



Nissen Hut

Job Title:	Relocation of Nissen Hut, Maidstone Migrant Centre	VHR:	H2190
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Client:	Department of Planning and Transport	Date:	20 March 2023



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1 Scope

ICS were commissioned to investigate the feasibility of relocating a Nissen Hut located at the former Maribyrnong Migrant Hostel site, Hampstead St, Maribyrnong, Victoria.

This report identifies options for, and associated methodologies, to relocate the hut to another location on the same site.

2 Background

Following World War II, Australia embarked on a large-scale immigration program, intended to redress the labour shortage in all but the primary industries. Service camps and other establishments, surplus to current needs, were used to accommodate refugees from war-torn Europe and immigrants from Britain, who between 1947 and 1951 numbered over 280,000.

With an acute shortage of building materials, and the need for speedily erected housing, in 1949-52, the Commonwealth Government imported thousands of Nissen huts from Britain to provide urgently needed migrant accommodation throughout Australia.

3 Inspection

The site was inspected on 19 September 2022 by:

- Richard Silink, Head of Conservation, Objects and Outdoor Heritage, ICS
- Katie Smith, Senior Conservation Manager, ICS Melbourne
- Kristine Allinson, Conservation Projects Manager, ICS Melbourne
- Alistair Ravenscroft, Conservation Architect, Purcell

A further site inspection was made by Richard Silink, Alistair Ravenscroft, Robert Chambers, Engineer and members of the Project team on 19 October 2022 after the removal of part of the internal Masonite lining and a sample of the floor to expose the floor structure below.

4 Description

The Nissen Hut is located within the former Maribyrnong Migrant Hostel site, Hampstead St, Maribyrnong, Victoria.

The Nissen Hut is a standard 24' X 60' (7.3m X 18.3m) model that was one of two sizes that were commonly used during WWII and later repurposed as temporary structures for a variety of non-military uses.

5 Condition Assessment

The Hut is in poor / fair condition.

The condition of the individual elements of the hut are as follows:

5.1 Roof Cladding

- Clad in curved heavy gauge (most likely 24 gauge) hot dipped galvanised corrugated iron roof sheeting
- Roofing fixed with galvanised roofing nails. Multiple examples of loose roofing nails (Plate 5)
- Cladding is covered in multiple layers of flaking off white / cream paint
- Generally, in sound condition with localised corrosion around roofing nail holes and at ends of sheets.
- Minor damage to exposed edges of sheets near ground level

5.2 Wall Cladding - End walls

- Vertical timber splayed teardrop weatherboards
- Flaking white paint finish (likely to contain lead)
- Significant decay and rot in boards (Plate 4)
- Lower app. 900mm of cladding to the southern end has been replaced with a fibre cement board

5.3 Internal Lining

- The hut is lined with painted smooth faced Masonite. Typically, the Masonite from the 1950's was a heavier thickness than contemporary equivalents
- Masonite heavily water damaged and bowed.
- Significant graffiti and other damage (Plate 6)

5.4 Structure

- The hut uses a proprietary 2" X 2" (50mm X 50mm) T-section steel arches developed by Lt Peter Nissen for the British Army in 1916. The arch is divided into 5 sections joined together using a metal plate. (Plates 7 & 8)
- The 24' span arches are spaced approximated at 6' centres.
- The external cladding is attached using 70mm X 45mm timber purlins that are attached to the steel arches using a proprietary J-hook.

5.5 Floor structure

- The floor was until recently covered with square lino tiles that are adhered to 100 X 19mm T&G floorboards. (likely to contain asbestos).
- There is evidence historical of rot / damage to the floor to the southern end (adjacent to the vertical end wall). The extent of the rot damage could not be determined.

- The floor joists are 90 X 48mm @450-460mm centres (app.) and sit upon 90 X 70mm (app.) timber hardwood bearers.
- The sub floor structure appears to be in good condition from the inspection on 19 October 2022. The condition of the sub structure may vary due to the proximity to the ground.

5.6 Windows and doors

- The windows all appear to have been replaced with anodised aluminium.
- The remaining doors may be original with evidence of early door hardware. The doors to the end walls have been removed.
- Original windows would most likely have been timber framed

6 Options for Relocation

6.1 Options for relocation

The following three options were considered for the relocation of the Nissen Hut:

- Option A - Relocate hut as a single unit to new location
- Option B - Relocate hut in 5 segments and reassemble in new location
- Option C - Relocate hut by dismantling and reassembly



6.2 Comparison of options

	Option A	Option B	Option C
Description	<ul style="list-style-type: none"> • Relocate hut as a single unit to new location 	<ul style="list-style-type: none"> • Relocate hut in 5 segments and reassemble in new location 	<ul style="list-style-type: none"> • Relocate hut by dismantling and reassembly
Methodology	<ul style="list-style-type: none"> • Install temporary internal bracing to minimize deformation during transportation • Investigate moving options e.g. crane, oversized flatbed truck transport • Install temporary sub structure to engineers' detail to allow for lifting and transporting hut in a single unit • Re-install on new footings at new location 	<ul style="list-style-type: none"> • Install temporary internal bracing to prevent deformation during transportation including temporary bracing to open ends of segments (ie ends of segments without the steel arch) to minimise deflection • Install temporary sub structure to engineers' detail to allow for lifting and transporting hut in separate segments • Separate Nissen Hut into 5 equal segments in alignment with the steel arch of every 2nd steel arch (refer ICS Drawing A02) • Document and carefully remove roof sheeting to upper section of arch above separation line (refer ICS Drawing A02). Original roof sheeting to be reinstalled in original location during reassembly • Cut / detach timber purlins in alignment with the steel arch (refer ICS Drawing A02) 	<ul style="list-style-type: none"> • Carefully document and dismantle roof sheeting and steel structure for reuse • Carefully remove semi-circular end walls, replace studs, weatherboards and replace elements as necessary • Carefully lift floorboards for reuse • Reuse where possible, but allow for new floor substructure (piers, joists, and bearers) due to probability of historical damage to subfloor structure from inability to inspect and maintain due to proximity to the ground • Carefully dismantle steel arch frames, purlins for reuse • Reassemble on new footings

		<ul style="list-style-type: none"> • Cut floorboards in alignment with the steel arch (refer ICS Drawing A03) • Relocate each segment on flat bed transport using internal road network • Reassemble sections on new footings 	
Advantages	<ul style="list-style-type: none"> • Minimal intervention / disassembly of original building fabric 	<ul style="list-style-type: none"> • More manageable units • Can be moved on standard flatbed moving truck • Can be moved using internal road network after initial demolition occurs • Reduces risk of damage from deflection compared to moving hut in larger segments 	<ul style="list-style-type: none"> • Relocation could be undertaken with standard equipment • Opportunity to upgrade the structure (e.g. insulation, lining) • Reduces risk for damage from moving hut in larger sections • Opportunity to replace damaged building elements
Disadvantages	<ul style="list-style-type: none"> • Any deformation, even minor, will likely cause significant damage (buckling) to original corrugated roof sheeting and roofing nails • Large footprint will prevent moving hut within the internal road network. • Large footprint is beyond commercially available moving equipment. Will require significant bespoke moving equipment • Relocation route will require using public streets and will impact on overhead utilities 	<ul style="list-style-type: none"> • Requires partial dismantling of roof structure and cladding • Cutting of floor boarding in 4 locations • Cutting of floor substructure 	<ul style="list-style-type: none"> • High likelihood of significant loss of original material • High likelihood of significant damage to original roof sheeting, roof structure and flooring during dismantling
Cost	<ul style="list-style-type: none"> • TBA 	<ul style="list-style-type: none"> • TBA 	<ul style="list-style-type: none"> • TBA
Heritage Impact	<ul style="list-style-type: none"> • High likelihood of significant damage to original corrugated roof sheeting and nail fixings from deflection during relocation to new site 	<ul style="list-style-type: none"> • Minor risk of damage to original roof sheeting when removing sheets to upper part of arches to allow for dividing the structure into 5 segments 	<ul style="list-style-type: none"> • High likelihood of significant loss of original material • High likelihood of significant damage to original roof sheeting, roof structure and flooring during dismantling

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		<ul style="list-style-type: none"> Floor will require 4 cuts to allow for dividing the structure into 5 segments. Propose to lay timber board along alignment of cut to illustrate that the structure had been relocated and to limit the impact to adjacent flooring 	
RECOMMENDATIONS	<ul style="list-style-type: none"> The relocation of the hut in a single unit is not recommended due to the high risk of structural damage 	<p>Preferred option</p> <ul style="list-style-type: none"> The relocation of the hut in 5 segments will allow for the use of internal roads, minimizes risks during moving and requires limited intervention to the original building fabric. 	<ul style="list-style-type: none"> The relocation of the hut by disassembling is not recommended due to the difficulty in disassembly and the associated high probability of losing original fabric including roof sheeting



7 Preferred Option

The preferred option is Option B of relocating the hut in 5 segments. This will allow for the use of internal roads for transport, minimises risks during moving to the structure and requires limited intervention to the original building fabric.

Appendix A – Photographic Record

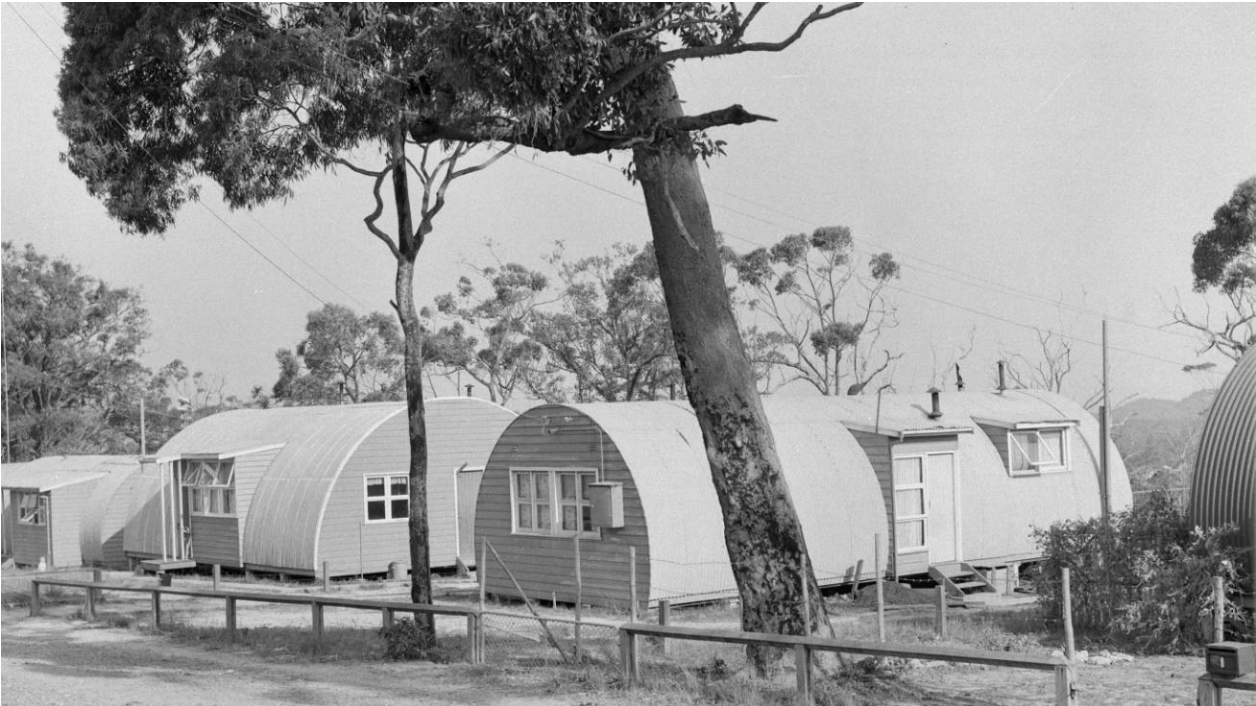


Figure 1: Image of Nissen Huts used for migrant accommodation in Belmont Nth, NSW. Note the two sizes of Nissen Hut (16' and 24') that were used and the configuration of typical timber windows / doors.

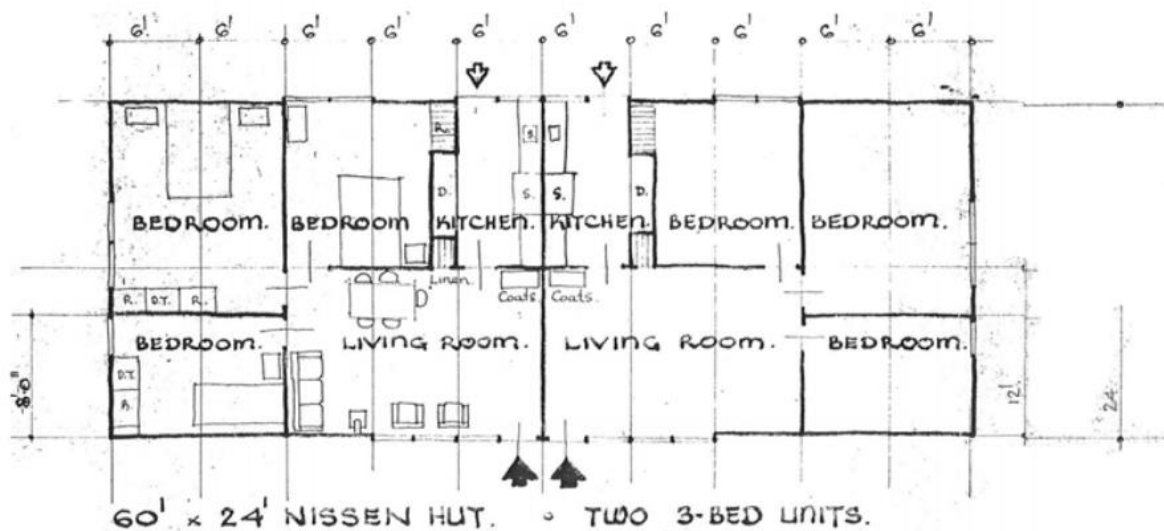


Figure 2: Typical internal configuration of a 60' X 24' Nissen Hut providing two 3-bedroom units for Post War migrant accommodation

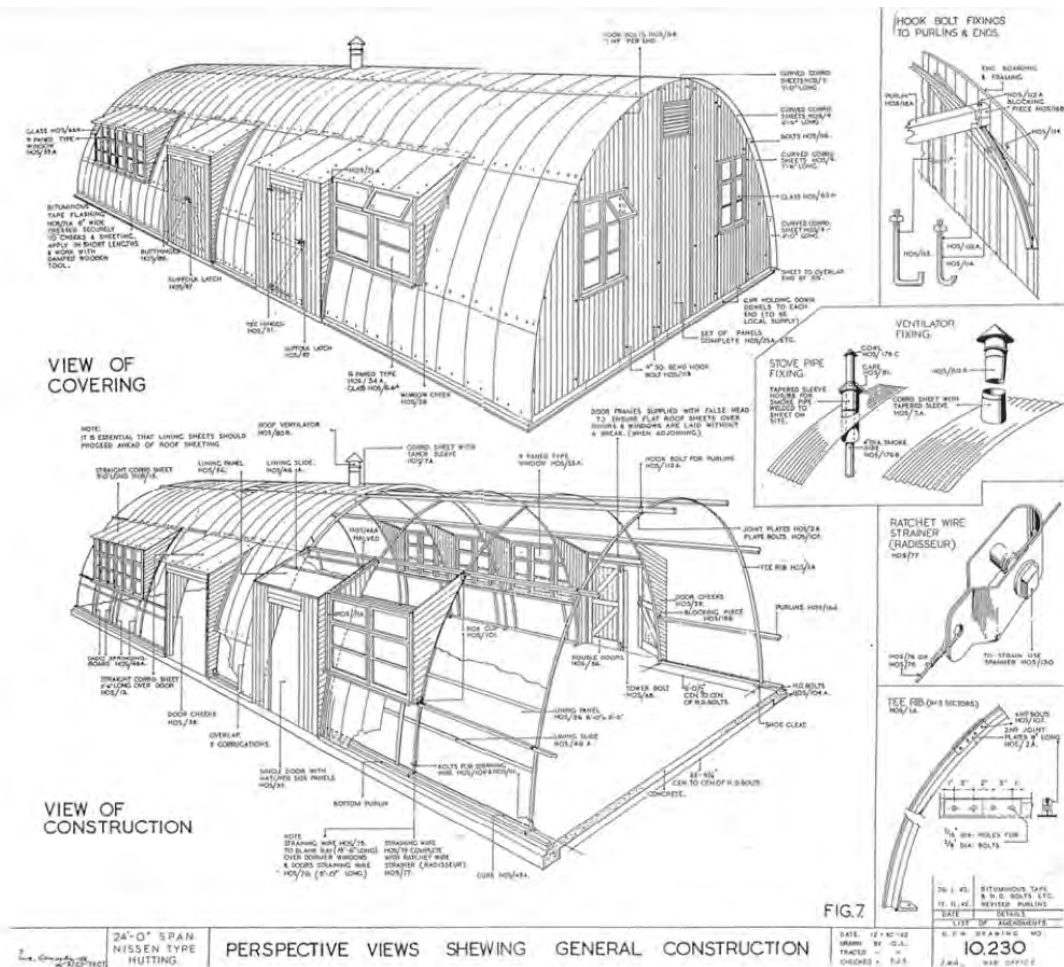


Figure 3: Perspective view illustrating the typical construction of a 24' Nissen Hut. Note that the floor structure was either timber framed or a concrete slab depending on local site conditions

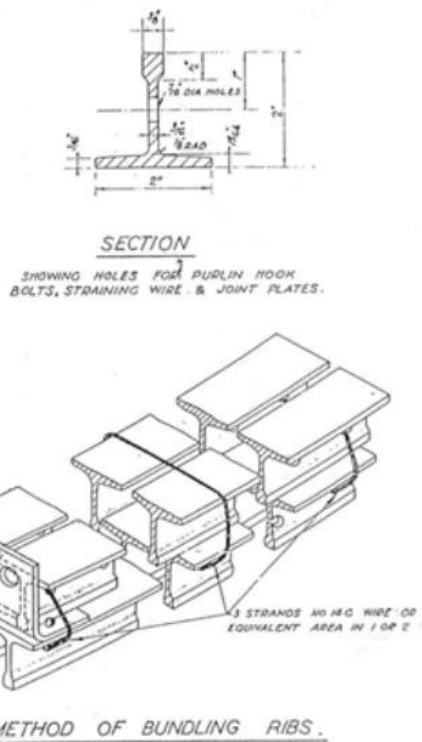


Figure 4: Proprietary T shaped rib used to form the steel arches. The ribs could be broken down into shorter lengths and bundled together for transport



Figure 5: External of Nissen Hut. All openings have been boarded up with plywood. All windows and doors have previously been replaced with aluminium



Figure 6: End elevations clad with splayed teardrop weatherboards. Boards typically in poor condition



Figure 7: Typical roofing nail



Figure 8: Internal Masonite lining in poor condition with extensive deformation and graffiti

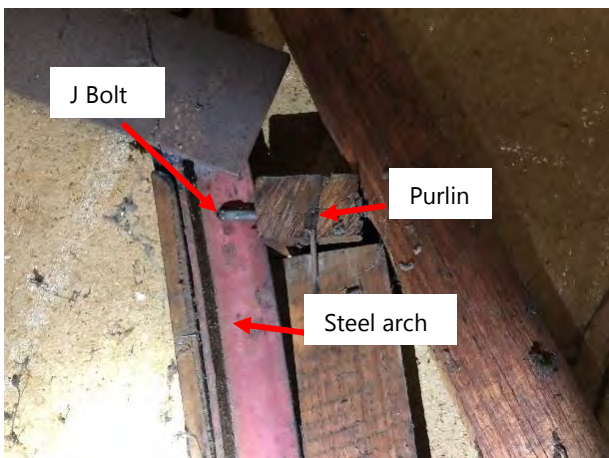


Figure 9: 2" x 2" steel rib arch (reddish colour) Purlin is evident (the cut end of a purlin is shown) J bolt to hold purlin to outside of rib

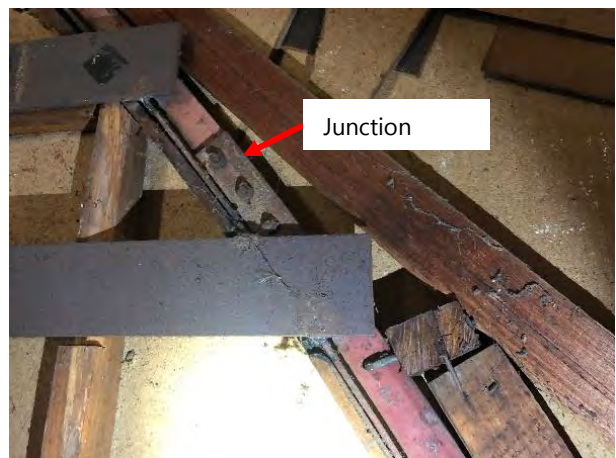


Figure 10: Junction plate bolting segments of T-shaped arch

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