CONSULTANTS

Suite 2, Level 1
33 Herbert Street
ST LEONARDS NSW 2065

ST LEONARDS NSW 1590

T 02 9438 5098
F 02 9438 5398

www.acor.com.au

ENGINEERS

MANAGERS

INFRASTRUCTURE
PLANNERS

DEVELOPMENT
CONSULTANTS

Stormwater Management Report

Londonderry Service Station

Prepared for: R J Sinclair

Document no: SY180205

Issue no: Rev 1

Disclaimer

This Report has been prepared in accordance with the scope of services described in the contract or agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements and results taken at or under the particular terms and conditions specified herein. Changes to circumstances or facts after certain information or material has been submitted may impact on the accuracy, completeness or currency of the information or material. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd accepts no responsibility for its use by other parties without the specific authorisation of ACOR Consultants Pty Ltd. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. Any reference to "Report" where used in this Disclaimer is also a reference to any plan, table, data or other document that has been created for the purposes of the "Report" and referred to in the "Report"

REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
0	03/08/2018	Development Approval	GL	AH
1	10/01/2019	Flood Assessment Amendment	JH	GL

Review Panel	
Division/Office	**Name**

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions of the site located at Wallendbeen Service Station Stormwater Drainage

Table of Contents

Appendices

1 Introduction

ACOR have been appointed by R.J. Sinclair to produce a stormwater management plan for the proposed new service station on 370-372 Carrington Road, Londonderry. This report provides the findings and outcomes of the stormwater design, including analysis for stormwater quantity and quality of the flows on site.

2 Site

2.1 Location and Existing Development

The site is an existing site over exiting Lot 2 DP1179316 on the corner of Carrington Road and Londonderry Road. The current site is an existing service station with majority of surface comprising of impervious hardstand. The land slopes generally in a south westerly direction at around 1.0 % grade towards an the south west of the site. Carringotn Road falls to the east and is kerbed, Londonderry Road falls to the south and is also kerbed.

2.2 Point of Stormwater Discharge

The exiting point of discharge for the current vacant lots is towards the north, and onto adjacent residential blocks. It is evident from viewing the topography that this point of discharge forms a low depression in the south west corner of the site with possible ponding occuring. As part of this proposed development, this existing direction of water flow and land fall will be maintained, and stormwater from the site will be discharged to an existing Council pit and pipe network to the north west of the site.

2.3 Council Road Drainage

GIS Data has been obtained from Council to confirm local stormwater network layout. It is proposed that the site will be connected to Councils existing road drainage via a connection to the existing pit located on the corner of Londonderry Road and Carrington Road.

3 Development

3.1 Proposed Development

The proposed development of the site will include the building of a sales building, under canopy refuelling areas for passenger vehicles and a service yard. Driveways and vehicle parking areas will typically be rigid concrete pavement.

Refer to Proposed Development Plan attached as Appendix A.

3.2 Earthworks

Wherever possible, the site has been designed to maintain existing slope of land and minimise any earthworks. Stormwater catchments are not intended to be changed.

4 Stormwater Quantity

4.1 Standards

The following guidelines and standards relating to water quantity have been adopted for the design of the stormwater system:

- Penrith City Council DCP 2014 - Volume 1
- AS/NZS 3500.3 Plumbing and Drainage Part 3: Stormwater Drainage 2015
  - The Pit and Pipe System to convey stormwater through the site to Londonderry Road Council drainage network has been designed to convey the 20 year ARI flows.
  - The major overland system of internal road/footpath pavement have been designed to convey 100 year ARI flows.

4.2 Methodology and Modelling

DRAINS was used to model the proposed pit and pipe system with predicted overland flow paths. The pit and pipe network has been sized to cater for rainfall events up to and including the 20 year ARI (minor rainfall event). Larger rainfall events will be drained via overland flow paths to the external road carriageway.

4.3 Rainfall Data

Rainfall data for the Londonderry region was obtained from the Bureau of Meteorology (BOM) IFD Tables and imported into DRAINS for the 1 to 100 year ARI rainfall event.

4.4 On Site Detention

The OSD (On Site Detention) system on site was designed in accordance with Penrith City Councils Site Storage Rquirements (SSR) and Permissible Site Discharge (PSD) requirements for the site. A 37 m^3 OSD tank was calculated and site discharge is to be limited to 16 L/s via an 88mm orifice plate.

5 Stormwater Quality

5.1 Standards

ACOR understands that Penrith Council currently currently use MUSIC-Link to provide an output format for MUSIC water quality modelling. It is also understood that the proposed DCP for this area has included a section on WSUD, and as such, the stormwater management plan includes for treatment of stormwater prior to discharge form site.

As part of the stormwater drainage system, it is proposed to divert all stormwater through 6 x Stormwater360 Stormfilters and 3 x Stormwater360 Enviropod pit inserts immediately before discharging from the site. This Stormfilters will allow for capture of oily water discharge, hydrocarbons, nutrients, and heavy metals.

Note that all under canopy drainage will be drained through a runoff capture system separate from the stormwater network.

6 Flood Risk Assessment

6.1 Flood Study

As per comment 3 in the preliminary DA review from council, the site was said to be “Flood Affected”. Upon further investigation, the proposed site is not affected by the 1% AEP local overland flow flood levels from analysing the Flood Level Enquiry (Appendix C) issued by Penrith City Council dated 23 May 2017 and the site is located outside the Flood Planning Land Map area (Appendix D). Both flood maps show that the proposed development is not in the vicinity of the flood affected areas. Despite this, the proposed building has a FFL 19.30 which is 0.6m above the 18.7m AHD overland flow flood level at the southern property boundary, shown in Appendix C. Appropriate freeboard has been provided by the proposed development and as such, considered safe from flood flows (for all events up to and including the 1% AEP flood event).

7 Conclusion

The stormwater system designed for the proposed service station development is an in ground pit and pipe system discharging to a treatment tank before being captured within the site OSD system. The pit and pipe networks has capacity to collect and discharge rainfall runoff up to and including the 20 year ARI flows. Overland flow paths have been designed to cater for the 100 year ARI flows via overland flow to the existing streetscape.

Prior to discharge from the site, stormwater will flow through a treatment device (Stormfilters and Enviropods) to remove pollutants and improve the stormwater quality released into the stormwater system.

The proposed development is considered safe from flood flows for all events up to and including the 1% AEP flood event and is not considered “Flood Affected”.

Appendix A - Proposed Development Plan

- SD – 01: Stormwater Drainage Plan

CARRINGTON ROAD

UNDER GROUND STORMFILTER CHAMBER
WITH 6 x 0.45 DIA. STORMWATER 360
PSORB STORMFILTERS. REFER TO
DRAWING SD - 02 FOR DETAILS.

UNDER GROUND OSD TANK CHAMBER
9.25m x 4.0m x 1.0m DEEP
REFER TO DRAWING SD - 02 FOR DETAILS.
VOLUME = 37.00m³
PSD = 16 L/s

BOUNDARY — 43.36m — 97°50'30"

EXISTING STORMWATER
KERB INLET PIT
C.L. - 18.76
I.L. - 17.00

Ø150 PVC @ 1% FALL

ROAD WIDENING EASEMENT

Lot 11
DP 255073

I.L. - 17.82

Lot 2
DP 1179316
1315m²
(Title)

Ø225 PVC @ 1% FALL

Ø150 PVC
@ 1% FALL

SIP 600 x 600
CLASS 'C' LID
C.L. - 18.83
I.L. - 18.27

SIP 600 x 600
CLASS 'C' LID
WITH ENVIROPOD INSERT
C.L. - 19.00
I.L. - 18.40

Ø150 PVC @ 1% FALL

SIP 600 x 600
CLASS 'C' LID
WITH ENVIROPOD INSERT
C.L. - 19.00
I.L. - 18.35

Ø150 PVC @ 1% FALL

Ø150 PVC @ 1% FALL

Ø150 PVC @ 1% FALL

DP

SIP 450 x 450
CLASS 'C' LID
WITH ENVIROPOD INSERT
C.L. - 19.15
I.L. - 18.30

Ø150 PVC
@ 1% FALL

Ø225 PVC @ 1% FALL

Ø225 PVC @ 1% FALL

Ø150 PVC @ 0.5% FALL

SIP 600 x 600
CLASS 'C' LID
WITH ENVIROPOD
INSERT
C.L. - 19.10
I.L. - 18.00

Ø150 PVC @ 1% FALL

GRATED DRAIN
250 x 250
CLASS 'C' LID
DRAIN TO
ADJCENT SWP

SIP 600 x 600
CLASS 'C' LID
WITH ENVIROPOD INSERT
C.L. - 18.65
I.L. - 18.05

BOUNDARY — 42.99m — 277°50'30"

Lot 1
DP 537513

BOUNDARY — 30.48m — 188°18'55"

Lot 4
DP 1179316

ROAD

LONDONDERRY ROAD

BOUNDARY — 30.48m — 7°37'15"

STORMWATER DRAINAGE PLAN

SCALE BAR 1 : 1 On A1 Size Original

0 10 20 30 40 50 60 70 80 90 100

SCALE BAR 1 : 2 On A3 Size Reduction

0 20 40 60 80 100 120 140 160 180 200

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

No.	Amendment	By	Date
P1	PRELIMINARY ISSUE. NOT FOR CONSTRUCTION.	VP	03.08.2018
DA1	ISSUED FOR DEVELOPMENT APPROVAL ONLY. NOT FOR CONSTRUCTION.	VP	03.08.2018

Chartered Member :
BUILDING DESIGNERS AUSTRALIA
Accredited Building Designer : 6318
Victoria : RBP DP-AD 15529
Queensland : QBCC 1082914
Tasmania : ABDC 1010
New Zealand : BP 131362

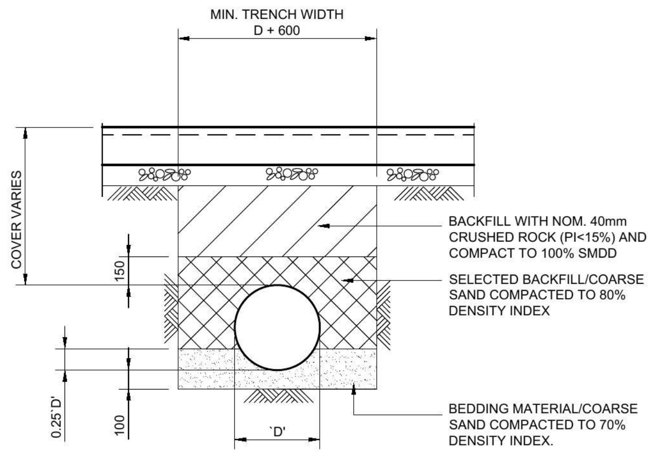
R.J. SINCLAIR Pty Ltd
Building Design
Office : Suite B111 - Sky City
NorWest Business Park
20 Lexington Drive
BELLA VISTA NSW 2153
Postal : PO Box 503
ROUND CORNER NSW 2158
Phone : 02 8883 0999
E-mail : designs@rjsinclair.com.au
Web : www.rjsinclair.com.au
Multi-Discipline Design + Project Management

Project
PROPOSED SERVICE STATION
370 - 372 CARRINGTON ROAD
LONDONDERRY NSW
FOR
MARIA GALIS

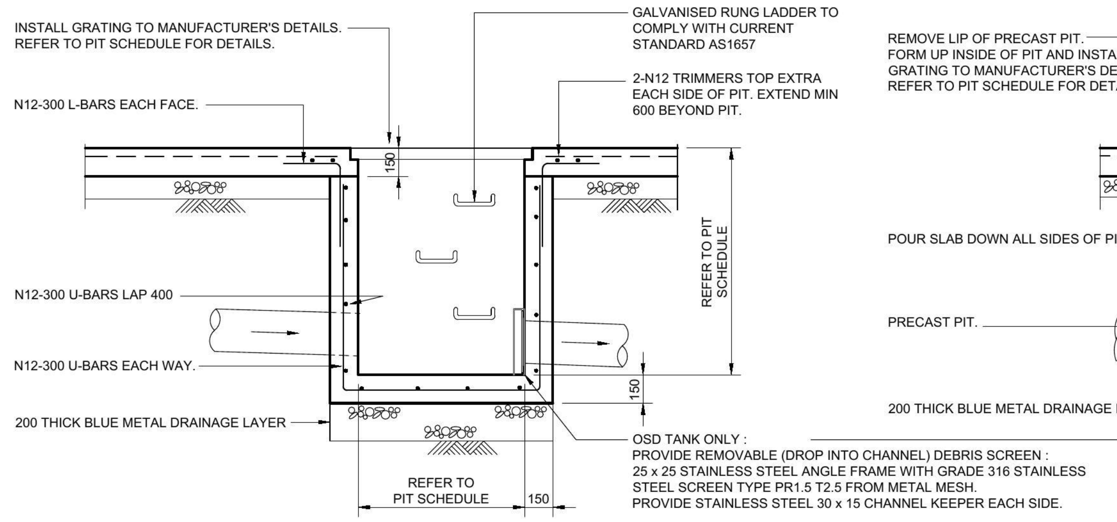
Drawing Title
STORMWATER DRAINAGE PLAN

Approved	Designed VP
Date: March 2018	Drawn VP
Scale: 1:100 @ A1 & 1:200 @ A3	Checked
Project No. 16 - 096	Drawing No. SD - 01
	Amdt. DA1

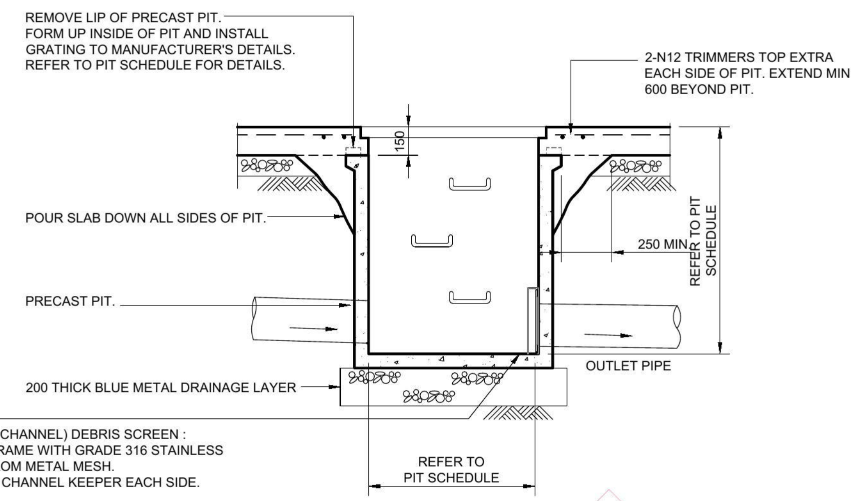
NOTE: THE CHOICE TO USE EITHER CAST INSITU OR PRECAST STORMWATER PITS TO BE MADE BY THE CONTRACTOR.



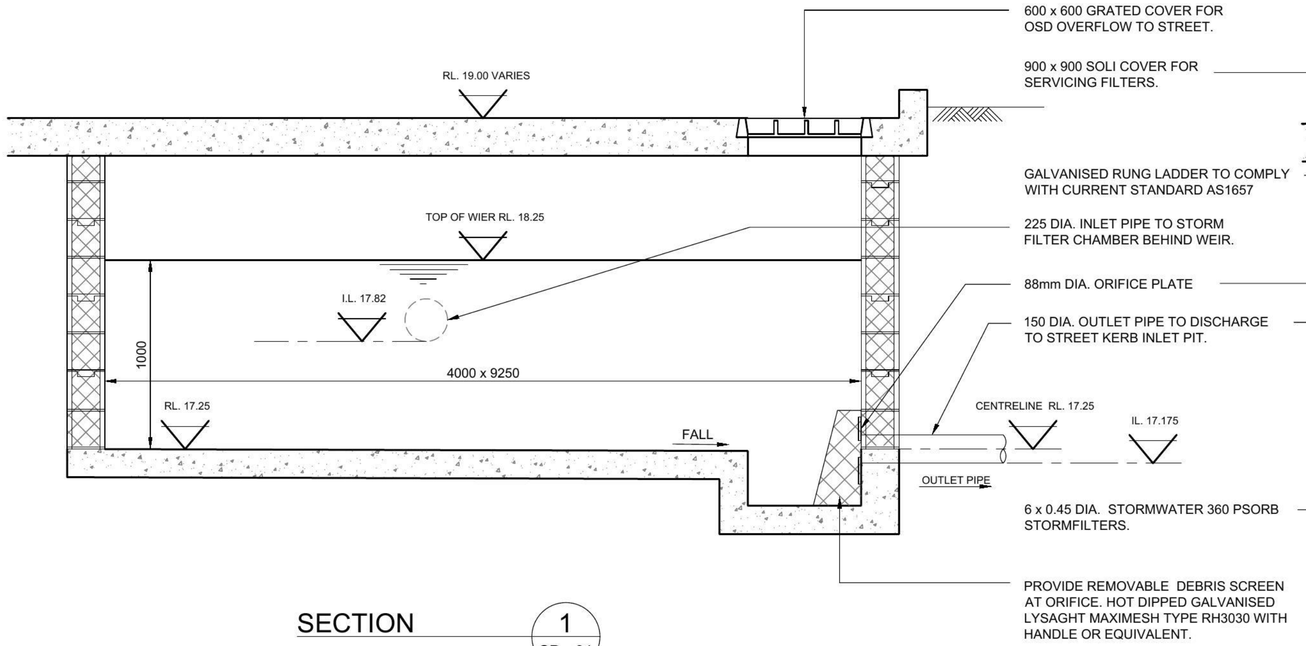
TYPICAL PIPE TRENCH DETAIL



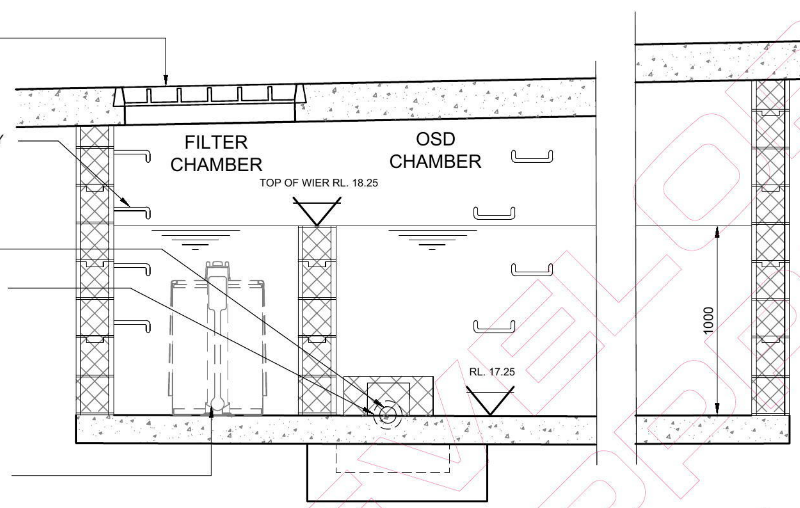
TYPICAL INSITU STORMWATER DRAINAGE PIT DETAIL



TYPICAL PRECAST STORMWATER DRAINAGE PIT DETAIL



SECTION 1 SD - 01



SECTION 2 SD - 01

STORMWATER TREATMENT SECTIONS

ISSUED FOR DEVELOPMENT APPROVAL
NOT FOR CONSTRUCTION

SCALE BAR 1 : 1 On A1 Size Original
0 10 20 30 40 50 60 70 80 90 100
0 20 40 60 80 100 120 140 160 180 200
SCALE BAR 1 : 2 On A3 Size Reduction

No.	Amendment	By	Date
P1	PRELIMINARY ISSUE. FOR DISCUSSION PURPOSES ONLY. NOT FOR CONSTRUCTION.	VP	03.08.2018
DA1	ISSUED FOR DEVELOPMENT APPROVAL ONLY. NOT FOR CONSTRUCTION.	VP	03.08.2018

Chartered Member : BUILDING DESIGNERS AUSTRALIA
Accredited Building Designer : 6318
Victoria : RBP DP-AD 15529
Queensland : QBCC 1082914
Tasmania : ABP CC6710
New Zealand : BP 131362

R.J. SINCLAIR Pty Ltd
Building Design
Office : Suite B111 - Sky City
NorWest Business Park
20 Lexington Drive
BELLA VISTA NSW 2153
Postal : PO Box 503
ROUND CORNER NSW 2158
Phone : 02 8883 0999
E-mail : designs@rjsinclair.com.au
Web : www.rjsinclair.com.au
Multi-Discipline Design + Project Management

Project
PROPOSED SERVICE STATION
370 - 372 CARRINGTON ROAD
LONDONDERRY NSW
FOR
MARIA GALIS
Drawing Title
STORMWATER DETAILS

Approved		Designed AH
Date: August 2018		Drawn VP
Scale: 1:20 @ A1 & 1:40 @ A3		Checked
Project No. 16 - 096	Drawing No. SD - 02	Amdt. DA1

Appendix B - MUSIC Link Output

PENRITH CITY COUNCIL

music@link

MUSIC-*link* Report

Project Details		Company Details	
Project:	370-372 Carrington Road, Londonderry	**Company:**	ACOR Consultants
Report Export Date:	3/08/2018	**Contact:**	
Catchment Name:	SY180205 Londonderry (MUSIC-Link)	**Address:**	
Catchment Area:	0.362ha	**Phone:**	
Impervious Area*:	79.34%	**Email:**	
Rainfall Station:	67113 PENRITH		
Modelling Time-step:	6 Minutes		
Modelling Period:	1/01/1999 - 31/12/2008 11:54:00 PM		
Mean Annual Rainfall:	691mm		
Evapotranspiration:	1158mm		
MUSIC Version:	6.3.0		
MUSIC-link data Version:	6.31		
Study Area:	Penrith		
Scenario:	Penrith Development		

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

Treatment Train Effectiveness		Treatment Nodes		Source Nodes	
Node: Post-Development Node	**Reduction**	**Node Type**	**Number**	**Node Type**	**Number**
Flow	0.00168%	Detention Basin Node	1	Urban Source Node	3
TSS	85.3%	GPT Node	1		
TP	71.9%	Generic Node	1		
TN	46.5%				
GP	100%				

Comments

Passing Parameters

Node Type	Node Name	Parameter	Min	Max	Actual
Detention	Detention Basin	Hi-flow bypass rate (cum/sec)	None	99	2
GPT	3 x EnviroPod 200	Hi-flow bypass rate (cum/sec)	None	99	0.06
Post	Post-Development Node	% Load Reduction	None	None	0.00168
Post	Post-Development Node	GP % Load Reduction	90	None	100
Post	Post-Development Node	TN % Load Reduction	45	None	46.5
Post	Post-Development Node	TP % Load Reduction	60	None	71.9
Post	Post-Development Node	TSS % Load Reduction	85	None	85.3
Urban	Refuelling Canopy (255m2)	Area Impervious (ha)	None	None	0.255
Urban	Refuelling Canopy (255m2)	Area Pervious (ha)	None	None	0
Urban	Refuelling Canopy (255m2)	Total Area (ha)	None	None	0.255
Urban	Sales Building Canopy (210 m2)	Area Impervious (ha)	None	None	0.021
Urban	Sales Building Canopy (210 m2)	Area Pervious (ha)	None	None	0
Urban	Sales Building Canopy (210 m2)	Total Area (ha)	None	None	0.021
Urban	Site Stormwater (860m2)	Area Impervious (ha)	None	None	0.011
Urban	Site Stormwater (860m2)	Area Pervious (ha)	None	None	0.074
Urban	Site Stormwater (860m2)	Total Area (ha)	None	None	0.086

Only certain parameters are reported when they pass validation

Appendix C - Flood Level Equiry, Penrith City Council

PENRITH

Our reference: ECM7655533
Contact: Ratnam Thilliyar
Telephone: 4732 7988

23 May 2017

Vaughn Pelias
PO Box 503
ROUND CORNER NSW 2158

Dear Sir/Madam

Flood Level Enquiry
Lot 2 DP 1179316 No. 370-372 Carrington Road LONDONDERRY

Please find enclosed Flood Level information for the above property.

Should you require any further information please do not hesitate to contact me on 4732 7988.

Yours sincerely

Ratnam Thilliyar
Engineering Stormwater Supervisor

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

PENRITH

Flood Information
Lot 2 DP 1179316 No. 370-372 Carrington Road LONDONDERRY

Date of issue: 23 May 2017

The 1% AEP local overland flow flood levels in the vicinity of the above property are estimated to vary from RL 19.4m AHD at the eastern property boundary to RL 18.7m AHD at southern property boundary.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions

AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.

AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Notes:

1. The contours shown above in yellow numbering are at 0.5m intervals and are based on Aerial Laser Scanning (ALS) Survey undertaken in 2002. The contour levels are approximate and for general information only. Accurate ground levels should be obtained by a Registered Surveyor.

2. The flood level is based on current information available to Council at the date of issue. The flood level may change in the future if new information becomes available. The 1% AEP flood is the flood adopted by Council for planning controls. Rarer and more extreme flood events will have a greater effect on the property.

3. You are strongly advised if you propose to carry out development upon the property, that you retain the assistance of an experienced flooding engineer and have carried out a detailed investigation.

4. Council accepts no liability for the accuracy of the flood levels (or any other data) contained in this certificate, having regard to the information disclosed in Notes "1", "2". As such you should carry out and rely upon your own investigations.

Penrith City Council
PO Box 60, Penrith
NSW 2751 Australia
T 4732 7777
F 4732 7958
penrithcity.nsw.gov.au

Ratnam Thilliyar
Engineering Stormwater Supervisor

PENRITH
CITY COUNCIL

Appendix D - Flood Planning Land Map, Penrith City Council

Penrith Local Environmental Plan 2010

Flood planning land map - sheet FLD_010

Flooding

Flood planning area

Cadastre

Cadastre 12/05/2010 © Penrith City Council

N

200 0 200 400 600

Metres

Projection: GDA 1994
MGA Zone 56

Scale: 1:20,000 @ A3

Map identification number:
6350_COM_FLD_010_020_20100512