CROWLE GARDENS

76 BELMORE STREET, RYDE, NSW, 2112

DESIGN STATEMENTS

FOR

HYDRAULIC & FIRE PROTECTION ENGINEERING SERVICES

JOB NO:

10344

DATE:

17th February, 2011

ISSUE:

'A'

CLIENT:

Achieve Australia

ARCHITECTS

NBRS & Partners Pty Ltd
Level 3, 4 Glen Street
Milsons Point NSW 2061
Tel: 9922 2344 Fax: 9922 1308

HYDRAULIC SERVICES CONSULTANTS:

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CONTENTS

1. EXECUTIVE SUMMARY

The availability of Hydraulic and Fire Protection Engineering services has been investigated by review at the site and with Sydney Water Corporation and other Authorities.

Watermain and sewer mains drawings have been obtained from Sydney Water Corporation. Natural gas mains drawings have been obtained from Jemena. Stormwater drawings have been obtained from Ryde City Council.

Hydraulic and Fire Protection Engineering Services are available to support the necessary functions of the proposed buildings.

These services are:

- Sewer Drainage
- Stormwater Drainage
- Fire Hydrant Water Supply
- Fire Sprinkler System Water Supply
- Natural Gas Supply
- Harvested Rainwater for Irrigation Water and Toilet Flushing

The report explains in detail the way in which these Engineering Services will be made available to the development.

2. INTRODUCTION

This report detailing the Preliminary Design Statement for Hydraulic and Fire Protection Engineering Services has been prepared for inclusion in the Department of Planning Part 3A application.

The following list represents the essential engineering services required by the Development. These engineering services are addressed in further detail in the report.

3. SITE ENGINEERING SERVICES

The following hydraulic engineering services and initiatives will be provided for the buildings and site works:

- Sewer Drainage
- Stormwater Drainage
- Potable (domestic) Cold Water Service
- Fire Hydrant Service
- Incoming Fire Sprinkler Watermain
- Natural Gas Service
- Harvested Rainwater for Irrigation Water
- ESD initiatives

4. STORMWATER DRAINAGE AND WATER SENSITIVE URBAN DESIGN PRINCIPLES

City of Ryde Council have provided written advice dated Thursday 20 January, 2011 that design and construction of inground On Site Detention structures of sufficient volume and with orifice plates to achieve the objective of post development flows not exceeding pre-existing green field site flows for all storms would be acceptable.

A copy of the written advice is attached.

A system of piped stormwater drainage will be included to convey design flows from roof gutters, rainwater downpipes and surface rainwater outlets. Pipes will be sized to convey flows from a once in 100 year event storm. Overland flow routes will be incorporated in the landscape design.

Generally drainage pipelines will be constructed with uPVC pipes. Where drainage is in roads or carpark areas the pipe material will be FRC or RCP.

A new connection will be made to the existing Council stormwater infrastructure in Belmore and Porter Streets. Ryde City Council has been consulted in respect to proposed stormwater mains extensions and connections for the development. Council's drainage engineer has confirmed acceptance of the proposal to extend in street drainage to the property. Council's engineer has agreed that there are no flooding issues affecting the site. A copy of Council's reply email is attached.

On site detention tanks are proposed for each building. The OSD detention tanks would be constructed underground with locked access grates at surface level. Additionally the development proposes to incorporate rainwater harvesting below the OSD detention tanks. The OSD detention tanks walls would be extended deeper into ground to contain harvested rainwater which will be used for landscape irrigation water. Reuse volume proposed for each building is 60,000 litres. Calculations utilising Drains Program are attached. The stormwater drainage concept plans provide information on the proposed location and volumes proposed for On Site Detention structures. The drawing also indicates proposals to achieve acceptable stormwater discharges water quality.

Water sensitive urban design principles will be incorporated in the designs for stormwater drainage. Ground surface levels will be arranged so that rainwater is directed into and across landscape areas achieving promotion of plant growth and filtration of nutrients attached to water molecules before stormwater is directed from the site into Council's piped drainage systems.

5. POTENTIAL FOR FLOODING

The risk of flooding to the site from surface water storm flows in the general area at the intersection of Belmore and Junction Streets and impact of flows from the developed site on Council's infrastructure has been assessed by Council's drainage engineer.

Written confirmation has been received from Council, confirming that surface flood waters will not affect the subject land and secondly that the outflow from On Site Detention tanks as calculated on the Drains programme spread sheets contained in this report will not have an adverse effect on Council's downstream piped drainage infrastructure.

Reference should be made to correspondence attached to this report from Sparks and Partners dated 19 January, 2011 and Council's correspondence dated 20 January, 2011.

6. SEWER DRAINAGE

All sanitary fixtures and fittings will be connected to sewer drainage and connected to Sydney Water sewer mains.

Brown Consulting (NSW) Pty Ltd, Sydney Water Co-Ordinators have provided advice related to anticipated upgrade works required to Sydney Water sewer mains. The desk study undertaken by Brown Consulting (NSW) Pty Ltd concludes that extension to the existing Sydney Water Corporation sewer mains system will be necessary and acceptable to Sydney Water to serve the Crowle Gardens development. Extent of new sewer mains is likely to be 60 metres of 225mm diameter drainage in Porter Street and 30 metres of 225mm diameter drainage in Belmore Street.

Detailed design of the sewer main extensions would proceed after development approval is received. The written advice from Brown Consulting (NSW) Pty Ltd is attached.

Sewer drainage from all sanitary fixtures will be collected by uPVC gravitational drainage and will discharge to the existing sewer drainage system at the corner of Belmore and Junction Streets.

The complete sewer drainage system will comply with AS/NZS 3500.2.2 and the NSW Code of Practice, Plumbing and Drainage.

A record drawing of the existing sewer drainage on the site is attached. The drawing indicates the general arrangement of sewer drainage between buildings and connections to the authorities sewer mains.

7. SANITARY PLUMBING

All sanitary fixtures will be chosen to comply with ESD principles, be a minimum of 4 star rated and connected to the sewer drainage system.

Pipework for sanitary plumbing conveying general area waste water would be uPVC with solvent welded joints.

Sanitary plumbing pipes will be acoustically insulated to limit noise transfer to rooms below the ground floor ceilings.

8. POTABLE COLD WATER SERVICE

A existing 100 diameter Sydney Water watermain is located in Porter Street.

Brown Consulting (NSW) Pty Ltd, Sydney Water Co-Ordinators have provided advice related to anticipated upgrade works required to Sydney Water Corporation, watermains.

The desk study undertaken by Brown Consulting (NSW) Pty Ltd concludes that extension to the existing Sydney Water Corporation watermains system will be necessary and acceptable to Sydney Water to serve the Crowle Gardens development. Extent of new watermains is likely to be 30 metres of 150mm diameter pipework.

Detailed design of the watermain extensions would proceed after development approval is received. The written advice from Brown Consulting (NSW) Pty Ltd is attached.

The existing incoming water services will be progressively removed and new copper water services provided to the proposed buildings. Boundary protection in the form of a Reduced Pressure Zone Device will be provided for the new development.

Water supply will be extended from the street watermain by providing a polyethylene water service through to a common centralised plant room in which pressure pumps and filters will be installed.

Water conservation will be achieved by provision of 4½/3 litre dual flush WC cisterns and Four Star Wels rated water efficient tapware in accordance with the new mandatory star rating for Tapware complying with AS 6400.

9. RAINWATER HARVESTING AND REUSE WATER SERVICE

It is proposed that tank storage of harvested rainwater be provided for each building and the site. Pressure pumps would be provided to pump rainwater through 50 micron automatic back wash filters and 5 micron bag filters, then into the rainwater reuse pipework distribution system. Rainwater will also be distributed to landscape irrigation directly after the 50 micron filter. Rainwater will also be used for building cleaning and car washing.

Metered cold water service will be connected to the rainwater reuse water service as a back up supply via an electric solenoid valve and backflow prevention valve.

A rainwater tank, water level indicator will be provided in the common plant room.

10. POTABLE HOT AND WARM WATER SERVICES

The hot and warm water services will be constructed in compliance with AS/NZS 3500.4 and NSW Code of Practice, Plumbing and Drainage.

Each building would have a solar, heated with natural gas boost, mains pressure, centralised, recirculating, hot water system. Hot water heaters would be located in a concealed position on the roof of each building.

It is also proposed that solar absorber panels be installed to capture energy from the sun as pre heat to incoming cold water before it passes to the water heaters.

11. FIRE HYDRANT SERVICE AND INCOMING FIRE SPRINKLER WATERMAIN

A incoming fire hydrant and fire sprinkler watermain will connect to the Sydney Water watermain in Porter Street with fire brigade booster assemblies complying with requirements of AS 2419-2005.

It is proposed that a diesel motor driven fire hydrant pump set be located in a common centralised plantroom with the fire sprinkler valve sets.

A chained open, padlocked stop valve would be provided after the diesel pump set on the fire watermain supplying the buildings.

The inground fire hydrant watermain will be constructed with polyethylene pipes jointed with electrofusion fittings. Within the buildings fire hydrant landing valves will be located close to the doorway of each fire stair on all levels of each building. Pipework within the building distributing to fire hydrant valves will be constructed with galvanised steel pipe and fittings.

12. NATURAL GAS SERVICE

All heating plant, equipment and appliances, where possible will be natural gas powered.

Natural gas mains are located close to three property boundaries in Belmore, Junction and Porter Streets.

Jemena Gas Networks (NSW) Ltd have provided a letter, dated 20 January, 2011 which advises that natural gas mains are in the general area of the development and will convey the gas loads required by the development. The written advice from Jemena is attached.

Natural gas meter and regulator will be located along the Porter Street site boundary.

Inground polyethylene gas pipe will convey gas from the gas meter to the each building. Gas will be distributed to hot water heaters and appliances in the kitchens.

13. LANDSCAPE IRRIGATION WATER SERVICE

The landscape irrigation water service will draw water from the rainwater harvesting reuse water tanks described previously in Section 4.

Inground polyethylene watermains will be provided to distribute landscape irrigation water to terminal points, garden taps, car washing areas for tenants cars and also extended to landscape sprayers.

14. CAR PARKING AREAS FIRE SPRINKLER SYSTEM

Car parking areas within each building will be fire sprinkler protected by a system compliant with AS 2118.4-1995 and the BCA.

Fire sprinkler systems will be charged from a central fire sprinkler pump room located within the buildings and accessible to the fire brigade. A central FIP will be located within sight of the pump room. Separate mimic FIP's will be located in each building.

Incoming watermain would be complete with compliant double testable check valve system with isolation valves and a fire brigade booster suction and delivery system at Porter Street site boundary.

A set of fire sprinkler control valve will be provided. This will include monitored stop valves wired to the F.I.P.

The F.I.P. also will incorporate the smoke detection system. Should the fire sprinklers or the smoke detectors activate then a signal would be sent to the building occupant warning system as per BCA Specification E1.5-8 and compliant with Clause 3.22 AS 1670 and Clause 6 of Specification E2.2a.

Activation of either the fire sprinkler or smoke detection system will send an alarm to the closest fire station or fire station dispatch centre with the shortest response time.

15. HYDRAULIC SERVICES ESD INITITIVES

To achieve a cost effective and ecologically sustainable project in terms of conservation and reuse of naturally occurring resources the project proposes to include the following initiatives:

1. Collection of radiated heat generated by the sun through roof top solar absorber panels to augment natural gas powered hot water heaters for generation of hot water distributed to taps in the buildings.

2. Harvesting of rainwater and retention of rainwater in storage tanks from which water will be pumped to landscaped gardens, grassed areas, wash down of hard surfaces on and around buildings and tenants car washing facilities.

3. Water sensitive urban design principles will be incorporated in the designs for stormwater drainage. Ground surface levels will be arranged so that rainwater is directed into and across landscaped areas achieving promotion of plant growth and filtration of nutrients attached to water molecules before stormwater is directed from the site into Council's piped drainage systems.

4. Inclusion in the hydraulic services for buildings on the site of water supply conservation measures to achieve reduction in water flows from and liquid waste generated and discharged to the Sydney Water Corporation potable watermains and sewer mains.

5. Installing four star rated sanitary ware i.e. 4½/3 litre toilet flushing and four star Wels rated Tapware at sanitary fixtures showers and appliances.

6. Provision of natural gas cooking appliances so that reliance on electrical energy provided to the buildings is minimised.

7. Conservation of natural gas consumption at the centralised hot water heaters in each building by insulating the hot water flow and return pipework and limiting heat losses from the pipework.

16. SOIL AND WATER MANAGEMENT DURING CONSTRUCTION

Sediment contained in storm flows from the disturbed site during construction activities will be arrested by geotextile silt fence filters, temporary sedimentation basins, shakers at vehicle entries from public roads and sand bag barriers.

Diversion drains will be provided where appropriate to divert clean upstream runoff around disturbed areas.

Basement excavations will contain temporary sediment basins. Clarified water will be pumped to Council's street drainage.

Construction stage, erosion and sediment control site plans, drawings ES-01 and ES-02 drawings are attached which indicate the general strategies which will be implemented across the site to manage sediment transportation from the site.

APPENDIX 1

STORMWATER ATTACHMENTS

1. Stormwater Management concept Site Plan — Drawing H-01

2. Stormwater Management Concept Area Plan — Drawing H-02

3. City of Ryde Drainage Engineer concurrence email to On Site Detention calculations for the project.

4. Email from City of Ryde Drainage Engineer regarding upgrade/extension of Council's drainage system to the site.

   Additionally Council does not possess any flood level information for the site.

5. On Site Detention calculations utilising Drains program.

BELMORE STREET

19.41 TK
17.82 INV 375mm
17.92 INV
KEP
EXISTING COUNCIL DRAINAGE INFRASTRUCTURE
375mm
18.33 INV
KEP

1:100 YEAR FLOOD LINE

SITE GROSS POLLUTANT TRAP.

STW

BLOCK A
BUILT
Area = 1530 m²

INDICATIVE LOCATION OF WETLAND FOR STORMWATER TREATMENT BY ESD CONSULTANT

INDICATIVE LOCATION OF STORMWATER BIO RETENTION SYSTEM BY ESD CONSULTANT

TELLARAGA HOUSE

BLOCK F
BUILT
Area = 630 m²

BLOCK A
OSD TANK 11m³

BLOCK F OSD TANK 5m³

BLOCK B
BUILT
Area = 1200 m²

BLOCK B
OSD TANK 9m³

INDICATIVE LOCATION OF WETLAND FOR STORM WATER TREATMENT BY ESD CONSULTANT

BLOCK C
OSD TANK 7m³

BLOCK D & E
OSD TANK 9m³

BLOCK D
OSD TANK 4m³

BLOCK E
BUILT
Area = 1400 m²

BLOCK D
BUILT
Area = 900 m²

BLOCK C
BUILT
Area = 900 m²

H-02

BLOCK E
OSD TANK 6m³

CAR ENTRY
AREA=100m²

EXTEND FROM EX. COUNCIL PIPES TO SITE

SITE GROSS POLLUTANT TRAP.

INDICATIVE LOCATION OF STORMWATER BIO RETENTION SYSTEM BY ESD CONSULTANT

SITE GROSS POLLUTANT TRAP.

H-02 STW 375 KEP

STW 375 KEP

PORTER STREET

JUNCTION STREET

DATE	No	AMENDMENT	INIT.	ISSUE

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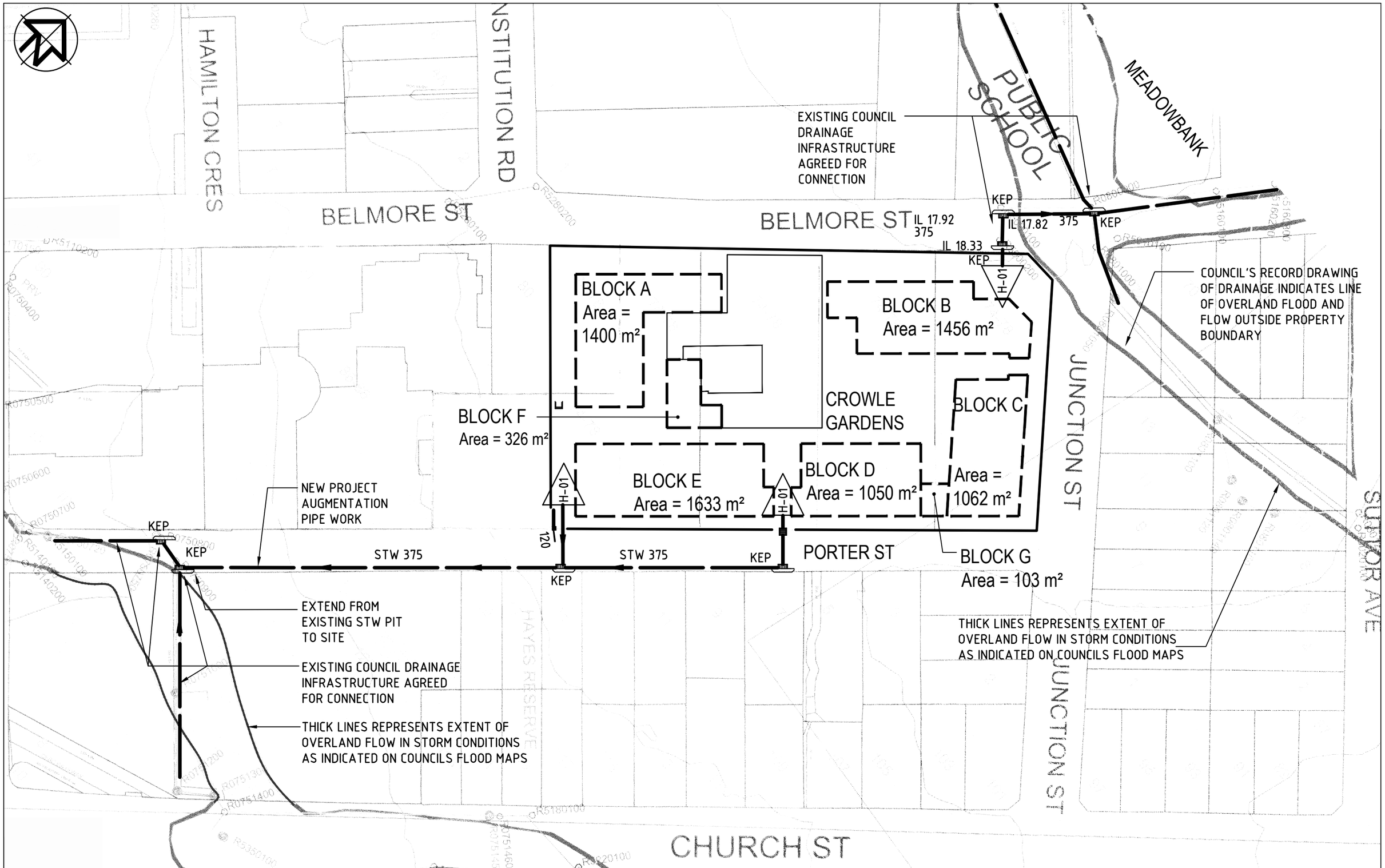
E: architects@nbrsap.com.au W: www.nbrsap.com.au

PROJECT **CROWLE GARDENS**
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY BS DATE 07.02.11
CHECKED BY BS DATE 07.02.11

TITLE
STORMWATER MANAGEMENT CONCEPT SITE PLAN

SCALE 1:500 @ A3
DRAWN BY GM
DATE FEB 2011
JOB NO 10344
DRAWING No. H-01
No. IN SET
ISSUE P3



DATE	No	AMENDMENT	INIT.	ISSUE

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PROJECT **CROWLE GARDENS**
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY DATE 04.02.11

CHECKED BY BS DATE 04.02.11

TITLE
STORMWATER MANAGEMENT CONCEPT AREA PLAN

SCALE	DRAWN BY	DATE	
1:1200	GM	FEB 2011	
JOB NO	DRAWING No.	No. IN SET	ISSUE
10344	H-02		P3

G J Sparks

From: Guna Veerasingham [gunav@ryde.nsw.gov.au]
Sent: Thursday, 20 January 2011 11:34 AM
To: Daniel Hoogesteger
Subject: RE: [Fwd: FW: RE: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. ATTACHMENT A (ref:D10/65930) [7666A]]

Daniel,

That is fine as long as you comply with Council's DCP2010.

Kind regards

Guna Veerasingham
Stormwater and Park Assets
City of Ryde
gunav@ryde.nsw.gov.au

From: Daniel Hoogesteger [mailto:mail@gjsparks.com.au]
Sent: Wednesday, 19 January 2011 3:39 PM
To: Guna Veerasingham
Subject: [Fwd: FW: RE: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. ATTACHMENT A (ref:D10/65930) [7666A]]

<!--[if mso 9]--> <!--[endif]--> Guna,

As per our discussion today on the phone, we are after confirmation that design of an osd system for this development taking post development flows back to pre-existing green field site flows for all storms would meet the requirements in attachment A as included in this email. Can you please confirm that this will satisfy the requirements of the attachment A to assist in mitigating the impact on down stream properties. The drains program would be used in the design of the osd systems and a drains file would accompany any later formal submission. Therefore if you can write back with confirmation in principal that this method of design and calculation would be acceptable by council in regard to helping with the issues in the stormwater system down stream from our site. If you have and questions please contact me in the office on 9891 5033.

Regards,

Daniel Hoogesteger

-------- Original Message --------
Subject:FW: RE: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. ATTACHMENT A (ref:D10/65930) [7666A]
Date: Tue, 18 Jan 2011 10:57:35 +1100
From: Graham Nicholas <Graham.Nicholas@nbrsap.com.au>
To:<mail@gjsparks.com.au>

<!--[if mso 9]--> <!--[endif]-->

Barrie further information for response to.

Regards,

Graham Nicholas
GENERAL MANAGER
NBRS+PARTNERS

From: David Kettle [mailto:DKettle@donfoxplanning.com.au]
Sent: Tuesday, 18 January 2011 9:33 AM
To: Graham Nicholas
Subject: FW: RE: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. ATTACHMENT A (ref:D10/65930) [7666A]

Graham,

Further to my email yesterday, please find attached Attachment A that forms part of Ryde Council's letter to DoP (for DGRs).

Attachment A has been specifically prepared in the context of Achieve Australia's site and will need to be addressed to tick of the DGR relating to flooding.

Regards

David Kettle | Senior Planner | Don Fox Planning
d : 02 9473 4912
m : 0410 004778

From: Peter McManus [mailto:Peter.McManus@planning.nsw.gov.au]
Sent: Tuesday, 18 January 2011 9:27 AM
To: David Kettle
Subject: Fwd: RE: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. ATTACHMENT A (ref:D10/65930)
Hi David,
Further to our discussions yesterday, please find attached a copy of 'Attachment A', as referred to within Council's submissions.
Regards,
Peter McManus I Senior Planner
Government Land & Social Projects
NSW Department of Planning
23-33 Bridge Street Sydney NSW 2000
GPO Box 39 Sydney 2001
Ph: 02 9228 6316

>>> "Glenn Ford" <gFord@ryde.nsw.gov.au> 17/01/2011 5:00 pm >>>
Peter

Apologies for the absence of Attachment A. Herewith attached is a copy for the Department and Proponent. Please note that the position description of the "Contact person" is now Manager, Stormwater & Parks Assets. His name is Austin Morris.
During December 2010, I put the proponent's hydraulic consultant (Barry Smith) in touch with Council's drainage engineers to discuss preliminary designs etc..
Cheers
Glenn

From: Peter McManus [mailto:Peter.McManus@planning.nsw.gov.au]
Sent: Monday, 17 January 2011 12:39 PM
To: Glenn Ford
Subject: Re: ACHIEVE AUSTRALIA site - DGRs - Major Project Application MP10_0110. Request for provision of details of key issues andassessment requirements - D10/65930

Hi Glenn,
Further to Council's response (attached), the Proponent has recently raised a question with respect to the comments provided against the Drainage and Flooding Environmental Assessment Requirements, specifically where it makes reference to the background flooding/remediation information contained within 'Attachment A'. The response from Ryde Council received by the Department did not include 'Attachment A' which has been requested by the Proponent to assist in completing their Draft Environmental Assessment.
Should you have any questions or would like to discuss the above, please don't hesitate to contact me.
Regards,
Peter McManus I Senior Planner
Government Land & Social Projects
NSW Department of Planning
23-33 Bridge Street Sydney NSW 2000
GPO Box 39 Sydney 2001
Ph: 02 9228 6316

>>> "Glenn Ford" <gFord@ryde.nsw.gov.au> 18/10/2010 6:54 pm >>>
Peter
Please find attached a copy of the DGRs letter for ACHIEVE AUSTRALIA.
The letter has been cleared by the Group Manager and the signed copy will follow soon.
Cheers
Glenn

--
Regards,

Daniel Hoogesteger
(B.Eng/B.A/Dip.Eng.Prac)

Subject: RE: Redevelopment of Achieve Australia (Crowle Homes) site - Stormwater Drainage Infrastructure (MP10_0110)
From: "Guna Veerasingham" <gunav@ryde.nsw.gov.au>
Date: Tue, 4 Jan 2011 14:38:31 +1100
To: <mail@gjsparks.com.au>
CC: "Austin Morris" <AMorris@ryde.nsw.gov.au>, "Glen Quetcher" <Glen.Q@bucktonlysenko.com.au>

Hi Barrie,

I refer to your e-mail dated 14 December 2010 regarding proposed drainage works along Council's Roads.

City of Ryde has no objection to upgrade/extend Council's drainage system. The Council will assess in details after receiving the hydrology and hydraulic models, report and plans - during Pre DA and DA stages.

The Council does not possess any flood level information for the site.

Kind regards

Guna Veerasingham
Stormwater and Park Assets
City of Ryde
gunav@ryde.nsw.gov.au

From: G J Sparks [mailto:mail@gjsparks.com.au]
Sent: Tuesday, 14 December 2010 4:38 PM
To: Glenn Ford
Cc: Lexie Macdonald; Guna Veerasingham; 'Graham Nicholas'
Subject: Redevelopment of Crowle Home, 8 Junction Street, Ryde, Stormwater Draiange Infrastructure

Our Company has been commissioned to prepare Stormwater Management drawings for the proposed redevelopment at the above address.

To facilitate the planning two stormwater drawings have been prepared. The drawings indicate two drainage catchments, one draining to Porter Street south, the other draining to the corner of Belmore and Junction Streets.

The drawing background is a recent survey drawing of the site and indicates surface levels in AHD.

We are seeking an acceptance "in principle" for extended or augmented public infrastructure drainage to service the proposed buildings.

It is envisaged that On Site Detention (OSD) combined with rainwater harvesting tanks will be provided at ground level within each of the proposed building footprints.

Lastly, could you please provide advice in respect to any known flood heights in the general area of Belmore and Junction Street intersection.

Regards

Barrie Smith

G J Sparks and Partners Pty Ltd
PO Box 979
Parramatta NSW 2124
Tel: 9891 5033
Fax: 9891 3898

Intensity-Frequency-Duration Table

Location: 33.825S 151.100E NEAR.. Belmore St Ryde Issued: 17/1/2011

Rainfall intensity in mm/h for various durations and Average Recurrence Interval

	Average Recurrence Interval						
Duration	**1 YEAR**	**2 YEARS**	**5 YEARS**	**10 YEARS**	**20 YEARS**	**50 YEARS**	**100 YEARS**
5Mins	90.9	116	146	163	186	215	238
6Mins	85.2	109	137	153	174	202	223
10Mins	69.7	89.2	113	126	144	167	184
20Mins	51.0	65.3	82.7	92.7	106	123	136
30Mins	41.5	53.2	67.6	75.8	86.7	101	112
1Hr	28.2	36.2	46.3	52.0	59.7	69.7	77.2
2Hrs	18.5	23.8	30.7	34.7	40.0	46.9	52.1
3Hrs	14.3	18.5	24.0	27.2	31.4	36.9	41.1
6Hrs	9.20	11.9	15.7	17.9	20.7	24.5	27.4
12Hrs	5.96	7.76	10.3	11.8	13.7	16.3	18.3
24Hrs	3.90	5.09	6.77	7.77	9.08	10.8	12.1
48Hrs	2.51	3.28	4.38	5.02	5.87	7.01	7.87
72Hrs	1.88	2.46	3.29	3.79	4.43	5.29	5.95

(Raw data: 36.32, 7.75, 2.46, 69.78, 16.3, 5.29, skew=0.00, F2=4.3, F50=15.85)

DRAINS results prepared 22 December, 2010 from Version 2010.06

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	9.15		0.08				
N2	8.95		0				
N3	9.14		0.08				
N5	5.49		0				
N9	9.13		0.07				
N11	8.93		0				
N16	9.12		0.06				
N20	5.48		0				
N22	9.11		0.05				
N23	8.91		0				
N25	9.1		0.04				
N29	5.47		0				

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
block A	0.08	0	0.08	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block A - D	0.08	0.08	0	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block B	0.07	0	0.07	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block B - D	0.06	0.06	0	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block C	0.05	0	0.05	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block C - D	0.04	0.04	0	5	5		5 AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.36 impervious + 0.36 pervious = 0.73 total ha)

Storm	Total Rainf	Total Runo	Impervious cu.m (Run	Pervious cu.m (Runoff %)
	cu.m	cu.m (Run		
AR&R 100	143.99	108.89 (75.5	53.85 (74.8	55.05 (76.5%)
AR&R 50 y	130.07	95.03 (73.1	46.89 (72.1	48.14 (74.0%)
AR&R 20 y	112.53	77.57 (68.9	38.11 (67.7	39.46 (70.1%)
AR&R 10 y	98.61	63.75 (64.6	31.16 (63.2	32.59 (66.1%)
AR&R 5 ye	88.33	53.55 (60.6	26.02 (58.9	27.53 (62.3%)

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
Pipe1	0.08	2	9.15	8.95	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Pipe5	0.08	2	9.14	9.04	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Pipe6	0.04	1.8	5.59	5.49	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P12	0.07	2	9.13	8.93	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P14	0.06	1.9	9.12	9.02	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P31	0.03	1.7	5.58	5.48	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P18	0.05	1.9	9.11	8.91	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P20	0.04	1.8	9.1	9	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P34	0.03	1.6	5.57	5.47	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

CHANNEL DETAILS

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

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD A	6.01	11	0.04	0.04	0
OSD B	5.91	8.9	0.03	0.03	0
OSD C	5.82	6.9	0.03	0.03	0

CONTINUITY CHECK for AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Ch (cu.m)	Difference %
N1	23.2	23.2	0	0
N2	23.2	23.2	0	0
N3	22.69	22.69	0	0
OSD A	22.69	22.47	0.22	0
N5	22.47	22.47	0	0
N9	18.2	18.2	0	0
N11	18.2	18.2	0	0
N16	17.8	17.8	0	0
OSD B	17.8	17.47	0.33	0
N20	17.47	17.47	0	0
N22	13.65	13.65	0	0
N23	13.65	13.65	0	0
N25	13.35	13.35	0	0
OSD C	13.35	12.91	0.44	0
N29	12.91	12.91	0	0

DRAINS results prepared 22 December, 2010 from Version 2010.06

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N1	9.11		0.05				
N2	8.91		0				
N3	9.1		0.04				
N5	5.47		0				
N9	9.14		0.08				
N11	8.94		0				
N16	9.13		0.07				
N20	5.49		0				
N22	9.09		0.03				
N23	8.89		0				
N25	9.08		0.03				
N29	5.46		0				
N67	9.04		0.01				
N69	8.84		0				
N72	9.04		0.01				
N76	5.42		0				

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
block D	0.05	0	0.05	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block D - C	0.04	0.04	0	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block E	0.08	0	0.08	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block E - D	0.07	0.07	0	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block F	0.03	0	0.03	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Block F - D	0.03	0.03	0	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Carpark	0.01	0	0.01	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
carpark - d	0.01	0.01	0	5	5	5	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

Outflow Volumes for Total Catchment (0.30 impervious + 0.30 pervious = 0.61 total ha)

Storm	Total Rainf cu.m	Total Runo cu.m (Run	Impervious cu.m (Run	Pervious Runoff cu.m (Runoff %)
AR&R 100	120.19	90.89 (75.6	44.95 (74.6	45.95 (76.5%)
AR&R 50 y	108.58	79.32 (73.1	39.14 (72.1	40.18 (74.0%)
AR&R 20 y	93.93	64.75 (68.9	31.81 (67.7	32.93 (70.1%)
AR&R 10 y	82.32	53.21 (64.6	26.01 (63.2	27.20 (66.1%)
AR&R 5 ye	73.73	44.70 (60.6	21.72 (58.9	22.98 (62.3%)

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
Pipe1	0.05	1.9	9.11	8.91	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Pipe5	0.04	1.8	9.1	9	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
Pipe6	0.03	1.6	5.57	5.47	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P12	0.08	2	9.14	8.94	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P14	0.07	2	9.13	9.03	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P31	0.04	1.8	5.59	5.49	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P18	0.03	1.8	9.09	8.89	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P20	0.03	1.7	9.08	8.98	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P34	0.02	1.4	5.56	5.46	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P36	0.01	0.8	9.04	8.84	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P38	0.01	0.8	9.04	8.94	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1
P40	0	1	5.52	5.42	AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

CHANNEL DETAILS

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

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD D	5.82	6.9	0.03	0.03	0
OSD E	5.98	10.2	0.04	0.04	0
OSD F	5.73	5	0.02	0.02	0
carpark	5.57	0.8	0	0	0

CONTINUITY CHECK for AR&R 100 year, 5 minutes storm, average 238 mm/h, Zone 1

Node	Inflow (cu.m)	Outflow (cu.m)	Storage Ch (cu.m)	Difference %
N1	13.65	13.65	0	0
N2	13.65	13.65	0	0
N3	13.35	13.35	0	0
OSD D	13.35	12.91	0.44	0
N5	12.91	12.91	0	0
N9	21.23	21.23	0	0
N11	21.23	21.23	0	0
N16	20.77	20.77	0	0
OSD E	20.77	20.49	0.28	0
N20	20.49	20.49	0	0
N22	9.55	9.55	0	0
N23	9.55	9.55	0	0
N25	9.34	9.34	0	0
OSD F	9.34	8.85	0.49	0
N29	8.85	8.85	0	0
N67	1.52	1.52	0	0
N69	1.52	1.52	0	0
N72	1.48	1.48	0	0
carpark	1.48	1.25	0.23	0
N76	1.25	1.25	0	0

PIT / NODE DETAILS Version 9

Name	Type	Family	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
N1	Node					10			0	52	-18		2	
N2	Node					10			0	155	-34		3	
N3	Node					10			0	268	-9		9	
N5	Node					10			0	425	-34		11	
N9	Node					10			0	55	-132		23	
N11	Node					10			0	160	-147		27	
N16	Node					10			0	268	-141		35	
N20	Node					10			0	432	-168		43	
N22	Node					10			0	52	-262		46	
N23	Node					10			0	155	-277		51	
N25	Node					10			0	268	-281		55	
N29	Node					10			0	428	-308		63	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length
OSD A	5.5	20	0	Orifice		180	5.6			341	-27	No		10
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												
OSD B	5.5	20	0	Orifice		170	5.6			342	-161	No		102
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												
OSD C	5.5	20	0	Orifice		160	5.6			342	-303	No		108
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												

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
block A	N1	0.15	0	100	0	5	5	5											0		
Block A - D	N3	0.15	100	0	0	5	5	5											0		
Block B	N9	0.12	0	100	0	5	5	5											0		
Block B - D	N16	0.12	100	0	0	5	5	5											0		
Block C	N22	0.09	0	100	0	5	5	5											0		
Block C - D	N25	0.09	100	0	0	5	5	5											0		

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)
Pipe1	N1	N2	20	9	8.8	1	uPVC, not i	375	386	0.03	New		1 N1		0				
Pipe5	N3	OSD A	10	9	8.9	1	uPVC, not i	375	386	0.03	New/Fixed		1 N3		0				
Pipe6	OSD A	N5	10	5.5	5.4	1	FRC Class	450	458	0.06	New/Fixed		1 OSD A		0				
P12	N9	N11	20	9	8.8	1	uPVC, not i	375	386	0.03	New		1 N9		0				
P14	N16	OSD B	10	9	8.9	1	uPVC, not i	375	386	0.03	New/Fixed		1 N16		0				
P31	OSD B	N20	10	5.5	5.4	1	FRC Class	450	458	0.06	New/Fixed		1 OSD B		0				
P18	N22	N23	20	9	8.8	1	uPVC, not i	375	386	0.03	New		1 N22		0				
P20	N25	OSD C	10	9	8.9	1	uPVC, not i	375	386	0.03	New/Fixed		1 N25		0				
P34	OSD C	N29	10	5.5	5.4	1	FRC Class	450	456	0.06	New/Fixed		1 OSD C		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	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

PIT / NODE DETAILS Version 9

Name	Type	Family	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
N1	Node					10			0	52	-18		2	
N2	Node					10			0	155	-34		3	
N3	Node					10			0	268	-9		9	
N5	Node					10			0	425	-34		11	
N9	Node					10			0	55	-132		23	
N11	Node					10			0	160	-147		27	
N16	Node					10			0	268	-141		35	
N20	Node					10			0	432	-168		43	
N22	Node					10			0	52	-262		46	
N23	Node					10			0	155	-277		51	
N25	Node					10			0	266	-281		55	
N29	Node					10			0	428	-308		63	
N67	Node					10			0	53	-376		125	
N69	Node					10			0	156	-392		129	
N72	Node					10			0	262	-394		135	
N76	Node					10			0	422	-419		143	

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Init Vol. (cu	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Lengid
OSD D	5.5	20	0	Orifice		160	5.6			341	-27	No		10
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												
OSD E	5.5	20	0	Orifice		175	5.6			342	-161	No		102
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												
OSD F	5.5	20	0	Orifice		155	5.6			342	-303	No		108
	6	20												
	6.5	20												
	7	20												
	7.5	20												
	8	20												
	8.5	20												
	8.9	20												
carpark	5.5	10	0	Orifice		160	5.6			337	-415	No		138
	6	10												
	6.5	10												
	7	10												
	7.5	10												
	8	10												
	8.5	10												
	8.9	10												

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
block D	N1	0.09	0	100	0	5	5	5											0		
Block D - C	N3	0.09	100	0	0	5	5	5											0		
Block E	N9	0.14	0	100	0	5	5	5											0		
Block E - D	N16	0.14	100	0	0	5	5	5											0		
Block F	N22	0.06	0	100	0	5	5	5											0		
Block F - D	N25	0.06	100	0	0	5	5	5											0		
Carpark	N67	0.01	0	100	0	5	5	5											0		
carpark - d	N72	0.01	100	0	0	5	5	5											0		

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)	RI (m)	Chg (m)	RL (m)	etc (m)
Pipe1	N1	N2	20	9	8.8		1 uPVC, not	375	386	0.03	New		1 N1		0				
Pipe5	N3	OSD D	10	9	8.9		1 uPVC, not	375	386	0.03	New/Fixed		1 N3		0				
Pipe6	OSD D	N5	10	5.5	5.4		1 FRC Class	450	456	0.06	New/Fixed		1 OSD D		0				
P12	N9	N11	20	9	8.8		1 uPVC, not	375	386	0.03	New		1 N9		0				
P14	N16	OSD E	10	9	8.9		1 uPVC, not	375	386	0.03	New/Fixed		1 N16		0				
P31	OSD E	N20	10	5.5	5.4		1 FRC Class	450	456	0.06	New/Fixed		1 OSD E		0				
P18	N22	N23	20	9	8.8		1 uPVC, not	375	386	0.03	New		1 N22		0				
P20	N25	OSD F	10	9	8.9		1 uPVC, not	375	386	0.03	New/Fixed		1 N25		0				
P34	OSD F	N29	10	5.5	5.4		1 FRC Class	450	456	0.06	New/Fixed		1 OSD F		0				
P36	N67	N69	20	9	8.8		1 uPVC, not	375	386	0.03	New		1 N67		0				
P38	N72	carpark	10	9	8.9		1 uPVC, not	375	386	0.03	New/Fixed		1 N72		0				
P40	carpark	N76	10	5.5	5.4		1 FRC Class	450	456	0.06	New/Fixed		1 carpark		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (m)	Chg (m)	Bottom Elev (m)	Height of S (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

APPENDIX 2

SEWER AND WATERMAINS ATTACHMENTS

1. Email from Sydney Water Co-ordinator regarding augmentation and extension of sewer and watermains to serve the property.

2. Sydney Water Corporation House Drainage (sewer) diagram for existing buildings on the site.

G J Sparks

From: Judy Massingham [judy.massingham@brownconsulting.com.au]
Sent: Friday, 17 December 2010 4:11 PM
To: Barrie Smith
Subject: 72 Belmore Street, Ryde - Amended requirements

Barrie,

We have investigated Sydney Water records of sewers and water mains adjacent to the above site and found that, although the site does not have frontage to appropriately sized mains for the proposed development, suitably sized mains are not too far away and could be extended to serve the site.

On the basis that the site will be developed as one parcel (ie not subdivided into separate lots) these extensions would comprise approximately 60 metres of DN225 sewer in Porter Street, 30 metres of DN225 sewer in Belmore Street and 30 metres of DN150 water main in Belmore Street. Any subdivision of the land would simply increase these lengths.

The extensions to serve the site would be carried out as part of the requirements for a Section 73 Certificate to be obtained after consent is received. Our fees to act as Water Servicing Coordinator for the Section 73 process including application ,design and Project Management of the required works would be in the order of $17,000 plus GST.

Judy Massingham | Assistant Water Servicing Coordinator
Brown Consulting (NSW) Pty Ltd
Level 2, 2 Burbank Place, Norwest Business Park, Baulkham Hills, NSW 2153
PO Box 8300, Baulkham Hills BC, NSW, 2153
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W www.brownconsulting.com.au

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diagram of sanitary drainage.

SYMBOLS AND ABBREVIATIONS

B	Boundary Trap	R.V.	Reflux Valve	I.P.	Induct Pipe	Bsn.	Basin
P	Pit	C.E.	Cleaning Eye	M.F.	Mica Flap	Shr.	Shower
G.I.	Grease Interceptor	oVert.	Vertical Pipe	T.	Tubs	W.I.P.	Wrought Iron P
G	Gully	oV.P.	Vent. Pipe	K.S.	Kitchen Sink	C.I.P.	Cast Iron P
P.T.	P. Trap	oSV.P.	Soil Vent. Pipe	W.C.	Water Closet	F.W.	Floor Well
R.S.	Reflux Sink	D.C.C.	Down Cast Cowl	B.W.	Bath Waste		

Existing drainage shown by black lines. Scale : 40 feet to an inch ~~New drainage shown by full li~~

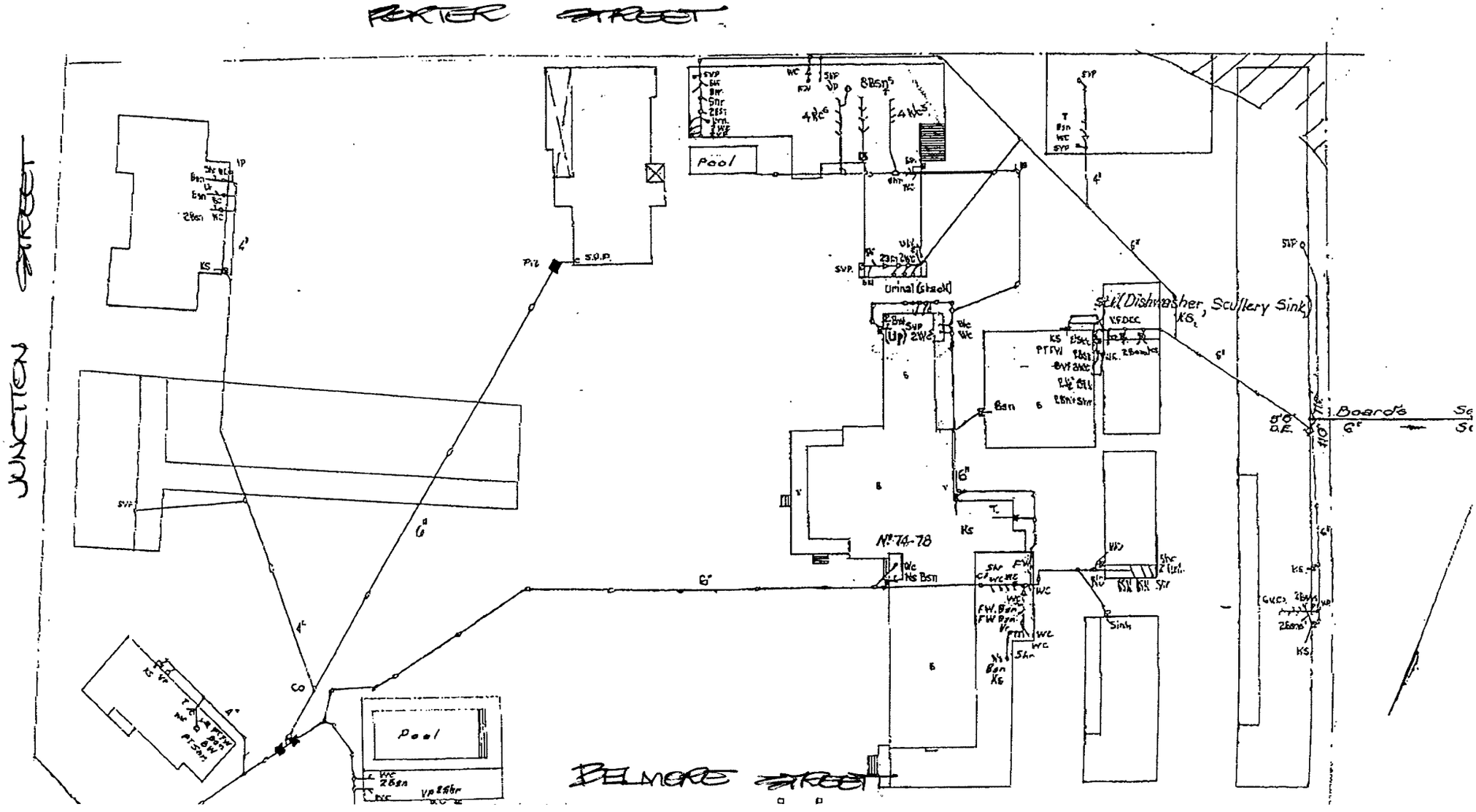
~~This diagram is the property of the Proprietor and is to be returned to him on completion of the work.~~

Certificates for drainage and sanitary plumbing may be obtained on application at the office of the Drainer or Plumber concerned.

~~The Board accepts no responsibility for the suitability of the diagram in relation to the eventual position of the Sew~~
~~When the sewer becomes available it will be necessary to apply for a revised diagram.~~

This work must be carried out in accordance with the Board's By-laws and Regulation
(4" dia. pipes may be used in lieu of 6" dia. pipes as shown on this diagram if the property owner so desir
that the relative levels of the sewer and house fixtures will permit of the pipes being laid with regulat
and cover. For further information consult Board's Inspector)

This work will be tested from .....



APPENDIX 3

SITE UTILITIES INFRASTRUCTURE

1. Sewer Mains	Drawing H-03
2. Watermains	Drawing H-04
3. Natural Gas Mains	Drawing H-05

BELMORE STREET

SMH
S
DN 150 SGW Sewer
IL 2.44
SMH
DN 150 SGW
IL 2.39
EX SYDNEY WATER SEWER MAIN

BLOCK A
BUILT
Area = 1530 m²

TELLARAGA HOUSE

BLOCK F
BUILT
Area = 630 m²

BLOCK B
BUILT
Area = 1200 m²

DN 150 SGW Sewer
IL 21.52
SMH
DN 150 SGW Sewer
IL 21.42
SMH

150 SGW Sewer
SMH
EX SYDNEY WATER SEWER MAIN

BLOCK E
BUILT
Area = 1400 m²

BLOCK D
BUILT
Area = 900 m²

BLOCK C
BUILT
Area = 900 m²

JUNCTION STREET

CAR ENTRY
AREA=100m²

PORTER STREET

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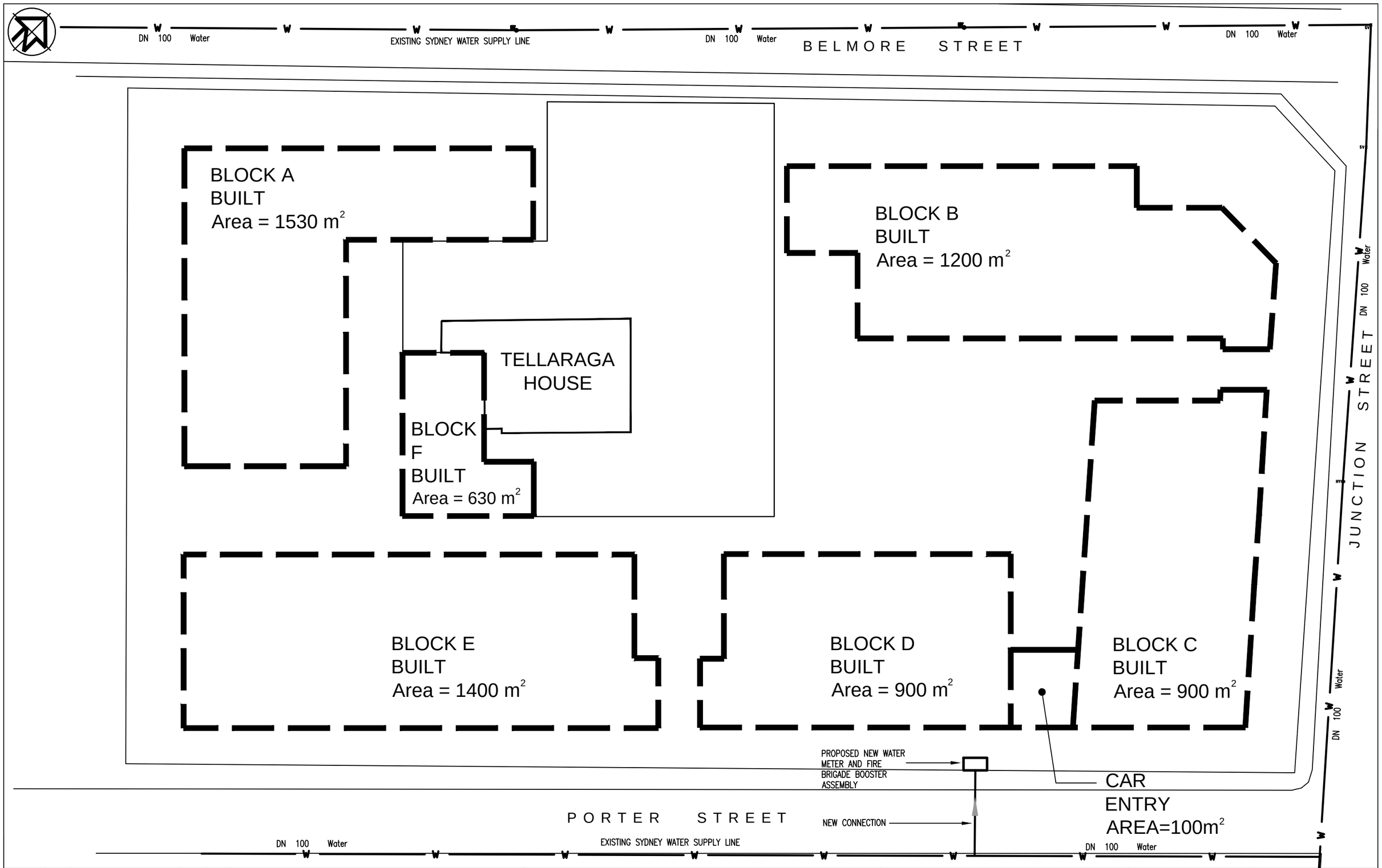
PROJECT CROWLE GARDENS
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY BS DATE 04.02.11
CHECKED BY BS DATE 04.02.11

TITLE
SEWER DRAINAGE CONCEPT SITE PLAN

SCALE 1:500 @ A3
DRAWN BY GM
DATE FEB 2011
JOB NO 10344
DRAWING No. H-03
No. IN SET
ISSUE P2



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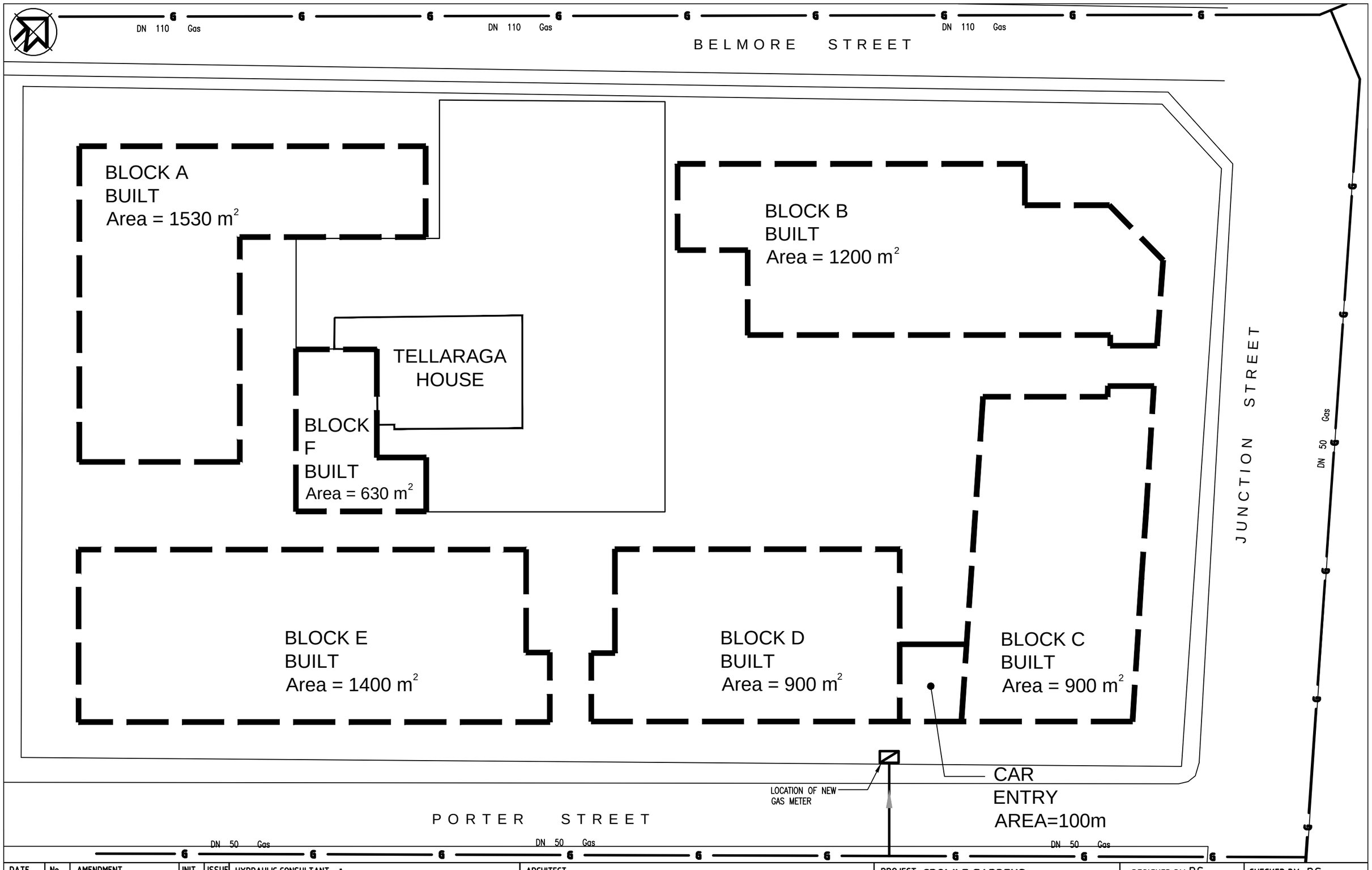
PROJECT **CROWLE GARDENS**
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY BS DATE 04.02.11
CHECKED BY BS DATE 04.02.11

TITLE
WATER SERVICES CONCEPT SITE PLAN

SCALE	DRAWN BY	DATE
1:500 @ A3	GM	FEB 2011

JOB NO	DRAWING No.	No. IN SET	ISSUE
10344	H-04		P3



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PROJECT **CROWLE GARDENS**
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY BS DATE 04.02.11

CHECKED BY BS DATE 04.02.11

TITLE
NATURAL GAS SERVICES CONCEPT SITE PLAN

SCALE	DRAWN BY	DATE
1:500 @ A3	GM	FEB 2011

JOB NO	DRAWING No.	No. IN SET	ISSUE
10344	H-05		P3

APPENDIX 4

NATURAL GAS MAINS

Jemena correspondence relating to availability and adequate capacity of existing Natural Gas mains.

G J Sparks

From: Knight, Gregory [Greg.Knight@jemena.com.au]
Sent: Thursday, 20 January 2011 1:34 PM
To: G J Sparks
Subject: RE: Crowle Gardens, 76 Belmore Street, Ryde - Amended email
Attachments: Crowie Gardens, 76 Belmore Street Ryde.pdf

Barrie,

Please find attached my formal response to your request

regards

Greg Knight
Network Development Manager
Central Coast and Hunter

thenaturalchoice.com.au

Jemena Gas Networks (NSW) Limited
Postal Address PO Box 8212 Tumbi Umbi NSW 2261
Mobile 0402 060 241 Fax (02) 4389 8619 Email greg.knight@jemena.com.au

Natural Gas. *The Natural Choice.*

Connect Direct

From: G J Sparks [mailto:mail@gjsparks.com.au]
Sent: Wednesday, 19 January 2011 1:42 PM
To: Knight, Gregory
Subject: RE: Crowle Gardens, 76 Belmore Street, Ryde - Amended email

Greg,

The letter is required by NSW Planning who are processing Part 4A Development Application.

Regards

Garey Sparks

From: Knight, Gregory [mailto:Greg.Knight@jemena.com.au]
Sent: Wednesday, 19 January 2011 11:43 AM
To: G J Sparks
Subject: RE: Crowle Gardens, 76 Belmore Street, Ryde - Amended email

Barry,

Is this letter required by Council as part of DA consent?

regards

Greg Knight
Network Development Manager
Central Coast and Hunter

thenaturalchoice.com.au

Jemena Gas Networks (NSW) Limited
Postal Address PO Box 8212 Tumbi Umbi NSW 2261
Mobile 0402 060 241 Fax (02) 4389 8619 email greg.knight@jemena.com.au

Natural Gas. *The Natural Choice.*

Connect Direct

From: G J Sparks [mailto:mail@gjsparks.com.au]
Sent: Tuesday, 18 January 2011 3:43 PM
To: Knight, Gregory
Subject: Crowle Gardens, 76 Belmore Street, Ryde - Amended email

From: G J Sparks [mailto:mail@gjsparks.com.au]
Sent: Tuesday, 18 January 2011 3:30 PM
To: greg.knight@jemena.com.au
Subject: Crowle Gardens, 76 Belmore Street, ryde

Greg,

The above property is subject to replanning and an application to NSW Planning for several residential home unit buildings.

Natural gas is currently being supplied to buildings on the site.

Attached are site plan drawings indicating the footprint of proposed development and a natural gas mains drawing which was obtained from Jemena.

Below is a schedule of home units.

Tellaraga House is an existing historically classified building that will be retained on the site.

Also below is a schedule of home units and anticipated population prepared by the architects.

Unit Types	Unit Numbers	Car Numbers					
		Ryde Council Compliance		RTA Compliance		Recommended	
1 Bed	260	1.0/dwelling	260	.6/dwelling	156	1.0/dwelling	260
2 Bed	110	1.4/dwelling	154	.9/dwelling	99	1.0/dwelling	110
3 Bed(probably the penthouses)	20	1.6/dwelling	32	1.4/dwelling	28	2/dwelling	40
Visitors	-	1/4dwellings	98	1/5dwellings	78	1/5dwellings	78
	390		544		361		488

We wish to request a statement on letterhead stating that each of the proposed buildings can be supplied with natural gas and that the natural gas mains in Belmore, Junction and Porter Streets are adequate to carry the required gas loads.

Natural Gas. The Natural Choice.

20/01/2011

GJ Sparks & Partners
P.O.Box 979
Parramatta, N.S.W.
2124

Att: Mr. Barrie Smith

Dear Sir:

RE: PROPOSED DEVELOPMENT OF CROWIE GARDENS, 76 BELMORE STREET RYDE.

Natural Gas is available in the vicinity to supply this development.

Our mains are installed in the allocated space within the footpath area adjacent to the proposed development and have sufficient capacity to supply the proposal.

Caution should be exercised when carrying out any road works that may expose the Natural Gas mains existing at this location. For excavation security you should call 1100 before commencement of any earth works to verify Utility locations.

To arrange a connection offer for the site please contact Neale Hilton on 0402 060 151 once the development has been approved and final load configurations are known.

Thank you for your inquiry. If further information or assistance is required, please do not hesitate to contact me on 0402 060 241.

Yours faithfully,

Greg Knight

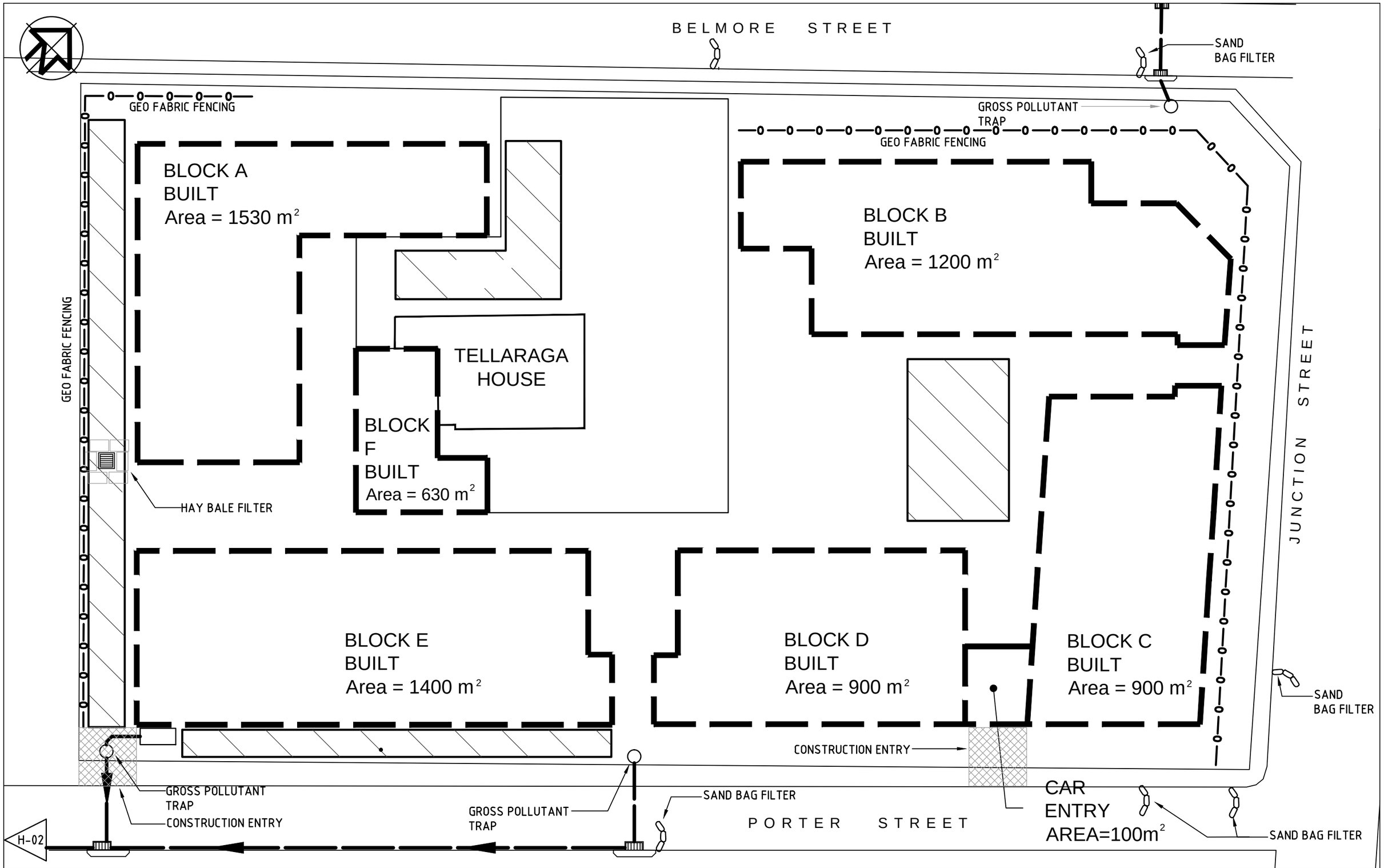
Greg Knight
Network Development Manager

Jemena Gas Networks (NSW) Ltd
ABN 87 003 004 322 PO Box 8212 Tumbi Umbi NSW 2261 Telephone 0402 060 241 Facsimile (02) 4389 8619 www.thenaturalchoice.com.au

APPENDIX 5

SEDIMENT AND EROSION CONTROL DURING CONSTRUCTION ACTIVITIES

1. Erosion and Sediment Control – Site Plan Drawing No ES-01
2. Erosion and Sediment Control – Detail Sheet Drawing No ES-02



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PROJECT **CROWLE GARDENS**
76 BELMORE ST, RYDE NSW 2112

DESIGNED BY BS DATE 04.02.11

CHECKED BY BS DATE 04.02.11

TITLE
EROSION & SEDIMENT CONTROL-SITE PLAN

SCALE	DRAWN BY	DATE
1:500 @ A3	GM	FEB 2011

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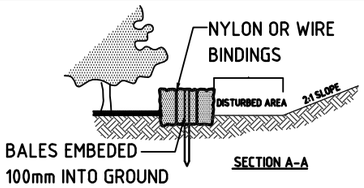
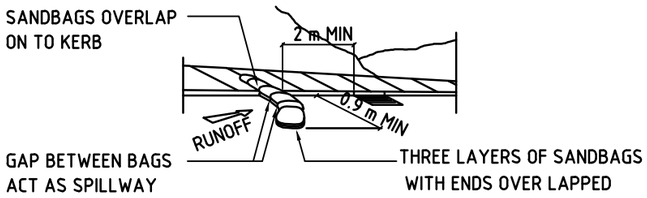


Construction Notes

1. CONSTRUCT STRAW BALE FILTER AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AT THE TOE OF A SLOPE
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS TO BE PLACED PARALLEL TO GROUND.
3. MAXIMUM HEIGHT OF FILTER IS ONE BALE.
4. ON SOFT MATERIALS, EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS. ANGLE THE FIRST STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BALE. DRIVE STAKES 600mm INTO THE GROUND AND FLUSH WITH THE TOP OF THE BALES.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWNSLOPE FROM A DISTURBED BATTER THE BALES SHOULD BE LOCATED 1.5 TO 2 METRES DOWNSLOPE FROM THE TOE OF THE BATTER.

STRAW BALE FILTER

NOT TO SCALE

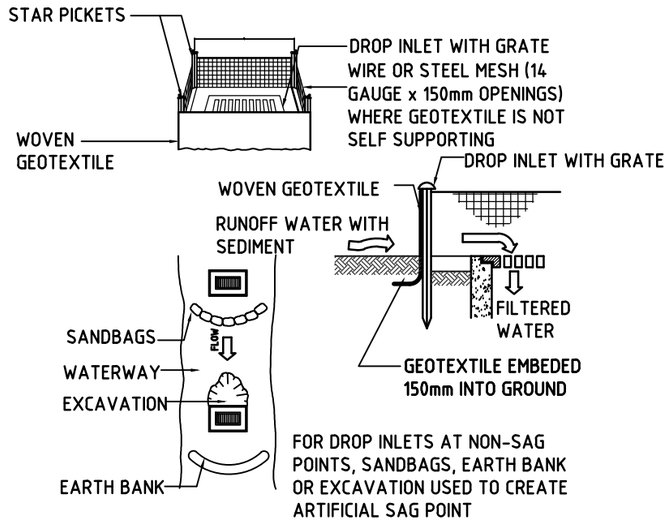


SANDBAG KERB INLET SEDIMENT TRAP

NOT TO SCALE

EROSION & SEDIMENT CONTROL

1. THIS PLAN SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ENGINEERING PLANS AND ANY OTHER PLANS OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED
2. THE CONTRACTOR SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS SHOWN ON THIS DRAWING.
3. PROTECT ALL NEW PITS FROM SEDIMENT INFILTRATION PROGRESSIVELY, AS THEY ARE CONSTRUCTED.
4. ALL DOWNSTREAM STORMWATER PITS ARE TO BE PROTECTED FROM SEDIMENT INFILTRATION DURING CONSTRUCTION.
5. ALL SUB-CONTRACTORS ON SITE SHALL BE MADE AWARE OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO WATER COURSES AND WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SIDE SHALL BE KEPT AS LOW AS POSSIBLE. TO ACHIEVE, WORKS SHOULD BE CARRIED OUT AS FOLLOWS.
6. 1) INSTALL ANY NECESSARY SECURITY/BOUNDARY FENCES FOR THE SITE.
   2) CONSTRUCT 'SILT' FENCING AS DETAILED ALONG BOTH DOWNSLOPE BOUNDARIES.
7. DURING WINDY WEATHER, LARGE UNPROTECTED AREAS SHALL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.

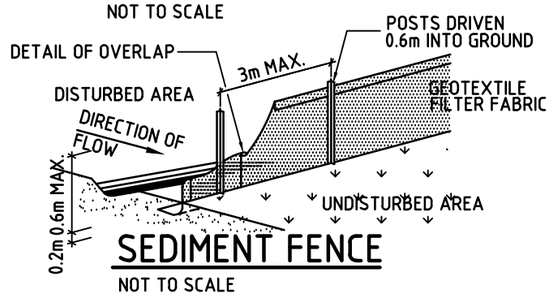


CONSTRUCTION NOTES -

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1 METRE CENTRES.
3. DO NOT COVER INLET GEOTEXTILE

GEOTEXTILE INLET FILTER

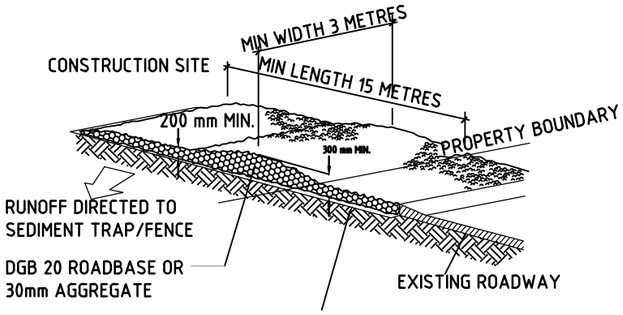
NOT TO SCALE



SEDIMENT FENCE

NOT TO SCALE

8. FINAL SITE LANDSCAPING SHALL BE UNDERTAKEN AS SOON AS POSSIBLE, AND WITHIN TWENTY WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.
9. SAND USED IN THE CONCRETE CURING PROCESS SHALL BE REMOVED ASAP, AND WITHIN TEN WORKING DAYS FROM PLACEMENT.
10. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM, UNLESS IT IS RELATIVELY SEDIMENT-FREE: ie, THE CATCHMENT AREA HAS BEEN LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
11. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.
12. THE CONTRACTOR SHALL PROVIDE ACCEPTABLE RECEPTORS FOR CONCRETE & MORTAR SLURRIES, PAINTS, ACID WASHINGS. LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE SITE SUPERINTENDENT.



GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS.

GEOTEXTILE MAY BE A WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) 2500N

CONSTRUCTION NOTES

1. STRIP TOPSOIL AND LEVEL SITE
2. COMPACT SUBGRADE
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROADBASE OR
5. 30mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
   CONSTRUCT HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

STABILISED SITE ACCESS

NOT TO SCALE

14. EVERY WEEK, FOR THE DURATION OF WORKS THE CONTRACTOR SHALL INSPECT THE SITE FOR THE FOLLOWING ITEMS:
- ENSURE DRAINS OPERATE EFFECTIVELY, AND INITIATE REPAIR OR MAINTENANCE AS REQUIRED.
- REMOVE SPILLED SAND (OR OTHER MATERIALS) FROM HAZARD AREAS, INCLUDING LANDS CLOSER THAN 2 METRES FROM AREAS OF CONCENTRATED OR HIGH-VELOCITY FLOWS SUCH AS WATERCOURSES, OVERLAND FLOW PATHS, GUTTERS, PAVED AREAS, DRIVEWAYS AND ROADS.

15. CONSTRUCT ADDITIONAL EROSION AND/OR SEDIMENT WORKS IS NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS, ie: MAKE ONGOING CHANGES TO THE PLAN.
16. MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES IN A FUNCTIONING CONDITION UNTIL ALL EARTHWORK ACTIVITIES ARE COMPLETED AND THE SITE REHABILITATED.
17. REMOVE TEMPORARY SOIL CONSERVATION STRUCTURES AS A LAST ACTIVITY IN THE REHABILITATION PROGRAM.
18. THE CONTRACTOR SHALL KEEP A LOG BOOK, MAKING ENTRIES AT LEAST WEEKLY, AND AFTER RAINFALL AND/OR SITE CLOSURE.

RECORD:- 1) THE VOLUME OF ANY RAINFALL EVENTS (CHECK WEATHER BUREAU)
2) THE CONDITION OF ANY SOIL AND WATER MANAGEMENT WORKS
3) REMEDIAL WORKS

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DESIGNED BY BS DATE 04.02.11
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EROSION & SEDIMENT CONTROL-DETAIL SHEET

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