



BC 031396 SPES

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Wall Bracing Calculation Sheet A

ALL WORK DESIGNED BY THE ENGINEER

Job Details

IS TO BE SUPERVISED BY THE

box 1

MARLBOROUGH DISTRICT COUNCIL
Approved subject to all work complying with
the N.Z. Building Code.

ENGINEER AND ON COMPLETION OF
THE WORK THE ENGINEER IS TO SUPPLY
COUNCIL WITH A CONSTRUCTION

Lot and DP Number

REVIEW

City/Town/District

Location of Building

Date 10/09/03

single/upper of two/lower of two

Floor load: 2kPa/3kPa

Building height to apex 7.5 m

Roof weight light/heavy

Roof height above eaves 2.5 m

Cladding weights:

Subfloor light/medium/heavy

Stud height 2.4 m

Lower Storey light/medium/heavy

Average roof pitch 22.5

Upper Storey light/medium/heavy

Room in Roof Space Yes / No

Building length BL = 12.2 m

Gross Building

Building width BW = 6 m

Plan Area, GPA = 1.1 m²

Note: When the average roof pitch is over 25 degrees, use the eaves length and width to determine BL and BW.

Wind Zone

box 2

Region:	Terrain:	Exposure:	Topography:
R1 0	Inland 0	Sheltered 0 ☒	Gentle 0 ☒
R2 1 ☒	Coastal 1 ☒	Exposed 1	Moderate 1
			Extreme 3
Total points			
Wind Zone: Low (0)		Very high (3)	
Medium (1)		Specific Design (4)	
☒ High (2)			

Earthquake Zone

box 3

From figure EQ1 select Earthquake Zone:

A

B

C

BUs required Wind

box 4

From Table W1A/W1B

W along = 7.1 BUs/m

W across = 6.8 BUs/m

Total wind load,

W ALONG:

W along x BW = 7.0 BUs

W ACROSS

W across x BL = 83.0 BUs

BUs required Earthquake

box 5

From Table EQ1/EQ2/EQ3/EQ4/EQ5/EQ6

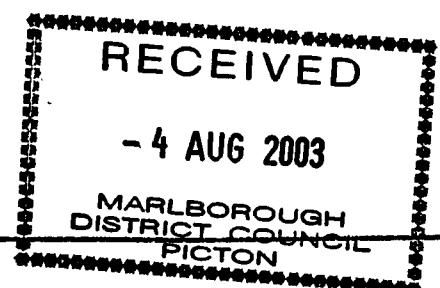
E = 7.1 BUs/m²

Note: For a room in the roof space use E + 3

Total earthquake load,

EQ ALONG and EQ ACROSS

E x GPA BUs = 7.8 BUs



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Wall Bracing Calculation Sheet B

Along

Wall or Bracing Line		Bracing Elements Provided			Wind		Earthquake	
1	2	3	4	5	6 W	7 W	6 E	7 E
Line Label	Minimum BUs Required	Bracing Element No.	Bracing Type	Length Element (m) L	Rating BU/m W	BUs Achieved (BU/m x L) W	Rating BU/m E	BUs Achieved (BU/m x L) E
A		A1	SP14	1.0	100	100	100	
		A2	"	1.2	100	120	50	
		A3	"	1.2	100	120	100	
		A4	"	1.2	100	120	100	
B		B1	G2b	2.5	80	200	50	
		B2	G2a	2.0	75	150	60	
		B3	SP14	2.2	100	220	100	
C		C1	"	1.0	"	100		
		C2	"	1.2	"	120		
		C3	"	1.8	"	180		
D		D1	"	0.9	"	90		
		D2	"	0.6	"	60		
		D3	"	0.6	"	60		
E								

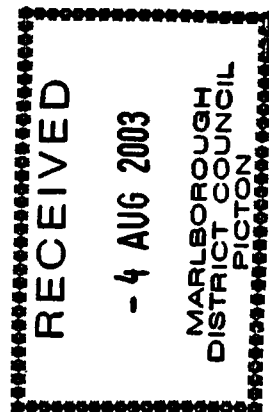
Totals Achieved		W	1700	E	
From Sheet A	Totals Required	W	430	E	
Wreq/Ereq =		OK			

* If Wreq/Ereq is 1 or less complete E column only
If Wreq/Ereq is 1.5 or more complete W column only
Otherwise complete both W and E

Across

Wall or Bracing Line		Bracing Elements Provided			Wind		Earthquake	
1	2	3	4	5	6 W	7 W	6 E	7 E
Line Label	Minimum BUs Required	Bracing Element No.	Bracing Type	Length Element (m) L	Rating BU/m W	BUs Achieved (BU/m x L) W	Rating BU/m E	BUs Achieved (BU/m x L) E
M		M1	SP14	3.0	100	300		
		M2	SP14	1.7	100	170		
		M3	"	1.1				
N		N1	G2b	3.8	80	304		
		N2	"	3.8	80	304		
		N3	"	3.9	80	312		
O		O1	"	1.1				
		O2	"	0.9				
		O3	G2a	2.7	75	158		
P		P1	SP14	1.0	100	100		
		P2	SP14	1.0	100	100		
		P3	SP14	1.7	100	170		
Q								

Totals Achieved		W	740	E	
From Sheet A	Totals Required	W	710	E	
Wreq/Ereq =					



PRODUCER STATEMENT - DESIGN

(Guidance notes on the use of this form are printed on the reverse side)

RECEIVED**- 4 AUG 2003****MARLBOROUGH
DISTRICT COUNCIL
PICTON**

ISSUED BY:

Dm Cromarty
(Suitably qualified Design Professional)

TO:

S. Ryan

IN RESPECT OF:

Proposed dwelling

AT:

*McCormacks Road**Whakamanga Bay*
(Address)

LOT:

DP

SO

..... *Dm Cromarty* has been engaged by

(Design Firm)

Owner
(Owner/Developer/Contractor)

to provide:

Design foundations beams & bracing
B1 & B2

services in respect of the

requirements of Clause(s)

of the Building Regulations 1992 for

☐ All☒ Part only as specified

of the building work. The design has been prepared in accordance with

B1/mv1 B2/mv1
(verification method/acceptable solution)

of the approved documents issued by the Building Industry Authority and the work is described on

..... *Ronald H O'Connor Ltd* drawings titled .. *S. Ryan dwelling*
(Design Firm)and numbered *Sheets 1 & 2* and the specification and other documents
according to what the being is proposed to be constructed.As an independent design professional covered by a current policy of Professional Indemnity Insurance
to a minimum value of \$200,000, I BELIEVE ON REASONABLE GROUNDS that subject to:

- (i) the verification of the following design assumptions
- Site observations*
-
-
- 1. Foundations & underpinning 2. Beams in place*

and (ii) all proprietary products meeting the performance specification requirements, the
drawings, specifications and other documents according to which the building is proposed
to be constructed comply with the relevant provisions of the building code...... *Dm Cromarty*
(Signature suitably qualified Design Professional)Date *26.07.2003*..... *BE: M.P. CH?*
(Professional Qualifications)ERA/AERB Reg No. *3787*..... *15A Budget St. Br*
(Address)

Member

ACENZ ☐IPENZ ☒☐ NZIA

Wall Bracing Calculation Sheet A**Job Details**

box 1

Name S. Ryan

Street and Number _____

Lot and DP Number _____

City/Town/District Whanganui Bay

Location of Storey: single/upper of two lower of two Floor load: 2kPa/3kPa

Building height to apex 7.5 m Roof weight light/heavy

Roof height above eaves 2.5 m Cladding weights: light/medium/heavy

Stud height 2.4 m Subfloor light/medium/heavy

Average roof pitch 22.5 Lower Storey light/medium/heavy

Upper Storey light/medium/heavy

Room in Roof Space Yes No

Building length BL = 12.2 m Gross Building

Building width BW = 8.0 m Plan Area, GPA = 13 m²

Note: When the average roof pitch is over 25 degrees, use the eaves length and width to determine BL and BW.

Wind Zone

box 2

Region: R1 0 _____ Terrain: Inland 0 _____ Exposure: Sheltered 0 ☒ Topography: Gentle 0 ☒

R2 1 ☒ Coastal 1 ☒ Exposed 1 _____ Moderate 1 _____

Extreme 3 _____

Total points _____

Wind Zone: _____ Low (0) _____ Very high (3)

_____ Medium (1) _____ Specific Design (4)

☒ High (2)

Earthquake Zone

box 3

From figure EQ1 select Earthquake Zone: A B C

BU's required Wind

box 4

From Table W1A/W1B

W along = 146 BU's/m

W across = 142 BU's/m

Total wind load,

W ALONG:

W along x BW = 1168 BU's

W ACROSS

W across x BL = 1732 BU's

BU's required Earthquake

box 5

From Table EQ1/EQ2/EQ3/EQ4/EQ5/EQ6

E = 134 BU's/m²

Note: For a room in the roof space use E + 3

Total earthquake load,

EQ ALONG and EQ ACROSS

E x GPA BU's = 1246 BU's

one of two.

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Wall Bracing Calculation Sheet B

Along

Wall or Bracing Line		Bracing Elements Provided			Wind		Earthquake	
1	2	3	4	5	6 W	7 W	6 E	7 E
Line Label	Minimum BUs Required	Bracing Element No.	Bracing Type	Length Element (m) L	Rating BU/m W	BUs Achieved (BU/m x L) W	Rating BU/m E	BUs Achieved (BU/m x L) E
A		A1	SPIC	1.0	100		100	100
		A2	SPIC	5.1	100		100	510
		B1	SPIC	1.1				
B		C1	"	2.0	75		60	120
		C2	"	2.0	75		60	120
		C3	"	4.8	80		70	336
C		D1	"	3.1	75		70	217
		D2	"	1.7	75		60	102
		E1	SPIC	7.7	100		120	726
D								
E								

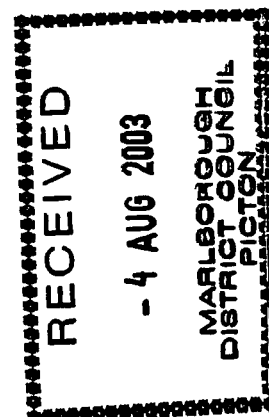
Totals Achieved		W		E	2543
From Sheet A	Totals Required	W		E	1746
Wreq/Ereq = *					

*If Wreq/Ereq is 1 or less complete E column only
If Wreq/Ereq is 1.5 or more complete W column only
Otherwise complete both W and E

Across

Wall or Bracing Line		Bracing Elements Provided			Wind		Earthquake	
1	2	3	4	5	6 W	7 W	6 E	7 E
Line Label	Minimum BUs Required	Bracing Element No.	Bracing Type	Length Element (m) L	Rating BU/m W	BUs Achieved (BU/m x L) W	Rating BU/m E	BUs Achieved (BU/m x L) E
M		M1	SPIC	1.1	100	110	100	
		M2	SPIC	1.2	100	120	100	
		N1	BRS	2.9	115	334		
N		N2	"	2.8	115	322		
		N3	"	2.0	115	230		
		Q1	"	3.8	115	322		
O		P1	SPIC	0.6	95	57		
		P2	SPIC	1.4	100	140	100	
		M3	SPIC	0.6	95	57	95	
P		M4	SPIC	0.6	95	57	95	
		N4	BRS	0.45	100	45		
Q								

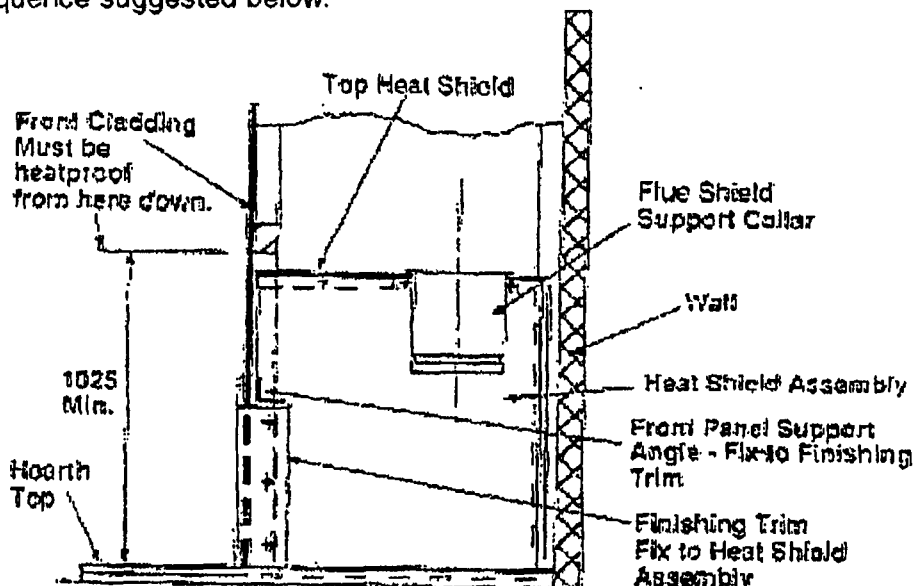
Totals Achieved		W	1544	E	
From Sheet A	Totals Required	W	1752	E	
Wreq/Ereq = *					



Masport

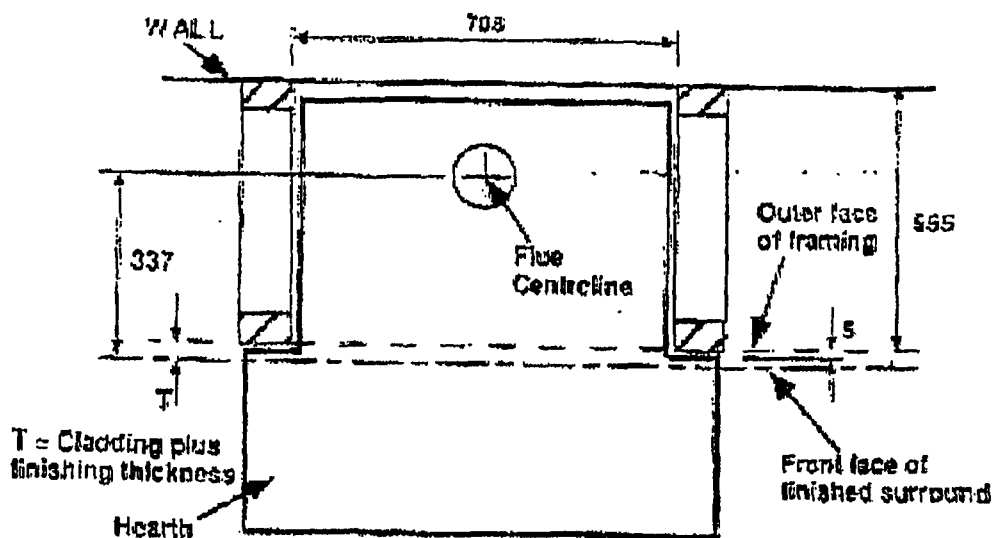
Zero Clearance Fireplace Kit (N.Z. only)

The kit enables the Masport LE 3000 Provincial Series 2 Woodfire to be installed when no conventional masonry chimney is available. Erection of the kit is not difficult, but it is important to follow the sequence suggested below.



STANDARD KIT:-

1. Inspect the house construction at the proposed installation position to verify that the flue shield (250mm diameter, plus 25mm clearance all around) can pass right up through the ceiling space without requiring the removal of essential roof or ceiling support beams. The flue centreline will be 337mm back from the finished front face of the enclosure and its distance from the rear wall will depend on the total finished thickness of the cladding on the front of the enclosure. To get the flue centreline to wall distance, add 555mm to the thickness of the finished front enclosure panel and subtract 337mm. This gives a distance of 224mm clearance for a 6mm front panel and approximately 231mm for a 6mm panel with tiles.



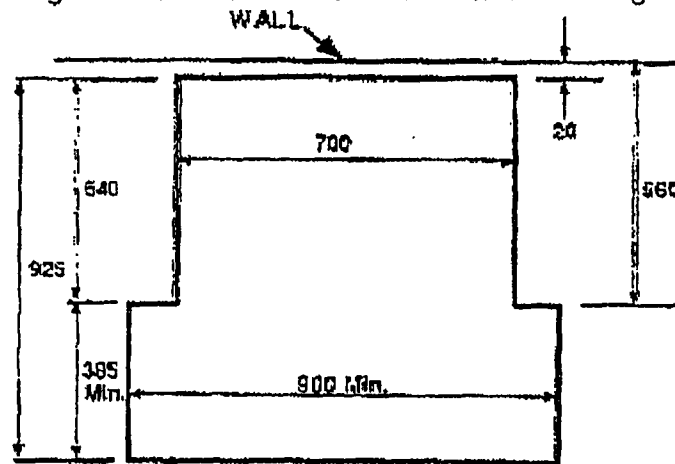
FLOOR PLAN

RECEIVED

- 4 AUG 2003

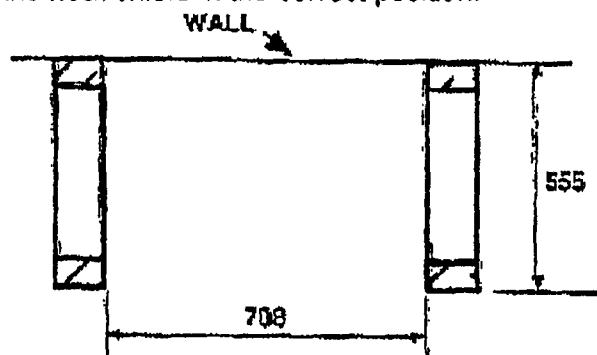
MARLBOROUGH
DISTRICT COUNCIL
PICTON

2. Drop a plumb line from the ceiling to the floor to establish a flue centreline as detailed above, and cut a hole at least 300mm square through the ceiling on this centreline. If the house is at the construction stage, there may be no ceiling at all inside the fireplace enclosure; this is satisfactory. (See step 10)
3. Ensure that there are suitable nogs at either the ceiling or roof level (whichever is appropriate) to provide anchorage for the ends of the outer heat shield bracing angles.



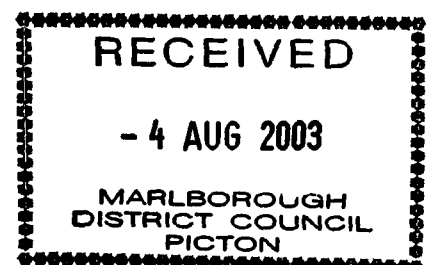
HEARTH SHAPE

4. For heat sensitive floors, construct a hearth of the shape shown and securely fasten it down checking that it aligns with the flue centreline. (See below for concrete floors). The hearth is constructed of two layers of Micore 160 (each 16mm thick) topped with one layer of 6mm Hardies Tile and Slate Underlay.
5. Cement the tiles or slate to the hearth, noting that the 700mm wide portion will not be visible and therefore does not need complete coverage. We suggest that, for easy installation and withdrawal of the firebox, sufficient tiles be fixed in this area to support the base of the heater at the same level as the visible portion. The visible edges of the hearth are best finished with wooden trim or tiles after the stove has been installed.
6. Frame up the enclosure using nominal 100 by 50 dressed timber. The overall depth of the frame should be 555mm, and its internal width 708mm. If, for aesthetic reasons, a wider enclosure is desired, it must have two vertical studs spaced 708mm (between) at the front. If this option is used, fix two small positioning blocks at floor level (708 apart) to locate the bottom rear corners of the heat shield in the correct position.

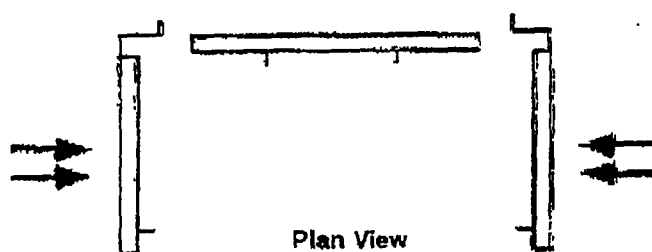


ENCLOSURE FRAME SIZES

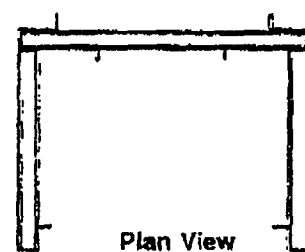
The usual three nogs may be fixed at each side of the enclosure, but at the front the lowest nog must have its lower face not less than 1025 above the top face of the finished hearth. Further nogs can be fitted anywhere above this one.



7. Assemble the three heat shields as shown and slide the assembly into place in the enclosure

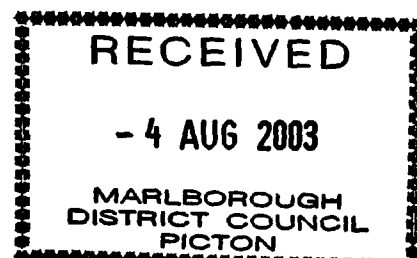


ASSEMBLY OF SHIELDING



ASSEMBLY OF SHIELDING

8. Install the flue shield support collar which straddles the top of the shielding assembly. Ensure that it is located the correct distance from the wan as calculated in 1 above. The top heat shield (650 x 160) can also be fitted at this point. It also straddles the shielding assembly and it should be brought forward as far as possible so that it will **CONTACT THE REAR FACE OF THE FRONT ENCLOSURE CLADDING MATERIAL**. Fix the support collar and the top heat shield to the shielding assembly in their correct positions with rivets or screws through their end flanges.
9. Penetrate the roofing material on the flue centreline, making a hole sufficiently large to ensure that no combustible material will be within 25mm of the 250mm diameter outer heat shield. Assemble and install sufficient lengths of inner (200mm) and outer (250mm) heat shields so that the inner shield extends past to the roof penetration point and the outer shield is sufficiently high to avoid down-draught. If the flue centreline is within 3m of the ridge, the outer-shield must end at least 600mm above the roof ridge. If it is further than 3m from the ridge, the shield must extend at least 900mm above the point of roof penetration. Fit the two shield bracing angles at either ceiling or roof level o appropriate. Fix a suitable flashing where the outer shield penetrates the roof.
10. **IMPORTANT. TO AVOID THE RISK OF A FIRE, COVER THE ENTIRE OPEN SPACE SURROUNDING THE HEAT SHIELD AT CEILING LEVEL WITH WER8 NETTING WHICH HAS A MESH SMALL ENOUGH TO PREVENT THE ENTRY OF BIRDS OR VERMIN INTO THE ENCLOSURE.**
11. Fix the cladding to the enclosure frame. NOTE: The enclosure sides may be covered with any normal wall construction material such as GIB Board, but the front cladding from the lowest nog (approx. 1050 above the hearth) down, **MUST** be heat resistant material such as Hardies Tile and Slate Underlay, Hardiflex or Supalux. These materials can be carried right up the front of the enclosure, or conventional wall cladding may be used above the nog. The aperture in the front cladding for the heater should be 650-mm wide and 620 high (from the hearth top). The lower part of the front panel may be finished by cementing on tiles, slate or by finishing with any other heat resistant material.
12. If a mantelshelf is being fitted, its undersurface should be at least 1075 above the hearth top to avoid the need for heat shielding below it
13. Fit the three-sided finishing trim in the front opening, securing its inside edges to the front corners of the heat shield assembly with three PK screws or pop rivets each side.
14. Place the front panel support angle behind the front panel (on top of the horizontal section of the finishing trim), push it firmly against the back face of the front panel and PK screw or pop rivet it to the finishing trim.
15. Slide the firebox into the recess and provide seismic restraint in the same way as any masonry chimney installation. (See Installation Instructions).
16. Lower the assembled flue down through the heat shields in the usual manner and ensure that it engages with the flue socket of the heater. The top front panel of the heater case can be removed for easier access.
17. Install the insulating blanket on top of the firebox case before replacing the heater case top front panel.
18. At the top of the flue, fit the top flue spacer bracket, the flashing cone and the cowl in the usual way.



19. Fit the firebox door and fascia in the usual way.

20. Finish the hearth edge trim if necessary.

SPECIAL CONSTRUCTIONS:

CONCRETE FLOORS: The above instructions assume that the heater is being assembled on a heat sensitive floor such as timber or particle board. In cases where the floor is not heat sensitive (e.g. concrete), the insulating hearth may be omitted. However if heat sensitive floor coverings are fitted it will be necessary to keep them at a Safe distance. The most practical way to do this is to fix tiles to the floor over the area where the insulating hearth would normally be. This will make the top of the hearth approximately flush with the floor covering, so a larger hearth will be needed. It must extend out to 450mm from the face of the fireplace surround, but the 900mm

EXTERNAL INSTALLATIONS: In the case where the enclosure is to be erected outside the house, the shielding and flue installation details above will still apply. It is important to remember that the aperture in the wall of the house will need to be sufficiently high to permit the installation of heat resistant panelling in front of the heater to at least 1025mm above the hearth top. While the opening in the wall will be tall enough (before the heat resistant panel is fixed) to allow the shielding panels to pass through, it will be narrower than the assembled panels and therefore it is advisable to offer up the shielding assembly from outside the house before completing the construction of its surrounding frame. Clearly, suitable foundations will also be required to support the weight of the enclosure and the heater, and weatherproofing of the entire assembly will be necessary.

BRICK FACED ENCLOSURES: For brick enclosures, the dimension 'T' (in the Floor Plan on page 1) can range from 70 to 110mm. The inside face of the front of the surround will be 555mm from the wall, and for a 70mm brick facing the flue centreline to wall distance will be 288mm. The distance for a 90mm brick will be 308mm, and for a 110mm brick it will be 328mm.

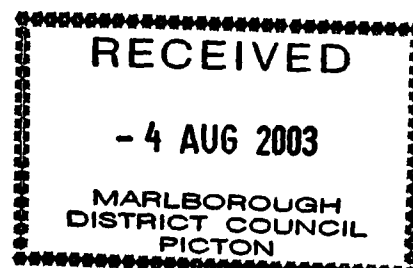
Flue installation and clearance requirements are as detailed above. Brick wall construction will normally require a cast concrete foundation, so this can be extended to provide the necessary hearth. Naturally it must also pass right under the heater and be large enough to completely cover the area enclosed by the heat shield assembly. **CAUTION.** If local Building Requirements permit laying the concrete slab on top of a wooden floor, it should be made of lightweight concrete and even then may require extra foundation support. In any case, the slab should be poured on top of one layer of Micore 160 board (covered with sheet plastic to keep it dry) to prevent heat damage to the wooden floor. The top surface can be finished with bricks or tiles etc. In all cases the hearth must be at least 900mm wide as before. Its minimum extension forward from the face of the surround depends on its depth.

Hearth Elevation	60 or more	50 mm	25 mm	Zero
Min. Hearth extension	300mm	325mm	400mm	450mm

As before, the opening for the appliance in the front wall must be 650 wide and 620 high. Note that the shield must be in place before the brick surround is laid, and that the bricks must extend to at least 1025mm above the hearth. If there is timber construction above the bricks at this point, it should be shielded using the 650 x 190 top heat shield. It will be necessary to trim the shield to allow it to clear the flue heat shield. (This alteration depends on the width of brick being used). Of course, if the entire front wall of the enclosure is brick, no top shield is needed.

Details of mantelshelf requirements are as above.

Fitting the heater, flue, blanket and fascia is as detailed above.



Builders Plastics Ltd.

- SPECIALISTS IN APPLIED COATINGS
- FLAT ROOFING STSTEMS
- JOINT SEALANTS
- INSULATED PLASTER CLADDING
- REGISTERED MASTER PAINTERS

21 BURGESS ROAD, JOHNSONVILLE
PO BOX 2417
WELLINGTON

PHONE 4787-554
FAX 4781-131
EMAIL: bldplastics@xtra.co.nz

TRAFFIGARD DECK PROCESS

STANDARD SPECIFICATION AND RECOMMENDATION FOR PLYWOOD SUBSTRATES BP/4/01

Traffigard is a reinforced liquid roofing and deck process to provide a seamless durable finish for decks, roofs, gutters etc. The product is suitable for both concrete, plaster and plywood substrates and is available in a range of standard colours.

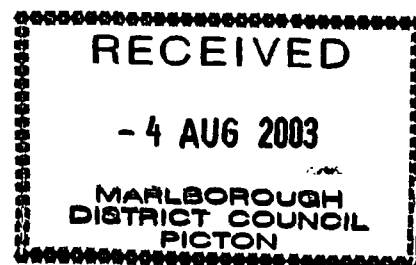
The process is hard wearing and designed to take wear such as foot traffic and even vehicle traffic. It can be damaged by very high point loadings such as stiletto heels. Normal footwear and most outdoor furniture will not have any adverse affect on the finished material.

The process is applied as a built up liquid incorporating a heavy layer of chopped strand mat fibreglass. The process is applied directly onto the substrate, however certain requirements are essential for a good result. We set these out later.

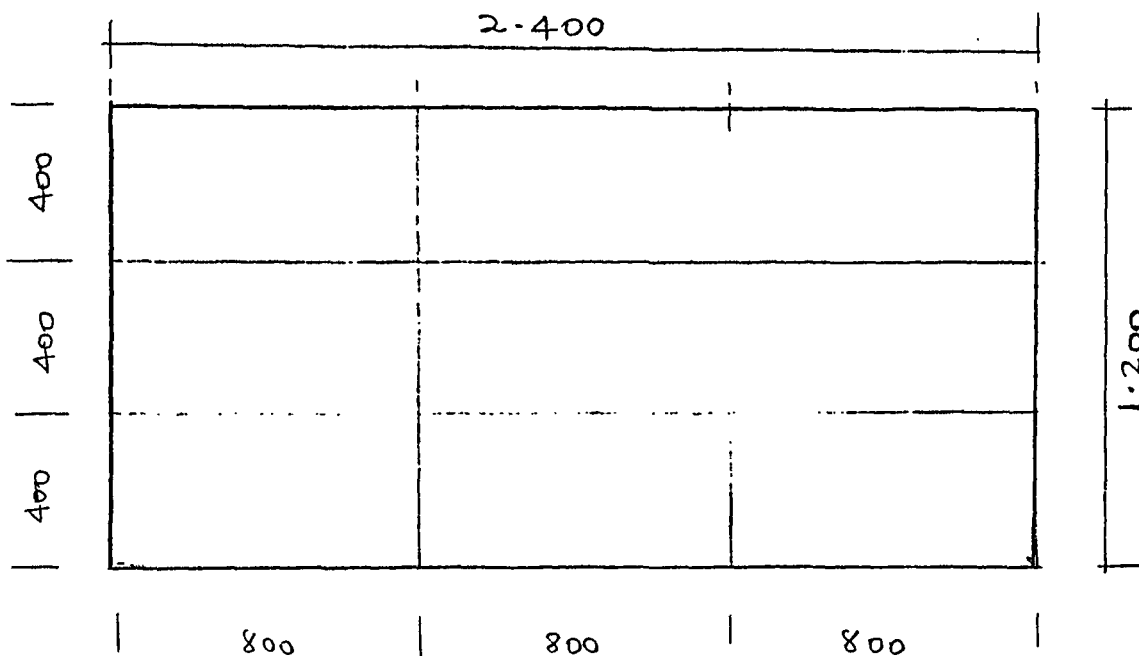
Traffigard is made up from a high performance acrylic resin and will follow the substrate exactly as it is presented, therefore excessive movement in the substrate will cause wrinkling within the applied finish and discrepancies in the surface will show through the finished work. The finish is lightly textured with the pattern of chopped strand fibreglass reflecting through the finish. This also provides a non slip finish.

It is essential that the plywood sheets are fixed to framing which is both seasoned and dry. Recommended moisture content in framing timbers should be no more than 10%.

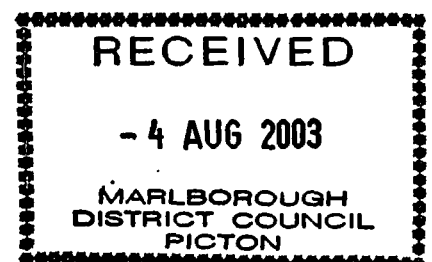
We set out the following basic requirements for plywood substrates.



- A. Plywood substrate must be minimum C.P.D. 17mm thick construction plywood, we recommend tanalised H.3.
- B. Framing timbers should be centred to provide maximum support, in general, joists to be at 400mm or up to 600mm maximum centres. We recommend dwanging be of material that is the same depth as joists to provide greatest stability against twisting of joists. Dwanging to be at each end of sheet and at maximum 800mm centres i.e. 3 spaces within the 2.400 length of a sheet - in addition to end dwangs.

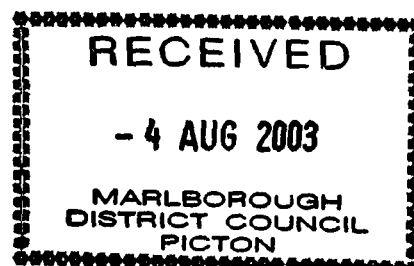


- C. The plywood must be pre-primed both sides and edges with a suitable Alkyd (turps based) primer prior to fixing by the builder. Cut edges are to be re-primed. Moisture content to be no more than 10%.
- D. The plywood sheets to be tightly butted together to form tight joints.
- E. Angle fillets must be provided at junction of wall and deck or at internal corners of gutters. Usually 25 x 25mm is adequate or it may be larger. Kiln dried tanalised is preferred. The fillet to be thoroughly fixed in position using glue and galvanised nails.
- F. Solid upstands minimum height 150mm (must also be primed).
- G. Turndowns to be usually over fascia using additional 100 x 25 tanalised batten with rounded top edge, or where into spouting a suitably shaped timber moulding can be used to provide a drip edge giving adequate cover and drip formation at the spouting.



- H. Sheets to be thoroughly fixed with screws. We recommend posidrive self tapping C/S stainless steel 50mm x 10 gauge. Suggested spacing to be 150mm at perimeter of sheets and 200mm through centres.
- I. It is highly recommended that the sheets be glued as well as screwed to the framing timber using builders adhesive.
- J. When fixing plywood sheets, a bead of Sealant (**Silaflex M.S.**) should be gunned along each joint between the sheets to provide a weather seal and gap filler. **DO NOT USE STANDARD SILICONE SEALANT** as the sealant must be paintable.
- K. It is essential that sufficient fall is provided in the design and construction of the deck. We recommend 1 in 50 be achieved. This equates to 12mm of fall in each 1.000 of deck. It is usually too late to try and alter decks when ponding occurs. It is far cheaper to get the falls correct before the deck membrane is applied. It is the builder's responsibility to provide adequate fall.
- L. Outlets in decks must be at lowest point in the deck. We recommend the use of a **P.V.C. Proprietary Flanged Outlet** for most situations. Please advise should you require these.

The above information is given as a guide only. The best jobs are those where the above items are carried out correctly. The above points may be checked off prior to the installation of the membrane.



Description and Purpose

The Carter Holt Harvey Plywood house bracing system uses structural plywood of various types to provide sheet bracing for walls and sub-floor foundations in both internal and external applications. The purpose of the system is to provide bracing resistance for light timber frame buildings under wind and earthquake loading, to meet the requirements of the New Zealand Building Code Section B1 Structure, and B2.3(a) Durability.

Identification

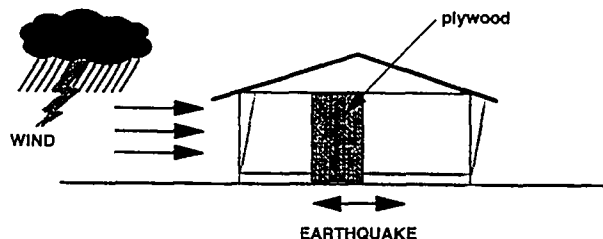
Carter Holt Harvey structural plywood is manufactured to comply with the joint Australian/New Zealand Standard AS/NZS 2269: 1994, "Plywood-Structural", by Carter Holt Harvey Plywood, a division of Carter Holt Harvey Limited. Sheets are branded in accordance with the standard.

Compliance with the New Zealand Building Code

Structure

NZS 3604: 1990, "Code of practice for Light Timber Frame Buildings" is listed as an acceptable solution within section B1/AS1 of the Approved Document B1/AS1 under clause 4.0 Timber. Bracing unit ratings for an extended range of plywood wall bracing systems have been derived from tests according to clauses 6.9.1.1 and 6.9.3.1 of NZS 3604 for walls and clause 4.7.8.1 for sub-floor timber framing.

Structural plywood is the only sheet brace material with properties defined in a published New Zealand engineering design code, NZS 3603: 1993, "Timber Structures", and so can be designed in compliance with Verification method B1/VM1 under clause 6.0, Timber for use in buildings over two storeys in height. Structural plywood is manufactured under a third-party-audited, product quality control programme to joint Australian/New Zealand Standard AS/NZS 2269: 1994, "Plywood - Structural".

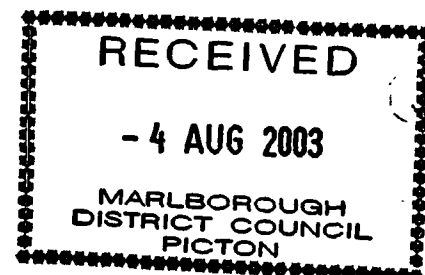


Durability

Durability for structural plywood bracing will be in excess of 50 years when installed in accordance with the installation instructions and the other requirements of this brochure.

Advantages over other Bracing Systems

- A large range of thicknesses, nailing and hold-down options offer design flexibility.
- Ratings down to 450mm long walls.
- Now available in 2745mm long sheets.
- Allows single sheet cladding and bracing from top plate to cover floor joists.
- Nogs not required.
- More cost effective.
- Cleaner, lighter to handle and easier to work than other boards.
- Easy to nail, and can nail close to the edge of the sheet.
- Can be used more easily on thinner framing.
- Can be treated and detailed for high exposure.
- Can be used as both construction and permanent bracing.
- Can use aesthetic plywood cladding as bracing.
- Can be used as subfloor bracing.
- A strong resilient sheet able to withstand impact.
- Can be specifically designed for buildings over two storeys.
- Made from sustainable, renewable radiata pine.



SPECIFICATION SECTIONS

Project : NEW HOUSE AT LOT 13 McCORMICKS ROAD WHATAMANGA BAY PICTON

Owner : S RYAN

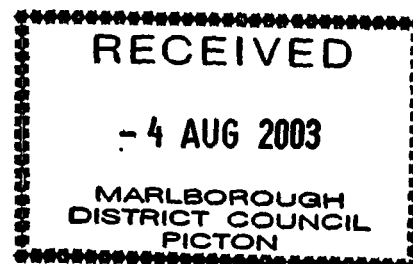
- 00 Schedule of Work
- 01 Timber Treatment Schedule
- 02 Preliminary and General
- 03 Materials and Workmanship
- 04 Excavation
- 05 General Siteworks
- 06 Steel Reinforcing
- 07 Concrete Work
- 08 Carpentry
- 09 Timber Framing
- 10 Building Foils and Papers
- 11 Plumbing
- 12 Electrical Work
- 13 Plywood Sheets
- 14 Fibreglass Batts
- 15 Aluminium Joinery
- 16 Textured Polystyrene Cladding
- 17 Gibraltar Board
- 18 Pressed Metal Roofing Tiles

REFER TO THE OWNERS ENGINEER FOR SPECIFICATIONS AND DETAILS FOR THE FOLLOWING.

Roof and Wall Bracing Setout and Calculations
On Site Sewerage Treatment and Disposal.
Design Details and Calculations for House Foundation

NOTE:

These specifications are intended as a general guide to the standard of materials and workmanship required for the job. The details in the drawings shall take precedence over these specifications. If doubtful the matter in question shall be referred to the Employer or Engineer as appropriate.



SCHEDULE OF WORKS

NEW HOUSE AT LOT 13 McCORMICKS ROAD WHATAMANGA BAY PICTON

FOR MR S RYAN

SCOPE OF WORK

The work involves the construction of a new light timber framed two storey house as per the accompanying plans/specification/Engineers Details and Documents. It is the owners intention that the house will be finished in all respects except for those items which he will be responsible for – these will be made known at the time of Contract Agreement.

SITE/LEVELS

The levels as shown on the drawings are approximate only and the final foundation heights and excavation extent is to be determined on the site. The Contractor is to take care to ensure that the max height of the house does not exceed 7.500 metres – this will need to be determined at the time of setting out. Confer with the Owner as to his requirements for the removal and/or retention of any excavated spoil.

OWNERS ENGINEER

Refer to the Owners Engineer for details relating to the house sewerage system, wall and roof bracing requirements, and the sizes and depth of the foundations of the house. All aspects of the foundation ie design and supervision to be by the Owners Engineer.

FOUNDATIONS CONCRETE SLAB

To be concrete and to the sizes as shown on the plans unless otherwise instructed by the Owners' Engineer. Slabs to be 100mm thick on heavy duty polythene DPC on 40mm sand blinding on 150mm compacted hardfill. Min 225 mm from top of slab to excavated ground level. Note step in slab at lower level patio.

WALL FRAMING

Generally to be 100mm x 50mm at 400 crs. Double top plate at lower level. 3 rows of 100mm x 50mm dwangs. 3 studs at all corners. All exterior wall framing to be H3 Tan Treated. All interior framing to be No 1 Boric Treated – max moisture content before lining to be as per the Local Authority Requirements.

PLYWOOD EXTERIOR LINING

Line the exterior of the building (both levels) with 7.5mm Tan H3 Plywood before the fixing of the building wrap and polystyrene cladding.

BUILDING WRAP

To be of an approved type for use with Tanalith Treated timber and polystyrene.

ALUMINIUM JOINERY

All the exterior joinery except the front entry door are to be constructed using aluminium. Refer to the Owner for Aluminium supplier. Contractor to liaise with Plumber for fixing of flashings to all exterior joinery. All opening sashes wider than 400mm are to be fitted with 2 holding stays.

EXTERIOR CLADDING

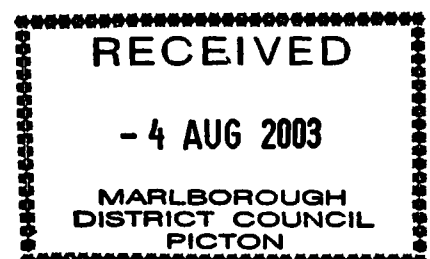
To be StoTherm Insulating Board 40mm thick all fixed and finished as per the manufacturers Technical Details and Specification. Refer to the Owner for final colour of plaster coat.

PAINTING

Refer to the owner for this trade.

KITCHEN JOINERY

Refer to the Owner for the Kitchen Joinery Supplier. Contractor to allow for installation of Kitchen Units.



BATHROOM FITTINGS

Refer to the Owner for Make/Colour/Size of all Bathroom fittings ie Vanities, Showers, Bath, WCs, Wash Hand basins etc.

ELECTRICAL FITTINGS

Refer to the plans for the setout of lights, switches, power sockets etc. Electrician to confirm final electrical layout plan on site with Owner together with any special fittings that the Owner may require. Determine location of Meter/Switchboard on site.

FLASHINGS

All window and door flashings to be fitted by Plumber. Contractor to liaise with Plumber/Window supplier as to flashing supply and responsibility.

ROOF

To be lightweight pressed metal tiles to Owners choice. Roofer to note change in roof pitch at Deck roof.

WOODBURNER

To be Masport LE 3000 Provincial Series 2 Wood fire – location as per the plans and constructed as per the attached Manufacturers details.

DECKING

To be Traffiguard fixed as per the Manufacturers instructions as to min.falls, upstands and finish. Colour to be Owners choice.

HANDRAIL

Refer to the drawings for details. All handrails to be min 1000mm from the finished floor level and any gaps/openings are not to exceed 100mm.

GARAGE DOORS

To be sectional doors to the Owners choice.

INSULATION

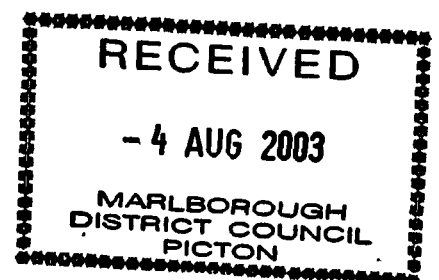
Exterior walls to be fitted with 75mm fibreglass batts. Ceilings both sloping and flat to be fitted with 100mm thick fibreglass batts.

VEHICLE ACCESS DRIVEWAY

Refer to the Owner for details relating to whether this item is to be included.

ACCESS WALKWAY

Refer to the plans for details relation to the construction of this item. Final location and setout of this walkway to be determined on site – location as shown on the plan is approximate only.



TIMBER TREATMENT SCHEDULE

Project Address: Lot 13 McCormicks Road Whatamanga Bay Picton

Location/Use	Untreated	H1 Boron	H3 LOSP Fixed	H3 CCA Non Fixed	H4	H5	Notes
Timber Piles						x	
Bearers				x			
Floor Joists (Decks)				x			
Floor Joists (Interior)		x					
Particle Board Flooring							
Plywood Flooring				x			
Framing (Exterior Walls)				x			
Framing (Interior Walls)		x					
Ceiling Joists		x					
Roof Rafters		x					
Roof Rafters (Exposed)				x			
Roof Struts/Purlins/Ties		x					
Roof Framing (Gable Ends)				x			
Lintels (Exterior Walls)				x			
Lintels (Interior Walls)		x					
Weatherboards							
Exterior Plywood Cladding				x			
Ext Trim/Boards/Battens				x			
Fascia Boards				x			
Window Reveals				x			
Exterior Timber Joinery				x			

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PRELIMINARIES AND GENERAL

SITE LOCATION and legal description are:

Lot 13 McCormicks Road Whatamanga Bay Picton

OWNER : S Ryan

THE SITE

Of the works is shown on the drawings and will be pointed out to Tenderers on request. Tenderers are advised to visit the site and check the slope of the ground, subsoil conditions, any site features etc., as no extras will be paid for foundation work, site drainage or levelling not detailed or specified and which should have been apparent from proper inspection.

SITE LIMITATIONS:

Confine access and work to the area of the site indicated on the drawings.

SCOPE:

Carry out the contract in accordance with the full intent and meaning of the contract documents taken collectively or separately and including any work which is to be reasonably inferred from those documents all to the satisfaction of the Owner.

PROVISIONAL SUMS:

Refer to the Conditions of Contract in the form of contract for the method of operation and allow a contingency sum of \$ _____.

MASTER BUILD GUARANTEE:

Provide a "New Home" Master Build 5-year Guarantee at no cost to the Employer and covering completion, inspection, workmanship and material defects under the terms of the "New Home" guarantee offered by Master Build Services Ltd. Execute with all three signatures, Employer, Builder and Master Build Services, before commencing the contract works.

NZ BUILDING CODE:

Throughout this specification references are made to NZ Building Code clauses and Approved Document paragraphs for the criteria and/or methods that must be used to establish compliance with the Code.

STANDARDS:

Throughout this specification, references are made to Standards produced by the Standards Association of New Zealand and other Associations as well as to various Acts and Regulations. The latest edition at the date of tender - including Provisional standards - applies unless stated otherwise. It is the responsibility of Contractor and of Subcontractors to be informed of the material in those publications which are referred to in this specification

PROGRESS PHOTOGRAPHS:

Provide two prints size 150x100 mm of colour photographs of the works taken from 3 different angles at monthly intervals

AS-BUILT DRAWINGS AND RECORDS:

Where specified, prepare and submit to the Owner 3 copies of as-built information in permanently titled hard back covers. All information to be of good quality and properly titled, numbered, cross-referenced and dated. Include list of contents. Record positions of installed components as the job progresses for inclusion in as-built drawings. The final Certificate of payment will not become due before the final approved bound copies have been delivered to the Owner

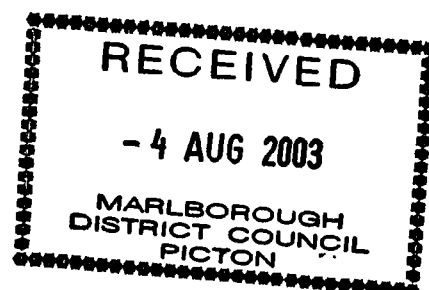
COMPLY with the NZ Building Code and all statutory obligations and regulations of Territorial Authorities and Regulatory Bodies with regard to the execution of the contract.

BUILDING CONSENT:

The Employer will obtain from the Territorial Authority such consents as are required by the Building Act 1991 and will pay all charges due for their processing and issue.

The Contractor will keep the building consent form and documents on site and liaise with the Territorial Authority for all notices to be given and all inspection required during construction to ensure compliance. Return consent form and documents to the Employer on completion.

GIVE ALL OTHER NOTICES to and obtain from all Authorities and Network Utility Operators all other permits, authorisations and approvals which relate to the carrying out of the contract works. Pay all fees and levies in respect of same including re-inspections.



CODE COMPLIANCE CERTIFICATE:

On behalf of and in the name of the Employer apply for the issue of a Code Compliance Certificate for this building work by Territorial Authority as prescribed under the Building Act 1991, Section 43 (3).

COMPLIANCE SCHEDULE:

Obtain from the Employer the list of systems and features that were agreed as completing the Compliance Schedule when application was made for Building Consent. Supply to the Employer the inspection, maintenance and reporting procedure information of each system or feature of the building needed to complete the schedule for issue by the Territorial Authority.

INSURANCES:

Refer to the conditions of contract and take out all insurance cover called for, stating in the tender those amounts

SAFETY: Comply with all regulations applying to the safety, health and welfare of workers. Fence off, light or otherwise separate any source of danger on the site to people outside of work hours.

NUISANCE:

Take all reasonable precautions to prevent damage and nuisance from water, fire, smoke, vehicles, dust, rubbish, noise and any other causes resulting from the construction works. Comply with the requirements of the Territorial Authority and relevant Acts and Standards

PROGRAMME:

Provide within 2 weeks of tender acceptance an approved programme chart for the contract including the work of nominated sub-contractors and other work concurrent with the contract.

SITE MEETINGS:

Allow for holding site meetings when required by the Owner. The main-contractor's representative and site foreman are to attend such meetings and inform subcontractors when their presence is required. Meetings will normally be held (weekly/fortnightly/monthly)

ATTEND upon all subcontractors and other trades and render them reasonable assistance, including use of standing scaffolding, connection points for water, power and lighting, provision of extra fixing drawings and the clearing away of rubbish from a predetermined point.

PROVIDE, erect and maintain all necessary scaffolding, sheds, toilet, water, power, hoardings and access to the site. Allow for all necessary cartage, crange, plant hire, storage or the like. Arrange for all temporary works and services necessary for the completion of the works, including that for nominated subcontractors. Pay all fees in connection therewith and remove on completion of the contract

PROTECT all parts of the work liable to damage and all adjoining property, and all existing site features to be retained, until completion of the contract. Take all precautions necessary to protect the works from damage by unauthorised entry or inclement weather. Keep the site and works clean and tidy

WORK-SITE BARRIERS:

Provide fences, hoardings and toe-boards as required by Acceptable Solution F5/AS1 but excluding domestic dwellings up to 2 - storeys above ground

MATERIALS are to be new unless otherwise stated, the best quality of their respective kinds, and complying with relevant BIA Approved Documents, NZ Standards and Regulations.

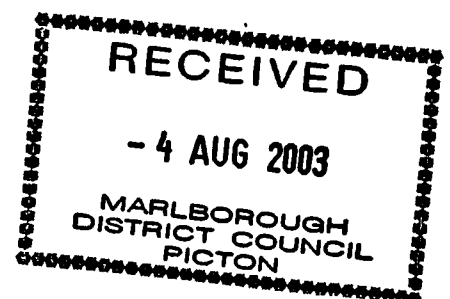
WORKMANSHIP:

Conform to good trade practice and the relevant Codes of Practice in current use in NZ. All work to be level, plumb, and true to line and face. Employ only experienced workers familiar with the materials and techniques specified

SUPPLY all labour, materials, services, temporary works and equipment and plant required for the proper execution and completion of the contract works.

GUARANTEES, stating the period and any special obligations, may be called for in any work section of this specification. The general terms of such guarantees are covered by the General Conditions of Contract but in no case shall the terms or conditions accepted negate the minimum remedies available under common law as if no guarantee had been offered or accepted.

CLEAR AWAY all trade debris from the site and leave the building clean and ready for occupancy, with all services operating and mechanical parts in good working order. Remove all temporary markings, coverings and protective wrappings. Clean all glass inside and out.



MATERIALS AND WORKMANSHIP

MATERIALS AND COMPONENTS to be new unless otherwise specified

PROGRAMME AND ARRANGE FOR DELIVERIES of materials to integrate with the construction programme

HANDLE, STORE AND FIX each material in accordance with manufacturer's latest recommendations in the absence of any other instructions.

IF ANY PROPRIETARY PROCESS IS USED, allow for and strictly follow the proprietor's latest recommendations

SAMPLES OF MATERIALS/COMPONENTS: Where approval is specified, submit samples. Do not confirm orders for these until approval has been obtained. Retain approved samples on site for comparison with those used in the works. Remove when no longer required.

SAMPLES OF FINISHED WORK: Where specified to be approved, obtain approval before proceeding with the works. Retain approved samples on site for comparison with the works. Remove from site when no longer required

DISSIMILAR METALS IN CONTACT: Where any dissimilar metals liable to corrosion are indicated to be in contact, allow for separation by bitumen strips or coatings.

SETTING-OUT CERTIFICATE: Before commencing construction, provide the Owner with a certificate from a registered surveyor that the setting out has been completed and is accurately placed on the site.

DIMENSIONS: Take all dimensions to be between structural elements before lining or applied finishes unless clearly shown otherwise.

REMOVE all temporary markings, coverings and protective wrappings unless otherwise instructed.

REMOVE from the site all hoardings, surplus materials and all rubbish and dirt.

REINSTATE SITE in areas not covered by site finish work to original condition after removal of temporary works, services and completion of the work

CLEAN all glass, inside and out, remove all paint and putty marks. Replace any cracked or broken glass.

CLEAN the works thoroughly inside and out, removing all splashes, deposits, rubbish and surplus materials

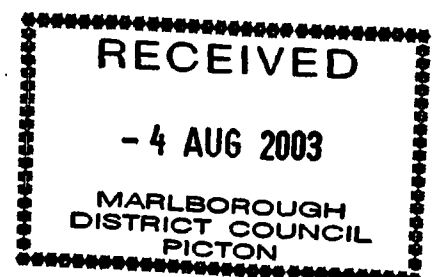
CLEANING MATERIALS AND METHODS to be as recommended by manufacturer of materials used and material being cleaned. In the absence of such recommendations cleaning materials and methods to be approved by the architect.

REPLACE any material or component which has become damaged during the course of the work, touch up minor faults, carefully matching colour, and brushing out edges. Repaint badly marked areas back to suitable breaks or junctions.

ADJUST, EASE AND LUBRICATE all doors, windows, drawers, hardware, appliances, controls and other parts as necessary to ensure easy and efficient operation

LEAVE IN PERFECT WORKING ORDER all items of equipment, with full instructions for their use and continued maintenance supplied to the Owner.

LEAVE THE WORKS secure with all accesses locked. Account for all keys, and hand over to the Owner with itemised schedule, retaining duplicate schedule signed by the Owner as receipt



EXCAVATION

This section deals with the general requirements for excavating required for the building works and the disposal of excavated material.

GENERAL

DOCUMENTS which relate to this section are.

NZS 3108	Concrete production - ordinary grade.
BS 1377	Methods of test for soils for civil engineering purposes.
BS 8000	Workmanship on building sites Part 1: Excavation and filling.

Department of Labour Safety in construction document No.5: Excavation code of practice.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments, at the time of tender. However this specification takes precedence when it is of a higher standard than the cited document.

PROOF DRILLING: For the foundations designated on the plan, hand augered proof holes may be required by the engineer to determine the extent of such material. Allow for this work in programming and adjust against provisional quantities scheduled.

VISIT THE SITE to determine the access for machines, the nature of the ground and sub-soil to be excavated, the water-level on the site and all matters that will influence the tender price.

SAFE WORKING CONDITIONS: To be the sole responsibility of the contractor by the provision of adequate support to all excavations at all times. Cover holes and fence off trenches and banks.

WORKMANSHIP

COMPLY with the recommendations of the Department of Labour document No. 5: Excavation code of practice.

WORK BY OTHERS: Before taking over work done on the site by others check all levels and conditions and report to engineer any discrepancies that will affect further work.

EXISTING SERVICES & FOUNDATIONS: Locate underground services and foundations before work is started. Any information provided regarding the location of these services and foundations is given from available records but with no guarantee of accuracy as regards alignment or depth; furthermore no guarantee is given or implied that the information provided covers all existing services and foundations. Make good at no extra cost, damage to existing services to the satisfaction of the appropriate utility network operator.

OBSTRUCTIONS

WATERWAYS: Temporarily divert as necessary all ditches, field drains and other water-ways encountered during the excavations and reinstate to approval on completion.

DRAINS AND SERVICE LINES: Divert services, drains and field drains encountered in the excavations to new routes clear of the building and reconnect to the approval of the utility network operator.

DISPOSAL OF WATER

KEEP ALL excavations free from water and keep water from excavations clear of other construction work.

SUMPS. Form sumps outside the line of foundations and deep enough to drain excavations. Pump from sumps without disturbing excavations or any material in place.

EXCAVATION

UNDERPINNING: Where underpinning of existing building foundations is shown on the plans, excavate in short lengths not more than 1.5 m wide leaving at least 4 metres solid bearing between panels. Complete these panels of underpinning foundation prior to excavating intermediate panels. Provide all necessary struts, shores and needles to ensure stability during the operation.

EXCAVATE for pads, strip foundations and tie beams to the profiles and levels shown on the drawings. Allow clearance for working space and formwork as necessary. Trim to required profiles, falls and levels. Bench surface of sloping ground to receive filling.

INSPECTION. Inform engineer when excavations are ready for inspection and for approval which must be obtained before placing any new work. If after approval bearing becomes inadequate due to any cause then inform engineer for instructions.

OVER EXCAVATION: Make good at own expense with 10.0 MPa site concrete to engineer's instructions.

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BACKFILLING

EXCAVATED BACKFILL: Stockpile selected excavated backfill on site where directed so that it does not impede continuing works until it is required

FOUNDATIONS Backfill trenches to foundations with excavated backfill in 200 mm layers each layer well and evenly compacted. If edges of excavations are not strong enough to withstand compaction without movement, cracking or other damage obtain engineers instructions
Do not backfill until concrete has been placed a minimum of 3 days.

RETAINING WALLS Backfill drainage space behind walls with granular backfill in 200 mm layers each layer firmly tamped. Do not disturb sub-soil drains.

DPC MEMBRANES. Protect from damage by granular backfill with polystyrene sheets glue-fixed in place and with joints taped

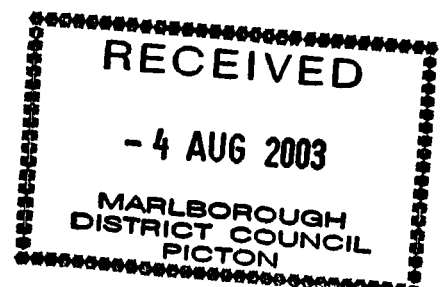
CONCRETE SLABS: From approved sub-grade spread and level a granular base in 100mm maximum loose layers well and evenly compacted. Dress with a 25mm layer of sand and roll to form a tight dense surface ready for dpc.

COMPLETION

BATTERS - TEMPORARY PROTECTION: Protect batters with change of level between crest and toe greater than 1.5 metres from weather erosion with a waterproof covering either hessian and tar, or heavy duty black polythene sheet. Seal at joints and securely fix down at crest and toe.

Maintain coverings in good condition until ground is secured by permanent construction.

SURPLUS MATERIAL: Remove excavated material from the site continually as the excavation proceeds. Clean up continually any excavated material if dropped on footpaths or roads.



GENERAL SITE WORKS

SCOPE: This section deals with the clearance/excavation/filling as shown on the accompanying drawings

DOCUMENTS referred to in this section are:

NZS 3604 Light timber frame buildings not requiring specific design

Documents listed above and cited in the clauses which follow are deemed to form part of this specification. However this specification takes precedence in the event of it being of a higher standard than the cited documents

SITE VISIT: Visit the site and make all necessary investigations as to conditions.

ANTIQUITIES: All fossils, antiquities and other objects of interest or value which may be found on the site are the property of the employer.

CLEARANCE

PREPARATION: Comply with NZS 3604 - Clause 3.4, Site preparation. Remove all turf, vegetation, trees, topsoil, stumps and rubbish from the area to be built on.

TOPSOIL: Stockpile excavated topsoil on site where directed by the Owner. Keep separate from other excavated materials. Spread and level where directed before completion of contract

UNDERGROUND VOIDS/SERVICES/OLD FOUNDATIONS: Break out and remove old foundations, slabs, drainage pipes, manholes, tanks, cables, etc. Report to the Owner or Engineer for instructions when any unexpected voids, made-up ground or services are encountered. Seal off ends of drains to local authority approval.

EXCAVATION

GENERAL EXCAVATION. Trim ground to required profiles, batters, falls and levels. Remove all loose material. Protect all cut faces from collapse. Keep all excavations free from water. General excavation is assumed to be in material other than rock.

ROCK EXCAVATION Tenderers must state their monetary rate/cubic metre for excavation in rock

EXCAVATION FOR FOOTINGS: Footing excavations are to be taken down to depths shown. Trenches must be plumb and straight, bottoms level and solid, stepped as required and kept clean and free of water

INADEQUATE BEARING: If, due to any cause, bearing becomes inadequate then excavate further, backfill and compact to approval with material as follows:

Below slabs on grade.	Hardfill
Below footings:	10MPa concrete
Service trenches.	Hardfill

EXCESS EXCAVATION If, for any reason, excavation exceeds the required depths, backfill and compact to correct level with material as shown in the table above at no cost to employer.

FILLING

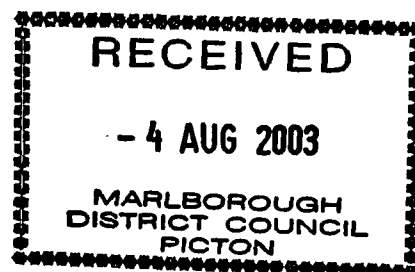
GRANULAR BASE FOR SLABS. To conform with Appendix E5, Granular Base, of NZS 3604. Consolidate with a vibrating roller. Blind the surface with coarse sand and roll ready to receive a polythene sheet vapour barrier

RETAINING WALLS. Ensure that tanking membranes and DPCs are not punctured. Backfill with free draining granular material and compact in 200mm layers

GENERAL BACKFILLING: Use excavated material, compacted in 150mm layers. The last 200mm to be clean top soil lightly compacted and neatly finished off

COMPLETION

SURPLUS MATERIAL: Remove and dispose off the site any surplus excavated material including that excavated for drains.



STEEL REINFORCEMENT

This section deals with the placing of steel bar reinforcement for in-situ concrete.

GENERAL

NZ BUILDING CODE Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

DOCUMENTS which relate to this section are:

NZS 3109	Concrete construction
NZS 3402	Steel bars for the reinforcement of concrete
NZS 3422	Welded fabric of drawn steel wire for concrete reinforcement
NZS 4702	Metal arc welding of Grade 275 reinforcing
AS 1554	Structural steel welding - Part 3: Welding of reinforcing steel

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments at the time of tender. However this specification takes precedence when it is of a higher standard than the cited document.

CERTIFICATE OF COMPLIANCE with the above standards. Provide if required by the Engineer.

TEST RECORDS demonstrating compliance with relevant standards. Provide if required by the Engineer.

CERTIFICATES: Before delivery, provide a certificate of origin, manufacture, compliance with cited standards and test certificates demonstrating compliance

IDENTIFICATION: All steel to be clearly marked for identification with certificates

BAR BENDING SCHEDULES AND DIAGRAMS: Provide, if required by the Engineer.

MATERIALS

GRADE 300 STEEL: To NZS 3402 round bars are shown by symbol "MR" and deformed bars by symbol "MD", followed by diameter in millimetres

GRADE 430 STEEL: To NZS 3402 round bars shown by symbol "HR" and deformed bars by symbol "HD" followed by diameter in millimetres

STEEL MESH: To NZS 3422

SPACERS AND CHAIRS: Precast concrete or purpose made moulded PVC.

WORKMANSHIP

CLEANLINESS Reinforcement to be clean and free of all loose mill scale, loose rust, oil and grease at time of placing concrete

RUST STAINING Protect projecting reinforcement from the weather where rust staining of exposed concrete surfaces may occur

REJECT consignment if reinforcement shows signs of fractures

CUTTING AND BENDING

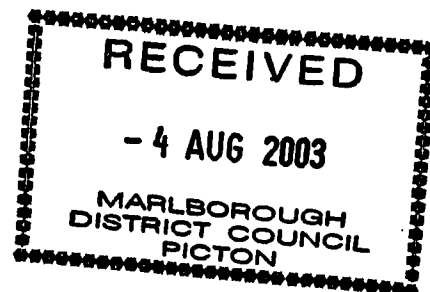
CUT AND BEND bars to NZS 3109, unless otherwise instructed.

BEND BARS cold on approved machines.

DO NOT REBEND bars without approval.

ADJUSTMENTS: Provide on site facilities for hand bending to deal with minor adjustments

SPECIAL BENDING Hot bending may be permitted only with approval



• • FIXING

LAPS OR SPLICES For main reinforcing, provide laps only where indicated on the drawings. For small bars, distribution bars, tie bars, etc., use random laps, of standard length, where necessary.

MINIMUM LAPS unless detailed otherwise to be

Mild steel (plain) 40 diameters

Mild steel (deformed Grade 300): 32 diameters

High tensile steel (deformed Grade 380): 48 diameters

Mesh 664 and lighter: 225mm - walls & slabs on grade
300mm - suspended slabs

Heavier meshes: 300mm - walls and slabs on grade
375mm - suspended slabs

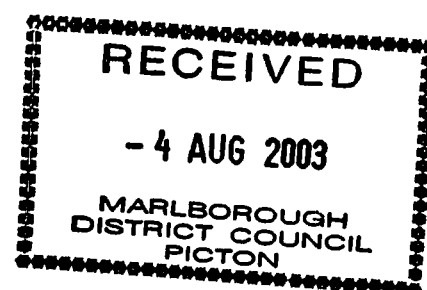
ELECTROLYTIC ACTION: Do not fix or place reinforcement in contact with non-ferrous metals.

SECURE reinforcement adequately with tying wire. Bend wire well back clear of forms. Ensure that reinforcing is not displaced during concreting and vibration.

BRACE all free ends of partially embedded reinforcing that could be displaced, thereby destroying bond in the concrete.

WELDING Do not weld without approval. Where welding is shown, ensure good preparation and completion of full strength welds. Do not weld or tack to Grade 380 steel.

COVER to reinforcing bars to be as listed in Table 3 of NZS 3109 unless specifically shown otherwise on the drawings.



CONCRETE WORK

SCOPE This section deals with the formwork, reinforcing, mixes and the placing of concrete in buildings and in landscaping

NZ BUILDING CODE. Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

B1/AS1 Structure - general
2.0 Concrete
B1/AS3 Structure - small chimneys
B1/AS4 Structure - foundations
1.0 Foundations for small buildings
E2/AS1 External moisture
4.0 Floors
5.0 Basements.

DOCUMENTS referred to in this section are:

NZS 3104	Concrete production - high grade and special grade
NZS 3108	Concrete production - ordinary grade
NZS 3109	Concrete construction
NZS 3114	Concrete surface finishes
NZS 3124	Concrete construction for minor works
NZS 3402	Steel bars for the reinforcement of concrete
NZS 3422	Welded fabric of drawn steel wire for concrete reinforcement
NZS 3604	Light timber frame buildings not requiring specific design

Documents listed above and cited in the clauses which follow are deemed to form part of this specification

However this specification takes precedence in the event of it being of a higher standard than the cited documents

MATERIALS

GENERAL: All materials for concrete work to comply with NZS 3109.

FORMWORK:

Framing No 2 Framing radiata pine
Boards No 2 Framing radiata pine
Rigid Sheets Construction plywood CP-D grade Hardboard

REINFORCEMENT: Grade 300 deformed bars, to NZS 3402.
668 and 665 welded reinforcing mesh, to NZS 3422

VAPOUR BARRIER 0.25mm minimum polythene to NZS 3604 Appendix E8

READY-MIX CONCRETE: High grade 20 MPa, maximum aggregate size 19mm to NZS 3104.

SITE-MIX CONCRETE: Ordinary grade 20 MPa with separate batching of sand and coarse aggregate all to NZS 3108

SITE WORKS CONCRETE: 1.8 - cement all-in aggregate with minimum water for workability, all materials and batching to NZS 3108

WORKMANSHIP

GENERALLY. Workmanship and construction to comply with NZS 3109 and NZS 3604.

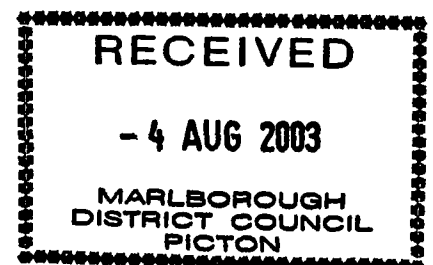
INSPECTION. Place no concrete until all excavations, boxing and reinforcing have been inspected and passed by both the Owners Engineer and Territorial Authority inspector.

FORMWORK:

To be securely fixed and braced, have sufficient strength to support all loads and with joints and linings tight enough to prevent loss of water. Hose out to clean thoroughly and keep wet before and after concrete is placed

Apply polythene with 150 mm laps, tape sealed to laps and penetrations

REINFORCEMENT: To comply with NZS 3109 Bends to be made cold, without fracture All reinforcing to be accurately placed and well secured against displacement. Do not weld reinforcement



CARPENTRY

GENERAL

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

DOCUMENTS: Referred to in this section are:

NZS 2295	Building papers (breather type).
NZS 3109	Concrete construction.
NZS 3602	Specifying timber and wood-based products for use in building.
NZS 3603	Timber design
NZS 3604	Light timber frame buildings not requiring specific design.
NZS 3606	Manufacture of glue-laminated timber.
NZS 3608	Resin bonded, wood chipboard
NZS 3614	Manufacture of construction plywood.
NZS 3616	Finger jointed timber.
NZS 3617	Profiles of weatherboards fascia boards and flooring.
NZS 3631	NZ National timber grading rules
NZMP 3640	Minimum requirements of the NZ Timber Preservation Council
NZS 4214	Methods of determining the total thermal resistance of parts of buildings.
NZS 4218P	Minimum thermal insulation for residential buildings.

Documents listed above and cited in the clauses which follow are deemed to form part of this specification. However this specification takes precedence in the event of it being of a higher standard than the cited documents.

MATERIALS

FRAMING: Grading to NZS 3631 and treated to NZMP 3640.

FASCIA & BARGEBOARDS: Dressing grade to NZS 3631 and H3 treated to NZMP 3640.

PVC JOINTERS: To suit sheet thickness.

GLASS FIBRE: Interleaved glass fibre quilt in batt form fitted to NZS 4218.

BUILDING PAPER: Light weight breather type flame proof kraft paper laminates to NZS 2295.

ALUMINIUM FOIL: Aluminium sheet, kraft paper fibre reinforced laminates to NZS 4222 and fitted to NZS 4218.

DAMP PROOF COURSE: Heavy kraft strip laminates saturated and coated with bitumen.

PARTICLE BOARD: Flooring grade high density resin bonded to NZS 3608.

PLYWOOD: Construction plywood to NZS 3614 for bracing. Interior plywood to NZS 3612 for interior finish.

FIBRE CEMENT SHEET: Cellulose cement fully compressed auto-claved sheets to NZS 4234.

MELAMINE FACED SHEET: Melamine sheet factory laminated to tempered fibreboard to BS 1142 Pt 2.

NAILS: Steel and galvanised steel of pattern to suit location and to Appendix A, NZS 3604.

BOLTS & SCREWS: Steel and galvanised steel to suit location and to NZS 3604.

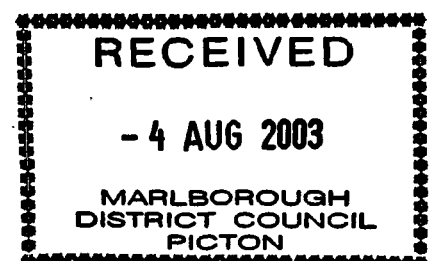
NAIL PLATES: Toothed or nailed steel plates to manufacturer's design for particular location shown on the drawings.

WORKMANSHIP

GENERALLY: Comply with NZS 3604 except as varied in this specification. Workmanship to be in accordance with the best trade practice and to current syllabi for NZ Trade Certificates in carpentry, joinery and timber machining.

INSPECTIONS: Allow for and ensure that inspections required for NZ Building Code compliance are carried out at the required times.

ATTENDANCE: Allow for attending on all trades as is normal trade practice. Provide and fix all blocks, nogs, openings and other items as required for them.



WALL FRAMING: Frame to required loading and bracing complete with lintels, sills and nogs all fabricated and fastened to section 8, NZS 3604. All exterior wall framing to be treated H3.

ROOF FRAMING: Frame to required loading and bracing complete with valley boards, and purlins.

PAPERS AND INSULATIONS: Lay aluminium foil insulating sheet, fix breather type building paper and fit fibre glass insulation as detailed and to manufacturer's recommendations.

FIBRE CEMENT SHEET: Fix to timber framing to detail and to manufacturer's recommendations with PVC jointers.

MOISTURE CONTENT at time of fixing or installing:

Framing Timbers	18-20%
Exterior Trim	12-14%

PRIME OR SEAL: faces, edges and end grain before fixing of all weatherboards and exterior trim to finish and workmanship specified in Section V01 - Painting.

MELAMINE FACED SHEET: Fix to timber framing with jointing as detailed and to manufacturer's recommendations.

COMPLETION

LEAVE all this work in proper condition for the work of following trades. Take away from the site all trade rubbish.

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TIMBER FRAMING

This section deals with timber stud framework (incl. bracing and isolated timber posts/beams) usually as a support for sheet and board finishes.

GENERAL

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

B1/MM1 Structure - general
2.0 Loadings
6.0 Timber
B1/AS1 Structure - general
4.0 Timber

DOCUMENTS which relate to this section are :

NZS 3601 Metric dimensions for timber
NZS 3602 Specifying timber and wood based products in building
NZS 3603 Timber design
NZS 3604 Light timber frame buildings not requiring specific design
NZS 3631 New Zealand national timber grading rules
NZMP 3640 Minimum requirements of the NZ Timber Preservation Council (Inc.)
Department of Labour Safety in construction document No.16: Powder powered tool guide.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments, at the time of tender. However, this specification takes precedence in the event of it being of a higher standard than the cited documents.

MATERIALS

TIMBER

ALL TIMBER specified in this section is to comply with the requirements and recommendations of NZS 3601, 3602 and 3604 where appropriate, unless otherwise specified.

TIMBER species, grade, quality and preservative treatment may be any of those as listed in NZS 3602 tables 1-9 for each situation, unless otherwise specified. All timber framing to Interior Walls to be No 1 Boric treated timber. All timber framing to Exterior Walls to be H3 treated timber.

TEST MOISTURE CONTENT of timbers specified to be "dry" using an electrical moisture meter. Test 5% but not less than 10 lengths of each cross section in the centre of the length. 90% of the values obtained must be within the range specified by NZS 3602.

ALL TIMBER sizes are NZS 3601 nominal call sizes unless otherwise specified as finished size (abbreviated: fin)

ALL FRAMING TIMBER greater than 25mm in thickness is to be gauged to both width and thickness unless otherwise specified.

PROPRIETARY JOINTED Framing Members: Where specified, timbers may be supplied with machine made splices provided the manufacturer's instructions on suitability are followed. Acceptable systems are: Lumberlok floor joists, Lumberlok purlins and girts.

MERCHANTABLE GRADE TIMBER: for hit and miss sarking, gutter boards and the like.

COMPONENTS

ALL COMPONENTS Comply with NZS 3604 unless otherwise specified.

FASTENINGS: Provide nails, screws, bolts, washers and other fastenings as specified or required.

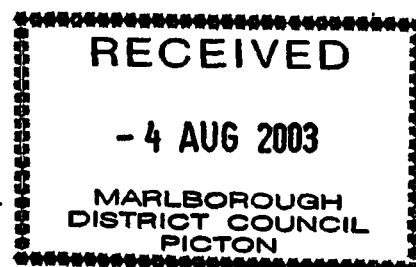
FRAMING ANCHORS: Angular brackets formed from not less than 1.2mm zinc annealed or galvanised steel with flat head nails provided by the manufacturer.

NAIL PLATES: To be used only where approved.

BOLTS AND WASHERS: Generally use Coach bolts unless otherwise specified. For structural timber connections, use Engineering bolts unless otherwise specified. Washers for bolts must always be used. If round washers are used they are not to be less in area or thickness than the equivalent square washer. All bolts and washers are to be electroplated finish unless otherwise specified.

HANGERS: For framed suspended ceilings. Galvanised flat mild steel strap

BRACING STRAPS: Galvanised mild steel angle bracing



POWDER ACTUATED FASTENINGS. In compliance with Department of Labour Document No. 16.

BULLDOG ANCHOR PLATES: Circular toothed shear connectors

MASONRY NAILS: A suitable hammer driven type.

WORKMANSHIP

WORKMANSHIP: Generally to be in accordance with the best trade practice, and this shall be deemed to include those methods, practices and processes contained in current syllabi for the New Zealand Trade Certificates in carpentry and timber machining and as contained in NZS 3604.

TOLERANCES for framework to be:

Straightness in each 8m (not cumulative) $\pm 6\text{mm}$.

Height $\pm 3\text{mm}$.

Plumb in storey height $\pm 3\text{mm}$.

Width and height of openings $\pm 3\text{mm}$.

SET OUT framing generally in accordance with the requirements of NZS 3604, to carry superimposed loads and as required to support sheet linings and/or other cladding materials. Ensure that dwangs are inset 12.5mm from face of studs when back blocking for plasterboard is required.

ADDITIONAL SUPPORTS: Position and fix additional supports not shown on drawings, for appliances, fixtures, edge of sheets, and to provide lateral support to load carrying framing.

FRAMING ABUTTING concrete or steel structure will not require bracing, unless specifically indicated by drawing or instruction. Provide bitumen DPC between timber and all concrete or masonry.

TIMBER FURRING AND PLATES TO STEELWORK: Fix with bolts and washers, or approved proprietary fastenings, at not more than 1.0m spacing or less than two fixings to each member minimum, unless otherwise specified.

CUTTING OF TREATED TIMBER: Ensure the wood exposed by the cut is dry before liberally applying a proprietary formulation of pentachlorophenol, copper naphthenate, zinc naphthenate or TBTO in a suitable organic solvent

TIMBER CUTTING Select and cut spanning members so that allowable defects are reduced to a minimum

AVOID knots and short grain on edges in the middle third of the length.

AVOID shakes, checks and splits at mid length or close to ends.

AVOID knots on faces where timber connectors are to be used.

KNOT PLUGGING OF EXOTIC PINES is permitted only as specified in Appendix B of NZS 3631.

TEMPORARY WORK: Do not use timber to be incorporated in the work for any temporary purposes.

PROPRIETARY JOINTS & CONNECTORS are not to be used on any structural timber exposed to view unless indicated.

CLEAN OFF any marks on exposed timber.

SUBSTRUCTURE AND FLOOR FRAMING

DO NOT EMBED any cut surface made on natural round timber after preservative treatment.

FLOOR BATTENS: Fix battens to concrete floor with built in shock absorbing metal anchor clips with batten tops in even plane and parallel, fixed to anchor manufacturer's instructions

ENSURE that top edges of joists are in an even plane and have full bearing at support points.

FLOOR JOISTS If proprietary jointed joists are used, comply with the manufacturer's handling and fixing instructions

STRUTTING: Use only herringbone strutting to deep joists.

STRUTTING: May be timber or proprietary metal type.

WALLS AND PARTITION FRAMING

ALLOWANCE FOR DEFLECTIONS: The partition system is required to allow for interstorey seismic deflections. Ensure that these seismic joints are unrestricted as to movement except at bottom plates and finishing beads. Wall linings and finishing beads to be fixed to one side of seismic joints only.

SELECT plates for straightness in long lengths.

BUTT JOINT plates at every connecting point with nail plate connectors in accordance with NZS 3604.

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PROVIDE studs in single gauged lengths with three studs at every corner and partition junction.

STUDS which develop minor warping may be straightened by wedging a saw cut and fish plates both sides.

STUDS may not be straightened by cutting. Use only straight studs.

DIAGONAL BRACING: Galvanised steel angle, min. 22 x 22 x 1.2mm with vertical leg standing downwards

BRACING. Will not be required where wall framing is to be clad with Hit and miss diagonal sarking as specified in this section. Close boarded diagonal sarking as specified in H42 or H43.

GIRTS: If proprietary jointed girts are used, comply with the manufacturer's handling and fixing instructions.

STRAPPING TO MASONRY WALLS: Use hammer driven masonry nails, not powder powered fixings

ROOF FRAMING AND GUTTERS

PROVIDE all roof framing members in single lengths over spans. Cut accurately to ensure close contact at fixing points with edges in an even plane.

CONNECTORS: Secure rafters to framework with framing anchors. Secure stringers to steelwork with toothed nail shear connector let in flush and through bolted to steelwork.

RAFTERS AND PURLINS: If proprietary jointed members are used, comply with the manufacturer's handling and fixing instructions.

BRACE PURLINS with and of the following approved methods:

Solid timber strutting.

12mm diameter ms rods

CEILING FRAMING

JOISTS: To be in single lengths between supports with undersides gauged level and in an even plane.

HANGERS AND RUNNERS: Fix at every point of contact with structure.

CEILING HANGER CLIPS: Fix to soffit formwork at _____mm centres before casting concrete.

CEILING HANGER CLIPS: Fix to proprietary floor system at time of laying.

H23:6 HIT AND MISS SARKING

EDGE DISTANCE: Fixing at ends of boards to be between 15mm and 20mm from ends.

FACE NAIL: At each point of support with two nails equally spaced.

HEAD JOINTS IN WALL SARKING: Position centrally over points of support

WALL BOARDING: Fix vertically.

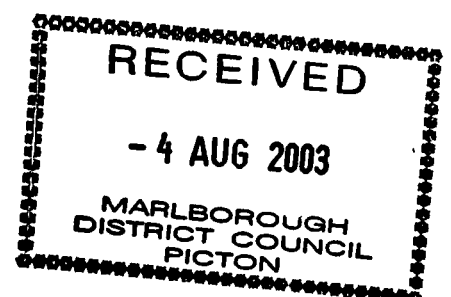
WALL BOARDING: Fix at an angle of 45 degrees to supports

HEADING JOINTS IN ROOF SARKING: Position centrally over points of support and stagger not less than two board widths apart.

ROOF SARKING: Fix as soon as structural roof is complete.

ROOF SARKING: Fix at right angles to supports

ROOF SARKING: Fix at an angle of 45 degrees to supports



BUILDING FOILS/PAPERS/FILMS

This section deals with the supply and fixing of membranes as part of the construction system for insulation, draught exclusion or moisture exclusion.

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

DOCUMENTS which relate to this section are:

NZS 2295	Building papers (breather type).
NZS 3604	Light timber frame buildings not requiring specific design.
NZS 4218	Minimum thermal insulation requirements for residential buildings.
NZS 4222	Materials for the thermal insulation of buildings.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments, at the time of tender. However this specification takes precedence when it is of a higher standard than the cited document.

MATERIALS

WIRE MESH

WIRE NETTING: Galvanised hexagon 900mm wide sheet, 42mm mesh, 1mm diameter steel wire.

FLEXIBLE SHEET

REFLECTIVE FOIL INSULATION: Brightly burnished aluminium foil laminated with thermo-setting adhesives to high density kraft paper incorporating inert fibre reinforcing.

REFLECTIVE FOIL INSULATION/VAPOUR BARRIER: Brightly burnished aluminium foil laminated with thermo-setting adhesives to high density kraft-paper incorporating inert fibre reinforcing, complete with 72mm wide self-adhesive pressure-sensitive foil tape recommended by manufacturer.

REFLECTIVE FOIL INSULATION - PERFORATED: Brightly burnished aluminium foil laminated with thermo-setting adhesives to high density kraft-paper incorporating inert fibre reinforcing and perforated to avoid trapping of moisture.

BUILDING PAPER: Breather type bitumen saturated kraft paper to NZS 2295.

ROOFING UNDERLAY: Breather type bitumen saturated kraft paper to NZS 2295

ROOFING UNDERLAY - FIRE RETARDANT: Breather type kraft paper layers treated with fire retardant chemicals and laminated with fire retardant adhesives incorporating inert fibre reinforcement to NZS 2295.

CONCRETE UNDERLAY - FILM: Single/multi layer polyethylene film, complete with self-adhesive pressure-sensitive tape recommended by manufacturer.

GENERAL

STORAGE: Accept rolls of material undamaged and dry and store on end on a level firm base. Protect from damage.

HANDLING: Avoid distortion, stretching, puncturing and damage to edges while unrolling and placing sheet. Do not use damaged sheet. Make good any damage to architect/engineer's approval.

INSTALLATION

WIRE NETTING: Lay at right angles across the sub-strate members. Pull tight and temporarily fix. Tie edges of sheets together with galvanised wire to keep them on the same plane.

ROOF BUILDING PAPER: Lay horizontally starting at the gutter line with succeeding sheets in true alignment and lapping 150mm. Carefully scribe around and fit neatly to all penetrations. Temporarily fix in place and keep dry and clean until covered in.

WALL BUILDING PAPER: Fix horizontally to outside face of sub-strate in true alignment with succeeding sheets overlapping 150mm. Temporarily fix to manufacturer's recommendations. Scribe neatly around penetrations and openings to leave no gaps. Keep clean, undamaged and without visible weather deterioration until closed in. Make good/replace to architect's directions.

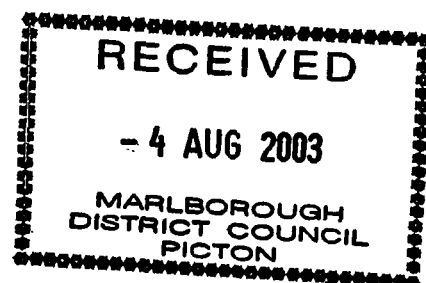
FLOOR INSULATION: Pre-cut foil to length. Lay across the sub-strate members in true alignment, lapped 150mm with a sag of exactly 100mm between and laps in full contact. Cut over nogs and ensure a tight neat of all foil edges to adjacent member. Keep foil clean and dry and free of any sawdust and shavings until flooring laid as soon as possible after fixing.

CONCRETE UNDERLAY/FILM. Do not lay until the main contractor has the granular hardfill to a suitable surface to receive the underlay. Lay the underlay/film in true alignment lapping 150mm. Carefully scribe fit around all penetrations. Fully seal all laps and penetrations with adhesive tape to manufacturer's instructions

COMPLETION

FOILS/PAPERS: Ensure these are dry, clean, bright, undamaged and free of all debris before covered.

FILMS: Ensure these are one homogeneous sheet vapour barrier and remain as such through the ensuing work. Make good to Owner/engineer's approval if damaged during the ensuing work.



PLUMBING

SCOPE: This section describes the supply and fitting of roof stormwater collection, flashings, waste disposal, water supply and plumbing fittings.

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods to establish compliance with the Code.

DOCUMENTS referred to in this section are:

NZS 3441	Hot-dipped zinc-coated steel coil and cut lengths.
NZS 3501	Copper tubes for water, gas and sanitation
NZS 4602	Low pressure copper thermal storage electric heaters.
NZS 7641	Unplasticized PVC waste and ventilating pipe, fittings and accessories 32, 40 and 50mm.
AS 1804	Soft lead sheet and strip

Plumbers, Gasfitters and Drainlayers Act, 1976

Documents listed above and cited in the clauses which follow are deemed to form part of this specification. However, this specification takes precedence in the event of it being of a higher standard than the cited documents.

COMPLY with the NZ Building Code and utility network operator's requirements for inspections and carry out tests as required.

ALL WORK covering waste disposal, water supply and plumbing fittings to be carried out by or under the direct supervision of a person registered under the Plumbers, Gasfitters and Drainlayers Act.

MATERIALS

DOWNPIPES: Refer to plan

FLASHINGS: 0.60 mm sheet steel galvanized to NZS 3441, 1.8mm (20kg/m²) copperised pure lead to AS 1804, 0.50 mm copper sheet and 0.70 mm aluminium sheet to suit location of the flashing.

WASTE PIPES, COPPER: Copper tube to NZS 3501.

WASTE PIPES, PLASTIC: Upvc pipe to NZS 7641 complete with fittings brand-matched to manufacturer's specification.

WATER MAIN: High density alkathene 25 mm i.d pipe to minimum 170 psi complete with "o"-ring compression type fittings.

WATER PIPE, COPPER: Copper tube to NZS 3501.

GATE VALVES: de-zincified brass b.s.p screwed ends.

HW CYLINDER, MAINS PRESSURE: (if required) Copper thermal storage cylinder, insulated and complete with fittings recommended for installation by manufacturer. Refer to the Owners for cylinder manufacturer and sizes.

WORKMANSHIP

GENERALLY carry out the whole of this work and tests to acceptable solutions E1/AS1, G12/AS1 and G13/AS1.

AVOID electrolytic action by eliminating actual contact or continuity of water between dissimilar metals.

FLASHINGS: Scribe fit, fold, lap, seam, run solder or braze as required by the metal to flash roof penetrations, roofing and exterior joinery to prevent weather penetration.

EXCAVATE for water main to a firm even bottom in straight runs. Allow to backfill.

WATER MAIN: Lay a minimum of 450 mm below ground level from utility network operator supply through a gate valve and to box to the building all to manufacturer's specification and all brand-matched.

WATER SUPPLY - COPPER: Size piping layout to eliminate loss of pressure at any point by simultaneous draw-off. Run pipes in straight runs, firmly fixed, to falls with easy bends and jointed by brazing or with cross fittings all to acceptable solution G12/AS1. Conceal all piping, lag all hot water piping and pressure test before wall linings are fixed.

HW CYLINDER: (if required) Install where shown complete with all the necessary fittings to manufacturer's recommendations

EXPOSED PIPES: Chrome plate on copper or white PB/PVC including back nuts. At wall penetrations provide and fit c/p or white PVC collars

SANITARY FIXTURES SCHEDULE: Fit and install plumb, true to line and rigid, all to manufacturer's recommendations.

Refer to the Owners for the Sanitary Fixtures Schedule.

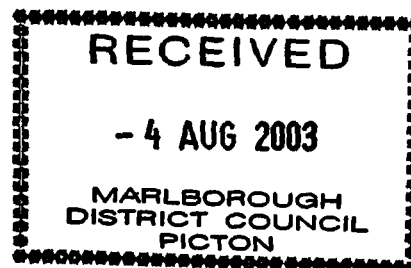
Sink/bench: Refer to Drawings

TRAPS AND WASTE PIPES: Connect waste outlets to traps and run waste pipes and back vents concealed, all sized and fixed to acceptable solution G13/AS1. Discharge wastes into drainage system slack soil pipe or gully trap as shown.

COMPLETION

GENERALLY: Leave all rainwater services in proper working order and all flashing work keeping building weathertight. Pressure test all water supply services and fittings and check all waste disposal services to ensure no leakage and leave all in proper working order.

CLEAN UP: Remove labels and clean all fittings. Take away from the site all rubbish and trade waste.



ELECTRICAL

GENERAL

SCOPE: This section deals with the wiring for power and lighting complete with all electrical fittings and necessary components and connected back to the electrical authorities supply.

NZ BUILDING CODE: Refer to the following NZ Building Code clauses and Approved Document paragraphs for the criteria and/or methods that must be used in this section to establish compliance with the Code.

DOCUMENTS referred to in this section are:

Electricity Regulations 1993	
NZ ECP 2	Electrical installations in damp situations
NZ ECP 3	Electrical safety of apparatus and materials
NZ ECP 5	Electrical installations - cold cathode discharge lighting
NZ ECP 11	Inspecting and testing low-voltage installations for certification
NZ ECP 28	Selection and installation of cables
NZ ECP 33	Electrical installations of mineral insulated cables and equipment
NZS 6401	PVC - insulated cables for electric power and lighting

COMPLY with Electricity Regulations 1993 for listed and prescribed work and with the utility network operator's requirements. Apply for the service connection. Arrange for the required inspections of listed work. Pay all fees.

ALL WORK must be carried out by or under the direct supervision of a holder of an employer licence under Electricity Regulations 1993.

CERTIFICATE OF COMPLIANCE: Carry out the prescribed electrical work, test in accordance with ECP 11 and complete a certificate of compliance all as required by Electricity Regulations 1993 and particularly clauses 16, 34 and 35. Allow utility network operator to sight before meter installation, listed work inspection, polarity check and livening of supply. Supply the certificate to the employer.

MATERIALS

MAINS UNDERGROUND. Tough plastic sheathed neutral screened cable to NZS 6401 with a minimum rating of 60 amps per phase.

CABLES: Tough plastic sheathed copper conductors to NZS 6401.

Lighting Circuits	1.0 mm - domestic 1.5 mm - commercial
Power Circuits	2.5 mm

METER BOX: Rust protected metal case and glass panel door all powder coated and complete with meter mounting, main switch and fuse.

DISTRIBUTION BOARD Rust protected metal case and door all powder coated and complete with neutral and earth busbars, MCB's and 60 amp main switch complete with removable insulated panel.

WALL BOXES: Standard size in plastic and 2 or more gang size in metal.

SWITCH UNITS: 10 amp/240v flush polycarbonate units complete. For number of switches per unit, dimmer units, neon (indicator or toggle) units, locator units and 2-way units refer to electrical plan.

HOT WATER SYSTEM SWITCH: One way 20 amp switch complete with clamp for flexible pvc tubing.

SWITCHED SOCKET UNITS. 10 amp/240V flush polycarbonate 3 pin combined switch units complete. For number of single and double socket units and inbuilt earth leakage socket units refer to electrical plan.

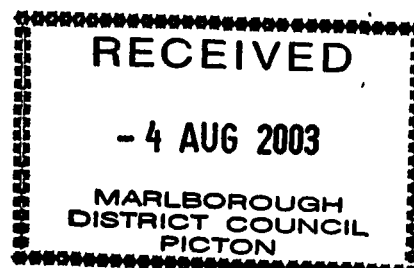
CEILING ROSES: White plastic mounting base with screwed cover complete.

BATTEN HOLDERS: Standard white plastic with angled cap complete.

WORKMANSHIP

LAY underground mains to utility network operator's requirements. Allow for trench excavation and backfill.

METER BOX: Fit to makers instructions, level and plumb where shown on plan, recessed into external wall.



DISTRIBUTION BOARD Fit to makers instructions, level and plumb where shown on plan, recessed into wall

CABLING: Design circuits with a maximum of 10 light outlet units or 4 switched socket units. All cabling to be run completely concealed.

UNITS: Fit all switch units and socket units level and plumb where shown on plan and to following heights, (centre of unit)

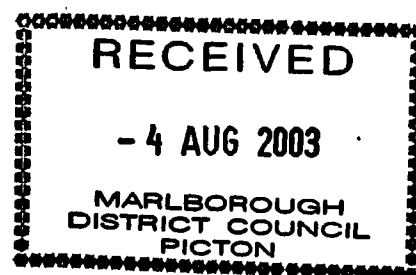
Switch Units :	1250 mm
Socket Units :	1200 mm over work benches
	300 mm elsewhere
Other Units :	as directed on site.

HOT WATER SYSTEM: Wire as a separate circuit through a system switch with cable from switch to element encased in flexible pvc hose clamp fixed at each end. Hot water cylinders, thermostats and 3000 W element supplied and fitted under 502 Plumbing.

TELEPHONE: Wire for or supply the necessary draw wires or arrange for Telecom to pre-wire for telephone outlets shown on the plan.

FINAL ELECTRICAL LAYOUT PLAN

Refer to the Owner for the final location of all electrical fixtures and fittings. The layout (if shown) on the drawings is a preliminary or suggested layout only.



PLYWOOD SHEETS

This section deals with the use of plywood sheets for roofs, sarkings, decking, exterior cladding.

GENERAL

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

E2/AS1 External moisture
2.0 Walls

DOCUMENTS which relate to this section are:

NZS 2295	Building paper (breather type)
NZS 3602	Code of practice for specifying timber and wood-based products.
NZS 3611	Exterior plywood
NZS 3612	Interior plywood
NZS 3614	Manufacture of construction plywood
MP 3640	Minimum requirements of NZ Timber Preservation Council

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments, at the time of tender.

However this specification takes precedence when it is of higher standard than the cited document.

MATERIALS

EXTERIOR TRIM: Pinus radiata run facings and mouldings to profiles as detailed or recommended by plywood cladding manufacturer. Treated H3.

RIGID SHEETS

CONSTRUCTION PLYWOOD - PINE: Rotary cut Pinus radiata veneer ply, face sanded. Treated H3.

PLYWOOD CLADDING - PINE: Rotary cut Pinus radiata veneer ply sheet to NZS 3614. Treated H3.

PLYWOOD LINING - PINE: Rotary cut Pinus radiata veneer ply sheet Grade A-C to NZS 3614. Treated H1.

PLYWOOD LINING - SELECTED: Rotary cut 3 ply sheet with selected face veneer to NZS 3612. Treated H1.

FLEXIBLE SHEET

BUILDING PAPER: To HZS 2295. Breather type - nominal weight of 200gm/square metre.

Note: Building wrap (paper) to be approved for use with Tanalith treated plywood.

COMPONENTS

NAILS: Refer to manufacturer's recommendation and use 30 x 2.5 FH for 7 mm thick plywood up to 60 x 2.8 FH for 21 mm for construction, cladding, roofs and decking.

Galvanised, aluminium or stainless steel for natural finish.

Deformed for roofs and decking

PANEL PINS: Refer to manufacturer's recommendation and use 30 and 50 x 2.0 plated panel pins for interior linings.

SCREWS: Refer to manufacturer's recommendations for size and use galvanised countersunk.

ADHESIVE/SEALANT

ADHESIVE: Refer to manufacturer's recommendation for multi-purpose water/solvent based wallboard adhesive.

SEALANT: Refer to manufacturer's recommendation for elastomeric sealant to waterproof penetrations.

WORKMANSHIP

HANDLE sheets carefully and reject all those with damaged face or edge.

STORE sheets in stacks clear of the ground, supported on evenly spaced horizontal bearers without sagging. Protect from damage and weather

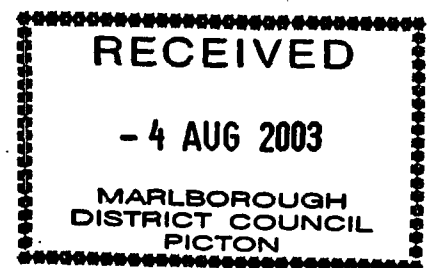
FRAMING: To NZS 3604 and to manufacturer's recommendations.

FIXING - GENERALLY

SUPPORT: Fully support all edges and joints unless tongue and groove jointed.

EXPANSION: Allow a 2-3mm gap at all edges of cladding for sheet expansion.

FIXINGS: To be a maximum of 10 mm from the edge, 150 mm centres along edges and 300 mm centres on intermediate supports.



CLADDING

FRAMING: Maximum moisture content 8%.

BUILDING PAPER: Fix horizontally with fixings and laps to manufacturer's instructions and with paper not damaged in any way.

SEALING: Seal cut edges before fixing with primer/sealer to suit painting/clear finish being used.

PLYWOOD SHEETS: Fit and fix to manufacturer's recommendation with sheets and trim all in plumb true alignment and face. All as detailed

WEATHER: Allow 1 month to weather before coating if plywood is to be used as exterior cladding

DECKING AND ROOFING

FIXING: Using galvanised flat head twisted shank or annular grooved nails, fix sheets to manufacturers recommendations.

TRAFFIC: Nail and adhesive fix for traffic areas to manufacturer's recommendation.

MEMBRANE ROOFING: Screw fix sheets with 3mm gap between sheets for membrane type roofing to manufacturers recommendations

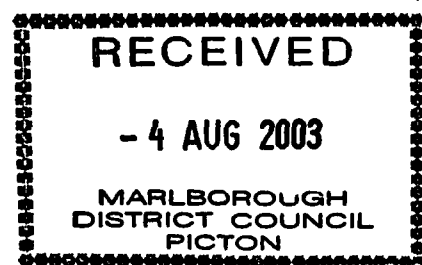
PLYWOOD SHEETS: Fit and fix to manufacturer's recommendations with staggered layout, face-grain of sheet at right-angles to support and with sheets in square true alignment and plane.

PROTECTION: Protect this work as it proceeds and when completed from the weather and until it is covered, coated or sealed

COMPLETION

PROTECTION: Protect the surfaces and the finished work until protective coatings or finishes are applied.

TAKE AWAY from the site all trade waste and unused material



INSULATION BATTS

This section deals with insulating batts/quilts, laid, hung or fitted as thermal or sound insulation.

NZ BUILDING CODE: Refer to the following NZ Building Code clauses and Approved Document paragraphs for the criteria and/or methods that must be used in this section to establish compliance with the Code.

H1/VM1 and AS1 Energy Efficiency.

DOCUMENTS which relate to this section are

NZS 2295	Building papers (breather type)
NZS 4214	Methods of determining the total thermal insulation of parts of buildings.
NZS 4218P	Minimum thermal insulation requirements for residential buildings.
NZS 4220	Energy conservation in non-residential buildings.
NZS 4222	Materials for the thermal insulation of buildings.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments, at the time of tender. However, this specification takes precedence when it is of a higher standard than the cited document.

MATERIALS

THERMAL BATT: Long fine glass fibres bonded with a thermosetting resin to form a rectangular batt.

THERMAL BLANKET: Long fine glass fibres bonded with a thermosetting resin to form a 1200mm wide flexible blanket

ACOUSTIC BATT: Lightweight glass fibre material in a 100mm thick block.

ACOUSTIC BLANKET: Lightweight glass fibre material in a 1200mm wide flexible blanket.

THERMAL BLANKET - NATURAL: Long fine wool fibres bonded with a polymer fibre to form a rectangular blanket.

BUILDING PAPER: Breather type bitumen saturated kraft paper to NZS 2295.

NAILS: Galvanised steel clouts 25mm gauge.

WORKMANSHIP

STORAGE: Accept materials undamaged and dry and store in a location that protects them from the weather.

HANDLING: Wear protective clothing as necessary and when handling avoid delamination or distortion of the rectangular form, always maintaining full thickness unless compression is an installation system requirement.

INSPECTION: Before starting installation check that location and framing are free from moisture, cavities are not interconnected and, if not specified here, that building papers and vapour barriers are in place.

PREPARATORY WORK

VAPOUR BARRIER: Fit and fix between insulation and lining with joints lapped and sealed with pressure-sensitive tape

BUILDING PAPER: Fit and fix to manufacturer's instructions between insulation and cladding/covering

INSTALLATION

THERMAL BATTS: Friction fit batts in place to completely fill the whole of the cavities. Carefully scribe cut batts slightly oversize to maintain friction fit to each other, to smaller spaces and around penetrations. Leave no gaps between, and maintain full thickness of the batts over the whole of the installation. Do not cover vents and leave 150mm gap around recessed light fittings and metal flues

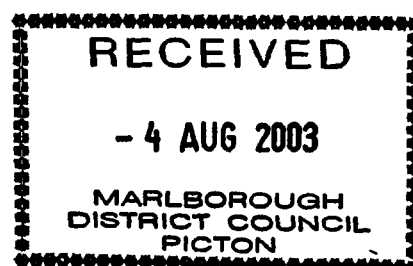
THERMAL BLANKET: Lay blanket in the same direction as and over the mesh/vapour barrier, firmly butting edges together. Carefully scribe cut blanket to maintain firmly butted edges and ends. Maintain full thickness of the blanket over the whole installation except where detailed

ACOUSTIC BATTS: After wall lining fixed to one side of the partition friction fit batts in place to completely fill the whole of the cavities. Carefully scribe cut batts slightly oversize to retain friction fit to each other, smaller spaces and around services. Maintain full thickness of the batts over the whole of the installation.

ACOUSTIC BLANKET: Before fitting the second row of studs in the double stud partitions run blankets across the inside face of studs, sitting one on top of the other with firmly butted edges and ends and without gaps or holes. Maintain full thickness of blanket over the whole of the installation by weaving to avoid any compressing as the studs are fixed in place.

COMPLETION

CLEAN UP: Collect all trade rubbish and deposit where directed on site. Take away all unused material.



ALUMINIUM WINDOWS & DOORS

GENERAL

SCOPE: This section deals with the manufacture, supply, glazing and installation of aluminium windows and doors.

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

THE DOCUMENTS referred to in this section are :

NZS 3503	Anodic oxide coatings on aluminium external applications
NZS 3504	Aluminium windows
NZS 4211	Performance of windows
NZS 4223	Glazing in buildings, parts 1 and 2
BS 6496	Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external Architectural purposes and for the finish on aluminium alloy components coated with powder organic coatings. Architectural Aluminium Association: Aluminium Window Handbook, and Specification for the powder organic coatings on Architectural aluminium products.

Documents listed above and cited in the clauses which follow are deemed to form part of this specification. However, this specification takes precedence in the event of it being of a higher standard than the cited documents.

SUBMIT samples on request of full size sections with the selected finish and hardware through all profiles offered. Provide evidence at time of tender from a TELARC registered laboratory that windows offered comply with the requirements of NZS 1900 ch. 10 and the required site and building Design Wind Pressure and Air Leakage level to NZS 4211.

GUARANTEE: Provide a written guarantee covering the work in this section for a period of two years from date of Practical Completion.

MATERIALS

ALUMINIUM WINDOWS AND DOORS: To comply with NZS 3504 and to have security beading

CONTRACTOR to nominate brand and type for the Employer's approval prior to acceptance of the tender. The Employer reserves the right to reject any brand and request nomination of alternatives.

ANODISED FINISH: To NZS 3503 with a minimum thickness of 12.5 microns Colour to match approved sample.

ORGANIC POWDER COATING FINISH: To BS 6496 and AAA specification with a minimum thickness of 40 microns. Use polyester powders capable of in-situ re-coating All finished surfaces to show uniformity of gloss and colour (to match approved sample) free of all painting defects.

SHEET GLASS: To be OQ and in thickness to suit sash and light size.

PATTERNED GLASS: Where located on the drawings with cast pattern on inside face.

SEALANT: To manufacturer's recommendation.

WORKMANSHIP

GENERALLY: Workmanship to be in accordance with best trade practice and properties to requirements of NZS 4211

AVOID DISTORTION of components during transit, handling and storage. Prevent pre-finished surfaces from rubbing together. Prevent contact with mud, plaster and cement. Do not deliver to site any components which cannot be immediately unloaded into suitable conditions of storage.

CORROSION PROTECTION: Before fixing, apply suitable barriers of bituminous coatings, slips or underlays between dissimilar metals in contact or aluminium in contact with concrete.

FLASHINGS: Install flashings to heads, jambs and sills of frames as supplied and recommended by the window manufacturer, and as detailed on the drawings. Head flashings finished to match windows.

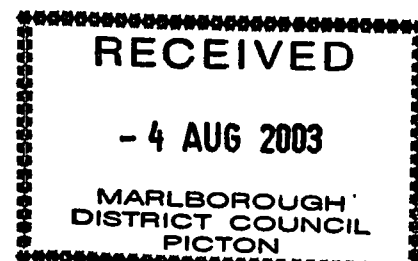
FIX FRAMES: Rigidly fix in place without distortion to manufacturer's and Aluminium Window Handbook recommendations plumb, true to line and face, weathertight and with all openings operating freely.

SEAL FRAMES to adjoining structure where necessary as recommended by manufacturer to make weathertight.

RETAIN PROTECTIVE COVERINGS and coatings in place during fixing wherever possible. Provide additional protection as necessary to prevent marking of surfaces which will be visible in completed work. Keep paper and cardboard wrappings on aluminium components dry Remove protection on completion unless designed to remain in place.

COMPLETION

ON COMPLETION, remove temporary protection and thoroughly clean down both sides of all aluminium and glass, using method recommended by the manufacturer. Protect glass from damage by crossing clearly visible tape between jamb liners and clear of the glass.



PLASTERBOARD LININGS

SCOPE: This section deals with the supply, fixing and stopping of plasterboard sheets and accessories to walls and ceilings as shown on the drawings.

NZ BUILDING CODE: Refer to the following NZ Building Code clauses and Approved Document paragraphs for the criteria and/or methods that must be used in this section to establish compliance with the Code.

E3/AS1 Internal Moisture
3.1 Lining Materials

DOCUMENTS referred to in this section are:

NZS 3604 Light timber frame buildings not requiring specific design.
ISO 6308 Gypsum plasterboard
ASTM C630.78 Water resistant backing board
Interior Systems Association document : Levels of finish.

Documents listed above and cited in the clauses which follow are deemed to form part of this specification. However this specification takes precedence in the event of it being of a higher standard than the cited documents.

LEVELS OF FINISH: Provide levels of finish to standards laid down by Interior Systems Association document as follows: Confirm with Owner for level of finish.

Level 3: surfaces receiving heavy/medium texture finishes
Level 4: surfaces receiving light texture/wall covering finishes
Level 5: surfaces receiving thin coating finishes.

MATERIALS

EXTERNAL ANGLE: Slim type 0.5 mm galvanised steel.
CASING BEAD: Slim type 0.5 galvanised steel/pvc.
CORNICE: Refer to drawings for scotia or Owner to confirm scotia type.
STANDARD SHEET: Plasterboard 9.5 and 12.5 mm thick, tapered edge, to ISO 6308.
BRACING SHEET: High density plasterboard 9.5 mm thick, tapered edge, to ISO 6308.
WATER RESISTANT SHEET: Modified plasterboard 9.5mm thick, tapered edge to ASTM C630.78 with filler sealant and pre-formed metallic skirting to manufacturer's recommendation.
FOIL FACED SHEET: Plasterboard 9.5 mm thick, tapered edge, to ISO 6308 with one side covered with aluminium foil
NAILS/SCREWS to board manufacturers recommendation.
JOINTING: Compound and tape to board manufacturer's recommendation.
ADHESIVE: Multi-purpose water based wallboard adhesive.

WORKMANSHIP

SUB-STRATE: To NZS 3604 and standard required by manufacturer's recommendations. Starting work implies acceptance by the sub-contractor.

PROTECT all joinery, fittings and finishes already in place from water staining or damage. Make good immediately any damage that occurs as directed by Architect.

LEVELS OF FINISH: Before commencing work, agree with the architect, contractor and Owners, upon the surface finish assessment procedures necessary to ensure that the levels of finish specified are obtained.

LINE CEILINGS generally with 12.5 mm thick sheets (or as shown on the drawings)and fasten with adhesive/screw system to manufacturer's recommendation.

LINE WALLS that are up to 2400 mm high by the horizontal method and walls above 2400 mm high by the vertical method with 10 mm thick sheets and fasten with adhesive/nail system to manufacturer's recommendations.

LINE WET AREA WALLS with 10mm water resistant sheet using adhesive/nail fixing to studs at centres all to suit the surface finish and to manufacturer's details. Seal all edge joints. Fit metal skirting to detail.

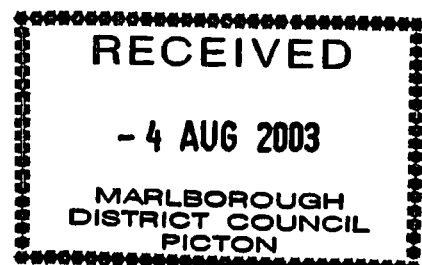
BRACING PANELS/SYSTEMS: Form using high density sheet fixed with clout-washers and clouts to manufacturer's details. For panels strap sub-strate and for systems diagonal brace to appendices K 4 and K.2 NZS 3604

EXTERNAL ANGLES: Fix full length to all external corners with clouts at 100 mm each side staggered.

CORNICE: Fix with adhesive and all joints scribe fitted to manufacturer's recommendations.

JOINTS: Fill recess with bedding compound, centre the tape, apply second coat of bedding compound followed by a coat of finishing compound, allow to dry and lightly sand off, all to manufacturer's recommendations.

STOPPING: Fill nail holes and flush up external angles with two successive coats of bedding compound followed by a coat of finishing compound, allow to dry and lightly sand off, all to manufacturer's recommendations.



TEXTURED POLYSTYRENE CLADDING

This section deals with the supply and fixing of a textured insulated exterior wall cladding system to timber/metal framing or brick/masonry/concrete sub-strates.

SCOPE _____

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

E2/AS1	Exterior moisture 2.0 Walls
E3/AS1	Internal moisture 1.0 Prevention of fungal growth.

DOCUMENTS which relate to this section are:

NZS 2295	Building papers (breather type).
NZS 3103	Sands for mortars and internal and external plasters.
NZS 3121	Water and aggregate for concrete.
NZS 3122	Portland cement (ordinary, rapid-hardening and modified)
NZS 3604	Light timber frame buildings not requiring specific design.
NZS 4218P	Minimal thermal insulation requirements for residential buildings.
BS 890	Building limes.
AS 1366	Pt 3 Rigid cellular polystyrene.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition, including amendments at the time of tender. However this specification takes precedence when it is of a higher standard than the cited document.

APPLICATOR: Must be contractors licensed by the selected systems manufacturer to fix and apply the exterior wall cladding system.

GUARANTEE this work under normal conditions of use against failure of

- material for 10 years and
- workmanship for 3 years from date of practical completion

with a joint written warranty by both systems supplier and applicator.
Make out in Employer's name and supply to contractor at that date

MATERIALS

FLEXIBLE SHEET

BUILDING PAPER: To NZS 2295. Breather type - minimum of 500 g/square metre. Lap joins 75 mm.

REINFORCING MESH: Alkali-resistant fibreglass woven mesh.

RIGID SHEETS

PLASTERBOARD SHEET: Formed of a gypsum plaster core encased in a durable face and backing paper.

INSULATING BOARD. Rigid cellular polystyrene made from fire-retardant virgin beads to AS 1366 Pt 3

Brand _____

Density _____ kg/cubic metre

Thickness _____ mm

COATING WORK

PAINT: 100% acrylic latex house paint compatible with cement based plaster.

COMPONENTS

NAILS: Non-rusting in accordance with systems manufacturer fasteners guide.

FORMLESS WORK

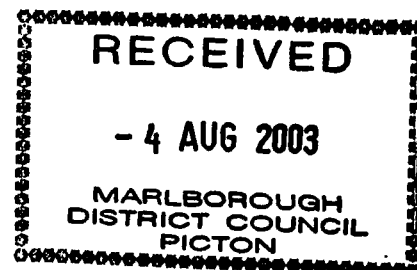
ADHESIVE: Solvent-based synthetic rubber construction adhesive.

BONDING COMPOUND Plaster mix containing glass fibres, portland cement, sand, lime and other admixtures.

PLASTER: Factory-mixed plaster coating containing portland cement, sand, lime and other admixtures.

PRIMER ADHESIVE: Factory-mixed 100% acrylic based wet product. Add 50% by volume, portland cement on site with just sufficient water to keep it workable. Do not retemper.

SYNTHETIC COATING: Factory-mixed 100% acrylic based wet product containing the texture aggregate.



SEALANTS: Neutral cure silicone in accordance with systems manufacturer guide and set against backer rods where necessary.

WORKMANSHIP

STORAGE: Deliver all materials in original unopened packaging with labels intact. Provide dry storage on site, stack carefully, protect from mechanical damage. Do not store insulating boards or pvc beads in direct sunlight.

SAMPLE PANEL: Submit one 600 mm x 600 mm sample of the selected system of each finish texture and colour for approval by the Owner.

PROTECT all existing work and approaches with boards, dust sheets and the like. All droppings onto finished work to be cleaned off immediately.

DO NOT BEGIN application until all required openings, and apertures have been cut pipes, fixtures, fixing pads and plugs have been fixed flashings and other preparation are complete.

DETAILING as shown by the systems manufacturer must be adhered to and carried out to a high standard of workmanship to ensure that water does not penetrate.

BACKGROUND PREPARATION

FRAMING: To standard required by system manufacturers directions. Plumb, level, in true alignment and to relevant building codes and regulations.

CONCRETE AND MASONRY: To have no deviation more than 6 mm from a straight edge 1200 mm long. Abrupt deviations not accepted.

OVERCLADDING: Check existing background for and make good any deterioration or borer insect infestation to same to ensure the original cladding is sound and weathertight.

CLEANING: Remove all oils, growths, dirt and loose flaking paint to leave background to be covered dust free and clean.

ACCEPTANCE OF BACKGROUNDS: Commencement of work indicates acceptance by the applicator of preceding work as a satisfactory background.

INSTALLATION

BUILDING PAPER: Fix to framing with laps and fixing to manufacturer's instructions.

PLASTERBOARD: Line exterior of walls with the various sheets, fixed to manufacturer's details and instructions.

PLASTERBOARD, FIRE RATED: Line exterior of walls with sheets fixed to NZMP 9 fire rated system requirements.

INSULATING BOARD, NAILED: Butt-joint, stagger joints, continuously support all edges and nail with heads flush, the polystyrene board to systems manufacturer details.

INSULATING BOARD, BONDED: Apply bonding coat and then butt joint, stagger joints and fix polystyrene board to systems manufacturer detail.

INSULATING BOARD, ADHERED: Apply primer-adhesive and then butt joint, stagger joints, and fix polystyrene to systems manufacturer details. Prime brick, block or concrete sub-strates before application of primer-adhesive.

EXPANSION JOINTS: Incorporate in accordance with design information supplied by manufacturer. Joints to be horizontal or vertical to standard details and fully supported. Architect to agree to locations before work commences.

CORNER BEADS: Using adhesive, fit beads and channels to manufacturers instructions.

SYNTHETIC PLASTER FINISH: Embed reinforcing mesh in primer-adhesive coating to face of insulating board. Follow with application of synthetic-coating of selected texture and colour. All to manufacturer's recommended techniques and thicknesses.

CEMENT PLASTER FINISH: Apply a base plaster coat 2 to 3mm thick and embed the reinforcing mesh in it while still plastic. Before the base coat dries apply a 1 mm minimum thick second coat of selected texture. All to manufacturer's recommended techniques.

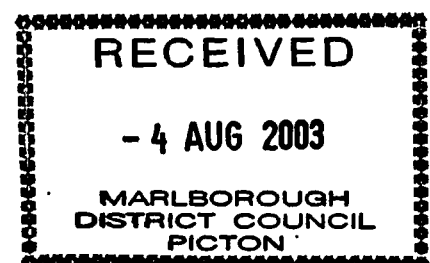
Keep moist for 5 hours from time of initial set.

PAINT FINISH: As soon as the cement plaster finish is dry enough to accept it apply 3 coats of paint to manufacturer's instructions. Do not dilute first coat.

COMPLETION

GENERALLY At completion, clean down all work and all adjoining surfaces and floors. Take away from the site all material not used and all trade rubbish.

FINAL INSPECTION by the manufacturer or authorised applicator of the entire finished contract to take place 28 days after completion and any defects or subsequent damage made good to satisfaction of Architect.



PRESSED METAL ROOFING TILES

This section deals with proprietary interlocking pressed metal roofing tiles complete with underlay, battens and accessories as a new roof.

GENERAL

For flashings refer to Section M21 Sheet Metalwork rainwater disposal
Section 522 Rainwater pipework/gutters

REFER to PRELIMINARIES and GENERAL for items affecting this section.

NZ BUILDING CODE: Follow the Approved Documents with regard to the criteria and/or methods that must be used in this section to establish compliance with the Code.

E2/AS1 External moisture
1.0 Roofs

DOCUMENTS which relate to this section are:

NZS 2295 Building papers (breather type).
NZS 3604 Light timber frame buildings not requiring specific design.
NZMP3640 Minimum requirements of NZ Timber Preservation Council.
NZS 4217 Pressed metal tile roofs - Part 1 Roofing tiles and accessories - Part 2 Preparation of the structure and the laying and fixing of metal roofing tiles.
NZS 4203 General structural design and design loadings for buildings.

Documents listed above and cited in the following clauses are part of this specification and are the latest edition including amendments at the time of tender. However this specification takes precedence when it is of a higher standard than the cited document.

TILER QUALIFICATION: Carry out all tiling work with experienced competent tradesmen familiar with the materials and techniques specified.

GUARANTEE this work under conditions of normal use against failure of

- weatherproofing for 25 years
 - chip/coating for 15 years pro rata or
 - paint surface for 10 years pro rata and
 - workmanship for 3 years from the date of practical completion.
- Make out in the employer's name and give to contractor before the end of that period

STANDARD OF PERFORMANCE: Design and use the tile fixing appropriate for the wind zone (R) and topographical classification (T) of this site and building height as required by NZS 3604 and the wind loads on various roof areas as given by NZS 4203.

MATERIALS

TIMBER BATTENS: Radiata pine No 1 framing, treated H11 50 x 40mm for spans up to 900mm.

FLEXIBLE SHEET

BUILDING PAPER: Light weight self-supporting breather type flame-proof kraft paper laminates to NZS 2295

SHEET OVERLAP TILES

PRESSED METAL TILES: To NZS 4217, Part 1.

ACCESSORIES

NAILS: Hot dipped galvanised steel flat head 50 x 2.8mm nails

COMPONENTS: Use ridge and hip caps, barge covers, general purpose lead-edged flashings and side flashings supplied by the manufacturer as part of the selected tile roofing system.

WORKMANSHIP

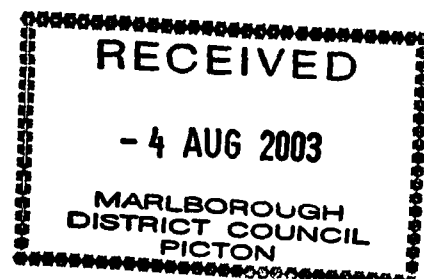
INSPECTION: Inspect the roof framing and supporting structure to ensure that it is complete and fully braced ready for tiling. Do not start work until the main contractor has completed to the requirements of NZS 3604.

ATTENDANCE: Do not start work until the main contractor has properly provided and fitted all valley boards and gutters, fascias, spoutings, bargeboards, hips, ridges and flashings as required and detailed to suit the roof system and the manufacturer's recommendations.

STORAGE: Stack on a level hard base, ventilated and protected from damage and weather.

HANDLING: Unload and handle tiles without soiling, scratching, crushing or other damage.

COMPLY with the laying and fixing requirements of NZS 4217 Part 2 or the manufacturer's recommendation where these differ.



PREPARATION

GENERAL: Carefully set out the roof with a measuring rod to position the battens accurately taking account of rafter lengths, overhangs into gutters and spoutings and verge overhangs all to minimise tile cutting.

UNDERLAY: Lay building paper, drawn tight, over rafters from ridges and hips, over fascia into gutters and into valleys all to NZS 4217 Part 2. Fix to makers instructions, without any damage. If damaged make good with full lap inserts as the work proceeds to Architect's approval.

BATTENS: Fix battens over the underlays in straight courses spanning at least 3 rafters between fascia and ridge and elsewhere to tile manufacturer's recommended details. Nail at every crossing to requirements of NZS 4217 Table 1. Square cut ends to form butt joint over rafters with joints staggered

TILE INSTALLATION

LAYING: Do not take heavy equipment onto roof. Plan work to minimise foot traffic. Work on roof using appropriate footwear. Interlock, lap and lay to manufacturer's "manual" and finish to ridge, hip, valley, barge and eaves recommended details if not detailed elsewhere.

NAILING: Nail tiles to battens generally through upstand and downturn of the tile lap and all components to manufacturer's "manual" details and to nail size, type and spacing in NZS 4217 Part 2 Table 5. Fit neoprene washers under vertical nails for smooth-coated tiles.

CUTTING AND BENDING: Cut, bend and straighten tiles neatly to finish true to line and plane when in place using installation equipment maintained in first class condition all to NZS 4217 and as recommended by the manufacturer.

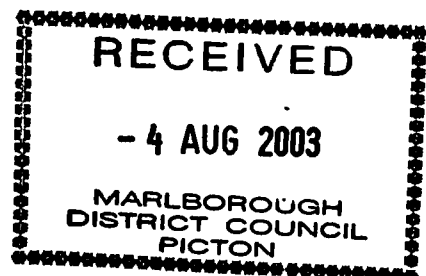
ACCESSORIES: Cut, fit and fix components true to line and plane to manufacturers "manual" details if not detailed elsewhere.

PENETRATIONS: Cut tiles for penetrations to provide upstands to NZS 4217 and for flashing in lead under Metalwork.

COMPLETION

MAKE GOOD any damage to underlay and replace any damaged or flattened tiles. Seal vertical nails and touch up where necessary all chip coatings with manufacturers "finishing kit".

CLEAN UP: Remove all trade rubbish from all of the roof, gutters, valleys and other areas to leave the roof clean, sound and weatherproof. Put all trade rubbish into one place on the site where directed.



ecogent

ENVIRONMENTAL ENGINEERING SOLUTIONS

28 July, 2003

Our Ref#:eco078-04

C&S Contractors
452 Old Renwick Rd
RD2
Blenheim

Attn: **Cliff**

Dear Cliff

Re: **Ecowaste Wastewater Treatment System – PRODUCER STATEMENT**

The Ecowaste system has been designed by Registered Engineers in accordance with ARC TP58 and the treatment area is sized in line with the requirements for permitted activities for sewage treatment and disposal.

Ecowaste system components include:

- 3000 litre septic tank with Ecotube outlet filter
- 3000 litre aerated Ecowaste treatment plant with Biopac treatment media.
- 200 lineal meters of Pressure compensating Wasteflow drip irrigation. Wasteflow incorporates bactericide lining in the pipe and root inhibitors in the dripper to give longer term protection against field failure than normal irrigation pipe.

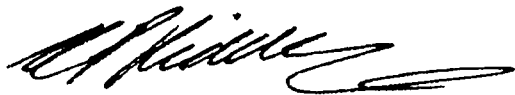
The Wasteflow subsurface disposal pipe is designed specifically for Wastewater irrigation below ground to provide adequate public health protection and incorporates a herbicide in the drippers to stop roots entering and blocking the disposal system. Subsurface disposal through small diameter outlets will ensure that the wastewater is applied to the soil in small doses and will be well distributed which will afford a high level of treatment to the effluent.

The Ecowaste treatment unit will reduce suspended solids and BOD to treatment levels ideally suitable for subsurface disposal. The treatment system incorporates a high level alarm to warn of high water levels typically caused by either irrigation pump malfunction, irrigation filter blockage or entry of external stormwater into the system.

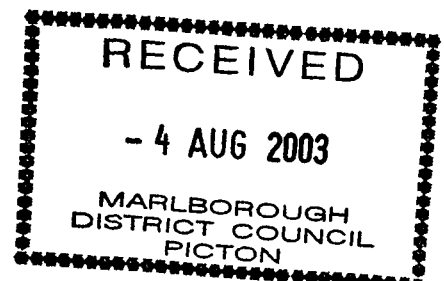
Please find enclosed supporting information on the Ecowaste wastewater treatment system:

- Ecowaste brochure
- Ecowaste process description
- Ecowaste specifications
- Sample Ecowaste commissioning report
- Wasteflow specialised wastewater dripline brochure

Sincerely,



ECOAGENT LTD
Matt Riddell,
Engineer



ecogent

ENVIRONMENTAL ENGINEERING SOLUTIONS

452 C. D. R. W. T. P.
R. D. J. E. H. M. A.
PHONE (09) 579-1080
CELL 021 111 1111

ECOWASTE PROCESS DESCRIPTION

Treatment

The Ecowaste is a package aerated treatment plant designed for typical households. Wastewater is treated anaerobically by the first stage septic tank. Wastewater then passes through a septic tank effluent filter into the core aerobic treatment tank.

The aerobic treatment tank has 2m³ storage volume with 0.25m³ of NSW Biopac treatment media. The treatment media has a greater than 95% open area to avoid clogging and large surface area to allow treatment microorganisms to adhere and grow. Aerated water is circulated through media to maintain intimate contact between wastewater, microorganisms and oxygen supply. Typical recycle rate is 10:1. System is characterised by very low sludge production and ability to be easily adjusted to suit low flow or high load situations.

Aeration is provided by a 380 watt Grundfos submersible pump and high efficiency Mazzei aerators which dissolve oxygen prior to circulating the flow through the media. The aerator is timer controlled and aeration time can be minimised for periods of inoccupation or low use or increased to deal with temporary increases in wastewater loading. Settled treated wastewater flows to the irrigation chamber through a vertical corrugated plate clarifier, which utilises Dura-Pac media from NSW Environmental. The clarifier reduces suspended solids loads and continues the wastewater treatment process.

The treated wastewater is then pumped to the disposal field via a float controlled irrigation pump. The pumped irrigation water is filtered, for added protection of the disposal field, through a 150 micron spin clean screen filter. If water level rises in the pump chamber due to pump failure or filter blockage a float will operate a visual alarm at the control board. There is a minimum 24 hour emergency storage but in most circumstances there is significantly more time available to remedy any malfunctions.

Disposal

The disposal field utilises Wasteflow disposal pipe. Wasteflow is a flexible polyethylene dripline with pressure compensating turbulent flow emitters regularly spaced along the line. With the dripline typically hidden 50-150mm below the ground, effluent is distributed slowly and uniformly, reducing ponding, even in difficult soils and hilly terrain.

Subsurface disposal of the treated wastewater is essential because domestic wastewater treatment plants do not eliminate disease causing organisms and hence the use of long life subsurface disposal systems is important to protect public health and the environment.

Wasteflow is specifically designed for wastewater disposal and is built to last. The emitters are protected against root intrusion by the Rootguard[®] patented process, and the dripline wall is protected from organic growth with a bactericide lining.

The rampant growth of roots (Kikuya, Willow etc) is a major problem for blockages of drains and irrigation pipe. Wasteflow has a 15 year warrantee against failure due to root blockage. Other advantages are its bactericide lining to stop ongoing slime growth and its strong construction.

Reliability

The Ecowaste is noted for its simplicity with an aeration pump and irrigation pump each with its own integrated float switch. A third float switch activates the high level alarm. The system has a low power usage.

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PO Box 56-144, Mission Bay Auckland
31 Cain Rd, Penrose
Phone (09) 579-1080
Fax (09) 579-1090

ecogent

ENVIRONMENTAL ENGINEERING SOLUTIONS

ECOWASTE SPECIFICATIONS

Septic Tank	Variable according to number of bedrooms and pump out frequency that is acceptable to the owner. Sizes range from 1.5 ³ to 5m ³ .
Septic Tank Effluent Filter	Patented twin screen, 2.5mm opening size filter with flow modulation. Cleaning frequency typically 3 years but easily removed and washed during maintenance without needing to remove any pumps.
Ecowaste Treatment Unit	3m ³ concrete tank, twin concrete risers and lids. Three days detention at 1m ³ /day. Aerated water flow 4,500 litres per hour. Normal power consumption 1 – 2 kW hours/day depending on effluent loading.
Ecowaste Treatment Media	Aerobic treatment in the Ecowaste is supported on 0.25m ³ of submerged media. The media is specialised 'BioPac' from NSW Environmental. BioPac has a high surface area and high open flow area to provide complete mixing in the reactor and high treatment efficiency.
Aeration	Aeration is provided by a timer controlled 380 watt Grundfos KPC 300 running through a high efficiency Mazzei venturi air injector.
Clarifier	Vertical corrugated PVC plate clarifier utilising of NSW Environmental Durapac media
Maximum Treatment Capacity	Long term capacity up to 2m ³ /day (limited by Council permit and disposal field size). However the modular Ecowaste concept easily allows systems with additional capacity to be designed.
Disposal Field	Wasteflow pressure compensating emitters from Geoflow Inc. The emitters are Rootguard protected for root intrusion control and bactericide lined pipe for slime control. Wasteflow dripper spacing 600mm. Dripper flow 2 or 4 litres per hour. Installation depth within topsoil 50 to 100mm. Field flush line returned to treatment tank or in a dedicated soak hole. Air valve inside irrigation chamber or at high point in disposal field.
Irrigation Pump	Spring 80 (750 watt) delivers 23m head @ 16 litres/minute* or Spring 100 (900 watt) delivers 33m head @ 16 litres/minute* *16 litres/minute is the standard flow rate allowed by the disposal field
Irrigation Filter	Plastic 'Spin Clean' filter from Agricultural Products Inc with 150 micron screen filter.
Control Box	Control boxes are custom built in New Zealand. They are IP65 rated and house circuit breakers for the aerator pump, irrigation pump and high level alarm float. The control box also houses the main isolating switch, high level alarm light, aeration pump timer and timer by pass switch.
Treatment Standards	The treatment parameters for the domestic ecowaste unit are 25ppm BOD and TSS. If required the Ecowaste can be constructed for larger flows and/or higher treatment standards. Within 300mm of the Wasteflow emitters in the topsoil layer effluent standards are typically better than 5ppm BOD and SS.

Note: As part of an ongoing process improvement program specifications may change.
This specification is dated May 2003

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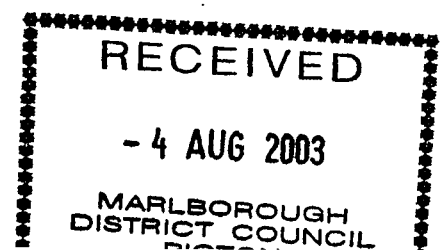
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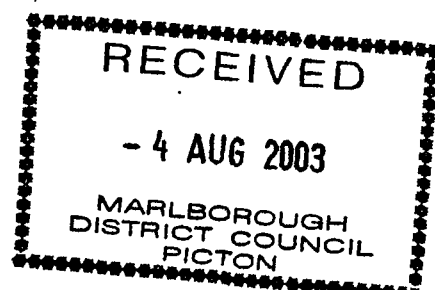
ECOWASTE™

Wastewater Treatment and Disposal System



CONTENTS

- WHY USE AN ECOWASTE™ SYSTEM ?
- HOW THE ECOWASTE™ WORKS
- SATISFACTORY OPERATION OF THE ECOWASTE SYSTEM
- HOW THE WASTEFLOW DISPOSAL SYSTEM WORKS
- ECOWASTE™ DIAGRAM
- ECOWASTE™ BROCHURE
- WASTEFLOW™ BROCHURE
- ECOWASTE™ INSTALLATION PHOTOGRAPHS
- THE ADVANTAGES OF WASTEFLOW™
- ECOWASTE™ MAINTENANCE
- ECOWASTE™ DAY TO DAY OPERATION
- DO'S AND DON'TS
- COMPONENT BROCHURES



Why use an Ecowaste™ System ?

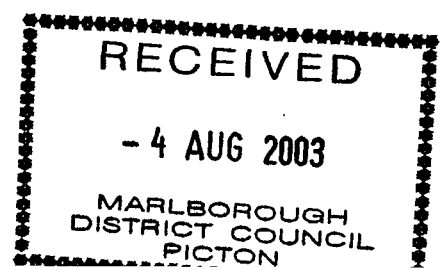
Because Councils do not allow septic tanks on sites with:

- Small land area or
- Poor drainage or
- Shallow groundwater or
- Flooding problems or
- Waterways close by

The Ecowaste solves these problems by treating the wastewater and disposing of it over a controlled area through Wasteflow disposal pipe.

How the Ecowaste™ Works

- It settles effluent in a septic tank
- Only filtered wastewater enters the treatment unit
- It then aerates the effluent by cycling effluent and air through media on which microbiology lives and feeds on pollutants in the wastewater
- It then settles the aerated effluent
- It filters and pumps the treated effluent to a Wasteflow™ subsurface disposal field



Satisfactory Operation of the Ecowaste™ System

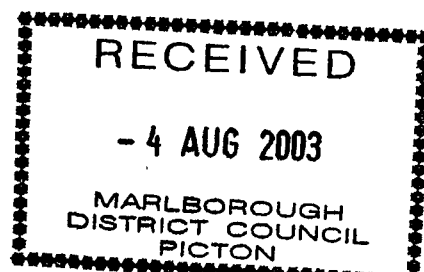
To ensure trouble free performance requires a joint effort between:

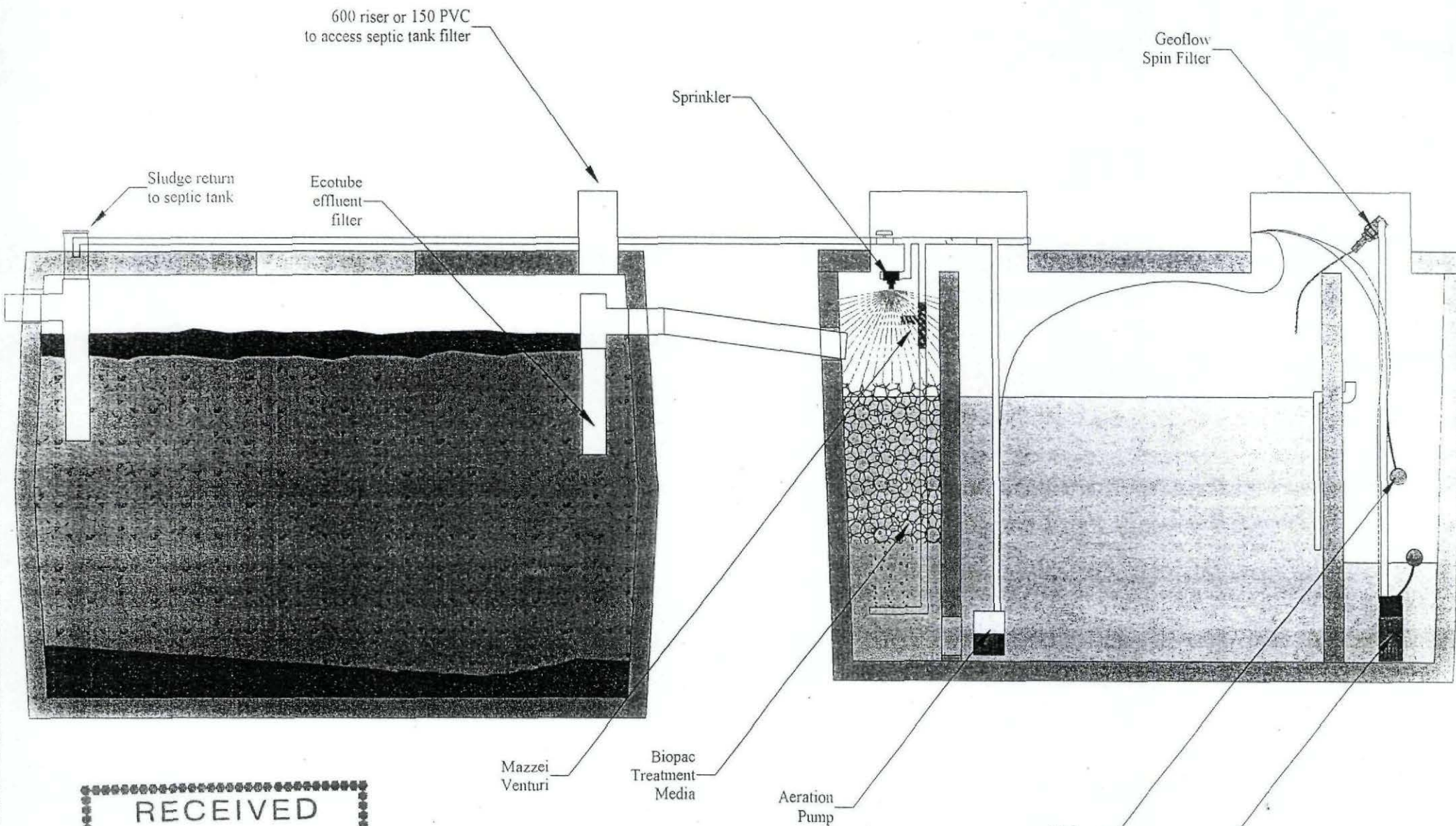
- Design engineer
- Manufacturer
- Installer
- Maintenance Contractor
- Owner

Council requires regular reports from the maintenance contractor to confirm maintenance has been undertaken

How the Wasteflow Disposal System Works

- A typical household field has 250 outlets which each emit the same volume of water (4 litres per hour)
- It is buried between 50 and 150mm into the organic topsoil where soil micro-organisms treat the wastewater to a high standard
- Wastewater is emitted in several pulses each day (usually 3 to 5 times) to maximise treatment
- Wasteflow emitters have a herbicide incorporated to stop roots growing in and blocking the pipe
- Wasteflow pipe has a (green) bactericide lining to reduce slime growth in the pipe
- The irrigation system includes a return line that allows the Wasteflow pipe to be regularly flushed back into the tank
- Wasteflow can be installed in bush, ornamental gardens, pasture or lawn. On lawns care needs to be taken to ensure good distribution and drainage.





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ECOWASTE UNIT MANUFACTURED BY SUBSURFACE TECHNOLOGIES

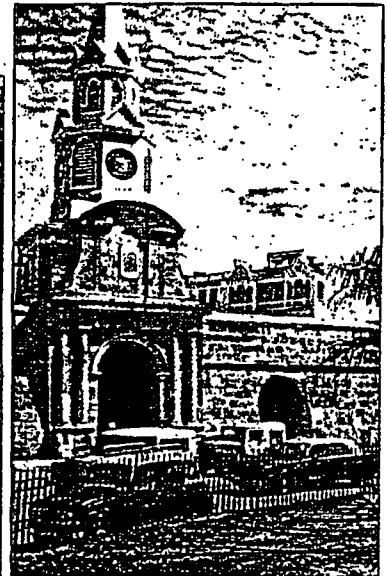
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WASTEFLOW™

DRIPLINE FOR SUBSURFACE WASTEWATER DISPOSAL



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GEOFLOW, Inc.

WASTEFLOWTM

- Flexible emitterline for subsurface treated wastewater disposal.
- Guaranteed root intrusion protection plus bactericide.

CHARACTERISTICS

Reliable and economic.

The low cost of the system and low cost of installation make it possible to cover large areas or have backup fields without incurring high costs.

No ponding, surfacing or deep percolation.

Effluent is uniformly distributed over the entire area using low flow rate, uniformly spaced emitters. Water is slowly applied at each individual point, enabling the water to move laterally through capillary action, reducing percolation.

Flexible and easy to install.

A small vibratory plow or trencher is all that is required to install several thousand feet of tubing.

Easy to design.

The flow characteristics of the emitters and the uniform water distribution make it very easy to design a safe and reliable system.

Resistant to plugging.

Wasteflow has the largest flow orifices on the market. The turbulent flow design keeps fine particles in suspension, and the raised entry ports into the emitter reduce the risk of solids plugging the emitter flow path.

Can be used for irrigation.

The uniform rate of application and its reliability make the system ideal for reuse in landscaping or irrigating agricultural crops.

Solves limited area and soil problems.

Can be used in smaller areas than conventional systems, or where soil type or steep slopes preclude conventional systems.

ROOTGUARD protected.

Incorporation of Treflan guarantees protection from root intrusion and assures the system a long trouble free life.

Bactericide protected.

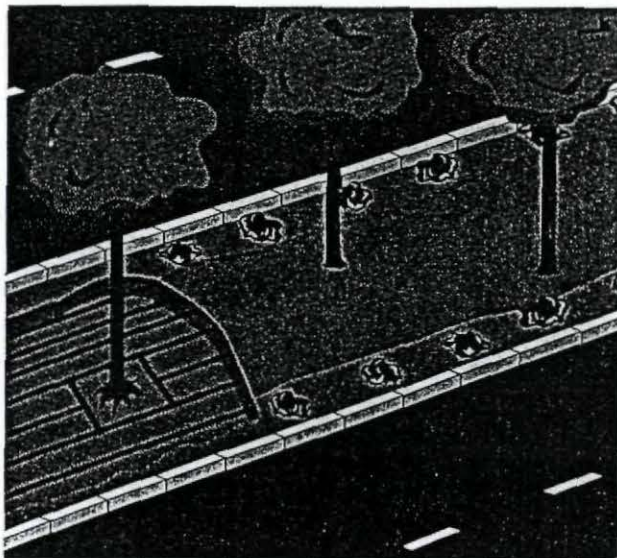
Incorporation of 10,10' oxybisphenoxarsine into the tube inhibits slime formation on the walls of the tube. This does not replace effluent pre-treatment.

Purple stripes.

3 stripes identify the Wasteflow product.

Freezing conditions.

Operating aerobic systems have shown resistance to freezing through a Wisconsin winter. In the event a system is left idle through freezing conditions Wasteflow will not crack or break.



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DESCRIPTION

The flexible polyethylene dripline has large turbulent flow emitters regularly spaced along the line. With the dripline hidden about six inches below ground, effluent is distributed slowly and uniformly, reducing ponding, even in difficult soils and hilly terrain.

Wasteflow is built to last. The emitters are protected against root intrusion by the ROOTGUARD® patented process, and the dripline wall is protected from organic growth with a bactericide lining.

Wasteflow is easily adaptable for projects ranging in size from single family homes to large multi-million gallon per day projects.

WASTEFLOW PC & WASTEFLOW CLASSIC

Wasteflow is now available with either classic turbulent flow emitters (Wasteflow Classic) or with pressure compensating emitters (Wasteflow PC).

Wasteflow dripline has precision molded, large flow path emitters inserted into 1/2" tubing every 2ft. The standard nominal flow rate per emitter is 1GPH. The standard spacing for effluent disposal is 24 X 24 inches. Different flow rates, tube diameters and spacings are available against special order. The 1/2" tubing presents a smooth exterior for easy insertion into the ground. Use CA600 compression adapters to connect the dripline to PVC pipe.

Wasteflow Classic				
Pressure	WF16-4-12 12" emitter spacing		WF16-4-24 24" emitter spacing	
	Max. Length of Run vs. Pressure	Flow Rate vs Pressure	Max. Length of Run vs. Pressure	Flow Rate vs. Pressure
10 psi	130ft.	0.93 gph	210 ft.	0.93 gph
15 psi	130 ft.	1.13 gph	210 ft.	1.13 gph
25 psi	130 ft.	1.49 gph	210 ft.	1.49 gph
30 psi	130 ft.	1.64 gph	210 ft.	1.64 gph
Wasteflow PC				
Pressure	WFPC16-2-12 12" emitter spacing		WFPC16-4-24 24" emitter spacing	
	Max. Length of Run vs. Pressure	Flow Rate vs Pressure	Max. Length of Run vs. Pressure	Flow Rate vs. Pressure
15 psi	174 ft.	0.53 gph	211 ft.	1.02 gph
25 psi	260 ft.	0.53 gph	315 ft.	1.02 gph
35 psi	313 ft.	0.53 gph	379 ft.	1.02 gph
45 psi	354 ft.	0.53 gph	429 ft.	1.02 gph

Wasteflow is manufactured 100% in the U.S.A.

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When to use Wasteflow PC vs. Wasteflow Classic

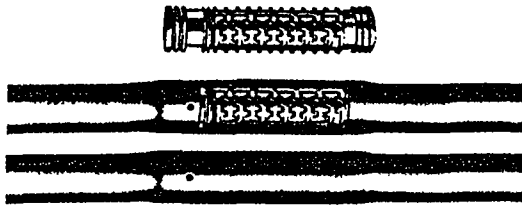
Advantages of Wasteflow PC

- Very long lateral runs are possible.
- Steep slopes require fewer pressure regulators.
- Rolling terrain. If the difference of height from trough to peak is greater than 6 foot, then Wasteflow PC is justified. Vacuum relief valves must be placed at the top of each rise.

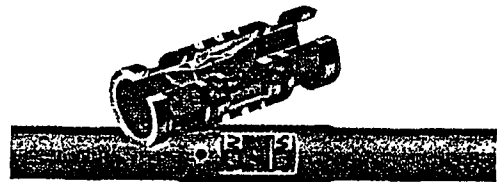
Disadvantages of Wasteflow PC

- More expensive.
- Contains a silicon rubber diaphragm which may not last as long as the plastic components.
- Systems with large elevation changes that are not designed very carefully are prone to the creation of vacuum upon shut down, causing soil ingestion. The dirt may lodge permanently under the diaphragm.

Geoflow, Inc. recommends that Wasteflow PC only be used when the advantages are of substantial economic value.



Wasteflow Classic



Wasteflow PC

THE ROOTGUARD® ADVANTAGE

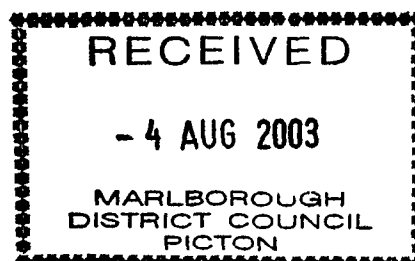
ROOTGUARD® is the key to Wasteflow's success below ground. ROOTGUARD technology combines Treflan® in the drip emitter to inhibit root growth. The herbicide is released at a uniform rate, maintaining sufficient concentration in the soil immediately surrounding the drip outlet to prevent longitudinal root growth into the emitter. ROOTGUARD life is a function of the mean soil temperature. The system is guaranteed not to fail due to root intrusion for 10 years, with an expected life of 20 years. Please read the limited warranty in our design and installation manual.

- For more detailed information on this application, phone: 1-800-828-3388 and request Geoflow's Design and Installation Manual for Onsite Wastewater Disposal or check your website at www.rootguard-geoflow.com.
- Wasteflow is only guaranteed when used with NSF Class I aeration treatment plants as tested by ANSI certified laboratory, or sand filters designed to meet EPA criteria, or treatment plants designed by a professional engineer.

Wasteflow is manufactured under U.S. patents 5 332 160, 5 116 414 & foreign equivalents
ROOTGUARD® is a registered trademark of A.I. Innovations
Treflan® is a registered trade-mark of DowElanco.

GEOFLOW, INC.

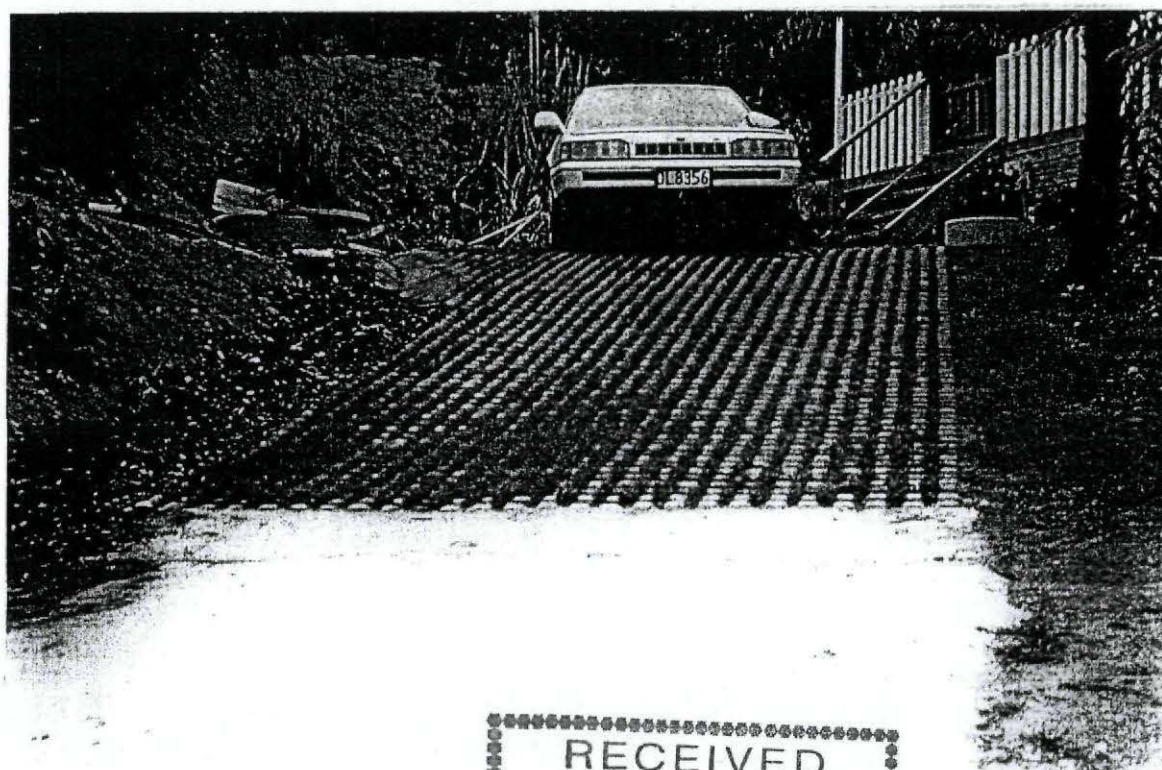
200 Gate 5 Road, #101
Sausalito, California 94965
800-828-3388 / 415-331-0166





Wasteflow™ buried under gardens and lawn

Wasteflow™ buried under Gobi Block™ driveway



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The Advantages of Wasteflow

It is the only system available manufacture for wastewater disposal and incorporating:

- Herbicide based protection against blockage from root intrusion.
- An inner lining of bactericide to reduce bacterial growth in the pipe.
- An external colour code to identify is as a wastewater pipe.

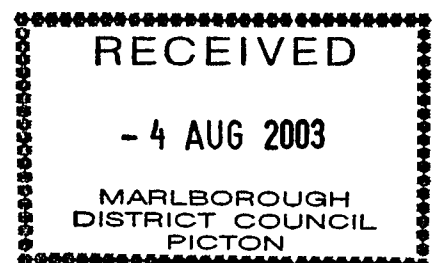
Ecowaste™ Maintenance

The crucial maintenance items are:

- Keep the filter clean
 - Replace with clean filter every 3 to 6 months depending on system biology
 - Wash old filter in chlorine solution over night. Rewash in clean water.
 - Make sure filter is installed without damaging screen (Nozzles face up into body use vaseline or similar on rubber end strips if screen is difficult to insert.)

Note: When systems first start up blockages may be more frequent. Ideally filters should also be checked and cleaned within the first month

- Flush irrigation field
 - On every three monthly visit activate the irrigation pump (use garden hose if necessary) and flush until clean water discharges
 - Observe operation of air valve. If not operating unscrew and clean it
- Clean irrigation field with chlorine



■ Transfer solids to septic tank

- Every three months open the transfer valve to allow aerated water to transfer. Generally the initial water is very dark and then quickly clears. Close the valve, turn main switch off for one minute to let solids settle then repeat.

■ Observe system operation

- If there is significant surface sludge in the clarifier or pump chamber there is probably excessive aeration. Reduce aeration hours. Hose down clarifiers.
- If there is a sign of water level build up in septic tank lift out PVC filter and wash the filter clean.

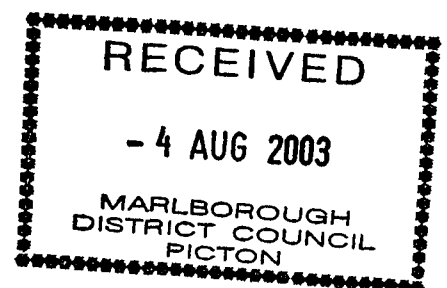
■ Check septic tank sludge levels

- Once per year use stick to determine depth of sludge. Arrange to desludge when level reaches bottom of PVC filter

■ Clear weed growth away from lids to ensure good closure

■ Inspect field for any obvious damage – walk over it at least every six months

■ Aerator pumps are supplied by Grundfos / Hiflo Pumps (09 579 6375) and irrigation pumps are supplied by Argon Industries (09 634 3415)



ECOWASTE™ - DAY TO DAY OPERATION

■ Irrigation Control

The system operates automatically with irrigation controlled by a float switch.

■ Aerator Control

The aerator is controlled by a time switch because:

- Excessive aeration wastes power
- Over aeration can cause biological sludges to float to the surface and affect settling and treatment performance and increases temperature and biological growth inside the tank

■ Time Switch Setting

For Holiday Homes

Set the timers to operate every three hours for 10 minutes. This keeps the system alive while owners are away then when they return the external (toggle) switch is turned on to run the system full time while they are in residence – and turned off when they leave.

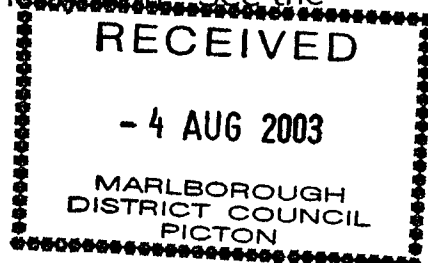
For Permanent Residences

For a household of about five people aeration for half the time i.e. two hours on two hours off is usually adequate.

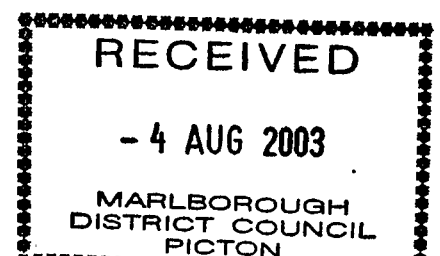
For a two person household it could be reduced to one hour on two hours off. In both cases the system can be run full time by using the external switch if required for increased occupancy over holiday periods.

■ Do not turn off the main switch on the control box when you leave the property.

■ The treatment system utilises bacteria to breakdown the organic pollution. Care must be taken to avoid tipping any chemicals into the system. See the separate sheet of do's and don'ts.



- Remember do not use the Ecowaste to dispose of chemicals, oils etc or solid materials such as vegetable scraps, nappies etc.
- Repair leaking taps, toilet cisterns. Use low flush toilets and other water savings devices and do not waste water.
- If the alarm lights up call the maintenance contractor and reduce your water use until the system is fixed.
- Look after the Wasteflow field. Remember where it is and do not dig it up. Standard 15mm hose joiners can be used to repair damage.



DO'S AND DON'TS

Do maintain the contract service arrangement offered by the installer after the initial maintenance period has expired. It is extremely important that both the treatment and disposal systems receive regular maintenance.

Do keep your system accessible for inspections and pumping, yet protected from unauthorised entrance. If access to your system is locked, make sure that your service contractor has a key.

Do call your installer whenever you experience problems with your system, whenever the alarm is activated, or whenever there are any signs of system failure.

Do keep records about your Ecowaste treatment system, including a map of where the Wasteflow disposal field is installed and general information, such as date installed, contract service agreement, records of service visits, and maintenance performed.

Do conserve water to avoid overloading the system. Be sure to repair any leaky taps or toilets.

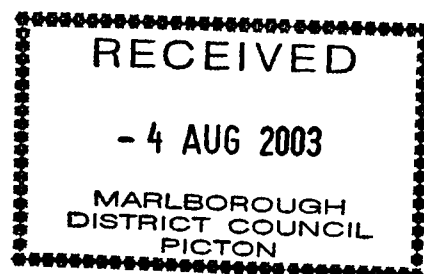
Do divert other sources of water, like roof drains, external stormwater or flooding, house drains including foundation drains, and sump pumps away from the treatment system.

Do use environmentally friendly detergents such as Down to Earth and keep to the recommended dosages.

Do become familiar with how your own particular system operates, and the way it looks, sounds, and smells when it is working correctly. This way, you may be able to identify problems before they become serious and alert your service provider to anything unusual.

Do be sure to ask your installer questions about how to know if your unit is malfunctioning.

Do practise water conservation. By reducing the amount of water used the life of the system may be increased and power consumption reduced and the disposal bed maintained in its best condition.



Don't allow anyone to drive over or park on any part of the system. (Unless part of the disposal field is installed beneath Gobi Block paving.)

Don't make or allow unauthorised repairs or changes to your treatment and disposal system without obtaining the required Council permits and advising the installer.

Don't use your toilet as a solid waste disposal system or poison your treatment system or the disposal area by pouring harmful chemicals down the drain. Harsh chemicals can kill the beneficial bacteria that treat your wastewater. Material that should not be in the toilet system includes:

<i>Coffee grounds</i>	<i>Dental floss</i>	<i>Disposable diapers</i>
<i>Sanitary napkins</i>	<i>Tampons</i>	<i>Cigarette butts</i>
<i>Condoms</i>	<i>Gauze bandages</i>	<i>Fat, grease or oil</i>
<i>Paper towels</i>	<i>Household bleaches</i>	<i>Commercial bleaches</i>

and never flush chemicals, such as:

<i>Paints</i>	<i>Varnishes</i>	<i>Thinners</i>
<i>Waste Oils</i>	<i>Photographic Solutions</i>	<i>Pesticides</i>

These items can overtax or destroy the biological digestion taking place within your system and reduce its ability to treat your wastewater.

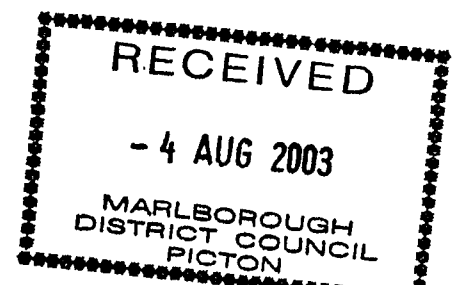
Don't increase the permanent accommodation connected to the treatment unit without obtaining approval from the Ecowaste installer and the Council.

Don't connect stormwater drains or rain gutters to your Ecowaste or allow infiltration of surface water as this will overload the Ecowaste, saturate the disposal field and increase your power bill.

Don't attempt to clean or perform maintenance on the Ecowaste other than the irrigation filter.

Don't touch the inside of your Ecowaste unit without protective clothing. The unit contains bacteria and other micro organisms that may be harmful to humans.

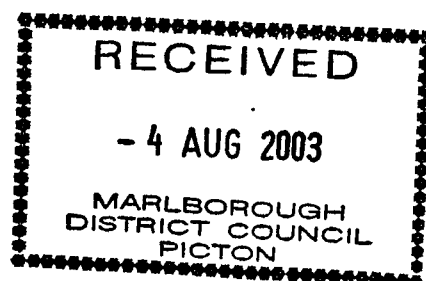
Don't enter the Ecowaste unit as the unit may contain harmful gasses.



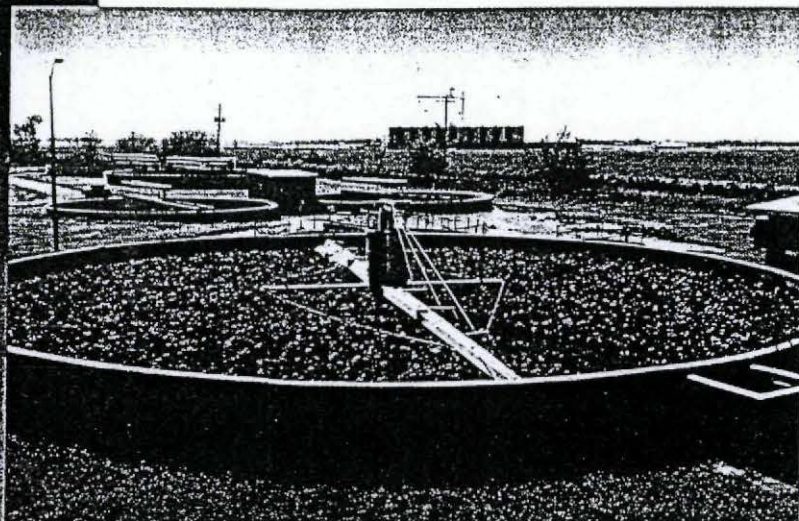
Warning Signs

Contact your installer in event of any of the following:

- Warning light being activated.
- Any changes in the system's normal operating sound.
- Any changes in the normal colour of the wastewater in the aeration chamber (for example if the colour is greyish brown rather than chocolate brown, this can sometimes indicate problems).
- Excessive solids, foam or scum in the unit.
- Plumbing backups.
- Excessive sewage odours from the treatment plant.



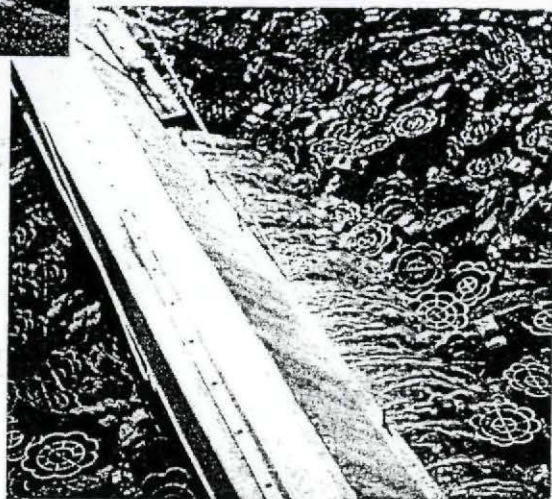
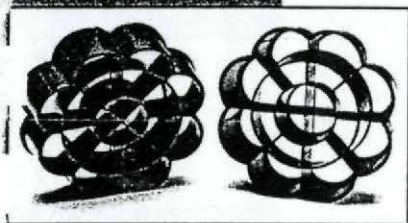
Bio-Pac SF#30 media for trickling filters, submerged beds and anaerobic reactors.



Bio-Pac SF#30 is ideally suited for either replacing rock in existing trickling filters to improve treatment plant performance or for installation in new trickling filters.

Media Characteristics:

- 30 ft²/ft³ surface area
- 95% void ratio
- Manufactured of UV stabilized polypropylene
- Low installation cost
- Excellent for BOD reduction or nitrification
- Low minimum wetting rate, 150 gpd/ft²
- For bed depths up to 30 ft.



Bio-Pac SF#30 random dump media is successfully operating in over 100 trickling filters. With over 300 mixing and redistribution points for both air and water per cubic foot of media, Bio-Pac is capable of redistributing wastewater every 2" of media depth. This feature makes Bio-Pac ideal for shallow trickling filters.

Bio-Pac SF#30 has also been used extensively in upflow anaerobic and aerobic submerged bed reactors. Since the media floats, use of an

underdrain support is eliminated. Furthermore, Bio-Pac's unique shape serves as a foam breaker when installed in anaerobic reactors.

NSW has been manufacturing trickling filter media since 1979 and has hundreds of installations worldwide. In addition to the Bio-Pac SF#30 random media, NSW offers several styles of structured media.

For further information, or to discuss your application, please contact NSW via phone, fax or e-mail.

540-981-0362 • 800-368-3610 • Fax 540-345-8421 • 530 Gregory Avenue • Roanoke, Virginia 24016
env@nswplastics.com • web site: nswplastics.com



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- 4 AUG 2003

MARLBOROUGH
DISTRICT COUNCIL
PITOM

EcoTube™

Septic Tank Effluent Filters NZ Patent Application No. 334385

INTRODUCTION

The **EcoTube™** septic tank effluent filters can improve the efficiency of your septic tank in two ways. Firstly they extend the life of your disposal area by filtering out any solid material in the effluent and preventing it from entering the disposal area. Secondly the Ecotube minimises blockage of the septic tank outlet.

Septic tank effluent typically separates into three layers. Floatable material in raw effluent tends to accumulate and form a crust on the surface of the septic tank while heavier material will sink and accumulate as a sludge on the bottom of the tank. Between these two layers is a relatively clean middle layer. It is from this layer that the Ecotube extracts the effluent which drains to the disposal area.

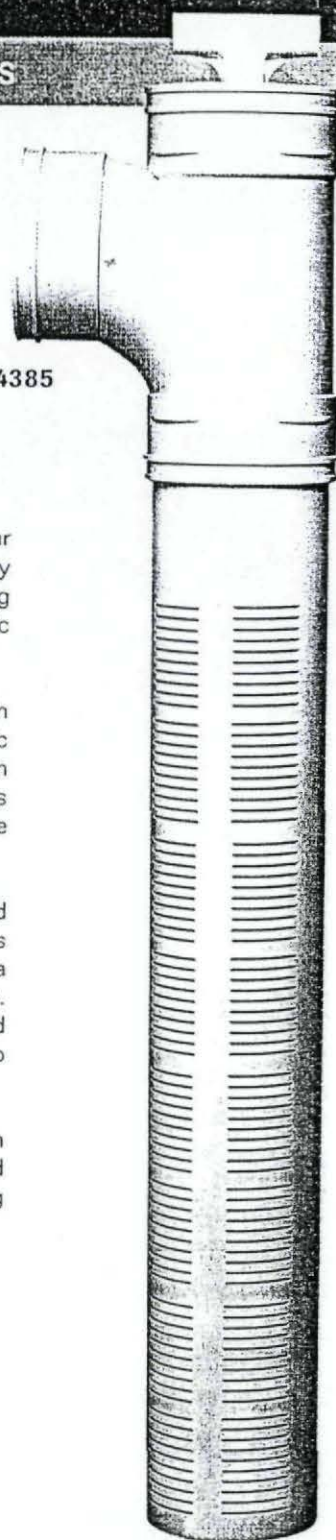
The **EcoTube™** is designed and built in New Zealand for New Zealand conditions for installation into septic tanks and package treatment plants. It is available as a complete unit for new septic tanks (**EcoTube 80**) or as a smaller unit for placement into standard 100mm outlet tees (**EcoTube 50**). The **EcoTube™** has been endorsed by Ian Gunn, author of Auckland Regional Council Technical Publication 58. It has an adjustable handle to assist in removal for cleaning.

In a correctly sized and maintained septic tank an **EcoTube™** tube filter can provide an effluent with an average discharge of less than 30ppm suspended solids. The **EcoTube™** will also improve the BOD of the effluent by reducing particulate BOD.

ADVANTAGES

Key advantages of the EcoTube™ septic tank effluent filter

- New Zealand designed and manufactured for New Zealand conditions
- Retractable handle for easy removal and replacement
- Performance and filtration area exceed most other septic tank effluent filters available on the market
- Two standard sizes of filter available for new tanks or retrofits into existing outlet tees
- Custom made sizes available for larger flows at very competitive prices
- Filtered solids fall back into the septic tank, for further treatment
- No sump or vault to capture solids with consequent build up of sludge inside filter
- 2.5mm filter opening size with low velocity through screens
- Large unimpeded filter area
- Flow modulation on outlet to reduce surges but still allowing full flow at high levels
- Removable filter allows easy cleaning with hose or brush either in-situ or by removing the filter from the tank. In most circumstances the tube filter will only require cleaning when the septic tank is deslugged.



Water and Wastewater Treatment Systems

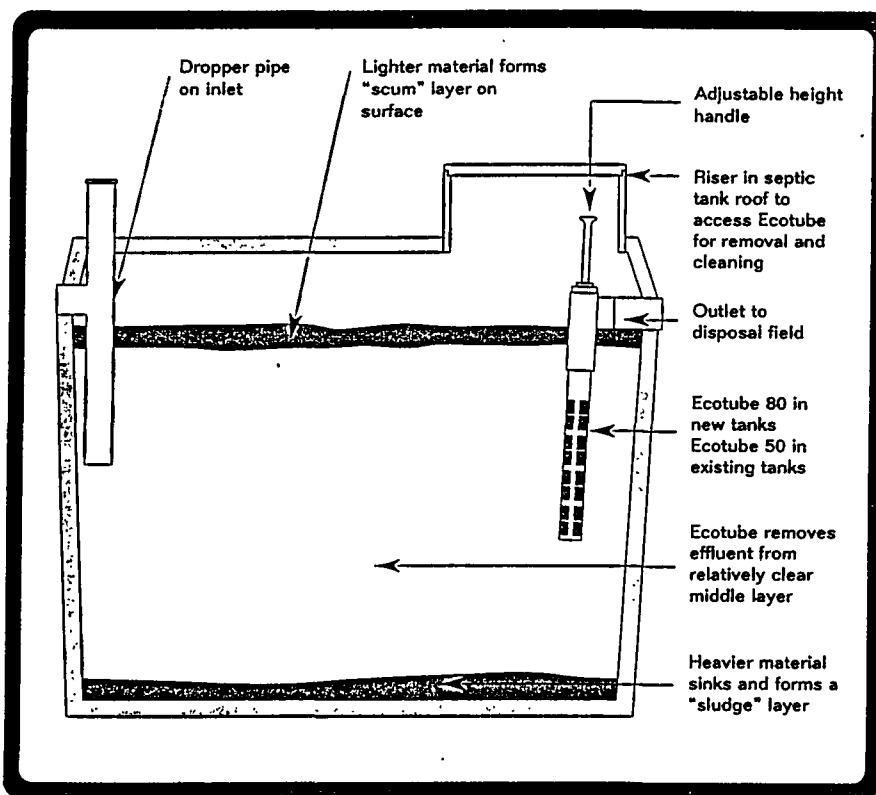
MAINTENANCE OF THE ECOTUBE™

The **EcoTube™** septic tank outlet filter stays cleaner for longer as solids that build up on the outside of the outer tube and the inside of the inner tube are able to fall off down to the sludge layer without blocking any internal casing. In normal installations the EcoTube need only be cleaned when the septic tank is desludged. The **EcoTube 80** is cleaned by removing the inner filter from its casing and washing externally and washing the outer fixed casing in place. The **EcoTube 50** can be totally removed for cleaning.

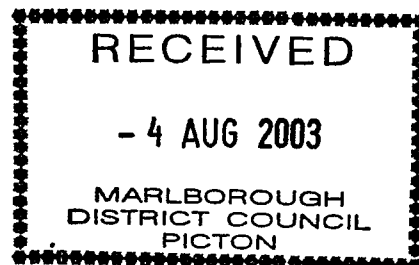
FURTHER WASTEWATER ADVICE

Clients with more complex wastewater problems requiring further advice should contact their agent or Subsurface Technologies who can assist to identify suitable solutions.

Subsurface Technologies are a team of registered engineers specialising in water and wastewater treatment. They have experience throughout New Zealand and the South Pacific in all aspects of wastewater treatment ranging from domestic upgrades through to community wastewater treatment plants.



YOUR LOCAL AGENT



Manufactured by Subsurface Technologies Ltd

Ph: (09) 570 9795 Fax: (09) 570 9794

Disclaimer: "Buyers and users must make their own assessment of our products under their own conditions for their own use. All queries regarding product suitability of purpose or installation should be directed to Subsurface Technologies for advice and assistance". Availability of product may differ slightly from that available in your area.



Agricultural Products Inc.

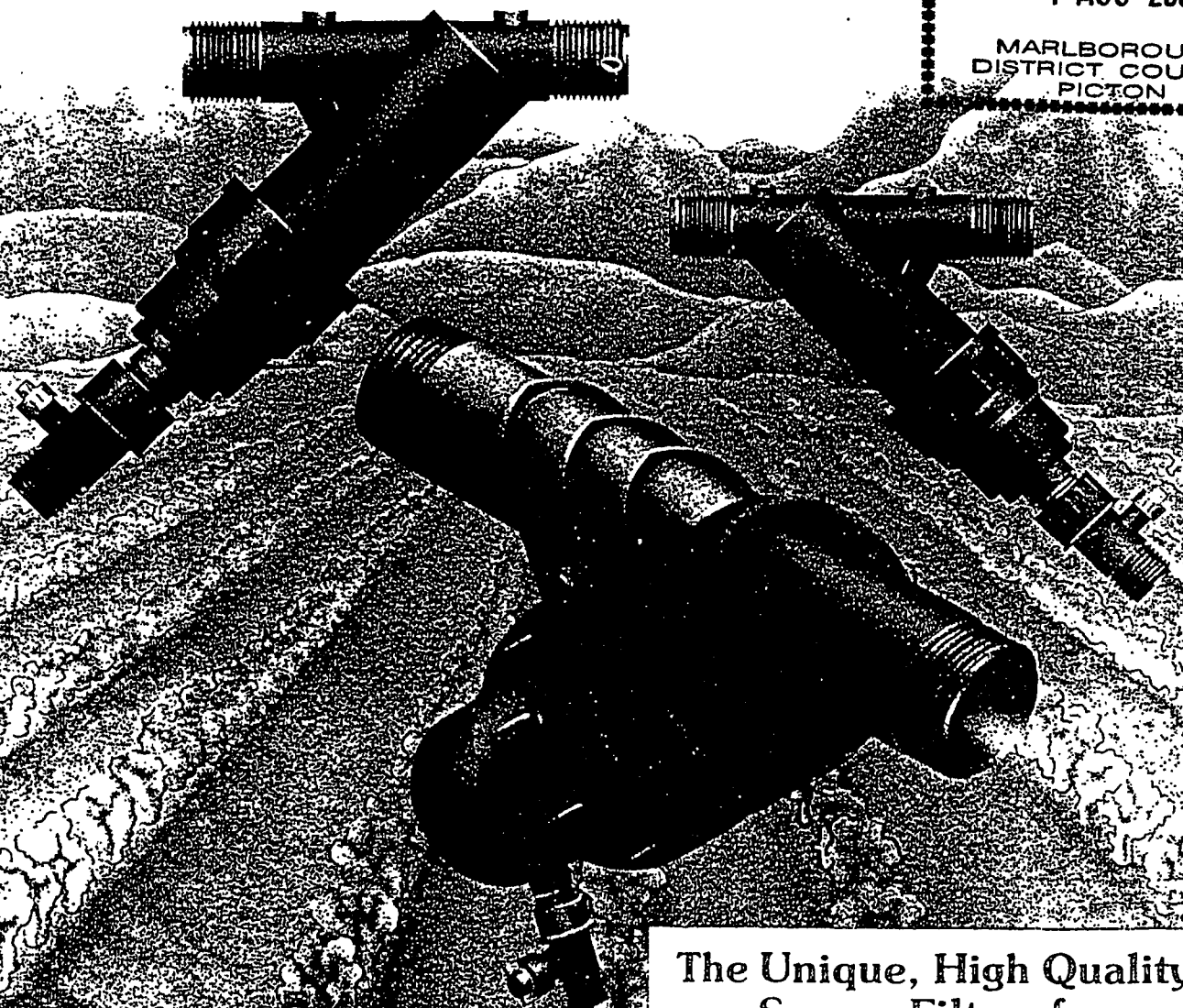
Manufacturers of Quality Water Handling Products

**4E-3/4", 1", 1 1/2" & 2"
PLASTIC SPIN CLEAN™ FILTERS**

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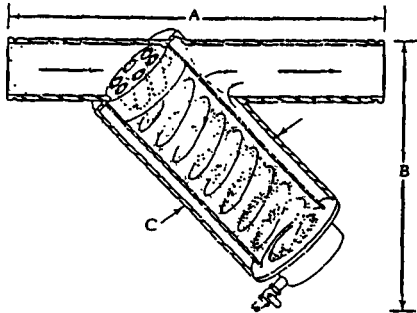
- 4 AUG 2003

MARLBOROUGH
DISTRICT COUNCIL
PICTON



The Unique, High Quality
Screen Filters for
Agricultural and Landscape
Irrigation and Industrial
Applications

HOUSING DIMENSIONS

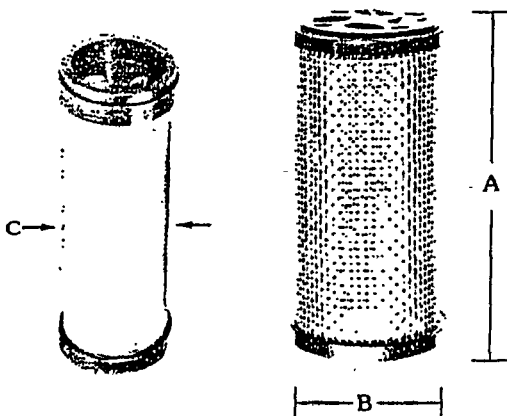


	A	B	C
3/4"	6"	9.5"	3"
1"	6.5"	10.5"	3"
1 1/2"	12"	12"	5.5"
2"	12"	12"	5.5"

SPIN CLEAN™ ACTION - HOW IT WORKS

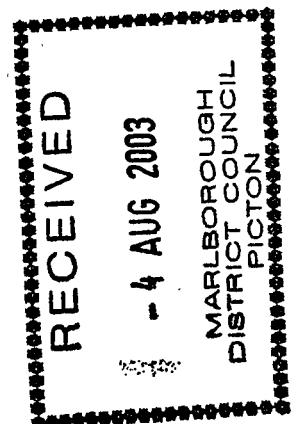
Ag Products "Spin Clean"™ filters are unique in that incoming dirtywater is forced through a directional nozzle plate onto the inside of the the stainless steel screen. This spinning action rotates debris down the screen wall to the large debris holding basin. Debris is flushed out via a ball valve or unscrewing cap. Spinning action keeps more of the screen area clean, minimizing pressure losses due to excessive dirt build-up. For optimum self-cleaning action, Spin Clean® filter should be operated at a flow rate that will produce 5 to 8 PSI pressure drop across the filter. For lower than normal flow, the 1 1/2" and 2" filters can be fitted with special spin plates.

SCREEN DIMENSIONS (Inches)



	A	B	C	SCREEN MATERIAL	AREA OF FILTRATION
3/4"	5.25	1.78	1.6	STAINLESS STEEL	23.40
1"	6.25	1.78	1.6	STAINLESS STEEL	28.40
1 1/2"	7.25	3.5	3.2	STAINLESS STEEL	60.80
2"	7.25	3.5	3.2	STAINLESS STEEL	60.80

FILTER SCREEN MESH/MICRON CONVERSIONS				
MESH	50	100	150	200
INCH	.012	.006	.004	.003
MICRON	300	152	100	80



ecogent

ENVIRONMENTAL ENGINEERING SOLUTIONS

28 July, 2003

Our Ref#:eco078-04

C&S Contractors
452 Old Renwick Rd
RD2
Blenheim

Attn: **Cliff**

Dear Cliff

Re: **Ecowaste Wastewater Treatment System – PRODUCER STATEMENT**

The Ecowaste system has been designed by Registered Engineers in accordance with ARC TP58 and the treatment area is sized in line with the requirements for permitted activities for sewage treatment and disposal.

Ecowaste system components include:

- 3000 litre septic tank with Ecotube outlet filter
- 3000 litre aerated Ecowaste treatment plant with Biopac treatment media.
- 200 lineal meters of Pressure compensating Wasteflow drip irrigation. Wasteflow incorporates bactericide lining in the pipe and root inhibitors in the dripper to give longer term protection against field failure than normal irrigation pipe.

The Wasteflow subsurface disposal pipe is designed specifically for Wastewater irrigation below ground to provide adequate public health protection and incorporates a herbicide in the drippers to stop roots entering and blocking the disposal system. Subsurface disposal through small diameter outlets will ensure that the wastewater is applied to the soil in small doses and will be well distributed which will afford a high level of treatment to the effluent.

The Ecowaste treatment unit will reduce suspended solids and BOD to treatment levels ideally suitable for subsurface disposal. The treatment system incorporates a high level alarm to warn of high water levels typically caused by either irrigation pump malfunction, irrigation filter blockage or entry of external stormwater into the system.

Please find enclosed supporting information on the Ecowaste wastewater treatment system:

- Ecowaste brochure
- Ecowaste process description
- Ecowaste specifications
- Sample Ecowaste commissioning report
- Wasteflow specialised wastewater dripline brochure

Sincerely,



ECOGENT LTD
Matt Riddell.
Engineer

ECOWASTE PROCESS DESCRIPTION

Treatment

The Ecowaste is a package aerated treatment plant designed for typical households. Wastewater is treated anaerobically by the first stage septic tank. Wastewater then passes through a septic tank effluent filter into the core aerobic treatment tank.

The aerobic treatment tank has 2m³ storage volume with 0.25m³ of NSW Biopac treatment media. The treatment media has a greater than 95% open area to avoid clogging and large surface area to allow treatment microorganisms to adhere and grow. Aerated water is circulated through media to maintain intimate contact between wastewater, microorganisms and oxygen supply. Typical recycle rate is 10:1. System is characterised by very low sludge production and ability to be easily adjusted to suit low flow or high load situations.

Aeration is provided by a 380 watt Grundfos submersible pump and high efficiency Mazzei aerators which dissolve oxygen prior to circulating the flow through the media. The aerator is timer controlled and aeration time can be minimised for periods of inoccupation or low use or increased to deal with temporary increases in wastewater loading. Settled treated wastewater flows to the irrigation chamber through a vertical corrugated plate clarifier, which utilises Dura-Pac media from NSW Environmental. The clarifier reduces suspended solids loads and continues the wastewater treatment process.

The treated wastewater is then pumped to the disposal field via a float controlled irrigation pump. The pumped irrigation water is filtered, for added protection of the disposal field, through a 150 micron spin clean screen filter. If water level rises in the pump chamber due to pump failure or filter blockage a float will operate a visual alarm at the control board. There is a minimum 24 hour emergency storage but in most circumstances there is significantly more time available to remedy any malfunctions.

Disposal

The disposal field utilises Wasteflow disposal pipe. Wasteflow is a flexible polyethylene dripline with pressure compensating turbulent flow emitters regularly spaced along the line. With the dripline typically hidden 50-150mm below the ground, effluent is distributed slowly and uniformly, reducing ponding, even in difficult soils and hilly terrain.

Subsurface disposal of the treated wastewater is essential because domestic wastewater treatment plants do not eliminate disease causing organisms and hence the use of long life subsurface disposal systems is important to protect public health and the environment.

Wasteflow is specifically designed for wastewater disposal and is built to last. The emitters are protected against root intrusion by the Rootguard® patented process, and the dripline wall is protected from organic growth with a bactericide lining.

The rampant growth of roots (Kikuya, Willow etc) is a major problem for blockages of drains and irrigation pipe. Wasteflow has a 15 year warrantee against failure due to root blockage. Other advantages are its bactericide lining to stop ongoing slime growth and its strong construction.

Reliability

The Ecowaste is noted for its simplicity with an aeration pump and irrigation pump each with its own integrated float switch. A third float switch activates the high level alarm. The system has a low power usage.

ECOWASTE SPECIFICATIONS

Septic Tank	Variable according to number of bedrooms and pump out frequency that is acceptable to the owner. Sizes range from 1.5 ³ to 5m ³ .
Septic Tank Effluent Filter	Patented twin screen, 2.5mm opening size filter with flow modulation. Cleaning frequency typically 3 years but easily removed and washed during maintenance without needing to remove any pumps.
Ecowaste Treatment Unit	3m ³ concrete tank, twin concrete risers and lids. Three days detention at 1m ³ /day. Aerated water flow 4,500 litres per hour. Normal power consumption 1 – 2 kW hours/day depending on effluent loading.
Ecowaste Treatment Media	Aerobic treatment in the Ecowaste is supported on 0.25m ³ of submerged media. The media is specialised 'BioPac' from NSW Environmental. BioPac has a high surface area and high open flow area to provide complete mixing in the reactor and high treatment efficiency.
Aeration	Aeration is provided by a timer controlled 380 watt Grundfos KPC 300 running through a high efficiency Mazzei venturi air injector.
Clarifier	Vertical corrugated PVC plate clarifier utilising of NSW Environmental Durapac media
Maximum Treatment Capacity	Long term capacity up to 2m ³ /day (limited by Council permit and disposal field size). However the modular Ecowaste concept easily allows systems with additional capacity to be designed.
Disposal Field	Wasteflow pressure compensating emitters from Geoflow Inc. The emitters are Rootguard protected for root intrusion control and bactericide lined pipe for slime control. Wasteflow dripper spacing 600mm. Dripper flow 2 or 4 litres per hour. Installation depth within topsoil 50 to 100mm. Field flush line returned to treatment tank or in a dedicated soak hole. Air valve inside irrigation chamber or at high point in disposal field.
Irrigation Pump	Spring 80 (750 watt) delivers 23m head @ 16 litres/minute* or Spring 100 (900 watt) delivers 33m head @ 16 litres/minute* *16 litres/minute is the standard flow rate allowed by the disposal field
Irrigation Filter	Plastic 'Spin Clean' filter from Agricultural Products Inc with 150 micron screen filter.
Control Box	Control boxes are custom built in New Zealand. They are IP65 rated and house circuit breakers for the aerator pump, irrigation pump and high level alarm float. The control box also houses the main isolating switch, high level alarm light, aeration pump timer and timer by pass switch.
Treatment Standards	The treatment parameters for the domestic ecowaste unit are 25ppm BOD and TSS. If required the Ecowaste can be constructed for larger flows and/or higher treatment standards. Within 300mm of the Wasteflow emitters in the topsoil layer effluent standards are typically better than 5ppm BOD and SS.

FILE COPY

C & S CONTRACTORS
452 OLD RENWICK RD.
R.D. 2, BLENHEIM
PHONE 03 578-1681
CELLPHONE 025-484-436

ECOWASTE™

**Wastewater Treatment and
Disposal System**

CONTENTS

■ WHY USE AN ECOWASTE™ SYSTEM ?

■ HOW THE ECOWASTE™ WORKS

■ SATISFACTORY OPERATION OF THE ECOWASTE SYSTEM

■ HOW THE WASTEFLOW DISPOSAL SYSTEM WORKS

■ ECOWASTE™ DIAGRAM

■ ECOWASTE™ BROCHURE

■ WASTEFLOW™ BROCHURE

■ ECOWASTE™ INSTALLATION PHOTOGRAPHS

■ THE ADVANTAGES OF WASTEFLOW™

■ ECOWASTE™ MAINTENANCE

■ ECOWASTE™ DAY TO DAY OPERATION

■ DO'S AND DON'TS

■ COMPONENT BROCHURES

Why use an Ecowaste™ System ?

Because Councils do not allow septic tanks on sites with:

- Small land area or
- Poor drainage or
- Shallow groundwater or
- Flooding problems or
- Waterways close by

The Ecowaste solves these problems by treating the wastewater and disposing of it over a controlled area through Wasteflow disposal pipe.

How the Ecowaste™ Works

- It settles effluent in a septic tank
- Only filtered wastewater enters the treatment unit
- It then aerates the effluent by cycling effluent and air through media on which microbiology lives and feeds on pollutants in the wastewater
- It then settles the aerated effluent
- It filters and pumps the treated effluent to a Wasteflow™ subsurface disposal field

Satisfactory Operation of the Ecowaste™ System

To ensure trouble free performance requires a joint effort between:

- Design engineer
- Manufacturer
- Installer
- Maintenance Contractor
- Owner

Council requires regular reports from the maintenance contractor to confirm maintenance has been undertaken

How the Wasteflow Disposal System Works

■ A typical household field has 250 outlets which each emit the same volume of water (4 litres per hour)

■ It is buried between 50 and 150mm into the organic topsoil where soil micro-organisms treat the wastewater to a high standard

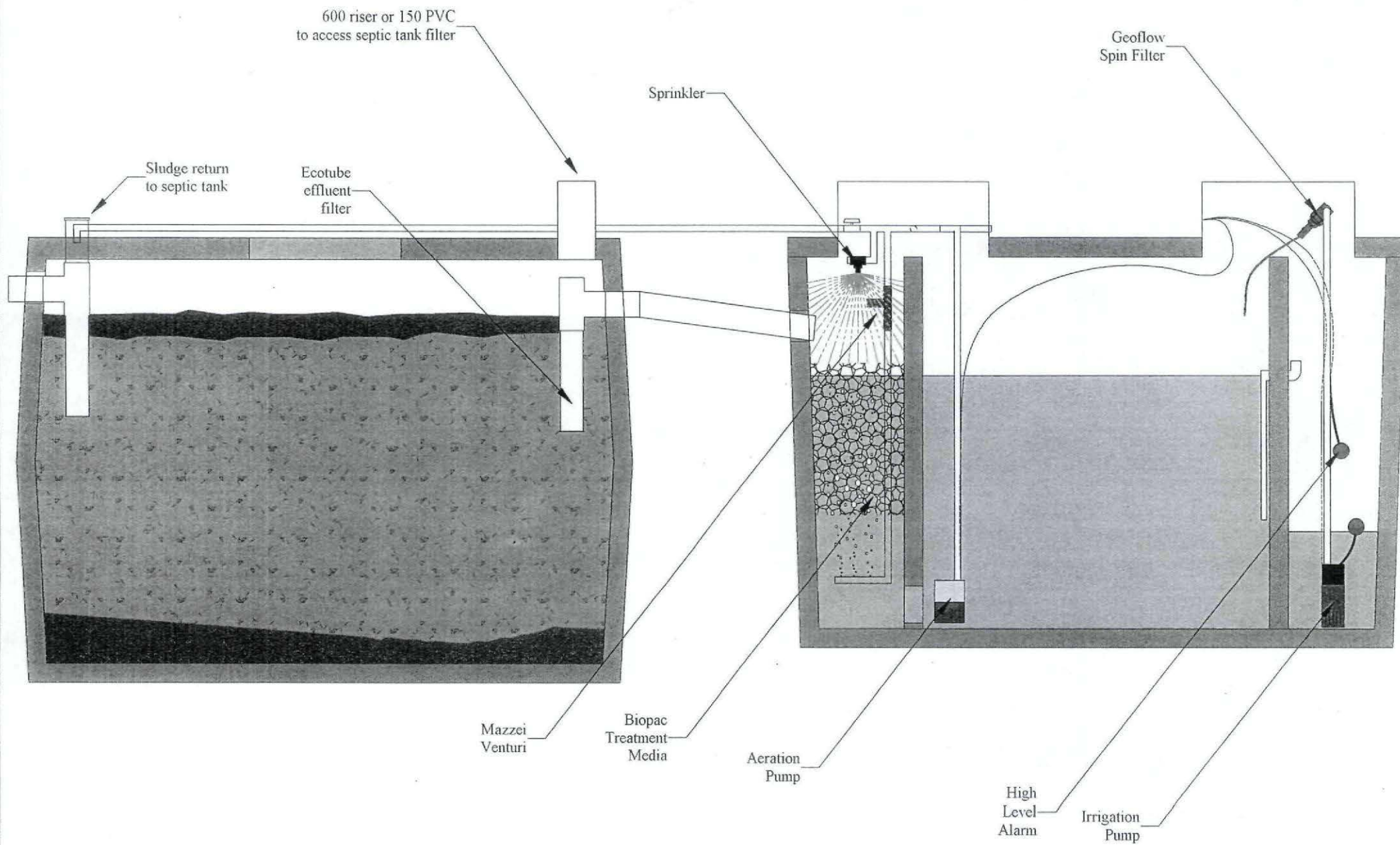
■ Wastewater is emitted in several pulses each day (usually 3 to 5 times) to maximise treatment

■ Wasteflow emitters have a herbicide incorporated to stop roots growing in and blocking the pipe

■ Wasteflow pipe has a (green) bactericide lining to reduce slime growth in the pipe

■ The irrigation system includes a return line that allows the Wasteflow pipe to be regularly flushed back into the tank

■ Wasteflow can be installed in bush, ornamental gardens, pasture or lawn. On lawns care needs to be taken to ensure good distribution and drainage.



ECOWASTE UNIT MANUFACTURED BY SUBSURFACE TECHNOLOGIES

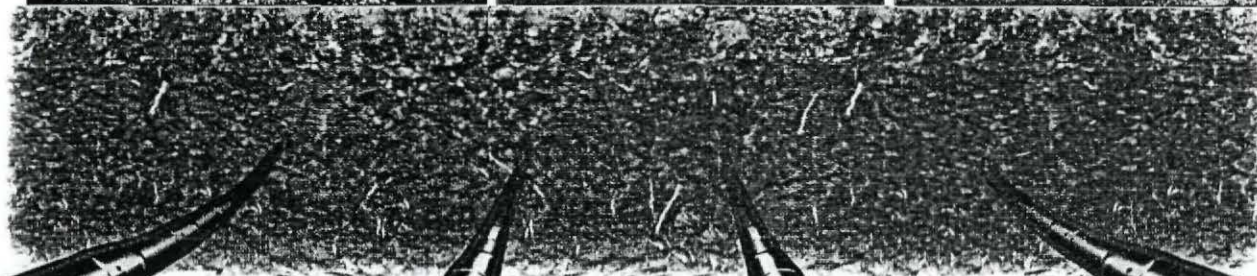
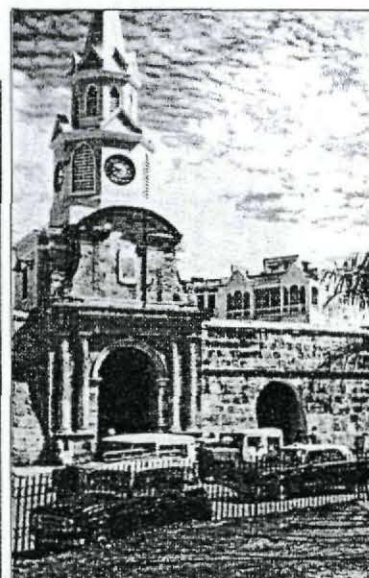
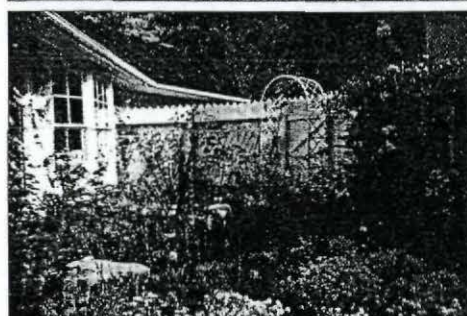
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WASTEFLOW™

DRIPLINE FOR SUBSURFACE WASTEWATER DISPOSAL



GEOFLOW, Inc.

WASTEFLOWTM

- Flexible emitterline for subsurface treated wastewater disposal.
- Guaranteed root intrusion protection plus bactericide.

CHARACTERISTICS

Reliable and economic.

The low cost of the system and low cost of installation make it possible to cover large areas or have backup fields without incurring high costs.

No ponding, surfacing or deep percolation.

Effluent is uniformly distributed over the entire area using low flow rate, uniformly spaced emitters. Water is slowly applied at each individual point, enabling the water to move laterally through capillary action, reducing percolation.

Flexible and easy to install.

A small vibratory plow or trencher is all that is required to install several thousand feet of tubing.

Easy to design.

The flow characteristics of the emitters and the uniform water distribution make it very easy to design a safe and reliable system.

Resistant to plugging.

Wasteflow has the largest flow orifices on the market. The turbulent flow design keeps fine particles in suspension, and the raised entry ports into the emitter reduce the risk of solids plugging the emitter flow path.

Can be used for irrigation.

The uniform rate of application and its reliability make the system ideal for reuse in landscaping or irrigating agricultural crops.

Solves limited area and soil problems.

Can be used in smaller areas than conventional systems, or where soil type or steep slopes preclude conventional systems.

ROOTGUARD protected.

Incorporation of Treflan guarantees protection from root intrusion and assures the system a long trouble free life.

Bactericide protected.

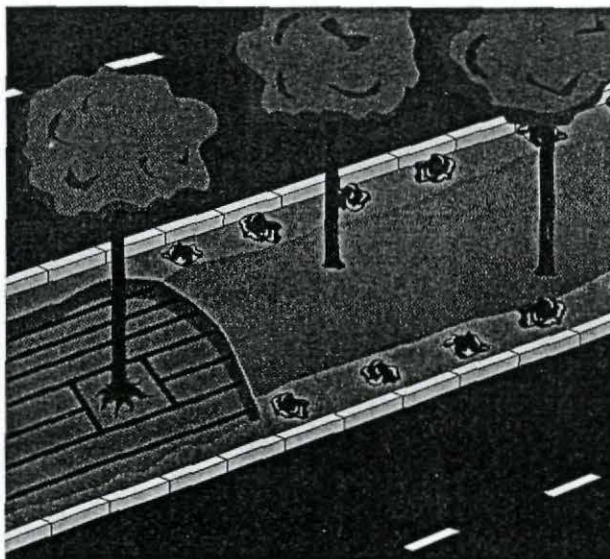
Incorporation of 10,10' oxybisphenoxarsine into the tube inhibits slime formation on the walls of the tube. This does not replace effluent pre-treatment.

Purple stripes.

3 stripes identify the Wasteflow product.

Freezing conditions.

Operating aerobic systems have shown resistance to freezing through a Wisconsin winter. In the event a system is left idle through freezing conditions Wasteflow will not crack or break.



DESCRIPTION

The flexible polyethylene dripline has large turbulent flow emitters regularly spaced along the line. With the dripline hidden about six inches below ground, effluent is distributed slowly and uniformly, reducing ponding, even in difficult soils and hilly terrain.

Wasteflow is built to last. The emitters are protected against root intrusion by the ROOTGUARD® patented process, and the dripline wall is protected from organic growth with a bactericide lining.

Wasteflow is easily adaptable for projects ranging in size from single family homes to large multi-million gallon per day projects.

WASTEFLOW PC & WASTEFLOW CLASSIC

Wasteflow is now available with either classic turbulent flow emitters (Wasteflow Classic) or with pressure compensating emitters (Wasteflow PC).

Wasteflow dripline has precision molded, large flow path emitters inserted into 1/2" tubing every 2ft. The standard nominal flow rate per emitter is 1GPH. The standard spacing for effluent disposal is 24 X 24 inches. Different flow rates, tube diameters and spacings are available against special order. The 1/2" tubing presents a smooth exterior for easy insertion into the ground. Use CA600 compression adapters to connect the dripline to PVC pipe.

Wasteflow Classic				
Pressure	WF16-4-12 12" emitter spacing		WF16-4-24 24" emitter spacing	
	Max. Length of Run vs. Pressure	Flow Rate vs Pressure	Max. Length of Run vs. Pressure	Flow Rate vs. Pressure
10 psi	130ft.	0.93 gph	210 ft.	0.93 gph
15 psi	130 ft.	1.13 gph	210 ft.	1.13 gph
25 psi	130 ft.	1.49 gph	210 ft.	1.49 gph
30 psi	130 ft.	1.64 gph	210 ft.	1.64 gph
Wasteflow PC				
Pressure	WFPC16-2-12 12" emitter spacing		WFPC16-4-24 24" emitter spacing	
	Max. Length of Run vs. Pressure	Flow Rate vs Pressure	Max. Length of Run vs. Pressure	Flow Rate vs. Pressure
15 psi	174 ft.	0.53 gph	211 ft.	1.02 gph
25 psi	260 ft.	0.53 gph	315 ft.	1.02 gph
35 psi	313 ft.	0.53 gph	379 ft.	1.02 gph
45 psi	354 ft.	0.53 gph	429 ft.	1.02 gph

Wasteflow is manufactured 100% in the U.S.A.

When to use Wasteflow PC vs. Wasteflow Classic

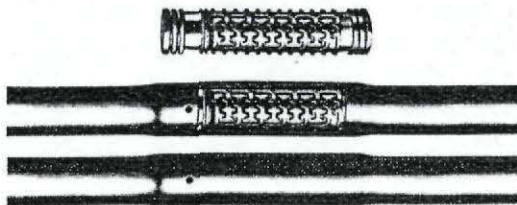
Advantages of Wasteflow PC

- Very long lateral runs are possible.
- Steep slopes require fewer pressure regulators.
- Rolling terrain. If the difference of height from trough to peak is greater than 6 foot, then Wasteflow PC is justified. Vacuum relief valves must be placed at the top of each rise.

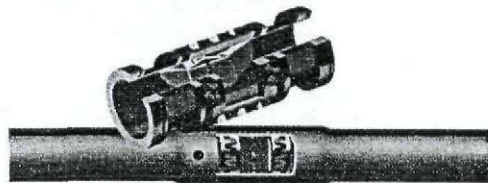
Disadvantages of Wasteflow PC

- More expensive.
- Contains a silicon rubber diaphragm which may not last as long as the plastic components.
- Systems with large elevation changes that are not designed very carefully are prone to the creation of vacuum upon shut down, causing soil ingestion. The dirt may lodge permanently under the diaphragm.

Geoflow, Inc. recommends that Wasteflow PC only be used when the advantages are of substantial economic value.



Wasteflow Classic



Wasteflow PC

THE ROOTGUARD® ADVANTAGE

ROOTGUARD® is the key to Wasteflow's success below ground. ROOTGUARD technology combines Treflan® in the drip emitter to inhibit root growth. The herbicide is released at a uniform rate, maintaining sufficient concentration in the soil immediately surrounding the drip outlet to prevent longitudinal root growth into the emitter. ROOTGUARD life is a function of the mean soil temperature. The system is guaranteed not to fail due to root intrusion for 10 years, with an expected life of 20 years. Please read the limited warranty in our design and installation manual.

- For more detailed information on this application, phone: 1-800-828-3388 and request Geoflow's Design and Installation Manual for Onsite Wastewater Disposal or check your website at www.rootguard-geoflow.com.
- Wasteflow is only guaranteed when used with NSF Class I aeration treatment plants as tested by ANSI certified laboratory, or sand filters designed to meet EPA criteria, or treatment plants designed by a professional engineer.

GEOFLOW, INC.

200 Gate 5 Road, #101
Sausalito, California 94965
800-828-3388 / 415-331-0166

Wasteflow is manufactured under U.S. patents 5 332 160, 5 116 414 & foreign equivalents

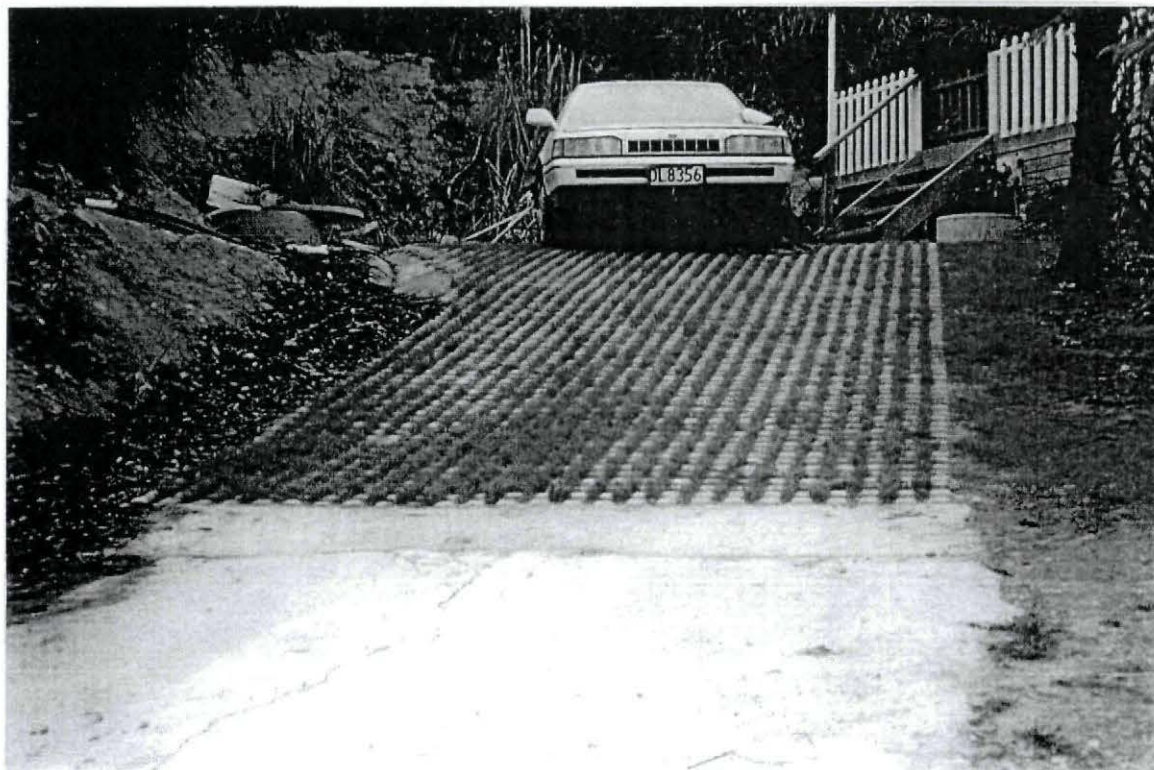
ROOTGUARD® is a registered trademark of A.I. Innovations

Treflan® is a registered trade-mark of DowElanco.



Wasteflow™ buried under gardens and lawn

Wasteflow™ buried under Gobi Block™ driveway



The Advantages of Wasteflow

It is the only system available manufacture for wastewater disposal and incorporating:

- Herbicide based protection against blockage from root intrusion.
- An inner lining of bactericide to reduce bacterial growth in the pipe.
- An external colour code to identify is as a wastewater pipe.

Ecowaste™ Maintenance

The crucial maintenance items are:

- Keep the filter clean
 - Replace with clean filter every 3 to 6 months depending on system biology
 - Wash old filter in chlorine solution over night. Rewash in clean water.
 - Make sure filter is installed without damaging screen (Nozzles face up into body use vaseline or similar on rubber end strips if screen is difficult to insert.)

Note: When systems first start up blockages may be more frequent. Ideally filters should also be checked and cleaned within the first month

- Flush irrigation field
 - On every three monthly visit activate the irrigation pump (use garden hose if necessary) and flush until clean water discharges
 - Observe operation of air valve. If not operating unscrew and clean it

■ Clean irrigation field with chlorine

Transfer solids to septic tank

- Every three months open the transfer valve to allow aerated water to transfer. Generally the initial water is very dark and then quickly clears. Close the valve, turn main switch off for one minute to let solids settle then repeat.

Observe system operation

- If there is significant surface sludge in the clarifier or pump chamber there is probably excessive aeration. Reduce aeration hours. Hose down clarifiers.
- If there is a sign of water level build up in septic tank lift out PVC filter and wash the filter clean.

Check septic tank sludge levels

- Once per year use stick to determine depth of sludge. Arrange to desludge when level reaches bottom of PVC filter

Clear weed growth away from lids to ensure good closure

Inspect field for any obvious damage – walk over it at least every six months

Aerator pumps are supplied by Grundfos / Hiflo Pumps (09 579 6375) and irrigation pumps are supplied by Argon Industries (09 634 3415)

ECOWASTE™ - DAY TO DAY OPERATION

Irrigation Control

The system operates automatically with irrigation controlled by a float switch.

Aerator Control

The aerator is controlled by a time switch because:

- Excessive aeration wastes power
- Over aeration can cause biological sludges to float to the surface and affect settling and treatment performance and increases temperature and biological growth inside the tank

Time Switch Setting

For Holiday Homes

Set the timers to operate every three hours for 10 minutes. This keeps the system alive while owners are away then when they return the external (toggle) switch is turned on to run the system full time while they are in residence – and turned off when they leave.

For Permanent Residences

For a household of about five people aeration for half the time i.e. two hours on two hours off is usually adequate.

For a two person household it could be reduced to one hour on two hours off. In both cases the system can be run full time by using the external switch if required for increased occupancy over holiday periods.

Do not turn off the main switch on the control box when you leave the property.

The treatment system utilises bacteria to breakdown the organic pollution. Care must be taken to avoid tipping any chemicals into the system. See the separate sheet of do's and don'ts.

- Remember do not use the Ecowaste to dispose of chemicals, oils etc or solid materials such as vegetable scraps, nappies etc.
- Repair leaking taps, toilet cisterns. Use low flush toilets and other water savings devices and do not waste water.
- If the alarm lights up call the maintenance contractor and reduce your water use until the system is fixed.
- Look after the Wasteflow field. Remember where it is and do not dig it up. Standard 15mm hose joiners can be used to repair damage.

DO'S AND DON'TS

Do maintain the contract service arrangement offered by the installer after the initial maintenance period has expired. It is extremely important that both the treatment and disposal systems receive regular maintenance.

Do keep your system accessible for inspections and pumping, yet protected from unauthorised entrance. If access to your system is locked, make sure that your service contractor has a key.

Do call your installer whenever you experience problems with your system, whenever the alarm is activated, or whenever there are any signs of system failure.

Do keep records about your Ecowaste treatment system, including a map of where the Wasteflow disposal field is installed and general information, such as date installed, contract service agreement, records of service visits, and maintenance performed.

Do conserve water to avoid overloading the system. Be sure to repair any leaky taps or toilets.

Do divert other sources of water, like roof drains, external stormwater or flooding, house drains including foundation drains, and sump pumps away from the treatment system.

Do use environmentally friendly detergents such as Down to Earth and keep to the recommended dosages.

Do become familiar with how your own particular system operates, and the way it looks, sounds, and smells when it is working correctly. This way, you may be able to identify problems before they become serious and alert your service provider to anything unusual.

Do be sure to ask your installer questions about how to know if your unit is malfunctioning.

Do practise water conservation. By reducing the amount of water used the life of the system may be increased and power consumption reduced and the disposal bed maintained in its best condition.

Don't allow anyone to drive over or park on any part of the system. (Unless part of the disposal field is installed beneath Gobi Block paving.)

Don't make or allow unauthorised repairs or changes to your treatment and disposal system without obtaining the required Council permits and advising the installer.

Don't use your toilet as a solid waste disposal system or poison your treatment system or the disposal area by pouring harmful chemicals down the drain. Harsh chemicals can kill the beneficial bacteria that treat your wastewater. Material that should not be in the toilet system includes:

<i>Coffee grounds</i>	<i>Dental floss</i>	<i>Disposable diapers</i>
<i>Sanitary napkins</i>	<i>Tampons</i>	<i>Cigarette butts</i>
<i>Condoms</i>	<i>Gauze bandages</i>	<i>Fat, grease or oil</i>
<i>Paper towels</i>	<i>Household bleaches</i>	<i>Commercial bleaches</i>

and never flush chemicals, such as:

<i>Paints</i>	<i>Varnishes</i>	<i>Thinners</i>
<i>Waste Oils</i>	<i>Photographic Solutions</i>	<i>Pesticides</i>

These items can overtax or destroy the biological digestion taking place within your system and reduce its ability to treat your wastewater.

Don't increase the permanent accommodation connected to the treatment unit without obtaining approval from the Ecowaste installer and the Council.

Don't connect stormwater drains or rain gutters to your Ecowaste or allow infiltration of surface water as this will overload the Ecowaste, saturate the disposal field and increase your power bill.

Don't attempt to clean or perform maintenance on the Ecowaste other than the irrigation filter.

Don't touch the inside of your Ecowaste unit without protective clothing. The unit contains bacteria and other micro organisms that may be harmful to humans.

Don't enter the Ecowaste unit as the unit may contain harmful gasses.

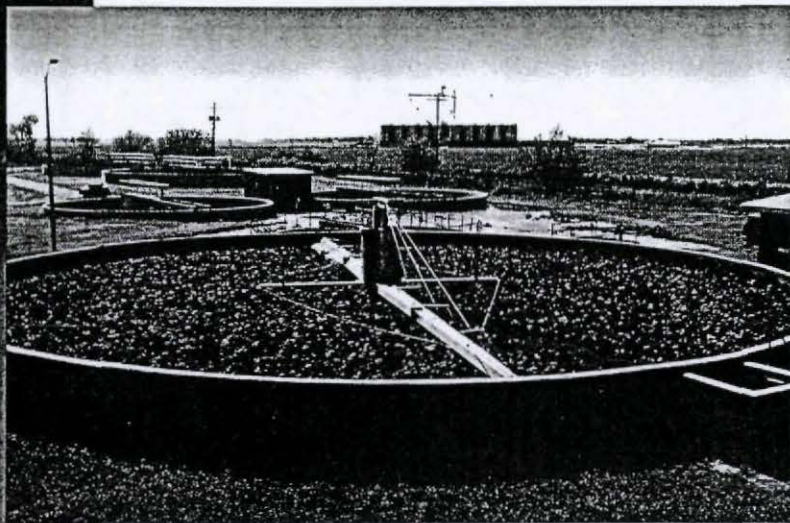
Warning Signs

Contact your installer in event of any of the following:

- Warning light being activated.
- Any changes in the system's normal operating sound.
- Any changes in the normal colour of the wastewater in the aeration chamber (for example if the colour is greyish brown rather than chocolate brown, this can sometimes indicate problems).
- Excessive solids, foam or scum in the unit.
- Plumbing backups.
- Excessive sewage odours from the treatment plant.

Bio-Pac SF#30
Trickling Filter Media

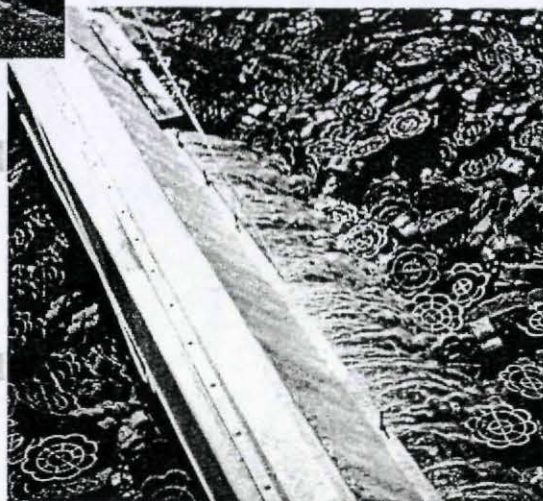
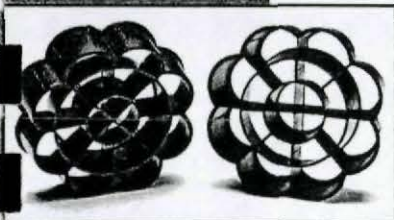
Bio-Pac SF#30 media for trickling filters, submerged beds and anaerobic reactors.



Bio-Pac SF#30 is ideally suited for either replacing rock in existing trickling filters to improve treatment plant performance or for installation in new trickling filters.

Media Characteristics:

- 30 ft²/ft³ surface area
- 95% void ratio
- Manufactured of UV stabilized polypropylene
- Low installation cost
- Excellent for BOD reduction or nitrification
- Low minimum wetting rate, 150 gpd/ft²
- For bed depths up to 30 ft.



Bio-Pac SF#30 random dump media is successfully operating in over 100 trickling filters. With over 300 mixing and redistribution points for both air and water per cubic foot of media, Bio-Pac is capable of redistributing wastewater every 2" of media depth. This feature makes Bio-Pac ideal for shallow trickling filters.

Bio-Pac SF#30 has also been used extensively in upflow anaerobic and aerobic submerged bed reactors. Since the media floats, use of an

underdrain support is eliminated. Furthermore, Bio-Pac's unique shape serves as a foam breaker when installed in anaerobic reactors.

NSW has been manufacturing trickling filter media since 1979 and has hundreds of installations worldwide. In addition to the Bio-Pac SF#30 random media, NSW offers several styles of structured media.

For further information, or to discuss your application, please contact NSW via phone, fax or e-mail.

NSW
ENVIRONMENTAL SYSTEMS

540-981-0362 • 800-368-3610 • Fax 540-345-8421 • 530 Gregory Avenue • Roanoke, Virginia 24016
env@nswplastics.com • web site: nswplastics.com





Water and Wastewater Treatment Systems

EcoTube™

Septic Tank Effluent Filters NZ Patent Application No. 334385

INTRODUCTION

The **EcoTube™** septic tank effluent filters can improve the efficiency of your septic tank in two ways. Firstly they extend the life of your disposal area by filtering out any solid material in the effluent and preventing it from entering the disposal area. Secondly the Ecotube minimises blockage of the septic tank outlet.

Septic tank effluent typically separates into three layers. Floatable material in raw effluent tends to accumulate and form a crust on the surface of the septic tank while heavier material will sink and accumulate as a sludge on the bottom of the tank. Between these two layers is a relatively clean middle layer. It is from this layer that the Ecotube extracts the effluent which drains to the disposal area.

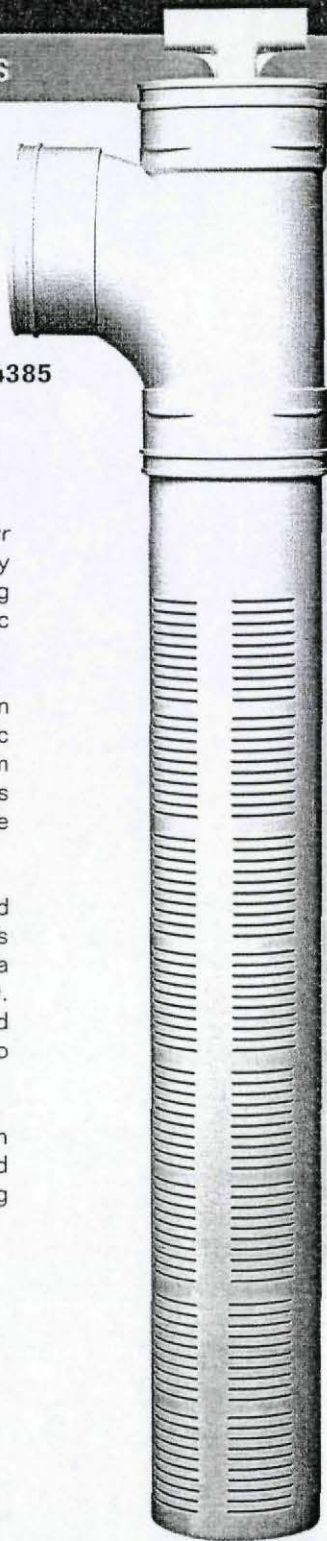
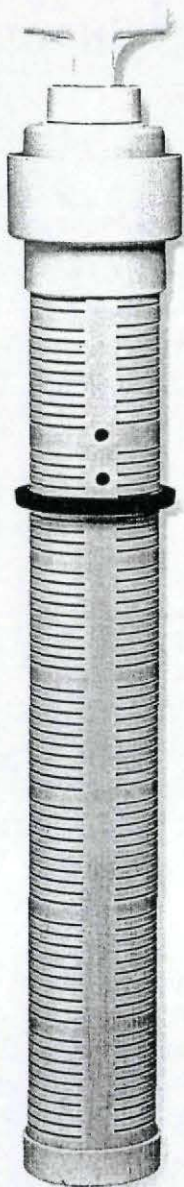
The **EcoTube™** is designed and built in New Zealand for New Zealand conditions for installation into septic tanks and package treatment plants. It is available as a complete unit for new septic tanks (**EcoTube 80**) or as a smaller unit for placement into standard 100mm outlet tees (**EcoTube 50**). The **EcoTube™** has been endorsed by Ian Gunn, author of Auckland Regional Council Technical Publication 58. It has an adjustable handle to assist in removal for cleaning.

In a correctly sized and maintained septic tank an **EcoTube™** tube filter can provide an effluent with an average discharge of less than 30ppm suspended solids. The **EcoTube™** will also improve the BOD of the effluent by reducing particulate BOD.

ADVANTAGES

Key advantages of the EcoTube™ septic tank effluent filter

- New Zealand designed and manufactured for New Zealand conditions
- Retractable handle for easy removal and replacement
- Performance and filtration area exceed most other septic tank effluent filters available on the market
- Two standard sizes of filter available for new tanks or retrofits into existing outlet tees
- Custom made sizes available for larger flows at very competitive prices
- Filtered solids fall back into the septic tank, for further treatment
- No sump or vault to capture solids with consequent build up of sludge inside filter
- 2.5mm filter opening size with low velocity through screens
- Large unimpeded filter area
- Flow modulation on outlet to reduce surges but still allowing full flow at high levels
- Removable filter allows easy cleaning with hose or brush either in-situ or by removing the filter from the tank. In most circumstances the tube filter will only require cleaning when the septic tank is desludged.





Water and Wastewater Treatment Systems

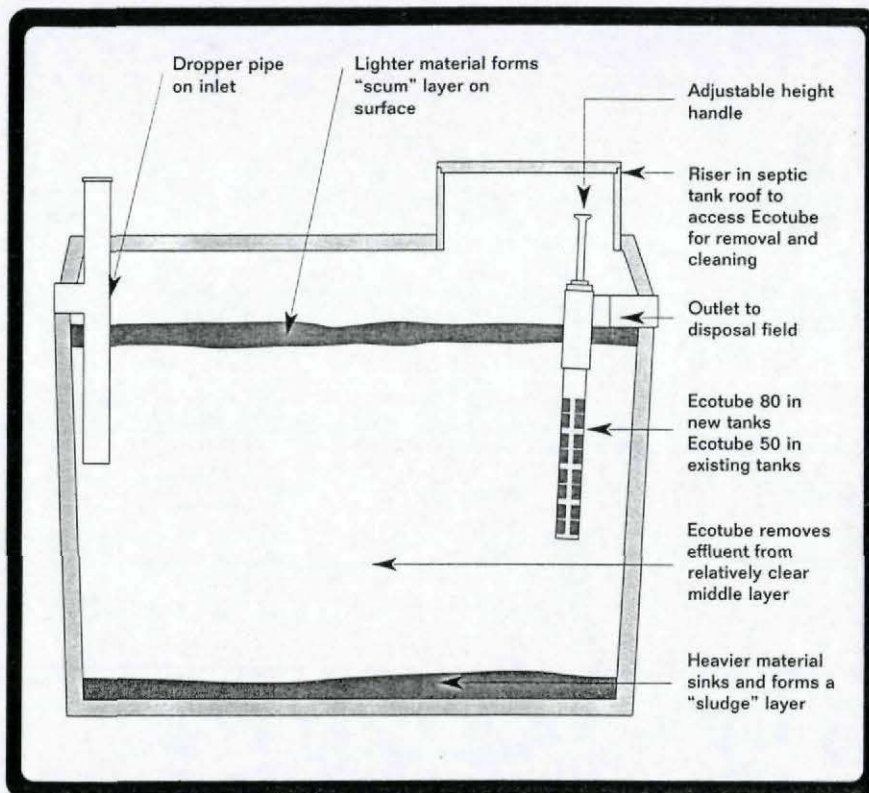
MAINTENANCE OF THE ECOTUBE™

The **EcoTube™** septic tank outlet filter stays cleaner for longer as solids that build up on the outside of the outer tube and the inside of the inner tube are able to fall off down to the sludge layer without blocking any internal casing. In normal installations the Ecotube need only be cleaned when the septic tank is desludged. The **EcoTube 80** is cleaned by removing the inner filter from its casing and washing externally and washing the outer fixed casing in place. The **EcoTube 50** can be totally removed for cleaning.

FURTHER WASTEWATER ADVICE

Clients with more complex wastewater problems requiring further advice should contact their agent or Subsurface Technologies who can assist to identify suitable solutions.

Subsurface Technologies are a team of registered engineers specialising in water and wastewater treatment. They have experience throughout New Zealand and the South Pacific in all aspects of wastewater treatment ranging from domestic upgrades through to community wastewater treatment plants.



YOUR LOCAL AGENT

Manufactured by Subsurface Technologies Ltd

Ph: (09) 570 9795 Fax: (09) 570 9794

Disclaimer: "Buyers and users must make their own assessment of our products under their own conditions for their own use. All queries regarding product suitability of purpose or installation should be directed to Subsurface Technologies for advice and assistance". Availability of product may differ slightly from that available in your area.

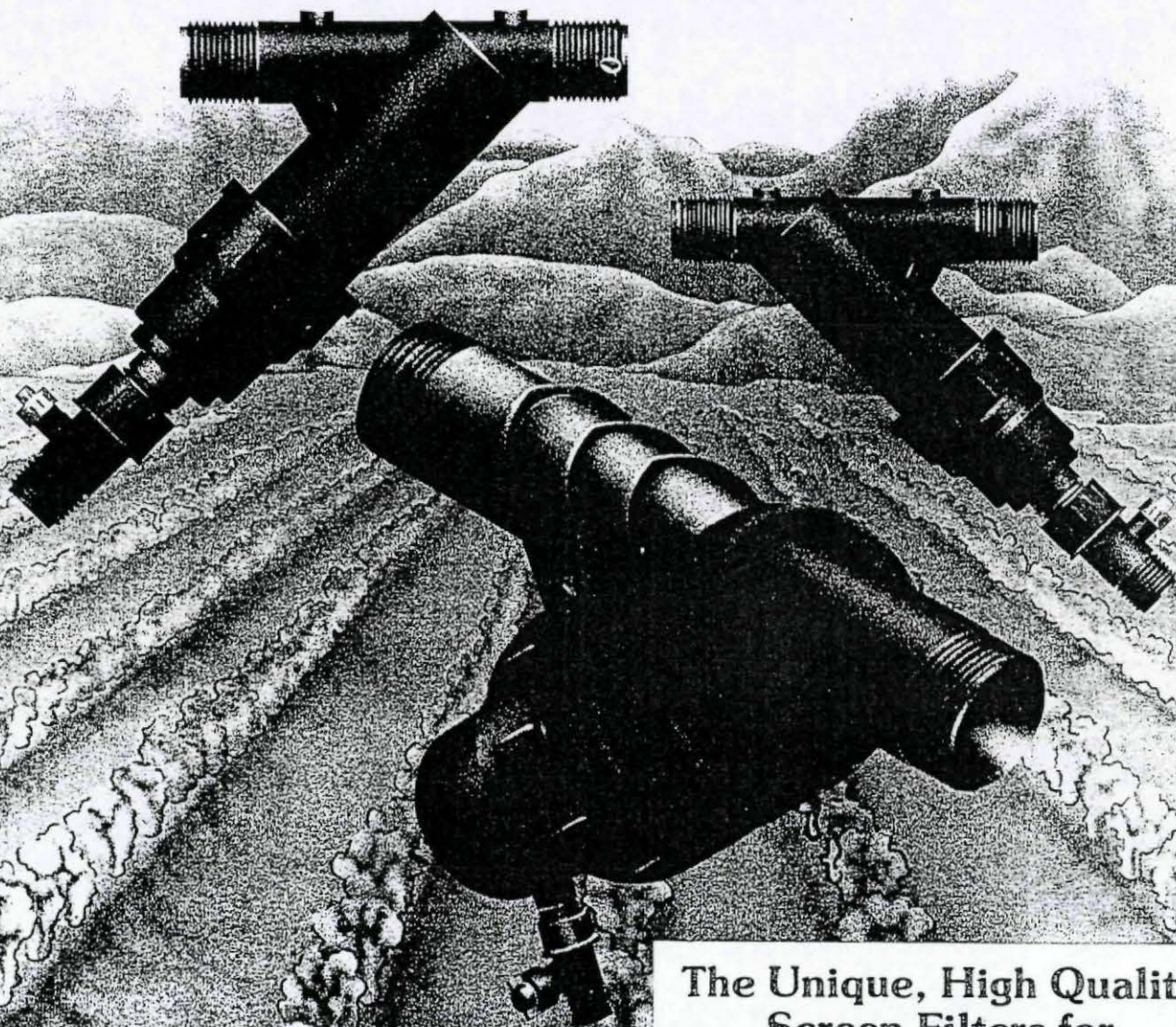
ECOTUBE™



Agricultural Products Inc.

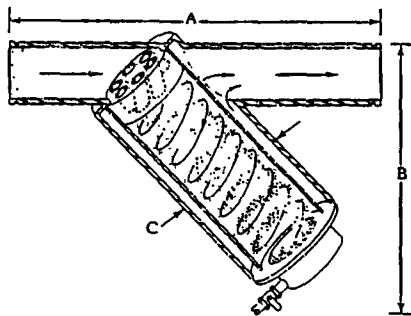
Manufacturers of Quality Water Handling Products

**4E-3/4", 1", 1 1/2" & 2"
PLASTIC SPIN CLEAN™ FILTERS**



The Unique, High Quality
Screen Filters for
Agricultural and Landscape
Irrigation and Industrial
Applications

HOUSING DIMENSIONS

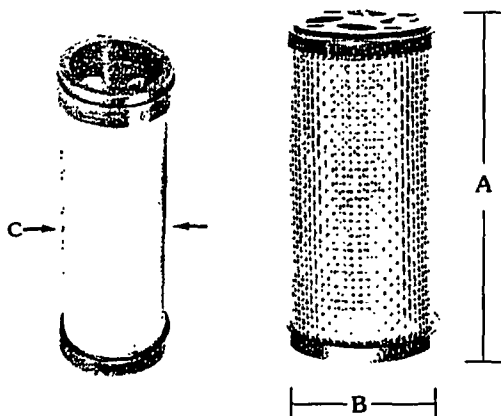


	A	B	C
3/4"	6"	9.5"	3"
1"	6.5"	10.5"	3"
1 1/2"	12"	12"	5.5"
2"	12"	12"	5.5"

SPIN CLEANTM ACTION - HOW IT WORKS

Ag Products "Spin CleanTM" filters are unique in that incoming dirtywater is forced through a directional nozzle plate onto the inside of the the stainless steel screen. This spinning action rotates debris down the screen wall to the large debris holding basin. Debris is flushed out via a ball valve or unscrewing cap. Spinning action keeps more of the screen area clean, minimizing pressure losses due to excessive dirt build-up. For optimum self-cleaning action, Spin Clean[®] filter should be operated at a flow rate that will produce 5 to 8 PSI pressure drop across the filter. For lower than normal flow, the 1 1/2" and 2" filters can be fitted with special spin plates.

SCREEN DIMENSIONS (Inches)

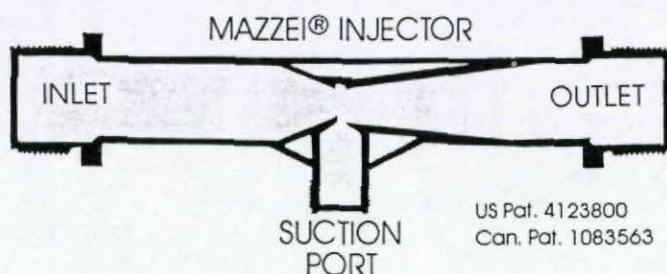


	A	B	C	SCREEN MATERIAL	AREA OF FILTRATION
3/4"	5.25	1.78	1.6	STAINLESS STEEL	23.40
1"	6.25	1.78	1.6	STAINLESS STEEL	28.40
1 1/2"	7.25	3.5	3.2	STAINLESS STEEL	60.80
2"	7.25	3.5	3.2	STAINLESS STEEL	60.80

FILTER SCREEN MESH/MICRON CONVERSIONS				
MESH	50	100	150	200
INCH	.012	.006	.004	.003
MICRON	300	152	100	80

Mazzei Injector Corporation

Mazzei Injector Corporation designs, manufactures, and globally markets a diversified line of high efficiency, differential pressure injectors and application systems. Due to the extreme accuracy and performance demanded, over 80 Injector models of differing type and construction are available. Mazzei® Injectors offer dramatic improvement to existing educators utilizing advanced engineering concepts, theories, and principles involving pressures and velocities of liquids and gases. Currently operating successfully in thousands of installations worldwide, Mazzei® Injectors (patented) offer accurate, economical, and trouble free methods to inject virtually any liquid or gas substance into a pressurized fluid stream. The engineering staff assists customers with applications, design, and Injector selection.



Function

How Mazzei® Injectors Work

The Injector relies on its efficient ability to create a vacuum at the suction port for desired suction of material to occur. This is accomplished when a minimal amount of differential pressure (ΔP) exist

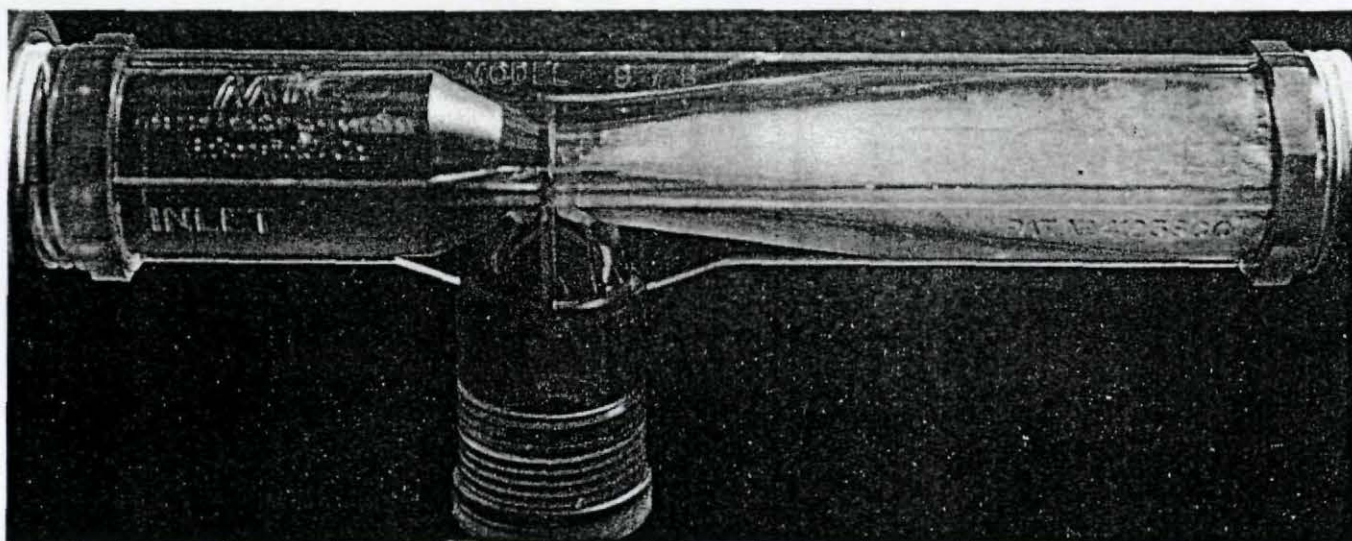
between the inlet and outlet sides of the Injector. The majority of Mazzei® Injectors are highly efficient, requiring less than 20% differential to initiate suction.

When a pressurized operating (motive) fluid, such as water, enters the Injector inlet, it constricts toward the injection chamber and changes into a high velocity jet stream. The increase in velocity through the injection chamber, as a result of the differential pressure, results in a decrease in pressure in the chamber. This pressure drop enables an additive material to be drawn through the suction port and is dynamically entrained into the motive stream. As the jet stream is diffused toward the Injector outlet, its velocity is reduced and it is reconverted into pressure energy (but at a pressure level lower than Injector inlet pressure).

Performance Testing

Performance data and other technical information as described within the Performance Tables located in this catalog have been prepared from actual independent test results. They are considered accurate and reliable. Mazzei Injector Corp., however, assumes no responsibility for the accuracy of performance information under varied field conditions.

Testing was conducted at an elevation of approximately 300 feet above sea level. Water temperature of both motive and liquid suction was approximately 60° F. Liquid (water) suction was measured at 0 lift. Instruments and gauges used in the measuring were calibrated to an accuracy of less than + or - 2%.

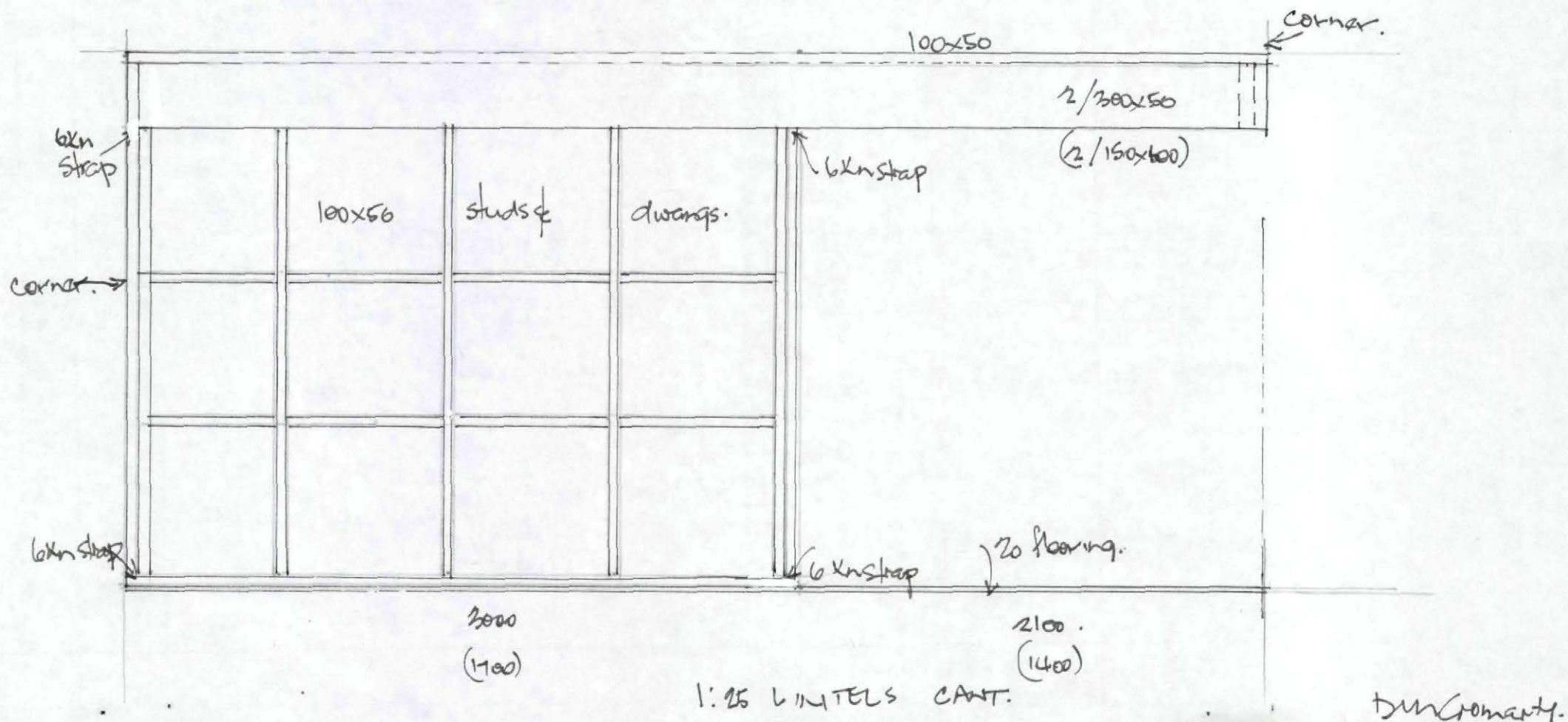


Mazzei Injector in operation demonstrating the injection of air into a water system. NOTE the thorough mixing action taking place just downstream of the suction port as the air is entrained into the water flow.



031396

S. RYAN HOUSE.





7 — 写真植字印字割付表 ① 写真植字印

20 — 写真植字印字

32 — 写真植字

P1, 300



TEST CHART

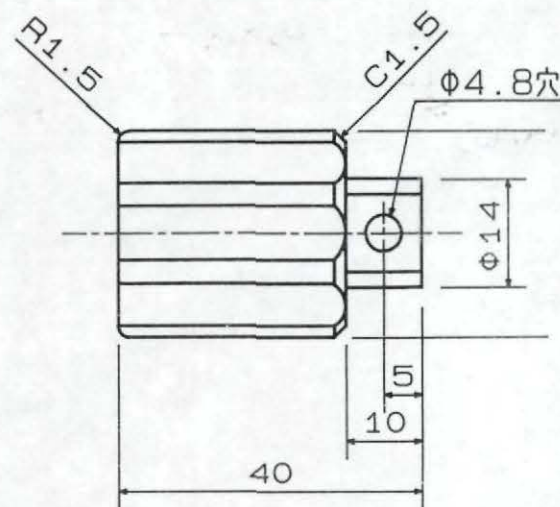


7 — ABCDEFGHIJKLMNOPQRST

20 — ABCDEFG

32 — ABCDE

P2, 300



CONSTRUCTION FIXINGS FOR THE FOLLOWING

(as requested by Marlborough District Council)

Bearer To Piles

2/4.9mm Galv Wire Dogs together with 2/100x3.75 Galv Nails skew driven into Piles.

Bottom Plate To Slab

12mm dia Galv Tru Bolts @ ⁹⁰⁰~~1000~~mm crs along plate min 100mm into concrete with bolt bent to prevent turning. Start bolts max 200mm from corners or change of direction of plate. NB On external walls project plate over slab edge 6mm.

Lintel Fixings

Refer to the attached sketch.

Roof Trusses/Rafters To Top Plate

Fix Rafters and/or Trusses to Top Plate using 3/100mm x 3.75 skewed nails and 3 Wire Dogs per connection.

Top Plates and Plate Junctions

But join plates over a stud and fix using a 6Kn Galv Nail Plate using 6/40 x 3.15mm nails per side.

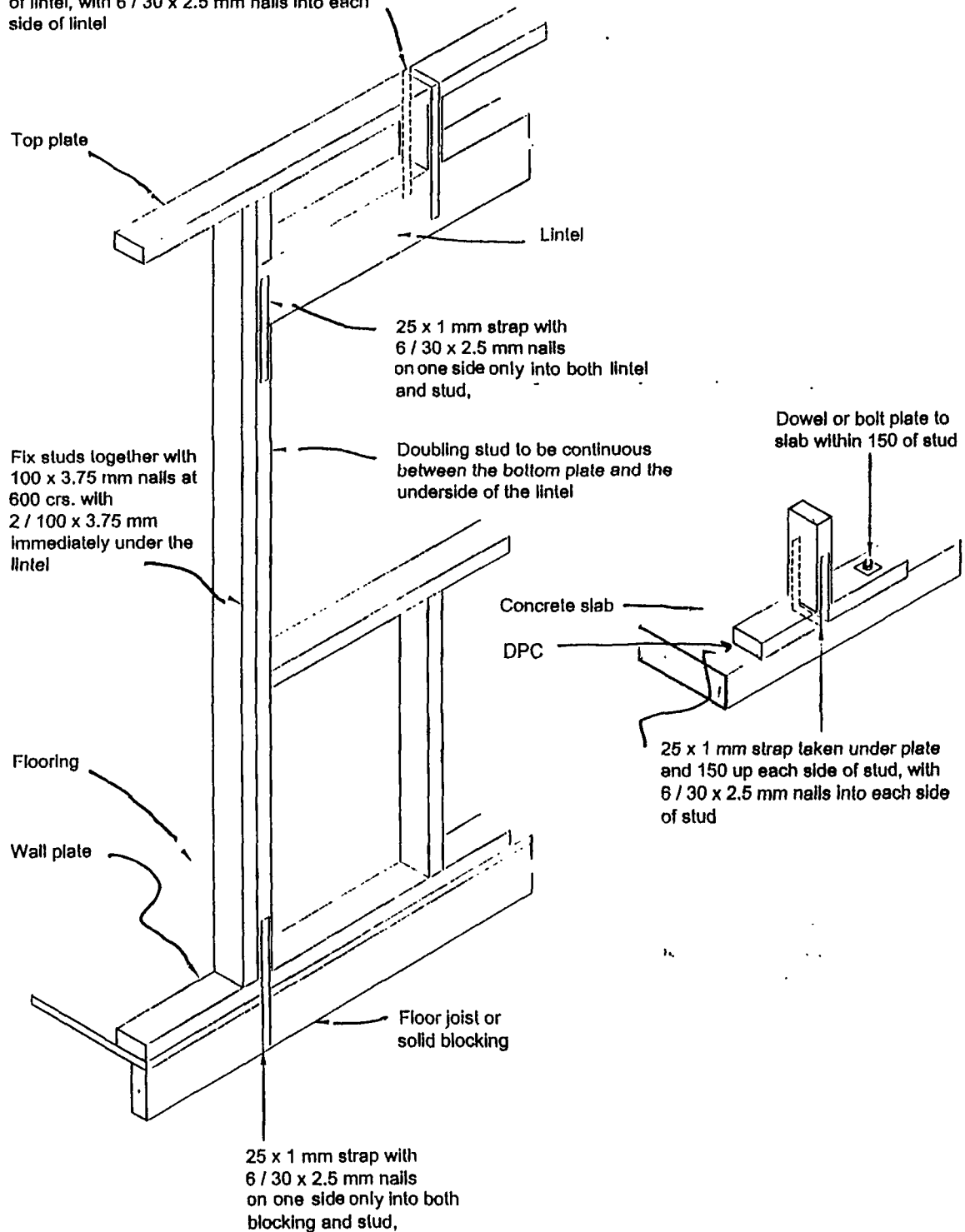
Fix Plates to Studs using 2/100mm x 3.75 (end nailed) and 1/75mm x 3.15 skewed.

Fixing of Floor Joists

Joint	Hand driven nails	
	Length (mm) x diameter (mm) and type	Number and location
Floor framing		
Boundary joist to end of each joist	100 x 3.75	2 (end nailed)
Curtailed joist not exceeding 3 m long to trimmer	100 x 3.75	3 (end nailed)
Curtailed joist to trimmer when half housed	100 x 3.75	2 (end nailed)
Flitched joint in joist	100 x 3.75	4 (each end)
Herringbone strutting to joist	60 x 2.8	2 (skewed)
Joist to plate on foundation walls	100 x 3.75	12 (skewed) per 1.5 m length
Joist to plate or bearer	100 x 3.75	2 (skewed)
Lapped joint in joist	100 x 3.75	2 (each side)
Solid blocking between joists to plate bearer or stringer	100 x 3.75	4 (skewed)
Solid blocking to joist	100 x 3.75 or 75 x 3.15	2 (end nailed) 4 (skewed)

FILE No.:	
OFFICER:	
DATE REC'D	20 AUG 2003

25 x 1 mm strap taken over plate and 150 on each side of lintel, with 6 / 30 x 2.5 mm nails into each side of lintel



(A) DOUBLING STUD

- Fixing of lintels to prevent uplift

Insulation Batts

Wall Batts to be R2.2

Batts to Flat Ceilings to be R2.2

Batts to Sloping Ceilings to be R2.6

Cladding System Details

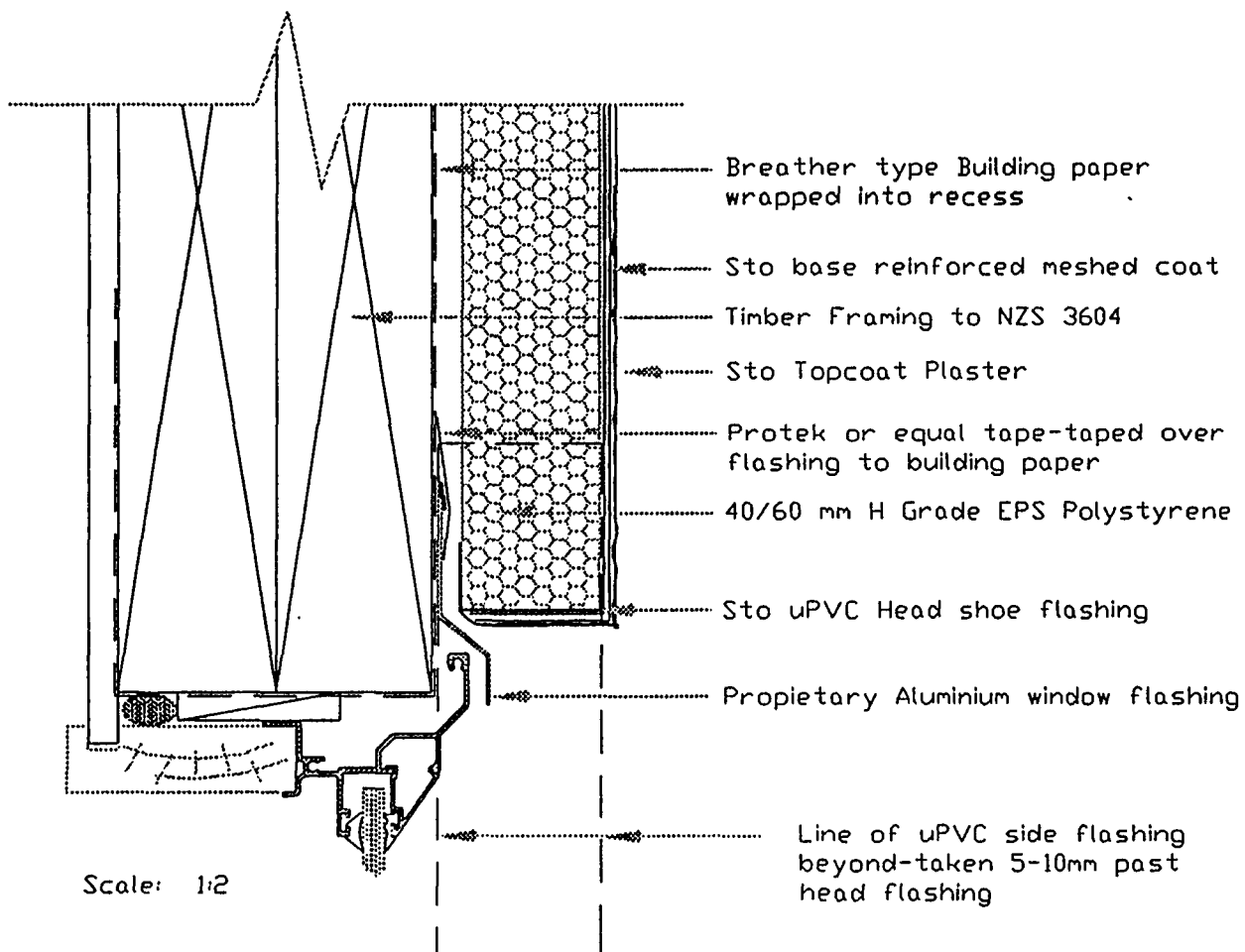
Refer to the attached detail sheets copied from Sto ACAD Details 02.

Smoke Alarms

Refer to the attached plan for location of these.

Stair Landing At Garage

Refer to the attached plan. The landing would intrude into the usable Garage space so the door has been removed.



Note:

At head flashing/uPVC junction
tape over head flashing
to mask onto building paper
and seal edge in MS sealant

STO
THERM

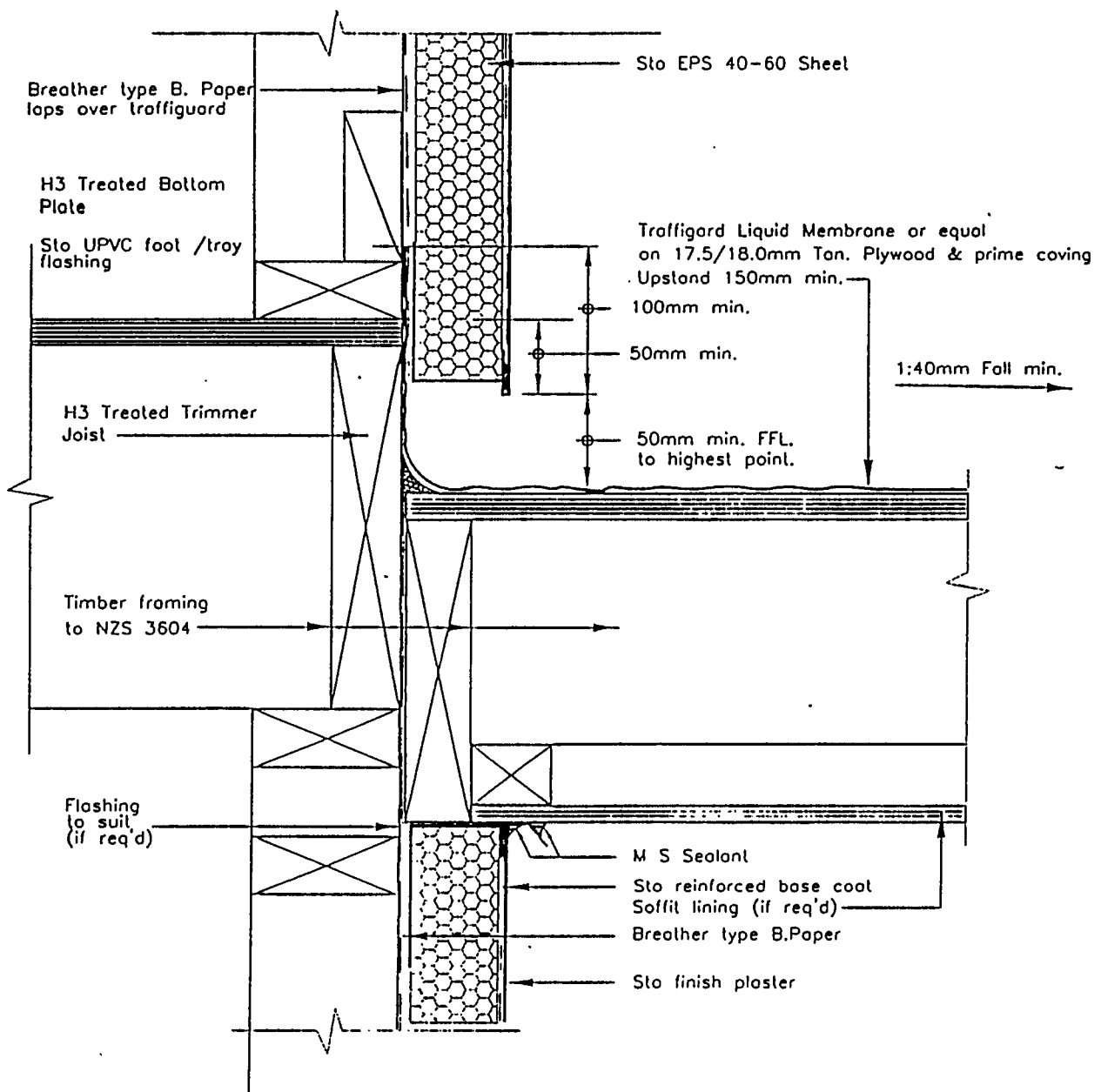
EIF System

Sto Window Head Detail – Alum. Type 3

Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.

STNZ 06e

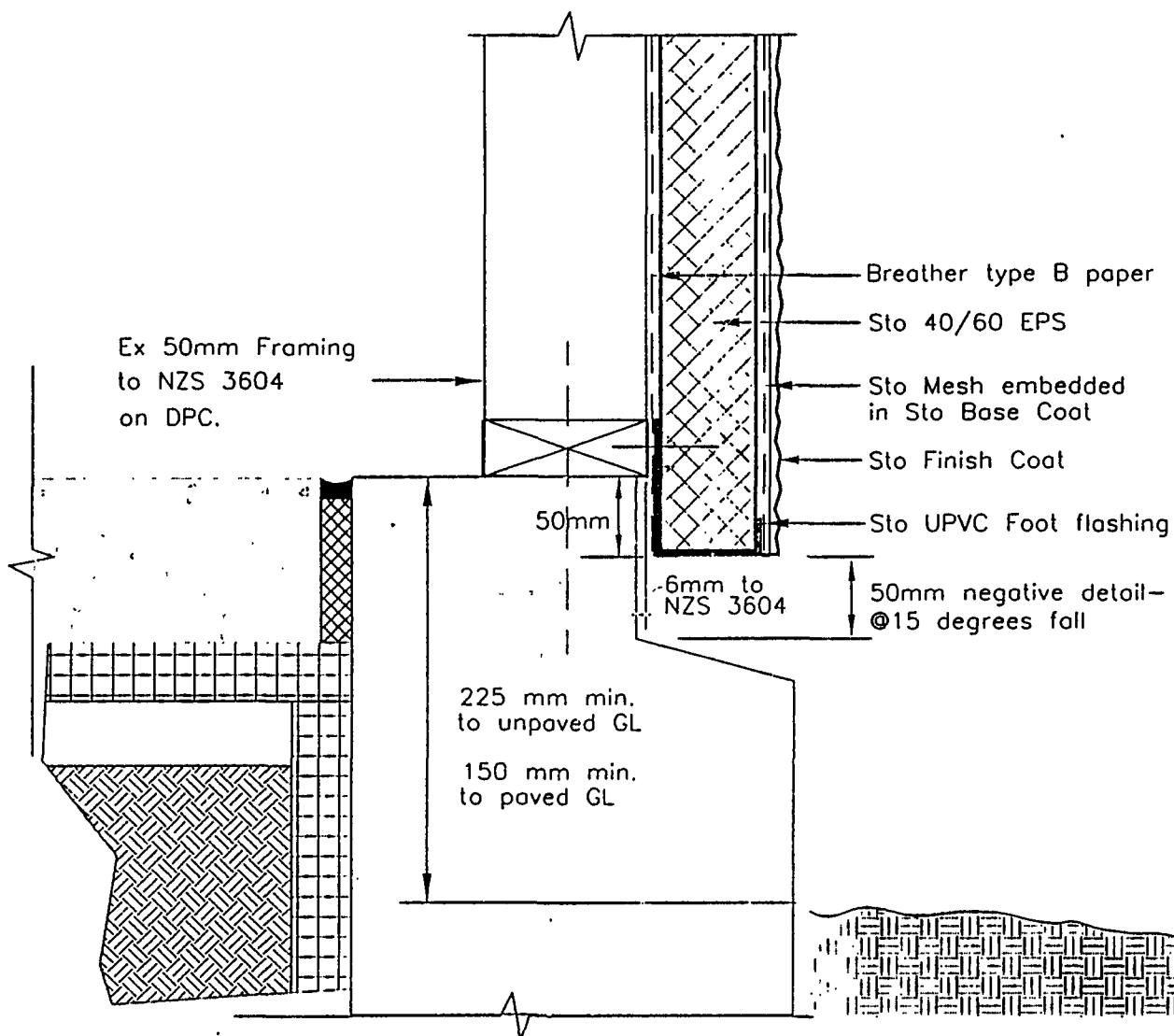
E Nov 2002



Notes:

1. Provide minimum 10 mm sealant joint width.
2. Back flashing by Main Contractor.

STO THERM	Sto EIFS at Wall-Membrane Deck/Closed Soffit Junction	STNZ 24f
EIF System	Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	F Oct 2002



Notes:

1. Distance to grade varies to paved. Allow sufficient distance to prevent snow/ice and puddling water against system.
2. EIFS not adhered to concrete. Maintain the seal/bond breaker tape at EIFS termination.

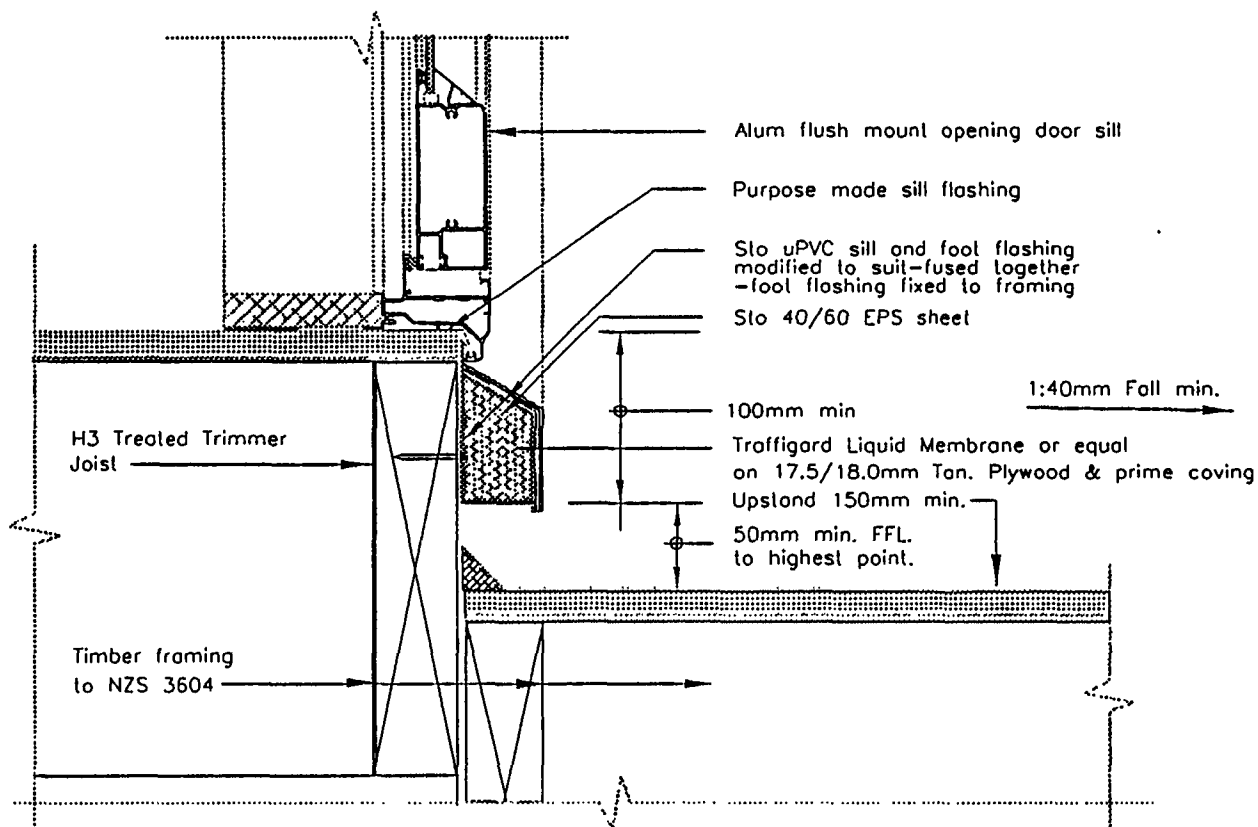
STO THERM
EIF System

Alternate Sto EIFS at Grade-Type 1

STNZ 02b

Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.

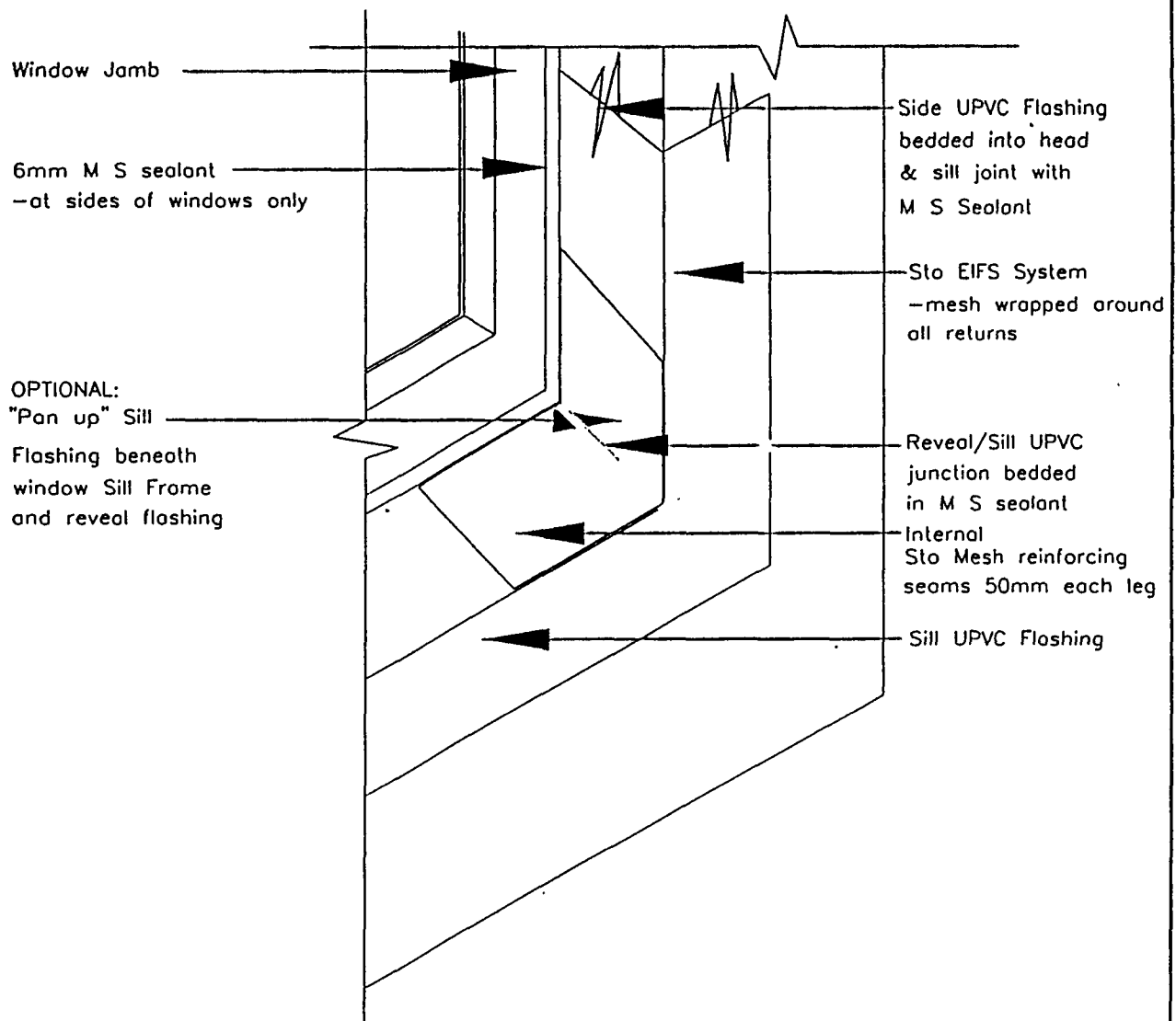
B Oct 2001



Notes:

1. Ensure 3mm clearance from door sill to plaster finish for condensate.
2. Ensure Deck membrane laps up behind at least 150mm.

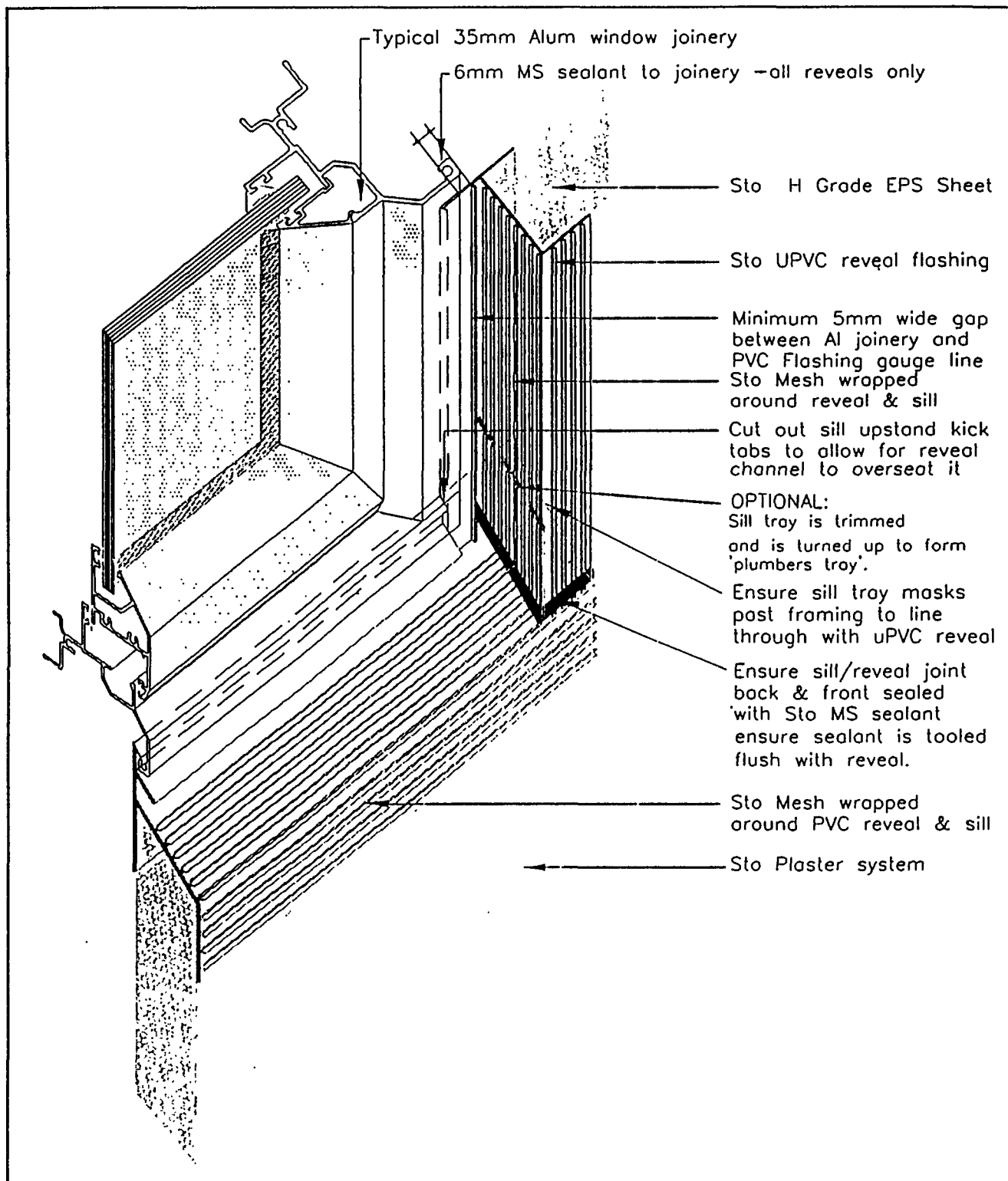
STO THERM EIF System	Sto EIFS below door sill at 150mm deck clearance	STNZ 45
	Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	



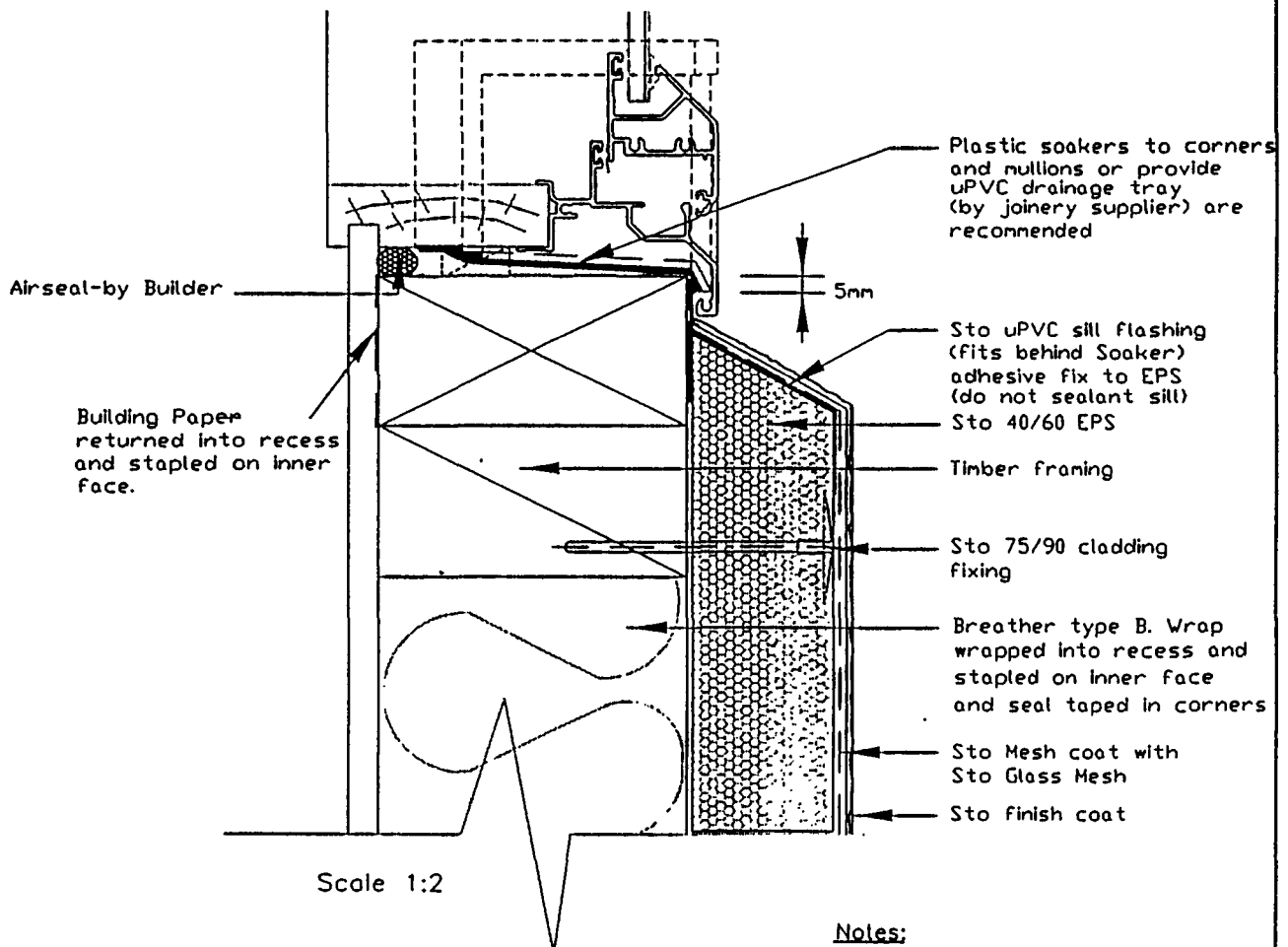
Notes:

1. Provide minimum 5mm clearance from the inner face of the UPVC flashing to the Aluminium joinery for sealant bead. depth to install sealant.

STO THERM EIFS System	Sto EIFS at Window Jamb Sill joint	STNZ 14a
	Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	A May 2001



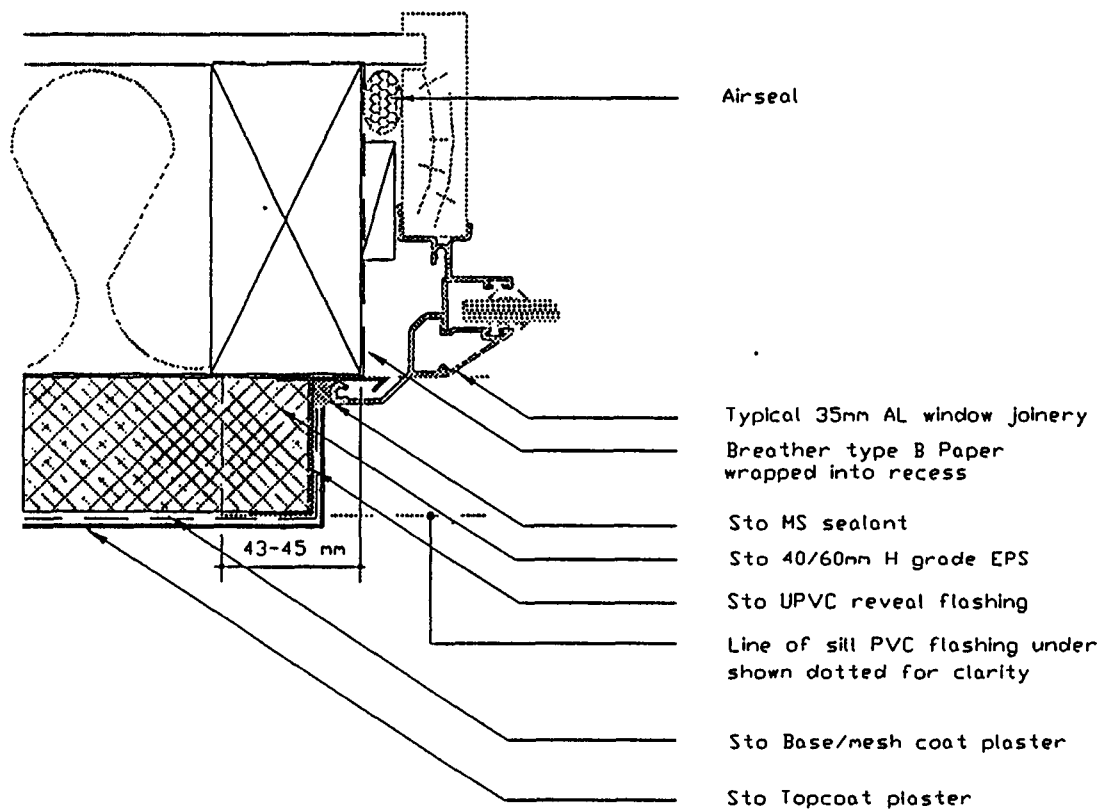
STO THERM EIF System	Sto Window Sill-Reveal Axonometric Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	STNZ 13e E Sept 2002
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Notes:

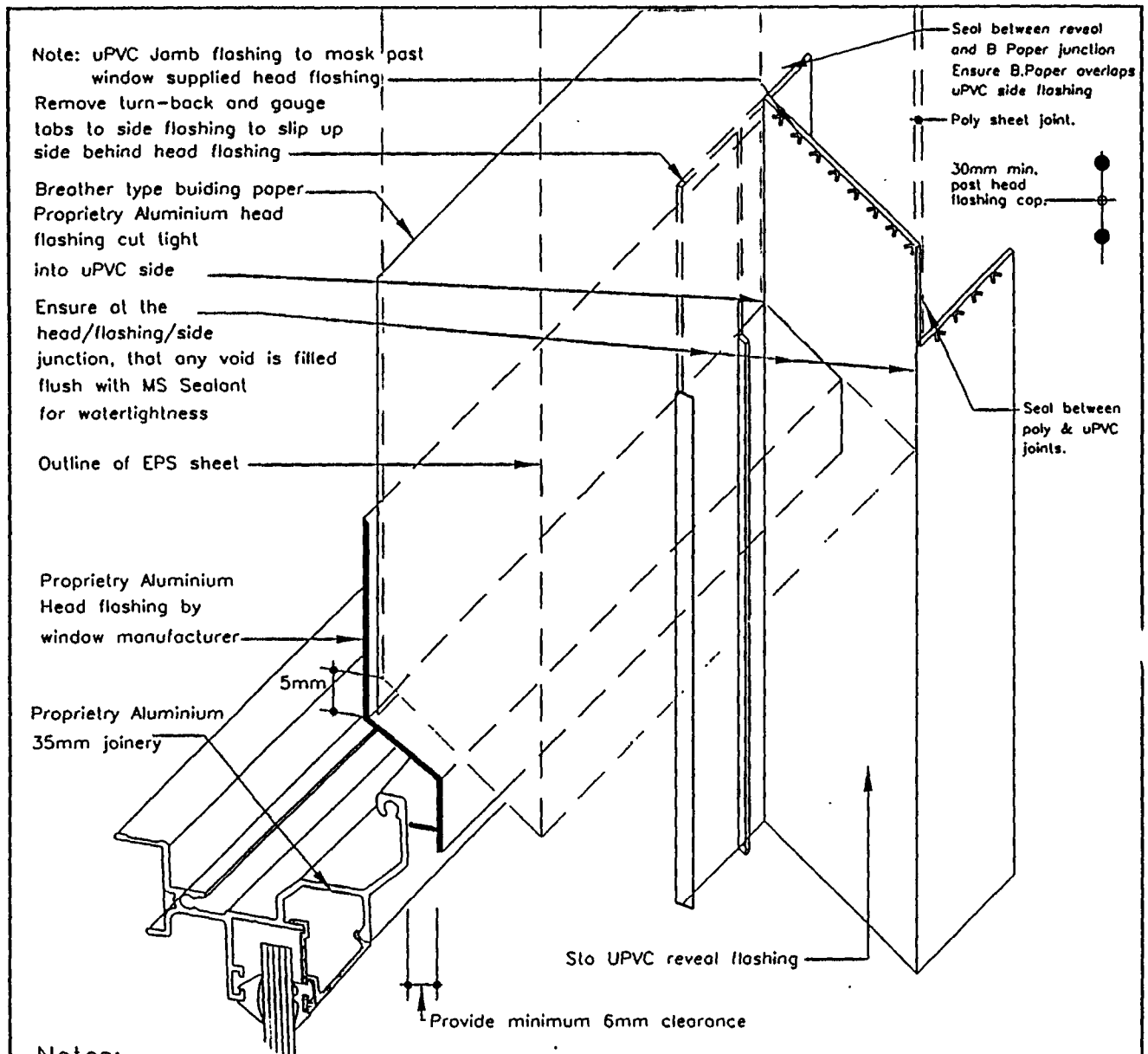
1. Provide minimum 6mm fillet bead of MS sealant to head/reveal & reveal/side junction corner flashing joints.
2. Plastic Soakers filled by Joinery supplier before window placement
3. No Sealant is applied to the sill just to sill/reveal junction.

STO THERM EIF System	Sto Window Sill only – Alum. Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	STNZ 12d D Sept 2002
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Scale: 1:2

STO THERM EIF System	Sto Window Reveal-Aluminium Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accommodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.	STNZ 11c C Nov 2002
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Notes:

1. Provide minimum 5mm depth from Aluminium window to capillary track of UPVC flashing, for the Sto Plaster and Sto MS sealant.
2. The Head flashing is tightly obtult into the uPvc side flashing.
3. Ensure all joints between the Alum. head & sill UPVC flashings is back and front sealed with Sto MS sealant-6mm caulked bead.

STO THERM
EIF System

Sto EIFS UPVC Head-Side joint

STNZ 6-1e

Sto details are intended for use by the design professional and user of Sto products to assist in developing specific project details. They should be modified where necessary to accomodate individual project conditions. The wall assembly must be designed to prevent or control condensation within the assembly. Final details and specifications must be approved by a licensed professional.

E Oct 2002

SMOKE ALARMS

AS from the end of April 2003, the New Zealand Building Code requires smoke alarms in all new dwellings and dwellings that are altered. Even very minor alteration work will trigger the need for new smoke alarms even water cylinder replacement or logfires.

Your Building Consent is issued on the condition that complying smoke alarms be provided and installed in a complying manner. The following information is intended to help you select and place the alarms correctly.

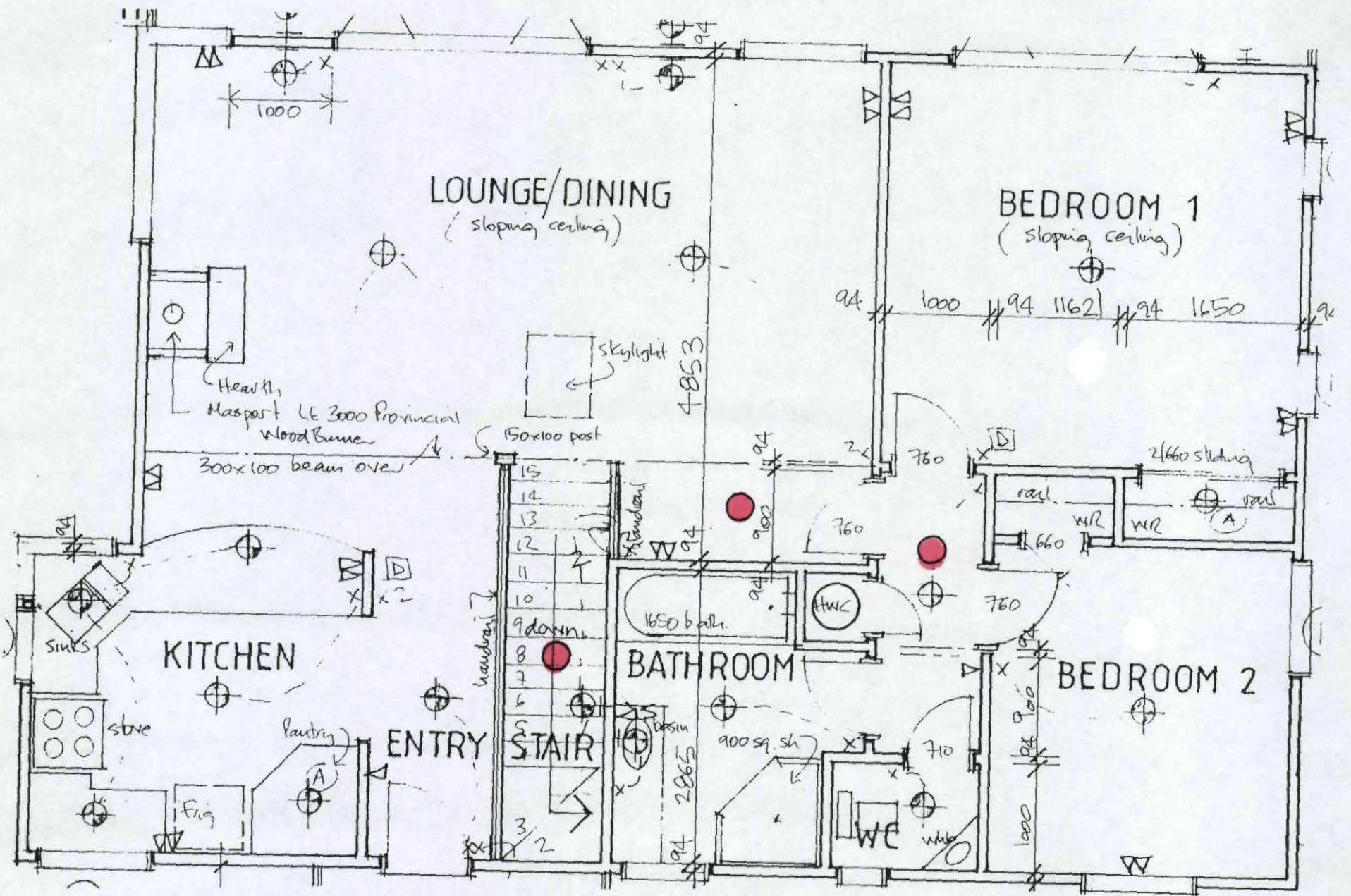
- 1 Only alarms complying with the following standards are acceptable. UL217, ULC-S531, AS3786, BS5446 Part 1. Look on the alarm or the packet for an indication that the alarm complies. If it doesn't say so then it won't be accepted as complying.
- 2 One alarm is required in all escape routes with at least one on every level. (Passageways, halls, lobbies, stair wells)
- 3 One alarm is required in every sleeping space or within 3.0) meters of every sleeping space. If the alarm is outside of the bedroom door then it needs to be loud enough to wake a sleeping person in the bedroom with the door closed. We recommend one in every bedroom.
- 4 Alarms must have a hush facility. (Able to be switched off for a period of at least 1 minute).
- 5 All alarms must have a test facility.
- 6 Existing alarms will not be accepted as complying unless they meet one of the standards listed above. You can keep them in the house but complying ones meeting all new requirements will also be needed.
- 7 Alarms do not need to be interconnected.
- 8 Battery powered alarms are acceptable if they meet all of the other requirements.

No Code Compliance Certificate will be issued unless fully complying alarms are in position and operating.

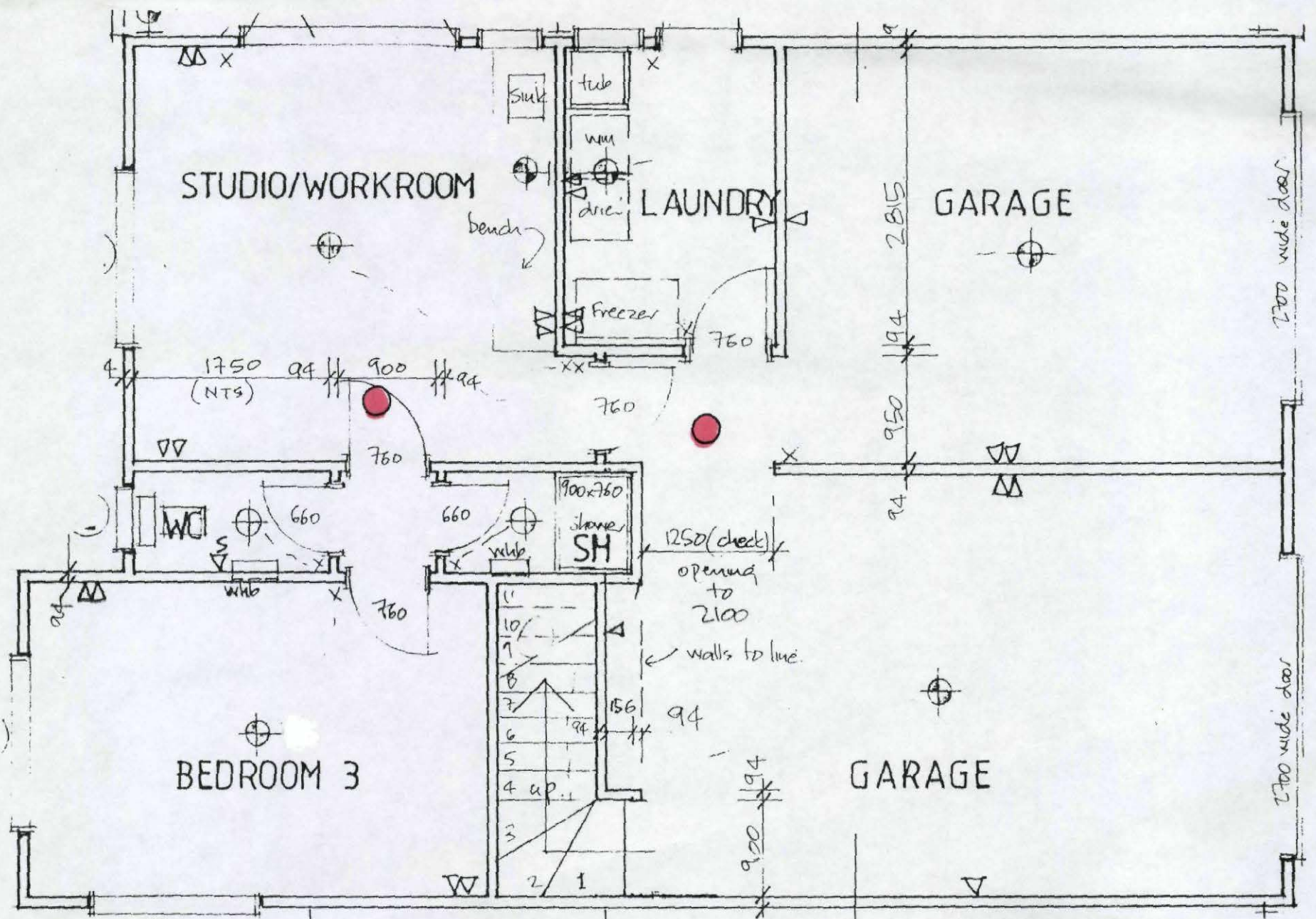
If you have any questions ask the Building Inspector when he is on site.

Graham Roberts
Group Leader Building Control

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UPPER LEVEL



LOWER LEVEL

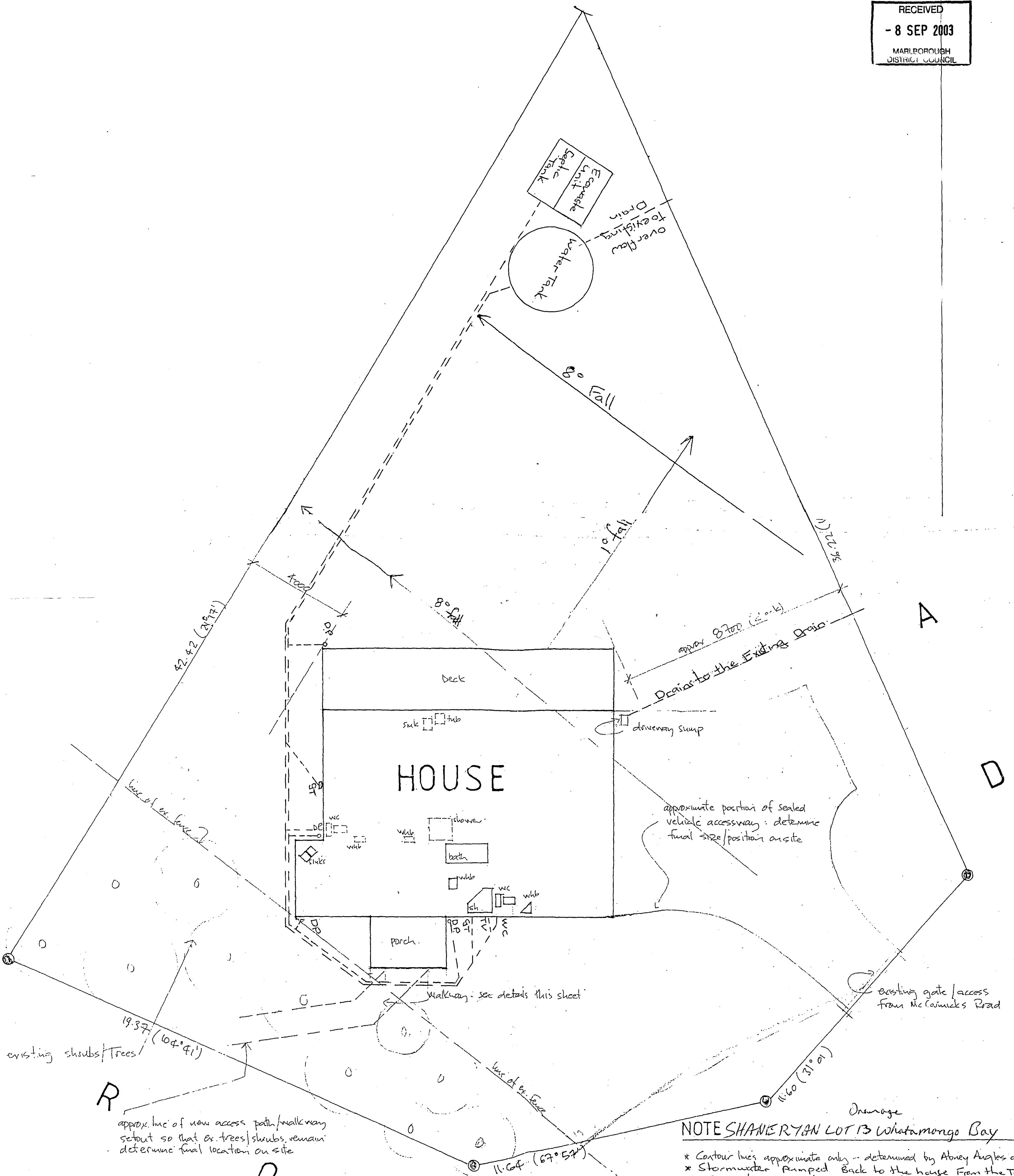
Smoke detectors ●

BC 031396 SPECS



- * Contour lines approximate only -- determined by Abney Angles as sk
- * Stormwater Ramped Back to the house From the Tank.
- * Ecowaste pumped to EPL Plant Fields.
- * Power from the house to the Ecowaste unit + water pump, to be layed in the trench under Stormwater pipes
- * Determine final siting of house on site
- * Shrubs/Trees between Road and Fence are to remain.

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NOTE SHANIERYAN LOT 13 Whatamongo Bay

- * Contour lines approximate only - determined by Abney Angles as sh
- * Stormwater Pumped Back to the house From the Tank.
- * Ecomate Pumped to Effluent Fields.
- * Power from the house to the Ecomate unit + water pump, to be layed in the trench under stormwater pipes
- * Determine final siting of house on site
- * Shrubs/Trees between Road and Fence are to remain.

