



SUITE 17, 808 FOREST ROAD, PEAKHURST 2210 ABN 73 107 291 494
P. 02 9046 3874 SYDNEY@DAYDESIGN.COM.AU WWW.DAYDESIGN.COM.AU#

Environmental Noise & Vibration Assessment

Proposed Metal Recovery and Recycling Facility
57 - 69 Tattersall Road, Kings Park, NSW

REPORT NUMBER
6186-3.1R

DATE ISSUED
21 October 2019

Prepared For:

Rush Metal Recyclers Pty Ltd
C/- Barker Ryan Stewart
Suite 603, Level 6, 12 Century Circuit
Norwest Business Park NSW 2153

Attention: Ms Kim Stamper



Revision History

Status	Date	Prepared	Checked	Comment
Draft 1	20/09/2018	Adam Shearer	Stephen Gauld	By email, for client review
Draft 2	03/10/2018	Adam Shearer	Stephen Gauld	By email, for client review
Draft 3	18/01/2018	Adam Shearer	Stephen Gauld	Shear barrier changes
Draft 4	20/03/2019	Adam Shearer	Stephen Gauld	Traffic movements
Draft 5	08/10/2019	Adam Shearer	Stephen Gauld	Copper Granulator
Final	21/10/2019	Adam Shearer	Stephen Gauld	

Document 6186-3.1R, 26 pages plus attachments

Disclaimer

The work presented in this document was carried out in accordance with the Day Design Pty Ltd Quality Management System. Day Design is certified to ISO9001.

Day Design Pty Ltd reserves all copyright of intellectual property in any or all of Day Design's documents. No permission, license or authority is granted by Day Design to any person or organisation to use any of Day Design's documents for any purpose without written consent of Day Design.

This report has been prepared for the client identified in Section 1.0 only and cannot be relied or used by any third party. Any representation, statement, opinion or advice, expressed or implied in this report is made in good faith but on the basis that Day Design is not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in any respect of any representation, statement, or advice referred to above.

Recommendations made in this report are intended to resolve acoustical problems only. No claims of expertise in other areas are made and no liability is accepted in respect of design or construction for issues falling outside the specialist field of acoustical engineering including but not limited to structural, fire, thermal, architectural buildability, fit for purpose, waterproofing or other aspects of building construction. Supplementary professional advice should be sought in respect of these issues.

The information in this document should not be reproduced, presented or reviewed except in full. Prior to passing onto a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission. The only exception to this is for the Regulatory Authority in its use of this report to make a Determination.



TABLE OF CONTENTS

1.0	CONSULTING BRIEF.....	5
2.0	SITE & PROJECT DESCRIPTION	6
3.0	NOISE SURVEY INSTRUMENTATION	8
4.0	NOISE AND VIBRATION CRITERIA.....	9
4.1	Measured Ambient Noise Level	9
4.2	NSW Department of Planning & Environment.....	10
4.3	NSW Environment Protection Authority.....	10
4.3.1	DoPE Request for Input.....	10
4.3.2	NSW Noise Policy for Industry	11
4.3.2.1	Project Intrusiveness Noise Levels	11
4.3.2.2	Project Amenity Noise Levels.....	12
4.3.2.3	Sleep Disturbance Criteria.....	13
4.3.3	NSW Road Noise Policy – On Road Traffic Noise Criteria	14
4.4	Vibration Guidelines.....	14
4.4.1	EPA Vibration Guideline	14
4.4.2	British Standard BS7385-2	15
4.4.3	German Standard - DIN4150:1999.....	15
4.5	Project Specific Noise and Vibration Criteria.....	16
4.5.1	Noise - Residential Receptors.....	16
4.5.2	Noise - Industrial Receptors.....	16
4.5.3	Vibration - Industrial & Residential Receptors	17
4.5.4	Vibration – Buried Pipework	17
5.0	NOISE EMISSION	18
5.1	Site Noise Emission.....	19
5.2	On Road Traffic Noise	20
5.3	Predicted Noise Levels	21
5.3.1	Predicted Cumulative Noise Levels – General Operations.....	21
5.3.2	Predicted Sleep Disturbance Noise Levels	23
5.3.3	Predicted On Road Traffic Noise	23
6.0	VIBRATION EMISSION	24
7.0	NOISE CONTROL RECOMMENDATIONS - ACOUSTIC BARRIERS	25
8.0	NOISE & VIBRATION IMPACT STATEMENT.....	26
	APPENDICES.....	26



TABLES

Table 1	Noise Sensitive Receptor	6
Table 2	Noise Instrumentation.....	8
Table 3	Ambient Noise Levels.....	9
Table 4	Amenity Noise Levels (<i>NPI - Table 2.2</i>)	12
Table 5	Preferred & Maximum Weighted RMS Values for Impulsive Vibration Acceleration (m/s^2) - 1 – 80 Hz	14
Table 6	Transient Vibration Guide Values for Cosmetic Damage	15
Table 7	Guideline Values for Vibration on Buried Pipework.....	15
Table 8	$L_{eq, 30 \text{ second}}$ Sound Power Levels	19
Table 9	L_{max} Sound Power Levels.....	19
Table 10	$L_{eq, 10 \text{ second}}$ Sound Power Level of a Truck Pass By.....	20
Table 11	Predicted $L_{eq, 15 \text{ minute}}$ Noise Levels – All Receptors – Use of Site	22
Table 12	Predicted L_{max} Noise Levels at Residential Receptors - Sleep Disturbance	23
Table 13	Predicted $L_{eq, 15 \text{ hour}}$ Noise Levels at Residential Receptor - On Road Traffic.....	23



1.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Barker Ryan Stewart on behalf of Rush Metal Recyclers Pty Ltd to conduct a noise and vibration assessment of a proposed metal recovery and recycling facility at 57-69 Tattersall Road, Kings Park, NSW.

This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Prepare a site plan identifying the proposal and nearby noise sensitive locations
- Establish acceptable noise and vibration level criteria
- Quantify noise and vibration emissions from the site
- Calculate the level of noise and vibration emission, taking into distance attenuation
- Provide recommendations for noise and vibration controls (if necessary)
- Prepare an Environmental Noise and Vibration Assessment Report.



2.0 SITE & PROJECT DESCRIPTION

The site is located at 57-69 Tattersall Road, Kings Park, NSW, within in an industrial area zoned as IN1 – General Industrial under the Blacktown Local Environmental Plan (2015).

Rush Metal Recyclers Pty Ltd, trading as Pick and Payless, currently operates a metal recovery and recycling facility which includes the sale of second hand motor vehicle parts at the above address. The site currently processes 30,000 tons of scrap metal per year.

The site is surrounded in all directions by industrial premises. To the east of the site is a metal recycling facility operated by 'Sell and Parker', who also operate a car shredding machine.

The nearest residential receptors to the site are in excess of 500 metres away to the east (at 187 Sunnyholt Road) and west (at 5 Chedley Place). These residences have no line of sight to the subject site and the attenuation due to the intervening industrial buildings is significant.

Distances are based on the assessment point at the receptor location to the proposed car shredding machine located within the subject site.

Table 1 Noise Sensitive Receptor

Receptor and Type	Address	Direction from site
R1 – Industrial	71-77 Tattersall Road	North
R2 – Industrial	45 Tattersall Rd	East
R3 – Industrial	24 Forge Street	South
R4 – Industrial	37 Bessemer Street	West
R5 – Residential	187 Sunnyholt Road	East
R6 – Residential	5 Chedley Place	West

Pick and Payless propose to operate a car shredder (*Thor 2121K Hammermill*) and the associated processing equipment, a pre-shredder (*Taurus, Bravo - B16H*) and non-ferrous processing equipment (*Steinert – Finesmaster Package & KSS 200*), a shear (*Vezzani*), a copper granulator (*Matrix 380VZT*), excavators and trucks on the site. The site will process 130,000 tons of scrap metal per year.

The proposed hours of operation are as follows:

Machinery: 7 days a week - 6.00 am to 6.00 pm; and

Maintenance: 7 days a week - 6.00 pm to 6.00 am.

The proposal is a State Significant Development (SSD) and has been issued with the Secretary's Environmental Assessment Requirements (SEARs) by the NSW Department of Planning and Environment. The SEARs require an assessment against the NSW Environment Protection Authority's (EPA) *Industrial Noise Policy (2000)*, *NSW Road Noise Policy (2011)*, *Environmental Criteria for Road Traffic Noise (1999)* and *Assessing Vibration: A Technical Guideline (2006)*.



An acoustic assessment of the noise and vibration from the use of the site has been carried out to ensure the noise impact will not adversely affect the acoustic amenity of the nearby noise sensitive receivers.

Calculations show that, provided the recommendations in Section 7 of this report are implemented and adhered to, the level of noise and vibration emission from the metal recovery and recycling facility will meet the acoustic requirements in the NSW Environment Protection Authority's *Industrial Noise Policy (2000)*¹, *NSW Road Noise Policy (2011)*, *Environmental Criteria for Road Traffic Noise (1999)* and *Assessing Vibration: A Technical Guideline (2006)*.



Figure 1 – Location Plan – 57 – 69 Tattersall Road, Kings Park, NSW

¹ It is noted that the NSW EPA's Industrial Noise Policy was superseded by the NSW EPA's Noise Policy for Industry in October 2017. The Noise Policy for Industry has therefore been used for the assessment of industrial noise emissions in this report.

3.0 NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis were made with instrumentation as follows in Table 2:

Table 2 Noise Instrumentation

Description	Model No.	Serial No.
Modular Precision Sound Analyser	B&K 2270	264 4584
Condenser Microphone 0.5" diameter	B&K 4189	263 8722
Acoustical Calibrator	CAL200	3646
Modular Precision Sound Analyser	B&K 2270 G4	301 0781
Condenser Microphone 0.5" diameter	B&K 4189	122 8153
Acoustical Calibrator	CAL200	3646
Infobyte Noise Logger (Type 1)	iM4	106
Condenser Microphone 0.5" diameter	MK 250	106
Infobyte Noise Logger (Type 1)	iM4	116
Condenser Microphone 0.5" diameter	MK 250	116

An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitor iM4s is a Type 2 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 0.5 dB during attended measurements and 1 dB during unattended measurements. No adjustments for instrument drift during the measurement period were warranted.



4.0 NOISE AND VIBRATION CRITERIA

This section presents the noise and vibration guidelines applicable to this proposal and establishes the project specific noise and vibration criteria.

4.1 Measured Ambient Noise Level

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the NSW EPA as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for the day, evening or night time periods, measured over a number of days during the proposed days and times of operation.

The location of the residential receivers are shown in the Site Plan on Figure 1 as 'R5' and 'R6'. The times of worst possible annoyance will be during the day when the metal recovery and recycling facility is operating.

Ambient noise levels were measured in the backyard of 1 Attard Avenue, Marayong, and the front yard of 189 Sunnyholt Road, Blacktown, shown as Location 'A' and Location 'B', on Figure 1, from Monday 10 September to Monday 17 September, 2018.

The early morning, day, evening and night time ambient noise levels are presented in the attached Appendix D1 and D2, and also below in Table 3.

Table 3 Ambient Noise Levels

Noise Measurement Location	Time Period	L_{90} Rating Background Level	Existing L_{eq} Noise Level
Location 'A' - Backyard – 1 Attard Avenue	Early Morning (6 am to 7 am)	43 dBA	n/a
	Day (7 am to 6 pm)	40 dBA	62 dBA
	Evening (6 pm to 10 pm)	40 dBA	63 dBA
	Night (10 pm to 7 am)	37 dBA	60 dBA
Location 'B' - Front yard – 189 Sunnyholt Road	Early Morning (6 am to 7 am)	55 dBA	n/a
	Day (7 am to 6 pm)	54 dBA	62 dBA
	Evening (6 pm to 10 pm)	51 dBA	61 dBA
	Night (10 pm to 7 am)	40 dBA	59 dBA

Meteorological conditions during the testing typically consisted of clear skies and temperatures of 4 to 32°C. Atmospheric conditions were ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor areas.



4.2 NSW Department of Planning & Environment

The NSW Department of Planning and Environment (DoPE) issued the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the proposed metal recovery and recycling facility at 57-69 Tattersall Road, Kings Park, NSW (SSD 8375). As part of the SEARs, the following requirements relating to acoustics must be satisfied:

- **'Noise and Vibration – including:**
 - *a quantitative assessment of potential demolition, construction, operational and transport noise and vibration impacts on accordance with relevant Environment Protection Authority guidelines;*
 - *an assessment of the predicted transport noise and vibration impacts and justification of proposed transport routes and times; and*
 - *details and justification of the proposed noise mitigation and monitoring measures.'*

4.3 NSW Environment Protection Authority

4.3.1 DoPE Request for Input

The DoPE requested input from the EPA on SSD 8375, as a result the EPA provided the following matters for consideration:

'Noise and Vibration

Identify all noise sources or potential sources from the development (including both construction and operation phases). Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.

Specifically the times of operation for all phases of the development and for all noise producing activities.

For projects with a significant potential traffic noise impact provide details of road alignment (include gradients, road surface, topography, bridges, culverts etc), and land use along the proposed road and measurement locations – diagrams should be a scale sufficient to delineate individual residential blocks.



4.3.2 NSW Noise Policy for Industry

The NSW Environment Protection Authority (EPA) published the *Noise Policy for Industry* (NPI) in October 2017. The NPI is specifically aimed at assessing noise from industrial noise sources listed in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO, 1997).

The metal recovery and recycling facility is required to hold a licence under the Protection of the Environment Operations Act 1997.

The NPI provides a framework to assess noise emission from a premises, and whether that premises produces intrusive or non-intrusive noise.

Section 2.1 of the NPI states the following:

"Intrusive noise levels are only applied to residential receivers (residences). For other receiver types identified in Table 2.2, only the amenity levels apply."

4.3.2.1 Project Intrusiveness Noise Levels

The EPA states in Section 2.3 of its NSW *Noise Policy for Industry* (October 2017) that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the rating background noise level by more than 5 dB when beyond a minimum threshold (EPA NPI, 2017, Section 2.3).

The Rating Background Level at Location 'A', 1 Attard Avenue, Marayong was 43 dBA in the early morning, 40 dBA during the day and in the evening and 37 dBA at night (see Table 3).

Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ noise intrusiveness criteria in this area is:

- $(43 + 5 =) 48 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the early morning;
- $(40 + 5 =) 45 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day and in the evening; and
- $(37 + 5 =) 42 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.

The Rating Background Level at Location 'B', 189 Sunnyholt Road, Blacktown was 55 dBA in the early morning, 54 dBA during the day, 51 dBA in the evening and 40 dBA at night (see Table 3).

Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ noise intrusiveness criteria in this area is:

- $(55 + 5 =) 60 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the early morning;
- $(54 + 5 =) 59 \text{ dBA } L_{eq, 15 \text{ minute}}$ during the day;
- $(51 + 5 =) 56 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the evening; and
- $(40 + 5 =) 45 \text{ dBA } L_{eq, 15 \text{ minute}}$ at night.



4.3.2.2 Project Amenity Noise Levels

Depending on the type of area in which the noise is being made, there is a certain reasonable expectancy for noise amenity. The *NSW Noise Policy for Industry* provides a schedule of recommended L_{eq} industrial noise levels that under normal circumstances should not be exceeded. If successive developments occur near a residential area, each one allowing a criterion of background noise level plus 5 dB, the ambient noise level will gradually creep higher.

The recommended L_{eq} noise levels below in Table 4 are taken from Section 2.4, Table 2.2 of the NPI. Compliance with the Noise Amenity levels in Table 2.2 will limit ambient noise creep.

Table 4 Amenity Noise Levels (NPI - Table 2.2)

Receiver	Noise Amenity Area	Time of Day	L_{eq} , dBA, Recommended Amenity Noise Level
Residential	Urban	Day	60
		Evening	50
		Night	45
Industrial premises	All	When in use	70

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the NPI assumes that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq, period} + 3 \text{ decibels (dB)}$ (Section 2.2, NPI).

Compliance with the amenity criteria will limit ambient noise creep. **Section 2.4** of the NPI states the following:

*‘To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a **project amenity noise level** applies for each new source of industrial noise as follows:*

- **Project amenity noise level for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB (A)’.**

The following exceptions to the above method to derive the project amenity noise level apply:

3. *Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.’*



In addition, the level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the L_{Aeq} noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the $L_{Aeq, period (traffic)}$ minus 15 dBA.

The existing L_{eq} noise level at Location 'A', 1 Attard Avenue, Marayong was 62 dBA during the day, 63 dBA in the evening and 60 dBA at night (see Table 3).

Therefore, the acceptable amenity criteria for the residential receptors in this area are:

- $(60 - 5 + 3 =) 58$ dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(63^2 - 10 + 3 =) 56$ dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(60^2 - 10 + 3 =) 53$ dBA $L_{eq, 15 \text{ minute}}$ at night.

The existing L_{eq} noise level at Location 'B', 189 Sunnyholt Road, Blacktown was 62 dBA during the day, 61 dBA in the evening and 59 dBA at night (see Table 3).

Therefore, the acceptable amenity criteria for the residential receptors in this area are:

- $(60^3 - 5 + 3 =) 58$ dBA $L_{eq, 15 \text{ minute}}$ during the day;
- $(61^3 - 15 + 3 =) 49$ dBA $L_{eq, 15 \text{ minute}}$ in the evening; and
- $(59^3 - 15 + 3 =) 47$ dBA $L_{eq, 15 \text{ minute}}$ at night.

4.3.2.3 Sleep Disturbance Criteria

The EPA's *Noise Policy for Industry* states in Section 2.5 that the potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Sleep may be disturbed if the subject development night-time noise levels at a residential location exceed the following:

- $L_{Aeq, 15min}$ 40 dBA or the prevailing RBL plus 5 dB, whichever is greater; and/or
- L_{AFmax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

Where either of the above criteria are triggered, a detailed maximum noise level event assessment should be undertaken.

The RBL at Location 'A', 1 Attard Avenue, Marayong was 43 dBA in the early morning (see Table 3).

² Ambient L_{eq} noise levels at Location 'A' were affected by existing industry and rail noise during the day, evening and night.

³ Ambient L_{eq} noise levels at Location 'B' were affected by traffic during the day, evening and night.



Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ and L_{AFmax} noise sleep disturbance criteria in this area is:

- $(43 + 5 =) 48 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the early morning; and / or
- $(43 + 15 =) 58 \text{ dBA } L_{AFmax}$ in the early morning.

The RBL at Location 'B', 189 Sunnyholt Road, Blacktown was 55 dBA in the early morning, (see Table 3).

Therefore, the acceptable $L_{eq, 15 \text{ minute}}$ and L_{AFmax} noise sleep disturbance criteria in this area is:

- $(55 + 5 =) 60 \text{ dBA } L_{eq, 15 \text{ minute}}$ in the early morning; and / or
- $(55 + 15 =) 70 \text{ dBA } L_{AFmax}$ in the early morning.

4.3.3 NSW Road Noise Policy – On Road Traffic Noise Criteria

The EPA indicates in Table 3 of its *NSW Road Noise Policy* that the level of noise intrusion from land use developments with potential to create additional traffic on freeways / arterial / sub-arterial roads should not exceed $L_{Aeq, 15 \text{ hour}}$ 60 dBA during the day time (7 am to 10 pm) and $L_{Aeq, 9 \text{ hour}}$ 55 dBA during night time (10 pm to 7 am).

We recommend that this criterion be applied for the assessment of noise at the nearby residential receptor, 'R5', for trucks from the site travelling on Sunnyholt Road.

4.4 Vibration Guidelines

4.4.1 EPA Vibration Guideline

The NSW EPA published the *Assessing Vibration: a technical guideline* in February 2006. This guideline is based on the British Standard BS6472:1992 "Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)."

The guideline presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. The guideline considers vibration from occasional loading and unloading activities as Impulsive Vibration. Table 2.4 of the guideline sets out limits for Vibration Dose Values to assess impulsive vibration and is replicated below in Table 5 for residential and industrial receptor locations.

Table 5 Preferred & Maximum Weighted RMS Values for Impulsive Vibration Acceleration (m/s^2) - 1 – 80 Hz

Receptor Location	Daytime ¹		Night – time ¹	
	Preferred Value	Maximum value	Preferred Value	Maximum value
Residences	0.30	0.60	0.10	0.20
Workshops	0.64	1.28	0.64	1.28

¹ Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.



4.4.2 British Standard BS7385-2

The British Standard BS7385-2:1993 “*Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration*” provides guide values for transient vibration relating to cosmetic damage, replicated in Table 6 for residential and industrial buildings.

Table 6 Transient Vibration Guide Values for Cosmetic Damage

Type of building	Peak component particle velocity in frequency range of predominant pulse	
	4 Hz to 15 Hz	15 Hz and above
Residential buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
Industrial buildings	50 mm/s at 4 Hz and above	

In our opinion, an overall peak particle velocity of **15 mm/s** at the residential boundaries and **50 mm/s** at the industrial boundaries will comply with the recommended values in Table 6, and is an acceptable criterion for impulsive vibration to prevent cosmetic damage to the adjacent industrial buildings or residential buildings some 500 metres away.

4.4.3 German Standard - DIN4150:1999

Service pipelines may exist in the immediate area surrounding the site. German Standard DIN 4150-3:1999 also provides guideline vibration values for buried pipework, which is summarised as follows in Table 7.

Table 7 Guideline Values for Vibration on Buried Pipework

Line	Pipe Material	Guideline Values For Velocity Measured On The Pipe - mm/sec
1	Steel (including welded pipes)	100
2	Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80
3	Masonry, plastic	50

These values shall be adopted when assessing vibration levels for services and pipework in areas nearby the site.



4.5 Project Specific Noise and Vibration Criteria

The most stringent noise and vibration criteria at each receptor location are follows:

4.5.1 Noise - Residential Receptors

Based on measurements at Location 'A'

These criteria apply at the most-affected point on or within the residential property boundary of 'R6':

- **48 dBA** $L_{eq, 15 \text{ minute}}$ in the early morning;
- **45 dBA** $L_{eq, 15 \text{ minute}}$ during the day and in the evening; and
- **42 dBA** $L_{eq, 15 \text{ minute}}$ at night.

The following criterion will be applied at 1 metre from the residential façade of 'R6' for sleep disturbance:

- **58 dBA** L_{AFmax} in the early morning.

Based on measurements at Location 'B'

These criteria apply at the most-affected point on or within the residential property boundary of 'R5':

- **60 dBA** $L_{eq, 15 \text{ minute}}$ in the early morning;
- **58 dBA** $L_{eq, 15 \text{ minute}}$ during the day;
- **49 dBA** $L_{eq, 15 \text{ minute}}$ during the evening; and
- **45 dBA** $L_{eq, 15 \text{ minute}}$ at night.

The following criterion will be applied at 1 metre from the residential façade of 'R6' for sleep disturbance:

- **70 dBA** L_{AFmax} in the early morning.

The following criterion will be applied at 1 metre from the residential façade of 'R5' for on road traffic noise:

- **60 dBA** $L_{Aeq, 15 \text{ hour}}$ during the day; and
- **55 dBA** $L_{Aeq, 9 \text{ hour}}$ during the night.

4.5.2 Noise - Industrial Receptors

- $(70 - 5 + 3 =)$ **68 dBA** $L_{eq, 15 \text{ minute}}$ when in use.



4.5.3 Vibration - Industrial & Residential Receptors

The most relevant vibration management levels for this development are as follows:

- An RMS Acceleration Value between **0.10 – 0.20 m/s²** for human annoyance inside the nearby residence; and
- An RMS Acceleration Value between **0.64 – 1.28 m/s²** for human annoyance inside the nearby industrial premises.
- A Peak Particle Velocity no greater than **15 mm/s** for cosmetic damage at the residential buildings.
- A Peak Particle Velocity no greater than **50 mm/s** for cosmetic damage at the industrial buildings.

NOTE: Day Design is of the opinion the proposed use of the site, which includes truck movements, car shredding machines, shear and copper granulator, will not cause vibration at a level that may cause human discomfort or the dilapidation of the surrounding premises. However, recommendations are provided in Section 6.0 of this report in the unlikely event complaints are received regarding vibration levels from the use of the site

4.5.4 Vibration – Buried Pipework

Peak Particle Velocity values for buried pipework, as measured on or within close proximity to the buried pipework for structural damage of:

- 50 mm/s for masonry or plastic pipes;
- 80 mm/s for concrete, clay or metal pipes; and
- 100 mm/s for steel pipes.

Given the relatively high guideline vibration values and the distance from the car shredding machines, shear and copper granulator, it is unlikely that any industrial, commercial or residential premises, services or buried pipework will be exposed to vibration levels approaching these values.



5.0 NOISE EMISSION

The main sources of noise associated with the metal recovery and recycling facility include the car shredding machines, shear, copper granulator, excavators used to prepare the car bodies, downstream processing equipment and other mobile plant used to transport the finished products including ferrous metals, non-ferrous metals and waste.

We have been advised that the existing daily heavy vehicle traffic volume to the site per day are as follows:

- 50 per day < 15 tonne GVM;
- 10 per day < 25 tonne GVM;
- 10 per day < 30 tonne GVM; and
- 30 per day < 43 tonne GVM.

This equates to 200 truck movements to the site per day (6.00 am to 6.00 pm), 17 truck movements per hour and 4 truck movements every 15 minutes.

The Barker Ryan Stewart Total Project Solutions '*Traffic and Parking Impact Assessment Report*' for 57 Tattersall Road, Kings Park, Blacktown, CC 160135, dated 11 September 2019, in Section 4.1 '*Traffic Generation*', shows that the proposed traffic generation will be 756 truck movements to the site per day (6.00 am to 6.00 pm), which equates to 63 truck movements per hour and 16 truck movements every 15 minutes.

We have also assumed (calculated) the following distribution of daily heavy vehicles based on the existing distribution above:

- 189 per day < 15 tonne GVM;
- 38 per day < 25 tonne GVM;
- 38 per day < 30 tonne GVM; and
- 113 per day < 43 tonne GVM.

Calculations are based on the drawing prepared by Barker Ryan Stewart, dated 3 September 2019, as shown in the attached Appendix A.



5.1 Site Noise Emission

The L_{eq} sound power level and spectrum of a container truck, excavator and car shredders has been measured previously at other sites by Day Design and is given below in Table 8. The L_{eq} sound power level of the shear and copper granulator have been provided by the manufacturers and is also shown below in Table 8.

Table 8 L_{eq} , 30 second Sound Power Levels

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Container Truck Passing	111	89	94	103	105	105	106	99	89
Container truck idle & reversing (with alarm)	97	103	99	87	88	95	89	81	74
Excavator – pick and place	107	113	107	105	103	103	100	94	94
Car Shredders - Thor 2121K Hammermill & Taurus Bravo - B16H	126	127	122	122	121	121	119	118	113
Vezzani Shear	117	118	113	113	112	112	110	109	104
Copper Granulator	95	96	91	91	90	90	88	87	82

**Numbers in italics are estimated based on other similar machinery.*

The L_{max} sound power level and spectrum of a container truck, excavator and car shredders has been measured previously at other sites by Day Design and is given below in Table 9. The L_{eq} sound power level of the shear and copper granulator have been provided by the manufacturers and has been used to estimate the L_{max} sound power level as shown below in Table 9.

Table 9 L_{max} Sound Power Levels

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	63	125	250	500	1k	2k	4k	8k
Container truck idle & reversing (with alarm)	101	108	104	91	91	99	93	84	77
Excavator – pick and place	113	122	112	111	109	109	105	98	90
Car Shredders - Thor 2121K Hammermill & Taurus Bravo - B16H	133	134	129	129	128	128	126	125	120
Vezzani Shear	124	125	120	120	119	119	117	116	111
Copper Granulator	102	103	98	98	97	97	95	94	89

**Numbers in italics are estimated based on other similar machinery.*



5.2 On Road Traffic Noise

The $L_{eq, 10 \text{ second}}$ sound power level and spectrum of a truck pass by has been measured previously at other sites by Day Design and is shown below in Table 10.

Table 10 $L_{eq, 10 \text{ second}}$ Sound Power Level of a Truck Pass By

Description	dBA	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
$L_{eq, 10 \text{ second}}$ - Truck Pass By	116	94	99	108	110	110	111	104	94



5.3 Predicted Noise Levels

Knowing the sound power and pressure levels of a noise source (see Tables 8, 9 and 10), the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for sound transmission loss, distance losses, sound barriers, ground absorption, atmospheric effects, etc.

5.3.1 Predicted Cumulative Noise Levels – General Operations

The proposed location for the shredder, pre-shredder, downstream ferrous and non-ferrous processing equipment and shear are shown in Appendix A. The shredder and pre-shredder will be fixed to a concrete slab and a metal shed will also be constructed on the slab to the south of the shredder. The copper granulator is proposed to be located in Building B.

The calculated noise levels include the following barrier assumptions and recommendations:

- R1 – approved (CDC 180201) 5 metre barrier to the north of the shredders and recommended 3.5 and 2.5 metre high barrier north of the shear, as shown in Appendix A;
- R2 – existing 9 metre high (approximate) barrier on eastern boundary of site;
- R3 – approved (CDC 180201) 4 metre barrier to the south of the shredder, as shown in Appendix A;
- R4 – approved (CDC 180201) 6 metre barrier to the west of the shredder and recommended 3.5 metre high barrier west of the shear, as shown in Appendix A;
- R5 – existing industrial buildings, 8 metres high; and
- R6 – existing industrial buildings, 8 metres high.

The calculated noise levels to the receptor locations from noise associated with the use of the copper granulator in Building B assume the following:

- Sound transmission loss for standard 0.6 mm thick metal roof and wall of Building B;
- 25 m² openings on the western and eastern sides of Building B.

The calculated on-road noise levels to 'R5' include a shielding reduction for the existing (approx.) 3.5 metre high road side barrier on Sunnyholt Road.



Calculations have been carried out to determine the noise level at each industrial and residential boundary due to the operation of the site. Table 11 provides a schedule of the calculated noise levels at each receptor.

Table 11 Predicted L_{eq} , 15 minute Noise Levels – All Receptors – Use of Site

Description	Predicted Noise Levels (dBA) at Receptor Location					
	R1	R2	R3	R4	R5	R6
Metal Recovery & Recycling Facility	69	56	67	70	< 50	< 47
Acceptable Noise Limit – Early Morning L_{eq}, 15 minute (6.00 am to 7.00 am)		68			60	48
Complies	<i>Yes¹</i>	Yes	Yes	<i>Yes¹</i>	Yes	Yes
Acceptable Noise Limit – Day L_{eq}, 15 minute (7.00 am to 6.00 pm)		68			58	45
Complies	Yes	Yes	Yes	<i>Yes¹</i>	Yes	<i>Yes^{1, 2}</i>

¹ An exceedance of ≤ 2 dB is considered negligible (see Table 4.1 & 4.2 of NPI), and is not perceivable to the human ear.

² Due to the large distance, multiple noise sources (industrial sites) between the proposed development site and the nearest residences and the proximity of the residences to Sunnyholt Road, R5, the T1 North Shore, Northern and Western Line and Cumberland Line, R4, and other industrial sites, R5 and R6, (dominant noise in acoustic environments), respectively, the metal recovery and recycling facility would give rise to negligible noise impacts at the residential receptors.

Table 11 shows that provided the abovementioned barriers are constructed, predicted noise levels at each receptor are within acceptable limits outlined in this Report and are therefore acceptable.



5.3.2 Predicted Sleep Disturbance Noise Levels

Table 12 below shows assessment against sleep disturbance for the residential receptors.

Table 12 Predicted $L_{\max}$ Noise Levels at Residential Receptors - Sleep Disturbance

Receptor Location	Predicted $L_{\max}$ Noise Level (dBA)	Sleep Disturbance Criterion (dBA)	Compliance
Activity On-Site			
R5 – 187 Sunnyholt Road			
- Container truck idle & reversing (with alarm)/ Excavator/Shredders/ Shear/Copper Granulator	< 56	70	Yes
R6 – 5 Chedley Place			
- Container truck idle & reversing (with alarm)/ Excavator/Shredders/ Shear/Copper Granulator	< 53	58	Yes

It can be seen from Table 12 that the predicted $L_{\max}$ noise levels from activities taking place on-site at the residential receptors, 'R5' and 'R6', comply with the sleep disturbance criteria outlined in Section 4.4.1 of this report, and will therefore be acceptable.

5.3.3 Predicted On Road Traffic Noise

Table 13 below shows assessment against on road traffic for the residential receptor, 'R5'. We have assumed that half of the trucks arriving / leaving (378 movements) the site during operation will travel along Sunnyholt Road to the south of Tattersall Road.

Table 13 Predicted $L_{eq, 15 \text{ hour}}$ Noise Levels at Residential Receptor - On Road Traffic

Receptor Location	Predicted $L_{eq, 15 \text{ hour}}$ Noise Level (dBA)	RNP On Road Traffic Noise Criteria (dBA)	Compliance
Day			
R5 – 187 Sunnyholt Road	59	60	Yes
– 378 x Truck Movements			

The predicted level of on road traffic noise from the metal recovery and recycling facility are within the recommended on road traffic noise criterion in Section 4.5.1 at receptor location 'R5', and will therefore be acceptable.



6.0 VIBRATION EMISSION

Previous measurements of ground borne vibration of car shredders on-site (PPV 0.76 mm/s at 25 metres) show that vibration levels will meet the specified vibration limits in Section 4.5.3 and 4.5.4. Given the distances from neighbouring residences and industrial premises to the location of the transport routes throughout the site and plant equipment, we are of the opinion any vibration at the receiver locations would be negligible.

In the unlikely event complaints are received regarding vibration originating from the use of the site, we recommend that compliance monitoring of ground borne vibration is carried out at the nearest affected receptor location.



7.0 NOISE CONTROL RECOMMENDATIONS - ACOUSTIC BARRIERS

To ensure that the operation of the metal recovery and recycling facility meets the *Noise Policy for Industry's* noise criteria, we recommend the following noise controls be implemented into the design.

An acoustic barrier should be constructed around the shear to reduce the noise emission to the adjacent industrial premises to the north and west of the site.

A 2.5 metre high acoustic barrier should be constructed to the north of the shear at a distance of no greater than 15 metres from the machine as shown in Appendix A.

A 3.5 metre high acoustic barrier should be constructed to the west of the shear at a distance of no greater than 30 metres from the machine as shown in Appendix A.

The acoustic barriers may be constructed with 'DuneWall Custom Height Acoustic Wall', which will be acceptable. Details of the acoustic barrier can be seen in the attached Appendix B.

Should the location of the recommended barriers be required to change due to conflicts with the functionality of the site / shear, further acoustic assessment is required.



8.0 NOISE & VIBRATION IMPACT STATEMENT

A noise and vibration assessment of a proposed metal recovery and recycling facility at 57-69 Tattersall Road, Kings Park, NSW has been undertaken.

Measurements and calculations show that provided the recommendations in Section 7 are implemented, the level of noise and vibration emitted from the metal recovery and recycling facility will meet the noise level requirements as detailed in Section 4 of this report, and are therefore acceptable.



Adam Shearer, BCT (Audio), MDesSc (Audio & Acoustics), MAAS

Senior Acoustical Consultant

for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

APPENDICES

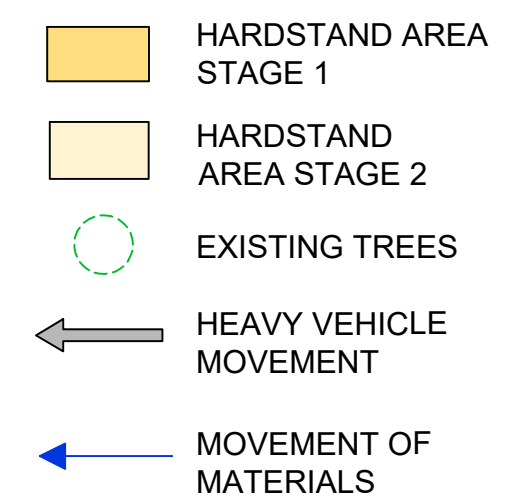
Appendix A – Proposed Site Layout

Appendix B – DuneWall Custom Height Acoustic Wall Brochure

Appendix C – NCG Flood Wall

Appendix D – Ambient Noise Level Graphs

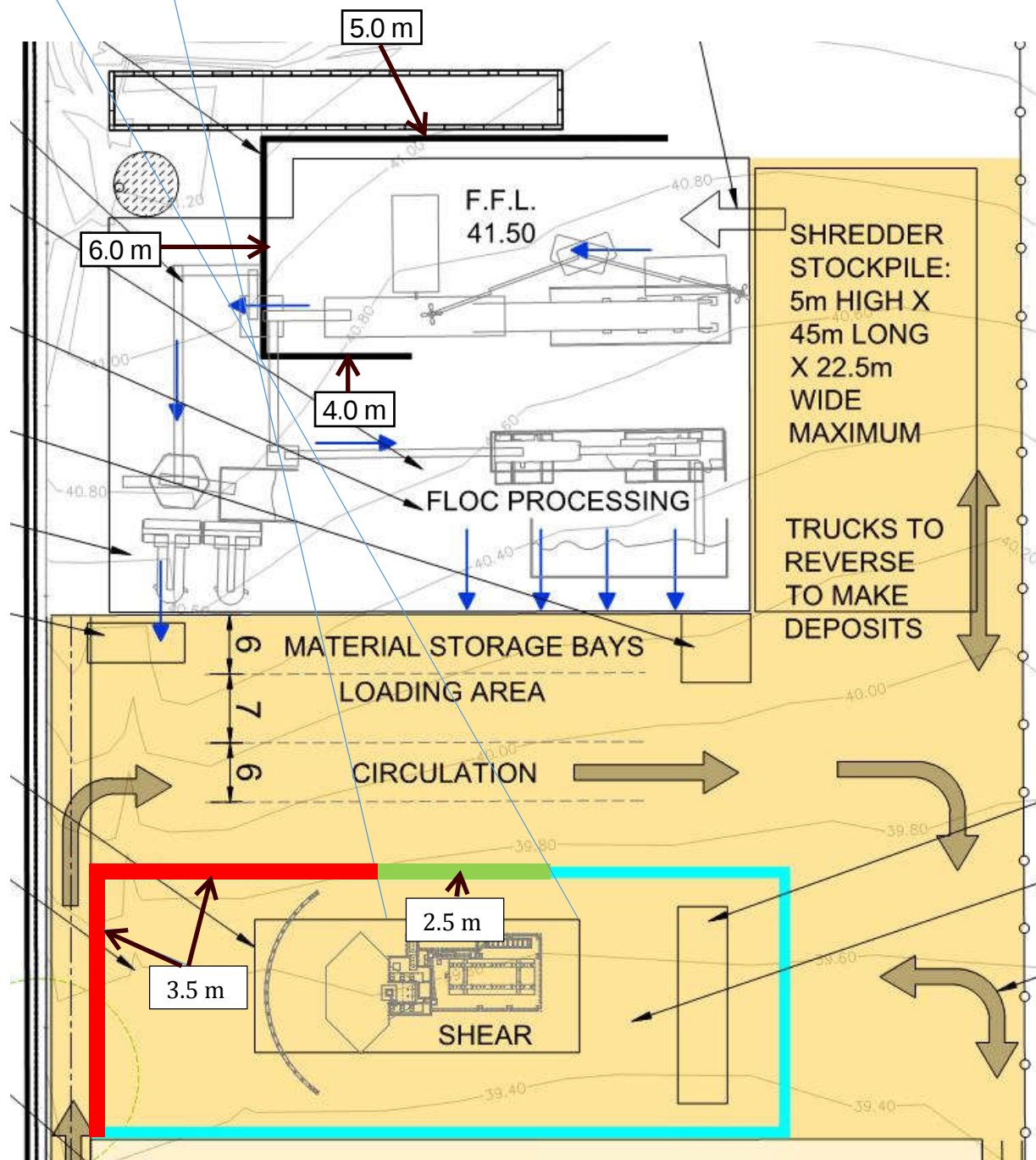




(A) EASEMENT FOR SEWERAGE & DRAINAGE 0.915 WIDE (VIDE H854441)
(B) EASEMENT FOR TRANSMISSION LINE 20.115 WIDE (VIDE H478705)
(C) EASEMENT FOR TRANSMISSION LINE 20.115 WIDE AND VARIABLE
(D) FORMER BANK OF CREEK



No	DATE	AMENDMENT	 BARKER RYAN STEWART TOTAL PROJECT SOLUTIONS ENGINEERING PLANNING PROJECT MANAGEMENT SURVEYING CERTIFICATION	SYDNEY P: 02 9659 0005 CENTRAL COAST P: 02 4326 5255 HUNTER P: 02 4960 8389 A\$N: 26 134 067 842 www.brs.com.au mail@brs.com.au	Client: AUTORECYCLERS PTY LTD	57- 69 TATTERSALL ROAD KINGS PARK PROPOSED METAL RECOVERY PROCESSING & RECYCLING FACILITY SITE PLAN - STATE SIGNIFICANT DEVELOPMENT APPLICATION	Designed: _____ Scales: Plan 1:750 Drawn: MS Horiz. Checked: AD Vert. X-Sect. Datum: A.H.D.	Plan No. 160136SSD.01 File Ref. REV. CC160136SSD.dwg SHEET 1 OF 1 SHEETS E
A	09/07/18	GOV. AGENCIES						
B	06/08/18	COMMUNITY CONSULT						
C	30/08/18	REVISED SITE PLAN						
D	30/09/18	REVISED STAGING						
E	16/01/19	REVISED SITE PLAN						



Custom Height Acoustic Wall



PRE-ENGINEERED CUSTOM POST

- Cost effective alternative to block and tilt wall systems
- Pre-engineered to 12m
- Fast install
- Excellent sound reduction
- Looks the same from both sides
- Craneless panel installation



DuneWall
CUSTOM HEIGHT ACOUSTIC WALL
Pre-engineered Custom Post

DuneWall > Custom Height Acoustic Wall

If noise reduction and privacy are critical to your operations, look no further than the Dunewall acoustic wall system for your commercial, heavy duty industrial, mining, road and railway applications. The modular acoustic panel system is the cost effective alternative to high block walls and tilt panel concrete alternatives.

Pre-engineered to 12m in height to suit a variety of wind regions and available as a single or double wall acoustic solution, Dunewall is solving troublesome noise issues right across Australia. Dunewall provides a clean stylish fibre cement finish to both sides of the wall that can easily be finished by spray or roller including anti-graffiti coatings for extra protection. Cranes are not required to fit the panels and the system ensures minimal site disruption, a real bonus for busy commercial and industrial operations. The smart modular design delivers a crack free finish for the lifetime of your Dunewall.

Wallmark is committed to solving your challenging acoustic boundary solutions with a complete Dunewall design service, delivering you a set of detailed drawings tailored to your project to define the layout for correct installation and engineering sign off if required. Work with the team at Wallmark for factory direct personalised service and great advice. Call **1300 925 562** to find out more.

Real Noise Reduction

Shield your property from noisy neighbour, busy roadways and commercial noise or limit your own noise exposure for operational efficiency with the ultimate composite sound reduction acoustic panels by Wallmark - NATA tested and certified to AS 1191-2002.



DuneWall



1. Universal Post (mm)
100 UC 14.8 | 150 UC 23.4 | 200 UB 25.4 | 310 UB 40.4 | 410 UB 59.7



2. Wall Panel (mm) Single Rebate
WP 924 > 900H x 2400L | WP 1224 > 1200H x 2400L
WP 930 > 900H x 3000L | WP 1230 > 1200H x 3000L



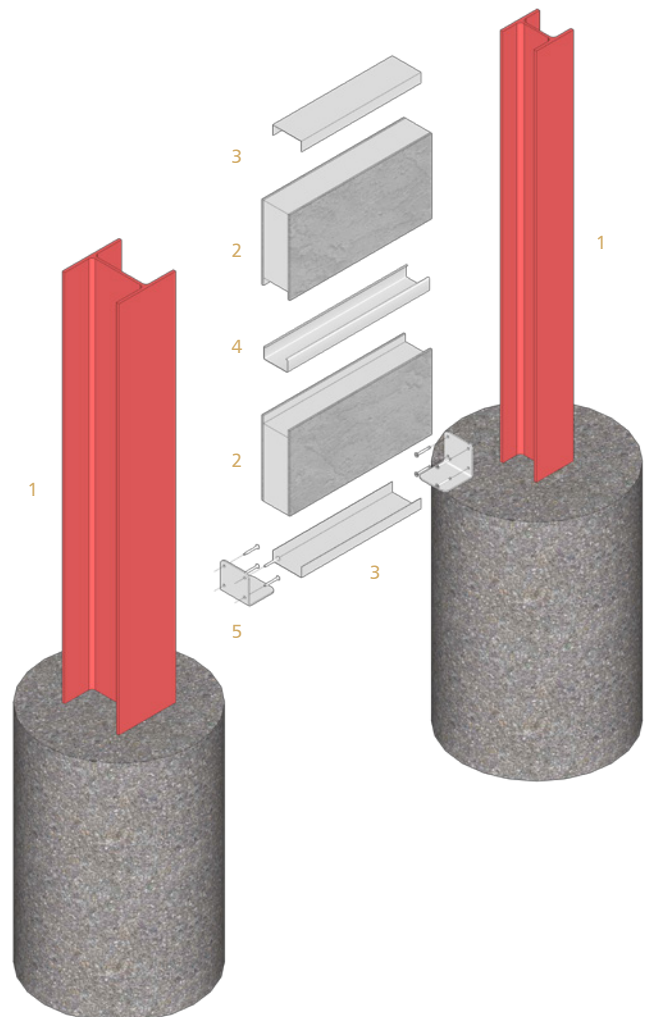
3. Gal Flush Capping (mm)
FCZ > 2390 | 2990



4. Pre Primed Gal Internal Panel Joiner (mm)
PJT > 2350 | 2650 | 2950



5. Pre Primed Gal Wall Support Bracket
WSBZ



Specifications

- Wallmark "DuneWall" Structural Steel System
- Post Spacing 2430 - 3030mm
- Engineering as per table on back page
- To be installed as per manufactures specification

Pre-Engineered Custom Post



DuneWall > Pre-Engineered Custom Post

Maximum Post Height & Wind Regions

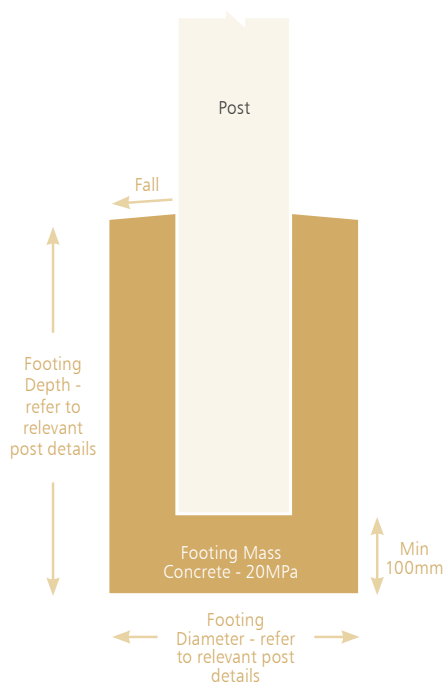
Panel Length mm	Wall Height mm				
	3000	3300	3600	3900	4200
2400	C2	C2	C2	C1	C1
3000	N3	N3	N3	N3	N3

Footing Depths for 350mm Diameter Footing for various Wind Regions

Panel Length mm	Wall Height mm				
	3000	3300	3600	3900	4200
2400	N2 - P1/1000	N2 - P1/1100	N2 - P1/1200	N2 - P1/1200	N2 - P1/1300
	N3 - P1/1200	N3 - P1/1300	N3 - P1/1400	N3 - P1/1500	N3 - P1/1600
	C1 - P1/1400	C1 - P1/1500	C1 - P1/1600	C1 - P1/1800	C1 - P1/1900
	C2 - P1/1700	C2 - P1/1800	C2 - P1/2000	-	-
3000	N2 - P1/1000	N2 - P1/1200	N2 - P1/1300	N2 - P1/1400	N2 - P1/1500
	N3 - P1/1300	N3 - P1/1500	N3 - P1/1600	N3 - P1/1700	N3 - P1/1800
	C1 - P1/1500	C1 - P1/1700	C1 - P1/1800	C1 - P1/1900	-
	C2 - P1/1800	-	-	-	-

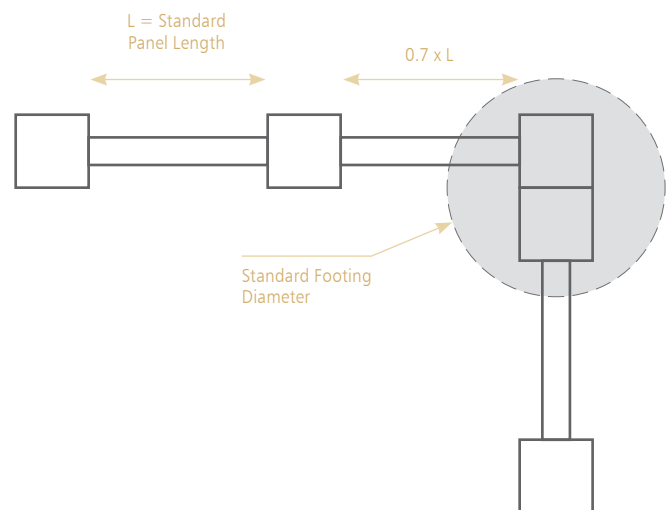
NOTE > P1/1.5 Denotes 350ø bore pier, 1500mm deep into firm clay
 > Recommended footing depths are for terrain categories 2, 2.5 & 3

Footing Detail



NOTE > Footing Depths are based on Firm Clay. Engineering advice must be sought on Footing Depths for all other soil types.

Post Spacing

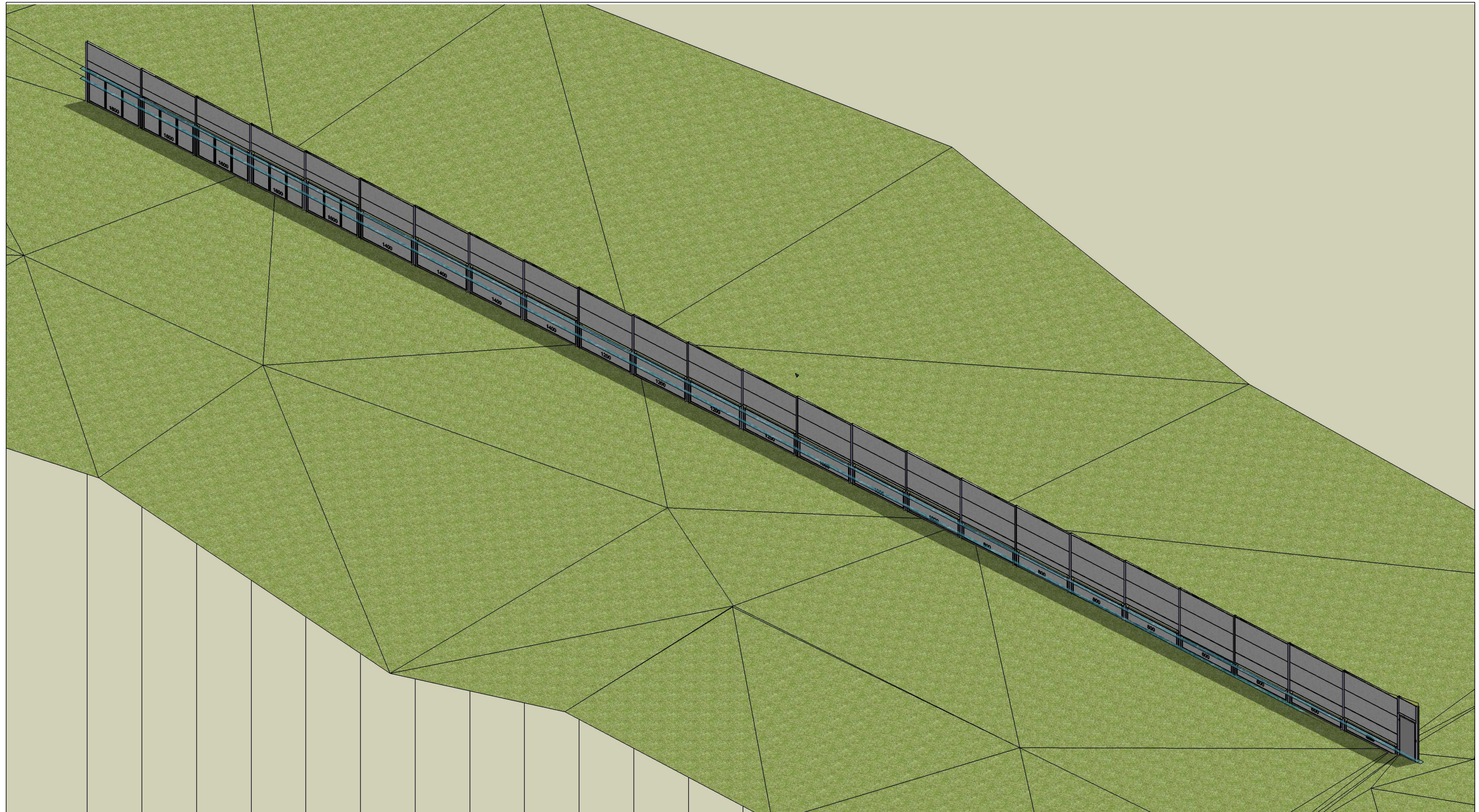


At Wallmark, we recognise that when it comes to architectural wall solutions, one design does not fit all. We look forward to working hand in hand with you to solve your acoustic privacy wall challenges.

To find out more about our Smart Acoustic Wall Solutions visit www.wallmark.com.au or call **02 6057 7600**.

Wallmark
SMART WALL SOLUTIONS

www.wallmark.com.au



Overall Pictorial View with Ground planes, Flood Level and Flood Level+500mm

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

**Layout of Screen wall with Flood provision
Northern Contracting Group**

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 1

Date

By

Reason

Page: 1 of 12

**DO
NOT
SCALE**

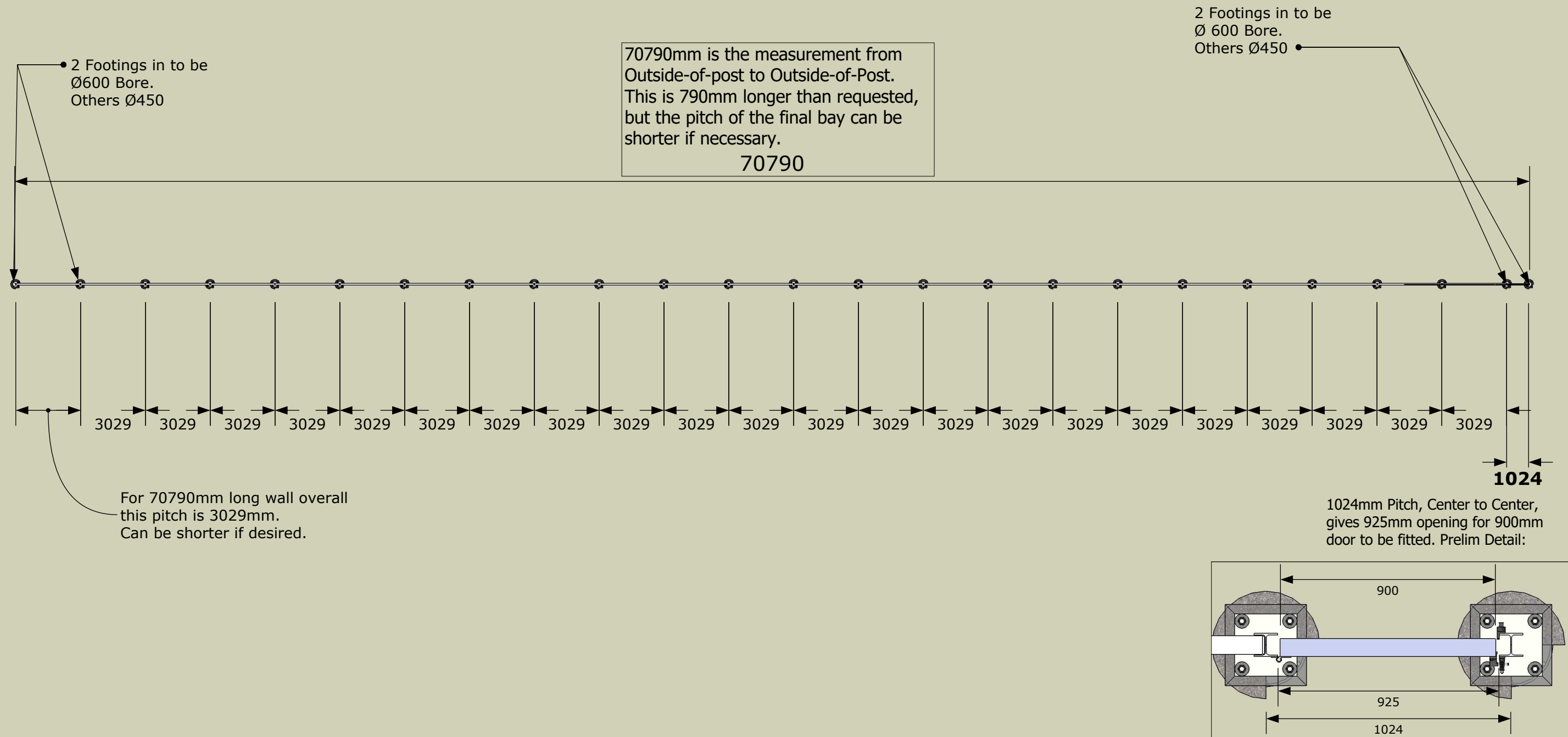
REVISIONS

1

2

3

4



Plan View

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision
Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The
design and specifications contained herein are confidential
and the property of Wallmark Australia. The information may
not be divulged or used in any form or by any means, for any
purposes other than that stated by Wallmark Australia. Storage,
transmittal, forwarding to third party, copying, reproduction,
viewing or scanning of this Drawing by any person or party,
whether in whole or in part is prohibited, except with express
prior written consent by Wallmark Australia. The perspective is
only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 2

Date

By

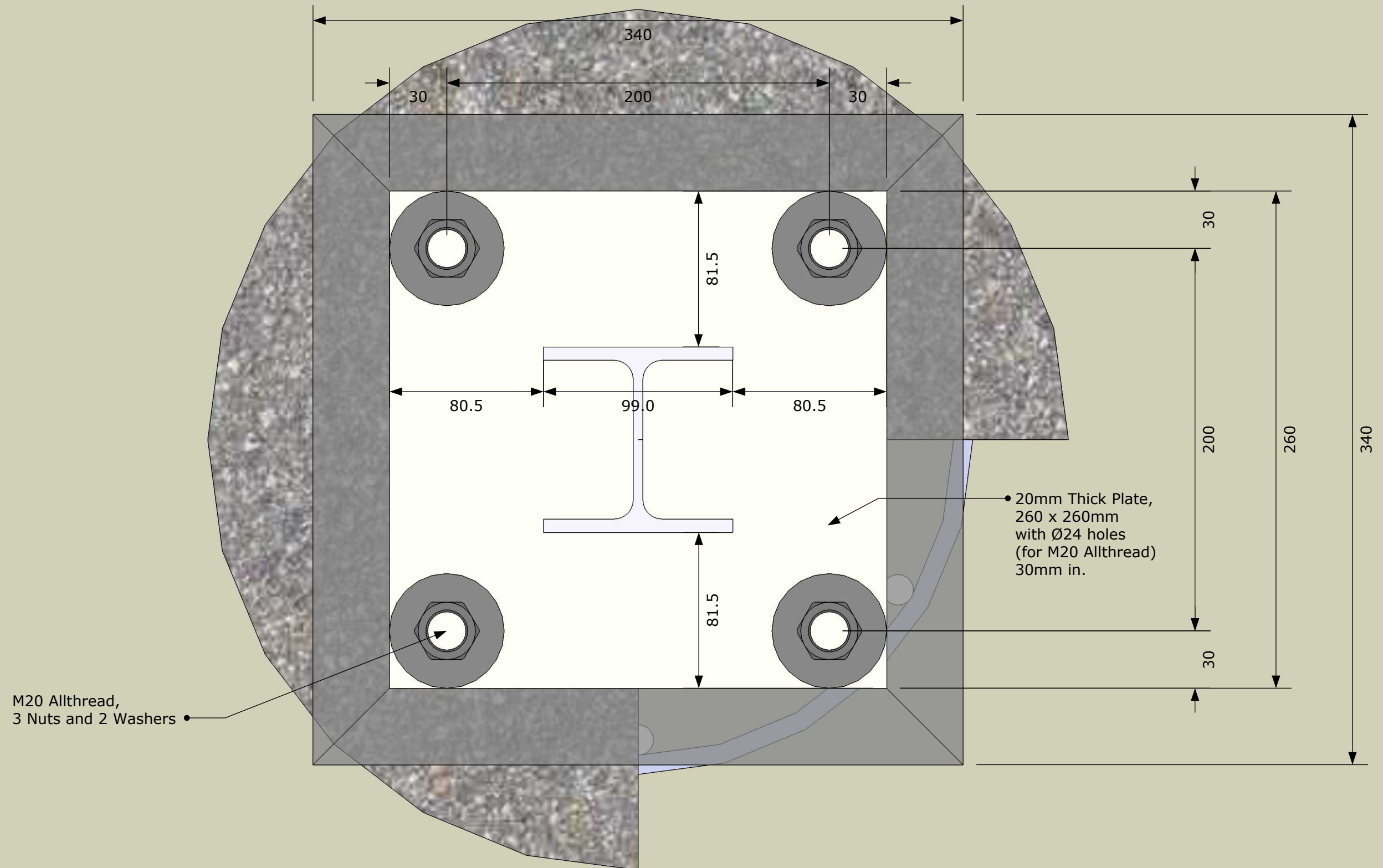
Reason

Page: 2 of 12

**DO
NOT
SCALE**

REVISIONS

1
2
3
4



Typical Post

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Checked By:

Notes:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 3

Date

By

Reason

Page: 3 of 12

**DO
NOT
SCALE**

REVISIONS

1

2

3

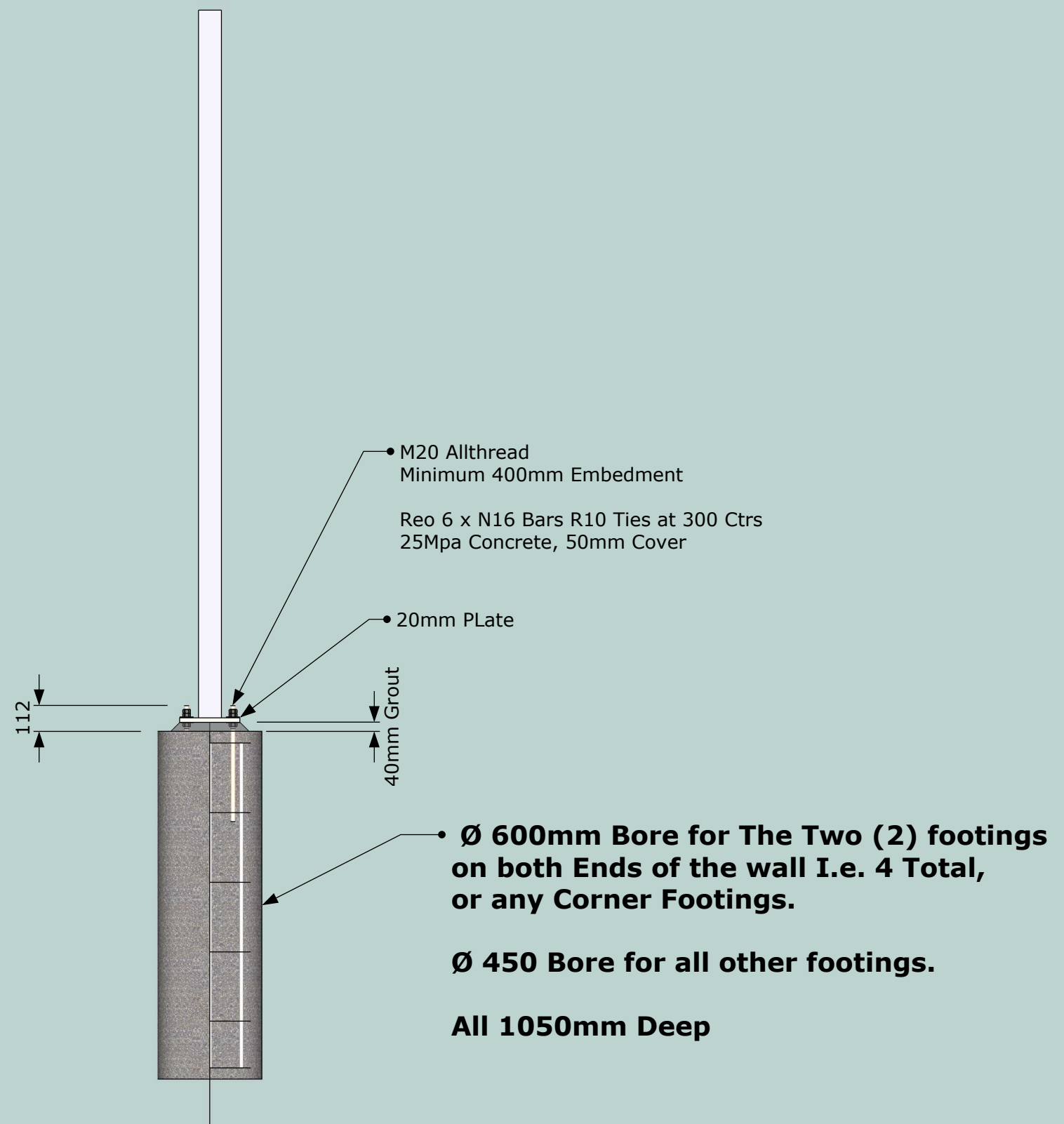
4

NOTE: As the Flood Units are unable to be "Stepped" by cutting around the baseplate, please note that the bottom of the Flood Unit will be sitting on the top of the Higher baseplate. This means that the top of the baseplate will need to be at ground level (or below).

If it is at ground level, then the step from one post to the next, caused by ground slope, will result in a gap below the Flood Unit near the lower baseplate.

As this is a screen wall and not an Acoustic wall, this is considered immaterial, but if it is considered a problem, then infill flashing need to be fixed below the Flood units, at an additional cost.

See Page 6



Typical Column

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

**Layout of Screen wall with Flood provision
Northern Contracting Group**

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 4

Date

By

Reason

Page: 4 of 12

**DO
NOT
SCALE**

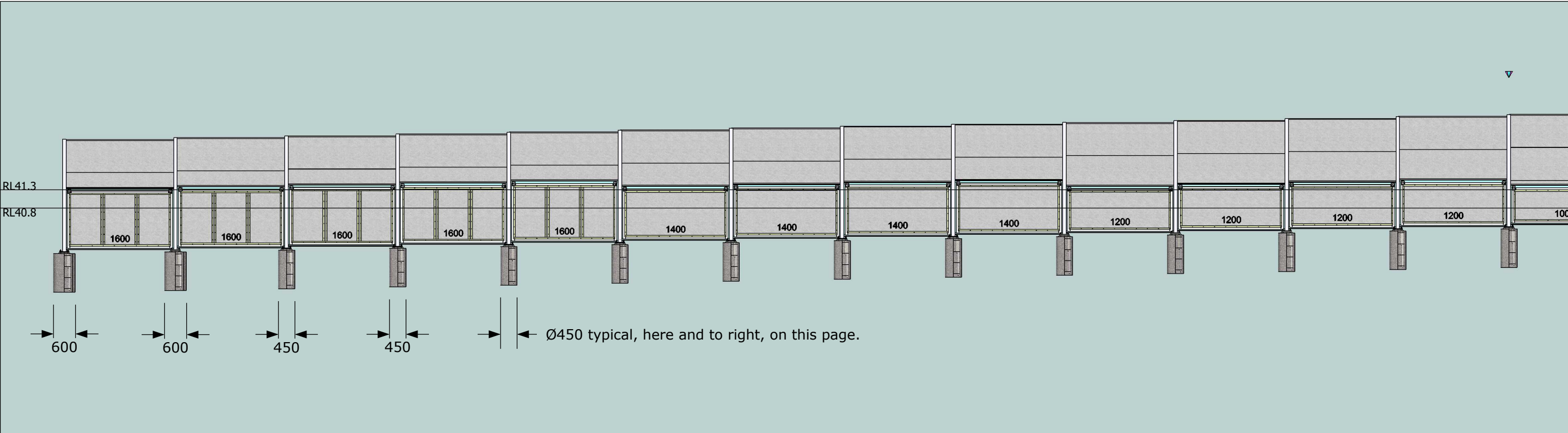
REVISIONS

1

2

3

4



Front View, Lower end



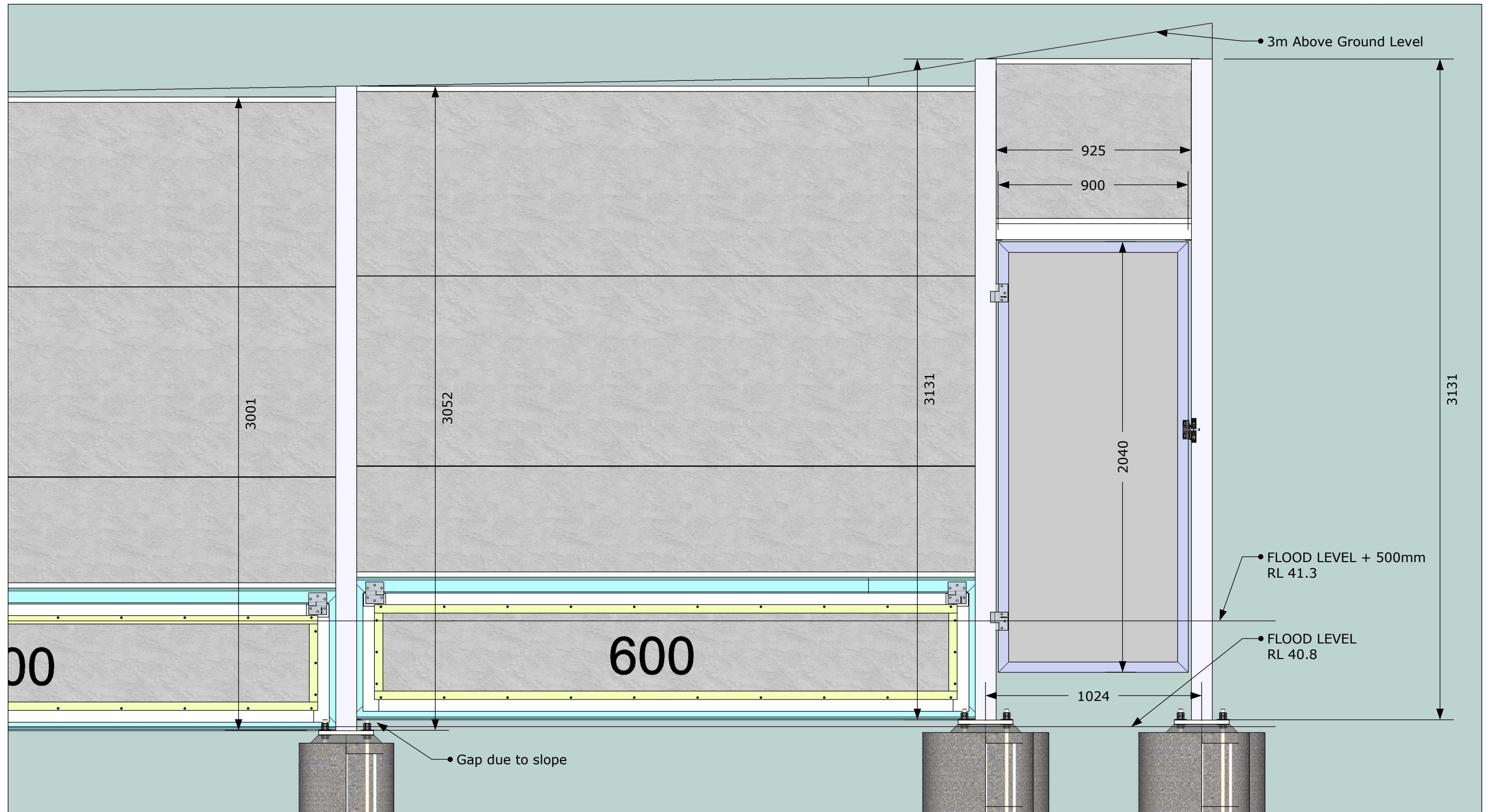
Front View, Higher end

DESIGN APPROVED
Signed: _____



Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision Northern Contracting Group				File Name: NCG_FloodWall					Page: 5 of 12	
				Date Modified: September 10, 2018		Page Name: Page 5				
				Date Published: September 10, 2018		Date	By	Reason		
WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.	Drawn By: DCO	Notes:	DO NOT SCALE	REVISIONS	1					
	Checked By:					2				
						3				
						4				



Typical Bay incorporating Flood Provision, and Door Area

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

**Layout of Screen wall with Flood provision
Northern Contracting Group**

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Page Name: Page 6

Page: 6 of 12

Date Published: September 10, 2018

Date

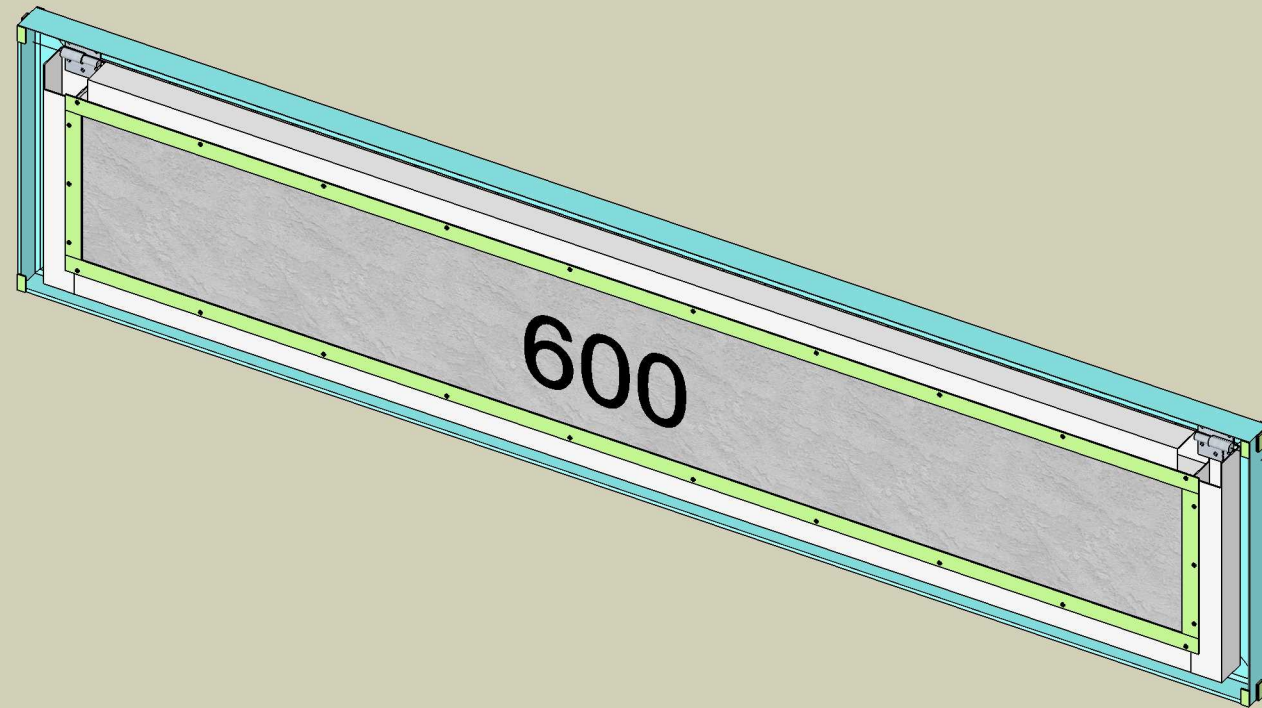
By

Reason

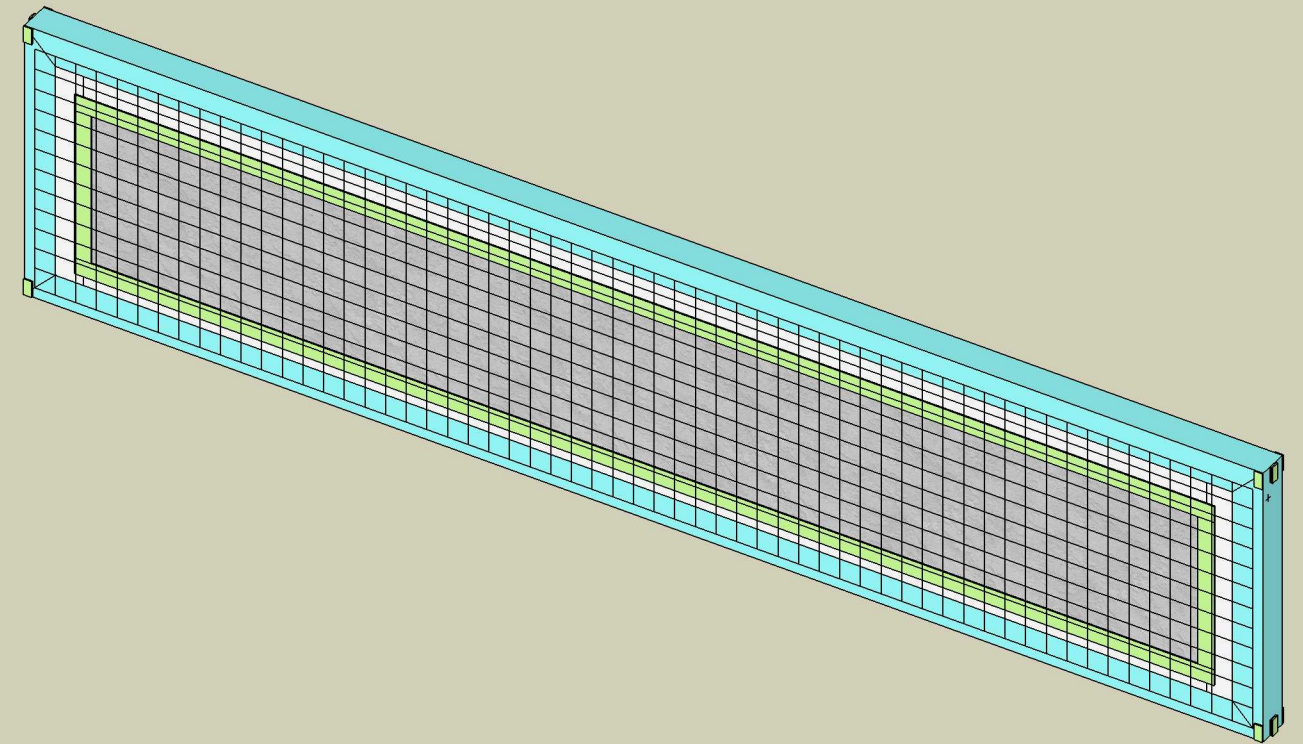
**DO
NOT
SCALE**

REVISIONS

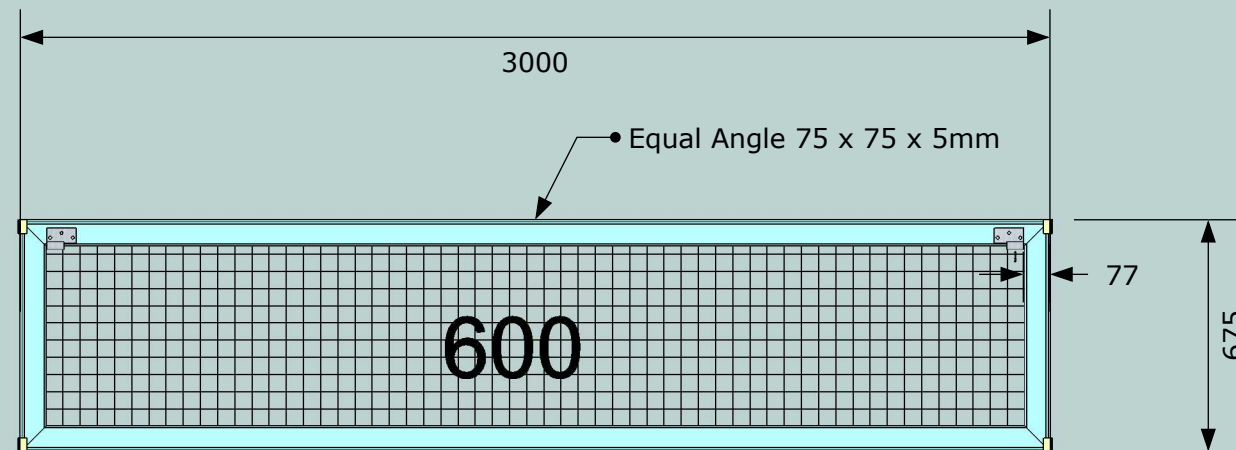
1
2
3
4



600mm Flood Unit Pictorial Front

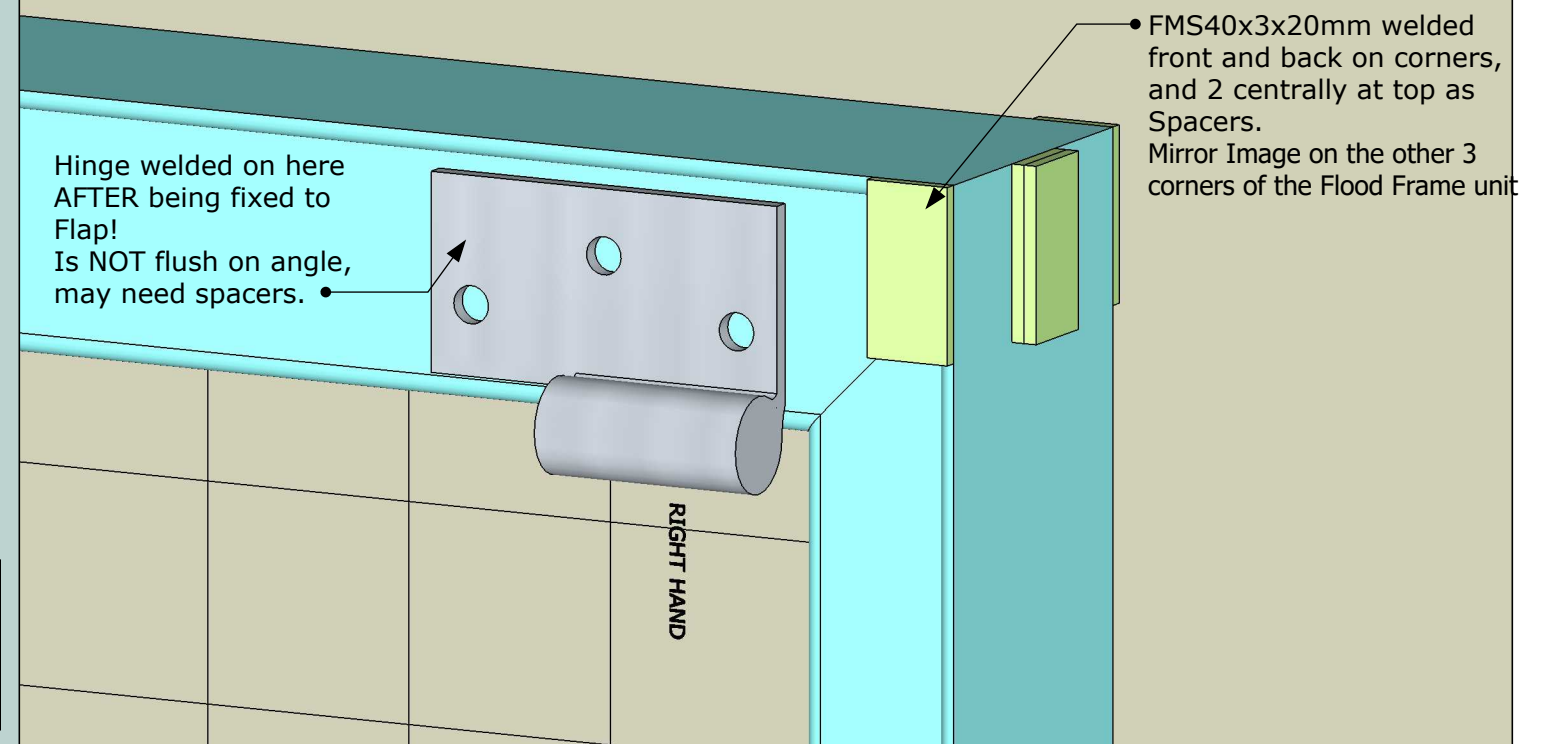


600mm Flood Unit Pictorial Back



Vertical components for the larger sized Flood Units are larger in increments of 200mm.
See last page for vertical sizes.

600mm Front View, Frame Only



Frame Corner Detail

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision
Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 7

Date

By

Reason

Page: 7 of 12

DO NOT SCALE

REVISIONS

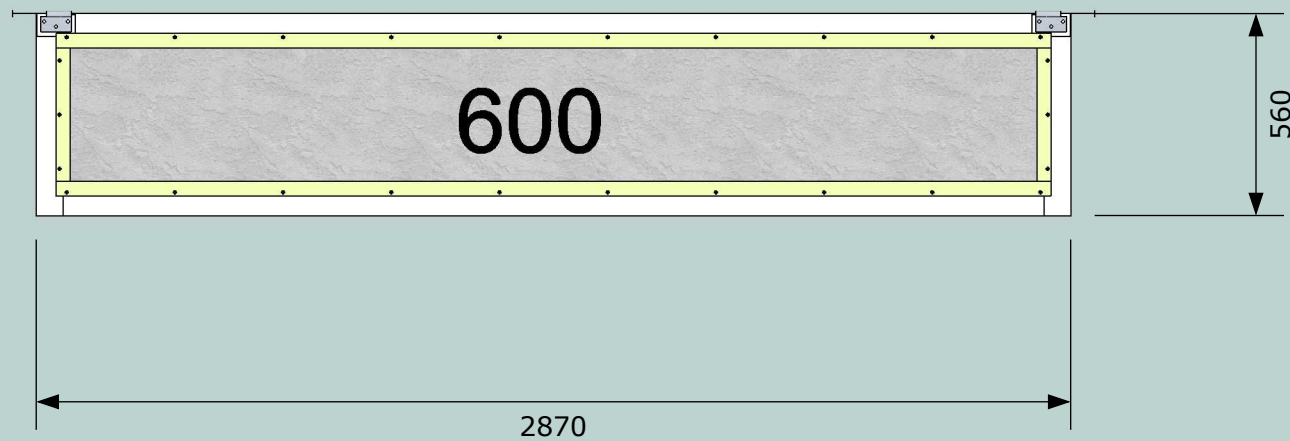
1

2

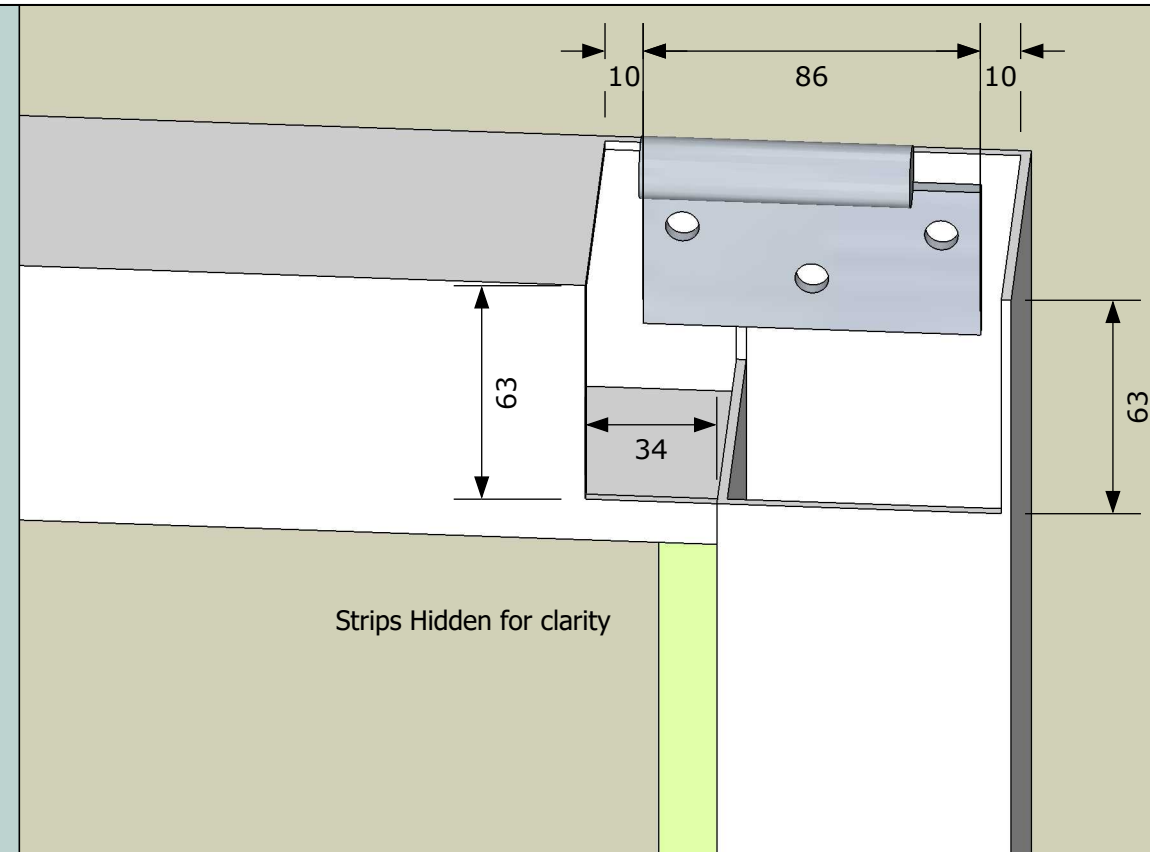
3

4

Vertical components for the larger sized Flood Units are larger in increments of 200mm.
See last page for vertical sizes.

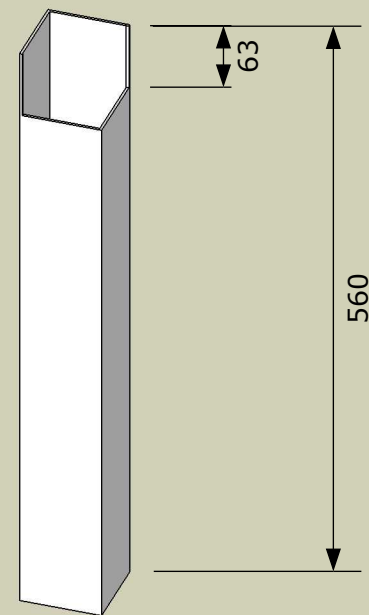


600mm Flap Front View



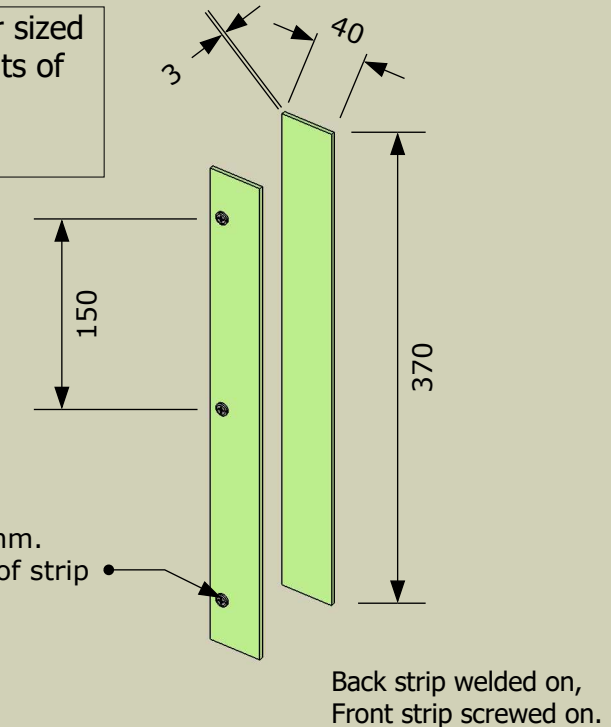
All Flap Corner Detail

Vertical components for the larger sized Flood Units are larger in increments of 200mm.
See last page for vertical sizes.



600mm Flap Vertical

Vertical components for the larger sized Flood Units are larger in increments of 200mm.
See last page for vertical sizes.



Wafer (Pan) Head Tek Screw
10G16x16mm 150mm max.
Strip to overlap onto panel by 20mm.
Screws approx. 10mm from edge of strip

600mm Flap Vertical Fixing Strips

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 8

Date

By

Reason

Page: 8 of 12

DO NOT SCALE

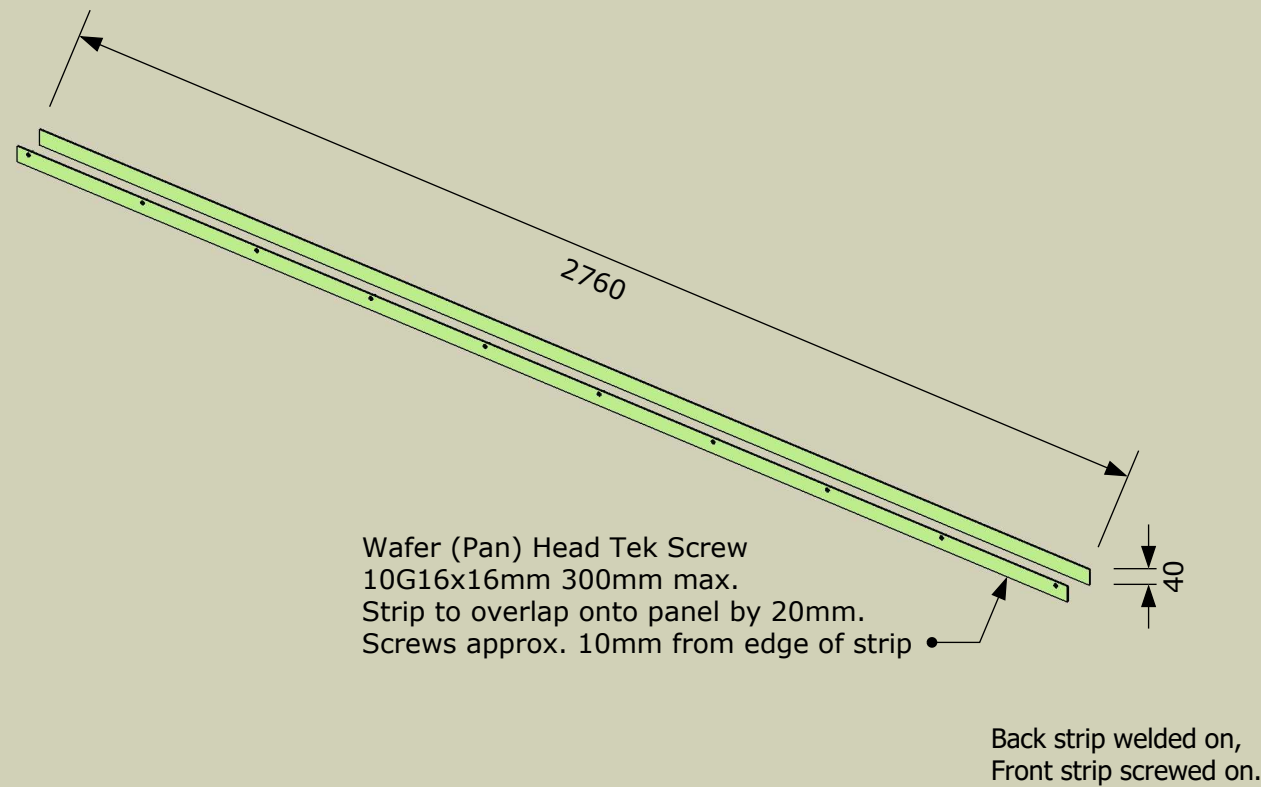
REVISIONS

1

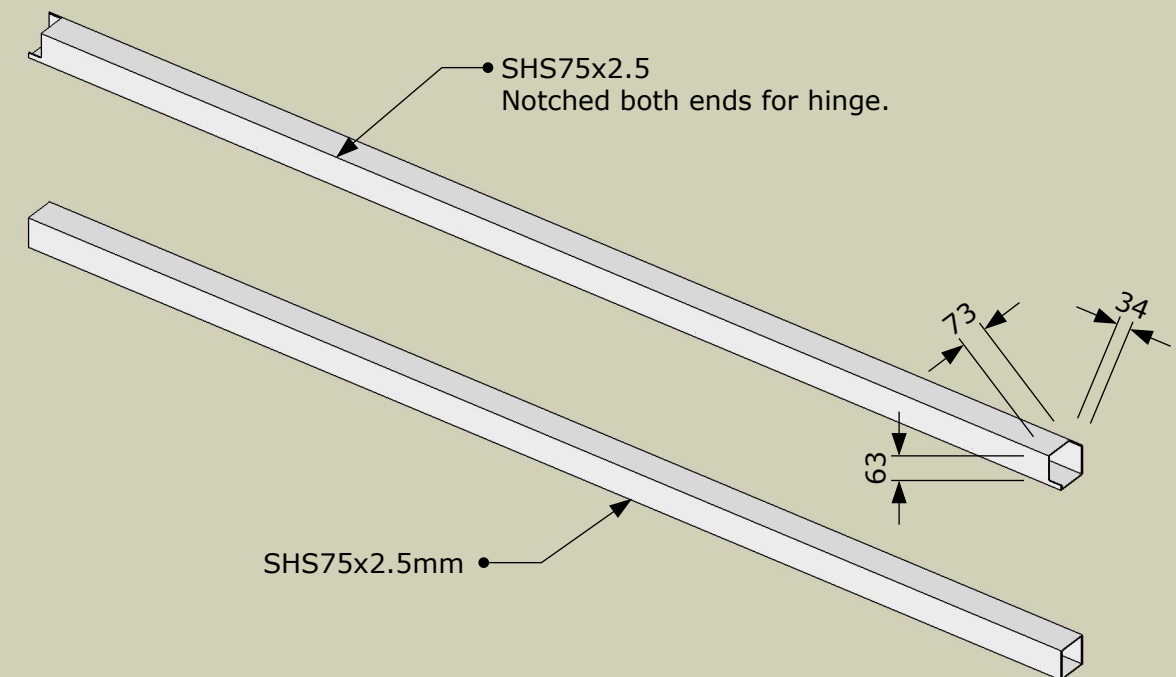
2

3

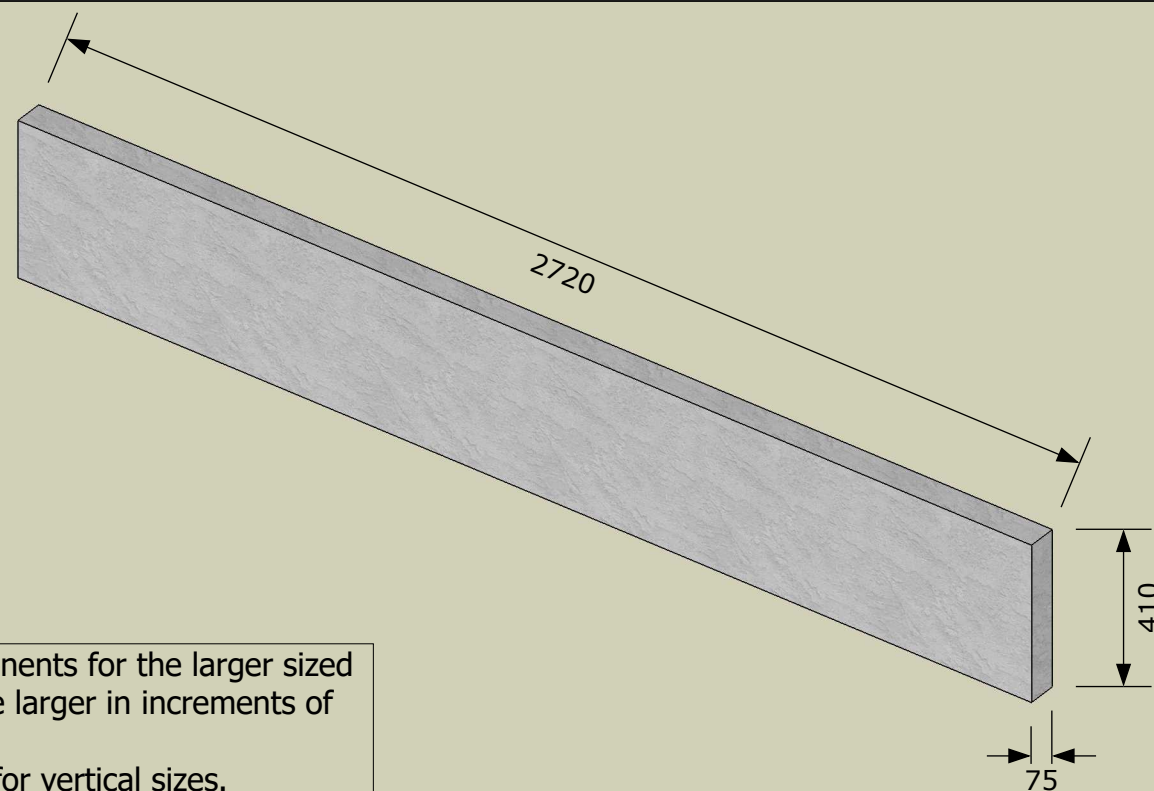
4



Flap Horizontal Fixing Strips



Flap Horizontals



Vertical components for the larger sized
Flood Units are larger in increments of
200mm.
See last page for vertical sizes.

600mm Flap Panelling

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The
design and specifications contained herein are confidential
and the property of Wallmark Australia. The information may
not be divulged or used in any form or by any means, for any
purposes other than that stated by Wallmark Australia. Storage,
transmittal, forwarding to third party, copying, reproduction,
viewing or scanning of this Drawing by any person or party,
whether in whole or in part is prohibited, except with express
prior written consent by Wallmark Australia. The perspective is
only an indication of the planned installation.

Drawn By: DCO

Checked By:

Notes:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 9

Date

By

Reason

Page: 9 of 12

**DO
NOT
SCALE**

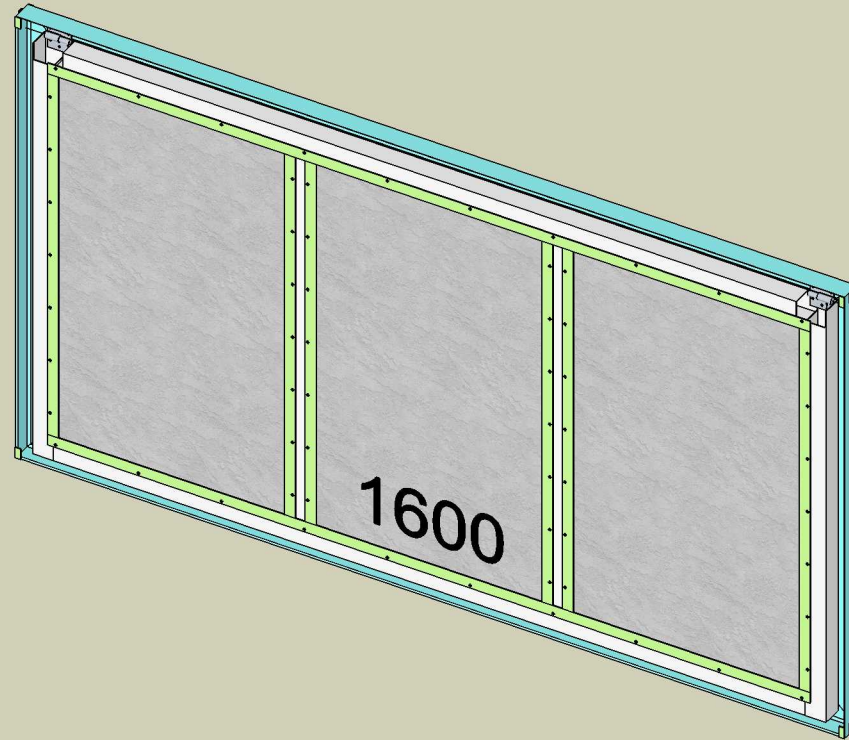
REVISIONS

1

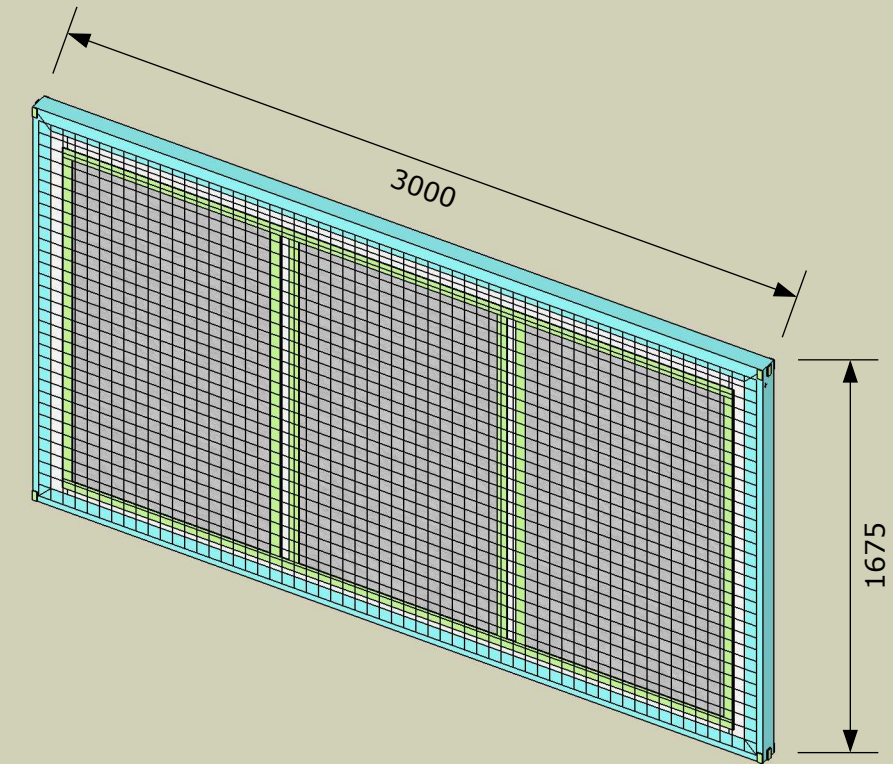
2

3

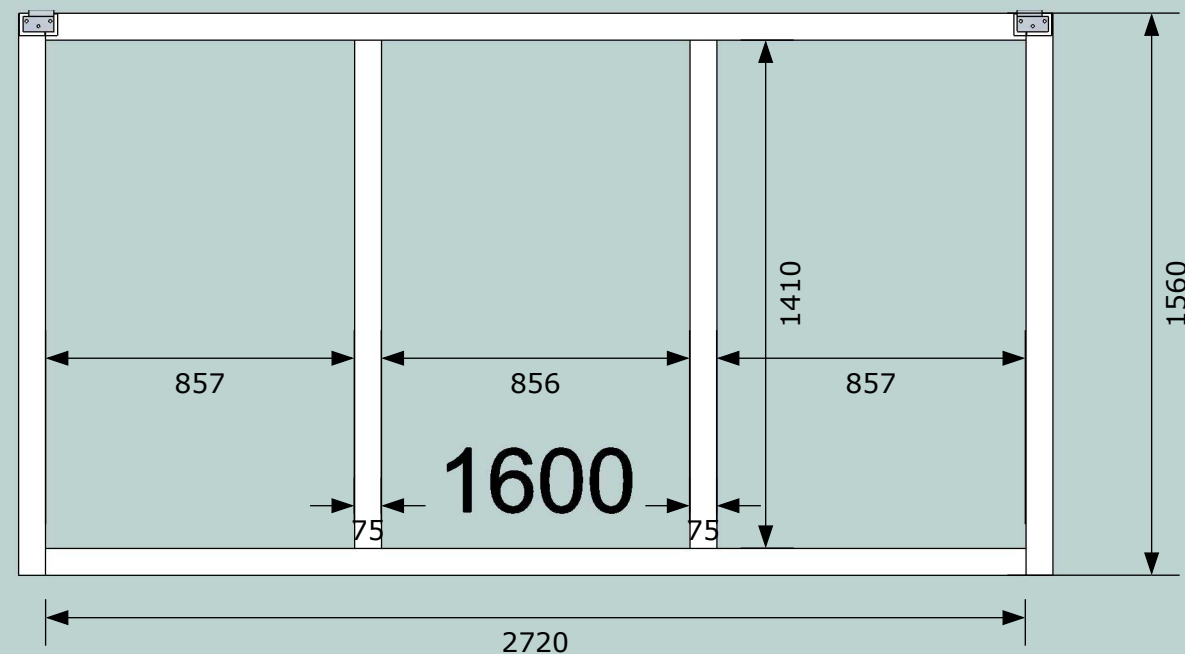
4



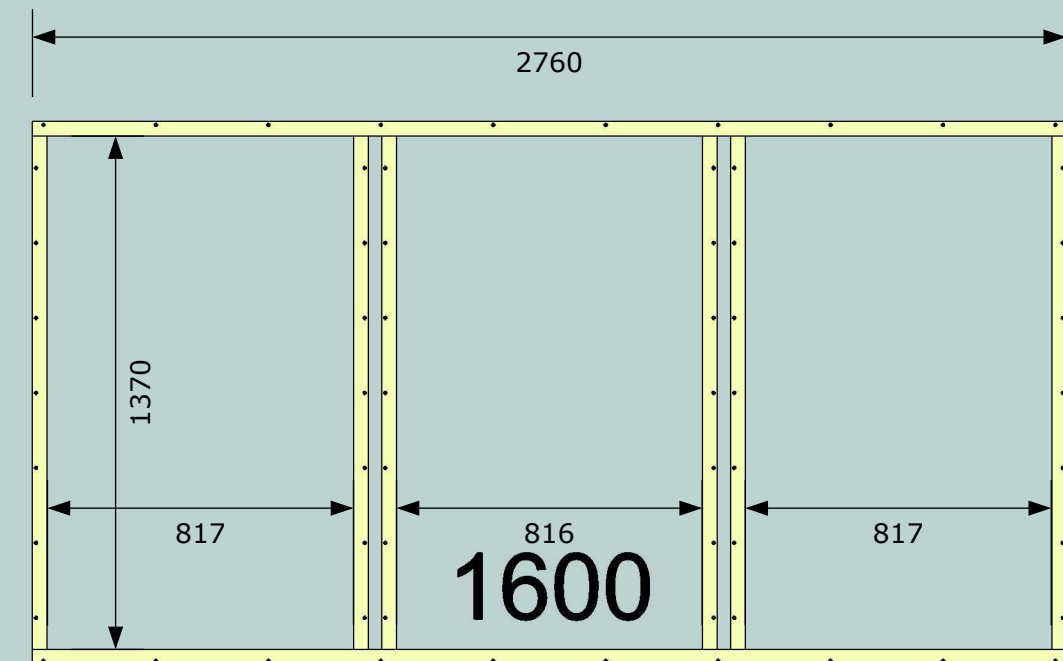
1600mm Flood Unit Pictorial Front



1600mm Flood Unit Pictorial Back



1600mm Flap frame



1600mm Flap Strips

DESIGN APPROVED
Signed: _____

Wallmark
SMART WALL SOLUTIONS

Wallmark Australia
80 Catherine Crescent
Lavington NSW 2641
Tel: 02 6057 7690
Fax: 02 6040 9201
Email: sales@wallmark.com.au
Web: www.wallmark.com.au

Layout of Screen wall with Flood provision Northern Contracting Group

WALLMARK AUSTRALIA CONFIDENTIAL MATERIAL
This drawing is copyright and all rights are reserved. The design and specifications contained herein are confidential and the property of Wallmark Australia. The information may not be divulged or used in any form or by any means, for any purposes other than that stated by Wallmark Australia. Storage, transmittal, forwarding to third party, copying, reproduction, viewing or scanning of this Drawing by any person or party, whether in whole or in part is prohibited, except with express prior written consent by Wallmark Australia. The perspective is only an indication of the planned installation.

Drawn By: DCO

Notes:

Checked By:

File Name: NCG_FloodWall

Date Modified: September 10, 2018

Date Published: September 10, 2018

Page Name: Page 10

Date

By

Reason

Page: 10 of 12

**DO
NOT
SCALE**

REVISIONS

1
2
3
4

Date

By

Reason

SIZE	Vert Length	Vert Strips	Flap Panel
------	-------------	-------------	------------

600	560	370	410 x 2720mm long	Place FC sheet as spacers in frame to compensate for 10mm gap compared to above.
800	760	570	610 x 2720mm long	
1000	960	770	810 x 2720mm long	
1200	1160	970	1010 x 2720mm long	
1400	1360	1170	1200 x 2720mm long	
1600	1560	1370	See Drawings	

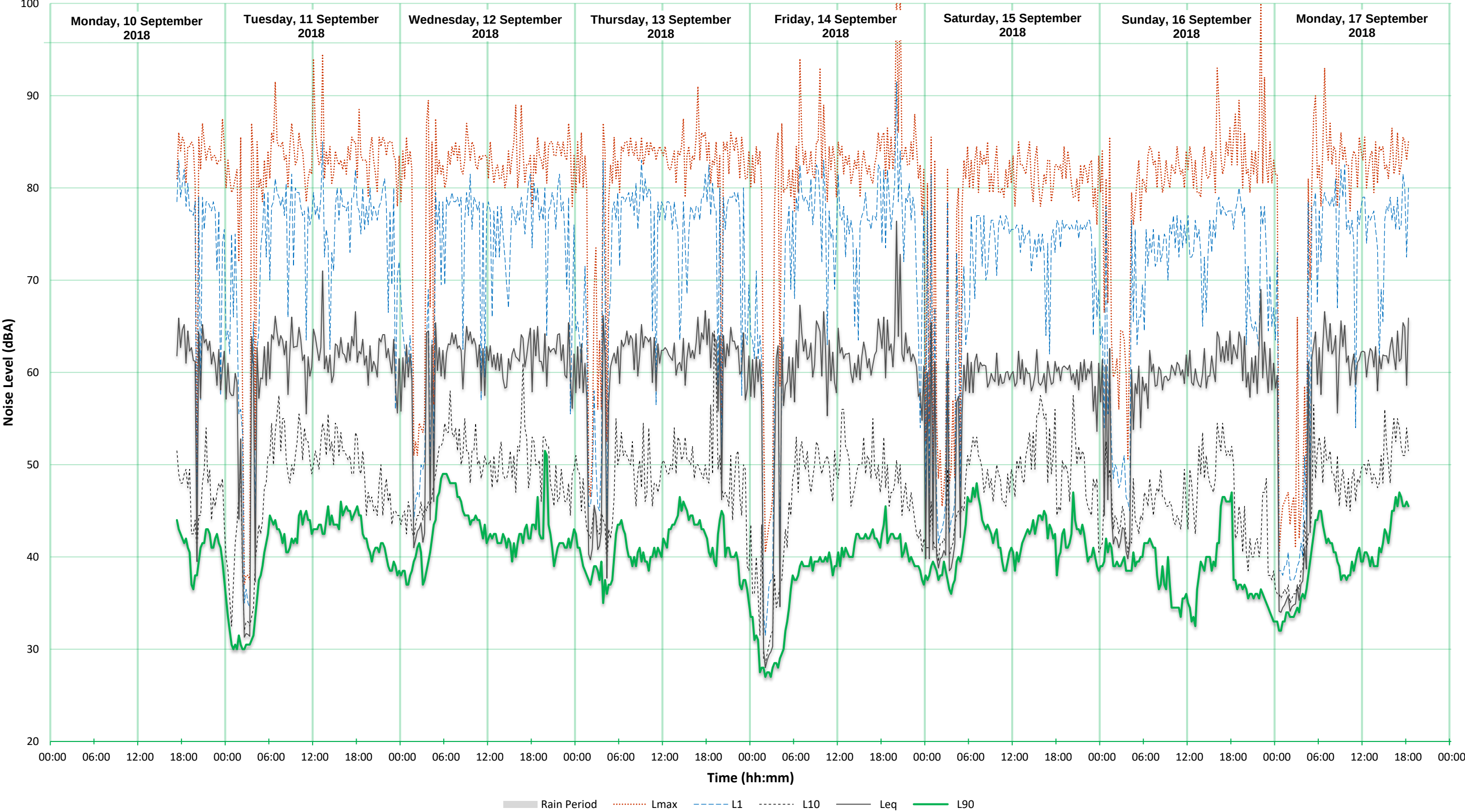
SIZE Vertical Angle Frame

600	675
800	875
1000	1075
1200	1275
1400	1475
1600	1675

AMBIENT NOISE SURVEY

6186-3.1R
Appendix D

Located at 1 Attard Avenue, Marayong, NSW



AMBIENT NOISE SURVEY

6186-3.1R
Appendix D

Located at 189 Sunnyholt Road, Blacktown, NSW

