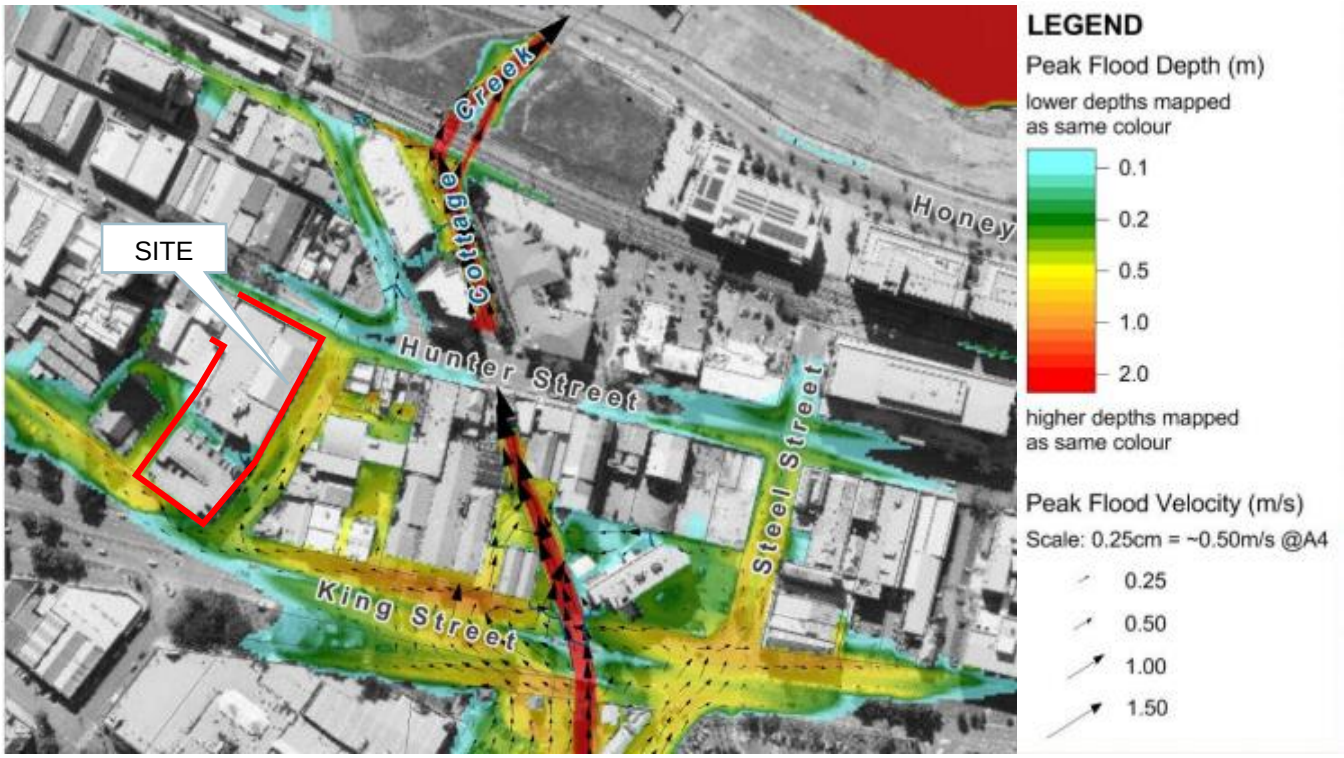

Figure 3 : 1% AEP Flood Mapping (BMT WBM 2017)

As provided in the Flood Certificate, the 1% AEP event flood level for the site is to RL 2.6m AHD. At this level, the footpaths will be inundated with flood waters to depths ranging from 0.4m to 0.6m in this event. In the PMF, the flood mapping indicates flood depths around 2m above kerb level.

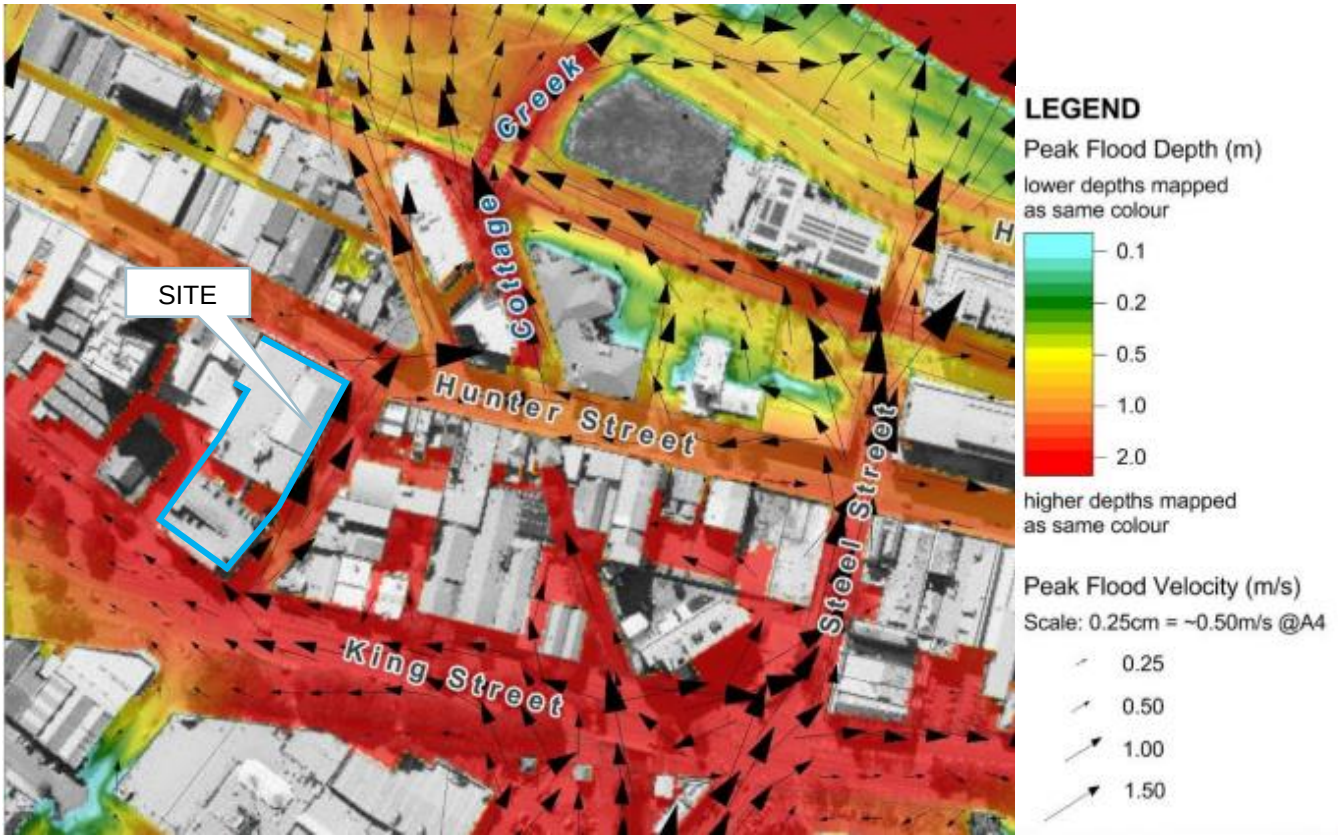

Figure 4 : PMF Flood Mapping (BMT WBM 2017)

3. Proposed Development Risk Assessment

3.1 Planning Controls

The development is required to comply with Council's Local Environmental Plan (LEP) 2012, clause 5.21 and the controls outlined in Council's Development Control Plan 2012 4.01 – Flood Management

3.2 Flood Mitigation Strategy

As a result of raising the ground floor level to RL 3.2m AHD, an analysis has been undertaken for review of flood storage within the site boundary to offset potential loss of flood storage based on a unmitigated solution without on-site storage. As noted previously, approximately 800m^3 flood water would be displaced by the proposed development.

A strategy of suspended ground-floor pavement around the main structure, predominantly along the three frontages will be employed to leave a void under the pavement for flood storage. This scheme has in-principal agreement from Council as documented in an email to Council in Appendix C. The voids will be created between the perimeter stairs and the main tower footing system and will be accessible from ground level. This strategy would prevent the loss of temporary flood storage during a flood event created if the void were to be filled with concrete or other material.

Preliminary calculations for the volume retained by this scheme indicates the provision of approximately 750m^3 around the site perimeter in the flood storage areas, which is less than 7% loss of flood storage. It is noted that Council permits filling within flood storage areas provided to no more than 20% of the site area is filled In DCP 4.01 Item 3. The provision of approximately 750m^3 of on-site flood storage in our view satisfies Council's objective to minimise loss of flood storage.

As the ground level is at RL 3.2m AHD and the structure is maximum 300mm thick, the soffit will be above the RL 2.6m 1% AEP event flood level. Flood waters will penetrate the voids through openings at street level. These openings will have gauze or grated inlets with small aperture size to limit blockage and prevent access by small fauna. The detail design of these inlets will be further developed during detail design but are initially expected to be 100mm outlet openings at approximately 1m centres and will drop into the created void space beneath. The openings will be located at the bottom tread of the external stairs or on the first riser, to prevent regular rainfall runoff entering the void.

The flood storages will drain by reverse flow through the same inlet system and given the sandy alluvial material underlying the site, a small depth of excess water that does not drain back to street will slowly infiltrate to groundwater, relatively quickly given the underlying substrate.

Access to the voids will be through square sealed inlet openings at periodic intervals along the frontage to enable access for inspection and maintenance. An example of the flood retention scheme is diagrammatically presented in Figure 5, below, and subject to design development prior to the construction certificate.

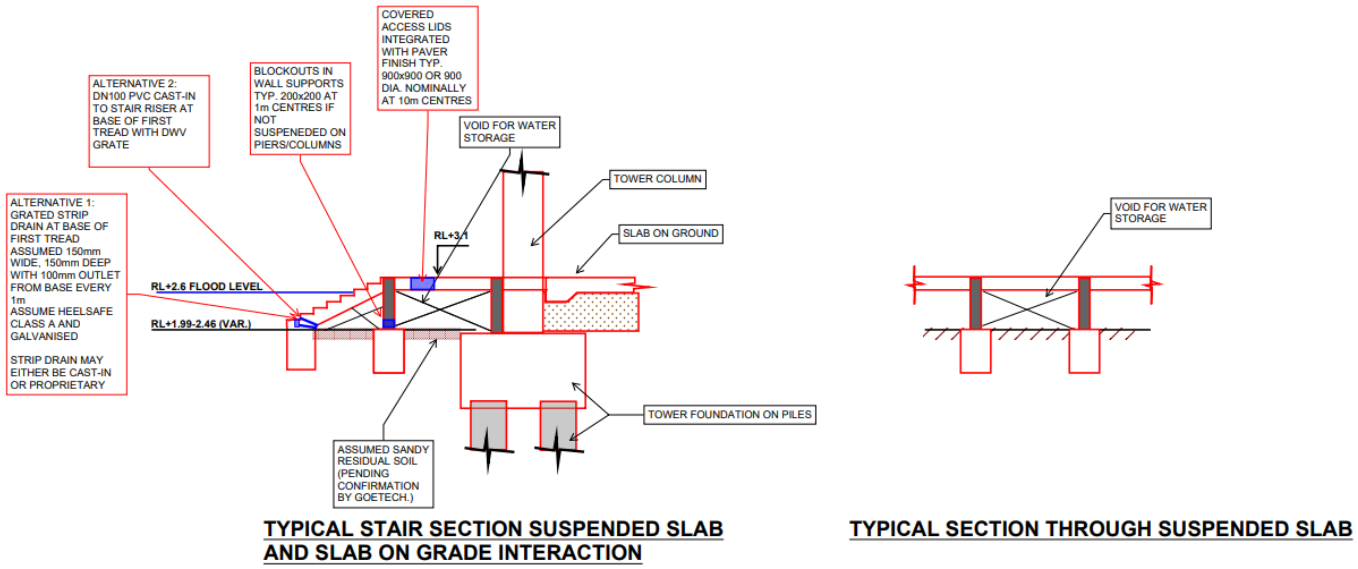

Figure 5: Indicative design solution for flood storage around site perimeter

3.3 Finished Floor Levels and Flood Affectation

3.3.1 Internal floor levels

Whilst the Flood Planning Level for the site is noted from the flood certificate at R L3.1m AHD, Council's Pre-DA meeting advice has stipulated that the ground floor level should be set to RL 3.2m AHD, which corresponds to the high-water level recorded in the June 2007 "Pasha Bulker" storm.

3.3.2 Enclosed carparking area

All off-street parking is located on level 1, which is above the PMF level. Access to the site is from a driveway connection to Little King Street, for which the street level is approximately RL 2.0m AHD. Flood mapping indicates the site is not affected by the 5% AEP event, however movement of vehicles on and off site will not be possible in a 1% AEP flood event, making the need for an on-site refuge necessary.

3.3.3 Electrical Installation

Building services, including electrical substation, is located on the ground floor, above RL 3.2m AHD. The building services will not be affected by the modelled 1% AEP event but will potentially be submerged to a depth of 0.9 m in a PMF. For a shelter in place evacuation plan key facilities may need to be flood proofed to ensure operation during flooding.

3.4 Compliance with the Planning Controls

With respect to the City of Newcastle's Development Control Plan 2012 – Chapter 4.01 Flood Management and Newcastle Local Environmental Plan (NLEP2012):

As outlined previously, underfloor flood storage is proposed to minimise the loss of flood storage arising from the filling of the site to above the Flood Planning Level. Flood storage has been considered volumetrically, The current proposal to provide approximately 750m^3 underfloor storage is in compliance with the DCP control.

There are no overland flows arriving from adjoining properties that could enter the site; it appears that flooding arises from overland flows from King Street and National Park Street. Concerns have been flagged by Council to address the passage of floodwaters through to 733 Hunter Street. This adjacent site to the west appears to gravitate toward the street, so receding flood storage from 733 Hunter Street should drain back to Hunter Street and Little King Street. Openings will also be provided on the western boundary to enable passage of flood waters to the adjacent carpark on Number 733 Hunter Street, which will replicate the existing flood response given the existing gap between the buildings in the same location.

As the finished (ground) floor level of the building is set to RL 3.2m AHD, the depth of 1% AEP event floodwaters through the ground floor will be zero. There are flood risks to property along the street frontage for all events greater than the 5% AEP. This flood risk relates to structures that are of a landscape nature.

The flood hazard on Little King Street is classified as category “H5” on the Honeysuckle Flood study at the location of the driveway access, indicating that in a 1% AEP flood event, vehicular access to the site will be cut-off by flood waters, although it appears that the affectation is limited to events less frequent than a 5% AEP event.

Electrical installations, water meters and valves etc will all be located on ground level above the 1% AEP flood level and hence will be unaffected by the 1% AEP event.

The Flood Certificate states that the site has a risk to life Hazard Category of L4, in the 1% AEP event which is characterised by short-duration flash flooding with minimal warning time and the creation of short-duration islands during the PMF that is not suitable for wading or heavy vehicle passage. An on-site refuge is provided on the first floor above the PMF level for occupants on the ground floor to move to. Occupants on the ground floor are commercial tenancies.

The building will be of reinforced concrete structure and certification will be provided by a structural engineer for the refuge areas being capable of withstanding the forces of flood waters and impact from debris.

An Emergency Flood Response Plan is recommended prior to occupation certificate stage to consider:

1) Flood behaviour and indicate likely cause of flooding
2) The effective warning time
3) Procedures for evacuating people to flood refuge area(s)
4) Outline of measures to prepare for flooding and make recommendations for flood response actions

The implementation of an Emergency Flood Response Plan and provision of on-site flood refuge reduces the risk to life from the development to an acceptable level.

3.4.1 Summary of responses to the Planning Controls

The development satisfies the objectives of the LEP with regard to:

a) Flood risk to life (provision of on-site refuge)
b) The development proposal incorporates controls and elements that are compatible with the flood function and behaviour
c) Avoids adverse impacts on flood behaviour and
d) Enables safe occupation in the event of flash flooding

The development satisfies the requirement of the LEP in that the development is:

a) Compatible with the flood function and behaviour
b) Will not adversely affect flood behaviour through the implementation of on-site storage to the equivalent volume displaced by the development
c) In the event of a flood provides for on-site refuge
d) Incorporates measures to manage risk to life, for example on-site refuge
e) Is not located on a vegetated floodway and hence will not increase the risk of erosion, siltation or destruction of riparian vegetation

4. Conclusion

The proposed development at 711 Hunter Street, Newcastle is planned to be provided in accordance with the NCC Development Control Plan (2012).

From a flooding perspective, the development is located in a flood storage area and the local street network is susceptible to short-duration, rapid response flooding due to local site characteristics, which means that public access to the site (both vehicular and pedestrian) will be cut-off during a local catchment flood event.

Adequate flood mitigation measures have been devised to alleviate adverse flood impacts on adjacent property resulting from potential loss of flood storage.

The provision of on-site refuge and recommendation for an Emergency Flood Response Plan to be developed prior to Occupation Certificate should minimise risk to life.

The flood management strategy includes:

- Provision of on-site flood storage management through voids around the building exterior that approximately maintains the level of flood storage compared with the existing site. These voids can be filled and subsequently emptied after passage of a local catchment flood event.
- Provision for protection of life by ensuring the ground floor levels are above the 1% AEP flood level and an on-site refuge provided on the first floor above the PMF level.

Appendices

Appendix A -
Pre DA-Minutes Register

A.1 Comment Register

Table 1 – Pre DA Meeting Stormwater Comment Register

Requirement	Comment	Reference
Flood Management: The site is subject to flooding and is a flood prone land. Any future DA application will therefore have to address the flood management and risks aspects in accordance with CN Flood Management LEP & DCP and Citywide Risk Management principles. According to CN records, the site is affected during 1% Annual Exceedance Probability (AEP), Probable Maximum Flood (PMF) for both ocean and flash flood events. It is noted that the site was impacted during the 2007 Pasha Bulker Storm, with flood levels reaching approx. 3.2m Australian Height Datum (AHD). Flood impacts and risks for this site is noted as high to very high, with National Park St and Hunter St frontages noted to be a floodway and the site being a flood storage area. A site specific flood study is recommended to be provided with any future DA.	Refer generally to this Flood Study Noted. Addressed in this flood study This report addresses the flood risks	
Flood Data & Management A recent flood certificate FL2021/00233 has been obtained. Although the flood certificate provides information in relation to the site, CN have other available flood information which directly relates to this site, being Newcastle West Drainage Study and Honeysuckle Redevelopment Area Flood Study (links below). https://newcastle.nsw.gov.au/Newcastle/media/Documents/environment/Flooding/Newcastle -West-Drainage-Study-Final-Report-(Rev-3)-Volume-1-(3).pdf https://newcastle.nsw.gov.au/Newcastle/media/Documents/environment/Flooding/Honeysuc kle-Redevelopment-Area-Flood-Study_March-2018.pdf	These studies are referenced in this report and some of the flood mappings are provided as figures in this report	Section 1.4
LEP Requirements CN LEP requirements set the planning principles for the flood risks associated with a site. The LEP elements have to be addressed and the proposal is to clearly demonstrate that it meets the objectives of the LEP.	LEP objectives have been met This is outlined in 4.4.1	Section 3.4.1
Recent Changes to Legislation and LEP Recent changes have been done to the LEP under the EP&A Act 1979 (July 2021 – See Link below). https://www.planningportal.nsw.gov.au/flood-prone-land-package Considering the logical approach to flood planning changes in the LEP, it is extremely important that any development satisfies safe occupation and most importantly evacuation of the land in line with the Flood Planning Order 2021.	Noted. The LEP has been referenced and commentary is provided in Section 3.4	Section 3.4
DCP Requirements – Section 4.01 Flood Management The development of this land has to consider the flooding management, risks and impacts on the entire site and the surrounding areas (including potential impacts on the adjoining developments and future developments). This is to ensure that the entire land is considered during the early phase of planning to	Acknowledged. This flood study provides site-specific detailed assessment of the flood risks and provides a consolidated response to the DCP controls.	Section 3.4

ensure that the flood risks and impacts can appropriately be managed.		
Flooding is a very sensitive issue at this location, with National Park Street being noted as a floodway and the entire site being noted as a flood storage area. The proposal seems to be filling majority of the ground floor area to approx. 3.1m AHD (approx. more than 1m of fill). The design seems to imply on the filling of the site which may displace floodwaters. Potential displacement of flood storage area may very likely impact on flood behaviour, which could impact on the surrounding environment and properties with potential increased flood risks.	A scheme of surface level temporary storage is provided around the building exterior, sized approximately to equal the amount of flood waters displaced from the existing site. This has in-principal agreement from Council and is documented on the design drawings and this report	Section 3.2
The recommendations within Newcastle West Drainage Study for the changes required to National Park St, Hunter St drainage and road infrastructure has to be considered as part of this development. This is to ensure that the site provides for adequate infrastructure to manage the flooding impacts surrounding its new environment, while also setting up appropriate footpath and flood planning levels to manage the access to the development site.	The proposed changes (Option B) from the Newcastle West Drainage study will have the effect of reducing the extent of flooding within National Park Street. The modelling provided in the external studies and referenced in this site-specific flood study is based on the current state and hence when works by Council are complete, will represent a reduction in flood risk.	Section 2.2
The proposal will therefore have to demonstrate that the flooding impacts can be appropriately managed and sustained.	This is addressed with the flood storage solution.	Section 3.2
Any future DA at this site will therefore have to demonstrate that the flood storage areas are not impacted, and any displacement of flood waters does not cause detrimental flood impacts and risks to the surrounding environment.	This is addressed with the flood storage solution	
<u>Management of Risk to property and Flood Planning</u> Habitable floor levels will need to satisfy Flood Planning Level (FPL). Although the concept plans have indicated the proposed ground floor levels to be set at 3.1m AHD, which is as per the flood certificate. It is noted that the site was also very heavily impacted during the 2007 Pasha Bulker storms, with flood levels known to have reached 3.2m AHD.	The Ground floor level has been set to RL3.2m AHD as per the Council request.	Section 3.3.1
Based on the above available flood data, generally, the Flood Planning Level (FPL) for any development is generally based on the worst flooding scenario. The recommended FPL for this site therefore should be based on the 2007 flood impacts, therefore the FPL is to be at 3.2m AHD.	The Ground floor level has been set to RL3.2m AHD as per the Council request.	
However, a site-specific flood study is recommended to be carried out for this development and it is suggested that the relevant flooding engineer consider the appropriate flood planning level for the development based the overall flood regime.	This report should adequately address this requirement	
Consideration should be given to mitigate impacts from vehicles, floating debris and other flooding aspects on the development and any resulting impacts on the surrounding properties.	Floating debris and vehicular impacts are to be considered with detailed structural design in future C/C stage.	
Garages (parking areas) are generally required to be designed at the 1% AEP flood level and associated services such as substations to FPL.	Both garages and Substations are located above the FPL 3.1m AHD	
<u>Management of Potential Risk to Life</u> Floodwaters in the PMF is predicted to be at high velocity and depth resulting in a very high risk to life. The risk to life category for the location is L4. Flood refuge is required for the site.	On-site flood refuge is to be provided.	Section 3.4

Floodwater can rise extremely rapidly within this catchment meaning that persons could easily be trapped in buildings without any viable means of escape. The site is surrounded by floodways on National Park St and Hunter St, both posing risk and safety concerns.	Noting the concerns for flash-flooding and likely small response times, an on-site refuge is provided.	Section 3.4
Summary The design of any development of this site needs to be driven from a flood management perspective first and foremost. Flood regimes must not be affected. The proposal is noted to be a sensitive development in a high-risk flood area, therefore has to be the foremost front of the flood assessment, while also considering if the proposal is the best use for the site. The applicant needs to engage a highly competent flood consultant to assess the flood risks and undertake necessary flood modelling. A structural engineer is recommended to be engaged to assist in undertaking the structural design review for flooding related impacts, while careful considerations for vehicular and pedestrian access and other aspects of such as FPL to be given through consideration.	This site-specific flood study addresses the Concerns raised in the Pre DA meeting. This development is consistent in the approach adopted for developments of a similar size and scale, for example 1 National Park Street, which was approved with Development consent and has similar flood mitigation measures This site-specific flood study has been written to address this requirement. A structural design solution will be continued through the design development phase to address flood-related impacts.	

Appendix B Flood Certificate

10 August 2021

St Hilliers Property Investments Pty Ltd
Level 3, 8 Windmill Street
MILLERS POINT NSW 2000

Flood Information Certificate No:	FL2021/00233
Land:	Lot 1 DP 867617
Property Address:	711 Hunter Street Newcastle West NSW 2302

Thank you for your recent enquiry regarding flood behaviour at the above property. This letter confirms the property is located in a flood prone area.

The pertinent features of the flood behaviour are estimated as follows:

Ocean Flooding

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	No
Estimated 1% Annual Exceedance Probability event level: (equivalent to the "*Defined Flood Level*" in the Building Code of Australia)	2.2m AHD
Estimated Maximum Flow Velocity of floodwaters (in the "*Defined Flood Event*" as per the Building Code of Australia)	0.1m/s
Highest Property Hazard Category	P1
Estimated Probable Maximum Flood Level	3.4m AHD
Highest Life Hazard Category	L1 (H3)

Local Catchment Flooding

Is any part of the site affected by a floodway?	No
Is any part of the site affected by a flood storage area?	Yes (entire site)
Estimated 1% Annual Exceedance Probability event level: (equivalent to the "*Defined Flood Level*" in the Building Code of Australia)	2.6m AHD
Estimated Maximum Flow Velocity of floodwaters (in the "*Defined Flood Event*" as per the Building Code of Australia)	1.0m/s
Highest Property Hazard Category	P2
Estimated Probable Maximum Flood Level	4.1m AHD (King Street side) 3.7m AHD (Hunter Street side) Velocity 0.8m/s
Highest Life Hazard Category	L4

The flood study from which the above information is derived is part of a Newcastle City Wide Floodplain Management Plan. The above advice may change in the future, however the advice is based on the best information held by Council at the time of issue of this certificate.

The above ocean flood level estimates include a sea level rise relative to 1990 mean sea levels of 90cm by 2100, as used in the Newcastle City-wide Floodplain Risk Management Study and Plan (June 2012).

The Newcastle Development Control Plan 2012 addresses the issues of flood management for new development. You can view the development control plan at www.newcastle.nsw.gov.au. In summary, the following requirements apply for all future development applications on the site.

Development in a floodway is not generally allowable due to likely redistribution of flood water.	Not Applicable
Filling of a flood storage area by more than 20% is not generally allowable due to redistribution of flood water.	Applicable
Minimum floor level for occupiable rooms in a new development on this site is: (equivalent to the "*Flood Hazard Level*" in the Building Code of Australia)	3.1m AHD
Is onsite flood refuge required?	Yes

It is estimated that, during the June 2007 storms, flood waters reached a level of approximately 3.2m AHD in the vicinity of the specified land.

Please note that:

1. The information contained in this certificate may alter in the future. The applicant should at all times ensure the currency of this information.

Should you require any further clarification please contact Matthew Swan on 4974 2000 or at maswan@ncc.nsw.gov.au.

Yours faithfully

Matthew Swan
DEVELOPMENT OFFICER

Appendix C Council Correspondence

Ben Collyer

From: Rajnesh Prakash <rprakash@ncc.nsw.gov.au>
Sent: Tuesday, 23 August 2022 9:43 AM
To: Ben Collyer
Cc: Luke McNamara; Ivan Varga
Subject: RE: N21112 Meeting minutes - 711 Hunter Street NEwcastle West St.Hilliers
Attachments: Newcastle West Drainage Study - Options Assessment (Rev 1) - Compressed.zip

Follow Up Flag: Follow up
Flag Status: Completed

Dear Ben

Please see attached NW Drainage options.

A separate email with information for drainage works done along Little King St by adjoining developers and CN drainage data to be provided soon.

Thanks

Raj

Rajnesh Prakash | Senior Development Officer (Engineering)
City of Newcastle | Governance
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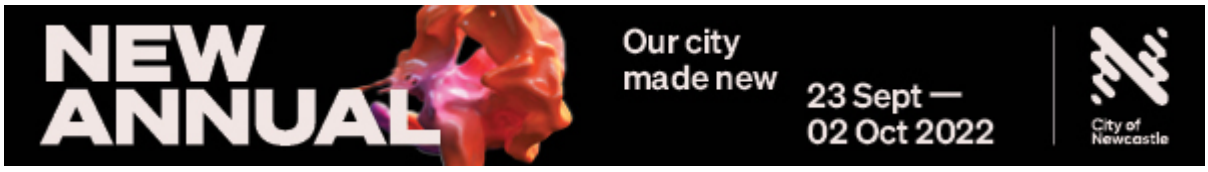
Newcastle is a liveable, sustainable, inclusive global city.
Cooperation | Respect | Excellence | Wellbeing

City of Newcastle acknowledges the Traditional Custodians of the land of the Newcastle LGA, the Awabakal and Worimi peoples.



From: Ben Collyer <ben.collyer@bgeeng.com>
Sent: Monday, 15 August 2022 12:46 PM
To: Rajnesh Prakash <rprakash@ncc.nsw.gov.au>
Cc: Luke McNamara <lmcnamara@sthilliers.com.au>; Ivan Varga <Ivan.Varga@bgeeng.com>
Subject: RE: N21112 Meeting minutes - 711 Hunter Street NEwcastle West St.Hilliers

Hi Raj,

Are you able to provide an indication on when we might get the required information (below) from Council in order for us to progress the concept and DA design per below?

Kind Regards,

Ben

From: Ben Collyer
Sent: Monday, 8 August 2022 3:35 PM
To: Rajnesh Prakash (rprakash@ncc.nsw.gov.au) <rprakash@ncc.nsw.gov.au>
Cc: Luke McNamara <lmcnamara@sthilliers.com.au>; Ivan Varga <Ivan.Varga@bgeeng.com>
Subject: RE: N21112 Meeting minutes - 711 Hunter Street NEwcastle West St.Hilliers

Raj,

Further to this advice we also request the following:

1) Proposed details of the referred option (B) in the Newcastle West Flood study. The flood study references a concept design in Appendix D, which is not available on the public version of this document.

Kind Regards,
Ben

From: Ben Collyer
Sent: Friday, 5 August 2022 3:24 PM
To: Rajnesh Prakash (rprakash@ncc.nsw.gov.au) <rprakash@ncc.nsw.gov.au>
Cc: Luke McNamara <lmcnamara@sthilliers.com.au>; Ivan Varga <Ivan.Varga@bgeeng.com>
Subject: N21112 Meeting minutes - 711 Hunter Street NEwcastle West St.Hilliers

Raj,

Follows are the brief notes made during our meeting today:

- Submitted Option 1 Flood storage plan for the site accepted in-principle by Council, pending addressing more detail in a DA submission
- Calculations for the Storage to be provided with the DA submission (BGE)
- BG&E to resolve with the DA submission:
    - High and Low-level inlets to the storage addressing safety, maintenance, and aesthetics
    - BG&E suggested grated strip drains as possibility and gauze covered outlets to drain out
    - Noted that the soils underlying the sites are alluvial sands to around 6m depth (likely) and will assist any areas that, through construction, cannot adequately drain
- Concern raised for receeding of floodflows particularly on the adjacent carpark 731 Hunter Street (rear carpark to Little King St). BG&E to provide detailing of this
- Council has noted that developer works along Little King Street are under design. Council to supply design drawings for upgrade works in Little King Street
- Maintenance to be considered at a DA stage
- Upgrades for works in National Park Street to be included in the DA proposal. BG&E to incorporate the relevant 'option' from the Newc.West flood study by CatchmentSim
- Raised garden beds in Little King Street on the current architectural plan is likely to change, Council expressed concern that this may impede recession of floodwaters
- BG&E to consider the items flagged the Newcastle West Public Domain Plan
- Noted that the DA is likely to be actually two DA's (north/south) but only one level of DA documents to cover stormwater/flooding for both DA's
- Council to supply flood reporting from 1 National Park Street that will inform proposed upgrades to National Park Street
- BG&E and St.Hilliers both propose no flood hydraulic modelling on the basis of the agreed in-principle flood storage option. DA documents will be prepared to address the above matters. It is understood that extra supplied information from Council should inform solutions for the site that does not warrant further hydraulic modelling:
    - 1 National Park Street flood study
    - Upgrade works proposed for Little King Street

Please add/change if I haven't captured it all.

Regards,

Ben Collyer
Associate - Civil

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Australia

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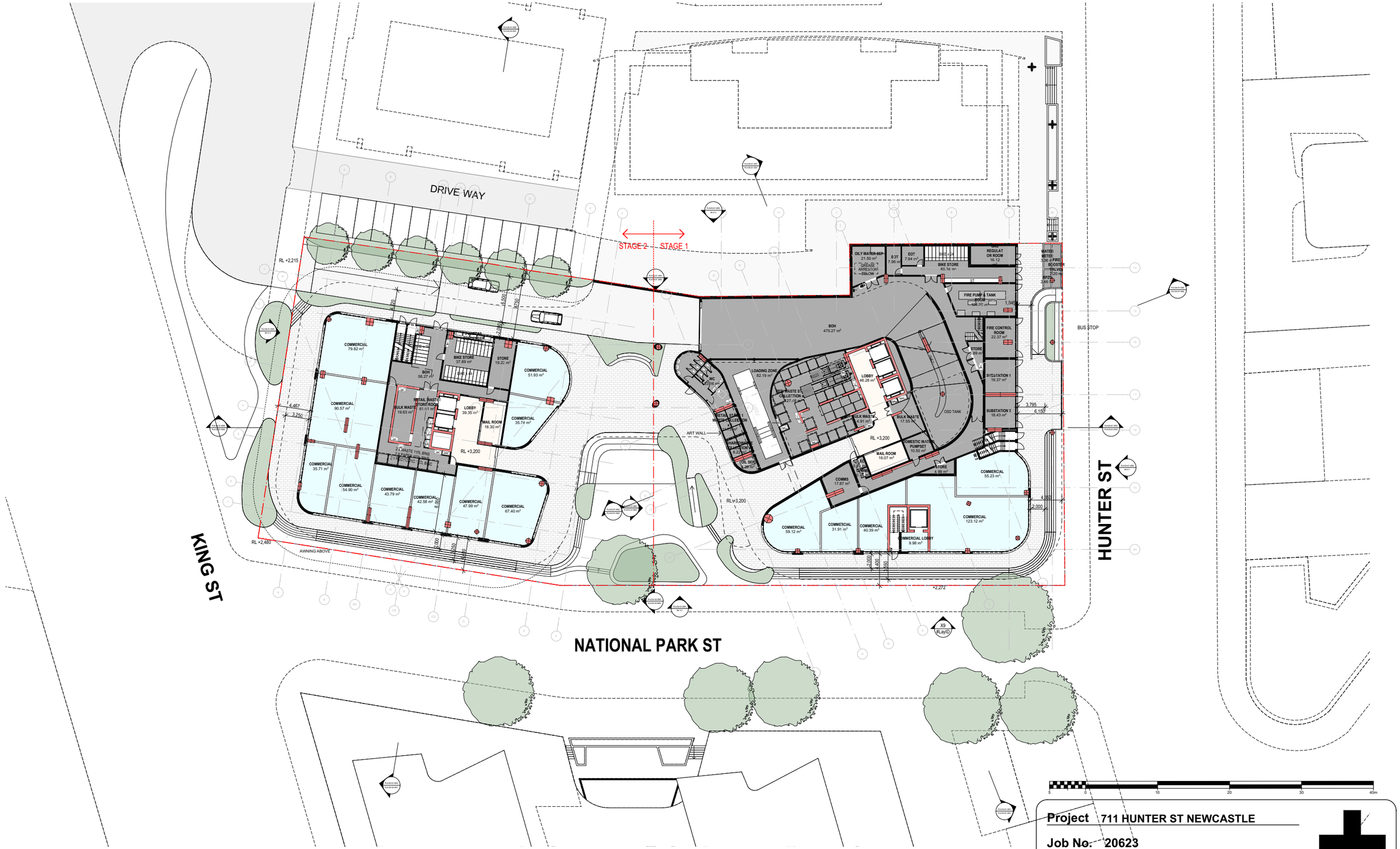
OPPORTUNITIES THROUGH EXCELLENCE

BG&E

We believe that truly great engineering takes curiosity, bravery and trust, and is key to creating extraordinary built environments.

Appendix D Ground Floor Development Plan



Project	711 HUNTER ST NEWCASTLE
Job No.	20623
Title	PLA-SK-0400 20623 GROUND
Sketch	By
Date	20/10/2022

plus architecture

Nominated Architect (NSW): Rido Pin 11286

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We collaborate with leading contractors, developers, architects, planners, financiers and government agencies, to create projects for today and future generations.

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