Bonniface Consulting
Structural Engineers

Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch 8545

Tel: (03) 963 1025
Email: admin@bonniface.com

Our Ref: 1712/DJB/BB

18 March 2024

Malteurop New Zealand Ltd
PO Box 501
ASHBURTON 7740

Attention: Jeremy Thiblet

Dear Sir/Madam

DETAILED SEISMIC ASSESSMENT OF GLASSWORKS BUILDING AT BREMNESS ROAD, ASHBURTON

Further to your instructions, we confirm that we have completed a Detailed Seismic Assessment of the above property and report as follows: -

1.0 INTRODUCTION

Bonniface Consulting Ltd has been engaged by Malteurop New Zealand Ltd to carry out a Detailed Seismic Assessment (DSA) and provide preliminary strengthening schemes for the Glassworks building and associated sheds and chimney. The assessment was carried out in accordance with *The Technical Guidelines for Engineering Assessments* using information gathered on site. No information was available from the Ashburton District Council's property file and no drawings for the buildings were available. The site was visited on 12 September 2023 and 27 September 2023 to carry out a site measure and survey.

2.0 BUILDING DESCRIPTIONS

There are five structures that make up the Glassworks, the original brick building (main hall and annexes), the two timber sheds immediately to the southwest of the brick building, the workshop and railway siding wall on the southeast of the brick building and the concrete chimney. A brief description of these structures is given below: -

BUILDING 1	
Date Constructed	1928
Number of Storeys	One
Current Use	Storage of equipment and bags of grain
Plan dimensions	Ground Floor Area: - 1690m^2
Importance Level AS/NZS 1170.0:2002	IL2 – Normal Structure

BUILDING 2	
Date Constructed	Circa 1930
Number of Storeys	One
Current Use	Storage
Plan dimensions	Ground Floor Area: - 533m^2 Covered loading Area: - 197m^2
Importance Level AS/NZS 1170.0:2002	IL2 – Normal Structure

BUILDING 3	
Date Constructed	Circa 1930
Number of Storeys	One
Current Use	Not Used
Plan dimensions	Ground Floor Area: - 329m^2
Importance Level AS/NZS 1170.0:2002	IL2 – Normal Structure

BUILDING 4	
Date Constructed	Circa 1950
Current Use	Storage and telecommunication equipment
Plan dimensions	Ground Floor Area: - 319m^2
Importance Level AS/NZS 1170.0:2002	IL2 – Normal Structure

CHIMNEY	
Date Constructed	1928
Current Use	Support of telecommunication equipment
Dimensions	Base Area: - 23.8m^2 Height: - 38.4m (approx.)
Importance Level AS/NZS 1170.0:2002	IL2 – Normal Structure

3.0 STRUCTURAL FORM AND LOAD PATHS

BUILDING 1 (Brick Building, Main Hall and Annexes)

Structural Form

Within the main hall, steel roof trusses supporting steel angle purlins and corrugated steel roof sheeting. Within the annex areas timber rafters support timber purlins and corrugated steel roof sheeting. All external walls are cavity brick, 230 x 110 x 70 bricks each face with a 40mm cavity. Brick wythes are connected with galvanised wire ties. Solid brick 600 x 500 piers are provided at varying centres along these walls.

Internal walls are solid 230 thick brickwork with solid brick piers of varying sizes and spacings, except there are no brick piers on the walls adjacent to the railway siding.

Load Paths

Gravity: Main Hall – the roof sheeting is supported on steel angle purlins which in turn are supported by steel trusses on a reinforced concrete bond beam supported on the brick walls.

Annexes – the roof sheeting is supported on timber purlins which is supported on timber rafters supported on the brick walls.

Lateral Along: Main Hall – roof and gable end loads are transferred to the brick walls on grids 7 and 12 via steel flat roof bracing and an eaves height reinforced concrete bond beam. The brick walls act as shear walls to transfer loads to the ground.

Annexes – roof loads are transferred via diaphragm action of the roof sheeting to the brick walls parallel to the northwest and southeast elevations, which act as shear walls to transfer roof and wall loads to the ground.

Lateral Across: Main Hall – roof and side wall loads are transferred to the brick walls on grids H and P via steel roof bracing and a reinforced concrete bond beam at eaves level. The brick walls act as shear walls to transfer loads to the ground.

Annexes – roof loads are transferred via diaphragm action of the roof sheeting to the brick walls parallel to the southwest and northeast elevations, which act as shear walls to transfer roof and wall loads to the ground.

BUILDING 2 (Timber shed grids A to H)

Structural Form

Timber roof trusses supported on square timber posts, supporting timber purlins and corrugated steel roof sheeting. The external walls are clad in vertically orientated corrugated steel on timber stud walls.

Load Paths

Gravity: The roof sheeting is supported on timber purlins which in turn are supported by the timber trusses supported on square timber posts.

Lateral Along: Walls and roof loads are transferred via diaphragm action of the roof sheeting to the timber frame walls on grids 7 and 12 that act as shear walls to transfer loads to the ground.

Lateral Across: Portalised timber trusses and support posts transfer loads from the roof and side walls to the ground.

BUILDING 3 (Timber shed southwest of grid A)

Structural Form

Timber roof trusses supported on timber posts and stud walls, supporting timber purlins and corrugated steel roof sheeting. The external walls are clad in vertically orientated corrugated steel on a timber stud wall.

Load Paths

Gravity: The roof sheeting is supported on timber purlins which in turn are supported by the timber trusses supported on square timber posts or timber stud walls.

Lateral Along: Walls and roof loads are transferred via diaphragm action of the roof sheeting to the timber frame walls on the southwest side and grid A.

Lateral Across: Walls and roof loads are transferred via diaphragm action of the roof sheeting to the timber frame walls on the northwest and southeast ends.

BUILDING 4 (Workshop and Railway Siding Roof)

Load Paths

Gravity: The roof sheeting is supported on timber purlins which in turn are supported on timber rafters spanning southeast to northwest. The rafters are supported by buildings 1 and 2 on the northwest side of the rail sidings and on the southeast side by a concrete bond beam supported by concrete columns.

Lateral Along: Roof loads are transferred to the walls on grids 13 and 14 via diaphragm action of the roof sheeting. The wall on grid 14 acts as a brick infilled concrete frame shear wall to transfer loads to the ground.

Lateral Across: Roof and wall loads are resisted by cantilever action of reinforced concrete columns.

CHIMNEY

Load Paths

Lateral Along: Cantilever action of octagonal reinforced concrete tube.

4.0 FOUNDATIONS

The foundations of the buildings are reinforced concrete strip foundations under external and internal walls. The type and size of the chimney foundation is unknown but is likely to be a raft foundation.

5.0 DRAWINGS & SPECIFICATION

No drawings or specifications were available in the Ashburton District Council's Property file. Enquiries at the Ashburton Museum, Archives New Zealand and Canterbury University Architectural Archive were also made without success.

The assessment is based on site measure information gathered by us and shown on drawings 1712/S01 to S08.

6.0 OBSERVATIONS FROM SITE VISIT

The following observations were noted: -

External

Northwest Elevations

(i) No distress noted on buildings 1, 2 and 3.

Southwest Elevations

(ii) Building 1 grid 1H – a diagonal crack approximately 5mm wide raking downwards from the top of the west corner to the sill of the adjacent window.

(iii) The eaves brickwork on the gable end of the main hall in building 1 (room D) has slid outwards by approximately 25mm. The coping beam has also slid along the top of the wall by the same amount. This occurs on both ends of the wall.

(iv) A 500 long by 200 high area has spalled at the bottom of the concrete bond beam between grids 3H and 4H on building 1. At the centre of this spalling is a vertical crack approximately 3-4mm in width extending to the top of the beam.

(v) No major distress noted on buildings 2 and 3.

Northeast Elevations

(vi) Building 1 grid 1P – A diagonal crack approximately 3mm wide raking downwards from the top of the north corner to the sill of the adjacent window.

(vii) The eaves brickwork on each side of the gable end of the main hall in building 1 have slid outwards by approximately 20mm. The coping beams have also slid along the top of the wall by the same amount.

(viii) Impact damage on the brick pier on the southeast side of roller shutter door into the main hall of building 1.

(ix) 10mm wide crack in the base of the concrete lintel above the southeast window between grids 12 to 13.

Southeast Elevation

(x) No distress noted.

Chimney

(xi) A crack approximately 2-3mm in width running vertically upwards on the northeast side.

(xii) A crack approximately 4mm in width running vertically upwards on the southwest side.

(xiii) A large hole approximately 500 diameter has been cut into the southwest side at approximately 4 metres above ground level.

(xiv) A large horizontal line of spalled concrete on the northeast side at approximately half height. The spalling is due to corrosion of the horizontal reinforcement along the same line.

(xv) A small area of spalled concrete of approximately 250 diameter on the northeast side just above ground level. The spalling is due to corrosion of a vertical reinforcing rod.

Internal

(i) Building 1 Main Hall – faint hairline cracking in the northeast corner.

(ii) Forklift impact damage to the brickwork southeastern side of the roller shutter door on grid P.

(iii) A crack in the concrete lintel above the sliding door access into room U from the main hall and impact damage to the supporting brickwork.

(iv) Diagonal cracks on the northwest and southeast walls in rooms P and N. The cracks rake down from the southwest and northeast corners down to the sill of the adjacent windows.

(v) Horizontal concrete cracking at the support of the steel roof beams in rooms P an N adjacent to grid 1L.

(vi) Slight relative movement of the wall on grid 1 and the timber roof beams. This appears to be associated with outward movement of the top of the wall.

(vii) No major distress noted in the other rooms or buildings.

(viii) Building 3 is in a dilapidated condition. Many of the structural timbers are riddled with borer and/or have rotted. The roof and wall cladding are also past the point of repair.

7.0 ASSUMPTIONS

The following assumptions have been made: -

- A building consent and code compliance certificate (or equivalent at the time of construction) was issued for all of the buildings.

- The buildings were designed to comply with the relevant standards at the time of construction and subsequent modifications.

- The bond beam reinforcement assumed for the assessment is based on the reinforcement visible at the damaged bond beam on grid H.

- The chimney reinforcement used in the assessment is based on the reinforcement measured within the hole at the southwest side.

- The reinforcement and pad size for the cantilever columns on grid 14 is based on the requirements of the design standards of the time.

8.0 ASSESSMENT OUTCOME

The results of our Detailed Seismic Assessment (DSA) indicate the seismic ratings to be as follows: -

Structure	% NBS	Grade
BUILDING 1	15% NBS*	E
BUILDING 2	15% NBS*	E
BUILDING 3	15% NBS*	E
BUILDING 4	15% NBS*	E
CHIMNEY	20% NBS[1]	D

* *NBS rating has been rounded up as recommended by Part A of "The Technical Guidelines for Engineering assessments". Actual raw score is less.*

1 *Low level of certainty*

A building with a seismic rating less than 34% NBS is considered to be an Earthquake-Prone Building (EPB) in accordance with the Building Act and a building rating less than 67% NBS is classed as an Earthquake Risk Building (ERB) by the New Zealand Society for Earthquake Engineering (NZSEE). Therefore, all of the buildings and the chimney are categorised by our assessment as Earthquake Prone Buildings.

9.0 CRITICAL STRUCTURAL WEAKNESSES (CSW)

A structural weakness is an aspect of the building structure and/or the foundation soils that scores less than 100% NBS. The critical structural weakness (CSW) is the lowest scoring structural weakness. The structural weaknesses for the buildings are tabulated below:

BUILDING 1				
Location	**Load Direction**	**Element**	**Limiting Factor**	**Rating (% NBS)**
Walls grids H & P	Across (NW to SE)	Brick walls	In-plane capacity	37
Wall grid 7	Along (SW to NE)	Brick wall	In-plane capacity	34
Wall grid 12	Along (SW to NE)	Brick wall	In-plane capacity	21
Grids P, H, 7 & 12	Both	Bond beam	Flexural capacity	15*
Roof	Both	Roof bracing	Tension capacity	15*
Roof (annex)	Both	Diaphragm	Shear capacity	15*
Walls (annex) grids 1 & 4	Both	Brick walls	Out-of-plane capacity	40
Walls (annex) grid L	Both	Brick walls	Out-of-plane capacity	61
Walls (annex) other grids	Both	Brick walls	Out-of-plane capacity	>85

BUILDING 2				
Location	**Load Direction**	**Element**	**Limiting Factor**	**Rating (% NBS)**
Grids B to G	Across (SE to NW)	Truss Portal	Knee Joint Connection	90
Roof	Along (SW to NE)	Roof Bracing	Lack of Bracing	15*
Grids B to G	Along (SE to NW)	Truss Portal Posts	Base Connection	15*
Walls grid 7 & 12	Across (SW to NE)	Wall Bracing	Capacity of Sheathing	26

BUILDING 3				
Location	**Load Direction**	**Element**	**Limiting Factor**	**Rating (% NBS)**
NW & SE Walls	Across (SW to NE)	Wall Bracing	Capacity of Sheathing	20
SW & NE Walls	Along (NW to SE)	Wall Bracing	Capacity of Sheathing	40
Roof	Both	Diaphragm	Lack of Roof Bracing	15*

BUILDING 4				
Location	**Load Direction**	**Element**	**Limiting Factor**	**Rating (% NBS)**
Grid 14	Across (NW to SE)	Concrete Columns	Cantilever bending capacity and foundation	18
Grid D/E & H/J	Along (SW to NE)	Brick Infill	Face load capacity	15*

CHIMNEY[1]				
Location	**Load Direction**	**Element**	**Limiting Factor**	**Rating (% NBS)**
Concrete Octangle Tube	Any	Concrete tube	Bending Capacity	30[2]
Brick Flue	Any	Brick tube	Bending Capacity	15 to 20[3]
Foundation	Any	Foundation	Overturning Capacity	29

1. *Low level of certainty in results due to lack of information.*
2. *Reduced due to probable use of short laps.*
3. *Collapse of brick flue is unlikely to pose a risk to people.*

10.0 STRENGTHENING

We have carried out the preliminary design of two earthquake strengthening schemes, one to lift the capacities of the buildings to above Earthquake Prone Status (i.e 34% NBS) and the other to lift their capacities to 67% NBS (above Earthquake Risk Status). The schemes are similar in nature, but the size and quantity of materials differs. The schemes involve the following work: -

BUILDING 1

1. Installation of steel portal frames and associated foundations within the main hall.
2. Installation of eaves level steel bracing within the main hall.
3. Installation of horizontal steel transoms (girts) within the main hall and annexes.
4. Installation of steel roof bracing in the main hall
5. Installation of steel wall bracing in the main hall.
6. Installation of steel bracing between the existing steel beams in room J.
7. Installation of strip steel roof bracing in rooms P and N.

8. Installation of brickwork restraints on the gable end walls of the main hall.

9. Connection of existing roof structure to brick walls on grids 1 and 2.

10. Installation of fixing between the existing concrete copings and brick wall below.

11. Repair of various areas of damage.

BUILDING 2

1. Installation of brackets to fix the truss support posts to the foundation.

2. Installation of steel roof and wall bracing.

3. Installation of strip steel wall bracing on grid A.

BUILDING 3

1. Demolish building 3 due to its dilapidated state.

BUILDING 4

1. Demolish building 4 (1950's addition).

CHIMNEY

1. Demolish chimney.

Please note the following: -

- As no drawings can be found, to provide a detailed strengthening scheme for the chimney would require an exorbitant amount of intrusive investigations to establish:

    - Foundation size, depth and reinforcing. Excavation down to approximately 3.5m below ground level would be required.
    - Chasing of concrete on both the outside and inside of the octagonal tube at various heights.
    - Scanning and chasing to establish reinforcement lap lengths.
    - Concrete cores to establish the compressive strength.

    Even with this additional information, there will still be doubt over the construction, for example adequate anchorage of the chimney wall bars into the foundation will remain unknown, as will the reinforcement content throughout the foundation.

- The chimney concrete is likely to have suffered from carbonation which reduces the PH of the concrete and allows the reinforcement to corrode. There is also a possibility that sulphates from burning coal may have also affected the concrete.

11. BALLPARK COST ESTIMATES FOR STRENGTHENING

Cost estimate for 67% NBS strengthening: -

Building 1	$1,127,000 & GST
Building 2	$ 50,600 & GST
Demolition	$ 630,000 & GST
Total	**$1,807,600 & GST**

Cost estimate for 34% NBS strengthening: -

Building 1	$ 896,250 & GST
Building 2	$ 47,600 & GST
Demolition	$ 630,000 & GST
Total	**$1,573,850 & GST**

Please note the following limitations: -

- These costings are very preliminary high level cost estimates based on the preliminary strengthening designs shown on drawings 1712/S20 to S25 and based on a methodology determined by Bonniface Consulting Ltd only.
- If the costings are the determinant to proceed or not, we recommend that a more accurate costing is determined by a Quantity Surveyor.
- The costings do not include design, consenting costs and Heritage New Zealand approval costs.
- The costings exclude moving/relocation of services and equipment to gain access to carry out the work and installation.
- The costings exclude operational costs i.e. disruption and cleaning etc.
- The costings do not include repair and maintenance that the buildings require.
- The costs are subject to verification of market rates at the time of construction.

- The demolition costs are difficult to estimate and we recommend that you obtain an estimate from a demolition contractor.

I trust the above meets your requirements but if you require any further information, please do not hesitate to contact us.

Yours faithfully

D J Bonniface BE (Hons), CMEngNZ, CPEng, MIStructE, IntPE
DIRECTOR

Appendix A
Photographs

Photo 1. Northeast Elevation of Building 1.

Photo 2. Part Northeast Elevation of Building 1 (Main Hall Gable End).

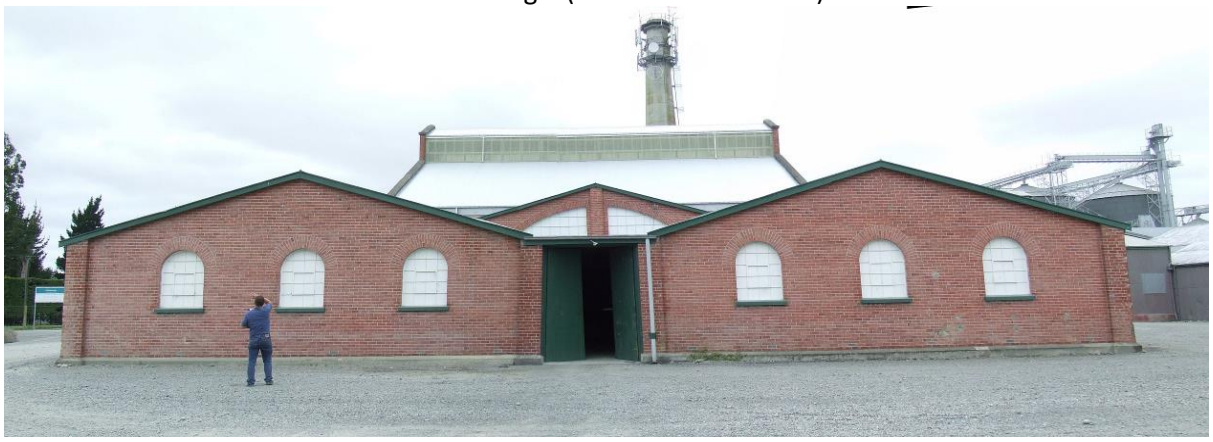


Photo 3. Northwest Elevation of Building 1.

Photo 4. Southwest Elevation of Building 1.

Photo 5. Southeast Elevation of Building 1. Building 4 is in the foreground.

Photo 6. Part Southwest Elevation of Building 1.

Photo 7. Northwest Elevation of Building 2 and part Southwest Elevation of Building 1.

Photo 7. Building 3 viewed from the north.

Photo 8. Southeast Elevation of Building 4.

Photo 9. Damage to gable end brickwork and coping on Building 1 west corner.

Photo 10. Eaves brickwork and coping damage on Building 1 gable end west corner.

Photo 11. Lintel cracking due to reinforcement corrosion on Building 1 Northeast Elevation.

Photo 12. Chimney – Spalling due to reinforcement corrosion.

Photo 13. Chimney – Vertical crack on northeast side.

Photo 14 Chimney – Vertical crack on southwest side.

Photo 15. Chimney – Vertical crack on southwest side.

Photo 16. Chimney – Spalling on northeast side.

Photo 17. Chimney – Hole in southwest side. View of internal brick flue.

Photo 18. Chimney – Hole in southwest wall.

Photo 19. Building 1. – Spalled concrete on bond beam on grid H.

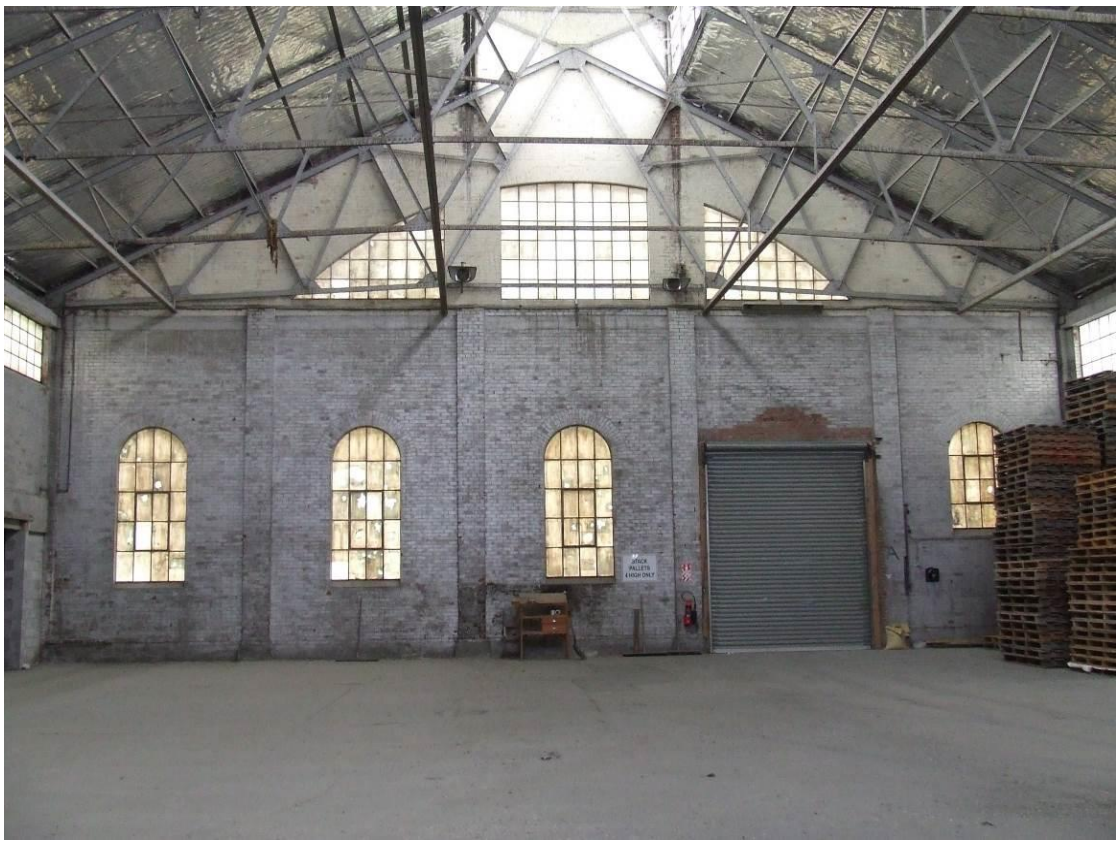


Photo 20. Building 1. - Main Hall internal view looking to the northeast.

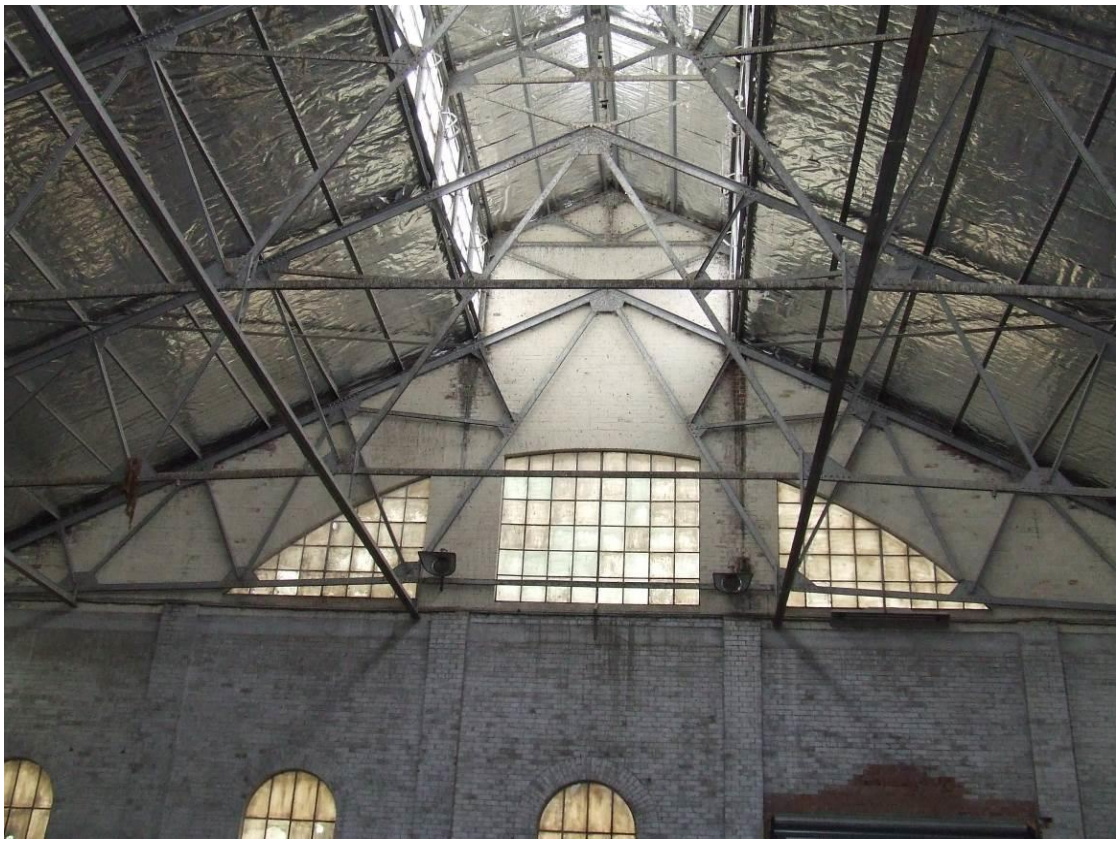


Photo 21. Building 1. - Main Hall looking to the northeast.

Photo 22. Building 1. - Main Hall looking to the northwest.

Photo 23. Building 1. – Main Hall looking to the southwest.

Photo 24. Building 1. – Main Hall looking to the southeast.

Photo 25. Building 1. - Main Hall truss connection to bond beam.

Photo 26. Building 1. – Main Hall typical truss joint.

Photo 27. Building 1. – Main Hall truss eaves support.

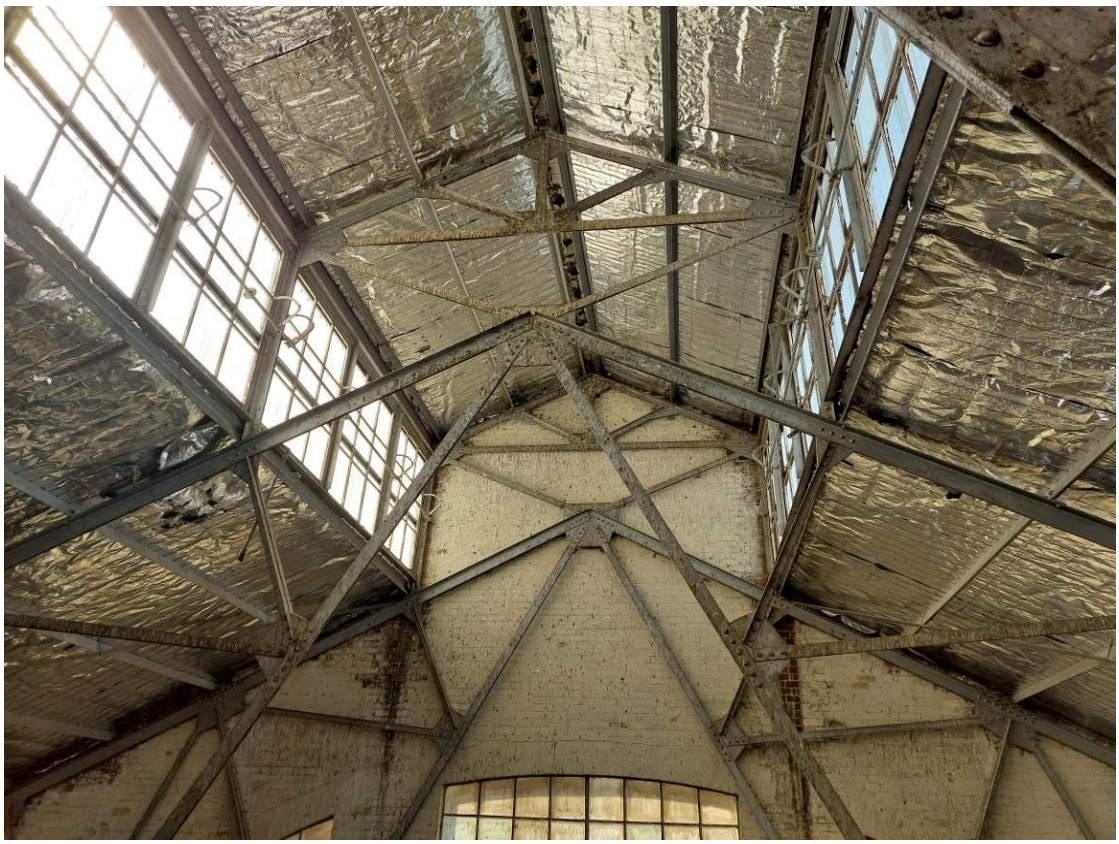


Photo 28. Building 1. - Main Hall roof trusses.

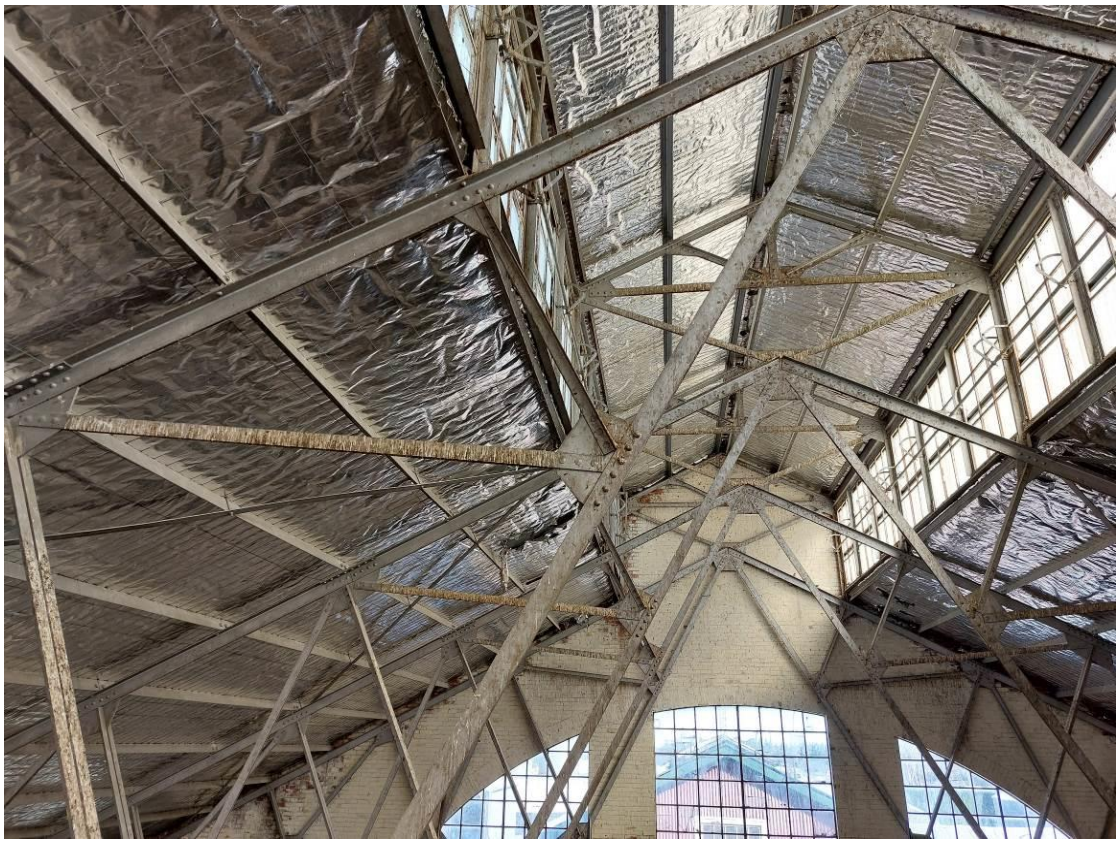


Photo 29 Building 1. – Main Hall roof trusses.

Photo 30 Building 1. Room J.

Photo 31 Building 1. Room J.

Photo 32. Building 1. Room P & N

Photo 33. Building 1. – Outside room E.

Photo 34. Building 2. Covered loading dock on southeast side.

Photo 35. Building 1 & 2 and 4.

Photo 36. Building 2.

Photo 37. Building 2.

Photo 38. Building 2.

Photo 39. Building 2. – Truss connection.

Photo 40. Building 2. Truss connection.

Building 41. Building 3.

Photo 42. Building 3.

Photo 43. Building 3.

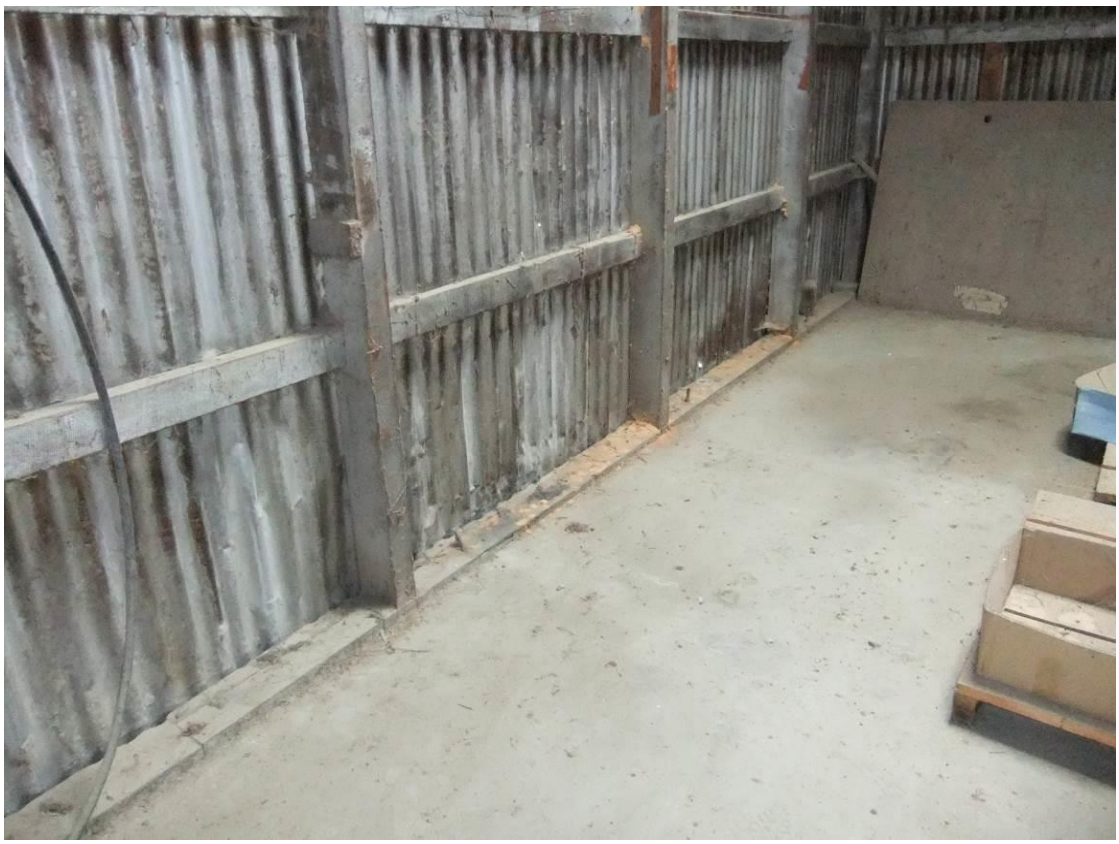


Photo 44. Building 3. - Dust from borer.

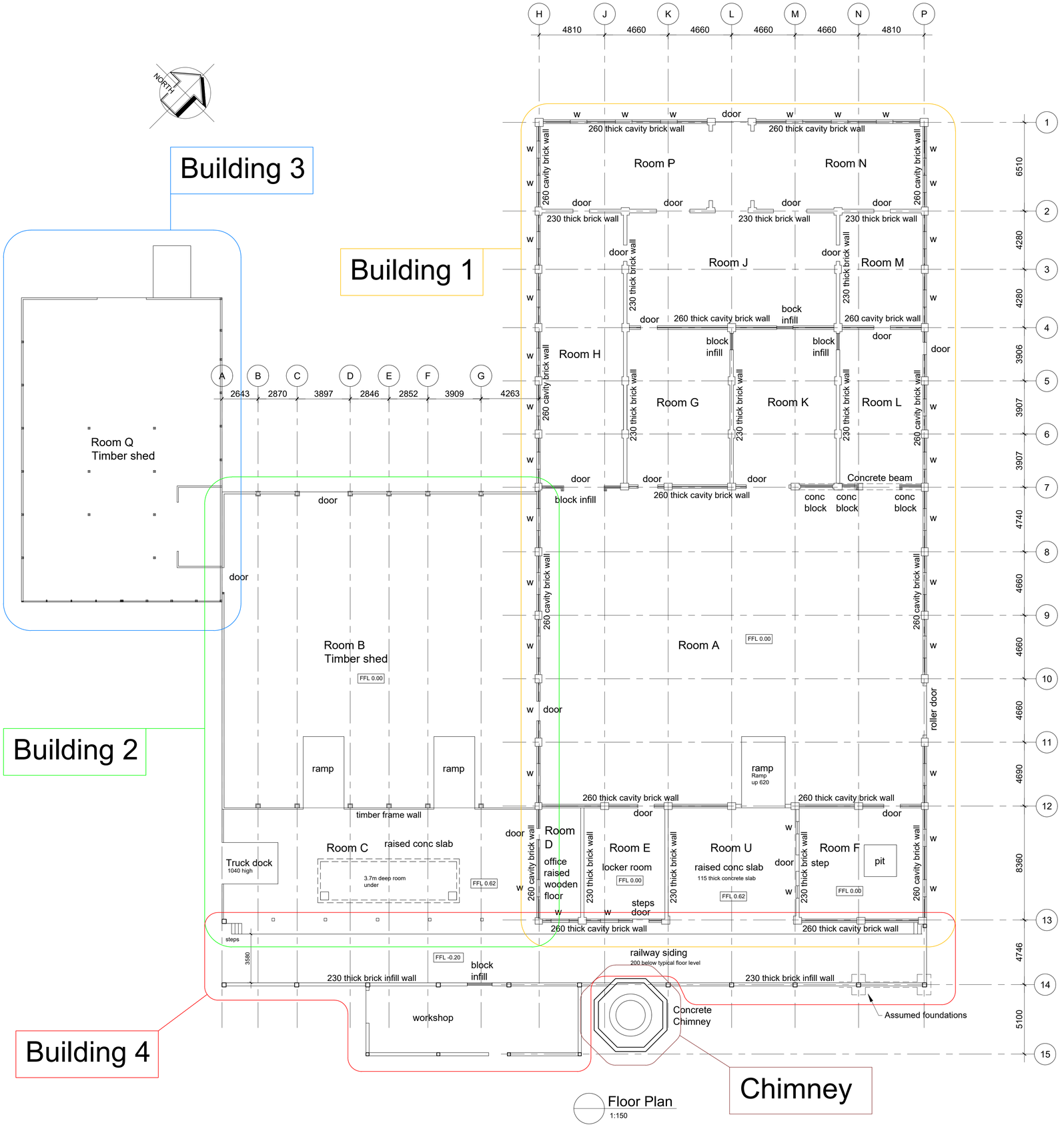
Photo 45. Building 4.

Photo 46. Base of chimney on north west side.

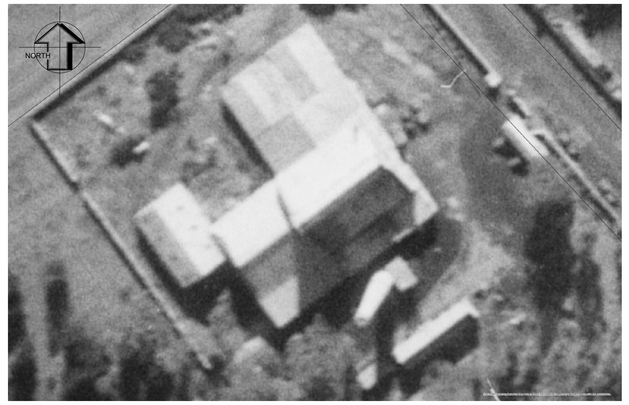
Photo 47. Building 2. Timber beam rotten over post due to downpipe leak.

Appendix B

Bonniface Consulting Drawings



Floor Plan
1:150



Aerial photo circa 1940 to 1944
not to scale

Aerial photo circa 1955 to 1959
not to scale

NOTES

Building 1 and the chimney were constructed in 1928.

Building 2 and 3 were constructed circa 1930.

Building 4 extension was added circa 1950's.

The aerial photographs above show the site in the 1940's and 1950's.

Dimensions shown in these drawings are based on site measures and are approximate only and should be confirmed on site before fabricating any strengthening steelwork.

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

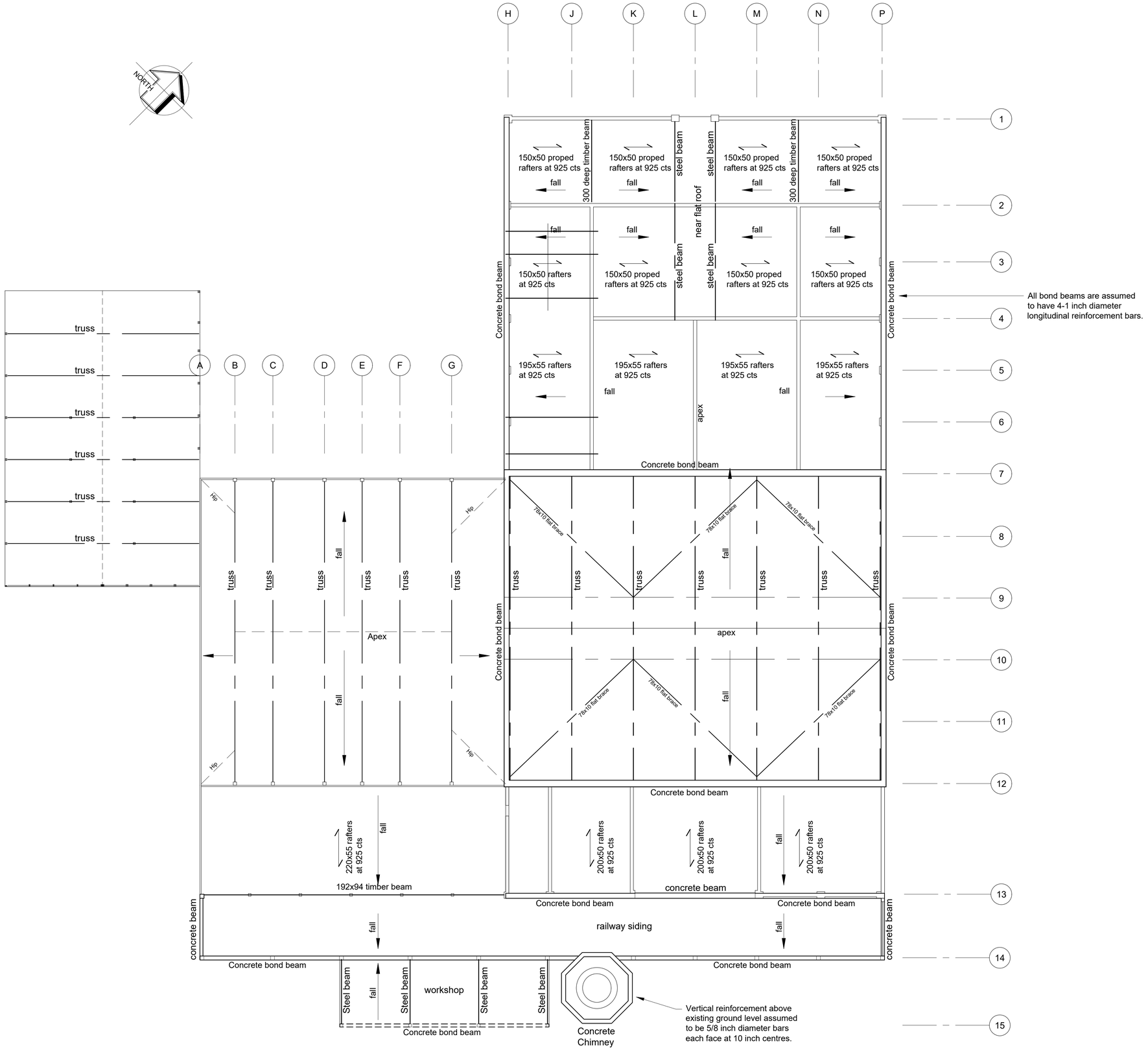
Client
MALTEUROP
ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title
EXISTING FLOOR PLAN

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-01
Designed	D.B.		
Drawn	John Wilson		
Scales	1:150 (A1) 1:300 (A3)	Rev.	C



Roof Framing Plan

1:150

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

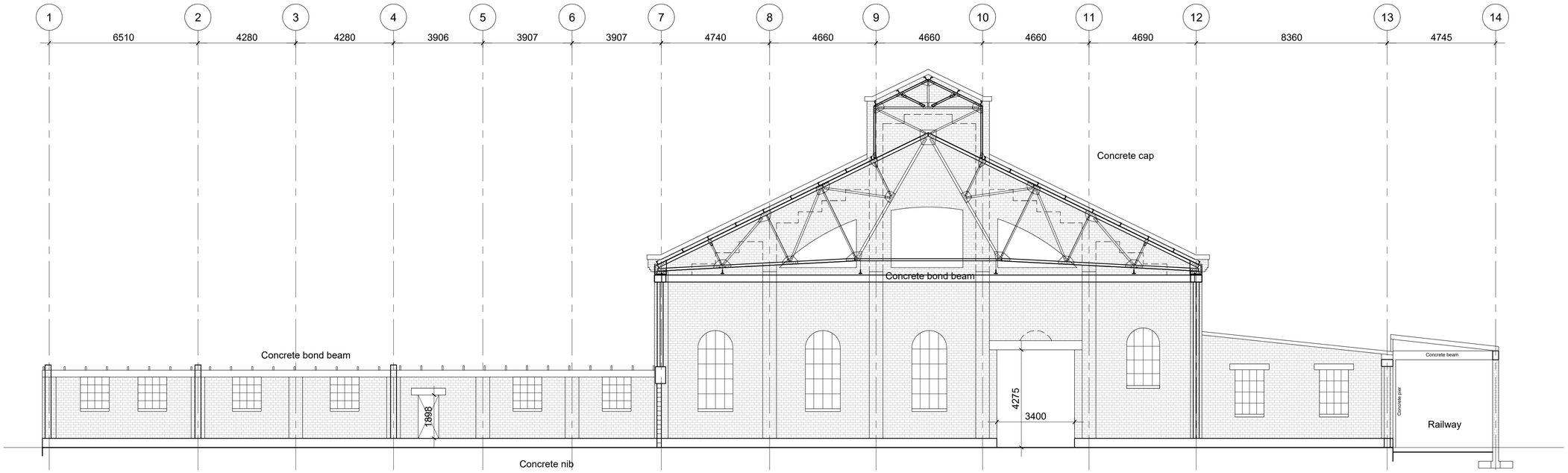
EXISTING
ROOF FRAMING PLAN

Bonniface Consulting
Structural Engineers

Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

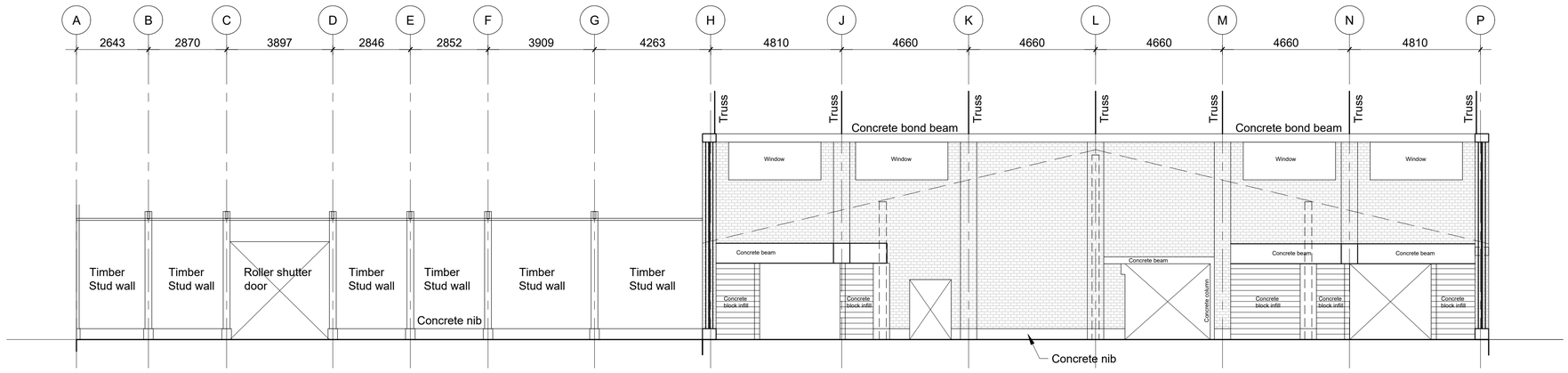
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-02
Designed	D.B.		
Drawn	John Wilson		
Scales	1:150 (A1) 1:300 (A3)	Rev.	C



Grid P Wall Elevation

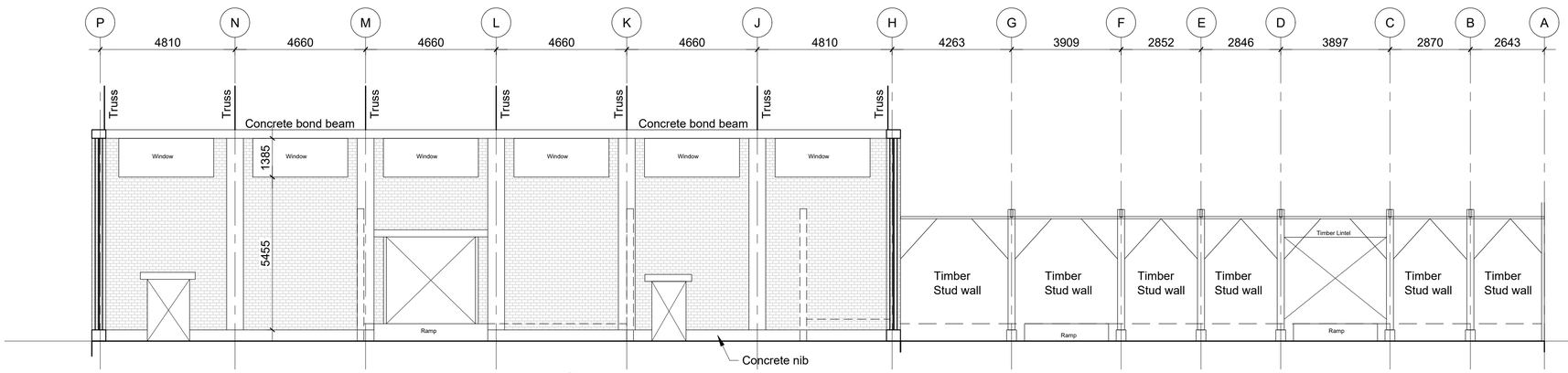
1:100



Foundations to be confirmed

Grid 7 Wall Elevation

1:100



Grid 12 Wall Elevation

1:100

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

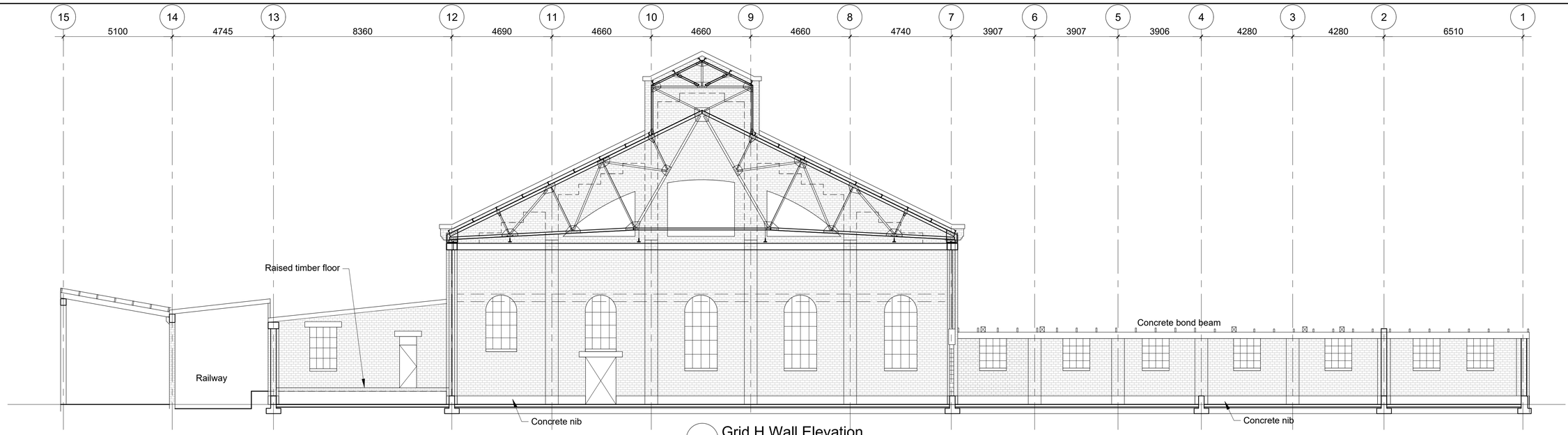
EXISTING
WALL ELEVATIONS
GRID P, 7, 12

Bonniface Consulting
Structural Engineers

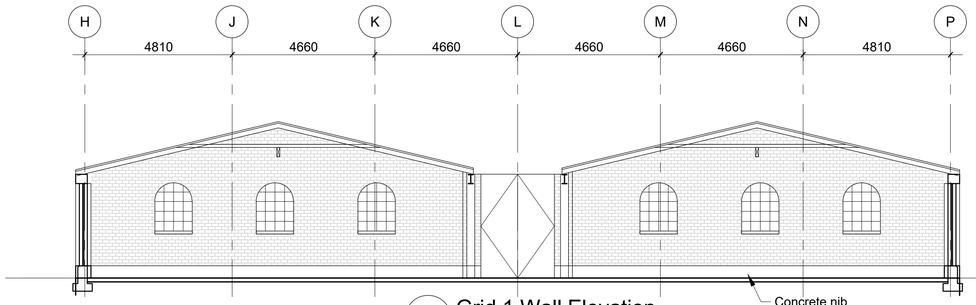
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

Tel: (03) 963 1025
Email: admin@bonniface.com

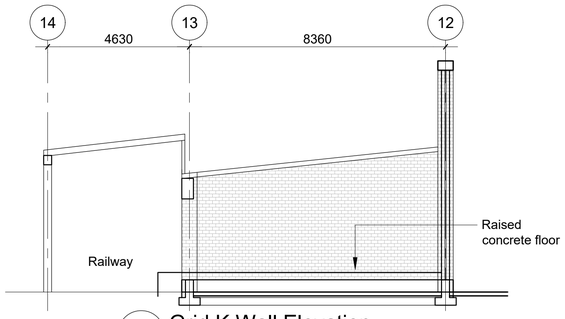
Job No.	1712	Drg. No.	S-03
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	C



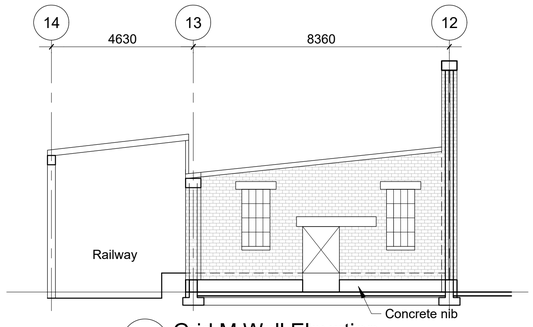
Grid H Wall Elevation
1:100



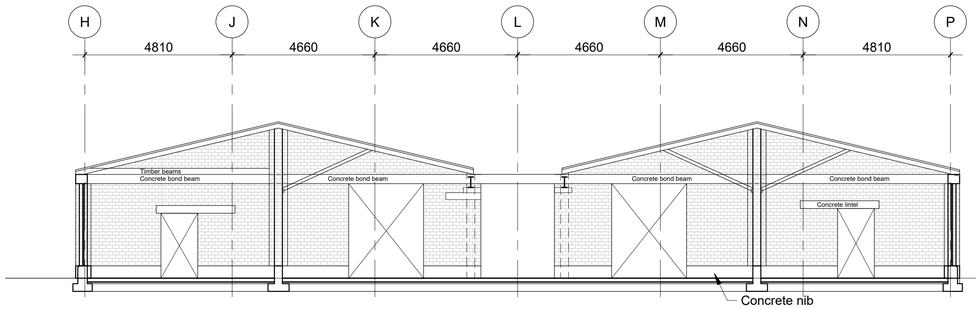
Grid 1 Wall Elevation
100



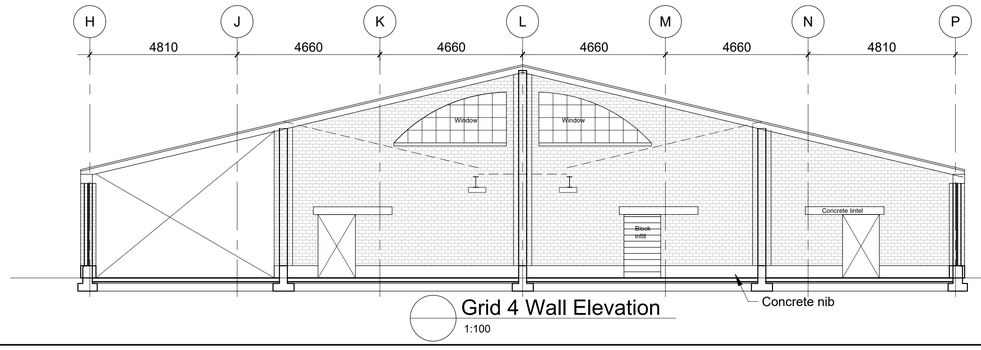
Grid K Wall Elevation
1:100



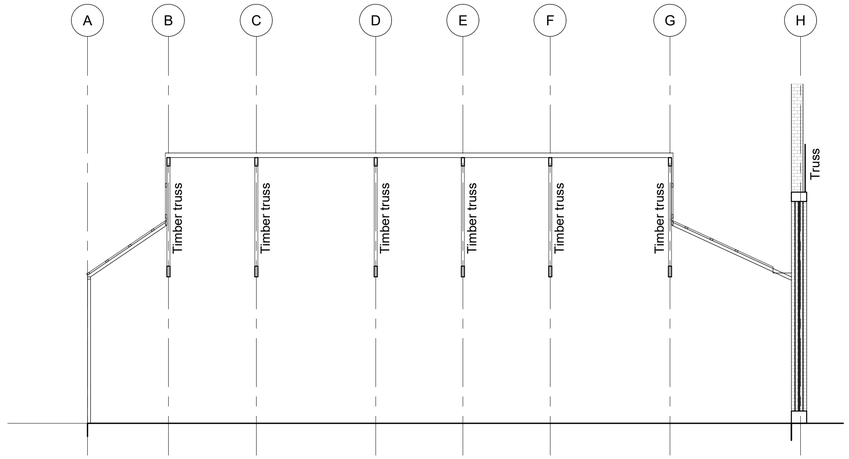
Grid M Wall Elevation
1:100



Grid 2 Wall Elevation
1:100



Grid 4 Wall Elevation
1:100



Grid 9 Section
1:100

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

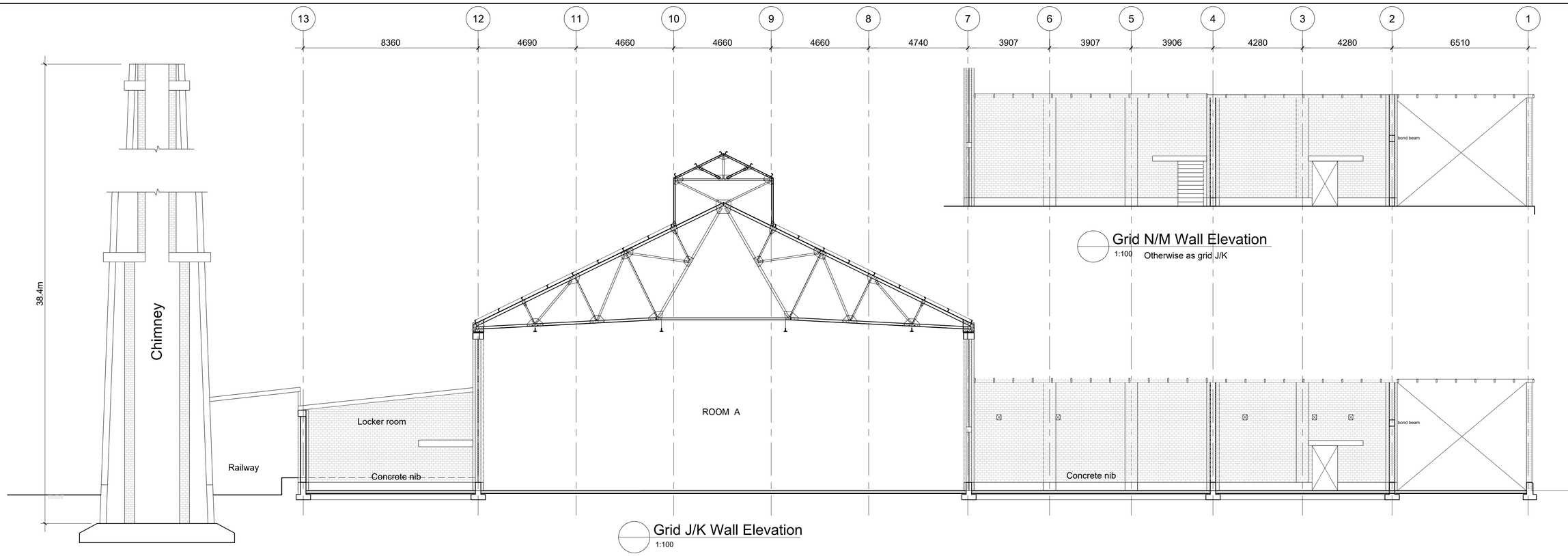
EXISTING
WALL ELEVATIONS
GRIDS 1, 2, 4, H, K, M

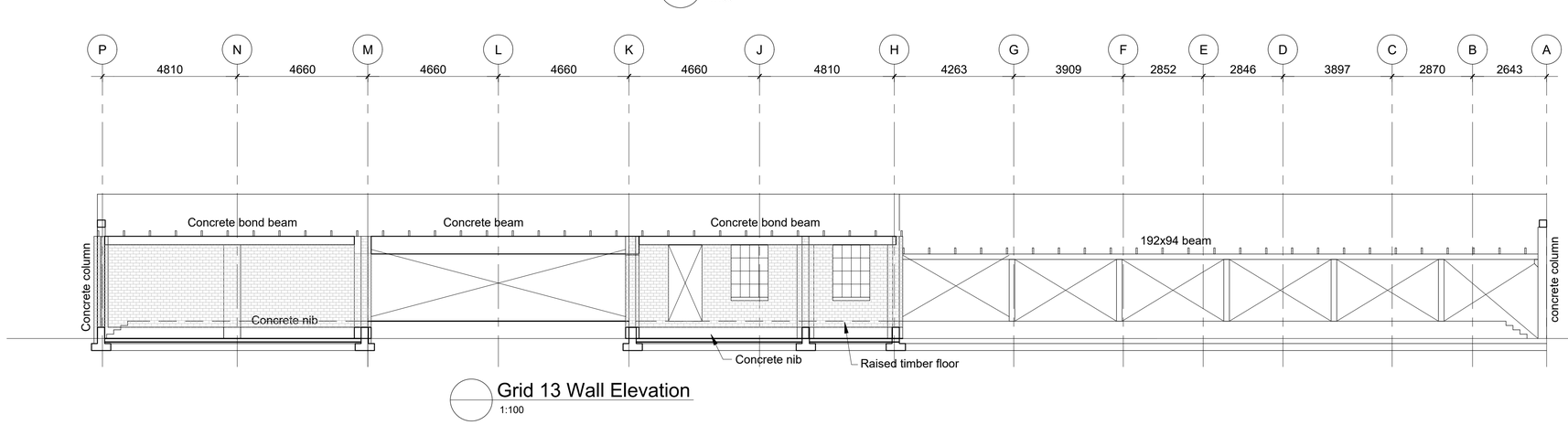
Bonniface Consulting
Structural Engineers

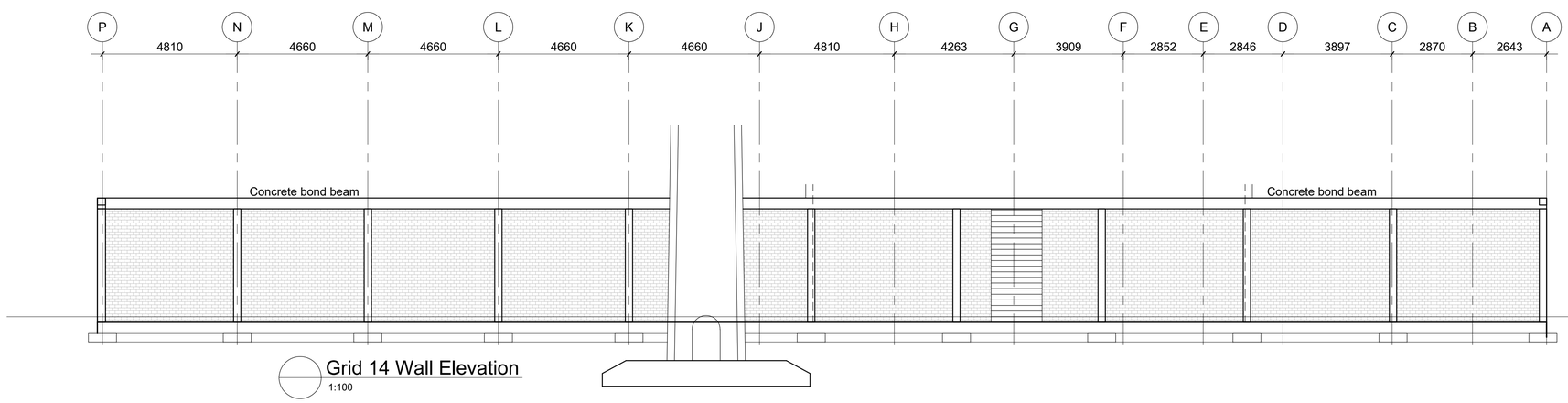
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-04
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	C







Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

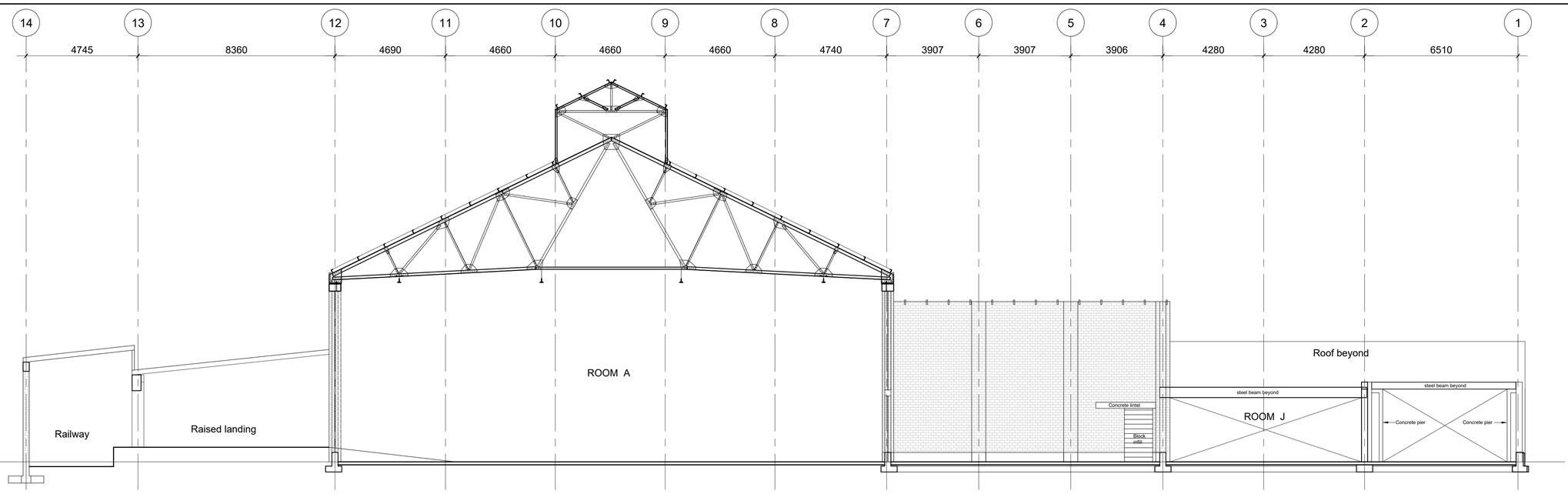
EXISTING
WALL ELEVATIONS
GRIDS 13, 14, J/K, N/M

Bonniface Consulting
Structural Engineers

Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

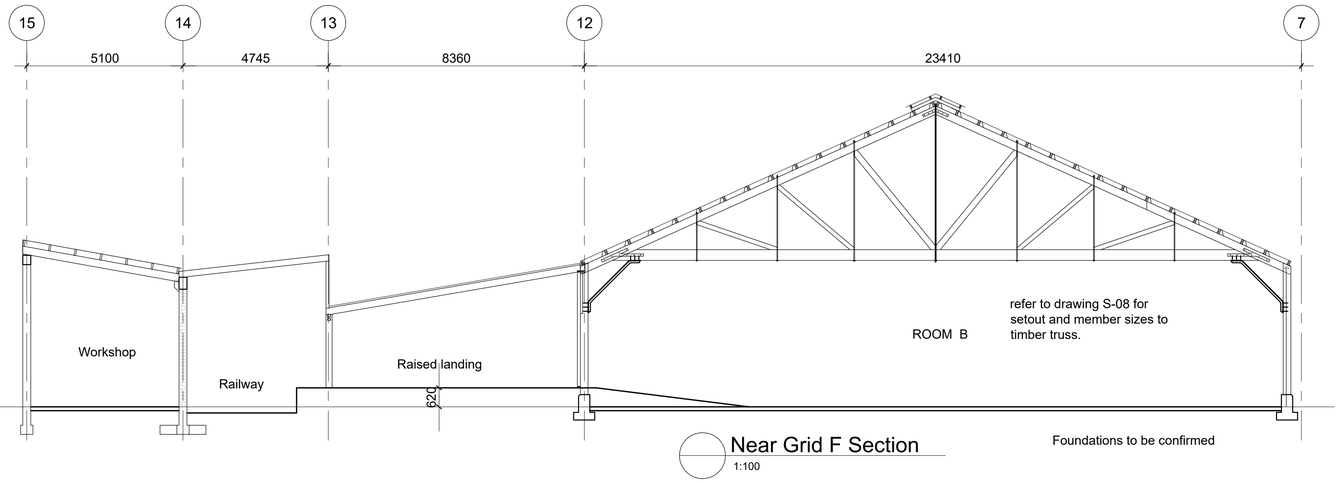
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-05
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	C



Grid L Wall Elevation

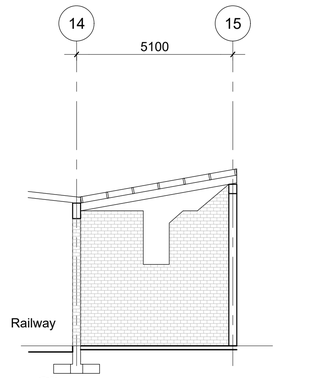
1:100



Near Grid F Section

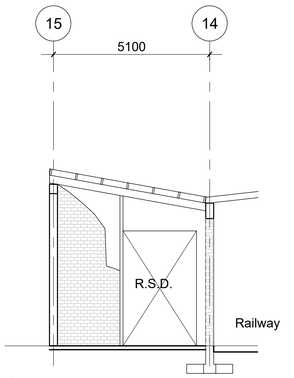
1:100

Foundations to be confirmed



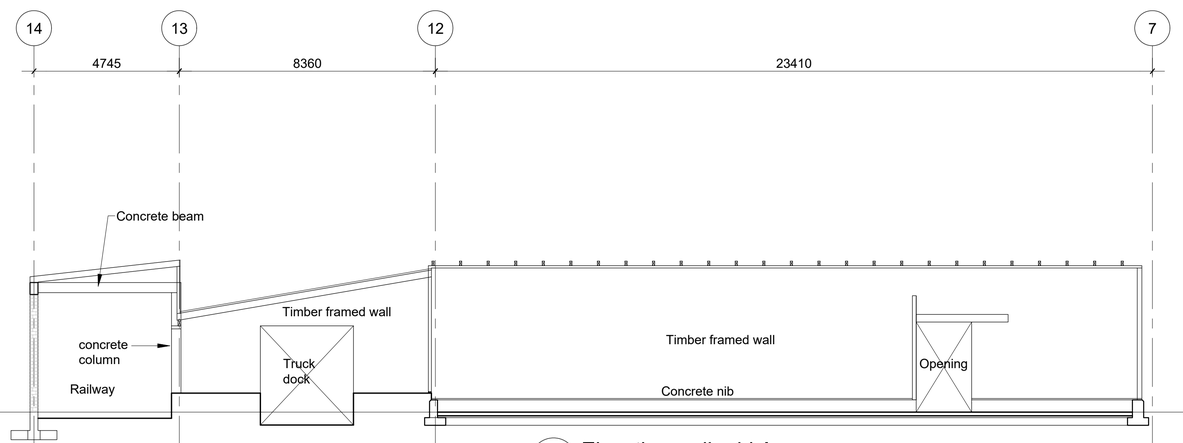
Near Grid J Wall Elevation

1:100 WORKSHOP



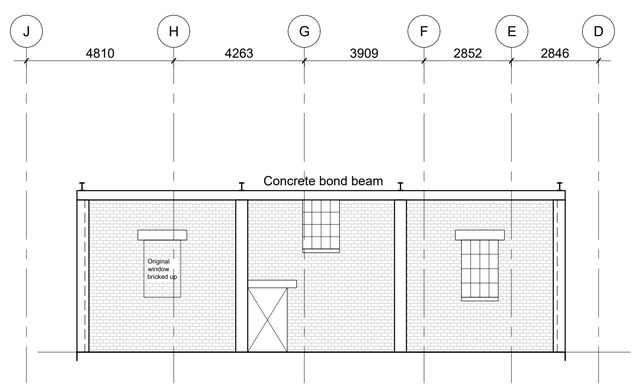
Near Grid D Wall Elevation

1:100 WORKSHOP



Elevation wall grid A

1:100



Grid 15 Wall Elevation

1:100 WORKSHOP

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

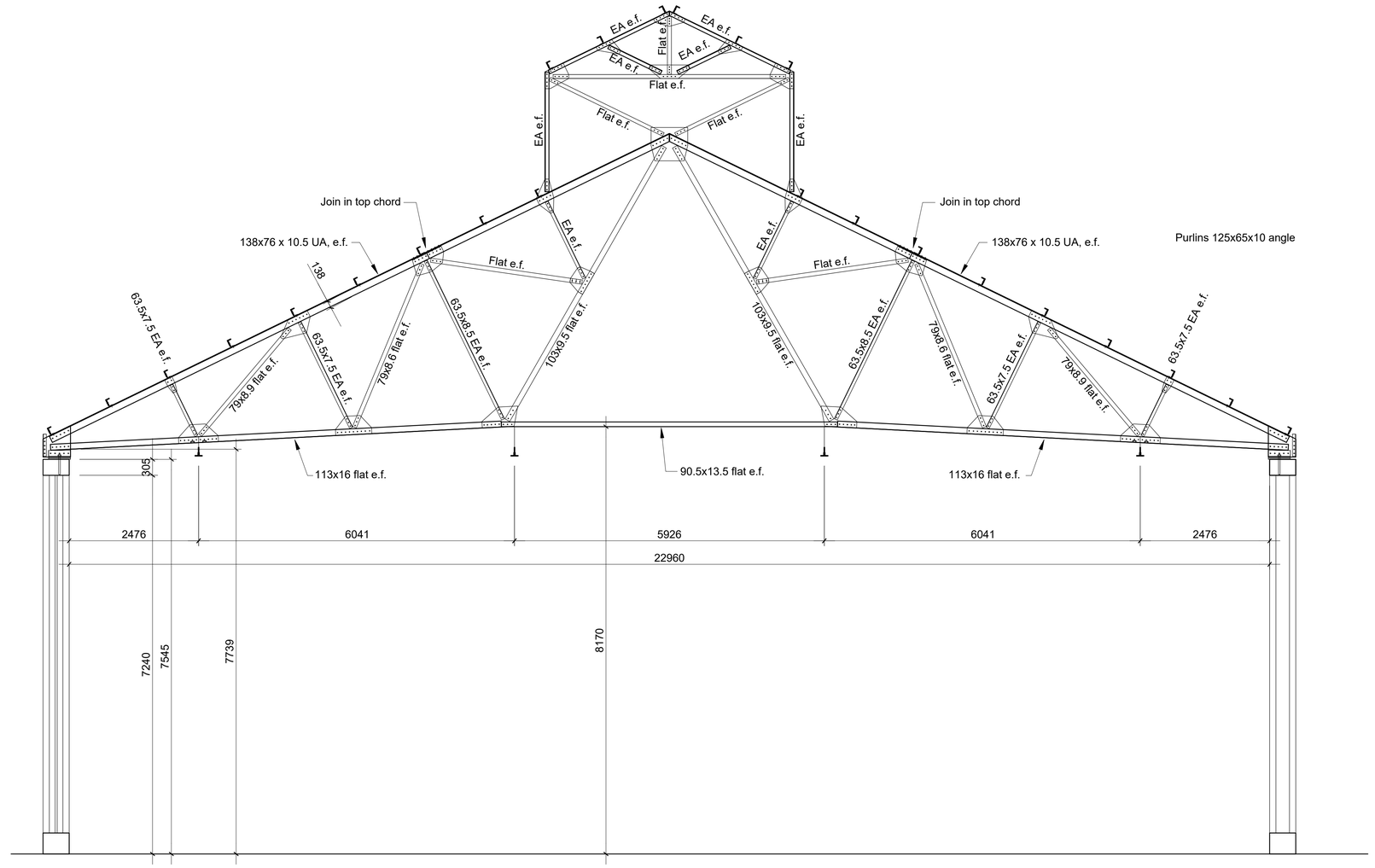
EXISTING WALL
ELEVATIONS / SECTIONS
GRID 15, A, D, F, J, L

Bonniface Consulting
Structural Engineers

Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712
Designed	D.B.
Drawn	John Wilson
Scales	1:100 (A1) 1:200 (A3)
Drg. No.	S-06
Rev.	C



Steel Truss Elevation
1:50

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

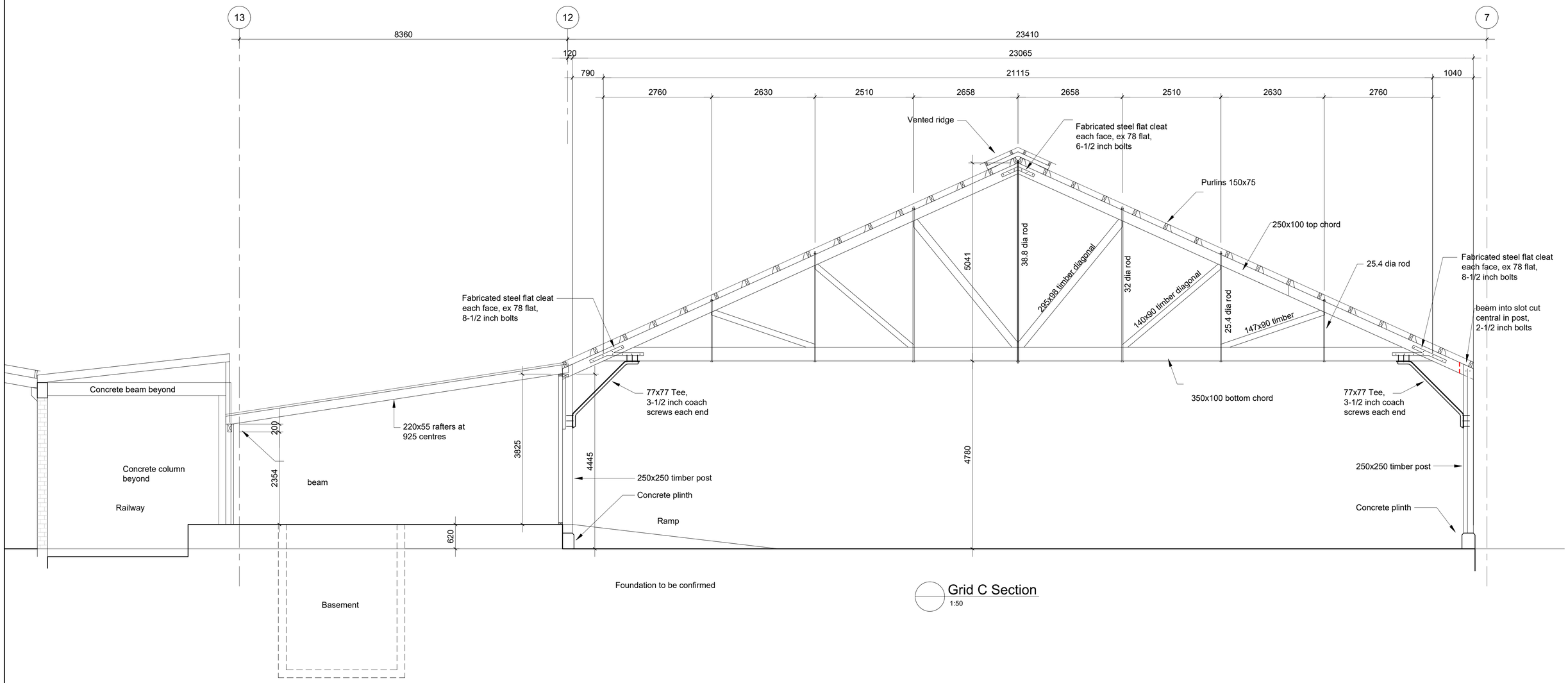
Client
MALTEUROP
ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title
EXISTING
STEEL TRUSS ELEVATION

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-07
Designed	D.B.		
Drawn	John Wilson		
Scales	1:50 (A1) 1:100 (A3)	Rev.	C



Grid C Section
1:50

Rev.	Description of Issue / Revision	Date
C	DSA Report	18-03-24
B	Preliminary	13-03-24
A	Preliminary	07-12-23

Client
MALTEUROP
ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title
EXISTING
TIMBER SHED B
TRUSS ELEVATION

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-08
Designed	D.B.		
Drawn	John Wilson		
Scales	1:50 (A1) 1:100 (A3)	Rev.	C

NOTES

CONCRETE:
Materials and workmanship to be accordance with NZS3109:1997.

The strength of concrete, unless noted otherwise, shall be:

Foundations	30Mpa
Floor slabs	30Mpa
Site concrete	15Mpa

REINFORCEMENT:
Reinforcing bars shall comply with AS/NZS 4671:2001
All reinforcement has been designated as follows:

grade 500	Deformed	H
grade 300	Deformed	D
grade 500	Plain	HR
grade 300	Plain	R

Lap lengths (u.n.o):

grade 500	Deformed	65d
grade 300	Deformed	40d

Cover (u.n.o.):

Cast against ground	75mm
Cast against DPC	50mm
Elsewhere	40mm

STEELWORK:
All steelwork grades to be as follows:

UB, UC, PFC	grade 300 plus
SHS, RHS	grade 350
plate for HERA bolted joints	grade 350
other plate	grade 300

All welds to be class SP unless noted otherwise.

Unless noted otherwise all welds to be continuous 6mm fillet weld.

All bolts to be grade 8.8 Galv installed snug tight unless noted otherwise.

All internal steelwork to be painted with an ALK-1 system to AS/NZS 2312.1:2014 and SNZ TS 3404:2018.

A Reoscan may be required to determine the location of existing reinforcing before fabrication of steelwork if drill in fixings are specified. Reinforcing is not to be cut during the installation of fixings.

Reidbrace to be installed in accordance with Reidbrace specification and installations instructions.

All Reidbrace connections to be cast steel not ductile iron.

Building 3

Building 1

Building 2

Building 4

Demolish existing building Q. shown hatched.

Repair damaged brick wall.

Repair exposed reinforcing to existing concrete bod beam.

New steel bracing between existing steel beams

New bracing at underside of near flat roof, 125x6 SHS central (67% & 34%), RB16 bracing each side (67% & 34%)

Carry bracing in braced bays down to floor level, RB25 (67% and 34%)

RB25 wall bracing only required at 67% strengthening, refer wall elevation for detail

5 new steel portal frames
530 UB.82 (67%)
460 UB.67 (34%)

2 bays of Reidbrace grid 7 to 12.
RB20 (67%)
RB16 (34%)

4 new steel posts at grid H and 4 posts at grid P,
310 UB.40 (67&)
250 UB.31 (34%)

Carry bracing in braced bays down to floor level, RB25 (67% and 34%)

New foundation pads at new portal frames.
3000x2000x600 deep reinforced with H25 at 300 e.w. t &b for 67% strengthening.
2500x1800x600 deep reinforced with H20 at 300 e.w. t & b for 34% strengthening.

Demolish existing wall grid 14, the roof over the railway line, the workshop and the chimney. All shown hatched.

Chimney

New concrete strengthening to existing concrete plinth and steel brackets to post, refer notes on dwg S-25

Floor plan / Low level bracing plan
1:150

Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

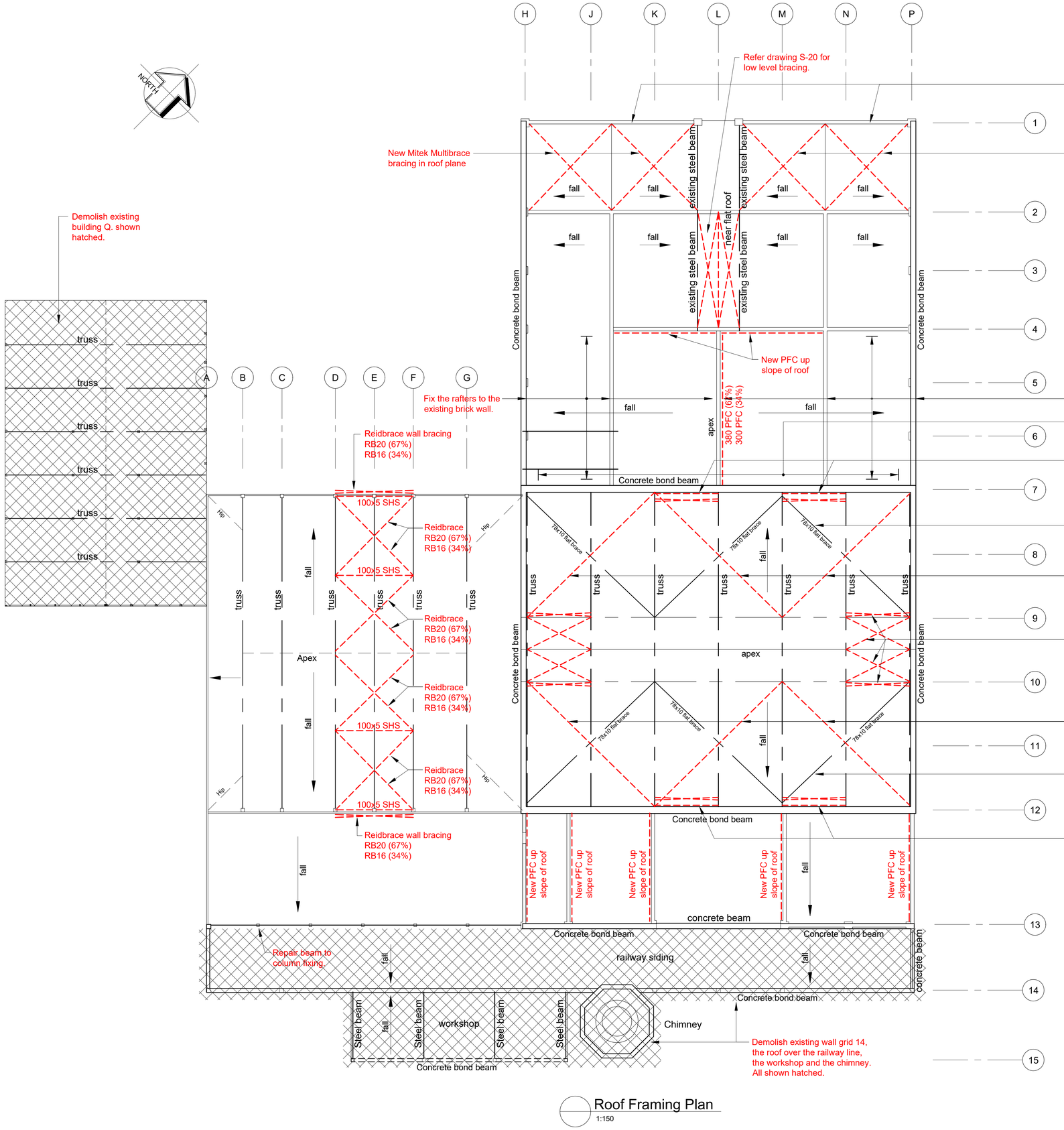
Client
MALTEUROP ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

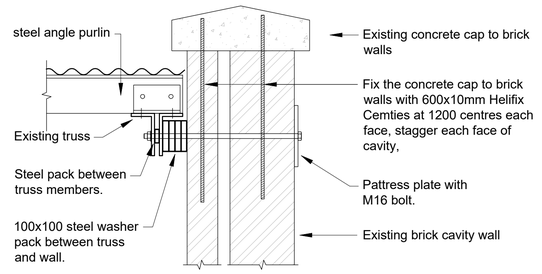
Title
PROPOSED FLOOR PLAN

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

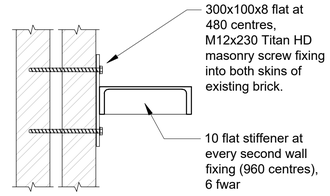
Job No.	1712	Drg. No.	S-20
Designed	D.B.		
Drawn	John Wilson		
Scales	1:150 (A1) 1:300 (A3)	Rev.	B



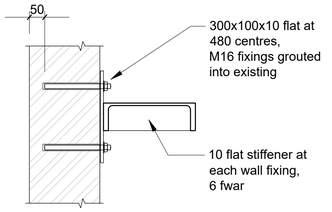
Roof Framing Plan
1:150



1 Wall cap detail grid H & P / 7 to 12
1:10



2 Typical wall girt fixing to cavity brick wall
1:10



3 Typical wall girt fixing to solid brick wall
1:10

Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

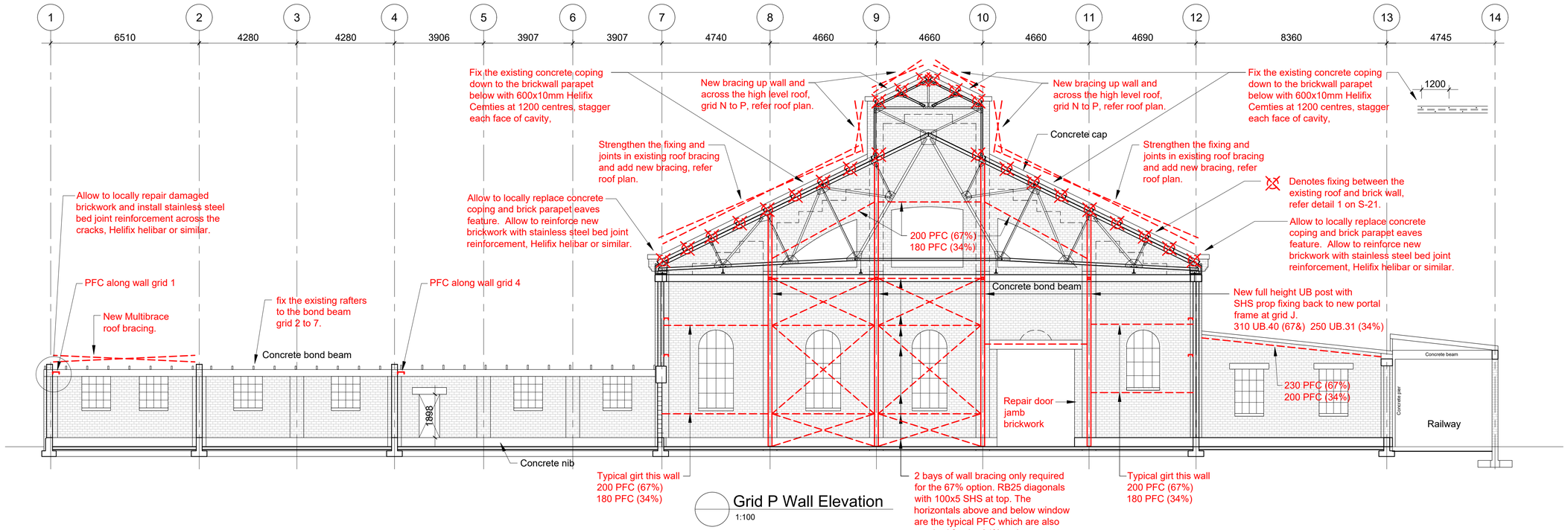
Client
MALTEUROP ASHBURTON

Project
GLASSWORKS BUILDING EQ STRENGTHENING PRELIMINARY DESIGN

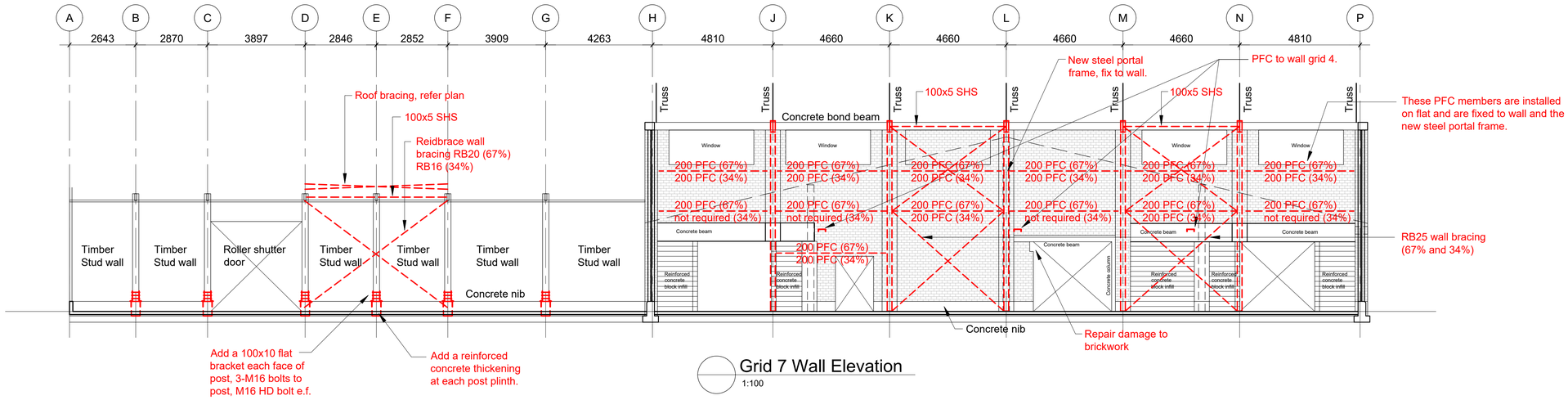
Title
PROPOSED ROOF FRAMING PLAN

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

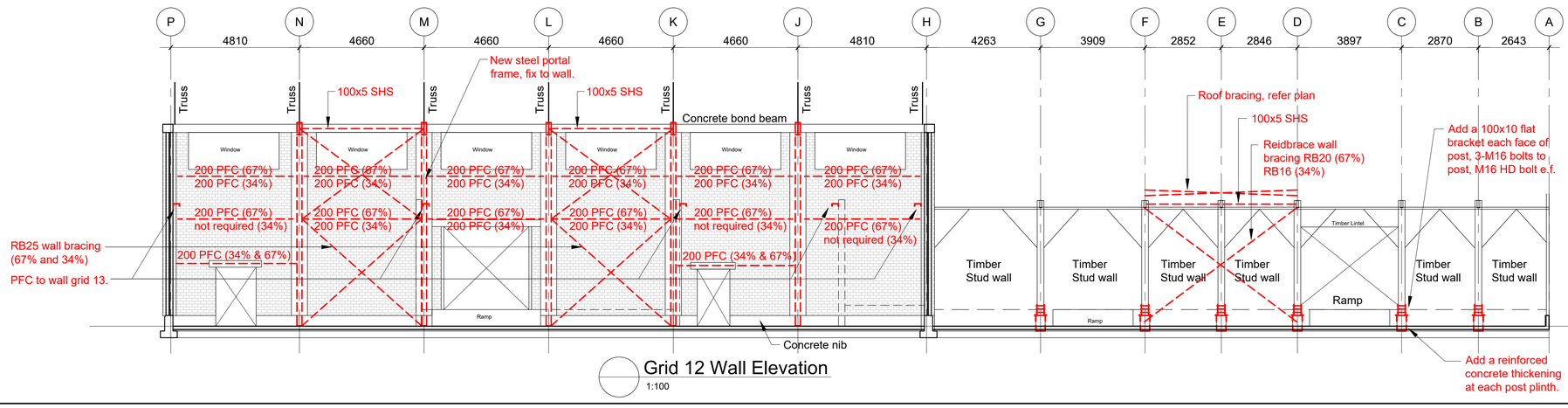
Job No.	1712	Drg. No.	S-21
Designed	D.B.		
Drawn	John Wilson		
Scales	1:150, 1:10 (A1) 1:300, 1:20 (A3)	Rev.	B



Grid P Wall Elevation
1:100



Grid 7 Wall Elevation
1:100



Grid 12 Wall Elevation
1:100

Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

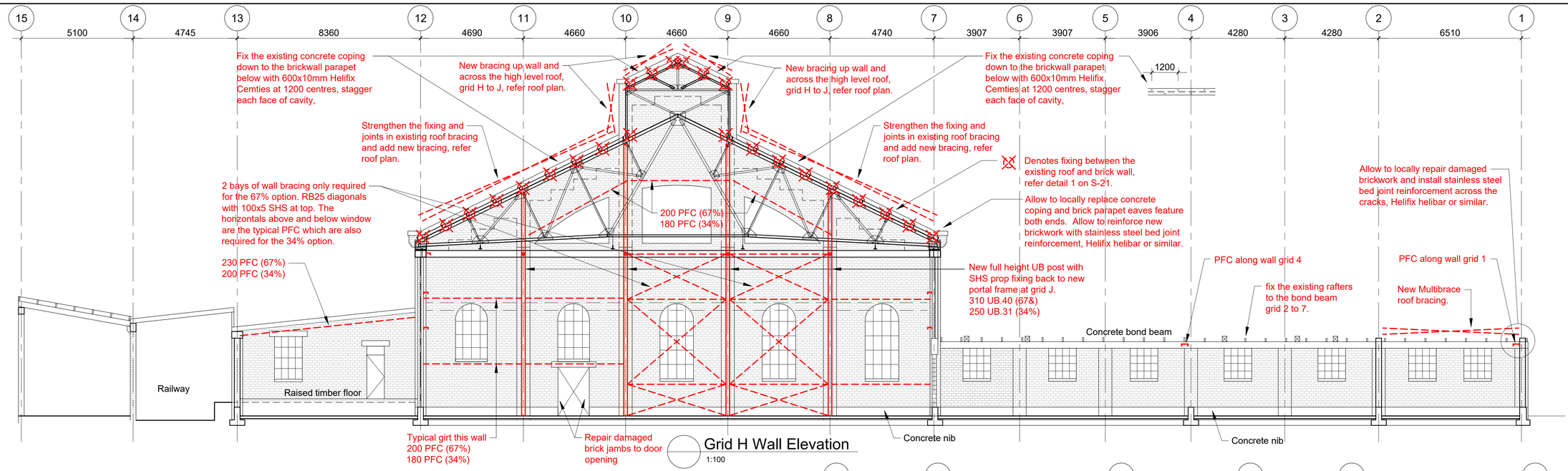
Client
MALTEUROP ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

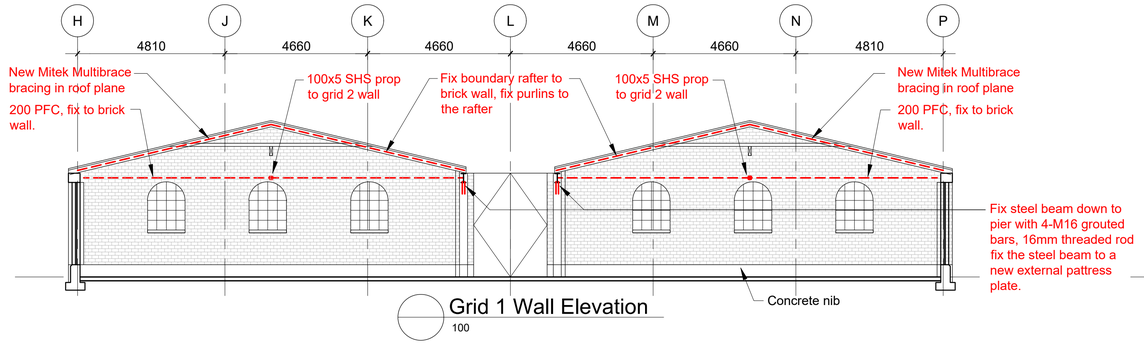
Title
PROPOSED
WALL ELEVATIONS
GRID P, 7, 12

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

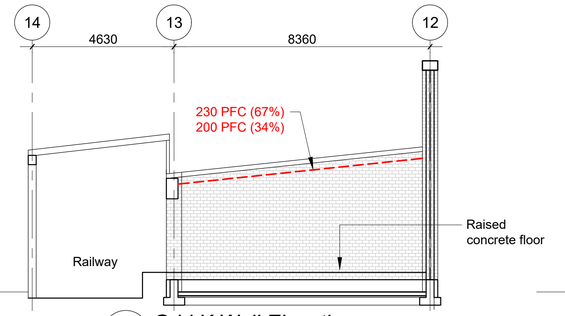
Job No.	1712	Drg. No.	S-22
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	B



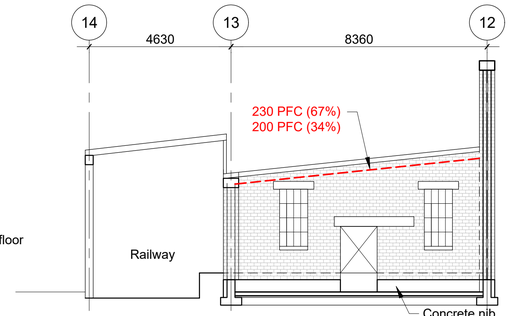
Grid H Wall Elevation
1:100



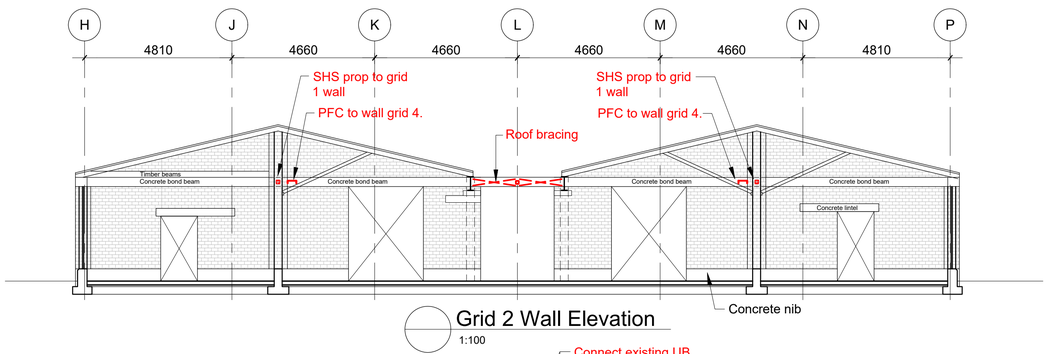
Grid 1 Wall Elevation
100



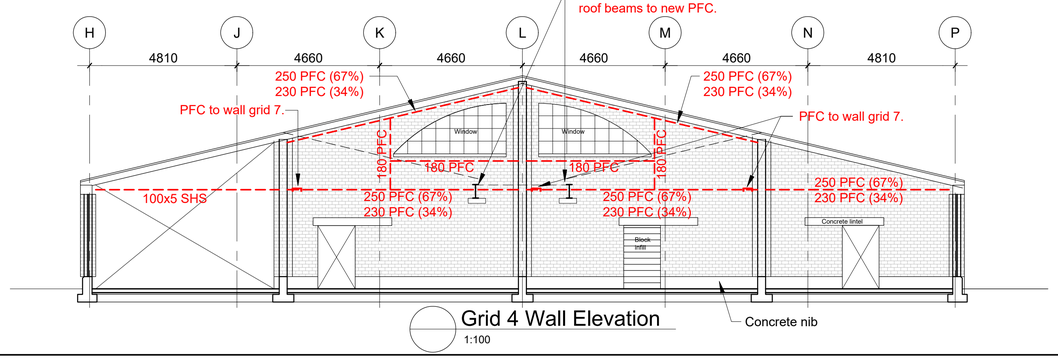
Grid K Wall Elevation
1:100



Grid M Wall Elevation
1:100



Grid 2 Wall Elevation
1:100



Grid 4 Wall Elevation
1:100

Grid 9 Section
1:100

Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

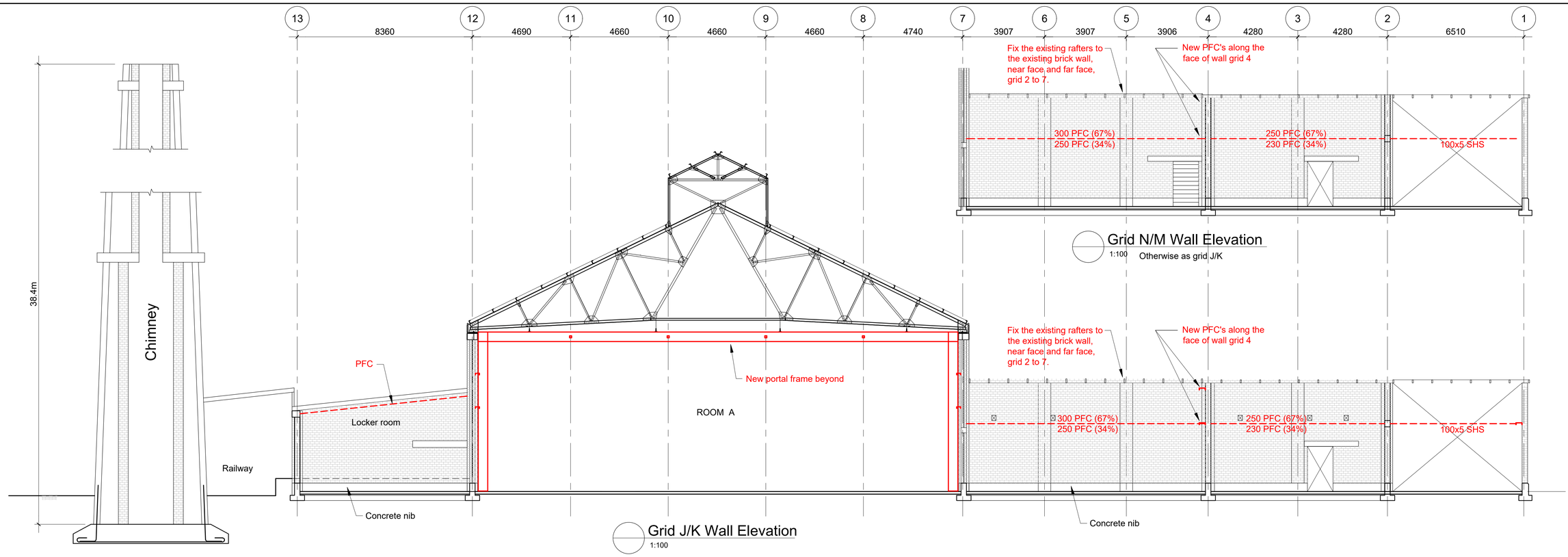
Client
MALTEUROP
ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title
PROPOSED
WALL ELEVATIONS
GRIDS 1, 2, 4, H, K, M

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712	Drg. No.	S-23
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	B



Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

Client

MALTEUROP
ASHBURTON

Project

GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title

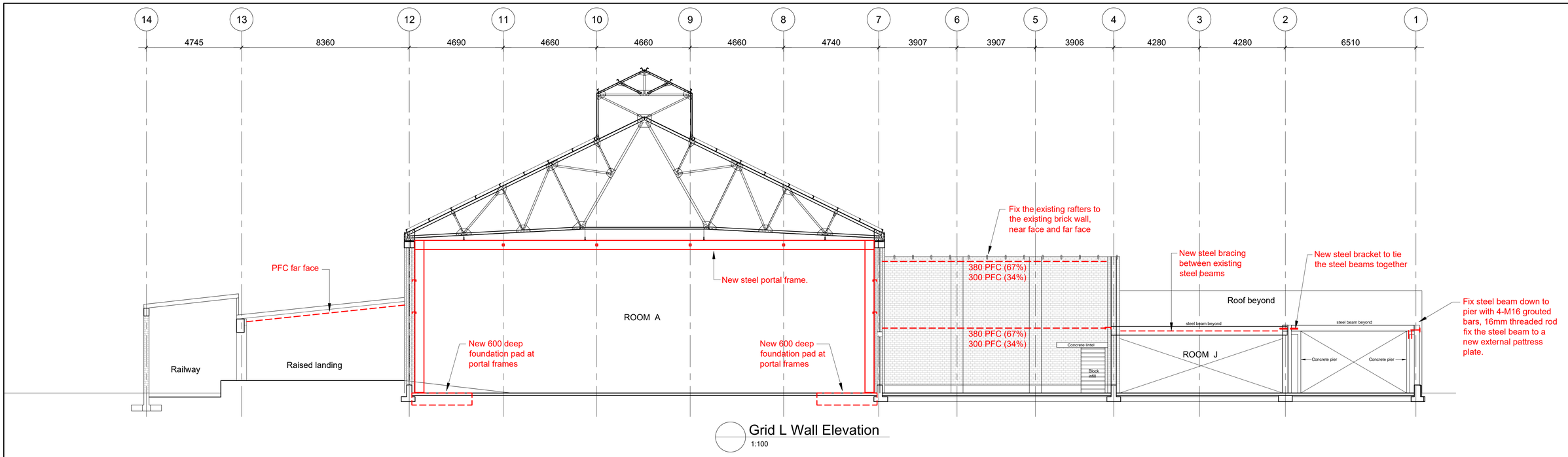
EXISTING
WALL ELEVATIONS
GRIDS 13, 14, J/K, N/M

Bonniface Consulting
Structural Engineers

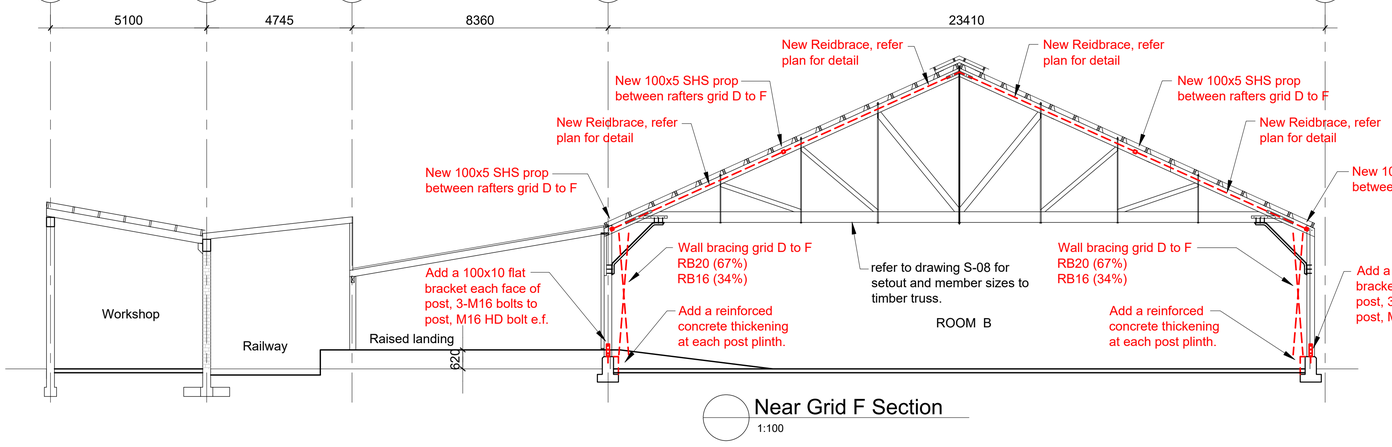
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch

Tel: (03) 963 1025
Email: admin@bonniface.com

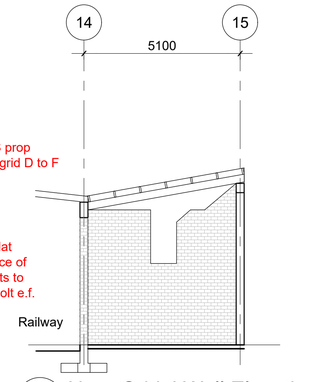
Job No.	1712	Drg. No.	S-24
Designed	D.B.		
Drawn	John Wilson		
Scales	1:100 (A1) 1:200 (A3)	Rev.	B



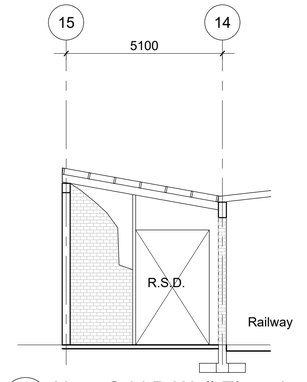
Grid L Wall Elevation
1:100



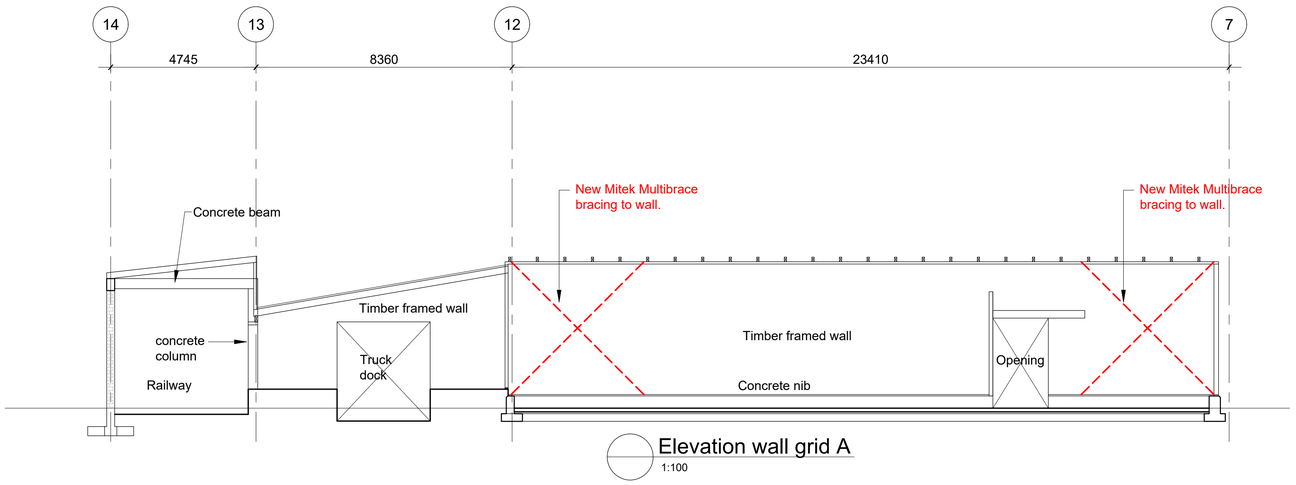
Near Grid F Section
1:100



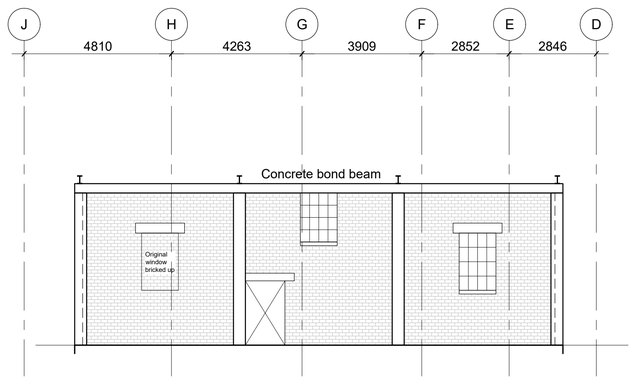
Near Grid J Wall Elevation
1:100 WORKSHOP



Near Grid D Wall Elevation
1:100 WORKSHOP



Elevation wall grid A
1:100



Grid 15 Wall Elevation
1:100 WORKSHOP

Rev.	Description of Issue / Revision	Date
B	DSA Report	18-03-24
A	Preliminary	13-03-24

Client
MALTEUROP ASHBURTON

Project
GLASSWORKS BUILDING
EQ STRENGTHENING
PRELIMINARY DESIGN

Title
PROPOSED WALL ELEVATIONS / SECTIONS GRID 15, A, D, F, J, L

Bonniface Consulting
Structural Engineers
Bonniface Consulting Ltd
3/202 Wooldridge Road
P.O. Box 39131
Christchurch
Tel: (03) 963 1025
Email: admin@bonniface.com

Job No.	1712
Designed	D.B.
Drawn	John Wilson
Scales	1:100 (A1) 1:200 (A3)
Drg. No.	S-25
Rev.	B