

PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN SERVICES

25 June 2014

The General Manager
Pittwater Council
PO Box 882
MONA VALE NSW 1660

Dear Sir/Madam,

6-14 MACPHERSON STREET WARRIEWOOD
LOTS 1, 2, 3, 4 & 5 DP 1161389
DEVELOPMENT APPLICATION NO: N0267/13
CONSTRUCTION CERTIFICATE NO: 142440
DATE OF DETERMINATION: 25/06/14

As required by clause 142(2) of the EP&A Regulations 2000 notice is hereby given of the determination of the following application:

- Construction Certificate No. CC 142440

Please also find enclosed a cheque for Council's registration fee plus the following documentation:

- Copy of application for Construction Certificate.
- Documentation used to determine the application for the Construction Certificate as detailed in Schedule 1 of the certificate.
- Notice of Appointment of Principal Certifying Authority.

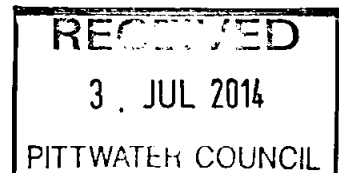
Our client has been advised of the necessity to submit to Council the notice of commencement of building works 48 hours prior to the commencement of works.

Should you need to discuss any issues, please do not hesitate to contact the Project Building Surveyor Brendan Bennett on 8270-3500.

Yours faithfully


Brendan Bennett
Managing Director

Encl



\$36 REC:362492 3/7/14.

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CONSTRUCTION CERTIFICATE NO. 142440

Issued under Section 81A(5) and Part 4A Sections 109C of the Environmental Planning and Assessment Act 1979

APPLICANT

Name of person having benefit of the development consent: **Peter Magnisalis - Anglican Retirement Villages (Diocese of Sydney)**

Address: **Level 2, 62 Norwest Boulevard, Baulkham Hills, NSW 2153**

Contact Details: **Phone: (02) 9421 5331 Fax: (02) 9421 2222**

DEVELOPMENT CONSENT

Consent Authority/Local Government Area:

Pittwater Council

Development Consent No:

N0267/13

Date of Development Consent:

20/02/14

PROPOSAL

Address of Development:

6-14 Macpherson Street Warriewood, NSW 2102

Lot & DP No:

Lots 1, 2, 3, 4 & 5 DP 1161389

Building Code of Australia Classification:

N/A

Type of Construction:

N/A

Scope of building works covered by this Notice:

Stage 1: Demolition, earthworks and Civil works.

Value of Construction Certificate (Incl GST):

\$2,791,439.00

Plans and Specifications approved:

Schedule 1

Fire Safety Schedule:

N/A

Critical Stage Inspections:

See attached Notice

Exclusions:

construction of a seniors housing development pursuant to SEPP (HSPD) 2004 consisting of 59 self-contained dwellings with a community building, bowling green, landscaping and carparking

Conditions (Clause 187 or 188 of the Environmental Planning & Assessment Regulation 2000):

Nil

Date of the Application for Construction Certificate:

12/06/14

Date Application Received:

12/06/14

PROJECT BUILDING SURVEYOR

Please contact **Brendan Bennett** for any inquiries

CERTIFYING AUTHORITY

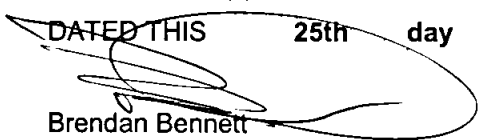
Brendan Bennett for and on behalf of
City Plan Services Pty Ltd

ACCREDITATION NUMBER

BPB 0027

That I, Brendan Bennett, as the certifying authority, certify that the work if completed in accordance with the plans and specifications identified in Schedule 1 (with such modifications verified by the certifying authority as may be shown on that documentation) will comply with the requirements of the Environmental Planning & Assessment Regulation 2000 as referred to in section 81A(5) of the Environmental Planning and Assessment Act 1979.

DATED THIS 25th day of June 2014


Brendan Bennett
Managing Director

NB: Prior to the commencement of work S81A(2)(b)(i) and (ii) and (b2)(i) and (ii) and (iii) and (c) of the Environment Planning and Assessment Act 1979 must be satisfied.

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SCHEDULE 1 APPROVED PLANS AND SPECIFICATIONS

1. Endorsed Architectural plans prepared by Henry & Hyams

Plan Title	Drawing No	Revision	Date
Bulk Earthworks Overall Plan	12693_CC_BE00	02	16/05/14
Bulk Earthworks Detail Plan Sheet 1 of 4	12693_CC_BE01	02	16/05/14
Bulk Earthworks Detail Plan Sheet 2 of 4	12693_CC_BE02	02	16/05/14
Bulk Earthworks Detail Plan Sheet 3 of 4	12693_CC_BE03	02	16/05/14
Bulk Earthworks Detail Plan Sheet 4 of 4	12693_CC_BE04	02	16/05/14
Bulk Earthworks Sections	12693_CC_BE05	02	16/05/14
Bulk Earthworks Details	12693_CC_BE06	02	16/05/14
Bulk Earthworks Over Excavation Plan	12693_CC_BE07	02	16/05/14
Cover Sheet, Drawing Schedule & Locality Sketch	12693_CC_C000	03	16/05/14
Notes Sheet	12693_CC_C010	01	16/05/14
General Arrangement Plan	12693_CC_C100	03	16/05/14
Detail Plan Sheet 1 of 4	12693_CC_C101	03	16/05/14
Detail Plan Sheet 2 of 4	12693_CC_C102	03	16/05/14
Detail Plan Sheet 3 of 4	12693_CC_C103	03	16/05/14
Detail Plan Sheet 4 of 4	12693_CC_C104	03	16/05/14
Typical Sections and Details	12693_CC_C110	04	16/05/14
Entry Driveway Grading and Section	12693_CC_C115	03	16/05/14
Loop Road Center Line Alignment Setout	12693_CC_C118	02	16/05/14
Road 1 Longitudinal Section and Section	12693_CC_C120	03	16/05/14
Site Sections	12693_CC_C130	03	16/05/14
Road Cross Sections Sheet 1 of 2	12693_CC_C140	02	16/05/14
Road Cross Sections Sheet 2 of 2	12693_CC_C141	02	16/05/14
Stormwater Miscellaneous Details	12693_CC_C200	03	16/05/14
Stormwater 360 Details	12693_CC_C201	03	16/05/14
Stormwater Longitudinal Sections 1:10 year ARI, Sheet 1 of 2	12693_CC_C210	03	16/05/14
Stormwater Longitudinal Sections 1:10 year ARI, Sheet 2 of 2	12693_CC_C211	03	16/05/14
Stormfilter Plan and Offtake Wier Sections	12693_CC_C220	02	16/05/14
Basin Sections	12693_CC_C221	02	16/05/14
Setout Detail Plan Sheet 1 of 4	12693_CC_C401	01	16/05/14
Setout Detail Plan Sheet 2 of 4	12693_CC_C402	01	16/05/14
Setout Detail Plan Sheet 3 of 4	12693_CC_C403	01	16/05/14
Setout Detail Plan Sheet 4 of 4	12693_CC_C404	01	16/05/14
Pavement Plan	12693_CC_C500	06	16/05/14
General Arrangement Services Plan	12693_CC_C800	02	16/05/14
Services Plan Sheet 1 of 4	12693_CC_C801	02	16/05/14
Services Plan Sheet 2 of 4	12693_CC_C802	03	16/05/14
Services Plan Sheet 3 of 4	12693_CC_C803	03	16/05/14
Services Plan Sheet 4 of 4	12693_CC_C804	03	16/05/14

2. Endorsed Electrical plans prepared by JHA Engineers

Plan Title	Drawing No	Revision	Date
Legend of Symbols, General Notes and Drawing List	E1000	B	02/06/14
Site Plan, Power, Comms & PayTV Reticulation Layout	E1001	B	02/06/14
Site Plan External Lighting Layout	E1002	B	02/06/14
Single Line Diagram and Details	E1003	C	21/05/14

3. Endorsed Hydraulic plans prepared by JHA Engineers

Plan Title	Drawing No	Revision	Date
Cover Sheet, Legend of Symbols, Drawing List, General Notes & Locality Plan	H000	D	30/05/14
Site Plan	H001	E	30/05/14
Detail Sheet	H002	D	30/05/14

4. Other documents relied upon

Title	Prepared By	Reference	Date
Construction Certificate Application	Peter Magnisalis - Anglican Retirement Villages (Diocese of Sydney)	-	12/06/14
Civil Design Certificate	H & H Consulting Engineers Pty Ltd	12693-C1/AF	16/05/14
Hydraulic Design Certificate	JHA Consulting Engineers	-	12/06/14
Water Management Report	H & H Consulting Engineers Pty Ltd	12693 Rev 2	May 2014
StormFilter Operations and Maintenance	Stormwater 360 Australia	-	-
Maintenance Plan	Enviropod & Wetland	12693	-
Controlled Activity Approval	Department of Primary Industries	10 ERM2013/0778	24/06/14

NOTICE TO APPLICANT OF CRITICAL STAGE INSPECTIONS

Made under Part 4 of the Environmental Planning and Assessment Act 1979 and Regulations 2000

PROPOSAL

Address of land on which the work is to be carried out: **6-14 Macpherson Street Warriewood NSW 2102**
Lot & DP Number: **Lots 1, 2, 3, 4 & 5 DP 1161389**
Description of building works covered by this Notice: **Stage 1: Demolition, earthworks and civil works.**

APPLICANT

Name of person having benefit of the development consent: **Peter Magnisalis - Anglican Retirement Villages (Diocese of Sydney)**
Address: **Level 2, 62 Norwest Boulevard, Baulkham Hills NSW 2153**
Contact Details: **Phone: (02) 9421 5331 Fax: (02) 9421 2222**

RELEVANT CONSENTS

Consent Authority: **Pittwater Council**
Development Consent No: **N0267/13**
Date of Development Consent: **20/02/14**
Construction Certificate No: **CC 142440**
Date of Construction Certificate: **25/06/14**

INSPECTION TELEPHONE NUMBER

Please telephone the following number to book a critical stage inspection: **Ph: 8270 3500**
A minimum period of 48 hours is to be provided

PRINCIPAL CERTIFYING AUTHORITY

**Brendan Bennett for and on behalf of
City Plan Services Pty Ltd**

ACCREDITATION NUMBER

BPB 0027

MANDATORY CRITICAL STAGE INSPECTIONS

That I, Brendan Bennett, of City Plan Services located at Level 1, 364 Kent Street, Sydney acting as the principal certifying authority hereby give notice in accordance with Section 81A(2)(b1)(ii) of the Environmental Planning and Assessment Act 1979 to the person having the benefit of the development consent that the mandatory critical stage inspections identified in Schedule 1 & Schedule 2 are to be carried out in respect of the building work.

The applicant, being the person having benefit of the development consent is required under Section 81A(2)(b2)(lii) of the Environmental Planning and Assessment Act 1979 to notify the principal contractor (if not an owner-builder) of the applicable mandatory critical stage inspections specified under this notice.

To allow a principal certifying authority or another certifying authority time to carry out mandatory critical stage inspections, the principal contractor for the building site, or the owner builder, must notify the principal certifying authority at least 48 hours before building work is commenced at the site if a mandatory critical stage inspection is required before the commencement of the work in accordance with Clause 163 of the Environmental Planning & Assessment Regulation 2000.

Failure to request a mandatory critical stage inspections will prohibit the principal certifying authority under with Section 109E(3)(d) of the Environmental Planning and Assessment Act 1979 to issue an occupation certificate.

DATED THIS **25th** day of **June** **2014**


Brendan Bennett
Managing Director



SCHEDULE 1
MANDATORY CRITICAL STAGE INSPECTIONS

NO.	CRITICAL STAGE INSPECTION	INSPECTOR
1.	After Excavation for, and prior to the placement of any footings	Certifying Authority
2.	Prior to pouring any in-situ reinforced concrete building element	Certifying Authority
3.	Prior to covering of the framework for any floor, wall, roof or other building element	Certifying Authority
4.	Prior to covering waterproofing in any wet areas	Certifying Authority
5.	Prior to covering any stormwater drainage connections	Certifying Authority
6.	After the building work has been completed & prior to any occupation certificate being issued in relation to the building	Principal Certifying Authority

SCHEDULE 2
OTHER MANDATORY INSPECTION SPECIFIED BY THE PRINCIPAL CERTIFYING AUTHORITY

NO.	OTHER CRITICAL STAGE INSPECTIONS	INSPECTOR
	None have been specified in this instance	N/A



NOTICE OF APPOINTMENT OF PRINCIPAL CERTIFYING AUTHORITY

Made under Part 4 of the Environmental Planning and Assessment Act 1979 Sections 81A(2)(b1)(i) & 86(1)(a1)(i)

NOTICE TO

**Pittwater Council
PO Box 882, Mona Vale, NSW 1660**

PROPOSAL

Address of land on which the work is to be carried out:

6-14 Macpherson Street Warriewood NSW 2102

Lot & DP Number:

Lots 1, 2, 3, 4 & 5 DP 1161389

Description of building works covered by this Notice:

Stage 1: Demolition, earthworks and civil works.

DETAILS OF THE PERSON APPOINTING PCA

Name of person having benefit of the development consent:

Peter Magnisalis - Anglican Retirement Villages (Diocese of Sydney)

Address:

Level 2, 62 Norwest Boulevard, Baulkham Hills NSW 2153

Contact Details:

Phone: (02) 9421 5331 Fax: (02) 9421 2222

The applicant has appointed Brendan Bennett as the Principal Certifying Authority as stated in the Construction Certificate Application lodged with City Plan Services for the building works identified in this Notice.

RELEVANT CONSENTS

Consent Authority:

Pittwater Council

Development Consent No:

N0267/13

Date of Development Consent:

20/02/14

Construction Certificate No:

CC 142440

Date of Construction Certificate:

25/06/14

PRINCIPAL CERTIFYING AUTHORITY

**Brendan Bennett for and on behalf of
City Plan Services Pty Ltd**

ACCREDITATION NUMBER

BPB 0027

That I, Brendan Bennett, of City Plan Services located at Level 1, 364 Kent Street, Sydney accept the appointment as the Principal Certifying Authority for the building works identified and covered under the relevant Construction Certificate as stated in this Notice.

DATED THIS 25th day of June 2014


**Brendan Bennett
Managing Director**

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Received
12 JUN 2014

CONSTRUCTION CERTIFICATE APPLICATION

Made under the *Environmental Planning and Assessment Act 1979* Section 109C(1)(b) & Section 139 of Regulations 2000

Information for the applicant

- This form may be used to apply for a construction certificate to carry out building work or subdivision work.
- To minimise delay in receiving a decision about the application, please fill in all sections and ensure all relevant information and documents are provided.
- A construction certificate has no effect if it is issued after the building work or subdivision work to which it relates is physically commenced on the land to which the relevant development consent applies.

APPLICANT

Name of person having benefit of the development consent.*

Name Peter Magnisalis

Company Anglican Retirement Villages (Diocese of Sydney)

ABN Number (if applicable) 39 922 848 563

Address Level 2, 62 Norwest Boulevard

Suburb or town Baulkham Hills Postcode 2153

Telephone 02 9421 5331 Fax 02 9421 2222

Mobile 0412 186 333 Email Peter.Magnisalis@arv.org.au

**An application for a construction certificate may only be made by a person who has the benefit of the development consent. An application may not be made by the person who will carry out the building work or subdivision work unless that person owns the land on which the work is to be carried out.*

IDENTIFICATION OF BUILDING

Address 6-14 Macpherson Street

Lot No 3, 4 & 5

DP No 1161389

Suburb or town Warriewood Postcode 2102

DESCRIPTION OF DEVELOPMENT

Building or Subdivision Works:

Civil works comprising bulk earthworks, storm water, electrical and

hydraulic infrastructure, loop road and street lighting for a new

seniors housing development.

BUILDING CODE OF AUSTRALIA BUILDING CLASSIFICATION

Class(s) Not Applicable

VALUE OF WORK

Estimated Cost of Work:
(Including GST)

\$ 2,791,439

The contract price, or if there is no contract a genuine and accurate estimate, for all labour and material costs associated with all demolition and construction required for the development, including the cost of construction of any building and the preparation of a building for the purpose for which it is to be used (such as the costs of installing plant, fittings, fixtures and equipment).

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LEVEL 1364 KENT ST, SYDNEY NSW 2000 | TEL +61 2 8270 3500 | FAX +61 2 6270 3501 | WWW.CITYPLAN.COM.AU
CITY PLAN SERVICES P/L ABN 30 075 223 353
CITY PLAN STRATEGY & DEVELOPMENT P/L ABN 58 133 501 774
CITY PLAN HERITAGE P/L ABN 46 103 185 113
CITY PLAN URBAN DESIGN P/L ABN 41 107 317 206

DEVELOPMENT CONSENT

Provide electronic copies of:

- approved plans endorsed by the consent authority
- conditions of development consent
- other documents referenced by the development consent that are relevant to this application.

Consent Authority Pittwater Council
Development Consent No NO267/13
Date of Determination 20 February 2014
Name of Applicant on Development Consent ARV

PLANNING AGREEMENTS

Is the development or the land upon which the development is to be carried out subject to a planning agreement as referred to in section 93F EP&A Act?

☐ Yes ☒ No
If Yes - Provide:
A copy of the planning agreement.

ADDITIONAL REQUIREMENTS

- Schedule 1 must be completed and accompanied by information required to be submitted with the application for a construction certificate for proposed building works. Prepare and attach a list of all documents provided.
- Applications for construction certificates must be delivered by hand, by post or transmitted electronically to the principal office of the certifying authority. Applications MAY NOT be sent by fax.

Schedule 1 – Attachments relating to the proposed development.

Applicants must provide electronic copies of the documents listed below that are relevant to the type of development that is proposed. Please place a cross in the appropriate box(s) to indicate the type of development involved.

- FIRE LINK CONVERSION**
Does the application relate ONLY to Fire Link Conversion?
☐ Yes ☒ No
If Yes - provide:
A document that describes the design and construction and mode of operation of the new fire alarm communication link.
- SUBDIVISION WORK**
Does the development involve Subdivision Work?
☐ Yes ☒ No
If Yes - provide:
Appropriate subdivision work plans and specifications, which include copies of:
a) details of the existing and proposed subdivision pattern (including the number of lots and the location of roads)
b) details as to which public authorities have been consulted with as to the provision of utility services to the land concerned
c) detailed engineering plans as to the following matters:
i. earthworks
ii. roadworks
iii. road pavement
iv. road furnishings
v. stormwater drainage
vi. water supply works
vii. sewerage works
viii. landscaping works
ix. erosion control works
- BUILDINGS**
3.1 Does the development involve building work (including work in relation to a dwelling house or building or structure ancillary to a dwelling house?)
☐ Yes ☒ No
If Yes - provide:
1. A detailed description of the development by completing page 3 of the application form
2. Appropriate building work plans and specifications, which include copies of:
a) detailed plans drawn to a suitable scale and consisting of a block plan and a general plan, that show:
i. a plan of each floor section
ii. a plan of each elevation of the building
iii. the levels of the lowest floor and of any yard or unbuilt on area belonging to that floor and the levels of the adjacent ground
iv. the height, design, construction and provision for fire safety and fire resistance (if any)
b) specifications for the development:
i. that describe the construction and materials of which the building is to be built and the method of drainage, sewerage and water supply, and

- ii. that state whether the materials to be used are new or second-hand and (in the case of second-hand materials) give particulars of the materials to be used
- c) a statement as to how the performance requirements of the *Building Code of Australia* are to be complied with (if an alternative solution, to meet the performance requirements, is to be used)
- d) a description of any accredited building product or system sought to be relied on for the purposes of section 79C(4) of the *Environmental Planning and Assessment Act 1979* (EP&A Act)*
- e) copies of any compliance certificate to be relied on
- f) if the development involves building work to alter, expand or rebuild an existing building, a scaled plan of the existing building
- g) if a BASIX certificate has been obtained for the development, such other matters as the BASIX certificate requires to be included in the plans and specifications.

*S.79C(4) EP&A Act provides that a consent authority must not refuse to grant consent to development on the ground that any building product or system relating to the development does not comply with a requirement of the *Building Code of Australia* if the building product or system is accredited in respect of the requirement in accordance with the EP&A regulation 2000.

3.2 Does the development involve building work (other than work in relation to a dwelling-house or a building or structure that is ancillary to a dwelling-house or work that relates only to fire link conversion)?

☐ Yes

☒ No

If Yes - provide:

- a) A list of any existing fire safety measures provided in relation to the land or any existing building on the land.
- b) A list of the proposed fire safety measures to be provided in relation to the land and any building on the land as a consequence of the building work.

3.3 Does the building work (see note below) involve an alternative solution under the *Building Code of Australia* ("BCA") in respect of a fire safety requirement?

☐ Yes

☒ No

If Yes - Provide:

Either or both of the following from a "fire safety engineer" (a private accredited certifier holding Category C10 accreditation):

- a) A compliance certificate (as referred to in s.109C(1)(a)(v) EP&A Act) that certifies that the alternative solution complies with the relevant performance requirements of the BCA.
- b) A written report that includes a statement that the alternative solution complies with the relevant requirements of the BCA.

Note: The above requirement only applies to building work in respect of:

- a) a class 9a building that is proposed to have a total floor area of 2000 square metres or more
- b) any building (other than a class 9a building) that is proposed to have:
 - i. a fire compartment with a total floor area of more than 2000 square metres or
 - ii. a total floor area of more than 6000 square metres that involves an alternative solution under the BCA in respect of the requirements set out in EP1.4, EP2.1, DP4 and DP5 in Volume 1 of the BCA.

3.4 Does the application relate to a residential flat development for which the development application was required under Clause 50(1A) of the EP&A Regulation to be accompanied by a design verification from a qualified designer?

☐ Yes

☒ No

If Yes - Provide:

A statement from a qualified designer which verifies that the plans and specifications achieve or improve the design quality of the development for which development consent was granted, having regard to the design quality principles set out in Part 2 of State Environmental Planning Policy No. 65: Design Quality of Residential Flat Development (SEPP 65)

Note: If the development application was also required to be accompanied by a BASIX certificate with respect to any building, the statement need not verify the design quality principles set out in SEPP 65 to the extent to which they aim to

- reduce consumption of mains-supplied potable water, or reduce emissions of greenhouse gases, in the building or in the use of the land that it is built on, or
- improve the thermal performance of the building

3.5 Has the Fire Commissioner granted an exemption under clause 188 EP&A Regulation from compliance with any specified Category 3 fire safety provision?

☐ Yes

☒ No

If Yes - Provide:

A copy of the exemption together with any conditions imposed.

3.6 Is any long service payment levy payable under s.34 of the Building and Construction Industry Long Service Payments Act 1986?

☐ Yes

☒ No

If Yes - Provide:

A copy of a receipt for any long service payment levy that has been made (or, where such a levy is payable by instalments, a receipt for the first instalment of the levy).

3.7 Does the application involve a BASIX affect development or a BASIX optional development in respect of which the applicant has obtained a BASIX certificate?

☐ Yes

☒ No

If Yes - Provide:

The BASIX certificate(s) for the development (being either the BASIX certificate issued when the development consent was granted or some other BASIX certificate(s) that have been issued no earlier than three months before the date of the Application being made), and such other documents as the BASIX certificate(s) for the development requires to accompany the Application.

BASIX (the Building and Sustainability Index) ensures homes are built to be more energy and water efficient. BASIX uses an online program to assess a building's design and compares it against energy and water reduction targets. The design must meet these targets before a BASIX certificate can be printed. Any changes made to a building's design after a BASIX certificate has been issued requires another BASIX assessment and new BASIX certificate. "BASIX affected buildings" contain one or more dwellings (but do not include hotels or motels).

A BASIX certificate **MUST** be obtained for every "BASIX affected development", which are any of the following (other than development that is "BASIX excluded development"):

- (a) development that involves the erection (but not the relocation) of a BASIX affected building
- (b) development that involves a change of building use by which a building becomes a BASIX affected building
- (c) development that involves the alteration, enlargement or extension of a BASIX affected building, where the estimated construction cost of the development is \$50,000 or more
- (d) development for the purpose of a swimming pool or spa, or combination of swimming pools and spas, that services or service only one dwelling and that has a capacity, or combined capacity, of 40,000 litres or more.

"BASIX excluded development" is

- (a) development for the purpose of a garage, storeroom, car port, gazebo, verandah or awning
- (b) alterations, enlargements or extensions to a building listed on the State Heritage Register under the Heritage Act 1977
- (c) alterations, enlargements or extensions that result in a space that cannot be fully enclosed (for example, a veranda that is open or enclosed by screens, mesh or other materials that permit the free and uncontrolled flow of air), other than a space can be fully enclosed but for a vent needed for the safe operation of a gas appliance
- (d) alterations, enlargements or extensions that the Director-General has declared, by order published in the Gazette, to be BASIX excluded development.

A BASIX Certificate **MAY** be obtained for certain developments by an Applicant even though there is no obligation to do so. This is called "BASIX optional development". "BASIX optional development" means any of the following development that is not BASIX excluded development:

- (a) development that involves the alteration, enlargement or extension of a BASIX affected building, where the estimate of the construction cost of the development is less than \$50,000
- (b) development for the purpose of a swimming pool or spa, or combination of swimming pools and spas, that services or service only one dwelling and that has a capacity, or combined capacity, of less than 40,000 litres.

If the proposed development involves the alteration, enlargement or extension of a BASIX affected building that contains more than one dwelling, a separate BASIX certificate is required for each dwelling concerned.

Further information about BASIX and to obtain a BASIX Certificate, go to <http://www.basix.nsw.gov.au>

3.8 Have the plans subject to the application been stamped by a Sydney Water Quick Check Agent or the relevant water utility authority or their authorised agent?

☐ Yes

☒ No

If Yes - Provide:

A copy of the stamped plans.

Note: The approved plans must be submitted to a Sydney Water Quick Check agent or other relevant water utility to determine whether the development will affect any wastewater and water mains, stormwater drains and/or easement, and if any requirements need to be met. Plans will be appropriately stamped.

4. RESTRICTIONS ON THE TITLES

Is the proposed work affected by any restrictions on the titles (including covenants, easements & rights of way)?

☐ Yes

☒ No

If Yes - Provide Details

5. HOME BUILDING ACT REQUIREMENTS

In the case of an application for a construction certificate for residential building work (within the meaning of the *Home Building Act 1989*) attach the following:

☐ Yes

☒ No

If Yes - Provide:

a) In the case of work by a licensee under the Act:

- i) a statement detailing the licensee's name and contractor licence number, and
- ii) documentary evidence that the licensee has complied with the applicable requirements of that Act*.

or

b) In the case of work done by any other person:

- i) a statement detailing the person's name and owner builder permit number, or
- ii) a declaration signed by the owner of the land, to the effect that the reasonable market cost of the labour and materials involved in the work is less than the amount prescribed for the purpose of the definition of owner-builder work in section 29 of that Act.

**A certificate purporting to be issued by an approved insurer under Part 6 of the Home Building Act 1989 to the effect that a person is the holder of an insurance contract issued for the purposes of that Part, is sufficient evidence that the person has complied with the requirements of that Part.*

6. LIST OF DOCUMENTS

Prepare & attach a list of all documents provided under Development Consent, Additional Requirements & Schedule 1.

☒ Yes

If Yes - Provide Details

☐ No

7. OWNERS CONSENT

As the owner(s) of the land on which the work is to be carried out:

1. I/we hereby consent to the applicant(s) named on the application to act on my/our behalf as the person with benefit of the development consent nominated herein.
2. I/we hereby consent to the certifying authority, or an accredited certifier nominated by City Plan Services P/L, to enter the subject property at any reasonable time for the purpose of carrying out an inspection in connection with the assessment of this application. I/we will undertake all necessary steps to make access available to the property to enable the inspection to be carried out.

Signature of all owner(s):

Name

Pat Marshall

Sign

[Signature]

Name

Sign

Date

A certifying authority must not issue a construction certificate for the development on a site which affects an existing building unless the certifying authority or an accredited certifier nominated by City Plan Services P/L has carried out an inspection of the site of the development.

8. APPLICANT SIGNATURE

As a person eligible to be an applicant for this work:

1. I/we hereby submit this Construction Certificate Application under the Environmental Planning & Assessment Act 1979, with City Plan Services Pty Ltd.
2. I/we hereby appoint ☒ Brendan Bennett/ ☐ Chris Michaels/ ☐ Adam DeLooze/ ☐ Darren Bugg of City Plan Services Pty Ltd as the Principal Certifying Authority for the building work identified in this application.
3. I/we (if not the owner(s) of the land on which the work is to be carried out), hereby state that I/we are not the contractor who will carry out the building work or subdivision.
4. I/we hereby state that, to the best of my knowledge, the information provided within this application is true and accurate.

Signature of applicant(s):

Sign

[Signature]

Date

12/6/19

Sign

Date

Date

DETAILED DESCRIPTION

For each proposed new building, indicate:

The number of storeys (including underground storeys) in the building.

Gross floor area of existing building (m²)

The gross site area of the land on which the building is to be erected (m²)

For each proposed new residential building, indicate:

The number of existing dwellings on the land on which the new building is to be erected.

The number of existing dwellings that are to be demolished in connection with the erection of the new building

The number of dwellings to be included in the new building

Whether the new building is to be attached to any existing building

Whether the new building is to be attached to any other new building

Whether the site contain a dual occupancy

The materials to be used in the construction of the new building by completing the table below

MATERIALS TO BE USED

Walls	Code	Roof	Code
Brick (double)	11	Tiles	10
Brick (veneer)	12	Concrete/Slate	20
Concrete /Stone	20	Fibrous cement	30
Fibrous cement	20	Steel	60
Timber	40	Aluminium	70
Curtain glass	50	Other	80
Steel	60	Not specified	90
Aluminium cladding	70		
Timber/weatherboard	40		
Other	80		
Not specified	90		
Floor	Code	Frame	Code
Concrete/Slate	20	Timber	40
Timber	40	Steel	60
Other	80	Aluminium	70
Unknown	90	Other	80
		Unknown	90

Not Applicable

Schedule 2 – Existing Essential Fire Safety Measures

Part 1 of 2

Item No.	Existing Measure	Is this measure Installed in the Building? Yes / No	If yes, enter the current standard of performance (eg: ORD 70 Clause 19/2 or BCA Clause E1.5 & AS 2118.1-1999)
1	Access Panels, doors and hoppers to fire resisting shaft		
2	Automatic fail safe devices		
3	Automatic fire detection and alarm system		
4	Automatic fire suppression system (sprinkler)		
5	Automatic fire suppression system (others – specify)		
6	Building occupant warning system		
7	Emergency lighting		
8	Emergency lifts		
9	Emergency warning and intercommunication system		
10	Exit signs		
11	Fire control centres and rooms		
12	Fire dampers		
13	Fire doors		
14	Fire hydrant systems		
15	Fire seals (protecting openings in fire resisting components of the building)		
16	Fire shutters		
17	Fire windows		
18	Hose reel system		
19	Light weight construction		
20	Mechanical air handling systems		
21	Paths of travel stairways passageways or ramps		
22	Perimeter vehicle access for emergency vehicles		
23	Portable fire extinguishers		
24	Pressurising system		
25	Required (automatic) exit doors		
26	Safety curtains in proscenium openings		
27	Smoke and Heat Vents		
28	Smoke Control System		
29	Smoke dampers		
30	Smoke detectors and heat detectors		
31	Smoke doors		
32	Solid Core doors		
33	Stand-By Power Systems		
34	Wall wetting sprinkler and drencher systems		
35	Warning and operational signs		
36	OTHERS - Specify		

This is an accurate statement of all existing Fire Safety Measures implemented in the whole building.

Signed _____ (Owner/ Agent) Name _____ Date _____

Schedule 3 – Proposed Essential Fire Safety Measures

Part 2 of 2

Item No.	Proposed New Measure	Is this measure Installed in the Building? Yes or No	If yes, enter the current standard of performance (eg: BCA Clause E1.5 & AS2118.1-1999)
1	Access Panels, doors and hoppers to fire resisting shaft		
2	Automatic fail safe devices		
3	Automatic fire detection and alarm system		
4	Automatic fire suppression system (sprinkler)		
5	Automatic fire suppression system (others – specify)		
6	Building occupant warning system		
7	Emergency lighting		
8	Emergency lifts		
9	Emergency warning and intercommunication system		
10	Exit signs		
11	Fire control centres and rooms		
12	Fire dampers		
13	Fire doors		
14	Fire hydrant systems		
15	Fire seals (protecting openings in fire resisting components of the building)		
16	Fire shutters		
17	Fire windows		
18	Hose reel system		
19	Light weight construction		
20	Mechanical air handling systems		
21	Paths of travel stairways passageways or ramps		
22	Perimeter vehicle access for emergency vehicles		
23	Portable fire extinguishers		
24	Pressurising system		
25	Required (automatic) exit doors		
26	Safety curtains in proscenium openings		
27	Smoke and Heat Vents		
28	Smoke Control System		
29	Smoke dampers		
30	Smoke detectors and heat detectors		
31	Smoke doors		
32	Solid-Core doors		
33	Stand-By Power Systems		
34	Wall wetting sprinkler and drencher systems		
35	Warning and operational signs		
36	OTHERS - Specify		

This is an accurate statement of all proposed Fire Safety Measures to be installed/ modified in the whole building.

Signed _____ (Owner/ Agent) Name _____ Date _____

**H&H Consulting Engineers
Pty Ltd** (trading as Henry & Hymas)

ABN 77 091 243 355
ACN 091 243 355

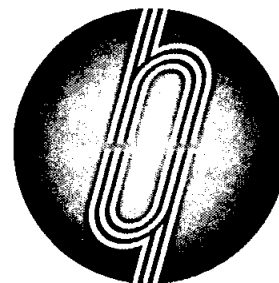
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Web
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henry&hymas

16 May 2014

Our Ref: 12693-C1/AF

CITY PLAN SERVICES PTY LTD.
364 KENT STREET
SYDNEY, NSW 2000

Attention: Brendan Bennett

Dear Sir,

**RE: PROPOSED RETIERMENT VILLAGE
CERTIFICATE OF DESIGN – CIVIL ENGINEERING**

**SUBJECT PREMISES: 6- 14 Macpherson Street, WARRIEWOOD NSW 2101
Lot 1, 2, 3, 4, and 5 DP 1161389.**

DEVELOPMENT CONSENT: PITTWATER COUNCIL DA NO. NO267/13

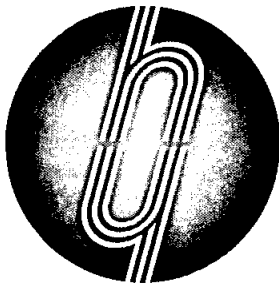
Pursuant to the provisions of the **Clause A2.2 of the Building Code of Australia**, I hereby certify that the above design is in accordance with best engineering practice and in our opinion meets the requirements of the Environmental Planning and Assessment Regulations of the Building Code of Australia, relevant Australian Standards and relevant conditions of the development consent. In particular, the design is generally in accordance with the following:

- AS3500 – 'National Plumbing and Drainage Code' – Part 3: Stormwater Drainage;
- Warriewood Valley Urban Land Release – Water Management Specification (WMS);
- Pittwater Council Development Control Plan 21;
- Conditions B6, B9, C8, C9 and C10 of the Development Consent dated 20 February 2014;
- Condition C16 in that the Drawings are generally in accordance with the Development Application Drawings.
- GHD letter dated 13/12/2013 (B2);
- GHD Warriewood Retirement Village – Water Management Report 2006.

I am an appropriately qualified and experienced person in this field and as such have a capacity to certify on behalf of Henry & Hymas Consulting Engineers that the design and performance of the design systems generally and in our opinion comply with the above and which are detailed on the civil drawings listed herewith.



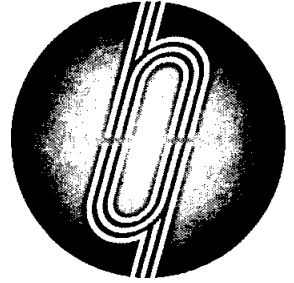
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Drawing List:

C000	COVER SHEET, DRAWING SCHEDULE, NOTE & LOCALITY SKETCH	3
C010	NOTES SHEET	1
C100	GENERAL ARRANGEMENT PLAN	3
C101	DETAIL PLAN, SHEET 1 OF 4	3
C102	DETAIL PLAN, SHEET 2 OF 4	3
C103	DETAIL PLAN, SHEET 3 OF 4	3
C104	DETAIL PLAN, SHEET 4 OF 4	3
C110	TYPICAL SECTIONS AND DETAILS	4
C115	EXTRY DRIVEWAY GRADING AND SECTIONS	3
C118	LOOP ROAD CENTRE LINE ALIGNEMENT SETOUT	2
C120	ROAD 1 LONGITUDINAL SECTION	3
C130	SITE SECTIONS	3
C140	ROAD CROSS SECTION – SHEET 1 OF 2	2
C141	ROAD CROSS SECTION – SHEET 2 OF 2	2
C200	STORMWATER MISCELLANEOUS DETAILS	3
C201	STORMWATER 360 DETAILS	3
C210	STORMWATER LONGITUDINAL SECTIONS, SHEET 1 OF 2	3
C211	STORMWATER LONGITUDINAL SECTIONS, SHEET 2 OF 2	3
C220	STOMRFILTER PLAN AND OFFTAKE WIER SECTIONS	2
C221	BASIN SECTIONS	2
C401	SET OUT PLAN SHEET 1 OF 4	1
C402	SET OUT PLAN SHEET 2 OF 4	1
C403	SET OUT PLAN SHEET 3 OF 4	1
C404	SET OUT PLAN SHEET 4 OF 4	1
C500	PAVEMENT PLAN	6
C800	GENERAL ARRANGEMENT PLAN - SERVICES PLAN	2
C801	SERVICES PLAN 1 OF 4	3
C802	SERVICES PLAN 2 OF 4	3
C803	SERVICES PLAN 3 OF 4	3
C804	SERVICES PLAN 4 OF 4	3
BE00	BULK EARTHWORKS OVERALL PLAN	2
BE01	BULK EARTHWORKS DETAIL PLAN - SHEET 1 OF 4	2
BE02	BULK EARTHWORKS DETAIL PLAN - SHEET 2 OF 4	2
BE03	BULK EARTHWORKS DETAIL PLAN - SHEET 3 OF 4	2
BE04	BULK EARTHWORKS DETAIL PLAN - SHEET 4 OF 4	2
BE05	BULK EARTHWORKS SECTIONS	2
BE06	BULK EARTHWORKS DETAILS	2
BE07	BULK EARTHWORKS - OVER EXCAVATION PLAN	2
SE01	SEDIMENT & EROSION CONTROL PLAN	3
SE02	SEDIMENT & EROSION CONTROL TYPICAL DETAILS	3



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Designer: Andrew Francis
Qualifications: B.E. (Civil)
Employer: H & H Consulting Engineers Pty Ltd
Address: Level 5, 79 Victoria Ave CHATSWOOD
Business Tel. No: 9417 8400 Fax No: 9417 8337

H & H Consulting Engineers possesses indemnity insurance to the satisfaction of the Client. However, this certificate shall not be construed in any way to relieve any other party of their responsibilities.

Yours faithfully,

ANDREW FRANCIS

For, and on behalf of,
H & H Consulting Engineers Pty Ltd



JHA Consulting Engineers
ABN 19 347 292 481

Level 3, 146 Arthur Street
North Sydney NSW 2060

PO Box 3
North Sydney NSW 2059

Ph: (02) 9437 1000



12 June 2014

Morgan Moore & Associates
Level 2
4-10 Bridge Street
Pymble NSW 2073

Attention: Mr. M. Moore

Dear Martin,

CERTIFICATE OF DESIGN – HYDRAULIC SERVICES

SUBJECT PREMISES : 6-14 Macpherson Street, Warriewood (lots 3, 4 & 5 DP1161389) – Infrastructure

Pursuant to the provisions of **Clause A2.2 of the Building Code of Australia 2013**, I hereby certify that the above design is in accordance with normal engineering practice, and meets the requirements of the Building Code of Australia and relevant Australian Standards. In particular, the design is in accordance with the following:

- 1) Energy efficiency to comply with following clauses of BCA clause J7.2
- 2) AS3500.1 & 2 - 2003: Plumbing and Drainage
- 3) AS2419.1-2005 Fire Hydrant Installations (Infrastructure only)
- 4) AS5601-2004 Gas Installations

I am an appropriately qualified and competent person in this area and as such can certify that the design complies with the above and which are detailed on the following drawings Revisions as noted:

- H000 Cover Sheet, Legend of Symbols, Drawing List & General Notes – Rev D
- H001 Site Plan – Rev E
- H002 Detail Sheet – Rev D

Full Name of Designer: Chris Healy

Qualifications: Dip- Hydraulic Services

Address of Designer: JHA Consulting Engineers,
Level 3, 146 Arthur Street,
NORTH SYDNEY NSW 2080

Business Telephone No: (02) 9437 1000

Name of Employer: JHA Consulting Engineers

Yours sincerely,

Chris Healy

Chris Healy
Hydraulic Engineer

H&H Consulting Engineers Pty Ltd (trading as Henry & Hymas)
ABN 77 091 243 355 ACN 091 243 355

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ANGLICAN RETIREMENT VILLAGES



WATER MANAGEMENT REPORT **STAGES 4-6** **ANGLICAN RETIREMENT VILLAGE** **WARRIEWOOD**

Revision 2
MAY 2014
Job No. 12693

HENRY & HYMAS
LEVEL 5, 79 VICTORIA AVENUE
CHATSWOOD NSW 2067
Our Ref: 12693
Tel: (02) 9417 8400 Fax: (02) 9417 8337
E-mail: email@hhconsult.com.au



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1.0 Referenced documentation

- GHD letter dated 13.12.2013
- GHD Warriewood Retirement Village – Water Management Report. 2006
- Warriewood Valley Urban Land Release – Water Management Specification (WMS).
- Pittwater Council Development Control Plan 21;

1.1 Water Quality

1.1.1 Water Quality Requirements

Urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. To limit impact on the downstream water quality, water quality measures at source and end of line treatments will be provided. This section describes the specific implementation of these measures for the proposed development.

The water quality modelling software program MUSIC has been used to establish the effectiveness of the water quality treatment proposal. MUSIC has been developed by the Cooperative Research Centre for Catchment Hydrology, and is designed as a planning tool for water quality “treatment trains” for catchment runoff.

Water quality measures will be implemented for stage 4-6. This will be to ensure that stormwater runoff is treated sufficiently prior to discharge to the downstream stormwater system.

Catchments were separated into three components for the purpose of the music model:

- Roof areas (drainage to Rainwater Tanks for subsequent reuse)
- Pavement areas (including roads, footpaths, etc.)
- Pervious areas (landscape areas).

MUSIC modelling was conducted to ensure that the water quality treatment targets nominated by Council will be achieved and approved water quality assessment prepared by GHD in 2006 and in accordance with Warriewood Valley Urban Land Release – Water Management Specification (WMS).

As the Water Management Specification (WMS) only contains event (storm flow) data, base flow was derived from EPA CRC for Catchment Hydrology – (October 2003) reference in (WMS). Post development and pollutant parameters are adopted from WMS (table 1 below). Due to the lack of data, roofs which typically experience lower levels of pollution were sourced from values prepared from GHD water management report 2006.

Table 4.1 Suggested Event Mean Concentrations for Modelling*

Land Use	TN EMC (mg/L)	TP EMC (mg/L)	SS EMC (mg/L)
Urban**	1.50	0.30	100
Rural Residential	1.00	0.10	35
Horticulture	2.50	0.20	45
Pasture	0.50	0.04	15
Forest/Native Vegetation	0.32	0.03	10

*Sources for suggested EMC's include creek autosampler data, Lawson & Treloar, 1997, AWT, 1995

**Urban includes urban residential, commercial and light industrial

Assessment of the performance of various devices is to be undertaken using data from published best management practice documents such as:

- Managing Urban Stormwater - Treatment Techniques (EPA, 1997)
- The Constructed Wetlands Manual (DLWC, 1998)
- Managing Urban Stormwater using Constructed Wetlands, CRC for Catchment Hydrology, 1998
- Controlling Urban Runoff - Schueler, 1987.

Table 1. Post development pollutant parameters – WMS



Warriewood stages 4-6	Sources	Residual Load	Target 2006 %	GHD Reduction %
Total Suspended Solids (kg/yr)	2100	352	77.0	83.3
Total Phosphorus (kg/yr)	6.19	2.13	60.1	65.5
Total Nitrogen (kg/yr)	39.5	22.7	42.1	42.5
Gross Pollutants (kg/yr)	577	10.6	100	98.5

The results show the reduction rates generally meet criteria outlined in GHD report 2006%. The results also show that the proposed treatment strategies effectively mitigate the increase pollution loads typically found with increased impervious areas. There is a small shortfall noted on the Gross Pollutants due to the inclusion of Fire Trail Footpath in the model.

- Roof or rainwater runoff which can be reused for toilet flushing or irrigation.
- Road, pavement and landscape areas, which can be treated by Enviropods/Pit baskets, Stormwater filters and the Wetland.





1.1.2 Constructed Wetland

The wetland will be approx. 185 sqm, with a permanent water depth ranging from 1000mm to 500mm. The wetland will have 1 in 6 batters to promote rapid dewatering and to accommodate for a large variety of planting. Multiple outlets are used and staggered in line to outlet in order to promote flow within the wetland, inhibiting the basin from short circuiting and to discourage the occurrence of stagnation and cultivation of mosquitos. Overflow in excess of the capacity of this wetland will be piped to the existing lake for Stages 4-6. The basin is to be free of overhanging trees to reduce the shade to the basin and to reduce the maintenance requirements form falling debris.

The basins permanent water levels are designed in accordance with WMS 4.3.2. Stormwater Quality improvement devices the wetland - where a "pond/wetland must also lie above the 5% AEP flood level" with "invert of the ponds in all other sectors should be such that the local groundwater is not intercepted by the pond". The 1 in 20 year ARI flood level from Warriewood Valley Flood Study (April 2005) for section G Narrabeen 6 is a flood level of 3.69. Thus the permanent water level for the basin is proposed at RL 3.69, with extended storage 100mm above the permanent water level.



1.1.3 EnviroPod/Pit Baskets

In addition to the proposed constructed wetlands, it is proposed to provide pit baskets such as Enviropods or an approved equivalent for all grated gully pits within the road network as well as future shared driveways. These pit baskets will assist in the water quality pre-treatment for the site by capturing a large portion or gross pollutants, large sediment particles and organic matter that may also contain nutrients.



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The enviropod pit basket acts as pre-treatment for the basin and storm filter cartridges, removing sediments and gross pollutants to increase the basins and Stormfilters viability and performance over time. EnviroPods also provide some treatment of Phosphorous and Nitrogen by filtering out particulate matter carrying these pollutants.

The removal rates for the 'EnviroPods' vary based on the amount of inflow pollutant concentrations. The removal rates curves for the various pollutants have been supplied from Stormwater 360 (SW360) for the 'EnviroPods'.

1.1.4 Stormfilters

Stormfilter removes the most challenging stormwater pollutants – including fine solids, soluble heavy metals, oil, and total nutrients – using a variety of sustainable media. The chamber is 2.7m x 5.4m x 1.6m with 29 storm filter cartridges. The proposed storm filter system was designed with the use of an offtake weir. This strategy ensures the storm filters can remove pollutants effectively at the given treatment rate - 46 l/s. In addition to the cartridges the storm filter tank is also designed to have an extra quality of detention, to remove settling suspended solids and particulates. A section of the proposed Stormfilter cartridge system can be seen below;

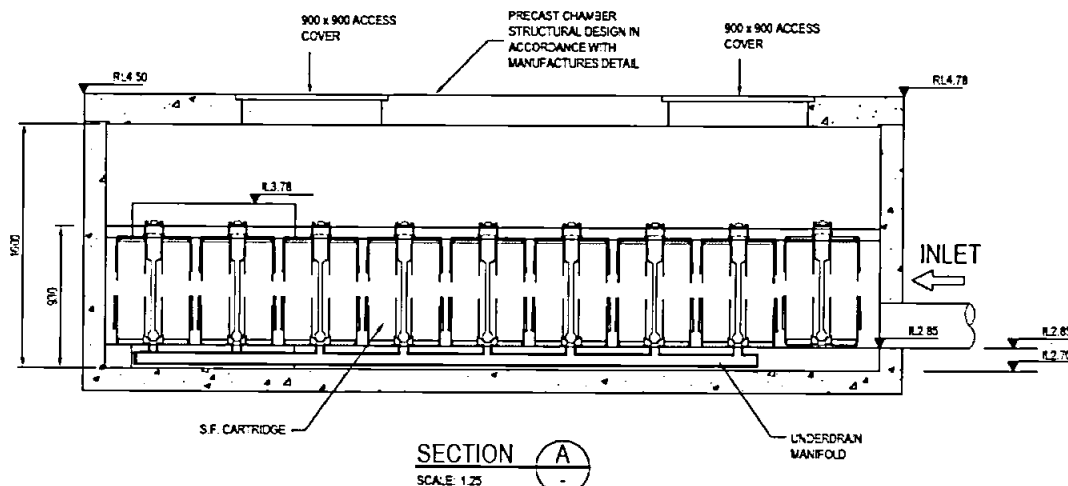


Figure 3 Stormfilter Section

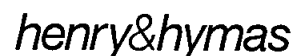
A Stormfilter cartridge system is proposed as the wetland area alone will not meet specific water quality targets from GHD report 2006. Flow directed into the storm filter vault bypasses the wetland as the basin water level (restricted by flood level) if connected would cause the cartridge system to bypass and become ineffective. Details regarding the Stormfilters can be found in Appendix B – Stormfilter 360 Details & Appendix C – Storm filter Plan & Offtake Weir Details.

1.1.5 Rainwater reuse

Re-use of rainwater is proposed for the individual dwellings on the site in accordance with the requirements of the BASIX report. 1000L capacity Rain Water Tank is proposed for each dwelling. The retention and reuse of rainwater will provide a small contribution to improved water quality through reduction of nutrients.

As part of the intergraded on-site stormwater management system, stormwater overflow from the rainwater tank is designed to discharge into the adjacent waterway via piped systems with minimal erosion to the development.

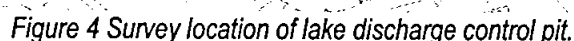
The modelling for the Rainwater reuse for toilet flushing and outdoor garden use was undertaken using parameters from the GHD Report 2006, Music modelling guidelines and current best practice.



- Total number of units for stage 4-6 is 59.
- Average Daily Demand: 120 L per household – Music Modelling Guidelines. (August 2010)
- Daily reuse 310 L landscape/ irrigation and other uses. – Music Modelling Guidelines. (August 2010)
- Rain water storage of 59000 L
- Monthly distribution of annual demand

The drainage system for the site has been designed to collect all runoff from the landscape and impervious surfaces such as driveways, car parks and roof areas. The piped drainage system has been designed generally to convey the 1 in 10 year ARI with adequate provision for the 1 in 100 year ARI to be safely conveyed overland. The stormwater network has been designed to safely convey minor storm events via a pit and pipe stormwater system with provision for larger, more infrequent storm events overland via the road and driveway network. The piped stormwater network connects to an either a constructed wetland or storm filter vault finally discharging to the existing lake.

As discussed in the GHD letter dated 13/12/2013, replacing the existing 550mm orifice plate with a 450mm plate on the lake outlet would provide a better compliance with WMS PSD requirements. This change would increase the maximum storage uptake in the lake to 2500m³ which is still well within the SSR requirements. The location of the discharge control pit is shown in Figure 4 below, details regarding the orifice modifications can be found in Appendix A.



Total discharge from the site for stage 4-6 is 0.783 m³/s (1 in 100 ARI) which is less than the PSD of 1.162 m³/s allowed for stage 4-6 from GHD report – dated 2006. Drains printouts (Figures 5 & 6) show the drainage network during the 1 in 10 ARI and 1 in 100 ARI events.



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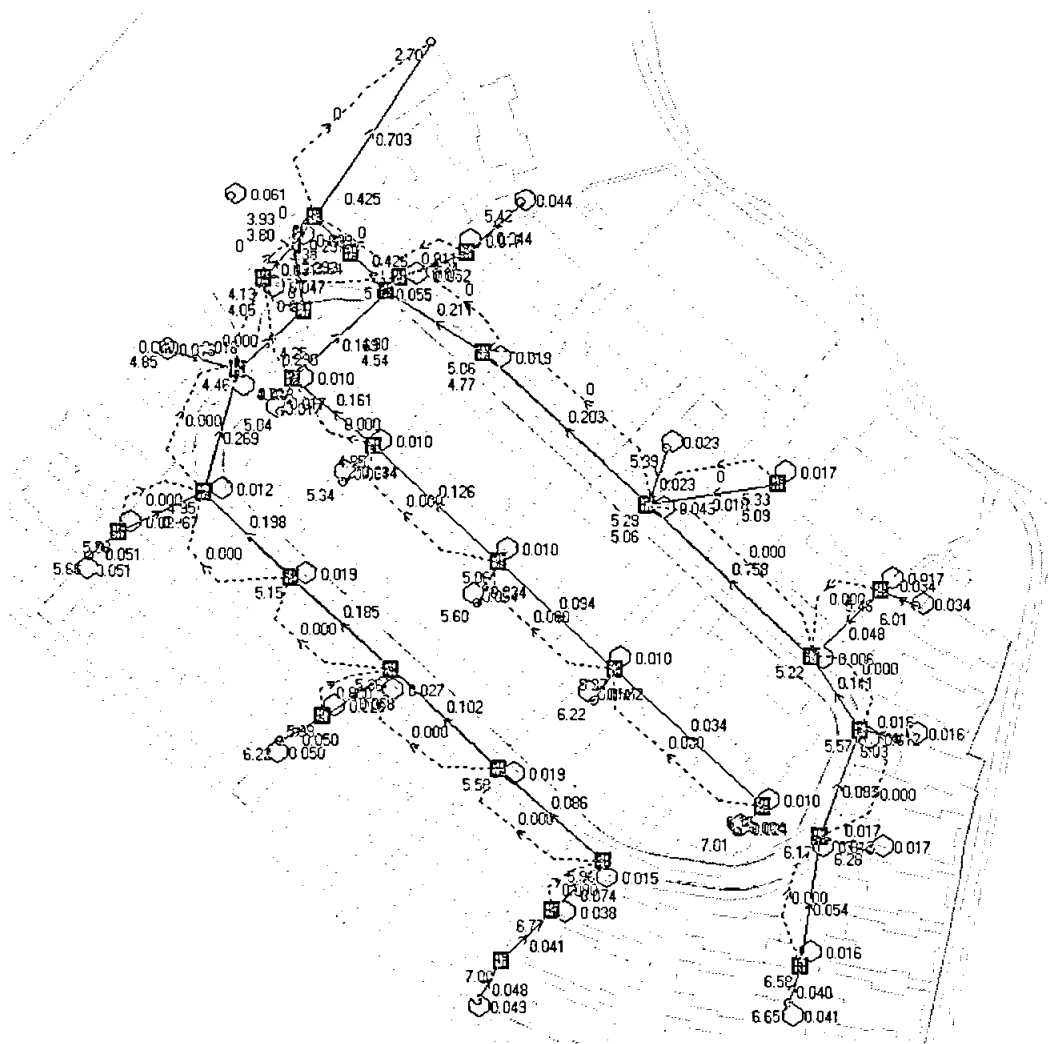
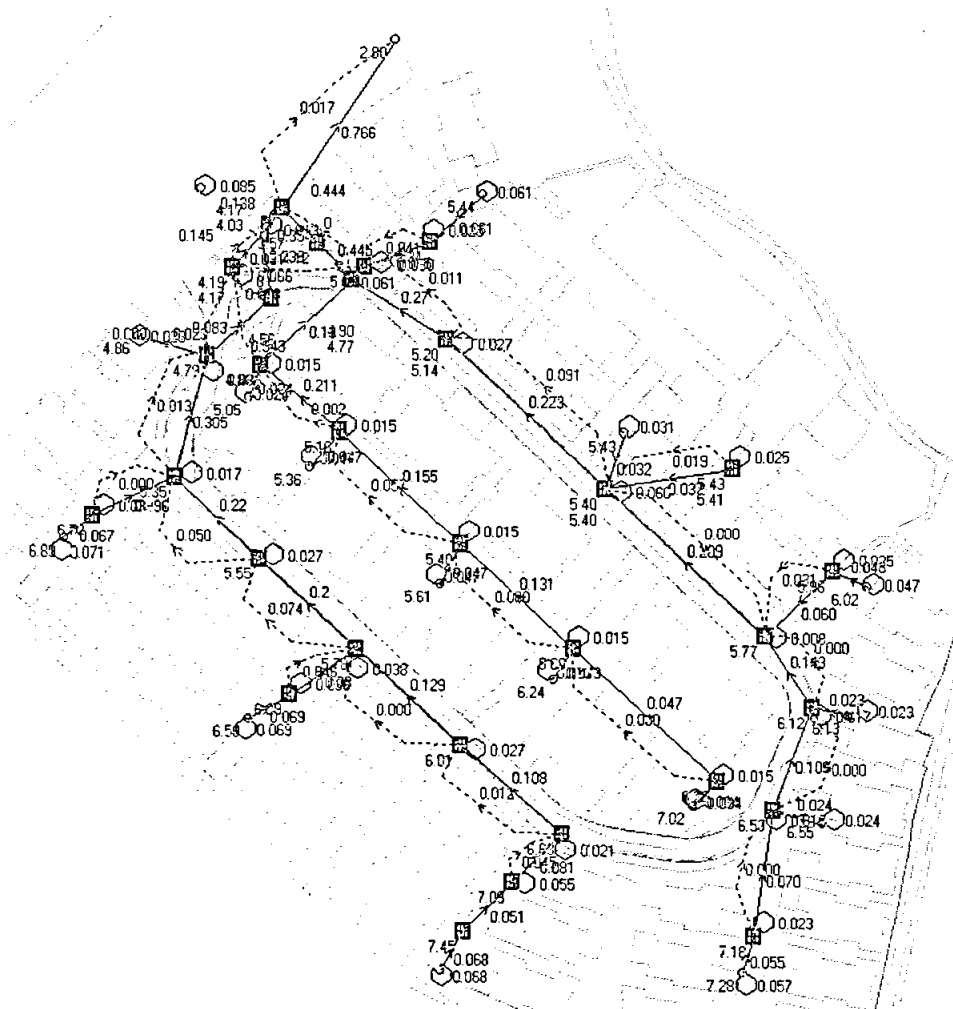
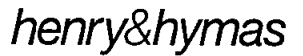


Figure 5 Drains model for stage 4-6 for Minor design storm. 1 in 10 ARI



4.1 Mosquito Management

In general, newly flooded areas and stagnant water provide favourable breeding conditions for mosquitos. Similar to measures discussed in GHD report 2006, the wetland will be designed to minimise the risk of mosquito breeding by implementing the following measures:

- Open water areas will be sufficiently deep, with edges gently sloping edges 1 in 6.
- In accordance with maintenance plan (referred below), accumulations of debris, vegetation and algal mats will be routinely be removed.
- Shallow areas are graded for rapid de-watering.
- Inlet and outlet structures will be incorporated into the overall design to enable water level management of the wetland.
- The interior deep water areas will be maintained free of vegetation.
- Vertebrates (i.e. fish), invertebrates (eg, dragonflies, water beetles, water bugs) will be encouraged by providing appropriate habitat.
- Planting will be periodically removed or thinned out to maintain the effectiveness of fish predation.
- Basin design and shape reduces potential for stagnation.



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4.2 Algae Management.

Algae outbreaks in waterways are caused by an increase in the nutrient levels (typically phosphorus), which is introduced to the waterway by pollutants such as fertilisers and cleaning products. Algae outbreaks can have negative effects on the native water plant species as they grow rapidly choking and killing off the native plant species.

The wetland can be designed and monitored in order to reduce the likelihood of Algae outbreaks. In order to minimise the risk chance of Algae blooms the following protective measures are proposed;

- Maintenance of phosphorus levels in the wetland.
- Physical removal of Algae blooms upon occurrence.
- Monthly monitoring of Algae presence in summer months November to April.
- Use of environmentally friendly mixtures e.g. Phoslock; to reduce nutrients and promote healthy aquatic environment.

4.3 Maintenance, monitoring and operation of stormwater quality treatment devices.

As the maintenance and operation of the Stormfilter system is site specific, please consult Stormwater 360 for details regarding the maintenance of SW360 Cartridges and Enviropod filters. An example maintenance and operation program generally provided by SW360 can be seen in Appendix E.

For Maintenance, monitoring and operation of stormwater quality treatment device see Appendix F – Long Term Maintenance program.

Monitoring of stormwater treatment devices in addition to general maintenance measures is to be in accordance with GHD Warriewood Retirement Village – Water Management Report 2006 chapters 3 & 4, and Warriewood Valley Urban Land Release – Water Management Specification (WMS) chapter 4.4.

Operations and maintenance

StormFilter® EnviroPod Treatment Train



Device details

Location of Device

GPS Coord

N:

E:

D P Number:

Relevant Council

Company

Contact

Email

Ph

Engineer

Contact

Email

Ph

SFEP Treatment

1

2

Frequency of Inspection/Maintenance

Inspections
(time/year)

Major
Maintenance

StormFilter

EnviroPod

Maintenance Estimated Annual Cost

StormFilter

EnviroPod

TOTAL

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Maintaining the EnviroPod[®] Stormwater Gully Pit Insert

Maintenance is as integral to every stormwater management system as it is to any other type of machinery or equipment.

The primary purpose of the EnviroPod[®] Stormwater Gully Pit Insert is to filter out and capture pollutants from entering the waterways. To ensure that the EnviroPod[®] continues to function effectively, it is important that the pollutants it captures are periodically removed and the filtration components properly cleaned.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site, as well as the occurrence of events such as discarded spills or excessive rainfall leading to the in situ erosion of extreme storms. Similarly, the system should be inspected after all major storm events.

Treatment Train Specifications



Performance Specification

The stormwater filtration treatment train shall consist of x 200 micron gully pit basket/s and x 460/690mm passive, siphon-actuated, radial flow, self cleaning media filtration cartridge system/s operating at a specific flow rate of not more than 1.5L/s/m².

The gully pit basket system shall consist of the following components;

- Removable 200 micron Nylon monofilament Precision woven Filtration Bag
- Fixed Galvanised Mesh Cage (no greater than 80mm x 80mm) around the Filtration Bag
- Recycled modified ABS plastic to seal the unit into the pit
- By-pass mechanism above the Filter with no moving parts
- System rigidly fixed to the walls of the pit.

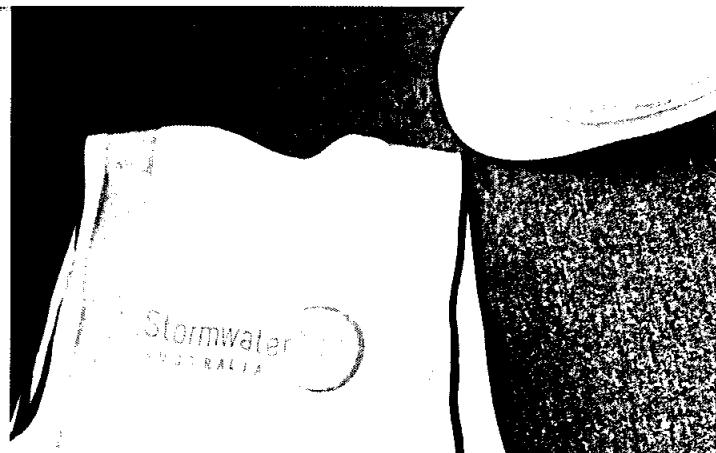
The media filtration system shall be located within the following structure.

- Manhole
- DownPipe
- Linear
- Vault
- Large Box
- Detention.

Regardless of the system type, the media filtration system shall consist of the following components;

- Inlet energy dissipation
- Cartridge section
- Outlet section to bypass storm flows and convey treated stormwater
- Access Lids in roof slab for access to Cartridges
- Siphon actuated cartridges filled with proprietary ZPG™ filter media
- Specific flow rate of each individual cartridge limited not to exceed 1.5L/s/m²
- Air Lock Cap complete with one way Air Valve Flap
- Outer Hood complete with Scrubbing Regulators
- Automated high-energy turbulence on the screen face (only) at the end of storm flows to flush pollutants from the cartridge
- Centre Drainage Tube complete with Buoyancy Float
- Individual Cartridge Flow Restrictor Disc
- ¼ Turn Bayonet Fittings
- Under drain manifold to convey treated stormwater to the receiving environment.

Components of any proposed treatment train or technology



The components of any proposed the treatment train or technology, including a gully pit basket upstream of a radial flow cartridge filtration system, must be evaluated for a range of pollutants and these performance expectations must comply with current best practice guidelines, i.e. Water by Design "MUSIC Modeling Guidelines version 1.0 2010" for South East Queensland.

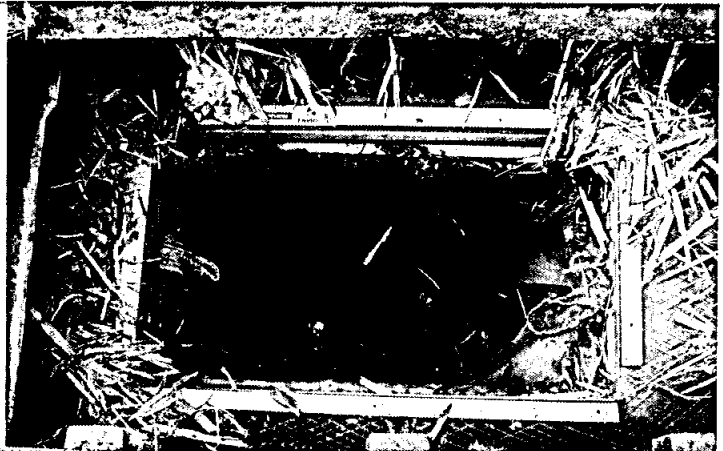
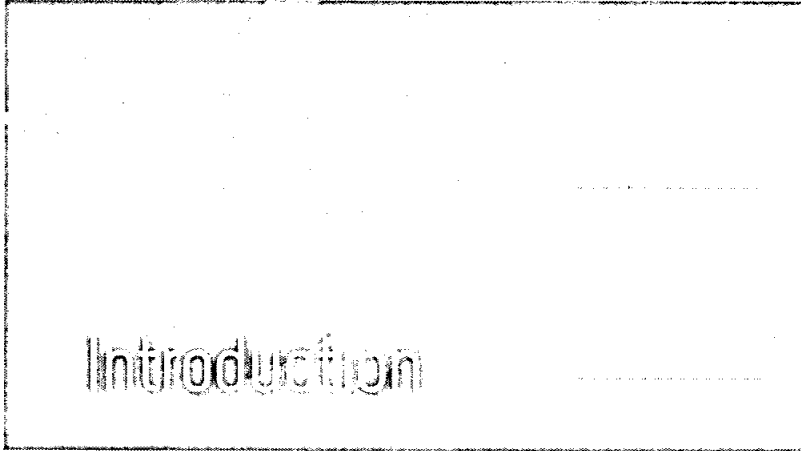
In short, the performance evaluation of any system must show:

- 1. Any reduction efficiencies are justified by rigorous scientific testing as determined by an independent peer reviewer and the results further peer reviewed and published in a credible scientific journal. Any potential or perceived conflicts of interest should be disclosed within the published article.
- 2. Published article providing insight into the pollutant composition (e.g. soluble vs particulate for nitrogen) and the mean concentration of inflow and outflow to compare to local and or regional conditions.
- 3. Performance evaluation undertaken in dry weather conditions or a method to take into account any potential leaching of nutrients that may occur in the system(s).
- 4. Evaluation is conducted using full-scale systems with details of treatable flow rates sampled and how they correlate to discrete removal efficiencies and comparisons to the designed treatable flow rates of the device. A comparison should also be made to the climatic conditions especially where un-restricted filters are used.

Maintenance Overview

The primary purpose of the Stormwater Treatment Train is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the system to its full efficiency and effectiveness.

*** Maintenance requirements and frequency are dependent on the pollutants and characteristics of each site. Maintenance must be performed in accordance with the Treatment Train Operator and Maintenance Guidelines.**



Introduction

This manual has been designed to assist you with cleaning and maintaining the EnviroPod Stormwater Gully Pit Insert, using the methods recommended by the manufacturer.

The cleaning process and methods described cover all aspects of the system, including:

- Removing the grate
- Cleaning the filter bag
- Inspecting the unit
- Rejuvenating the filter bag
- Re-installing the filter bags.

The manual should be used in conjunction with your site's traffic management and safety plans, as well as other appropriate Stormwater360 (IES) documents such as the IES Employee Health and Safety Manual. We also recommend that maintenance and cleaning contractors, or device owners, develop their own site-specific health and safety activity plans to ensure a safe work environment.

★ Please note this manual consists primarily of the processes and tasks associated with the maintenance and cleaning of the stormwater gully pit insert. It does not include details of the site's traffic management and occupational health and safety requirements. Contractors and IES staff should consult their own Employee Health and Safety Manual which details the policies and procedures to site work.

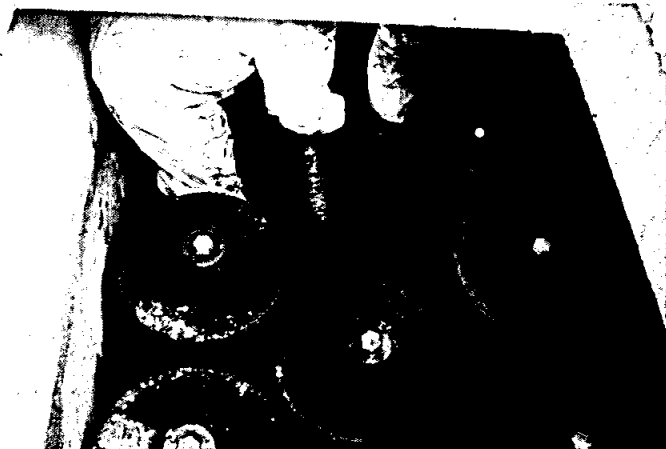
Why cleaning and maintenance are so vitally important

Adhering to the inspection and maintenance schedule of each stormwater treatment device is essential to ensuring that it works properly throughout its estimated design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It's also essential that qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner. To ensure consistency, we recommend that one person be responsible for overseeing the management of the maintenance and cleaning process.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up).

Health and safety



The EnviroPod has been designed to trap and retain pollutants in stormwater runoff, helping to maintain the quality of water entering our aquatic ecosystems. Depending on the nature of your site, pollutants can range from organic material such as leaves and sticks through to debris such as broken glass, syringes or other potentially harmful materials.

Access to gully pits containing EnviroPods may require removing heavy protective grates, while cleaning such pits may entail working in confined spaces. For these reasons, all aspects of maintaining and cleaning your EnviroPod require careful adherence to Occupational Health and Safety (OH&S) guidelines. Doing so will ensure that all maintenance personnel are adequately protected and have been properly trained before taking part in any specialist activities. The same level of care needs to be taken to protect non-work personnel in and around the site, while appropriate traffic control measures must be put in place where collection pits are situated in, or adjacent to, roadways or car parks.

★ The procedures indicated in the operations section of this manual are recommended as the safest and most efficient manner of conducting the maintenance of EnviroPod units (Section 2). However, contractors and cleaning staff may vary the procedure in response to the site conditions, varying work practices or general preferences in the cleaning techniques. Please note that procedures outlined in this manual are not exhaustive, and that any changes made should always comply with general safe work practices.


Cleaning of EnviroPod filters and StormFilters is a specialist activity. The material collected by the devices can be harmful, and needs to be handled correctly. For example, sediments may contain heavy metals and carcinogenic substances as well as harmful objects such as broken glass and syringes. It is essential that Occupational Safety and Health guidelines are followed at all times, and that the following steps are carried out to ensure safe and successful maintenance operations.

In addition to the dangers associated with the cleaning and handling of material in the filter bags, precaution needs to be taken with activities such as removing the grate as well as with managing the traffic, pedestrians and other non-worker personnel at the site. The general workplace hazards associated with working outdoors also need to be taken into account.

2.1 Personnel health and safety

All contractors and staff must comply with all current workplace health and safety legislation and take all practicable steps to:

- Comply with all applicable laws, regulations and standards
- Ensure that all employees, contractors and visitors are informed of and understand their obligations in respect of current workplace health and safety legislation
- Ensure that employees understand and accept their responsibility to practice and promote a safe and healthy work environment.

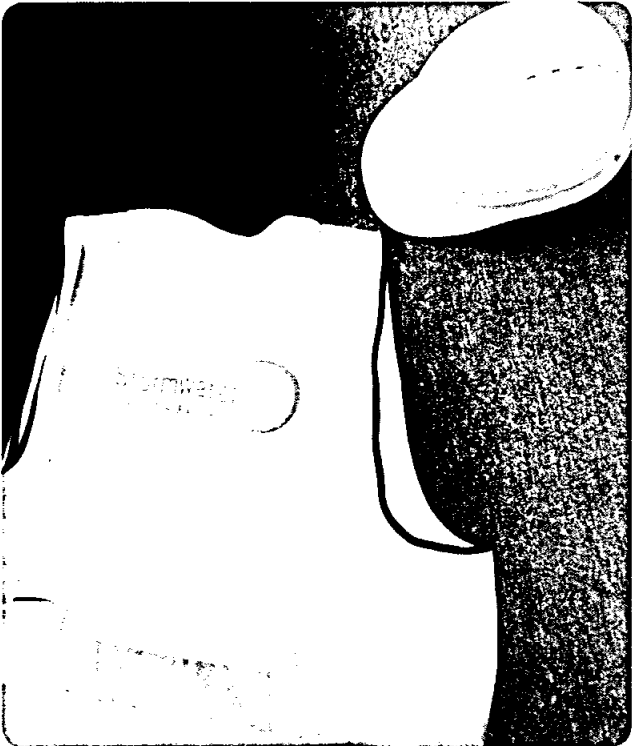


Take proper care. Pollutants can range from organic materials such as leaves and sticks through to debris such as broken glass, syringes or other potentially harmful materials.

While cleaning and maintaining filters, all relevant precautions must be taken to prevent contact with sediment and litter. This includes wearing the following personal protective and safety equipment:

- Puncture resistant gloves
- Steel capped safety boots
- Fluorescent safety vest
- Overalls or similar skin protection
- Safety apron (if necessary)*
- Eye protection (if necessary)*.

* Higher personal safety conditions may be required when maintaining units that may contain more hazardous material, for example pits where syringes have been observed or pits located in areas associated with such activities.



2.2 Traffic control

Stormwater collection pits are typically situated either in or on roads and car parks, or adjacent to roads in a footpath or swale. Traffic control requirements across all such locations differ with most of the state and local road authorities requiring the same controls to be implemented whether the work is to be conducted on the road or on the road reserve.

As traffic requirements differ depending on road usage and the specific road configuration, separate traffic control plans should be prepared for each site. Given that maintenance is typically a quick process, the contractor should liaise with the relevant road authority to determine the specific road safety requirements for each location to ensure that on site workers can conduct the cleaning operations safely and efficiently, while complying with all laws and regulations.

State government publications such as the NSW RMS *Traffic Control at Work Sites* safety manual outline the signage requirements, placement of barricades or witches hats and the positioning of traffic control personnel that's required when working on public roads. For increased safety, IES recommends that the maintenance vehicle be used to shield the work area from oncoming traffic.

Photo 1 shows the maintenance vehicle with cones placed around and positioned to shield the work area. **Photo 2** shows the head-on view, note the vehicle is positioned to allow access to the drive, whilst still blocking the pit from on-coming traffic. The vehicle has a flashing light on the roof and the hazard lights switched on.




Photo 1 Vehicle positioned near pit, preventing traffic from passing close to the pit.

2.3 Confined spaces

Confined space entry procedures are not included as part of this manual. For IES employees these procedures are included as part of the IES Safety Manual. It is recommended that all contractors evaluate their own needs for confined space entry and compliance with Occupational Health and Safety regulations.

When repairs or maintenance activities cannot be conducted from the surface, and there is a need to enter and work in a confined space, only staff with current confined space training are permitted to operate in a confined space. Appropriate measures and controls must be put in place to meet confined space entry requirements. At all times the necessary safety equipment must be worn, and where gas or oxygen hazards occur, only staff trained in its use will use breathing apparatus gear. **Non-trained staff must not go into confined spaces.**



Confined spaces pose a serious safety hazard for all personnel. However, during the normal maintenance procedures there should be no reason to enter a confined space and all maintenance procedures are able to be conducted from the surface.

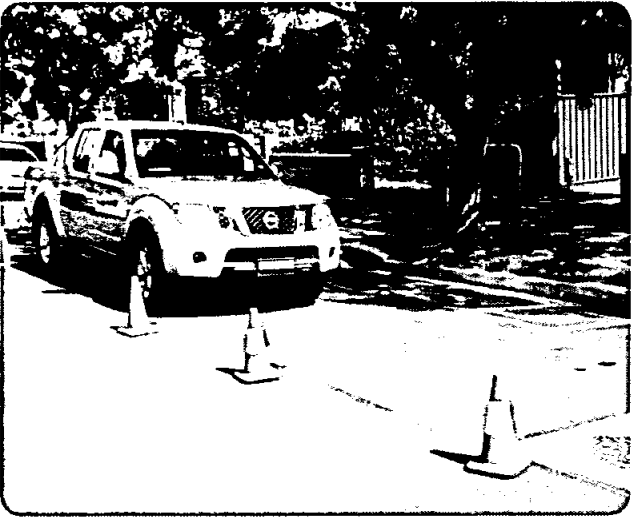
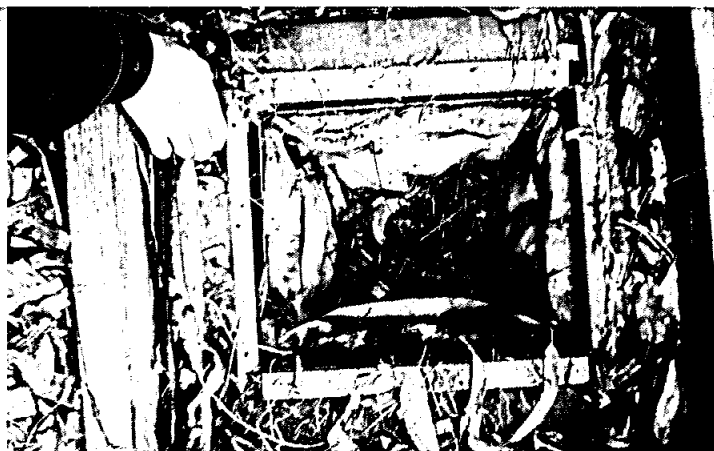


Photo 2 Head-on view, indicating the placement of the vehicle near the pit.

Operations



EnviroPod units need to be regularly inspected to determine whether they require maintenance or cleaning. This process involves several steps, and may require two or more maintenance personnel working together, as well the use of specialised equipment such as a hydraulic lifting arm or an inductor truck with a vacuum hose.

As gully pit grates are usually quite heavy, it is important that correct lifting procedures are adopted, and that the area surrounding the opened pit is shielded from access to non-work personnel.

If inspection reveals that the filter bag needs to be emptied and rejuvenated, the entire unit should also be examined to ensure that all connections and joints are sound. Any material that has accumulated in the overflow diversion channels or outlet pipes also needs to be removed, with those areas then being flushed. Where required, filter bags may need to be cleaned or repaired, and all waste material must be disposed of according to local guidelines at either an approved disposal site or transfer station.

This section outlines the procedures for cleaning the EnviroPod units. It has been written so that someone who has never previously encountered a stormwater pit or an EnviroPod unit can carry out such maintenance by simply following the outlined steps.

3.1 Maintenance and monitoring of EnviroPod filters

To ensure that each EnviroPod unit achieves optimal performance, the material collected by the filter bag should be emptied when the level of material is no more than approximately **half to two thirds** of the total bag depth or when there is evidence of material overflow. While the bag has a greater storage capacity, it is recommended that it is not left to fill completely prior to emptying, for the following reasons:

- the bags are capable of retaining a heavy mass of material (in excess of 50kg), which will make them more difficult to lift and empty
- material near the top of the bag can be re-suspended during high to extreme rainfall events
- blockage of the overflow sections can occur, when material is allowed to build up above the filter bag.

It is also recommended that additional monitoring is conducted following moderate to extreme rainfall events, especially when preceding months have had little or no rainfall. This increased frequency of monitoring is necessary as there is a greater accumulation of surface contamination during low rainfall periods, which will then enter the unit with the higher volumes of runoff generated during a major rainfall event. It is also important to ensure that the units have not been damaged due to high pipe velocities.

3.2 Stormwater pit cover removal

3.2.1 Hinged pit grates

These are the steps for opening a hinged pit grate:

- 1 Insert the lifting hooks beneath the grate.
(Position indicated in **Photo 3**)
- 2 Check hinge point is not damaged and debris is not caught in the hinge area.
- 3 Fully open pit grate, ensuring that the grate will stay in the open position without any external forces applied. Grates that do not remain open without being held should be removed or secured during cleaning or maintenance activities. **Photo 4** indicates the grate being opened and grate resting freely in the open position, respectively.

★ Please note: Many cast iron hoses are not designed securely to enable the removal of the grate. This may result in the pit cover not being able to sit in an open position. Additionally, the hinge points may also be damaged or corroded, which may allow the grate to fall into the pit. Such pit grates can be removed using the method indicated below for non-hinged grates.

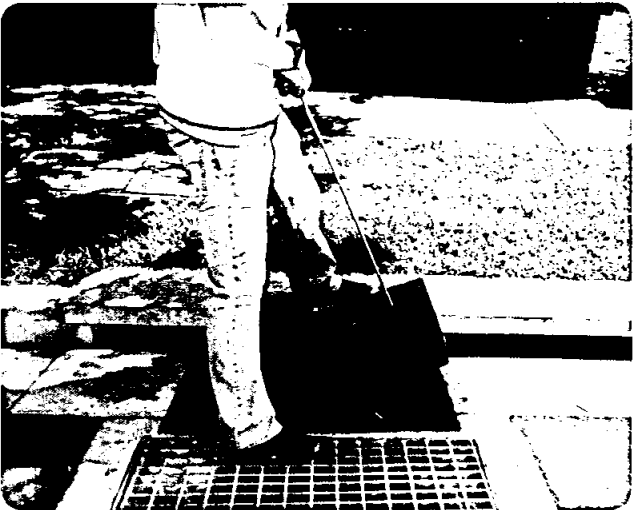


Photo 3 Lifting the grate



Photo 4 Fully open grate



Photo 5 Lowering grate

3.2.2 Non-hinged pit grates

To remove a non-hinged pit grate:

- 1 Place lifting hooks beneath grate, where possible in the four corners of the grate (see **Photo 6**). Concrete lids may have Gatic lifting points, a key arrangement or holes in the lid, which may require special equipment such as Gatic lifters
- 2 Position each person either side of the grate (see **Photo 7**)
- 3 Lift the grate, ensuring that good heavy lifting posture is used at all times
- 4 Place the grate on an angle on the gutter, to allow for the lifting hooks to be removed (see **Photo 8**)
- 5 For extremely heavy one-piece grates and concrete Gatic covers, insert the lifters in place and slide the lids back. Note some lids may still require two people

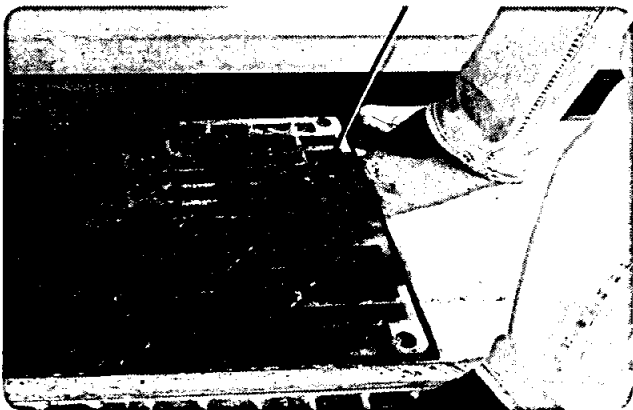


Photo 6 Insert hook near edge of grate

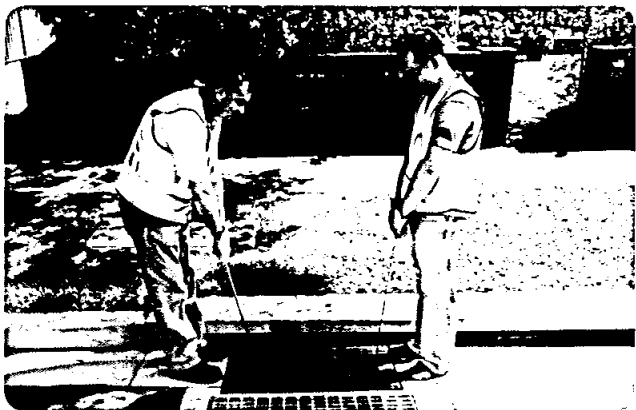


Photo 7 Position each lifter either side of the grate

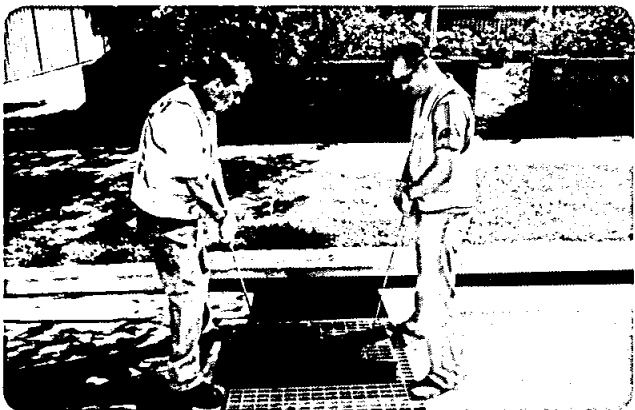


Photo 8 Lift grate and move grate to one side



Photo 9 Lift grate above the support frame

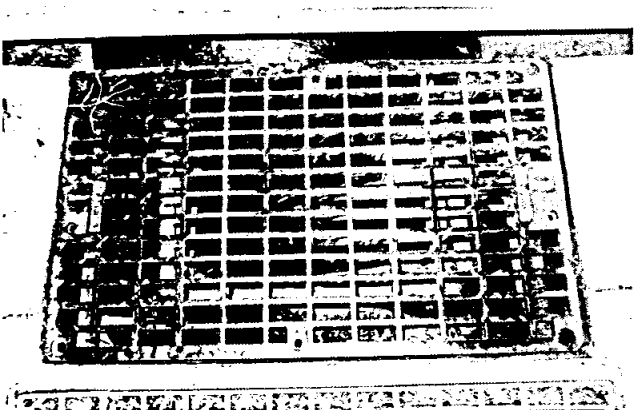


Photo 10 Reinstated non hinged grate

3.3 Cleaning methods

One of the following maintenance methods should be used for servicing EnviroPod Filters:

3.3.1 Cleaning using an inductor truck

Follow these steps to safely and efficiently clean the EnviroPod using an inductor truck:

- 1. Open gully pit (See Section 3.2)
- 2. Place the inductor hose over the material collected in the filter bag and switch on the inductor
- 3. Using the inductor hose, suck out all of the sediment, organic leaf material, litter etc. collected in the filter bag
- 4. Allow the filter bag to be sucked up into the inductor hose for a few seconds to allow for the filter mesh pores to be cleaned. Care is to be taken that there are no sharp edges on the inductor hose that can damage the filter bag
- 5. If material has built up around the overflows, use the inductor hose to clear the accumulated material
- 6. Remove filter bag from the pit
- 7. Sediment retained in the gully pit grate is to be removed
- 8. Back-opening channels are to be cleared of any debris to ensure flow is not hindered. This debris can also be collected using the inductor truck
- 9. All gully pit waste is to be removed from the pit
- 10. Check the EnviroPod unit (Section 3.4)
- 11. Check filter bag (Section 3.4)
- 12. Reinstall filter bag and gully pit lids

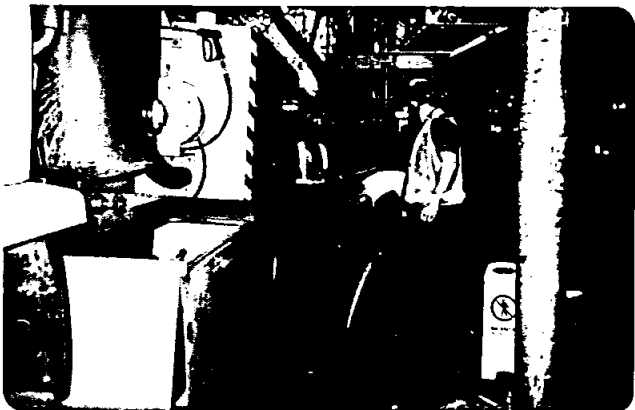


Photo 11 Cleaning an EnviroPod using the inductor method

3.3.2 Hand maintenance

To clean the EnviroPod manually by hand, follow these steps:

- 1. Open gully pit (See Section 1)
- 2. Place the lifting hooks in the lifting loops of the filter bag (See Photo 12)
- 3. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the bag, or remove excess material using a shovel or similar piece of equipment. IES prefers the use of a post hole shovel, due to the reduced strain on the back when digging and the ability of the shovel to grab material vertically
- 4. Lift the bag vertically off the supporting frame, ensuring that no undue pressure is placed on the filter bag. (See Photo 13)
- 5. Lift the bag clear of the stormwater pit (See Photo 14)
- 6. Position the bag over the truck or other collection vehicle, taking hold of the loops at the base of the bag (See Photo 15 and Photo 16)
- 7. Lift and empty the filter bag by holding the bottom lifting loops only (See Photo 17)
- 8. Completely empty the filter bag (See Photo 18)
- 9. Brush the filter bag with a stiff brush to remove bound sediment from the filter pores
- 10. Check the EnviroPod unit (Section 3.4)
- 11. Check the filter bag (Section 3.5)
- 12. Reinstall filter bag, ensuring bag is installed the correct way (See Photo 19 and Photo 20)
- 13. Reinstall gully pit lids (See Photo 21 and Photo 22)



Photo 12 Place the lifting hooks through the bag loops

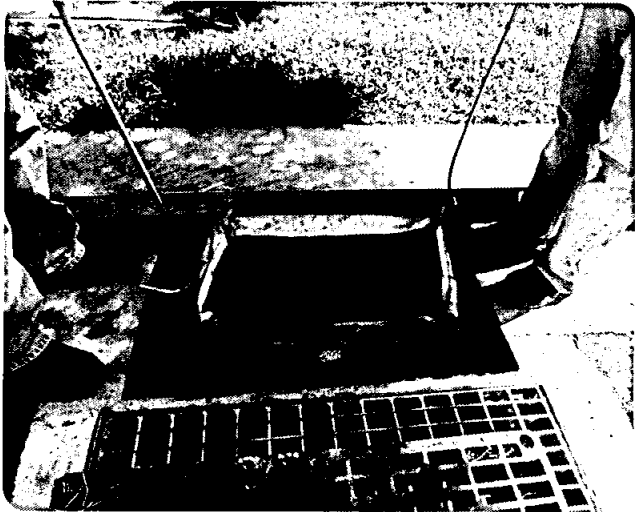


Photo 13 Lift the bag from the cage and support frame

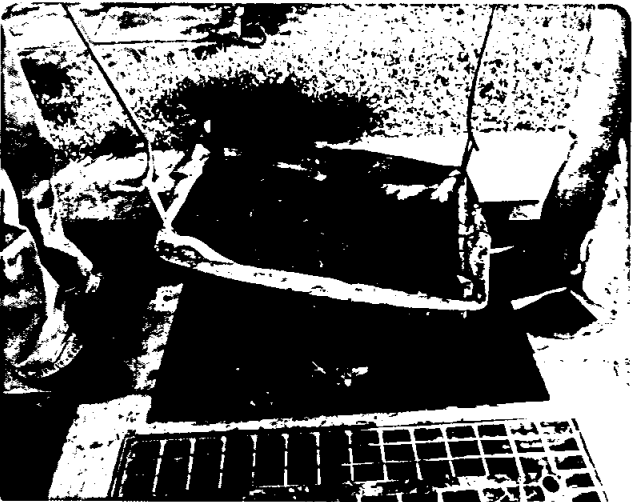


Photo 14 Lift the bag from the stormwater pit

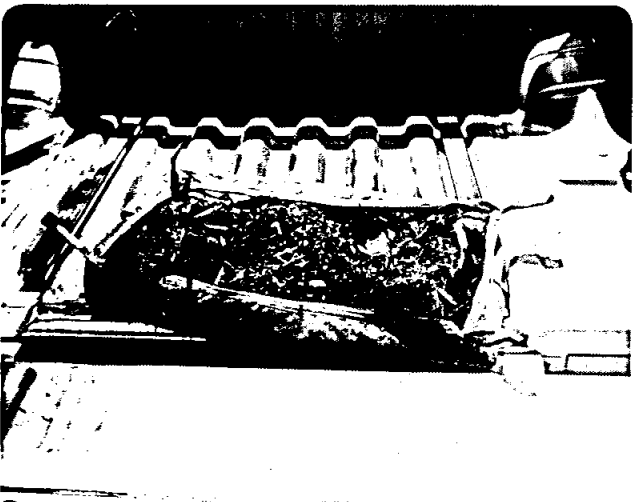


Photo 15 Lift the bag onto the collection vehicle

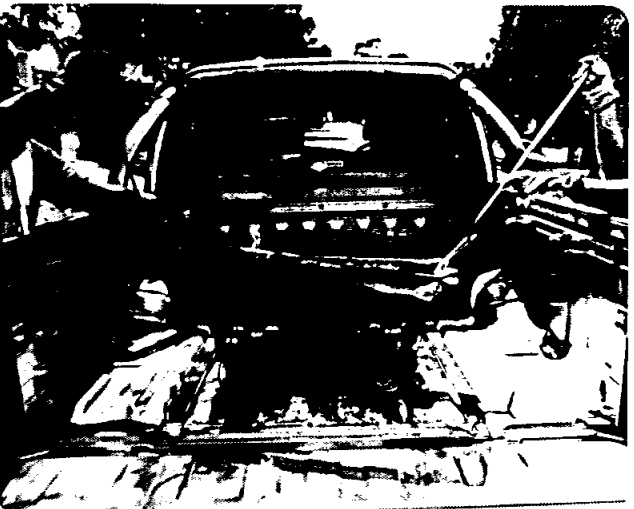


Photo 16 Grab the bottom lifting loops

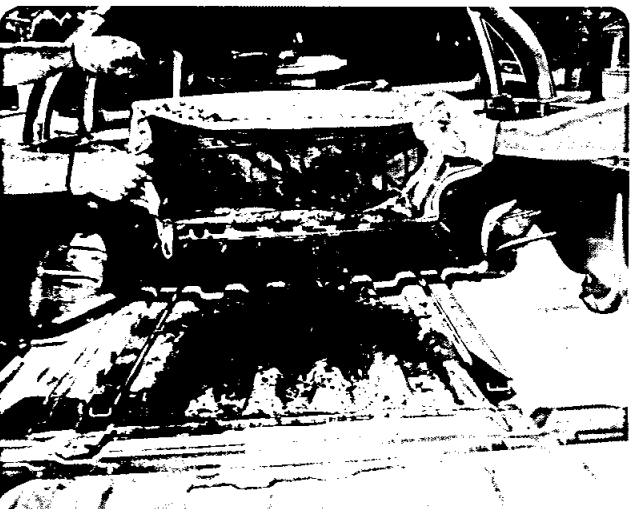


Photo 17 Lifting the bottom bag loops empty the filter bag

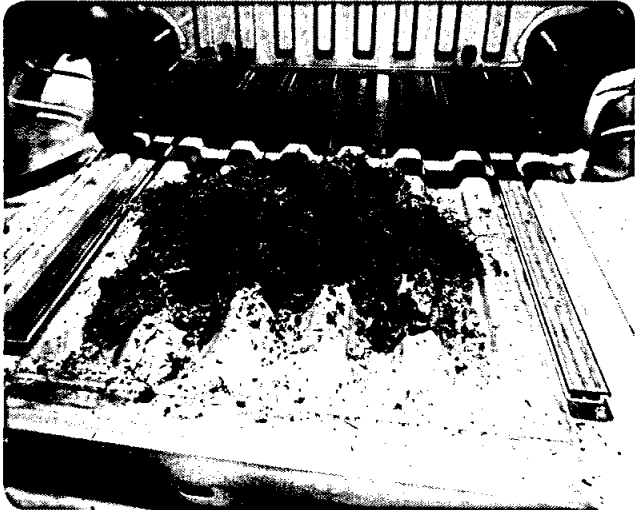


Photo 18 Completely empty the contents of the filter bag

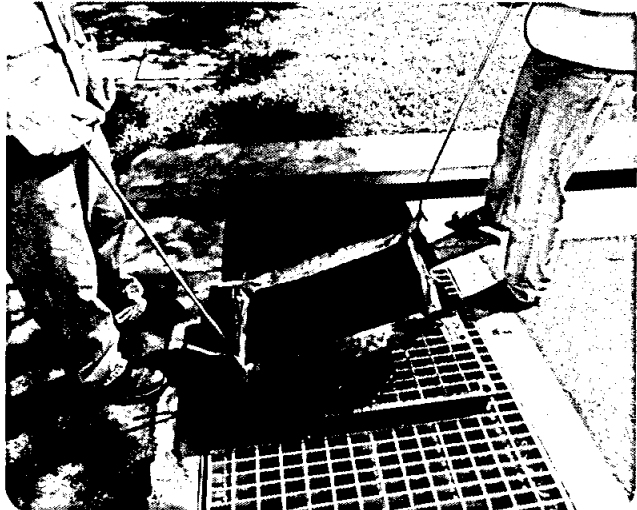


Photo 19 Reinstall filter bag

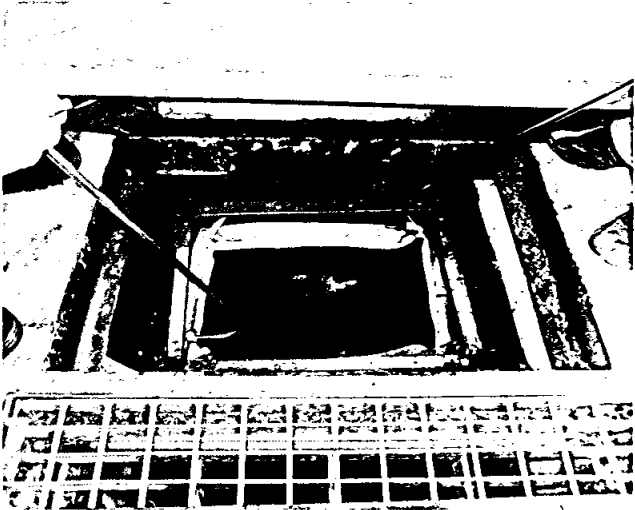


Photo 20 Ensure that the unit is positioned correctly, with the lifting loops on the inside

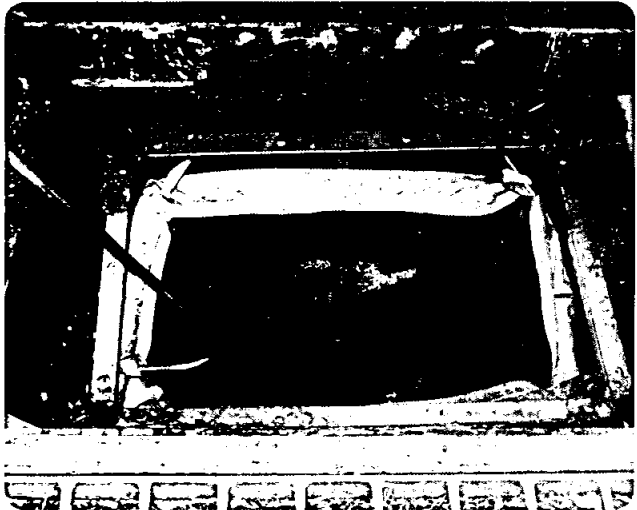


Photo 21 Correctly installed filter bag



Photo 22 Installed filter bag and sealed pit

* Please note: Under no circumstances are any pit sediments to be backwashed into the gutter.



Photo 23 Check seals are pushed against the pit walls

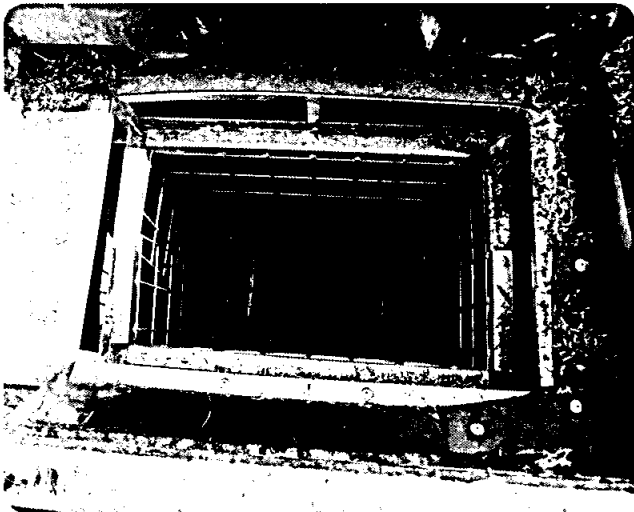


Photo 24 Check joining rivets (two piece unit shown above)


3.4 Unit inspection

After the EnviroPod filter bag has been removed, emptied and cleaned, the following should be checked to ensure that the unit has not been damaged:

- All connections and joints should be checked and broken rivets replaced (See **Photo 23**)
- The plastic pit seals should be inspected for unit movement or damage (See **Photo 24**)
- The cage should be inspected for damage or movement.

The overflow diversion channels, and the area between the EnviroPod cage and pit wall should also be inspected for any accumulated debris. Any observed debris should be removed and disposed of off-site. Accumulated material within the outlet pipe may also need to be flushed.

If spare parts are required, Stormwater360 is able to provide these at a cost to the owner of the EnviroPod unit, although these parts may also be obtained from other suppliers.



Please note: The units are not cleaned internally, the mobilisation of material collected in the EnviroPod unit may occur. As such, cleaning of the unit is required. All units are manufactured from high quality materials and are designed to last. The unit is not a disposable item and should be maintained in good condition. The unit is not a disposable item and should be maintained in good condition. The unit is not a disposable item and should be maintained in good condition.

3.5 Filter bag inspection and rejuvenation

After the filter bags have been emptied and cleaned, they should be inspected to evaluate their condition. Given the nature of stormwater, the filter bag may become considerably clogged with fine sediment or damaged by various objects in stormwater as well as fauna. Sharp material such as sticks, combined with high velocity water and a large mass in the filter bag, can cause small tears in the filter material. Animals such as rats have also been known to chew through fine mesh filter bags located in gully pits near takeaway food outlets.

3.5.1 Clogged filters

Clogged filter bags can be cleaned using several different methods. If the techniques described in the general maintenance sections above do not adequately clean the filter bags, the following options should be considered:

- Using a stiff brush and a bucket of soapy water, scrub the filter bag surface.
- Remove filter bags from the pit and wash the bags using a high pressure water spray, taking care not to transfer the contamination elsewhere. Wastewater from the process should be collected and disposed of correctly.
- Remove the filter bags from the pits and the support rings and wash the bags in an industrial washing machine.

This final option typically results in the bags appearing like new, with no visible stain or pore clogging within the filter mesh.



Photo 25 Slightly clogged filter bag, indicated by the brown stain on in the centre of the bag



Photo 26 A clean used filter bag

3.5.2 Damaged filters

Damaged filter bags can often be repaired, provided the damage is small. Small tears in the fabric may occur due to several reasons, however the overall strength and structure of the nylon fabric typically prevents small tears becoming much larger. Although the bag is unlikely to tear further, care must be used when cleaning torn bags so as not to spill the collected material into the pit.

Small tears may be repaired by either sewing the tear back together with additional fabric to increase the strength of the stitching, or by sewing a patch of the filter material onto the filter bag. If large tears are present, the filter bag may need to be replaced as it is no longer able to function as intended.

3.6 Disposal of material

All gully pit wastes are to be taken off site and disposed of at a transfer station or similar approved disposal site. Stormwater sediments can contain lead, copper, zinc, mercury, hydrocarbons and PCBs, which are harmful to both humans and the receiving environment. Appropriate sampling and laboratory analysis may be required to classify the material as suitable for reuse, or disposal under appropriate local guidelines.

Emergency procedures



Spills and blockages can have an immediate impact on the performance of a stormwater management system, and can potentially result in serious damage to built infrastructure as well as the surrounding waterways and wetlands.

In these types of emergencies, it is important to act quickly to remediate the problem by removing affected sediment or clearing the cause of the blockage, so that the system can resume normal and effective functioning as soon as possible.

4.1 Spill procedures

In the event of a spill discharging into any gully pit, all sediment is to be extracted and the filter bags are to be removed and replaced with rejuvenated filter bags. Normal operation procedures apply to additional cleaning as a result of spills.

4.2 Blockages

In the unlikely event of surface flooding around a gully pit fitted with an EnviroPod the following steps should be carried out:

- ☐ Check EnviroPod overflow bypass. The EnviroPod filter has been designed with an overflow mechanism built into the filter box. If surface flooding still exists, check the overflow slots underneath the rubber seal. If debris is lodged in the overflow slots it can be easily cleared by hand or a steel rod.
- ☐ If overflow is clear and surface flooding still exists remove EnviroPod and check outlet pipe for blockages.
- ☐ Removal of the EnviroPod may be difficult if the filter is clogged and the EnviroPod is holding water. If the filter is clogged, brush the sidewalls of the filter with a yard broom or similar. This will dislodge particles trapped at the interface allowing contained water to flow through the filter.
- ☐ If the outlet pipe is blocked, it is likely that a gully sucker truck will be required to unblock it. Debris should be removed from the EnviroPod with the gully sucker truck before removal of the EnviroPod filter. If a gully sucker truck is not available and the EnviroPod needs to be removed by hand, follow the steps below:
 - ☐ Remove excess debris by hand or brush the side of the filter.
 - ☐ Lift and place filter ring through the filter box and into cage.
 - ☐ Remove Filter box.
 - ☐ Lift cage containing filter bag and ring out of the pit.
 - ☐ Unblock outlet pipe.

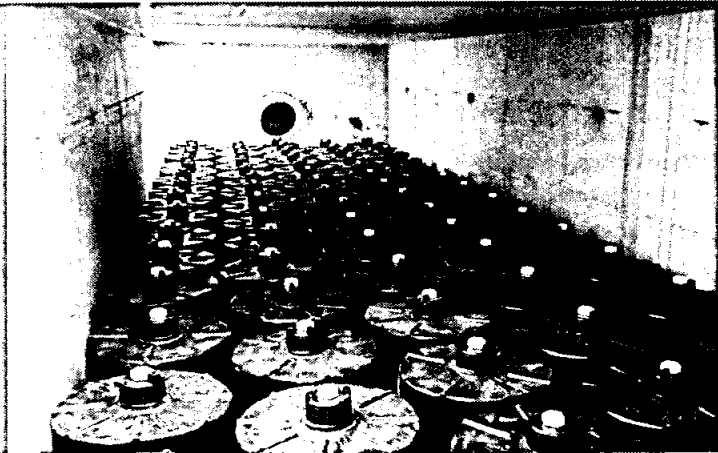
The Stormwater Management StormFilter

In almost two decades the Stormwater Management StormFilter has helped meet the most stringent stormwater quality requirements.

The system has been continually tested and refined to ensure it achieves maximum reliability and performance.

As a best management practice (BMP) system, it removes the most challenging target pollutants - including fine solids, soluble heavy metals, oils and total nutrients (including soluble) - by using a variety of media to achieve site specific pollutant removal objectives.

StormFilter overview



1.1 Description

StormFilter is a passive, flow-through stormwater filtration system consisting of vaults that house rechargeable cartridges filled with a variety of filter media, and is installed in-line with storm drains. The StormFilter works by passing stormwater through media-filled cartridges, which trap particulates and adsorb materials such as dissolved metals and hydrocarbons. After being filtered through the media, the treated stormwater flows into a collection pipe or discharges into an open channel drainage way. StormFilter is offered in three different configurations: cast-in-place, precast and linear. The precast and linear models utilise pre-manufactured vaults. The cast-in-place units are customised for larger flows and may be either covered or uncovered underground units.

1.2 Operation

1.2.1 Purpose

The StormFilter is a passive stormwater filtration system designed to improve the quality of stormwater runoff from the urban environment before it enters receiving waterways.

Through independent third party studies, it has been demonstrated that the StormFilter is highly effective for treatment of first flush flows, and fast-paced flows, during the latter part of a storm. In general, StormFilter's efficiency is highest when pollutant concentrations are highest. The primary target pollutants for removal are: sediments (TSS), soluble metals, soluble phosphorus, nitrates, and oil and grease.

1.2.2 Sizing

The StormFilter is typically sized to meet design water quality objectives, which are subject to legislation regulated by local government authorities and other relevant environmental bodies. MUSIC modelling software is used to determine pollutant loads from a site, influenced by a number of factors such as site area, imperviousness and land use. Pollutant load reduction capabilities, based on third party testing, allows the number of StormFilter cartridges required to achieve the relevant objectives to be established. Cartridges are designed to treat a peak flow between 0.7 and 1.6 litres/second, depending on the cartridge size used. For example, 10 standard sized cartridges (460mm) are able to treat 11 L/s, as each filter can treat 1.1 L/s.

Because of the highly porous nature of the granular filter media, the flow through a newly installed cartridge is restricted to 1 L/s (average 460mm), using a restrictor disc, to ensure adequate pollutant-media contact time.



Photo 27 Filter cartridge

1.2.3 Basic function

The StormFilter is designed to siphon stormwater runoff through a filter cartridge containing media. The variety of media available can be designed to act as a mechanical filter to remove sediments, as an ion exchanger to remove dissolved heavy meta's, and as an absorber to remove oils and greases.

1.2.4 Priming system function

The treated stormwater collects in the centre tube of the cartridge, which is equipped with a self-priming siphon system. (Figure 1 illustrates this system.) The key component of the system is the plastic float, consisting of a ball located at the base leading up to a larger portion, which provides ncreased buoyancy. Initially the ball rests in a seat, effectively closing off the port to the drainage manifold.

As a result, the filter fills the centre drainage tube until the water level has risen high enough to purge the air from the filter cartridges and displaces the float. At a water depth of 22 inches the float pulls loose and allows the filtered water to drain out through the manifold. This effectively "primes" a siphon within the drainage tube and greatly increases the potential across the filter. The priming system increases StormFilter's ability to be loaded with sediment. A related feature is the cartridge "hood". This hood maintains the siphon effect by preventing air from being drawn into the cartridge until the external water level drops below the bottom of the hood.

Cartridges are connected to the manifold with a plastic connector. These can be either quarter turn connectors or in the older systems, threaded connectors.

StormFilter is also equipped with flow spreaders that trap floating debris and surface films, even during overflow conditions. Depending on individual site characteristics, some systems are equipped with high and/or low flow bypasses. High flow bypasses are instal'ed when the calculated peak storm event generates a flow that overcomes the overflow capacity of the system. This is especially important for precast systems. Low flow bypasses are sometimes instal'ed to bypass continuous inflows caused by ground water seepage, which usually do not require treatment. All StormFilter units are designed with an overflow. The overflow operates when the inflow rate is greater than the infiltration capacity of the filter media.

1.2.5 Maintenance overview

The primary purpose of the StormFilter is to filter out and prevent pollutants from entering our waterways. Like any effective filtration system, these pollutants must be removed periodically to restore the StormFilter to its full efficiency and effectiveness. Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. To assist the owner with maintenance issues, Stormwater360 provides detailed Operation and Maintenance Guidelines with each unit.

Stormwater360 can provide maintenance services completely, or in part. Available services include tracking of installed systems, advising the system's owner of maintenance needs, and notification of the regulatory agency once the system has been maintained.

Maintenance is usually performed in the dryer periods to rejuvenate the filter media and prepare the system for the next rainy period. Maintenance activities can also be required in the event of a chemical spill or excessive sediment loading due to site erosion or extreme storms. It is good practice to inspect the system after severe storm events.

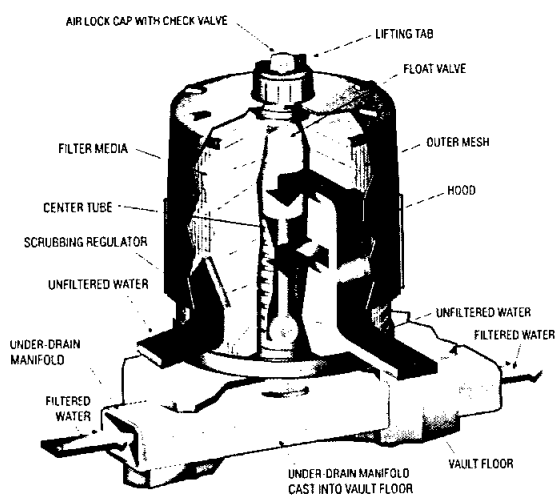


Figure 1 Filter cartridge

StormFilter® maintenance and performance expectations



To ensure the optimal and ongoing performance of the StormFilter, the system requires systematic inspection, cleaning and maintenance. This maintenance regime falls into two categories – ongoing minor inspection and maintenance, and major cleaning and maintenance. The maintenance frequency is largely determined by the conditions of each site, and the amount of sedimentation in the stormwater runoff that flows through the system. Unexpected events such as chemical spills, erosion or extreme storm activity require immediate inspection of the system, together with removal of debris or contaminated sediment, and where appropriate, replacement of the media cartridges.

While some maintenance activities can be completed by hand, others require specialised equipment such as an inductor truck with a vacuum hose. In all cases, it is important that maintenance staff are properly trained in the functioning of the StormFilter system and have a good knowledge of the correct procedures for disposing contaminated sediment as well as the methods for removing and installing StormFilter media cartridges.

At all times, appropriate safety equipment must be used, and Occupational Health And Safety (OH&S) guidelines adhered to.

2.1 Types of maintenance

Presently, procedures have been developed for two levels of maintenance:

- Inspection and/or minor maintenance
- Major maintenance.

Inspection/minor maintenance activities are combined since the minor maintenance does not require special equipment and typically little or no materials are in need of disposal.

Inspection/minor maintenance typically involves opening the flow restricting valves (to pre-set levels) and cleaning up vegetation and debris. Major maintenance typically includes cartridge recharging. Major maintenance may involve disposal of materials that require consideration of regulatory guidelines. Depending on the particular unit configuration and equipment used, major maintenance may require an understanding of OSHA rules. **Table 1** summarises the primary activities associated with StormFilter maintenance.

Table 1: StormFilter

Facility component requiring maintenance	Maintenance activity	When maintenance activity is required	Expected facility performance after maintaining
StormFilter cartridges and containment structure	Litter and debris removal	Floatable objects or other litter is present in the filter. Remove to avoid hindrance of filtration and eliminate unsightly debris and litter.	Permanent removal from storm system.
StormFilter cartridges and containment structure	Cartridge replacement and sediment removal	Media has been contaminated by high levels of pollutants, such as after a spill.	New media is able to effectively treat stormwater.
Drainage system piping	Flushing with water	Drainage system is obstructed by debris or sediment.	Outflow is not restricted.

2.2 Maintenance activities

2.2.1 Maintenance activity timing

Two scheduled inspections/maintenance activities should take place during the year. During the minor maintenance activities (routine inspection, debris removal), the type of major maintenance required is determined and, if required for disposal, samples of the sediments and media are obtained.

The next scheduled date is to perform major maintenance activities (replacement of the filter cartridges and associated sediment removal). In addition to the scheduled activities, it is important to check the condition of the filter after major storms to check for damage caused by high flows and to check for high sediment accumulation, which may be caused by localised erosion in the drainage area. It may be necessary to adjust maintenance activity scheduling depending on the actual operating conditions encountered by the system.

2.2.2 Maintenance activity frequency

The primary factor controlling timing of maintenance for the StormFilter is sedimentation. A properly functioning system will remove solids from water by trapping these particulates within the porous structure of the media. The flow through the system will naturally decrease as more and more solids are trapped. Eventually the flow through a system will be low enough to require replacement of the cartridges. Sediment should be removed from upstream trapping devices on an as-needed basis to prevent material from being re-suspended and discharged to the system.

Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction should be inspected and maintained more often than those in fully established areas. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after large storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual filter.

2.3 Maintenance crew requirements

Table 2 lists the anticipated crew requirements for maintenance operations. Removal of water and sediments during major maintenance activities can be accomplished using either a pump and water truck or a vacuum truck. All

applicable occupational health and safety (OH&S) and disposal regulations should be followed. A general description of the maintenance activities follows.

Table 2 Anticipated Crew Requirements

	Inspection/Minor Maintenance	Major Maintenance Sediment Removal	Major Maintenance Cartridge Replacement
Labourer	1		1
Skilled Worker	1	1	1
Vacuum/Water Truck Operator		1	0/1
Total	2*	2*	2/3*
Special Requirements	Knowledge of Proper StormFilter Function	Knowledge of Disposal Requirements	Knowledge of Cartridge Removal and Installation Procedures


* May require OH&S trained person if/when vault entry occurs.


2.4 Maintenance methods


2.4.1 Minor maintenance/inspection (twice a year)


Minor maintenance typically will involve the steps below, however if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately.


Steps for Minor Maintenance/Inspection


1. 


Maintenance to be performed by a skilled worker familiar with StormFilter units.
2. 


If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open access covers. Also set up appropriate safety equipment for work near roadways.
3. 


Inspect the external condition of the unit and take notes concerning defects/problems.
4. 


Open the access covers to the vault and allow the system to air out for 5-10 minutes.
5. 

Without entering the vault, inspect the inside of the unit, including components.
6. 

Take notes about the external and internal condition. This includes inspecting pit penetrations, walls, lids, ladders and grates etc.
7. 

Give particular attention to recording the level of sediment build-up on the floor of the vault and on top of the internal components. If flow is occurring, note the level of water and estimate the flow rate per drainage pipe. Record all observations.
8. 

Remove large loose debris and litter using a pole with a grapple or net on the end.
9. 

Close and fasten the access cover, and remove safety equipment.
10. 

Finally, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loadings of other materials to the system.



~~In the case of a spill, workers should abort maintenance activities until the proper guidance has been obtained.~~

2.4.2 Major maintenance inspection (once a year)

The primary goal of the major maintenance inspection is to assess the condition of the cartridges relative to the level of sediment loading. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, large amounts of sediments should be present and very little flow will be discharging from the drainage pipes. It is likely that the cartridges need to be replaced. Major maintenance inspection will typically involve the steps below. However, if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately. **In the case of a spill, the worker should abort maintenance activities until the proper guidance has been obtained.**


Steps for Pre-Major Maintenance Inspection

- 1. Maintenance to be performed by a skilled worker familiar with StormFilter units.
- 2. If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open doors. Also, set up appropriate safety equipment for work near roadways.
- 3. Inspect the external condition of the unit and take notes concerning defects/problems.
- 4. Open the access covers to the vault and allow the vault to air out for 5-10 minutes.
- 5. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
- 6. Take notes about the external and internal condition.
- 7. Give particular attention to recording the level of sediment build-up on the floor of the vault, and on top of the internal components.
- 8. Remove large loose debris and litter using a pole with a grapple or net on the end.
- 9. If the visit is during a storm, make the flow observations discussed above.
- 10. Close and fasten the access cover, and remove safety equipment.
- 11. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
- 12. Review the condition reports from the previous minor and major maintenance visits and schedule for cartridge replacement if needed.

2.4.3 Major maintenance: sediment removal and cartridge replacement (and emergency)

Major maintenance/filter cartridge replacement typically involves the steps below. However, if it appears that a spill of some type has occurred, the local hazard control agency and Stormwater360 should be notified immediately. **In the case of a spill, the worker should abort maintenance activities until the proper guidance has been obtained.**

Depending on the configuration of the particular system, a worker may be required to enter the vault to perform some tasks. If vault entry is required, OH&S rules for general confined space entry must be strictly adhered to. Filter cartridge replacement should occur during dry weather and it may be necessary to plug the filter inlet pipe if base flows exist. Standing water present in the vault should be regarded as polluted and contained during this operation by temporarily capping the manifold connectors.



Please note: Confined space entry may be required for StormFilter systems. In this case, please ensure that appropriate Confined Space entry, training and subsequent certification has been undertaken and is valid, and work procedures are strictly adhered to. If you are unsure, do not enter the vault and contact Stormwater360 immediately.

Steps For Cartridge Replacement Maintenance

- 1. Depending on the particular unit, one or two utility workers and a hauling truck operator will deliver the replacement cartridges to the site. Information concerning how to obtain the replacement cartridges is available from Stormwater360.
- 2. If applicable, set up safety equipment to protect pedestrians from fall hazards presented by open doors. Also, set up appropriate safety equipment for work near roadways.
- 3. Inspect the external condition of the unit and take notes concerning defects/problems.
- 4. Open the doors to the vault and allow the system to air out for 5-10 minutes.
- 5. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
- 6. Make notes about the external and internal condition.
- 7. Give particular attention to recording the level of sediment build-up on the floor of the vault and on top of the internal components.
- 8. Ensuring safe working procedures are met, off load the replacement cartridges (16-39kgs each) and set aside.
- 9. Remove the top cap (threaded), upper seal and float from the cartridge. Repeat procedure for every cartridge within StormFilter vault. Place items in a large plastic container to be lifted from the vault.
- 10. Using a cordless drill and 8mm hex head, remove the three screws located around the top perimeter of the cartridge hood. Place screws in the large plastic container and, once full or completed, remove plastic container from vault.
- 11. Move the vacuum truck near the StormFilter vault on the down-wind side. Be sure that the truck is not too close to the vault so that fumes will not enter the vault. Make sure that the last 500mm of the nozzle is approximately 100-125mm in outside diameter.
- 12. Feed vacuum nozzle into cartridge bay and start vacuum truck. Remove cartridge hood and place nozzle directly onto filter media. Completely remove media from each cartridge and repeat process for every cartridge in vault.
- 13. Once completed disconnect cartridges from vault floor and place hood back on cartridges

- 14. Using the appropriate lifting cap, attach the cable and remove the cartridge (up to 10kgs. each) from the vault. It is strictly prohibited to have personnel standing under suspended cartridges. Care must also be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner unless Stormwater360 is performing maintenance activities and damage is not related to discharges to the system.
- 15. Set the used cartridge aside or load onto the hauling truck.
- 16. Repeat steps 14 to 15 until all cartridges have been removed.
- 17. Remove deposited sediment from the floor of the vault. This can be accomplished by using the vacuum truck
- 18. Once the sediments are removed, it is necessary to assess the condition of the vault, particularly the manifold and the connectors. These are short sections of 2-inch schedule 50 PVC, or threaded schedule 80 PVC that should protrude above the floor of the vault. If required, apply a light coating of FDA approved silicon grease to the outside of the exposed portion of the connectors. This ensures a watertight connection between the cartridge and the drainage pipe. Replace any damaged connectors.
- 19. Using the boom, crane, or tripod, lower and install the new cartridges (typically 30kg for standard 460 cartridges). Once again, take care not to damage connectors.
- 20. Close and fasten the access cover, and remove safety equipment.
- 21. Make notes about the local drainage area relative to ongoing construction, erosion problems, or high loadings of other materials to the system.
- 22. Finally, dispose of the residual materials in accordance with applicable regulations. Make arrangements to return the used cartridges to Stormwater360.

2.4.4 Related maintenance activities (performed on an as-needed basis)

StormFilter units are often just one of many components in a more comprehensive stormwater drainage and treatment system. The entire system may include catch basins, detention vaults, sedimentation vaults and manholes, detention/retention ponds, swales, artificial wetlands, and other miscellaneous components. In order for maintenance of the StormFilter to be successful, it is imperative that all other

components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities. In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil and grease loading, and discharges of inappropriate materials.

2.5 Typical equipment required for maintenance activities

Typical equipment required for conducting maintenance is shown in Table 3. Some of the materials listed are suggestions rather than requirements. It should be noted that there is more than one way to accomplish some tasks. Owners

with available labour and equipment resources may desire to use alternative methods. However, it is advisable that guidance from Stormwater360 be obtained prior to using alternative techniques.

Table 3 Maintenance Equipment Requirements

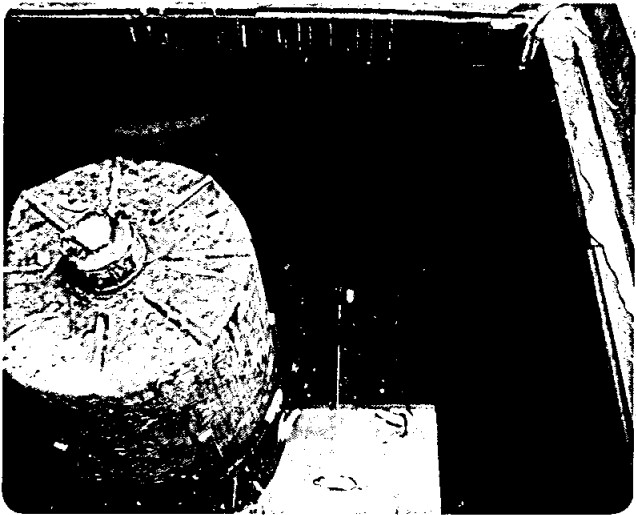
Maintenance equipment required		
Minor maintenance	Medium maintenance/inspection	Major maintenance/clean-up/replacement
<ul style="list-style-type: none">• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats• Work clothes: Rubber boots, overalls, and gloves• Door bolt, wrench, proprietary lifters (e.g. Gatic) and miscellaneous Tools• Tape measure• Flashlight• Grapple or net pole• Record keeping forms• Litter/debris container	<ul style="list-style-type: none">• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats• Work clothes: Rubber boots, overalls, and gloves• Door bolt, wrench, proprietary lifters (e.g. Gatic) and miscellaneous Tools• Tape measure• Flashlight• Grapple or net pole• Record keeping forms• Litter/debris container	<ul style="list-style-type: none">• Safety equipment*: First aid, cones, barricades, flagging, flares, tape, vests, hard hats• Work clothes: Rubber boots, overalls, and gloves• Door bolt, wrench, Pentasocket and miscellaneous Tools• Tape measure• Flashlight• Grapple or net pole• Record keeping forms• Vacuum truck• Replacement cartridges• Cartridge hauling truck• Crane, tripod and hoist, or other lifting device (150kg minimum capacity)• Shovels• Extra 50mm PVC cartridge connectors• Spare flow restrictor discs• Litter/debris container• Vault inlet pipe plug• Dolly• PVC Pipe cutter• Ladder• Cartridge installation and removal sling

*Confined space equipment may be required for vault entry. This equipment must be used by personnel with the appropriate OH&S training. This equipment typically includes: Atmospheric testing devices, atmospheric purging and ventilating devices, and entry, exit, and rescue assisting devices.

2.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in a manner that will not allow the material to affect surface or ground water. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily travelled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations.

It is not appropriate to discharge these materials back to the stormwater drainage system. Part of arranging for maintenance to occur should include coordination of disposal of solids (landfill coordination) and liquids (municipal vacuum truck decant facility, local wastewater treatment plant, on-site treatment and discharge). Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals. Stormwater360 will determine disposal methods or reuse of the media contained in the cartridges. If the material has been contaminated with any unusual substance, the cost of special handling and disposal will be the responsibility of the owner.



SFEP StormFilter & EnviroPod Maintenance Data Sheet



Date:	Location:	GPS COORD:
System size:	Type: <input type="radio"/> Cast-in-place <input type="radio"/> Precast <input type="radio"/> Linear	
Number of Cartridges:	Type of Cartridge: <input checked="" type="radio"/> 460mm <input type="radio"/> 690mm <input type="radio"/> 310mm	
Filter Media: <input type="radio"/> ZPG <input type="radio"/> Perlite		
Type of EnviroPods:		Number of EnviroPods:
Personnel:		

STORMFILTER SYSTEM OBSERVATIONS		
Last service:		
Sediment Depth on Vault Floor:		
Structural Damage:		
Cartridges submerged:	<input type="radio"/> Yes <input type="radio"/> No	How deep:
Comments:		

ENVIROPOD SYSTEM OBSERVATIONS		
Last service:		
Amount of Sediment in Basket:		
Structural Damage:		
Comments:		

DRAINAGE AREA REPORT		
Excessive Oil and Grease Loading	<input type="radio"/> Yes <input type="radio"/> No	Source:
Sediment Accumulation on Pavement	<input type="radio"/> Yes <input type="radio"/> No	Source:
Erosion of Landscaped Areas	<input type="radio"/> Yes <input type="radio"/> No	Source:
Comments:		

STORMFILTER CARTRIDGE MAINTENANCE ACTIVITIES		
Remove Litter and Debris	<input type="radio"/> Yes <input type="radio"/> No	Details:
Sediment Removed from Vault Floor	<input type="radio"/> Yes <input type="radio"/> No	Details:
Quantity of Sediment Removed (estimate?):		
Replace Cartridges	<input type="radio"/> Yes <input type="radio"/> No	Details:
Minor Structural Repairs	<input type="radio"/> Yes <input type="radio"/> No	Details:
Residuals (debris, sediment) Disposal Methods:		
Notes/Problems:		

ENVIROPOD MAINTENANCE ACTIVITIES		
Number of Bags Replaced:	Clogged EnviroPods/Bags: <input type="radio"/> Yes <input type="radio"/> No	
Comments:		

SFEP Treatment Train Inspection Data Sheet



It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, large amounts of sediments should be present, very little flow will be discharging from the drainage pipes, and it is likely that the cartridges need to be replaced during major maintenance.

Date:	Location:	GPS COORD:
System size:	Type: <input type="radio"/> Cast-in-place <input type="radio"/> Precast <input type="radio"/> Linear	
Number of Cartridges:	Type of Cartridge: <input type="radio"/> 460mm <input type="radio"/> 690mm <input type="radio"/> 310mm	
Filter Media: <input type="radio"/> ZPG <input type="radio"/> Perlite		
Type of EnviroPods:		Number of EnviroPods:
Personnel Attending Inspection:		

STORMFILTER SYSTEM OBSERVATIONS

Last service:	
Sediment Depth on Vault Floor:	
Structural Damage:	
Cartridges submerged: <input type="radio"/> Yes <input type="radio"/> No	How deep:
Comments:	

ENVIROPOD SYSTEM OBSERVATIONS

Last service:	
Amount of Sediment in Basket:	
Structural Damage:	
Comments:	

DRAINAGE AREA REPORT

Excessive Oil and Grease Loading	<input type="radio"/> Yes <input type="radio"/> No	Source:
Sediment Accumulation on Pavement	<input type="radio"/> Yes <input type="radio"/> No	Source:
Erosion of Landscaped Areas	<input type="radio"/> Yes <input type="radio"/> No	Source:
Comments:		

Next steps

Learn more

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Stormwater Solutions is a leading provider of
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website at www.stormwater661.com.au.
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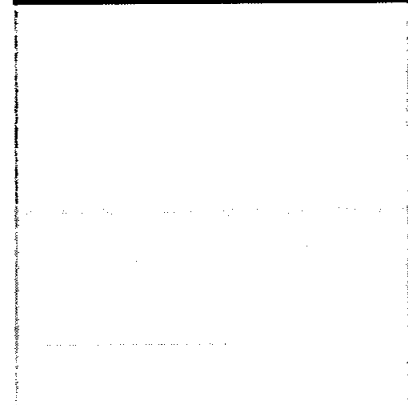
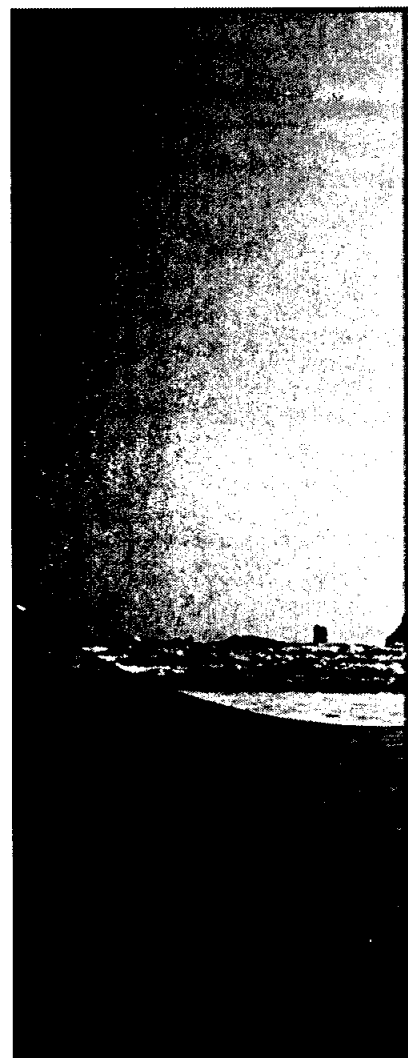
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Stormwater Management StormFilter is a licensed trademark of Stormwater360 Australia.

Stormwater360 supplies and maintains
a complete range of filtration,
hydrodynamic separation, screening and
oil/water separation technologies.

Call 1300 354 722

www.stormwater360.com.au



1. LONG TERM MAIENCE TASKS.

1.1 Schedule of Visits

1.1.1 Schedule of Site Visits (Regular Inspec & Maint)	
Purpose of Visit	Frequency
Inspection	Regular inspection and maintenance should be carried out to ensure the system functions as designed. It is recommended that these checks be undertaken on a Three monthly basis during the initial period of operating the system. A less frequent schedule might be determined after the system has established.
Maintenance	

1.2 Treatment Train Device Description

Constructed Wetland

A constructed wetland is a permanent water body that will be used for aesthetic purposes in addition to the water quality. The wetland will be constructed as an earth basin with a combination of sandstone rock and earth batters. The constructed wetland will have 50% of the surface area covered by vegetation specified by the landscape architect.

Stormwater 360 products

The Enviropod basket and storm filter cartridges will be located in every surface inlet pit as well as every pit that a downpipe drains through. The device works by filtering storm water runoff through the mesh basket that is fixed below the grate or solid lid. Stormwater 360 products are to be maintained monitored and operated to manufactures details.

1.3 Maintenance Issues

Constructed Wetland

- Buildup of silt and oil
- Scour to wetland
- Weeds and plant disease

Enviropod Pit Basket

- Access to pits during opening hours
- Basket filled with litter and debris
- Mesh clogged with silt
- Basket damaged

1.4 Tasks

The scope of maintenance tasks should include verifying the function and condition of the, following elements:

- Filter media
- Horticultural
- Drainage infrastructure
- Stormwater 360 products
- Other routine tasks

All maintenance task must be in accordance with Warriewood Valley Urban Land Release – Water Management Specification (WMS).

Enviropod & Wetland Maintenance Plan
#12693: 6-14 Macpherson Street, WARRIEWOOD NSW

1.4.1 Constructed wetland base	
Sediment deposition	Remove sediment build up from surface of wetland surface and Of wetland street trees. Manually monitor in 1m Grid with rigid survey pole. Remove if necessary. Frequency - Yearly
Holes or scour	Infill any holes in the filter media. Check for erosion or scour and repair, provide energy dissipation (e.g. rocks and pebbles at inlet) if necessary. Frequency - 3 MONTHLY AFTER RAIN
Litter Control	Check for litter (including organic litter) in and around treatment areas. Remove both organic and anthropogenic litter to ensure flow paths and Vegetation media are not hindered. Frequency - 3 MONTHLY OR AS DESIRED FOR AESTHETICS

1.4.2 Horticultural Tasks	
Pests and Diseases	Assess plants for disease, pest infection, stunted growth or senescent plants. Treat or replace as necessary. Reduced plant density reduces pollutant removal performance. Frequency - 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Maintain original plant densities	Infill planting: To landscape architects details should (depending on species) be adequate to maintain a density where the plant's roots touch each other. Planting should be evenly spaced to help prevent scouring due to a concentration of flow. Frequency - 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Weeds	It is important to identify the presence of any rapidly spreading weeds as they occur. The presence of such weeds can reduce dominant species distributions and diminish aesthetics. Weed species can also compromise the systems long term performance. Inspect for and manually remove weed species. Application of herbicide should be limited to a wand or restrictive spot spraying due to the effect on the constructed wetland system. Frequency - 3 MONTHLY OR AS DESIRED FOR AESTHETICS

1.4.3 Drainage tasks	
High flow inlet pits, overflow pits and other stormwater junction pits	Ensure inflow areas and grates over pits are clear of litter and debris and in good and safe condition. A blocked grate would cause nuisance flooding of streets. Inspect for dislodged or damaged pit covers and ensure general structural integrity. Remove sediment from pits and entry sites etc. (likely to be an irregular occurrence in mature catchment). Frequency - MONTHLY AND OCCASIONALLY AFTER RAIN

1.4.4 Stormwater 360 Enviropod and Stormfilter cartridges.	
Visual Inspection	The Enviropod filters require servicing every 1 - 6 months depending on

	<p>site characteristics, however the maintenance requirements are less labor intensive than alternate traditional treatments. During each inspection and clean, details of the mass, volume and type of material observed should be record to provide ongoing data for future management plan revisions and the optimization of the maintenance frequency.</p> <p>Enviropod are also be maintained using Cleaning using Inductor Truck. See storm water 360 manual for details</p> <p>Frequency - MONTHLY AFTER RAIN</p>
Emptying and maintenance	<p>Open gully pit. Place the lifting hooks in the lifting loops of the filter bag. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the bag, or remove excess material using a shovel or similar piece of equipment. IES prefers the use of a post hole shovel, due to the reduced strain on the back when digging and the ability of the shovel to grab material vertically. Lift the bag vertically off the supporting frame, ensuring that no undue pressure is placed on the filter bag. Lift the bag clear of the stormwater pit. Position the bag over the truck or other collection vehicle, taking hold of the loops at the base of the bag. Lift and empty the filter bag by holding the bottom lifting loops only. Completely empty the filter bag. Brush the filter bag with a stiff brush to remove bound sediment from the filter pores. Check the filter bag. Check the Enviropod unit. Reinstall filter bag, ensuring bag is installed the correct way. Reinstall pit lids.</p> <p>Maintenance frequency should be adjusted to accommodate variable rainfall patterns.</p> <p>Enviropod area also maintained using Cleaning using Inductor Truck. See stormwater 360 manual for details</p> <p>Frequency – 3 to 6 MONTHLY AFTER RAIN</p>

1.4.5 OTHER ROUTINE TASKS	
Inspection after rainfall	<p>Occasionally clay lined surface pit after a rainfall event to check infiltration. Identify signs of poor drainage (extended ponding on the permanent water levels surface). If poor drainage is identified, check land use and assess whether is has altered from design capacity.</p> <p>Frequency – TWICE A YEAR AFTER RAIN</p>
Water quality modeling	<p>Water quality modeling to be conducted in accordance with GHD Warriewood Retirement Village – Water Management Report. 2006 and Warriewood Valley Urban Land Release – Water Management Specification (WMS).</p>
Algae	<p>Manually monitor Algae in summer months. Remove Algae blooms physically upon occurrence. Manage phosphorus levels in wetland using Phoslock if required.</p> <p>Frequency – Monthly November to April.</p>

Appendix A

Maintenance Inspection Form – Wetland

Water Quality Maintenance Checklist				
Inspection Frequency:	1 to 6 monthly	Date of Visit		
Location:				
Description:				
Site Visit by:				
Inspection Items	Y	N	Action Required (details)	
Wetland				
Sediment accumulation at inflow points?				
Litter within basin?				
Erosion at inlet or other key structures?				
Traffic damage present?				
Evidence of dumping (e.g. building waste)?				
Vegetation condition satisfactory (density, weeds etc.)?				
Watering of vegetation required?				
Replanting required?				
Slashing required?				
Clogging of drainage points (sediment or debris)?				
Evidence of ponding?				
Damage/vandalism to structures present?				
Surface clogging visible?				
Drainage system inspected?				
Is Algae Present?				
Resetting of wetland required?				
Comments:				



Department of
Primary Industries
Office of Water

Contact: Gina Potter
Phone: 02 8838 7566
Fax: 02 8838 7554
Email: gina.potter@water.nsw.gov.au

ARV Peter Magnisalis
Level 2
62 Norwest Boulevard
Baulkham Hills NSW 2153

Our ref: 10 ERM2013/0778
File No: 9057375
Your Ref: DANO267/13

Attention: Peter Magnisalis

24 June 2014

Dear Sir/Madam

Re: Controlled activity approval – 10 ERM2013/0778
For activity described as: Demolition earthworks and construction of a seniors housing 59 dwellings with a community dwelling bowling greens landscaping road work and ancillary,
To be carried out at: 6-14 Macpherson Street Warriewood
Date of Issue 24 June 2014 : Date of Expiry 24 June 2017.

I refer to your application for a controlled activity approval under the *Water Management Act 2000* which was received at this office on 3 June 2014. Receipt of your application fee of 1324 is also acknowledged.

1. Controlled activity approval

The Office of Water has determined to grant you a controlled activity approval. Please find enclosed the **Notice of Determination** together with your **Statement of Approval**.

Please read carefully the conditions of the approval and seek clarification from the Office of Water for any condition not fully understood.

A **copy** of this approval and any annotated documentation should be **provided to council**, your **certifier** and to all **contractors** engaged in the implementation of this controlled activity or the Vegetation Management Plan (VMP) to ensure they are also aware of the conditions.

The controlled activity approval must be kept **current until** the controlled activity has been **completed**. Applications for **extending the approval** should be made to the Office of Water, in writing, at least **one month** prior to the expiry date on the approval.

2. Inspections and fees

As the approval holder, you are required to notify the Office of Water on completion of the controlled activity. A site inspection may be needed to confirm that all of your obligations under the controlled activity approval have been carried out.

Costs associated with a single inspection may be covered by the application fee. However, if extra inspections or significant reassessment is required then additional fees will be incurred.

Fees will also apply to any amendments requested or any extension of this approval. The current fee schedule is available at:

www.water.nsw.gov.au [Water licensing](#) > [Approvals](#) > Controlled activities

3. Other approvals may be required

Subject to the conditions of the attached Statement of Approval, the approval holder is only authorised to carry out the controlled activity described at the location specified.

The attached Statement of Approval does not relieve the approval holder of any obligation which may exist to also obtain permission / approval / consent from any other agency who may have some form of control over the site or the proposed development.

Any questions regarding this correspondence should be directed to **Gina Potter**,
gina.potter@water.nsw.gov.au.

Yours sincerely



Gina Potter
Water Regulation Officer
NSW Office of Water
Hunter, Sydney & South Coast

Enc:
Notice of Determination
Statement of Approval



Statement of Approval

Water Management Act 2000

Approval details

Approval No: 10 ERM2013/0778

File No: 9057375

Status: CURRENT *

Approval type: Controlled Activity Approval

Water sharing plan: not applicable

Period of Approval

Date of effect: 24 June 2014

Expiry date: 24 June 2017

Approval holder(s): Schedule 1

Description of activity: Schedule 2

Conditions: Schedule 3

Contact for service of documents

Name: ARV Peter Magnisalis

Address: Level 2, Baulkham Hills, NSW, 2153

- * NOTE: An approval has effect for such period as is specified in the approval, or if the period is extended under section 105 of the *Water Management Act 2000*, that extended period. If an application for extension of an approval is lodged before the approval expires, the term of the expiring approval is extended until either the date of the final decision on the application, or a date fixed by the Minister for the approval, whichever is the later date. An approval which has expired can be the subject of an application to extend it but it needs to be accompanied by a statutory declaration of the reasons for the delay in making the application. If the Minister accepts these reasons the term of the approval is taken to have been extended, and the application may be dealt with, as if the application had been made before the approval expired.

It is an offence under the *Water Management Act 2000* to breach a term or condition of the approval or to construct or carry out a controlled activity to which the approval does not relate, or if the approval has expired, been surrendered or cancelled.

Schedule 1 - Approval holder(s)

Holder's name(1):	ARV Peter Magnisalis		
Postal Address:	Level 2		
	Town/City	State	P/Code
	Baulkham Hills	NSW	2153
Holder's name(2):			
Postal Address:			
	Town/City	State	P/Code
Company Name:			
ACN (if applicable):			
Office Address:			
	Town/City	State	P/Code

Property/land owner's details

Name of Owner/s (1)	ARV Peter Magnisalis		
Postal Address:	Level 2		
	Town/City	State	P/Code
	Baulkham Hills	NSW	2153
Name of Owner/s (2)			
Postal Address:			
	Town/City	State	P/Code

IMPORTANT NOTICE – Change of approval holder or landholder or contact person.

Please advise the Office of Water in the event of any of the following as soon as practicable:

- If there is a change in the ownership or occupation of the land benefited by this approval (see Schedule 2). Under the *Water Management Act 2000*, an approval is typically held by the owner or lawful occupier of the benefited land. Consequently, a change in ownership may cause a change in your legal obligations as an approval holder. *
- If there is a change to the contact person or their contact details. You will be required to lodge a written statement signed by all the approval holders. *
- If there is a change in the mailing address for the nominated contact person. This should be done by the contact person in writing.

* An updated Statement of Approval reflecting these changes will be issued free of charge.

Schedule 2 – Controlled activity

Authorised Controlled Activity

Subject to the conditions of this approval, in relation to the controlled activity described, the holders of this approval are authorised to construct and carry out the controlled activity at the location specified:

Controlled activity: Demolition earthworks and construction of a seniors housing 59 dwellings with a community dwelling bowling greens landscaping road work and ancillary as shown on Plan No. SE01, Sediment & Erosion Control, Rev 04, dated 27/05/2014, prepared by Enviro Studio

Property Name:

Site address: 6-14 Macpherson Street Warriewood

Lot 3, 4, 5

DP 1161389

Parish

County

Lot

DP

Parish

County

Lot

DP

Parish

County

Local Council: Pittwater Council

Development Reference: DANO267/13

(if applicable)

Name of watercourse: Narrabeen Creek

Catchment name:

Security Details (if applicable)

Numb er	Provider	Value
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Application fees

Fee: \$ 1324 has been paid exclusive of GST

Receipt No: PAR14/1218

Approval issued by

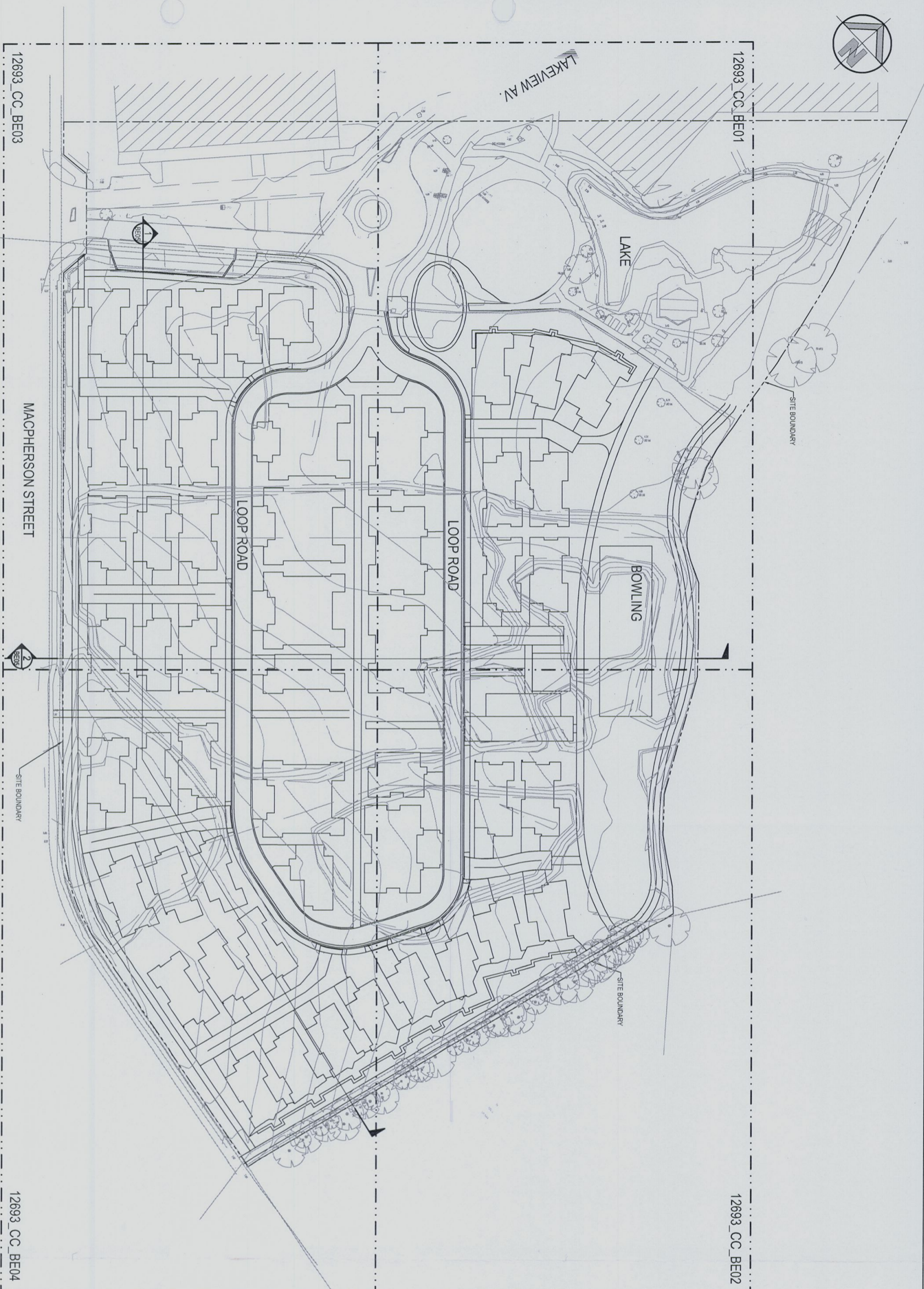
Officer's name Gina Potter

Schedule 3 Conditions:

In relation to the controlled activity described in Schedule 2, the holders of this approval are authorised to construct and carry out the controlled activity at the location specified subject to the conditions listed:

Number	Condition
Plans, standards and guidelines	
1	This Controlled Activity Approval number 10 ERM2013/0778 only applies to the controlled activity carried out at the location marked on Plan No SE01, Sediment & Erosion Control, Rev 04, dated 27/05/2014, prepared by Enviro Studio as approved by the NSW Office of Water and stamped on 24 June 2014. This Controlled Activity Approval does not permit controlled activities at any other site.
2	The approval holder must not transfer this Controlled Activity Approval 10 ERM2013/0778 without the written approval of the NSW Office of Water.
3	The approval holder must keep a copy of the current Controlled Activity Approval 10 ERM2013/0778 on site at all times and make this approval available to officers from the NSW Office of Water on request.
4	If the controlled activities described in this Controlled Activity Approval 10 ERM2013/0778, have not commenced or been completed within the period of this approval, the approval holder must apply to the NSW Office of Water for a new approval or seek an extension prior to the lapsing of the consent.
5	The approval holder must notify the NSW Office of Water in writing within 14 calendar days of any change in (i) site management; (ii) land ownership; (iii) land occupation.
6	The approval holder must comply with the requirements of each of the plans approved by the NSW Office of Water and stamped on 24/06/2014 as follows: <ul style="list-style-type: none"> i. Plan No. SE01, Sediment & Erosion Control, Rev 04, dated 27/05/2014, prepared by Enviro Studio ii. Plan No. C402, Setout Detail Sht 2 of 4, Rev 01, dated 15/05/2014, prepared by Enviro Studio iii. Plan No. C401, Setout Detail Sht 1 of 4, Rev 01, dated 16/05/2014, prepared by Enviro Studio
7	N/A
8	The approval holder must submit for approval, by the NSW Office of Water, any amendments to a plan listed in Condition 6 (six) prior to carrying out any works in relation to the approved controlled activity.
9-10	N/A
11	The approval holder must comply with the requirements of the approved vegetation management plan dated 27/03/2009 for the Controlled Activity Approval ERM2008/1071 to the extent that it relates to the carrying out of the rehabilitation activities on the site which is the subject of this controlled activity approval.
12-13	N/A
14	The approval holder must not disturb the rehabilitation activities required by the approved Vegetation Management Plan (VMP) dated 27/03/2009 for the Controlled Activity Approval ERM2008/1071.
15-20	N/A
21	At practical completion and/or at the end of the maintenance period, the approval holder must provide a final written report to the NSW Office of Water evidencing completion of the approved controlled activity.
22-24	N/A
25	The approval holder must notify the NSW Office of Water in writing within seven (7) days if the controlled activity (i) ceases for a period of more than 30 calendar days; or (ii) is terminated before its full completion, or (iii) is resumed.
26-35	N/A

Number	Condition
36	The approval holder must not leave materials which could obstruct the flow of water or damage river banks on waterfront land at any time.
37	The approval holder must remove surplus material when operations cease and the controlled activity is completed.
38	The approval holder must not put materials in the drainage line or river or in any area that has existing native vegetation and/or that is identified as part of the riparian corridor.
39-43	N/A
44	The approval holder must use only biodegradable materials for any erosion control matting in the riparian corridor.
45	The approval holder must decommission all erosion and sediment control works using a suitably qualified person when the site has stabilised .
46	The approval holder must (i) implement erosion and sediment control measures in accordance with the requirements of the Managing Urban Stormwater Manual, Volume 1, Soils and Construction (Landcom, 4th Edition, March 2004) prior to any works commencing at the site; and (ii) maintain the control measures for the duration of the approval to prevent sediment and dirty water entering the waterway.
47-54	N/A
65	The approval holder must not use wire mesh structures, concrete, spray concrete, concrete grouting, crib walling, masonry or car tyres for bank stabilisation.
66-75	N/A
END OF CONDITIONS	



BULK EARTHWORKS QUANTITIES - CIVIL WORKS - AREA 2, 24ha	
CUT	11450 m ³
FILL	12600 m ³
SHORTFALL	1150 m ³

EXCAVATION FOR SERVICE TRENCHES NOT INCLUDED IN CALCULATION

NOTES - OVEREXCAVATION

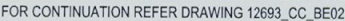
OVER EXCAVATION FOR COMPACTION UNDER THE ROAD AND DRIVEWAYS OF 10000m³ NOT INCLUDED IN BULK EARTHWORKS QUANTITIES

LEGEND

CITY PLAN SERVICES	
Conservation Certificate No.	Approval Date:
142440	25 JUN 2014
Certifying Authority:	
Brendan Barnatt	
Accreditation No:	
BPP 0027	

FOR CONSTRUCTION CERTIFICATE

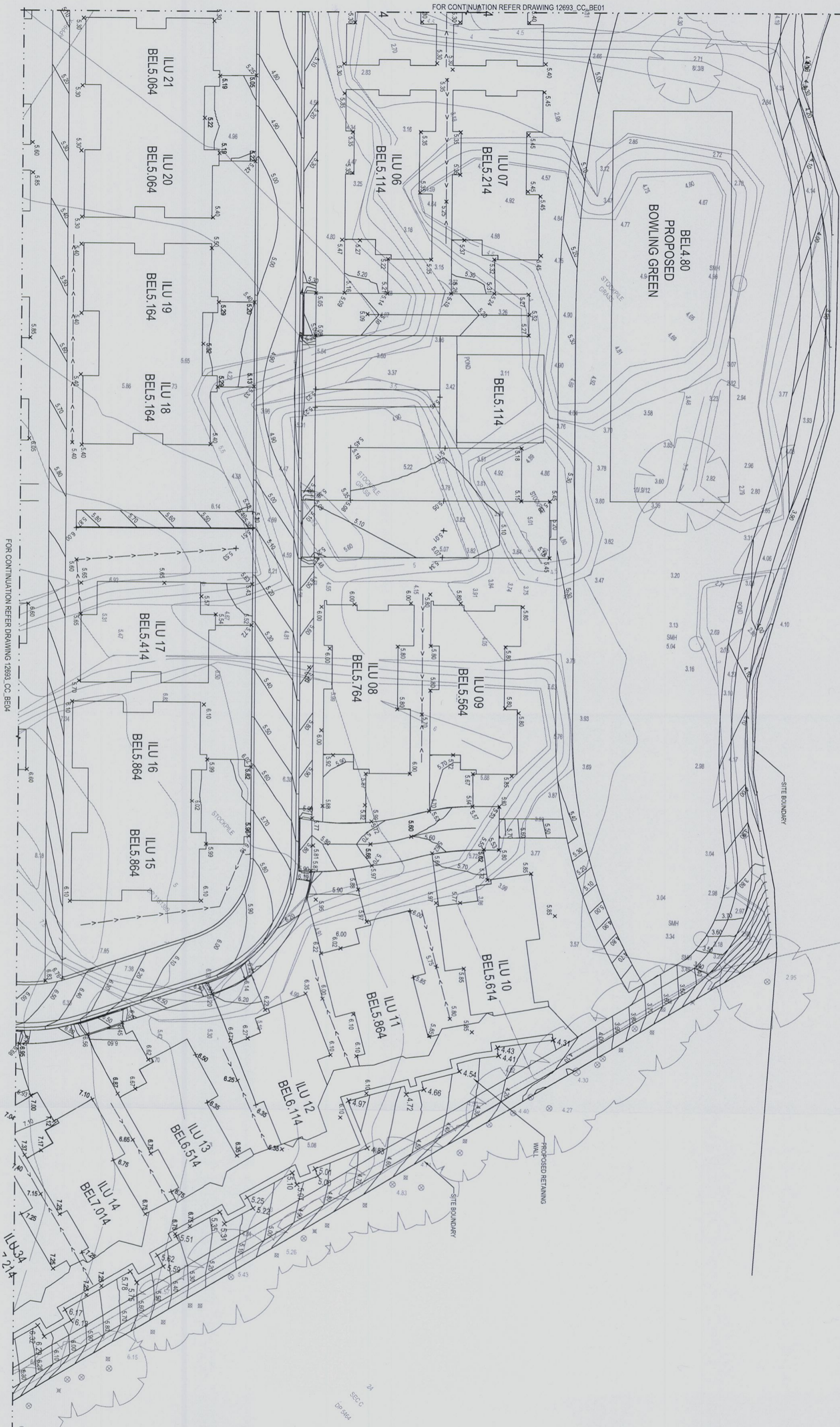
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DETAIL PLAN - SHEET 1 OF 4
SCALE 1/200

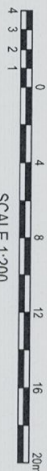
FOR CONSTRUCTION CERTIFICATE

Drawing number	Revision
12693_CC_BE01	02



FOR CONTINUATION REFER DRAWING 12693_CC_BE01

FOR CONTINUATION REFER DRAWING 12693_CC_BE04

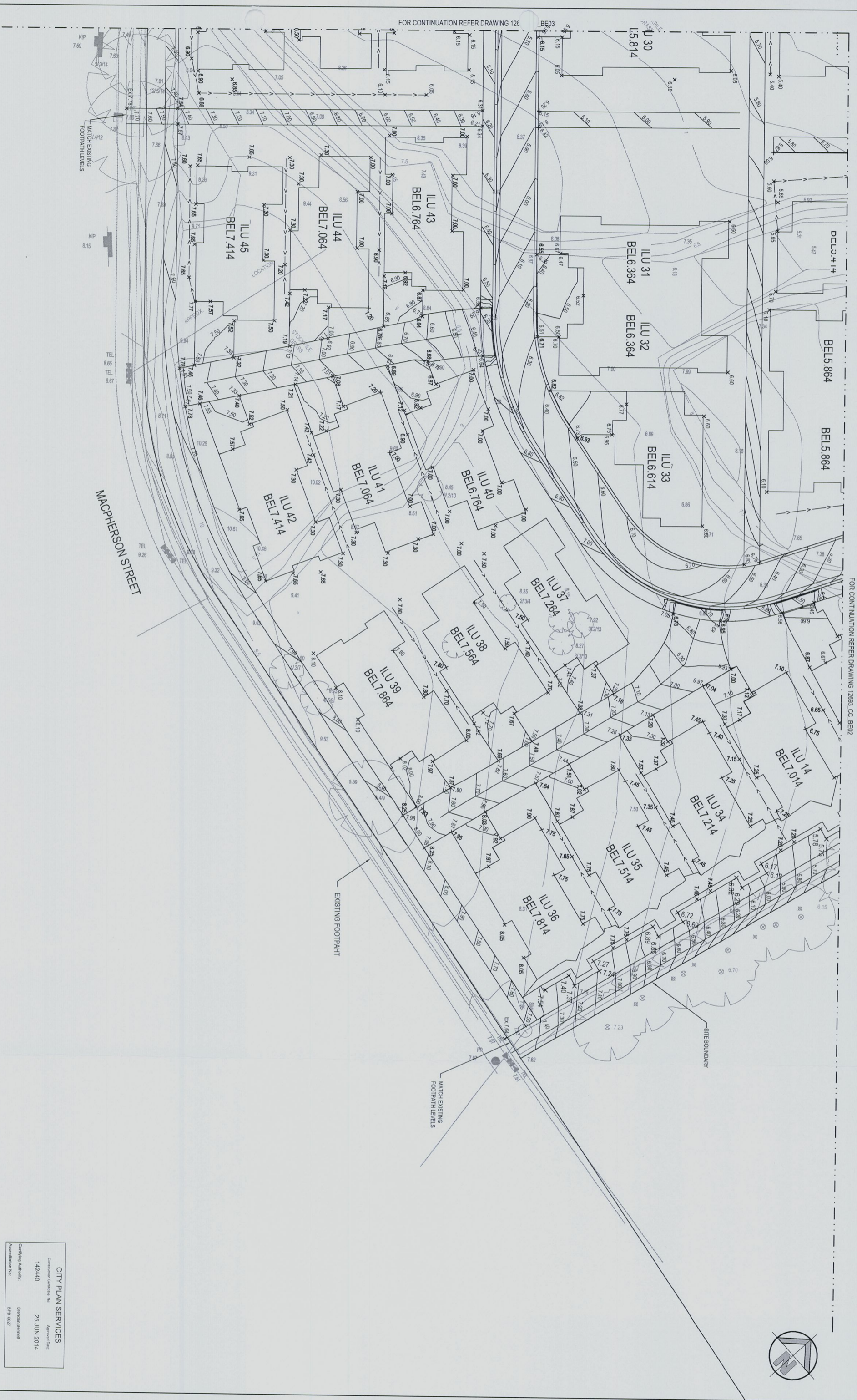



DETAIL PLAN - SHEET 1 OF 4
SCALE 1:200

SURVEY INFORMATION				Client			
SURVEYED BY:				ARV			
LOCKEY LAND TITLE SOLUTIONS				ENVIRONA STUDIO			
DANIEL A.H.D.				This drawing and design remains the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.			
ORIGIN OF LEVELS: PASSED 83.38				Level 5 79 Victoria Avenue Oranmore NSW 2067			
REVISION	DATE	BY	REASON	DATE	BY	REASON	DATE
02		ISSUED FOR CC					
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FOR CONSTRUCTION CERTIFICATE

Project				Drawn			
ANGLOCAN RETIREMENT VILLAGES				M. S. M. / A. W. / J. W.			
8 MACHERSON STREET WARRIEWOOD				B. S. M. / A. W. / J. W.			
BULK EARTHWORKS DETAIL PLAN				1:200 @ A1			
SHEET 2 OF 4				12693_CC_BE02_02			



SURVEY INFORMATION					
SURVEYED BY: LOCKLEY LAND TITLE SOLUTIONS DATA A/HO					
ORIGIN OF TITLES: PHS049 R/LJ38					
SURVEY NO.					
ISSUED FOR:					
DATE ISSUED FOR CONTRACT					
REVISION					
AMENDMENT					
DRAWN	MA	1/05/2014			
CHECKED	MM	1/05/2014			
APPROVED					
DATE					
PROJECT	Level 5, 79 VICTORIA AVENUE CHADDERTON NSW 2007 TIMOTHY +61 2 9417 8400 +61 2 9417 8527 Email timothy@timothysolutions.com.au Web www.timothysolutions.com.au				
CLIENT	ARV ENVIRONA STUDIO				
DESCRIPTION	This drawing and design retain the property of Henry & Hyman's and may not be copied in whole or in part without the prior written approval of Henry & Hyman's				
DRAWN	DEVELOPER	DATE			
					
PROJECT	ANGUICAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD BULK EARTHWORKS DETAIL PLAN SHEET 4 OF 4				
DESIGN	M STROVER	DESIGNED	N WEHNER	DATE	MAY 2014
CHECKED	B SUTTOR	APPROVED	A FRANCIS	SCALE	1:200 @ A1
DRAWING NUMBER	12693 CC BE04 02				



LEGEND

----- PROPOSED BATTERY BOUNDARY

EXISTING BATTERY LINE

PROPOSED BATTERY LINE

CITY PLAN SERVICES

EXISTING SURFACE

ROAD FINISHED DESIGN LEVELS

BULK EARTHWORKS LEVELS

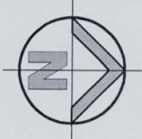
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Project	Drawn	Discipl	Date	Revision
ANGELCAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD	M SHIRWA B SHIRWA	N WIGLER Approved A.FINCH	MAR 2014	12693_CC_BE07_02
BULK EARTHWORKS OVER EXCAVATION PAIN				



PROPOSED ANGLICAN RETIREMENT VILLAGES
8 MACPHERSON STREET WARRIEWOOD, NSW
CIVIL ENGINEERING WORKS



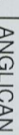
LOCALITY PLAN
N.T.S.

DRAWING SCHEDULE	
12693.00.C000	COVER SHEET, DRAWING SCHEDULE & LOCALITY SKECH
12693.00.C010	NOTES SHEET
12693.00.C100	GENERAL ARRANGEMENT PLAN
12693.00.C101	DETAIL PLAN SHEET 1 OF 4
12693.00.C102	DETAIL PLAN SHEET 2 OF 4
12693.00.C103	DETAIL PLAN SHEET 3 OF 4
12693.00.C104	DETAIL PLAN SHEET 4 OF 4
12693.00.C115	TYPICAL SECTIONS AND DETAILS
12693.00.C116	ENTRY DRIVEWAY GRADING AND SECTIONS
12693.00.C118	LOOP ROAD CENTRE LINE ALIGNMENT SET/OUT
12693.00.C120	ROAD 1 LONGITUDINAL SECTION
12693.00.C130	SITE SECTIONS
12693.00.C140	ROAD CROSS SECTIONS - SHEET 1 OF 2
12693.00.C141	ROAD CROSS SECTIONS - SHEET 2 OF 2
12693.00.C160	STORMWATER MISCELLANEOUS DETAILS
12693.00.C201	STORMWATER360 DETAILS
12693.00.C211	STORMWATER LONGITUDINAL SECTIONS, SHEET 1 OF 2
12693.00.C212	STORMWATER LONGITUDINAL SECTIONS, SHEET 2 OF 2
12693.00.C220	STORMWATER PLAN AND OFF-RAE WEIR SECTIONS
12693.00.C221	BASIN SECTIONS
12693.00.C241	SET/OUT DETAIL PLAN, SHEET 1 OF 4
12693.00.C242	SET/OUT DETAIL PLAN, SHEET 2 OF 4
12693.00.C243	SET/OUT DETAIL PLAN, SHEET 3 OF 4
12693.00.C244	SET/OUT DETAIL PLAN, SHEET 4 OF 4
12693.00.C260	PAYEMENT PLAN
12693.00.C281	GENERAL ARRANGEMENT PLAN - SERVICES PLAN
12693.00.C281	SERVICES PLAN 1 OF 4
12693.00.C282	SERVICES PLAN 2 OF 4
12693.00.C283	SERVICES PLAN 3 OF 4
12693.00.C284	SERVICES PLAN 4 OF 4
12693.00.C300	BULK EARTHWORKS OVERALL PLAN
12693.00.C301	BULK EARTHWORKS DETAIL PLAN, SHEET 1 OF 4
12693.00.C302	BULK EARTHWORKS DETAIL PLAN, SHEET 2 OF 4
12693.00.C303	BULK EARTHWORKS DETAIL PLAN, SHEET 3 OF 4
12693.00.C304	BULK EARTHWORKS DETAIL PLAN, SHEET 4 OF 4
12693.00.C305	BULK EARTHWORKS DETAIL PLAN, SHEET 4 OF 4
12693.00.C306	BULK EARTHWORKS SECTIONS
12693.00.C307	BULK EARTHWORKS DETAILS
12693.00.C307	BULK EARTHWORKS - OVER EXCAVATION PLAN
12693.00.C307	SEGMENT 1 & EROSION CONTROL PLAN
12693.00.C307	SEGMENT 1 & EROSION CONTROL TYPICAL SECTIONS & DETAILS
12693.00.C307	SEGMENT 1 & EROSION CONTROL TYPICAL SECTIONS & DETAILS

CITY PLAN SERVICES	Construction Certificate No.	Approved Date:
142440	25 JUN 2014	
Certifying Authority:	Brendan Bennett	
Accreditation No.	BFB 0027	

FOR CONSTRUCTION CERTIFICATE

[illegible]



Karmahyamas

ANGELCAN RETIREMENT VILLAGES

8 MACPHERSON STREET WARREIWOOD

COVER SHEET, DRAWING SCHEDULE

& LOCALITY SKETCH

12693 CC C000 03

Drawing number	Designed	Date	Revision
01	M. Sironval	MAR 2014	
02	C. Gould		
03	B. Sironval		
04	A. Firooz		
05			
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GENERAL NOTES:

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH ATTACHED CONTRACT SPECIFICATION CONTRACTOR TO OBTAIN AND RETAIN A COPY ON SITE DURING THE COURSE OF THE WORKS.
2. ALL NEW WORKS ARE TO MAKE A SHORTCUT FUNCTION WITH EXISTING CONDITIONS, AND MAINTAIN A WORKMANLIKE MANNER.
3. THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL SERVICES WITH EACH RELEVANT AUTHORITY. ANY DAMAGE TO EXISTING SERVICES SHALL BE REPAIR BY THE CONTRACTOR OR THE RELEVANT AUTHORITY AT THE CONTRACTOR'S EXPENSE. SERVICES SHOWN ON THESE PLANS ARE ONLY THOSE IDENTIFIED AT THE TIME OF SURVEY, OR AS CONSULTING WITH THE RELEVANT AUTHORITY. THE CONTRACTOR SHALL CONSULT WITH THE RELEVANT AUTHORITY TO OBTAIN THE INFORMATION SHOWN, NOT ACCEPT ANY RESPONSIBILITY FOR INACCURACIES OR INCOMPLETE DATA.
4. SERVICES ACCESSSES TO THE EXISTING PROPERTIES ARE TO BE MAINTAINED IN WORKING ORDER AT ALL TIMES DURING CONSTRUCTION.
5. ADJUST EXISTING SERVICE COVERS TO SUIT NEW FINISHED LEVELS TO RELEVANT AUTHORITY REQUIREMENTS WHERE NECESSARY.
6. REMOVE AND STABILISE ALL DISTURBED LANDSCAPED AREAS.
7. MINIMUM GRADE OF SUBSOIL SHALL BE 0.2% (1:20) FALL TO OUTLETS
8. ALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS. STORMS AND SEDIMENTATION OF THE DRAINAGE AND FUTURE TOWN COUNCIL REQUIREMENTS WHERE APPLICABLE.
9. CONTRACTOR TO CHECK AND CONFIRM SITE DRAINAGE CONNECTIONS ACROSS THE VERGE PRIOR TO COMPLETION OF SITE DRAINAGE WORKS.
10. PROPERTIES AFFECTED BY THE WORKS ARE TO BE NOTIFIED IN ADVANCE WHERE DISRUPTION TO EXISTING ACCESS IS LIKELY.

SUBGRADE PREPARATION - SITEWORKS

9. EVALUATE ADHESIVE SUBGRADE LEVELS WHERE NECESSARY
PARENTS, TOPSOIL OR OBVIOUS UNSUITABLE MATERIAL
8. THE EXPOSED SUBGRADE AFTER STRIPPING AND/OR OCAVIATION
TO BE PROOF ROLLED USING NOT FEWER THAN 5 PASSES OF A
MAMMOET 3 TONNE DUAL WEIGHT STEEL SMOOTH-ROLL ROLLER
UNDER THE SUPERVISION OF AN EXPERIENCED GEOTECHNICAL
ENGINEER OR AN EQUIVALENT GEOTECHNICAL ENGINEER. ANY
AREAS OF THE SUBGRADE EXHIBITING EXCESSIVE DEFLECTION
BASED ON THE SURFACE MEASURED TO A MIN DEPTH
OF 0.6m AND RECORDED SHALL BE REWORKED UNTIL THE MATERIAL
IS COMPACTED IN 25mm LOOSE LAYERS AS DIRECTED BY THE
GEOTECHNICAL ENGINEER.
7. ENGINEERED FILL FOR REPLACEMENT OF SOFT OR HEAVING
AREAS OR FOR BUILD-UPPING TO COMPRESS ESSENTIALLY OF
GRANULAR MATERIALS (EO EQUIVALENT SHALE) WITH A PARTICLE
SIZE NOT GREATER THAN 19mm DIAMETER. ENGINEERED FILL TO
BE PLACED IN LAYERS NOT EXCEEDING 250mm LOOSE THICKNESS
AND COMPACTED TO BETWEEN 98% AND 102% OF STANDARD
MAMMOET DRY DENSITY (SDND) WITH 2% OF OPTIMUM
MOISTURE CONTENT (SOMC).
6. IMPROVED FILLING (EQUIVALENT) IS TO BE AT THE APPROVAL
OF THE GEOTECHNICAL ENGINEER. THE CONTRACTORS ARE TO
SUBMIT THE SOURCE AND PROVIDE A SAMPLE FOR APPROVAL
PRIOR TO IMPORTATION AND PLACEMENT ON SITE.
5. ALL FILL MATERIAL SHALL BE FROM A SOURCE APPROVED BY THE
FREE PORT AUTHORITY AND SHALL COMPLY WITH THE FOLLOWING:
FRESH NON ORGANIC AND PERMISSIBLE MATTER
MAMMOET PARTICLE SIZE = 19mm
4. MAMMOET PLASTIC INDEX = 15%

SURVEY NOTES

THE EXISTING ROAD CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY SURVEYOR SPECIFIED IN THE TITLE BLOCK AND THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. HENRY AND HYMAS PTT, LTD. DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.

THE FOLLOWING DISCREPANCIES ARE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT HENRY AND HYMAS PTT, LTD. THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM ORIGINAL SURVEY DOCUMENTS.

ORIGIN OF LEVELS

RL 9.38

AHD

EXISTING SERVICES & FEATURES

- THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/ CONSTRUCTION OF TEMPORARY SERVICES.
- CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY OF EXISTING BUILDINGS AND TO PROVIDE ACCESS TO ALL WORKS TO BE MAINTAINED AND APPROVAL OF THE SUPERINTENDENT SHALL BE OBTAINED. SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
- INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL CONTRACTOR TO GAIN ACCESS FROM THE SUPERINTENDENT FOR THE PURPOSE OF INTERRUPTION.
- EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
- EXISTING SERVICES UNLESS SHOWN ON SURVEY PLAN HAVE BEEN PROTECTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACQUAINTANCE CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ACCESS TO ALL SERVICES AND TO ESTABLISH THE LOCATION AND LEVEL OF ALL SERVICES PRIOR TO ANY CONSTRUCTION WORKS.
- WORKS AND DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- ALL BRACK GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN 800MM DIA PVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.

FLEXIBLE PAVEMENT NOTES:

BASE, SUB BASE AND SELECT MATERIAL

1. GENERAL: "BASE" (I.E. THE HIGHEST COURSE OF THE PAVEMENT BELOW THE SURFACING) SHALL BE CONSTRUCTED OF ONE CRUSHED ROCK (EITHER CONCRETE OR ASPHALT) OR ONE COURSE OF THE BASE. THE BASE SHALL BE INTENDED TO BE A CRUSHED ROCK OR CRUSHED ROCK AND ASPHALT. THE BASE SHALL BE CONSTRUCTED OF A CRUSHED ROCK OR NATURAL GRAVELS.
2. PAVEMENT: "SELECT MATERIAL LAYER" (I.E. THE LOWER COURSE OF THE PAVEMENT BELOW THE SUB-BASE) SHALL BE CONSTRUCTED OF CRUSHED ROCK, NATURAL GRAVELS OR SUIABLE SOLLS. THE SUBGRADE SURFACE SHALL BE THE SURFACE THAT UNDERLIES OTHER.
3. THE SELECT MATERIAL LAYER WHEN SELECT MATERIAL LAYERS IS PRESENT ON THE SUB-BASE, WHEN SELECT MATERIAL LAYERS IS ABSENT FROM THE PAVEMENT CONSTRUCTION, OR
4. THE BASE WHEN BOTH SELECT MATERIAL LAYERS AND SUB-BASE ARE ABSENT FROM THE PAVEMENT CONSTRUCTION
5. MATERIALS:
 - a. PRIOR TO THE DELIVERY OF ANY MATERIAL TO THE SITE, THE SOURCE OF SUCH MATERIALS AND CERTIFICATES THAT THE MATERIAL SATISFIES THE SPECIFIED REQUIREMENTS SHALL BE SUBMITTED TO THE APPROVAL. ADDITIONALLY, FOR EACH MATERIAL SOURCE COMPLYING WITH THE APPROVED QUALITY ASSURANCE PROGRAM FOR INDIVIDUAL MATERIALS, SHALL BE PROVIDED TO THE SUPERINTENDENT AS REQUIRED IN THE QUALITY SYSTEM REQUIREMENTS. TESTING OF PAVEMENT MATERIALS WILL BE NORMALIZED AND PERFORMED ON SAMPLES TAKEN AT THE SOURCE PRIOR TO DELIVERY TO THE SITE AND IN THEIR FINAL CONDITIONS AFTER PLACEMENT.
 - b. SPECIFIC ACTION IN THE PAVEMENT, HOWEVER, THE PREFERENCES SPECIFIED IN THE CONTRACT SHALL BE APPLICABLE TO THE MATERIALS IN THEIR FINAL CONDITION IN THE PAVEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PAVEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PAVEMENT IN CASE OF SEPARATION OR CONTAMINATION DURING SUBSEQUENT PAVEMENT WORKS.

FINE CRUSHED ROCK BASE MATERIAL

FINE CRUSHED ROCK SHALL CONFORM TO THE REQUIREMENTS OF CLASS D6820 MATERIAL AS SPECIFIED IN R1A SPECIFICATION 3071 AND SHALL BE HARD, DURABLE STONE FREE OF CLAY LUMPS, ORGANIC MATTER AND OBSTRUCTABLE OR LUMPY QUANTITIES OF DELETERIOUS SUBSTANCES. THE MATERIAL MAY BE CRUSHER RUN OR SCREENED AND RECOMBINED. ALL THE MATERIAL REQUIREMENTS APPLY BOTH PRIOR TO AND AFTER PLACEMENT IN THE PAVEMENT.

SUB-BASE MATERIALS

SUB-BASE MATERIALS SHALL BE CRUSHED ROCK SUB-BASE OR SUITABLE NATURAL GRAVELS AND CONFORM TO THE REQUIREMENTS OF CLASS DGS-40 OR DGS-20 OF RITA SPECIFICATION 3051. STONE SHALL BE HARD, DURABLE AND THE MATERIALS SHALL BE FREE OF CLAY LUMPS, ORGANIC MATTER AND OBJECTABLE QUANTITIES OF DELETERIOUS SUBSTANCES. ALL MATERIAL REQUIREMENTS WILL APPLY BOTH PRIOR TO AND AFTER PLACEMENT IN THE PAVEMENT.

SITWORKS NOTES

- DATUM/LEVEL
- ORIGIN OF LEVELS REFER TO BENCH OR STATE SURVEY MARKS WHERE SURVEY OR PLAN IS BASED ON
- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK
- ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS, THE DIRECTIONS OF THE SUPERINTENDENT.
- EXISTING SERVICES, UNLESS SHOWN ON SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES RECORDS ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK, ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT AUTHORITY.
- WHERE NEW WORKS ARE BEING EXISTING THE CONTRACTOR SHALL ENSURE THAT SMOOTH FLEET PROFILES FROM ADJACENT CHANGES IS ACHIEVED.
- THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
- CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES, NO MECHANICAL EXCAVATIONS TO BE UNDERTAKEN OVER TELESTRA OR ELECTRICAL SERVICES UNLESS HAND EXCAVATE IN THESE AREAS
- CONTRACTOR TO OBTAIN AUTHORITY APPROVAL, WHERE APPLICABLE
- MAKE SMOOTH TRANSITION TO EXISTING SURFACES AND MAKE GOOD
- THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED EXISTING ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND MECHANICAL DRAWINGS AND ANY OTHER INSTRUCTIONS THAT MAY BE ISSUED RELATING TO DEVELOPMENT AT THE SITE
- TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE MADE TO FULL DEPTH OF CONCRETE AND A MINIMUM OF 50mm IN BITUMINOUS

COMPACTION REQUIREMENTS

1. CLEAR SITE, STRIP TOP- SOIL, CUT AND FILL AND PREPARATIONS OF SUB GRADE SHALL BE AS DESCRIBED IN "EXHIBITURES"
2. SUB- GRADE SHALL BE COMPACTED TO 98% STANDARD DRY DENSITY RATIO AT 300MM TO 1000.55MM. THE CONTENT $\pm 2\%$ IN ACCORDANCE WITH 1289.5.11. "TOP LOWER BASE COURSE SHALL BE CONSTRUCTED FROM FINE GRAPHERD ROCK (MATERIAL COMPACTED TO 98% MODIFIED DRY DENSITY RATIO AT OPTIMUM MOISTURE CONTENT $\pm 2\%$ IN ACCORDANCE WITH 1289.5.11. OF THICKNESS NOTED ON DRAWINGS.
3. BASE COURSE SHALL BE CONSTRUCTED FROM FINE CRUSHED ROCK COMPACTED TO 98% MODIFIED DRY DENSITY RATIO AT OPTIMUM MOISTURE CONTENT $\pm 2\%$ IN ACCORDANCE WITH 1289.5.11. OF THICKNESS NOTED ON DRAWINGS.
4. WEARING SURFACE SHALL BE ASPHALTIC CONCRETE TO STANDARD SPECIFICATION
5. TESTING OF THE SUBGRADE AND PAVENTMENT LAYERS SHALL BE CARRIED OUT BY APPROVED N.A.T.A REGISTERED LABORATORY

KERBING NOTES

1. ALL TYPES OF KEBABS, DISH DRAINS, CROSSING AND DICES, KINGS, GUTTERS, DISH DRAINS AND CROSSING TO BE CONSTRUCTED ON 100MM SAND BED.
2. MODIFIED MAXIMUM DRAIN DENSITY IS TO BE CONNECTED TO MAXIMUM 300MM DRAINAGE DITCHES.
3. EXPANSION JOINTS (EJ) TO BE FORMED FROM 100 COMPRESSIBLE CORE FILTER BOARD FOR THE TALL DEPTH OF THE SECTION AND CUT TO PROFILE EXPANSION JOINTS TO BE LOCATED AT DRAINAGE DITS ON TANGENT POINTS OF CURVES AND E/S WHERE AT 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATION IN THE PAVEMENT.
4. EXISTING ROAD PAVEMENT IS TO BE MIN. 150MM THICK AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS AND 1000mm WIDENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATION IN KERBS.
5. BROOCHED FINISHED TALL FLAT LAPPED AND VERTICAL CROSSINGS, ALL OTHER KERBER OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. EXISTING ROAD PAVEMENT IS TO BE SAWCUT 50MM FROM LIP OF GUTTER TO 100% COMPLETION OF NEW KERBS, NEW SARECROSSING AND SURFACES IS TO EXISTING ALL JOINT DRAINAGE PIPE ARE TO BE BUILT INTO NEW KERBS WITH A 100MM DIA HOLE.
7. EXISTING KERBS ARE TO BE COMPLETELY REMOVED WHERE NEW KERBS ARE SHOWN.

RIGID CONCRETE PAVEMENT NOTES

GENERAL:

1. CARRY OUT ALL CONCRETE WORK IN ACCORDANCE WITH AS3600:1994 AND THE SPECIFICATION
2. KEEP A COPY OF THESE DOCUMENTS ON SITE.
3. VERIFY ALL SETTING OUT DIMENSIONS WITH THE ARCHITECT AND/OR THE SUPERVISOR
4. DO NOT OBTAIN DIMENSIONS BY SCALING THE DRAWINGS.
5. IN CASE OF DOUBT - ASK

- | | ASTM C 109
28 DAYS | SPECIFIED
SLUMP | NOMINAL
AGG SIZE |
|-------------------------|---|--------------------|---------------------|
| ALL KERBS,
PIPS ETC. | 32 | 80 | 20 |
| UNUSUAL
PAVING | REFER TO CONCRETE PAVEMENT NOTES
BELOW | | |

ALL KERBS, PITS ETC.	AS3600.0 P.C. MP. AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR PAVING	32	80	20
	REFER TO CONCRETE PAVEMENT NOTES BELOW		

ENFORCEMENT:

- FIX REINFORCEMENT AS SHOWN ON DRAWINGS. THE TYPE AND GRADE IS INDICATED BY A SYMBOL AS SHOWN BELOW.
 N HOT ROLLED DEFORMED BAR GRADE 60
 R PLAIN ROUND BAR GRADE 260
 ST OR HL HAWD DRINK WIRE HEMP SQUARE OR RECTANGULAR
 PROVIDE BAR SUPPORTS OR SPACERS TO CURE THE FOLLOWING CONCRETE COVER TO ALL REINFORCEMENT UNLESS NOTED OTHERWISE:
 FLOORS 75 BOTTOM, 65 TOP AND SIDES, 40 SLABS
 40 WHEN EXPOSED TO WEATHER
 DRAINAGE STRUCTURES: 30 WHEN CAST IN FORMS BUT LATER EXPOSED TO WEATHER OR GROUND, 65 WHEN CAST DIRECTLY IN CONTACT WITH GROUND.

CONCRETE VEHICULAR PAVEMENT NOTES:

- [illegible]

FOR CONSTRUCTION CERTIFICATE

CITY PLAN SERVICES	
Contractor Certificate No.	Approved Date
142440	25 JUN 2014
Certifying Authority:	
Accreditation No:	
	Brandon Bennett
	gPR 0027


Drum	Designed	Date
M. Sirmova	N. Wozniar	MAR 2014
B. Selezov	A. Francis	Scale
		N.T.S.

[illegible]

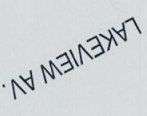
CHART
ARTY
CONTRACT
ENVIRONA STUDIO
This drawing and design retains the property of Henry & Hyman and may not be

Level 5,
79 Victoria Avenue
Chidswode NSW 2067

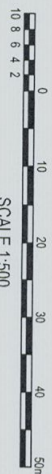
Triforce
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enrich@triforce.com.au
Web
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Project	Owner	Designed	Date
ANGELICAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD	M. Shrivastava	N. Westfall	March 2014
Type	Reviewed B. GARDNER	Approved A. FREDOS	Scale N.T.S.
NOTES SHEET	Drawing number 12603	CC	CC



SCALE 1:50M



CITY PLAN SERVICES	
Construction Certificate No:	Approved Date:
142440	25 JUN 2014
Certifying Authority:	Brendan Bennett
Accreditation No:	BPP 0027

LEGEND

Legend symbols for boundary and subsoil lines. The first symbol is a dashed line. The second symbol is a line with cross-hatching. The third symbol is a line with cross-hatching and a small square at the end.

EXISTING BOUNDARY
PROPOSED SUBSOIL LINE
PROPOSED TABLE DRAIN

Legend symbols for junction pits and surface inlet pits. The first symbol is a square with a cross-hatch pattern. The second symbol is a square with a cross-hatch pattern and a small square at the end. The third symbol is a square with a cross-hatch pattern and a small square at the end.

PROPOSED JUNCTION PITS
PROPOSED SURFACE INLET PITS

Legend symbols for lintel ongrade and sag pits. The first symbol is a square with a cross-hatch pattern. The second symbol is a square with a cross-hatch pattern and a small square at the end. The third symbol is a square with a cross-hatch pattern and a small square at the end.

PROPOSED LINTEL ONGRADE & SAG PITS

Legend symbol for proposed PT tag. It shows a circle with a line passing through it, labeled 'LINE LETTER' and 'PT NUMBER'.

PROPOSED PT TAG

STORMWATER UPSTREAM INVERT RL
STORMWATER PIPE DIAMETER & CLASS
STORMWATER PIPE LENGTH
STORMWATER PIPE GRODE
STORMWATER DOWNSPEAK INVERT RL

Legend symbols for existing stormwater pipe. The first symbol is a line with cross-hatching. The second symbol is a line with cross-hatching and a small square at the end. The third symbol is a line with cross-hatching and a small square at the end.

EXISTING STORMWATER PIPE
PROPOSED STORMWATER PIPE
EXISTING BATTERY LINE

Legend symbols for existing contours. The first symbol is a line with cross-hatching. The second symbol is a line with cross-hatching and a small square at the end. The third symbol is a line with cross-hatching and a small square at the end.

PROPOSED BATTERY LINE
EXISTING CONTOURS
PROPOSED CONTOURS

Legend symbols for spot level, kerb, gutter, and edge strip. The first symbol is a line with cross-hatching. The second symbol is a line with cross-hatching and a small square at the end. The third symbol is a line with cross-hatching and a small square at the end.

PROPOSED SPOT LEVEL
PROPOSED KERB & GUTTER
PROPOSED KERB ONLY
PROPOSED EDGE STRIP

Legend symbols for electrical mains, gas line, sewer line, telstra lines, and water line. The first symbol is a line with cross-hatching. The second symbol is a line with cross-hatching and a small square at the end. The third symbol is a line with cross-hatching and a small square at the end.

EXISTING ELECTRICAL MAINS LINE
EXISTING GAS LINE
EXISTING SEWER LINE
EXISTING TELSTRA LINES
EXISTING WATER LINE

FOR CONSTRUCTION CERTIFICATE



PITS A-10, A-11, B-8, B-9, J-1, J-2, I-1, I-2, H-1, F-2
TO FUTURE DETAIL AS PART OF BUILDING CONTRACT

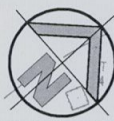
—FUTURE 11 U RAINWATER TANKS TO OVERFLOW INTO PROPOSED PIPED SYSTEM.

FLOOD PLANNING LEVELS.
PMF = R.L. 5.4 AND
1 IN 100 = 4.36 (500 FREEBOARD INCLUDED)

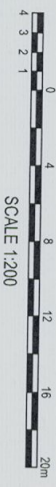
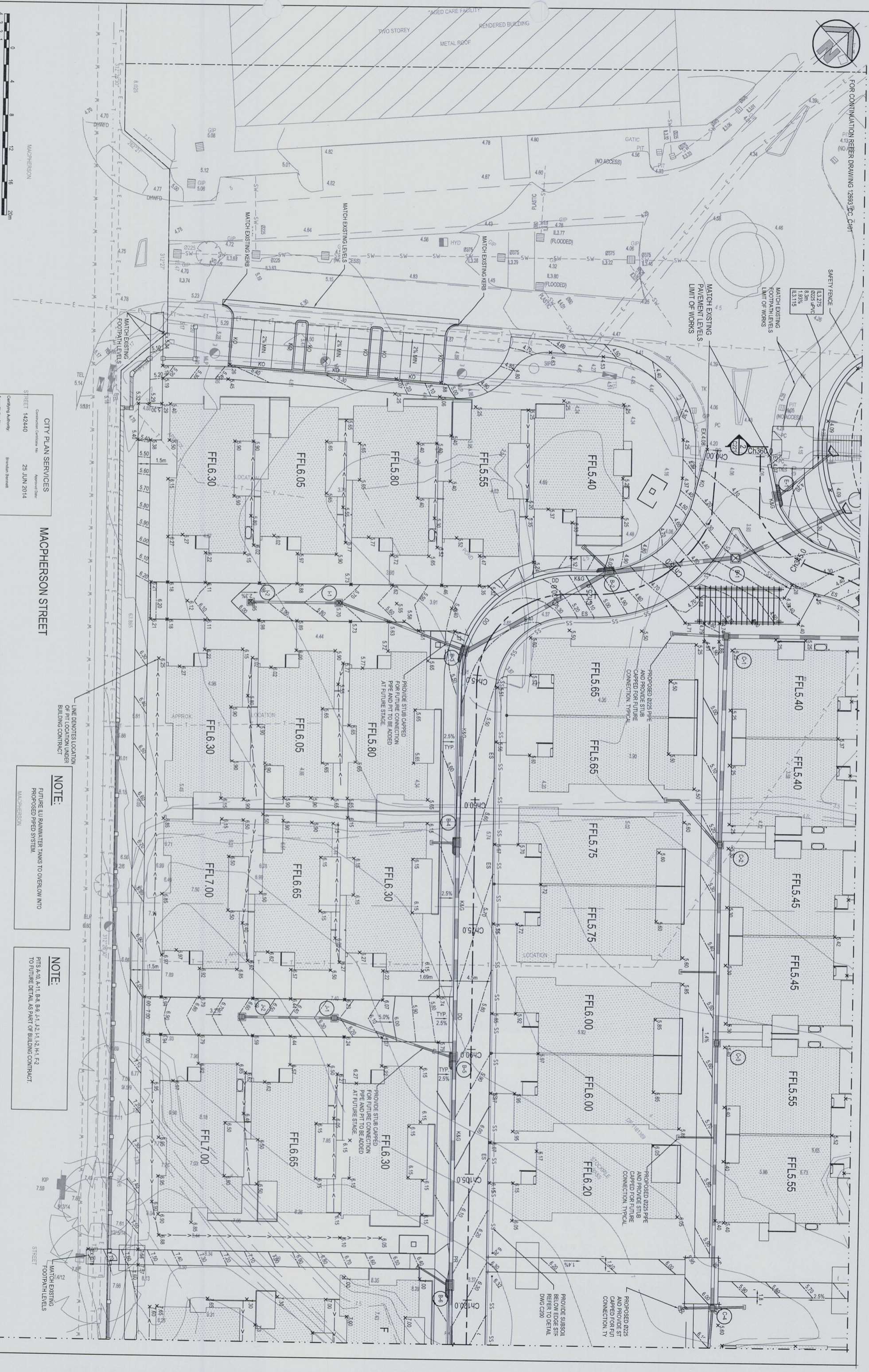
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142440	25 JUN 2014
Certifying Authority:	Breridan Bennett
Accreditation No:	BPS 0027

FOR CONSTRUCTION CERTIFICATE

[illegible]



FOR CONTINUATION REFER DRAWING 12693 CC C101



SURVEY
SURREYED BY:
LOCKEYLAND TITLE SOLUTIONS
ORIGINAL LAYOUT: 19/05/2014
REVISION: 01/06/2014

DATE	19/05/2014
BY	LOCKEYLAND TITLE SOLUTIONS
DATE	01/06/2014
BY	LOCKEYLAND TITLE SOLUTIONS

CITY PLAN SERVICES
CONSTRUCTION CERTIFICATE No. 142440
SHEET 142440
25 JUN 2014
Certifying Authority: Brandon Barrett
Accreditation No. BP01 0027

MACHPHERSON STREET

DETAIL PLAN - SHEET 3 OF 4
SCALE 1:200

FOR CONSTRUCTION CERTIFICATE

ANGLO-AMERICAN RETIREMENT VILLAGES
8 MACHPHERSON STREET WARRIEWOOD
SHEET 3 OF 4

12693 CC C103

03

INFORMATION
SURREYED BY:
LOCKEYLAND TITLE SOLUTIONS
ORIGINAL LAYOUT: 19/05/2014
REVISION: 01/06/2014

DATE	19/05/2014
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MACHPHERSON STREET

DETAIL PLAN - SHEET 3 OF 4
SCALE 1:200

FOR CONSTRUCTION CERTIFICATE

ANGLO-AMERICAN RETIREMENT VILLAGES
8 MACHPHERSON STREET WARRIEWOOD
SHEET 3 OF 4

12693 CC C103

03

INFORMATION
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ORIGINAL LAYOUT: 19/05/2014
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MACHPHERSON STREET

DETAIL PLAN - SHEET 3 OF 4
SCALE 1:200

FOR CONSTRUCTION CERTIFICATE

ANGLO-AMERICAN RETIREMENT VILLAGES
8 MACHPHERSON STREET WARRIEWOOD
SHEET 3 OF 4

12693 CC C103

03

INFORMATION
SURREYED BY:
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ORIGINAL LAYOUT: 19/05/2014
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DATE	19/05/2014
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MACHPHERSON STREET

DETAIL PLAN - SHEET 3 OF 4
SCALE 1:200

FOR CONSTRUCTION CERTIFICATE

ANGLO-AMERICAN RETIREMENT VILLAGES
8 MACHPHERSON STREET WARRIEWOOD
SHEET 3 OF 4

12693 CC C103

03

NOTE:
FUTURE 100mm RAINWATER TANKS TO OVERFLOW INTO PROPOSED PIPED SYSTEM
MACHPHERSON

NOTE:
PITS A-10, A-11, B-8, B-9, J-1, J-2, H-1, H-2 AT FUTURE DETAIL AS PART OF BUILDING CONTRACT

ARV
ENVIRONA STUDIO

harrythymas

harrythymas

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ANGLO-AMERICAN RETIREMENT VILLAGES
8 MACHPHERSON STREET WARRIEWOOD
SHEET 3 OF 4

12693 CC C103

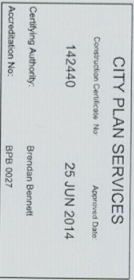
03

harrythymas

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NOTE:

PITS A-10, A-11, B-3, B-4, J-1, J-2, L-1, L-2, H-1, F-2
TO FUTURE DETAIL AS PART OF BUILDING CONTRACT

NOTE:

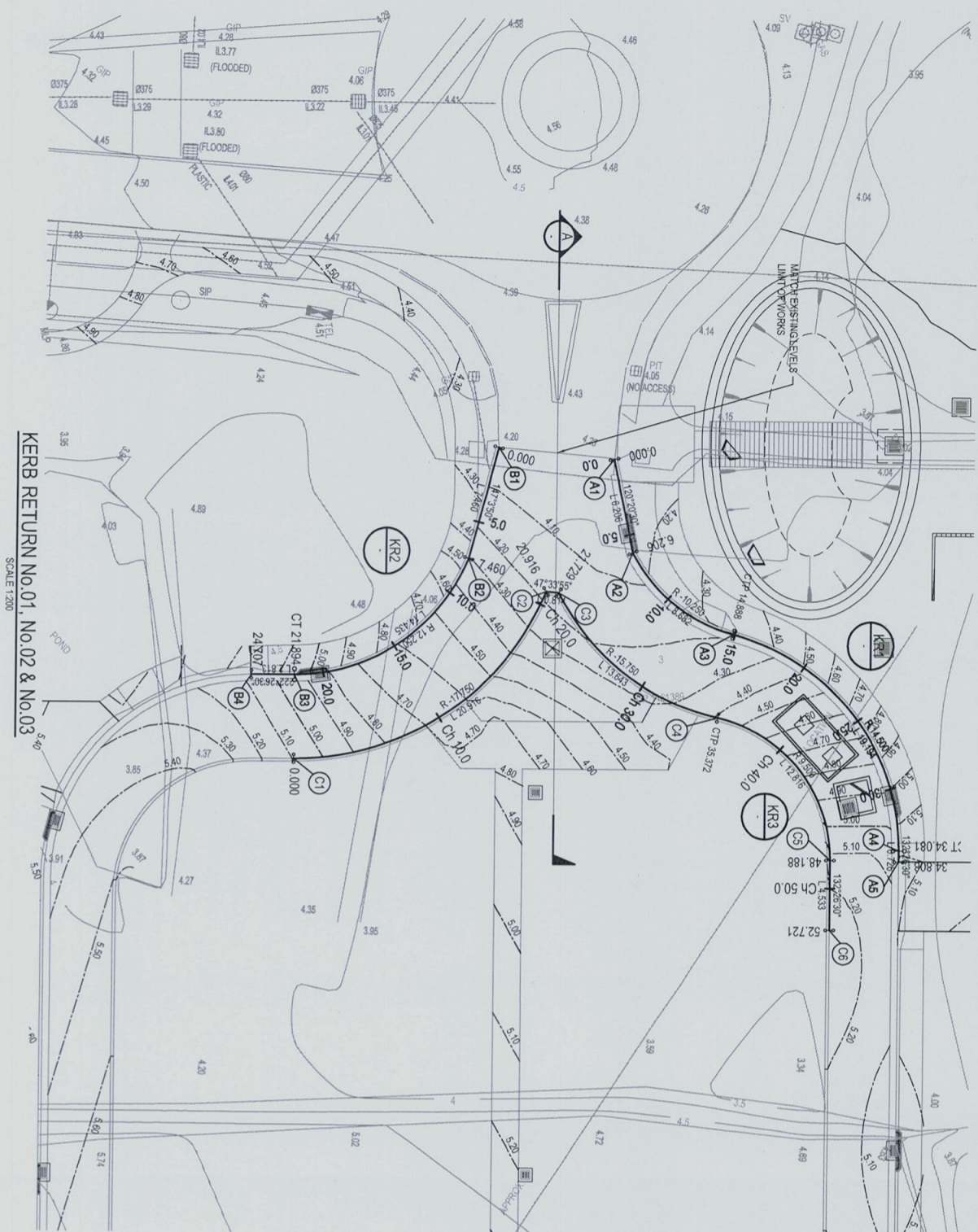
FIGURE 10 BAKA WATER TANKS TO OVERFLOW INTO
PROPOSED PAVED STREET

NOTE:

FUTURE ILU RAINWATER TANKS TO OVERFLOW INTO PROPOSED PIPED SYSTEM.

DETAIL PLAN - SHEET 4 OF 4
SCALE 1/20

FOR CONSTRUCTION CERTIFICATE

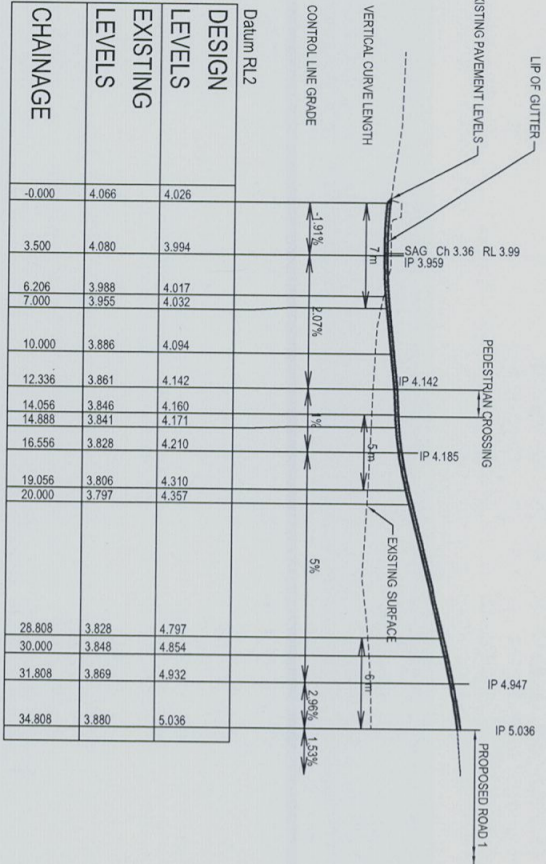


KEEB RETURN NO. 01 - COUNTRY LINE DETAILS - INVERT OF KEEB							
P1	Changeage	Easting	Northing	Level	Bearing	Rail/Spyal	Alignment
A1	0	342001.474	6271172.414	4.026	120°20'23.80"		
	5	342005.789	627119.888	4.002	120°20'28.80"		
A2	6.206	342006.829	627119.279	4.017			
	10	342010.59	627118.882	4.094	83°55'19.63"		
A2-A3	10.547	342011.29	627118.073	4.105		-10.25	8.882
A3	14.888	342015.147	6271120.617	4.171	56°55'59.04"		48°1'58.34"
	15	342015.241	6271120.678	4.173	57°02'34.06"		
	20	342018.818	6271122.829	4.357	76°47'59.87"		
A3-A4	24.485	342024.578	6271126.855	4.381		14.5	19.194
	25	342024.785	6271122.817	4.607			75°50'33.96"
	30	342028.557	6271121.809	4.854	96°53'52.67"		
A4	34.081	342032.915	6271119.212	5.014	116°1'55.14"		
					132°26'30.00"		
A5	34.898	342033.451	6271118.722	5.036	132°26'30.00"		

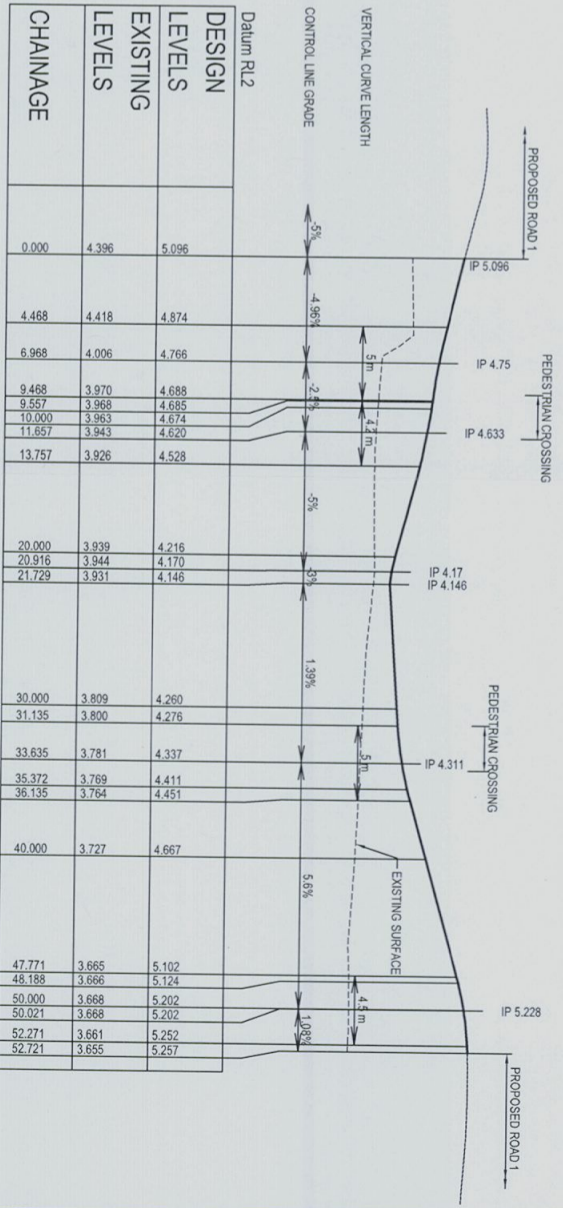
KEIRB RETURN No.02 : CONTROL LINE DETAILS - INVERT OF KEIRB							
Pt	Change	Existing	Noting	Level	Bearing	Run/Spiral	Length
B1	0	341995.849	6271117.326	4.164	147°03'45.56"	12.25	67°30'48.44"
	5	341998.568	6271113.13	4.164	147°03'48.56"		
B2	7.46	341999.505	6271111.065	4.307	166°46'33.19"	14.535	
	10	342000.736	6271108.67	4.433			
B2-B3	14.677	342003.374	6271103.65	4.597	180°11'42.91"		
	15	342000.666	6271103.706	4.606			
B3	20	341999.014	6271099.098	4.609	213°54'57.65"		
	21.894	341997.849	6271097.608	4.904			
B4	24.707	341995.951	6271095.532	5.044	222°36'30.00"		

KERN RETURN NO.03: CONTROL LINE DETAILS - INVERT OF KERN							
Pt.	Change	Easting	Northing	Level	Bearing	Rad/Spiral	A Length
C1	0	342001.598	6271093.886	5.066	42°26'31.50"		
	5	342004.721	6271098.009	4.848	28°1'03.874"		
	10	342006.281	6271102.743	4.674	10°09'45.98"		
C1+2	10.458	342009.914	6271102.651	4.661		-17.75	20.916
	15	342008.483	6271107.723	4.466	354°0'123.22"		67°30'49.95"
	20	342005.233	6271115.557	4.216	33°55'00.45"		
C2	20.916	342004.887	6271113.386	4.17			
C3	21.729	342005.487	6271119.945	4.166			
C3+4	25	342008.713	6271113.444	4.191	92°52'51.74"		
	28.551	342012.529	6271112.087	4.24		-15.75	13.643
	30	342013.663	6271113.983	4.26	74°41'30.85"		49°37'53.53"
C4	35	342018.197	6271116.04	4.333	56°38'09.98"		
	35.572	342018.535	6271116.249	4.411	55°08'52.44"		
	40	342022.786	6271117.883	4.867	83°03'26.44"		
C4+5	41.78	342024.739	6271120.59	4.767		9.5	12.816
	46	342027.679	6271117.184	4.847	113°12'46.86"		77°17'38.59"
	48.188	342030.545	6271115.464	5.124			
C5	50	342031.682	6271114.241	5.202	132°28'30.00"		
	52.721	342033.69	6271112.405	5.257	132°28'30.00"		

CITY PLAN SERVICES	
Construction Certificate No.	Approval Date
142440	25 JUN 2014
Issuing Authority	Brendan Barnett
Accreditation No.	BPB 0027



CHAINAGE	EXISTING LEVELS	DESIGN LEVELS	Datum RL2
-0.000	4.084	4.084	
2.500	4.096	4.096	
5.000	4.064	4.184	
7.480	4.046	4.307	
9.345	4.039	4.401	
10.000	4.038	4.433	
11.845	4.037	4.511	
14.345	4.155	4.589	
16.845	4.454	4.667	
19.345	4.440	4.776	
20.000	4.436	4.809	
21.894	4.427	4.904	
24.707	4.465	5.044	

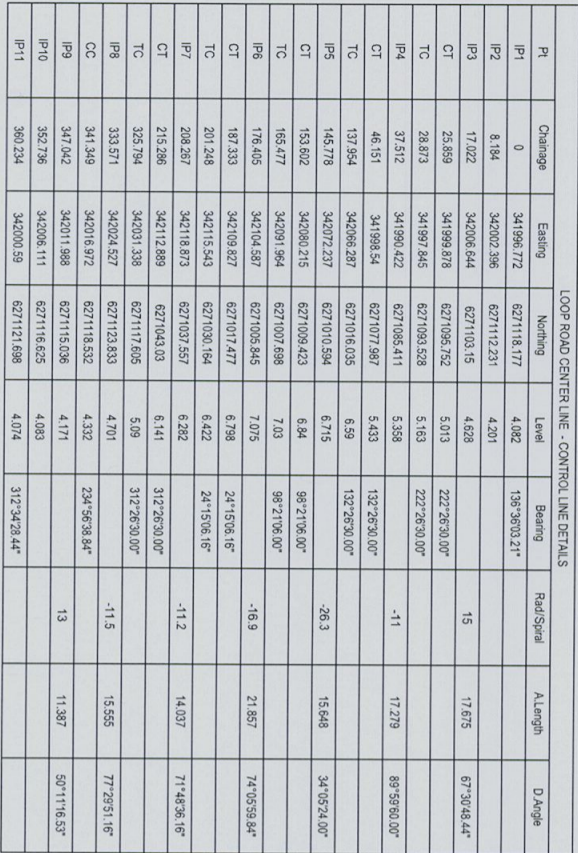


CHAINAGE	EXISTING LEVELS	DESIGN LEVELS	Datum RL2
0.000	4.396	5.096	
4.488	4.418	4.874	
6.968	4.006	4.766	
9.468	3.970	4.688	
9.557	3.968	4.685	
10.000	3.963	4.674	
11.657	3.943	4.620	
13.757	3.926	4.528	
20.000	3.939	4.216	
20.916	3.944	4.170	
21.729	3.931	4.146	
30.000	3.899	4.260	
31.135	3.800	4.276	
33.635	3.781	4.337	
35.372	3.769	4.411	
36.135	3.764	4.451	
40.000	3.727	4.667	
47.771	3.665	5.102	
48.188	3.666	5.124	
50.000	3.668	5.202	
50.021	3.668	5.202	
52.271	3.661	5.252	
52.721	3.655	5.257	

[illegible]

<div>Level 5 79 Victoria Avenue Chalchacombo NSW 2567</div> <div><div><div><div><div><div></div></div></div><div><div><div></div></div></div><div><div><div></div></div></div></div></div><div>Telephone +61 2 9471 9400 Facsimile +61 2 9471 9237 Email enquiries@ccs.com.au Web www.berryandjones.com.au</div></div>	<div><div><div><div><div></div></div></div><div><div><div></div></div></div><div><div><div></div></div></div></div></div> <div>Berry & Jones</div>	<div>Project</div> <div>ANGLICAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD</div>	<div>Drawn</div> <div>M. Sriniva</div> <div>Checked</div> <div>B. Sriniva</div> <div>Design number</div> <div>12693</div>	<div>Designed</div> <div>L. Chella</div> <div>Approved</div> <div>A. Prithvi</div> <div>Date</div> <div>MAR 2014</div> <div>Scale</div> <div>AS SHOWN @ A1</div> <div>Revision</div> <div></div>
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FOR CONSTRUCTION CERTIFICATE



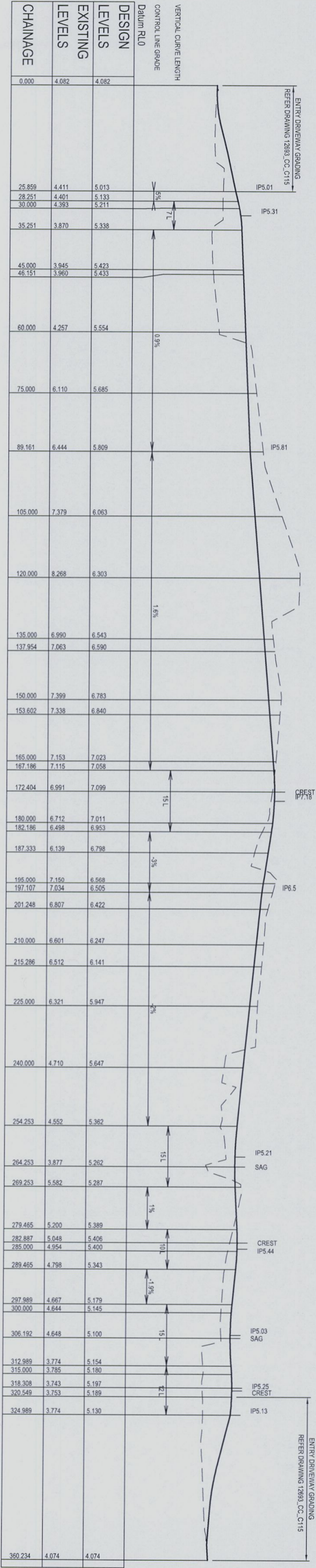
LOOP ROAD CENTER LINE - CONTROL LINE DETAILS					
Easting	Northing	Level	Bearing	Rad/Spiral	A Length
627118.772	627118.177	4.082	136°36'03.21"		
627112.231	627112.231	4.201			
627103.15	627103.15	4.628		15	17.675
627106.752	627106.752	5.013	222°26'30.00"		67°30'48.44"
627103.528	627103.528	5.163	222°26'30.00"		
627106.411	627106.411	5.358		-11	17.279
627106.035	627106.035	5.433	132°26'30.00"		89°59'00.00"
627106.287	627106.287	5.59	132°26'30.00"		
627106.237	627106.237	6.715		-26.3	34°05'24.00"
627109.423	627109.423	6.84	98°21'06.00"		
627107.688	627107.688	7.03			
627105.845	627105.845	7.075	24°15'06.16"	-16.9	21.857
627107.477	627107.477	6.798			74°05'59.84"
627103.164	627103.164	6.422	24°15'06.16"		
627103.557	627103.557	6.282		-11.2	14.037
627104.03	627104.03	6.141	312°26'30.00"		71°48'36.16"
627117.665	627117.665	5.09	312°26'30.00"		
627123.833	627123.833	4.701		-11.5	15.555
627118.532	627118.532	4.332	234°56'38.84"		77°29'51.16"
627115.098	627115.098	4.171		13	11.387
627116.625	627116.625	4.083			50°11'16.53"
627121.688	627121.688	4.074	312°34'28.44"		

The figure is a detailed site plan for a residential development. It shows numerous building footprints, parking lots, and a network of roads. Key features include:

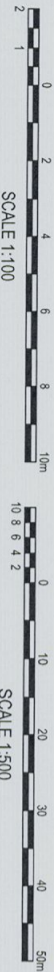
- Site Boundary:** Indicated by a dashed line on the right side of the plan.
- Road Center Lines:** Shown as solid lines with various annotations for stationing and geometry.
- Engineering Annotations:**
 - Stationing: e.g., 0+000, 1+000, 2+000, 3+000, 4+000, 5+000, 6+000, 7+000, 8+000, 9+000, 10+000, 11+000, 12+000, 13+000, 14+000, 15+000, 16+000, 17+000, 18+000, 19+000, 20+000, 21+000, 22+000, 23+000, 24+000, 25+000, 26+000, 27+000, 28+000, 29+000, 30+000, 31+000, 32+000, 33+000, 34+000, 35+000, 36+000, 37+000, 38+000, 39+000, 40+000, 41+000, 42+000, 43+000, 44+000, 45+000, 46+000, 47+000, 48+000, 49+000, 50+000, 51+000, 52+000, 53+000, 54+000, 55+000, 56+000, 57+000, 58+000, 59+000, 60+000, 61+000, 62+000, 63+000, 64+000, 65+000, 66+000, 67+000, 68+000, 69+000, 70+000, 71+000, 72+000, 73+000, 74+000, 75+000, 76+000, 77+000, 78+000, 79+000, 80+000, 81+000, 82+000, 83+000, 84+000, 85+000, 86+000, 87+000, 88+000, 89+000, 90+000, 91+000, 92+000, 93+000, 94+000, 95+000, 96+000, 97+000, 98+000, 99+000, 100+000.
 - Curvature: e.g., R=10.000, R=12.000, R=14.000, R=16.000, R=18.000, R=20.000, R=22.000, R=24.000, R=26.000, R=28.000, R=30.000, R=32.000, R=34.000, R=36.000, R=38.000, R=40.000, R=42.000, R=44.000, R=46.000, R=48.000, R=50.000, R=52.000, R=54.000, R=56.000, R=58.000, R=60.000, R=62.000, R=64.000, R=66.000, R=68.000, R=70.000, R=72.000, R=74.000, R=76.000, R=78.000, R=80.000, R=82.000, R=84.000, R=86.000, R=88.000, R=90.000, R=92.000, R=94.000, R=96.000, R=98.000, R=100.000.
 - Chord Lengths: e.g., CL=28.61, CL=28.62, CL=28.63, CL=28.64, CL=28.65, CL=28.66, CL=28.67, CL=28.68, CL=28.69, CL=28.70, CL=28.71, CL=28.72, CL=28.73, CL=28.74, CL=28.75, CL=28.76, CL=28.77, CL=28.78, CL=28.79, CL=28.80, CL=28.81, CL=28.82, CL=28.83, CL=28.84, CL=28.85, CL=28.86, CL=28.87, CL=28.88, CL=28.89, CL=28.90, CL=28.91, CL=28.92, CL=28.93, CL=28.94, CL=28.95, CL=28.96, CL=28.97, CL=28.98, CL=28.99, CL=29.00, CL=29.01, CL=29.02, CL=29.03, CL=29.04, CL=29.05, CL=29.06, CL=29.07, CL=29.08, CL=29.09, CL=29.10, CL=29.11, CL=29.12, CL=29.13, CL=29.14, CL=29.15, CL=29.16, CL=29.17, CL=29.18, CL=29.19, CL=29.20, CL=29.21, CL=29.22, CL=29.23, CL=29.24, CL=29.25, CL=29.26, CL=29.27, CL=29.28, CL=29.29, CL=29.30, CL=29.31, CL=29.32, CL=29.33, CL=29.34, CL=29.35, CL=29.36, CL=29.37, CL=29.38, CL=29.39, CL=29.40, CL=29.41, CL=29.42, CL=29.43, CL=29.44, CL=29.45, CL=29.46, CL=29.47, CL=29.48, CL=29.49, CL=29.50, CL=29.51, CL=29.52, CL=29.53, CL=29.54, CL=29.55, CL=29.56, CL=29.57, CL=29.58, CL=29.59, CL=29.60, CL=29.61, CL=29.62, CL=29.63, CL=29.64, CL=29.65, CL=29.66, CL=29.67, CL=29.68, CL=29.69, CL=29.70, CL=29.71, CL=29.72, CL=29.73, CL=29.74, CL=29.75, CL=29.76, CL=29.77, CL=29.78, CL=29.79, CL=29.80, CL=29.81,

FOR CONSTRUCTION CERTIFICATE

CITY PLAN SERVICES
Construction Certificate No. 142440
Approved Date: 25 JUN 2014
Certifying Authority: Brenda Bernett
Accreditation No. BPR 0027



LONGITUDINAL SECTION ROAD 1
HORIZONTAL SCALE 1:300
VERTICAL SCALE 1:100

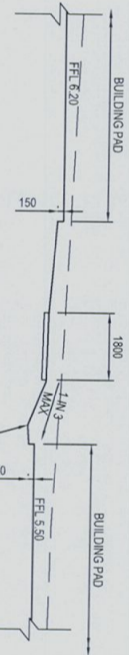
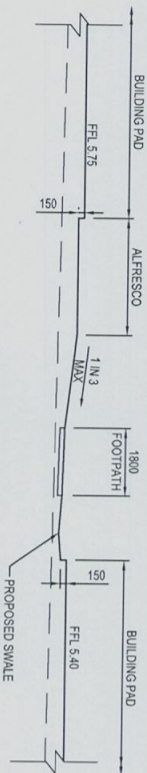
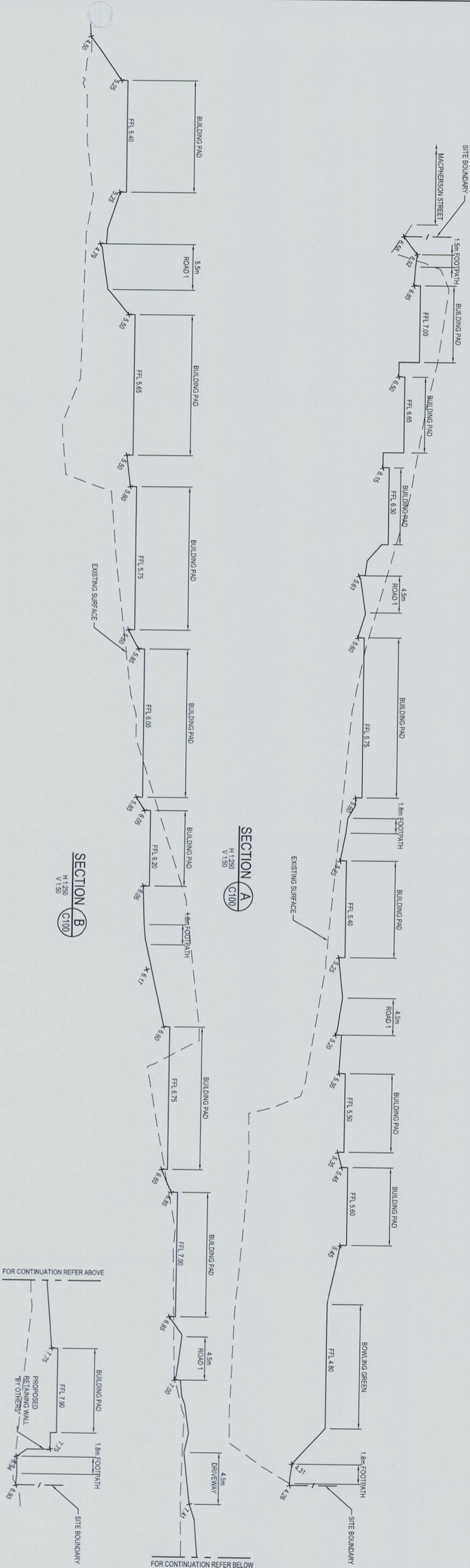


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Certifying Authority: BRENDA BERNELL
Accreditation No. BPR 0027

Approved Date: 25 JUN 2014
Scale: AS SHOWN @ A1

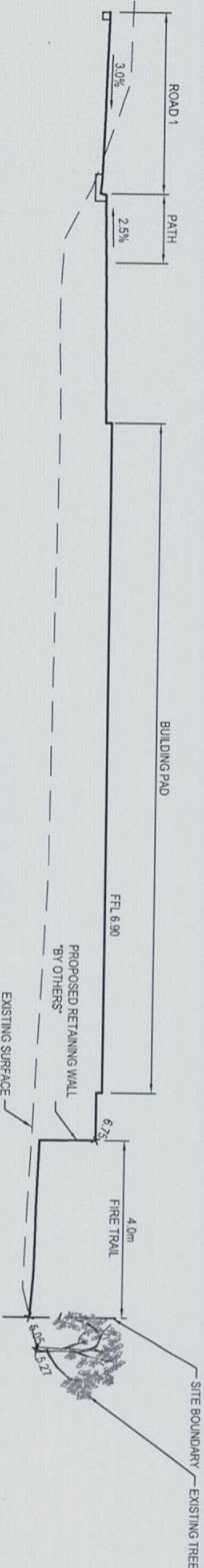
FOR CONSTRUCTION CERTIFICATE

SURVEY INFORMATION		Client	
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DRAWN: []		Project	
DESIGNED: []		ANGELCAN RETIREMENT VILLAGES	
CHECKED: []		8 MACPHERSON STREET WARRIEWOOD	
APPROVED: []		Title	
REVISION		ROAD 1 LONGITUDINAL SECTION AND SECTION	
DATE		Drawing Number	
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16/02/2014			
08/02/2014			
04/02/2014			
REVISION		Revision	
DATE		AS SHOWN @ A1	
14/02/2014			
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04/02/2014			
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REVISION			

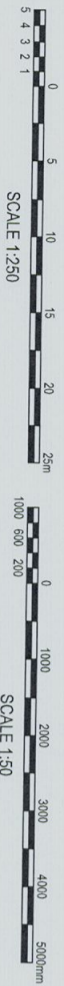


SECTION C
SCALE 1:100
C100

SECTION D
SCALE 1:100
C100



SECTION E
SCALE 1:100
C100



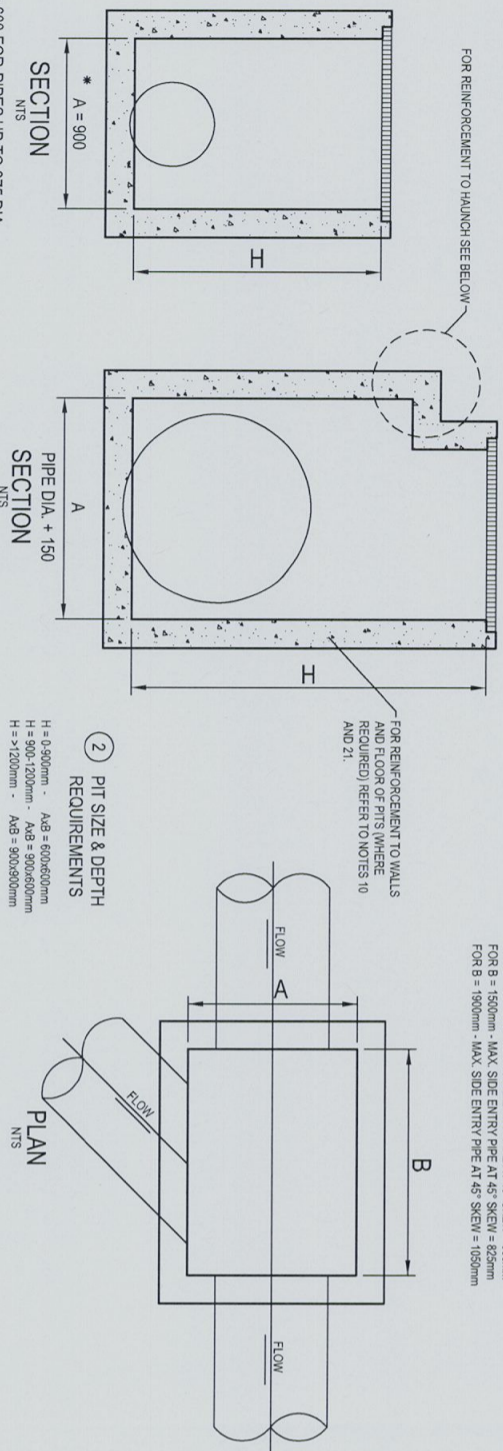
CITY PLAN SERVICES
142240
25 JUN 2014
Certifying Authority
Accreditation No. 8798 0027

FOR CONSTRUCTION CERTIFICATE

Drawn	Checked	Date
M. Sillitoe	L. Colla	MAR 2014
B. Sillitoe	A. Fritsch	AS SHOWN @ A1
Revised		
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TYPICAL PIT CHAMBER SIZES
RESPONSIBILITY TO SELECT PIT CHAMBER SIZE WITH REGARDS TO PIPE SIZE, DEPTH TO
INVERT AND SKEW ANGLE. REFER SKETCHES BELOW.

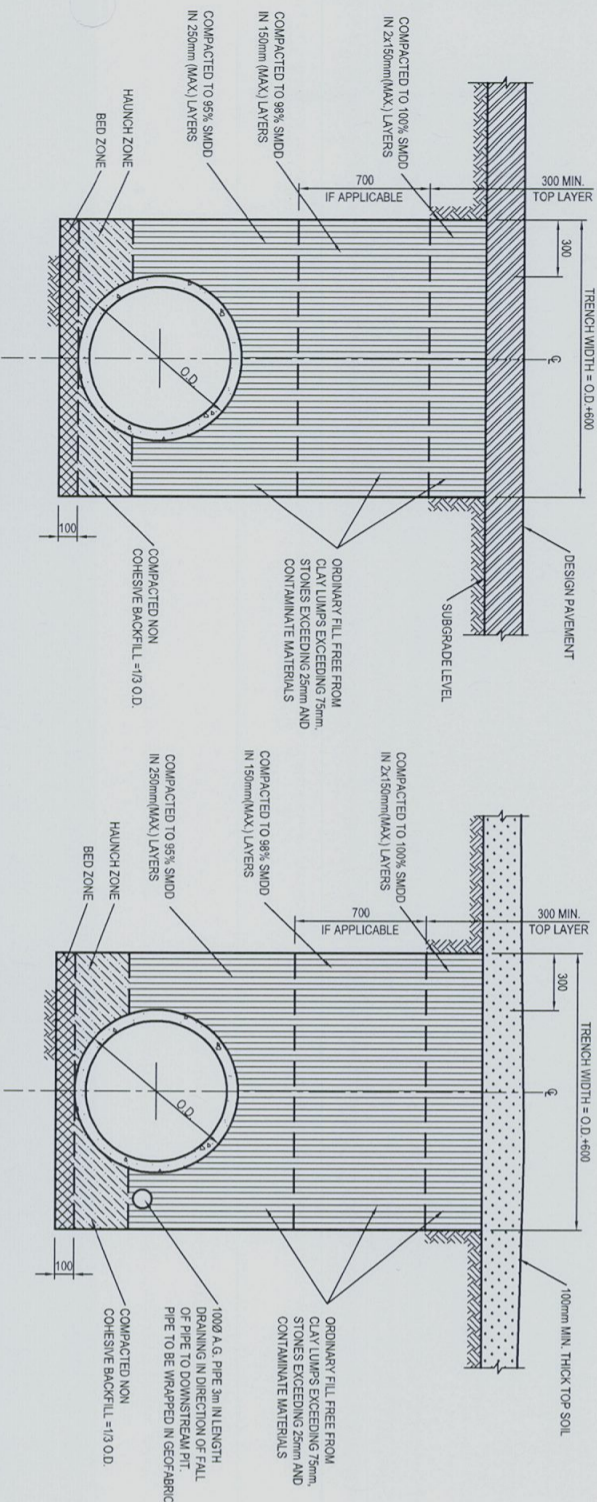
- ① SELECT PIT CHAMBER USING THE STEPS BELOW:
- ② SELECT PIT CHAMBER SIZE DEPENDING ON THE PIPE DIAMETERS.
- ③ CHECK PIT CHAMBER SIZE TO SATISFY DEPTH TO INVERT REQUIREMENTS.
- ③ CHECK PIT CHAMBER DIMENSIONS TO SATISFY THE SKEW ANGLE IN THE TABLE



- NTS
- *A = 600 FOR PIPES UP TO 375 DIA.
- ① PIT CHAMBER DIMENSIONS FOR PIPES UP TO 600 DIA.
- ① PIT CHAMBER FOR PIPES GREATER THAN 600 DIA.

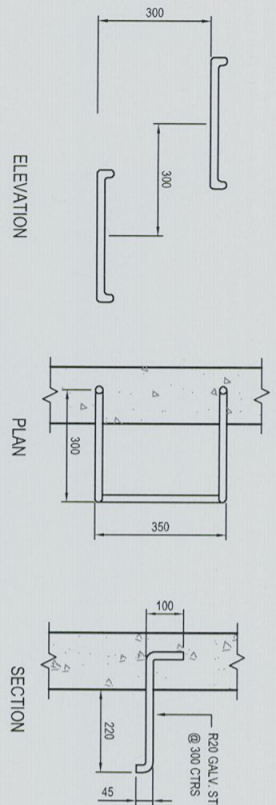
- ① PIT CHAMBER FOR PIPES GREATER THAN 600 DIA.

- 3 PIT CHAMBER FOR
SIDE ENTRY ON SKEW

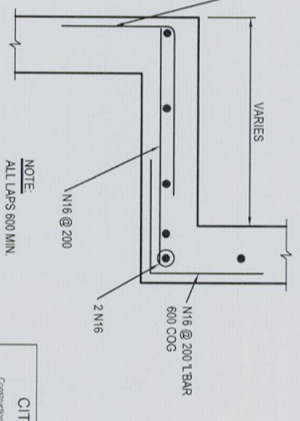


PIPE TRENCH INSTALLATION
BENEATH PAVEMENT
(H1 & H2 SUPPORT)
SCALE 1:20

PIPE TRENCH INSTALLATION
IN LANDSCAPE AREAS
(H1 & H2 SUPPORT)
SCALE 1:20




**PIPE TRENCH INSTALLATION
IN LANDSCAPE AREAS**
(H1 & H2 SUPPORT)
SCALE 1:20



HAUNCH DETAIL - TYPICAL

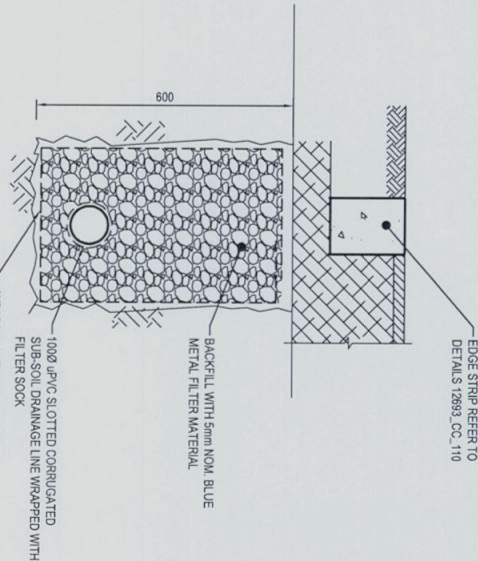
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<p>Level 5, 2000-21 Avenue Cheltenham NSW 2667</p>	<p>Telephone 02 4621 9640 Fax 02 4621 8337 Email info@henrydymmas.com.au Web www.henrydymmas.com.au</p>	 <p>henry&dymmas</p>
<p>Project</p> <p>ANGULCAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD</p>	<p>Drawings</p> <p>M. SHIRVOOL Drawings B. SHIRVOOL A. FRENCH</p>	<p>Drawings Number</p> <p>12693_CC_C200</p>
<p>Period</p> <p>STORMWATER MISCELLANEOUS DETAILS</p>	<p>Drawings</p> <p>M. SHIRVOOL Drawings B. SHIRVOOL A. FRENCH</p>	<p>Drawings Number</p> <p>12693_CC_C200</p>
<p>Period</p> <p>STORMWATER MISCELLANEOUS DETAILS</p>	<p>Drawings</p> <p>M. SHIRVOOL Drawings B. SHIRVOOL A. FRENCH</p>	<p>Drawings Number</p> <p>12693_CC_C200</p>

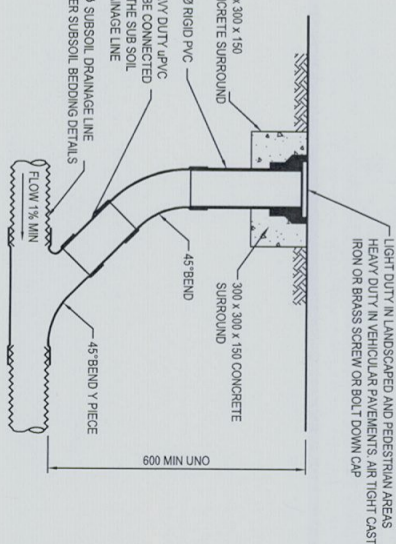
PIT SCHEDULE

PIPS/STRUCTURE NUMBER		DESCRIPTION
F-1	C-1 G-1	PROPOSED SURFACE INLET PIT WITH HINGED 900mm x 900mm MEDIUM DUTY GRADED I/D CLASS "C" IN ACCORDANCE WITH PIT/WATER COUNCIL'S REQUIREMENTS.
A-4		OFFGATE KERN PIT REFER TO DING C09.1 HEAVY DUTY I/D CLASS "D" IN ACCORDANCE WITH MANUFACTURES DETAILS & PIT/WATER COUNCIL REQUIREMENTS.
A-7	A-8 A-9 B-2 B-3 B-4 B-5	ON GRADE KERN INLET PIT WITH 1.8m LINTEL AND HEAVY DUTY GRADED I/D CLASS "D" IN ACCORDANCE WITH PIT/WATER COUNCIL'S REQUIREMENTS THESE PITS TO BE FITTED WITH "ENVIROPODS" WITH OIL FILTERS.
B-6	B-7	
A-5	A-6 E-1	SAG KERN INLET PIT WITH 1.8m LINTEL AND HEAVY DUTY GRADED I/D CLASS "D" IN ACCORDANCE WITH PIT/WATER COUNCIL'S REQUIREMENTS THESE PITS TO BE FITTED WITH "ENVIROPODS" WITH OIL FILTERS.
A-2 A-3	B-1	PROPOSED JUNCTION PIT WITH HINGED 800 x 900 MEDIUM DUTY SEALED I/D CLASS "D" IN ACCORDANCE WITH PIT/WATER COUNCIL'S REQUIREMENTS.
A-11		PROPOSED HEADWALL TO SUIT Ø825 PIPE
B-0		PROPOSED HEADWALL TO SUIT Ø825 PIPE
C-2 C-3	C-4 C-5	PROPOSED SURFACE INLET PIT WITH HINGED 600x600 MEDIUM DUTY GRADE CLASS "C" IN ACCORDANCE WITH PIT/WATER COUNCIL'S REQUIREMENTS. PITS TO BE FITTED WITH "ENVIRO POOL FILTERS"
D-1		PROPOSED DISCHARGE CONTROL PIT 900 x 800 SURCHARGE STYLE. LIGHT DUTY GRADE CLASS "B" IN ACCORDANCE WITH PIT/WATER COUNCIL REQUIREMENTS.

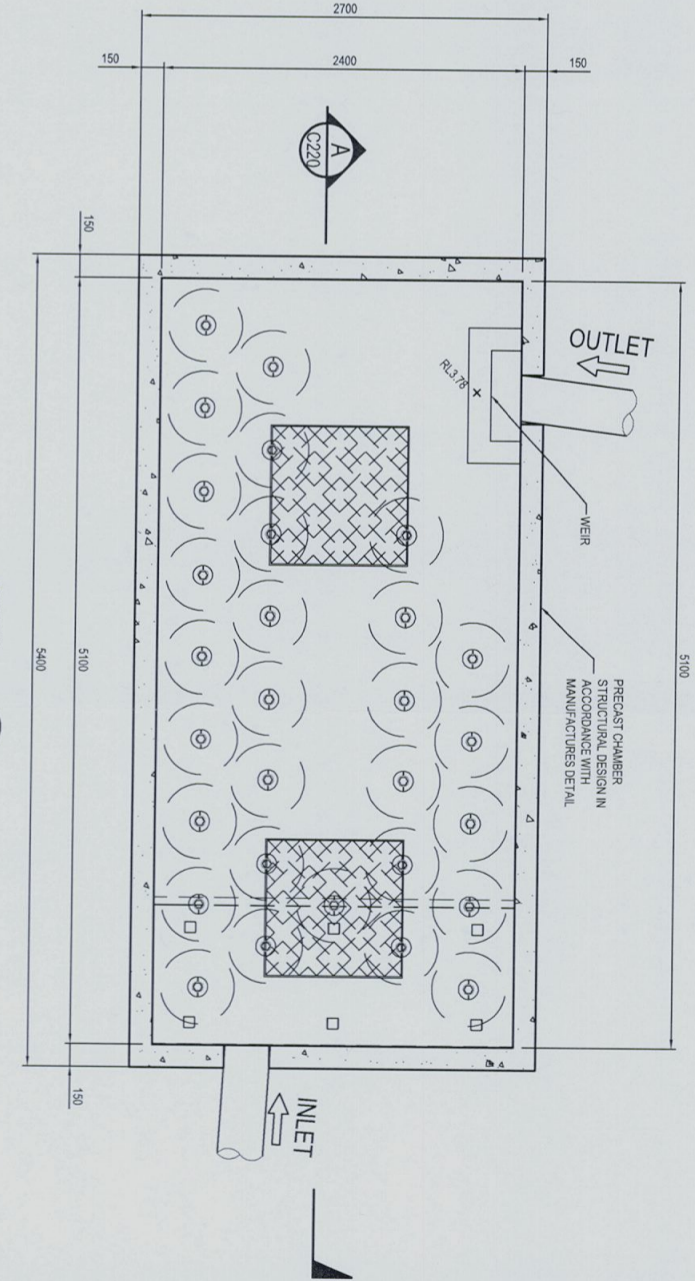
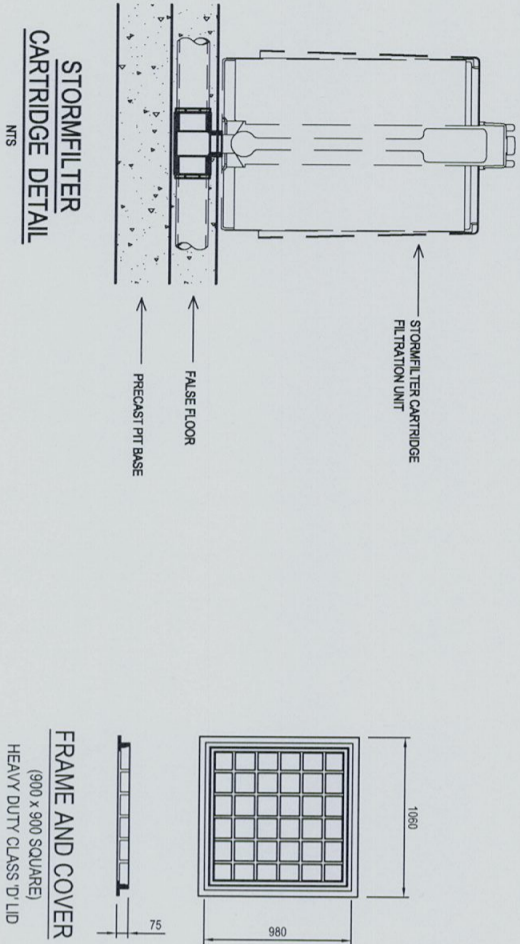
SUB-SOIL DRAIN DETAIL BELOW EDGE STRIP



INTERMEDIATE RISER (IR)



FOR CONSTRUCTION CERTIFICATE



GENERAL NOTES:

1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 FOR OPTIONS.
3. THE FILTER CARTRIDGES ARE SPRING-ACTUATED AND SELF-CLEANING. THE STANDARD DETAIL DRAWING SHOWS THE MAXIMUM NUMBER OF CARTRIDGES. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH ASS800.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP* FOR SHALLOW, LOW DROP OR SPECIAL DESIGN.
5. MANUFACTURER'S CONTACT STORMWATER360 FOR DESIGN OPTIONS.
6. MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
7. THE STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTRALASIAN T41 LOAD RATING WITH 0.1m TO 2.0m FILL MAXIMUM.
8. ANY BACKFILL DEPTH, SUB-BASE, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 690mm (SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360, STONEY (AU) PHONE: (02) 9335 1888, BRISBANE (AU) PHONE: (07) 3114 9595.

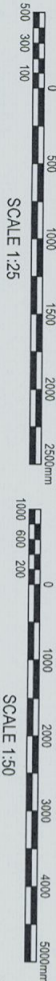
STORMFILTER DESIGN TABLE

- THE SIZE 5.0 x 2.1 STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION-SPECIFIC INTERNAL FLOW CONTROLS.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360, UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	690	460	310
SYSTEM HYDRAULIC DROP (H - HEAD, MIN.)	930	700	550
TREATMENT BY MEDIA SURFACE AREA (L/S/m ²)	1.4	0.7	0.7
CARTRIDGE FLOW RATE (L/S)	1.42	0.71	0.63

NOTE:

SPECIFICATIONS AND CONSTRUCTION DETAILS TO MANUFACTURERS DETAILS.



SURVEY

INFORMATION

SURVEYED BY:

LOCKEY LAND TITLE SOLUTIONS

DATUM: AHD

ORIGIN OF LEVELS: PASSERELLE 3

REVISION	DESCRIPTION	DATE	REVISION	DESCRIPTION	DATE
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99	ISSUED FOR CONTRACT	14/05/2014	100	ISSUED FOR CONTRACT	14/05/2014

Client	ARV
Approved	ENVIRONA STUDIO
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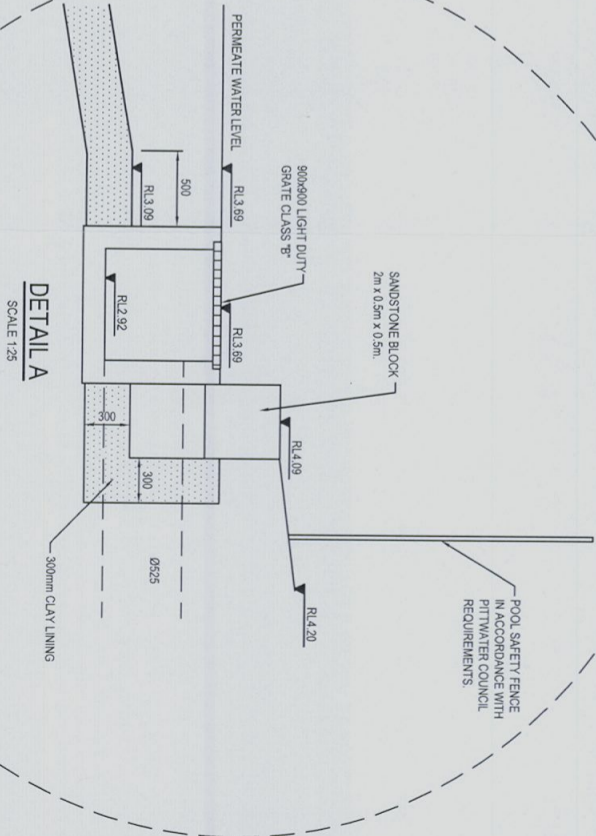
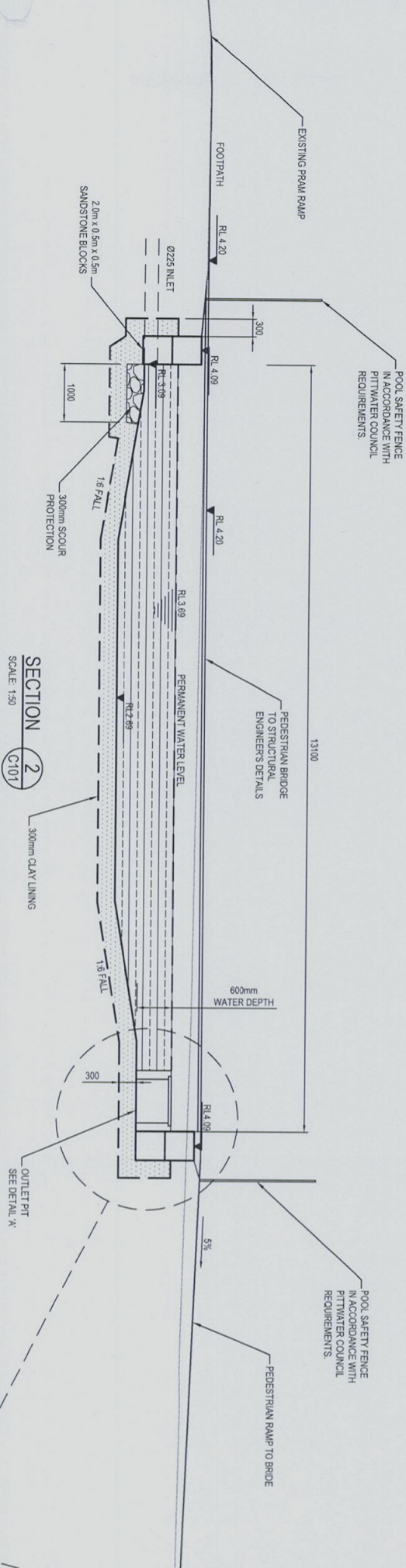
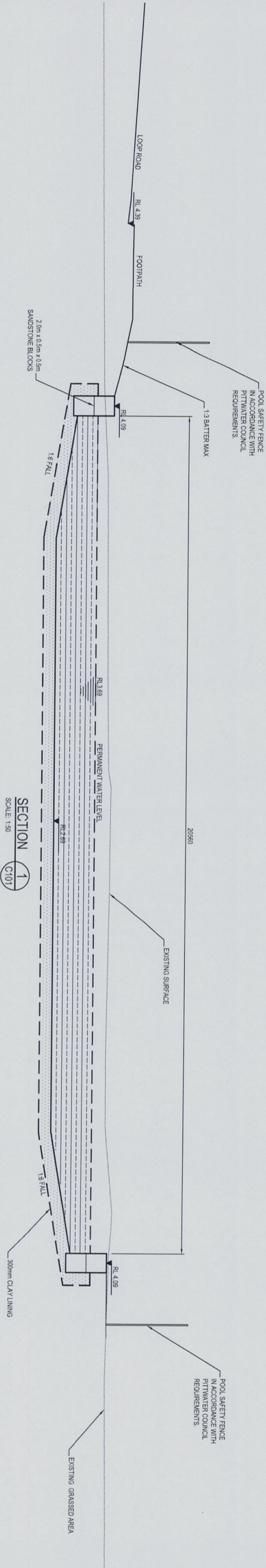
Project	ANGELICAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARRIEWOOD
Title	STORMWATER 360 DETAILS

Client	M. Smith	Designed	N. Wetherill	Date	MAY 2014
Checked	B. Smith	Reviewed	A. Francis	As Shown	@ A1
Drawn	W. Smith	Approved	B. Smith	Revision	

CITY PLAN SERVICES Consultation Certificate No. 1422440 Approved Date 25 JUN 2014 Certifying Authority: Brendan Bennett Accreditation No. BPS 0027	
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FOR CONSTRUCTION CERTIFICATE

12693_CC_C201_03



CLAY LINED NOTES:

1. CLAY PERMEABILITY MUST BE 5×10^{-9} mm/sec
2. MATERIAL USED SHOULD BE CLASSIFIED AS CL, CL, CH, SC OR GC UNDER USCS
3. CLAY COMPONENT MATERIAL SHOULD HAVE A LIQUID LIMIT BETWEEN 30% AND 60% AND PLASTICITY INDEX OF 10% TO BE APPROVED BY GEOTECHNICAL ENGINEER
4. CLAYS WITH A LIQUID LIMIT BETWEEN 60% AND 80% MAY BE USED AS LINING MATERIAL COMPACTED ORAKAL
5. THE CLAY LINER MUST BE MIN. 300mm THICK
6. POND SHOULD BE FILLED WITH AT LEAST 500mm OF WATER UPON CONSTRUCTION

BASIN COMPACTION NOTES:

1. FLOODS AND EMBANKMENTS MUST BE APPROPRIATELY COMPACTED WITH ROLLER, SCAPERS OR SHEEP FOOT ROLLERS GIVE GREATER COMPACTION RATES EIGHT PASSES
2. COMPACT SOIL WITH A MOISTURE CONTENT $\pm 2\%$ OF OPTIMUM
3. EACH LIFT (LAYER OF FILL GENERALLY NOT EXCEEDING 200mm) MUST BE COMPACTED TO AT LEAST 95% OF MAXIMUM DRY DENSITY. TAMPING FOOT AND VIBRATING ROLLERS CAN BE USED
4. CLAY LINERS WITH MIN. TWO COMPACTED LIFTS FOR OPTIMUM PERFORMANCE

SURVEY INFORMATION				Client			
SURVEYED BY:				ARV			
LOCKEY LAND TITLE SOLUTIONS				ADDRESS			
DATA: A/D				ENVIRONA STUDIO			
ORIGIN OF LEVELS: NTS549 R.3.8				This drawing and design remains the property of Henry & Hyman and may not be copied in whole or in part without the prior written approval of Henry & Hyman.			
REVISION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE
02		IS/ED FOR C/C	IS/ED FOR C/C				
01		IS/ED FOR CONTRACT	IS/ED FOR CONTRACT				
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		DESIGNED	DATE				
		APPROVED	DATE				

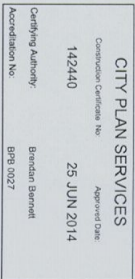


CITY PLAN SERVICES
Corporation Certificate No. 142440
25 JUN 2014
Certifying Authority: Brenda Barnett
Accreditation No. BPS 0027



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Email: info@hhyman.com.au
www.henryandhyman.com.au

FOR CONSTRUCTION CERTIFICATE			
ANGELICAN RETIREMENT VILLAGES			
8 MACPHERSON STREET WARREWOOD			
BASIN SECTIONS			
Drawn	Designed	Scale	Date
M. Shirova	N. Macfarlane	AS SHOWN @ A1	MAY 2014
Checked	Approved		
B. Shirova	A. Francis		
Drawing Number	Revision		
12693_CC_C221	02		



- DOUBLE HEADED FIRE HYDRANT
- CAST IRON VALVE BOX WITH SURROUND
- 11/2 CAST IRON VALVE BOXES
- SEWER MANHOLE
- POO PIT
- CLEAR OUT
- IN STREET CAST IRON VALVE BOXES
- IN STREET CAST IRON VALVE BOXES
- CAST IRON VALVE BOX WITHOUT SURROUND

⊙ LIGHT POLE



☐ ELECTRICAL SAND PIT WHICH WILL BE BURIED AFTER THE CONSTRUCTION

☐ ELECTRICAL PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)

☐ MATV PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)

PROPOSED
BOWLING GREEN



INFORMATION
SURVEYED BY:
LOCKLEY LAND TITLE SOLUTIONS

[illegible]

ENVIRONA STUDIO

ENVIRONA STUDIO

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henry&hymas

ANGELICAN RETIREMENT VILLAGES
8 MACPHERSON STREET WARRIEWOOD

Table
SET OUT DETAIL PLAN
SHEET 1 OF 4

D. Gile	Approved	Scale	MAY 2014
Chenod	Approved	Scale	MAY 2014
B. Shtoz	A. Francis	Scale	1:200 @ A1
Drawing number			Revision

FOR CONSTRUCTION CERTIFICATE



CITY PLAN SERVICES

142440
25 JUN 2014
Brenden Bennett
EP9 0027

- HYDRAULIC LEGEND
- DOUBLE HEADED FIRE HYDRANT
 - CAST IRON VALVE BOX WITH SURROUND
 - ILU CAST IRON VALVE BOXES
 - SEWER MANHOLE
 - POO PIT
 - CLEAR OUT
 - IN STREET CAST IRON VALVE BOXES
 - IN STREET CAST IRON VALVE BOXES
 - CAST IRON VALVE BOX WITHOUT SURROUND

ELECTRICAL LEGEND

- SURFACE ITEMS
- LIGHT POLE
 - NBN PIT
 - MAIN SWITCHBOARD (DIMENSION TO BE CONFIRMED)

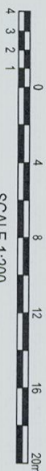
- UNDERGROUND ITEMS
- ELECTRICAL SAND PIT WHICH WILL BE BURED AFTER THE CONSTRUCTION.
 - ELECTRICAL PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)
 - MATV PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)

PROPOSED
BOWLING GREEN

FOR CONTINUATION REFER DRAWING 12693_CC_C401



FOR CONTINUATION REFER DRAWING 12693_CC_C404



SETOUT DETAIL PLAN - SHEET 2 OF 4

SCALE 1:200

SURVEY INFORMATION				Client			
SURVEYED BY:				ARV			
LOCKEY LAND TITLE SOLUTIONS				ENVIRONA STUDIO			
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ORIGIN OF LEVELS: MWS94PLA.38				Level 5, 7th Victoria Avenue, Glenwood NSW 2207			
REVISION				Tel: 02 9417 8400			
B1				Fax: 02 9417 8337			
DESIGNED FOR: CC				Email: herry@herrythomas.com.au			
APPROVED				www.herrythomas.com.au			
DRAWN				herrythomas			
DESIGNED				Project: ANGELCAN RETIREMENT VILLAGES			
DATE				8 MACHERSON STREET WARRIEWOOD			
REVISION				SET OUT DETAIL PLAN			
DATE				SHEET 2 OF 4			
APPROVED				Drawing Number: 12693_CC_C402			
DESIGNED				12693_CC_C402			
DATE				01			

FOR CONSTRUCTION CERTIFICATE



HYDRAULIC LEGEND

- DOUBLE HEADED FIRE HYDRANT
- CAST IRON VALVE BOX WITH SURROUND
- ILI CAST IRON VALVE BOXES
- SEWER MANHOLE
- POO PIT
- CLEAR OUT
- IN STREET CAST IRON VALVE BOXES
- IN STREET CAST IRON VALVE BOXES
- CAST IRON VALVE BOX WITHOUT SURROUND

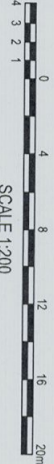
ELECTRICAL LEGEND

SURFACE ITEMS

- LIGHT POLE
- NBN PIT
- MAIN SWITCHBOARD (DIMENSION TO BE CONFIRMED)

UNDERGROUND ITEMS

- ELECTRICAL SAND PIT WHICH WILL BE BURIED AFTER THE CONSTRUCTION.
- ELECTRICAL PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)
- MATV PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)



SCALE 1:200

MACPHERSON STREET

SETOUT DETAIL PLAN - SHEET 3 OF 4

SCALE 1:200

CITY PLAN SERVICES
Construction Certificate No. 142440
Approved Date 25 JUN 2014
Certifying Authority: Brandon Bennett
Accreditation No. BPR 0027

FOR CONSTRUCTION CERTIFICATE

SURVEY INFORMATION		Client	
SURVEYED BY: LOCKEY LAND TITLE SOLUTIONS		ARV	
DATE: 14/04/2014		ENVIRONA STUDIO	
OWNER: LUTHER PAPER INDUSTRIES		This drawing and design remain the property of Henry & Hynes and may not be copied in whole or in part without the prior written approval of Henry & Hynes.	
REVISION	ISSUED FOR: CC	AMENDMENT	DATE
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FOR CONTINUATION REFER DRAWING 12693_CC_C402



HYDRAULIC LEGEND

- DOUBLE HEADED FIRE HYDRANT
- CAST IRON VALVE BOX WITH SURROUND
- ILI CAST IRON VALVE BOXES
- SEWER MANHOLE
- POO PIT
- CLEAR OUT
- IN STREET CAST IRON VALVE BOXES
- IN STREET CAST IRON VALVE BOXES
- CAST IRON VALVE BOX WITHOUT SURROUND

ELECTRICAL LEGEND

- SURFACE ITEMS
 - LIGHT POLE
 - NBN PIT
 - MAIN SWITCHBOARD (DIMENSION TO BE CONFIRMED)
- UNDERGROUND ITEMS
 - ELECTRICAL SAND PIT WHICH WILL BE BURIED AFTER THE CONSTRUCTION
 - ELECTRICAL PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)
 - MATV PIT (BURIED 300mm UNDER FINAL GROUND SURFACE)

COORDINATES

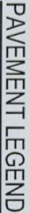
POINTS	EASTING	NORTHING
01	342000.985	627129.305
02	342006.919	627124.693
03	342006.915	627124.961
04	342006.97	627123.84
05	342006.992	627123.558
06	342007.416	627123.628
07	342007.12	627122.96
08	342015.544	627123.997
09	342017.196	627124.319
10	342018.12	627124.614
11	342018.2	627124.327
12	342017.244	627124.033
13	342019.357	627119.36
14	342020.286	627115.231
15	342021.345	627115.435
16	342021.634	627114.757
17	342020.525	627114.757
18	342022.254	627115.591
19	342022.992	627114.917
20	342022.317	627114.479
21	342021.579	627114.853
22	342025.74	627115.434
23	342026.415	627117.172
24	342027.155	627116.497
25	342026.918	627116.759
26	342022.916	627121.927
27	342033.58	627124.465
28	342040.094	627132.779
29	342050.049	627139.386
30	342048.677	627133.352
31	342059.323	627138.046
32	342059.497	627138.786
33	342060.219	627137.845
34	342063.838	627137.845
35	342063.838	627137.845
36	342062.205	627126.231
37	342044.54	627117.901
38	342037.281	627116.959
39	342038.049	627117.144
40	342038.861	627116.401
41	342038.692	627116.217
42	342032.452	627116.638
43	342032.206	627113.413
44	342032.538	627113.109
45	342032.455	627112.91
46	342032.723	627113.213
47	342030.919	627113.985
48	342031.878	627113.106
49	342031.503	627112.689
50	342030.844	627113.575
51	342030.581	627108.493
52	342030.05	627108.221
53	342029.718	627108.425
54	342029.411	627107.573
55	342029.854	627107.329
56	342029.226	627107.025
57	342029.044	627106.826
58	342029.12	627106.826
59	342029.386	627106.085
60	342029.431	627106.937
61	342029.465	627106.214
62	342029.223	627109.599
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98	342029.223	627109.599
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100	342111.169	627105.696

COORDINATES

POINTS	EASTING	NORTHING
01	34205.166	627104.615
02	34211.544	627104.507
03	34211.813	627104.469
04	34212.825	627104.469
05	34212.825	627104.469
06	34212.825	627104.469
07	34212.825	627104.469
08	34212.825	627104.469
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100	342052.335	627103.782

COORDINATES

POINTS	EASTING	NORTHING
01	34204.342	627103.469
02	34204.524	627103.469
03	34204.524	627103.469
04	34204.524	627103.469
05	34204.524	627103.469
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75	34204.524	627103.469
76	34204.524	627103.469
77	34204.524	627103.469
78	34204.524	627103



PAVEMENT LEGEND

NOTES:

1. PAVEMENT 2, 3, 4 & 5 TO BE PROVIDED BY BUILDING CONTRACTOR

2. PAVEMENT 2 - 120mm DGB20 & COMPACTED SUBGRADE ONLY TO BE PROVIDED BY CIVIL CONTRACTOR

3. PAVEMENT 1 - FINAL AC LAYER TO BE PROVIDED BY BUILDING CONTRACTOR

NOTES:

1. PAVEMENT 2, 3, 4 & 5 TO BE PROVIDED BY BUILDING CONTRACTOR
2. PAVEMENT 2 - 120mm DGB20 & COMPACTED SUBGRADE ONLY TO BE PROVIDED BY CIVIL CONTRACTOR
3. PAVEMENT 1 - FINAL AC LAYER TO BE PROVIDED BY BUILDING CONTRACTOR

PAVEMENT PLAN

SCALE 1:400

FOR CONSTRUCTION CERTIFICATE

CITY PLAN SERVICES	
Construction Certificate No.	Approved Date
142440	25 JUN 2014
Certifying Authority:	Brandon Bennett
Accreditation No:	BPB 0027



CITY PLAN SERVICES	
Construction Certificate No.	Approved Date
142440	25 JUN 2014
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Accreditation No.	BPB 0027

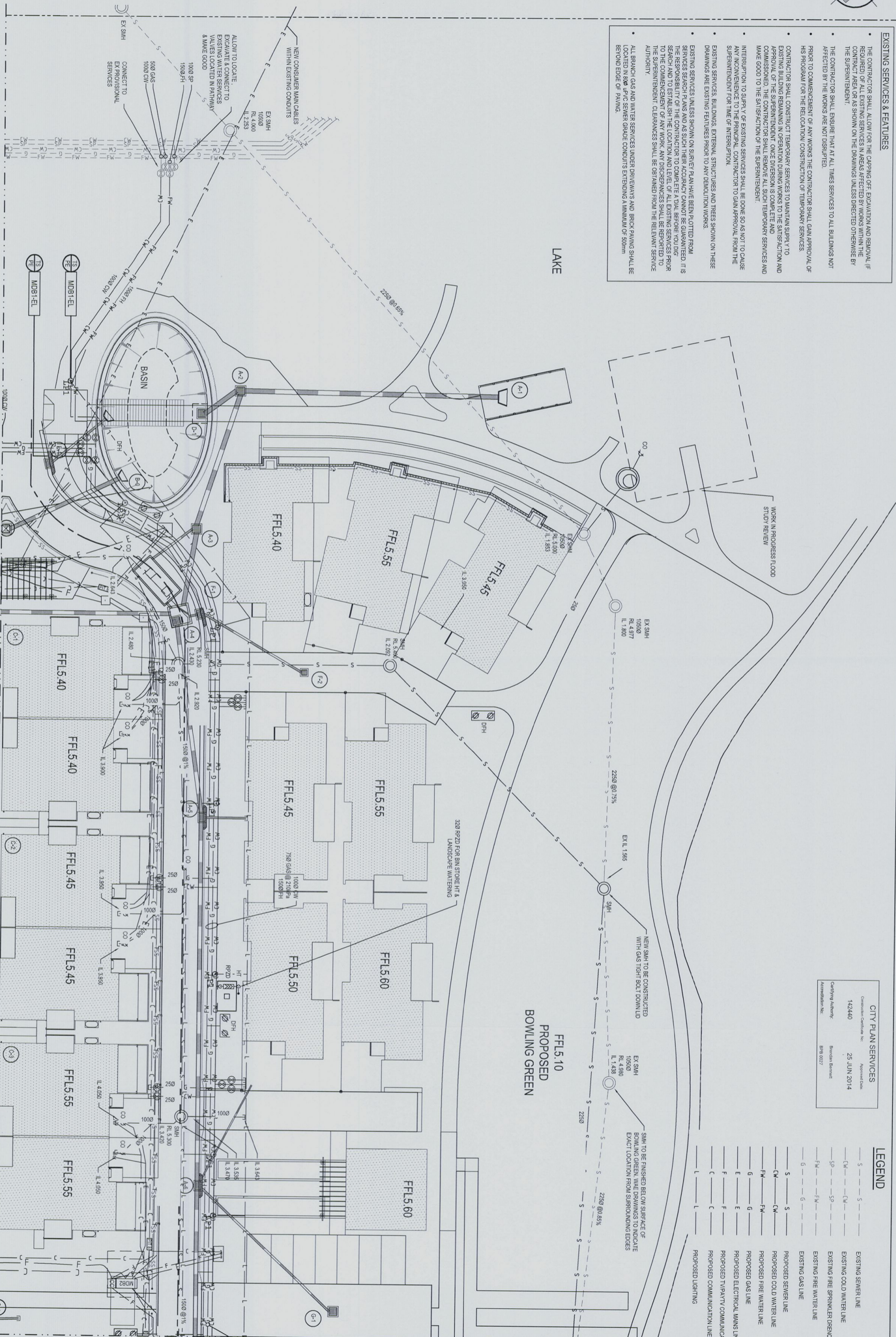
FOR CONSTRUCTION CERTIFICATE

[illegible]



EXISTING SERVICES & FEATURES

- THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
- CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY TO EXISTING BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED, THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
- INTERFERENCE TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. CONTRACTOR TO OBTAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERFERENCE.
- EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
- EXISTING SERVICES UNLESS SHOWN ON SURVEY/PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COME TOGETHER WITH THE SURVEYOR TO OBTAIN AND ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. TOLERANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVINGS SHALL BE LOCATED IN 800 W/PC GREATER GROUND CONDITIONS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.

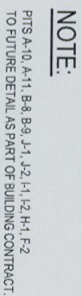


LEGEND

EXISTING SEWER LINE	S	S
EXISTING COLD WATER LINE	CM	CM
EXISTING FIRE SPRINKLER OBSCURER	SP	SP
EXISTING FIRE WATER LINE	FW	FW
EXISTING GAS LINE	G	G
PROPOSED SEWER LINE	S	S
PROPOSED COLD WATER LINE	CM	CM
PROPOSED FIRE WATER LINE	FW	FW
PROPOSED GAS LINE	G	G
PROPOSED ELECTRICAL MAINS LINE	E	E
PROPOSED TV/PA/TV COMMUNICATION LINE	F	F
PROPOSED COMMUNICATION LINE	C	C
PROPOSED LIGHTING	L	L

CITY PLAN SERVICES	
Construction Certificate No:	Approval Date:
142440	25 JUN 2014
Certifying Authority: Accreditation No:	Brendan Barnett BFB 0027

[illegible]



THE CONTRACTOR SHALL ALLOW FOR THE PAVING OF EXCAVATION AND REMOVAL OF EXISTING PAVEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF THE CONTRACT AREA OR AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.

THE CONTRACTOR SHALL ENSURE THAT ALL UTILITIES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.

PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.

THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN ACCESS TO EXISTING BUILDING SEWING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED, THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.

INTERFERENCE TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PROPERTY/CONTRACTOR TO OBTAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERFERENCE.

EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.

EXISTING SERVICES PLANS SHOWN ON SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE A DIAL BEFORE ANY DUG SEARCH AND TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.

ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN 800mm DEEP GUTTER GRADE COURSES EXTENDING A MINIMUM OF 500mm BEYOND EACH SIDE OF PAVING.


EXISTING SEWER LINE	5	5	---
EXISTING COLD WATER LINE	CM	CM	---
EXISTING FIRE SPRINKLER BRENCHER	SP	SP	---
EXISTING FIRE WATER LINE	F-W	F-W	---
EXISTING GAS LINE	G	G	---
PROPOSED SEWER LINE	5	5	---
PROPOSED COLD WATER LINE	CM	CM	---
PROPOSED FIRE WATER LINE	F-W	F-W	---
PROPOSED GAS LINE	G	G	---
PROPOSED ELECTRICAL MAINS LINE	E	E	---
PROPOSED TYPARITY COMMUNICATION LINE	C	C	---
PROPOSED COMMUNICATION LINE	C	C	---
PROPOSED LIGHTING	L	L	---

CITY PLAN SERVICES	
Consolidated Certificate No	Approved Date
142440	25 JUN 2014
Certifying Authority	Brandon Bennett
Accreditation No	BPB 0027

FOR CONSTRUCTION CERTIFICATE

SURVEY INFORMATION		Client	
SURVEYED BY: LOCKEYLAND TITLE SOLUTIONS		ARV	
ORIGIN OF E.T.E.B.S. 5/15/54 S.E. 34			
REVISION		REVISION	
01	ISSUED FOR CONTRACT	01	ISSUED FOR CONTRACT
02	AMENDMENT	02	AMENDMENT
03	AMENDMENT	03	AMENDMENT
04	AMENDMENT	04	AMENDMENT
05	AMENDMENT	05	AMENDMENT
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100	AMENDMENT	100	AMENDMENT

Client	ARV
Address	ENVIRONA STUDIO
Level 5, 79 Victoria Avenue +61 2 8417 8400 Oxleywood NSW 2067	
Telephone	+61 2 8417 8400
Fax	+61 2 8417 8337
Email	envelop@envirostudio.com.au
Website	www.envelopstudio.com.au

	
Project	ANGLICAN RETIREMENT VILLAGES 8 MACPHERSON STREET WARREWOOD
Site	

Owner	Anglican	Designed		Date	
Architect	AZNha	Drawn	N.Walsh		
Checked	C. Mould	Scale	1:200 @ A1	March 2014	
Project Manager	B. Sharkey	Approved	A. Francis		
Quantity Surveyor		Revision			

12693 CC C802 03

SHEET 2 OF 4

SERVICES PLAN



EX SMH
CONNECT TO
EX PROVISIONAL
SERVICES

MDBI-EL
MDBI-EL
MDBI-EL

1000 CW
750 GAS @ 210kPa
1500 FH

320 RPZD FOR BIN STORE HT
& LANDSCAPE WATERING

EX SMH

EX PIT CAPPED
FOR FUTURE
CONNECTION

MDBI-EL

EX DH

EX PROVISIONAL
SERVICES

EX 1000 RACE CW
EX 1000 SP
EX 1000 GAS
EX 500 GAS
EX 1500 FH

EX SWP
RL 5.100
LL 3.900

EXISTING SPRINKLER
BOOSTER ASSEMBLY
EXISTING HYDRANT
BOOSTER ASSEMBLY

MACHPHERSON STREET

PROVIDE RPZD TO HOSE
TAP FOR LANDSCAPE
WATER SUPPLY

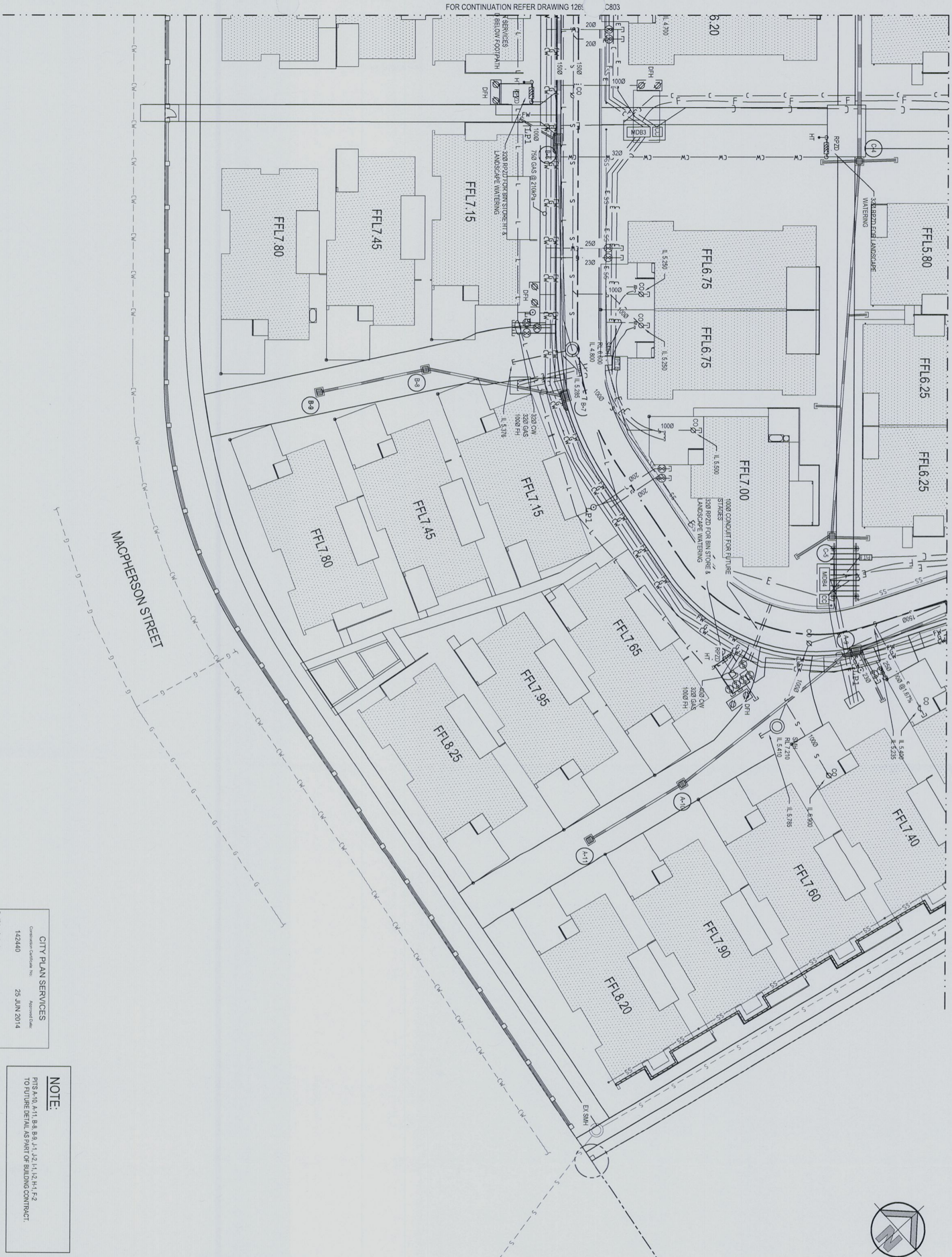
NEW GAS REGULATOR ASSEMBLY SET TO 210kPa
OUTLET PRESSURE & CAPACITY OF 200m3/H

0 4 8 12 16 20m
SCALE 1:200

FOR CONTINUATION REFER DRAWING 12693 CC C804

SURVEY INFORMATION				Client			
SURVEYED BY:				ARV			
LOOK/LEVEL AND TITLE SOLUTIONS				ENVIRONA STUDIO			
ORIGIN OF LEVELS PW1544 & 3.3				This drawing and design remain the property of Henry & Hyman and may not be copied in whole or in part without the prior written approval of Henry & Hyman.			
REVISION				REVISION			
B1	ISSUED FOR CONCEPT	A	NW	16/05/2014			
B2	ISSUED FOR CONCEPT	D0	NW	15/05/14			
B1	ISSUED FOR CONCEPT	AZ	NW	09/05/14			
REVISION				REVISION			

FOR CONTINUATION REFER DRAWING 12693_CC_C802



LEGEND

- S --- S --- EXISTING SEWER LINE
- CW --- CW --- EXISTING COLD WATER LINE
- SP --- SP --- EXISTING FIRE SPRINKLER DRAINAGE
- FW --- FW --- EXISTING FIRE WATER LINE
- G --- G --- EXISTING GAS LINE
- S --- S --- PROPOSED SEWER LINE
- CW --- CW --- PROPOSED COLD WATER LINE
- FW --- FW --- PROPOSED FIRE WATER LINE
- G --- G --- PROPOSED GAS LINE
- E --- E --- PROPOSED ELECTRICAL MAINS LINE
- F --- F --- PROPOSED TV/PA/TV COMMUNICATION LINE
- C --- C --- PROPOSED COMMUNICATION LINE
- L --- L --- PROPOSED LIGHTING

EXISTING SERVICES & FEATURES

- THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF ALL EXISTING SERVICES (GAS, WATER, SEWER, ETC.) AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.
- THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
- CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY TO EXISTING BUILDING REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVISION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
- INTERUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE A DISRUPTION TO THE PRINCIPAL CONTRACTOR TO OBTAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERUPTION.
- EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
- EXISTING SERVICES UNLESS SHOWN ON SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE A DIL BEFORE YOU DUE SEARCH OF THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORKS TO THE SATISFACTION OF THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN 800 PVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.

FOR CONSTRUCTION CERTIFICATE

NOTE:

PTS A-10, A-11, B-8, B-9, J-1, J-2, K-1, K-2, K-3, F-2 TO FUTURE DETAIL AS PART OF BUILDING CONTRACT.

CITY PLAN SERVICES

Construction Certificate No. 142440
Approved Date: 25 JUN 2014

City of Sydney
City Engineer
Bridget Bennett

Level 5
77 Macpherson Avenue
Cherrywood NSW 2007

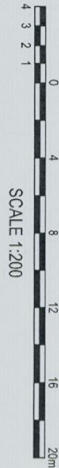
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SERVICES PLAN - SHEET 4 OF 4

SCALE 1:200



SURVEY INFORMATION				Client			
SURVEYED BY:				ARV			
LOOKLEY LAND TITLE SOLUTIONS				ENVIRONA STUDIO			
DRAWN AND CHECKED BY:				This drawing and design remains the property of Henry & Herry and may not be copied in whole or in part without the prior written approval of Henry & Herry.			
ORIGIN OF DETAILS: M1554-14.33							
REVISION		AMENDMENT		DRAWN		DESIGNED	
B1		ISSUED FOR CONTRACT		JL		18/05/2014	
B2		ISSUED FOR CONTRACT		JL		18/05/2014	
B3		ISSUED FOR CONTRACT		JL		18/05/2014	
B4		ISSUED FOR CONTRACT		JL		18/05/2014	
B5		ISSUED FOR CONTRACT		JL		18/05/2014	
B6		ISSUED FOR CONTRACT		JL		18/05/2014	
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B88		ISSUED FOR CONTRACT		JL		18/05/2014	

**ANGLICAN RETIREMENT VILLAGE
WARRIEWOOD BROOK STAGE 4,5 & 6
INFRASTRUCTURE
ELECTRICAL SERVICES**

EXTERNAL LIGHTING

- LED POST TOP LUMINAIRE ON A METER POLE
INTERMEDIATE LIGHTING FOR EAVES 120 LED WITH CROOK ARM

POWER

- [illegible]
































COMMUNICATIONS

- [illegible]

FOXTEL/MATV

- F1—
FOOTL UNDERGROUND CONDUIT RETICULATION
F1 - DENOTES a 150mm HDPE WHITE CONDUITS
- F4a—
MAIN ELECTRICAL UNDERGROUND CONDUIT RETICULATION
F4a - DENOTES a 150mm HDPE WHITE CONDUITS
- F4b—
CONDUIT TURN UP 500mm ABOVE GROUND AND CAPPED

SINGLE LINE DIAGRAM

- | | |
|---|---|
|  | THREE PHASE |
|  | CROST BRIDGE |
|  | 3- PHASED CURRENT TRANS |
|  | ISOLATOR SWITCH |
|  | DIFFERENTIAL CROST BRIDGE 3PHASE SYSTEM |
|  | WITHDRAWN AT DISJUNT BREAKER |
|  | CONNECTION |
|  | NO-CHARGED SHOWN IN CLEAD |
|  | FLAT TOP SWITCH |
|  | FLAT TOP SWITCH |
|  | NO-CHARGED SHOWN IN CLEAD |
|  | NO-CHARGED SHOWN IN CLEAD |
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|  | NO-CHARGED SHOWN IN CLEAD |
|  | NO-CHARGED SHOWN IN CLEAD |

GENERAL NOTES:

1. COMMUNICATION SERVICES INFRASTRUCTURE PROVISION SHALL BE INSTALLED IN ACCORDANCE WITH NEW INSTALLATION PREPARATION GUIDE, SEE ELECTRICAL SPECIFICATION
2. ALL CONDUITS SHALL BE COMPLETE WITH PULL WIRE.
3. EACH ELECTRICAL ITEM SHALL BE INSTALLED AS PER THE MANUFACTURER RECOMMENDATIONS
4. DRAWINGS ARE SUPPLEMENTARY, REFER TO OWNER'S SELECTED DRAWINGS FOR EXACT LOCATION OF ELECTRICAL SERVICES
5. DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE ELECTRICAL SERVICES SPECIFICATION

DRAWING SCHEDULE

- | | |
|---------------|--|
| 140035-E-1005 | TITLE LEGEND AND DRAWING SCHEDULE |
| 140035-E-1006 | POWER, COMING AND TIE/IN TV INFRASTRUCTURE |
| 140035-E-1007 | EXTERNAL LIGHTING LAYOUT |
| 140035-E-1008 | SINGLE LINE DIAGRAM AND DETAILS |

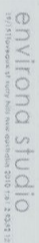
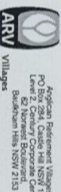
REVISIONS / AMENDMENTS		
Rev	Date	Description
A	15.05.14	CONTRACT ISSUE

Rev	Date	Description	Verified	Rev	Drawing Number	Description	Project
A	11.05.14	CONTRACT ISSUE	pp				
B	02.09.14	CONSTRUCTION ISSUE	pp				

[illegible]

Row	Drawing Number	Description	From

All dimensions to be verified on site prior to commencement of on-site work and/or off-site prefabrication. Figured dimension to be taken in preference to scaled dimensions. This drawing is copyright and remains the property of JHA Consulting Engineers. Reproduction in whole or part of these drawings without written consent constitutes an infringement of copyright.



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North Sydney
NSW 2060
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ANGLICIAN RETIREMENT VILLAGES
8 MACPHERSON STREET
WARRIEWOOD NSW 2102

ELECTRICAL SERVICES
LEGEND OF SYMBOLE,
GENERAL NOTES AND
DRAWINGS LIST

CONSTRUCTION ISSUE

140055	APPROVED	SCALE 3 AS	27/03/14
	RP	NTS	REV
	JH		
E1000	QUANTITY NO.		
B			

CITY PLAN SERVICES

Contractor Certificate No. 14240 Approved Date 25 JUN 2014

Issuing Authority: General Permit
Accreditation No. 669 0027

