

Technical Note

Project name **Hammerstone Road Depot, Gorton**
Project no. **1620005855**
Client **Morgan Sindall Construction**
Memo no. **2025/01**
Version **1**
To **Phil Williams**
From **Ryan McNulty**

Prepared by **Ryan McNulty**
Checked by **Simon Taylor**
Approved by **Simon Taylor**

Hammerstone Road Depot – Condition 16

Date 11/02/2025

1 Introduction and Background

The Hammerstone Road development sees the refurbishment of a large locomotive shed, which was stripped out to create new offices for both Manchester City Council (MCC) and Biffa. The scheme is served by various items of plant, including several external air handling and air conditioning plant items.

RUK has been appointed by Morgan Sindall Construction to provide a technical note in support of the discharge of planning Condition 16 of the permission (137572/JO/2023) granted for the Hammerstone Road Depot site in Gorton, Manchester. The condition states:

16) a) Externally mounted ancillary plant, equipment and servicing (including the condenser units) shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.
Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site.

b) Prior to occupation of the development a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

This technical note responds to item 'a)' by presenting details of the external plant serving the development and using a noise model to predict the resultant noise levels at the closest receptor for comparison to the noise criteria set by MCC.

Ramboll
Arkwright House
Parsonage Gardens
Manchester M3 2LF
United Kingdom

T +44 161 827 1890
<https://uk.ramboll.com>

Ramboll UK Limited
Registered in England & Wales
Company No: 03659970
Registered office:
240 Blackfriars Road
London
SE1 8NW

For item 'b)' Ramboll demonstrated the internal acoustic performance requirements complied with the design targets in 2024 via acoustic commissioning tests. The results of these tests are set out in Ramboll's commissioning report dated March 2024.

2 Criteria

2.1 Manchester City Council – Planning and Noise, Technical Guidance

Planning permission for the scheme institute was granted in 2021 under application 137572/JO/2023. The planning application for the scheme was supported by a noise assessment by RUK¹ which sets limits for new external plant.

This report was prepared to confirm that the as installed plant meets the requirements of Manchester City Council's 'Planning and Noise, Technical Guidance'. (revised 2022)².

The guidance states:

'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'

The assessment methodology and definition of a 'rating level' are from the following British Standard.

2.2 British Standard 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019³ (BS4142) provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

The basis of BS4142 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Level, $L_{A90,T}$: defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
- Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location due to the specific sound source under consideration, over a given time interval, T; and
- Rating Level, $L_{Ar,T}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

¹ HRD-RAM-ZZ-XX-RP-Y-0001, 2018

² https://www.manchester.gov.uk/downloads/download/5199/information_for_developers

³ British Standards Institute, 2014 and 2019. British Standard BS 4142+A1:2019: Methods for rating and assessing industrial and commercial sound. BSI.

Potential impacts are predicted from the difference between the representative background level at a noise sensitive receptor and the rating level from the noise source considered. The standard suggests that the greater the difference, the greater the magnitude of impact.

Section 11 of BS4142 gives guidance for significance of impacts in reference to comparing rating noise levels against existing background noise levels:

- i. Typically, the greater this difference, the greater the magnitude of the impact;
- ii. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- iii. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- iv. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.2.1 BS4142 Noise Characteristics and Penalties

BS4142 applies different penalties for noise sources that have an acoustic feature. These penalties are applied to the plant noise level where such features increase attention to the noise, such as tonality and intermittent operation.

BS4142 gives a guide to the level of penalty that should be applied, summarised below.

Tonality

- Tone just perceptible at the noise receptor: +2dB
- Tone clearly perceptible: +4dB
- Tone highly perceptible: +6dB

Intermittency

- Identifiable on/off conditions, readily distinctive against the residual acoustic environment: +3dB

3 Existing Background Levels

3.1 2018 Noise Survey

Noise levels were measured using a fixed sound level meter was installed on the southern boundary of the site between 10 to 13 December 2018, as reproduced on Figure 1 (Position 1). This long-term monitor was used to establish typical daytime and night-time background noise levels, representative of the nearest noise sensitive receptors to the south (Sunny Brow House – nursing and care home).

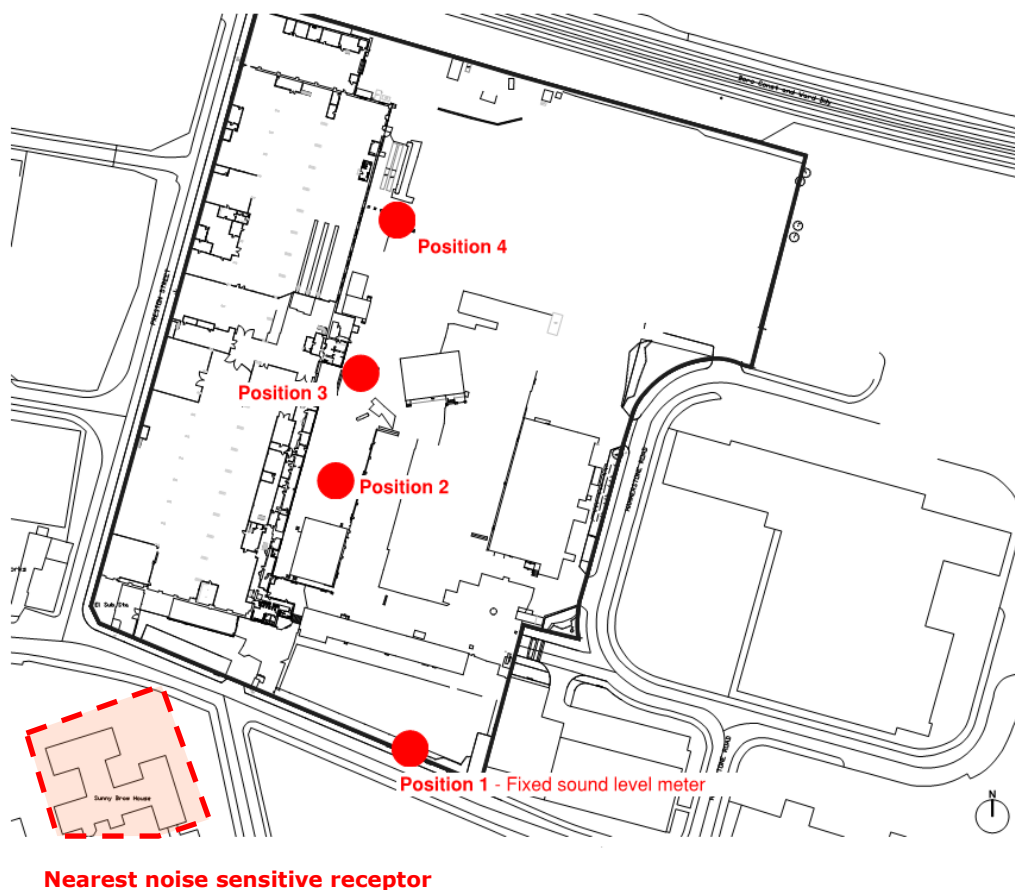


Figure 1 – Existing site layout showing locations of survey positions

In addition, Ramboll did several spot measurements on-site, on the 13 December (Positions 2 to 4) for the purposes of informing the design of the glazing to the refurbished areas of the scheme.

The noise survey details are provided in Appendix A of this note.

3.2 Noise Data

Table 1 below presents the 'typical' background level measured at position 1. This typical level has been derived from the measured data as per Appendix A of the MCC *Planning and Noise* guidance, by arithmetically averaging the data for each period of the days/nights and then obtaining the lowest background level.

Table 1 – Noise levels measured by Ramboll in December 2018 – Typical lowest background levels

Receptor	Daytime	Night-time
Position 1 (unattended meter) Southern boundary and representative of the nearest noise sensitive receptors	47 dB LA90	44dB LA90

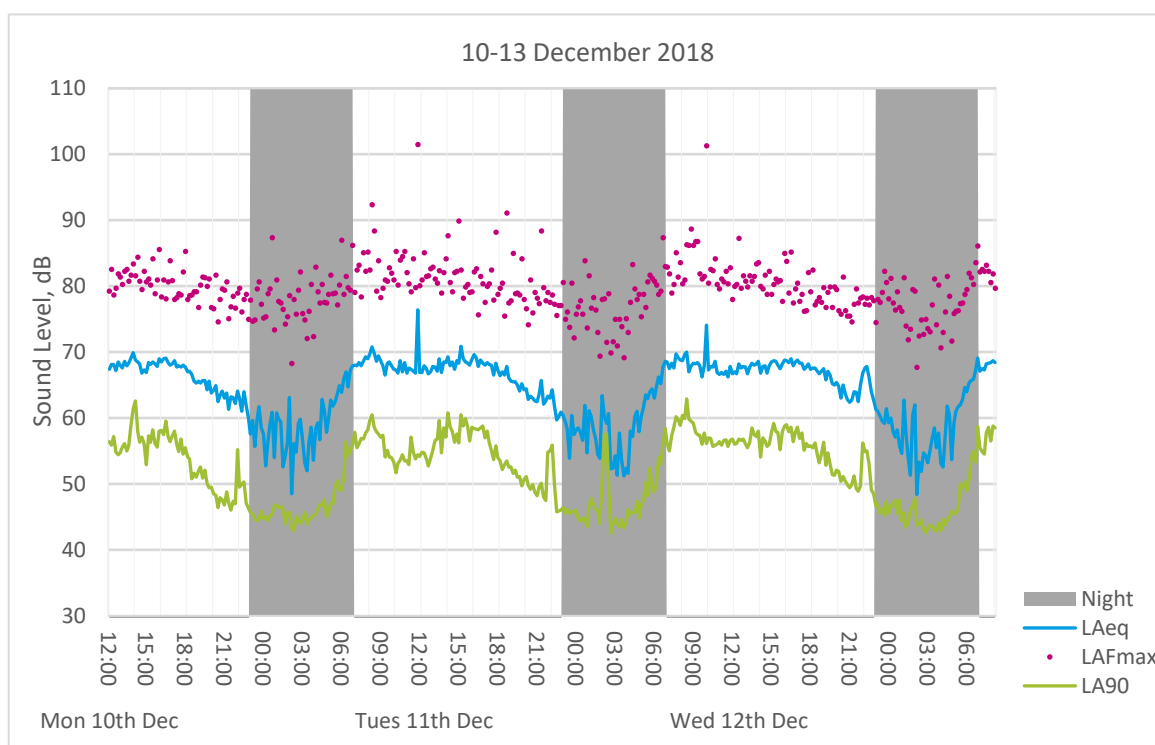


Figure 2 – Noise levels measured by Ramboll between 10-13 December 2018

4 Proposed Plant and Location

Noise data for the installed plant items at Hammerstone Road are presented in Table 2, and identified on subsequent Figure 3. The data for the Mitsubishi units is based on the sound pressure sound spectra of each unit as per the manufacturer's data book and corrected to the published sound power levels. For the 'PURY' units, these are based on the published sound power level of each unit when operating at 75% capacity, which represents normal design duty.

Table 2 – Noise data for installed plant items

Description	Overall, dB L _{WA}	Sound power level, dB, @ octave band centre frequency							
		63	125	250	500	1k	2k	4k	8k
Biffa Compound									
1.No. Mitsubishi PURY-EP200YNW	71	89	73	73	70	63	59	56	54
1.No. Mitsubishi PURY-EP300YNW	75	90	77	77	74	68	64	59	54
2.No. Mitsubishi PUZ-ZM100YKA	69	72	72	71	67	64	59	54	47
MCC Compound									
4.No. Mitsubishi PUZ-ZM35VKA	65	77	70	64	63	59	56	51	50
CR016M-PVIE-7 Air Cooled Condenser	78	69	69	71	70	72	72	71	62
Adjacent to plant room, which contains AHU									
2.No. Mitsubishi PUZ-ZM100YKA	69	72	72	71	67	64	59	54	47
2.No. Mitsubishi PURY-EP700YSNW	80	87	81	81	79	74	69	64	58
1.No. Mitsubishi PURY-EP200YNW	71	89	73	73	70	63	59	56	54
AHU fresh air intake – in duct	69	71	72	72	68	61	59	54	53
AHU exhaust – in duct	69	73	83	79	78	78	77	74	68

At night, it is understood the AHU will be off and the demand from the Mitsubishi units will be low. A conservative assumption that the units will operate at <75 % capacity overnight, which would be a reduction of at least 3 dB based on the manufacturer's published data.

The fresh air intake and exhaust connections of the AHU connect to atmosphere via louvres on the east wall of the plant room. The air intake and exhaust connections of the AHU include the following attenuators:

Table 3 – Insertion losses for the AHU attenuators

Description	Insertion loss, dB, @ octave band centre frequency							
	63	125	250	500	1k	2k	4k	8k
Exhaust attenuator (450 mm)	2	3	8	17	15	11	10	9
Intake attenuator (450 mm)	1	1	5	10	7	7	7	6

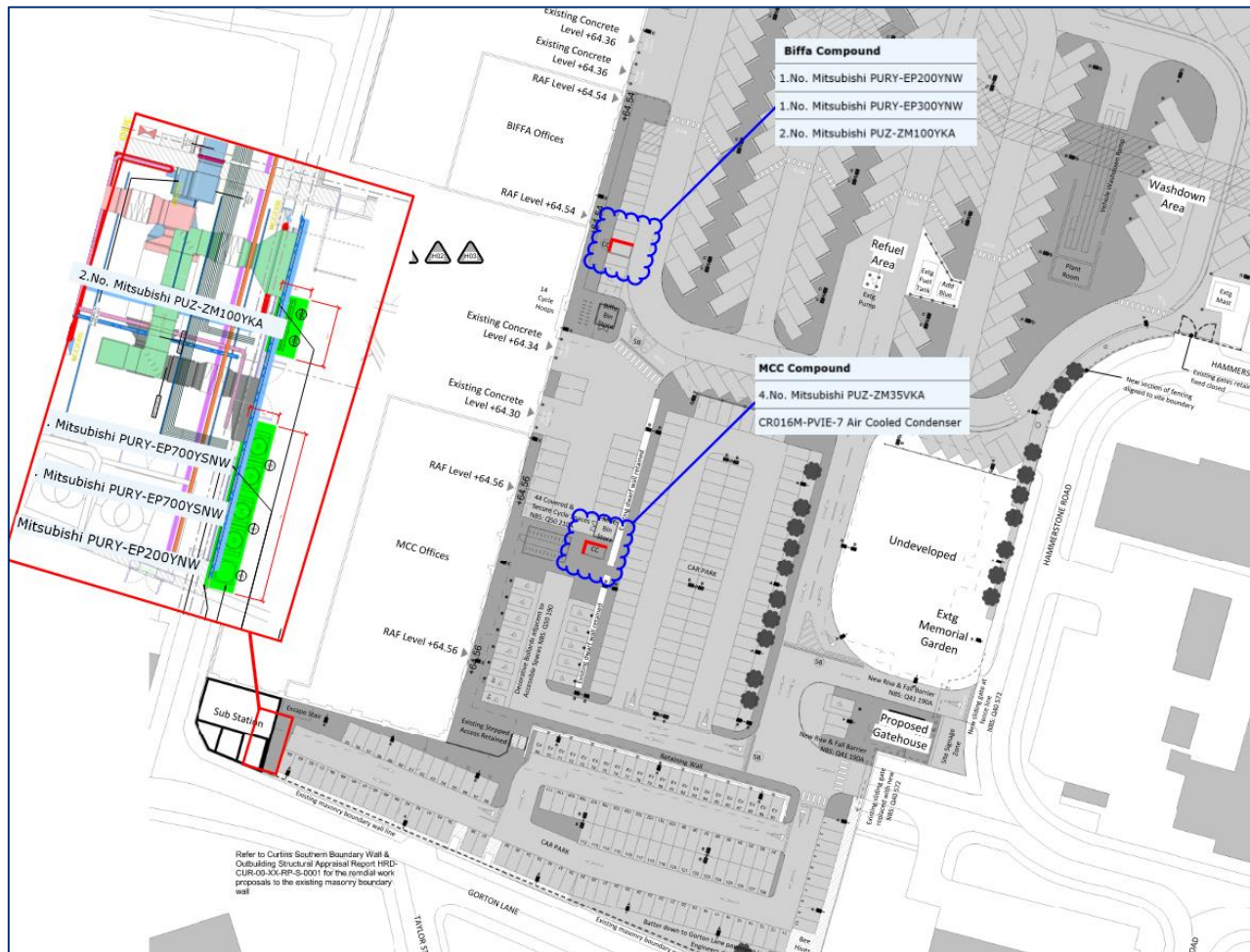


Figure 3 – Site plan showing locations of the installed plant items

To predict noise levels from the plant as operational, a 3D computer noise model was prepared to calculate industrial noise levels at the nearest receptors using Datakustik CadnaA software.

Sound propagation predictions within the model are undertaken in accordance with *ISO 9613-2:2024 - Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors*. This predicts the level of noise at the closest receptor, accounting for reflections from nearby surfaces and buildings as well as the screening effects of any intervening buildings/walls.

The surrounding ground of the Hammerstone site is generally hard and reflective, with softer ground noted by Sunny Brow House. A reflection coefficient of 0.3 is used in the model for the site footprint, and a reflection coefficient of 1.0 is used for the areas of soft ground (0 = fully reflective, 1 = fully absorptive).

The heights of Buildings are based on the Architect's drawings where available.

The order of reflections in the model is set to 2. All buildings are inputted as fully reflective surfaces.

The perimeter wall to the south of the Hammerstone site is input as 1.8 m in height.

Industrial noise levels are predicted in terms of the 1-hour average specific sound level, dB $L_{Aeq,1hour}$, at a height of 1.5 m at the nearest noise-sensitive receptor as this is a single storey building.

It should also be noted that the condenser compounds are partially enclosed by 2 solid sides, where the fence is at least 10kg/m² and at 2 m in height. These enclosures are presented in Appendix B.

5 Assessment

Manchester City Council's guidance requires the rating level ($L_{A,Tr}$) of any external plant items, when assessed in accordance with BS4142:2014 to be controlled to 5dB below existing background noise levels (L_{A90}).

To meet this criterion, the noise limits in Table 6 below must be met by the new external plant items as presented in Table 2 at the nearest noise sensitive premises, which as identified previously is Sunny Brow House to the south.

Table 4 – Rating noise limits to comply with MCC requirements

Noise Rating Limit, dB $L_{A,Tr}$	
Daytime	Night-time
≤ 42	≤ 39

Figure 4 below presents the output of the noise model to identify the predicted noise levels at this receptor during the day and at night. At night, the offices will be unoccupied and as a result demand is less. The AHU is expected to be off, and condensers will be running at < 75 % capacity.

Predicted noise levels were found to be up to 40 dB $L_{Aeq, 1h}$ during the day and up to 36 dB $L_{Aeq, 15min}$ at night. The higher levels of 41 dB L_{Aeq} (day) and 37 dB L_{Aeq} (night) shown on the above figure are to elevations that are non-habitable.

Daytime predicted noise levels at 1.5m above ground, dB $L_{Aeq, 1hour}$



Night-time predicted noise levels at 1.5m above ground, dB $L_{Aeq, 15min}$



Figure 4 – Predicted noise levels at Sunny Brow House

Using the predicted levels from the noise model, a BS4142 assessment has been carried out as presented in Table 4. The plant is understood to run in steady state once operational and Table 5 confirms the noise sources are broadband. Therefore, no additional acoustic penalties have been applied since the site is a commercial site already and the new plant not expected to be readily distinctive in character.

Table 5 – BS4142 Assessment

Description	Noise level at nearest sensitive receptor, dB(A)	
	Sunny Brow House	
	Day	Night
Noise level predicted at receptor (Specific Sound Level, $L_{Aeq, 1\text{hour}}$)	≤ 40	≤ 36
Acoustic feature corrections	Not applied	Not applied
Rating level ($L_{Ar,Tr}$)	40	36
Background level (L_{A90})	47	44
Excess of rating level over background	-7	-8
Rating level complies with MCC requirements ?	✓	✓

The above table shows that predicted rating noise levels from the new plant serving the Hammerstone Road Depot using the methodology of BS4142 will be more than 5 dB below the existing background noise climate. This meets the criterion set by Manchester City Council for new plant items and no mitigation measures are required.

5.1 Uncertainty

An assessment in accordance with BS 4142:2014+A1:2019 requires consideration of the potential effects of uncertainty on the assessment outcome. The effect of some types of uncertainty cannot be easily quantified. For this reason, the approach taken during this assessment has been to ensure control measures are in place to minimise uncertainty as far as practicable.

The control measures are listed below. Primarily, the assessment was undertaken by suitably qualified practitioners, using established best practice methods of measuring and predicting sound levels and applying professional judgement throughout the assessment.

Table 6 - Control measures taken to reduce uncertainty

Possible source of uncertainty	Control measures to reduce uncertainty
Date of survey	The noise survey used for this assessment was initially done in 2018, but even allowing for some difference in noise levels in 2025 it is not expected that background noise levels will have changed much or enough to affect the outcome of this assessment.
Selection of representative assessment locations	Initial appraisal and desk study carried out beforehand, and long-term meter installed in a location representative of nearest receptor.
Background sound level: measurement uncertainty	Measurements carried out with Class 1 (BS EN 61672-1:2013) instrumentation with effective windshield to minimise turbulence at the microphone. Calibration level checked before and after the survey. Background sound level measured over a period of several days to include the day and night. Representative value then determined using the typical average background sound level while excluding periods deemed to be atypical (due to high background sound levels).
Background sound level: effects of weather	Noise survey carried out under suitable weather conditions for environmental noise measurement, and weather conditions reported. Measurement results affected by periods of rain excluded from the analysis. Wind velocity during the survey was not sufficient to affect the measured background sound level. The background sound levels presented are considered representative of typical conditions in the absence of adverse weather conditions.
Specific sound level: source level uncertainty	Source emission levels for new sources were agreed with the client and MEP subcontractor.
Sound propagation uncertainty	Sound propagation predictions carried out using best industry practice (computational modelling applying ISO 9613-2:2024). Industrial sound level predictions apply under moderate downwind conditions at the assessment location (a moderate wind between source and receptor). This is considered suitable for evaluating the worst-case condition.
Rating level: acoustic feature corrections	Acoustic feature corrections not applied based on subjective observations at the assessment location and analysis of noise measurement frequency data for existing sources.
Context	Observations carried out during noise survey to assess the context into which the sound sources will be introduced. Consideration of the existing industrial sound level context forms part of the assessment.

6 Conclusion

Ramboll UK has reviewed the noise data for new external plant serving the Hammerstone Road Depot.

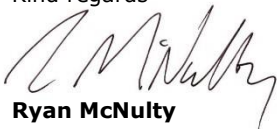
Based on noise data provided by the manufacturers of the plant, together with information regarding the location of each item and details for the perimeter screens to each condenser compound it has been determined that rating noise levels from the proposed plant item will be significantly lower than existing background noise levels at the nearest sensitive receptors as assessed using relevant British Standards and with reference to Manchester City Council's own Planning and Noise guidance.

Noise levels from the proposed plant meet the criterion set by Manchester City Council for new plant items and no mitigation measures are required.

This technical note, together with the commissioning test report from March 2024 confirm that the requirements of Condition 16 of the permission for this development are met.

I trust the assessment within this letter report are clear. Should any further information be required please do not hesitate to contact me.

Kind regards



Ryan McNulty

BA(Hons) MIOA

Acoustics

D +44 161 827 1890

M +44 7976 448682

ryan.mcnulty@ramboll.co.uk

Appendix A – 2018 Noise Survey Details

Location

Hammerstone Depot, off Gorton Lane, Manchester M18 8EQ

Date, time

Monday to Thursday, 10 to 13 December 2018

Thursday 20 May 2021

Tuesday 1 June 2021

Weather

10-13 December 2018: 2 – 8°C, light wind (ESE), occasional gusts, approx. 50% cloud cover, dry road surfaces

Thursday 20 May 2021: 100% cloud coverage, 12°C, light wind, occasional gusts, dry road to slightly damp road surfaces

Tuesday 1 June 2021: 20% cloud coverage, 26°C, very light wind, dry road surfaces

Equipment

- Norsonic NOR-140 sound level meter with all-weather kit (serial number 1406951) – Kit 3
- Norsonic calibrator (serial number 34964) – Kit 3
- Bruel & Kjaer 2250 sound level analyser (serial number 3002075)
- Bruel & Kjaer 2270 sound level analyser (serial number 2644605)

Before and after the survey the sound level meter was check calibrated to an accuracy of ± 0.1 dB using type 1251 and 4231 Sound Level Calibrators.

Attended noise levels were measured at a height of 1.5m above ground, and approximately 4m above ground where unattended.

Noise levels are as reported in the main report body. Further data and spectral information available on request.

Appendix B – Condenser Compounds Details

General Notes

Do not scale from this drawing. Only work to written dimensions.

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

This drawing is the property of Fletcher-Rae (UK) Limited (t/a Fletcher-Rae) and copyright is reserved by them. The drawing is not to be copied or disclosed by or to any unauthorised persons without the prior written consent of Fletcher-Rae (UK) Limited.

MORGAN SINDALL

Notes:

Refer to drawing HRD-FRA-00-XX-DR-A-90-0200 for location of Condenser Compounds

Acoustic Fencing Specification:

Manufacturer: Gramm Barrier Systems

Product: PolySoundBlok Absorptive

Material: High strength reinforced polymers, core up-cycled PVC (3.50mm)

Barrier Rating: A5, B3

Absorption: 16 Db

Reflection: 28 Db

Height: From 0.415 - 10m

Lengths: 1m - 4.25m

Weight: 23kg/m sq.

Finish: Posts & panels RAL 7047 Ilex grey

Mesh Fencing & Galflex: ArmaMeshV

Nominal Height: 2.0m

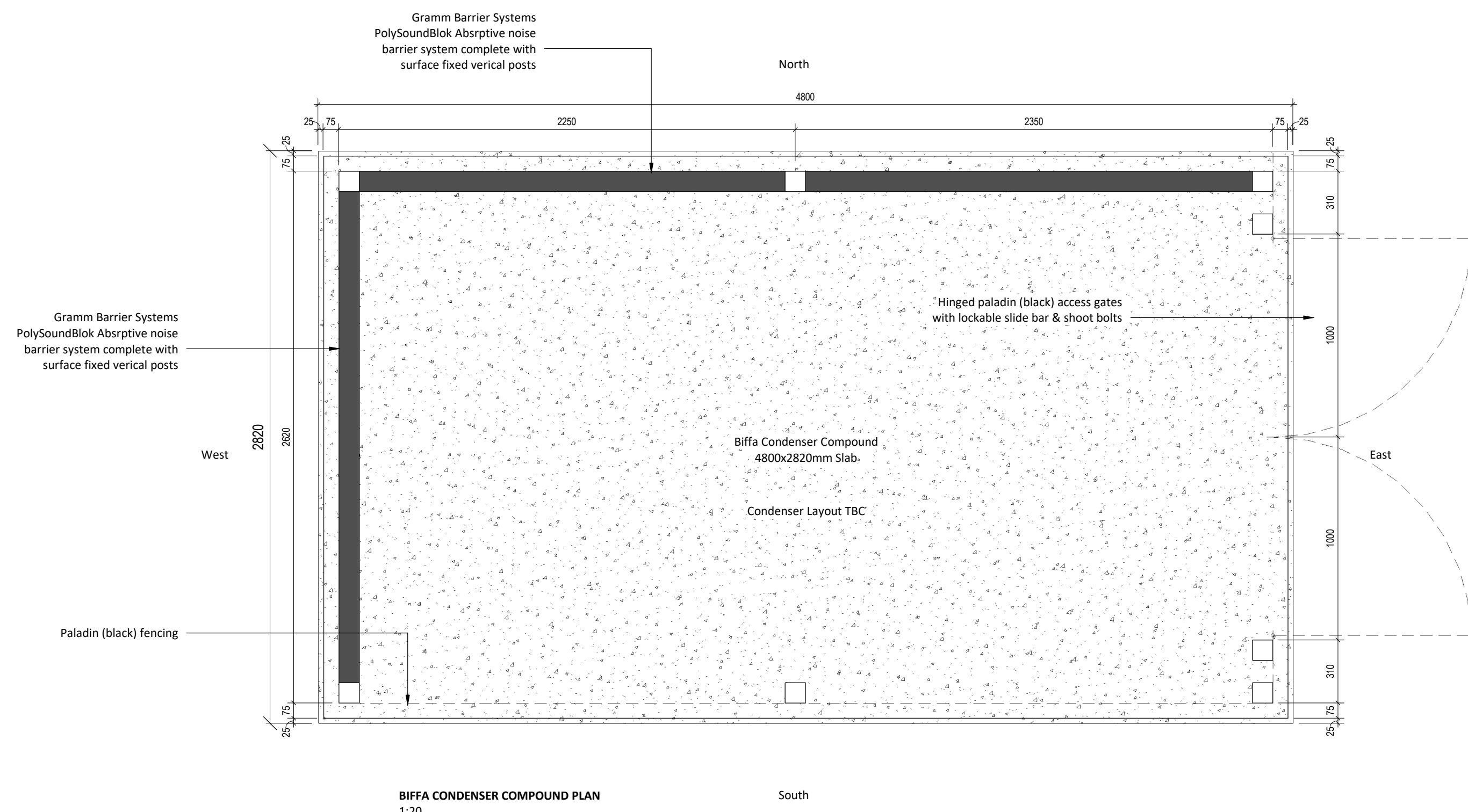
Finish: Posts & mesh RAL 7016 black grey

Ironmongery: Hinged gates provided with lockable sliding bar and shoot bolts.

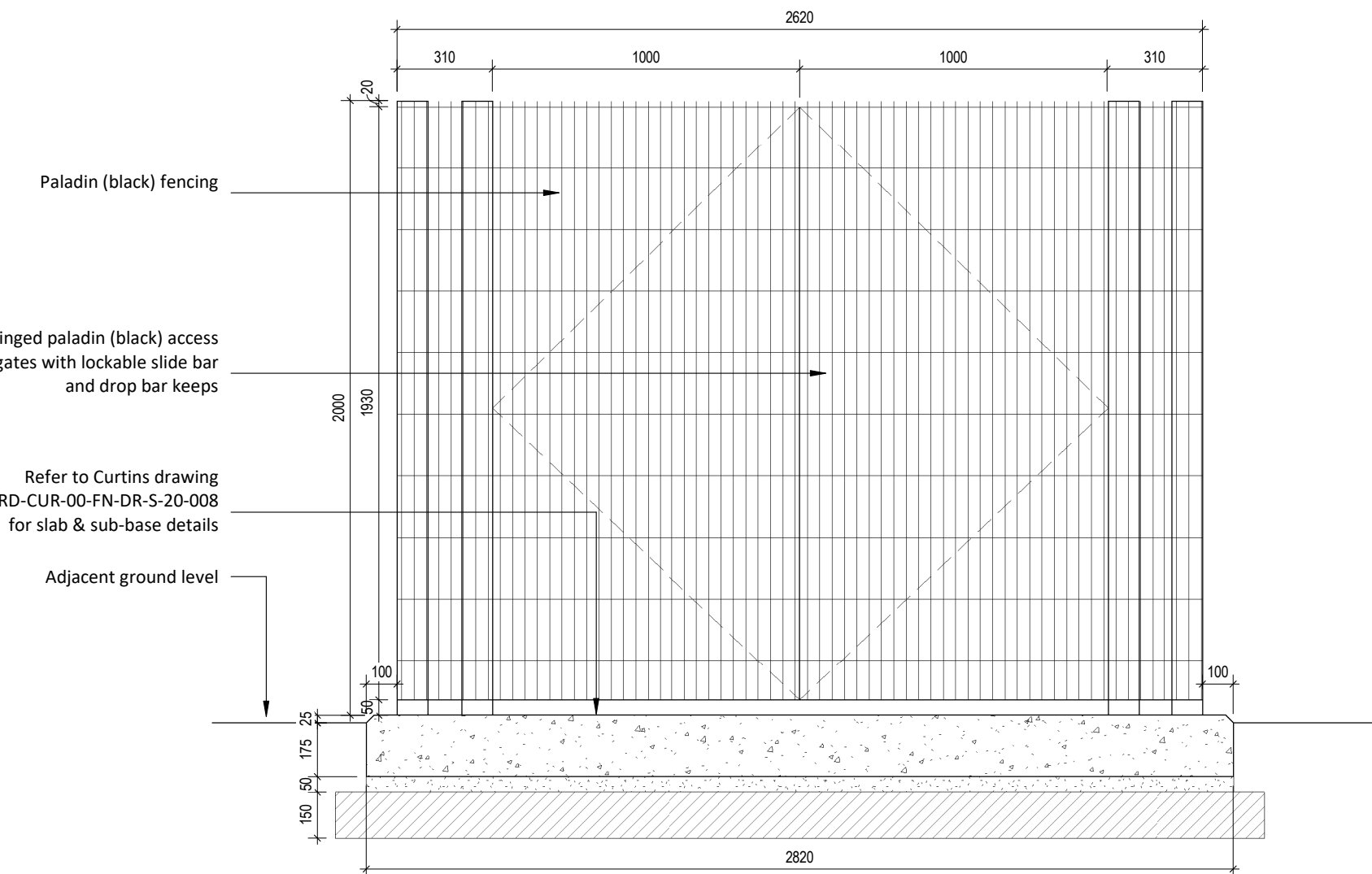
Notes:

All posts to be supplied with base plates to allow surface fixing to concrete slab. Baseplates to be designed to work with slab / compound dimensions.

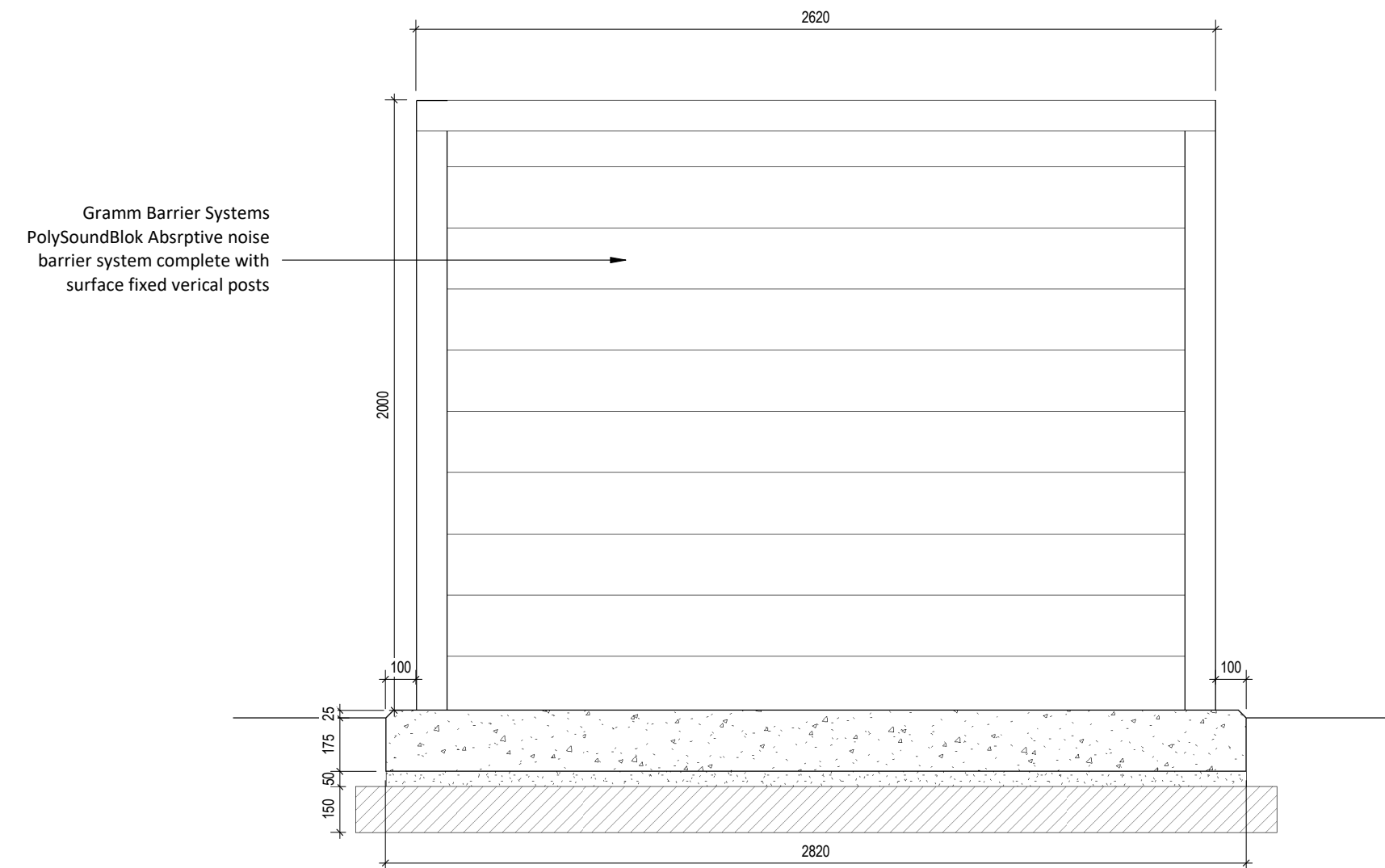
Manufacturer to provide detailed drawings for comment.



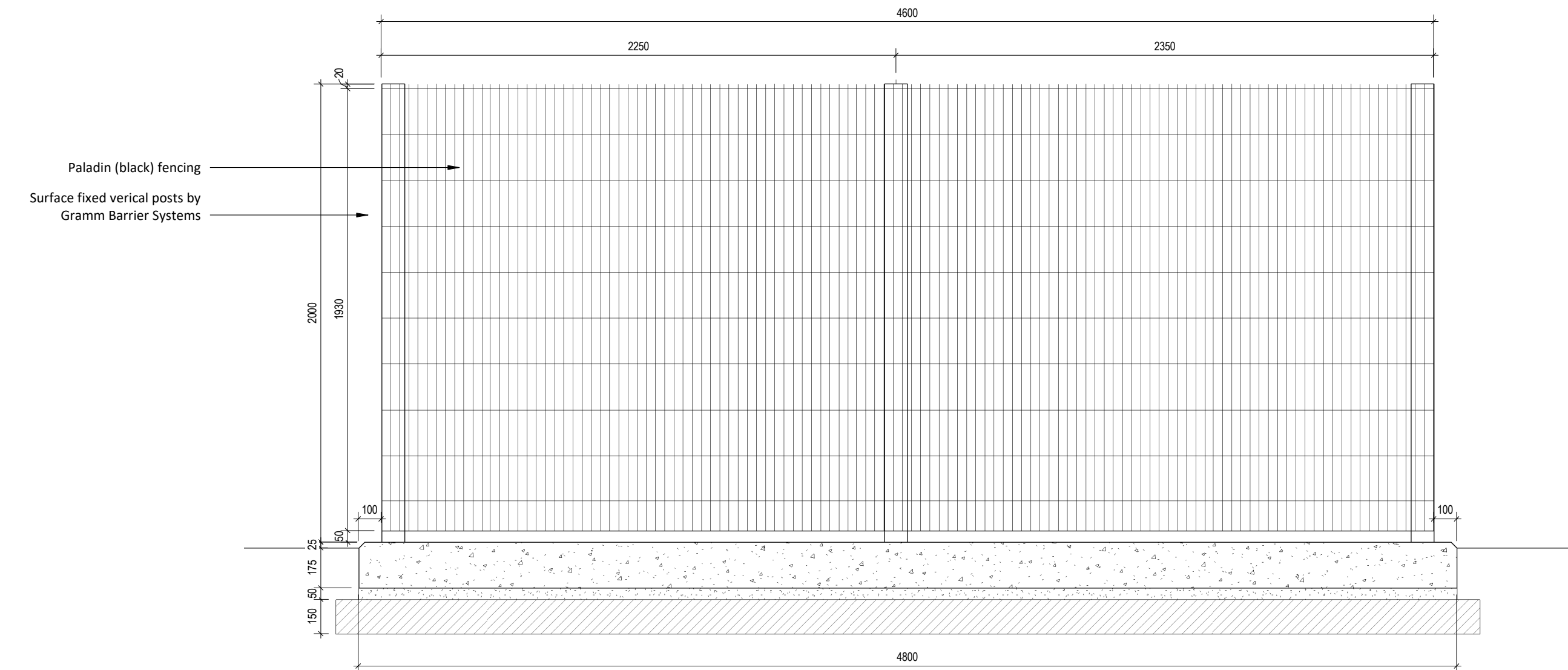
BIFFA CONDENSER COMPOUND PLAN
1:20



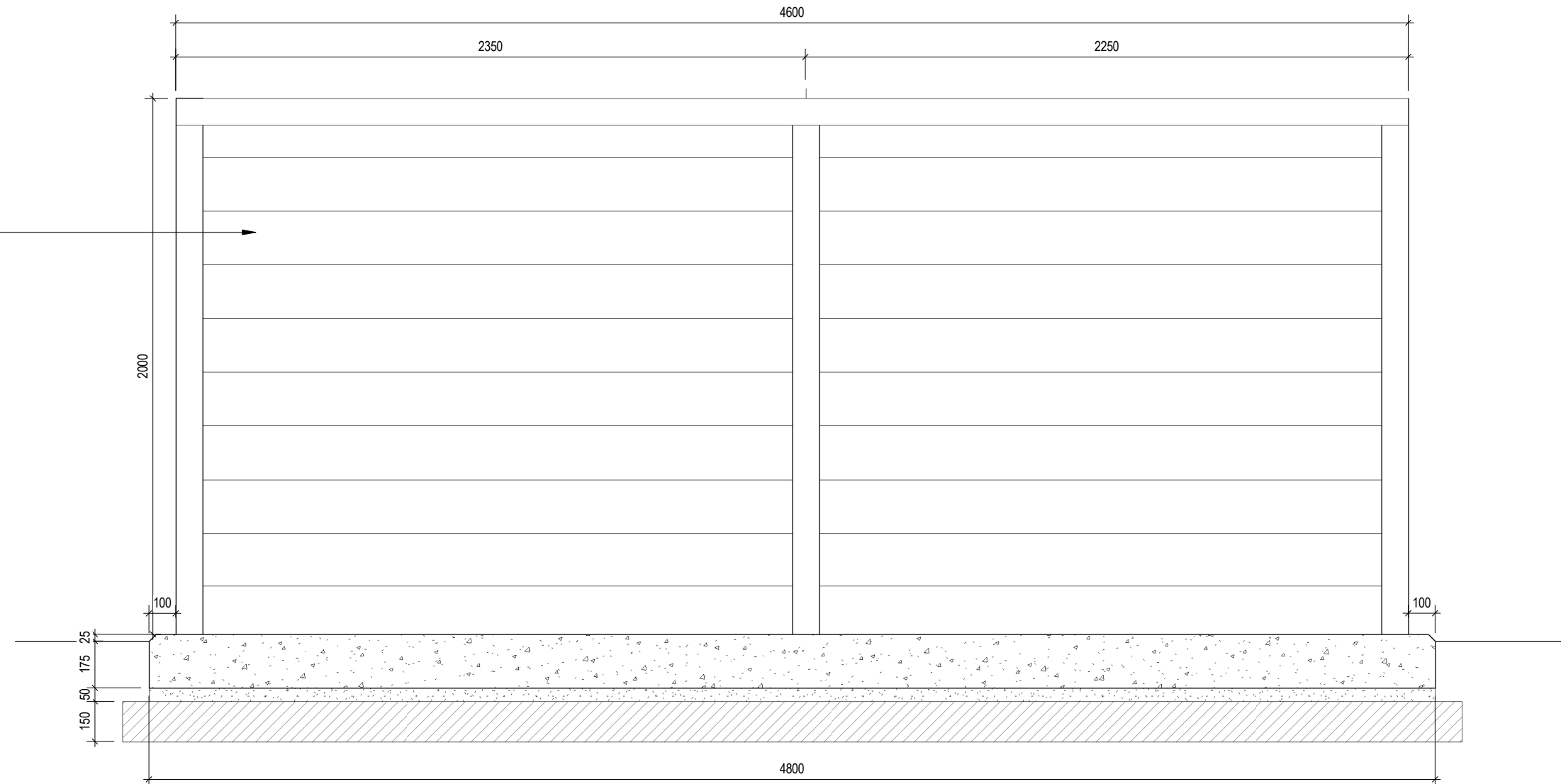
BIFFA EAST ELEVATION
1:20



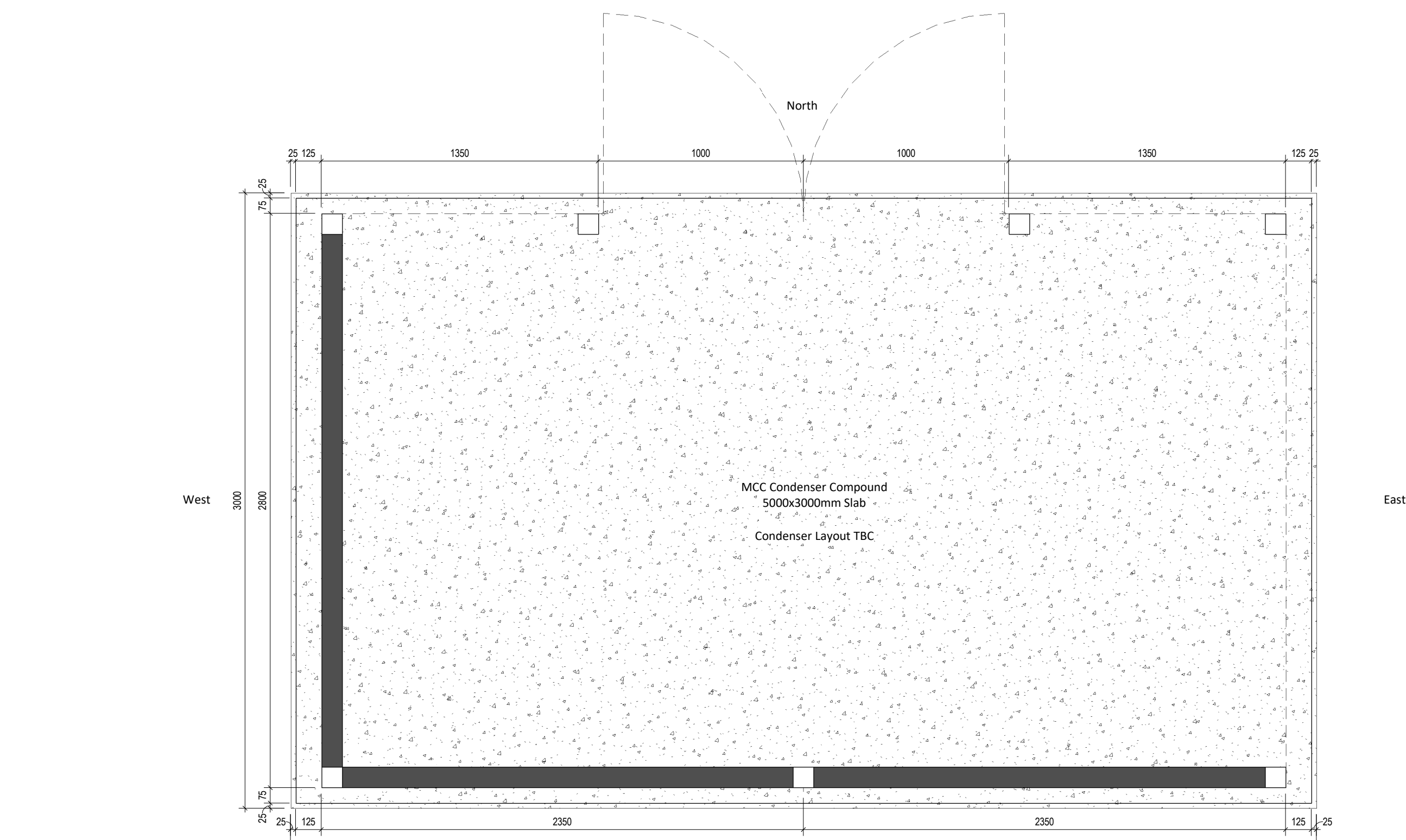
BIFFA NORTH ELEVATION
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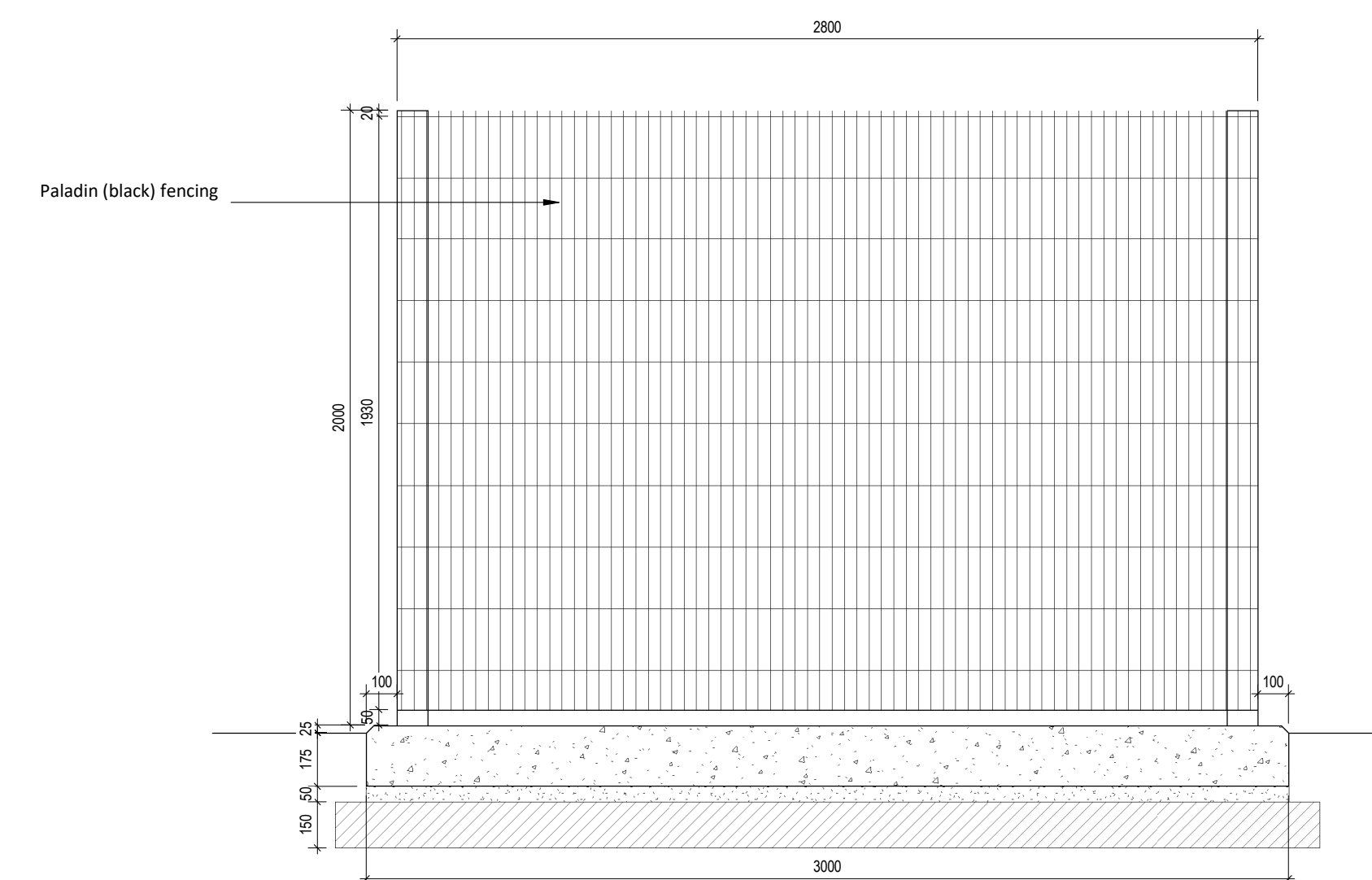
BIFFA SOUTH ELEVATION
1:20



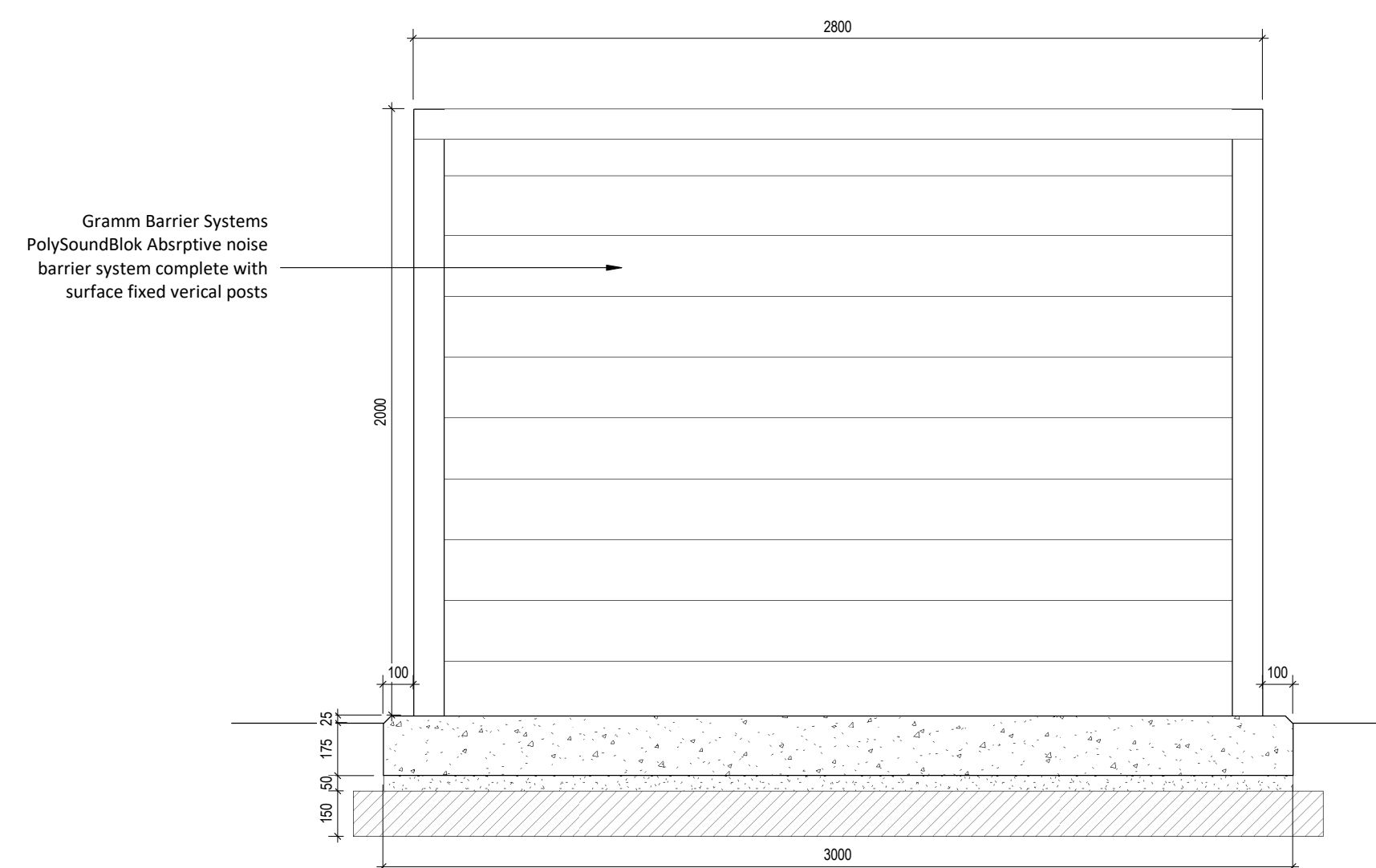
MCC NORTH ELEVATION
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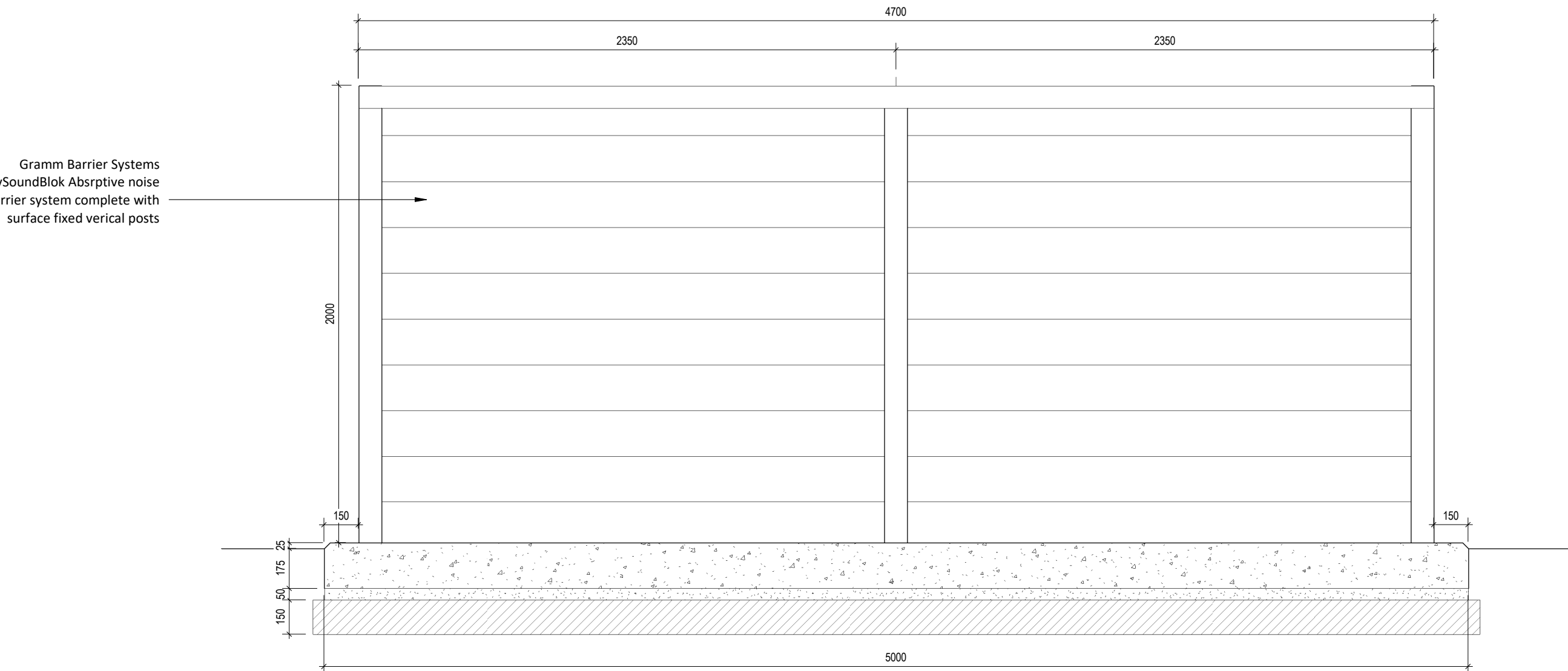
MCC CONDENSER COMPOUND PLAN
1:20



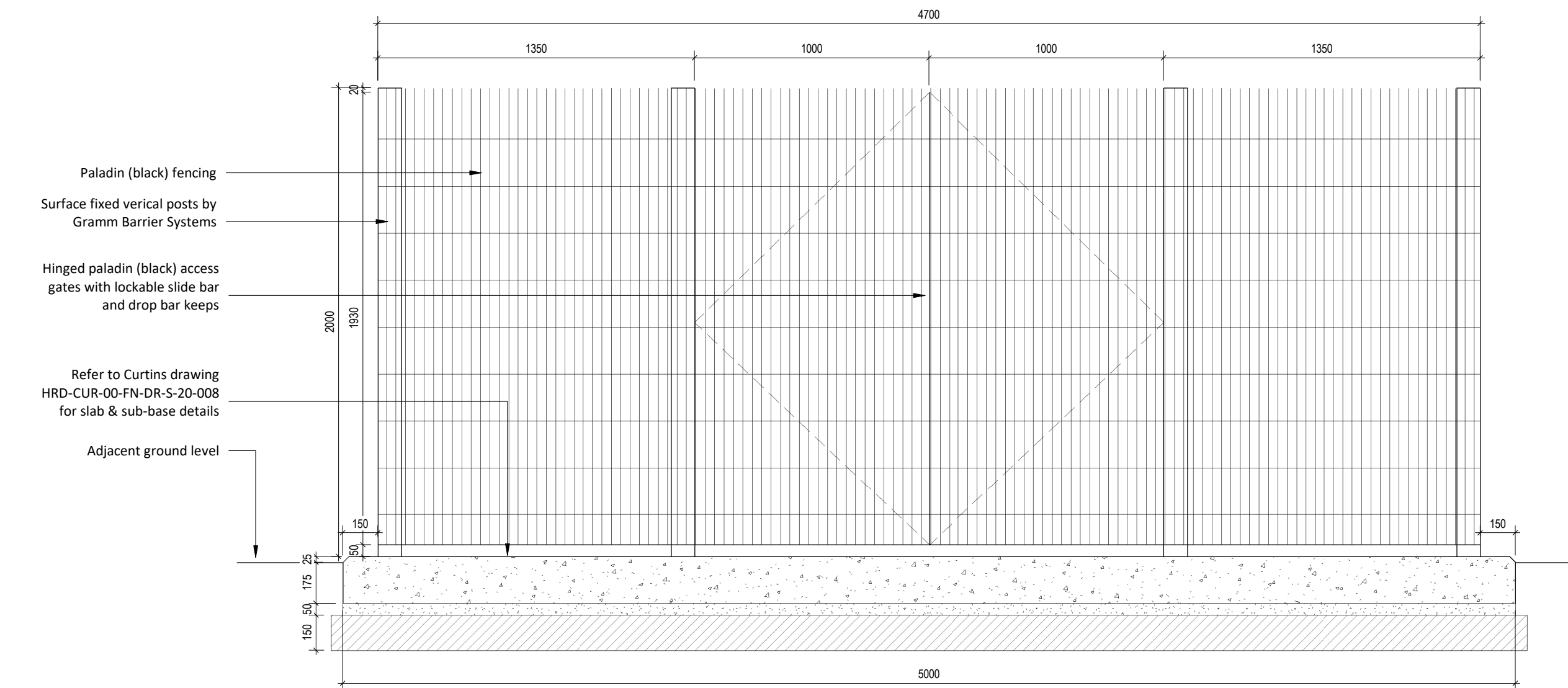
MCC EAST ELEVATION
1:20



MCC WEST ELEVATION
1:20



MCC SOUTH ELEVATION
1:20



MCC NORTH ELEVATION
1:20

C04	PolySoundBlok colour amended to RAL 7047	2024.03.25	AT
C03	Biffa compound dimensions updated to reflect as built slab size	2024.03.01	AT
C02	Compound revised to incorporate acoustic & mesh fencing, individual MCC & Biffa arrangements indicated	2024.02.28	AT
C01	First issue	2022.11.04	AT
Rev.	Description	Date	IS APP

Scale: 1:20 @ A0

Status:

Drawn By: JB

Checked By: AT

Date:

Client: 2022.11.02

Project: 18021 Hammerstone Road

Manchester

Sheet Name:

Proposed External Condenser Compound

Project No. Orig. Zone Level Typo Role Ctr. Draw No. Rev.

HRD-FRA-00-XX-DR-A-90-0255 C04

fletcher|rae

Architects | Master Planners | Designers

Level 12, Tower 12, 18-22 Bridge Street, Manchester, M3 3BZ

t +44 (0) 161 242 1140

f +44 (0) 161 242 1141

w www.fletcher-rae.com

e info@fletcher-rae.com