

ENGINEERING REPORT

**FOR THE PROPOSED
HAMILTON HARBOUR DEVELOPMENT**

**LOCATED AT
29 HERCULES ST & 485 KINGSFORD SMITH DR
HAMILTON**

PREPARED FOR: Hamilton Harbour Unit Trust
(Devine Ltd & Leighton Properties)

PREPARED BY: Bornhorst & Ward Pty Ltd.

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Bornhorst & Ward Project No. **07224**

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Issue	Date	Description	Author	Rev.	Approved
D	November 08	Re-issue to ULDA	KR	NR	NR
C	October 08	Issue to ULDA	KR	NR	NR
B	October 08	Draft Issue 2 to Client	KR		
A	September 08	Draft Issue 1 to Client	KR		

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1. INTRODUCTION

Hamilton Harbour is a mixed use, commercial and residential development, located on the corner of Kingsford Smith Drive and Harbour Road, Hamilton. The proposed development is located across Lot 544 on SL1514, Lot 550 on SL1551, Lot 100 on SP116284, Lot 650 on SL2212 and Lot 1 on SP206759.

Hamilton Harbour consists of the construction of two commercial and two residential buildings. The development will also consist of two basement levels and a common podium area with retail tenancies fronting an internal roadway. A park area is proposed for the southern corner of the site, at the intersection of Hercules Street and Harbour Road.

The following document is in support of a development application to be lodged with the Urban Land Development Authority (ULDA). This document reports on the stormwater management and related services for the proposed development, while considering the effects of this development on the neighbouring properties and the surrounding environment.

Although this site is located within the ULDA Urban Development Area (UDA), all engineering requirements presented are in accordance with the Brisbane City Council Subdivision and Development Guidelines. This will ensure consistency with the surrounding developments, and allow service connections to be approved by BCC. Reference is also made to BCC's "Guideline on Identifying and Applying Water Quality Objectives in Brisbane City" and "Guidelines for Pollutant Modelling in Brisbane Version 7 – Draft" for Water Quality.

Consultant team

Applicant:	Hamilton Harbour Unit Trust (Devine Ltd & Leighton Properties)
Civil Engineers:	Bornhorst + Ward Consulting Engineers Pty Ltd
Architects:	COX Rayner Architects
Traffic Engineers:	GTA Consulting
Structural Engineers:	Robert Bird Group
Hydraulic Engineers:	George Floth Consulting Engineers

This report outlines the preliminary design methodology and calculations in support of a Development Application.

2. SITE CHARACTERISTICS

2.1 LOCATION

The proposed site is located on the eastern side of the intersection of Kingsford Smith Drive and Harbour Road. It is bounded by these roads, as well as Hercules Street and another commercial allotment.

Street Address: 29 Hercules St & 485 Kingsford Smith Drive, Hamilton
 RP Descriptions: Lot 544 on SL1514
 Lot 550 on SL1551
 Lot 100 on SP116284
 Lot 650 on SL2212
 Lot 1 on SP206759
 UBD Description: Map 140 Grid Q17

Figure 1: Site Location



2.2 TOPOGRAPHY AND SITE DRAINAGE

The site is partially developed with a 2 level building and surrounding carpark areas. It is generally flat with levels ranging between RL3.0 and RL5.0. Areas of the site currently drain via pipes to the existing drainage network located within Harbour Road and Hercules Street, which are the legal points of discharge for the site.

2.3 EXISTING AND PROPOSED LANDUSE

The site is currently occupied by the Seafarers Mission, carpark areas and a swimming pool which are proposed to be demolished. A Butter Factory, Police Station and Fire Station were also previously located on the site, but have been demolished, leaving open cut earthworks.

The proposed development consists of the construction of two Commercial buildings, two residential buildings, and two standalone retail buildings as well as a common basement and podium level. A number of restaurants and shops will also be present within the development. Refer to the COX Rayner Site Plan and Basement Plans attached in Appendix B.

3. DATA

3.1 SOURCES OF INFORMATION

In order to collate existing information for the receiving environment, the relevant governing bodies, including BCC and ULDA 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	- NIL
☐ Infrastructure Charges Plans for Stormwater	- NIL
☐ Flood Report	- BCC FloodWise Property Report

3.2 EXISTING STORMWATER / WATERWAY INFRASTRUCTURE

There is a significant amount of Stormwater Drainage infrastructure located within Harbour Road, Hercules Street and the development site. There are also several legal points of discharge for the existing developments. These are described as follows and can be seen in the PMM Survey Plan, attached in Appendix B.

1. There are 3 gully pits, located on the development side of Harbour Road, close to its intersection with Kingsford Smith Drive. These drain to a 375mm-diameter pipe, which discharges to a 600mm-diameter pipe, crossing Harbour Road.
2. There is a 525mm-diameter pipe, connecting to a number of manholes and gully pits, close to the intersection of Harbour Road and Hercules Street. This is discharged through the existing Portside Wharf Development.
3. There is an 1125mm-diameter pipe crossing through the development site, from Seymour Road. This crosses through Lot 100 on SP116284, Lot 650 on SL2212, Hercules Street and the Portside Wharf development, before discharge into the Brisbane River. There are also two manholes located along this line, within the development site. This stormwater pipe will be the legal point of discharge for the site.
4. Existing 600 and 750mm-diameter pipes provide drainage to 6 gully pits located within Hercules Street, before connecting into the 1125mm-diameter stormwater pipe described above.

4. OPPORTUNITIES AND CONSTRAINTS FOR STORMWATER CONTROLS

4.1 SITE OPPORTUNITIES

The major opportunities identified for the site with respect to the application of stormwater quality and quantity controls are:

- The inclusion of rainwater tanks to capture the roofwater runoff, which is proposed to be used for pool top up.
- The close proximity to the Brisbane River.
- The close proximity to and availability of legal points of discharge.

4.2 SITE CONSTRAINTS

The major constraints identified for the site with respect to the application of stormwater quality and quantity controls are:

- The high level of impervious area results in a situation where runoff quantities are difficult to reduce.
- The limited site area and concrete Podium Level covering the majority of the site restricts the incorporation of large scale treatment devices.

5. STORMWATER MANAGEMENT

5.1 INTRODUCTION AND OBJECTIVES

Under the Brisbane City Council Land Use Development Guidelines (2000), several design elements were identified in relation to stormwater management issues. Under these guidelines, it must be demonstrated 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.

5.2 STORMWATER DRAINAGE METHODOLOGY

Modelling of stormwater run-off quantity has been considered for the existing case and operational phase of the development. In order to assess the existing and developed (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 (1992).

When determining flows for the operational phase of development, all areas were assumed to be fully developed, with the Best Management Practices (BMPs) incorporated into the site layout for stormwater quantity and quality control. Preliminary calculations for the stormwater characteristics of the development can be reviewed in Appendix A.

5.3 EXISTING AND DEVELOPED SCENARIOS

As the site is currently in a partially developed state and had a large amount of impervious area from the previous developments, the redevelopment of the site will not dramatically increase the quantity of stormwater runoff. Rainwater tanks will collect roofwater from all buildings; these have been assumed full for this calculation as they will not be designed with the capacity necessary for rainwater detention.

The Q_2 , Q_{10} and Q_{100} quantities of runoff has been calculated. For calculation of the existing scenario, a time of concentration of 6 minutes was applied with a C_{10} value of 0.87. The developed scenario was also modelled using a time of concentration of 6 minutes and a C_{10} value of 0.87. The time of concentration has been estimated based on the standard 5 minute inlet time, plus an additional 1 minute as time in the pipe. Fraction impervious values were calculated for both scenarios (Refer Appendix A).

5.4 STORMWATER ANALYSIS

The modelling of stormwater runoff quantity was considered for both the existing and fully developed scenarios. Based on the rational method calculations, the Q_{10} runoff has slightly increased due to rounding. The Q_2 and Q_{100} flows have remained the same as existing. This satisfies the Green Star EMI5 credit, as there has been no increase in runoff for a Q_2 storm event. In actual conditions runoff from these calculations will be decreased slightly as a 50kL rainwater tank has been proposed.

The following table is a summary of the stormwater discharge from the site for both scenarios. Refer to Appendix A for detailed calculations.

Table 1: Peak Runoff Discharges

PHASE	DESIGN EVENT		
	Q_2 (m ³ /s)	Q_{10} (m ³ /s)	Q_{100} (m ³ /s)
Existing	0.523	0.881	1.510
Developed	0.523	0.882	1.510

5.4 SITE FLOODING

FloodWise Property Reports have been requested from council for the development site. These have specified that the Q_{100} flood level from a storm surge event is 2.5m AHD. Based on this information and as the existing ground level of the site is above RL3.0, the development should not be affected by flooding. As shown on the architectural, the basement is accessed via the podium level. This is set above RL 4.0 and hence has sufficient flood immunity.

6. WATER QUALITY

6.1 WATER QUALITY

No information was available regarding water quality data in this area. However, all references to quality designs and requirements will be in accordance with Brisbane City Council Stormwater Management and Water Quality Guidelines (Draft 2002). This report has been prepared using the Brisbane City Council Reference Material: "Guidelines for Pollutant Export Modelling in Brisbane Version 7-Draft" and Gold Coast City Council Music Modelling Guidelines 2006. It is preferred that the developments water quality export outcomes satisfy the governing discharge loads.

6.2 POLLUTANTS OF CONCERN

The key pollutants generated by various developments are listed by BCC (Ref 4). During the operational phase of the development BCC (Ref 4) identifies the following pollutants as being typically generated:

- Litter
- Sediment
- Nutrients (N & P)
- Pathogens and Faecal Coliforms
- Hydrocarbons
- Heavy Metals
- Surfactants
- Thermal Pollution (Heat)

It is recommended that the following pollutants be targeted for trapping:

- Litter
- Sediment
- Nutrients (N & P)

During the construction phase of a development, the pollutants listed in Table 2 have been identified by BCC (Ref 4) as being typically generated. Measures should be put in place during the construction phase to manage each of these pollutants.

Table 2: Pollutants Typically Generated During the Construction Phase (BCC, Ref 4)

Pollutant	Source
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building
Hydrocarbons	Fuel and oil spills, leaks from construction equipment
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash-waters (eg. From tile works)
pH altering substances	Acid sulphate soils, cement slurry and wash-waters

6.3 ENVIRONMENTAL VALUES AND WATER QUALITY OBJECTIVES

Environmental Values (EVs) of the receiving environment and the Water Quality Objectives (WQOs) for discharge from the site have been identified using "Guidelines on Identifying and Applying Water Quality Objectives in Brisbane City" (BCC Ref 5). These guidelines specify a 10 step process to identify the relevant EVs and WQOs, as detailed below:

Step A Identify the Nature of Affected Receiving Waters

The nearest affected waterway is the Brisbane River. WQO's have been applied only to surface water flows leaving the development site.

Step B Identify Affected Creek Catchment and Waterway Planning Unit

Using the maps presented in Appendix 2 of BCC (Ref 5), the site is known to be located within the Brisbane River Catchment (BN/120).

Step C Check Schedule 1 of the Water EPP

Schedule 1 of the EPP has been checked, and no WQO's or EV's are scheduled for the receiving waterways.

Step D Check for Site Specific Studies

No Site specific Studies have been completed for this site.

Step E Identify Where WQO's will Apply.

The WQO's will apply to Stormwater discharge leaving the site, prior to discharge into the council's stormwater system.

Step F Determine the Waterway Type, Category and Set of Environmental Values

Planning unit BN/120 affects a fresh waterway. The environmental values adopted for the planning unit is Set A.

Step G Match the Waterway Type and WQO's

The relevant table from Appendix 5 of the guidelines, is Table 1 – Freshwater.

Step H Match the Type of Activity with the WQO's

The proposed development includes commercial and residential buildings with a common basement, and podium level. The site is low lying and affected by Acid Sulfate Soils. The minimum indicators to be considered in the development assessment process are Suspended Solids, Nutrients, Litter, Faecal Coliforms, pH Levels, Hydrocarbons and Metals.

Step I Understanding the WQO's Once Identified

Median values during water quality modelling are to be compared with WQO Maximum Values.

Step J Adopt the Relevant WQO's

Set A EV's in Table 1 – Freshwater are to be protected. These have been derived from Step H and are displayed in Table 3 Below.

The relevant EV's from Guideline on Identifying and Applying Water Quality Objectives in Brisbane City, Appendix 5, Table 1 are as follows.

Table 3: Freshwater - WQOs (from BCC, Ref 5)

	SET A Environmental Values (EVs)
Indicator	Modified ecosystem, wildlife, cultural Heritage, secondary and visual recreation, industry, stock and irrigation
pH	6.5 to 8.5
Total phosphorus	70 µg/l
Total nitrogen	650 µg/l
Suspended solids	15 mg/l for combined wet and dry periods 90%ile < 100 mg/l for wet weather periods
Total aluminium	5 µg/l if pH < 6.5 or 100 µg/l if pH > 6.5
Total iron	300 to 1000 µg/l (depending upon Fe(II) concentration*)
Total cadmium	0.2 to 2 µg/l (depending upon hardness*)
Total chromium	10 µg/l (if it is all chromium (VI)*)
Total copper	2 to 5 µg/l (depending upon hardness*)
Total nickel	15 to 150 µg/l (depending upon hardness*)
Total lead	1 to 5 µg/l (depending upon hardness*)
Total zinc	5 to 50 µg/l (if iron not present as Fe(II)*)
Oils and grease	No visible films or odour
PAH	<3 µg/l
Faecal coliforms	1000 organisms/100mL (minimum of 5 samples taken at regular intervals not exceeding one month, with 4 of 5 not exceeding 4000 organisms/100 ml)
Litter/gross Pollutants	No anthropogenic (man-made) material greater than 5mm in any dimension

Notes: WQOs are upper limits for median values or ranges in which medians should lie, unless otherwise stated. If a parameter relevant to a particular activity (eg. An organophosphorus pesticide for a pesticide formulator) is not given in the above table please refer to Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC, 1992).

6.4 MODELLING/ASSESSMENT APPROACH

A quantitative assessment of stormwater run-off quality was considered only for the operational phase of the development. The pollutants of concern during the construction phase are not readily modelled due to the site-specific nature of typical construction pollutant sources that are dependent largely on site management practices and vary throughout the construction phase depending on the particular activities being undertaken. A Best Management Practice (BMP) approach was adopted in selecting management options for the construction phase.

In order to assess the predicted future (operational phase) discharge concentrations of key pollutants from the development site, preliminary modelling of the proposed development has been conducted using version 3 of the Model for Urban Stormwater Improvement Conceptualisation (MUSIC). MUSIC models stormwater quality and 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 are as specified by the BCC Guidelines for Pollutant Export Modelling – Version 7.

6.4.1 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 run-off 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 1980- 1989, 6 Minutes.

6.4.2 Source Nodes

The second step taken in creating the MUSIC model was to define 'Source Nodes' or Sub-Catchments. Source nodes for modelling catchments were defined as per the reference material: "Guideline for Pollutant Export Modelling – Version 7" and Gold Coast City Council Music Modelling Guidelines 2006.

The development site was broken into three source nodes as displayed in the table below. The estimated fraction impervious of each section has also been included.

Table 4: MUSIC Source Nodes

Site Area	BCC MUSIC Source Node	Fraction Impervious
Roofwater	Commercial Roofwater	100%
Podium Area	Commercial	91%
Park Area	Rural Residential	20%

The Roofwater and Podium Area were modelled as Commercial source nodes, due to their large commercial use. The park area at the intersection of Hercules Street and Harbour Road was modelled as Rural Residential according to Table 2.1 of BCC's Guideline for Pollutant Export Modelling.

The commercial source node is used to model situations comprising of commercial areas which do not generate manufacturing wastes. Such areas will typically include associated activities such as offices and restaurants. It is typical for commercial areas to have a high percentage of impervious area, exceeding 70%.

Each MUSIC Source Node required the definition of Soil Properties within the catchment. These values, along with the rainfall data, determine the runoff generation from the catchment. The soil properties of a catchment have been derived through calibration using data from Brisbane City Council's Stormwater Monitoring Program. The soil parameters for the landuse included in this development are as follows:

Table 5: Recommended MUSIC Runoff Generation Parameters

Parameter	Commercial	Roofwater	Rural Residential
Field Capacity (mm)	80	80	80
Infiltration Capacity Coefficient a	200	200	200
Infiltration Capacity Exponent b	1	1	1
Rainfall Threshold (mm)	1	1	1
Soil Capacity (mm)	120	120	120
Initial Storage (%)	25	25	25
Daily Recharge Rate (%)	25	25	25
Daily Drainage Rate (%)	5	5	5
Initial Depth (mm)	50	50	50

6.4.3 Pollution Concentration

MUSIC generates pollutant concentrations for both the storm flow and base flow components of runoff generated from the rainfall runoff model. The pollutant concentration parameters used for each land use in this modelling application are listed below.

Table 6: Music Base and Stormflow Concentration Parameters for Brisbane Catchments

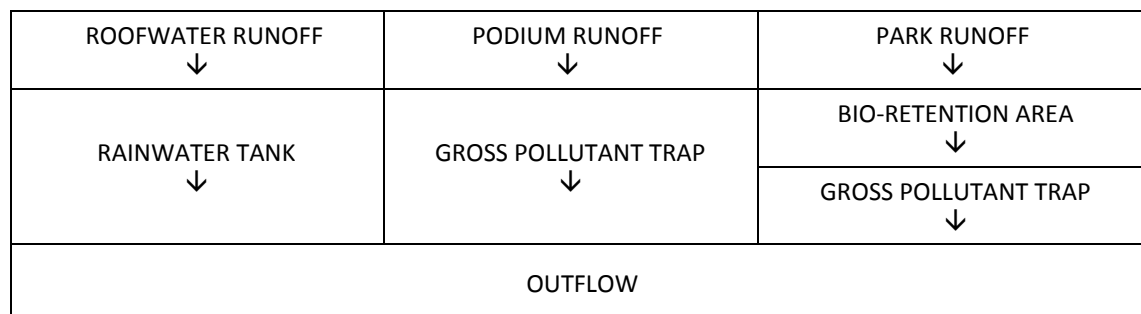
Land Use Type	Parameter	TSS (Log ₁₀ mg/L)		P (Log ₁₀ mg/L)		N (Log ₁₀ mg/L)	
		Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow
Commercial	Mean	0.78	2.16	-0.60	-0.39	0.32	0.37
	Std Dev	0.39	0.38	0.50	0.34	0.30	0.34
Roofwater	Mean	0.78	1.30	-0.60	-0.89	0.32	0.37
	Std Dev	0.39	0.38	0.50	0.34	0.30	0.34
Rural Residential	Mean	0.53	2.26	-1.54	-0.56	-0.52	0.32
	Std Dev	0.24	0.51	0.38	0.28	0.39	0.30

7. SELECTION AND TESTING OF STORMWATER MANAGEMENT OPTIONS

7.1 OPERATIONAL PHASE

A range of SQBMPs were considered for inclusion in the development site layout, with information regarding SQBMPs primarily sourced from BCC (Ref 4). Each has been reviewed for its suitability for this location. 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.

Figure 2: Treatment Train



The following is a summary of the SQBMPs included in the site treatment train along with an appraisal of why they were selected.

Figure 3: SQBMP Selection Matrix

SQBMP Description	Discussion
Landscaped Bio-Retention Area	A bio-retention system ponds water, forcing it to infiltrate through underlying filter media. The filtered stormwater then discharges to the piped drainage system via a slotted drain at the base of the filter media.
Gross Pollutant Trap (Ecosol RSF 4000 Series or equivalent)	A GPT is a treatment device designed to capture coarse sediment, trash and vegetation matter in stormwater. These will be placed inline with the piped drainage system prior to discharge.

The parameters input into the MUSIC model for the above Stormwater Quality Improvement Devices (SQUID's) are as follows:

Table 7: Rainwater Tank Input Parameters

Parameter	Value
Low Flow Bypass (m ³ /s)	0.0
High Flow Bypass (m ³ /s)	100.0
Volume below overflow pipe (kL)	50.0
Depth above overflow (m)	0.20
Surface Area (m ²)	5.0
Overflow Pipe Diameter (mm)	50.0
Annual Demand (kL/yr)	1.6kL/day

Table 8: Bio-Retention Input Parameters

Parameter	Value
Low Flow Bypass (m ³ /s)	0.0
High Flow Bypass (m ³ /s)	0.015
Extended Detention Depth (m)	0.30
Surface Area (m ²)	20.0
Seepage Loss (mm/hr)	0.00
Filter Area (m ²)	15.0
Filter Depth	0.70
Filter Median Particle Diameter (mm)	0.45
Saturated Hydraulic Conductivity (mm/hr)	120.0
Depth below underdrain pipe (% filter depth)	10.0
Overflow Weir Width	1.0

Table 9: GPT Input Parameters

Parameter	Value
Low Flow Bypass (m ³ /s)	0.0
High Flow Bypass (m ³ /s)	100.0
Total Suspended Solids (mg/L)	(1000, 90)
Total Nitrogen (mg/L)	(1000, 870)
Total Phosphorus (mg/L)	(1000, 700)
Gross Pollutants (kg/ML)	(1000, 20)

7.2 RESULTS

The pollutant efficiencies and treatment train, in addition to the pollutant exports for the developed scenario, are shown in the attached MUSIC outputs (Refer to Appendix C). The pollutant export levels for the existing and developed scenarios are summarised below. The estimated pollutant removal efficiencies of each of the SQBMPs are as calculated by the MUSIC model.

Table 10: MUSIC Pollutant Export Levels – Pollution Concentrations

	TSS (mg/L)	TP (mg/L)	TN (mg/L)
Developed Mitigated	0.156	0.0462	0.637
BCC WQO's	15	0.07	0.65

As shown in the above table, the pollution concentrations from the developed mitigated scenario meet the Brisbane City Council Water Quality Objectives and hence it is believed that these are acceptable. On this basis we believe that the measures provided for the proposed mixed use development will yield satisfactory results.

8. WATER QUALITY MONITORING PROGRAM

As this development does not discharge to particularly sensitive waterways or propose to use untried/uncertain stormwater quality best management practices, no proposal for water quality monitoring has been made. The measures proposed for water quality and water quantity treatment are reasonably well understood and demonstrated in Brisbane. Hence it is anticipated that they are acceptable.

9. EARTHWORKS

The earthworks required are mainly for excavation of the basement levels. The Bornhorst and Ward drawing SK10 attached in Appendix B, shows the approximate extents and preliminary levels. Minor earthworks have not been included as a part of this drawing. All soil removed during excavation shall be spoiled off site. Cut and fill volumes will be determined during detailed design.

10. SEWERAGE INFRASTRUCTURE

The proposed development consists of 40,008m² Commercial GFA (including office, retail, café and showroom areas) and 416 Residential Apartments (comprising of 1, 2 and 3 bedroom units). This generates a load of 1648EP's, based on 152EP/ha Commercial GFA and 2.5EP/residential unit. As the site is to connect into existing RRJ (Rubber Ring Jointed) sewers, the Peak Wet Weather Flow (PWWF) for the development has been calculated at 22.9L/s based on 1200L/EP/Day.

The existing developments on the site are serviced by the 1350mm-diameter sewer on Kingsford Smith Drive and a 225mm-diameter sewer located within Hercules Street. It is of our understanding from the sewer catchment investigations completed by Bornhorst + Ward that the nearby Portside Wharf Development has some of the remaining of the capacity in the existing system reserved for future expansion.

Options for possible sewer connection locations have been investigated whereby connection to the Northshore system and construction of a new trunk sewer along Kingsford Smith Drive were considered. In discussions with Brisbane Water it was suggested that it is unreasonable to request construction of a trunk sewer to service the development. Brisbane Water has advised that connection directly into the S1 fronting the development site in Kingsford Smith Drive is acceptable. Correspondence from Brisbane Water has been attached in Appendix D. The sewer connection location is shown on the Bornhorst + Ward drawing SK30, attached in Appendix B. An additional connection to the existing 225mm diameter sewer main within Hercules Street is also required for offices in the lower floors of the residential building.

11. WATER INFRASTRUCTURE

There is an existing 150mm-diameter water reticulation main, located within Hercules Street. This will provide connection to the site. An additional connection to the existing 225mm-diameter water main in Kingsford Smith Drive is also required. As the existing water is on the opposite site of Kingsford Smith Drive, a new water crossing will be constructed. There is also an existing 150mm-diameter water main in Harbour Road, which is not proposed to be used by the development.

All internal works will be documented by the hydraulics consultant. Connection locations are shown on the Bornhorst + Ward drawing SK40 attached in Appendix B.

Following discussions with Brisbane Water, it is not anticipated that upgrades to the services within Hercules Street and Harbour Road are necessary. There is also potential for the site to connect into the future recycled water main proposed for the Northshore Hamilton development.

12. EXISTING STORMWATER

The existing 1125mm-diameter stormwater pipe crossing through the development site requires relocation as it is too large to be located within the basement levels of the development. It is proposed that the stormwater line is relocated outside the developable area on an approximate 6m alignment from the new boundary. This locates it in the future traffic lanes of the Kingsford Smith Drive upgrades. The new line will then enter the site within an easement along the Hercules Street frontage and connect into existing at the intersection of Hercules Street and Harbour Road. The stormwater diversion layout is shown on the Bornhorst + Ward drawing SK20 attached in Appendix B.

Due to pipe grades and cover requirements, sections of the stormwater line are required to be box culverts. This alignment was chosen as there are a lot of existing services within Hercules Street, not allowing suitable passage. Alignment within the property will also reduce construction difficulties and traffic disruption.

Extinguishment of the easement over the existing stormwater pipe and creation of the new easement in favour of Brisbane City Council will be required in association of the stormwater diversion works.

13. RELATED SERVICES

13.1 TELECOMMUNICATIONS

Telstra assets including fibre optic cables and service pits are located within the road reserves surrounding the development site. There are also cables entering the site close to the intersection of Hercules Street and Kingsford Smith Drive, which will require relocation prior to construction.

It is anticipated that upgrading of these services will not be required, however this is dependent on the details and requirements of the development. Telstra would consider the serviceability of the site in conjunction with the project's electrical consultant at the time of application for the development. Uecomm and Optus also operate cables within the Kingsford Smith Drive and Harbour Road. These are outside the development zone and will therefore not be affected.

13.2 ENERGEX

Energex has infrastructure located within the Kingsford Smith Drive, Harbour Road and Hercules Street road reserves. These consist of cables with voltages less than 33kV. There are no cables located within the development site. Cables located within Harbour Road or Hercules Street may require location for the Stormwater Relocation, or any roadworks required for the site. It is not anticipated that existing electrical infrastructure will be required to service the proposed development.

13.3 GAS

Envestra has a 50mm-diameter high pressure Natural Gas main located within Harbour Road and a 100mm-diameter 'dormant' gas main located within Kingsford Smith Drive. It is anticipated that this will not require upgrading as a result of the development. Disturbance of the mains will not occur, however may need to be located for the purposes of services crossings.

14. ASSET HAND-OVER

It is the intention of the applicant that the stormwater quantity and quality controls detailed in this document will not be handed over to Council as part of the development's stormwater infrastructure.

15. SUMMARY

From the investigations conducted, it has been shown that the proposed Hamilton Harbour development, located at 29 Hercules Street and 485 Kingsford Smith Drive, Hamilton as described by Lot 544 on SL1514, Lot 550 on SL1551, Lot 100 on SP116284, Lot 650 on SL2212 and Lot 1 on SP206759 can be serviced in accordance with Brisbane City Council Guidelines.

The Stormwater Management Plan has demonstrated that adequate treatment of stormwater quantity and quality is possible under the proposed plan. Sufficient consideration of stormwater controls has been made to demonstrate the viability of the proposed site development, and Best Management Practices have been adhered to.

The site layout has been designed to integrate stormwater quality and quantity carrying capacity with the implementation of a stormwater quality treatment train to achieve acceptable levels of discharge from the site. Accordingly, it is believed that the post-development discharges will be acceptable.

16. REFERENCES

- 1) South East Queensland Regional Water Quality Management Strategy (SEQRWQMS) (Waterways Partnership 2001)
- 2) Draft Australian Run-off Quality (IEAust 2003).
- 3) Brisbane City Council (1999) – Draft Design Guidelines for Stormwater Quality Improvement Devices.
- 4) Brisbane City Council (2000) Brisbane City Council's Water Quality Management Guidelines.
- 5) Brisbane City Council (2000) – Guidelines for Sediment Basin design, Construction and Maintenance
- 6) Brisbane City Council - Draft WSRD Guidelines (2003)
- 7) Brisbane City Council - Draft Design Guidelines for Stormwater Quality Improvement Devices (1999)
- 8) Brisbane City Council (October 2003) Guidelines for Pollutant Export Modelling in Brisbane – Version 7.
- 9) Water Quality management Guidelines, Part C of Brisbane City Council (2000) Subdivision and Development Guidelines
- 10) Queensland Urban Drainage Manual (1992).
- 11) Model for Urban Stormwater Improvement Conceptualisation User Manual Version 1.00. (CRC-CH 2002).
- 12) A Bibliography of Urban Stormwater Quality (Duncan 1995)
- 13) Soil Erosion and Sediment Control Guidelines for Queensland Construction Sites (1996). The Queensland Division of the Institution of Engineers, Australia.
- 14) Australian Rainfall and Runoff (The Institution of Engineers Australia, 1987)
- 15) Gold Coast City Council Music Modelling Guidelines 2006 - Version 1

APPENDIX A

HYDRAULIC CALCULATIONS

Hydraulic Calculations**Existing Conditions**

Total Area 17876 m2
 1.7876 ha

Fraction Impervious

		fi
Landscaping	2545 m2	0.25
Roof / Carparks	15331 m2	1

Total fi 0.893

Rational Method

C10	0.8786
C2	0.7468
C100	1.000

tc 6 mins

I2	141 mm/hr
I10	202 mm/hr
I100	304 mm/hr

Q2	0.523 m3/s
Q10	0.881 m3/s
Q100	1.510 m3/s

Developed Conditions

Total Area 17876 m2
 1.7876 ha

Fraction Impervious

		fi
Podium	7612 m2	0.9
Roof	8887 m2	1
Park Area	1377 m2	0.2

Total fi 0.896

Rational Method

C10	0.8792
C2	0.7473
C100	1.000

tc 6 mins

I2	141 mm/hr
I10	202 mm/hr
I100	304 mm/hr

Q2	0.523 m3/s
Q10	0.882 m3/s
Q100	1.510 m3/s

APPENDIX B

DRAWINGS

- MAJOR EXCAVATION AREAS SHOWN ONLY. EXTENT OF EARTHWORKS REQUIRED OUTSIDE BASEMENT & BUILDING CORES WILL BE DETERMINED DURING DETAILED DESIGN.
- SOIL REMOVED FOR BASEMENT EXCAVATION TO BE SPOILED OFF SITE.
- BASEMENT 1 LAYOUT SHOWN
- PRELIMINARY EARTHWORKS LEVELS SHOWN.



LEGEND:

CUT

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES		A1 UNREDUCED
		A3 REDUCED
SCALES		UNREDUCED / REDUCED
A	0 5 10 15 20 25 m	1 : 500 / 1 : 1000
SUBJECT		SCALE
BULK EARTHWORKS PLAN		AS NOTED
		ORIG. SIZE
		A1
		JOB No
		07224
		DRAWING No.
		SK10
		REVISION
		-

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REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APPROVED

ASSOCIATED CONSULTANTS
COX RAYNER ARCHITECTS

APPROVED	CHECKED
.....	
DATE	DATE

BORNHORST + WARD

CONSULTING ENGINEERS

CIVIL AND STRUCTURAL

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Bornhorst & Ward Pty Ltd

Brisbane Australia

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A.C.N. 000 153 354

A.B.N. 78 010 153 354

CLIENT
HAMILTON HARBOUR UNIT TRUST

PROJECT
HAMILTON HARBOUR

LEGEND:

EXISTING	PROPOSED	
---	---	STORMWATER
---	---	WATER
---	---	SEWER
		BUILDING
		KERB INVERT
		KERB ONLY
		LINEMARKING
		KERB AND CHANNEL
		FOOTPATH
		RESUMPTION BOUNDARY
		OVERLAND FLOW DIRECTION
		EASEMENT

- PODIUM DRAINAGE ACCORDING TO HYDRAULICS DRAWINGS.
- PIPE SIZES SHOWN ARE PRELIMINARY ONLY AND ARE SUBJECT TO DETAILED DESIGN
- ECOSOL RSF4000 RANGE (OR EQUIVALENT) GPT'S TO BE LOCATED ON END OF INTERNAL STORMWATER LINES PRIOR TO DISCHARGE. LOCATION TO BE CONFIRMED DURING DETAILED DESIGN OF INTERNAL DRAINAGE NETWORK.

STORMWATER LAYOUT
SCALE A



PRELIMINARY
NOT FOR CONSTRUCTION

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APPROVED

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DATE	DATE

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PROJECT
HAMILTON HARBOUR

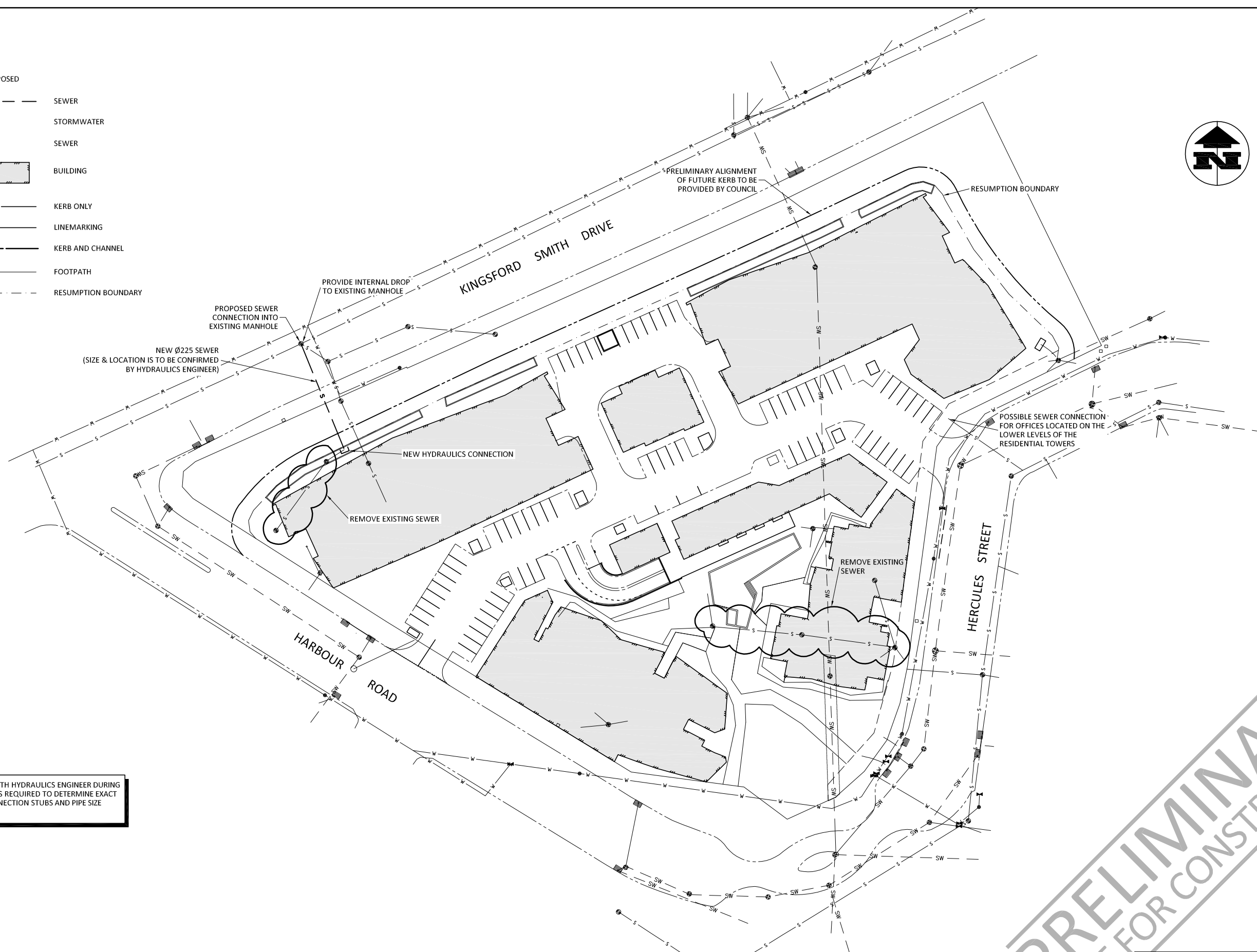
SUBJECT	SCALE	ORIG. SIZE
STORMWATER LAYOUT	AS NOTED	A1
	JOB No	07224
	DRAWING No.	SK20
	REVISION	-

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES	A1 UNREDUCED A3 REDUCED
UNREDUCED / REDUCED	1:500 / 1:1000
SCALES	0 5 10 15 20 25 m

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J:\2007\07224\HWS\SK20.dwg - Plotted by PAPAOUTSAMIS on Oct 15, 2008 - 08:57

EXISTING	PROPOSED	
		SEWER
		STORMWATER
		SEWER
		BUILDING
		KERB ONLY
		LINEMARKING
		KERB AND CHANNEL
		FOOTPATH
		RESUMPTION BOUNDARY



COORDINATION WITH HYDRAULICS ENGINEER DURING DETAILED DESIGN IS REQUIRED TO DETERMINE EXACT LOCATION OF CONNECTION STUBS AND PIPE SIZE REQUIREMENTS.

SEWER LAYOUT PLAN
SCALE A

**PRELIMINARY
NOT FOR CONSTRUCTION**

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES		A1 UNREDUCED A3 REDUCED
SCALES	UNREDUCED / REDUCED	
A		1:500 / 1:1000

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES		A1 UNREDUCED A3 REDUCED	
SCALES		UNREDUCED / REDUCED	
A 0 5 10 15 20 25 m		1:500 / 1:1000	
SUBJECT SEWER LAYOUT PLAN		SCALE AS NOTED JOB No 07224 DRAWING No. SK30 REVISION -	

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..... RPEQ	
DATE	DATE

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 AS/NZS 4360:2004

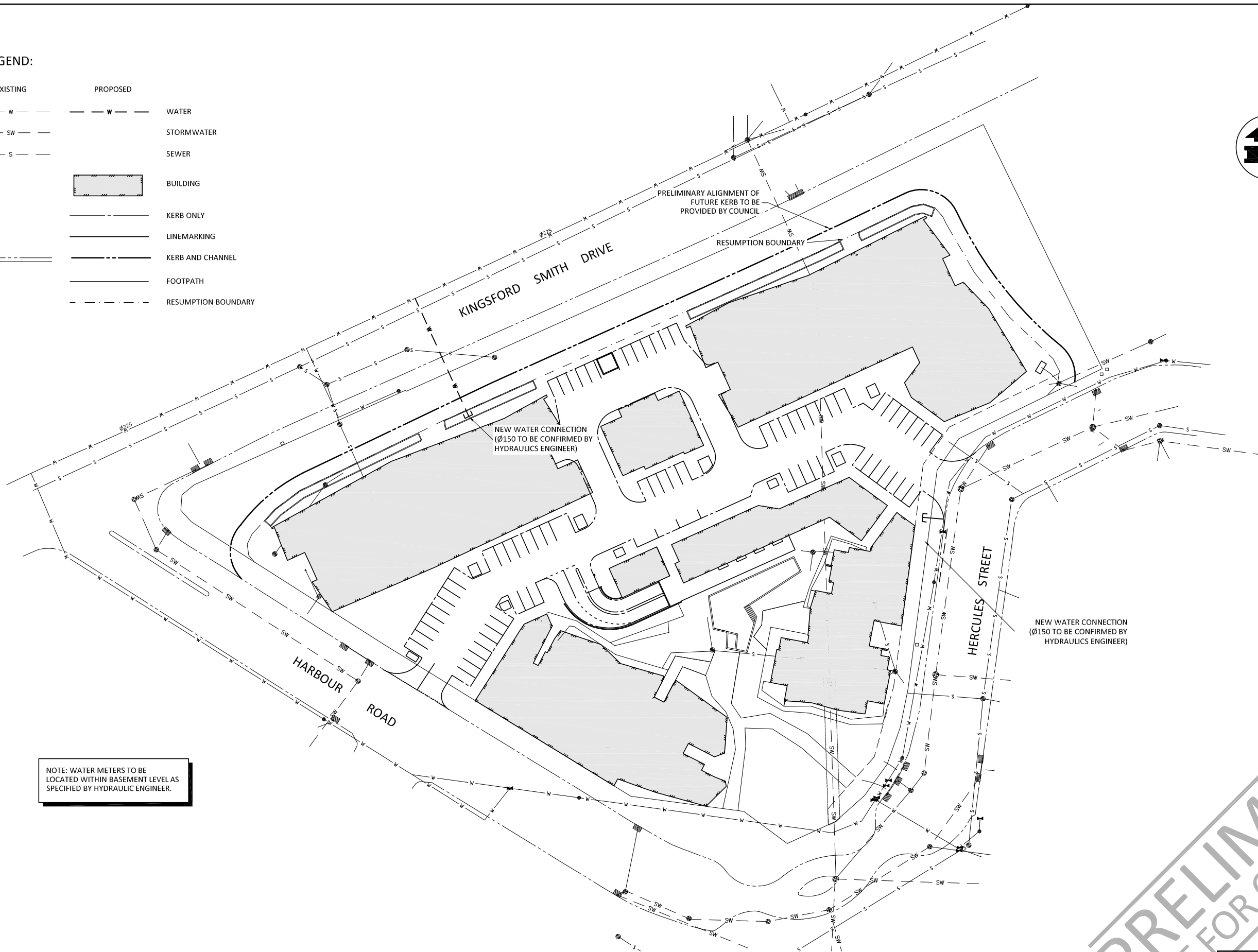
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TRUST

PROJECT
HAMILTON HARBOUR

SUBJECT SEWER LAYOUT PLAN	SCALE AS NOTED		ORIG. SIZE A1
	JOB No 07224		
	DRAWING No. SK30	REVISIONS -	

LEGEND:

EXISTING	PROPOSED	
— W —	— W —	WATER
— SW —	— SW —	STORMWATER
— S —	— S —	SEWER
		BUILDING
	— — —	KERB ONLY
	— — —	LINEMARKING
— — —	— — —	KERB AND CHANNEL
	— — —	FOOTPATH
	- - - - -	RESUMPTION BOUNDARY



NOTE: WATER METERS TO BE LOCATED WITHIN BASEMENT LEVEL AS SPECIFIED BY HYDRAULIC ENGINEER.

WATER CONNECTION PLAN
SCALE A

PRELIMINARY
NOT FOR CONSTRUCTION

DIMENSIONS IN METRES EXCEPT WHERE SHOWN OTHERWISE. CULVERT AND PIPE SIZES IN MILLIMETRES		A1 UNREDUCED
		A3 REDUCED
SCALES	UNREDUCED / REDUCED	
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SUBJECT		SCALE
WATER CONNECTION PLAN		AS NOTED
		ORIG. SIZE
		A1
DRAWING No.		REVISION
SK40		-

REV.	DATE	AMENDMENT / ISSUE	DWN	DES	CHK	APPROVED

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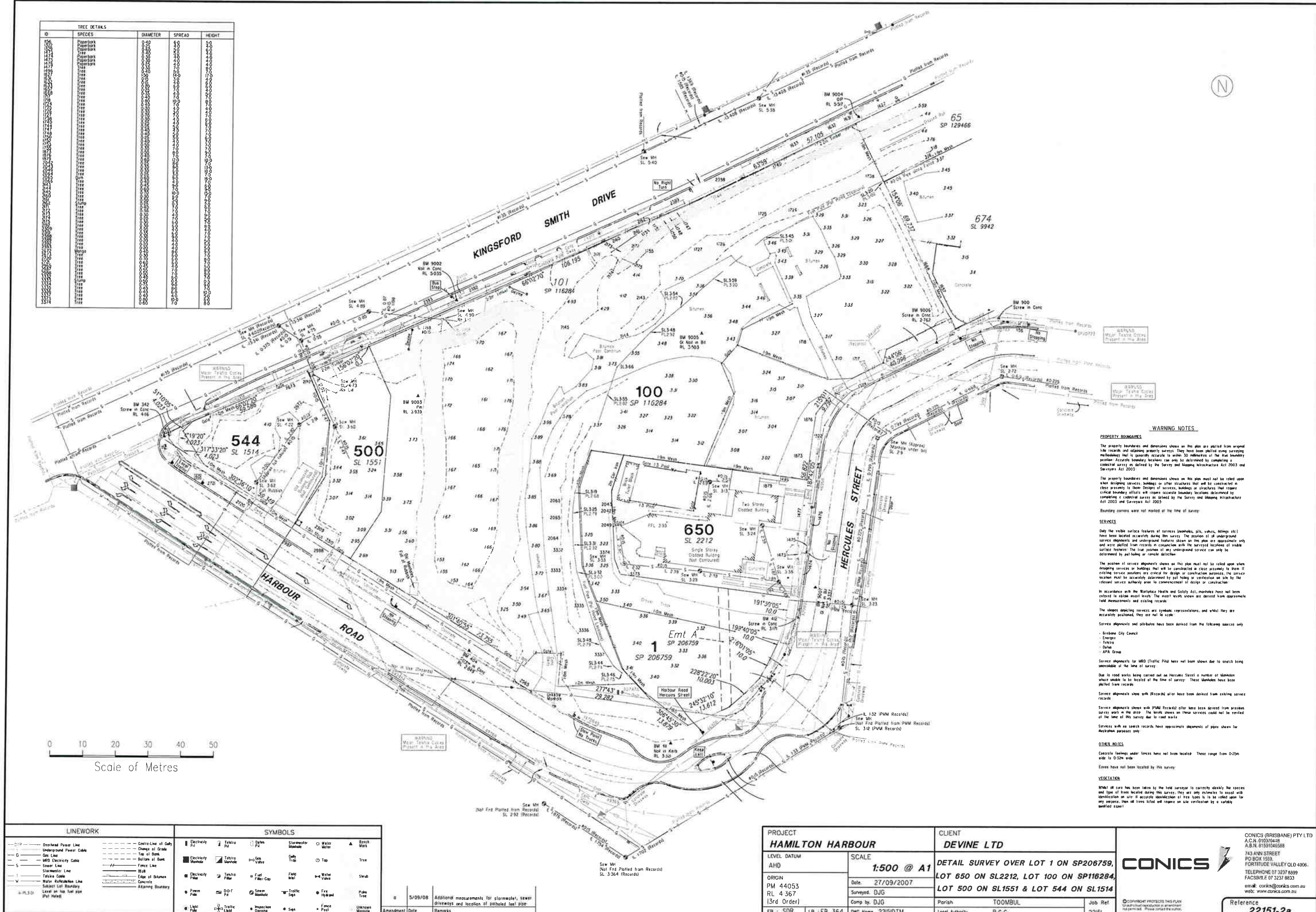
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DATE	DATE

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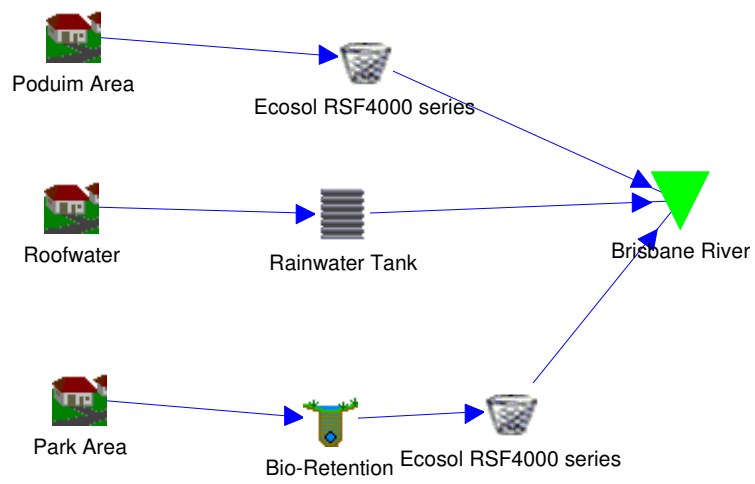
Rayner Level 2, 2 Edward St, Brisbane QLD 4000 Australia Tel: 07 233 0000 Fax: 07 233 0000 Email: info@rayner.com.au Website: www.rayner.com.au		
Architecture Planning Urban design interior design master planning facility design		
Build Structure Partners		
		
Project HAMILTON HARBOUR KINGSFORD SMITH DRIVE HAMILTON		
Drawing Title BASEMENT LEVEL B1 FLOOR PLAN		
Document Control Status INFORMATION ONLY NOT FOR CONSTRUCTION		
Original Scale of A3		
Name	Key Plan	
CAD File Name: KLS		
Project:	SQ	Date: 08/07/2006
Coordinates:		Scale:
Project Address:		Date:
Project Director:		Project File:
Scale: 1:250		Planbook: 4080035
Drawing Number		5
A-11-02		



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Architectural Planning Urban Design & Inter design. Multi facilities	
1811 Venture Partners	
 	
Project KINGSTON HARBOUR HAMILFORD SMITH DRIVE HAMILTON	
Drawing Title BASEMENT LEVEL B2 FLOOR PLAN	
Document Control Status INFORMATION ONLY NOT FOR CONSTRUCTION	
Original Scale of 1:50	
Name:	Pxy Plan
Scale: Mr. Cox	
Sheet: 3205	Project No: 408035
Drawing Number A-11-03	
The Index: 5	

APPENDIX C

MUSIC DATA



mitigated update - Brisbane River

Flow-Based Sub-Sample Statistics

10/10/2008 11:35:25 AM

	Inflow						
	mean	stddev	median	maximum	minimum	10 %ile	90 %ile
Flow (cubic metres/sec)	543E-6	6.97E-3	1.75E-6	1.04	0.00	0.00	39.0E-6
TSS Concentration (mg/L)	1.18	5.03	0.156	301	0.00	0.00	0.738
Log [TSS] (mg/L)	-0.592	0.637	-0.661	2.48	-8.00	-1.19	-36.9E-3
TP Concentration (mg/L)	0.104	0.183	46.2E-3	8.76	0.00	0.00	0.259
Log [TP] (mg/L)	-1.16	0.554	-1.15	0.943	-8.00	-1.79	-0.520
TN Concentration (mg/L)	0.824	0.882	0.637	27.7	0.00	0.00	1.87
Log [TN] (mg/L)	-0.117	0.487	-94.3E-3	1.44	-8.00	-0.485	0.319
TSS Load (kg/6 Minutes)	4.43E-3	65.0E-3	116E-9	18.2	0.00	0.00	3.52E-6
TP Load (kg/6 Minutes)	51.1E-6	768E-6	37.1E-9	0.160	0.00	0.00	1.36E-6
TN Load (kg/6 Minutes)	570E-6	7.94E-3	443E-9	1.19	0.00	0.00	11.6E-6
Gross Pollutant Load (kg/6 Minutes)	41.3E-6	482E-6	0.00	46.0E-3	0.00	0.00	0.00

APPENDIX D

ADDITIONAL INFORMATION

MEMORANDUM



Dedicated to a better Brisbane

To: **DA** Date: **28/4/08**

Attn: **Philip Eastgate**

CC: **Lew Maguire, Dennis Kim**

From: **Michael Hyde**

Re: **Development Assessment**
483-571A Kingsford Smith Drive Hamilton

File : **S1-EFPS 05/02/03**

System Planning

TC Beirne Centre
Level 2, 315 Brunswick Street Mall
Fortitude Valley Qld 4006
GPO Box 1434
Brisbane Qld 4001

Phone: 07 3403 3264

Facsimile: 07 3403 3404
Email: PE18@brisbane.qld.gov.au
Internet: www.brisbane.qld.gov.au

Philip,

I refer to your e-mail of 8th February 2008 requesting advice regarding the sewerage infrastructure required to service the proposed development at 483-571A Kingsford Smith Drive Hamilton.

The proposed development has been assessed as General Industry/Community Use.

The proposed development is expected to add 20.625 L/sec into the sewerage system.

An assessment of the sewerage network servicing the site has been completed including hydraulic modelling of the network under peak wet weather flow conditions. Modelling results show the 1350-mm gravity sewer in Kingsford Smith Drive is currently running outside Brisbane City Council Standards at PWWF and is subject to surcharge

Major capital works required to augment the capacity of this sewer are scheduled for commencement in Councils Capital Improvement Program in 2022 to 2026.

However the expected discharge will not have a significant impact on operating levels in the S1 sewer which is over 18 metres deep. It is therefore considered unreasonable to require an upgrade of the sewer as a condition of development for this site.

The developer will be required to design and construct, in accordance with Council standards, a suitably sized sewer line from the development to the main sewer. Also the route of this sewer line from the proposed development to the 1350-mm main sewer will depend on the connection point to the existing 1350-mm sewer.

If you need further advice regarding this development please contact me on 340 33307

Regards

Peter Marron,
Manager, Feasibilities and Developer Services
BRISBANE WATER

Kris Rensch

From: Kris Rensch
Sent: Tuesday, 2 September 2008 10:00 AM
To: David Morrow
Subject: FW: Re 483-571A Kingsford Smith Drive, Hamilton harbour Development

Categories: #07224-CO#
Attachments: 20080428-150934_05-02-03.doc
FileAs: CO
ProjFile: 07224-CO
ProjId: 07224
vers: v1.30



20080428-150934_
05-02-03.doc (...)

Hi David,

Just confirming our conversation last week that the 2L/s increase calculated for the Hamilton Harbour sewer flow is negligible compared to the S1's capacity, and connection directly into the S1 from the development site is still acceptable.

Thanks
Kris

Kris Rensch | Civil Engineer | Bornhorst + Ward Consulting Engineers Level 4, 67 Astor Terrace, Spring Hill, Qld 4000 E.
k.rensch@bornhorstward.com.au | P. (07) 3013 4699 | D. (07) 3013 4645 F. (07) 3013 4611 M. 0402 814 313

-----Original Message-----

From: Kris Rensch
Sent: Wednesday, 6 August 2008 4:08 PM
To: David Morrow
Subject: Re 483-571A Kingsford Smith Drive, Hamilton harbour Development

Hi David,

A few months ago we had a meeting with yourself and Michael Hyde regarding sewer connection for the Hamilton Harbour development on the corner of Kingsford Smith Drive and Harbour Road. It was advised in the attached memo that it would be acceptable to connect directly into the S1 with 20.6L/s.

The developer has revised the scheme whereby the maximum parameters for the site are 41000m2 GFA of commercial (offices, retail, café and shops) and 400 residential apartments.

Based on BCC's 152EP/ha for commercial GFA and WSA's 2.5EP/ high density unit dwellings we have calculated the site to have 1624EP's.

Based on 1624EP's we have calculated the PWWF for the new scheme to be 22.6L/s. There has been a 2L/s increase as we had originally calculated 20.6L/s under the older scheme.

Could you please advise whether connection into the S1 is acceptable with the additional loading?

Thanks for your help
Kris

Kris Rensch | Civil Engineer | Bornhorst + Ward Consulting Engineers Level 4, 67 Astor Terrace, Spring Hill, Qld 4000 E.
k.rensch@bornhorstward.com.au | P. (07) 3013 4699 | D. (07) 3013 4645 F. (07) 3013 4611 M. 0402 814 313

-----Original Message-----

From: Michael Hyde [mailto:Michael.Hyde@brisbane.qld.gov.au]
Sent: Monday, 28 April 2008 2:27 PM
To: Kris Rensch
Cc: David Morrow
Subject: Re 483-571A Kingsford Smith Drive, Hamilton harbour Development

Kris,
For your information
Copy of recommendation sent to Development Assessment section re Hamilton Harbour development

Regards

Michael Hyde
Engineering Officer
System Planning
Brisbane Water
Phone : 3403 3825
Fax: 3403 3404
Email Michael.Hyde@brisbane.qld.gov.au

This message has passed through an insecure network.
Please direct all enquiries to the message author.
