

6. INVENTORY REPORT - PRINCIPAL TIMBER ELEMENTS DETAILS

6.1 A - Main support posts

G - Braces supporting main support posts

Timber element location on plan: -

- A - Main support Posts ■
- G - Braces supporting main support posts ■

Timber Species :

European Redwood

Construction:

The main support post and its supporting diagonal braces are supported on the inner lower wall plate and are positioned within the dome enclosure. Eight evenly spaced main support posts are aligned with the timber king post trusses and constitute the principal structural system of the dome.

The main support posts are connected to the inner elements of the upper rafter plates and lower stud wall plates using mortice and tenon joints (Figure 48 & 49). The diagonal braces (G) provide further structural stability to the main support posts.

Condition:

Most of the main support posts and supporting braces are charred, how-ever they were found in their original position.

Samples taken:

SLHA removed this element from the roof as one piece. This includes the entire section of the main support post (A), the supporting braces (G), inner lower stud wall plate (D1 & D2) and a section of the upper rafter plate (E1 & E2). The samples taken for records are shown on the following pages.

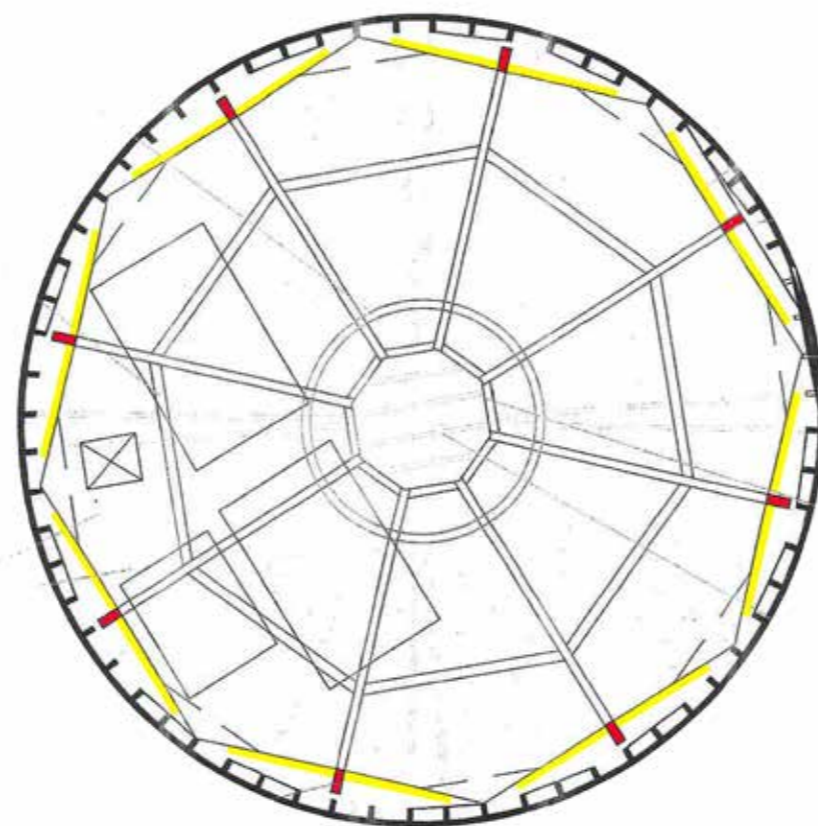


Figure 41: Main support posts (A) & Supporting Braces (G) (2019) © H&R (SLHA edit)



Figure 42: Main support posts (A) & Supporting braces (G) indicated in situ (2020) © SLHA

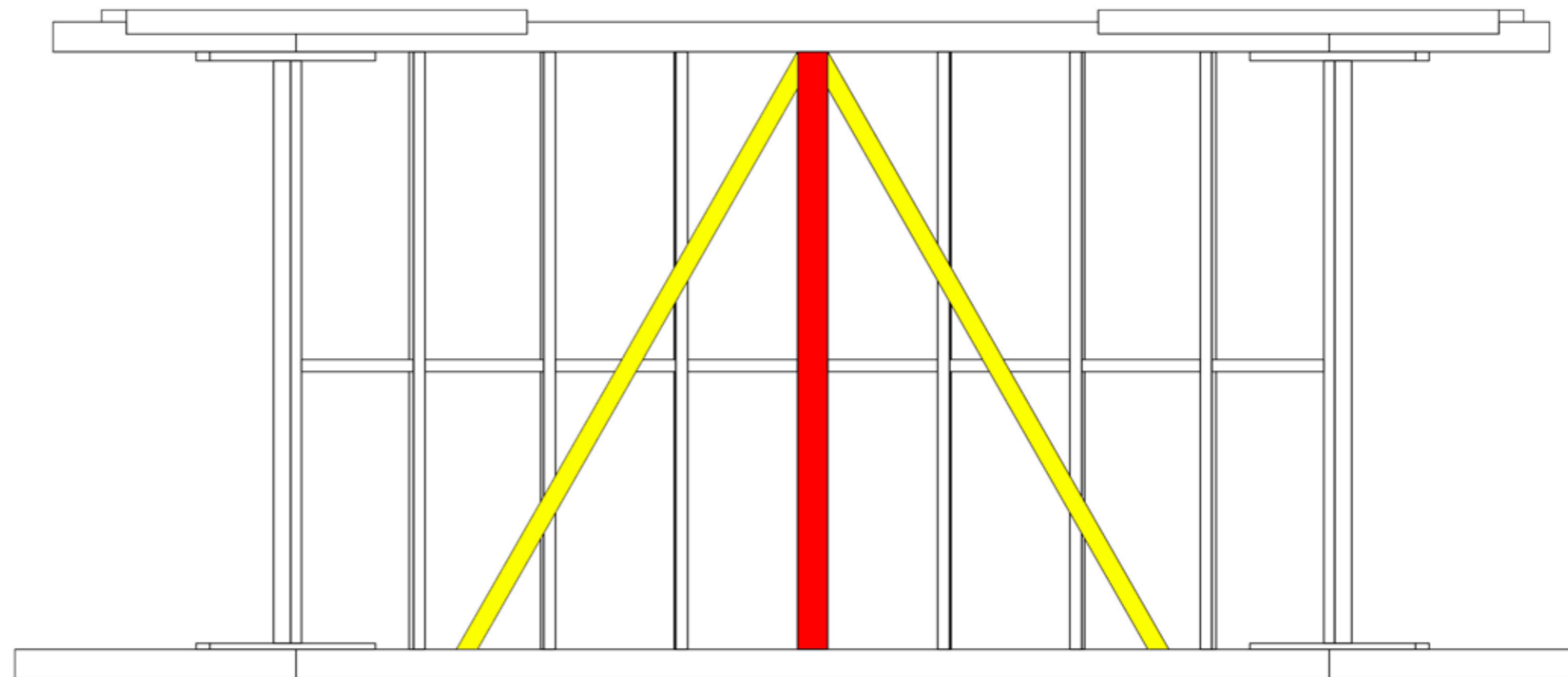


Figure 43: 1:20 post -fire measured survey - Main support posts (A) and supporting braces (G) highlighted in dome wall elevation (2020) © SLHA



Figure 44: Main support posts (A) & Supporting braces (G) indicated in situ (2020) © SLHA



Figure 45: Sample #1 - Main support posts braces (G) on inner lower stud wall (D) (2020) © SLHA



Figure 46: Sample #2 - Junction between main support post (A) with braces (G) and upper rafter plate (E) (2020) © SLHA



Figure 47: Main support posts (A) & Supporting braces (G) in situ (2020) © SLHA



Figure 48: Mortise and tenon joints between main support posts (A) and lower stud wall plate (D) (2020) © SLHA



Figure 49: Sample #3 - Tenon joints at the top of main support posts (A) (2020) © SLHA



Figure 50: Sample #3 - Main support posts (A) and lower stud wall plate (D) (2020) © SLHA



Figure 52: Main support posts (A) in situ pre-fire (2020) © SLHA



Figure 51: Sample #4- Junction between main support post (A) and braces (G) on inner lower stud wall plate (D1) (2020) © SLHA



Figure 53: Main support posts (A) in situ (2020) © SLHA



Figure 54: Main support posts (A) in situ (2020) © SLHA

6. DOME INVENTORY - PRINCIPAL TIMBER ELEMENTS DETAILS

6.2 B - Wall Studs and ties

Timber element location on plan: -

- B - Wall studs and ties ■ ■

Timber Species :

European Redwood

Construction:

The dome consist of 64 wall studs which are evenly spaced around the perimeter of the dome. These upright elements are positioned around the dome's perimeter and supported over the outer lower wall plate and are connected with mortise and tenon joints. Within the design, there is a wall stud situated behind each main post and 7 wall studs between the posts.

Wall studs are linked by a horizontal tie at approximately 845mm from the base. The wall studs support the timber boarding which forms the dome enclosure as well as the timber ribs which constitute the dome structure.

At the junctions of the lower stud walls (corners of the regular octagon), an additional timber base plate supports the stud wall. Likewise, at junctions of the upper rafter plate, an additional timber plate (in the form of a capital) is used over the wall stud (Figure 33).

Condition:

Most of the timbers are significantly charred due to fire damage, although most remained in position.

Samples taken:

A few samples for this element were salvaged and have been recorded. This includes:

- Sample comprised of the junction detail at corners of the octagon perimeter including a section of the lower wall plate and upper rafter plate.
- Sample of connection between wall ties and the wall boarding (H).

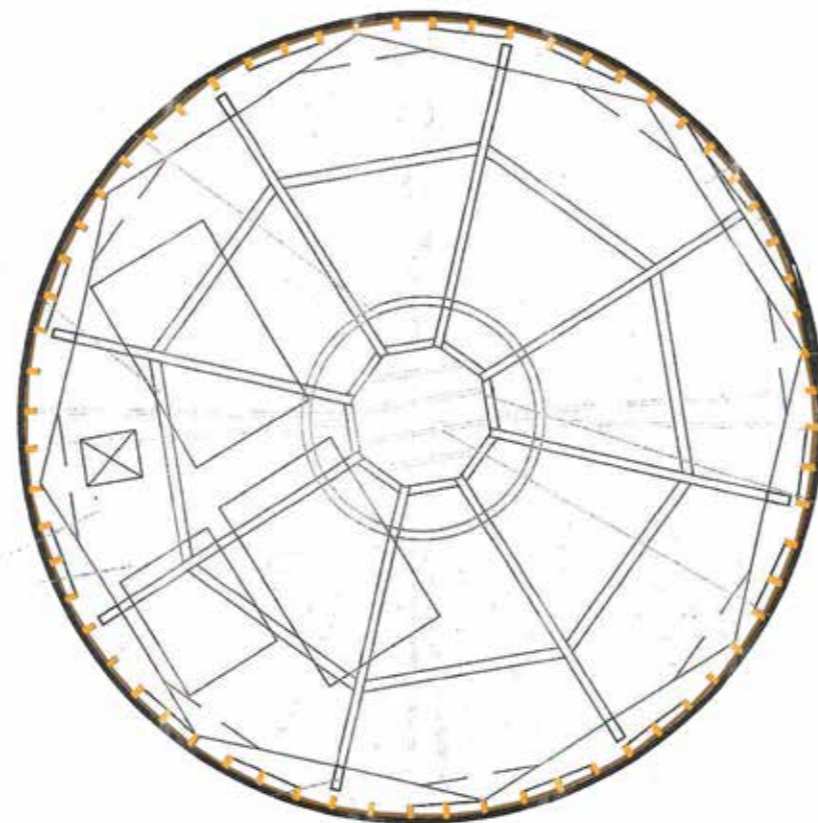


Figure 55: Wall studs and ties (B) in plan view (2019) © H&R (SLHA edit)



Figure 56: Wall studs and ties (B) in situ (2020) © SLHA

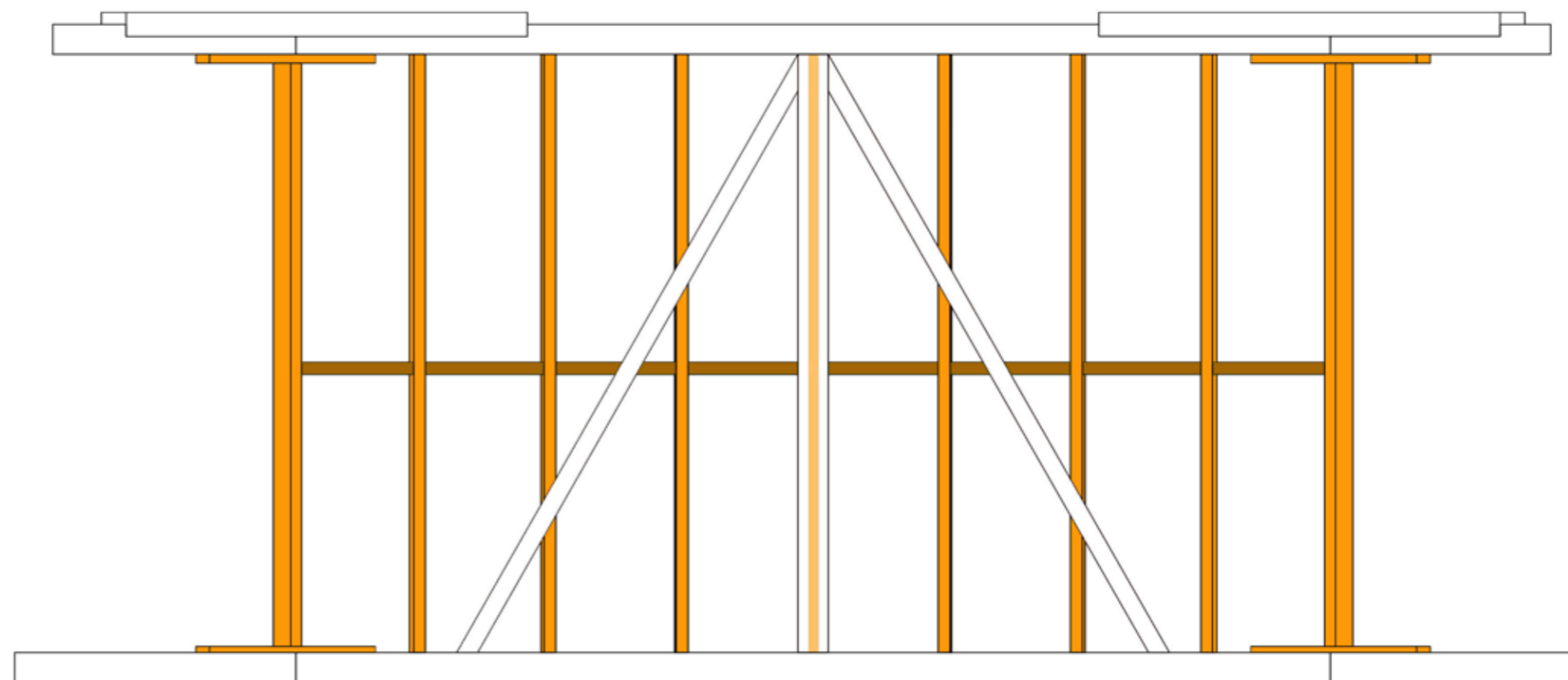


Figure 57: 1:20 post-fire measured survey - Wall studs and ties (B) highlighted in dome wall elevation (2020) © SLHA



Figure 58: Wall studs and ties (B) in situ (2020) © SLHA



Figure 59: Wall studs and ties (B) in situ (2020) © SLHA



Figure 60: Wall studs (B) with bottom plate tie at junction between the corner of lower rafter plates (2020) © SLHA



Figure 61: Wall studs and ties (B) in situ with wall boarding (H) and indication of proximity to main support posts (A) (2020) © SLHA



Figure 62: Mortise joint on addition plate for top of wall stud (B) to connect with upper rafter plate (E) (2020) © SLHA



Figure 63: B- Wall studs and ties in situ (2020) © SLHA



Figure 64: Sample #5 - Wall studs and ties (B) with wall boarding (H) (2020) © SLHA



Figure 65: Wall studs (B) with bottom plate connecting the lower stud walls (D) in situ (2020) © SLHA



Figure 66: Wall studs and ties (B) in situ (2020) © SLHA



Figure 67: Sample #6 - Wall stud (B) with upper rafter plate (D), wall boarding (H) and horizontal rafter wall tie (M) (2020) © SLHA

6. DOME INVENTORY - PRINCIPAL TIMBER ELEMENTS DETAILS

6.3 C - 2 PART RIBS

Timber element location on plan: -

- C - 2 Part ribs ■

Timber Species :

European Redwood

Construction:

The timber ribs (2-part) provide the structure for the dome and support the timber boarding forming the shell of the dome, over which the copper cladding was applied. These are 64 nos and correspond in position with the supporting wall studs.

The ribs comprise of two timber pieces that are fixed together with series of scarf joints that creates the curvature of the dome. These ribs spring from the upper rafter plater and extend towards to inner apex ring beam.

The joinery connection for the 2-part ribs between the upper rafter plate and inner apex ring beam was not clearly identifiable, however it is likely to have been a birds mouth joint.

At inner apex ring beam junction the end of the truss, at the birds-mouth junction, is sandwiched between the rib. One 2-part rib on each side of this junction. The outer apex ring beam is a circular ring that hold the ribs in place as it reaches the apex. This ring beam is situated at the top of the ribs and was identified through photography from H&R reports.

Condition:

All the ribs have been heavily damaged by the fire and only fragmentary evidence was discovered in the debris.

Samples taken:

A few fragmented samples of the timber 2 part ribs were identified and salvaged.

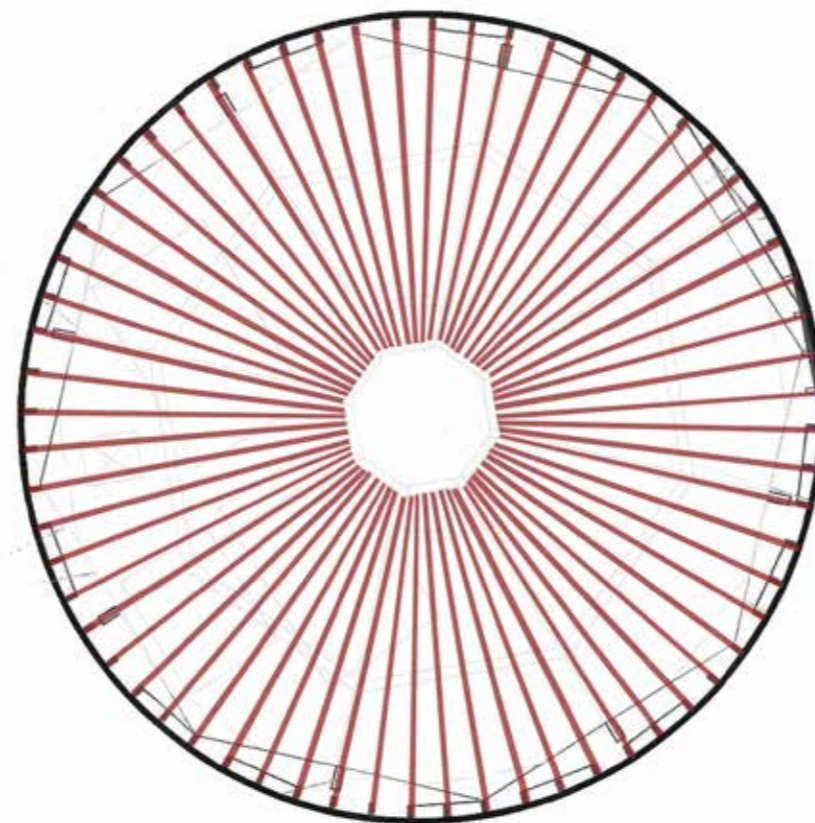


Figure 68: 2-Part ribs (C) in plan view (2019) © H&R (SLHA edit)



Figure 69: Sample #7 - 2-Part ribs (C) found within debris (2020) © SLHA



Figure 70: Example of scarf joinery detail on the 2 -part timber ribs (2020) © SLHA



Figure 71: Sample #8 - 2-Part ribs (C) found within debris (2020) © SLHA



Figure 73: Sample #8- 2-Part ribs (C) found within debris (2020) © SLHA



Figure 72: Sample #8 - 2-Part ribs (C) found within debris (2020) © SLHA



Figure 74: Sample #9- 2-Part ribs (C) found within debris (2020) © SLHA

6. DOME INVENTORY - PRINCIPAL TIMBER ELEMENTS DETAILS

6.4 D - Lower Stud Wall Plate

D1 - Inner

D2 - Outer

Timber element location on plan: -

- D1 - Inner lower stud wall plate ■
- D2 - Outer lower stud wall plate ■

Timber Species:

European Redwood

Construction:

The lower stud wall plates comprise of the inner and outer elements and constitute the dome's foundation. They are placed directly over the RCC slab and support all other elements of the dome. The lower stud wall plate is in the form of an octagon inscribed within a circle. The elements forming the octagon are the inner lower stud wall plate, whereas the 'arc' sections forming the circle comprise the outer stud wall plate. The main support posts (A) are centred along each side of the octagon and supported over the inner rafter plate. The 64 no wall studs are equally spaced along the perimeter of the circle and are fixed to the outer stud wall plate.

Condition:

The lower stud wall plate timbers have suffered significant fire damage but have been found in situ.

Samples taken:

A number of samples of the lower stud wall plate were salvaged and have been catalogued.

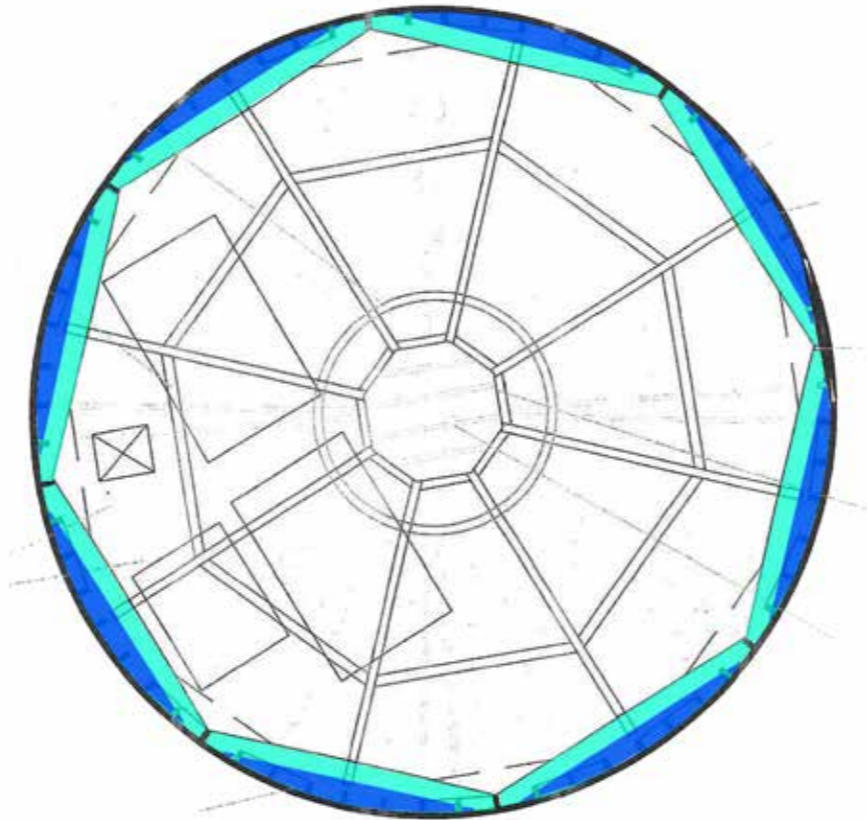


Figure 75: Lower stud wall plates (D) in plan view (2019) © H&R (SLHA edit)



Figure 76: Lower stud wall plates (D) in situ (2020) © SLHA

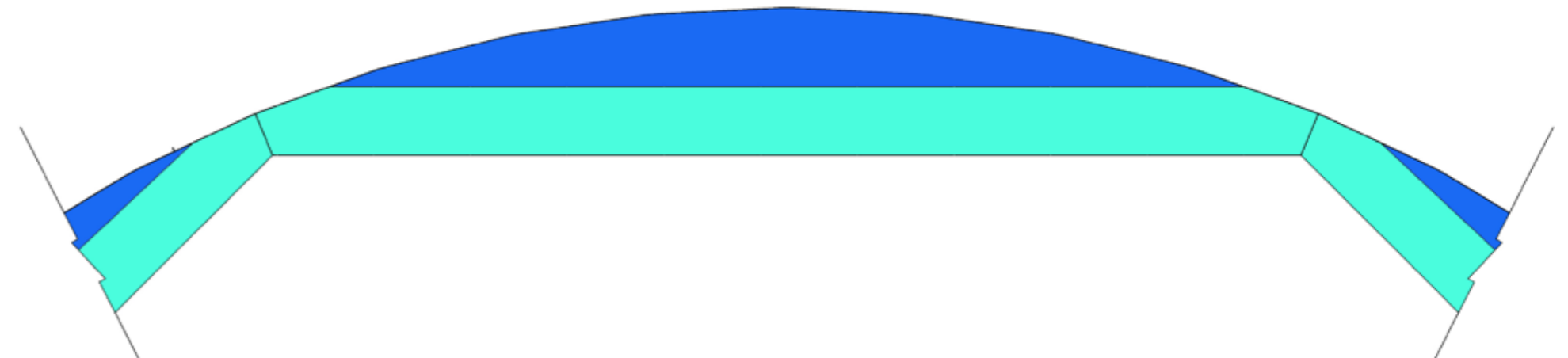


Figure 77: 1:20 post-fire measured survey - Inner and outer lower stud wall plates (D1 & D2) in detail plan view (2020) © SLHA

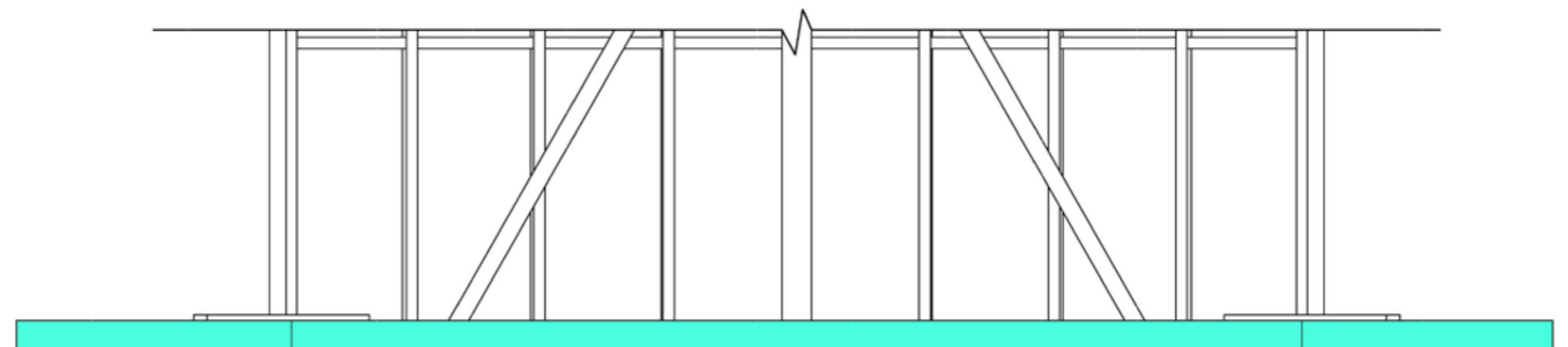


Figure 78: 1:20 post-fire measured survey - Inner lower stud wall plate (D1) indicated in dome wall interior elevation (2020) © SLHA



Figure 79: Sample #10 - Inner lower stud wall plate (D1) (2020) © SLHA



Figure 80: Sample #11- Outer lower stud wall plate (D2) (2020) © SLHA



Figure 81: D- Lower stud wall plate in situ (2020) © SLHA



Figure 82: Sample #12 - Outer lower stud wall plate (D) with wall stud ends (B) (2020) © SLHA



Figure 83: Sample #13 - Inner lower stud wall plate (D1) with main support post (A) and supporting braces (G). This elements was required to be divided into three separate parts (2020) © SLHA



Figure 84: Sample #12 - Outer lower stud wall plate (D) with wall stud ends (B) (2020) © SLHA



Figure 85: Sample #13 - Inner lower stud wall plate (D1) with main support post (A) and supporting braces (G). (2020) © SLHA



Figure 86: Sample #13 - End of inner lower stud wall plate (D1) with supporting braces (G) (2020) © SLHA



Figure 87: Sample #14 - End of inner lower stud wall plate (D1) with supporting braces (G) and overlapping wall stud (B) (2020) © SLHA



Figure 88: Lower stud wall plate (D) in situ (2020) © SLHA

6. DOME INVENTORY - PRINCIPAL TIMBER ELEMENTS DETAILS

6.5 E - Upper rafter plate

E1 - Inner

E2- Outer

Timber element location on plan: -

- E1 - Inner upper rafter plate
- E2 - Outer upper rafter plate

Timber Species:

European Redwood

Construction Description:

The construction details for the upper rafter plates (D) follow the same design principles as the lower stud wall plates. The upper rafter plate is composed of two elements; an outer semi-circular element (E2) and an inner octagonal element.

The upper rafter plates (E) are braced by the horizontal rafter wall ties (M) at the corners. The timber dome 2-part ribs (C) spring from the upper rafter plate. The timber trusses (T) are also supported over the upper rafter plate (E) and connected to the main support posts (A).

Mortise and tenon joint are used to connect the wall studs (B) to the bottom upper rafter plate (E). It follows the same principles as the lower stud wall plate (D) design.

Condition:

The upper rafter plate has been severely damaged in the fire, however aside from a small section on the southeast side, most of the plate was found in situ. All dome elements above this level had collapsed resulting in severe damage to some sections of the rafter plate.

Samples taken:

A number of samples showing important connections and junctions of the rafter plate have been salvaged and catalogued.

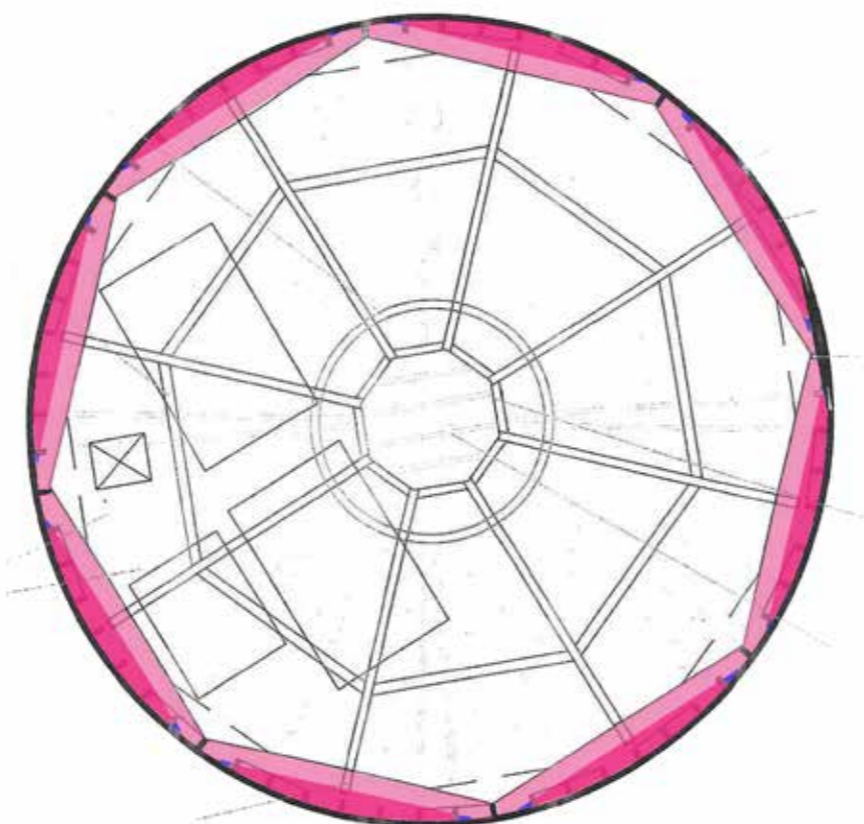


Figure 89: Upper rafter plates (E) in plan view (2019) © H&R (SLHA edit)



Figure 90: Upper rafter plates (E) in situ (2020) © SLHA

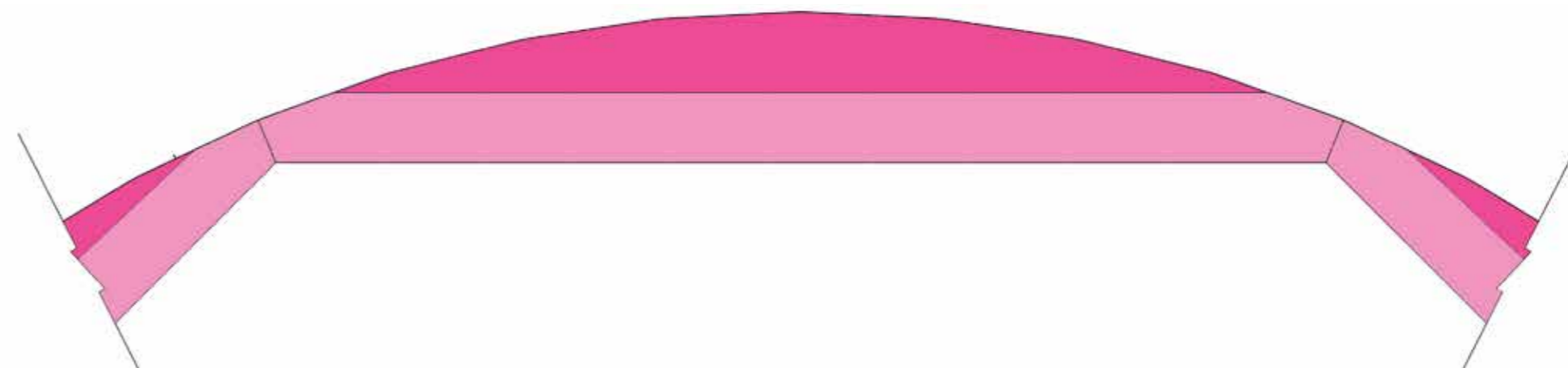


Figure 91: 1:20 post-fire measured survey - Inner and outer upper rafter plates (E1 & E2) in detail plan view (2020) © SLHA

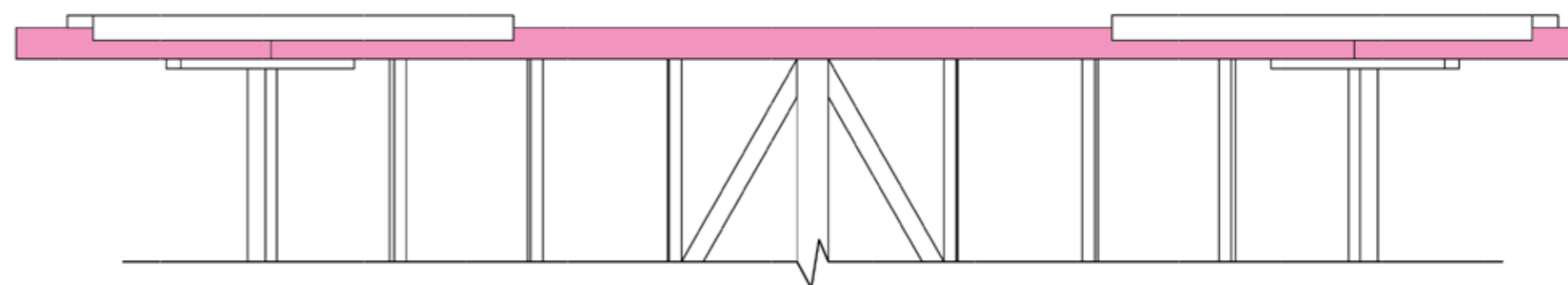


Figure 92: 1:20 post-fire measured survey - Inner upper rafter plate (D1) indicated in dome wall interior elevation (2020) © SLHA



Figure 93 Sample #15 - Upper rafter plates (E) sample taken with the main support post (A) and supporting braces (G) (2020) © SLHA



Figure 94: Upper rafter plates (E) in situ (2020) © SLHA



Figure 95: Upper rafter plates (E) with corresponding horizontal rafter wall tie (M) in situ (2020) © SLHA



Figure 96: Outer upper rafter plates (E2) with wall stud (B) in situ (2020) © SLHA



Figure 97: Outer upper rafter plates (E2) with wall stud (B) in situ (2020) © SLHA



Figure 98: Upper rafter plates (E) with wall stud (B), main support post (A) and braces (G) in situ (2020) © SLHA

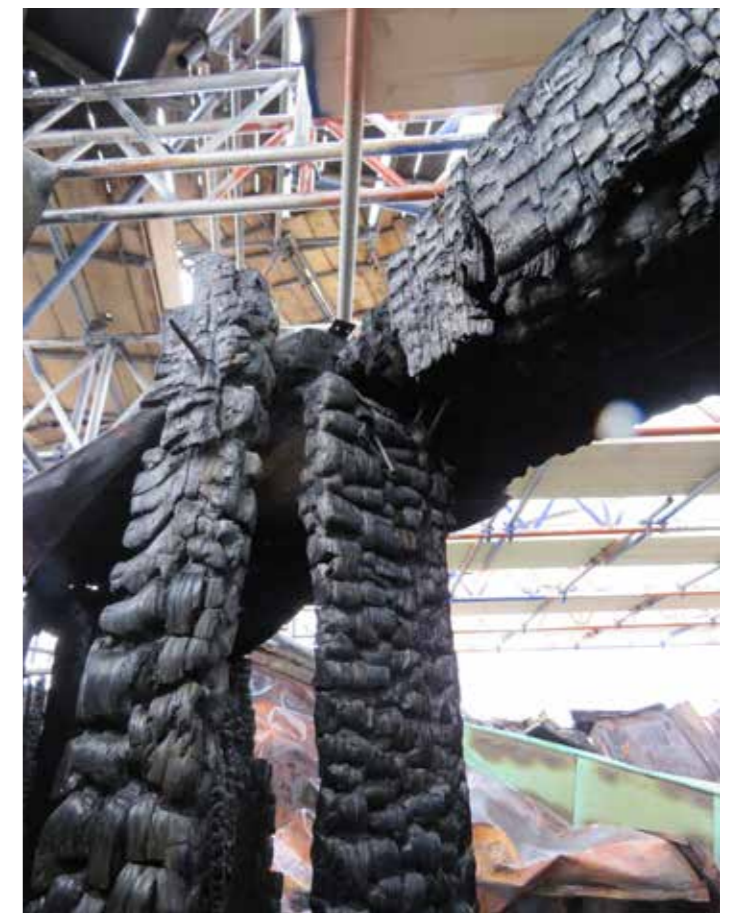


Figure 99: Upper rafter plates (E) with wall stud (B), main support post (A) and braces (G) in situ (2020) © SLHA



Figure 100: Inner upper rafter plates (E1) with main support post (A) and braces (G) in situ (2020) © SLHA



Figure 101: Upper rafter plates (E) in situ (2020) © SLHA



Figure 102: Upper rafter plates (E) in situ with dome wall construction (2020) © SLHA