

## SITE CLASSIFICATION REPORT

**Client:** Christopher Childs

**Project No:** CS1035

**Site Address:** 187 THE SADDLE ROAD,  
BRUNSWICK HEADS, NSW, 2483

**Date of Report:** 26 August 2021

### SITE PHOTO



### SITE CLASSIFICATION

**Class P**

(Due to trees)

In Accordance with AS2870-2011

### WIND CLASSIFICATION

**N4**

In Accordance with AS4055-2012

### SOIL PROPERTIES

$y_s$  RANGE (mm)

$y_t$  VALUE (mm)

**Class M**

21 - 40

10

Excludes tree effect

This report is authorised on behalf of  
Structerre Consulting Engineers by

#### BYRON BAY | YAMBA

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ABN: 63 619 141 310 Structerre CJA Pty Ltd trading as Northern Rivers Structerre Consulting Engineers

### P CLASS INDICATORS

On-site trees:	Yes	Notes:
Neighbouring trees:	Yes	
Estate fill:	No	
Uncontrolled fill:	No	
Low bearing capacity soils:	No	
Knock-down / rebuild:	No	

### SOIL CONDITIONS

Rock near surface	Yes	Notes: Rocks on surface throughout property
Marine / canal environment:	NA	
Surface water (ponding) :	No	
Sub-soil seepage / water table encountered	No	

### OTHER SITE OBSERVATIONS

Retaining walls	NA	Notes:
Services affecting the dwelling	NA	
Existing structures	Nil	
Slope	Moderate	
Vegetation	Grass & Trees	
Drainage	Fair	

### PROPOSED DEVELOPMENT

Building Class	Class 1a
Project Description	Single Detached Dwelling

## INTRODUCTION

This report is based on our field and laboratory test results, site and construction information (if any) supplied by the client. Should proposed construction vary from that advised, this office should be notified as additional testing may be required. It should also be noted that the test results may not be relevant if the location of a proposed structure varies from that originally advised. This report relates to the ground conditions on the property at the time of the site investigation. If so advised by the client, this report has considered the proposed site preparation. If unadvised cutting or filling is proposed or carried out, additional testing may be required to reclassify the site as indicated in Clause 2.3.2 (B) and Clause 2.5.3 of AS2870-2011.

This site has been classified in accordance with Section 2 of AS2870-2011. The characteristic surface movement,  $y_s$ , has been determined either by shrink and swell tests as specified in AS1289.7.1.1-1992 in accordance with Clause 2.3.2 (i) of AS2870-2011, or by visual-tactile identification of the soil with the assistance of Atterberg Limits in accordance with Clause 2.3.2 (iii) of AS2870-2011.

This investigation report is based upon information provided to our office and gathered by our staff for sites in New South Wales.

This report has been prepared in order that Structerre undertake a footing or slab design on the behalf of and for the client stated on the front page, and their building team. Structerre Consulting Engineers accepts no liability or responsibility whatsoever for the use of this report by other parties without formal written approval of this office.

## SITE CLASSIFICATION DESCRIPTIONS

(in accordance with Clause 2.1.1, Clause 2.1.3, Table 2.1 and Table 2.3 of AS2870-2011)

- A** Most sand and rock sites with little or no ground movement from moisture changes.
- S** Slightly reactive clay sites, which may experience only slight ground movement from moisture changes. Estimated characteristic surface movement,  $0 < y_s \leq 20\text{mm}$ .
- M** Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes.
- H1** Highly reactive clay sites, which may experience high ground movement from moisture changes. Estimated characteristic surface movement,  $40 < y_s \leq 60 \text{ mm}$ .
- H2** Highly reactive clay sites, which may experience very high ground movement from moisture changes. Estimated characteristic surface movement,  $60 < y_s \leq 75 \text{ mm}$ .
- E** Extremely reactive sites, which may experience extreme ground movement from moisture changes. Estimated characteristic surface movement,  $y_s > 75 \text{ mm}$ .
- P** Particular sites, due to either: low bearing strength, potential excessive foundation settlement, fill, mine subsidence, landslip, collapse activity, coastal erosion, abnormal moisture changes or sites which cannot be classified otherwise.

For sites with deep-seated moisture changes characteristic of dry climates and corresponding to a designed depth of suction change,  $H_s$ , equal to or greater than 3.0m, classifications M, H1, H2 and E shall include the suffix 'D', as appropriate (eg H1-D).

## INFLUENCE OF TREES

This site has been given a **P** classification in accordance with Clause 1.3.3, Clause 2.1.3 (e), Appendix H and Appendix CH of AS2870-2011 as our investigation indicates that trees were noted within or adjacent to the footprint of the proposed building. Trees remove moisture from the soil and result in abnormal moisture conditions occurring on site. On removal of these trees, or if they remain in place, damage to a proposed building may occur without additional treatment.

The designer is to be informed of the proposed work in order to provide an appropriate design to address the influence of the trees. This may include one of the following:

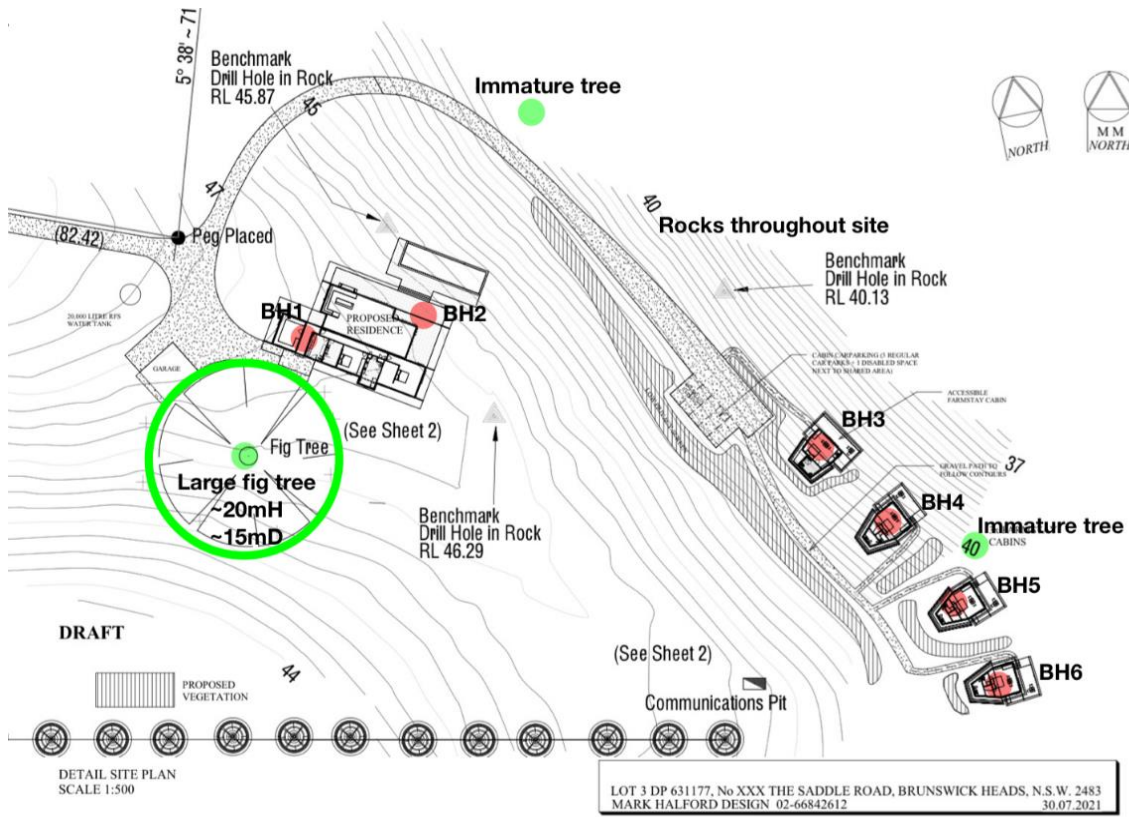
- 1) Provisions of piers.
- 2) Stiffening the footing system to take into consideration the total movement, i.e.  $y_{st} = (y_s +$
- 3) Provision of piers with a suspended slab solution.
- 4) Provision of a root barrier system acceptable to the designer.
- 5) A combination of the above, or an alternate design.

## LIMITS OF OUR INVESTIGATION

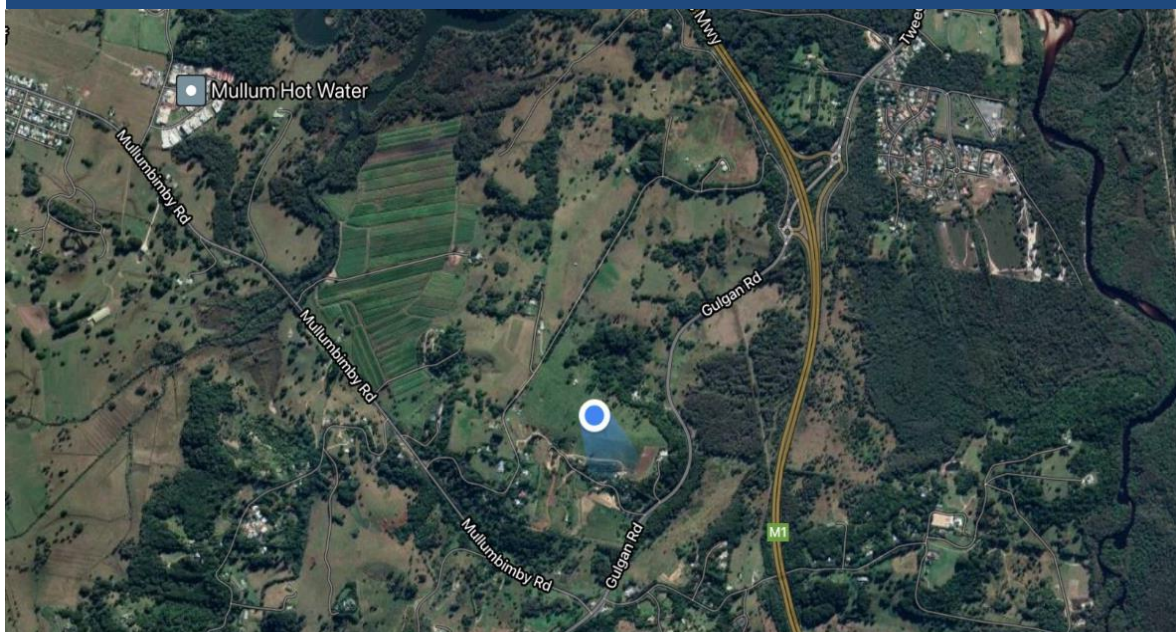
The recommendations made in this report are based on the assumption that the test results are representative of the overall subsurface conditions. Should excavations reveal variations from the soil conditions indicated in this report, our office should be notified before proceeding as the site classification may need revising and modifications to the design may be required. Also, should we be provided with additional information that affects the site classification, an additional fee may be charged to revise and reissue our report.

**If any detail of this report is unclear, contact this office.**

**SITE SKETCH**



**MAP REFERENCE**



**SITE PHOTOGRAPHS**



**LABORATORY RESULTS & CHARACTERISTIC SURFACE MOVEMENT CALCULATIONS**

Depth of Soil Suction Change ( $H_s$ mm)	1500	QBCC / Hedra $H_s$ values 201
Depth of Soil Cracking ( $H_c$ mm)	750	
Characteristic Surface Movement ( $y_s$ mm)	32	Section 2.3 of AS2870-2011
Extra Movement due to Trees ( $y_t$ mm)	10	Appendix H & CH of AS2870-2011
Assumed Maximum Cut (mm)	0	
Assumed Maximum Fill (mm)	0	

<b>Sample</b>	<b>A</b>
Liquid limit (LL %)	58
Linear Shrinkage (LS %)	14
$I_{ps}$ (%/pF)	2.9

Note : Liquid Limit as per Section 3.1.2 of AS1289-2009  
 Linear Shrinkage as per Section 3.4.1 of AS1289 - 2008

**WIND CLASSIFICATION**

Region	B	Figure 2.1 of AS4055 -2012
Terrain Category	2.5	Section 2.3 of AS4055 - 2012
Topographic Classification	T2	Table 2.3 of AS4055 - 2012
Shielding Classification	PS	Section 2.3 of AS4055 - 2012
Wind Rating	N4	Table 2.2 of AS4055 - 2012
Design Wind Gust Speed ( $V_{h,s}$ & $V_{h,u}$ )	39 & 61 m/s	Table 2.1 of AS4055-2012

**BORELOG PROFILES & BEARING CAPACITY**

BH1				BH2					
Depth (m)	PP	qa	DCP	Soil Profile	Depth (m)	PP	qa	DCP	Soil Profile
0.0			5	NATURAL: Silty Sandy CLAY (CI)	0.0			4	NATURAL: Silty Sandy CLAY (CI)
			5	Brown Red Yellow Moist				6	Brown Red Yellow Moist
		120	5				120	5	
			6					6	
0.5			6		0.5			5	
		160	6					4	
			10	SAMPLE A			120	4	
			15					6	
		200	7				120	6	
1.0			7		1.0			5	
			6					6	
			10					5	
			20+	UTP ROCK			120	5	Grey Orange Moist
				END OF BORE				5	
1.5					1.5				END OF BORE
2.0					2.0				
2.5					2.5				
3.0					3.0				
3.5					3.5				
4.0					4.0				

SAND			SILT & CLAY		
Density Term	Density Index (%)	Approx. DCP Blow Count	Consistency Term	Undrained Shear Strength (kPa)	Approx. DCP Blow Count
Very Loose	<15	< 1	Very Soft	0 - 12	< 1
Loose	15 - 35	1 - 3	Soft	12 - 25	1 - 2
Medium Dense	35 - 65	3 - 9	Firm	25 - 50	2 - 3
Dense	65 - 85	9 - 15	Stiff	50 - 100	3 - 5
Very Dense	> 85	> 15	Very Stiff	100 - 200	5 - 8
			Hard	> 200	> 8

able batter Information provided is to be used as a recommendation only and not for construction purposes. Information provided is from AS-2870 Table 3.2

PP - Pocket Penetrometer, qa - Allowable bearing pressure (kPa), DCP - Dynamic Cone Penetrometer (blows/100mm), UTP - Unable to penetrate , Stable Batter H/L (Height Length)

**BORELOG PROFILES & BEARING CAPACITY**

BH3				BH4					
Depth (m)	PP	qa	DCP	Soil Profile	Depth (m)	PP	qa	DCP	Soil Profile
0.0			3	NATURAL: Silty Sandy CLAY (CI)	0.0			3	NATURAL: Silty Sandy CLAY (CI)
			4	Brown Dark Red Moist				3	Brown Dark Red Moist
		100	5				100	4	
			5					5	
0.5			6		0.5			5	
		120	5				120	5	
			6					5	
			6					5	
		140	6				120	6	
1.0			7		1.0			5	
			5					6	
		120	5				140	6	
			5					6	
			6					6	
1.5				END OF BORE	1.5				END OF BORE
2.0					2.0				
2.5					2.5				
3.0					3.0				
3.5					3.5				
4.0					4.0				

SAND			SILT & CLAY		
Density Term	Density Index (%)	Approx. DCP Blow Count	Consistency Term	Undrained Shear Strength (kPa)	Approx. DCP Blow Count
Very Loose	<15	< 1	Very Soft	0 - 12	< 1
Loose	15 - 35	1 - 3	Soft	12 - 25	1 - 2
Medium Dense	35 - 65	3 - 9	Firm	25 - 50	2 - 3
Dense	65 - 85	9 - 15	Stiff	50 - 100	3 - 5
Very Dense	> 85	> 15	Very Stiff	100 - 200	5 - 8
			Hard	> 200	> 8

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 Stable Batter H/L (Height Length)

**BORELOG PROFILES & BEARING CAPACITY**

BH5				BH6					
Depth (m)	PP	qa	DCP	Soil Profile	Depth (m)	PP	qa	DCP	Soil Profile
0.0			2	NATURAL: Silty Sandy CLAY (CI)	0.0			3	NATURAL: Silty Sandy CLAY (CI)
			3	Brown Dark Red Moist				4	Brown Dark Red Moist
		100	4				120	6	
			5					5	
0.5			5		0.5			5	
		120	4				120	5	
			6					6	
			6					6	
		160	7				120	5	
1.0			7		1.0			5	
			6					6	
		120	5				140	6	
			6					6	
			6					6	
1.5				END OF BORE	1.5				END OF BORE
2.0					2.0				
2.5					2.5				
3.0					3.0				
3.5					3.5				
4.0					4.0				

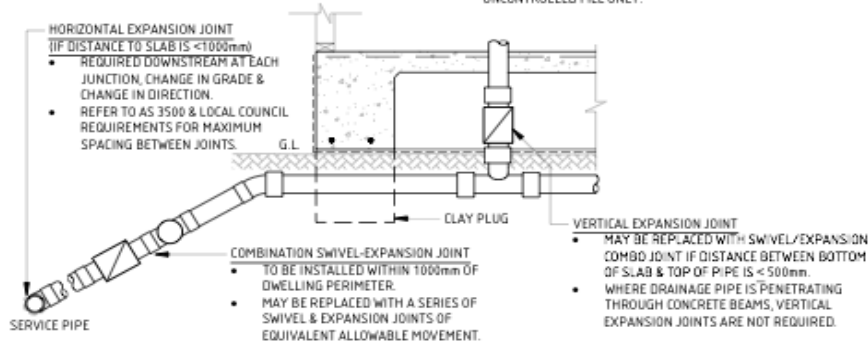
SAND			SILT & CLAY		
Density Term	Density Index (%)	Approx. DCP Blow Count	Consistency Term	Undrained Shear Strength (kPa)	Approx. DCP Blow Count
Very Loose	<15	< 1	Very Soft	0 - 12	< 1
Loose	15 - 35	1 - 3	Soft	12 - 25	1 - 2
Medium Dense	35 - 65	3 - 9	Firm	25 - 50	2 - 3
Dense	65 - 85	9 - 15	Stiff	50 - 100	3 - 5
Very Dense	> 85	> 15	Very Stiff	100 - 200	5 - 8
			Hard	> 200	> 8

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PP - Pocket Penetrometer, qa - Allowable bearing pressure (kPa), DCP - Dynamic Cone Penetrometer (blows/100mm), UTP - Unable to penetrate , Stable Batter H/L (Height Length)

**PLUMBING REQUIREMENTS - AS2870-2011**

**PLUMBING CONNECTION NOTES:**

- P.1. THE FOLLOWING NOTES & DETAILS PROVIDED ARE A GUIDE ONLY FOR ARTICULATION FOR SANITARY PLUMBING, DRAINAGE & SHOULD BE READ IN CONJUNCTION WITH AS/NZS 3500, AS 2870 & ANY OTHER RELEVANT STANDARD & OTHER REQUIREMENTS OF THE BUILDING CODE OF AUSTRALIA.
- P.2. ALL SEWER & STORMWATER TO BE CONSTRUCTED IN ACCORDANCE WITH AS/NZS 3500 & THE REQUIREMENTS OF AS 2870 SECTION 5: CLAUSE 5.6 & SECTION 6: CLAUSE 6.6. FOR SLAB OR STRIP FOOTINGS ON HIGHLY AND EXTREMELY REACTIVE SITES, THE FOLLOWING REQUIREMENTS APPLY: DRAINS ATTACHED TO OR EMERGING FROM UNDERNEATH THE BUILDING SHALL INCORPORATE FLEXIBLE JOINTS IMMEDIATELY OUTSIDE THE FOOTING AND COMMENCING WITHIN 1m OF THE BUILDING PERIMETER TO ACCOMMODATE A TOTAL RANGE OF DIFFERENTIAL MOVEMENT IN ANY DIRECTION EQUAL TO THE ESTIMATED CHARACTERISTIC SURFACE MOVEMENT OF THE SITE (YS). IN THE ABSENCE OF SPECIFIC DESIGN REQUIREMENTS, THE FITTINGS OR OTHER DEVICES THAT ARE PROVIDED TO ALLOW FOR THE MOVEMENT SHALL BE SET AT THE MID POSITION OF THEIR RANGE OF POSSIBLE MOVEMENT AT THE TIME OF INSTALLATION, SO AS TO ALLOW FOR MOVEMENT EQUAL TO 0.5YS IN ANY DIRECTION FROM THE INITIAL SETTING. THIS REQUIREMENT APPLIES TO ALL STORMWATER AND SANITARY PLUMBING DRAINS AND DISCHARGE PIPES.
- P.3. PLUMBING & DRAINAGE UNDER THE SLAB SHOULD BE AVOIDED WHERE PRACTICAL (REFER AS/NZS 3500 CLAUSE 4.10)
- P.4. GRADES IN PIPEWORK ON 'M', 'H', 'E' & 'P' SITES SHOULD HAVE A MINIMUM GRADE OF 1:30 WITHIN 1.5 METRES OF THE BUILDING & 1:60 ELSEWHERE. GRADES IN FLEXIBLE FITTINGS TO BE SET AT THE MINIMUM GRADE.
- P.5. ALL EXPANSION & ARTICULATION JOINTS TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ALL JOINTS TO BE SET MID POINT SO AS TO ALLOW FOR MAXIMUM MOVEMENT IN EITHER DIRECTION.
- P.6. STORMPLASTICS (SAI) PTY LTD "SWIVEL JOINTS" SHOULD NOT BE USED AS A BEND TO ACHIEVE CORRECT FALLS. THE JOINTS SHOULD BE SET IN A STRAIGHT LINE OF THE DRAIN TO ALLOW MAXIMUM (+) OR (-) MOVEMENT. A MINIMUM 15° BEND TO BE INSTALLED BEFORE SWIVEL JOINTS TO ACHIEVE MINIMUM GRADES FROM THE FACE OF THE FOOTINGS.
- P.7. GULLY PITS ARE RECOMMENDED UNDER ALL HOSE COCK LOCATIONS
- P.8. 20mm PENETRATION LAGGING IS ONLY RECOMMENDED THROUGH PENETRATIONS GREATER THAN 50mm DIA.
- P.9. DETAIL & SUPPORT OF TRAPS AT THE O.R.G. TO BE CONSIDERED ON SITE, TO ALLOW FOR POTENTIAL MOVEMENTS INCLUDING ISOLATION AND ARTICULATION ASSOCIATED WITH PATHS & PAVEMENTS. THE O.R.G. SHOULD BE CAST IN CONCRETE MONOLITHICALLY WITH THE FOOTING SYSTEM ON CLASS 'H' & 'E' SITES.
- P.10. STORMWATER SYSTEMS THAT COLLECT ROOFWATER & SURFACE WATER ARE REQUIRED TO BE DESIGNED & CONSTRUCTED IN ACCORDANCE WITH AS/NZS 3500 PART 5.
- P.11. THE USE OF CORRUGATED FLEXIBLE PVC PIPE PRODUCTS SHOULD BE AVOIDED ON CLASS H & E SITES AS THEY ARE NOT ABLE TO EXPAND LONGITUDINALLY TO ACCOMMODATE POTENTIAL VERTICAL & LATERAL MOVEMENTS AT THE SLAB OR FOOTING EDGE UNLESS SPECIFICALLY DETAILED BY THE MANUFACTURER.
- P.12. SEPTIC TANKS & ASSOCIATED SOAKAGE AREAS SHOULD BE LOCATED TO MINIMISE SOIL MOISTURE INCREASES WITHIN THE FOUNDATION.
- P.13. ALL PIPEWORK INCLUDING STORMWATER FITTINGS & ADAPTERS SHOULD BE PROTECTED FROM MECHANICAL DAMAGE.
- P.14. TERMITE PROTECTION NOT SPECIFIED IN THIS DESIGN AS THERE ARE VARIOUS OPTIONS. REFER TO THE BUILDING DESIGNER.
- P.15. PROVISIONS SHOULD BE MADE FOR THE CONNECTION OF OVERFLOW OR WATER DISCHARGE FROM FIXTURES SUCH AS HOT WATER SYSTEMS & AIR CONDITIONERS TO A DRAIN AS REQUIRED BY THE RELEVANT LOCAL AUTHORITY.
- P.16. EXPANDABLE JOINT & SWIVEL SPECIFICATIONS:
- P.16.1. TO BE MANUFACTURED AND COMPLY WITH AS 1280 AND AS 1415.
- P.16.2. TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS AND INSPECTED BY THE LOCAL AUTHORITY.
- P.16.3. DRAINAGE PIPES FOUNDED WITHIN THE FILLED SECTION OF THE BUILDING PAD UNDER THE SLAB ARE TO BE HUNG FROM SLAB REINFORCEMENT WITH STAINLESS STEEL STRAPS.
- P.16.4. TO ENSURE CORRECT PLUMBING CONNECTIONS ARE INSTALLED IT IS ESSENTIAL THAT A COPY OF THIS REPORT AND ANY RELEVANT ADDITIONS (WHERE APPLICABLE) ARE SUPPLIED TO THE PLUMBER PRIOR TO THEIR PREPARATION.
- P.16.5. IT IS ALSO ADVISABLE THAT SLAB DOCUMENTATION IS AVAILABLE ON-SITE FOR REFERENCE BY THE PLUMBERS AND NOMINATED INSPECTORS.
- P.16.6. 'P' CLASSIFICATION PLUMBING REQUIREMENTS ARE SPECIFIC TO UNCONTROLLED FILL ONLY.



**TYP. UNDER SLAB EDGE DETAIL**  
(ELEVATION VIEW)

COMPONENT	SITE/DESIGN CLASSIFICATION								
	A & S	M	H1	H2	E	P	M-D	H-D	E-D
HORIZONTAL PENETRATION LAGGING (mm)	x	20	20	40	40	40	40	40	40
JOINT EXPANSION SIZE (mm)	x	x	100	100	150	150	100	150	150-220
VERTICAL EXPANSION JOINTS (UNDER SLAB)	x	x	x	x	✓	✓	x	x	✓
SWIVEL JOINTS	x	x	✓	✓	✓	✓	✓	✓	✓
DOWNPIPE EXPANSION JOINTS	x	x	✓	✓	✓	✓	✓	✓	✓
GULLY PITS FOR HOSE COCKS & AC UNITS	x	x	✓	✓	✓	✓	✓	✓	✓

**IMPORTANT NOTE:**  
THESE RECOMMENDATIONS ARE A GUIDE ONLY. FINAL PLUMBING REQUIREMENTS TO BE DETERMINED BY LOCAL PLUMBING AUTHORITY IN CONJUNCTION WITH AS/NZS 3500

## GENERAL NOTES & SITE MAINTAINANCE

### **Curing concrete**

For satisfactory results, concrete must be cured for at least seven days. Curing may be achieved by keeping the concrete moist, by applying a curing membrane, or by covering the concrete with a moisture barrier. Many builders find that the most satisfactory way to cure a slab is to cover it with a sheet of polyethylene as soon as possible after finishing. If the slab is moist when covered and the polythene is held securely onto the concrete, this system provides satisfactory curing of the concrete.

### **Surface Drainage**

During any proposed construction surface drainage water shall be diverted away from footings to a lawful point of discharge. The finished surface of any ground, including pathways and driveways, shall be graded away from any footings, slab or basement retaining wall. This fall is to be at least 50mm over the first metre around the dwelling. The ground shall be graded around such that any surface water will drain away from the building and to prevent any ponding. Such measures to control surface drainage are to be established before the commencement of any ground works and improved further post construction.

### **Development Application & Decision Notices**

For work requiring building approval, the Development Application Decision Notice, or Form 6, issued by the Council or Building Certifier must be forwarded to us prior to arranging any inspections with this office.

### **Site Vegetation**

The long term performance of the house footings is dependant on factors such on site drainage, vegetation and watering of areas adjacent to the house. Trees should be kept an appropriate distance from the house in accordance with the following recommendations:

- 75% of the mature tree height for class M sites
- 100% of the mature tree height for class H sites
- 150% of the mature tree height for class E sites

Watering of lawns and gardens should be consistent. Over watering can damage footings. Equally footings may be damaged by prolonged periods of neglect after years of careful watering. Leaking taps and pipes, and blocked drains should be repaired promptly. Prolonged neglect can lead to damaged footings.

### **Design Performance & Home Owner's Responsibilities**

The owner's attention is drawn to Appendix B 'Performance Criteria and Foundation Maintenance' and Appendix C 'Classification of damage due to Foundation Movements' of AS2870-1996. We also direct the owner to the CSIRO publication Building Technology File 18-2011 'Foundation Maintenance and Footing Performance: A Homeowner's Guide'. Copies of this publication are available from CSIRO Publishing on Ph: 1300-788-000 or at <http://www.publish.csiro.au/book/7076>. This report may be rendered invalid if the property is not maintained as recommended in this publication.

Refer to links below:

<http://www.publish.csiro.au/book/3621>

<http://www.publish.csiro.au/book/3661>

<http://www.qbcc.qld.gov.au/home-owner-building-guide/home-maintenance>