WATERLOO METRO QUARTER OVER STATION DEVELOPMENT

Environmental Impact Statement
Appendix O – Stormwater Management Strategy and Flood Impact Assessment

SSD-10437 Southern Precinct

Detailed State Significant Development
Development Application

Prepared for **Waterloo Developer Pty Ltd**

30 September 2020

Reference	Description
Applicable SSD Applications	SSD-10437 Southern Precinct
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Document Number	WMQ-BLD3-WSP-DR-RPT-001
Status	Final
Version	5
Date of Issue	28 July 2020

Table of Contents

List of Figures

List of Tables

1. Glossary and abbreviations

Reference	Description
ACHAR	Aboriginal Cultural Heritage Assessment Report
ADG	Apartment Design Guide
AEP	Annual Exceedance Probability
AHD	Australian height datum
AQIA	Air Quality Impact Assessment
AR&R	Australian Rainfall & Runoff
ARI	Annual Recurrence Interval
BC Act	Biodiversity Conservation Act 2016
BCA	Building Code of Australia
BC Reg	Biodiversity Conservation Regulation 2017
BDAR	Biodiversity Development Assessment Report
CEEC	critically endangered ecological community
CIV	capital investment value
CMP	Construction Management Plan
Concept DA	A concept DA is a staged application often referred to as a 'Stage 1' DA. The subject application constitutes a detailed subsequent stage application to an approved concept DA (SSD 9393) lodged under section 4.22 of the EP&A Act.
Council	City of Sydney Council
CPTED	Crime Prevention Through Environmental Design
CSSI approval	critical State significant infrastructure approval
CTMP	Construction Traffic Management Plan
DA	development application
DCP	Development Control Plan
DPIE	NSW Department of Planning, Industry and Environment
DRP	Design Review Panel
EP&A Act	Environmental Planning and Assessment Act 1979

Reference	Description
EPA	NSW Environment Protection Authority
EPA Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESD	ecologically sustainable design
FPL	Flood Planning Level
GANSW	NSW Government Architect's Office
GFA	gross floor area
HIA	Heritage Impact Assessment
IAP	Interchange Access Plan
IFD	Intensity-Frequency-Duration
LGA	Local Government Area
NCC	National Construction Code
OSD	over station development OR on site detention
PIR	Preferred Infrastructure Report
POM	Plan of Management
PSD	Permissible Site Discharge
PSI	Preliminary Site Investigation
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEPP 55	State Environmental Planning Policy No 55—Remediation of Land
SEPP 65	State Environmental Planning Policy No. 65 – Design Quality of Residential Apartment Development
SRD SEPP	State Environmental Planning Policy (State and Regional Development) 2009
SREP Sydney Harbour	State Regional Environmental Plan (Sydney Harbour Catchment) 2005
SSD	State significant development

Reference	Description
SSD DA	State significant development application
SLEP	Sydney Local Environmental Plan 2012
Transport for NSW	Transport for New South Wales
TIA	Traffic Impact Assessment
The proposal	The proposed development which is the subject of the detailed SSD DA
The site	The site which is the subject of the detailed SSD DA
VIA	Visual Impact Assessment
WDAG	Waterloo Metro Quarter Design Amenity Guidelines (March 2020)
WMQ	Waterloo Metro Quarter
WMP	Waste Management Plan
WQFSR	Water Quality, Flooding and Stormwater Report, Waterloo Metro Quarter (October 2018)
WSUD	Water Sensitive Urban Design

2. Executive summary

This Stormwater Management Strategy and Flood Impact Assessment Report has been prepared by WSP to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site.

This report has been prepared to address the relevant conditions of the concept SSD DA (SSD 9393) and the Secretary's Environmental Assessment Requirements (SEARs) issued for the detailed SSD DA (SSD 10437).

The flood study aims to:

- Assess the flood risk within and around the vicinity of the site;
- Establish mitigation measures required to ensure the sustainability and safety of the proposed scheme over its lifetime; and
- Address study requirements to demonstrate the feasibility of the proposed development.

To improve the understanding of the flood mechanisms at the site and surrounding area detailed hydraulic modelling have been undertaken for the existing and post development conditions.

Hydraulic modelling has been undertaken using a modified version of City of Sydney Council flood model for the Alexandra Canal Catchment flood study.

The hydraulic model results were used to inform the building design.

Floor planning levels have been defined as per design requirements indicated in the Water Quality, Flooding and Stormwater Report, Waterloo Metro Quarter (October 2018) and Waterloo Design Amenity Guidelines (March – 2020).

The hydraulic model results for the baseline and proposed scenario were used to assess the flood impact of the proposed development to the existing flood conditions.

Southern Precinct is not expected to negatively affect the flood conditions.

The flood study has been produced in consultation with City of Sydney Council.

The Stormwater Management study aims to:

- Establish mitigation measures required to ensure the safe and sustainable management of the quantity and quality of stormwater discharge from the site; and
- Address the design requirements of various stakeholders to protect the community by ensuring the development does not adversely impact on existing infrastructure.

3. Introduction

This report has been prepared to accompany a detailed State significant development (SSD) development application (DA) for the Southern Precinct over station development (OSD) at the Waterloo Metro Quarter site. The detailed SSD DA is consistent with the concept approval (SSD 9393) granted for the maximum building envelope on the site, as proposed to be modified.

The Minister for Planning, or their delegate, is the consent authority for the SSD DA and this application is lodged with the NSW Department of Planning, Industry and Environment (DPIE) for assessment.

The detailed SSD DA seeks development consent for the design, construction and operation of:

Southern Precinct

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9-storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 April 2020 and issued for the detailed SSD DA. Specifically, this report has been prepared to respond to the SEARs requirements summarised below.

Item	Description of requirement	Section reference (this report)
16	The EIS shall: - Include an assessment of flood impact having regard to the requirements of Sydney LEP 2012 and the recommendations of the Concept Water Quality, Flooding and Stormwater Report dated 31 August 2018. - Include a stormwater management strategy that considers the relevant local council stormwater management policy, including details of onsite stormwater capture, storage and re-use measures developed for the site	Stormwater: 7.1 and 10.3.5 Flooding: 9.2, 9.4 and 9.5

Table 1 - SEARs requirements

This report has also been prepared in response to the following conditions of consent issued for the concept SSD DA (SSD 9393) for the OSD as summarised in the table below.

Item	Description of requirement	Section reference (this report)
B26	The Concept Conditions of Consent state: Future development applications shall be accompanied by a Flood and Stormwater Impact Assessment. The Assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding and Stormwater Report dated 31 October 2018 prepared by AECOM.	Stormwater: 7.1 and 10.3.6 Flooding: 9.2, 9.3, 9.4 9.5 and 9.6
3S	The objectives of the Waterloo Metro Quarter Design and Amenity Guidelines (March 2020) are: • To improve quality and reduce stormwater runoff • To manage flooding impacts and provide design responses that are integrated with the public domain and ensure street activation.	Stormwater: 7.1 and 10.3.7 Flooding: 9.3,9.4 and 9.5

Table 2 - Conditions of Concept Approval

4. The site

The site is located within the City of Sydney Local Government Area (LGA). The site is situated about 3.3 kilometres south of Sydney CBD and eight kilometres northeast of Sydney International Airport within the suburb of Waterloo.

The Waterloo Metro Quarter site comprises land to the west of Cope Street, east of Botany Road, south of Raglan Street and north of Wellington Street (refer to Figure 1). The heritage-listed Waterloo Congregational Church at 103–105 Botany Road is within this street block but does not form a part of the Waterloo Metro Quarter site boundaries.

The Waterloo Metro Quarter site is a rectangular shaped allotment with an overall site area of approximately 1.287 hectares.

The Waterloo Metro Quarter site comprises the following allotments and legal description at the date of this report. Following consolidation by Sydney Metro (the Principal) the land will be set out in deposited plan DP1257150.

- 1368 Raglan Street (Lot 4 DP 215751)
- 59 Botany Road (Lot 5 DP 215751)
- 65 Botany Road (Lot 1 DP 814205)
- 67 Botany Road (Lot 1 DP 228641)
- 124-128 Cope Street (Lot 2 DP 228641)
- 69-83 Botany Road (Lot 1, DP 1084919)
- 130-134 Cope Street (Lot 12 DP 399757)
- 136-144 Cope Street (Lots A-E DP 108312)
- 85 Botany Road (Lot 1 DP 27454)
- 87 Botany Road (Lot 2 DP 27454)
- 89-91 Botany Road (Lot 1 DP 996765)
- 93-101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891)
- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 156-160 Cope Street (Lot 31 DP 805384)
- 107-117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)
- 170-174 Cope Street (Lot 2 DP 205942).

The detailed SSD DA applies to the Southern Precinct (the site) of the Waterloo Metro Quarter site. The site has an area of approximately 4830sqm. The subject site comprises the following allotments and legal description at the date of this report.

Southern Precinct DA

- 130–134 Cope Street (Lot 12 DP 399757) (Part)
- 136–144 Cope Street (Lots A-E DP 108312) (Part)
- 93–101 Botany Road (Lot 1 DP 433969 and Lot 1 DP 738891) (Part)
- 156–160 Cope Street (Lot 31 DP 805384)
- 107–117A Botany Road (Lot 32 DP 805384 and Lot A DP 408116)

- 119 Botany Road (Lot 1 DP 205942 and Lot 1 DP 436831)
- 170–174 Cope Street (Lot 2 DP 205942).

The boundaries of the overall site are identified at Figure 1, and the subject site of the detailed SSD DA is identified at Figures 2 and 3. The site is reasonably flat with a slight fall to the south.

The site previously included three to five storey commercial, light industrial and shop top housing buildings. All previous structures except for an office building at the corner of Botany Road and Wellington Street have been demolished to facilitate construction of the new Sydney Metro Waterloo station. As such the existing site is predominately vacant and being used as a construction site. Construction of the Sydney metro is currently underway on site in accordance with critical State significant infrastructure approval (CSSI 7400).

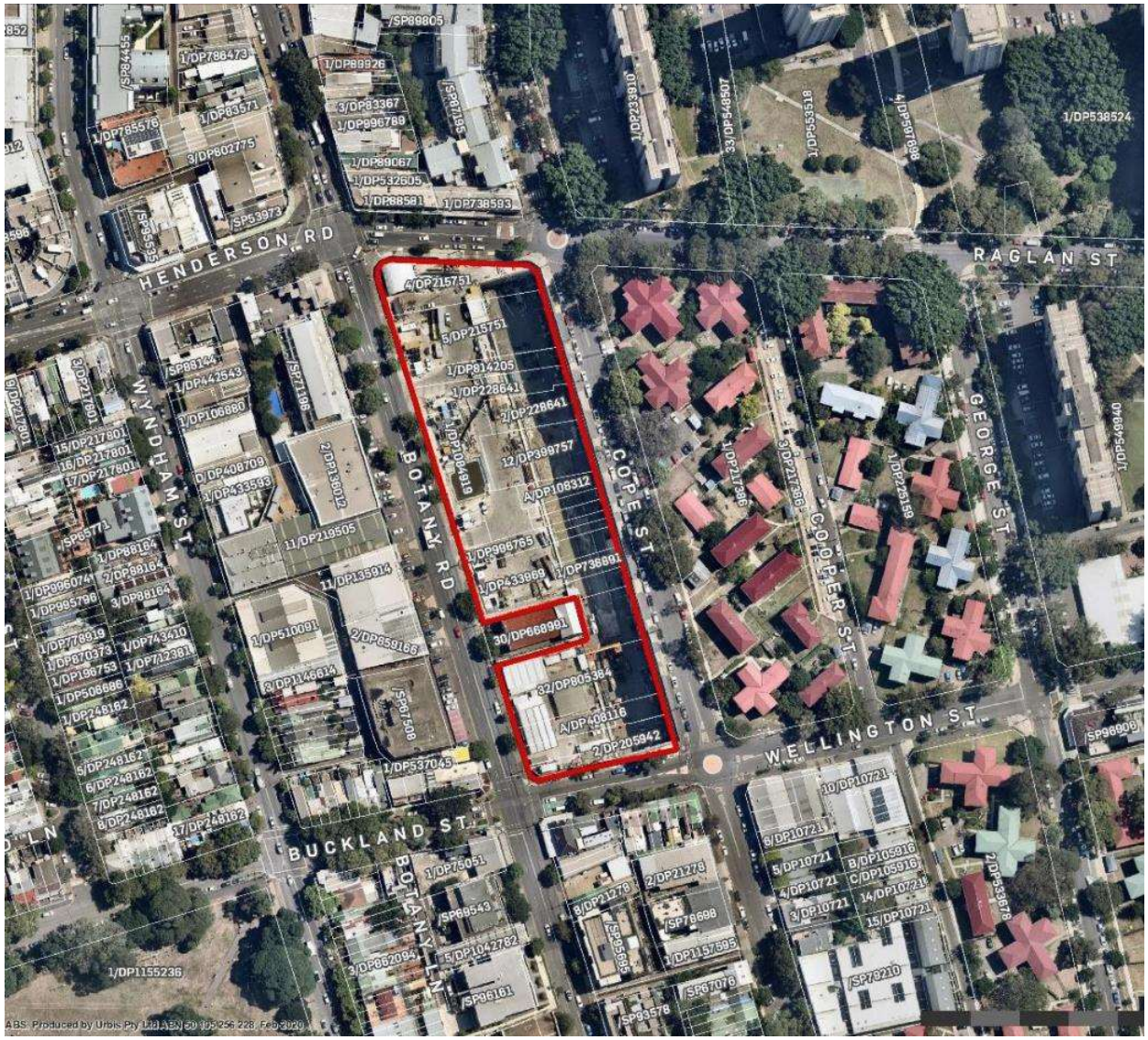


Figure 1 - Aerial image of the site
Source: Urbis

The area surrounding the site consists of commercial premises to the north, light industrial and mixed-use development to the south, residential development to the east and predominantly commercial and light industry uses to the west.

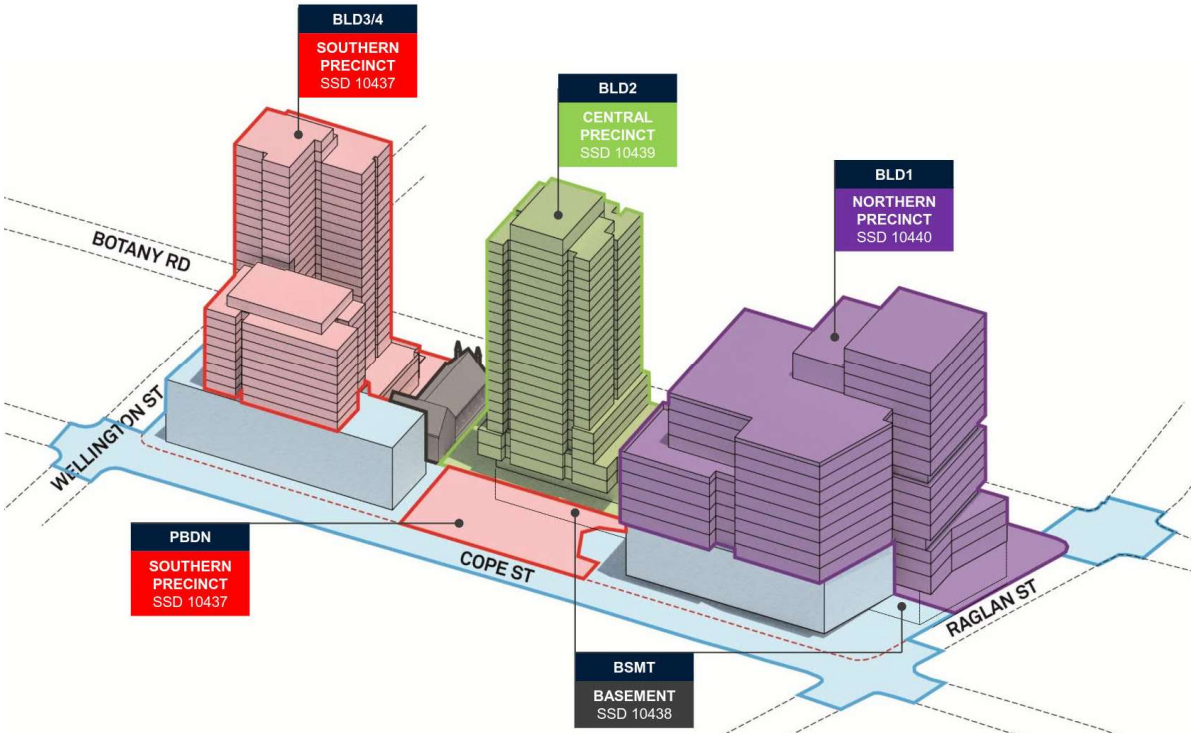


Figure 2 - Waterloo Metro Quarter site, with sub-precincts identified
Source: HASSELL

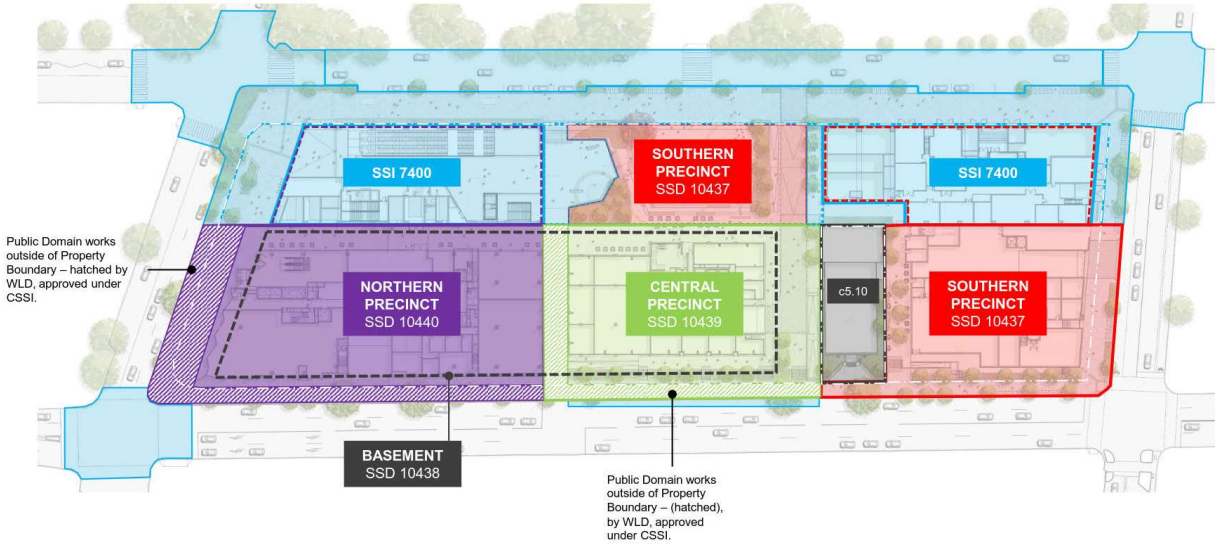


Figure 3 - Waterloo Metro Quarter site, with sub-precincts identified
Source: Waterloo Developer Pty Ltd

5. Background

5.1 About Sydney Metro

Sydney Metro is Australia's biggest public transport project. Services started in May 2019 in the city's North West with a train every four minutes in the peak. A new standalone railway, this 21st century network will revolutionise the way Sydney travels.

There are four core components:

5.1.1 Sydney Metro North West

This project is now complete and passenger services commenced in May 2019 between Rouse Hill and Chatswood, with a metro train every four minutes in the peak. The project was delivered on time and $1 billion under budget.

5.1.2 Sydney Metro City & Southwest

Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of Metro Northwest at Chatswood, under Sydney Harbour, through new CBD stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney.

Sydney Metro City & Southwest will deliver new metro stations at Crows Nest, Victoria Cross, Barangaroo, Martin Place, Pitt Street, Waterloo and new underground metro platforms at Central Station. In addition, it will upgrade and convert all 11 stations between Sydenham and Bankstown to metro standards.

5.1.3 Sydney Metro West

Sydney Metro West is a new underground railway connecting Greater Parramatta and the Sydney CBD. This once-in-a-century infrastructure investment will transform Sydney for generations to come, doubling rail capacity between these two areas, linking new communities to rail services and supporting employment growth and housing supply between the two CBDs.

The locations of seven proposed metro stations have been confirmed at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays.

The NSW Government is assessing an optional station at Pyrmont and further planning is underway to determine the location of a new metro station in the Sydney CBD.

5.1.4 Sydney Metro Greater West

Metro rail will also service Greater Western Sydney and the new Western Sydney International (Nancy Bird Walton) Airport. The new railway line will become the transport spine for the Western Parkland City's growth for generations to come, connecting communities and travellers with the rest of Sydney's public transport system with a fast, safe and easy metro service.

The Australian and NSW governments are equal partners in the delivery of this new railway.

The Sydney Metro project is illustrated below.

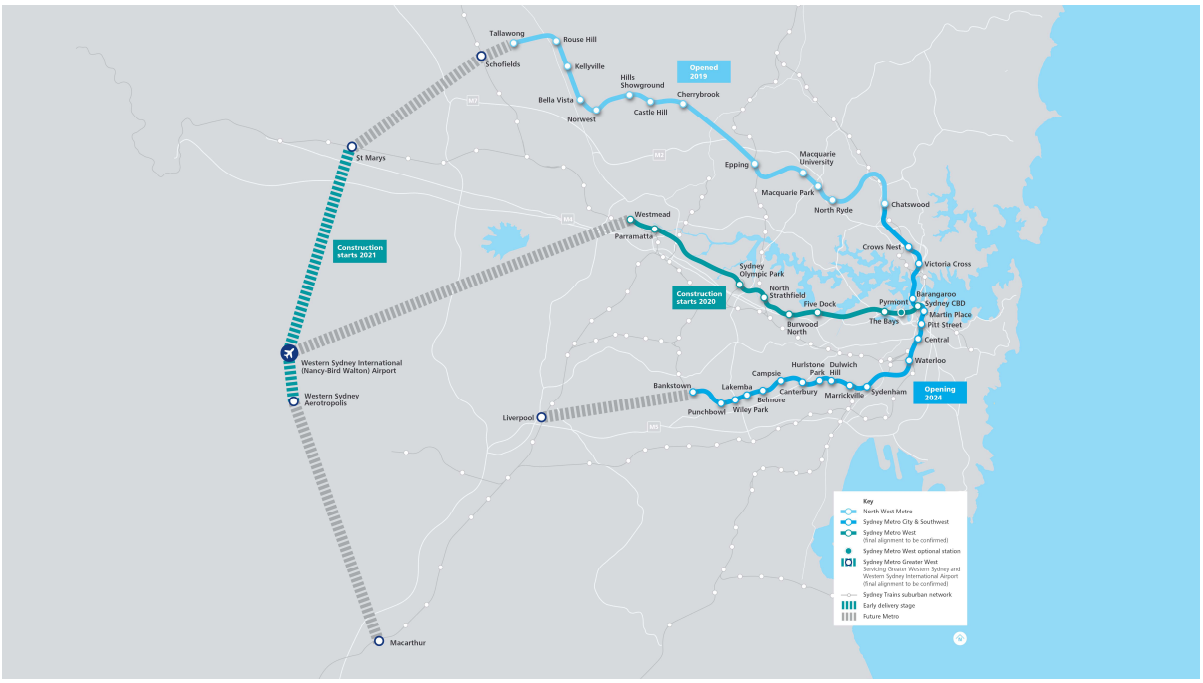


Figure 4 - Sydney Metro alignment map
Source: Sydney Metro

5.2 Sydney Metro CSSI Approval (SSI 7400)

On 9 January 2017, the Minister for Planning approved the Sydney Metro City & Southwest - Chatswood to Sydenham project as a critical State significant infrastructure (CSSI) project (reference SSI 7400) (CSSI approval). The terms of the CSSI approval includes all works required to construct the Sydney Metro Waterloo Station. The CSSI approval also includes the construction of below and above ground works within the metro station structure for appropriate integration with the OSD.

With regards to CSSI related works, any changes to the 'metro station box' envelope and public domain will be pursued in satisfaction of the CSSI conditions of approval and do not form part of the scope of the concept SSD DA or detailed SSD DA for the OSD.

Except to the extent described in the EIS or Preferred Infrastructure Report (PIR) submitted with the CSSI application, any OSD buildings and uses do not form part of the CSSI approval and will be subject to the relevant assessment pathway prescribed by the EP&A Act.

The delineation between the approved Sydney Metro works, generally described as within the two 'metro station boxes' and surrounding public domain works, and the OSD elements are illustrated in Figure 5.

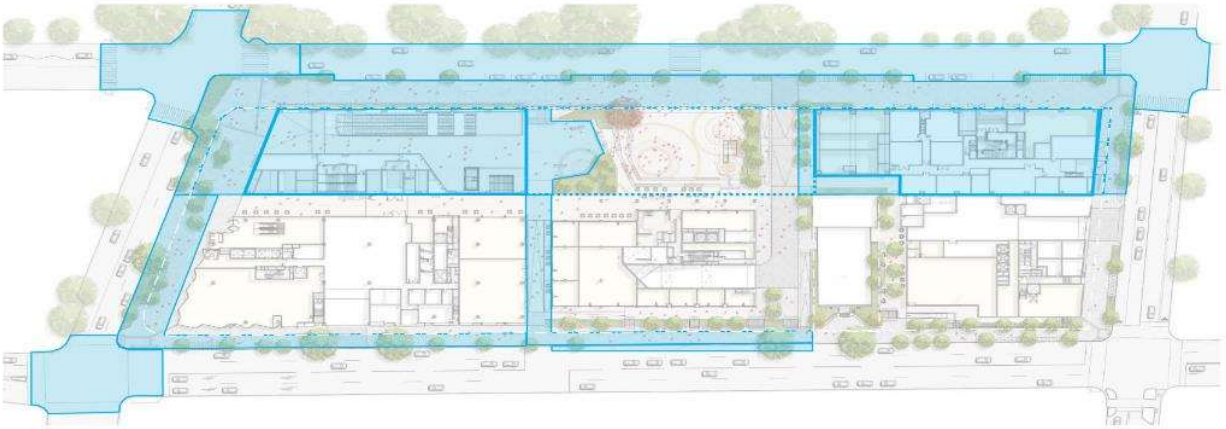


Figure 5 - CSSI Approval scope of works
Source: WL Developer Pty Ltd

5.3 Concept Approval (SSD 9393)

As per the requirements of clause 7.20 of the *Sydney Local Environmental Plan 2012* (SLEP), as the OSD exceeds a height of 25 metres above ground level (among other triggers), development consent is first required to be issued in a concept DA (formerly known as Stage 1 DA).

Development consent was granted on 10 December 2019 for the concept SSD DA (SSD 9393) for the Waterloo Metro Quarter OSD including:

- a maximum building envelope for podium, mid-rise and tower buildings
- a maximum gross floor area of 68,750sqm, excluding station floor space
- conceptual land use for non-residential and residential floor space
- minimum 12,000sqm of non-residential gross floor area including a minimum of 2,000sqm of community facilities
- minimum 5% residential gross floor area as affordable housing dwellings
- 70 social housing dwellings
- basement car parking, motorcycle parking, bicycle parking, and service vehicle spaces.

The detailed SSD DA seeks development consent for the OSD located within the Southern Precinct of the site, consistent with the parameters of this concept approval. Separate SSD DAs have been prepared and will be submitted for the Northern and Central Precincts and basement car park proposed across the Waterloo Metro Quarter site.

A concurrent amending concept SSD DA has been prepared and submitted to the DPIE which proposed to make modifications to the approved building envelopes at the northern precinct and central building. This amending concept SSD DA does not impact the proposed development within the southern precinct.

6. Proposed development

6.1 Waterloo Metro Quarter Development

The Waterloo Metro Quarter OSD comprises four separate buildings, a basement carpark and public domain works adjacent to the Waterloo Metro station.

Separate SSD DAs will be submitted concurrently for the design, construction and operation of each building in the precinct;

- Southern precinct SSD-10437,
- Basement Car Park SSD-10438,
- Central precinct SSD-10439, and
- Northern precinct-SSD-10440.

An overview of the Development is included below for context. This detailed SSD DA seeks development consent for the design, construction and operation of the Southern Precinct:

6.1.1 Southern Precinct (Subject DA)

The Southern Precinct comprises:

- 25-storey residential building (Building 3) comprising student accommodation, to be delivered as a mixture of studio and twin apartments with approximate capacity of 474 students
- 9 storey residential building (Building 4) above the southern station box to accommodate 70 social housing dwellings
- ground level retail tenancies including Makerspace and gymnasium lobby, and loading facilities
- level 1 and level 2 gymnasium and student accommodation communal facilities
- landscaping and private and communal open space at podium and roof top levels to support the residential accommodation
- new public open space including the delivery of the Cope Street Plaza, including vehicle access to the site via a shared way from Cope Street, expanded footpaths on Botany and Wellington Streets and public domain upgrades
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

6.1.2 Basement Car Park

The Basement Car Park comprises:

- 2-storey shared basement car park and associated excavation comprising
- Ground level structure
- Carparking for the Commercial Building 1, Residential Building 2, social housing Building 4, Waterloo Congregational Church and Sydney Metro
- Service vehicle bays
- commercial end of trip and bicycle storage facilities

- Retail end of trip and bicycle storage facilities
- residential storage facilities
- shared plant and services.

6.1.3 Central Precinct

The Central Precinct comprises:

- 24-storey residential building (Building 2) comprising approximately 126 market residential and 24 affordable housing apartments, to be delivered as a mixture of 1 bedroom, 2 bedroom and 3 bedroom apartments
- Ground level retail tenancies, community hub, precinct retail amenities and basement car park entry
- level 1 and level 2 community facilities (as defined in the SLEP) intended to be operated as a childcare centre
- landscaping and private and communal open space at roof top levels to support the residential accommodation
- new public open space including the delivery of the Church Square, including vehicle access to the basement via a shared way from Cope Street, expanded footpaths and public domain upgrades on Botany Road
- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

6.1.4 Northern Precinct

The Northern Precinct comprises:

- 17-storey commercial building (Building 1) comprising Commercial floor space, with an approximate capacity of 4000 workers
- ground level retail tenancies, loading dock facilities serving the northern and central precinct including Waterloo metro station
- landscaping and private open space at podium and roof top levels to support the commercial tenants
- new public open space including the delivery of the Raglan Street Plaza, Raglan Walk and expanded footpaths on Raglan Street and Botany Road and public domain upgrades
- external licensed seating areas
- signage zone locations
- utilities and service provision
- stratum subdivision (staged).

7. Study methodology

7.1 Stormwater Management

The objective of this report is to demonstrate the stormwater management strategy necessary to comply with the requirements of the SEARs requirements, the relevant conditions of consent issued for the concept SSD DA and the Waterloo Design and Amenity Guidelines issued in March 2020.

The SEARS requirements Section 16 in relation to Stormwater and Flood Impact state that the EIS shall:

Include a stormwater management strategy that considers the relevant local council stormwater management policy, including details of onsite stormwater capture, storage and re-use measures developed for the site.

In accordance with the SEARS requirements, the stormwater management report is to consider relevant local council stormwater management policy, in this case the City of Sydney and Sydney Water. The objectives are as follows:

- to provide a stormwater management strategy for the site to support the proposed Development Application,
- to provide a "Concept Stormwater Management Plan" for the proposed site,
- to evaluate the on-site detention system requirements for the site (in accordance with Council requirements),
- to provide a water quality strategy to control the water quality of stormwater leaving the site (in accordance with Councils requirements),
- to provide a Concept Sediment and Erosion Control Plan for the site which needs to be maintained during construction, and
- to interpret Council's flooding advice and apply it to the proposed development.

The proposed stormwater drainage and runoff systems for the development will need to comply with the design requirements for City of Sydney Development Control Plan (DCP) 2012 and Sydney Water. These requirements are:

- Post development stormwater runoff connections into existing drainage infrastructure will match pre-development case for both 20 and 100 year ARI storm events,
- Compliance with Sydney Water maximum Permissible Site Discharge (PSD) requirements of 503L/s for the entire site,
- Compliance with Sydney Water minimum On Site Detention (OSD) requirements of 208 m3 for the entire site,
- On-site detention is to be situated above the 100 year ARI flood levels to freely discharge into the stormwater network even under flooding conditions (up to 100 year ARI flood events), and
- Stormwater quantity management shall satisfy Sydney Water and City of Sydney requirements at each stage of the development.

The condition of consent issued for the concept SSD DA (SSD 93939) number B26 in relation to flooding and stormwater assessment states that:

Future development applications shall be accompanied by a Flood and Stormwater Impact Assessment. The Assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding and Stormwater Report dated 31 October 2018 prepared by AECOM.

In accordance with the condition of consent requirements, this stormwater management report is to address the conclusions and recommendations of the AECOM report. Table 13 of the AECOM report outlines the recommended DCP provisions which are:

- On-Site Detention: Combined OSD tank volume of 480 m^3
- Water Quality Targets and WSUD
  - Reduction of baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;
  - Reduction of baseline annual pollutant load for total suspended solids by 85%;
  - Reduction of baseline annual pollutant load for total phosphorous by 65%; and
  - Reduction of baseline annual pollutant load for total nitrogen by 45%.

This report addresses the underlying design requirements behind the OSD tank volume which are (refer to section 5.5.1 of the AECOM report for further information):

- Post development stormwater runoff connections into existing drainage infrastructure will match pre-development case;
- Compliance with Sydney Water total Permissible Site Discharge (PSD) requirements of 503L/s (assuming 13,500m2 area) and On Site Detention of 203m3 for the entire site;
- On-Site Detention is to be situated above the 100 year ARI flood levels to facilitate discharge into potentially fully charged stormwater pipes;
- Sizing of On-Site Detention areas, including bypass areas, to be managed based on relevant stage of construction process;
- Management of water quantity to ensure no increase in stormwater discharge rate from the site for the 20 and 100 year ARI storms.

For commentary on how the design requirements of the OSD tank volume have been met refer to section 11.3.6 of this report.

The Water Quality Targets and WSUD requirements have been addressed in section 11.5 of this report.

Section 3S (Stormwater and flooding) of the Waterloo Design and Amenity Guideline Requirements has the following objective which is relevant to stormwater management:

Improve water quality and reduce stormwater runoff

In accordance with the Design Guidelines, this stormwater management report outlines a water quality strategy to control the water quality of stormwater leaving the site (in accordance with City of Sydney and Sydney Water requirements). Similarly, this report outlines a strategy which reduces the peak stormwater runoff from the site and meets the Sydney Water total Permissible Site Discharge and On Site Detention requirements for the entire site.

7.2 Flood Study

The aims of the flood study are to:

- Assess the flood risk within and around the vicinity of the site;
- Establish mitigation measures required to ensure the sustainability and safety of the proposed scheme over its lifetime; and
- Address study requirements listed in Section 3 to demonstrate the feasibility of the proposed development.

The following objectives have been completed:

- Undertake consultations with City of Sydney flood engineer to present the proposed scheme and clarify council requirements for the flood study;
- Undertake a desktop research/review of flood information (i.e. flood study and historic records of flooding) available for the site and surrounding area to inform the overall strategy of the proposed scheme;
- Obtain City of Sydney council adopted hydraulic model to define flood conditions at the site and surrounding area;
- Refine and upgrade council hydraulic model with the latest topography survey undertaken to produce an accurate and up-to-date representation of the flood mechanisms at the site and surrounding area (i.e. water level, water depth, water velocity and flood hazard);
- Update council hydraulic model to reflect the proposed development configuration (i.e. proposed scenario) to describe flood mechanisms at the site and surrounding area;
- Use the hydraulic model results to inform the building design layout;
- Undertake a flood impact assessment to estimate changes generated by the proposed scheme to the flood mechanisms (i.e. water levels, flood extent, water velocity and flood hazard) on adjacent areas;
- Undertake a climate change sensitivity analysis to address residual food risks associated to climate change;
- Demonstrate how the proposed development satisfies project requirements;

This report has been informed by and refers where appropriate to the following documents and policies:

- Water Quality, Flooding and Stormwater Report, Waterloo Metro Quarter (October 2018);
- Waterloo Design Amenity Guidelines (March – 2020);
- Interim floodplain management policy (City of Sydney Council);
- Waterloo Metro Quarter State Significant Precinct Study (October 2018);
- Study Requirements, Nominated State Significant Precinct – Waterloo (March 2018);
- Floodplain Development Manual NSW (April 2005);
- Australian Rainfall and Runoff 2019 (ARR2019) guidelines;
- Alexandra Canal Floodplain Risk Management Study Plan (City of Sydney);
- Alexandra Canal Model Conversion (City of Sydney – 2015);
- Alexandra Canal Model Conversion (City of Sydney – 2015);

8. Flooding Context

The following section provides an overview of the flood context for the site area. Data used to inform this section was derived from the Alexandra Canal Floodplain Risk Management Study and Plan Report (City of Sydney 2014), Alexandra Canal Model Conversion (City of Sydney 2015) and discussion with the City of Sydney council flood engineer.

8.1 Alexandra Canal Catchment

The project site lies within the Alexandra Canal catchment. The Alexandra Canal catchment covers approximately 12 km^2 of Sydney City Council Local Government area. Figure 6: Alexandra Canal Catchment (figure extracted from Floodplain Risk Management Plan – City of Sydney)
below shows the extent of the Alexandra Canal catchment (i.e. catchment area extent is represented by the pink polygon).

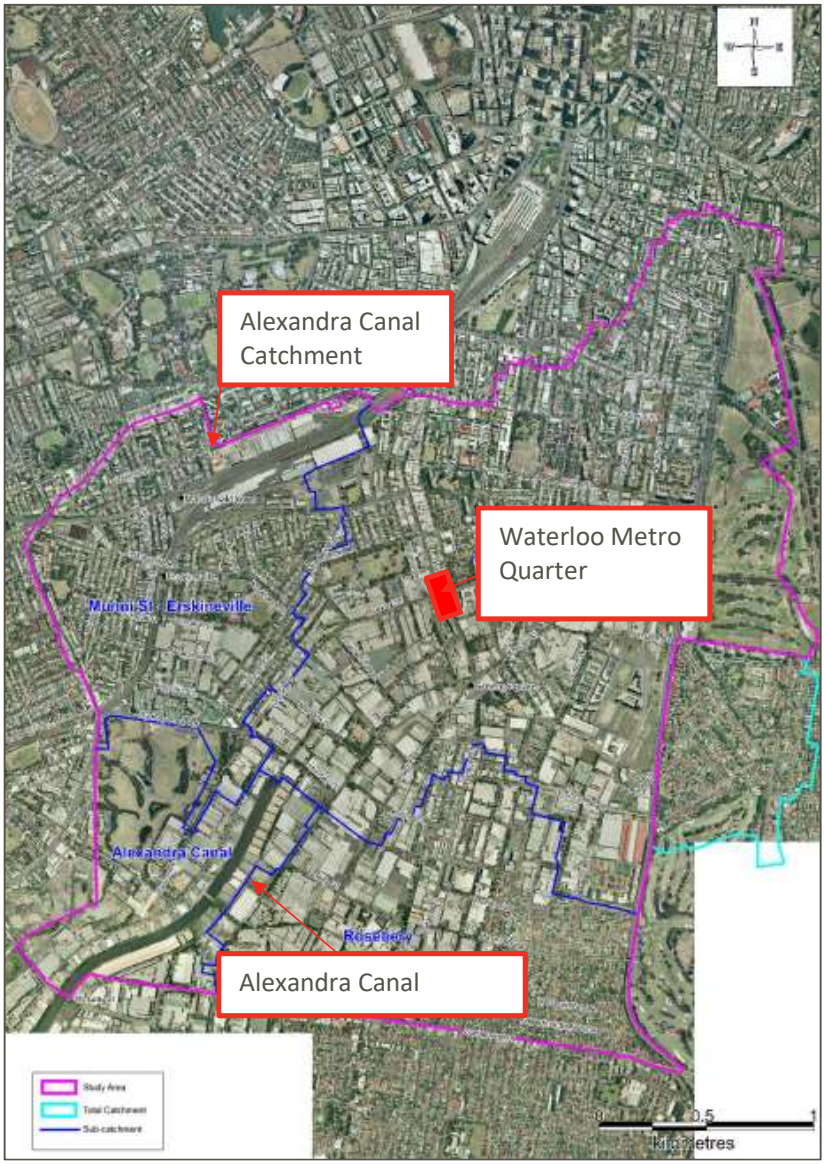


Figure 6: Alexandra Canal Catchment (figure extracted from Floodplain Risk Management Plan – City of Sydney)

Most of the catchment is fully developed and consists predominantly of medium to high-density housing, commercial and industrial development with some large open spaces that include Moore Park, Playing Fields, Moore Park Golf Course, The Australian Golf Course, Sidney Park, Redfern Park, Waterloo Park and Alexandria Park.

Catchment topography ranges from approximately 55-60 m AHD (i.e. highest area) at the north east to 10 - 5 m AHD to the south west (i.e. lowest area). Figure 7 below and Appendix 4 include an overview of the catchment and site topography.

The catchment drains into the Alexandra Canal with the eastern area draining towards south-west and the western area draining in south - south-east direction. Topography gradually slopes from north, north east and east towards Alexandra Canal at south west.

There are topography depressions (low points) within the catchment area where runoff water can escape only via pit and pipe system. These areas due to topographical and development constraints can result in ponding and flooding of properties and roads during flood events.

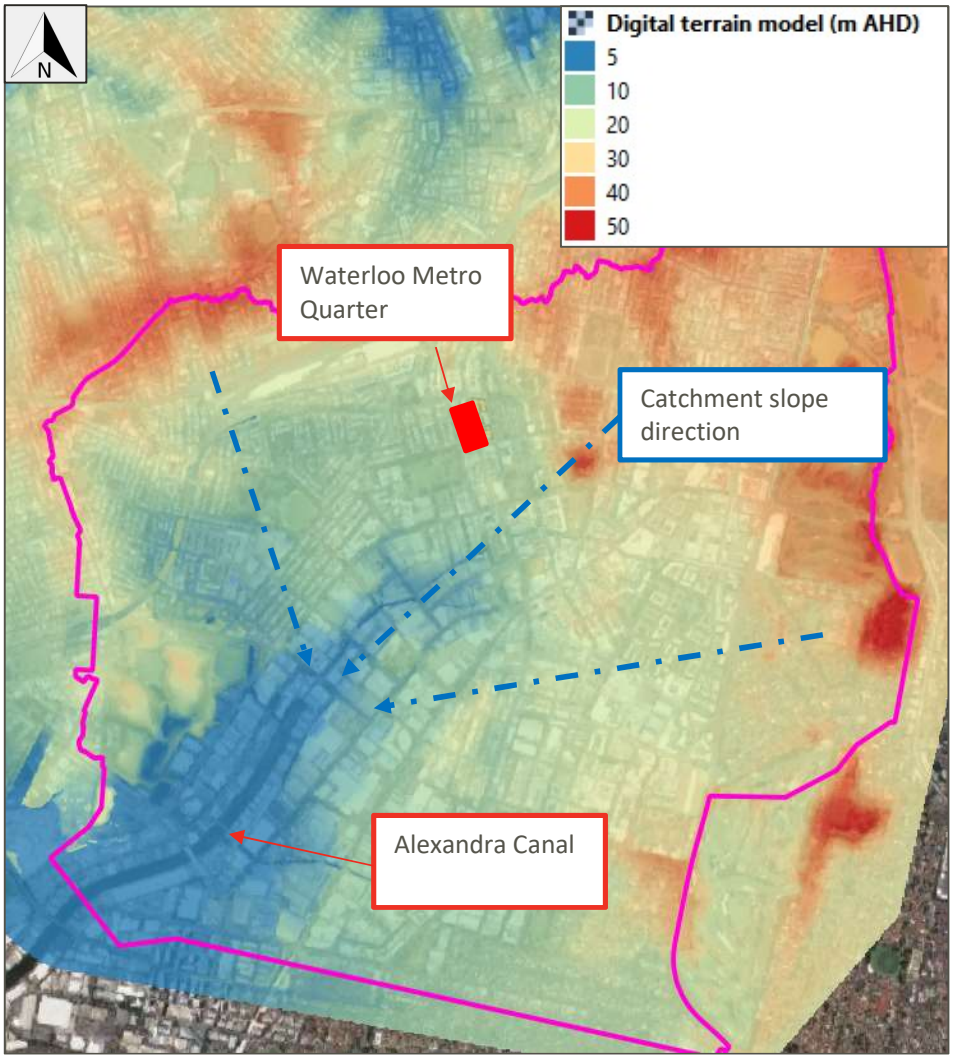


Figure 7: The Alexandra Canal Catchment topography

Around the site area (i.e. Waterloo Metro Quarter) the topography ranges from approximately 17-17.5 to 14-15 m AHD.

At the north of the site (i.e. Raglan Street) the topography ranges from approximately 16.5 - 17 m AHD at the intersection of Raglan Street and Botany Road to 16 – 16.5 m AHD at the intersection of Raglan and Cope Street.

To the East of the site (i.e. Cope Street), the topography ranges from approximately 16- 16.5 m AHD at the intersection of Raglan and Cope Street to 14.5 - 15 m AHD at the intersection of Cope and Wellington street.

To the West (i.e. Botany Road), the topography ranges from approximately 16.5 - 17 m AHD at the intersection of Raglan Street and Botany Road to 14.5 – 15 m AHD at the intersection of Botany Road and Wellington Street.

Figure 8 below shows the topography in the proximity of the site area. Topography Survey for the site area is included in Appendix 5.

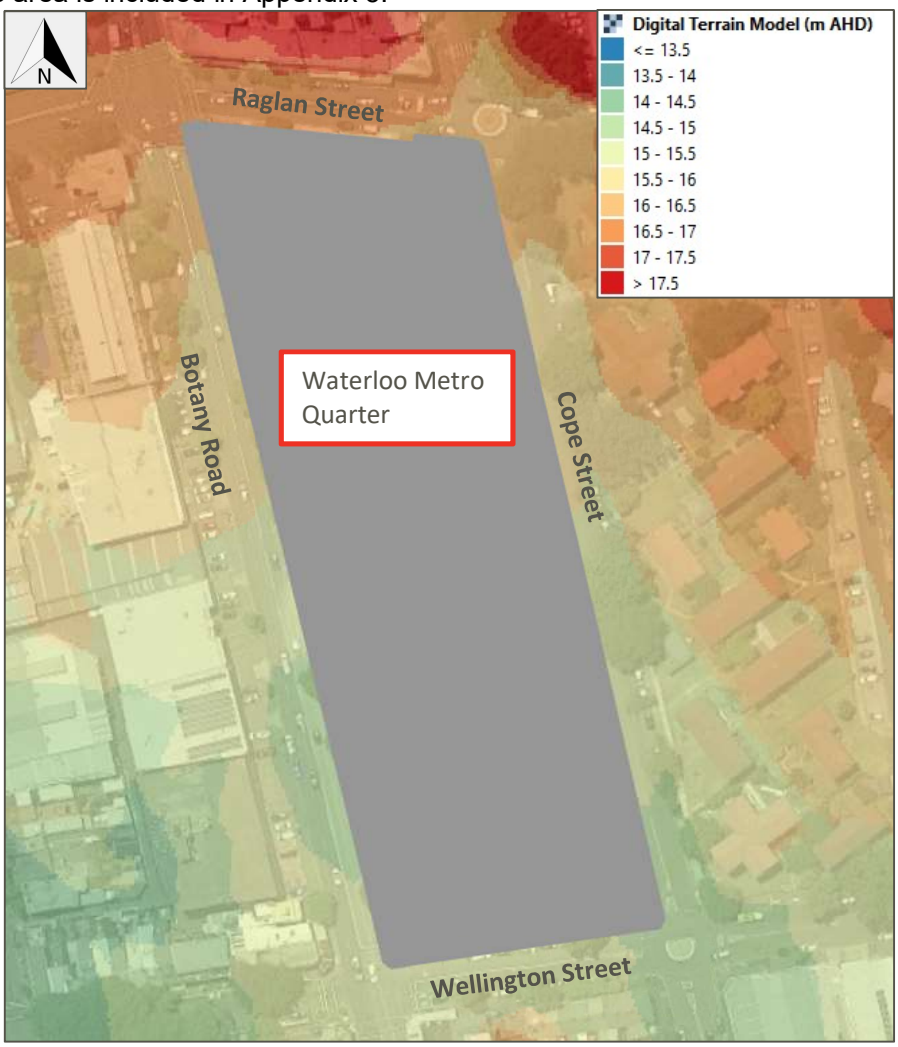


Figure 8: Waterloo Metro Quarter – Over Station Development topography

The drainage systems in the Alexandra Canal catchment consist of open channels, covered channels, in ground pipes, culverts and pits that convey runoff within the catchment to Alexandra which discharges into Cooks River.

Flooding within the catchments is mainly a combination of overland flow and mainstream flooding. Mainstream flooding issues tend to occur around Alexandra Canal and the open channels.

8.2 Historic record of flooding

There are records of flooding in the proximity of the site area. Pictures included in Figure 9 below show flooding occurred in 2011; Figure 9 Figure ***9***: Hunter Street (left), Botany Road & Buckland Street Intersection (right) – Photo taken May 2011. is extracted from the Water Quality, Flooding and Stormwater Report prepared for Waterloo Metro Quarter in 2018.

Figure 9: Hunter Street (left), Botany Road & Buckland Street Intersection (right) – Photo taken May 2011.

WSP has requested records of flooding to City of Sydney Council; at the time of writing this report the information has not been provided by the Council.

8.3 City of Sydney hydraulic model

WSP engaged with City of Sydney Council on 15th of April 2020 to obtain the latest hydraulic model the council has available to describe the flood conditions (i.e. water level, water depth, water velocity and flood hazard) at the site area.

Council provided WSP with the Alexandra Canal Flood model. Council flood engineer confirmed that the Alexandra Canal Flood model is the hydraulic model currently 'adopted' by the council to assess the flood conditions within the Alexandra Canal Catchment.

Alexandra Canal Flood model was developed for the City of Sydney Council in 2015 by BMT WBM. The hydraulic model is a combined 1 dimensional – 2 dimensional TUFLOW hydraulic model and the hydrology model is a DRAINS ILSAX model for catchment inflows.

For this flood study WSP updated the City of Sydney Council hydraulic model. Section 9.1 below describes the hydraulic modelling methodology adopted. The hydraulic modelling methodology was discussed with the City of Sydney flood engineer during a project meeting held in April.

9. Flood Study

The purpose of this section is to demonstrate the feasibility of the proposed development from a flood risk perspective.

The flood study aims to demonstrate that:

- The proposed development (i.e. Southern Precinct) has been designed consistent with the requirements reported in Table 1 and Table 2 of Section 3 above;
- Flood mitigation measures have been considered and implemented in the design to offset adverse flooding impacts during extreme events;
- The proposed development has negligible flood impact on the adjacent land; and,
- Safe refuge can be provided within the proposed development and site area during extreme flood conditions;

To inform the flood study detailed hydraulic modelling has been undertaken for the existing and post development conditions.

Section 9.1 below summarises the hydraulic modelling assessment and describes the flood conditions (i.e. water depth, flood hazard and water velocity) at the site and surrounding area that might occur during a range of flood events (i.e. 20 year ARI, 100 year ARI and PMF flood events).

Section 9.2 describes the Climate Change (CC) sensitivity analysis that has been produced as per the latest guidelines (Australian Rainfall Runoff 2019 – ARR2019). Climate change effects have been considered in the design process.

Section 9.3 presents the flood impact of the proposed development on the adjacent land. City of Sydney Council has been consulted to define the requirements for the flood impact assessment.

Section 9.4 describes the flood mitigation measures adopted to alleviate the flood risk at the proposed development. This section has been produced following the recommendations of the Design and Amenity Guidelines (March 2020) – Section 3S and the DCP provided in the Water Quality, Flooding and Stormwater Report (October 2018).

Section 9.5 describes the emergency responses identified that reduce the consequences of flooding for occupants of the proposed development.

9.1 Hydraulic Modelling

As mentioned above, the flood study has been informed by detailed hydraulic modelling that defines flood mechanisms and conditions at the site and surrounding area.

The hydraulic modelling was based on an updated version of the Alexandra Canal catchment flood model (developed by BMT in 2015).

The Alexandra Canal catchment flood model was provided to WSP by City of Sydney Council in April 2020.

As discussed in Section 8.3 the Alexandra Canal catchment flood model is currently ‘adopted’ by City of Sydney Council to inform flood conditions within the Alexandra Canal catchment.

The following improvements have been made to the existing model to ensure its suitability of use for the project:

- The software version was upgraded from 2013-12-AD to the latest software release (i.e. 2020-01-AB) to enable the use of GPU HPC modelling. This modelling approach ensures significantly faster model run times and negligible mass error;
- An additional storm duration (i.e. 90 minutes critical storm) was added to the existing storm durations to refine the definition of water level, velocity and flood hazard at the site and surrounding areas for the 100 year ARI;
- The PMF model run duration was extended to ensure peak water levels at the site and surrounding areas are properly captured;
- Adjustment have been made to the model to improve model instabilities that occurred during the PMF runs; and,
- The latest topographic survey has been included in the model to improve the representation of the terrain surfaces at the site and surrounding areas (refer to Appendix 5 for topography survey details).

Two model scenarios were analysed for assessing the flood conditions at the site and surrounding areas. The model scenarios are:

- baseline scenario which represents the pre-development site conditions; and,
- proposed scenario which represents the post-development site conditions.

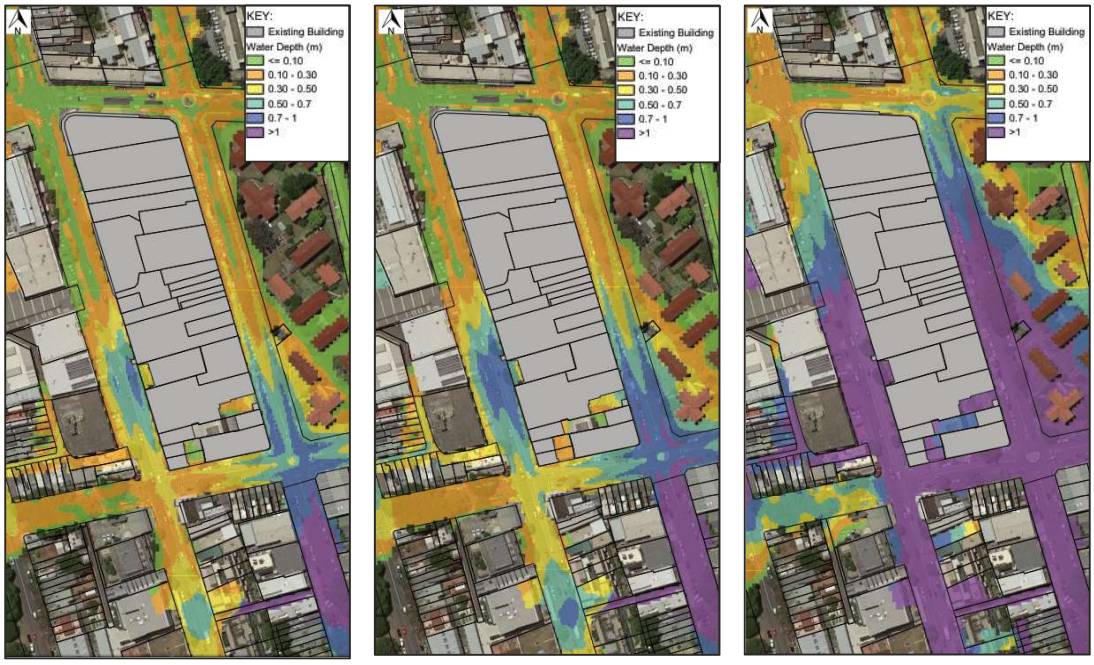
9.1.1 Baseline Scenario

The baseline scenario model defined the flood conditions at the site and surrounding area for the pre-development conditions. The 20, 100 year ARI and PMF flood events were considered.

The model results show that the site and surrounding area are expected to be affected by flooding during the 20, 100 year ARI and PMF flood events.

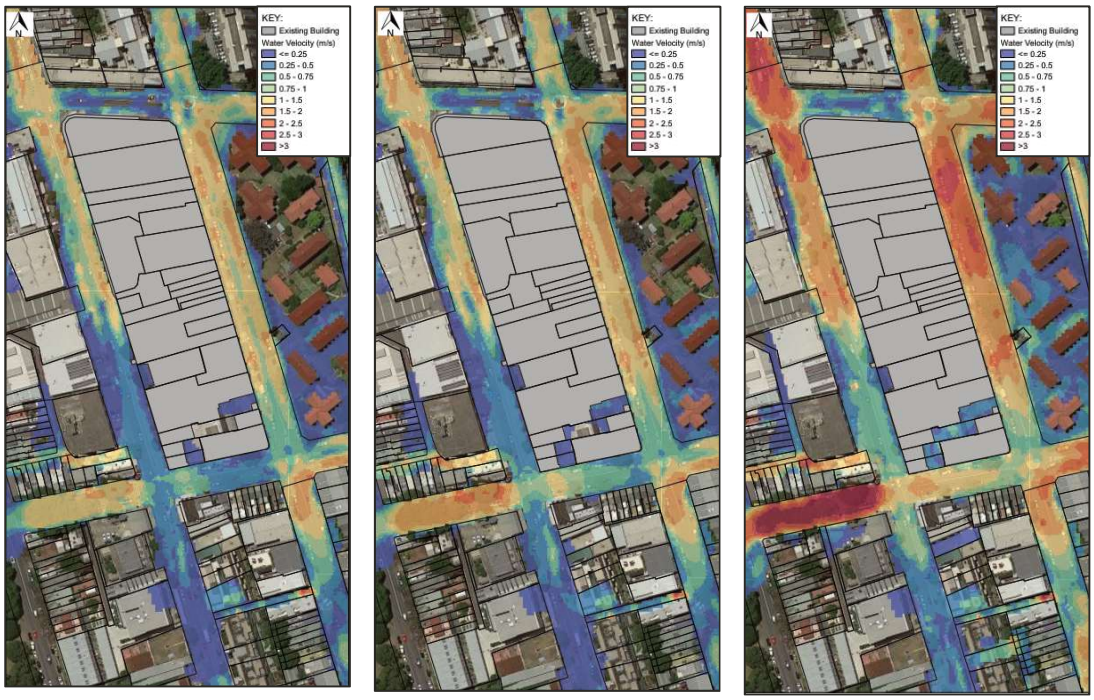
Maximum water depth, water velocity and flood hazard maps for the baseline scenario are shown in Figure 10,11 and 12 below; high resolution maps are included in the following appendices:

- Appendix 6: Water Depth – Baseline Scenario (20, 100 year ARI and PMF flood event);
- Appendix 7: Water Velocity – Baseline Scenario (20, 100 year ARI and PMF flood event); and,
- Appendix 8: Flood Hazard – Baseline Scenario (20, 100 year ARI and PMF flood event).



20 year ARI *100 year ARI* *PMF*

Figure 10: Water Depth – Baseline Scenario



20 year ARI *100 year ARI* *PMF*

Figure 11: Water Velocity – Baseline Scenario

20 year ARI *100 year ARI* *PMF*

Figure 12: Flood Hazard – Baseline Scenario

9.1.2 Proposed Scenario

The following adjustments were made to the baseline scenario to represent the proposed development configuration:

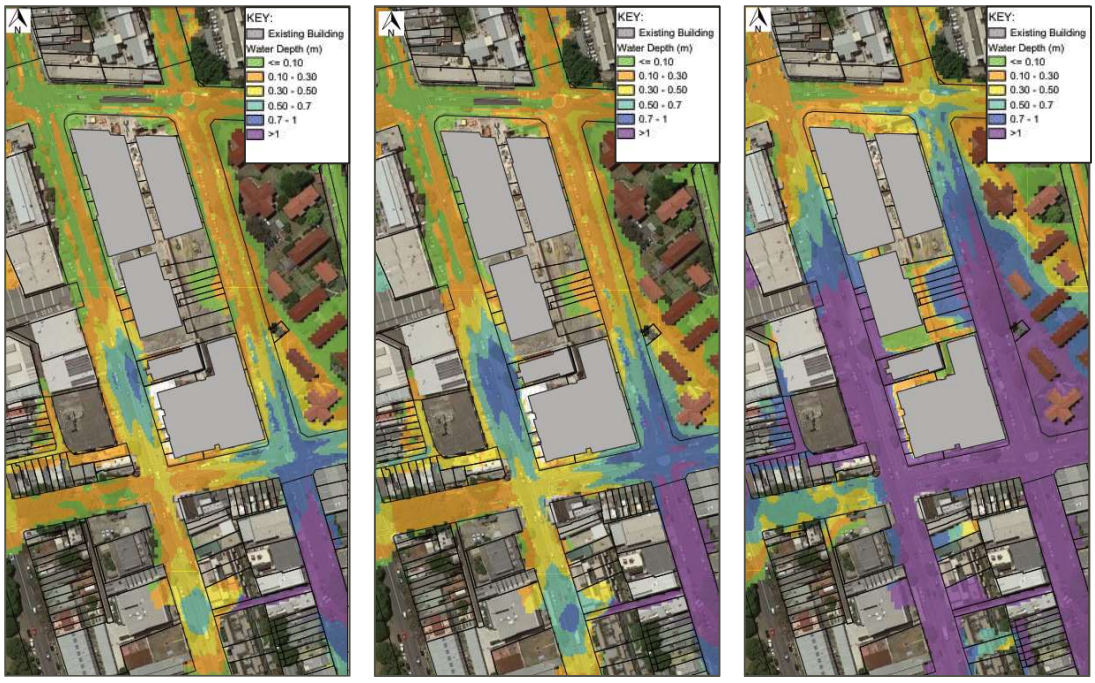
1. Topography data has been updated to reflect the proposed site configuration. Refer to the civil design report (i.e. Appendix CC) for a detailed discussion on the proposed development topography.
2. New building layout and material definition to represent the proposed buildings configuration.

The proposed scenario defined the flood conditions at the site and surrounding area for the post-development conditions. The 20, 100 year ARI and PMF flood events were assessed.

As per the baseline scenario the model results show that site and surrounding area are expected to be affected by flooding during the 20, 100 year ARI and PMF flood events.

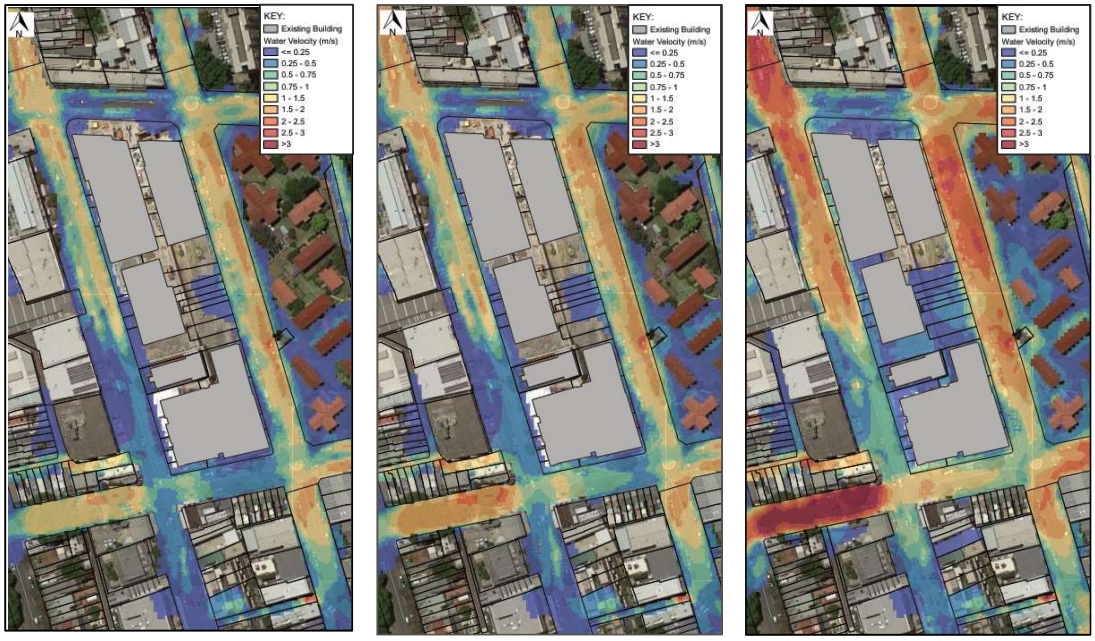
Maximum water depth, maximum water velocity and flood hazard maps for the proposed scenario are reported in Figure 13,14 and 15 below; high resolution maps are included in the following appendices:

- Appendix 9: Water Depth (for the 20, 100 year ARI and PMF flood event);
- Appendix 10: Water Velocity (for the 20, 100 year ARI and PMF flood event); and,
- Appendix 11: Flood Hazard (for the 20, 100 year ARI and PMF flood event).



20 year ARI *100 year ARI* *PMF*

Figure 13: Water Depth – Proposed Scenario



20 year ARI 100 year ARI PMF

Figure 14: Water Velocity – Proposed Scenario

20 year ARI *100 year ARI* *PMF*

Figure 15: Flood Hazard – Proposed Scenario

The differences in the flood conditions (i.e. flood impact) between the baseline and proposed scenario are discussed in Section 9.3.

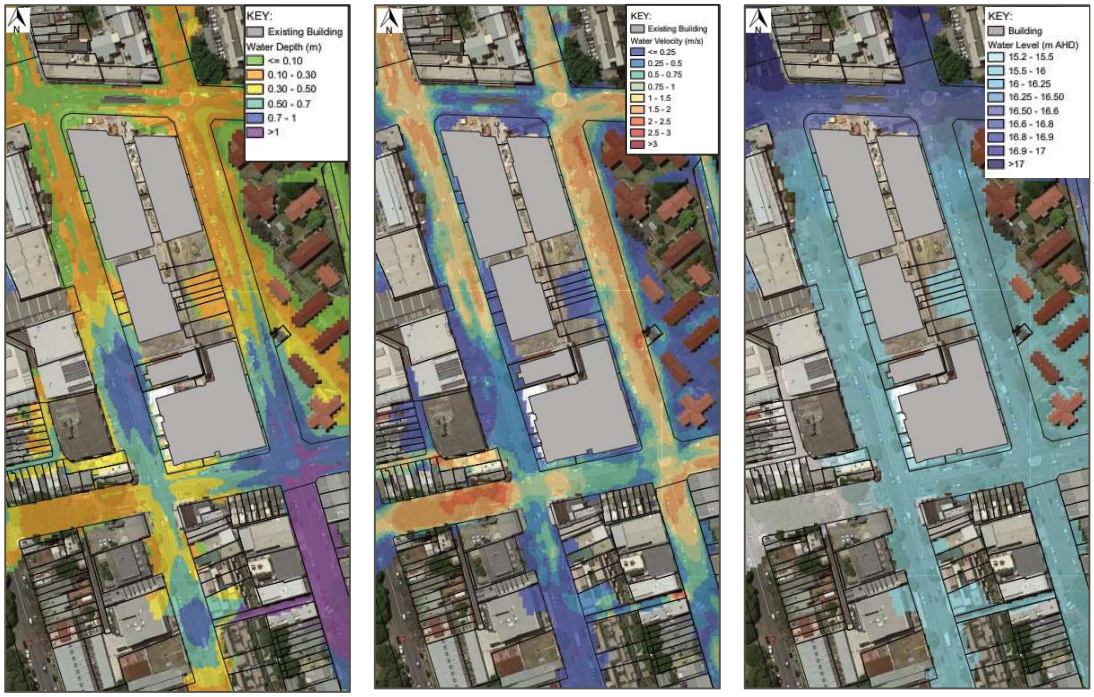
9.2 Climate Change analysis

A climate change sensitivity analysis has been undertaken for the 100 year ARI to assess the possible effects of climate change (CC) to the flood conditions.

As indicated in the Water Quality, Flooding and Stormwater Report, Waterloo Metro Quarter (October 2018), key climate change factors considered with respect to this project include:

- an increase in rainfall intensity of 10%, which corresponds to 2100 conditions predicted under Representative Concentration Pathways (RCPs) 4.5 emission scenarios (ARR2019).
- Sea level rise of 90 cm by 2100 as per the NSW Government Coastal Planning Guideline was also considered.

Proposed development scenario model result maps for climate change are included in Figure 16 below and Appendix 12.



Water Depth *Water Velocity* *Water Level*

Figure 16: 100 year ARI with Climate Change - Proposed Scenario

The Climate Change scenario shows that water level around the site area might increase up to 70 mm; this is in line with the climate change sensitivity analysis presented in the *Waterloo Metro Quarter State Significant Precinct Study (October 2018)* which demonstrated that Climate Change might generate water level increases of up to 60 mm around the site area.

Section 9.4 shows how climate changes effects have been considered in implementing flood risk mitigation measures (i.e. definition of minimum flood planning level).

9.3 Flood Impact Assessment

The proposed development flood impact has been assessed for the 20, 100 year ARI and PMF flood events.

Flood impact has been assessed by comparing the baseline and proposed scenario model results for water level and flood hazard.

9.3.1 Project Requirements

City of Sydney Council was consulted on the 15th of April 2020 to discuss project requirements to be considered in the flood impact assessment.

Council confirmed that the proposed development flood impact has to demonstrate no increase in water level (i.e. afflux) on the adjacent land.

Council considered 10 mm an acceptable tolerance for afflux (i.e. no increase in water level by more than 10 mm).

9.3.2 Post development flood Impact

The flood impact discussed below, shows the changes caused by the proposed Waterloo Metro Quarter Area (i.e. refer as proposed site configuration) to the baseline flood conditions (i.e. pre-development).

The proposed site configuration includes:

- Demolition of the existing buildings and inclusion of new buildings (i.e. Northern, Central, Southern Precinct and metro station);
- changes to the topography within the site;
- reconfiguration of the intersection between Raglan and Cope Street (i.e. removal of the roundabouts);
- reconfiguration of the intersection between Cope and Wellington Streets (i.e. removal of the roundabouts); and,
- carriageway narrowing (i.e. footpath widening) and raised threshold along Cope Street.

Refer to Appendix 15 for details of the proposed site configuration.

Flood impacts generated by the proposed site configuration are presented below.

Section 9.3.3 discuss the flood impact generated by the Southern Precinct development solely.

Afflux (i.e. changes in water level)

Figure 17 to 23 present the afflux maps for the overall site development. For further detail refer to afflux maps included in Appendix 13.

- 100 year ARI flood event

Figure 17 below shows the afflux at the site and surrounding area for the 100 year ARI flood event.

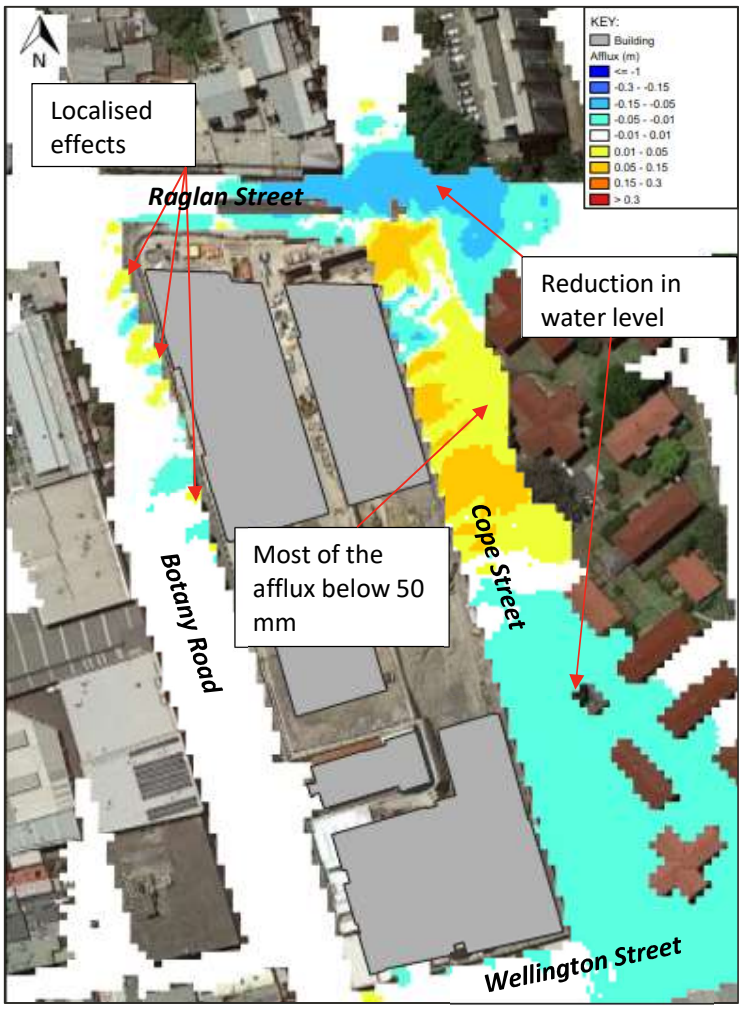


Figure 17: 100 year ARI – Afflux map

Raglan Street: Increase in water levels at the intersection with Cope Street is expected to be up to 80 mm. Reduction in water level is expected along Raglan Street up to 90 mm.

Cope Street: Increase in water levels is expected between 80 to 100 mm in limited areas; most of the afflux along Cope Street is expected to be below 50 mm. Reductions in water level are also expected along Cope Street and on adjacent land.

Figure 18 below shows the water level graph at location Po9 for both the baseline and proposed scenario during the 100 year ARI flood event.

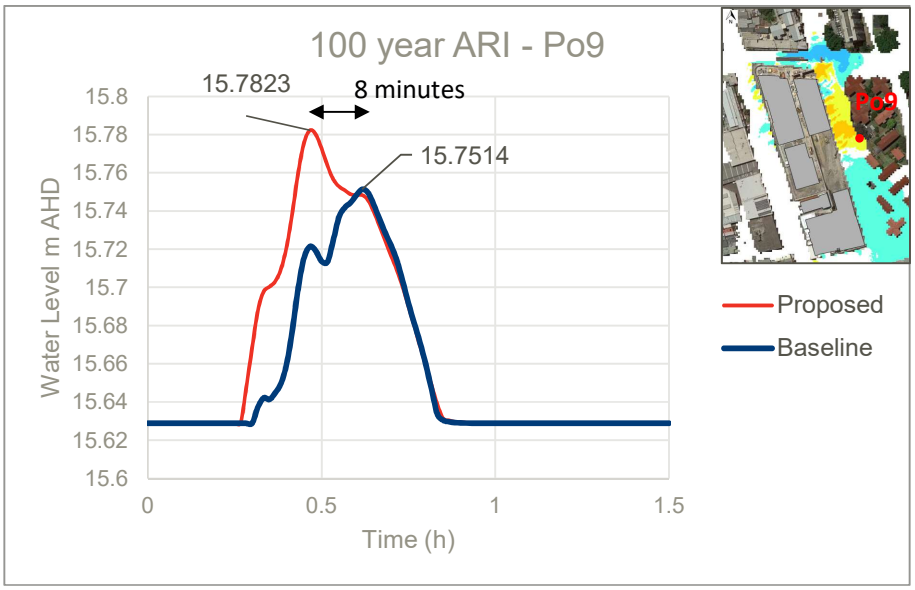


Figure 18: Water Level vs Time at point Po9 - 100 year ARI

Figure 18 shows that afflux of 31 mm is predicted to occur for 8 minutes at location Po9 during the 100 year ARI flood event; after 8 minutes the water level decreases and aligns with the baseline scenario conditions.

Figure 19 shows 71 mm increases in water level in Cope Street. This occurs for 14 minutes at location P10 during the 100 year ARI flood event. It has to be noted from Figure 19 below that despite the 71 mm increase in water level at location P10 the water depth increase is limited to 33 mm; this is due to proposed raised topography along Cope Street

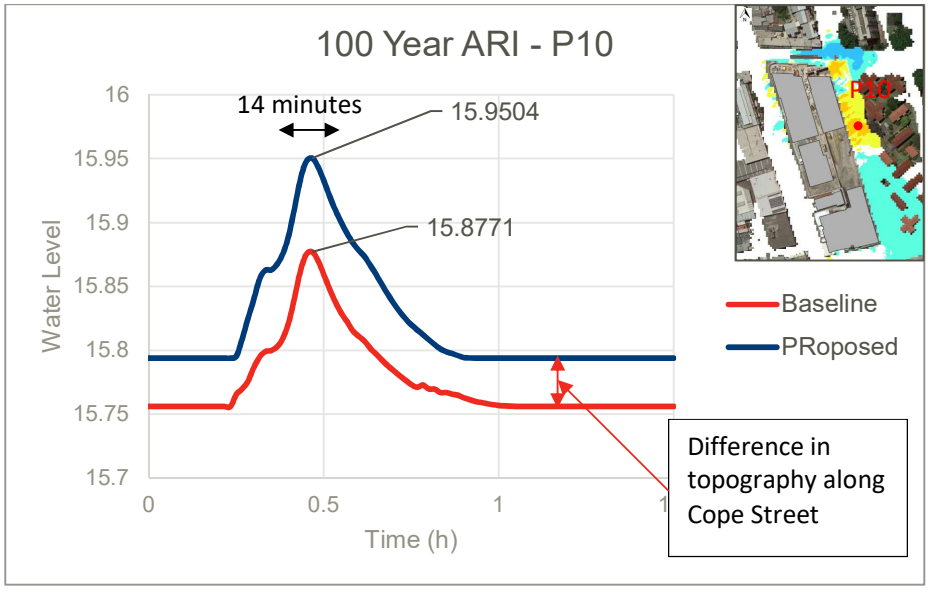


Figure 19: Water Level vs Time at point P10 – 100 year ARI

Wellington Street: No increase in water level.

Botany Road: Negligible increase in water level. Figure 17 shows localised areas along the footpath where there are increases in water level (up to 40 mm) that alternate to reductions in water level (up to 50 mm); these are limited effects that are attributed to the hydraulic model representation of the topography and therefore deemed within model tolerance.

- 20 year ARI flood event

Figure 20 below shows the afflux at the site area for the 20 year ARI flood event.

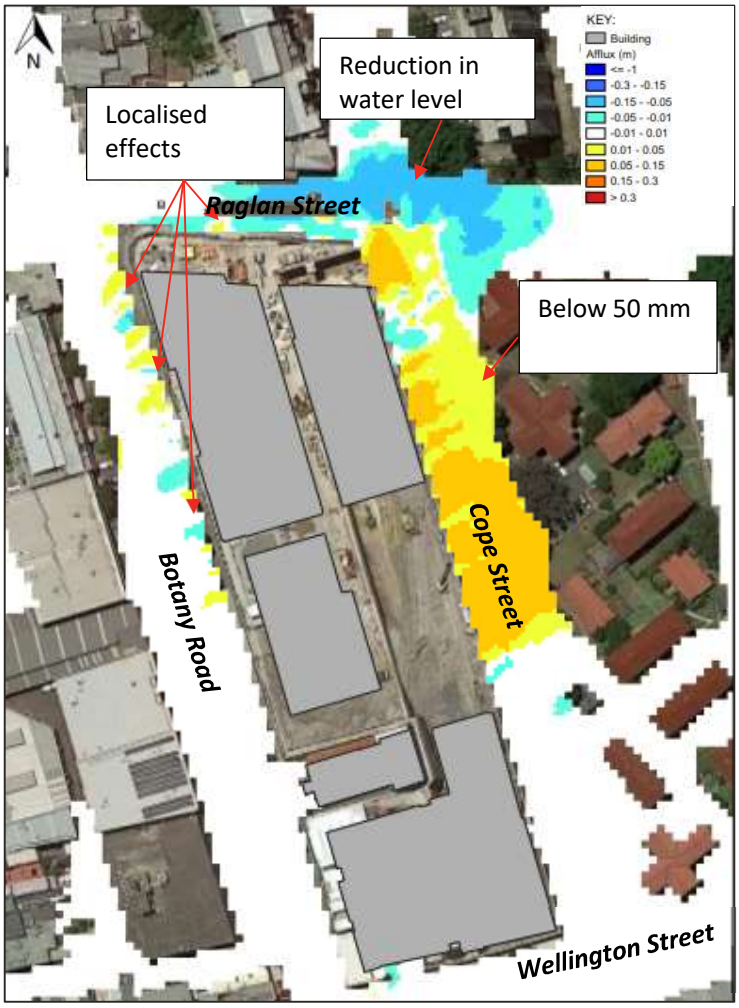


Figure 20: 20 year ARI – Afflux map

Raglan Street: Increase in water levels is limited at the intersection with Cope Street where afflux is expected to be up to 70-75 mm. Reduction in water level is also expected along Raglan Street up to 65 mm.

Cope Street: Increase in water levels is expected up to 70 – 80 mm.

Figure 21 below shows the increase in water level during the flood event at location Po9 for the baseline and proposed scenario.

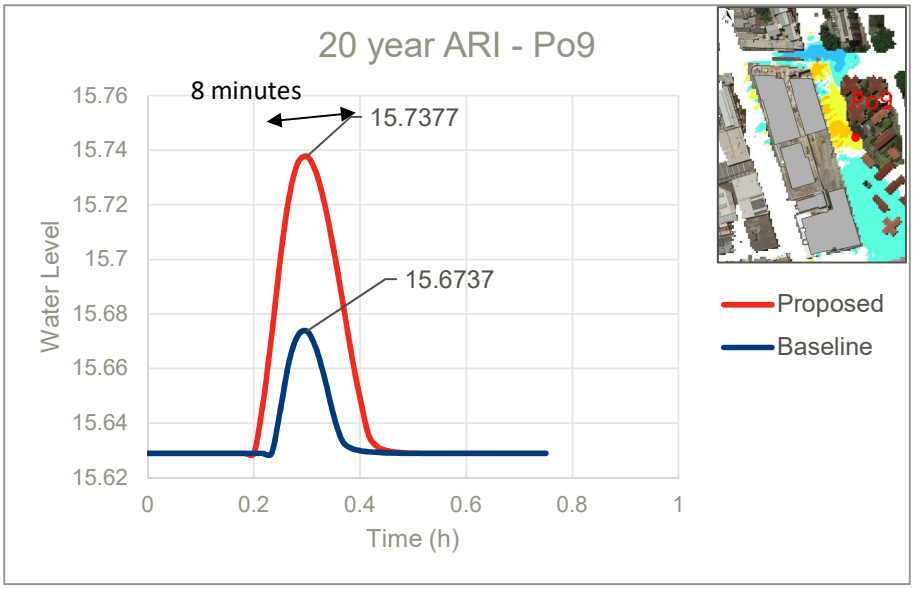


Figure 21: Water Level vs Time at point Po9 - 20 year ARI

Figure 21 shows that afflux of 64 mm is predicted to occur for 8 minutes at location Po9 during the 20 year ARI flood event.

Figure 22 shows that increase in water level of 70 mm is predicted to occur for 8 minutes at location P10 during the 20 year ARI flood event. As per Figure 19 above, 70 mm increase in water level at location P10 corresponds to 32 mm increase in water depth; this is due to proposed raised topography in Cope Street.

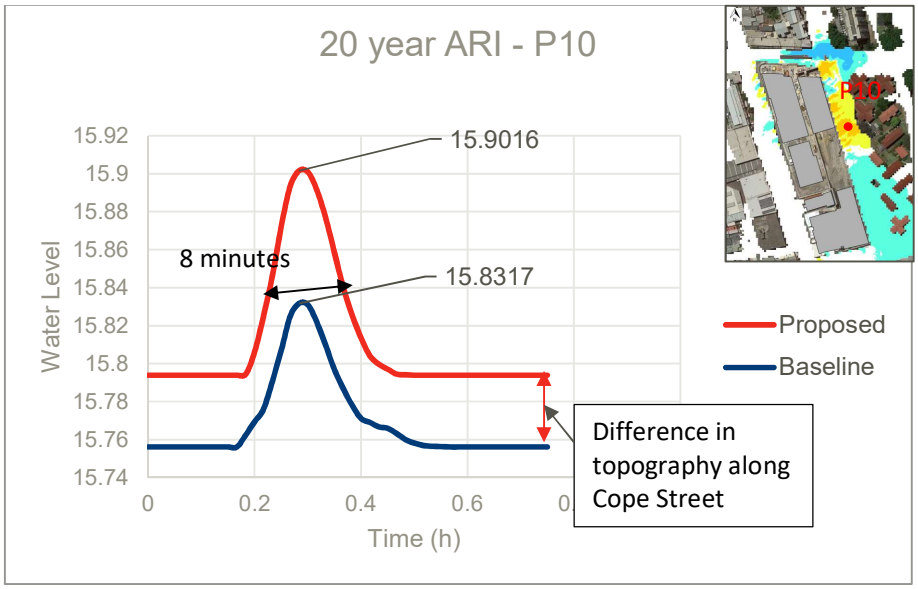


Figure 22: Water Level vs Time at point P10

Wellington Street: No increase in water level.

Botany Road: No increase in water level. Figure 20 shows localised areas along the footpath where there are increases in water level (below 30 mm) that alternate to reductions in water level (up to 50 mm); these are limited effects that are attributed to the hydraulic model representation of the topography and therefore within the model tolerance.

- PMF flood event

Figure 23 below shows the afflux at the site area for the PMF flood event.

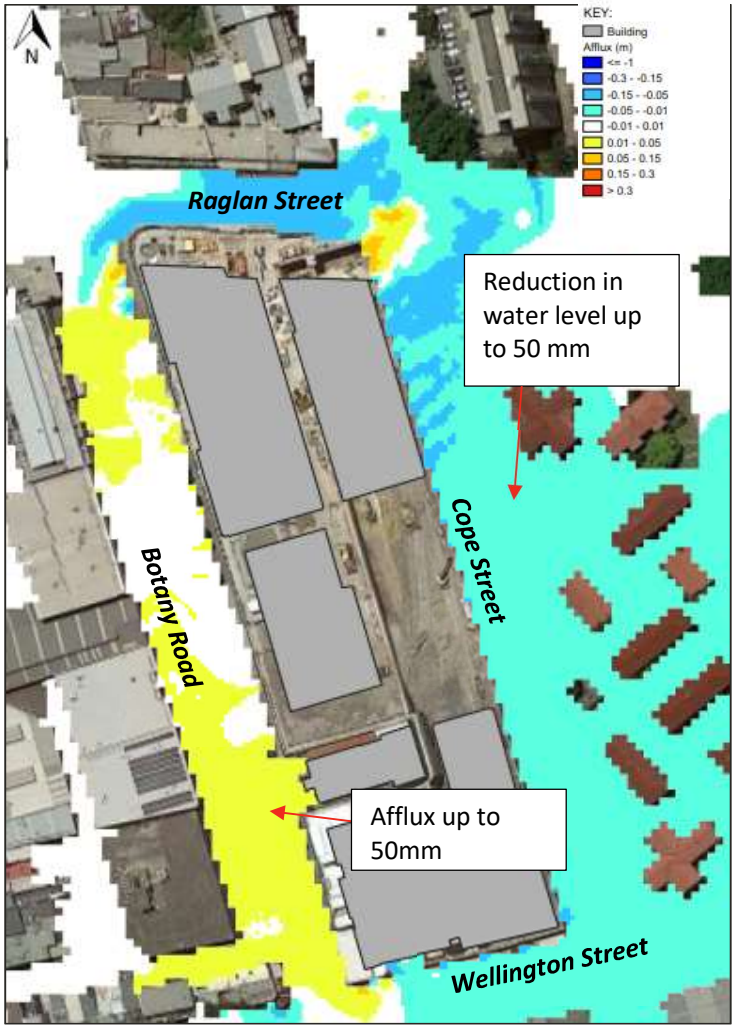


Figure 23: PMF – Afflux map

Raglan Street: Increase in water levels at the intersection with Cope Street where afflux is expected to be up to 60-70 mm. Reduction in water level is also expected along Raglan Street up to 70 mm.

Cope Street: No Increase in water levels. Reduction in water level is expected along Cope Street up to 70 mm.

Wellington Street: Increases in water level (i.e. 15 to 40 mm) in a limited area at the intersection with Botany Road.

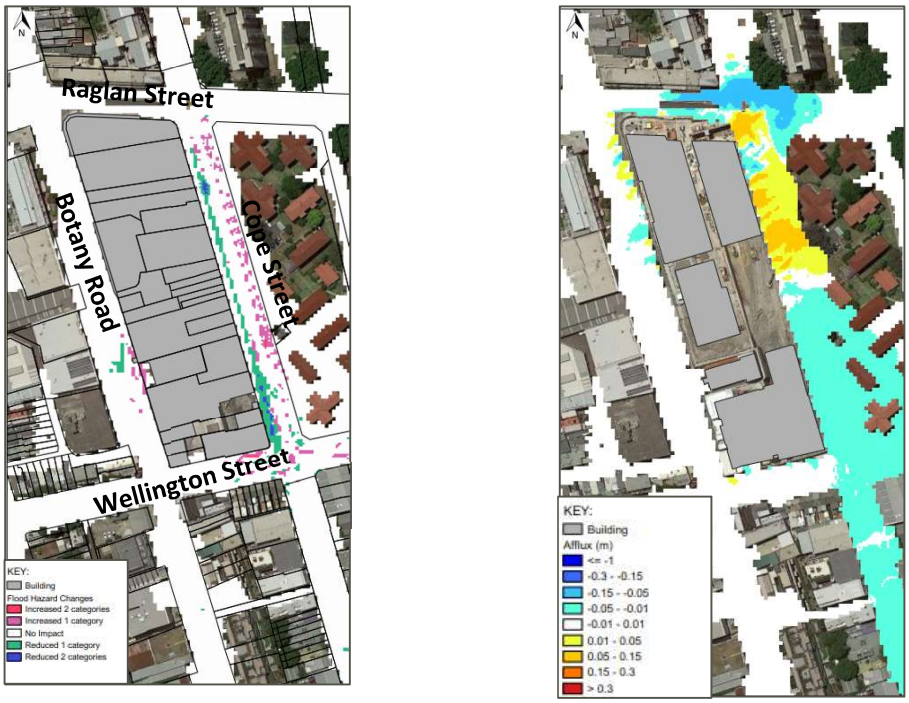
Botany Road: Increase in water levels is expected to be below 50 mm.

Change in flood hazard

The below section describes the changes in flood hazard generated by the proposed development. Refer to flood impact maps include in Appendix 13 for further details.

- 100 year ARI flood event

Figure 24 below shows the changes in flood hazard for the 100 year ARI flood event.



Flood Hazard Changes *Afflux*

Figure 24: 100 year ARI – Flood Hazard Changes

Raglan Street: No change.

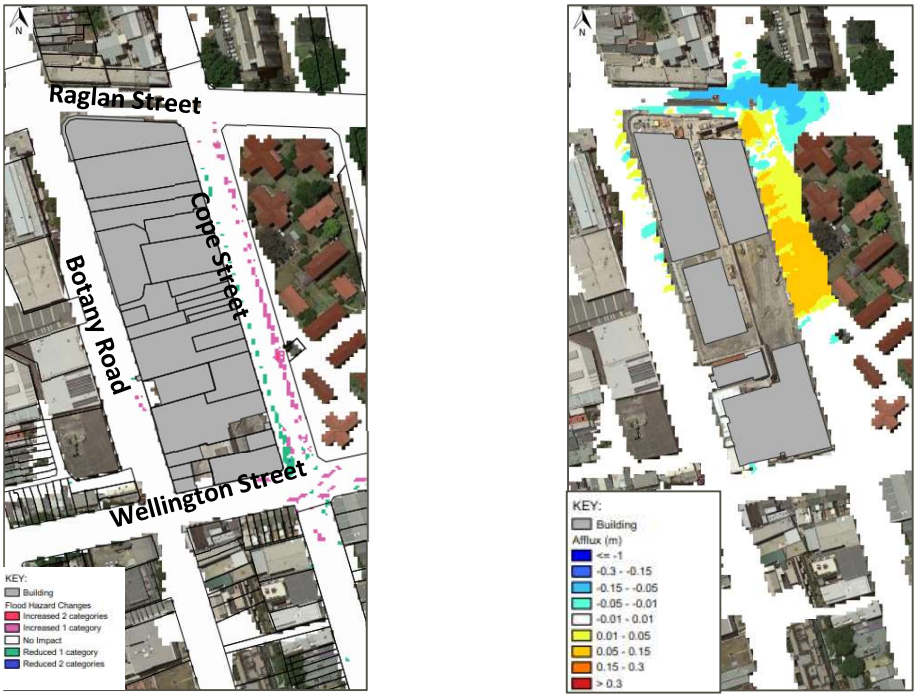
Cope Street: No increase in flood hazard to private properties (i.e. east of Cope Street). Limited changes in flood hazard along Cope street. As indicated in Figure 24 the proposed development generates reduction in flood hazard along the west side of Cope Street (reduction from High Hazard to Transitional Hazard and reduction from Transitional Hazard to Low Hazard). Flood hazard is increased in a limited area along Cope Street from Low Hazard to Transitional Hazard).

Wellington Street: No increase in flood hazard to private properties. Limited changes along Wellington street (i.e. reduction to flood hazard from high to transitional hazard; increase from low to transitional hazard).

Botany Road: No increase in flood hazard to private properties (outside the street). Hazard changes are present only in limited areas where flood hazard is reduced from transitional to low hazard and increased from low to transitional; there are no increases in water depth in this area.

- 20 year ARI flood event

Figure 25 below shows the changes in flood hazard for the 20 year ARI flood event.



Flood Hazard Changes *Afflux*

Figure 25: 20 year ARI – Flood Hazard Changes

Raglan Street: No Change.

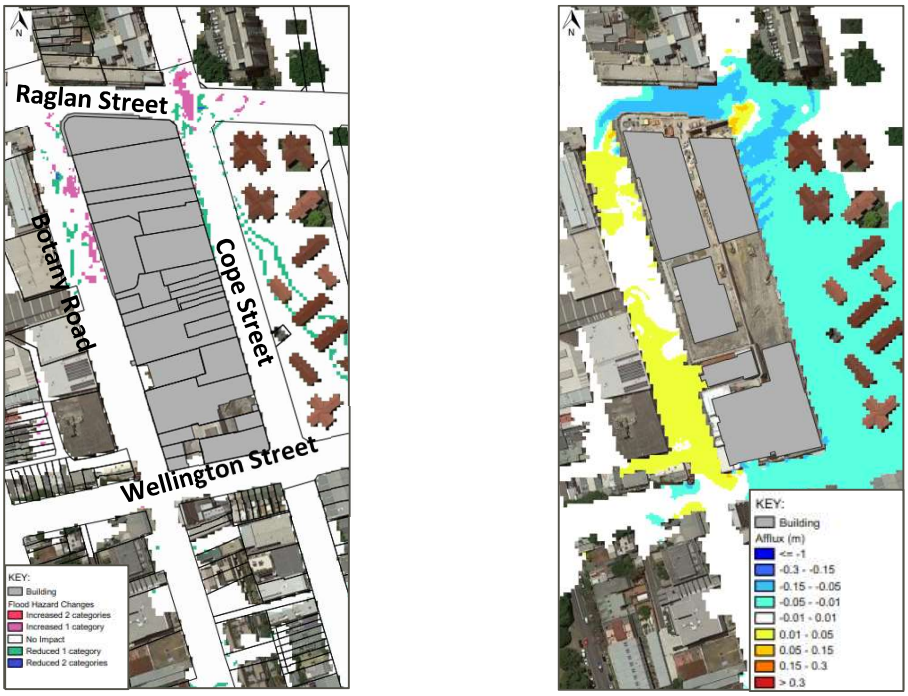
Cope Street: No increase in flood hazard to private properties (i.e. east of Cope Street). Limited changes in flood hazard along Cope street. Figure 25 shows that the proposed site configuration generates reduction in flood hazard along the west side of Cope Street (reduction from High Hazard to Transitional Hazard and reduction from Transitional Hazard to Low Hazard). Flood hazard is increased in a limited area along Cope Street (i.e. from Low Hazard to Transitional Hazard).

Wellington Street: No increase in flood hazard to private properties. Limited changes at the crossing between Wellington street and Cope Street (i.e. reduction from high to transitional hazard; increase from low to transitional hazard)

Botany Road: No changes in flood hazard.

- PMF flood event

Figure 26 below shows the changes in flood hazard for the 20 year ARI flood event.



Flood Hazard Changes *Afflux*

Figure 26: PMF – Flood Hazard Changes

Raglan Street: No increase in flood hazard to private properties. Flood hazard changes are expected at the intersection between Raglan and Cope Street (i.e. increase in flood hazard from low to transitional hazard and reduction from transitional to low hazard).

Cope Street: No increase in flood hazard to private properties (outside Cope Street). Reduction in flood hazard along Cope street and private properties to the west of Cope street (i.e. from transitional to low hazard).

Wellington Street: No changes in flood hazard.

Botany Road: No increase in flood hazard to private properties. Limited increase in flood hazard to the East side of Botany Road (next to the Norther Precinct).

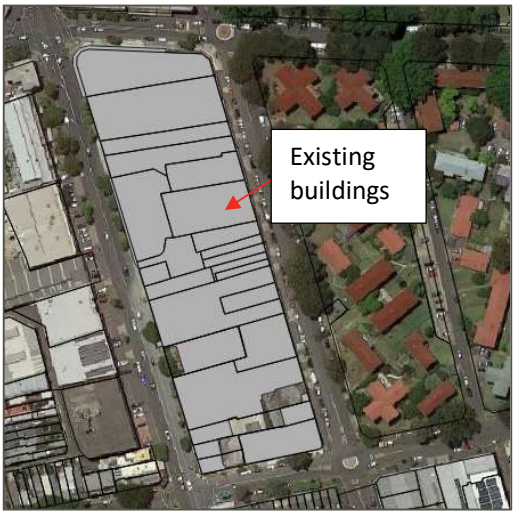
9.3.3 Flood Impact Considerations

Afflux to the east of Cope street, is expected to be limited to 8 minutes for the 20 and 100 year ARI flood events; afflux in Cope street is predicted to occur for approximately 8 to 14 minutes during the 20 and 100 year ARI flood events.

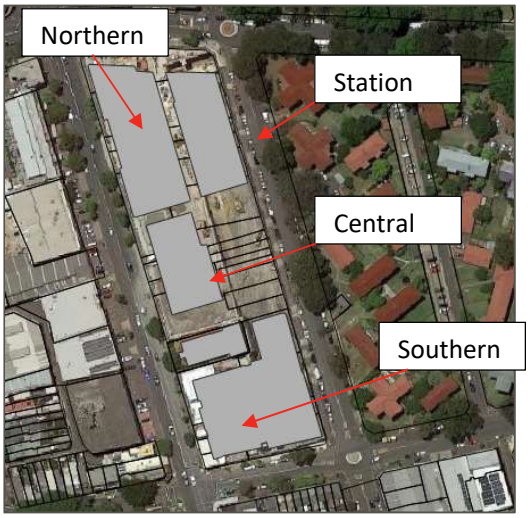
The results presented in Section 9.3.2 showed that there is negligible afflux for the 20 and 100 year ARI events along Botany Road, Raglan Street and Wellington Street, with any areas of increased flood level or hazard offset by areas where the flood level and hazard are reduced; and the proposed changes to the footpath levels along Botany Road, Raglan and Wellington Street are not expected to worsen the existing flood conditions.

Furthermore, the proposed buildings are not expected to negatively affect the existing flood conditions for the following reasons:

1. the proposed building footprints occupy a reduced area in respect to the existing buildings as shown in Figure 27;
2. the proposed building footprints do not exceed the existing building boundaries as shown in Figure 27 below.



Existing scenario



Proposed scenario

Footprints coparison

Figure 27: Building footprint comparison: existing and proposed development scenario.

1. Open areas are proposed within the site area to accommodate water (e.g. Public Plaza along Cope Street – refer to Figure 3 and Appendix 15 for details).

There is no increase in flood hazard to private properties. There are limited changes in flood hazard within street areas where increases in flood hazard (from low to transitional hazard) alternate to reduction in flood hazard (from transitional to low hazard).

PMF afflux along Botany Road is below 50 mm which is deemed to be reasonable for the PMF event; no increase in flood hazard is present in areas affected by PMF afflux.

PMF afflux at the intersection of Raglan and Cope street occurs only in a limited area at the intersection. Afflux is below 65 mm which is deemed reasonable for the PMF event.

For the considerations presented above the Southern Precinct is expected to have negligible impact on the existing flood conditions.

At the time of writing of this report mitigation measures are being tested along Cope Street to further reduce the flood impact along Cope Street. These mitigation measures are not expected to generate negative flood impact in Raglan Street, Botany Road and Wellington Street

9.4 Flood Planning Levels

As introduced in Section 9.1, the site and surrounding area may be affected by flooding with the key source of flood risk expected to be surface water runoff.

The hydraulic model results presented in Section 9.1.2 have been used to inform the design solutions for the proposed development.

The flood risk mitigation measures have been identified adopting building floor level above flood planning levels.

A meeting was held with City of Sydney Council flood engineer on 15th of April 2020 to discuss design requirements for the proposed development.

Council flood engineer recommended to use the Interim Floodplain Management Policy produced by the council as design criteria for the project area.

The Interim Floodplain Management Policy was adopted in the Stage 1 report: *Water Quality, Flooding and Stormwater Report (October 2018) (WQFSR)* to define the design requirements for Waterloo Metro Quarter.

Project requirements have been extracted from the WQFSR and Waterloo Metro Quarter Design Amenity Guidelines (March 2020) (WDAG).

Section 9.4.1 below summarises the project design requirements.

Section 9.4.2 presents the building floor levels in comparison with the project design requirements.

9.4.1 Project Requirements

Section 4.1.2 and Section 4.8.5 of the WQFSR defines the recommended minimum building floor levels and below ground development FPLs for the development site.

Table 3 below governs the permissible minimum building floor levels and below ground development flood planning levels for the Metro Quarter development as defined within the WQFSR.

Flood Planning Levels		
Residential	Habitable rooms	1% AEP / 100 year ARI flood level + 0.5 m or PMF (whichever is higher)
	Non-habitable rooms such as a laundry or garage (excluding below-ground car parks)	1% AEP / 100 year ARI flood level
Industrial or Commercial	Retail Floor Levels	1% AEP / 100 year ARI flood. Stepped up zone inside property for shelter in place evacuation for emergency response.
Below ground garage/ car park	All other belowground car parks	1% AEP / 100 year ARI flood level + 0.5 m or the PMF (whichever is the higher)

Flood Planning Levels	
Area Contiguous with Waterloo Metro Station (including Station entrances)	To be compliant with the Critical State Significant Infrastructure Sydney Metro City & Southwest Chatswood to Sydenham Conditions of Approval dated 9 January 2017

Table 3: **Flood Planning Level for Metro Quarter (Water Quality, Flooding and Stormwater Report – October 2018)**

9.4.2 Flood planning levels

As described above, the results of the hydraulic model produced for the proposed development have been used to inform building floor levels.

Minimum building floor levels have been defined in accordance with project requirements indicated in Table 3.

Climate change (refer to Section 9.2 above) was considered in the design of the building floor levels.

Figure 28 below (refer to Appendix 14 for further details) identifies ground floor sub areas for the Southern Precinct.

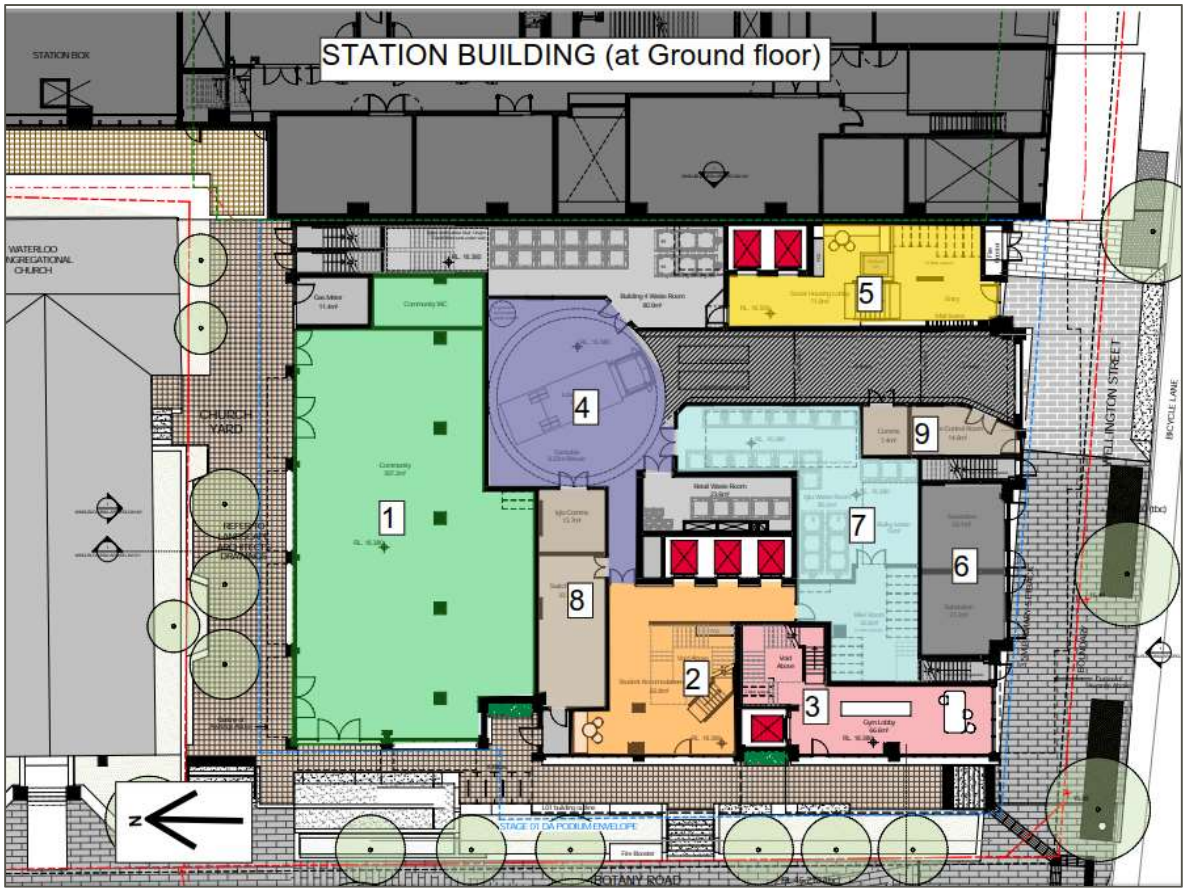


Figure 28: Southern Precinct – Ground Level floor areas

Table 4 below compares the ground floor levels (as per subareas indicated in Figure 28) with the maximum water levels and minimum project requirements (i.e. Table 3).

Area	Classification	Project Requirements (refer to Table 3)	Flood Level as per hydraulic model results (m AHD)	Proposed minimum Flood planning level (m AHD)	Compliant
1	Community Space	1% AEP / 100 year ARI flood.	PMF: 16.56 1%AEP+500 mm: 16.174 1%AEP: 15.674 1%AEP+CC: 15.732	16.38	Yes
2	Lobby	1% AEP / 100 year ARI flood.	PMF: 16.464 1%AEP+500 mm: 16.174 1%AEP: 15.674 1%AEP+CC: 15.732	16.38 (area 2 leads to upper floor at 21.1 m AHD which can be used as shelter in case of flood emergency)	Yes
3	Gym Lobby	1% AEP / 100 year ARI flood.	PMF: 16.51 1%AEP+500 mm: 16.268 1%AEP:15.768 1%AEP+CC: 15.771	16.38 (area 3 leads to upper floor at 21.1 m AHD which can be used as shelter in case of flood emergency)	Yes
4	Loading dock	1% AEP / 100 year ARI flood.	PMF: 16.523 1%AEP+500 mm: 16.223 1%AEP: 15.723 1%AEP+CC: 15.784	16.38	Yes
5	Lobby	1% AEP / 100 year ARI flood.	PMF: 16.55 1%AEP+500 mm: 16.226 1%AEP: 15.726 1%AEP+CC: 15.787	Access to street level with stepped in zone at 16.55	Yes
6	Substation	1% AEP / 100 year ARI flood.	PMF: 16.523 1%AEP+500 mm: 16.223 1%AEP: 15.723 1%AEP+CC: 15.784	East Substation: 15.61 West Substation: 15.67	level discussed with AUSGRID
7	Bike Room/ Waste room	1% AEP / 100 year ARI flood.	PMF: 16.523 1%AEP+500 mm: 16.223	Area 4 and Area 2 prevent flooding to Area 7.	Yes

Area	Classification	Project Requirements (refer to Table 3)	Flood Level as per hydraulic model results (m AHD)	Proposed minimum Flood planning level (m AHD)	Compliant
			1%AEP: 15.723 1%AEP+CC: 15.784		
8	Switch room	1% AEP / 100 year ARI flood.	PMF: 16.464 1%AEP+500 mm: 16.174 1%AEP: 15.674 1%AEP+CC: 15.732	16.38	Yes
9	Fire Control room	1% AEP / 100 year ARI flood.	PMF: 16.523 1%AEP+500 mm: 16.223 1%AEP: 15.723 1%AEP+CC: 15.784	15.79	Yes

Table 4: **Design Flood Planning Levels – Building Floor Level**

The Southern Precinct does not have an underground car park or basement.

Section 9.4.2 demonstrates that floor planning levels are above the minimum criteria as indicated in Section 9.4.1.

Development upper floors (i.e. above ground level) are not discussed in the flood study as flood risk is not relevant due to the floor elevation (i.e. first floor level is 21.1 m AHD which is approximately 5 meters higher than the PMF flood level).

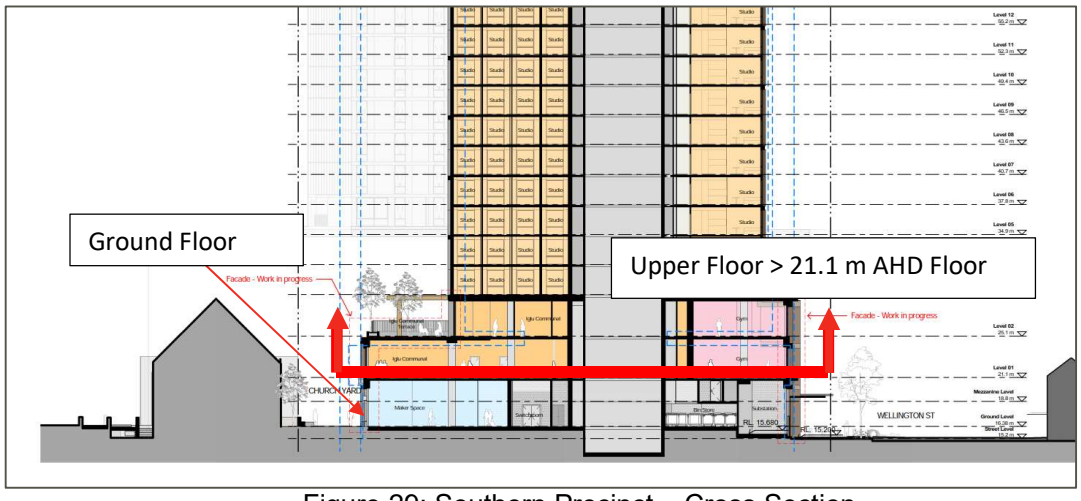


Figure 29: Southern Precinct – Cross Section

9.5 Emergency Planning

A flood warning and evacuation plan will be produced to inform the residents and managers of the building on the procedures to adopt to in case of an emergency associated to flood risk.

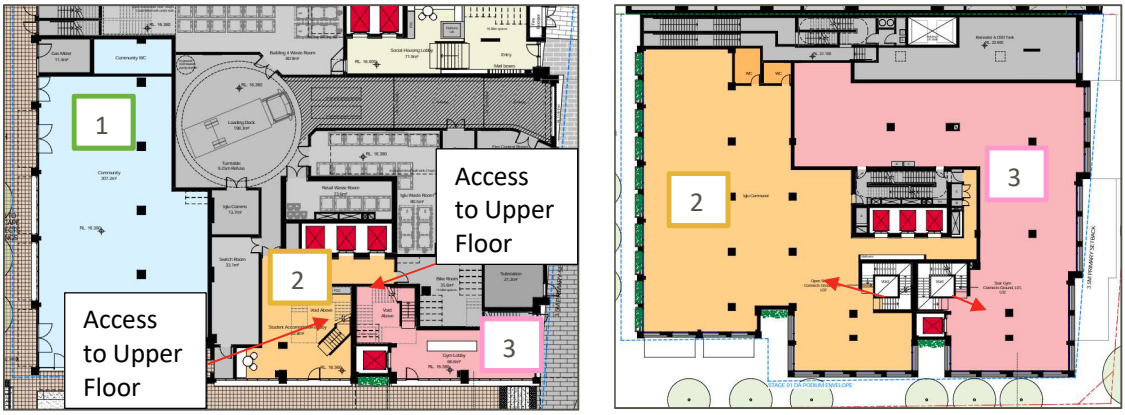
Emergency response measures have been identified in adopting appropriate FPLs (refer to Section 9.4.2) that ensure that the occupants of the development can remain safe within the building in case of a flood emergency.

9.5.1 Safe Refuge / Emergency Response

This section aims to demonstrate that all the occupants of ground floor are safe from a flood risk perspective; this section is not intended to be read as an evacuation plan.

Occupants of Area 1 can remain safe during an extreme flood event as flood planning level is above 100 year ARI and 100 year ARI+500 mm.

Occupants of Area 2 and 3 can remain safe during an extreme flood events as flood planning level is above 100 year ARI and 100 year ARI+500 mm. Upper floor can be accessed from both areas and used as shelter in case of flood emergency as indicated in Figure 30 below.

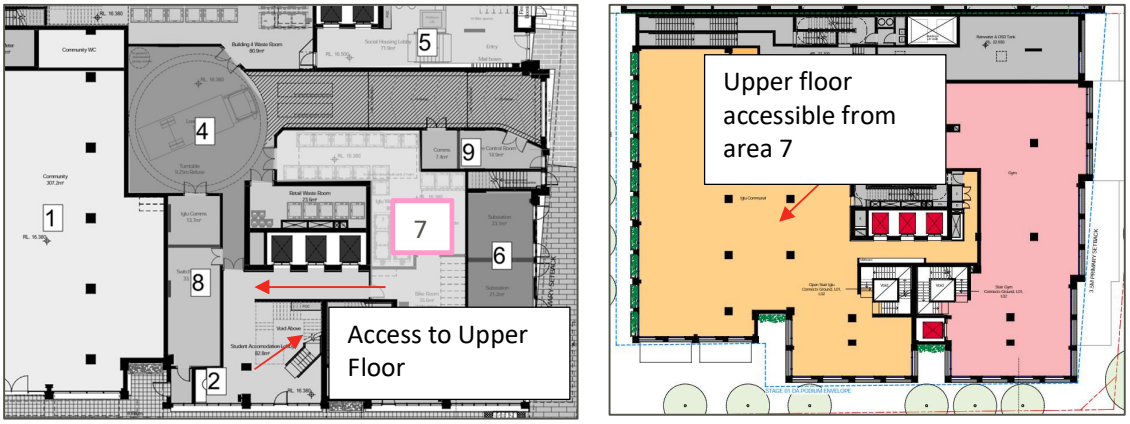


Ground Floor *Upper Floor*

Figure 30: Southern Precinct – Area 2 and Area 3

Occupants of Area 5 can remain safe within the area during an extreme flood event as flood planning level is above 100 year ARI + 500 mm and PMF.

Any occupants of Area 4 (loading dock) and 7 (bike and waste room) can remain safe during an extreme flood event within the areas as flood planning level is above 100 year ARI and 100 year ARI+500 mm. Occupants of area 7 can access area 2 move to the upper floors in case of emergency as indicated in Figure 31 below.



Ground Floor *Upper Floor*

Figure 31: Southern Precinct – Area 2 and Area 3

Area 6 (i.e. switch room), area 8 (i.e. substations) and area 9 (i.e. fire control room) are not discussed in this section as access to the areas will be limited and regulated by the building manager. The building manager will inform occupants of these areas on evacuation procedures to adopt in case of flood emergency.

Residents of the development (above first floor) could remain safely within their apartments as safe refuge is provided from their higher floor level. The level of the first floor is 21.1 m AHD; this would protect residents even in an extreme event PMF that has a maximum predicted water level of 16.59 (in Cope Street) m AOD.

9.6 Residual risks

The residual risk is limited by the absence of any residential accommodation at ground floor. Residential accommodations are located above third level.

The residual risk related to surface water flooding is mitigated by adopting floor levels above the 100 year ARI water level.

10. Stormwater Design Strategy

City of Sydney Development Control Plans were adopted to protect the community by ensuring new developments do not adversely impact on existing community infrastructure. The flood impact on the site, the stormwater quantity requirements and the stormwater quality requirements are addressed below.

10.1 Standards and policies

The development site falls under Sydney Water and City of Sydney stormwater requirements. The following guidelines are being considered for the stormwater design:

- City of Sydney Design Specification A4 Drainage Design
- RMS Specification R11.
- Concrete Pipe Association's "Concrete Pipe Selection and Installation" Guide
- AR&R Vol 1 - Australian Rainfall and Runoff "A Guide to Flood Estimation" Volume 1, 1987
- AR&R Vol 2 - Australian Rainfall and Runoff "A Guide to Flood Estimation" Volume 2, 1987
- AR&R – Project 10 Australian Rainfall and Runoff – Revision Projects "Appropriate Safety Criteria for People"
- AR&R – Project 11 Australian Rainfall and Runoff – Revision projects "Blockage of Hydraulic Structures"
- AS 3500.3: Plumbing and Drainage Code – Stormwater Drainage (2003)
- AS 3725: Design for Installing of Buried Concrete Pipes
- Botany Bay & Catchment Water Quality Improvement Plan. Sydney Metropolitan CMA, 2011
- New South Wales Floodplain Development Manual
- Waterloo Design and Amenity Guidelines (March 2020)

10.2 Existing Stormwater Conditions

The overall development site (of which the Southern Precinct is one part) drains to four (4) frontages; Botany Road, Cope, Wellington and Raglan Street. Botany Road frontage is serviced by a 900mm diameter pipe with undersized and poorly maintained (based on recent visual inspection on-site) inlet pits. Cope Street is serviced by a Council stormwater main located under the kerb and gutter and a Sydney Water owned box culvert located under the western footpath. Raglan and Wellington Street is provided with surface drainage infrastructure. The site drains to Sheas Creek via Sydney Water trunk drainage and ultimately to Alexandra Canal and Botany Bay.

For a 100 year storm event, the existing site discharge rate is approximately 1.3m3/s for a 2 hour storm duration, mostly via discharge to Council's kerb and gutter (refer to section 3.4.2. of the AECOM Water Quality, Flooding and Stormwater Report for a discussion of the Existing Peak Discharge calculation). None of the existing properties have documented stormwater quantity management systems.

10.3 Stormwater Quantity Strategy

10.3.1 Sydney Water PSD requirements

The Sydney Water requirements for the entire site were advised during the Stage 1 design in 2016 and were referenced in the AECOM Water Quality, Flooding and Stormwater Report (October 2018). They are as follows:

- On Site Detention 208 cubic meter
- Permissible Site Discharge 503 L/s

At the time the site was assumed to be 13,500 square meters.

Sydney Water also made the following comment:

- The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application.

See Appendix 3 for a copy of this correspondence.

10.3.2 Catchment Areas

The catchment areas assumed for the overall Waterloo Metro Quarter development site (not only the Southern Precinct) are as shown in Figure 12 below.

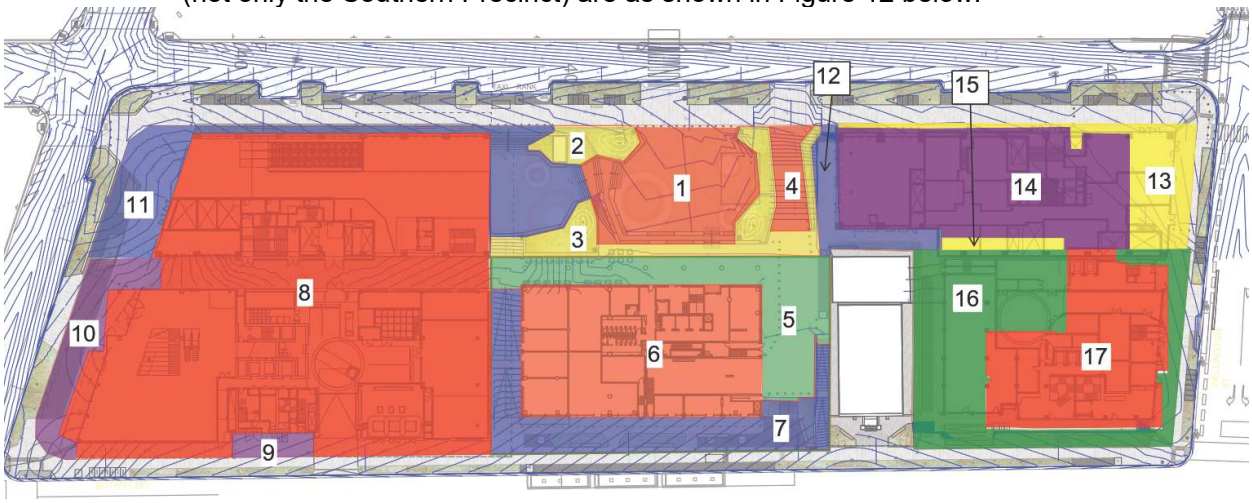


Figure 32 – Overall WMQ Site Catchment Areas

The site areas assumed for the individual sites are as shown in Table 5 below.

	Catchment Number	Bypass Area (SQM)	Captured Area (SQM)	Total Site Area (SQM)
Cope Street Plaza (Southern Precinct)	1	621		
	2*		110	
	3*		385	
	4	135		
Total		**756**	**495**	**1251**
Station	11	664		
	12	171		
Total		**835**	**0**	**835**
Building 1	8		4328	
	9	76		
	10	308		
Total		**384**	**4328**	**4712**
Building 2*	5		635	
	6		1159	
	7	606		
Total		**606**	**1794**	**2400**
Building 3 (Southern Precinct)	16	1202		
	17		698	
Total		**1202**	**698**	**1900**
Building 4 (Southern Precinct)	13	426		
	14		1157	
	15	52		

	Catchment Number	Bypass Area (SQM)	Captured Area (SQM)	Total Site Area (SQM)
Total		**478**	**1157**	**1635**
Total Site Area		**4261**	**8472**	**12733**

*Note that catchment numbers 2 and 3 are proposed to be directed to the OSD and treatment tanks in the Central Precinct

Table 5 – Stormwater Drainage Catchment Areas

10.3.3 Hydraulic Analysis

The hydrology and hydraulic analysis for the site was established using a DRAINS (computer program for hydrological and hydraulic assessment) model. The hydrological parameters used in DRAINS are in accordance with the City of Sydney DCP.
The intensity-frequency-duration (IFD) data for the site was extracted from the AR&R website, and a reproduction of the IFD data is provided in Appendix 2.
The DRAINS model was used to ensure that each individual site meets the required pro-rata PSD rate and OSD volume, which is as per Table 6 below:

	Permissible Site Discharge (L/S)	On Site Detention Volume (CU.M)	Bypass Flow Discharge (L/S)	Captured Flow Discharge (L/S)
Building 1	186	74	26	152
Building 2	94	78*	41	30
Public Plaza (Southern Precinct)	49	*	51	0
Station	32	*	56	0
Building 3&4 (Southern Precinct)	139	56	113	29
Total	**500**	**208**	**287**	**211**

*The on site detention volume for the Public Plaza and the Station are proposed to be provided within the Building 2 site in the Central Precinct.

Table 6 – On Site Detention and Permissible Site Discharge

The DRAINS model was calibrated to comply with the overall permissible site discharge by restricting discharge from the proposed OSD tanks by means of orifice plates over the outlet pipes. Details of the proposed OSD tanks and orifice plates are provided in Appendix 1. Results of the DRAINS model are provided in Appendix 2.

10.3.4 Drainage Point of discharge

The stormwater drainage point of discharge for the Southern Precinct is proposed to be located at the intersection of Cope and Wellington Streets, connecting to the existing Council stormwater pipe in Cope Street. Refer to drawing WMQ-BLD3-WSP-CV-DRG-C8230 in Appendix 1 of this report for details of the connection location.

For reference, the stormwater drainage points of discharge for the Northern and Central Precincts are proposed to be located in Botany Road.

10.3.5 Planning Secretary's Environmental Assessment Requirements

The SEARS requirements Section 16 in relation to Stormwater and Flood Impact state that the EIS shall:

- Include a stormwater management strategy that considers the relevant local council stormwater management policy, including details of onsite stormwater capture, storage and re-use measures developed for the site.

The stormwater strategy outlined in Section 11 of this report and supported by DRAINS calculations included in Appendix 2 demonstrate that the stormwater management strategy meets the Sydney Water requirements for stormwater discharge from the site and On Site Detention.

10.3.6 Concept Conditions of Consent Requirements

Condition number B26 in relation to flooding and stormwater assessment states that:

- Future development applications shall be accompanied by a Flood and Stormwater Impact Assessment. The Assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding and Stormwater Report dated 31 October 2018 prepared by AECOM.

The recommended DCP provision which is relevant to stormwater quantity is provided in Table 13 of the AECOM report and recommends that the development provides:

- a combined OSD tank volume of 480 m^3

The AECOM report does not clarify why the OSD tank volume has increased from the Sydney Water requirement of 208 m^3 to 480 m^3. It should be noted that the DRAINS model results were not included in the report to verify this number, and Figure 47 which depicts 8 separate OSD tanks across the site discharging to 6 different locations does not match the DRAINS results included in Figure 21 which depicts 2 OSD tanks discharging to 2 different locations.

The AECOM report (Section 6.2) also notes the following key factor which needs to be taken into consideration at the implementation stage:

- The total required On-Site Detention volume is approximately 480m^3 split through a number of different catchment zones. Hydraulic calculations at the detailed design development stage will determine the final detention storage volumes, outlets and interfaces.

208m^3 of On-Site Detention have been provided in the stormwater management plan to reduce the peak stormwater runoff from the site and meet the Sydney Water Permissible Site Discharge rates.

The DRAINS modelling undertaken at this stage demonstrates that the Sydney Water required OSD volume of 208m^3 is sufficient to reduce the overall Permissible Site Discharge to less than the required 503L/s. Therefore the stormwater management plan provided at this stage meets the intention of the Sydney Water discharge requirements.

10.3.7 Waterloo Design and Amenity Guideline Requirements

Section 3S (Stormwater and flooding) of the Waterloo Design and Amenity Guideline Requirements has the following objectives and design criteria which are relevant to stormwater quantity.

Objectives:

- Improve water quality and reduce stormwater runoff
- Manage flooding impacts and provide design responses that are integrated with the public domain and ensure street activation

Design Criteria:

- Provide a total on-site detention volume of approximately 480m3. On-site detention should be situated above the 100 year ARI flood level to facilitate discharge into potentially fully charged stormwater pipes.

As stated in section 11.3.5 above, On-Site Detention has been provided to reduce the peak stormwater runoff from the site and meet the Sydney Water Permissible Site Discharge rates. Refer to section 11.3.5 for details of the On-Site Detention sizing and how the design meets Sydney Water requirements.

The flooding impact of the site is reduced as a result of the On-Site Detention, which reduces the peak stormwater runoff from the site.

10.4 Stormwater Quality Requirements

Sydney Water and the City of Sydney set stormwater quality targets to protect the health of our waterways by minimising the environmental impacts of urban stormwater run-off.

Stormwater pollution originates from several sources; atmospheric depositions, erosion, litter and debris, vehicle emissions and weathering of buildings. These pollutants can be categorised broadly as follows; gross pollutants (over 5mm in size), total suspended solids (1 to 5mm in size), phosphorous, nitrogen and oils, grease and hydrocarbons.

The stormwater quality strategy for the site addresses the criteria from the SEARs requirements, the conditions of consent issued for the concept SSD DA and the Waterloo Design and Amenity Guidelines.

The SEARs include a stormwater management strategy that considers the relevant local council stormwater management policy.

The key pollutant reduction targets required by Sydney Water are as follows:

- Reduction of Mean Annual Load of Gross Pollutants – 90% (greater than 5mm)
- Reduction of Mean Annual Load of Total Suspended Solids – 85%
- Reduction of Mean Annual Load of Total Phosphorous –60%
- Reduction of Mean Annual Load of Total Nitrogen – 45%

The key pollutant reduction targets required by the City of Sydney (refer to section 3.7.3 of the City of Sydney Development Control Plan 2012) are:

- Reduction of Mean Annual Load of Gross Pollutants – 90% (greater than 5mm)
- Reduction of Mean Annual Load of Total Suspended Solids – 85%
- Reduction of Mean Annual Load of Total Phosphorous –65%
- Reduction of Mean Annual Load of Total Nitrogen – 45%

The Concept conditions of consent issued for the concept SSD DA state that the flood and stormwater impact assessment must demonstrate the conclusions and recommendations of the Concept Water Quality, Flooding and Stormwater Report prepared by AECOM. The relevant water quality targets and WSUD requirements from this report (Refer to Table 13 of the AECOM report) are:

- Reduction of baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;
- Reduction of baseline annual pollutant load for total suspended solids by 85%;
- Reduction of baseline annual pollutant load for total phosphorous by 65%; and
- Reduction of baseline annual pollutant load for total nitrogen by 45%.

These requirements have been adopted as they provide the highest level of water quality treatment (and are the same as the City of Sydney requirements).

The proposed stormwater quality strategy for the site is described in detail below.

10.5 Stormwater Quality Strategy

A stormwater quality treatment strategy has been developed for the site to reduce stormwater pollutant discharge resulting from the site; this strategy primarily incorporates Stormfilters. The roof and pavement runoff is directed to a Stormfilter chamber prior to discharge to Council's stormwater system. Stormfilter cartridges (PSorb) by Ocean Protect (or other similar approved equivalents) provide effective removal of TSS, Phosphorous and Nitrogen. Stormfilters are generally installed in specially fitted water quality chambers generally within an on-site detention tank prior to discharge. In this case it is proposed to provide a separate water quality chamber at the property boundary in order to treat runoff from pavement areas in addition to roof runoff. Refer to drawing WMQ-BLD2-WSP-CV-DRG-C8230 in Appendix 1 for further details.

The water quality model for the site was created using MUSIC software (Version 6.3.0). The main method of treatment within the proposed development is as follows:

- 7 Stormfilter cartridges for Buildings 3&4

The treatment tank for building 2 is also treating a catchment from the Public Plaza which is directed to the building 2 outfall (refer to section 10.3.2. for catchment information). Therefore

the Public Plaza and the Building 2 site are considered as one for the purpose of stormwater quality improvements. For details refer to the DA report for the Central Precinct. The areas of the Public Plaza which discharge directly to Cope Street will be treated by the raingardens in Cope Street. Refer to drawing WMQ-PBDN-WSP-CV-DRG-C8230 in Appendix 1 for further details.

Additional water quality treatment methods to be provided are as follows:

- One 10kL rainwater tank is to be installed within Building 3&4
- EnviroPod filters (or similar approved equivalent products) are to be installed within every stormwater inlet pit on the site. These are easy to maintain and provide effective removal of Total Suspended Solids and gross pollutants.

For reference, the following water quality treatment methods are proposed to be provided for the Northern and Central Precincts. These precincts also meet the requirements outlined above.

Northern Precinct:

- 8 Stormfilter cartridges for the treatment tank serving buildings 1
- One 10kL rainwater tank installed within Building 1
- EnviroPod filters (or similar approved equivalent products) to be installed within every stormwater inlet pit on the site

Central Precinct:

- 6 Stormfilter cartridges for the treatment tank serving building 2 and part of the Public Plaza
- One 10kL rainwater tank installed within Building 2
- EnviroPod filters (or similar approved equivalent products) to be installed within every stormwater inlet pit on the site

The MUSIC model and results for Building 3&4 is shown in Figure 33 below.

BUILDING 3 & 4

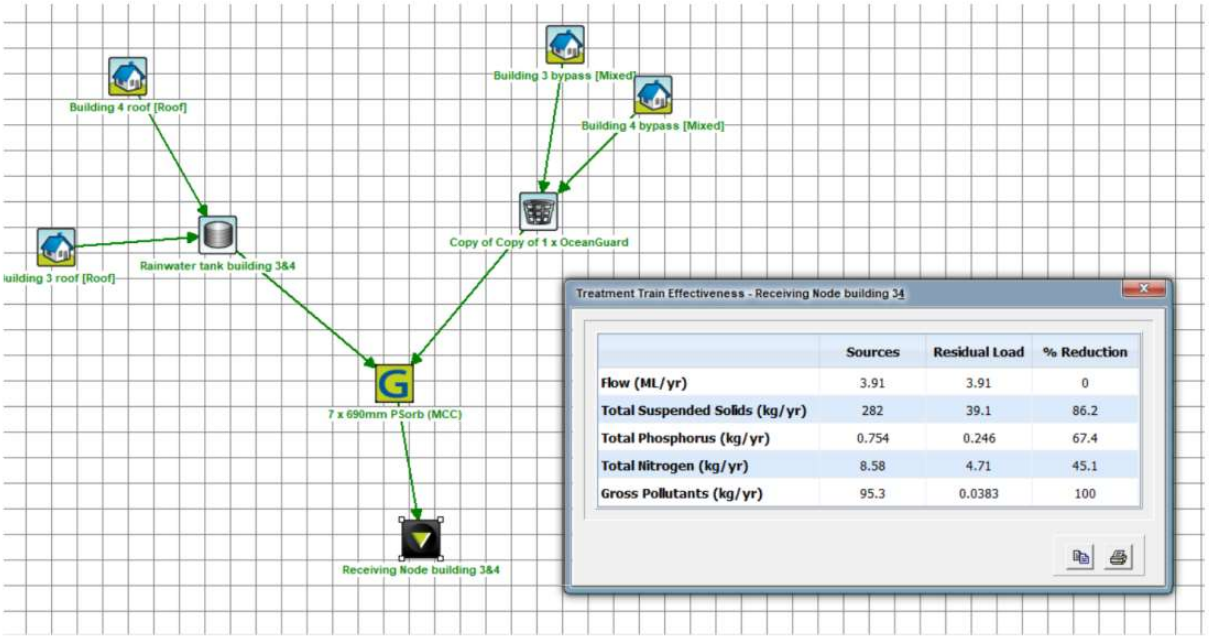


Figure 33 – Building 3&4 MUSIC model

11. Conclusion

Stormwater Management

The Stormwater drainage management strategy outlined in this report addresses the requirements outlined in the Secretary's Environmental Assessment Requirements, the conditions of consent issued for the concept SSD DA and the Waterloo Design and Amenity Guidelines.

The stormwater drainage management report demonstrates that the strategy meets the objectives of complying with relevant local council stormwater management policy; meets the design criteria of the original Concept Water Quality, Flooding and Stormwater report produced by AECOM; and meets the critical objective of the Waterloo Design and Amenity Guidelines by improving quality and reducing the peak stormwater runoff.

Flood Study

This flood study has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 April 2020 and issued for the detailed SSD DA (refer to Table 1 for project requirements).

This flood study has also been prepared in response to the conditions of consent issued for the concept SSD DA (SSD 9393) for the OSD and the Waterloo Design and Amenity Guidelines (refer to Table 2).

Hydraulic model results showed that the site area might be affected by flooding with the key source of flood risk expected to be surface water flooding.

- There is negligible afflux for the 20 and 100 year ARI events along Botany Road, Raglan Street and Wellington Street;
- In the PMF flood event afflux along Botany Road is below 50 mm; this is deemed to be acceptable for the PMF event. No increase in flood hazard is present in areas affected by PMF afflux;
- In the PMF flood event afflux at the intersection of Raglan and Cope street occurs only in a limited area. Afflux is below 65 mm. This is deemed acceptable for the PMF event;
- Afflux to the east of Cope street, is expected to be limited to 8 minutes for the 20 and 100 year ARI flood events; afflux in Cope street might occur for approximately 8 to 14 minutes during the 20 and 100 year ARI flood events;
- The afflux along Cope Street is generated by changes to the local topography (i.e. along Cope street);
- The proposed building footprints occupy a reduced area in respect to the existing buildings and do not exceed the existing building boundaries. As such the proposed buildings are not expected to negatively affect the existing flood conditions; and,

- There is no increase in flood hazard to private properties. There are limited changes in flood hazard within street areas where increases in flood hazard (from low to transitional hazard) alternate to reduction in flood hazard (from transitional to low hazard).

According to the considerations presented above the Southern Precinct is not expected to generate negative flood impact to the adjacent land.

Furthermore, flood risk has been mitigated in the proposed buildings by ensuring floor levels meet flood planning level requirements.

12. Appendices

Appendix 1 – Civil Engineering Works Drawings

NOTE:
TRENCH DRAIN AND ASSOCIATED CONNECTIONS SHOWN INDICATIVELY - FURTHER COORDINATION REQUIRED TO SUIT LANDSCAPING LAYOUT DURING DETAILED DESIGN.

APPROXIMATE BUILDING 3 & 4 OSD TANK LOCATION AT LEVEL 1 REFER TO ARCHITECT DWGS FOR DETAILS

REFER WATERLOO STATION DOCUMENTATION FOR CONTINUATION

OSD TANK REQUIREMENTS:
-TYPICAL RAINWATER INLET PIPES Ø150mm
-MAXIMUM DISCHARGE FLOW RATE=29 L/s
-OUTLET ORIFICE PLATE Ø119mm

REFER WATERLOO STATION DOCUMENTATION FOR CONTINUATION

DISCHARGE TO NEW STORMWATER PIT (BY STATION)

TREATMENT TANK 4.2m x1m

WATERLOO CONGREGATIONAL CHURCH

Gas Meter 11.4m²
Community Space WC
In ground water tank pump
Building 4 Waste Loading 80.9m²
Social Housing Lobby 72.6m²
Platform Lift
FCC
Social Housing Bike Store C
Fire Booster
Mail boxes
RL. 16.380
RL. 16.550
RL. 15.600
Entry
In ground grease arrestor
1 : 20 Ramp
1 : 12 Ramp
RL. 16.380 (tbc)
RL. 16.550 (tbc)
RL. 15.930 (tbc)
RL. 15.66 (tbc)
Loading Dock 198.3m²
Community Space 300.1m²
Turntable 9.25m Refuse
Bulky Waste 8m²
Student Accommodation Comms 13.0m²
Commercial Waste Loading 23.6m²
Student Accommodation Waste Loading 80.5m²
In ground water tank
NBN/PDH 7.4m²
Fire Control Room 14.9m²
Stair from mezzanine
Substation 23.1m²
RL. 15.610
Substation 21.2m²
RL. 15.670
Student Accommodation Bike Store A 35.6m²
Switch Room 31.4m²
Void Above
Student Accomodation Lobby 82.8m²
Gym Lobby 66.6m²
SP
IL
EH
SW
W
S
T
BKC
EP
WH
EXØ150 CI/CL WATER
EXØ225 VC SEWER
EXØ300 VC SEWER
EXØ100 CI/CL WATER

WELLINGTON STREET

BOTANY ROAD

DRAINAGE LEGEND

- PROPOSED STORMWATER JUNCTION PIT & DRAINAGE PIPE
- PROPOSED STORMWATER SURCHARGE PIT
- PROPOSED TRENCH GRATE
- PROPOSED STONE KERB AND GUTTER
- PROPOSED LIMIT OF WORKS
- EXISTING PROPERTY BOUNDARY
- EXISTING STORMWATER PIPE

	BY	DATE	DESCRIPTION	APPD.
C	MR	28.07.20	RE-ISSUE FOR CONCEPT DESIGN	KS
B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS
A	MR	17.07.20	ISSUE FOR DA	KS

SCALES
0 1 2 4 6
Full Size 1:100 ; Half Reduction 1:200
SCALE (m)

KEYPLAN
COPE STREET
RAGLAN STREET
BROOKLAND STREET
BOTANY ROAD
P6DN
BLD 1
BLD 2
BLD 3

Waterloo Integrated Station Development
A JOINT VENTURE PROJECT
CLIENT
JOHN HOLLAND
mirvac

CLIENT
NSW GOVERNMENT
sydney METRO

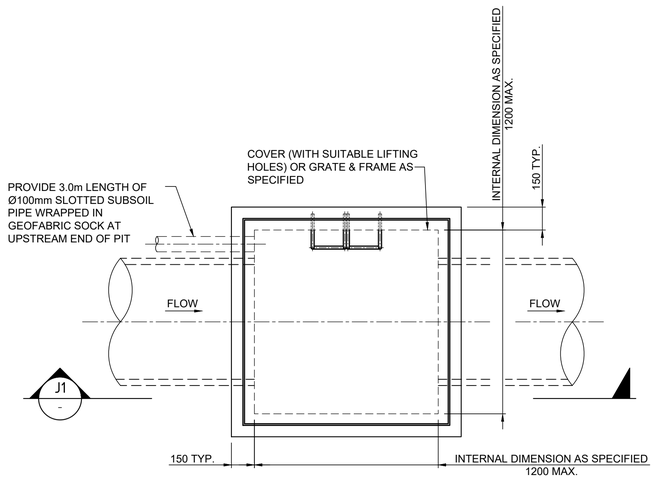
SERVICE PROVIDERS
wsp
Sydney, NSW, Australia
www.wsp.com

DRAWN	M.RANGWALA
DESIGNED	A.QUINN
DRG CHECK	J.PICKERING
DESIGN CHECK	J.CONDON
APPROVED	K.SWAN 28.07.20

WATERLOO METRO QUARTER DEVELOPMENT
SYDNEY METRO
BUILDING 3 (SOUTHERN PRECINCT)
CIVIL DRAINAGE PLAN

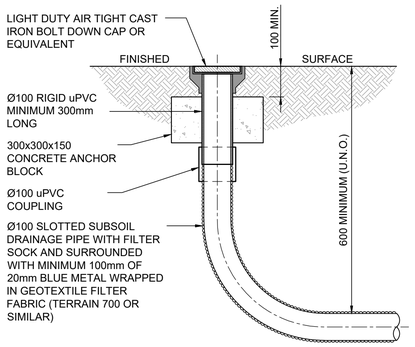
STATUS: PRELIMINARY | SHEET 1 OF 1 | ©
DRG No WMQ-BLD3-WSP-CV-DRG-C8250 | REV. C

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. [Alt. Drg. No.]



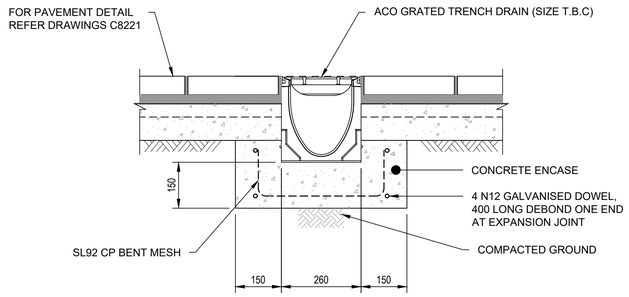
JUNCTION / GSIP STORMWATER PIT DETAIL - PLAN

SCALE 1:20



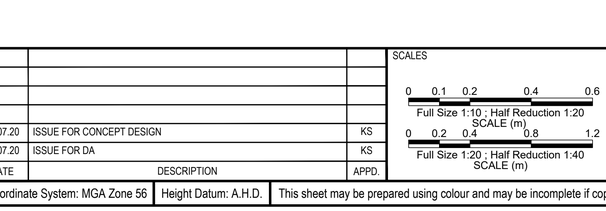
TYPICAL SUBSOIL FLUSHING POINT DETAIL FOR PERMEABLE PAVING AREAS

SCALE 1:10



TRENCH DRAIN DETAIL

SCALE 1:10



SECTION J1

SCALE 1:20

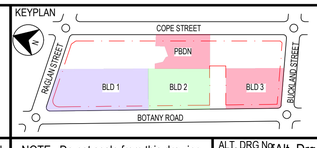
B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS
A	MR	17.07.20	ISSUE FOR DA	KS
	BY	DATE	DESCRIPTION	APPD.

SCALES

0 0.1 0.2 0.4 0.6
Full Size 1:10 ; Half Reduction 1:20
SCALE (m)

0 0.2 0.4 0.8 1.2
Full Size 1:20 ; Half Reduction 1:40
SCALE (m)

KEYPLAN



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DRAWN M.RANGWALA
DESIGNED A.QUINN
DRG CHECK J.PICKERING
DESIGN CHECK J.CONDON
APPROVED K.SWAN 17.07.20

WATERLOO METRO QUARTER DEVELOPMENT

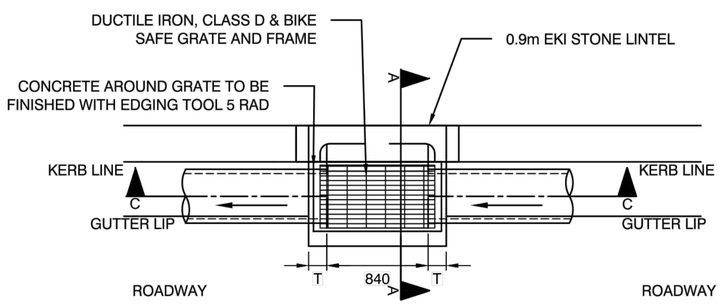
SYDNEY METRO
BUILDING 3 (SOUTHERN PRECINCT)
DRAINAGE DETAILS

STATUS: PRELIMINARY | SHEET 1 OF 1 | ©

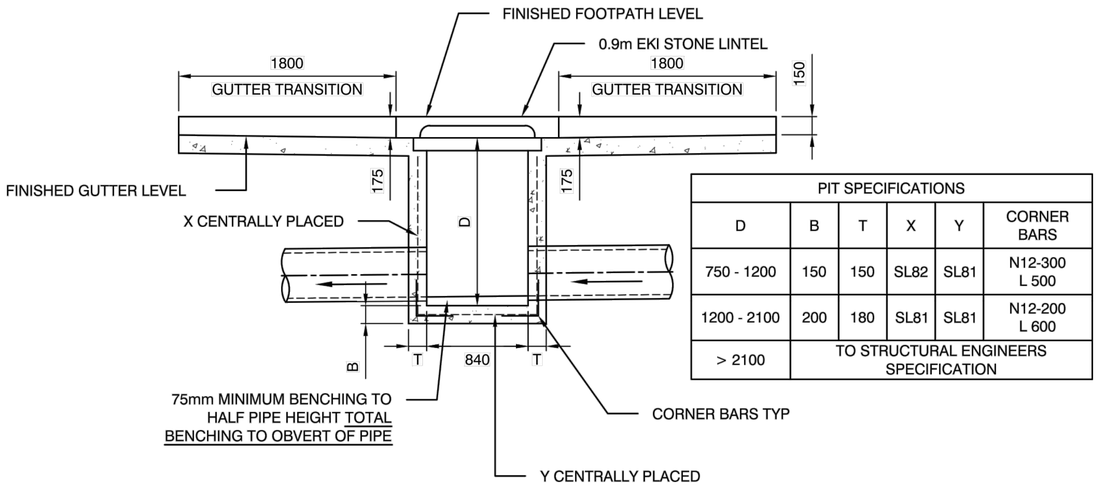
DRG No WMQ-BLD3-WSP-CV-DRG-C8260 | REV. B

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No [Alt. Drg. No.]

PLAN

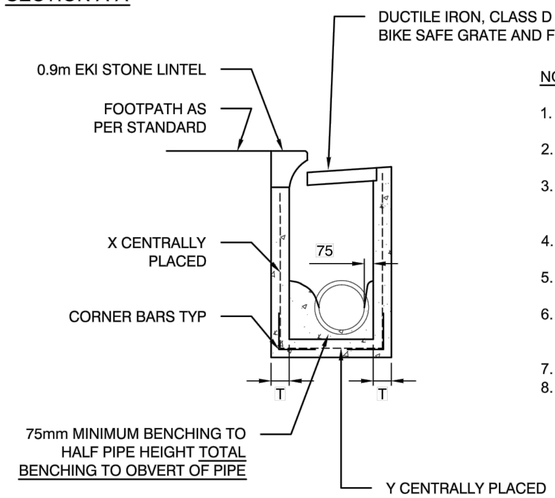


SECTION B-B



PIT SPECIFICATIONS					
D	B	T	X	Y	CORNER BARS
750 - 1200	150	150	SL82	SL81	N12-300 L 500
1200 - 2100	200	180	SL81	SL81	N12-200 L 600
> 2100	TO STRUCTURAL ENGINEERS SPECIFICATION				

SECTION A-A

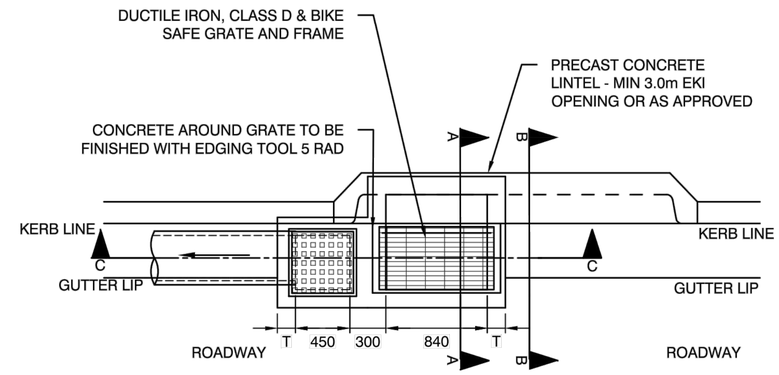


NOTES:

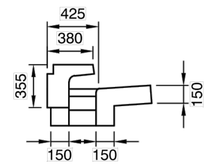
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS TO BE 32MPa.
2. 75mm MINIMUM BENCHING TO HALF PIPE HEIGHT TOTAL BENCHING TO OBVERT OF PIPE.
3. 100mmØ SUBSOIL DRAINAGE PIPE 3.0m LONG WRAPPED IN FABRIC SOCK TO BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES.
4. PROVIDE STEP IRONS WHERE PIT IS DEEPER THAN 1.0m AT 300mm CENTRES
5. PITS OVER 2.1m IN DEPTH TO BE DESIGNED BY STRUCTURAL ENGINEER.
6. GRATES SHALL BE BICYCLE SAFE AND HAVE MAXIMUM INLET CAPACITY. ALL GRATES MUST BE APPROVED BY THE CITY'S REPRESENTATIVE.
7. REINFORCEMENT TO COMPLY WITH AS1302, 1303 & 1304.
8. DRAINAGE PIPE TO BE 375Ø CLASS 4 REINFORCED CONCRETE PIPE

CITY OF SYDNEY DWG 7.1.2
STANDARD GULLY PIT WITH STONE INLET

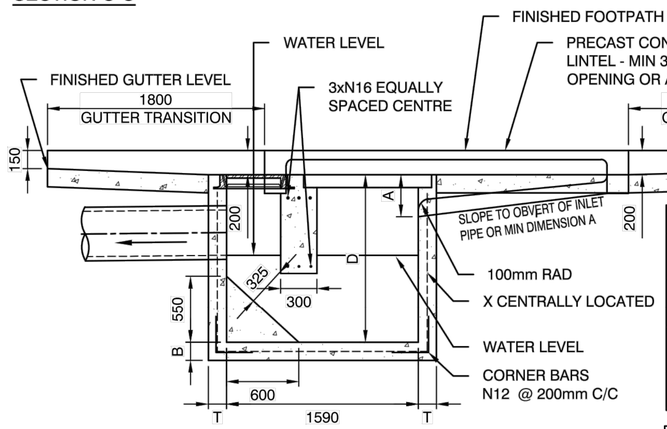
PLAN



SECTION B-B



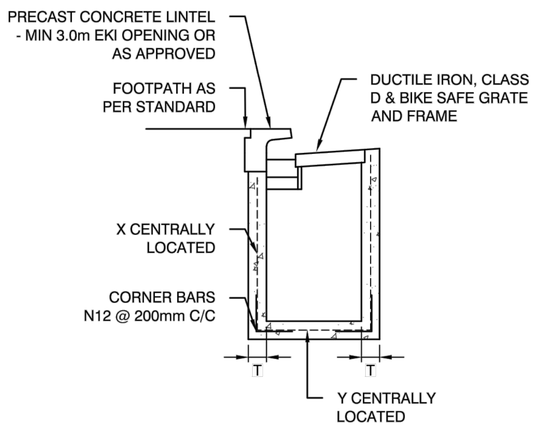
SECTION C-C



PIT SPECIFICATIONS					
D	B	T	X	Y	CORNER BARS
750 - 1200	150	150	SL82	SL81	N12-300 L 500
1200 - 2100	200	180	SL81	SL81	N12-200 L 600
> 2100	TO STRUCTURAL ENGINEERS SPECIFICATION				

MINIMUM DIMENSION A (mm)	INLET LENGHT - EKI (m)
250	1.8
300	2.4
400	3.0
450	3.6
500	4.2

SECTION A-A



NOTES:

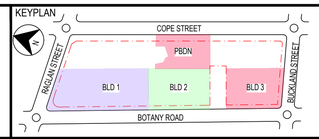
1. COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS TO BE 32MPa.
2. 75mm MINIMUM BENCHING TO HALF PIPE HEIGHT TOTAL BENCHING TO OBVERT OF PIPE.
3. 100mmØ SUBSOIL DRAINAGE PIPE 3.0m LONG WRAPPED IN FABRIC SOCK TO BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES.
4. PROVIDE STEP IRONS WHERE PIT IS DEEPER THAN 1.0m AT 300mm CENTRES.
5. PITS OVER 2.1m IN DEPTH TO BE DESIGNED BY STRUCTURAL ENGINEER.
6. GRATES SHALL BE BICYCLE SAFE AND HAVE MAXIMUM INLET CAPACITY. ALL GRATES MUST BE APPROVED BY THE CITY'S REPRESENTATIVE.
7. REINFORCEMENT TO COMPLY WITH AS 1302, 1303 & 1304.
8. DRAINAGE PIPE TO BE MINIMUM Ø375 CLASS 4 REINFORCED CONCRETE PIPE

CITY OF SYDNEY DWG 7.1.5
TRAPPED GULLY PIT WITH EXTENDED KERB INLET

B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS
A	MR	17.07.20	ISSUE FOR DA	KS
	BY	DATE	DESCRIPTION	APPD.

SCALES

KEYPLAN



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DESIGNED A.QUINN
DRG CHECK J.PICKERING
DESIGN CHECK J.CONDON
APPROVED K.SWAN 17.07.20

WATERLOO METRO QUARTER DEVELOPMENT
SYDNEY METRO
BUILDING 3 (SOUTHERN PRECINCT)
COUNCIL STANDARD DETAILS

STATUS: PRELIMINARY | SHEET 1 OF 3 | ©

DRG No WMQ-BLD3-WSP-CV-DRG-C8263 | REV. B

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing. | ALT. DRG No. [Alt. Drg. No.]

DRAINAGE LEGEND

- PROPOSED STORMWATER JUNCTION PIT & DRAINAGE PIPE
- PROPOSED STORMWATER SURCHARGE PIT
- PROPOSED TRENCH GRATE
- PROPOSED STONE KERB AND GUTTER
- PROPOSED LIMIT OF WORKS
- EXISTING PROPERTY BOUNDARY
- EXISTING STORMWATER PIPE

COPE ST

EXØ100 CICL WATER

EXØ400 VC SEWER

EXØ450 CICL WATER

EX 914x914 RC SWD

KERB OUTLET TO RAINGARDEN
INCLUDING DISSIPATION ROCKS

REFER WATERLOO STATION DOCUMENTATION FOR CONTINUATION

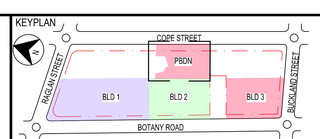
NOTE:
FOR DRAINAGE WORKS DETAIL REFER TO WATERLOO STATION DOCUMENTATION

NOTE:
TRENCH DRAIN AND ASSOCIATED CONNECTIONS SHOWN INDICATIVELY - FURTHER COORDINATION REQUIRED TO SUIT LANDSCAPING LAYOUT DURING DETAILED DESIGN.

REFER CENTRAL PRECINCT DOCUMENTATION FOR CONTINUATION

B	MR	23.07.20	ISSUE FOR CONCEPT DESIGN	KS
A	MR	17.07.20	ISSUE FOR DA	KS
	BY	DATE	DESCRIPTION	APPD.

SCALES
0 1 2 4 6
Full Size 1:100 ; Half Reduction 1:200
SCALE (m)

KEYPLAN


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DESIGNED A.QUINN
DRG CHECK J.PICKERING
DESIGN CHECK J.CONDON
APPROVED K.SWAN 23.07.20

WATERLOO METRO QUARTER DEVELOPMENT

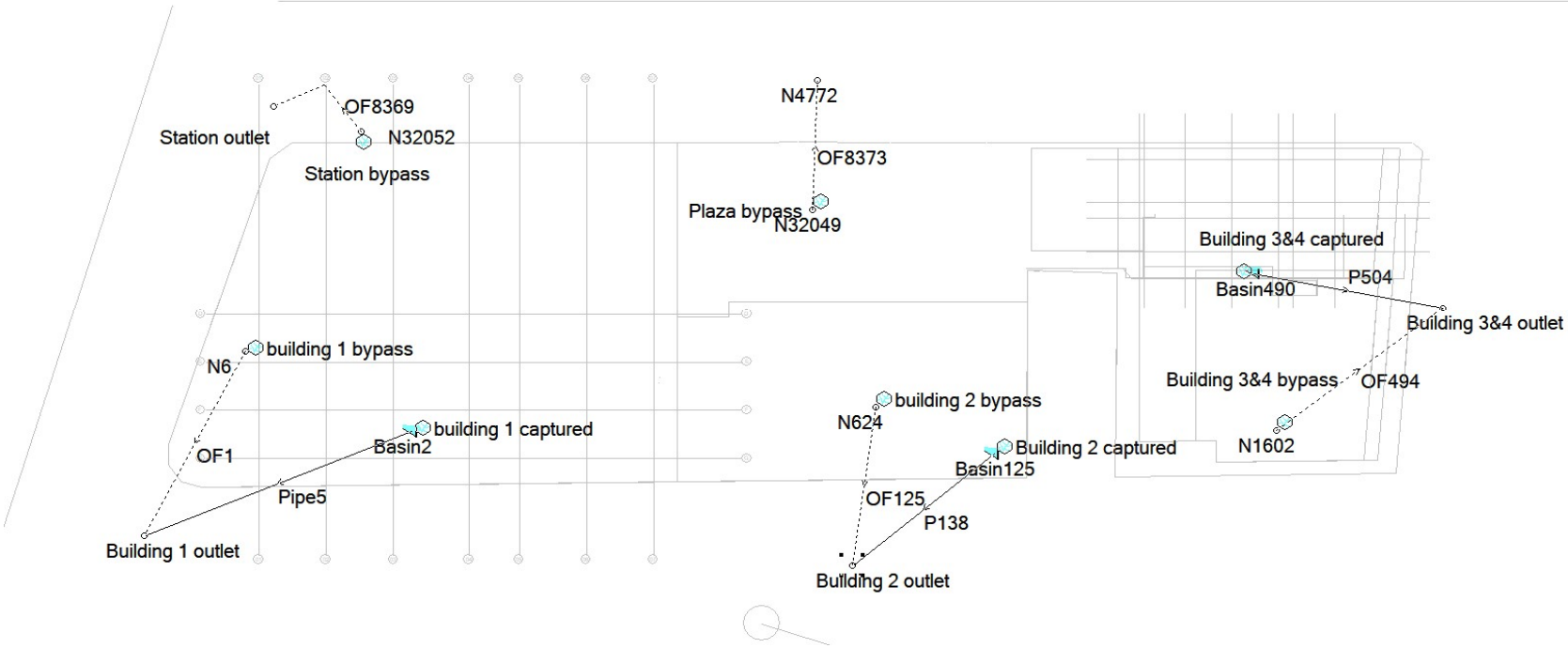
SYDNEY METRO
PUBLIC DOMAIN (SOUTHERN PRECINCT)
CIVIL DRAINAGE PLAN

STATUS: PRELIMINARY | SHEET 1 OF 1 | ©

DRG No WMQ-PBDN-WSP-CV-DRG-C8270 | REV. B

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No. [Alt. Drg. No.]

Appendix 2 – IFD Data and DRAINS Results


Station outlet
OF8369
N32052
Station bypass
N4772
OF8373
Plaza bypass
N32049
Building 3&4 captured
Basin490
P504
Building 3&4 outlet
Building 3&4 bypass
OF494
N1602
building 1 bypass
N6
building 1 captured
Basin2
OF1
Pipe5
Building 1 outlet
building 2 bypass
N624
Building 2 captured
Basin125
OF125
P138
Building 2 outlet

PIT / NODE DETAILS

Name	Type	Family	Version 14 Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
N6	Node						16.7		0	-80813.415	210269.309		22		No					
Building 1 outlet	Node						16.6		0	-98875.963	175854.523		17		No					
Building 2 outlet	Node						15.8		0	27645.304	170223.013		1013		No					
N624	Node						16.8		0	31816.794	199840.586		1634		No					
Building 3&4 outlet	Node						15.2		0	133183.981	218403.713		3583		No					
N1602	Node						11.5		0	103357.833	195460.522		4080		No					
N4772	Node						15.7		0	21388.071	260952.903		11266		No					
Station outlet	Node						16.2		0	-75819.215	256126.722		15758		No					
N32049	Node						11.5		0	20553.773	236758.265		72603		No					
N32052	Node						11.5		0	-60164.543	251358.478		72607		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
Basin2	16.6	75		Orifice		280	16.74			-51195.841	195251.948	Yes	17.5	2	27
	17.6	75													
Basin125	15.8	78		Orifice		121	15.94			52882.814	191080.459	Yes	16.7	2	1137
	16.8	78													
Basin490	15.2	56		Orifice		119	15.34			99394.919	224869.521	Yes	16.1	2	3708
	16.2	56													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	Paved Area %	Grass Area %	Supp Area %	Paved Time (min)	Grass Time (min)	Supp Time (min)	Paved Length (m)	Grass Length (m)	Supp Length (m)	Paved Slope(%) %	Grass Slope %	Supp Slope %	Paved Rough	Grass Rough	Supp Rough	Lag Time or Factor	Gutter Length (m)	Gutter Slope %	Gutter FlowFactor	Rainfall Multiplier
building 1 bypass	N6	0.0384	100	0	0	5	5	5										0				1
building 1 captured	Basin2	0.4328	100	0	0	5	5	5										0				1
Building 2 captured	Basin125	0.2289	100	0	0	5	5	5										0				1
building 2 bypass	N624	0.0606	100	0	0	5	5	5										0				1
Building 3&4 captured	Basin490	0.1855	100	0	0	5	5	5										0				1
Building 3&4 bypass	N1602	0.168	100	0	0	5	5	5										0				1
Plaza bypass	N32049	0.0756	100	0	0	5	5	5										0				1
Station bypass	N32052	0.0836	100	0	0	5	5	5										0				1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe5	Basin2	Building 1 outlet	100	16.6	15.6	1	FRC Class 4	750	720	0.012	NewFixed	1	Basin2		0				
P138	Basin125	Building 2 outlet	100	15.8	14.8	1	FRC Class 4	750	720	0.012	NewFixed	1	Basin125		0				
P504	Basin490	Building 3&4 outlet	100	15.2	14.2	1	FRC Class 4	750	720	0.012	NewFixed	1	Basin490		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	Chg (m)	Bottom Elev (m)	Height of Service (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storms (m)	SafeDepth Minor Storms (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
OF1	N6	Building 1 outlet	0.7				4 m wide pathway	0.3	0.15	0.4	1.5	0	21	16.7	16.6	100
OF125	N624	Building 2 outlet	0.7				4 m wide pathway	0.3	0.15	0.4	1.5	0	1260	16	15.8	100
OF494	N1602	Building 3&4 outlet	0.7				4 m wide pathway	0.3	0.15	0.4	1.5	0	3335	15.7	15.2	100
OF8373	N32049	N4772	0.7				4 m wide pathway	0.3	0.15	0.4	1.5	0	72600	15.6	15.1	100
OF8369	N32052	Station outlet	0.7				4 m wide pathway	0.3	0.15	0.4	1.5	0	72597			100

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover (m)	Cover (m)	
Pipe5	FRC Class 4	720	0.6	0.1	Unsafe
P138	FRC Class 4	720	0.6	0.1	Unsafe
P504	FRC Class 4	720	0.6	0.1	Unsafe

This model has no pipes with non-return valves

DRAINS results prepared from Version 2019.06

PIT / NODE DETAILS

Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Building 1 outlet	16.45		0.029				
Building 2 outlet	15.65		0.046				
Building 3&4 outlet	15.05		0.126				
N4772	15.55		0.057				
Station outlet	16.05		0.063				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	Paved Max Q (cu.m/s)	Grassed Max Q (cu.m/s)	Paved Tc (min)	Grassed Tc (min)	Supp. Tc (min)	Due to Storm
building 1 bypass	0.026	0.026	0	5	5	5	1% AEP, 5 min burst, Storm 1
building 1 captured	0.292	0.292	0	5	5	5	1% AEP, 5 min burst, Storm 1
Building 2 captured	0.155	0.155	0	5	5	5	1% AEP, 5 min burst, Storm 1
building 2 bypass	0.041	0.041	0	5	5	5	1% AEP, 5 min burst, Storm 1
Building 3&4 captured	0.125	0.125	0	5	5	5	1% AEP, 5 min burst, Storm 1
Building 3&4 bypass	0.113	0.113	0	5	5	5	1% AEP, 5 min burst, Storm 1
Plaza bypass	0.051	0.051	0	5	5	5	1% AEP, 5 min burst, Storm 1
Station bypass	0.056	0.056	0	5	5	5	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe5	0.152	0.37	17.445	16.45	1% AEP, 5 min burst, Storm 1
P138	0.03	0.07	16.637	15.65	1% AEP, 15 min burst, Storm 2
P504	0.029	0.07	16.022	15.05	1% AEP, 25 min burst, Storm 10

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF1	0.026	0.026	1.468	0.029	0.01	4	0.46	1% AEP, 5 min burst, Storm 1
OF125	0.041	0.041	1.468	0.033	0.02	4	0.57	1% AEP, 5 min burst, Storm 1
OF494	0.113	0.113	1.468	0.049	0.04	4	0.84	1% AEP, 5 min burst, Storm 1
OF8373	0.051	0.051	1.468	0.036	0.02	4	0.61	1% AEP, 5 min burst, Storm 1
OF8369	0.056	0.056	1.468	0.037	0.02	4	0.64	1% AEP, 5 min burst, Storm 1

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin2	17.17	42.7	0.152	0.152	0

Basin125	16.74	73.3	0.03	0.03	0
Basin490	16.17	54.5	0.029	0.029	0

Run Log for 200630 MQD Drains run at 18:04:22 on 30/6/2020

Flows were safe in all overflow routes.

Event ID	Region	Region (source)	Burst Duration (min)	Burst Loading	Original Burst Depth (mm)	AEP Window	AEP (source) (%)	Burst Start Date	Burst End Date	DB Event Reference No.	DB Pluviograph Reference No.	Offical Gauge	Lat	Long
4380	East Coast (South)	East Coast (South)	10	1	15.5	frequent	14.4679	3/25/2009 17:45	3/25/2009 17:50	113650	1828	qcd_563064_233	-32.2375	150.6306
4382	East Coast (South)	East Coast (South)	10	1	18.8	frequent	14.4924	12/28/1999 17:05	12/28/1999 17:10	39777	517	qcd_061250	-32.6296	151.5919
4384	East Coast (South)	East Coast (South)	10	1	16.8	frequent	14.5144	02-04-05 9:30	02-04-05 9:35	42925	556	qcd_068102	-34.4869	150.4019
4385	East Coast (South)	East Coast (South)	10	2	18.5	frequent	15.6473	3/27/1999 22:30	3/27/1999 22:35	114063	1835	qcd_563079_231	-33.7944	150.5083
4386	East Coast (South)	East Coast (South)	10	2	11	frequent	47.6798	4/28/1993 14:05	4/28/1993 14:10	113366	1824	qcd_563056_231	-34.0333	150.2153
4387	East Coast (South)	East Coast (South)	10	2	10	frequent	52.1369	05-03-07 9:35	05-03-07 9:40	112822	1817	qcd_563048_231	-33.4333	150.05
4388	East Coast (South)	East Coast (South)	10	2	10	frequent	61.856	12/26/1993 13:45	12/26/1993 13:50	120789	1949	qcd_568168_233	-34.1235	150.7384
4389	East Coast (South)	East Coast (South)	10	3	22.6	frequent	14.4213	11/26/2001 19:10	11/26/2001 19:15	61080	960	qcd_203010_77	-28.7365	153.164
4390	East Coast (South)	East Coast (South)	10	3	18.5	frequent	14.4226	12/14/1998 17:00	12/14/1998 17:05	62833	1000	qcd_213005_77	-33.7982	150.9825
4391	East Coast (South)	East Coast (South)	10	3	18.41	frequent	40.3161	03-07-73 14:30	03-07-73 14:35	12454	493	qcd_059067	-30.3439	152.7128
4369	East Coast (South)	East Coast (South)	10	1	21.44	intermediate	14.4035	12/21/1979 19:35	12/21/1979 19:40	36083	476	qcd_058026	-28.4414	152.8296
4370	East Coast (South)	East Coast (South)	10	1	29	intermediate	4.6567	12-10-08 15:50	12-10-08 15:55	38062	497	qcd_060085	-31.3865	152.2482
4372	East Coast (South)	East Coast (South)	10	1	18.2	intermediate	10.8076	12-05-03 13:55	12-05-03 14:00	39020	506	qcd_061158	-32.5067	151.3779
4373	East Coast (South)	East Coast (South)	10	2	20.6	intermediate	7.5877	07-01-10 12:55	07-01-10 13:00	35740	471	qcd_057104	-31.2739	151.9655
4374	East Coast (South)	East Coast (South)	10	2	24	intermediate	4.9848	12-06-94 13:30	12-06-94 13:35	114850	1847	qcd_566037_233	-33.8085	151.0907
4375	East Coast (South)	East Coast (South)	10	3	26.51	intermediate	5.4868	1/31/1966 15:40	1/31/1966 15:45	36685	484	qcd_058116	-28.45	153
4376	East Coast (South)	East Coast (South)	10	3	22.91	intermediate	12.4842	3/15/1955 4:40	3/15/1955 4:45	38474	502	qcd_061078	-32.7932	151.8359
4377	East Coast (South)	East Coast (South)	10	3	21.69	intermediate	5.3205	12-05-59 14:50	12-05-59 14:55	39674	516	qcd_061240	-32.9667	151.1333
4378	East Coast (South)	East Coast (South)	10	1	22	intermediate	7.2234	2/26/2008 16:25	2/26/2008 16:30	117210	1888	qcd_567108_231	-33.3846	150.9867
4379	East Coast (South)	East Coast (South)	10	1	23.58	intermediate	5.0066	1/29/1980 14:05	1/29/1980 14:10	39134	508	qcd_061174	-32.9	151.2667
4354	East Coast (South)	East Coast (South)	10	1	35.5	rare	0.3639	12/14/1986 23:20	12/14/1986 23:25	114277	1840	qcd_566018_233	-34.0308	151.1643
4355	East Coast (South)	East Coast (South)	10	1	38.48	rare	0.1482	03-08-03 18:40	03-08-03 18:45	112071	1809	qcd_563036_231	-34.1394	150.3106
4356	East Coast (South)	East Coast (South)	10	1	56.5	rare	0.1649	6/15/1997 19:35	6/15/1997 19:40	134779	2150	qcd_bateaubay_58	-33.3817	151.4767
4357	East Coast (South)	East Coast (South)	10	3	26.36	rare	0.9998	2/19/2007 15:50	2/19/2007 15:55	120662	1946	qcd_568163_231	-34.4261	150.1903
4361	East Coast (South)	East Coast (South)	10	3	28.89	rare	2.4427	02-11-97 20:40	02-11-97 20:45	35314	465	qcd_056202	-28.9776	152.1552
4363	East Coast (South)	East Coast (South)	10	1	27.5	rare	1.0386	10-05-09 15:15	10-05-09 15:20	117584	1897	qcd_567154_233	-33.8946	150.9459
4364	East Coast (South)	East Coast (South)	10	3	24.4	rare	2.0146	3/18/1990 16:00	3/18/1990 16:05	42415	547	qcd_066137	-33.9181	150.9864
4365	East Coast (South)	East Coast (South)	10	1	25.53	rare	2.3992	11-07-69 18:10	11-07-69 18:15	38997	506	qcd_061158	-32.5067	151.3779
4366	East Coast (South)	East Coast (South)	10	3	29.8	rare	1.5538	12/24/2004 13:35	12/24/2004 13:40	39314	512	qcd_061211	-33.3588	150.7058
4368	East Coast (South)	East Coast (South)	10	3	31	rare	2.0803	3/27/2008 16:20	3/27/2008 16:25	61326	965	qcd_204007_77	-29.5082	152.6832
4417	East Coast (South)	East Coast (South)	15	1	24.2	frequent	15.1426	11/29/2000 18:45	11/29/2000 18:55	35299	465	qcd_056202	-28.9776	152.1552
4418	East Coast (South)	East Coast (South)	15	1	20	frequent	17.7192	4/14/2009 19:00	4/14/2009 19:10	116404	1875	qcd_566155_233	-33.9587	150.9645
4419	East Coast (South)	East Coast (South)	15	1	15	frequent	17.8133	11-02-04 17:45	11-02-04 17:55	43994	571	qcd_070080	-34.4048	149.8197
4420	East Coast (South)	East Coast (South)	15	2	22.04	frequent	14.4274	1/31/1978 16:30	1/31/1978 16:40	39251	511	qcd_061209	-32.9597	150.675
4421	East Coast (South)	East Coast (South)	15	2	28	frequent	14.4292	12/21/1991 17:50	12/21/1991 18:00	116339	1873	qcd_566100_233	-33.808	151.3019
4422	East Coast (South)	East Coast (South)	15	2	22.12	frequent	14.4458	2/28/2007 12:20	2/28/2007 12:30	121174	1956	qcd_568183_231	-34.5756	150.5183
4423	East Coast (South)	East Coast (South)	15	2	23.5	frequent	14.5786	12-06-07 7:10	12-06-07 7:20	114345	1841	qcd_566020_233	-33.9005	151.0879
4424	East Coast (South)	East Coast (South)	15	2	21	frequent	14.6254	11-08-99 14:50	11-08-99 15:00	119756	1933	qcd_568130_233	-34.059	150.6809
4425	East Coast (South)	East Coast (South)	15	3	26	frequent	14.8113	11-11-84 18:15	11-11-84 18:25	115463	1855	qcd_566055_233	-33.7067	151.107
4426	East Coast (South)	East Coast (South)	15	3	26.15	frequent	15.7415	2/15/1984 12:55	2/15/1984 13:05	42048	543	qcd_066062	-33.8607	151.205
4381	East Coast (South)	East Coast (South)	15	1	20	intermediate	12.831	3/25/2009 17:45	3/25/2009 17:55	113650	1828	qcd_563064_233	-32.2375	150.6306
4408	East Coast (South)	East Coast (South)	15	1	26.5	intermediate	12.2861	2/15/1998 17:40	2/15/1998 17:50	117026	1885	qcd_567102_233	-33.6969	151.0277
4409	East Coast (South)	East Coast (South)	15	1	30	intermediate	9.975	12-04-07 23:35	12-04-07 23:45	61225	963	qcd_204001_77	-29.9793	152.725
4410	East Coast (South)	East Coast (South)	15	2	28.5	intermediate	3.9471	2/28/2007 13:50	2/28/2007 14:00	120264	1940	qcd_568147_233	-34.0996	150.6981
4411	East Coast (South)	East Coast (South)	15	2	35.22	intermediate	5.8797	12-05-80 4:55	12-05-80 5:05	39479	514	qcd_061223	-32.9131	151.75
4412	East Coast (South)	East Coast (South)	15	2	25	intermediate	9.3495	04-04-04 14:35	04-04-04 14:45	114700	1846	qcd_566036_233	-33.8893	151.0368
4413	East Coast (South)	East Coast (South)	15	2	38.58	intermediate	3.9998	12/22/1991 14:30	12/22/1991 14:40	38495	502	qcd_061078	-32.7932	151.8359
4414	East Coast (South)	East Coast (South)	15	2	23.47	intermediate	6.0127	2/24/1977 16:25	2/24/1977 16:35	40436	525	qcd_062005	-32.0051	149.9815
4415	East Coast (South)	East Coast (South)	15	3	22.36	intermediate	11.6619	3/21/1973 20:20	3/21/1973 20:30	39694	516	qcd_061240	-32.9667	151.1333
4416	East Coast (South)	East Coast (South)	15	3	33.5	intermediate	3.2636	2/17/1993 9:10	2/17/1993 9:20	115578	1857	qcd_566065_233	-33.8773	151.1673
4358	East Coast (South)	East Coast (South)	15	2	36.15	rare	0.4298	2/19/2007 15:45	2/19/2007 15:55	120662	1946	qcd_568163_231	-34.4261	150.1903
4392	East Coast (South)	East Coast (South)	15	1	34.5	rare	2.7085	4/21/1989 22:10	4/21/1989 22:20	115570	1857	qcd_566065_233	-33.8773	151.1673
4393	East Coast (South)	East Coast (South)	15	1	35	rare	1.9503	12-05-89 3:40	12-05-89 3:50	114882	1847	qcd_566037_233	-33.8085	151.0907
4396	East Coast (South)	East Coast (South)	15	1	40.5	rare	1.6461	01-06-89 14:40	01-06-89 14:50	114601	1845	qcd_566032_233	-33.887	151.2253
4397	East Coast (South)	East Coast (South)	15	2	50.5	rare	0.2955	1/21/1991 15:30	1/21/1991 15:40	117021	1885	qcd_567102_233	-33.6969	151.0277
4398	East Coast (South)	East Coast (South)	15	2	29.15	rare	1.9841	1/17/2007 14:40	1/17/2007 14:50	120661	1946	qcd_568163_231	-34.4261	150.1903
4400	East Coast (South)	East Coast (South)	15	2	32	rare	2.4768	2/24/2007 17:35	2/24/2007 17:45	120505	1943	qcd_568156_233	-34.0482	150.73
4401	East Coast (South)	East Coast (South)	15	2	32.75	rare	2.7058	11/27/1988 10:55	11/27/1988 11:05	112004	1808	qcd_563035_231	-33.9758	150.3811
4403	East Coast (South)	East Coast (South)	15	3	107.5	rare	0.0048	11/23/1996 20:35	11/23/1996 20:45	138481	2233	qcd_northbonvil_58	-30.3638	153.0055
4407	East Coast (South)	East Coast (South)	15	3	27.52	rare	2.5093	3/24/2008 14:55	3/24/2008 15:05	112382	1812	qcd_563041_231	-33.7686	150.1236

4445	East Coast (South)	East Coast (South)	20	1	30.5	frequent	14.5133	1/17/2001 22:15	1/17/2001 22:30	117769	1901	qcd_568004_231	-34.2872	150.7253
4446	East Coast (South)	East Coast (South)	20	1	32.85	frequent	14.7257	3/19/1978 22:45	3/19/1978 23:00	38101	497	qcd_060085	-31.3865	152.2482
4448	East Coast (South)	East Coast (South)	20	1	26.5	frequent	14.8119	2/28/1995 19:05	2/28/1995 19:20	116813	1882	qcd_567085_233	-33.608	150.7671
4449	East Coast (South)	East Coast (South)	20	2	30.5	frequent	14.4241	04-10-98 11:50	04-10-98 12:05	115990	1864	qcd_566085_233	-33.7629	151.1945
4450	East Coast (South)	East Coast (South)	20	2	23.35	frequent	14.4269	2/20/2005 13:50	2/20/2005 14:05	120704	1947	qcd_568165_231	-34.5369	150.3825
4451	East Coast (South)	East Coast (South)	20	2	24	frequent	14.4721	11/26/1988 13:15	11/26/1988 13:30	119753	1933	qcd_568130_233	-34.059	150.6809
4452	East Coast (South)	East Coast (South)	20	2	26.04	frequent	14.5324	01-02-80 16:45	01-02-80 17:00	35394	468	qcd_057091	-30.7167	151.8531
4453	East Coast (South)	East Coast (South)	20	2	31	frequent	14.5361	01-04-87 16:05	01-04-87 16:20	114620	1845	qcd_566032_233	-33.887	151.2253
4454	East Coast (South)	East Coast (South)	20	3	23	frequent	14.9591	12-05-95 11:20	12-05-95 11:35	113762	1831	qcd_563073_231	-33.6139	150.1561
4455	East Coast (South)	East Coast (South)	20	3	30.5	frequent	15.4448	09-01-02 7:35	09-01-02 7:50	134697	2148	qcd_avalon_58	-33.6408	151.3288
4383	East Coast (South)	East Coast (South)	20	1	30	intermediate	10.1606	12/28/1999 17:05	12/28/1999 17:20	39777	517	qcd_061250	-32.6296	151.5919
4434	East Coast (South)	East Coast (South)	20	1	38.5	intermediate	4.6924	12/29/2006 16:25	12/29/2006 16:40	115409	1854	qcd_566053_233	-33.6672	151.1047
4435	East Coast (South)	East Coast (South)	20	1	36	intermediate	14.0922	11/30/2005 15:25	11/30/2005 15:40	61631	973	qcd_205006_77	-30.6405	152.856
4436	East Coast (South)	East Coast (South)	20	2	24.21	intermediate	11.6266	10/27/1965 22:55	10/27/1965 23:10	39083	507	qcd_061171	-32.5167	150.9667
4437	East Coast (South)	East Coast (South)	20	2	28.54	intermediate	13.6735	02-10-81 18:05	02-10-81 18:20	38426	501	qcd_061029	-33.2333	151.2
4438	East Coast (South)	East Coast (South)	20	2	24.5	intermediate	11.8839	3/19/1985 14:55	3/19/1985 15:10	113402	1824	qcd_563056_231	-34.0333	150.2153
4439	East Coast (South)	East Coast (South)	20	2	30.57	intermediate	3.5787	2/15/1991 20:30	2/15/1991 20:45	40995	532	qcd_063039	-33.7122	150.3087
4440	East Coast (South)	East Coast (South)	20	2	38.48	intermediate	5.7957	02-06-92 14:15	02-06-92 14:30	37170	489	qcd_059000	-30.8141	152.5129
4441	East Coast (South)	East Coast (South)	20	3	27	intermediate	9.7177	08-05-86 16:50	08-05-86 17:05	116588	1877	qcd_567077_233	-33.8807	150.9504
4444	East Coast (South)	East Coast (South)	20	3	37.89	intermediate	10.2978	11/20/1979 20:05	11/20/1979 20:20	36292	478	qcd_058072	-28.6533	153.4542
4359	East Coast (South)	East Coast (South)	20	3	41.59	rare	0.3541	2/19/2007 15:40	2/19/2007 15:55	120662	1946	qcd_568163_231	-34.4261	150.1903
4367	East Coast (South)	East Coast (South)	20	2	45	rare	1.1259	12/24/2004 13:35	12/24/2004 13:50	39314	512	qcd_061211	-33.3588	150.7058
4371	East Coast (South)	East Coast (South)	20	1	47.2	rare	2.3539	12-10-08 15:50	12-10-08 16:05	38062	497	qcd_060085	-31.3865	152.2482
4399	East Coast (South)	East Coast (South)	20	2	34.37	rare	1.5391	1/17/2007 14:35	1/17/2007 14:50	120661	1946	qcd_568163_231	-34.4261	150.1903
4404	East Coast (South)	East Coast (South)	20	2	163	rare	0.0002	11/23/1996 20:30	11/23/1996 20:45	138481	2233	qcd_northbonvil_58	-30.3638	153.0055
4427	East Coast (South)	East Coast (South)	20	2	37.19	rare	2.2892	12-09-98 18:30	12-09-98 18:45	111571	1801	qcd_561104_231	-32.9777	150.5829
4428	East Coast (South)	East Coast (South)	20	2	36.66	rare	1.6471	3/31/1969 18:15	3/31/1969 18:30	42746	553	qcd_067035	-33.9272	150.9128
4429	East Coast (South)	East Coast (South)	20	2	65.43	rare	0.1171	11-08-84 22:00	11-08-84 22:15	42099	543	qcd_066062	-33.8607	151.205
4432	East Coast (South)	East Coast (South)	20	3	26.18	rare	1.8368	1/16/2006 10:45	1/16/2006 11:00	123044	1983	qcd_570350_231	-34.7506	149.6953
4433	East Coast (South)	East Coast (South)	20	2	38.5	rare	3.1017	2/21/1984 16:45	2/21/1984 17:00	116430	1876	qcd_567076_233	-33.7111	150.9842
4480	East Coast (South)	East Coast (South)	25	1	35.11	frequent	14.5614	02-05-96 15:50	02-05-96 16:10	38503	502	qcd_061078	-32.7932	151.8359
4481	East Coast (South)	East Coast (South)	25	1	27.19	frequent	15.2218	2/14/2001 15:55	2/14/2001 16:15	111682	1803	qcd_561107_231	-33.0288	150.8741
4483	East Coast (South)	East Coast (South)	25	1	20.44	frequent	15.2572	1/27/2006 15:30	1/27/2006 15:50	112994	1819	qcd_563050_231	-34.0839	149.9172
4485	East Coast (South)	East Coast (South)	25	2	27	frequent	14.4835	12-03-03 18:15	12-03-03 18:35	116642	1878	qcd_567078_233	-33.9827	150.9071
4486	East Coast (South)	East Coast (South)	25	2	26.5	frequent	14.4994	10-11-08 15:20	10-11-08 15:40	120349	1941	qcd_568149_233	-34.0292	150.6575
4487	East Coast (South)	East Coast (South)	25	2	28	frequent	14.6604	3/29/2002 15:50	3/29/2002 16:10	114188	1838	qcd_563082_231	-33.3766	150.6072
4488	East Coast (South)	East Coast (South)	25	2	31.18	frequent	14.7181	12/15/1970 15:10	12/15/1970 15:30	35384	466	qcd_057033	-30.5112	152.0427
4489	East Coast (South)	East Coast (South)	25	2	29	frequent	14.7598	2/17/1993 9:40	2/17/1993 10:00	116727	1880	qcd_567083_233	-33.8192	150.9127
4490	East Coast (South)	East Coast (South)	25	3	34.76	frequent	15.0494	02-02-90 12:15	02-02-90 12:35	39524	514	qcd_061223	-32.9131	151.75
4494	East Coast (South)	East Coast (South)	25	3	26.5	frequent	15.4218	10/24/1987 13:45	10/24/1987 14:05	120511	1943	qcd_568156_233	-34.0482	150.73
4447	East Coast (South)	East Coast (South)	25	1	37.17	intermediate	13.0798	3/19/1978 22:40	3/19/1978 23:00	38101	497	qcd_060085	-31.3865	152.2482
4468	East Coast (South)	East Coast (South)	25	1	40.4	intermediate	10.2032	1/19/2006 11:55	1/19/2006 12:15	36868	486	qcd_058131	-28.8521	153.4556
4470	East Coast (South)	East Coast (South)	25	1	36	intermediate	8.1516	11/29/2002 15:45	11/29/2002 16:05	116009	1865	qcd_566087_233	-33.8226	151.1294
4471	East Coast (South)	East Coast (South)	25	2	32.5	intermediate	10.877	03-02-95 22:30	03-02-95 22:50	117427	1893	qcd_567147_233	-33.7437	150.9924
4472	East Coast (South)	East Coast (South)	25	2	41.8	intermediate	8.5722	06-03-10 6:00	06-03-10 6:20	36857	486	qcd_058131	-28.8521	153.4556
4473	East Coast (South)	East Coast (South)	25	2	40.5	intermediate	3.5613	02-05-10 18:55	02-05-10 19:15	117648	1898	qcd_567163_233	-33.7745	150.6716
4474	East Coast (South)	East Coast (South)	25	2	38.82	intermediate	12.3554	1/23/1989 12:05	1/23/1989 12:25	36849	486	qcd_058131	-28.8521	153.4556
4476	East Coast (South)	East Coast (South)	25	2	30.59	intermediate	8.532	3/28/1969 18:25	3/28/1969 18:45	39004	506	qcd_061158	-32.5067	151.3779
4477	East Coast (South)	East Coast (South)	25	3	27.09	intermediate	9.0362	1/21/1988 16:45	1/21/1988 17:05	39436	513	qcd_061212	-32.3767	150.96
4479	East Coast (South)	East Coast (South)	25	3	33	intermediate	10.7451	10/31/2005 17:25	10/31/2005 17:45	114229	1839	qcd_563146_233	-33.6767	150.625
4394	East Coast (South)	East Coast (South)	25	2	52.5	rare	0.4819	12-05-89 3:30	12-05-89 3:50	114882	1847	qcd_566037_233	-33.8085	151.0907
4456	East Coast (South)	East Coast (South)	25	1	40	rare	2.5109	1/18/1993 14:55	1/18/1993 15:15	111557	1801	qcd_561104_231	-32.9777	150.5829
4458	East Coast (South)	East Coast (South)	25	1	44.5	rare	1.5041	1/21/1991 14:10	1/21/1991 14:30	120099	1938	qcd_568140_231	-34.1467	150.4244
4459	East Coast (South)	East Coast (South)	25	1	38.25	rare	1.0637	12/28/1996 13:50	12/28/1996 14:10	112555	1814	qcd_563043_231	-33.9844	150.1167
4460	East Coast (South)	East Coast (South)	25	2	53.48	rare	2.5174	1/17/1966 16:00	1/17/1966 16:20	37715	494	qcd_060030	-31.9033	152.4496
4461	East Coast (South)	East Coast (South)	25	2	53.5	rare	2.9389	11-05-00 16:50	11-05-00 17:10	60996	958	qcd_201001_77	-28.3537	153.2931
4462	East Coast (South)	East Coast (South)	25	2	132.62	rare	0	1/23/1991 20:55	1/23/1991 21:15	121513	1964	qcd_568296_77	-34.1437	150.6467
4464	East Coast (South)	East Coast (South)	25	2	81.5	rare	0.4897	3/31/2009 13:05	3/31/2009 13:25	137954	2223	qcd_middleboamb_58	-30.3262	153.048
4466	East Coast (South)	East Coast (South)	25	3	50.2	rare	1.2393	12/14/2003 14:10	12/14/2003 14:30	35700	470	qcd_057103	-30.0093	152.0101
4467	East Coast (South)	East Coast (South)	25	3	48.5	rare	1.3513	11/22/2005 19:10	11/22/2005 19:30	117645	1898	qcd_567163_233	-33.7745	150.6716
4484	East Coast (South)	East Coast (South)	30	1	22.14	frequent	14.4733	1/27/2006 15:30	1/27/2006 15:55	112994	1819	qcd_563050_231	-34.0839	149.9172

4516	East Coast (South)	East Coast (South)	30	1	40.5	frequent	14.486	03-12-91 23:35	3/13/1991 0:00	36875	486	qcd_058131	-28.8521	153.4556
4517	East Coast (South)	East Coast (South)	30	1	34.5	frequent	14.9489	02-07-10 0:30	02-07-10 0:55	115418	1854	qcd_566053_233	-33.6672	151.1047
4518	East Coast (South)	East Coast (South)	30	2	25.67	frequent	14.4634	04-04-07 14:45	04-04-07 15:10	112379	1812	qcd_563041_231	-33.7686	150.1236
4519	East Coast (South)	East Coast (South)	30	2	32.8	frequent	14.4655	1/28/2001 12:55	1/28/2001 13:20	61448	968	qcd_204030_77	-30.2587	152.0094
4520	East Coast (South)	East Coast (South)	30	2	30.79	frequent	14.5328	02-12-92 16:40	02-12-92 17:05	62836	1000	qcd_213005_77	-33.7982	150.9825
4521	East Coast (South)	East Coast (South)	30	2	34	frequent	14.5714	3/21/1983 16:20	3/21/1983 16:45	114290	1840	qcd_566018_233	-34.0308	151.1643
4522	East Coast (South)	East Coast (South)	30	2	40.18	frequent	14.6131	12/15/1986 13:55	12/15/1986 14:20	36552	482	qcd_058109	-28.3672	153.1689
4523	East Coast (South)	East Coast (South)	30	3	36.75	frequent	16.1324	04-07-84 23:50	04-08-84 0:15	118046	1905	qcd_568048_231	-34.265	150.8058
4524	East Coast (South)	East Coast (South)	30	3	35.5	frequent	16.2546	05-02-09 19:40	05-02-09 20:05	116302	1872	qcd_566099_233	-33.9119	151.2273
4506	East Coast (South)	East Coast (South)	30	1	32.75	intermediate	4.8824	12/29/1990 18:30	12/29/1990 18:55	111929	1807	qcd_562102_231	-32.991	150.1346
4507	East Coast (South)	East Coast (South)	30	1	50.6	intermediate	4.6224	12-03-07 14:30	12-03-07 14:55	40385	524	qcd_061390	-32.8905	151.707
4508	East Coast (South)	East Coast (South)	30	1	56.75	intermediate	7.4552	10/31/2005 12:30	10/31/2005 12:55	140323	2265	qcd_southboambe_58	-30.3417	153.0512
4509	East Coast (South)	East Coast (South)	30	2	41.5	intermediate	6.1808	01-08-88 18:50	01-08-88 19:15	119577	1929	qcd_568102_231	-34.5522	150.6317
4510	East Coast (South)	East Coast (South)	30	2	35.5	intermediate	8.2296	12-01-70 16:15	12-01-70 16:40	12654	508	qcd_061174	-32.9	151.2667
4511	East Coast (South)	East Coast (South)	30	2	43	intermediate	3.3107	03-04-96 12:20	03-04-96 12:45	120910	1951	qcd_568170_233	-33.3472	150.8578
4512	East Coast (South)	East Coast (South)	30	2	41	intermediate	7.2535	1/22/2005 17:25	1/22/2005 17:50	61580	971	qcd_204900_77	-29.1965	152.5931
4513	East Coast (South)	East Coast (South)	30	2	31.5	intermediate	6.3627	03-10-03 10:05	03-10-03 10:30	113655	1828	qcd_563064_233	-32.2375	150.6306
4514	East Coast (South)	East Coast (South)	30	3	27.79	intermediate	10.9771	2/23/1990 11:10	2/23/1990 11:35	40516	526	qcd_062020	-32.5014	150.0333
4515	East Coast (South)	East Coast (South)	30	3	31.47	intermediate	6.0188	01-01-67 17:20	01-01-67 17:45	40505	526	qcd_062020	-32.5014	150.0333
4402	East Coast (South)	East Coast (South)	30	2	45.75	rare	2.0727	11/27/1988 10:45	11/27/1988 11:10	112004	1808	qcd_563035_231	-33.9758	150.3811
4457	East Coast (South)	East Coast (South)	30	1	47.5	rare	1.433	1/18/1993 14:55	1/18/1993 15:20	111557	1801	qcd_561104_231	-32.9777	150.5829
4495	East Coast (South)	East Coast (South)	30	1	60.43	rare	2.4031	1/31/2008 15:30	1/31/2008 15:55	118546	1913	qcd_568061_231	-34.4056	150.7097
4497	East Coast (South)	East Coast (South)	30	1	65.25	rare	1.7251	05-03-94 6:10	05-03-94 6:35	138064	2226	qcd_mountelliot_58	-33.405	151.3933
4498	East Coast (South)	East Coast (South)	30	2	44.53	rare	3.1062	12/13/1963 3:25	12/13/1963 3:50	41915	542	qcd_066037	-33.9465	151.1731
4500	East Coast (South)	East Coast (South)	30	2	62.25	rare	0.1852	02-11-07 4:20	02-11-07 4:45	120109	1938	qcd_568140_231	-34.1467	150.4244
4502	East Coast (South)	East Coast (South)	30	2	56.25	rare	2.1328	3/23/1997 17:30	3/23/1997 17:55	118929	1919	qcd_568072_231	-34.1786	150.8317
4503	East Coast (South)	East Coast (South)	30	2	44.98	rare	1.2839	1/23/2004 15:20	1/23/2004 15:45	119452	1927	qcd_568094_231	-34.3778	150.3156
4504	East Coast (South)	East Coast (South)	30	3	54	rare	2.1685	10/25/2003 15:30	10/25/2003 15:55	117264	1889	qcd_567109_233	-33.6202	151.149
4505	East Coast (South)	East Coast (South)	30	3	50	rare	1.0156	02-10-90 13:50	02-10-90 14:15	120350	1941	qcd_568149_233	-34.0292	150.6575
4545	East Coast (South)	East Coast (South)	45	1	34.5	frequent	14.5408	03-07-94 3:40	03-07-94 4:20	120916	1951	qcd_568170_233	-33.3472	150.8578
4546	East Coast (South)	East Coast (South)	45	1	59.1	frequent	14.5668	02-11-92 23:20	02-12-92 0:00	37491	492	qcd_059040	-30.3107	153.1187
4547	East Coast (South)	East Coast (South)	45	1	28.59	frequent	14.8476	12/16/1985 16:10	12/16/1985 16:50	38659	503	qcd_061089	-32.0632	150.9272
4548	East Coast (South)	East Coast (South)	45	2	36.5	frequent	14.4248	2/26/2006 20:10	2/26/2006 20:50	117702	1899	qcd_567165_233	-33.6692	150.9206
4549	East Coast (South)	East Coast (South)	45	2	35.8	frequent	14.5019	03-09-03 14:25	03-09-03 15:05	42841	554	qcd_067113	-33.7195	150.6783
4550	East Coast (South)	East Coast (South)	45	2	35.25	frequent	14.5576	02-07-88 14:20	02-07-88 15:00	113741	1829	qcd_563070_231	-33.7	150.4847
4551	East Coast (South)	East Coast (South)	45	2	37.75	frequent	14.5836	5/19/1998 1:05	5/19/1998 1:45	117318	1890	qcd_567110_231	-33.5574	151.0179
4552	East Coast (South)	East Coast (South)	45	2	33.06	frequent	14.6479	4/25/1974 12:50	4/25/1974 13:30	42747	553	qcd_067035	-33.9272	150.9128
4553	East Coast (South)	East Coast (South)	45	3	39.53	frequent	14.494	2/17/1993 8:50	2/17/1993 9:30	41910	542	qcd_066037	-33.9465	151.1731
4554	East Coast (South)	East Coast (South)	45	3	47.25	frequent	16.5246	2/18/1984 8:30	2/18/1984 9:10	119543	1928	qcd_568097_231	-34.37	150.8197
4478	East Coast (South)	East Coast (South)	45	2	35.96	intermediate	6.592	1/21/1988 16:45	1/21/1988 17:25	39436	513	qcd_061212	-32.3767	150.96
4536	East Coast (South)	East Coast (South)	45	1	35	intermediate	8.9926	3/24/2008 17:35	3/24/2008 18:15	113979	1833	qcd_563076_231	-33.0503	150.4163
4537	East Coast (South)	East Coast (South)	45	1	50	intermediate	3.3244	11-07-85 15:20	11-07-85 16:00	116877	1883	qcd_567087_233	-33.7342	150.7692
4538	East Coast (South)	East Coast (South)	45	1	52.9	intermediate	3.5082	02-11-92 12:35	02-11-92 13:15	35248	465	qcd_056202	-28.9776	152.1552
4539	East Coast (South)	East Coast (South)	45	2	65	intermediate	4.5989	3/25/2001 21:15	3/25/2001 21:55	61633	973	qcd_205006_77	-30.6405	152.856
4540	East Coast (South)	East Coast (South)	45	2	33.11	intermediate	10.269	1/17/1971 18:05	1/17/1971 18:45	40227	522	qcd_061334	-33.0488	150.2325
4541	East Coast (South)	East Coast (South)	45	2	65	intermediate	4.3469	10/24/1999 7:55	10/24/1999 8:35	118616	1914	qcd_568065_231	-34.2653	150.8778
4542	East Coast (South)	East Coast (South)	45	2	24.4	intermediate	14.1608	11/22/2007 15:05	11/22/2007 15:45	44004	571	qcd_070080	-34.4048	149.8197
4543	East Coast (South)	East Coast (South)	45	3	60	intermediate	3.6973	11-04-90 9:55	11-04-90 10:35	134740	2149	qcd_barnsley_58	-32.9228	151.5917
4544	East Coast (South)	East Coast (South)	45	3	49.4	intermediate	13.3079	12-12-91 22:25	12-12-91 23:05	36850	486	qcd_058131	-28.8521	153.4556
4362	East Coast (South)	East Coast (South)	45	1	78.51	rare	0.4384	02-11-97 20:35	02-11-97 21:15	35314	465	qcd_056202	-28.9776	152.1552
4496	East Coast (South)	East Coast (South)	45	2	73.34	rare	2.2242	1/31/2008 15:20	1/31/2008 16:00	118546	1913	qcd_568061_231	-34.4056	150.7097
4525	East Coast (South)	East Coast (South)	45	1	41.85	rare	3.1772	12/30/1995 20:40	12/30/1995 21:20	62261	987	qcd_210055_77	-32.3809	150.7114
4526	East Coast (South)	East Coast (South)	45	1	59.8	rare	1.5171	02-04-08 17:40	02-04-08 18:20	35709	470	qcd_057103	-30.0093	152.0101
4527	East Coast (South)	East Coast (South)	45	2	62.6	rare	3.0333	2/13/1997 19:55	2/13/1997 20:35	61133	961	qcd_203030_77	-29.11	152.9994
4528	East Coast (South)	East Coast (South)	45	2	79	rare	2.4185	2/18/1984 4:50	2/18/1984 5:30	118685	1915	qcd_568068_231	-34.4097	150.7781
4531	East Coast (South)	East Coast (South)	45	2	95.64	rare	0.6534	2/16/1984 5:35	2/16/1984 6:15	118878	1918	qcd_568071_231	-34.4628	150.7333
4533	East Coast (South)	East Coast (South)	45	2	93.75	rare	1.1403	10/24/1999 8:30	10/24/1999 9:10	119535	1928	qcd_568097_231	-34.37	150.8197
4534	East Coast (South)	East Coast (South)	45	3	65.6	rare	0.3737	02-01-05 19:00	02-01-05 19:40	112917	1818	qcd_563049_231	-33.8675	150.2506
4535	East Coast (South)	East Coast (South)	45	3	57.08	rare	0.7913	02-01-80 14:50	02-01-80 15:30	62840	1000	qcd_213005_77	-33.7982	150.9825
4574	East Coast (South)	East Coast (South)	60	1	39	frequent	14.4622	03-06-90 14:30	03-06-90 15:25	116969	1884	qcd_567100_233	-33.6562	150.8477
4575	East Coast (South)	East Coast (South)	60	1	64	frequent	14.6147	04-02-98 2:25	04-02-98 3:20	138471	2233	qcd_northbonvil_58	-30.3638	153.0055

4576	East Coast (South)	East Coast (South)	60	1	47	frequent	14.6394	3/25/2001 22:05	3/25/2001 23:00	61229	963	qcd_204001_77	-29.9793	152.725
4577	East Coast (South)	East Coast (South)	60	2	66.2	frequent	14.6386	1/20/1971 17:05	1/20/1971 18:00	37486	492	qcd_059040	-30.3107	153.1187
4578	East Coast (South)	East Coast (South)	60	2	48.5	frequent	14.7615	08-05-86 13:10	08-05-86 14:05	115007	1848	qcd_566038_233	-33.8578	151.2788
4579	East Coast (South)	East Coast (South)	60	2	45	frequent	14.8912	04-02-92 12:10	04-02-92 13:05	115438	1855	qcd_566055_233	-33.7067	151.107
4580	East Coast (South)	East Coast (South)	60	2	33	frequent	14.8952	3/21/1983 13:05	3/21/1983 14:00	118202	1907	qcd_568050_231	-34.3033	150.4194
4581	East Coast (South)	East Coast (South)	60	2	38.5	frequent	14.9105	02-01-05 21:15	02-01-05 22:10	117653	1898	qcd_567163_233	-33.7745	150.6716
4582	East Coast (South)	East Coast (South)	60	3	38.43	frequent	14.8886	03-10-66 22:00	03-10-66 22:55	42638	552	qcd_067033	-33.6022	150.7794
4583	East Coast (South)	East Coast (South)	60	3	47.5	frequent	15.3843	02-07-10 1:25	02-07-10 2:20	116371	1874	qcd_566114_233	-33.8973	151.2587
4475	East Coast (South)	East Coast (South)	60	1	71.09	intermediate	3.7014	1/23/1989 11:55	1/23/1989 12:50	36849	486	qcd_058131	-28.8521	153.4556
4563	East Coast (South)	East Coast (South)	60	1	42.8	intermediate	8.986	09-06-06 22:40	09-06-06 23:35	42368	546	qcd_066124	-33.7917	151.0181
4565	East Coast (South)	East Coast (South)	60	1	39.12	intermediate	6.3382	1/25/2001 14:35	1/25/2001 15:30	119461	1927	qcd_568094_231	-34.3778	150.3156
4566	East Coast (South)	East Coast (South)	60	2	33.4	intermediate	4.4749	02-05-10 18:30	02-05-10 19:25	44005	571	qcd_070080	-34.4048	149.8197
4567	East Coast (South)	East Coast (South)	60	2	49.4	intermediate	9.8444	2/20/2005 14:50	2/20/2005 15:45	38319	499	qcd_060106	-31.6647	152.0637
4568	East Coast (South)	East Coast (South)	60	2	52.6	intermediate	5.0031	2/20/2006 15:10	2/20/2006 16:05	61444	968	qcd_204030_77	-30.2587	152.0094
4569	East Coast (South)	East Coast (South)	60	2	29	intermediate	4.0565	1/18/1998 14:55	1/18/1998 15:50	122389	1975	qcd_570341_231	-34.5508	149.5728
4570	East Coast (South)	East Coast (South)	60	2	66.96	intermediate	5.1299	03-02-77 22:05	03-02-77 23:00	36879	486	qcd_058131	-28.8521	153.4556
4572	East Coast (South)	East Coast (South)	60	3	54.28	intermediate	11.8976	3/29/1987 17:50	3/29/1987 18:45	36635	483	qcd_058113	-28.4738	153.0861
4573	East Coast (South)	East Coast (South)	60	3	35	intermediate	13.5113	3/21/1983 13:05	3/21/1983 14:00	120122	1938	qcd_568140_231	-34.1467	150.4244
4360	East Coast (South)	East Coast (South)	60	1	62.4	rare	0.1564	2/19/2007 15:40	2/19/2007 16:35	120662	1946	qcd_568163_231	-34.4261	150.1903
4405	East Coast (South)	East Coast (South)	60	2	374.5	rare	0	11/23/1996 20:15	11/23/1996 21:10	138481	2233	qcd_northbonvil_58	-30.3638	153.0055
4463	East Coast (South)	East Coast (South)	60	3	235.87	rare	0	1/23/1991 20:20	1/23/1991 21:15	121513	1964	qcd_568296_77	-34.1437	150.6467
4555	East Coast (South)	East Coast (South)	60	1	101.8	rare	0.188	02-05-01 15:25	02-05-01 16:20	38384	500	qcd_060112	-32.0525	151.9147
4556	East Coast (South)	East Coast (South)	60	1	73.26	rare	1.3479	8/21/1971 17:00	8/21/1971 17:55	42072	543	qcd_066062	-33.8607	151.205
4557	East Coast (South)	East Coast (South)	60	2	84.5	rare	0.6129	04-10-98 15:25	04-10-98 16:20	115645	1859	qcd_566071_233	-33.7338	151.2208
4558	East Coast (South)	East Coast (South)	60	2	71	rare	1.3749	1/24/1999 7:05	1/24/1999 8:00	116054	1866	qcd_566088_233	-33.9599	151.2515
4559	East Coast (South)	East Coast (South)	60	2	135.5	rare	0.0627	10/24/1987 5:30	10/24/1987 6:25	118605	1914	qcd_568065_231	-34.2653	150.8778
4560	East Coast (South)	East Coast (South)	60	2	85	rare	0.5813	12-02-03 14:15	12-02-03 15:10	38318	499	qcd_060106	-31.6647	152.0637
4561	East Coast (South)	East Coast (South)	60	3	53.5	rare	2.1486	02-10-95 17:45	02-10-95 18:40	111567	1801	qcd_561104_231	-32.9777	150.5829
4600	East Coast (South)	East Coast (South)	90	1	49	frequent	14.7149	4/30/1988 10:40	4/30/1988 12:05	115095	1849	qcd_566040_233	-33.7698	151.0671
4602	East Coast (South)	East Coast (South)	90	1	34.81	frequent	15.2717	12/28/1996 23:15	12/29/1996 0:40	38690	503	qcd_061089	-32.0632	150.9272
4603	East Coast (South)	East Coast (South)	90	1	52	frequent	15.2796	04-10-01 4:45	04-10-01 6:10	115987	1864	qcd_566085_233	-33.7629	151.1945
4604	East Coast (South)	East Coast (South)	90	2	41.5	frequent	14.5651	1/31/2001 3:10	1/31/2001 4:35	116653	1878	qcd_567078_233	-33.9827	150.9071
4605	East Coast (South)	East Coast (South)	90	2	44	frequent	14.6877	2/15/1994 21:25	2/15/1994 22:50	116901	1883	qcd_567087_233	-33.7342	150.7692
4606	East Coast (South)	East Coast (South)	90	2	51	frequent	14.7957	06-10-91 17:10	06-10-91 18:35	115423	1854	qcd_566053_233	-33.6672	151.1047
4607	East Coast (South)	East Coast (South)	90	2	59.34	frequent	14.9778	07-10-62 12:50	07-10-62 14:15	37652	493	qcd_059067	-30.3439	152.7128
4608	East Coast (South)	East Coast (South)	90	2	49	frequent	14.9856	02-04-02 15:20	02-04-02 16:45	116185	1869	qcd_566092_233	-34.0295	151.0711
4609	East Coast (South)	East Coast (South)	90	3	78.87	frequent	14.5338	12-12-91 23:05	12/13/1991 0:30	37524	492	qcd_059040	-30.3107	153.1187
4610	East Coast (South)	East Coast (South)	90	3	62.5	frequent	15.4796	8/17/1998 12:25	8/17/1998 13:50	118903	1918	qcd_568071_231	-34.4628	150.7333
4482	East Coast (South)	East Coast (South)	90	1	50.08	intermediate	6.6644	2/14/2001 15:55	2/14/2001 17:20	111682	1803	qcd_561107_231	-33.0288	150.8741
4564	East Coast (South)	East Coast (South)	90	1	56	intermediate	4.2664	09-06-06 22:35	09-07-06 0:00	42368	546	qcd_066124	-33.7917	151.0181
4589	East Coast (South)	East Coast (South)	90	1	35.87	intermediate	13.4921	10/28/1984 14:50	10/28/1984 16:15	38685	503	qcd_061089	-32.0632	150.9272
4590	East Coast (South)	East Coast (South)	90	2	60.2	intermediate	13.9557	11-09-04 4:10	11-09-04 5:35	37748	494	qcd_060030	-31.9033	152.4496
4592	East Coast (South)	East Coast (South)	90	2	63.5	intermediate	3.3943	2/17/1993 7:20	2/17/1993 8:45	116226	1870	qcd_566094_233	-34.0399	150.9992
4593	East Coast (South)	East Coast (South)	90	2	43.13	intermediate	11.8234	09-01-70 18:10	09-01-70 19:35	42765	553	qcd_067035	-33.9272	150.9128
4594	East Coast (South)	East Coast (South)	90	2	79.8	intermediate	9.3675	10-03-10 21:40	10-03-10 23:05	37024	487	qcd_058158	-28.3395	153.3809
4595	East Coast (South)	East Coast (South)	90	2	73.68	intermediate	8.1478	2/15/1995 13:45	2/15/1995 15:10	36876	486	qcd_058131	-28.8521	153.4556
4597	East Coast (South)	East Coast (South)	90	3	58.6	intermediate	9.6226	12-05-07 7:40	12-05-07 9:05	42488	548	qcd_066142	-33.6761	151.1818
4598	East Coast (South)	East Coast (South)	90	3	47.6	intermediate	12.6553	10/29/2007 6:00	10/29/2007 7:25	35723	470	qcd_057103	-30.0093	152.0101
4395	East Coast (South)	East Coast (South)	90	3	128	rare	0.0096	12-05-89 2:20	12-05-89 3:45	114882	1847	qcd_566037_233	-33.8085	151.0907
4430	East Coast (South)	East Coast (South)	90	1	157.35	rare	0.0071	11-08-84 21:55	11-08-84 23:20	42099	543	qcd_066062	-33.8607	151.205
4465	East Coast (South)	East Coast (South)	90	1	194.5	rare	0.1207	3/31/2009 12:55	3/31/2009 14:20	137954	2223	qcd_middleboamb_58	-30.3262	153.048
4501	East Coast (South)	East Coast (South)	90	2	153.5	rare	1.00E-04	02-11-07 4:15	02-11-07 5:40	120109	1938	qcd_568140_231	-34.1467	150.4244
4532	East Coast (South)	East Coast (South)	90	2	178.81	rare	0.03	2/16/1984 5:15	2/16/1984 6:40	118878	1918	qcd_568071_231	-34.4628	150.7333
4562	East Coast (South)	East Coast (South)	90	3	70	rare	0.7708	02-10-95 17:20	02-10-95 18:45	111567	1801	qcd_561104_231	-32.9777	150.5829
4584	East Coast (South)	East Coast (South)	90	1	64.83	rare	2.8376	02-06-77 16:45	02-06-77 18:10	35701	470	qcd_057103	-30.0093	152.0101
4585	East Coast (South)	East Coast (South)	90	2	52.7	rare	1.7458	02-01-05 18:20	02-01-05 19:45	112482	1813	qcd_563042_231	-33.8883	150.0456
4586	East Coast (South)	East Coast (South)	90	2	88.59	rare	0.4497	03-10-75 9:40	03-10-75 11:05	41940	542	qcd_066037	-33.9465	151.1731
4588	East Coast (South)	East Coast (South)	90	2	130.8	rare	1.9768	11-06-09 18:50	11-06-09 20:15	37517	492	qcd_059040	-30.3107	153.1187
4632	East Coast (South)	East Coast (South)	120	1	59.65	frequent	14.4488	11-10-75 19:50	11-10-75 21:45	37240	489	qcd_059000	-30.8141	152.5129
4635	East Coast (South)	East Coast (South)	120	1	61.34	frequent	14.5641	3/30/2002 10:05	3/30/2002 12:00	61670	975	qcd_206011_77	-31.0082	152.7126
4636	East Coast (South)	East Coast (South)	120	1	37.9	frequent	14.6687	1/21/1976 15:20	1/21/1976 17:15	38754	503	qcd_061089	-32.0632	150.9272

4638	East Coast (South)	East Coast (South)	120	2	59.38	frequent	14.5589	5/26/1919 5:50	5/26/1919 7:45	42130	543	qcd_066062	-33.8607	151.205
4640	East Coast (South)	East Coast (South)	120	2	64.25	frequent	14.5777	02-02-90 15:15	02-02-90 17:10	134938	2153	qcd_berkeleyval_58	-33.3467	151.42
4641	East Coast (South)	East Coast (South)	120	2	42.49	frequent	14.7009	12-05-95 13:10	12-05-95 15:05	111574	1801	qcd_561104_231	-32.9777	150.5829
4642	East Coast (South)	East Coast (South)	120	2	51.2	frequent	14.7505	1/25/1956 20:25	1/25/1956 22:20	114897	1847	qcd_566037_233	-33.8085	151.0907
4643	East Coast (South)	East Coast (South)	120	2	46.58	frequent	14.8011	1/15/1963 19:40	1/15/1963 21:35	42667	552	qcd_067033	-33.6022	150.7794
4644	East Coast (South)	East Coast (South)	120	3	45.5	frequent	14.6782	12-07-07 15:00	12-07-07 16:55	111513	1800	qcd_561103_231	-32.8241	150.7944
4645	East Coast (South)	East Coast (South)	120	3	80.8	frequent	14.8082	2/16/2009 18:55	2/16/2009 20:50	37442	491	qcd_059026	-30.3076	152.9874
4621	East Coast (South)	East Coast (South)	120	1	44.47	intermediate	13.8933	12/26/1971 16:00	12/26/1971 17:55	39701	516	qcd_061240	-32.9667	151.1333
4622	East Coast (South)	East Coast (South)	120	1	63	intermediate	5.6603	4/30/1988 8:25	4/30/1988 10:20	116487	1876	qcd_567076_233	-33.7111	150.9842
4623	East Coast (South)	East Coast (South)	120	1	60.29	intermediate	13.2515	12-05-64 12:15	12-05-64 14:10	35991	475	qcd_058025	-29.7067	152.94
4624	East Coast (South)	East Coast (South)	120	2	79.25	intermediate	6.5825	06-09-07 2:40	06-09-07 4:35	137622	2216	qcd_lisarow_58	-33.3833	151.375
4625	East Coast (South)	East Coast (South)	120	2	34.8	intermediate	12.006	9/29/2005 0:30	9/29/2005 2:25	44003	571	qcd_070080	-34.4048	149.8197
4626	East Coast (South)	East Coast (South)	120	2	69.8	intermediate	7.8857	02-01-02 14:30	02-01-02 16:25	38087	497	qcd_060085	-31.3865	152.2482
4628	East Coast (South)	East Coast (South)	120	2	87	intermediate	10.2057	2/24/2004 11:40	2/24/2004 13:35	61007	958	qcd_201001_77	-28.3537	153.2931
4629	East Coast (South)	East Coast (South)	120	2	75.2	intermediate	12.1396	1/15/1972 18:55	1/15/1972 20:50	36858	486	qcd_058131	-28.8521	153.4556
4630	East Coast (South)	East Coast (South)	120	3	58.5	intermediate	8.2216	5/19/1998 2:00	5/19/1998 3:55	117430	1893	qcd_567147_233	-33.7437	150.9924
4631	East Coast (South)	East Coast (South)	120	3	45.6	intermediate	14.3767	2/20/2001 21:35	2/20/2001 23:30	39937	519	qcd_061288	-32.3322	151.4595
4431	East Coast (South)	East Coast (South)	120	1	180.5	rare	0.0045	11-08-84 21:45	11-08-84 23:40	42099	543	qcd_066062	-33.8607	151.205
4499	East Coast (South)	East Coast (South)	120	3	102.74	rare	0.319	12/13/1963 2:00	12/13/1963 3:55	41915	542	qcd_066037	-33.9465	151.1731
4571	East Coast (South)	East Coast (South)	120	2	114.69	rare	1.4749	03-02-77 22:10	03-03-77 0:05	36879	486	qcd_058131	-28.8521	153.4556
4611	East Coast (South)	East Coast (South)	120	1	76.2	rare	1.8083	1/28/1999 16:45	1/28/1999 18:40	61449	968	qcd_204030_77	-30.2587	152.0094
4613	East Coast (South)	East Coast (South)	120	1	50.17	rare	0.5187	1/16/2006 13:30	1/16/2006 15:25	62723	998	qcd_21210065_77	-34.6595	149.5608
4614	East Coast (South)	East Coast (South)	120	2	97.25	rare	1.4083	4/29/1988 20:25	4/29/1988 22:20	115499	1855	qcd_566055_233	-33.7067	151.107
4615	East Coast (South)	East Coast (South)	120	2	77.47	rare	2.3992	01-08-73 2:25	01-08-73 4:20	41931	542	qcd_066037	-33.9465	151.1731
4617	East Coast (South)	East Coast (South)	120	2	64.59	rare	0.9401	1/18/1998 17:40	1/18/1998 19:35	40229	522	qcd_061334	-33.0488	150.2325
4618	East Coast (South)	East Coast (South)	120	2	74.5	rare	3.1801	2/13/1988 12:25	2/13/1988 14:20	114405	1842	qcd_566026_233	-33.9226	151.1556
4619	East Coast (South)	East Coast (South)	120	3	54.58	rare	2.6184	11/30/1965 14:20	11/30/1965 16:15	40524	526	qcd_062020	-32.5014	150.0333
4646	East Coast (South)	East Coast (South)	180	3	97.4	frequent	14.5448	2/16/2009 17:45	2/16/2009 20:40	37442	491	qcd_059026	-30.3076	152.9874
4669	East Coast (South)	East Coast (South)	180	1	48.2	frequent	14.568	11/28/2008 19:30	11/28/2008 22:25	38214	498	qcd_060104	-31.4138	151.598
4670	East Coast (South)	East Coast (South)	180	1	42.31	frequent	14.8405	10-12-85 19:05	10-12-85 22:00	38711	503	qcd_061089	-32.0632	150.9272
4673	East Coast (South)	East Coast (South)	180	1	64.32	frequent	15.1253	11/14/1969 4:20	11/14/1969 7:15	41949	542	qcd_066037	-33.9465	151.1731
4674	East Coast (South)	East Coast (South)	180	2	72.28	frequent	14.4315	02-02-90 13:00	02-02-90 15:55	138396	2231	qcd_narara_58	-33.395	151.3267
4675	East Coast (South)	East Coast (South)	180	2	73.52	frequent	14.4849	3/19/1978 3:55	3/19/1978 6:50	37909	496	qcd_060080	-31.6274	152.443
4676	East Coast (South)	East Coast (South)	180	2	66.03	frequent	14.7058	06-08-07 13:45	06-08-07 16:40	140925	2279	qcd_yarramalong_58	-33.2283	151.2617
4677	East Coast (South)	East Coast (South)	180	2	68.58	frequent	14.7403	7/26/1952 5:05	7/26/1952 8:00	42135	543	qcd_066062	-33.8607	151.205
4679	East Coast (South)	East Coast (South)	180	2	67.6	frequent	14.7988	06-12-67 11:20	06-12-67 14:15	36139	476	qcd_058026	-28.4414	152.8296
4681	East Coast (South)	East Coast (South)	180	3	66.5	frequent	14.429	1/23/1989 1:40	1/23/1989 4:35	115297	1852	qcd_566051_233	-33.6912	151.2993
4627	East Coast (South)	East Coast (South)	180	1	93.8	intermediate	3.5927	02-01-02 14:35	02-01-02 17:30	38087	497	qcd_060085	-31.3865	152.2482
4639	East Coast (South)	East Coast (South)	180	1	74.31	intermediate	10.5251	5/26/1919 5:50	5/26/1919 8:45	42130	543	qcd_066062	-33.8607	151.205
4658	East Coast (South)	East Coast (South)	180	1	82.61	intermediate	5.6788	2/13/1997 18:00	2/13/1997 20:55	36491	481	qcd_058099	-29.2823	152.9886
4659	East Coast (South)	East Coast (South)	180	2	57.98	intermediate	12.1292	1/21/1956 15:10	1/21/1956 18:05	35202	463	qcd_056059	-29.05	152.1
4662	East Coast (South)	East Coast (South)	180	2	75.5	intermediate	4.2805	02-07-90 0:15	02-07-90 3:10	106132	1856	qcd_566064_233	-33.8551	151.1075
4663	East Coast (South)	East Coast (South)	180	2	72.08	intermediate	6.1949	3/24/1978 6:30	3/24/1978 9:25	38857	504	qcd_061151	-32.2426	151.683
4665	East Coast (South)	East Coast (South)	180	2	99.09	intermediate	8.1192	1/16/1988 1:45	1/16/1988 4:40	36882	486	qcd_058131	-28.8521	153.4556
4666	East Coast (South)	East Coast (South)	180	2	68.93	intermediate	13.3535	05-09-07 19:45	05-09-07 22:40	134712	2148	qcd_avalon_58	-33.6408	151.3288
4667	East Coast (South)	East Coast (South)	180	3	106.24	intermediate	3.7737	07-06-88 5:00	07-06-88 7:55	119561	1929	qcd_568102_231	-34.5522	150.6317
4668	East Coast (South)	East Coast (South)	180	3	71	intermediate	9.5705	4/13/2009 14:25	4/13/2009 17:20	116144	1868	qcd_566091_233	-33.9467	151.1609
4469	East Coast (South)	East Coast (South)	180	1	142.2	rare	1.3489	1/19/2006 11:55	1/19/2006 14:50	36868	486	qcd_058131	-28.8521	153.4556
4599	East Coast (South)	East Coast (South)	180	3	81.4	rare	1.9004	10/29/2007 5:05	10/29/2007 8:00	35723	470	qcd_057103	-30.0093	152.0101
4612	East Coast (South)	East Coast (South)	180	1	106	rare	0.4439	1/28/1999 16:40	1/28/1999 19:35	61449	968	qcd_204030_77	-30.2587	152.0094
4647	East Coast (South)	East Coast (South)	180	1	110.5	rare	1.4614	04-10-98 7:15	04-10-98 10:10	114627	1845	qcd_566032_233	-33.887	151.2253
4648	East Coast (South)	East Coast (South)	180	2	121.5	rare	1.9402	2/18/1984 5:35	2/18/1984 8:30	119585	1929	qcd_568102_231	-34.5522	150.6317
4649	East Coast (South)	East Coast (South)	180	2	114.31	rare	2.663	03-02-76 3:55	03-02-76 6:50	37742	494	qcd_060030	-31.9033	152.4496
4651	East Coast (South)	East Coast (South)	180	2	95.07	rare	0.3723	4/15/1969 17:45	4/15/1969 20:40	42431	547	qcd_066137	-33.9181	150.9864
4652	East Coast (South)	East Coast (South)	180	2	51.6	rare	3.0027	02-05-01 8:05	02-05-01 11:00	44007	571	qcd_070080	-34.4048	149.8197
4653	East Coast (South)	East Coast (South)	180	2	167.63	rare	0.3497	2/28/1976 12:20	2/28/1976 15:15	36900	486	qcd_058131	-28.8521	153.4556
4656	East Coast (South)	East Coast (South)	180	3	89.81	rare	2.6465	3/19/1978 9:40	3/19/1978 12:35	38353	499	qcd_060106	-31.6647	152.0637
2749	East Coast (South)	East Coast (South)	270	3	83.13	frequent	14.8977	06-11-91 5:00	06-11-91 9:25	118834	1917	qcd_568070_231	-34.5542	150.5694
4706	East Coast (South)	East Coast (South)	270	1	54.6	frequent	14.6612	2/14/2001 17:45	2/14/2001 22:10	40066	520	qcd_061309	-32.6881	150.9728
4707	East Coast (South)	East Coast (South)	270	1	84.5	frequent	14.8298	1/31/2001 0:55	1/31/2001 5:20	116373	1874	qcd_566114_233	-33.8973	151.2587
4708	East Coast (South)	East Coast (South)	270	1	40.4	frequent	15.0529	5/13/1995 16:20	5/13/1995 20:45	122402	1975	qcd_570341_231	-34.5508	149.5728

4709	East Coast (South)	East Coast (South)	270	2	103.2	frequent	14.6801	2/24/2004 10:40	2/24/2004 15:05	36658	483	qcd_058113	-28.4738	153.0861
4711	East Coast (South)	East Coast (South)	270	2	62.47	frequent	14.7286	8/20/2007 2:05	8/20/2007 6:30	117204	1888	qcd_567108_231	-33.3846	150.9867
4712	East Coast (South)	East Coast (South)	270	2	62.5	frequent	14.8535	4/30/1988 7:35	4/30/1988 12:00	116911	1883	qcd_567087_233	-33.7342	150.7692
4715	East Coast (South)	East Coast (South)	270	2	113.9	frequent	14.964	03-10-74 11:45	03-10-74 16:10	36786	485	qcd_058129	-28.4659	153.2631
4717	East Coast (South)	East Coast (South)	270	2	52.35	frequent	15.1318	7/23/1986 2:55	7/23/1986 7:20	119482	1927	qcd_568094_231	-34.3778	150.3156
4718	East Coast (South)	East Coast (South)	270	3	76	frequent	14.8908	5/18/1998 23:35	5/19/1998 4:00	117515	1895	qcd_567149_233	-33.7452	151.0382
4664	East Coast (South)	East Coast (South)	270	1	85.23	intermediate	6.1522	3/24/1978 6:30	3/24/1978 10:55	38857	504	qcd_061151	-32.2426	151.683
4671	East Coast (South)	East Coast (South)	270	1	50.73	intermediate	11.8087	10-12-85 18:50	10-12-85 23:15	38711	503	qcd_061089	-32.0632	150.9272
4695	East Coast (South)	East Coast (South)	270	1	88.75	intermediate	10.3369	05-10-25 9:20	05-10-25 13:45	42153	543	qcd_066062	-33.8607	151.205
4698	East Coast (South)	East Coast (South)	270	2	94.49	intermediate	8.7196	2/18/1984 5:35	2/18/1984 10:00	118810	1917	qcd_568070_231	-34.5542	150.5694
4699	East Coast (South)	East Coast (South)	270	2	112.4	intermediate	3.3388	1/17/1988 0:50	1/17/1988 5:15	42143	543	qcd_066062	-33.8607	151.205
4700	East Coast (South)	East Coast (South)	270	2	56.11	intermediate	10.0568	6/23/1975 1:00	6/23/1975 5:25	39445	513	qcd_061212	-32.3767	150.96
4701	East Coast (South)	East Coast (South)	270	2	85.37	intermediate	12.1779	7/23/1950 9:15	7/23/1950 13:40	42134	543	qcd_066062	-33.8607	151.205
4702	East Coast (South)	East Coast (South)	270	2	98	intermediate	13.466	8/31/1996 4:25	8/31/1996 8:50	121444	1962	qcd_568189_233	-34.1891	150.9794
4704	East Coast (South)	East Coast (South)	270	3	120.8	intermediate	4.3174	03-08-00 0:30	03-08-00 4:55	37758	494	qcd_060030	-31.9033	152.4496
4705	East Coast (South)	East Coast (South)	270	3	61.71	intermediate	14.1339	2/23/1970 14:15	2/23/1970 18:40	35273	467	qcd_057056	-30.75	152.0667
4616	East Coast (South)	East Coast (South)	270	2	142.09	rare	0.4233	01-08-73 0:20	01-08-73 4:45	41931	542	qcd_066037	-33.9465	151.1731
4620	East Coast (South)	East Coast (South)	270	3	90.1	rare	0.5436	11/30/1965 11:55	11/30/1965 16:20	40524	526	qcd_062020	-32.5014	150.0333
4650	East Coast (South)	East Coast (South)	270	2	158.66	rare	1.1265	03-02-76 2:30	03-02-76 6:55	37742	494	qcd_060030	-31.9033	152.4496
4682	East Coast (South)	East Coast (South)	270	1	92	rare	3.1051	03-07-94 9:05	03-07-94 13:30	116729	1880	qcd_567083_233	-33.8192	150.9127
4683	East Coast (South)	East Coast (South)	270	1	203.75	rare	0.3725	10/24/1987 13:00	10/24/1987 17:25	118049	1905	qcd_568048_231	-34.265	150.8058
4684	East Coast (South)	East Coast (South)	270	1	119.31	rare	3.0235	03-10-58 2:20	03-10-58 6:45	42283	544	qcd_066063	-33.7206	151.1128
4685	East Coast (South)	East Coast (South)	270	2	122.5	rare	2.3209	1/17/1988 1:00	1/17/1988 5:25	114631	1845	qcd_566032_233	-33.887	151.2253
4686	East Coast (South)	East Coast (South)	270	2	177.81	rare	1.3227	03-10-74 13:25	03-10-74 17:50	36926	486	qcd_058131	-28.8521	153.4556
4692	East Coast (South)	East Coast (South)	270	2	128	rare	1.4991	11-05-84 10:40	11-05-84 15:05	114542	1844	qcd_566028_233	-33.9265	151.2144
4693	East Coast (South)	East Coast (South)	270	3	151	rare	0.1366	08-05-86 11:55	08-05-86 16:20	114919	1847	qcd_566037_233	-33.8085	151.0907
4732	East Coast (South)	East Coast (South)	360	1	116.34	frequent	14.566	10/24/1987 8:45	10/24/1987 14:40	118119	1906	qcd_568049_231	-34.3264	150.7417
4734	East Coast (South)	East Coast (South)	360	1	134.72	frequent	14.7579	2/21/1970 9:20	2/21/1970 15:15	36310	478	qcd_058072	-28.6533	153.4542
4735	East Coast (South)	East Coast (South)	360	1	85.5	frequent	15.2526	02-02-90 11:25	02-02-90 17:20	115610	1857	qcd_566065_233	-33.8773	151.1673
4736	East Coast (South)	East Coast (South)	360	2	98.24	frequent	14.4332	3/19/1978 6:15	3/19/1978 12:10	37770	494	qcd_060030	-31.9033	152.4496
4737	East Coast (South)	East Coast (South)	360	2	45.35	frequent	14.4421	3/14/1989 14:45	3/14/1989 20:40	62655	996	qcd_21210063_77	-34.6438	149.5583
4738	East Coast (South)	East Coast (South)	360	2	139.28	frequent	14.7063	8/17/1998 13:10	8/17/1998 19:05	118708	1915	qcd_568068_231	-34.4097	150.7781
4739	East Coast (South)	East Coast (South)	360	2	54.86	frequent	14.78	12-07-96 0:45	12-07-96 6:40	62032	982	qcd_208009_77	-31.5795	151.3154
4740	East Coast (South)	East Coast (South)	360	2	76.43	frequent	14.9557	10/27/1999 11:10	10/27/1999 17:05	61490	969	qcd_204033_77	-29.1934	152.2516
4741	East Coast (South)	East Coast (South)	360	3	84.5	frequent	14.5009	8/31/1996 0:35	8/31/1996 6:30	115096	1849	qcd_566040_233	-33.7698	151.0671
4742	East Coast (South)	East Coast (South)	360	3	82	frequent	14.827	02-09-92 0:15	02-09-92 6:10	115663	1858	qcd_566068_233	-33.7389	151.2814
4591	East Coast (South)	East Coast (South)	360	2	121.4	intermediate	6.5222	11-09-04 2:30	11-09-04 8:25	37748	494	qcd_060030	-31.9033	152.4496
4660	East Coast (South)	East Coast (South)	360	1	79.26	intermediate	6.8414	1/21/1956 14:45	1/21/1956 20:40	35202	463	qcd_056059	-29.05	152.1
4672	East Coast (South)	East Coast (South)	360	1	56.4	intermediate	10.5924	10-12-85 18:50	10/13/1985 0:45	38711	503	qcd_061089	-32.0632	150.9272
4678	East Coast (South)	East Coast (South)	360	3	92.38	intermediate	13.5946	7/26/1952 2:20	7/26/1952 8:15	42135	543	qcd_066062	-33.8607	151.205
4696	East Coast (South)	East Coast (South)	360	2	102.56	intermediate	8.8017	05-10-25 7:35	05-10-25 13:30	42153	543	qcd_066062	-33.8607	151.205
4725	East Coast (South)	East Coast (South)	360	1	74.88	intermediate	8.6787	1/28/1970 8:30	1/28/1970 14:25	39049	506	qcd_061158	-32.5067	151.3779
4726	East Coast (South)	East Coast (South)	360	2	88.5	intermediate	4.4773	06-10-91 14:10	06-10-91 20:05	116596	1877	qcd_567077_233	-33.8807	150.9504
4729	East Coast (South)	East Coast (South)	360	2	99.06	intermediate	8.7497	03-09-01 3:00	03-09-01 8:55	61381	966	qcd_204008_77	-30.4037	152.3469
4730	East Coast (South)	East Coast (South)	360	2	94	intermediate	8.9069	02-04-08 18:40	02-05-08 0:35	116236	1870	qcd_566094_233	-34.0399	150.9992
4731	East Coast (South)	East Coast (South)	360	3	114	intermediate	3.3619	1/30/2001 23:05	1/31/2001 5:00	116235	1870	qcd_566094_233	-34.0399	150.9992
4406	East Coast (South)	East Coast (South)	360	3	1121.5	rare	0	11/23/1996 15:15	11/23/1996 21:10	138481	2233	qcd_northbonvil_58	-30.3638	153.0055
4529	East Coast (South)	East Coast (South)	360	1	288.24	rare	0.3702	2/18/1984 3:35	2/18/1984 9:30	118685	1915	qcd_568068_231	-34.4097	150.7781
4587	East Coast (South)	East Coast (South)	360	1	174.74	rare	0.2208	03-10-75 9:30	03-10-75 15:25	41940	542	qcd_066037	-33.9465	151.1731
4596	East Coast (South)	East Coast (South)	360	2	229.66	rare	0.4716	2/15/1995 10:30	2/15/1995 16:25	36876	486	qcd_058131	-28.8521	153.4556
4694	East Coast (South)	East Coast (South)	360	2	174	rare	0.1159	08-05-86 12:10	08-05-86 18:05	114919	1847	qcd_566037_233	-33.8085	151.0907
4719	East Coast (South)	East Coast (South)	360	1	84.2	rare	2.0926	11/19/2001 17:00	11/19/2001 22:55	35857	471	qcd_057104	-31.2739	151.9655
4720	East Coast (South)	East Coast (South)	360	2	144	rare	1.8947	03-09-01 2:55	03-09-01 8:50	61233	963	qcd_204001_77	-29.9793	152.725
4721	East Coast (South)	East Coast (South)	360	2	139.8	rare	1.7692	2/17/2009 2:55	2/17/2009 8:50	38145	497	qcd_060085	-31.3865	152.2482
4722	East Coast (South)	East Coast (South)	360	2	156.51	rare	0.1051	02-10-56 1:35	02-10-56 7:30	42653	552	qcd_067033	-33.6022	150.7794
4723	East Coast (South)	East Coast (South)	360	3	103.23	rare	0.5906	06-08-07 5:10	06-08-07 11:05	62383	989	qcd_210076_77	-32.3366	150.9824
4767	East Coast (South)	East Coast (South)	540	1	61.08	frequent	14.5948	1/21/1976 15:20	1/22/1976 0:15	38716	503	qcd_061089	-32.0632	150.9272
4768	East Coast (South)	East Coast (South)	540	1	135.2	frequent	15.6361	03-05-04 16:35	03-06-04 1:30	36231	477	qcd_058044	-28.5966	153.2233
4769	East Coast (South)	East Coast (South)	540	2	113.6	frequent	14.4735	8/20/2007 0:15	8/20/2007 9:10	40340	523	qcd_061351	-33.3102	151.2443
4770	East Coast (South)	East Coast (South)	540	2	166.2	frequent	14.4892	02-01-01 8:00	02-01-01 16:55	36771	485	qcd_058129	-28.4659	153.2631
4771	East Coast (South)	East Coast (South)	540	2	86.22	frequent	14.552	07-05-88 15:45	07-06-88 0:40	117929	1903	qcd_568045_231	-33.8915	150.5923

4772	East Coast (South)	East Coast (South)	540	2	101.01	frequent	14.7462	2/23/2003 20:15	2/24/2003 5:10	61146	961	qcd_203030_77	-29.11	152.9994
4773	East Coast (South)	East Coast (South)	540	2	114.78	frequent	15.0757	9/24/1995 21:40	9/25/1995 6:35	115361	1853	qcd_566052_231	-34.1181	150.9333
4774	East Coast (South)	East Coast (South)	540	3	105	frequent	14.8157	06-10-91 15:00	06-10-91 23:55	114429	1842	qcd_566026_233	-33.9226	151.1556
4775	East Coast (South)	East Coast (South)	540	3	64.81	frequent	15.0794	01-04-68 12:10	01-04-68 21:05	39451	513	qcd_061212	-32.3767	150.96
4776	East Coast (South)	East Coast (South)	540	3	108.8	frequent	15.1527	6/14/2011 13:40	6/14/2011 22:35	38124	497	qcd_060085	-31.3865	152.2482
4697	East Coast (South)	East Coast (South)	540	3	131.03	intermediate	7.0866	05-10-25 4:30	05-10-25 13:25	42153	543	qcd_066062	-33.8607	151.205
4756	East Coast (South)	East Coast (South)	540	1	94	intermediate	7.8432	02-11-07 5:55	02-11-07 14:50	120515	1943	qcd_568156_233	-34.0482	150.73
4757	East Coast (South)	East Coast (South)	540	1	121	intermediate	6.1419	2/23/2004 20:50	2/24/2004 5:45	37092	488	qcd_058192	-28.9883	152.8809
4759	East Coast (South)	East Coast (South)	540	2	72.7	intermediate	14.1796	10/23/1999 18:50	10/24/1999 3:45	118220	1907	qcd_568050_231	-34.3033	150.4194
4760	East Coast (South)	East Coast (South)	540	2	67.92	intermediate	12.3799	01-12-68 15:35	1/13/1968 0:30	35933	472	qcd_057105	-31.0667	151.9167
4761	East Coast (South)	East Coast (South)	540	2	64.61	intermediate	7.0654	6/27/1997 4:30	6/27/1997 13:25	62536	993	qcd_21210060_77	-34.6423	149.5663
4763	East Coast (South)	East Coast (South)	540	2	99.82	intermediate	10.9007	6/21/1969 8:10	6/21/1969 17:05	38871	504	qcd_061151	-32.2426	151.683
4764	East Coast (South)	East Coast (South)	540	2	101	intermediate	5.5891	02-04-08 23:40	02-05-08 8:35	120943	1951	qcd_568170_233	-33.3472	150.8578
4765	East Coast (South)	East Coast (South)	540	3	72.88	intermediate	13.3369	4/28/1963 9:15	4/28/1963 18:10	39259	511	qcd_061209	-32.9597	150.675
4766	East Coast (South)	East Coast (South)	540	3	84.8	intermediate	12.9246	02-05-02 1:35	02-05-02 10:30	39624	515	qcd_061238	-32.8143	151.3025
4442	East Coast (South)	East Coast (South)	540	2	186	rare	0.1463	08-05-86 12:10	08-05-86 21:05	116588	1877	qcd_567077_233	-33.8807	150.9504
4530	East Coast (South)	East Coast (South)	540	1	385.5	rare	0.2514	2/18/1984 3:00	2/18/1984 11:55	118685	1915	qcd_568068_231	-34.4097	150.7781
4601	East Coast (South)	East Coast (South)	540	2	186	rare	1.0209	4/30/1988 8:35	4/30/1988 17:30	115095	1849	qcd_566040_233	-33.7698	151.0671
4657	East Coast (South)	East Coast (South)	540	3	165.66	rare	0.8794	3/19/1978 5:55	3/19/1978 14:50	38353	499	qcd_060106	-31.6647	152.0637
4743	East Coast (South)	East Coast (South)	540	1	208.4	rare	1.2902	02-01-01 8:45	02-01-01 17:40	61099	960	qcd_203010_77	-28.7365	153.164
4744	East Coast (South)	East Coast (South)	540	2	204.15	rare	2.3914	2/24/1975 9:10	2/24/1975 18:05	37917	496	qcd_060080	-31.6274	152.443
4745	East Coast (South)	East Coast (South)	540	2	168	rare	2.2899	1/16/1988 21:30	1/17/1988 6:25	115004	1848	qcd_566038_233	-33.8578	151.2788
4746	East Coast (South)	East Coast (South)	540	2	139.67	rare	2.3396	10/21/1967 0:50	10/21/1967 9:45	38882	504	qcd_061151	-32.2426	151.683
4750	East Coast (South)	East Coast (South)	540	3	173.99	rare	2.4593	02-09-92 16:30	02-10-92 1:25	140832	2276	qcd_wyoming_58	-33.4117	151.3483
4754	East Coast (South)	East Coast (South)	540	3	205.63	rare	0.6488	03-10-74 12:55	03-10-74 21:50	36385	479	qcd_058076	-29.7	152.9333
4802	East Coast (South)	East Coast (South)	720	1	90.61	frequent	14.5779	02-03-90 21:05	02-04-90 9:00	42702	552	qcd_067033	-33.6022	150.7794
4804	East Coast (South)	East Coast (South)	720	1	97.75	frequent	15.7445	02-09-92 1:00	02-09-92 12:55	42457	547	qcd_066137	-33.9181	150.9864
4805	East Coast (South)	East Coast (South)	720	2	123.64	frequent	14.4418	01-09-49 18:55	01-10-49 6:50	42157	543	qcd_066062	-33.8607	151.205
4806	East Coast (South)	East Coast (South)	720	2	154.12	frequent	14.5973	3/21/1983 0:35	3/21/1983 12:30	118820	1917	qcd_568070_231	-34.5542	150.5694
4807	East Coast (South)	East Coast (South)	720	2	91.97	frequent	14.618	3/19/1978 8:20	3/19/1978 20:15	39972	519	qcd_061288	-32.3322	151.4595
4808	East Coast (South)	East Coast (South)	720	2	103.23	frequent	14.9758	10-11-82 1:10	10-11-82 13:05	38339	499	qcd_060106	-31.6647	152.0637
4809	East Coast (South)	East Coast (South)	720	2	125.72	frequent	15.0094	9/24/1995 23:45	9/25/1995 11:40	117998	1904	qcd_568047_231	-34.3306	150.6097
4810	East Coast (South)	East Coast (South)	720	3	90.58	frequent	14.645	5/22/1981 19:20	5/23/1981 7:15	39632	515	qcd_061238	-32.8143	151.3025
4811	East Coast (South)	East Coast (South)	720	3	129.51	frequent	14.7289	03-11-74 1:35	03-11-74 13:30	37780	494	qcd_060030	-31.9033	152.4496
4813	East Coast (South)	East Coast (South)	720	3	62.69	frequent	14.8205	8/23/2003 13:05	8/24/2003 1:00	113934	1832	qcd_563075_231	-33.1213	150.046
4703	East Coast (South)	East Coast (South)	720	2	187	intermediate	6.3822	8/31/1996 0:55	8/31/1996 12:50	121444	1962	qcd_568189_233	-34.1891	150.9794
4788	East Coast (South)	East Coast (South)	720	1	128.46	intermediate	8.2334	03-10-58 0:05	03-10-58 12:00	114922	1847	qcd_566037_233	-33.8085	151.0907
4789	East Coast (South)	East Coast (South)	720	1	86.6	intermediate	5.9046	6/26/1997 16:05	6/27/1997 4:00	44008	571	qcd_070080	-34.4048	149.8197
4790	East Coast (South)	East Coast (South)	720	2	104.47	intermediate	14.2618	03-08-67 9:20	03-08-67 21:15	38869	504	qcd_061151	-32.2426	151.683
4791	East Coast (South)	East Coast (South)	720	2	130	intermediate	3.3079	02-09-92 14:30	02-10-92 2:25	116833	1882	qcd_567085_233	-33.608	150.7671
4792	East Coast (South)	East Coast (South)	720	2	144.85	intermediate	3.5368	07-05-88 15:55	07-06-88 3:50	118303	1908	qcd_568051_231	-34.0089	150.507
4793	East Coast (South)	East Coast (South)	720	2	129.14	intermediate	10.2865	5/17/1977 3:15	5/17/1977 15:10	36505	481	qcd_058099	-29.2823	152.9886
4794	East Coast (South)	East Coast (South)	720	3	88	intermediate	4.2556	02-05-10 16:55	02-06-10 4:50	113696	1828	qcd_563064_233	-32.2375	150.6306
4800	East Coast (South)	East Coast (South)	720	3	138.79	intermediate	9.3893	04-03-88 16:10	04-04-88 4:05	118378	1910	qcd_568054_231	-34.4761	150.5222
4801	East Coast (South)	East Coast (South)	720	3	97.65	intermediate	8.8185	9/24/1995 21:35	9/25/1995 9:30	113418	1824	qcd_563056_231	-34.0333	150.2153
4443	East Coast (South)	East Coast (South)	720	2	222.5	rare	0.1048	08-05-86 10:00	08-05-86 21:55	116588	1877	qcd_567077_233	-33.8807	150.9504
4654	East Coast (South)	East Coast (South)	720	1	361.07	rare	0.193	2/28/1976 11:35	2/28/1976 23:30	36900	486	qcd_058131	-28.8521	153.4556
4724	East Coast (South)	East Coast (South)	720	2	139.51	rare	0.4748	06-08-07 2:20	06-08-07 14:15	62383	989	qcd_210076_77	-32.3366	150.9824
4747	East Coast (South)	East Coast (South)	720	3	166.7	rare	1.7074	10/20/1967 21:50	10/21/1967 9:45	38882	504	qcd_061151	-32.2426	151.683
4751	East Coast (South)	East Coast (South)	720	3	210.4	rare	1.6438	02-09-92 14:40	02-10-92 2:35	140832	2276	qcd_wyoming_58	-33.4117	151.3483
4758	East Coast (South)	East Coast (South)	720	2	164.8	rare	2.286	2/23/2004 20:30	2/24/2004 8:25	37092	488	qcd_058192	-28.9883	152.8809
4777	East Coast (South)	East Coast (South)	720	1	155.59	rare	2.4317	1/19/1971 12:15	1/20/1971 0:10	38903	504	qcd_061151	-32.2426	151.683
4785	East Coast (South)	East Coast (South)	720	2	157.5	rare	0.7366	10/24/1987 13:50	10/25/1987 1:45	120288	1940	qcd_568147_233	-34.0996	150.6981
4786	East Coast (South)	East Coast (South)	720	2	110.39	rare	1.2895	2/24/1976 20:25	2/25/1976 8:20	39883	518	qcd_061287	-32.1852	150.1737
4787	East Coast (South)	East Coast (South)	720	3	178.13	rare	2.664	2/20/1954 13:00	2/21/1954 0:55	36047	475	qcd_058025	-29.7067	152.94
4833	East Coast (South)	East Coast (South)	1080	1	79	frequent	15.0169	6/30/2005 0:55	6/30/2005 18:50	113678	1828	qcd_563064_233	-32.2375	150.6306
4834	East Coast (South)	East Coast (South)	1080	1	96.05	frequent	15.1106	07-10-62 3:05	07-10-62 21:00	35203	463	qcd_056059	-29.05	152.1
4836	East Coast (South)	East Coast (South)	1080	2	80.62	frequent	14.6879	6/22/1998 7:00	6/23/1998 0:55	62042	982	qcd_208009_77	-31.5795	151.3154
4837	East Coast (South)	East Coast (South)	1080	2	95.81	frequent	14.8691	9/24/1995 7:10	9/25/1995 1:05	113869	1831	qcd_563073_231	-33.6139	150.1561
4838	East Coast (South)	East Coast (South)	1080	2	153.87	frequent	15.0039	05-09-80 5:40	05-09-80 23:35	38137	497	qcd_060085	-31.3865	152.2482
4842	East Coast (South)	East Coast (South)	1080	2	161.41	frequent	15.0352	6/17/1949 18:10	6/18/1949 12:05	42319	544	qcd_066063	-33.7206	151.1128

4845	East Coast (South)	East Coast (South)	1080	2	143.19	frequent	15.2667	01-04-08 9:05	01-05-08 3:00	61052	959	qcd_203005_77	-28.5049	152.9669
4846	East Coast (South)	East Coast (South)	1080	3	106.09	frequent	15.1779	3/20/1983 23:40	3/21/1983 17:35	113333	1823	qcd_563055_231	-34.1139	150.2194
4849	East Coast (South)	East Coast (South)	1080	3	222.19	frequent	15.5718	2/16/2009 5:50	2/16/2009 23:45	138502	2233	qcd_northbonvil_58	-30.3638	153.0055
4855	East Coast (South)	East Coast (South)	1080	3	199.13	frequent	15.8669	10/23/1999 16:20	10/24/1999 10:15	118441	1911	qcd_568058_231	-34.4583	150.6444
4710	East Coast (South)	East Coast (South)	1080	2	252.4	intermediate	8.4849	2/24/2004 3:30	2/24/2004 21:25	36658	483	qcd_058113	-28.4738	153.0861
4716	East Coast (South)	East Coast (South)	1080	2	322.08	intermediate	5.1315	03-09-74 23:05	03-10-74 17:00	36786	485	qcd_058129	-28.4659	153.2631
4733	East Coast (South)	East Coast (South)	1080	2	222.42	intermediate	11.3345	10/24/1987 5:55	10/24/1987 23:50	118119	1906	qcd_568049_231	-34.3264	150.7417
4824	East Coast (South)	East Coast (South)	1080	1	91.66	intermediate	6.3238	1/22/1976 19:00	1/23/1976 12:55	40546	526	qcd_062020	-32.5014	150.0333
4825	East Coast (South)	East Coast (South)	1080	1	209.5	intermediate	3.5038	02-02-90 11:05	02-03-90 5:00	115014	1848	qcd_566038_233	-33.8578	151.2788
4826	East Coast (South)	East Coast (South)	1080	2	146.14	intermediate	9.3358	5/17/1995 15:05	5/18/1995 9:00	112686	1815	qcd_563046_231	-33.8889	150.3861
4827	East Coast (South)	East Coast (South)	1080	2	152.19	intermediate	11.1591	8/29/1963 9:20	8/30/1963 3:15	42333	545	qcd_066078	-34.0517	150.98
4828	East Coast (South)	East Coast (South)	1080	3	136.52	intermediate	10.9109	12/25/1962 23:15	12/26/1962 17:10	38893	504	qcd_061151	-32.2426	151.683
4830	East Coast (South)	East Coast (South)	1080	3	102.91	intermediate	10.9149	5/22/1981 15:20	5/23/1981 9:15	39266	511	qcd_061209	-32.9597	150.675
4832	East Coast (South)	East Coast (South)	1080	3	137.2	intermediate	11.6301	5/21/2009 5:55	5/21/2009 23:50	37118	488	qcd_058192	-28.9883	152.8809
4491	East Coast (South)	East Coast (South)	1080	1	268.64	rare	1.1153	02-02-90 11:45	02-03-90 5:40	39524	514	qcd_061223	-32.9131	151.75
4727	East Coast (South)	East Coast (South)	1080	3	180.5	rare	2.4265	06-10-91 3:20	06-10-91 21:15	116596	1877	qcd_567077_233	-33.8807	150.9504
4748	East Coast (South)	East Coast (South)	1080	2	205.44	rare	1.6553	10/20/1967 21:15	10/21/1967 15:10	38882	504	qcd_061151	-32.2426	151.683
4778	East Coast (South)	East Coast (South)	1080	2	233.48	rare	0.839	1/19/1971 12:50	1/20/1971 6:45	38903	504	qcd_061151	-32.2426	151.683
4814	East Coast (South)	East Coast (South)	1080	1	241.5	rare	2.1459	02-09-92 3:35	02-09-92 21:30	115725	1859	qcd_566071_233	-33.7338	151.2208
4815	East Coast (South)	East Coast (South)	1080	2	245.5	rare	1.2378	04-10-98 6:50	04-11-98 0:45	115604	1857	qcd_566065_233	-33.8773	151.1673
4816	East Coast (South)	East Coast (South)	1080	2	180.4	rare	0.3471	03-09-01 4:05	03-09-01 22:00	35758	470	qcd_057103	-30.0093	152.0101
4818	East Coast (South)	East Coast (South)	1080	2	223.06	rare	0.6125	07-05-88 11:35	07-06-88 5:30	112598	1814	qcd_563043_231	-33.9844	150.1167
4819	East Coast (South)	East Coast (South)	1080	2	385.03	rare	1.1427	4/27/1963 11:05	4/28/1963 5:00	37552	492	qcd_059040	-30.3107	153.1187
4823	East Coast (South)	East Coast (South)	1080	3	146.74	rare	3.1392	9/24/1995 15:40	9/25/1995 9:35	112214	1810	qcd_563037_231	-34.0683	150.4033
4847	East Coast (South)	East Coast (South)	1440	3	121.74	frequent	14.7368	3/20/1983 17:40	3/21/1983 17:35	113333	1823	qcd_563055_231	-34.1139	150.2194
4875	East Coast (South)	East Coast (South)	1440	1	127.03	frequent	15.5956	02-01-01 12:00	02-02-01 11:55	61556	970	qcd_204036_77	-28.9325	152.2182
4876	East Coast (South)	East Coast (South)	1440	1	214.72	frequent	15.6437	03-01-75 22:05	03-02-75 22:00	36245	477	qcd_058044	-28.5966	153.2233
4877	East Coast (South)	East Coast (South)	1440	2	158.8	frequent	14.6685	11/13/1969 5:35	11/14/1969 5:30	114928	1847	qcd_566037_233	-33.8085	151.0907
4878	East Coast (South)	East Coast (South)	1440	2	100.04	frequent	14.7119	1/22/1976 17:35	1/23/1976 17:30	40120	520	qcd_061309	-32.6881	150.9728
4879	East Coast (South)	East Coast (South)	1440	2	112.78	frequent	15.0475	11-10-75 10:05	11-11-75 10:00	35396	466	qcd_057033	-30.5112	152.0427
4880	East Coast (South)	East Coast (South)	1440	2	188.4	frequent	15.1647	03-08-01 19:05	03-09-01 19:00	37227	489	qcd_059000	-30.8141	152.5129
4882	East Coast (South)	East Coast (South)	1440	2	172.07	frequent	15.1668	01-11-68 21:25	01-12-68 21:20	37768	494	qcd_060030	-31.9033	152.4496
4883	East Coast (South)	East Coast (South)	1440	3	104.51	frequent	14.4863	07-10-62 5:35	07-11-62 5:30	35877	471	qcd_057104	-31.2739	151.9655
4885	East Coast (South)	East Coast (South)	1440	3	224.95	frequent	15.6819	08-05-86 5:10	08-06-86 5:05	118755	1916	qcd_568069_231	-34.1817	150.9233
4680	East Coast (South)	East Coast (South)	1440	2	211.45	intermediate	4.1243	06-11-67 16:30	06-12-67 16:25	36139	476	qcd_058026	-28.4414	152.8296
4831	East Coast (South)	East Coast (South)	1440	3	133.24	intermediate	5.7862	5/22/1981 10:05	5/23/1981 10:00	39266	511	qcd_061209	-32.9597	150.675
4835	East Coast (South)	East Coast (South)	1440	1	116.19	intermediate	10.4002	07-10-62 1:20	07-11-62 1:15	35203	463	qcd_056059	-29.05	152.1
4866	East Coast (South)	East Coast (South)	1440	1	230.6	intermediate	12.584	7/19/1965 13:15	7/20/1965 13:10	36233	477	qcd_058044	-28.5966	153.2233
4867	East Coast (South)	East Coast (South)	1440	2	192.46	intermediate	4.1194	01-12-68 0:10	1/13/1968 0:05	38886	504	qcd_061151	-32.2426	151.683
4869	East Coast (South)	East Coast (South)	1440	2	100.25	intermediate	6.9911	10/24/1999 0:15	10/25/1999 0:10	62737	998	qcd_21210065_77	-34.6595	149.5608
4870	East Coast (South)	East Coast (South)	1440	2	183	intermediate	9.487	9/24/1995 19:05	9/25/1995 19:00	114422	1842	qcd_566026_233	-33.9226	151.1556
4871	East Coast (South)	East Coast (South)	1440	2	161.39	intermediate	13.8577	05-06-53 23:35	05-07-53 23:30	114926	1847	qcd_566037_233	-33.8085	151.0907
4872	East Coast (South)	East Coast (South)	1440	3	180.09	intermediate	9.1286	04-06-62 21:35	04-07-62 21:30	36049	475	qcd_058025	-29.7067	152.94
4873	East Coast (South)	East Coast (South)	1440	3	166.47	intermediate	3.9109	05-08-80 17:00	05-09-80 16:55	35444	467	qcd_057056	-30.75	152.0667
4655	East Coast (South)	East Coast (South)	1440	2	527.88	rare	0.0937	2/28/1976 2:45	2/29/1976 2:40	36900	486	qcd_058131	-28.8521	153.4556
4661	East Coast (South)	East Coast (South)	1440	3	150.62	rare	3.1575	1/20/1956 22:55	1/21/1956 22:50	35202	463	qcd_056059	-29.05	152.1
4728	East Coast (South)	East Coast (South)	1440	2	217.5	rare	1.8738	06-10-91 2:05	06-11-91 2:00	116596	1877	qcd_567077_233	-33.8807	150.9504
4749	East Coast (South)	East Coast (South)	1440	2	242.98	rare	1.3117	10/20/1967 21:05	10/21/1967 21:00	38882	504	qcd_061151	-32.2426	151.683
4755	East Coast (South)	East Coast (South)	1440	2	404.16	rare	0.1468	03-09-74 23:50	03-10-74 23:45	36385	479	qcd_058076	-29.7	152.9333
4817	East Coast (South)	East Coast (South)	1440	2	215.4	rare	0.1934	03-09-01 3:05	03-10-01 3:00	35758	470	qcd_057103	-30.0093	152.0101
4856	East Coast (South)	East Coast (South)	1440	1	146.8	rare	1.4021	06-08-07 4:10	06-09-07 4:05	39894	518	qcd_061287	-32.1852	150.1737
4859	East Coast (South)	East Coast (South)	1440	1	321.65	rare	0.8371	02-02-90 9:40	02-03-90 9:35	137620	2216	qcd_lisarow_58	-33.3833	151.375
4860	East Coast (South)	East Coast (South)	1440	2	221.15	rare	2.1096	3/19/1978 5:45	3/20/1978 5:40	38908	504	qcd_061151	-32.2426	151.683
4865	East Coast (South)	East Coast (South)	1440	2	128.7	rare	2.1589	6/26/1997 10:55	6/27/1997 10:50	62656	996	qcd_21210063_77	-34.6438	149.5583
4848	East Coast (South)	East Coast (South)	1800	3	136.29	frequent	14.6838	3/20/1983 11:40	3/21/1983 17:35	113333	1823	qcd_563055_231	-34.1139	150.2194
4881	East Coast (South)	East Coast (South)	1800	2	212.8	frequent	14.6678	03-08-01 16:30	03-09-01 22:25	37227	489	qcd_059000	-30.8141	152.5129
4895	East Coast (South)	East Coast (South)	1800	1	91.8	frequent	15.4667	04-12-94 5:45	4/13/1994 11:40	122333	1974	qcd_570340_231	-34.9056	149.6708
4896	East Coast (South)	East Coast (South)	1800	1	275.39	frequent	16.0475	08-01-90 2:40	08-02-90 8:35	119601	1929	qcd_568102_231	-34.5522	150.6317
4899	East Coast (South)	East Coast (South)	1800	2	168.11	frequent	14.4482	3/17/1978 13:00	3/18/1978 18:55	36151	476	qcd_058026	-28.4414	152.8296
4900	East Coast (South)	East Coast (South)	1800	2	157.6	frequent	14.7467	05-06-01 14:55	05-07-01 20:50	38915	504	qcd_061151	-32.2426	151.683
4901	East Coast (South)	East Coast (South)	1800	2	278.03	frequent	15.954	02-09-92 1:55	02-10-92 7:50	118567	1913	qcd_568061_231	-34.4056	150.7097

4902	East Coast (South)	East Coast (South)	1800	2	135.94	frequent	16.7588	1/18/1971 23:10	1/20/1971 5:05	39982	519	qcd_061288	-32.3322	151.4595
4906	East Coast (South)	East Coast (South)	1800	3	167.5	frequent	16.3691	1/21/1999 8:05	1/22/1999 14:00	117353	1893	qcd_567147_233	-33.7437	150.9924
4907	East Coast (South)	East Coast (South)	1800	3	167	frequent	18.3924	6/28/2005 18:00	6/29/2005 23:55	36520	481	qcd_058099	-29.2823	152.9886
4713	East Coast (South)	East Coast (South)	1800	2	173	intermediate	7.1354	4/29/1988 6:15	4/30/1988 12:10	116911	1883	qcd_567087_233	-33.7342	150.7692
4868	East Coast (South)	East Coast (South)	1800	2	225.3	intermediate	3.2762	01-11-68 16:00	01-12-68 21:55	38886	504	qcd_061151	-32.2426	151.683
4884	East Coast (South)	East Coast (South)	1800	3	118.44	intermediate	13.806	07-10-62 1:15	07-11-62 7:10	35877	471	qcd_057104	-31.2739	151.9655
4888	East Coast (South)	East Coast (South)	1800	1	319.4	intermediate	8.4177	1/31/2001 11:40	02-01-01 17:35	140351	2265	qcd_southboambe_58	-30.3417	153.0512
4889	East Coast (South)	East Coast (South)	1800	1	169.82	intermediate	4.7787	1/19/1971 0:50	1/20/1971 6:45	39050	506	qcd_061158	-32.5067	151.3779
4890	East Coast (South)	East Coast (South)	1800	2	364.79	intermediate	7.1856	2/16/2009 2:25	2/17/2009 8:20	137974	2223	qcd_middleboamb_58	-30.3262	153.048
4891	East Coast (South)	East Coast (South)	1800	2	140.78	intermediate	9.5761	05-07-63 18:30	05-09-63 0:25	35399	466	qcd_057033	-30.5112	152.0427
4892	East Coast (South)	East Coast (South)	1800	2	254.5	intermediate	3.9026	02-08-92 14:25	02-09-92 20:20	116346	1873	qcd_566100_233	-33.808	151.3019
4893	East Coast (South)	East Coast (South)	1800	3	390.12	intermediate	3.7562	3/17/1978 15:45	3/18/1978 21:40	36665	483	qcd_058113	-28.4738	153.0861
4894	East Coast (South)	East Coast (South)	1800	3	200.96	intermediate	3.7506	08-04-86 22:55	08-06-86 4:50	62805	999	qcd_212320_77	-33.876	150.7698
2737	East Coast (South)	East Coast (South)	1800	2	212.98	rare	1.8688	06-12-67 9:05	6/13/1967 15:00	35463	467	qcd_057056	-30.75	152.0667
4492	East Coast (South)	East Coast (South)	1800	1	323.13	rare	1.1065	02-02-90 11:35	02-03-90 17:30	39524	514	qcd_061223	-32.9131	151.75
4687	East Coast (South)	East Coast (South)	1800	2	550.84	rare	0.1484	03-09-74 20:10	03-11-74 2:05	36926	486	qcd_058131	-28.8521	153.4556
4752	East Coast (South)	East Coast (South)	1800	3	333.26	rare	1.2102	02-08-92 20:30	02-10-92 2:25	140832	2276	qcd_wyoming_58	-33.4117	151.3483
4762	East Coast (South)	East Coast (South)	1800	2	150.6	rare	1.5212	6/26/1997 7:50	6/27/1997 13:45	62536	993	qcd_21210060_77	-34.6423	149.5663
4779	East Coast (South)	East Coast (South)	1800	1	299.72	rare	0.7835	1/19/1971 12:30	1/20/1971 18:25	38903	504	qcd_061151	-32.2426	151.683
4820	East Coast (South)	East Coast (South)	1800	3	463.5	rare	0.9198	4/26/1963 23:05	4/28/1963 5:00	37552	492	qcd_059040	-30.3107	153.1187
4857	East Coast (South)	East Coast (South)	1800	2	162.4	rare	1.385	06-07-07 22:10	06-09-07 4:05	39894	518	qcd_061287	-32.1852	150.1737
4874	East Coast (South)	East Coast (South)	1800	3	216.5	rare	1.7152	05-08-80 10:15	05-09-80 16:10	35444	467	qcd_057056	-30.75	152.0667
4886	East Coast (South)	East Coast (South)	1800	2	363.99	rare	0.2923	08-05-86 0:10	08-06-86 6:05	113573	1826	qcd_563059_231	-33.6897	150.3008
4903	East Coast (South)	East Coast (South)	2160	2	150.55	frequent	15.4526	1/18/1971 20:35	1/20/1971 8:30	39982	519	qcd_061288	-32.3322	151.4595
4922	East Coast (South)	East Coast (South)	2160	1	169.35	frequent	14.9676	03-05-72 13:20	03-07-72 1:15	42458	547	qcd_066137	-33.9181	150.9864
4923	East Coast (South)	East Coast (South)	2160	1	184.8	frequent	18.5242	05-02-96 2:55	05-03-96 14:50	61249	963	qcd_204001_77	-29.9793	152.725
4929	East Coast (South)	East Coast (South)	2160	2	260.02	frequent	14.5448	1/31/2001 5:50	02-01-01 17:45	61644	973	qcd_205006_77	-30.6405	152.856
4930	East Coast (South)	East Coast (South)	2160	2	206	frequent	14.5795	10/18/2004 20:05	10/20/2004 8:00	37779	494	qcd_060030	-31.9033	152.4496
4931	East Coast (South)	East Coast (South)	2160	2	367.53	frequent	15.746	04-06-62 11:50	04-07-62 23:45	37681	493	qcd_059067	-30.3439	152.7128
4933	East Coast (South)	East Coast (South)	2160	2	166.64	frequent	15.7684	3/19/1978 6:50	3/20/1978 18:45	42466	547	qcd_066137	-33.9181	150.9864
4934	East Coast (South)	East Coast (South)	2160	3	266.11	frequent	14.9153	05-06-63 20:05	05-08-63 8:00	36916	486	qcd_058131	-28.8521	153.4556
4935	East Coast (South)	East Coast (South)	2160	3	194.3	frequent	16.1047	08-06-98 8:45	08-07-98 20:40	138567	2235	qcd_northmanly_58	-33.7687	151.2687
4936	East Coast (South)	East Coast (South)	2160	3	177.17	frequent	16.1653	10/27/1972 11:55	10/28/1972 23:50	36388	479	qcd_058076	-29.7	152.9333
4714	East Coast (South)	East Coast (South)	2160	3	209.5	intermediate	4.405	4/29/1988 5:50	4/30/1988 17:45	116911	1883	qcd_567087_233	-33.7342	150.7692
4803	East Coast (South)	East Coast (South)	2160	2	198.52	intermediate	5.5127	02-02-90 19:15	02-04-90 7:10	42702	552	qcd_067033	-33.6022	150.7794
4913	East Coast (South)	East Coast (South)	2160	1	156.54	intermediate	10.5394	2/21/1977 11:45	2/22/1977 23:40	35443	467	qcd_057056	-30.75	152.0667
4914	East Coast (South)	East Coast (South)	2160	1	122.84	intermediate	5.9504	7/31/1990 23:10	08-02-90 11:05	62658	996	qcd_21210063_77	-34.6438	149.5583
4915	East Coast (South)	East Coast (South)	2160	2	270.21	intermediate	4.3549	07-05-31 22:45	07-07-31 10:40	42197	543	qcd_066062	-33.8607	151.205
4916	East Coast (South)	East Coast (South)	2160	2	272.31	intermediate	4.2002	02-09-56 9:35	02-10-56 21:30	42199	543	qcd_066062	-33.8607	151.205
4917	East Coast (South)	East Coast (South)	2160	2	275.23	intermediate	14.1309	05-06-63 16:00	05-08-63 3:55	37567	492	qcd_059040	-30.3107	153.1187
4918	East Coast (South)	East Coast (South)	2160	2	230.2	intermediate	12.3299	3/31/2009 18:35	04-02-09 6:30	38132	497	qcd_060085	-31.3865	152.2482
4920	East Coast (South)	East Coast (South)	2160	3	260.28	intermediate	3.3991	05-08-80 1:05	05-09-80 13:00	35628	469	qcd_057095	-28.7551	152.4507
4921	East Coast (South)	East Coast (South)	2160	3	178.83	intermediate	5.5051	07-04-88 19:55	07-06-88 7:50	113251	1822	qcd_563054_231	-34.1253	150.0447
2738	East Coast (South)	East Coast (South)	2160	2	242.65	rare	1.3702	06-12-67 8:45	6/13/1967 20:40	35463	467	qcd_057056	-30.75	152.0667
4493	East Coast (South)	East Coast (South)	2160	1	409.31	rare	0.4671	02-02-90 11:35	02-03-90 23:30	39524	514	qcd_061223	-32.9131	151.75
4688	East Coast (South)	East Coast (South)	2160	2	636.26	rare	0.0754	03-09-74 16:55	03-11-74 4:50	36926	486	qcd_058131	-28.8521	153.4556
4753	East Coast (South)	East Coast (South)	2160	3	376.38	rare	0.9436	02-08-92 14:30	02-10-92 2:25	140832	2276	qcd_wyoming_58	-33.4117	151.3483
4821	East Coast (South)	East Coast (South)	2160	3	505.32	rare	0.6781	4/26/1963 17:15	4/28/1963 5:10	37552	492	qcd_059040	-30.3107	153.1187
4861	East Coast (South)	East Coast (South)	2160	2	270.56	rare	1.9781	3/18/1978 23:30	3/20/1978 11:25	38908	504	qcd_061151	-32.2426	151.683
4887	East Coast (South)	East Coast (South)	2160	2	409.73	rare	0.2858	08-05-86 0:15	08-06-86 12:10	113573	1826	qcd_563059_231	-33.6897	150.3008
4908	East Coast (South)	East Coast (South)	2160	1	285.5	rare	2.7183	06-10-91 14:05	06-12-91 2:00	115195	1850	qcd_566047_233	-33.9747	151.0778
4911	East Coast (South)	East Coast (South)	2160	2	318.97	rare	1.56	7/19/1965 9:40	7/20/1965 21:35	36391	479	qcd_058076	-29.7	152.9333
4912	East Coast (South)	East Coast (South)	2160	3	325	rare	2.6496	06-07-07 17:50	06-09-07 5:45	40365	523	qcd_061351	-33.3102	151.2443
4932	East Coast (South)	East Coast (South)	2880	2	429.41	frequent	14.9662	04-06-62 3:25	04-08-62 3:20	37681	493	qcd_059067	-30.3439	152.7128
4948	East Coast (South)	East Coast (South)	2880	1	286.16	frequent	17.1213	05-10-62 15:20	05-12-62 15:15	37551	492	qcd_059040	-30.3107	153.1187
4949	East Coast (South)	East Coast (South)	2880	1	163.52	frequent	17.1717	1/22/1976 17:15	1/24/1976 17:10	39969	519	qcd_061288	-32.3322	151.4595
4950	East Coast (South)	East Coast (South)	2880	2	294.6	frequent	14.659	01-03-08 3:20	01-05-08 3:15	36265	477	qcd_058044	-28.5966	153.2233
4954	East Coast (South)	East Coast (South)	2880	2	203.12	frequent	15.0315	03-08-01 10:45	03-10-01 10:40	61347	965	qcd_204007_77	-29.5082	152.6832
4955	East Coast (South)	East Coast (South)	2880	2	372.54	frequent	15.1302	7/31/1990 8:35	08-02-90 8:30	118896	1918	qcd_568071_231	-34.4628	150.7333
4956	East Coast (South)	East Coast (South)	2880	2	133.71	frequent	15.6159	3/18/1978 6:25	3/20/1978 6:20	38242	498	qcd_060104	-31.4138	151.598
4957	East Coast (South)	East Coast (South)	2880	3	204.86	frequent	14.9855	6/19/1975 9:40	6/21/1975 9:35	38454	501	qcd_061029	-33.2333	151.2

4958	East Coast (South)	East Coast (South)	2880	3	305.31	frequent	16.4151	05-06-63 3:45	05-08-63 3:40	35982	473	qcd_058013	-28.3167	153.4333
4959	East Coast (South)	East Coast (South)	2880	3	334.47	frequent	17.62	08-04-86 13:10	08-06-86 13:05	118637	1914	qcd_568065_231	-34.2653	150.8778
2750	East Coast (South)	East Coast (South)	2880	3	454.06	intermediate	3.9866	06-09-91 12:20	06-11-91 12:15	118834	1917	qcd_568070_231	-34.5542	150.5694
4812	East Coast (South)	East Coast (South)	2880	3	285.26	intermediate	5.8723	03-11-74 4:15	3/13/1974 4:10	37780	494	qcd_060030	-31.9033	152.4496
4839	East Coast (South)	East Coast (South)	2880	3	322.84	intermediate	4.932	05-08-80 1:00	05-10-80 0:55	38137	497	qcd_060085	-31.3865	152.2482
4897	East Coast (South)	East Coast (South)	2880	2	350.36	intermediate	13.2126	7/31/1990 9:05	08-02-90 9:00	119601	1929	qcd_568102_231	-34.5522	150.6317
4904	East Coast (South)	East Coast (South)	2880	2	184.5	intermediate	11.078	1/18/1971 20:40	1/20/1971 20:35	39982	519	qcd_061288	-32.3322	151.4595
4943	East Coast (South)	East Coast (South)	2880	1	247.52	intermediate	3.5577	02-02-90 10:20	02-04-90 10:15	62807	999	qcd_212320_77	-33.876	150.7698
4944	East Coast (South)	East Coast (South)	2880	1	464.2	intermediate	3.8937	02-01-01 2:10	02-03-01 2:05	36667	483	qcd_058113	-28.4738	153.0861
4945	East Coast (South)	East Coast (South)	2880	2	355.42	intermediate	7.7208	5/16/1977 13:45	5/18/1977 13:40	37565	492	qcd_059040	-30.3107	153.1187
4946	East Coast (South)	East Coast (South)	2880	2	365.12	intermediate	7.7263	1/24/1974 21:05	1/26/1974 21:00	36599	482	qcd_058109	-28.3672	153.1689
4947	East Coast (South)	East Coast (South)	2880	2	392	intermediate	4.9871	02-05-02 5:10	02-07-02 5:05	37560	492	qcd_059040	-30.3107	153.1187
4780	East Coast (South)	East Coast (South)	2880	1	395.37	rare	0.5651	1/19/1971 12:50	1/21/1971 12:45	38903	504	qcd_061151	-32.2426	151.683
4822	East Coast (South)	East Coast (South)	2880	3	578.27	rare	0.385	4/26/1963 5:35	4/28/1963 5:30	37552	492	qcd_059040	-30.3107	153.1187
4829	East Coast (South)	East Coast (South)	2880	2	296.35	rare	2.2359	12/25/1962 0:00	12/26/1962 23:55	38893	504	qcd_061151	-32.2426	151.683
4858	East Coast (South)	East Coast (South)	2880	3	210.2	rare	0.9641	06-07-07 1:45	06-09-07 1:40	39894	518	qcd_061287	-32.1852	150.1737
4862	East Coast (South)	East Coast (South)	2880	2	346.87	rare	1.0061	3/18/1978 8:25	3/20/1978 8:20	38908	504	qcd_061151	-32.2426	151.683
4909	East Coast (South)	East Coast (South)	2880	2	361	rare	1.384	06-10-91 2:05	06-12-91 2:00	115195	1850	qcd_566047_233	-33.9747	151.0778
4937	East Coast (South)	East Coast (South)	2880	1	322.52	rare	1.7647	08-05-98 21:15	08-07-98 21:10	135407	2168	qcd_cromer_58	-33.7488	151.3
4938	East Coast (South)	East Coast (South)	2880	2	299.73	rare	1.9422	08-04-86 12:55	08-06-86 12:50	112035	1808	qcd_563035_231	-33.9758	150.3811
4939	East Coast (South)	East Coast (South)	2880	2	250.18	rare	2.9709	1/29/2001 11:10	1/31/2001 11:05	61305	964	qcd_204002_77	-28.8857	152.5658
4940	East Coast (South)	East Coast (South)	2880	1	215.95	rare	0.6917	2/23/1955 17:30	2/25/1955 17:25	38750	503	qcd_061089	-32.0632	150.9272
4924	East Coast (South)	East Coast (South)	4320	2	254.37	frequent	14.5303	05-01-96 7:50	05-04-96 7:45	61249	963	qcd_204001_77	-29.9793	152.725
4970	East Coast (South)	East Coast (South)	4320	1	177.14	frequent	15.3136	8/23/1969 20:10	8/26/1969 20:05	35453	467	qcd_057056	-30.75	152.0667
4973	East Coast (South)	East Coast (South)	4320	1	483.48	frequent	16.3833	05-07-63 15:15	05-10-63 15:10	37685	493	qcd_059067	-30.3439	152.7128
4974	East Coast (South)	East Coast (South)	4320	2	250.2	frequent	15.3113	1/30/2001 18:05	02-02-01 18:00	61245	963	qcd_204001_77	-29.9793	152.725
4975	East Coast (South)	East Coast (South)	4320	2	177.07	frequent	15.3331	10-09-82 11:45	10-12-82 11:40	35451	467	qcd_057056	-30.75	152.0667
4976	East Coast (South)	East Coast (South)	4320	2	247.5	frequent	15.4341	8/15/1998 17:40	8/18/1998 17:35	116203	1869	qcd_566092_233	-34.0295	151.0711
4977	East Coast (South)	East Coast (South)	4320	2	210.8	frequent	15.7123	05-06-01 5:50	05-09-01 5:45	38603	502	qcd_061078	-32.7932	151.8359
4979	East Coast (South)	East Coast (South)	4320	3	197.98	frequent	14.4534	3/17/1978 8:55	3/20/1978 8:50	39825	517	qcd_061250	-32.6296	151.5919
4980	East Coast (South)	East Coast (South)	4320	3	194	frequent	15.5277	03-06-01 12:50	03-09-01 12:45	39973	519	qcd_061288	-32.3322	151.4595
4981	East Coast (South)	East Coast (South)	4320	3	379.6	frequent	17.0673	2/14/2009 19:10	2/17/2009 19:05	37956	496	qcd_060080	-31.6274	152.443
4840	East Coast (South)	East Coast (South)	4320	2	417.13	intermediate	3.3532	05-07-80 1:35	05-10-80 1:30	38137	497	qcd_060085	-31.3865	152.2482
4898	East Coast (South)	East Coast (South)	4320	1	398.61	intermediate	12.4489	7/31/1990 12:10	08-03-90 12:05	119601	1929	qcd_568102_231	-34.5522	150.6317
4905	East Coast (South)	East Coast (South)	4320	1	219.3	intermediate	9.8965	1/18/1971 20:40	1/21/1971 20:35	39982	519	qcd_061288	-32.3322	151.4595
4919	East Coast (South)	East Coast (South)	4320	2	357.8	intermediate	6.9901	3/30/2009 18:35	04-02-09 18:30	38132	497	qcd_060085	-31.3865	152.2482
4963	East Coast (South)	East Coast (South)	4320	2	371.01	intermediate	14.2879	11-05-84 11:35	11-08-84 11:30	118579	1913	qcd_568061_231	-34.4056	150.7097
4964	East Coast (South)	East Coast (South)	4320	2	475.56	intermediate	7.1166	11-10-75 20:05	11/13/1975 20:00	37942	496	qcd_060080	-31.6274	152.443
4966	East Coast (South)	East Coast (South)	4320	2	303.8	intermediate	13.7759	5/20/2009 17:05	5/23/2009 17:00	37236	489	qcd_059000	-30.8141	152.5129
4967	East Coast (South)	East Coast (South)	4320	3	152.99	intermediate	12.6825	1/28/1971 19:45	1/31/1971 19:40	40116	520	qcd_061309	-32.6881	150.9728
4968	East Coast (South)	East Coast (South)	4320	3	329.8	intermediate	4.7193	4/27/1988 19:05	4/30/1988 19:00	118521	1912	qcd_568060_231	-34.2972	150.6736
4969	East Coast (South)	East Coast (South)	4320	3	183.64	intermediate	10.0424	04-05-62 19:40	04-08-62 19:35	35892	471	qcd_057104	-31.2739	151.9655
2739	East Coast (South)	East Coast (South)	4320	2	316.43	rare	1.0542	06-11-67 13:35	6/14/1967 13:30	35463	467	qcd_057056	-30.75	152.0667
2789	East Coast (South)	East Coast (South)	4320	2	217.4	rare	1.8942	1/31/2001 1:50	02-03-01 1:45	35780	470	qcd_057103	-30.0093	152.0101
4637	East Coast (South)	East Coast (South)	4320	2	196.82	rare	2.0211	1/21/1976 15:20	1/24/1976 15:15	38754	503	qcd_061089	-32.0632	150.9272
4781	East Coast (South)	East Coast (South)	4320	1	478.42	rare	0.3877	1/19/1971 3:20	1/22/1971 3:15	38903	504	qcd_061151	-32.2426	151.683
4863	East Coast (South)	East Coast (South)	4320	3	414.93	rare	0.844	3/17/1978 11:50	3/20/1978 11:45	38908	504	qcd_061151	-32.2426	151.683
4910	East Coast (South)	East Coast (South)	4320	2	411	rare	1.3301	06-09-91 3:45	06-12-91 3:40	115195	1850	qcd_566047_233	-33.9747	151.0778
4941	East Coast (South)	East Coast (South)	4320	1	277.89	rare	0.328	2/23/1955 12:55	2/26/1955 12:50	38750	503	qcd_061089	-32.0632	150.9272
4960	East Coast (South)	East Coast (South)	4320	2	367.21	rare	2.1725	08-04-86 5:50	08-07-86 5:45	41982	542	qcd_066037	-33.9465	151.1731
4961	East Coast (South)	East Coast (South)	4320	2	412.22	rare	2.1815	06-07-07 4:05	06-10-07 4:00	138402	2231	qcd_narara_58	-33.395	151.3267
4962	East Coast (South)	East Coast (South)	4320	3	368.64	rare	2.9498	4/28/1988 0:50	05-01-88 0:45	118395	1910	qcd_568054_231	-34.4761	150.5222
5002	East Coast (South)	East Coast (South)	5760	1	140.06	frequent	15.4486	03-02-77 17:45	03-06-77 17:40	39465	513	qcd_061212	-32.3767	150.96
5003	East Coast (South)	East Coast (South)	5760	1	251	frequent	17.2	05-12-03 21:00	5/16/2003 20:55	114572	1844	qcd_566028_233	-33.9265	151.2144
5005	East Coast (South)	East Coast (South)	5760	2	207.65	frequent	14.5294	1/20/1976 14:30	1/24/1976 14:25	42711	552	qcd_067033	-33.6022	150.7794
5006	East Coast (South)	East Coast (South)	5760	2	425.96	frequent	14.9451	5/15/1977 9:40	5/19/1977 9:35	37945	496	qcd_060080	-31.6274	152.443
5007	East Coast (South)	East Coast (South)	5760	2	209.33	frequent	14.9712	05-04-79 4:15	05-08-79 4:10	39828	517	qcd_061250	-32.6296	151.5919
5008	East Coast (South)	East Coast (South)	5760	2	304.03	frequent	15.5503	03-06-01 6:20	03-10-01 6:15	61900	979	qcd_207004_77	-31.4225	152.4708
5012	East Coast (South)	East Coast (South)	5760	2	351.12	frequent	16.3139	06-10-67 4:35	6/14/1967 4:30	36262	477	qcd_058044	-28.5966	153.2233
5014	East Coast (South)	East Coast (South)	5760	3	484.2	frequent	14.9049	1/22/2012 23:40	1/26/2012 23:35	37443	491	qcd_059026	-30.3076	152.9874
5015	East Coast (South)	East Coast (South)	5760	3	414.16	frequent	15.249	3/14/1978 23:40	3/18/1978 23:35	36333	478	qcd_058072	-28.6533	153.4542

5016	East Coast (South)	East Coast (South)	5760	3	266.83	frequent	16.0359	06-08-64 9:15	06-12-64 9:10	42249	543	qcd_066062	-33.8607	151.205
4843	East Coast (South)	East Coast (South)	5760	3	330.07	intermediate	13.1569	6/14/1949 12:10	6/18/1949 12:05	42319	544	qcd_066063	-33.7206	151.1128
4850	East Coast (South)	East Coast (South)	5760	3	461.36	intermediate	8.5748	2/13/2009 9:45	2/17/2009 9:40	138502	2233	qcd_northbonvil_58	-30.3638	153.0055
4965	East Coast (South)	East Coast (South)	5760	2	547.83	intermediate	5.3369	11-10-75 12:35	11/14/1975 12:30	37942	496	qcd_060080	-31.6274	152.443
4971	East Coast (South)	East Coast (South)	5760	2	200.82	intermediate	12.5898	8/24/1969 0:35	8/28/1969 0:30	35453	467	qcd_057056	-30.75	152.0667
4978	East Coast (South)	East Coast (South)	5760	2	237.4	intermediate	13.4978	05-05-01 17:40	05-09-01 17:35	38603	502	qcd_061078	-32.7932	151.8359
4995	East Coast (South)	East Coast (South)	5760	1	190.25	intermediate	8.978	5/14/1977 4:10	5/18/1977 4:05	38274	498	qcd_060104	-31.4138	151.598
4997	East Coast (South)	East Coast (South)	5760	1	171.73	intermediate	14.2542	2/21/1977 11:20	2/25/1977 11:15	38267	498	qcd_060104	-31.4138	151.598
4999	East Coast (South)	East Coast (South)	5760	2	194.22	intermediate	7.374	05-05-63 16:35	05-09-63 16:30	35938	472	qcd_057105	-31.0667	151.9167
5000	East Coast (South)	East Coast (South)	5760	2	498.2	intermediate	7.4017	06-06-91 9:55	06-10-91 9:50	119604	1929	qcd_568102_231	-34.5522	150.6317
5001	East Coast (South)	East Coast (South)	5760	3	348.8	intermediate	11.7876	1/22/2012 17:00	1/26/2012 16:55	38146	497	qcd_060085	-31.3865	152.2482
2740	East Coast (South)	East Coast (South)	5760	2	339.19	rare	0.9688	06-10-67 17:50	6/14/1967 17:45	35463	467	qcd_057056	-30.75	152.0667
2790	East Coast (South)	East Coast (South)	5760	2	249	rare	1.2596	1/30/2001 14:35	02-03-01 14:30	35780	470	qcd_057103	-30.0093	152.0101
4689	East Coast (South)	East Coast (South)	5760	1	797.85	rare	0.0749	03-09-74 9:40	3/13/1974 9:35	36926	486	qcd_058131	-28.8521	153.4556
4782	East Coast (South)	East Coast (South)	5760	1	505.93	rare	0.385	1/18/1971 23:00	1/22/1971 22:55	38903	504	qcd_061151	-32.2426	151.683
4795	East Coast (South)	East Coast (South)	5760	2	196	rare	3.0599	02-04-10 1:40	02-08-10 1:35	113696	1828	qcd_563064_233	-32.2375	150.6306
4841	East Coast (South)	East Coast (South)	5760	3	479.48	rare	2.772	05-06-80 0:10	05-10-80 0:05	38137	497	qcd_060085	-31.3865	152.2482
4982	East Coast (South)	East Coast (South)	5760	2	771.39	rare	2.4349	03-06-01 12:55	03-10-01 12:50	61417	967	qcd_204017_77	-30.3057	152.7146
4985	East Coast (South)	East Coast (South)	5760	3	322.5	rare	3.0137	8/15/1998 16:55	8/19/1998 16:50	120950	1951	qcd_568170_233	-33.3472	150.8578
4986	East Coast (South)	East Coast (North)	5760	2	873.32	rare	0.5299	05-01-96 12:50	05-05-96 12:45	26237	347	qcd_040197	-27.9695	153.1954
4993	East Coast (South)	East Coast (North)	5760	2	1294.04	rare	0.569	1/24/1974 6:35	1/28/1974 6:30	26103	346	qcd_040192	-28.2264	153.2786
5009	East Coast (South)	East Coast (South)	7200	2	320.01	frequent	15.1582	03-06-01 0:45	03-11-01 0:40	61900	979	qcd_207004_77	-31.4225	152.4708
5013	East Coast (South)	East Coast (South)	7200	2	377.3	frequent	14.8368	06-09-67 5:00	6/14/1967 4:55	36262	477	qcd_058044	-28.5966	153.2233
5034	East Coast (South)	East Coast (South)	7200	1	504.52	frequent	15.2544	4/30/1996 22:40	05-05-96 22:35	61017	958	qcd_201001_77	-28.3537	153.2931
5036	East Coast (South)	East Coast (South)	7200	1	210.25	frequent	16.5795	5/14/1977 7:00	5/19/1977 6:55	39832	517	qcd_061250	-32.6296	151.5919
5037	East Coast (South)	East Coast (South)	7200	2	227.5	frequent	15.7564	05-12-03 21:10	5/17/2003 21:05	117731	1900	qcd_567167_233	-33.6961	150.9194
5038	East Coast (South)	East Coast (South)	7200	2	251.54	frequent	19.3568	06-07-64 13:05	06-12-64 13:00	41988	542	qcd_066037	-33.9465	151.1731
5039	East Coast (South)	East Coast (South)	7200	2	292.73	frequent	22.776	1/16/1951 7:15	1/21/1951 7:10	42320	544	qcd_066063	-33.7206	151.1128
5040	East Coast (South)	East Coast (South)	7200	3	358.6	frequent	17.0998	05-07-87 4:00	05-12-87 3:55	36934	486	qcd_058131	-28.8521	153.4556
5041	East Coast (South)	East Coast (South)	7200	3	236.2	frequent	17.3075	4/20/2008 14:10	4/25/2008 14:05	38930	504	qcd_061151	-32.2426	151.683
5044	East Coast (South)	East Coast (South)	7200	3	359.9	frequent	18.4569	01-08-68 5:45	1/13/1968 5:40	36603	482	qcd_058109	-28.3672	153.1689
4844	East Coast (South)	East Coast (South)	7200	3	347.43	intermediate	12.6723	6/14/1949 8:05	6/19/1949 8:00	42319	544	qcd_066063	-33.7206	151.1128
4851	East Coast (South)	East Coast (South)	7200	3	537.23	intermediate	5.1495	02-12-09 9:55	2/17/2009 9:50	138502	2233	qcd_northbonvil_58	-30.3638	153.0055
4972	East Coast (South)	East Coast (South)	7200	2	219.11	intermediate	10.4659	8/23/1969 5:05	8/28/1969 5:00	35453	467	qcd_057056	-30.75	152.0667
4996	East Coast (South)	East Coast (South)	7200	1	207.54	intermediate	7.4502	5/14/1977 2:30	5/19/1977 2:25	38274	498	qcd_060104	-31.4138	151.598
4998	East Coast (South)	East Coast (South)	7200	2	187.37	intermediate	12.1519	2/21/1977 9:15	2/26/1977 9:10	38267	498	qcd_060104	-31.4138	151.598
5004	East Coast (South)	East Coast (South)	7200	2	280	intermediate	13.7859	05-12-03 21:00	5/17/2003 20:55	114572	1844	qcd_566028_233	-33.9265	151.2144
5030	East Coast (South)	East Coast (South)	7200	1	207.91	intermediate	12.7343	01-07-74 12:55	01-12-74 12:50	35458	467	qcd_057056	-30.75	152.0667
5031	East Coast (South)	East Coast (South)	7200	2	459.19	intermediate	7.739	06-09-67 3:55	6/14/1967 3:50	36609	482	qcd_058109	-28.3672	153.1689
5032	East Coast (South)	East Coast (South)	7200	2	229.78	intermediate	5.4965	06-07-64 21:20	06-12-64 21:15	39729	516	qcd_061240	-32.9667	151.1333
5033	East Coast (South)	East Coast (South)	7200	3	449.11	intermediate	9.6469	05-04-80 17:55	05-09-80 17:50	37070	487	qcd_058158	-28.3395	153.3809
2741	East Coast (South)	East Coast (South)	7200	3	363.55	rare	0.7276	06-09-67 12:20	6/14/1967 12:15	35463	467	qcd_057056	-30.75	152.0667
2751	East Coast (South)	East Coast (South)	7200	3	708.85	rare	1.4194	06-07-91 0:50	06-12-91 0:45	118834	1917	qcd_568070_231	-34.5542	150.5694
2855	East Coast (South)	East Coast (North)	7200	2	558.17	rare	1.3524	05-01-96 0:05	05-06-96 0:00	26738	351	qcd_040223	-27.4178	153.1142
4633	East Coast (South)	East Coast (South)	7200	1	513.2	rare	2.1938	11-10-75 1:05	11/15/1975 1:00	37240	489	qcd_059000	-30.8141	152.5129
4796	East Coast (South)	East Coast (South)	7200	3	206	rare	2.8164	02-03-10 1:40	02-08-10 1:35	113696	1828	qcd_563064_233	-32.2375	150.6306
4925	East Coast (South)	East Coast (South)	7200	1	411.77	rare	3.1749	05-01-96 12:20	05-06-96 12:15	61249	963	qcd_204001_77	-29.9793	152.725
4983	East Coast (South)	East Coast (South)	7200	2	834.01	rare	1.87	03-05-01 16:35	03-10-01 16:30	61417	967	qcd_204017_77	-30.3057	152.7146
4987	East Coast (South)	East Coast (North)	7200	1	1040.64	rare	0.2216	05-01-96 12:35	05-06-96 12:30	26237	347	qcd_040197	-27.9695	153.1954
5020	East Coast (South)	East Coast (North)	7200	2	790.27	rare	0.7751	01-08-68 0:40	1/13/1968 0:35	486	360	qcd_040386	-26.5892	152.7322
5027	East Coast (South)	East Coast (North)	7200	1	654.02	rare	1.1531	05-01-96 0:05	05-06-96 0:00	28478	374	qcd_040584	-28.0481	153.2875
5010	East Coast (South)	East Coast (South)	8640	2	327.02	frequent	15.147	03-05-01 22:05	03-11-01 22:00	61900	979	qcd_207004_77	-31.4225	152.4708
5042	East Coast (South)	East Coast (South)	8640	3	249	frequent	16.0914	4/19/2008 14:00	4/25/2008 13:55	38930	504	qcd_061151	-32.2426	151.683
5053	East Coast (South)	East Coast (South)	8640	1	297.76	frequent	18.2885	4/30/1996 8:30	05-06-96 8:25	61110	960	qcd_203010_77	-28.7365	153.164
5055	East Coast (South)	East Coast (South)	8640	1	260.39	frequent	23.1002	05-01-53 18:00	05-07-53 17:55	42248	543	qcd_066062	-33.8607	151.205
5057	East Coast (South)	East Coast (South)	8640	2	337.14	frequent	18.5526	5/14/1977 2:40	5/20/1977 2:35	38144	497	qcd_060085	-31.3865	152.2482
5058	East Coast (South)	East Coast (South)	8640	2	184.6	frequent	18.5658	01-11-04 9:15	1/17/2004 9:10	35904	471	qcd_057104	-31.2739	151.9655
5060	East Coast (South)	East Coast (South)	8640	2	127.57	frequent	22.4244	1/25/1997 12:30	1/31/1997 12:25	62340	988	qcd_210061_77	-31.8099	150.9252
5061	East Coast (South)	East Coast (South)	8640	2	373.88	frequent	27.9349	06-08-67 15:35	6/14/1967 15:30	36341	478	qcd_058072	-28.6533	153.4542
5062	East Coast (South)	East Coast (South)	8640	3	280.48	frequent	15.3942	3/15/1983 17:05	3/21/1983 17:00	114573	1844	qcd_566028_233	-33.9265	151.2144
5063	East Coast (South)	East Coast (South)	8640	3	162	frequent	16.2996	01-05-74 15:45	01-11-74 15:40	40126	520	qcd_061309	-32.6881	150.9728

4852	East Coast (South)	East Coast (South)	8640	3	566.74	intermediate	4.5767	02-11-09 15:00	2/17/2009 14:55	138502	2233	qcd_northbonvil_58	-30.3638	153.0055
4951	East Coast (South)	East Coast (South)	8640	3	487.6	intermediate	5.8087	12/30/2007 17:20	01-05-08 17:15	36265	477	qcd_058044	-28.5966	153.2233
5017	East Coast (South)	East Coast (South)	8640	2	373.24	intermediate	5.2777	06-06-64 16:30	06-12-64 16:25	42249	543	qcd_066062	-33.8607	151.205
5035	East Coast (South)	East Coast (South)	8640	1	622.15	intermediate	8.1717	4/30/1996 19:10	05-06-96 19:05	61017	958	qcd_201001_77	-28.3537	153.2931
5046	East Coast (South)	East Coast (South)	8640	1	267.9	intermediate	4.6451	11-09-75 14:15	11/15/1975 14:10	35459	467	qcd_057056	-30.75	152.0667
5047	East Coast (South)	East Coast (South)	8640	2	162.97	intermediate	8.2469	01-11-04 9:50	1/17/2004 9:45	61815	977	qcd_206035_77	-30.2112	151.7261
5048	East Coast (South)	East Coast (South)	8640	2	305.24	intermediate	8.9163	5/13/1977 19:40	5/19/1977 19:35	38457	501	qcd_061029	-33.2333	151.2
5049	East Coast (South)	East Coast (South)	8640	2	377.2	intermediate	7.1074	02-02-10 0:30	02-08-10 0:25	41073	532	qcd_063039	-33.7122	150.3087
5050	East Coast (South)	East Coast (South)	8640	2	617.8	intermediate	4.5097	03-04-01 16:50	03-10-01 16:45	37950	496	qcd_060080	-31.6274	152.443
5051	East Coast (South)	East Coast (South)	8640	3	302.4	intermediate	12.3098	01-05-11 16:20	01-11-11 16:15	35648	469	qcd_057095	-28.7551	152.4507
2742	East Coast (South)	East Coast (South)	8640	3	392.89	rare	0.4541	06-08-67 0:10	6/14/1967 0:05	35463	467	qcd_057056	-30.75	152.0667
2791	East Coast (South)	East Coast (South)	8640	3	293.8	rare	0.5666	1/28/2001 10:45	02-03-01 10:40	35780	470	qcd_057103	-30.0093	152.0101
2797	East Coast (South)	East Coast (South)	8640	3	369.6	rare	0.6455	01-05-11 16:45	01-11-11 16:40	35365	465	qcd_056202	-28.9776	152.1552
2835	East Coast (South)	East Coast (South)	8640	1	333.64	rare	2.6473	02-02-90 3:50	02-08-90 3:45	42727	552	qcd_067033	-33.6022	150.7794
2840	East Coast (South)	East Coast (North)	8640	2	895.97	rare	0.7335	12/26/1990 14:10	01-01-91 14:05	110012	1764	qcd_533011_66	-21.4797	148.8283
4797	East Coast (South)	East Coast (South)	8640	3	214	rare	2.5066	02-02-10 11:30	02-08-10 11:25	113696	1828	qcd_563064_233	-32.2375	150.6306
4926	East Coast (South)	East Coast (South)	8640	2	441.07	rare	2.5687	4/30/1996 15:10	05-06-96 15:05	61249	963	qcd_204001_77	-29.9793	152.725
4988	East Coast (South)	East Coast (North)	8640	1	1114.98	rare	0.1627	05-01-96 0:05	05-07-96 0:00	26237	347	qcd_040197	-27.9695	153.1954
5028	East Coast (South)	East Coast (North)	8640	1	727.22	rare	0.7318	05-01-96 0:05	05-07-96 0:00	28478	374	qcd_040584	-28.0481	153.2875
5045	East Coast (South)	East Coast (South)	8640	3	638.8	rare	2.9238	12/30/2007 18:10	01-05-08 18:05	36675	483	qcd_058113	-28.4738	153.0861
5011	East Coast (South)	East Coast (South)	10080	1	334.02	frequent	14.4563	03-05-01 14:05	03-12-01 14:00	61900	979	qcd_207004_77	-31.4225	152.4708
5043	East Coast (South)	East Coast (South)	10080	3	261.2	frequent	14.5823	4/18/2008 19:20	4/25/2008 19:15	38930	504	qcd_061151	-32.2426	151.683
5054	East Coast (South)	East Coast (South)	10080	2	303.21	frequent	17.7861	4/29/1996 8:30	05-06-96 8:25	61110	960	qcd_203010_77	-28.7365	153.164
5059	East Coast (South)	East Coast (South)	10080	2	188	frequent	17.708	01-10-04 17:10	1/17/2004 17:05	35904	471	qcd_057104	-31.2739	151.9655
5084	East Coast (South)	East Coast (South)	10080	1	392.37	frequent	19.5449	4/20/1974 17:35	4/27/1974 17:30	37071	487	qcd_058158	-28.3395	153.3809
5085	East Coast (South)	East Coast (South)	10080	2	232.95	frequent	23.7558	3/15/1978 11:25	3/22/1978 11:20	36448	480	qcd_058081	-28.9667	152.8167
5086	East Coast (South)	East Coast (South)	10080	2	140.51	frequent	27.2124	02-11-09 14:00	2/18/2009 13:55	61466	968	qcd_204030_77	-30.2587	152.0094
5087	East Coast (South)	East Coast (South)	10080	2	249	frequent	28.9583	2/28/1995 19:50	03-07-95 19:45	117287	1889	qcd_567109_233	-33.6202	151.149
5088	East Coast (South)	East Coast (South)	10080	3	291.54	frequent	14.5536	6/15/1975 13:35	6/22/1975 13:30	114575	1844	qcd_566028_233	-33.9265	151.2144
5089	East Coast (South)	East Coast (South)	10080	3	383.72	frequent	16.3705	05-03-80 15:20	05-10-80 15:15	37584	492	qcd_059040	-30.3107	153.1187
4853	East Coast (South)	East Coast (South)	10080	2	586.71	intermediate	4.2815	02-11-09 15:00	2/18/2009 14:55	138502	2233	qcd_northbonvil_58	-30.3638	153.0055
4952	East Coast (South)	East Coast (South)	10080	2	518.6	intermediate	4.6729	12/30/2007 14:20	01-06-08 14:15	36265	477	qcd_058044	-28.5966	153.2233
5018	East Coast (South)	East Coast (South)	10080	2	398.69	intermediate	3.9847	06-05-64 18:00	06-12-64 17:55	42249	543	qcd_066062	-33.8607	151.205
5052	East Coast (South)	East Coast (South)	10080	3	356.4	intermediate	6.9096	01-04-11 16:50	01-11-11 16:45	35648	469	qcd_057095	-28.7551	152.4507
5056	East Coast (South)	East Coast (South)	10080	3	303.6	intermediate	13.9304	05-01-53 12:20	05-08-53 12:15	42248	543	qcd_066062	-33.8607	151.205
5078	East Coast (South)	East Coast (South)	10080	2	310.51	intermediate	10.8241	4/29/1996 18:05	05-06-96 18:00	61205	962	qcd_203900_77	-28.6206	152.9962
5079	East Coast (South)	East Coast (South)	10080	2	503.02	intermediate	4.7732	05-02-80 16:15	05-09-80 16:10	36939	486	qcd_058131	-28.8521	153.4556
5080	East Coast (South)	East Coast (South)	10080	3	440.42	intermediate	5.8487	06-07-67 7:30	6/14/1967 7:25	37248	489	qcd_059000	-30.8141	152.5129
5081	East Coast (South)	East Coast (South)	10080	3	247.4	intermediate	5.0151	03-04-01 3:10	03-11-01 3:05	35902	471	qcd_057104	-31.2739	151.9655
5082	East Coast (South)	East Coast (South)	10080	3	395.56	intermediate	4.1596	06-11-50 2:05	6/18/1950 2:00	42247	543	qcd_066062	-33.8607	151.205
2743	East Coast (South)	East Coast (South)	10080	3	453.15	rare	0.1591	06-07-67 4:20	6/14/1967 4:15	35463	467	qcd_057056	-30.75	152.0667
2792	East Coast (South)	East Coast (South)	10080	2	301.4	rare	0.4944	1/28/2001 10:35	02-04-01 10:30	35780	470	qcd_057103	-30.0093	152.0101
2798	East Coast (South)	East Coast (South)	10080	3	376.2	rare	0.5969	01-05-11 13:20	01-12-11 13:15	35365	465	qcd_056202	-28.9776	152.1552
2836	East Coast (South)	East Coast (South)	10080	2	334.54	rare	2.6214	02-02-90 3:50	02-09-90 3:45	42727	552	qcd_067033	-33.6022	150.7794
2841	East Coast (South)	East Coast (North)	10080	1	958.57	rare	0.6531	12/28/1990 16:35	01-04-91 16:30	110012	1764	qcd_533011_66	-21.4797	148.8283
2856	East Coast (South)	East Coast (North)	10080	1	595.23	rare	1.0865	05-01-96 0:05	05-08-96 0:00	26738	351	qcd_040223	-27.4178	153.1142
5064	East Coast (South)	East Coast (North)	10080	2	589.88	rare	1.2899	01-06-68 17:10	1/13/1968 17:05	24711	329	qcd_040093	-26.1831	152.6414
5069	East Coast (South)	East Coast (North)	10080	2	491.26	rare	2.702	01-06-68 4:10	1/13/1968 4:05	23354	313	qcd_039128	-24.9069	152.323
5071	East Coast (South)	East Coast (North)	10080	2	400.84	rare	2.9538	01-07-68 11:45	1/14/1968 11:40	27412	358	qcd_040318	-27.0258	152.5642
5072	East Coast (South)	East Coast (North)	10080	2	260.63	rare	3.1285	02-05-54 0:50	02-12-54 0:45	23094	310	qcd_039090	-24.9503	150.0725

Appendix 3 – Sydney Water Advice

21.26 Sydney Water Requirements

David Huang

From: JEYADEVAN, JEYA <JEYAJEYADEVAN@sydneywater.com.au>
Sent: Tuesday, 25 October 2016 3:34 PM
To: Lewis, Patrick
Cc: Fettell, Daniel
Subject: RE: Waterloo Over Station Development - PSD Requirements

Patrick,

The On Site Detention requirements for the 13,500 square meters site at Waterloo Over Station (59 – 121 Botany Road, Waterloo), are as follows:

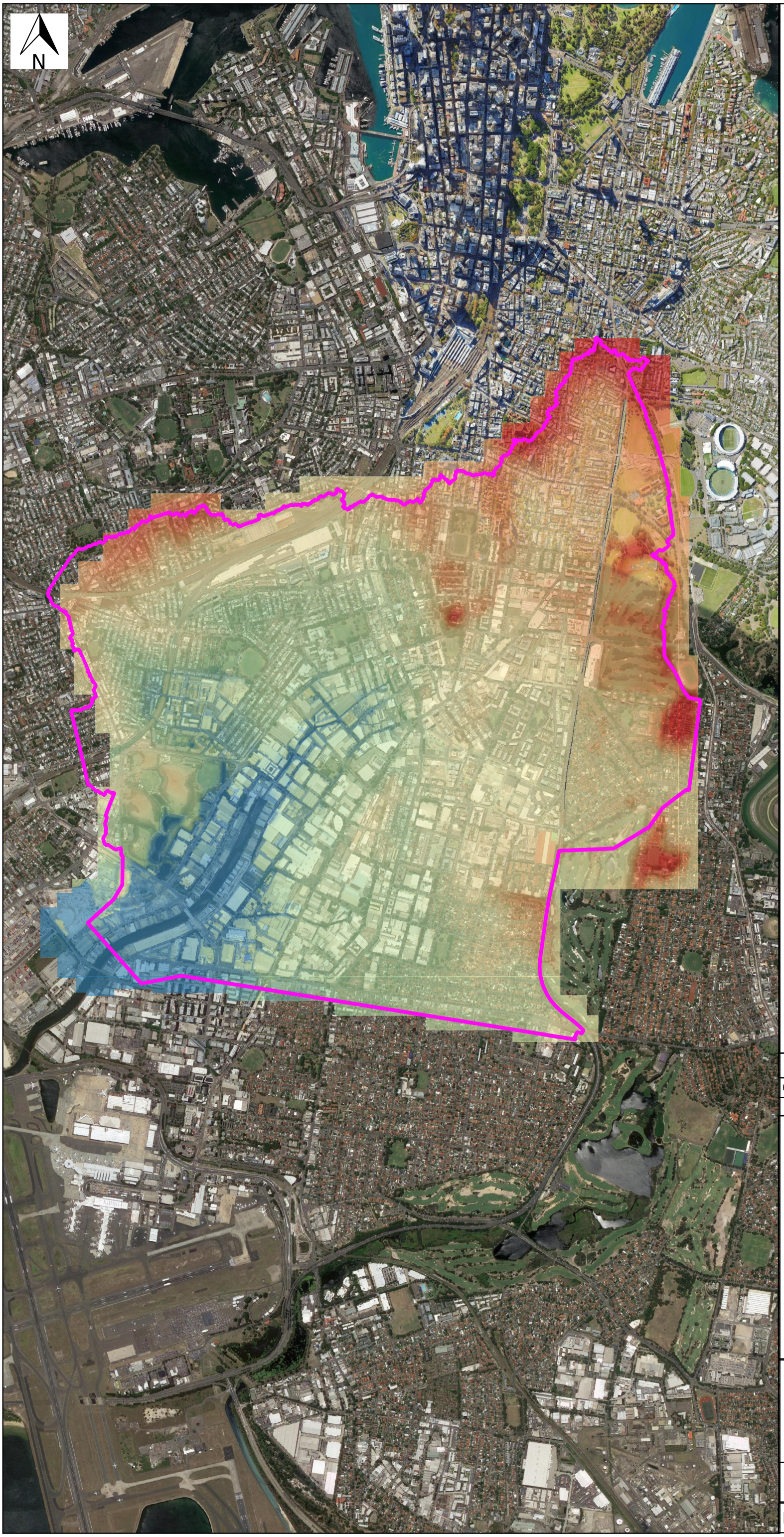
- On Site Detention 208 cubic meter
- Permissible Site Discharge 503 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

Best regards,
Jeya Jeyadevan | **Senior Capability Assessor**
Customer Delivery | Sydney Water
Level 7, 1 Smith St Parramatta NSW 2150
PO Box 399 Parramatta NSW 2124
T 8849 6118 | **M** 0409 318 827
E jeya.jeyadevan@sydneywater.com.au
sydneywater.com.au

Appendix 4 – Catchment Topography



KEY:

Catchment Extent

Elevation m AHD

- 5
- 10
- 20
- 30
- 40
- 50

0 15 30 45 m

FOR INFORMATION ONLY

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A	26/06/20	FIRST ISSUE	MZ	AV

WSP Australia Pty Limited
680 George Street
Sydney, NSW
2000 Australia
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Waterloo - OSD

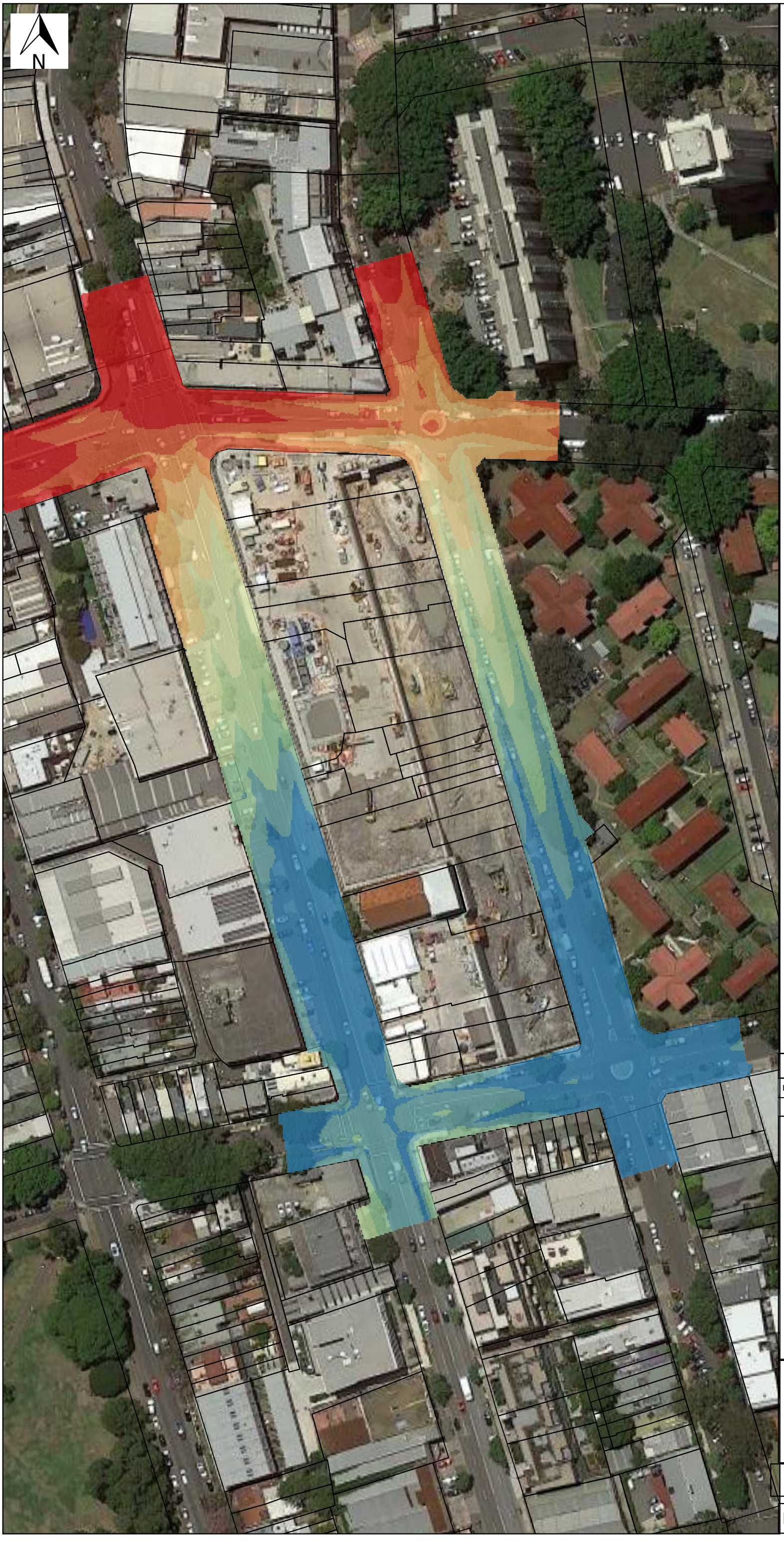
Alexandra Canal Catchment Topography

Scale: 1:25000

21/07/20

Project Number: PS119449

Appendix 5 – Topography Survey and proposed site configuration



KEY:

Elevation m AHD

- <= 15.2
- 15.2 - 15.4
- 15.4 - 15.6
- 15.6 - 15.8
- 15.8 - 16
- 16 - 16.2
- 16.2 - 16.4
- 16.4 - 16.6
- 16.6 - 16.8
- > 16.8

0 15 30 45 m

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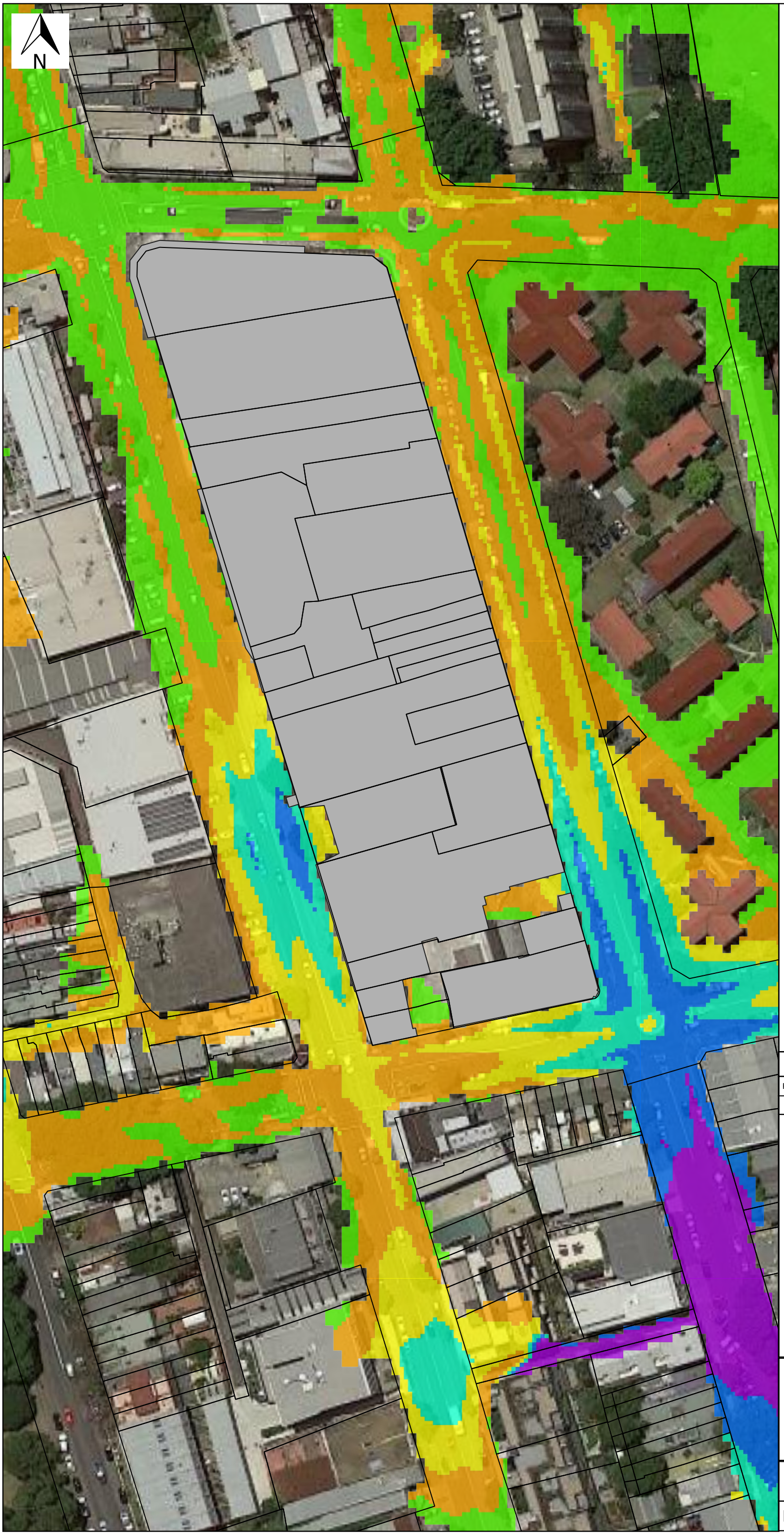
Alexandra Site Topography

Scale: 1:1250

23/07/20

Project Number: PS119449

Appendix 6 – Water Depth – Baseline Scenario



KEY:

- Existing Building

Water Depth (m)

- <= 0.10
- 0.10 - 0.30
- 0.30 - 0.50
- 0.50 - 0.7
- 0.7 - 1
- >1

0 15 30 45 m

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2000 Australia
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Waterloo - OSD

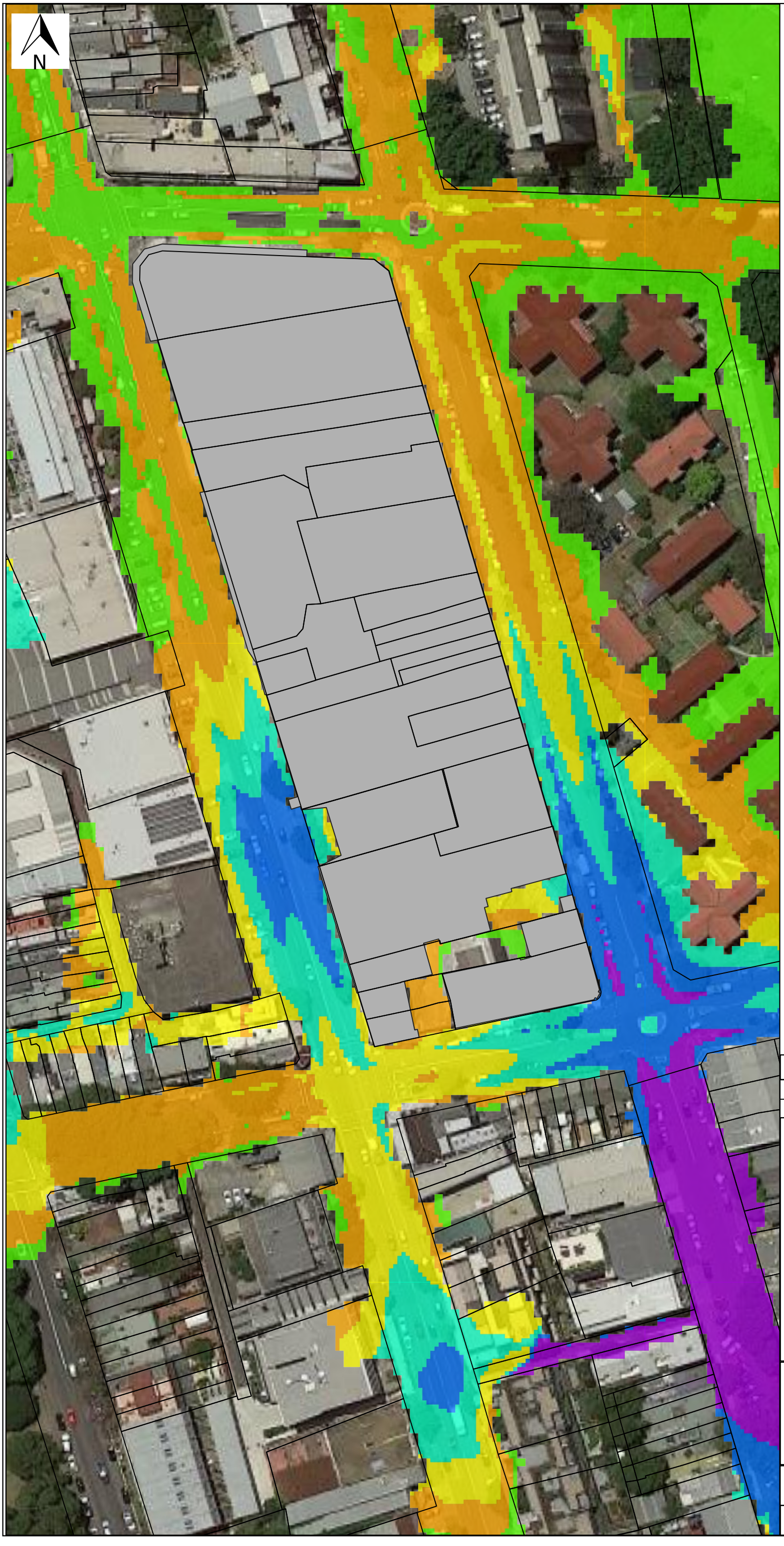
Existing Scenario - 5% AEP

Water Depth

Scale: 1:1000 | 24/07/20

Project Number: PS119449

Created by: AUMZ501756 - 2020-07-24 15:53:46 - U:\Projects\AU\PS119xxx\PS119449_Waterloo_OSD_work\4_WIP\Docs\Flood study\Flood Map\Existing Flood Map.qgz



KEY:

Existing Building

Water Depth (m)

<= 0.10

0.10 - 0.30

0.30 - 0.50

0.50 - 0.7

0.7 - 1

>1

0 15 30 45 m

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A	26/06/20	FIRST ISSUE	MZ	AV

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Sydney, NSW
2000 Australia
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Waterloo - OSD

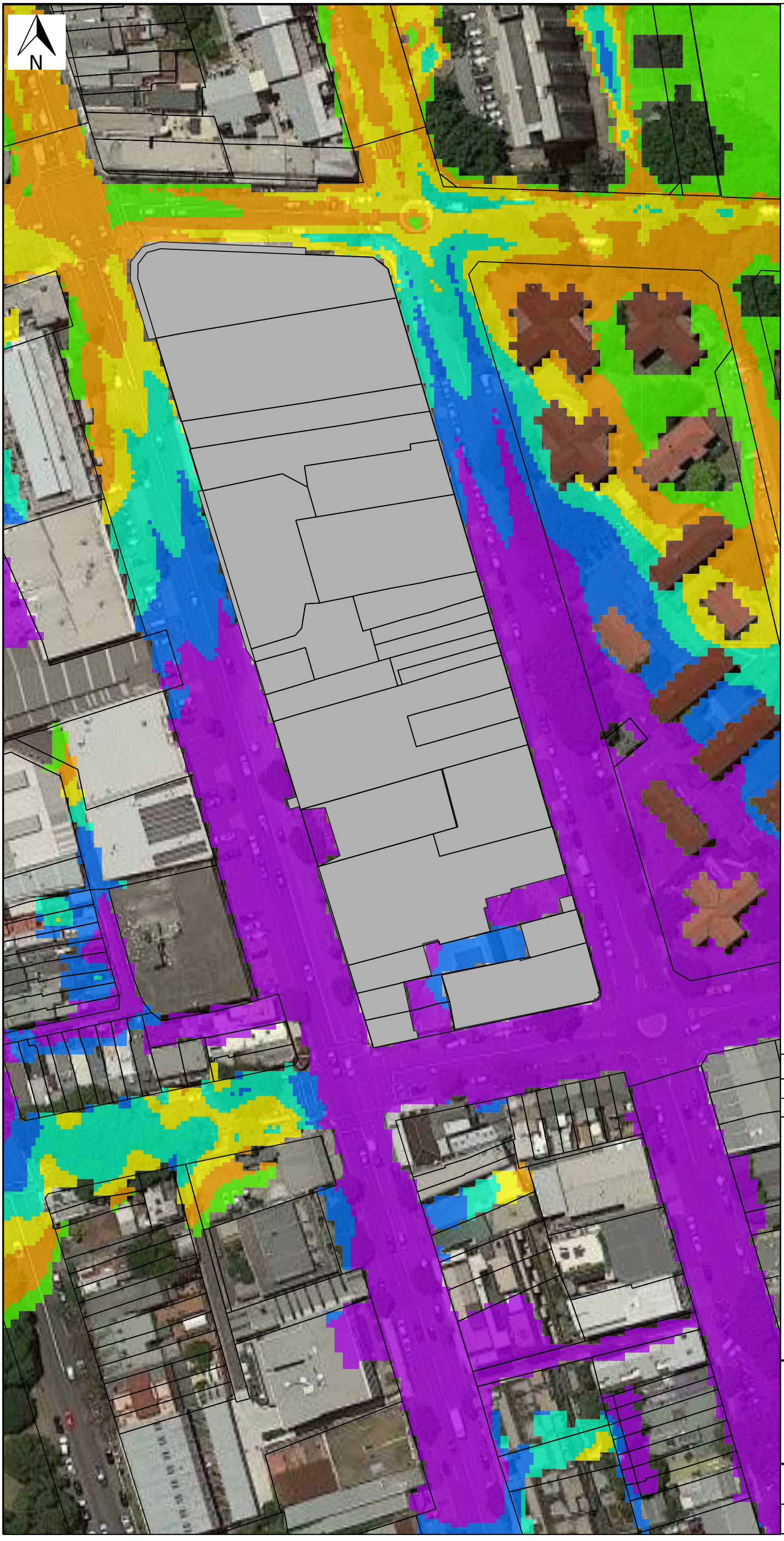
Existing Scenario - 1%AEP

Water Depth

Scale: 1:1000 | 24/07/20

Project Number: PS119449

Created by: AUMZ501756 - 2020-07-24 15:53:50 - U:\Projects\AU\PS119xxx\PS119449_Waterloo_OSD_work\4_WIP\Docs\Flood study\Flood Map\Existing Flood Map.qgz



KEY:

Existing Building

Water Depth (m)

<= 0.10

0.10 - 0.30

0.30 - 0.50

0.50 - 0.7

0.7 - 1

>1

0 15 30 45 m

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Rev.	Date	ISSUE	Prepare	Approve
A	26/06/20	FIRST ISSUE	MZ	AV

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2000 Australia
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Waterloo - OSD

Existing Scenario - PMF

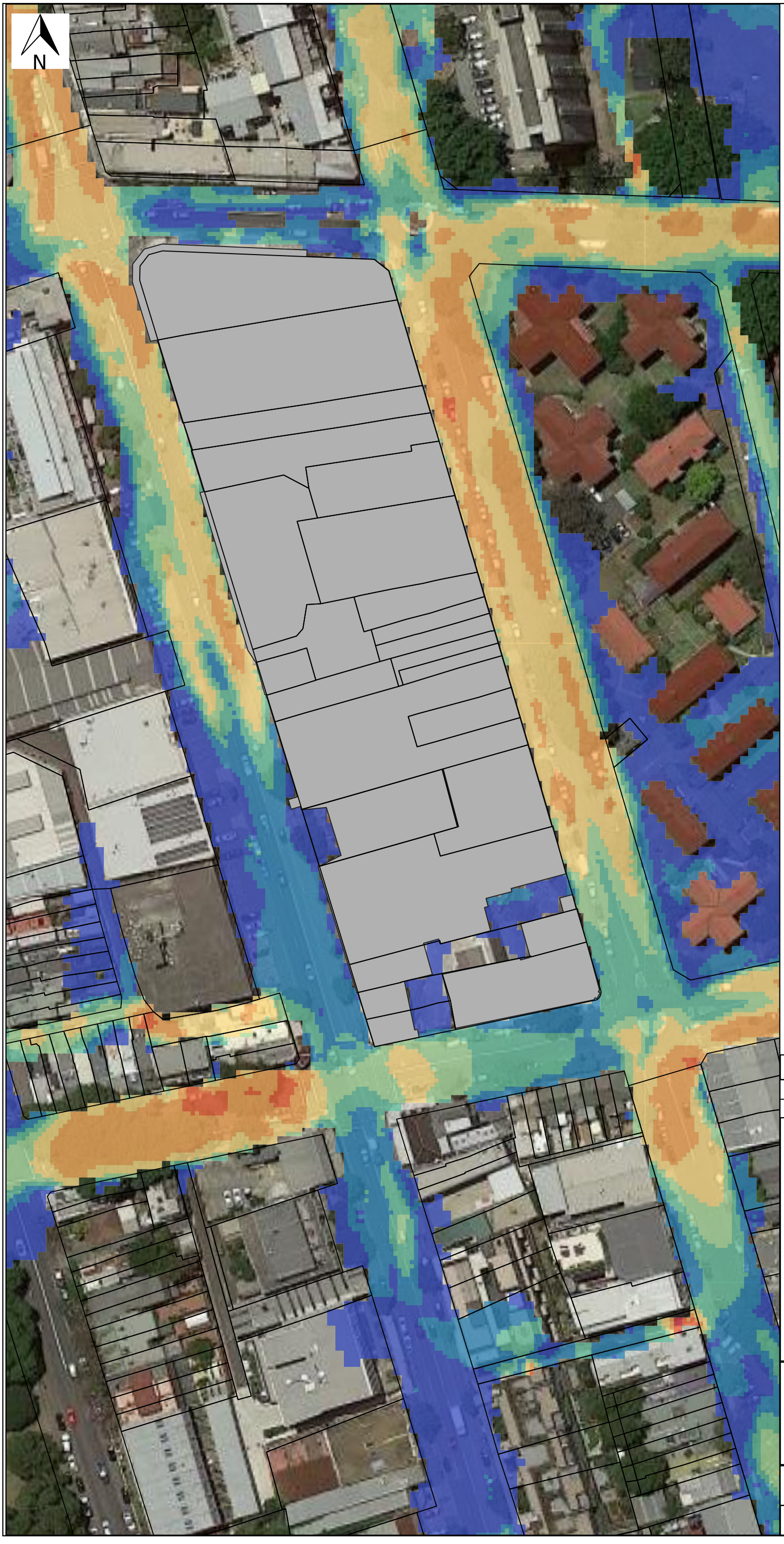
Water Depth

Scale: 1:1000

24/07/20

Project Number: PS119449

Appendix 7 – Water Velocity – Baseline Scenario



KEY:

Existing Building

Water Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- >3

0 15 30 45 m

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A	26/06/20	FIRST ISSUE	MZ	AV

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2000 Australia
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Waterloo - OSD

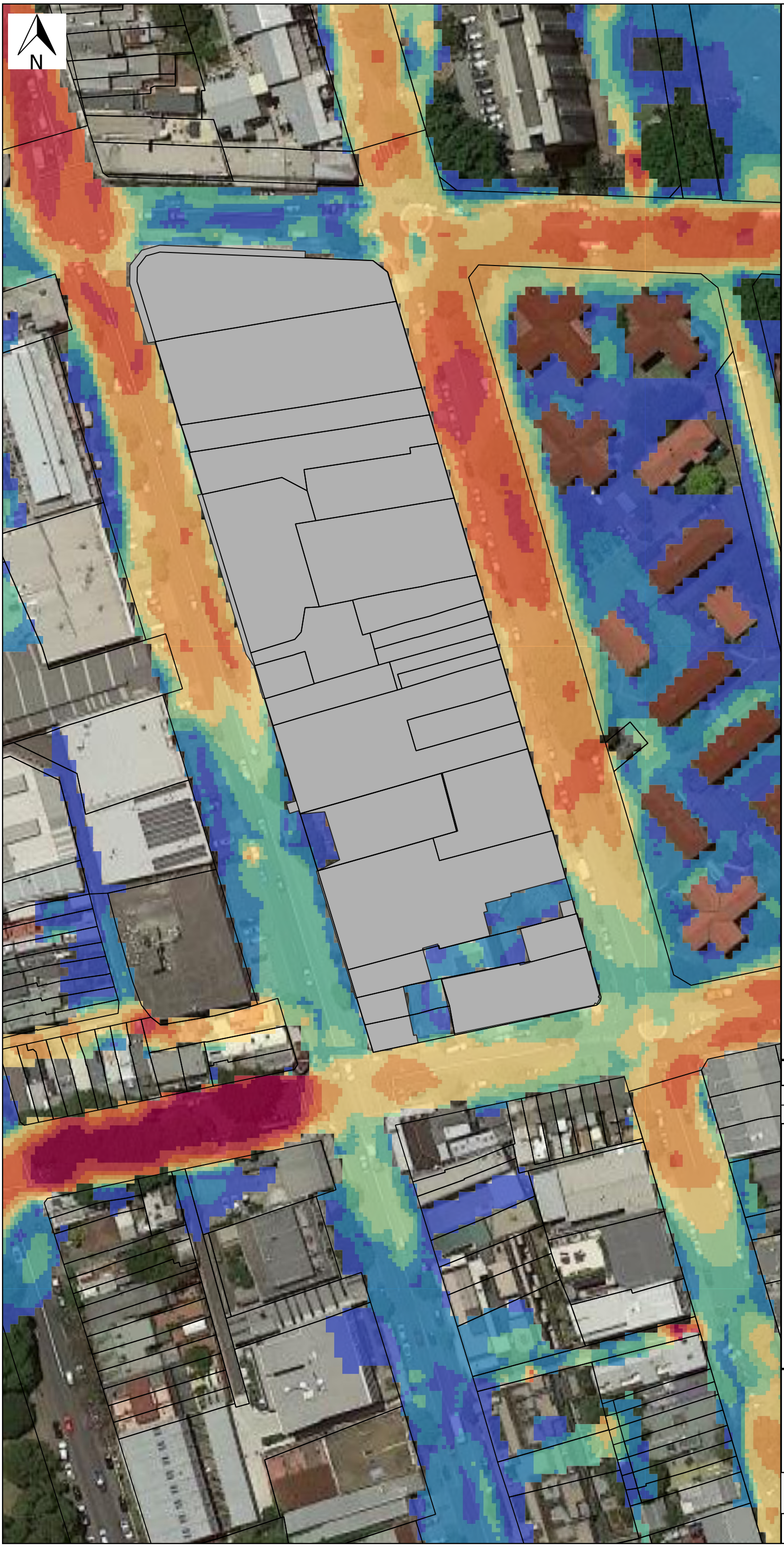
Existing Scenario - 1%AEP

Water Velocity

Scale: 1:1000 | 14/07/20

Project Number: PS119449

Created by: AUMZ501756 - 2020-07-14 16:22:16 - U:\Projects\AU\PS119xxx\PS119449_Waterloo_OSD_work\4_WIP\Docs\Flood study\Flood Map\Existing Flood Map.qgz



KEY:

Existing Building

Water Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- >3

0 15 30 45 m

FOR INFORMATION ONLY

Rev.	Date	ISSUE	Prepare	Approve
A	26/06/20	FIRST ISSUE	MZ	AV

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Sydney, NSW
2000 Australia
www.wsp.com

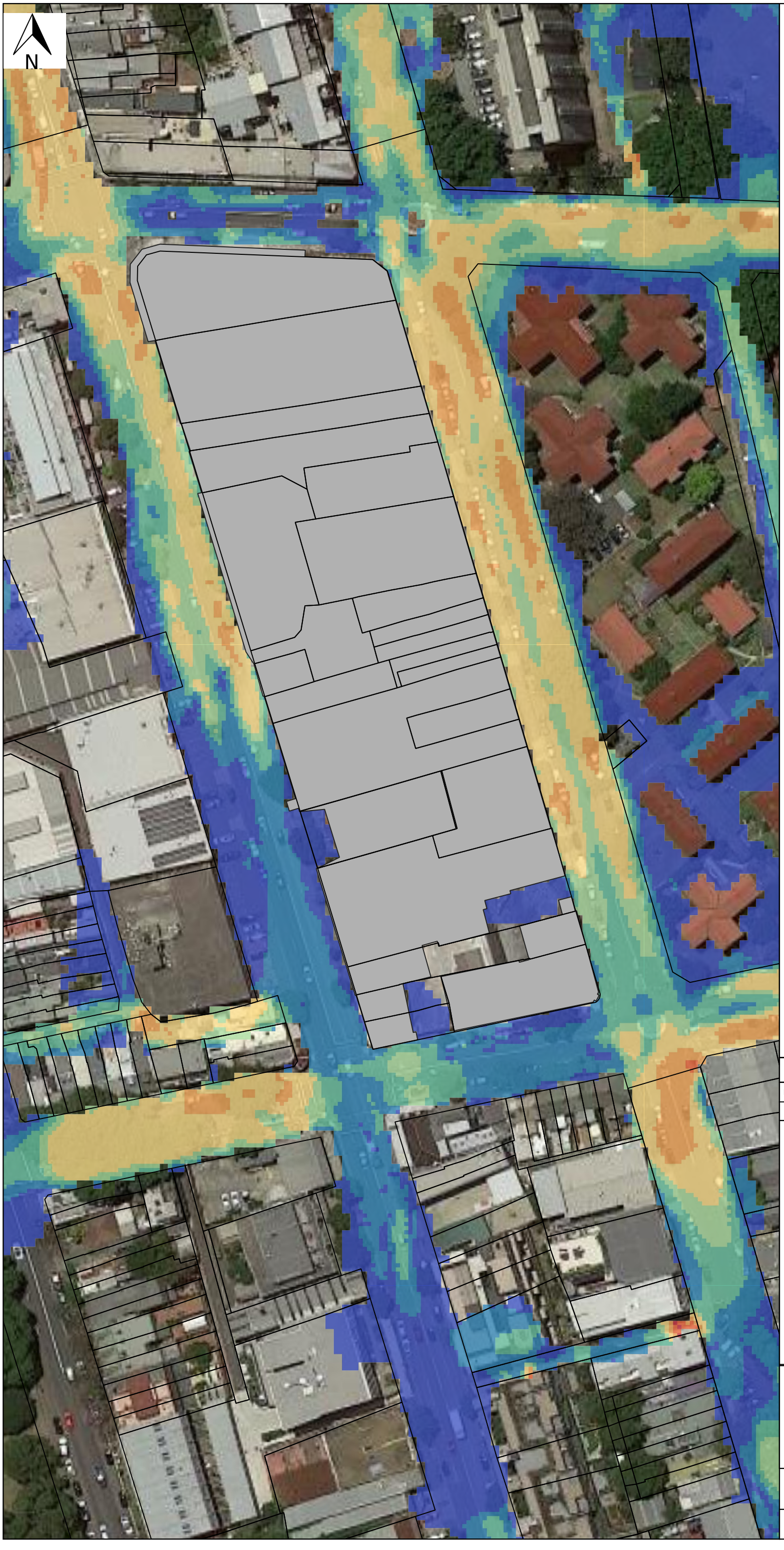
Waterloo - OSD

Existing Scenario - PMF

Water Velocity

1:1000 | 14/07/20

Project Number: PS119449



KEY:

Existing Building

Water Velocity (m/s)

- <= 0.25
- 0.25 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.5
- 1.5 - 2
- 2 - 2.5
- 2.5 - 3
- >3

0 15 30 45 m

FOR INFORMATION ONLY

Rev.	Date	ISSUE	Prepare	Approve
A	26/06/20	FIRST ISSUE	MZ	AV

WSP Australia Pty Limited
680 George Street
Sydney, NSW
2000 Australia
www.wsp.com

Waterloo - OSD

Existing Scenario - 5%AEP
Water Velocity

1:1000	14/07/20

Project Number: PS119449

Appendix 8 – Flood Hazard – Baseline Scenario