

PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

30 MAY 2013

MEDQ

ENGINEERING REPORT

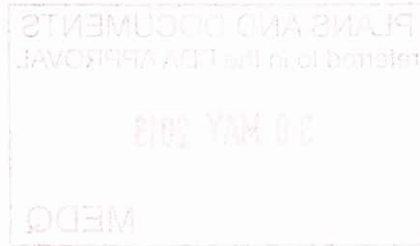
FOR THE PROPOSED
MIXED USE DEVELOPMENT

BUILDING 20

LOCATED AT
PORTSIDE WHARF, HAMILTON

PREPARED FOR BROOKFIELD

NOVEMBER 2012



Bornhorst and Ward Project No. **11464**

If you have any queries regarding this report please contact Nick Rozis

Revision	Date	Description	Author	Rev.	App.
B	November 2012	Architectural Layout Amended	TF	NR	NR
A	July 2012	Issue to Council	TF	NR	NR

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1. INTRODUCTION

A mixed use development has been proposed for the property located within the Portside Wharf precinct on Hercules Street, Hamilton. The proposed development layout is shown on the TVS architectural plans in Appendix A. The proposal consists of constructing a five storey building with retail on the ground level and residential units on the four levels above. An existing basement carpark is located below. Minor works will occur in the basement to remove an existing ramp and to create additional car parking spaces and a garbage room.

The following document reports on the existing and proposed civil works and infrastructure required as part of the proposed development. This document also reports on the stormwater quantity and quality management investigation relating to the proposed development. This document also considers the effects of adjoining areas on the development and the impact that this development may cause on the neighbouring properties. It also considers any stormwater quantity or quality infrastructure works required for the proposal. The engineering requirements will be in accordance with Brisbane City Council guidelines, the Queensland Urban Drainage Manual and the State Planning Policy 4/10.

2. SITE CHARACTERISTICS

2.1 LOCATION

The proposed development is located at 35A Hercules Street, Hamilton, formally known as Lot 910 on SP172657. This site is located within the north-eastern portion of the Portside Wharf precinct. Multi-storey mixed use developments surround the site. Refer to Figure 1 for locality details.



Figure 1: Locality Plan

(Retrieved from Nearmap.com © on 24 April 2012)

2.2 SITE DESCRIPTION

The site has an area of approximately 1550m² and is currently occupied by a carpark. A basement carpark is also present below.

2.3 TOPOGRAPHY AND SITE DRAINAGE

Minimum falls are present across the site. The existing basement is located at RL1.100m AHD.

Surface water runoff currently discharges from the site via a piped stormwater drainage network. Stormwater runoff from the ground floor carpark drains to gully pits located within the circulation road. Stormwater then discharges into the Brisbane River, south-east of the site.

The Brisbane City Council FloodWise Property Report states that the Defined Flood Level (DFL) for the site is RL2.5m AHD. As the existing basement is located below this level it may be subject to flooding. The ground floor carpark is located at approximately RL4.700m AHD and therefore has sufficient freeboard to provide flood immunity during a 100 year Average Recurrence Interval (ARI) flood event. It is recommended that a carpark evacuation plan be prepared for the basement carpark in the event of flooding.

3. SITE DATA

3.1 SOURCES OF INFORMATION

In order to collate existing information for the site and immediate environment, the relevant Council and governing authorities were contacted to determine whether any of the following documents, relevant to the area immediately adjacent to the development, exist:

Waterway Management Plans	- NIL
Catchment Management Plans	- NIL
Stormwater Management Plans	- YES (SKM SBSMP (Aug 2003) and Bornhorst and Ward Master Plan 2 (Dec 2006))
Flood Studies	- YES (Brisbane City Council FloodWise Property Report)

4. EXISTING AND PROPOSED CIVIL WORKS

4.1 STORMWATER

Stormwater infrastructure is present within the vicinity of the site. 600mm dia stormwater drains are present within Hercules Street, north of the site and stormwater drains increasing in size from 2 x 1500mm dia to 2100mm dia drains are located east of the site. This infrastructure discharges into the Brisbane River south-east of the site. Please refer to the Brisbane City Council Water and Stormwater Network plans in Appendix A for further information.

A detailed survey of neighbouring Lot 804 on SP172618 taken in 2007 shows that a 525mm dia stormwater pipe is present south-west of the Building 20 site (refer to Conics Proposed Buildings 2 & 4 Stage 2 Detail & Contour Survey in Appendix A). This infrastructure may have been removed during the construction of Building 4. It is expected that the piped stormwater drainage network currently draining the site discharges into the

existing stormwater drainage infrastructure present within the Portside Wharf precinct. Detailed survey is required to confirm details of the stormwater drainage structure.

The drainage connection currently servicing the site is to be retained to drain the proposed Building 20. It is not anticipated that the proposed development will increase the rate of flow discharged from the site. Therefore existing infrastructure provided in earlier stages should have sufficient capacity to drain the proposed development. Stormwater drainage is to be designed and constructed in accordance with Brisbane City Council guidelines.

4.2 SEWERAGE

The Portside Wharf development upgraded the sewerage infrastructure within the catchment and in particular Remora Road during Stage 1 of the development.

A 225mm dia gravity sewer is situated within Hercules Street, north of the site. A house connection is available from this sewer to Lot 910 on SP172657. Therefore it is proposed to service the development from this sewer connection via internal plumbing. Discussions are to be held with Queensland Urban Utilities (QUU) prior to detailed design to determine if the existing sewerage infrastructure has capacity to service the site, or if upgrades are required. A trunk sewer is being constructed within the Northshore Hamilton Urban Development Area. This infrastructure is to be completed in December 2012 and has been sized to cater for flows from Portside Wharf. QUU may require an upgrade in the infrastructure connecting Portside Wharf to the trunk sewer. Please refer to the Brisbane City Council Sewer and BCC Cable Network plan in Appendix A for further details.

4.3 WATER

The Portside Wharf precinct and surrounding areas are currently serviced by an existing reticulation system. It is expected the existing reticulation system has sufficient capacity to meet the needs of the existing development and the proposed project. The existing infrastructure consists of 150mm diameter mains located along the north and western side of Harbour Road and the eastern side of Remora Road.

Three connections from the 150mm dia main in Hercules Street enter Lot 910 on SP172657. It is proposed to service the site from the western connection via internal plumbing.

Sufficient pressures and capacities to supply the development are available; however water conservation methods such as showerhead minimisation and roofwater storage and reuse should be implemented within the site where applicable.

4.4 ROADS

Roadworks are not proposed as part of this development. Access to the site will be provided from the driveway on Hercules Street, north of the site.

4.5 EARTHWORKS

It is not anticipated that earthworks will be required as the basement carpark has already been constructed.

4.6 ENERGEX

Energex infrastructure is present north of the Building 20 site, within Hercules Street and Lot 910 on SP172657. It is anticipated that this infrastructure will be utilised to provide power to Building 20. This is to be confirmed through discussion with Energex as the project progresses. Please refer to the Energex DBYD plan in Appendix A for further details.

4.7 TELSTRA

Telstra infrastructure is present north of the site, within the Hercules Street road reserve. It is anticipated that this infrastructure will be utilised to service Building 20; however this is to be confirmed through discussions with Telstra as the development progresses. Please refer to the Conics survey in Appendix A for further details.

4.8 GAS

A medium pressure natural gas main is located north of the site, within the Hercules Street road reserve. It is anticipated that gas may be provided to the site from this main, if desired. This is to be confirmed through discussions with APA Group as the development progresses. Please refer to the APA Group plan in Appendix A for further details.

4.9 BRISBANE CITY PLAN CODES

The relevant Brisbane City Plan Codes with respect to engineering aspects for assessment of the Development Application have been addressed. The codes will assist in assessing operational works requirements. The following codes have been addressed in this report:

- Services Works and Infrastructure; and
- Stormwater Management.

The completed codes can be found attached in Appendix B of this Report.

5. STORMWATER MANAGEMENT PLAN

5.1 STORMWATER OBJECTIVES

Under Brisbane City Council guidelines, several design elements were identified in relation to stormwater management issues. Brisbane City Council must be satisfied that:

- The proposed development can be drained;
- The stormwater management system can follow the features and functions of the natural drainage system;
- The volume, timing velocity and pollutant load of stormwater has no adverse effect on any surrounding properties or receiving waters; and
- Suitable provision is made in the design layout to accommodate for major drainage.

6. STORMWATER QUANTITY

6.1 STORMWATER DRAINAGE METHODOLOGY

Modelling of stormwater runoff quantity has been considered for the existing site and operational phase of the development. In order to assess the existing and predicted future (operational phase) discharge rates from the development site, calculations have been conducted based on the Rational Method, according to the methods specified in the Queensland Urban Drainage Manual and Brisbane City Council guidelines.

Calculations have been undertaken to determine the undeveloped and developed run-off rates with the Best Management Practices (BMPs) incorporated into the site layout for stormwater quantity control.

6.2 PEAK FLOW CALCULATIONS

The Rational Method as outlined in the Queensland Urban Drainage Manual (QUDM) (2008) and the Brisbane City Council Subdivision and Development Guidelines were used to determine the peak flow rate corresponding to the minor and major storm events for this development. The design storm events for this development are:

Minor -	1 in 10 year ARI
Major -	1 in 100 year ARI

The modelling of stormwater runoff quantity was considered for the existing and fully developed phases of the subject site. The following table is a summary of the stormwater discharge from the site for both scenarios. Refer to Appendix C for detailed calculation spreadsheet.

Table 1: Catchment Properties and Peak Flow Calculations (Existing and Proposed Developed Case)

Catchment Details	Parameter	Existing Site	Developed Site	Difference
	Area (Ha)	0.155	0.155	-
	Coefficient of Runoff (C_{10})	0.88	0.90	-
	Time of Concentration (min)	5	5	-
Discharge	1 in 10 year ARI (m^3/s)	0.068	0.069	-
	1 in 100 year ARI (m^3/s)	0.102	0.102	-

Table 1 above, shows that the proposed development will not increase the rate of stormwater runoff discharged from the site for major storm events. Therefore onsite detention is not required.

The time of concentration of 5 minutes was adopted for both the existing and proposed development scenarios. This is the minimum allowable time of concentration and was deemed to be appropriate for the existing case as the site is predominantly a carpark and for the developed case due to the large amount of roof area.

The coefficient of runoff for a 10 year Average Recurrence Interval (ARI) storm event of 0.88 was adopted for the existing site. This value was determined with reference to Table B2.2 in the Brisbane City Council Subdivision and Development Guidelines. A coefficient of runoff of 0.90 was calculated for the developed scenario from first principles, based on the developed site having a 100% fraction impervious.

6.3 SITE FLOODING AND OVERLAND FLOW

As stated in section 2.3, the Brisbane City Council FloodWise Property Report states that the Defined Flood Level (DFL) for the site is RL2.5m AHD. As the existing basement is located below this level it may be subject to flooding. The ground floor carpark is located at approximately RL4.700m AHD and therefore has sufficient freeboard to provide flood immunity during a 100 year Average Recurrence Interval (ARI) flood event. It is recommended that a carpark evacuation plan be prepared for the basement carpark in the event of flooding.

7. STORMWATER QUALITY

7.1 WATER QUALITY

The existing site is situated within the Brisbane River Catchment.

All references within this report to water quality objectives and design requirements have been based on the State Planning Policy 4/10 – Healthy Waterways.

7.2 POLLUTANTS OF CONCERN

Key pollutants to be targeted for trapping and the pollutant reduction objectives for South East Queensland, as outlined in the Department of Environment and Resource Management (DERM) Urban Stormwater Quality Planning Guidelines 2010 are as follows:

Table 2: Water Quality Objectives

Pollutant	Minimum reduction in mean annual loads from unmitigated development
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	45%
Gross Pollutants	90%

7.3 MODELLING/ASSESSMENT APPROACH

A quantitative assessment of stormwater runoff quality was considered for both the existing and operational phases of the development.

The predicted future (operational phase) discharge concentrations of key pollutants, previously identified in section 7.2, have been conducted using the “Model for Urban Stormwater Improvement Conceptualisation” (MUSIC). MUSIC is a stormwater quality modelling program that provides estimates of stormwater pollution generation and the performance of stormwater management measures used in series or parallel to form a ‘treatment train’. Input parameters and desired Water Quality Objectives (WQO) specific to the South East Queensland were adopted in accordance with State guidelines.

7.3.1 Meteorological Data

The first step in creating the MUSIC model was to select the appropriate meteorological data set (period and time step) to be used as the basis for the runoff algorithms. Section 2.2 – Meteorological Data of the reference material details the Rainfall Data and Time Step process requirements of the model.

The time step used for the MUSIC modelling process was: Brisbane 6 Minutes (1970-79).

7.3.2 Source Nodes

The second step taken in creating the MUSIC model was to define 'Source Nodes' or Sub-Catchments. Source nodes were defined as per the Water by Design "MUSIC Modelling Guidelines" (2010).

For the purposes of this investigation commercial source nodes have been used to model all catchments within this development. A commercial node can be used to model special purpose or multipurpose centres such as hospitals, major educational facilities, shopping centres and community centres. It is typical for commercial areas to contain a high percentage of impervious area.

Table 3: Source Node Catchment Details

Catchment	Node Type	Area (Ha)	Fraction Impervious
Road	Commercial	0.017	100%
Roof	Commercial	0.100	100%
Ground Floor	Commercial	0.038	100%
	TOTAL	0.155	100%

Source node parameters for each node type were based on the Water by Design "MUSIC Modelling Guidelines" (2010). The parameters adopted are listed in Appendix D for reference.

7.3.3 Treatment Nodes

A range of Stormwater Quality Best Management Practices (SQBMPs) were considered for inclusion in the development site layout, with information on available SQBMPs primarily sourced from the Water By Design MUSIC Modelling Guidelines. Each has been reviewed for its suitability for this location. For this particular development the following treatment option has been chosen for incorporation into the development design:

SQBMP Description	Discussion
Stormwater360 StormFilter (or equivalent)	Stormwater360 StormFilters (or equivalent) are stormwater quality improvement devices effective in the removing fine solids, soluble heavy metals, oil and total nutrients.
Gross Pollutant Trap	Gross pollutant traps (GPTs) typically remove rubbish, sediment and hydrocarbons from stormwater runoff. GPTs are effective in the removal of solids greater than 5 mm in size from stormwater runoff. Two Stormwater360 EnviroPods (or equivalent) have been modelled.
Rainwater Tank	As the development has significant roof area, an opportunity exists to capture and possibly supplement some forms of water supply requirements of the development. A 10,000L tank has been modelled.

Figure 2: SQBMP Selection Matrix

7.4 PROPOSED TREATMENT TRAIN

From the available SQBMPs, a BMP 'Treatment Train' was developed to target each of the pollutants of concern and was subsequently incorporated into the development site layout. This treatment train is illustrated below.

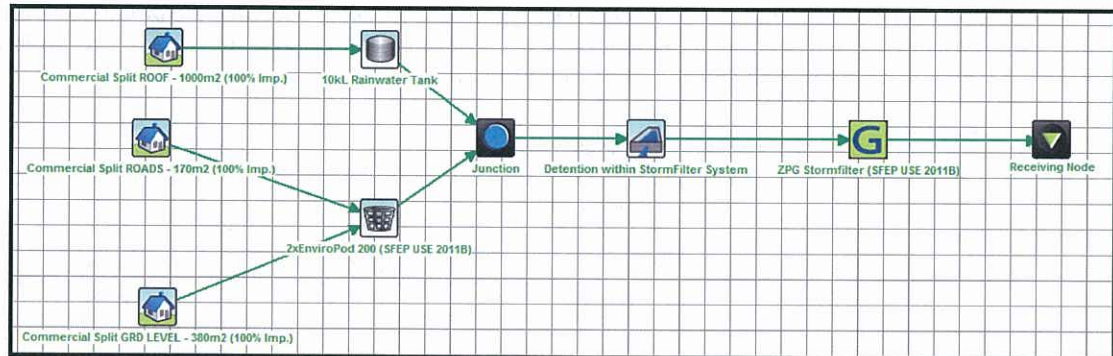


Figure 3: Treatment Train

7.5 RESULTS

The pollutant export concentrations for the developed phase are summarised below.

Table 4: Pollutant Export Discharge

	TSS	TP	TN	Gross Pollutants
Treatment Train Effectiveness	85.7%	64.4%	46.6%	100%
SPP 4/10 WQO	80%	60%	45%	90%

As can be seen in Table 4 above, the proposed development meets the required pollutant reductions. Therefore we believe that the proposed treatment train is acceptable.

Refer to the MUSIC outputs in Appendix D for further details of the predicted quality of stormwater exiting the site.

8. SUMMARY AND RECOMMENDATIONS

This Engineering Report has demonstrated that the proposed Building 20 located at Portside Wharf, Hamilton, can be developed in accordance with Engineering Best Management Practice and Brisbane City Council guidelines. The following points summarise the findings and recommendations:

- The Defined Flood Level is RL2.5m AHD. This is above the basement carpark level but below the ground floor level;
- The stormwater drainage infrastructure currently draining the site is to be retained for Building 20. Detailed survey is required to locate this stormwater drainage infrastructure;
- The site is to be serviced by the existing sewer plumbing infrastructure present onsite. Discussions are to be held with QUU to determine if sewer upgrades are required;
- Potable Water supply infrastructure present within the site is to service the proposed development;
- Roadworks are not required for the proposed development;

- Earthworks are not required for the proposed development;
- Energex, Telstra and Gas infrastructure is present within the vicinity of the site;
- A Stormwater360 StormFilter system (or equivalent) is required to treat stormwater runoff;
- Two Stormwater360 EnviroPods (or equivalent) are required to remove gross pollutants from stormwater runoff.

APPENDIX A

SITE SURVEY AND ADDITIONAL INFORMATION



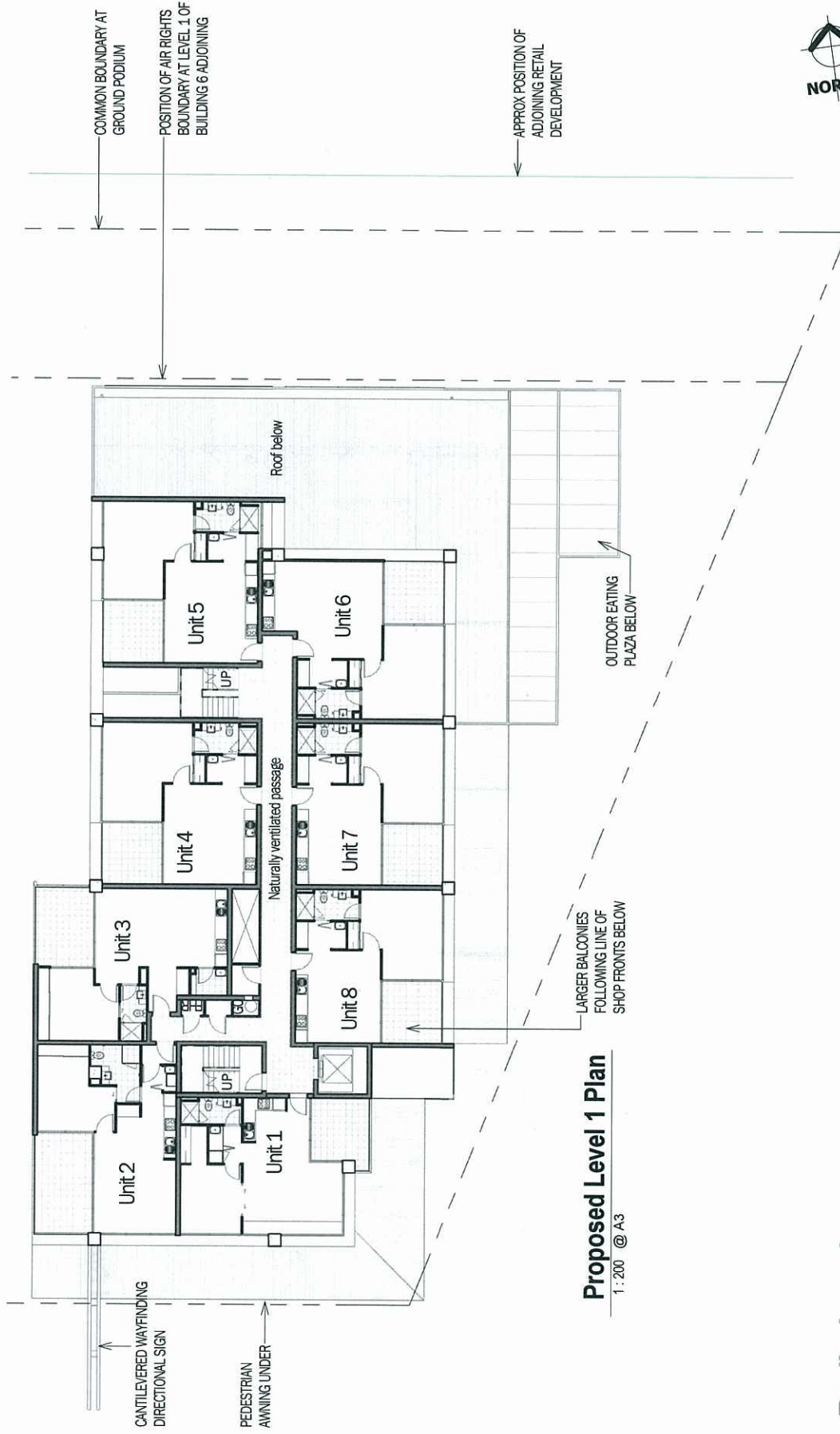
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TVS architects

Brookfield
Residential Properties

Proposed "Building 20" at Portside Wharf

Ground Level Plan
5325.3S.03 - (8)



Proposed Level 1 Plan

1:200 @ A3

Preliminary Issue

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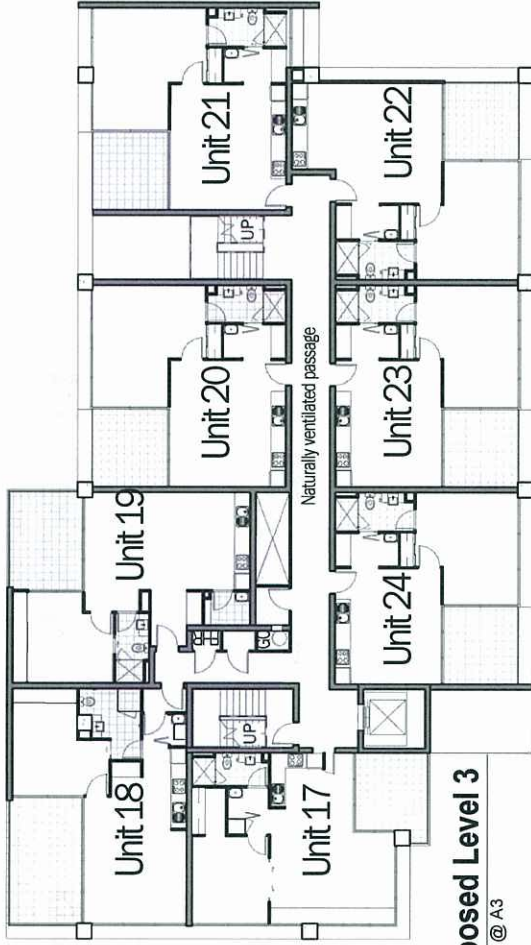
Level 1 Plan
 5325.3S.04 - (8)

Proposed "Building 20" at Portside Wharf

COMMON BOUNDARY AT
GROUND PODIUM

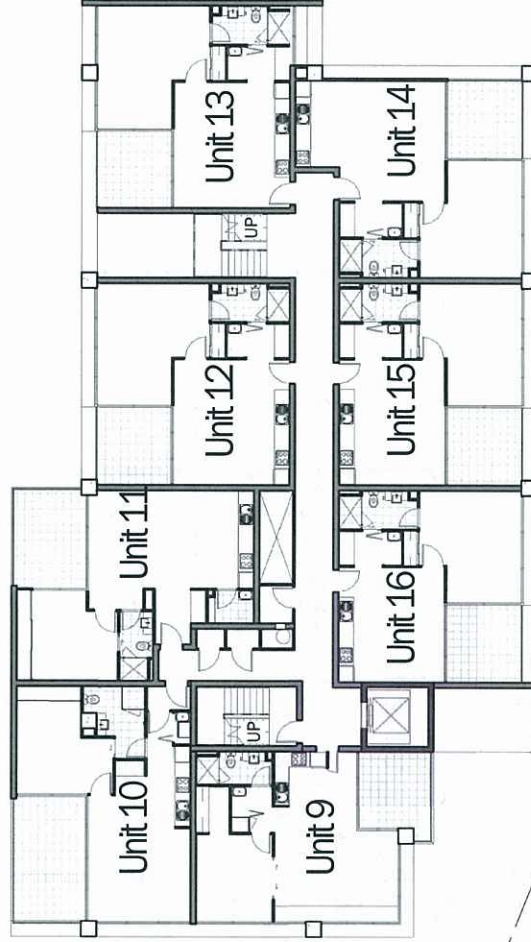
APPROX POSITION OF
ADJOINING RETAIL
DEVELOPMENT

POSITION OF AIR RIGHTS
BOUNDARY AT LEVEL 1 OF
BUILDING 6 ADJOINING



Proposed Level 3

1:200 @ A3



Proposed Level 2

1
 5325.3S.07 1:200

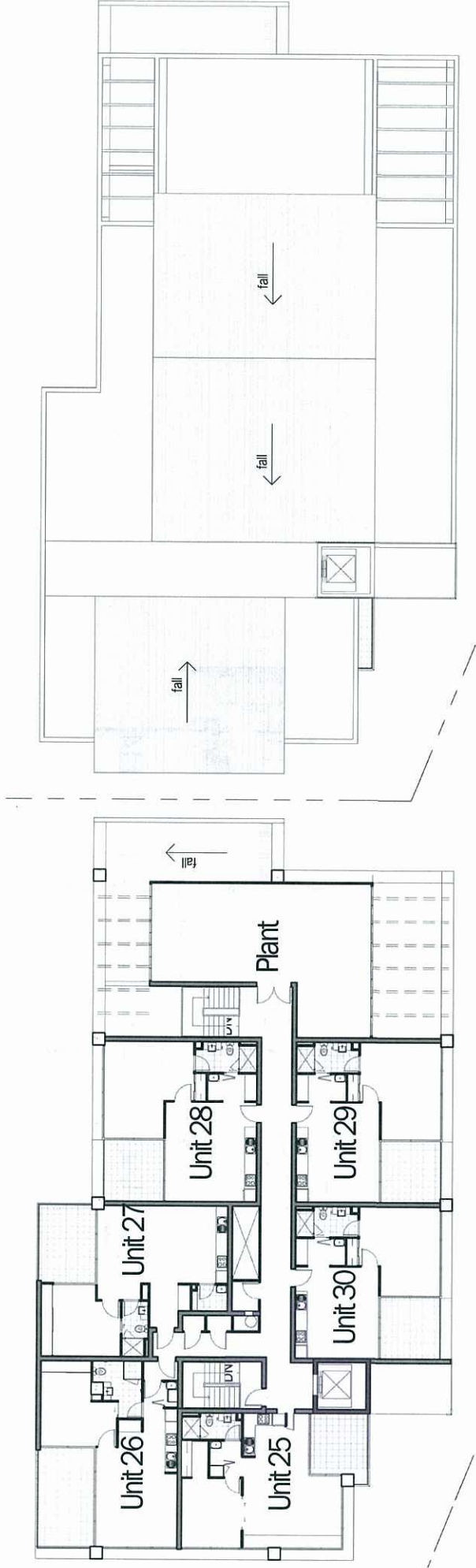
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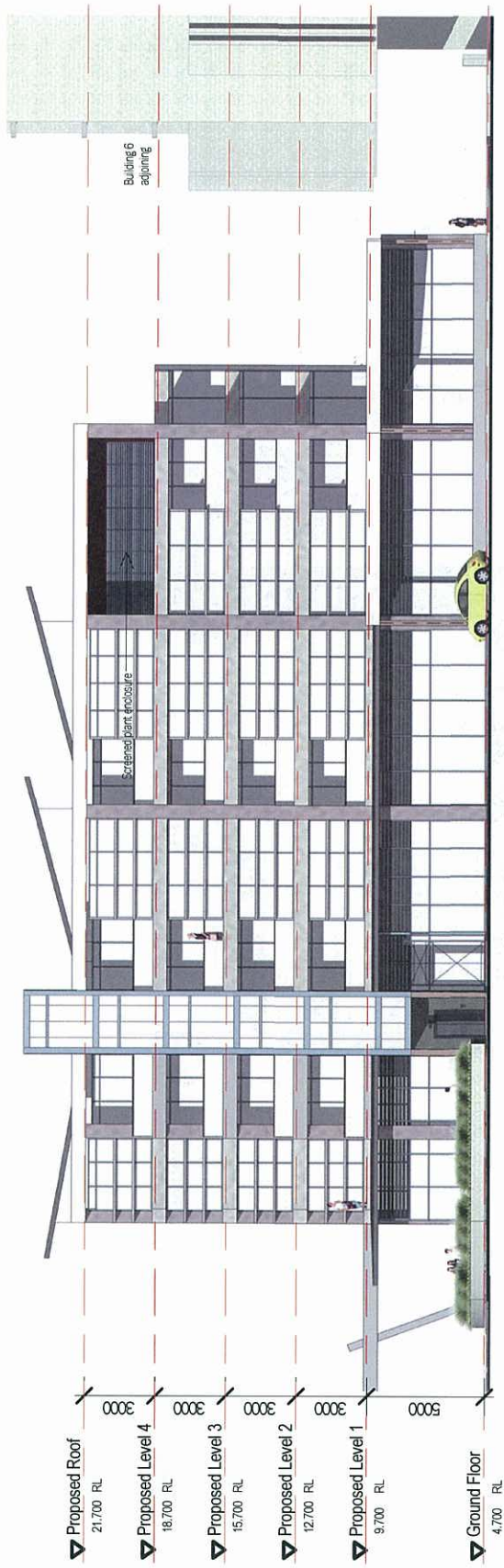
Proposed "Building 20" at Portside Wharf

Levels 2 & 3 Plans
 5325.3S.05 - (8)



Proposed Level 4
 1:200 @ A3

Proposed Roof Level Plan
 1:200 @ A3



East Elevation
1:200 @ A3

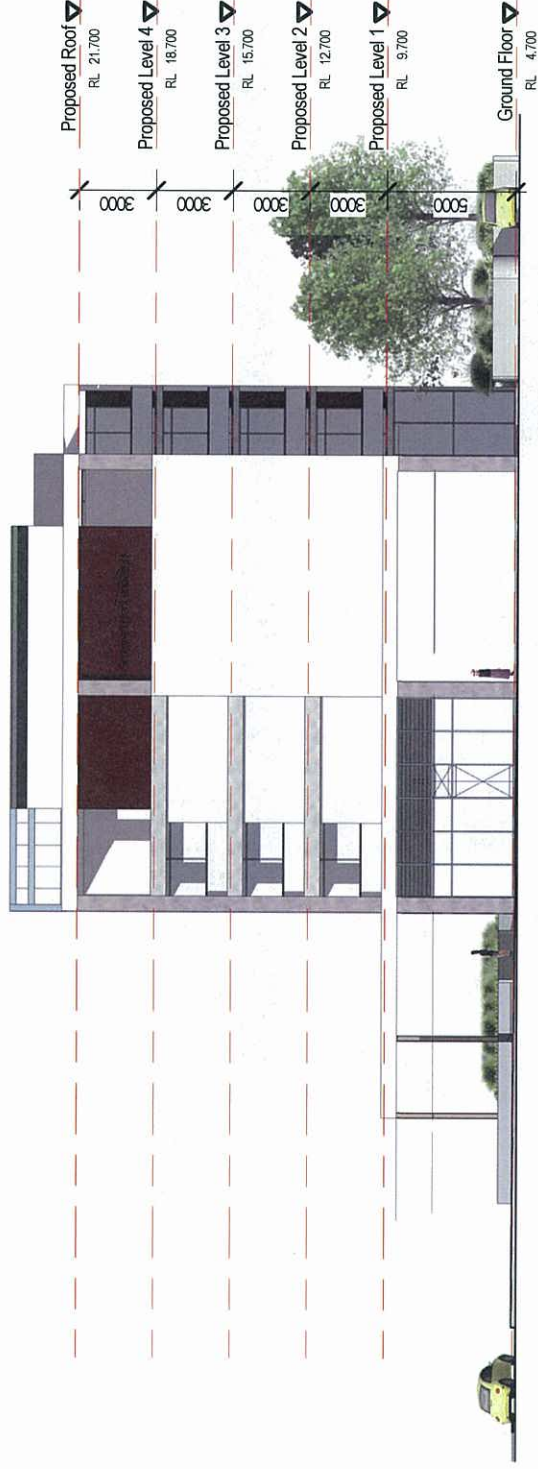
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East Elevation
5325.3S.07 - (9)

Proposed "Building 20" at Portside Wharf



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Proposed "Building 20" at Portside Wharf

North Elevation
 5325.3S.08 - (3)



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Proposed "Building 20" at Portside Wharf

West Elevation
5325.3S.09 - (9)



South Elevation

1:200 @ A3

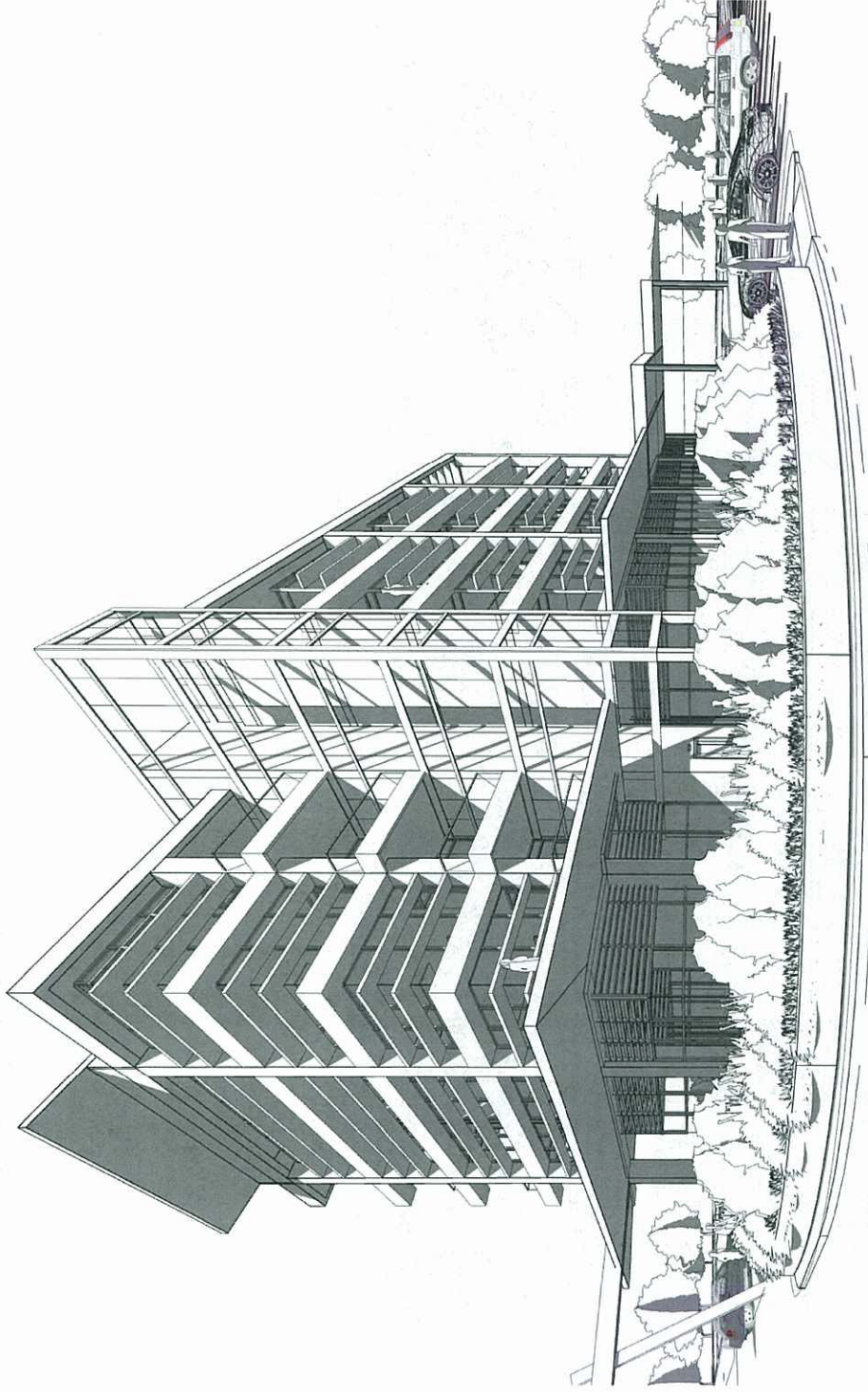
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Proposed "Building 20" at Portside Wharf

South Elevation
 5325.3S.10 - (9)



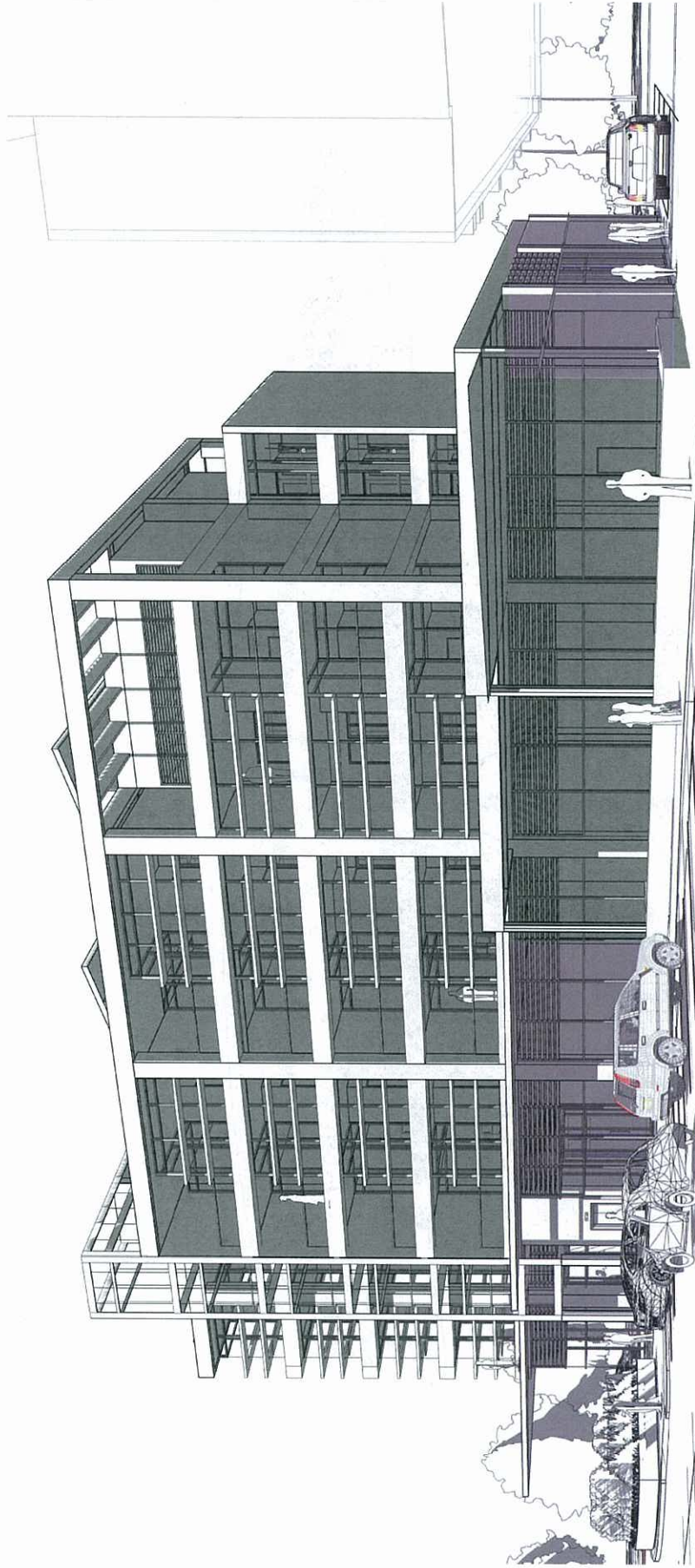
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Proposed "Building 20" at Portside Wharf

Perspectives
5325.3S.16 - (1)



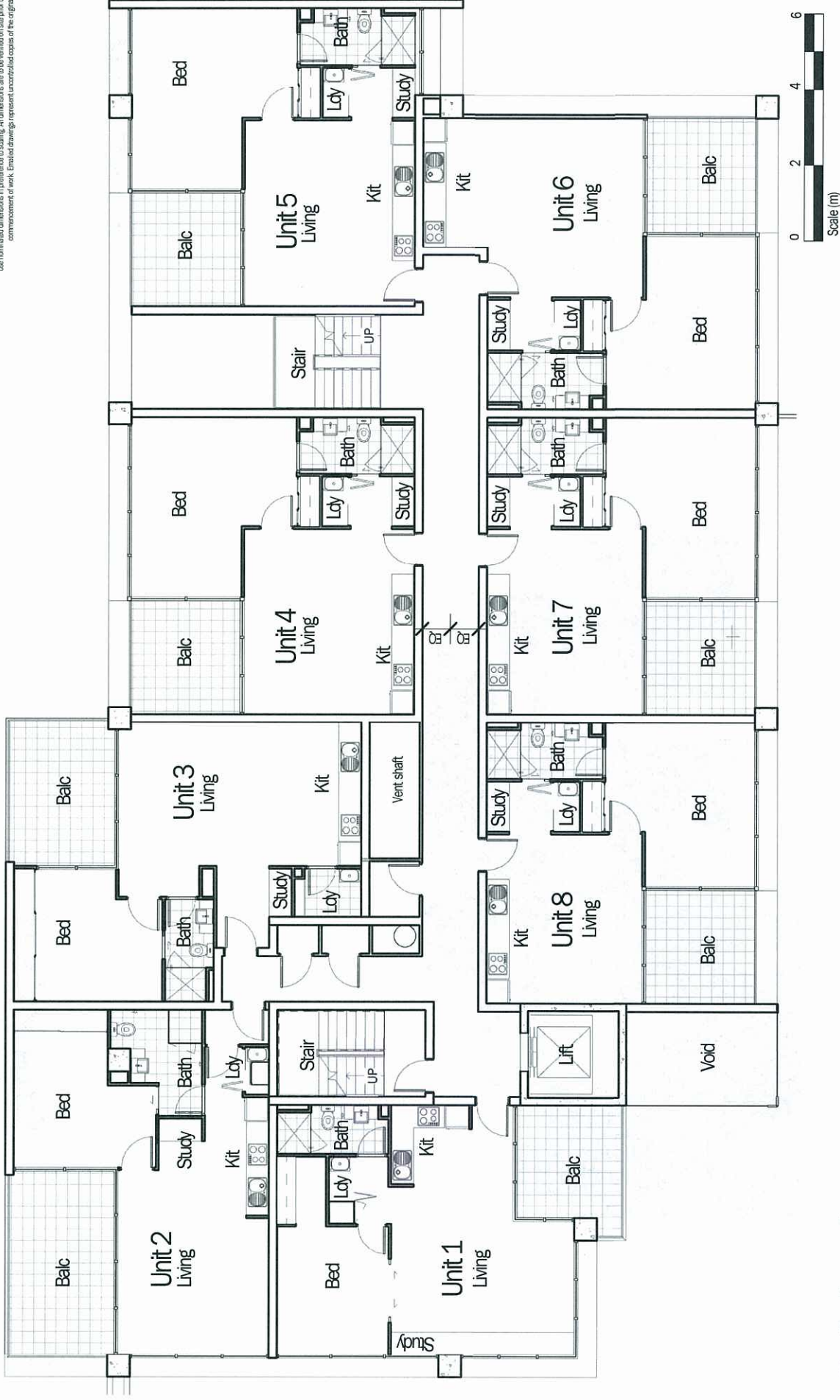
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Proposed "Building 20" at Portside Wharf

Perspectives
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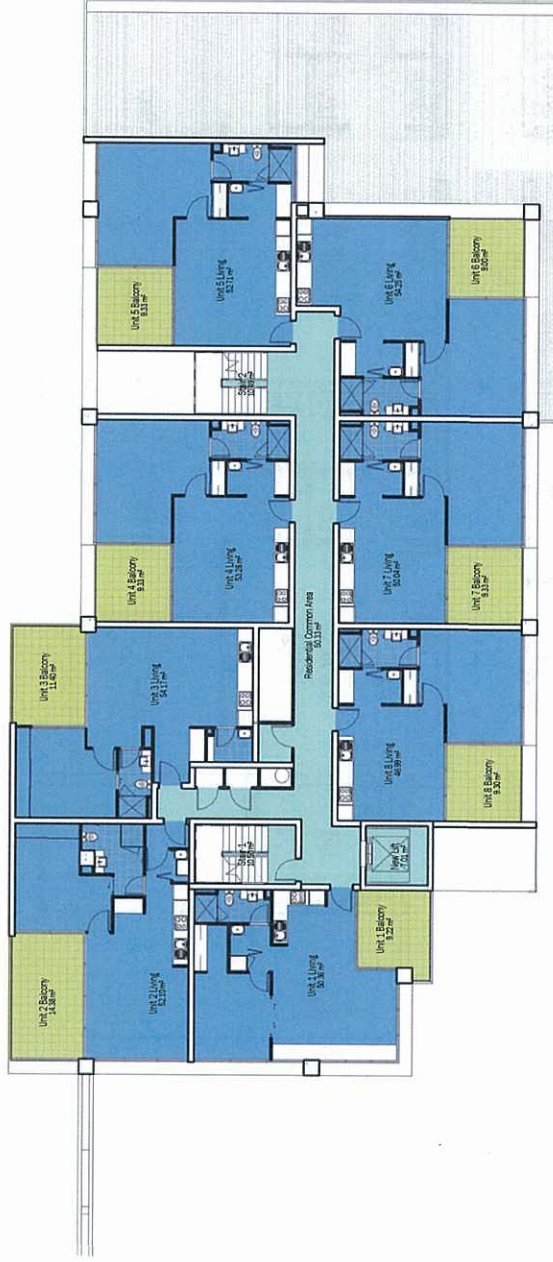


Preliminary Issue

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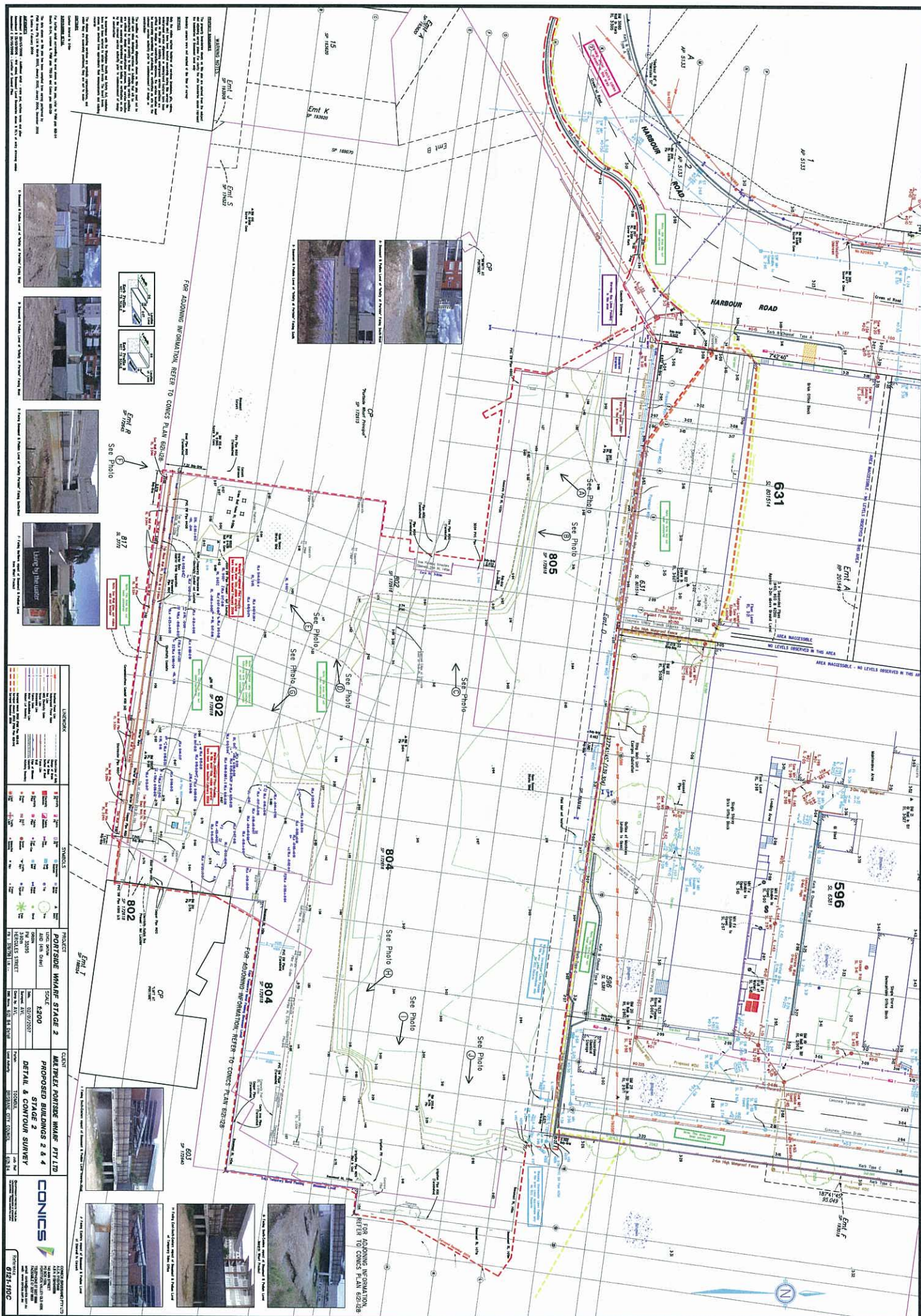
Brookfield
 Residential Properties

Typical floor plan
 5325.3S.18 - (1)
 Proposed "Building 20" at Portside Wharf

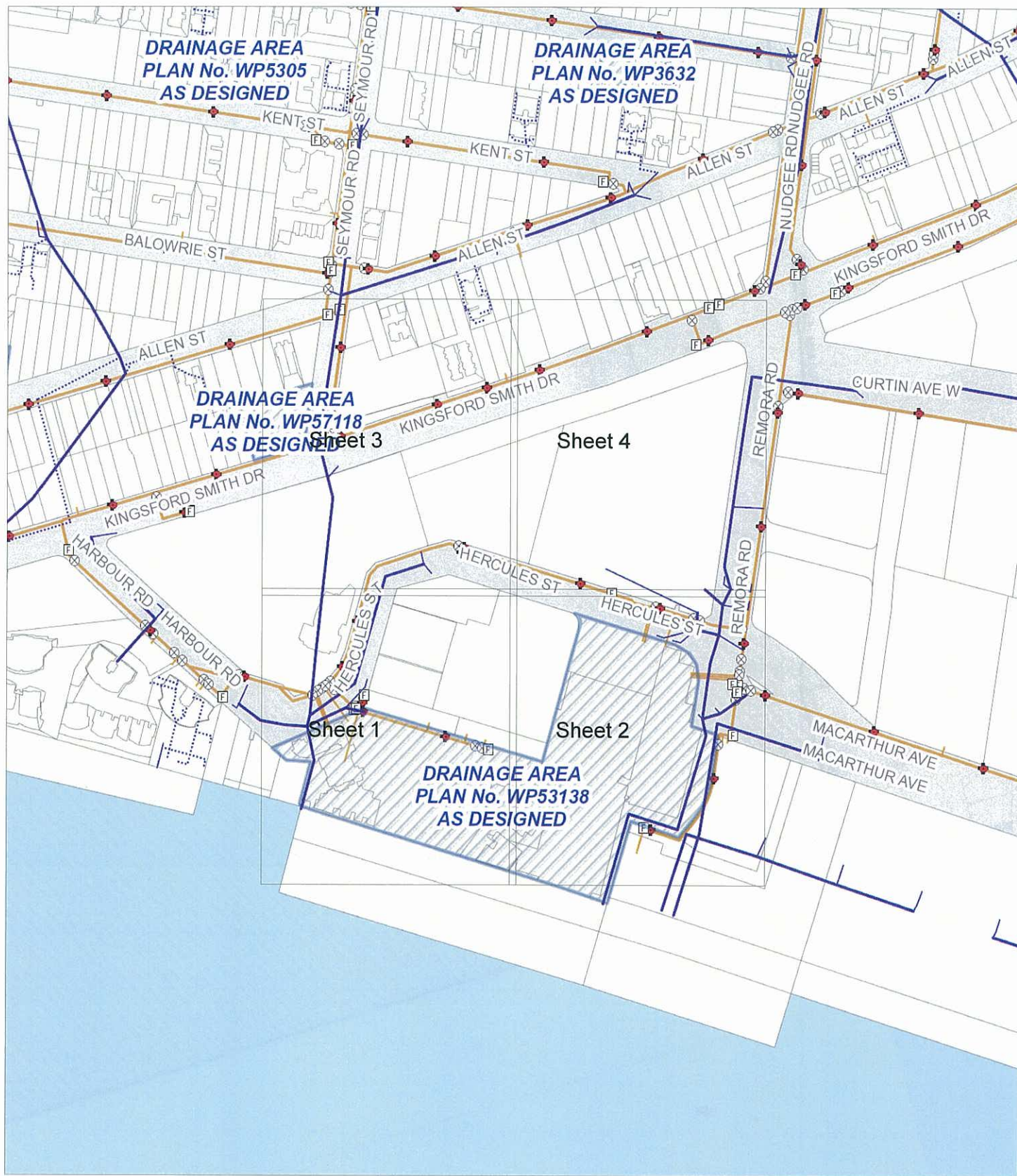


Balc
 Residential - Unit GFA
 Residential Common









Map Sheet Overview

Sequence Number: 24885971

Notification Number: 5417551

Date: Apr 24, 2012

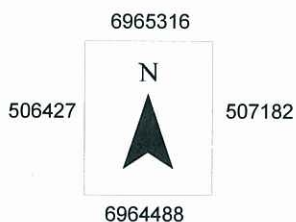
Water and Stormwater Network

Disclaimer:

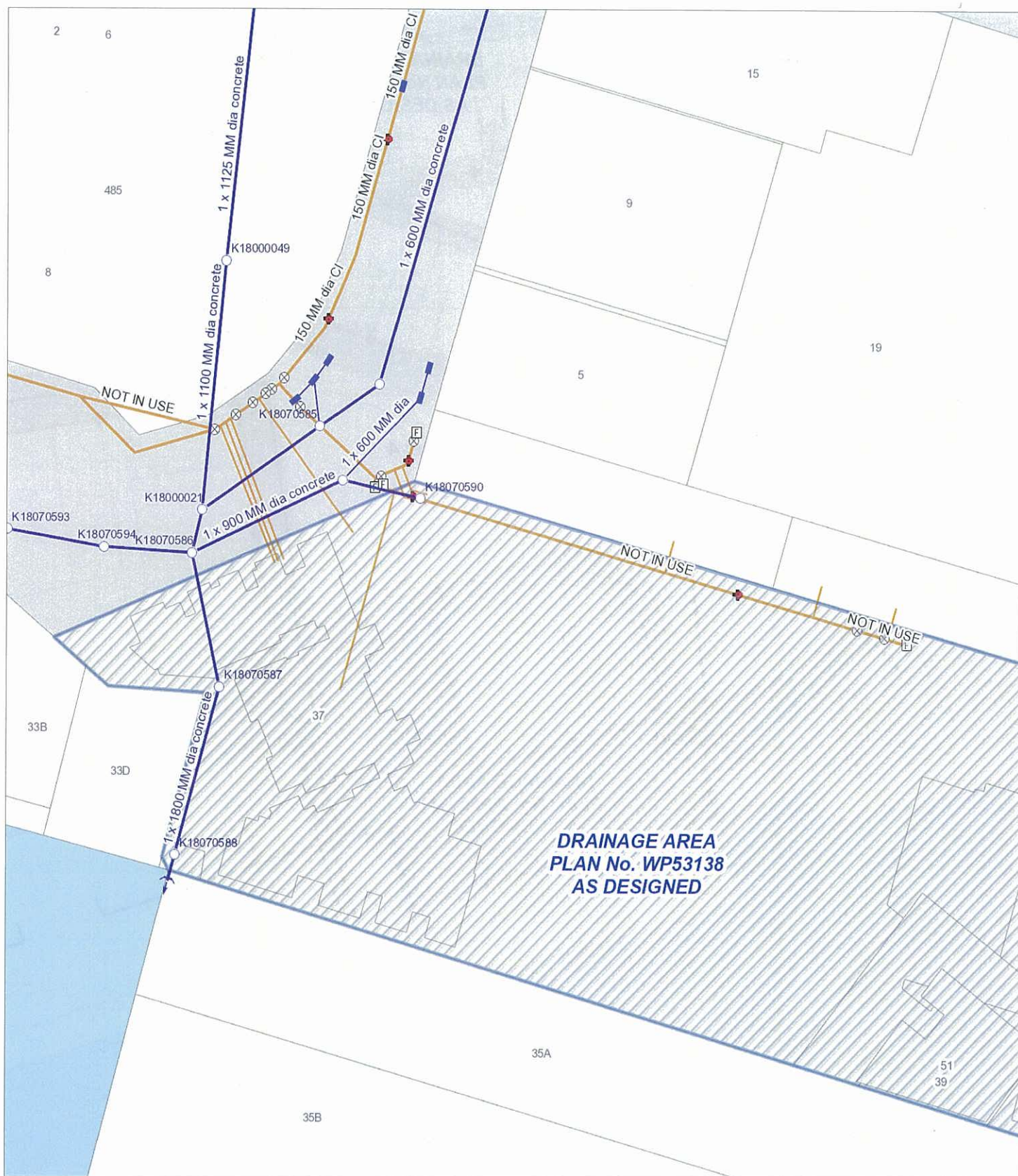
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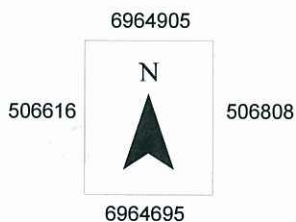
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Location:



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Location:

6964905
 506801
 506993
 6964695



Sequence Number: 24885971

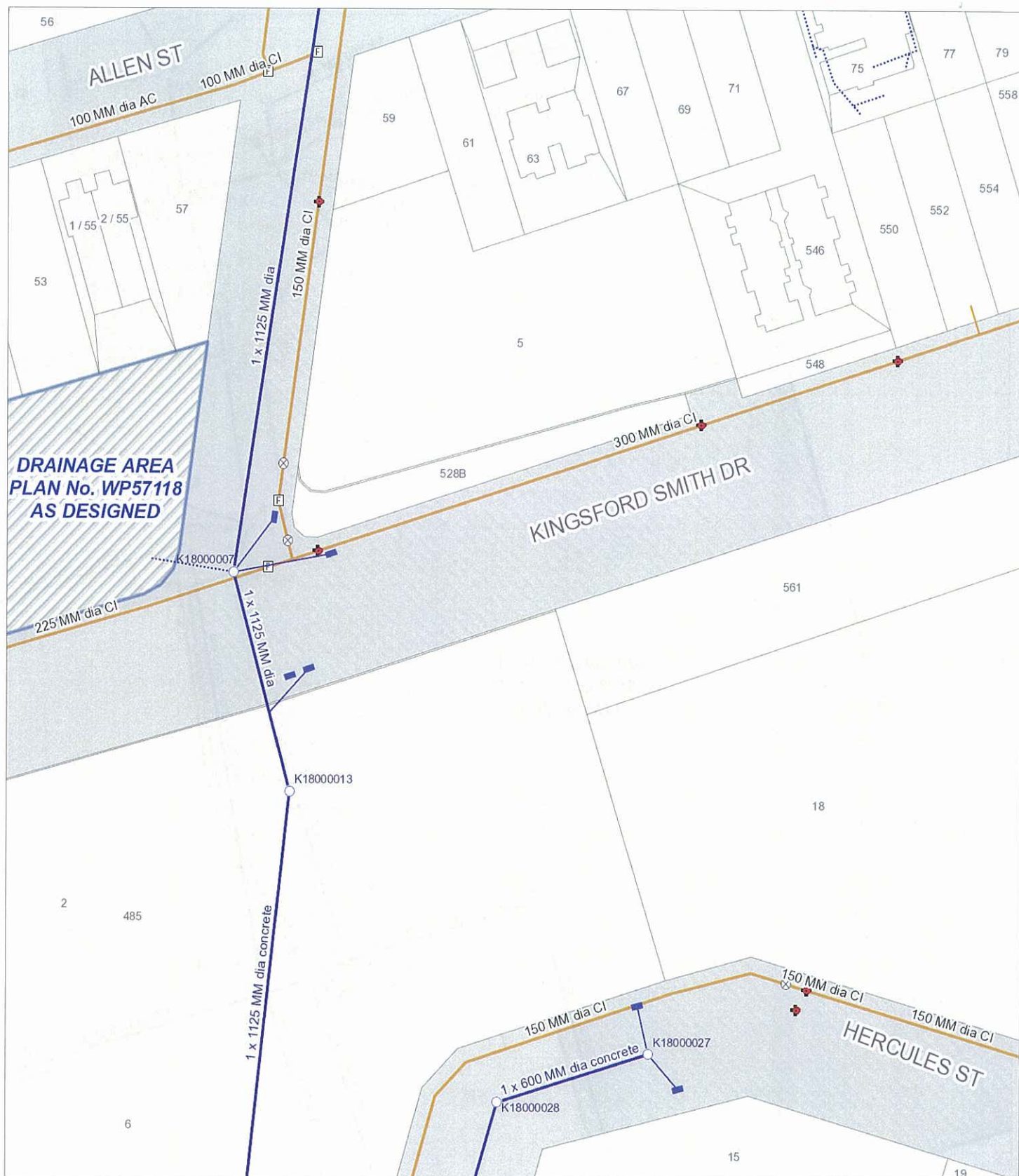
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Scale = 1:1000



Location:

6965110

506616



506808

6964900

Sequence Number: 24885971

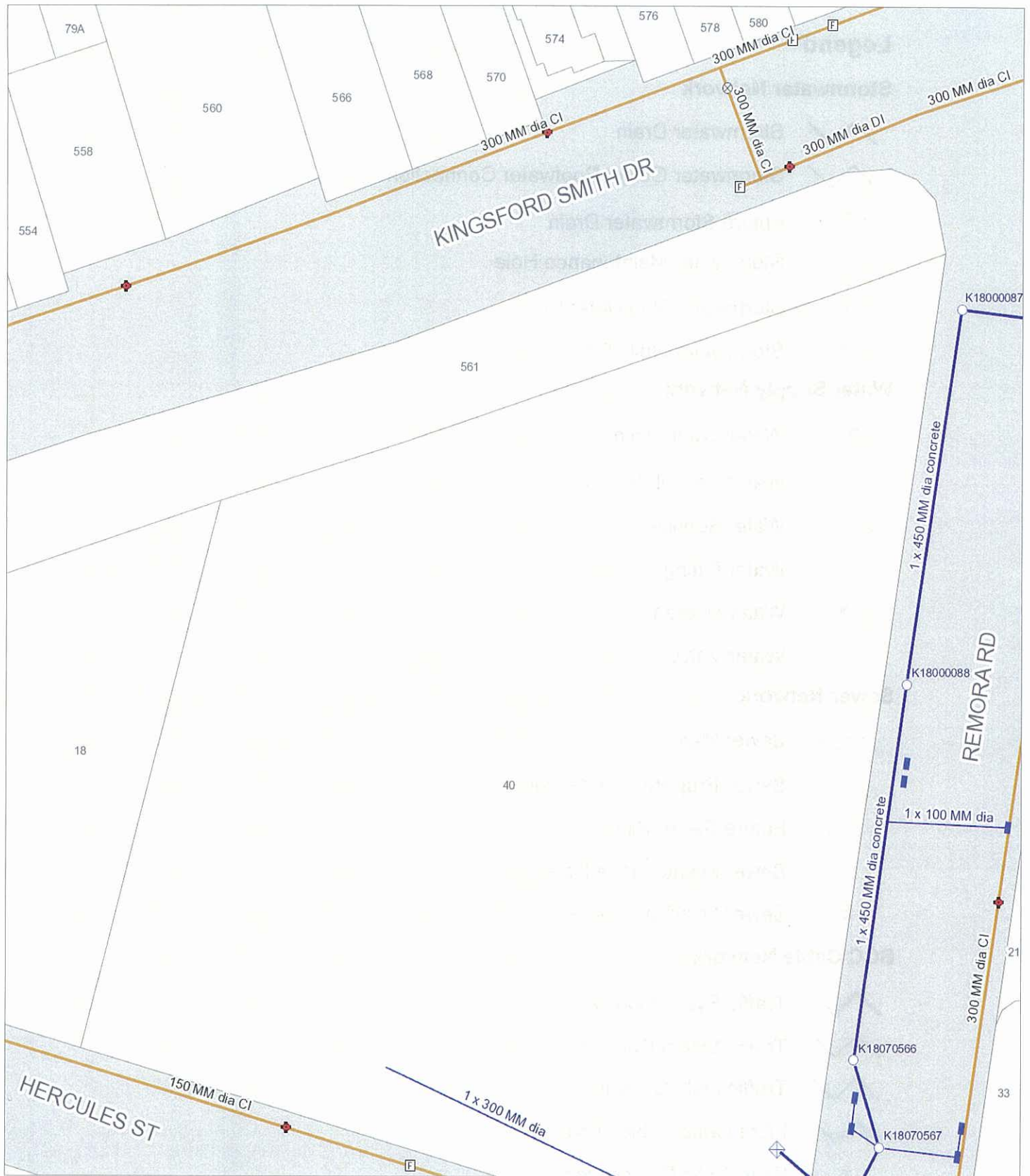
Notification Number: 5417551

Date: Apr 24, 2012

Sheet 3



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Sequence Number: 24885971

Notification Number: 5417551

Date: Apr 24, 2012

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Scale = 1:1000
Metres 20 40

Location:

6965110
506801 506993
6964900

Sheet 4



Copyright BCC, 2011

Legend

Stormwater Network

-  Stormwater Drain
-  Stormwater Gully / Roofwater Connection
-  Future Stormwater Drain
-  Stormwater Maintenance Hole
-  Stormwater Roofwater Pit
-  Stormwater Gully Pit

Water Supply Network

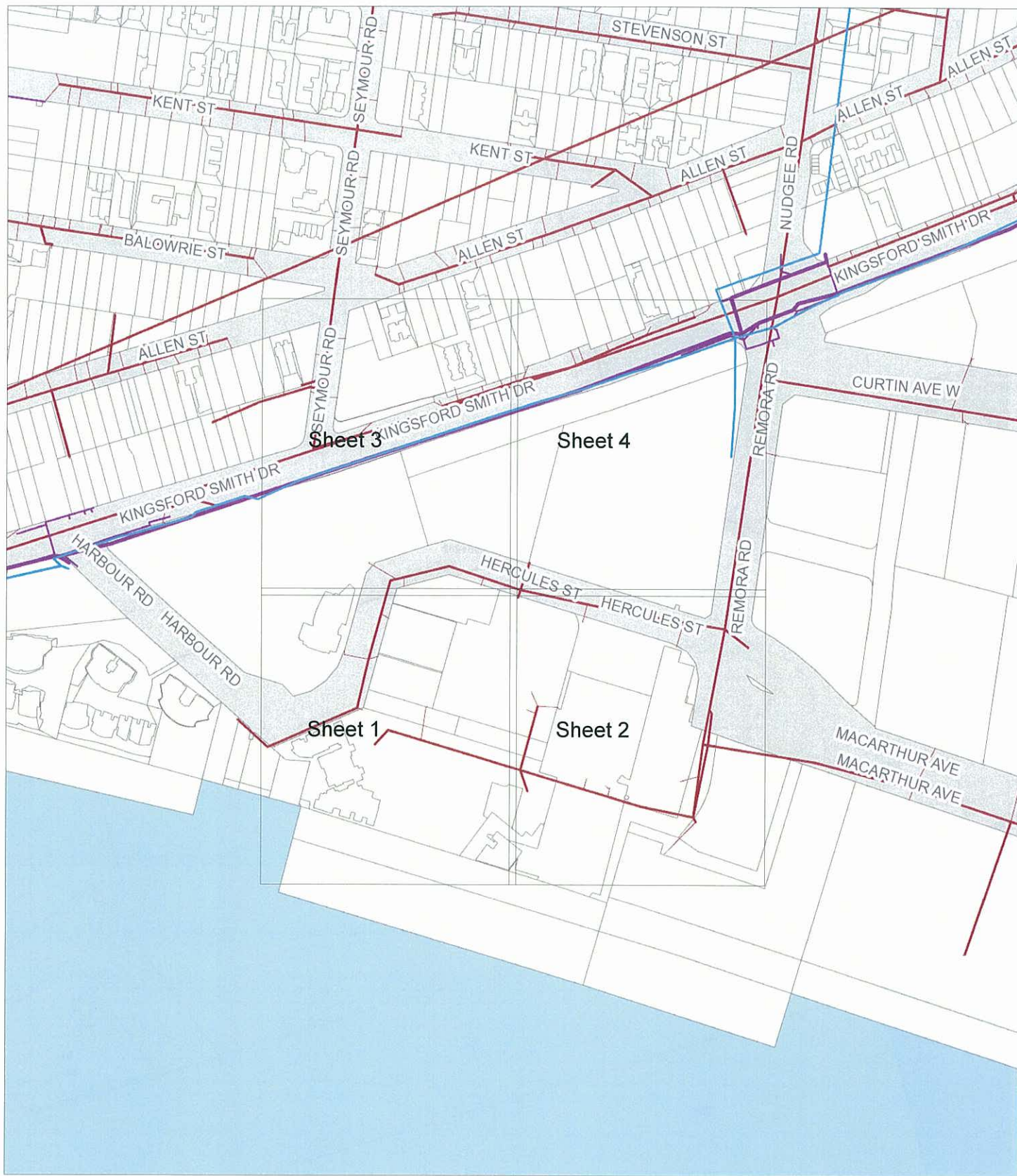
-  Water Trunk Main
-  Water Reticulation Main
-  Water Service
-  Water Fitting
-  Water Hydrant
-  Water Valve

Sewer Network

-  Sewer Main
-  Sewer Property Connection
-  Future Sewer Pipe
-  Sewer Maintenance Hole
-  Sewer Overflow / Outlet

BCC Cable Network

-  Traffic System Cable
-  Traffic Signal Ducting
-  Traffic Light Conduit
-  Fibre Optic Cable Location
-  Fibre Optic Pit Location



Map Sheet Overview

Sewer and BCC Cable Network

Sequence Number: 24885971

Notification Number: 5417551

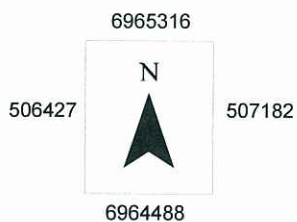
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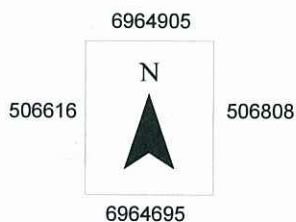
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Scale = 1:1000



Location:



Sequence Number: 24885971

Notification Number: 5417551

Date: Apr 24, 2012

Sheet 1



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Scale = 1:1000
Metres 20 40

Location:

6964905
506801 506993
6964695



Sheet 2



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Sequence Number: 24885971

Notification Number: 5417551

Date: Apr 24, 2012



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Scale = 1:1000



Location:

6965110

506616



506808

6964900

Sequence Number: 24885971

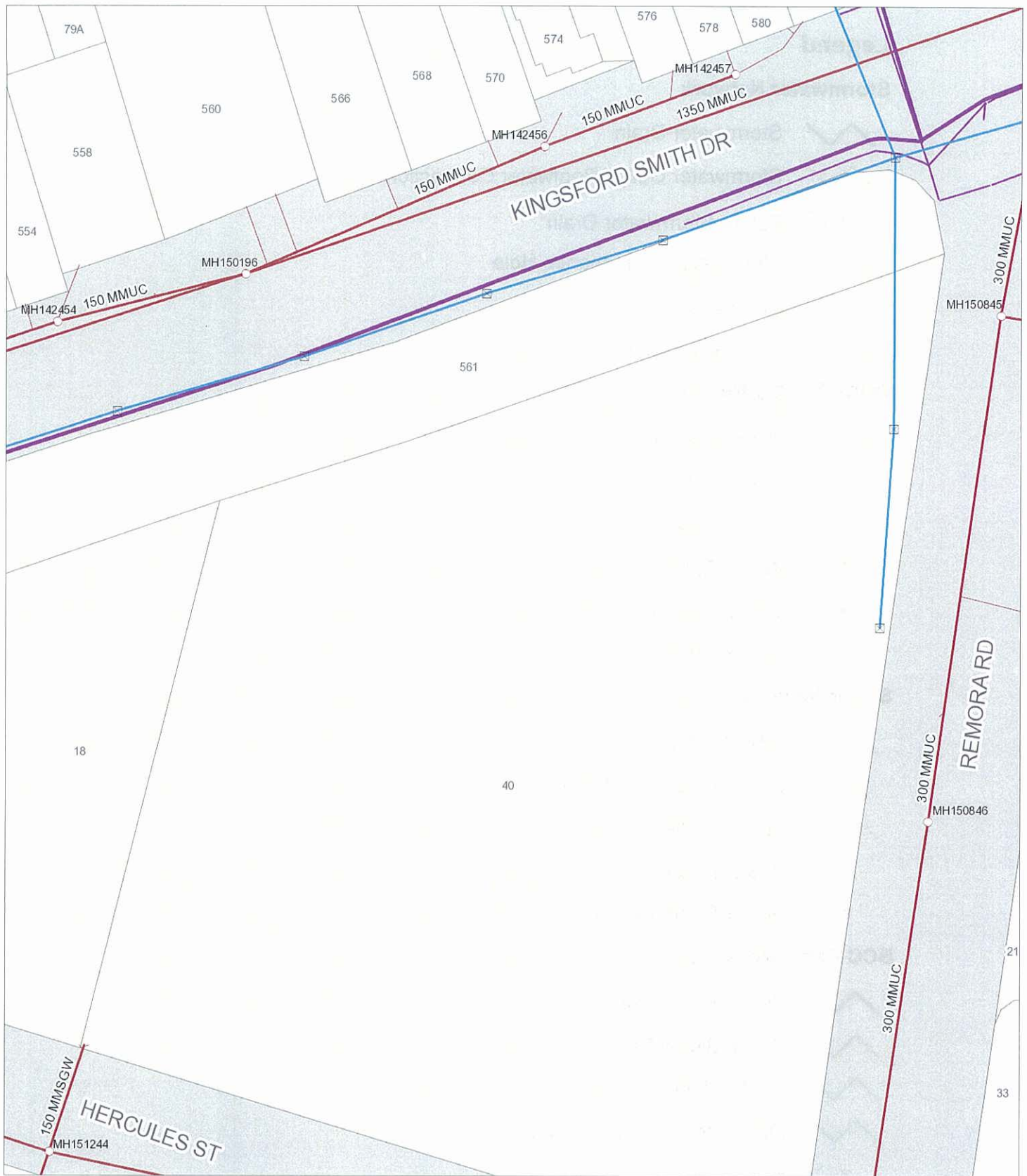
Notification Number: 5417551

Date: Apr 24, 2012

Sheet 3



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Scale = 1:1000
Metres 20 40

Location:

6965110
506801 N 506993
6964900

Sheet 4

Sequence Number: 24885971

Notification Number: 5417551

Date: Apr 24, 2012



Copyright BCC, 2011

Legend

Stormwater Network

-  Stormwater Drain
-  Stormwater Gully / Roofwater Connection
-  Future Stormwater Drain
-  Stormwater Maintenance Hole
-  Stormwater Roofwater Pit
-  Stormwater Gully Pit

Water Supply Network

-  Water Trunk Main
-  Water Reticulation Main
-  Water Service
-  Water Fitting
-  Water Hydrant
-  Water Valve

Sewer Network

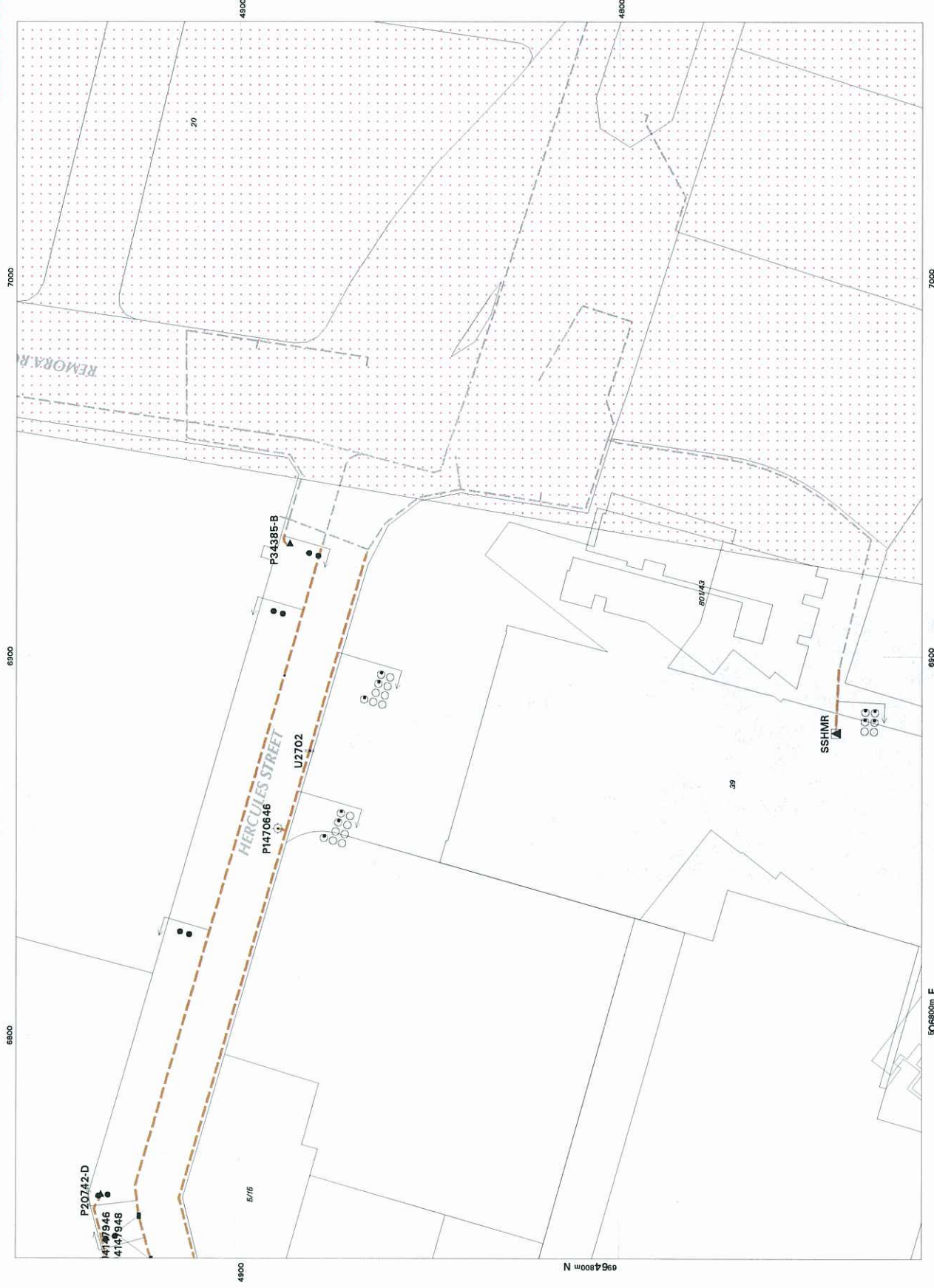
-  Sewer Main
-  Sewer Property Connection
-  Future Sewer Pipe
-  Sewer Maintenance Hole
-  Sewer Overflow / Outlet

BCC Cable Network

-  Traffic System Cable
-  Traffic Signal Ducting
-  Traffic Light Conduit
-  Fibre Optic Cable Location
-  Fibre Optic Pit Location

All underground cables shall be treated as being energised. Where a cable is located that is not represented on the ENERGEX EnerGISE DBYD map, then ENERGEX shall be contacted immediately.

For Emergency Situations
Please call 13 19 62



This output provides details of the ENERGEX electrical network. As verifiers may exist no responsibility is assumed by ENERGEX for the accuracy or completeness of the information provided. Exact positions of cables and electrical connectivity should be confirmed on site.

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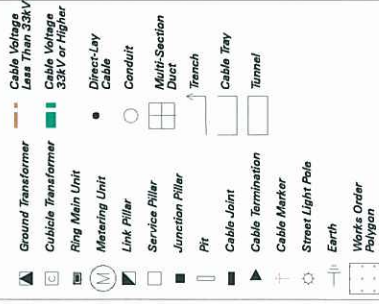


Date: 24 Apr 12 Time: 15:16:47
Requested By: DBYD

SCALE 1:1000

20 0 20m

Enquiry No: 24885972
STRIP No: 2

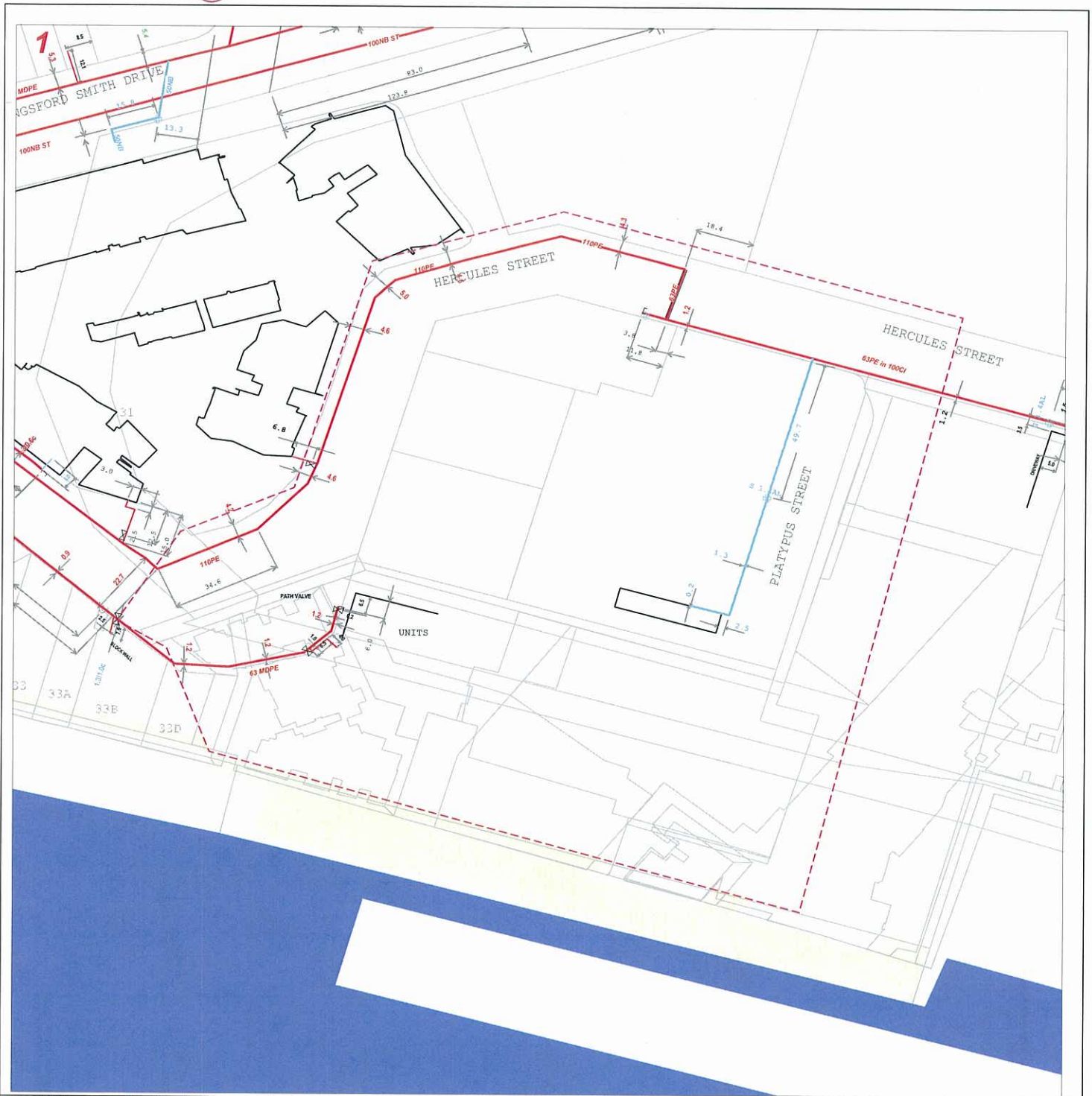


INDEX TO SHEETS



LOCALITY DIAGRAM





24885975 Map Sheet: 1

Papersize: A3 Scale: 1: 1000

0 0.01km



Map Key:

1

Legend

	Transmission Pressure Natural Gas		Sleeve		Sewer Manhole
	High Pressure Natural Gas		Valve		Power Pole
	Medium Pressure Natural Gas		Syphon		Telecom Pit
	Low Pressure Natural Gas		Endcap		Baghole
	LPG Reticulation		Regulator		Reducer
	Dormant Main		Pipe Connector		Purge Point
	Proposed Main		Insulated Connection		Warning Sign (Marker)
	Cathodic Test Point				

+ Point Request

- - - Line / Polygon Request

DCDB Easement

Data Source

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This map is created in colour and shall be printed in colour

APA Group