

**From:** Nick Webster-Henwood  
**Sent:** 03 February 2021 20:40  
**To:** Maria Calderon; Helen Webster  
**Cc:** Tessa Sanderson; simon Bailes  
**Subject:** NYM/2020/0973/LB - Bridge End House - Listed Building Consent Application.

Gd evening Maria/Helen

Hope your both well,

Please see attached the following updated information for reference/comment:

-2020-ID-17-WD003A Proposed Roofing works (Includes Structural Engineers details, suggested mortar specification for Party wall works i.e make good and re-use of salvaged slates)

Please also see attached for information the Structural Engineers details 'Bridge End House - Structural Calculations - Roof Reconfiguration'

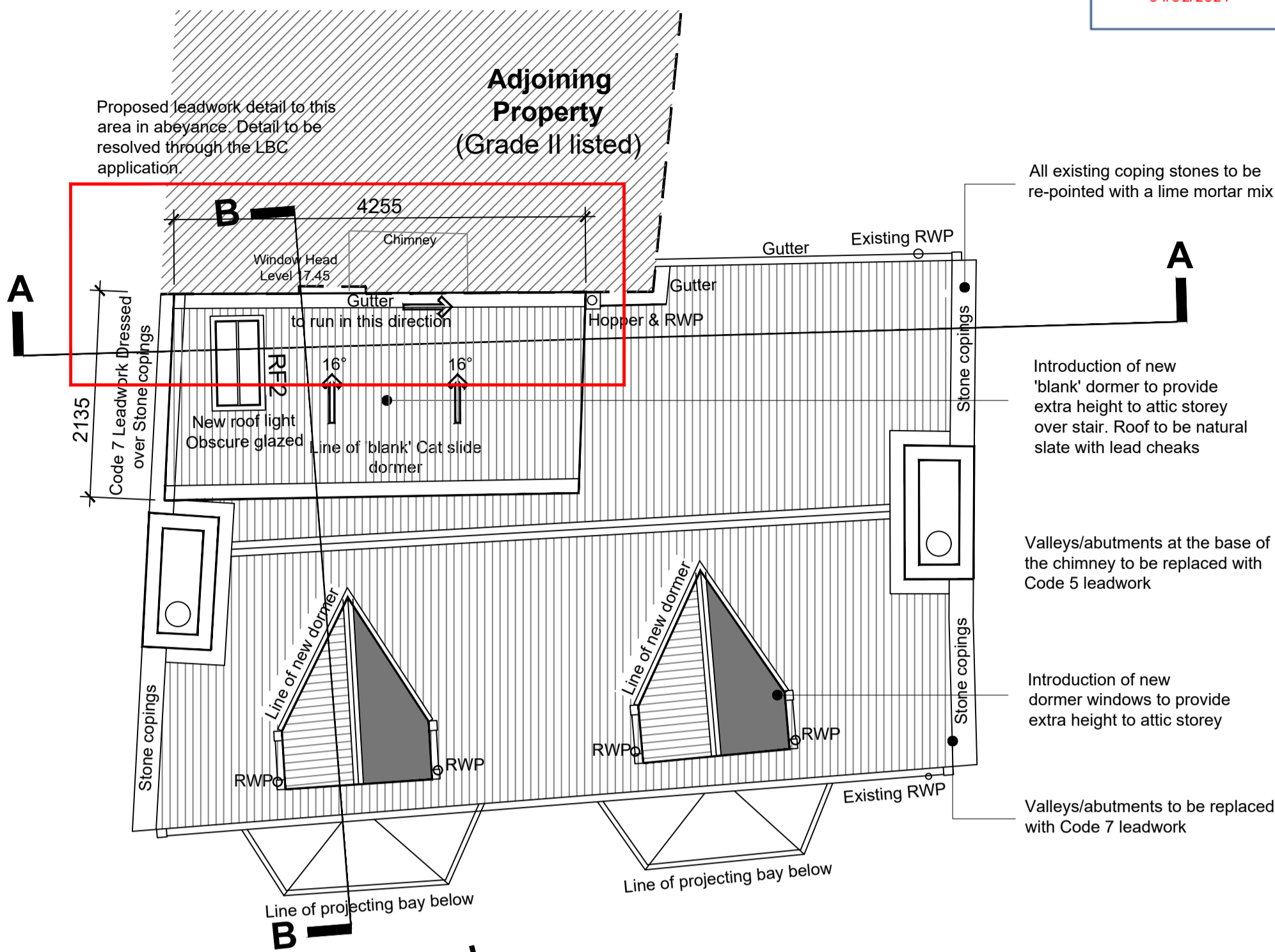
Happy to chat through further if required.

Thanks

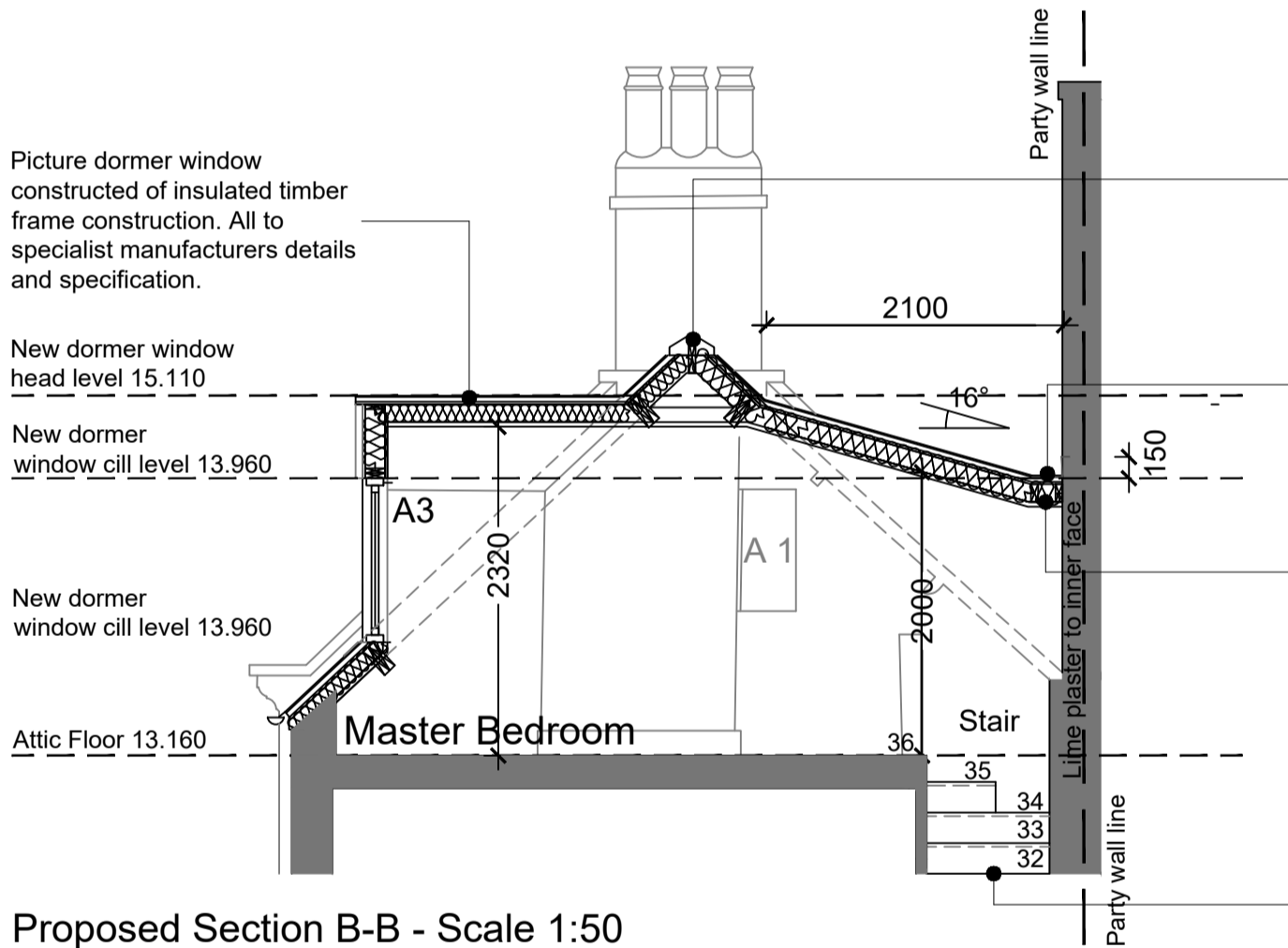
Nick

**Nick Webster-Henwood Bsc (Hons) MCIAT**  
Chartered Architectural Technologist

**Director**



Proposed Roof General Arrangement Scale 1:50



Proposed Section B-B - Scale 1:50

**Roof Preparatory Works - (General)**

**Structural assessment:**  
-Prior to the undertaking of any works the 'Contractor' is to satisfy themselves (with reference to the Structural Engineers analysis/report) that the structure is safe to work upon/within.

**Asbestos based material:**  
-Prior to the undertaking of any works the contractor is to review and make reference to the provided Asbestos R&D survey.

**Services:**  
-Locate and identify all services, including hidden services within the work areas.  
It is the responsibility of the contractor to identify any services which may be present and ensure that all of the necessary services are protected to the areas of the works.  
-Isolate all services in areas that represent a hazard to workers to facilitate the works.  
Allow for the reconnection testing and certification of all effected services upon completion of the works. Note: Service isolation must be localised to the work areas only.

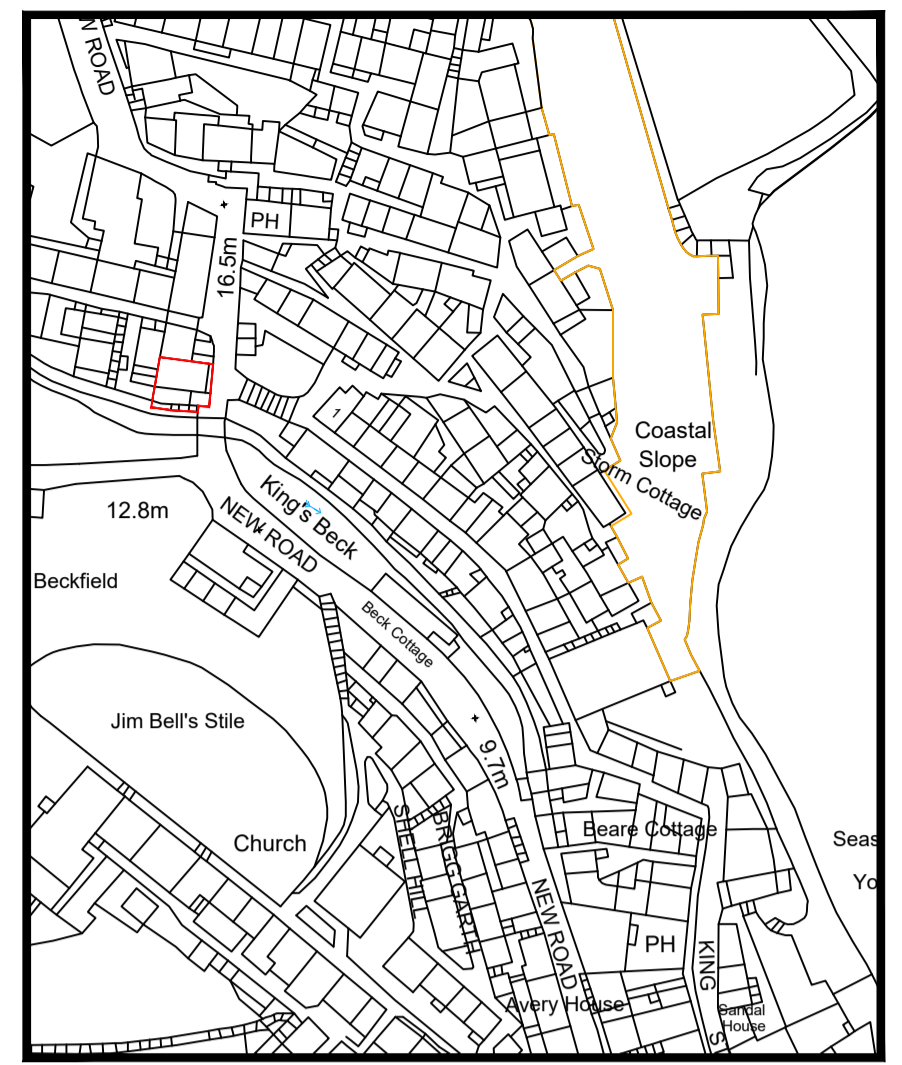
**Stripping:**  
-Allowance to be made for the stripping off of all existing slates, ridge tiles from all slopes. Sort and store the salvageable slates, ridge tiles at ground level for potential re-use elsewhere on the project.  
-Strip and dispose of all existing timber roof battens and roofing felt.  
-Strip off all associated lead work soakers and flashing's. Note: For the purposes of tender please assume that all removed lead materials will be retained by the Client.  
Once revealed the condition of all exposed timber structures are to be investigated by the contractor. A full condition survey of the existing roofing substrate (sarking boards, roof timbers) is to be undertaken, recorded, and reported to the client for information. All timbers are to be inspected by a specialist timber infestation consultant once exposed to establish if any treatment is required. Reference is to be made to the Structural Engineers details following roof strip with proposed works viability confirmed.

**Re-finish instatement works (General)**

**Roof covering and associated details:**  
-Install.  
-Install new pressure treated timber tile battens, note batten dimension to replicate existing.  
-Recover the roof areas in 25% salvaged slate and 75% imported salvaged slate. Imported slate to be of the same colour, dimension and gauge of the existing retained slate for continuity.  
-Charcoal ridge tiles to be installed, profile and dimension to match the existing exactly.  
-All walesh slate is to comply with BS EN 12326-1:2014 Slate and stone for discontinuous roofing and external cladding. Specifications for slate and carbonate slate.  
-All slates and tiles to be installed in accordance with BS 5534:2003 Code of Practice for slating and tiling  
-Samples of both the natural Welsh slate, charcoal ridge and hip tiles are to be submitted to the LPA Conservation Officer for approval/comment prior to installation.

**Leadworks:**  
-Renew all lead work soakers, flashing, valley, parapet gutters and abutments in 'Code 7 lead work. Refer to specific junction details for further information.  
-All new sheet lead work and detailing are to be designed to meet with current British Code of Practice BS 6915 in all aspects and are to meet with the guidance of the Lead Sheet Association (LSA). All lead material is to be in accordance with BS EN 12588:2006 'Lead and lead alloys. Rolled lead sheet for building purposes' and of 'Code 7'.  
All new lead work to be dressed a minimum of 150mm above adjacent/associated roof finish level at abutments.  
All new lead work to be finished in patination oil.

**General Note:**  
**Pointing Works (Party Wall)**  
All re-pointing required to the Party Wall following roof re-configuration works to be quicklime based mortar (calbux 90 or similar approved) mixed at 1:3 (quicklime: aggregate).  
-All proposed works to the adjacent party wall are to be strictly undertaken in accordance with the details approved by the Listed Building Consent decision notice



Site Location Plan - Scale 1:1250

**Roof Construction - Construction to achieve a U-value of 0.18 W/m²K**

- Ridge Beam Single 50x225mm C24
- Rafters - 50x125mm C16@ 600mm centres
- Purlins - 2x50x225mm C24 - bolted together with M16 94.6) @ 400mm centres (All to Structural Engineers details and specification).
- 125mm Kingspan Kooltherm K7 pitched roof board (or similar approved) sat within the rafters.
- 32.5mm insulated plasterboard to be fitted to the underside of the rafters.
- 18mm pressure treated softwood sarking boards to top of rafter
- Proprietary breather membrane
- Pressure treated roofing battens (38x28mm)
- Salvaged roof slates applied to finish, slates fixed with copper nails. Note all slate works to be undertaken/executed in accordance with British Standard 5534.
- Allowance to be made for the supply and installation of a VELUX GGL UK04 SD5N2 White Painted Conservation Window For Slate finish roofs - Size 550x980mm to 'blank'

**Dormer Checks - Construction to achieve a U-value of 0.18 W/m²K**

- Inner**
- 32.5mm insulated plasterboard and skim
  - 140x38mm softwood timber frame
  - 110mm of Kingspan Kooltherm K12 Framing Board or similar approved.
  - 18mm external grade plywood
  - Proprietary breather membrane
  - Code 5 lead work finish with rolled/standing seam connection details if required.
- Outer**
- Chimney works -**  
-Allowance to be made in the tender for re-fixing/re-haunching all existing chimney pots. Allowance to be made for re-pointing of stonework to chimneys if required.
- Copings -**  
-Allowance to be made in the tender for re-pointing of all of the existing coping stones
- New Rain water Goods**  
-Allowance or the supply and installation of 'Alumasc' aluminum gutter, hopper and Rainwater down pipes - Half round Gutters with circular down pipes and associated hoppers. - Finished Colour - Black

**General Note:**

All of the above information is based upon third party consultant information, namely:  
GEO Survey Ltd - Land & Measured Building Surveyor drawings:

-20039-13-E-GA	Bridge End House Existing Topographical Survey
-20039-13-B-LG	Bridge End House Existing Ground Floor GA
-20039-13-B-G	Bridge End House Existing Ground Floor GA
-20039-13-B-1	Bridge End House Existing First Floor GA
-20039-13-B-2	Bridge End House Existing Second Floor GA

- All dimensions are to be checked and verified on site prior to construction/manufacture
- This drawing sheet is to be read in conjunction with 2020-ID-17-WD001 and WD02
- This drawing is to be read in conjunction with Peter Vincent Design Document - Bridge End House - Structural Inspection.
- This drawing is to be read in conjunction with Peter Vincent Design Document - Bridge End House - Structural Calculations.
- This drawing is to be read in conjunction with Pinnacle. Construction property report/findings 'PC20051' dated 12th October 2012.
- This drawing is to be read in conjunction with the appropriate Refurbishment and Demolition Asbestos document provided with tender

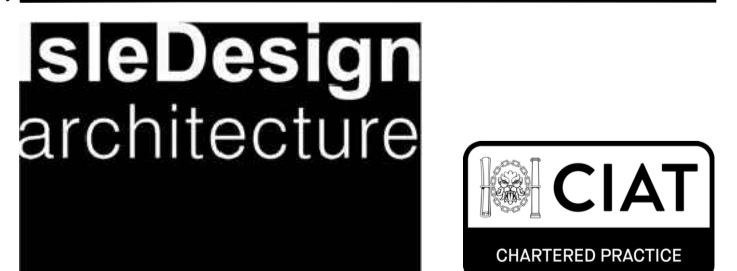
Rev	Details	Date	By	Chk.
A	Structural Engineers Information added to drawing along with Conservation Officer requirements.	February	NWH	NWH

Date	December 20	Drawn	NWH
Scale	1:50@ A2	Checked	NWH

**Project**  
Bridge End House, New Road,  
Robin Hood's Bay, Whitby

**Drawing Title**  
Working Drawing -  
Proposed Roof works/re-configuration

**Drawing No**  
2020-ID-17-WD003



No 12 High Street, Epworth, North Lincs

TENDER DRAWING

NYMNPA

04/02/2021

**Bridge End House**  
**New Road, Robin Hoods Bay**  
Structural Calculations

**Isle Design Architecture**  
**12 High Street**  
**Epworth**  
**North Lincolnshire**  
**DN9 1ET**



## Document Control Sheet

**Project Name:** Bridge End House  
**Project Ref:** PVD21038  
**Report Title:** Structural Calculations  
**Doc Ref:** 21038/0001  
**Date:** February 2021

	Name	Qualifications	Signature	Date
<b>Prepared by:</b>	Paul Teather	BEng CEng MStructE MICE	PT	01-02-2021
<b>For and on behalf of Peter Vincent Design Ltd</b>				

***It is the client's responsibility to ensure this document is submitted to Building Control for Building Regulations approval under a Building Notice or Full Application as required.***

This report has been prepared by Peter Vincent Design Ltd. ('PVD') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which PVD was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). PVD accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

## **Project Brief**

It is proposed to refurbish the habitable roof space of a three storey detached dwelling of traditional construction.

The dwelling is thought to have been constructed around the early to mid 1800's

Our structural engineer attended the dwelling to undertake a preliminary structural inspection and prepare a feasibility report.

This document should be read in conjunction with the inspection report reference PVD 20126 dated October 2020.

Reference should also be made to Isle Design Architecture planning drawings series 2020-ID-17.

The proposed refurbishment to the existing attic includes the modification of a concealed purlin support member. Given the age of the dwelling together with the internal opening along the support line we suspect the support member may be in the form of a king post truss. The support does not align with the internal assumed load-bearing partition to the lower levels.

The proposed refurbishment will necessitate the removal of the king post and consequently an alternative pitched steelwork support arrangement is proposed. The cranked beam is to be supplied in two pieces with an apex connection for ease of transport, manoeuvrability and lifting.

## **Technical Reference**

Loading BS6399

Masonry BS5628

Timber BS5268

Steelwork – BS5950

Concrete – BS8110

Analysis – Tekla S-frame

Connections – Tekla Connections

## **Lateral Stability**

The proposal does not include the removal of any buttressing masonry. We therefore do not consider the proposal affects the existing overall lateral stability provisions.

## **Assumptions**

All temporary works will be designed erected and maintained by the contractor. Loading guidance is set out on sheet 01.

It is assumed that the existing purlin support at approximately mid-span comprises a king post truss or similar arrangement concealed behind the internal finishes. The existing detail is to be fully exposed and inspected prior to commencement of the works.

It is assumed that recognised good building practice has been observed in the maintenance of the existing dwelling and all walls spanning parallel to the floor and roof joists are laterally restrained using GMS builders' straps in accordance with Building Regulations Approved

Document A. If this is found to not be the case lateral restraint should be introduced as part of these works.

It is assumed the works will be undertaken by a competent and experienced building contractor and the notes and details included on sketch sheets SK01 to SK03 will be taken into account. Any queries should be referred to the structural engineer.



## Loading Schedule

New Rugs :-

### 16° Pitch Vaulted

Tiles / Battens / feltings	0.69			
Ceiling Finishes	0.20			
	$0.89 \times 16 = 0.93$			
Services	0.10			
	<u>1.03</u>	1.4		<u>1.44</u>
Air / Daylight Saver	0.75	1.6		<u>1.20</u>
	1.78	(1.4E)		<u>2.64</u>

### 45° Pitch Vaulted

Tiles, Battens, feltings	0.69			
Ceiling finishes	0.20			
	$0.89 \times 45 = 1.26$			
Services	0.10			
	<u>1.36</u>	1.4		<u>1.90</u>
Air	0.60	1.6		<u>0.96</u>
	<u>1.96</u>	(1.4G)		<u>2.86</u>

### Flat / Domes Roof

Finish	0.30			
Insulation	0.30			
Joists	0.10			
Ceiling	0.20			
Services	0.10			
	<u>1.00</u>	1.00	1.4	<u>1.40</u>
Saver / Daylight	0.75	1.6		<u>1.20</u>
	<u>1.75</u>	(1.49)		<u>2.60</u>

## Ridge 16° Pitch

9/11 Spa 2.1m S<sub>y</sub> Gown Ctr<sub>s</sub>

$$0.6 \times 1.7^{\#} = 1.07 \text{ k/m}$$

$$BM_{\text{max}} = 1.07 \times 2.1^2 / 8 = 0.59 \text{ k/m}$$

$$I_y = \boxed{50 \times 125 \text{ dp C16 @ 600 ctrs}}$$

$$O-M_a = \frac{0.59 \times 6 \times 10^6}{50 \times 125^3} = 4.53 \text{ N/m}^2$$

$$G-M_{\text{red}} = 5.3 \times 1.1 \times 1.25 = 7.29 \text{ N/m}^2 \text{ Sct<sub>s</sub>}$$

$$D_{y1} = \frac{5 \times 1.07 \times 12 \times 210^4}{3EA \cdot E_{\text{red}} \times 50 \times 125^3} = 3.8 \text{ Sct<sub>s</sub>}$$

## Perkins adj. Ridge

$$\text{Neutral width} = \frac{5075 + 102 + 102}{2} = 2640 \text{ mm}$$

$$\text{Consol. L<sub>1</sub> SLS UDL} = (2.1 \times 0.5 \times 1.7^{\#}) + (0.54 \times 0.5 \times 1.96^{\#}) = 2.4 \text{ k/m}$$

$$\text{Spa} = 4.150 \text{ mm}$$

$$BM_{\text{max}} = 2.4 \times 4.15^2 / 8 = 5.17 \text{ k/m}$$

$$2 / 50 \times 225 \text{ dp C16}$$

$$O-M_a = \frac{5.17 \times 6 \times 10^6}{2 \times 50 \times 225^3} = 6.13 \text{ N/m}^2 \quad G-M_{\text{red}} = 5.3 \times 1.1 \times 1.25 = 7.29 \text{ N/m}^2$$

$$D_{y1} = \frac{5 \times 2.4 \times 12 \times 4150^4}{1.14 \times 3EA \times 50 \times 225^3} = 14.8 \text{ Sct<sub>s</sub>}$$

$$\text{Adapt C24 } D_{y1} = \frac{50 \times 14.8}{720} = 11.9 \text{ Sct<sub>s</sub>}$$

$$\boxed{\text{Adapt } 2 / 50 \times 225 \text{ dp C24}}$$

## Ridge Perlin

$$\text{SLS UDL} = 0.54 \times 1.96^{\#} = 1.06 \text{ k/m}$$

$$BM_{\text{max}} = 1.06 \times 4.15^2 / 8 = 2.3 \text{ k/m}$$

$$G-M_a = \frac{2.3 \times 6 \times 10^6}{50 \times 225^3} = 5.44 \text{ N/m}^2 < 7.5$$



$$D_{y12} = \frac{S \times 1.06 \times 12 \times 4150^4}{3EA \times 72W \times 50 \times 225^3} = 12.2 \text{ mm} < 0.003 \times 4150 = 12.45 \text{ mm} \quad \text{Satisfies}$$

Roof Check Support

$$SLS \text{ UDL} = (2.1 \times 0.5 \times 1.75) + (1.2 \times 0.5) = 2.44 \text{ k/m}$$

$$BM_{max} = 2.44 \times 4.15^2 / 8 = 5.25 \text{ kNm}$$

$$\sigma_{max} = \frac{5.25 \times 6 \times 10^6}{2 \times 50 \times 225^2} = 6.22 \text{ N/mm}^2 < 7.29 \text{ N/mm}^2 \quad \text{Satisfies}$$

$$D_{y12} = \frac{S \times 2.44 \times 12 \times 4150^4}{1.14 \times 3EA \times 72W \times 2 \times 50 \times 225^3} = 12.1 \text{ mm} \quad \text{Satisfies}$$

Cranked Beam to Replace assumed King Post Truss

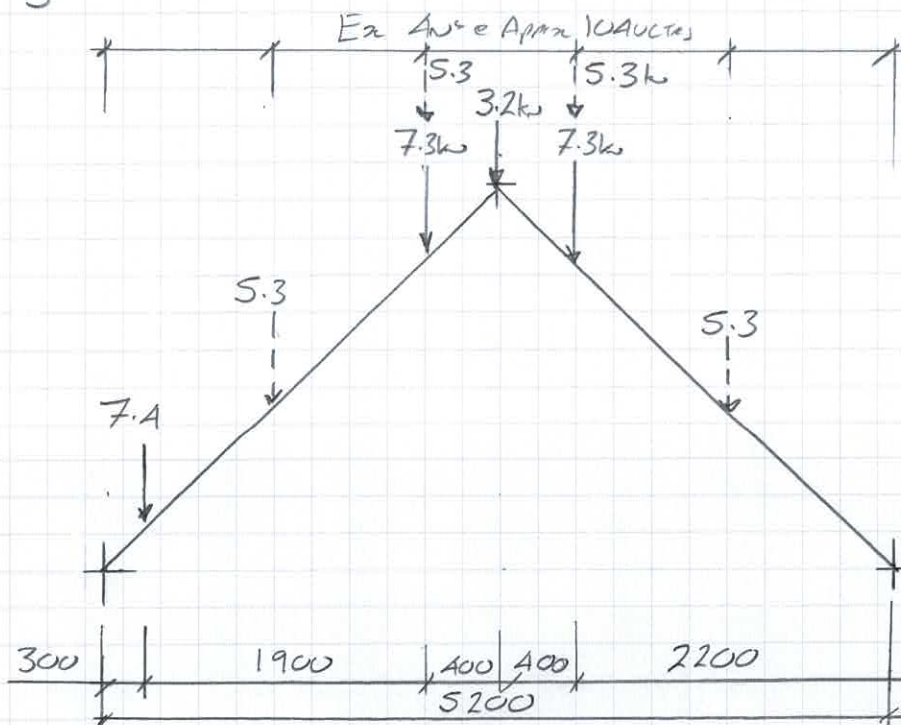
$$JR \text{ Ridge Purlin } M_u = 0.54 \times 2.86 \times 4.15 \times 0.5 = 3.2 \text{ kNm} \quad (2.2)$$

$$\text{Adj Ridge } 16^\circ \text{ Side } 3.54 \times 4.15 \times 0.5 = 7.3 \text{ kNm} \quad (5.0)$$

$$\text{Supporting Roofs Check } 3.57 \times 4.15 \times 0.5 = 7.4 \text{ kNm} \quad (5.1)$$

Existing purlins to be retained by 1/5 Spans - AN<sup>c</sup>

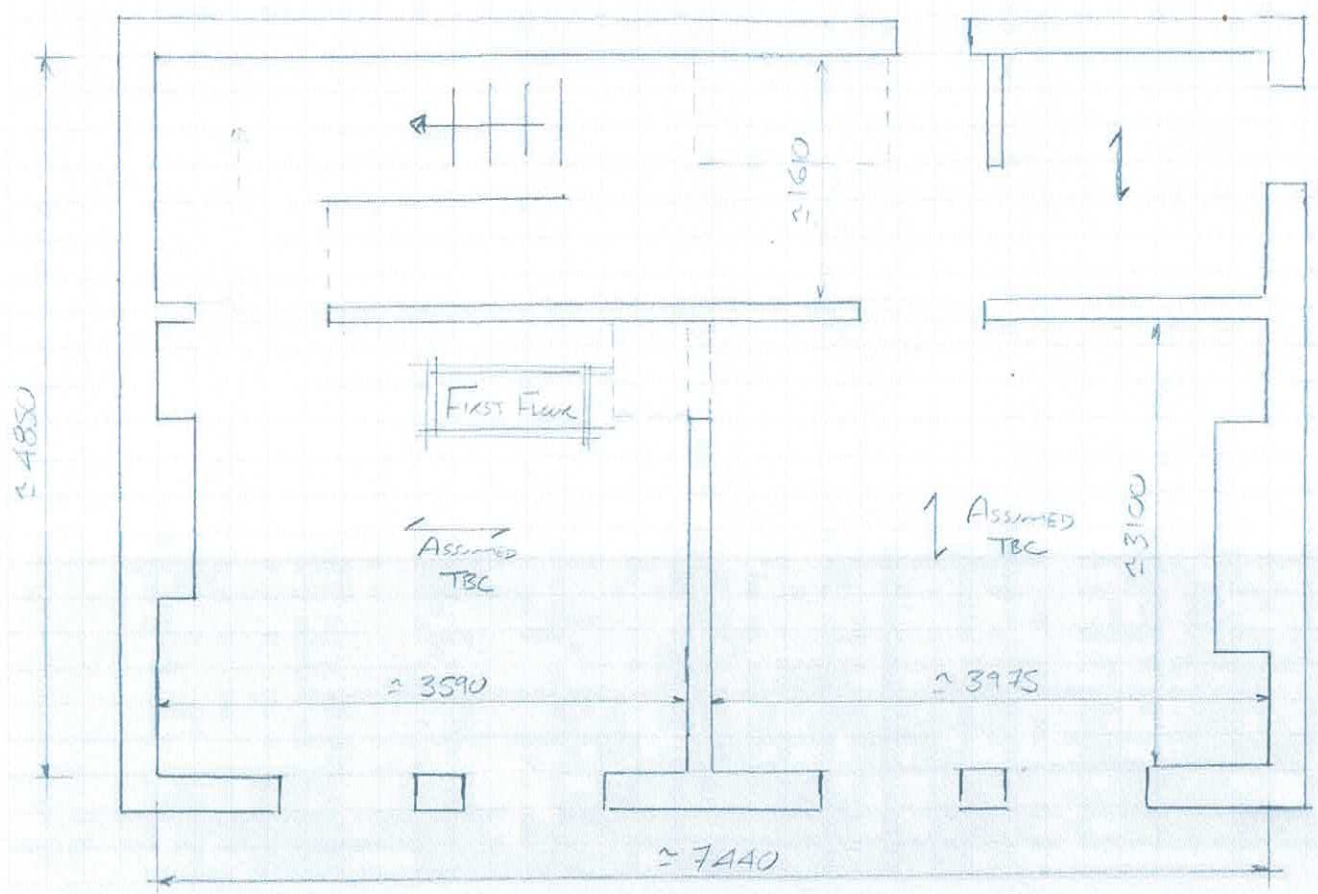
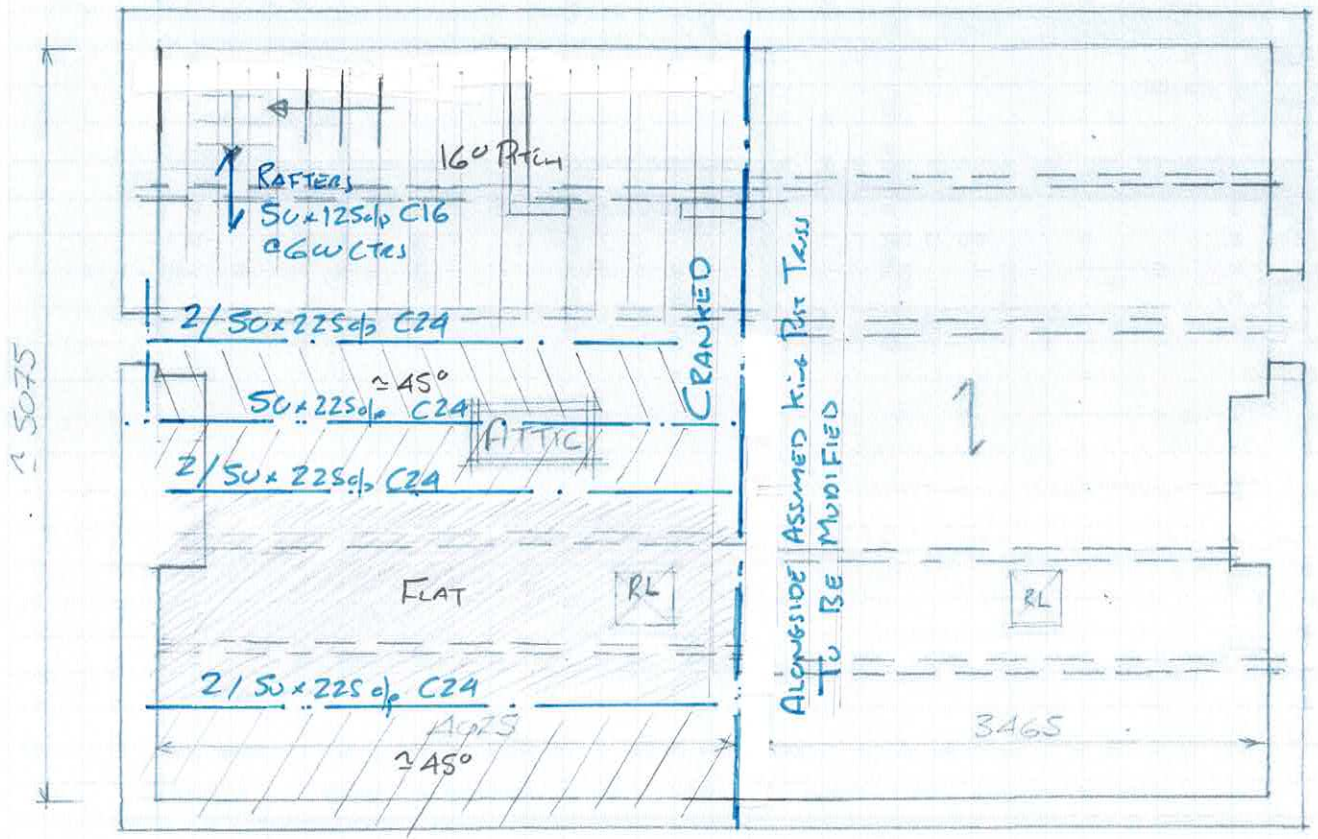
$$JR = \frac{5.2 \times (3.565 \times 0.5) \times 2.86}{5} = 5.3 \text{ kNm} \quad (3.63)$$



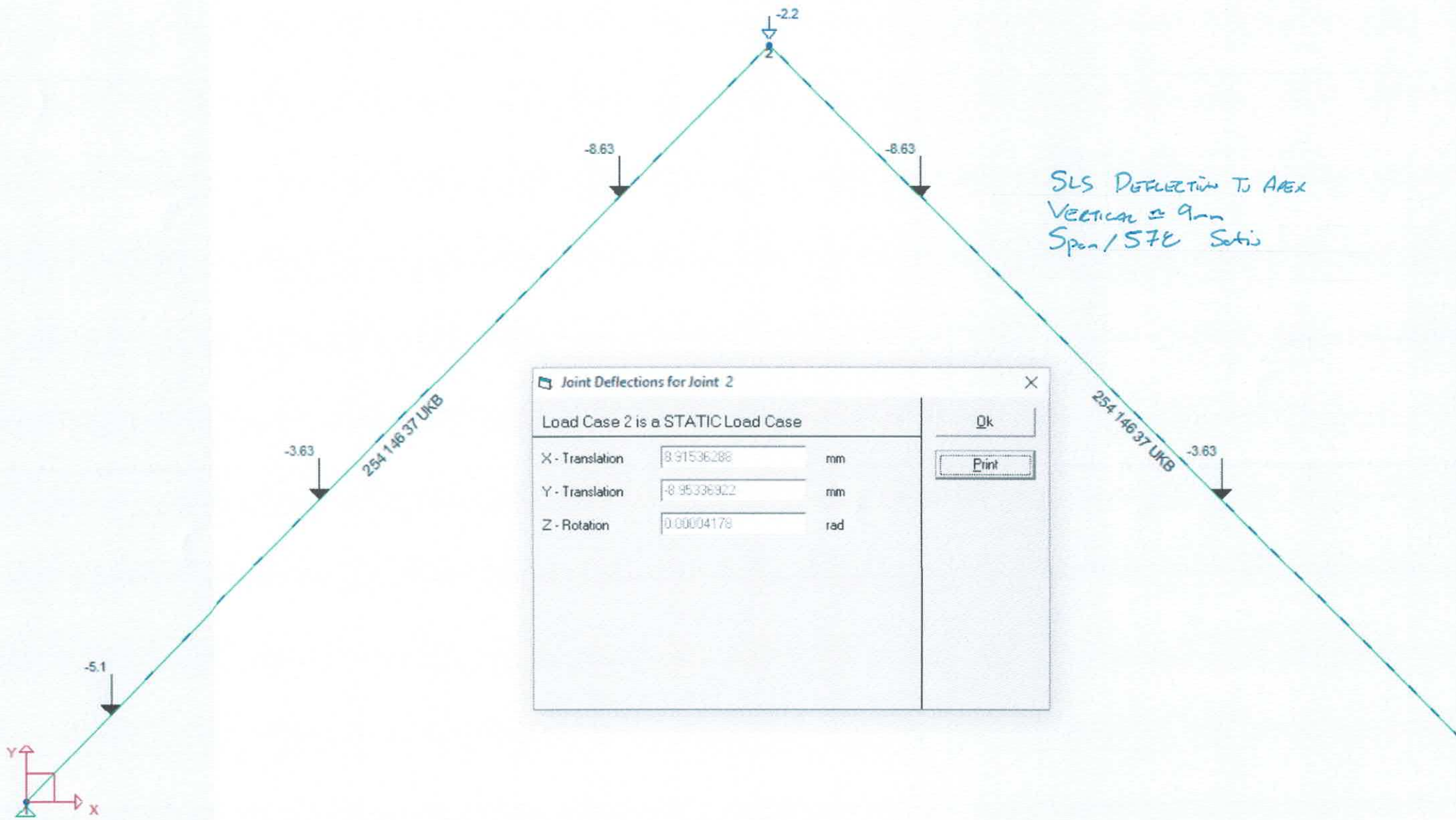
# Peter Vincent Design

Project	20126
Date	SEPT 2020
Sheet	SK01
Revision	

Markers up Survey Sketch  $\approx 7445$







SLS DEFLECTION TO Apex  
 VERTICAL  $\approx$  9mm  
 Span / 576 Setis

Joint Deflections for Joint 2

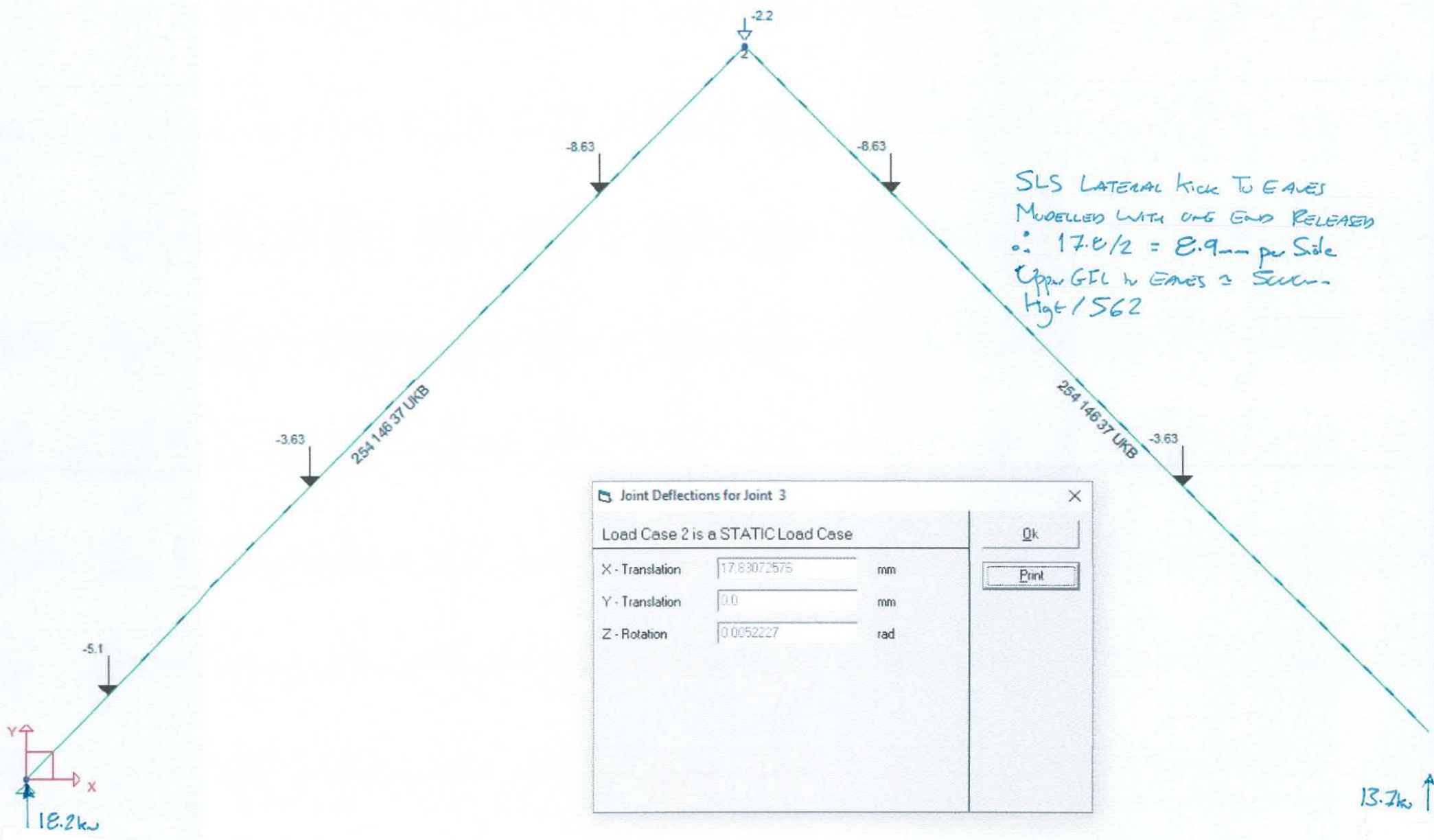
Load Case 2 is a STATIC Load Case

X - Translation	8.91536288	mm
Y - Translation	-8.95336922	mm
Z - Rotation	0.00004178	rad

Ok Print

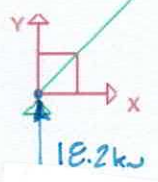


06



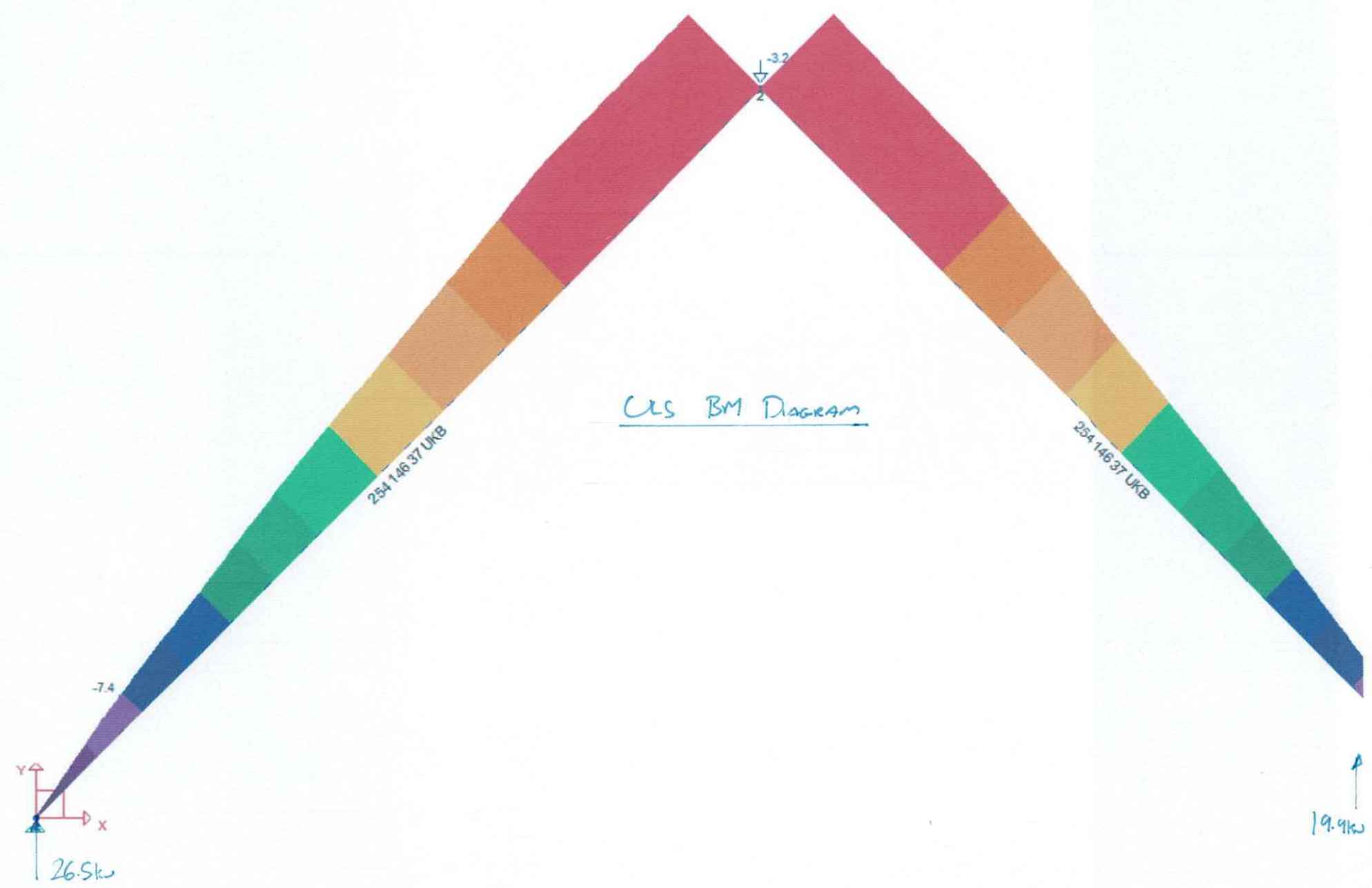
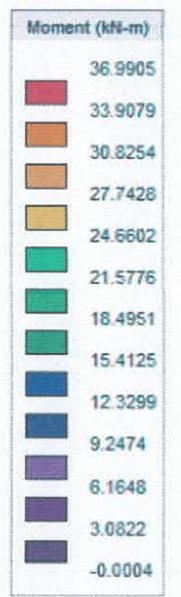
SLS LATERAL KICK TO EAVES  
 MODELLED WITH ONE END RELEASED  
 $\therefore 17.6/2 = 8.9$  mm per Side  
 Upper GIL to EAVES = SECTION  
 Hgt 1562

Load Case 2 is a STATIC Load Case			Ok
X - Translation	17.63072576	mm	Print
Y - Translation	0.0	mm	
Z - Rotation	0.0052227	rad	



13.7k ↑

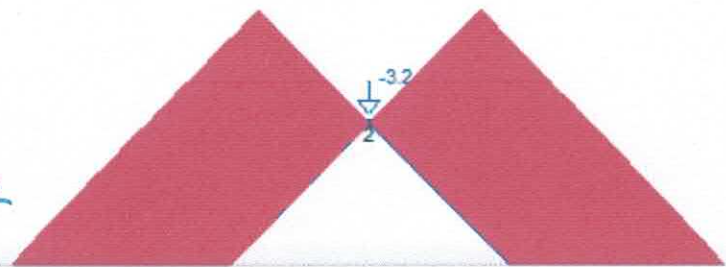
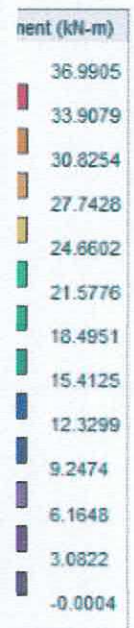
07





80/

RAFTER ULS BM  
 NEGLECTING RESTRAINT FROM PURLIN  
 $I_c = 1.5 \times 2.6 = 3.9$   
 ZS4 x 146 UB37 Selected to limit deflection  
 $M_{allow} = 74.5 \text{ kNm}$



**Force Diagram for Member 2**

Envelopes      Maximum Diagrams: 100       Global deflections

Load Type: **Load Cases**      Ld Case: **1 - ULS**      >> Next LC      << Previous LC

Project Titles      Margins      **Single Diagram**      Multiple Diagrams

Ld Case 1 STATIC      Distance: 0.0 m  
 Diagram For: **Moment**      Force: 36.990147 kN-m  
 Stations: 100

Row No	Member No	Ld Case No	Station m	Axial Force kN	Shear Force kN	Moment kN-m
1	2	1	0.0000	-1.4333	-1.4333	36.9901
2	2	1	0.0366	-1.4333	-1.4333	36.9377
3	2	1	0.0732	-1.4333	-1.4333	36.8853

**Moment Diagram**

Max = 36.9901      Min = 0.0000

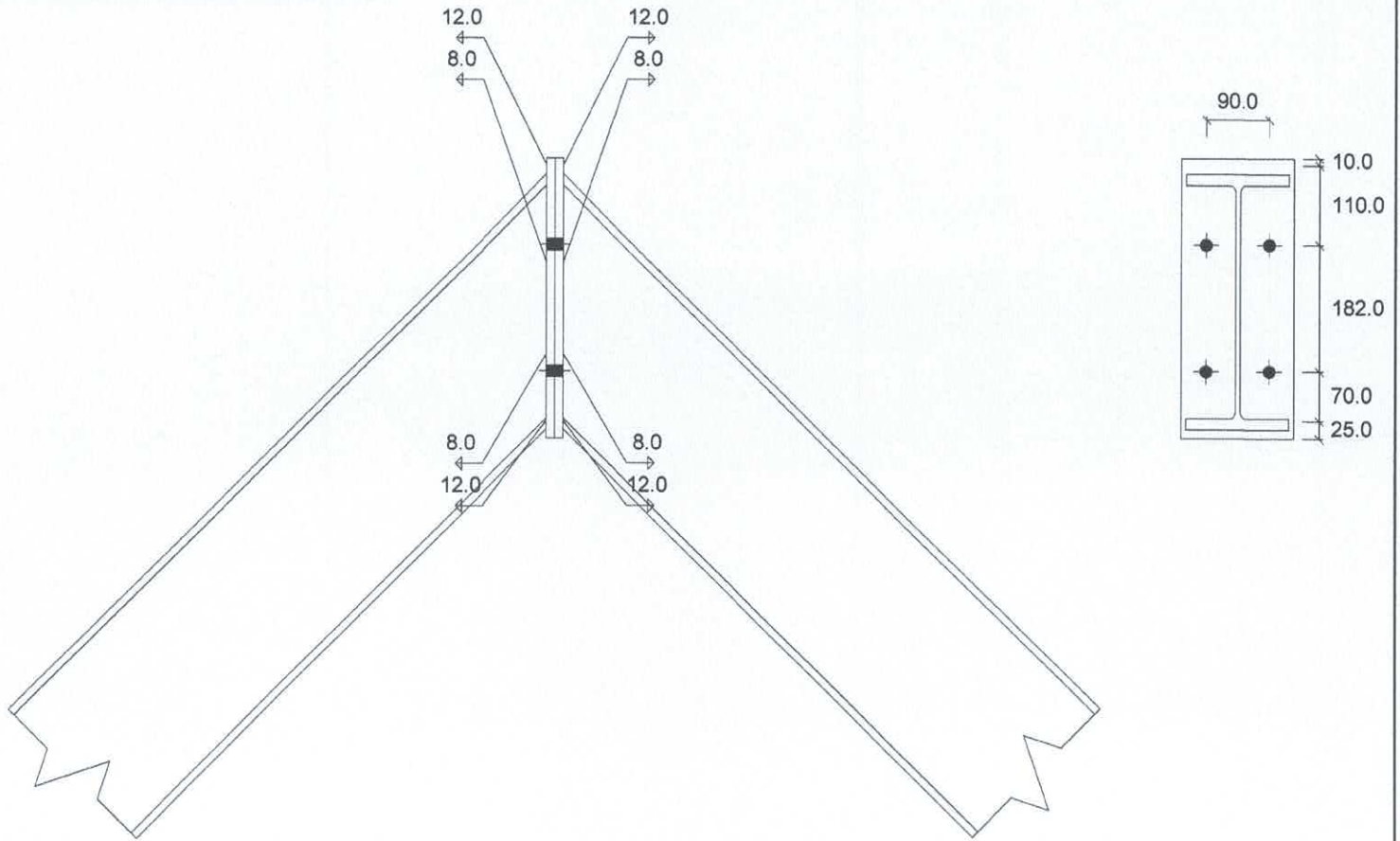


-7.4





**Beam-Beam Moment Connection 1**



EndPlate : 160 x 12 x 397 S275  
Bolts: M16(Grade 8.8)

UKB 254x146x37 S275 (Slope -45.0000°)

**Design Code: BS 5950-1 : 2000**

**Design Summary**

Item	Combination	Utilisation	Status
Moment	1	0.981	Pass
Shear	1	0.115	Pass
Beam			Not Checked
Stiffener	1	0.105	Pass
Weld	1	0.862	Pass

**Basic Details**  
**Face A**

No.	Combination Name	Moment [kNm]	Shear Force [kN]	Axial Load [kN]	Moment (Sharp End) [kNm]
1	ULS	37.0	19.0	19.0	37.0

**Face C**

No.	Combination Name	Moment [kNm]	Shear Force [kN]	Axial Load [kN]	Moment (Sharp End) [kNm]
1	ULS	37.0	19.0	19.0	37.0

**Face A**

Item	Value	Units	Remarks
S.O.P. Level	0.0	m	
Beam angle, $\theta_b$	-45.0000	°	
Overall joint depth	362.0	mm	
Section geometry			

**Section geometry**

Item	Value	Units	Remarks
Bolt gauge, g	90.0	mm	
Beam			
m <sub>top zone</sub>	35.5	mm	
m <sub>btm zone</sub>	35.5	mm	
e	35.0	mm	
n	35.0	mm	

**Face C**

Item	Value	Units	Remarks
S.O.P. Level	0.0	m	
Beam angle, $\theta_b$	-45.0000	°	
Overall joint depth	362.0	mm	
Section geometry			

**Section geometry**

Item	Value	Units	Remarks
Bolt gauge, g	90.0	mm	
Beam			
m <sub>top zone</sub>	35.5	mm	
m <sub>btm zone</sub>	35.5	mm	
e	35.0	mm	
n	35.0	mm	

**Design Combination: ULS**

**Moment Capacity**

**Face A, C, critical**

Item	Value	Units	Remarks
Tension bolt resistance, $\Sigma P_r + N$	159.7	kN	
Beam flange bearing, $P_c$	614.4	kN	
Compression force, $F_c$	159.7	kN	
Moment capacity, $M_c$	34.4	kNm	
Modified moment, $M_m$	33.7	kNm	
Utilisation ratio	0.981		
Pass			

**Tension bolt resistance,  $\Sigma P_r + N$**

Location	EP Bending	BW Tension	Pr modified	Pr
Bolt row 1	140.662	270.070	na	140.662

**Beam flange bearing,  $P_c$**

Item	Value	Units	Remarks
Breadth, B	146.4	mm	
Beam flange, $T_{beam}$	10.9	mm	
Beam web, $t_{beam}$	6.3	mm	
Design strength, $p_y$	275.0	N/mm <sup>2</sup>	

**Moment capacity,  $M_c$**

Item	Value	Units	Remarks
Bolt row 1, $M_c$	34.4	kNm	

**Modified moment,  $M_m$**

Item	Value	Units	Remarks
Applied moment, M	37.0	kNm	
Axial force, N	19.0	kN	
Distance of axial force from centre of compression, $h_N$	173.3	mm	

**Shear Capacity**

**Face A, C, critical**

Item	Value	Units	Remarks
Bearing strength, $p_b$	460.0	N/mm <sup>2</sup>	
Shear capacity, $V_c$	164.8	kN	



Item	Value	Units	Remarks
Shear force, V	19.0	kN	
Utilisation ratio	0.115		
Pass			

**Bearing strength,  $p_b$**

Item	Value	Units	Remarks
Coefficient, $k_{ps}$	1.000		
Bearing strength of bolts, $p_{bb}$	1000.0	N/mm <sup>2</sup>	
Bearing strength of endplate, $p_{bsp}$	460.0	N/mm <sup>2</sup>	

**Shear capacity,  $V_c$**

Item	Value	Units	Remarks
Bolt row 1, $P_{st}$	23.6	kN	
Bolt row 2, $P_{ss}$	58.9	kN	

**Beam Web Capacity**

**Face A, C, critical**

Item	Utilisation	Status
Beam web	-	Not applicable

**Beam web**

Item	Value	Units	Remarks
Not applicable			

**Stiffener Checks**

**Face A, C, critical**

Item	Utilisation	Status
Beam flange (top)	0.105	Pass
Beam flange (bottom)	Not Checked	

**Beam flange (top)**

Item	Value	Units	Remarks
Breadth, $B_b$	146.4	mm	
Flange thickness, $T_b$	10.9	mm	
Design strength, $p_y$	275.0	N/mm <sup>2</sup>	
Net area of flange, $Asn_{reqd}$	167	mm <sup>2</sup>	
Net area of flange, $Asn_{prov}$	1596	mm <sup>2</sup>	
Pass			

**Beam flange (bottom)**

Item	Value	Units	Remarks
Breadth, $B_b$	146.4	mm	
Flange thickness, $T_b$	10.9	mm	
Design strength, $p_y$	275.0	N/mm <sup>2</sup>	
No tension present in flange			

**Weld Checks**

**Face A, C, critical**

Item	Utilisation	Status
Tension flange weld (beam top flange)	0.319	Pass
Compression flange weld (beam bottom flange)	0.862	Pass
Tension web weld		Pass
Shear web weld	0.048	Pass

**Tension flange weld (beam top flange)**

Item	Value	Units	Remarks
Fillet weld	12.0	mm	
Design force, $F_{tfw}$	140.7	kN	
Weld capacity, $P_{tfw}$	441.3	kN	
Utilisation ratio	0.319		



**Compression flange weld (beam bottom flange)**

Item	Value	Units	Remarks
Fillet weld	12.0	mm	
Required nominal weld, $s_{nom}$	10.3	mm	
Pass			

**Tension web weld**

Item	Value	Units	Remarks
Fillet weld	8.0	mm	
Full strength weld provided			
Pass			

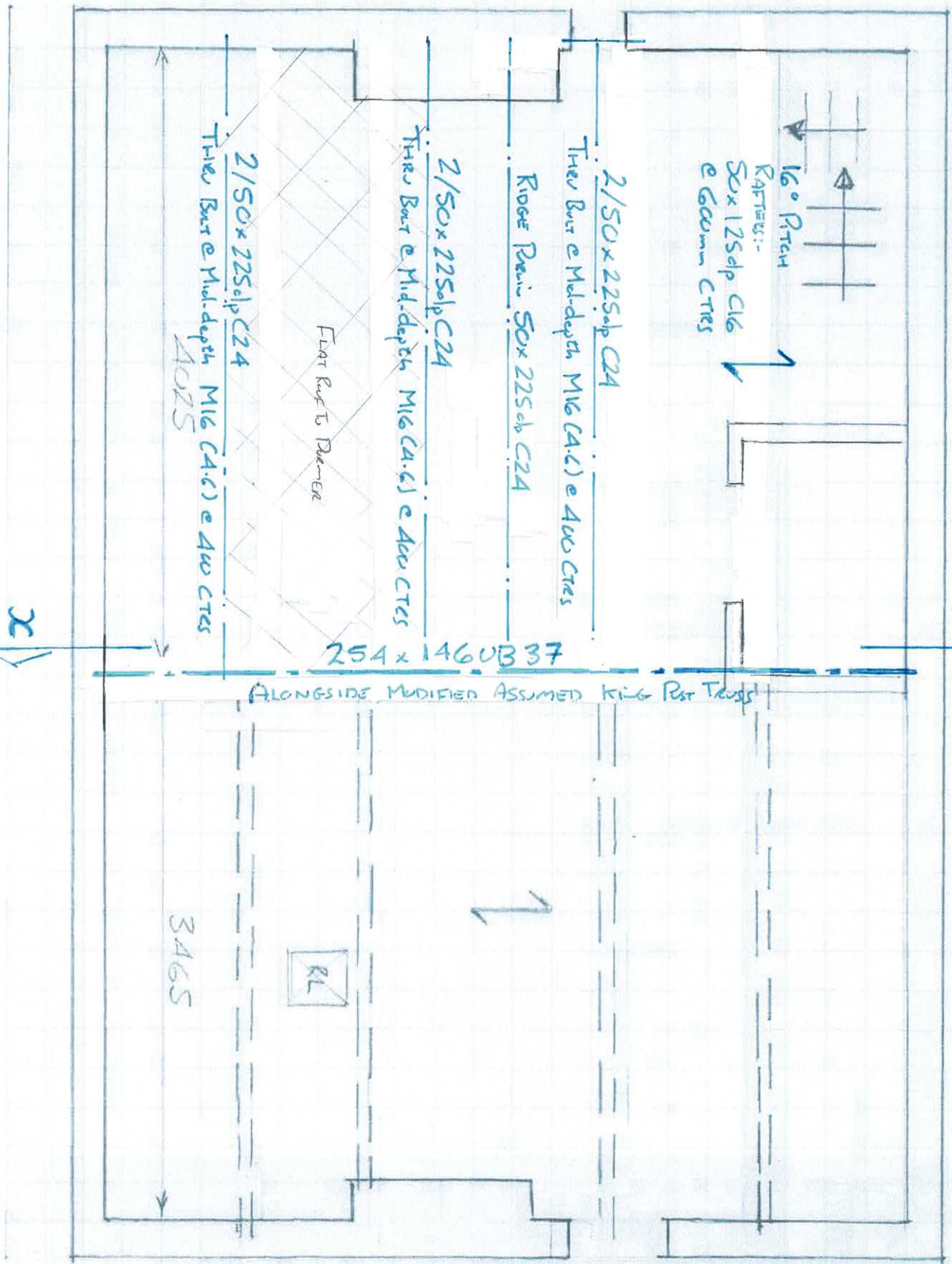
**Shear web weld**

Item	Value	Units	Remarks
Fillet weld	8.0	mm	
Required length of web weld, $L_{ws}$	159.9	mm	
Longitudinal force per unit length, $F_{Lww}$	118.8	kN/m	
Longitudinal capacity per unit length, $P_{Lww}$	2464.0	kN/m	
Utilisation ratio	0.048		

Library: MomentConnections.dll, version: 19.0.0.0

~ 5075

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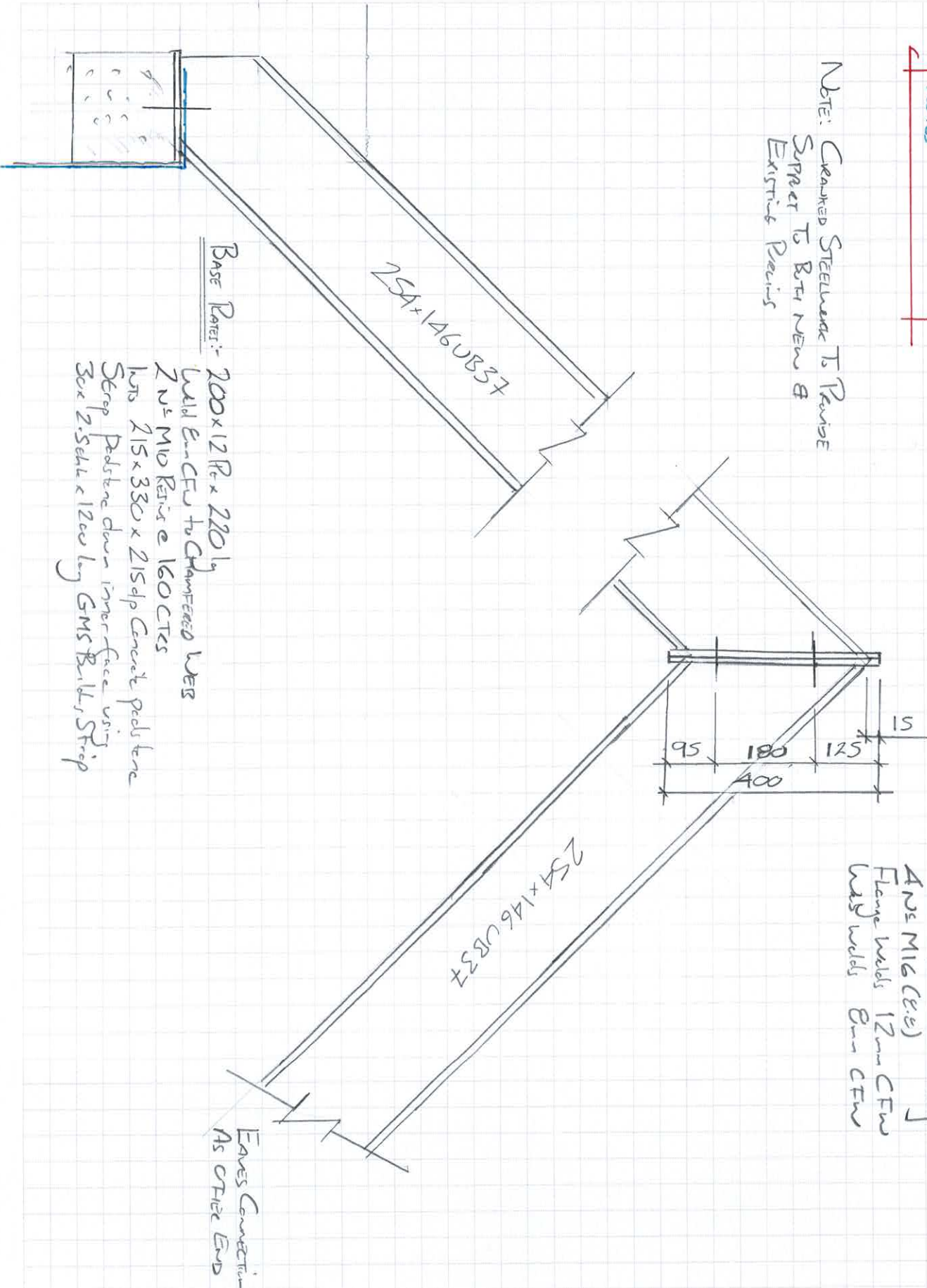


REFER SK02 FOR SECTION X-X

REFER SK05 FOR  
STRUCTURAL ENGINEERING  
NOTES

REFER SK03 FOR  
STRUCTURAL EXHIBITS  
NOTES

NOTE: CROOKED STEELWORK TO REUSE  
SUPPORT TO BOTH NEW &  
EXISTING PAVING




BASE PAVEMENT: 200x12R x 220lg  
Weld Encased to Chambered WBS  
2 No MID Reins @ 160 CTR  
1 No 215x330 x 215slp Concrete Pedstone  
Strip Pedstone down inner face using  
30x2.5slat x 1200lg GMS Builders Strip

Apex Connection  
Eng PAVES  
160x12R x 400mm long  
AND 116 (E/E)  
Flange Welds 12mm CFW  
Welds  
Bm - CFW

EAVES CONNECTION  
AS OTHER END



## Engineering Notes

1.  Indicates direction of span of existing and proposed rafters. Sizes and spacings as noted on the sketches.
2. All dimensions to be confirmed on site prior to work commencing. The dimensions on the sketches are approximate and intended for calculation purposes only.
3. All temporary works to be designed erected and maintained by the contractor. The calculations consider structural adequacy and lateral stability of the permanent arrangement only.
4. All steelwork to be minimum grade S275
5. All steelwork and fabrication to be in accordance with N555 5<sup>th</sup> Edition CE Marking Version.
6. All steelwork to be blast cleaned to SA2.5 to BS7079 and primed with a minimum of 80 microns high build zinc phosphate primer. Final coat to architect's specifications.
7. All steelwork in cavity or supporting outer leafs to be either hot dipped galvanised to 85 microns minimum thickness to BS EN ISO 1461:1999 or have 2 layers of bitumen paint as final coat.
8. Fire protection to architect's detail, (minimum half an hour) to comply with BC requirements.
9. All welds to be as per the notes on Sk02
10. Ends of beams to be effectively built onto wall.
11. All bolts to steelwork be grade 8.8. Timber thru bolts grade 4.6.
12. Minimum Length of cranked beam bearing to be 200mm.
13. New beams supporting existing load bearing walls should be pre-deflected using folded steel wedges. Gaps to be filled with slate and dry pack mortar prior to releasing the props.
14. All proprietary lintels to be installed in accordance with manufacturer's specifications.
15. All proprietary fixings to be installed in accordance with manufacturer's specification.
16. All walls orientated parallel to the floor and ceiling joists must be restrained using galvanised mild steel builders' straps in accordance with the guidance set out in the Building Regulations Approved Document A
17. All new timber members to be grade C24.

### CDM Note:

All steelwork members should be installed in single lengths. The longest span member measures approximately 3.8m and has an approximate mass of 140kg