



Shelter/NFI Cluster  
X-Border Operation - Turkey Hub  
ShelterCluster.org,  
Coordinating Humanitarian Shelter



*Photo Credit: IOM*

# Dignified Shelters

## Technical Guidance

Annex V.2  
April 2022

# NORTH-WEST SYRIA

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## 1. Introduction

Shelter cannot be looked at in isolation. This technical guidance document is an Annex to [the Dignified and Safer Living Conditions Guidance](#) which considers the needs and wider context in which households are sheltered.

As of January 2022, there were 1.68 million IDPs living in almost 1,401 sites in NW Syria. In self-settled sites (1,213 sites), 66% of households (173,688 households) are living in tents, while in planned camps (152 sites), 48% of households (28,343 households) are living in tents.<sup>1</sup>

Beyond survival, shelter is an essential contributor to security, personal safety, protection from the climate and resistance to ill health and disease. Ensuring adequate dignified shelter provides households with a place from which they can address their other needs, promoting the use of existing capacities and resources.

The guidance in this document is to promote dignified shelters for those in need of temporary support. The Technical Working Group for Dignified Shelters has drawn on earlier work including the [Dignified and Safer Living Condition Guidance](#) and examples from tested designs and materials which have been piloted in NW Syria (Section 5).

### **NW Syria Humanitarian Leadership Group Statement on Dignified Shelter & Living Conditions:**

The HLG supports emergency, temporary shelter for IDPs in NW Syria. This includes a range of different activities aimed at ensuring safe and dignified living conditions for displaced people. All shelter support is provided in accordance with humanitarian principles, the Guiding Principles on Internal Displacement, and following due diligence on housing, land and property rights. All temporary shelter support for IDPs is provided while recognizing the right of people to seek and enjoy asylum, and the right of displaced people to return to their places of origin when the situation is conducive for safe, voluntary and dignified returns. While tents are suitable for the initial period of displacement (6-12 months), where possible the HLG supports improved temporary shelters for people facing protracted displacement that have longer life-spans and provide greater levels of protection. All humanitarian shelter should be coordinated through the Shelter Cluster and follow agreed cluster guidelines. At this stage, while the conflict in Syria continues, the HLG is not supporting any construction of permanent housing for displaced people in NW Syria.

<sup>1</sup> CCCM Cluster, ISIMM tool, January 2022



While supporting self-build shelter activities by individual households is preferable in some cases; the scale of shelter needs, HLP considerations and the limited resources of IDP households means that the provision of dignified shelter solutions will require the use of temporary shelter solutions. Any such shelter designs need to reflect the local context, and where possible, local installation technologies and cultural preferences. The shelter should also fit within the wider Dignified and Safer Living Conditions approach to meet the multifaceted needs of the populations.

#### **Use of Concrete for Installation of Dignified Shelters:**

The use of concrete and blocks may be used for providing stable foundation bases and for WASH facilities, cooking areas and tank stands. Further use of concrete for walls and roofing of shelters may be considered in some circumstances, based on HLP, donor approval and stakeholder feedback, but only as a temporary solution, which may be demolished if IDPs leave and return to their homes of origin. The HLG is not supporting construction of any permanent housing for displaced people in NW Syria.

## **2. Shelter Terminologies**

### **Useful terms which can be used in relation to dignified shelters in IDP sites in NW Syria context:**

- Access
- Accountable
- Adapt
- Adequate
- Cost-effective
- Dependable
- Dignified
- Do No Harm
- Harmonious
- Humanitarian
- Impact
- Integrated
- Invest
- Multi-sectoral
- Prolonged crisis
- Protect
- Protracted displacement
- Range of shelter options
- Resilience
- Responsive
- Risk mitigation
- Robust
- Safe
- Temporary
- Transitional

### **Terms to avoid in relation to dignified shelters in IDP sites in NW Syria context:**

- Sustainable
- Settlements
- Durable
- Housing/homes
- Permanent
- IDP villages/towns





## 3. Designing a Shelter

### 3.1 Appropriateness

For a shelter design to be appropriate, it should reflect the needs, local culture, vulnerability and capacities of the affected community and the resources available. Some shelters can be relocated, upgraded by beneficiaries and the materials can be re-used, whilst others may be designed to be built on sites that should not be modified by beneficiaries.

The design of a shelter should be reviewed by beneficiaries and their considerations should be taken into account to ensure any proposed shelter is appropriate for the target population.

Appropriateness of designs should also take into account HLP considerations and what is viable within the constraints and permission from public authorities and land owners. See the HLP section of the [Dignified and Safer Living Conditions Guidance](#) for further information.

### 3.2 Design brief

A design brief is a document that defines the performance of a shelter on criteria including design, size, accessibility, WASH facilities, cooking facilities, thermal insulation, water proofing, safety, protection, cost, durability, time and budget. This document provides some examples of design briefs in Section 5. Before starting any shelter installation, a design brief should be made which considers these elements.

### **Consultation and Coordination**

Preparation of a design brief should include consultation with representatives of IDPs within the target area on the proposed design as well as coordination with the Shelter Cluster, Local Councils, camp management and other relevant actors who are working within the same target location.

For example, shelter should not be installed without taking into account to need for WASH, Early Recovery and Livelihoods, Health and Education as well as access to public spaces and services (see the Dignified and Safer Living Conditions Guidance for further information).

### **Who Builds**

Some shelter installation activities may consider participation of members from the target community as Cash for Work or training opportunities while other shelter installation activities may require experienced contractors or implementing agency staff with specific skills and technical expertise.

### 3.3 Maintenance

Once installation is complete, consider what longer term support will be required to maintain the shelters and support IDP families living in them. For example, windows may break, sewage connections may become blocked, taps may need to be replaced. A plan for who will be responsible for maintaining shelters needs to be established and agreed with beneficiaries and camp management. This should take into account the financial capacity of IDP households to maintain their shelters.

### 3.4 Hazards, risks and safety

Shelter designs must not increase the vulnerability of occupants to natural hazards such as storms or disease.

The location of a shelter may be more important than its design. Poorly located shelters can increase the risks faced by occupants to flooding or fires or exposure to severe weather conditions, while well located shelters can reduce exposure hazards. Shelters must not increase risk of death or injury.



Design for hazard resistance should be based on the kind of event that is likely to occur within the lifespan of the shelter. Dignified shelters should be able to withstand expected events such as annual heavy rainfall, annual snowfall, strong winds and wet muddy environments during the winter season and strong sun and heat during the summer season. Shelter materials should also be fire resistant where possible and/or adopt fire mitigation measures as part of site planning and camp management.

### **3.5 Timeliness and installation speed**

When planning installation of shelters, consider the time required for procurement, site preparation such as levelling and gravelling, and installation. Consider if materials can be procured locally or if they are required to be imported. Review if skilled labour is required or not and if resources are available to do this or if training is required.

### **3.6 Life span**

The Dignified Shelter should have a minimum **lifespan of at least 3 years**. This is the amount of time that the shelter is intended to last. When agreeing the design life of a shelter it should be taken into account that a longer lifespan of a shelter may increase the cost and affect the time required for installation.

The shelter may have elements of its design which have longer lifespans, such as steel bars for example. However, the lowest lifespan of any part of the shelter should be at least 3 years with little maintenance required.

Where possible, shelter installation materials can be reusable or upgradeable. For example, the walls, roof or other materials may be replaced by beneficiaries to extend the life of the shelter beyond 3 years or to increase insulation properties if beneficiaries have the capacity and wish to do so (while taking into account HLP).

### **3.8 Size and shape**

- The design should be **culturally appropriate** and meet the inhabitant's daily needs. Consultation with targeted groups including women and people with special needs to discuss the design is highly recommended.
- There should be a **minimum of 3.5 – 5.5m<sup>2</sup>** per person indoor sheltered living space in accordance with the minimum Sphere standards and NW Syria SNFI Cluster standards. This will provide an absolute minimum of 18m<sup>2</sup> for a family of 5. Additional space up to 5.5m<sup>2</sup> per person is required if space for cooking, bathing and sanitation facilities is included within the shelter area. Organizations should consider the needs of larger families as part of the planning process in order to ensure this minimum standard is met.
- Inclusion of a **private outdoor gathering area** within the shelter boundary respects and takes into consideration Syria's building typology in rural areas. This can be of great social and psychological importance for families. Consider inclusion of a private outdoor gathering area, if possible, based on feedback from beneficiaries.
- Consider **outdoor areas surrounding the shelter** which may be expanded as semi private zones for beneficiaries. Beneficiaries may cover these semi private outdoor areas to provide shade or protection from the rain.
- The **ceiling height should be a minimum of at least 2.2 - 2.6m** at the highest point, depending on the specific shelter design, materials used, feedback from beneficiaries and thermal insulation considerations.
- Where possible, the **shelter should have at least two rooms**, to ensure privacy and a separate cooking area. If there are no internal walls, installation of hooks or rails can help facilitate



beneficiaries to hang privacy curtains within the shelter. Each room should have at least one window and one door with a lock.

- Consider **installation of foundations and bases** which shelters (of variable available materials) can be fixed over. Raised bases can protect against wet weather conditions ([see Flood Risk Reduction Guidance](#)). The shelter base level should be at least 20cm high from the ground level to avoid risks from wet weather. In some cases, the base of the shelter should be higher, depending on the risk of flooding. This should be based on local assessments and agreement with local authorities and camp management.
- The shelter should be provided with a **latrine and bathing area**, either as a designated private space within the unit or a private facility next to the unit.
- Ensure **cooking spaces** are placed in locations that are well ventilated and will not increase fire risks for households.
- Installation of **accessible features such as ramps or railings** for households with People with Disabilities (PWD). This should include ramps for access to raised shelter floors, hand railings, acceptable door widths (900mm minimum for wheelchair users) and accessible WASH facilities for PWD.
- **Multiple shelter units connected together** can be helpful to save space, heating and stability. However, feedback and acceptance from beneficiaries should be considered, particularly when sheltering IDP families who are not related within the same block.
- **Consider if beneficiaries require the shelter to be reused** in another location in future. In some cases, it may be preferable for shelter to be able to be disassembled for reassembly in another location in future.
- Consider **areas for storage** within the shelter

### Privacy and security

- **Layout should be reviewed with IDP representatives** as part of the site planning design
- **Doors and windows should not face each other** between units. Create private zone and side entrances in the design if necessary. Where possible and appropriate, windows can include metal mesh for protection from being broken into or vandalized, based on consultation with beneficiaries.
- **Doors and windows should be lockable** from inside the shelter for security.
- Walls of the shelter should be **opaque for privacy**.
- Where possible, **private latrines and bathing areas** should be attached to the shelter unit or be situated next to the unit.

### Lighting and power supply

**Lighting should be provided** (solar powered lighting if there is not a continuous electricity supply) for all usable spaces in the shelter including WASH facilities, living rooms, kitchen and one light above the main external door. There should also be **public lighting on main roads** to ensure safe and easy access and to mitigate protection risks (especially related to GBV). If possible, consider installation of household solar power with capacity for charging mobile phones as well as lighting.



## Ventilation and thermal comfort

- Each room in the shelter should have **at least one window and one door with a lock**
- Consider installation of a small window and/or **ventilation for a cooking area**
- Consider **cross ventilation to allow for cooling in summer** (this can include vents in the walls if windows are not appropriate or not possible)
- **WASH facilities should have windows** with shutters for privacy
- Consider the **direction of the prevailing wind** in placement of windows, especially if in a location exposed to severe weather conditions.
- Consider **thermal insulation** which will reduce heating fuel usage and increase dignified living conditions in winter and thermal insulation and **shading** to prevent the shelter from overheating in summer.

## WASH facilities

- Each shelter should have **private WASH facilities** (bathing area and a latrine) either connected to the shelter or next to the shelter where possible.
- **Communal latrines** are more likely to fall into disrepair and are generally less preferred by beneficiaries compared to private latrines. Communal latrines may be appropriate if they are functional and being used and maintained adequately. Where possible, communal latrines are best provided between groups of families from the same community or extended family.
- Consult beneficiaries on the best **location for placing the latrine**. Ideally, it will be less preferable to have to walk through a bedroom to access to the latrine.
- Where possible, **at least four water points** should be provided within the shelter unit's private facilities: one for the latrine, one for handwashing, one for bathing one and one for a cooking area.
- Consider **wind direction and odours** when planning location of latrines.
- Provide a **water tank for each shelter unit**, with all needed connections for inside the shelter. The size of the tank should depend on frequency of refilling, either through a water network or water trucking to ensure a minimum of 25-40 litres per person per day.
- **Sewage management** should be planned and part of the design. This may include connection to a septic tank, holding pit or tank, or connection to a sewage system or decentralized wastewater treatment system. If sewage is directed to a holding pit or tank, a desludging plan should be established as part of the shelter implementation plan.
- **Engage with relevant clusters**, in particular the WASH Cluster, to ensure an integrated approach.
- **Water trucking** can be applicable if connection to a water network will not be implemented.
- Ensure that any water provided meets the **minimum water quality standards** (Free Residual Chlorine between 0.2-0.5mg/litres)
- Use of **water use efficiency** methods such as grey water treatment and reuse for gardening is encouraged





## Hazard resistance

- See [CCCM Guidance on Fire safety](#) in Formal and Informal Settlements.
- Shelters must be **designed to be less likely to kill or injure people** in a disaster. Lightweight structures are less likely to cause fatalities in the event of collapse. However, lightweight structures are more vulnerable to strong winds. All designs should calculate the wind forces and directions toward each node of the structure.
- Shelter designs should consider that those living in them are **likely to make alterations, extensions or upgrades over time**. Continued ongoing monitoring is required in order to ensure that any modifications to structures do not become hazardous to those living in the shelters.

## Cost and budgets

The Dignified Shelter is anticipated to cost between \$1,500 - \$2,500 USD (including WASH facilities). Organisations may go below or above this, depending on cost, quality and availability of materials.



*Credit: IYD, NW Syria*





## 4. IDPs Self-Management Approach

In many cases, IDPs living in tents or other temporary shelters have appropriated camp spaces by expanding and modifying household shelter structures to suit their needs. In some camps, IDPs are encouraged to undertake shelter improvements, with assistance shifting from in-kind to cash with encouragement towards self-reliance and self-management approaches. As part of the approach towards dignified shelters, IDPs should play a vital role in their own assistance and ability of self-management.

Humanitarian actors may support this process through:

- Cash for work to replace tents with dignified shelter modalities
- Provide cash for shelter to allow participants to implement their own household shelter rehabilitation activities, by employing labourers, or purchasing shelter materials and tools themselves
- Provide training in construction (masonry, carpentry, metalwork) which will increase their opportunities in the job market and support upgrading of local shelters
- Provide tool kits
- Provide shelter materials
- Provide upgrades to existing self-built IDP shelters, such as installation of windows and doors, repairing leakages and providing or rehabilitating WASH facilities

Assessments, Focus Group Discussions and KIIs should be undertaken to establish the levels of risks and mitigation that can be taken to address risks. Providing support to IDPs to implement their own shelter improvement activities should take the following elements into consideration:

- Safety and security
- Need for shelter support
- Community acceptance
- Availability of materials and skilled labour in the market
- HLP
- Protection and GBV risks



Figure 1: Self Built Shelter in IDP site in NW Syria. Credit: IhsanRD

## 5. Overview of Case Studies of Dignified Shelters in NW Syria

The shelter designs outlined in this section are case studies provided as examples. Implementing organisations may consider these designs or similar when planning interventions and may contact the Shelter NFI Cluster to request further details.

### BINAA CROP Shelter (*being installed, March 2022*)



#### Summary information

<b>Living space</b>	Indoor living space: 21.1m <sup>2</sup>
<b>m<sup>2</sup> per person</b>	4.2m <sup>2</sup>
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Contractor
<b>Materials</b>	Carbon Reinforced Organic Polymer (CROP) blocks element for walls, (CROP) roof elements for the roof, PVC for the windows and internal doors, iron for the external door, ceramic for the toilet and washbasin, marble for kitchen sink.
<b>Time to build</b>	3 days
<b>Anticipated life span</b>	10 years
<b>Construction team</b>	2-3 workers
<b>Total cost</b>	Estimated cost range 3,400 – 3,750 USD
<b>Cost per m<sup>2</sup></b>	161 – 178 USD

#### Shelter Description

The material CROP is reinforced with the fibres of materials with high physical properties such as carbon, aramid, Kevlar, glass, basalt, and hemp. The shelter consists of two living rooms and an open space with a toilet and bathing area (25.35m<sup>2</sup> in total). The two rooms will ensure the availability of gender-separated space within the shelter. Bathing and toilet room is separated to keep higher hygienic standards within the shelter and is based on feedback from IDP families and cultural norms. The roof is tilted to prevent vertical expansion (prevent additional floors being added) and to provide adequate drainage from the roof. This could be used for rainwater harvesting during the winter months.



Communal and garden areas are planned for every 30 units, where IDP families can come together. The communal areas can be used as play areas for children, communal food growing, or outdoor meeting or exercise places. The shelter units will be connected to the existing water and sewage network.

### **Shelter Performance Summary**

General features of the CROP shelter solution include:

- It has a very high tensile, pressure, shear resistance
- Earthquake resistant
- Very strong against the strains caused by climatic conditions on the building
- Material from dynamic loads (fatigue)
- High durability
- Dead load effect is very low
- It is light
- High strength with small sections
- Useful area maximization
- Dimensional stability is very high
- Does not corrode
- Anti-bacterial
- Anti-ballistic
- Environmentally friendly, sustainable
- Recycled material
- Resistant to chemical effects and sunlight
- No need for renovation/maintenance and strengthening
- High sound insulation
- High fire resistance, low electrical conductivity
- Long-term use, permanent design
- Prefabricated
- Easy to form and design
- Easy and fast installation
- Controlled production
- Low risk of human error and shelter is independent from field conditions
- Can be disassembled & portable

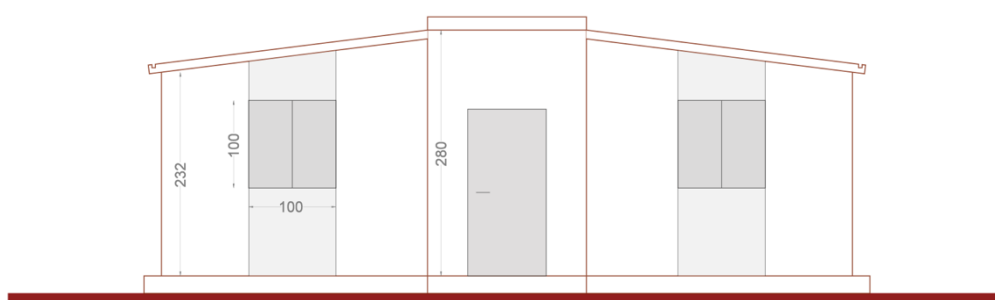
### **Shelter design**



## Plan



## Elevation



## Overall considerations

**Design and materials** | The chosen materials are innovative for NW Syria, the shelter can be easily disassembled and its different components are portable. The current design doesn't come with a private outdoor space, an element of great importance for Syrian families.

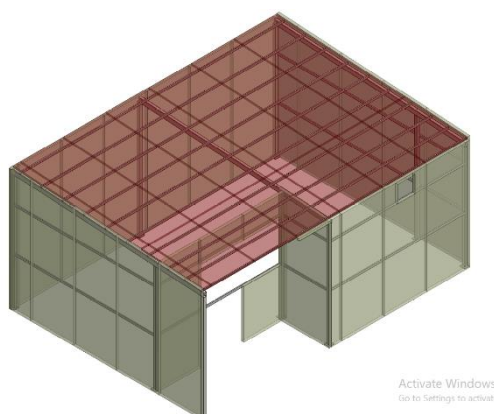
**Foundation** | The shelter needs to be raised from the ground level to avoid risks of wet weather and flooding conditions.

**Expected performance against hazards** | This shelter is anticipated to have structural stability in severe weather conditions

**Privacy and protection** | The shelter offers privacy and protection, thanks to the chosen materials and to the lockable door. Access to WASH facilities is secured at household level, with an expected increment of hygiene conditions.



## BINAA Sandwich Panel Shelter (*being installed, April 2022*)



Activate Windows  
Go to Settings to activate

### Summary information

<b>Living space</b>	Indoor living space: 25m <sup>2</sup>
<b>m<sup>2</sup> per person</b>	5m <sup>2</sup>
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Skilled labour
<b>Materials</b>	Sandwich panels and steel metal frame. The source is in Turkey and can be manufactured locally in Syria at a later stage but will not use the same production technology. PVC or Aluminium internal doors and windows.
<b>Time to build</b>	5 days for each unit, 90 days for 400 units.
<b>Anticipated life span</b>	Up to 25 years
<b>Construction team</b>	4 unskilled workers 5 skilled workers
<b>Total cost</b>	2,500 to 2,850 USD and the price will vary considerably based on the required facilities to be added and the technical specifications (225 to 300 USD extra including labour, procurement, and transport fees for materials)
<b>Cost per m<sup>2</sup></b>	126 USD

### Shelter Description

The housing unit consists of a metal frame with roofs and walls made of isolated sandwich panels. The living room is 20.1 m<sup>2</sup> and can be divided into two rooms. The total area including the bathroom and the kitchen is 25 m<sup>2</sup>.

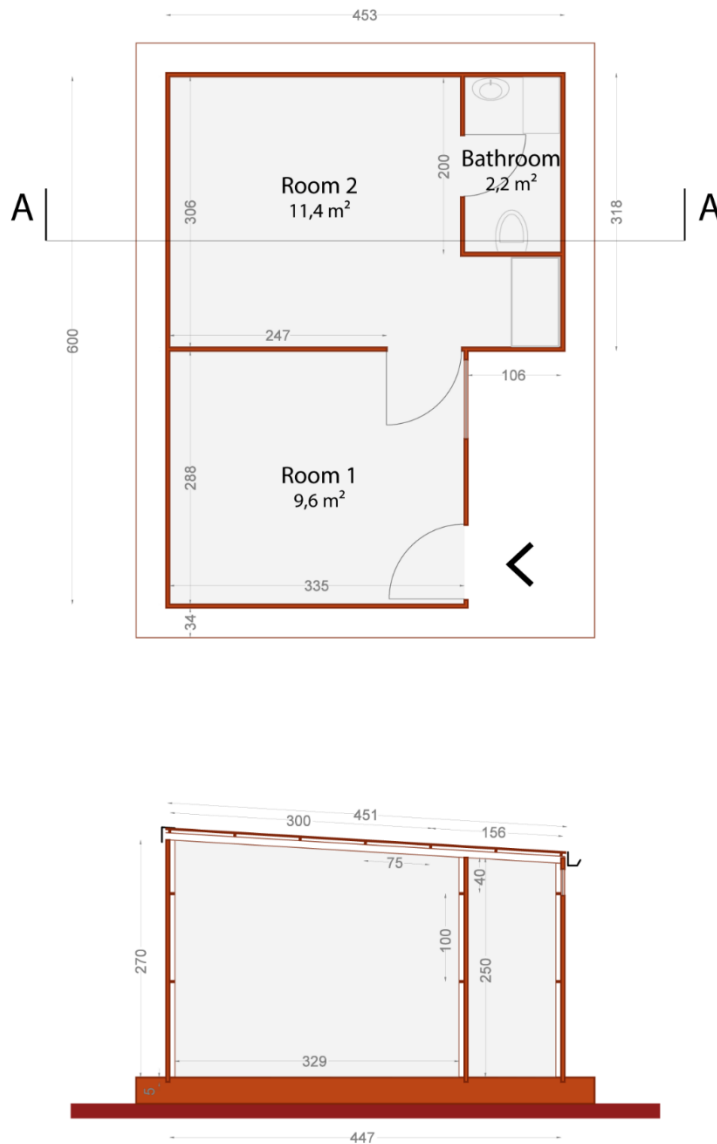
The housing unit includes an internal electrical network and sanitation network with all needed facilities and accessories.



## Shelter Performance Summary

The metal frame and the sandwich panels are designed to handle 180 kg/m<sup>2</sup> of the vertical loads and wind speed to 75 Km/h. All construction materials have a long-life span and good specifications regarding security, privacy, and weather conditions.

## Shelter design



## Overall

## considerations

**Design and materials** | Design is versatile and can easily be adapted to different needs concerning the installation area. Good performance expected from the chosen materials. The design doesn't take into account local housing traditions.

**Foundation** | The shelter needs to be raised from the ground level to avoid risks of wet weather and flooding conditions.

**Expected performance against hazards** | Good thermal insulation and good resistance to snow, wind, water.

**Privacy and protection** | High privacy and sound insulation.



## Mercy USA (being installed, March 2022)



### Summary information

<b>Living space</b>	Indoor living space: 22m <sup>2</sup>
<b>m<sup>2</sup> per person</b>	4.4m <sup>2</sup>
<b>HH WASH facilities</b>	No (3.5 m <sup>2</sup> for toilet and bathroom can be added)
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Skilled labour
<b>Materials</b>	Sandwich panels and steel metal frame. The source is in Turkey and can be manufactured locally in Syria at a later stage but will not use the same production technology
<b>Time to build</b>	12-man hours (3 people, 4 hours)
<b>Anticipated life span</b>	10-15 years in well-use
<b>Construction team</b>	3 people, skilled labour (4 hours for each shelter)
<b>Total cost</b>	2,000 – 2,500 USD and the price will vary considerably based on the required facilities to be added and the technical specifications (200 USD extra including labour, procurement, and transport fees for materials)
<b>Cost per m<sup>2</sup></b>	90 – 114 USD

### Shelter Description

This shelter is a rectangular framed structure with a gable style roof of approximately 6m x 3m dimensions with a minimum height of 2.10m and maximum height of 2.70m. This shelter has one room and kitchen while the toilet and bathroom can be added separately.

Outer wall specifications:

- Outer wall thickness is 30mm, its height is between 1,80m and 2,10m;
- Outer Surface Coating is 0.20mm (±0.02 mm) thickness, RAL 9002, electrostatic painted galvanized sheet;
- Heat Insulation 30mm thickness EPS (14-16 kg/m<sup>3</sup>);
- Fire Resistance “Strong Fire-Resistant Material”, B1 class according to DIN 4102;



- Panel Connection System connected with specially designed and detailed 1 mm thickness RAL 9002. Electrostatic painted galvanized connection items without using welding operation (every 1 meter);
- Outer Wall Inner Coating of 0.20mm thickness RAL 9002, electrostatic painted galvanized sheets.

Inner wall specifications:

- Inner wall thickness is 30mm;
- Inner Surface Coating is 0.20mm ( $\pm 0.02$ mm) thickness, RAL 9002, electrostatic painted galvanized sheets;
- Heat Insulation 30mm thickness EPS (14-16 kg/m<sup>3</sup>);
- Fire Resistance “Strong Fire-Resistant Material”, B1 class according to DIN 4102;
- Panel Connection System Connected with specially designed and detailed 1 mm thickness, RAL 9002, electrostatic painted galvanized connection items without using welding operation (every 1 meter).

Roof details:

- Outer Roof coating is 0.20mm ( $\pm 0.02$ mm) thickness, RAL 9002, electrostatic painted and 5 corrugated galvanized sheets;
- Inner Roof Coating 0.20mm ( $\pm 0.02$  mm) thickness, RAL 9002, electrostatic painted galvanized sheet;
- Heat Insulation 40mm thickness EPS (14-16 kg/m<sup>3</sup>);
- Roof Support System Profiles are made of specially designed 1mm thickness, RAL 9002, electrostatic painted galvanized sheet (every 1 meter). Connections are by bolt and screws (no welding);
- Eaves: Head of truss is 0cm thickness. The other direction has 5 cm width. Rain gutters and downfalls are not included.

The shelter has all electrical and water connections inside the shelter ready in place. It requires a power source for electricity to be connected easily and sewage network outside to be connected directly.

### **Shelter Performance Summary**

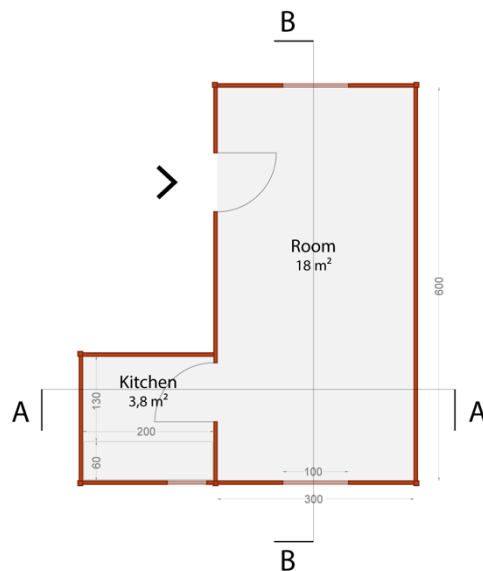
- Snow Load: 50 kg/m<sup>2</sup>, TS 498 (it changes with snow load and altitude of construction site)
- Wind Speed: 21 m/s, TS 498
- Earthquake calculations: Active ground acceleration coefficient:  $A_0=0.40$  (1<sup>st</sup> degree earthquake region). Building priority coefficient ( $I=1$ ), Load Accession Coefficient ( $n=0.3$ ) According to using scope and type of building, it is estimated as;  $I=1/1.2/1.4/1.5$   $n=0.3 /0.6$
- Full insulation from cold and heat by having 30mm thickness of EPS, so heat insulation -5 C0/ +45 C0
- All parts are painted with electrostatic powder paint in a fully automatic paint machine
- High privacy and sound isolation
- Strength: Rigid secure
- Adaptable skeleton for any opportunities of future production in local market
- Easy to install (only hand equipment needed) and easily fixable from user (reparability)
- Fire Resistance: for the Combustibility, the raw materials are certified according to DIN 4102, B2 Class Fire Resistant
- Water proofing: no leakage, by having 40mm EPS in the ceiling
- Easy to add additional module or utilities

The cost of the shelter is variable due to unstable prices which can impacted with any issue in Turkey or globally. This shelter is still under pilot stage.





## Shelter design



### Plan



### Sections

## Overall considerations

**Design and materials** | Design is versatile and can easily be adapted to different needs concerning the installation area. Good performance expected from the chosen materials. The design doesn't take into account local housing traditions.

**Foundation** | The shelter needs to be raised from the ground level to avoid risks of wet weather and flooding conditions.

**Expected performance against hazards** | Good thermal insulation and good resistance to snow, wind, water.

**Privacy and protection** | High privacy and sound insulation. WASH facilities can be added to the shelter unit as an additional element.



## IYD (being installed, March 2022)



### Summary information

<b>Living space</b>	Indoor living space: 24m <sup>2</sup>
<b>m<sup>2</sup> per person</b>	Yes
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	4,8m <sup>2</sup>
<b>Who will install the shelters?</b>	Skilled labour, Local contractors
<b>Materials</b>	Iron, tarpaulin sheets and cement
<b>Time to build</b>	5 to 7 working days
<b>Anticipated life span</b>	2-3 years minimum
<b>Construction team</b>	6 people, skilled labour, local contractors
<b>Total cost</b>	1,800 USD (1,200 USD per shelter, 600 USD for labour, procurement and transport fees for materials)
<b>Cost per m<sup>2</sup></b>	75 USD

### Shelter Description

This shelter is a rectangular framed structure with an A-shape roof of 4m x 6m dimensions. The unit is linked with private WASH facilities of 1.5m x 4m dimensions.

The structure of this unit consists of a metal structure (frame) that is covered by tarpaulin sheets. The weight of 1m<sup>2</sup> is not less than 450gr. The foundation consists of cement stripe beams with grade 250Kg/m<sup>2</sup>, the floor consists of a gravel layer of 0-7cm height; above this layer cement will casting with a thickness of 15cm.

The shelter has one room, with the option to be divided into two-rooms: one for the living and the other to sleep. The facilities space has a cooking area and one bathroom/toilet. The shelter is designed to fit a 1m<sup>3</sup> water tank on the roof of the facilities' block, connected to 4 water points within the shelter. The shelter will also be connected to a sewage network if there is one available. The raw materials like iron, tarpaulin, and cement will be imported from Turkey, while the shelter will be constructed and installed on site by local labour.



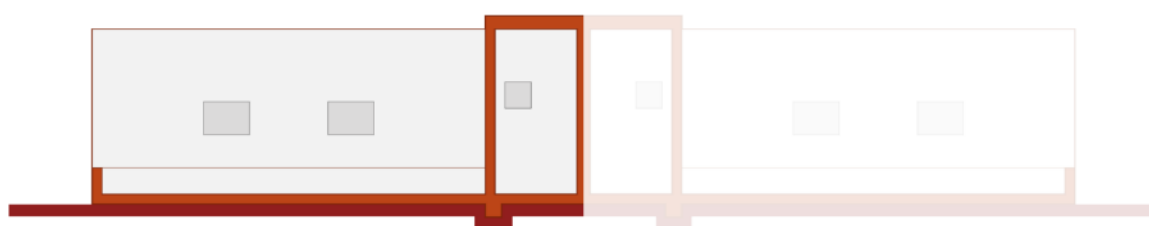
## Shelter Performance Summary

The roofing structure is complex and requires skilled workers to construct it. Thermal insulation is not high as tarpaulin sheets offer low thermal insulation. Performance could be improved by adding thermal insulation materials.

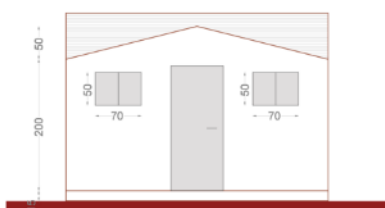
## Shelter design



Plan



Section AA



Elevation

## Overall considerations

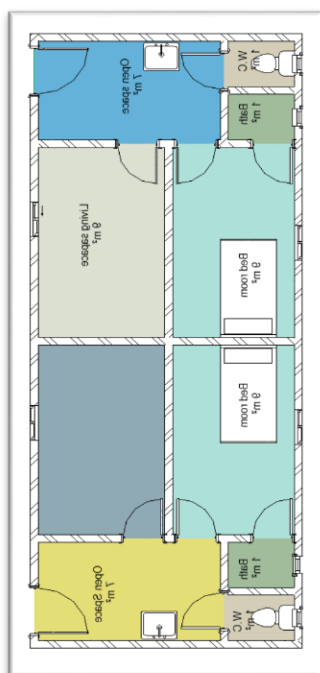
**Design and materials** | There is the possibility to divide the living room into two rooms to meet the household's possible needs, without compromising ventilation for each of them. Although material such as cement is used, this occurs only for the facilities area and the foundation. The raw materials like iron, tarpaulin, and cement will be imported from Turkey most likely.

**Foundation** | The shelter needs to be raised from the ground level to avoid risks of wet weather and flooding conditions.

**Expected performance against hazards** | Insulation of the unit should be improved through thermal insulation materials, to assure thermal comfort throughout the year. Protection against wind, snow, rain might be improved using materials which are more resistant than tarpaulin sheets.

**Privacy and protection** | The shelter offers privacy and protection, thanks to the chosen materials and to the lockable door. Access to WASH facilities is secured at household level, with an expected improvement in hygiene conditions, privacy and protection.

## CARE (implemented in 2021/2022)



### Summary information

<b>Living space</b>	Indoor living space: 20m <sup>2</sup> Private outdoor living space: 6,8m <sup>2</sup>
<b>m<sup>2</sup> per person</b>	4m <sup>2</sup>
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Qualified contractor
<b>Materials</b>	The structure is made of semi cement bricks as bearing walls. The foundations are made of ground reinforced beams while the ceiling, where present, is made of reinforced concrete slab.  The internal doors and windows are made of PVC; the external one of metal.
<b>Time to build</b>	CARE constructed with qualified contractor 400 dignified shelter units, within 75 days
<b>Anticipated life span</b>	Up to 10 years
<b>Construction team</b>	Skilled installation labour/ contractors
<b>Total cost</b>	\$1,575 USD per shelter unit  (Connection to sewage and water network excluded)
<b>Cost per m<sup>2</sup></b>	\$59 USD



## Shelter Description

The shelter units consist of two living rooms, one toilet, a bath, and open space. The structure is made of semi cement bricks, 15cm, as bearing walls. The foundations are made of ground reinforced beams, 40cm depth and 20cm width, which carry the ground beams directly. The ceiling for the two living rooms is made of a reinforced concrete slab, thickness 12cm. The roof does not cover all the areas. There is an open space without a ceiling of about 7m<sup>2</sup>. The roof for the toilet and bath is made of reinforced concrete slab, thickness 10cm, and holds the water tank. The internal doors and windows made of PVC, while the external door is made of metal.

All shelter units will be connected to water and sewage networks to ensure the functionality of the WASH facilities. Flood mitigation has already been implemented in the entire camp by installing a drainage system. The camp is gravelled, and the solar lighting will be provided as soon as the installation works are completed. Solar lighting is provided at household level while public lighting will cover the main public facilities and roads.

## Shelter Performance Summary

The constructed shelter units will secure equal access to all WASH services at the HH level, as well as securing privacy, protection, and safety for the inhabitants. The design of the units allows more sustainable solutions if compared with shared or public WASH facilities.

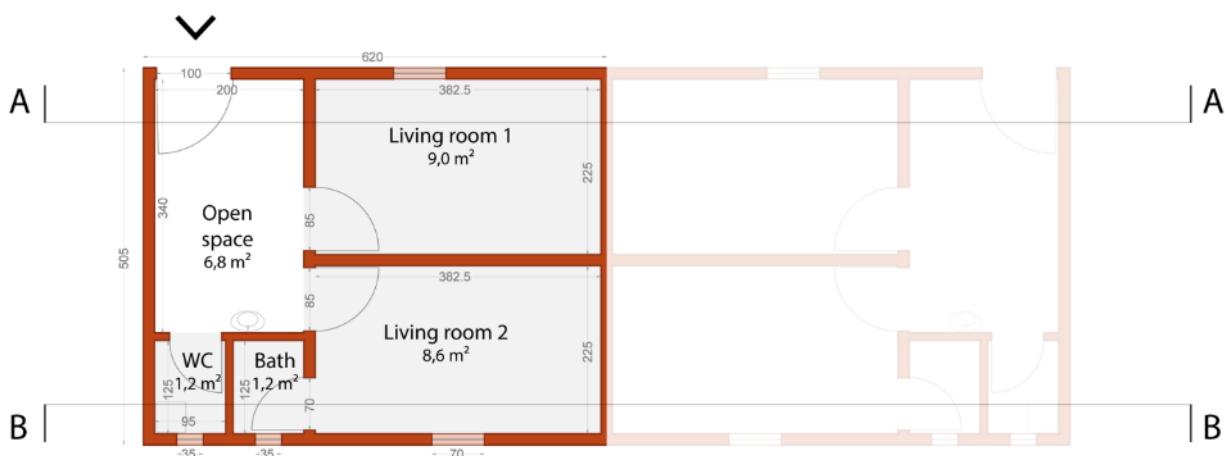
The shelter units assure major protection from weather conditions and are healthier and more hygienic than tents. GBV risks are reduced since all family members can live across separate rooms with privacy, while there is also access to a private latrine and bathing area within the shelter. The shelter can be horizontally extended, based on the size of the family in the future.

The shelter unit layout also allows for more engagement and involvement in social events.

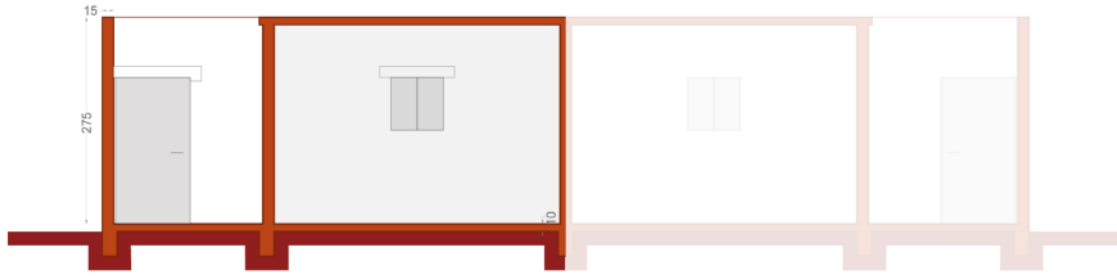
Although the many advantages offered from this layout, larger families greater than 5 would require more space and any modifications on the structure may affect the safety of the structure itself. Moreover, plastering should be provided to improve shelter's insulation.

Integration with other activities, such as sewage and water networks, is required.

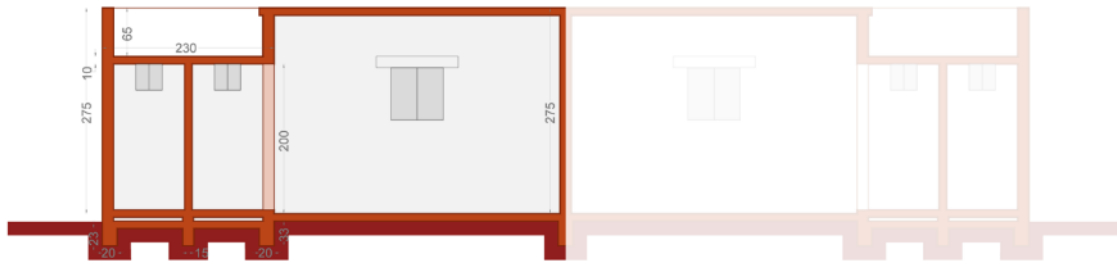
## Shelter design



Plan



**Section AA**



**Section BB**

### **Overall considerations**

**Design and materials** | The open space respects and take into consideration Syria's building typology in rural areas, offering a private gathering area of great importance for families. The installation materials are available locally and local contractors are familiar with these installation techniques. It should be noted that HLG is not supporting any installation of permanent housing and any implementation of this modality should be approached as a temporary shelter solution only.

**Foundation** | The shelter is raised from the ground level, which allows protection against severe wet conditions.

**Expected performance against hazards** | Cement brick walls and concrete roof offer good resistance against hazards such as heavy rains and wind. Despite this, to provide thermal comfort throughout the year further insulation could be provided to insulate the rooms.

**Privacy and protection** | The shelter offers privacy and protection, thanks to the chosen materials and to the lockable door. Access to WASH facilities is secured at household level which can improve hygiene conditions as well addressing protection concerns.

## Qatar Charity (being implemented, March 2022)

### Summary information



<b>Living space</b>	Indoor living space: 14.4m <sup>2</sup>
<b>m2 per person</b>	2.9m <sup>2</sup> (5 people) 3.6m <sup>2</sup> (4 people)
<b>HH WASH facilities</b>	No
<b>HH cooking facilities</b>	No
<b>Who will install the shelters?</b>	Installed by the supplier; a technical team is needed
<b>Materials</b>	Framed structure, sandwich panels (with core material in either polyurethane or EPS), steel chassis.  The floor is made of fibre cement panel finished with PVC vinyl.
<b>Time to build</b>	Bolted chassis: where the chassis are assembled by bolts. This type of living container comes folded and installed on site. This may take half a day to be installed on-site with a crane.  Welded Chassis: the chassis comes in a single piece and is assembled at the factory/workshop then moved to the site. This would take 1-2 hours to be installed on-site with a crane.
<b>Anticipated life span</b>	10 – 15 years
<b>Construction team</b>	5 skilled workers and a crane
<b>Total cost</b>	3,000 USD depending on the specifications. Not including the infrastructure works (ground levelling, graveling, latrine, sewage, etc.)
<b>Cost per m<sup>2</sup></b>	208 USD

## Shelter Description

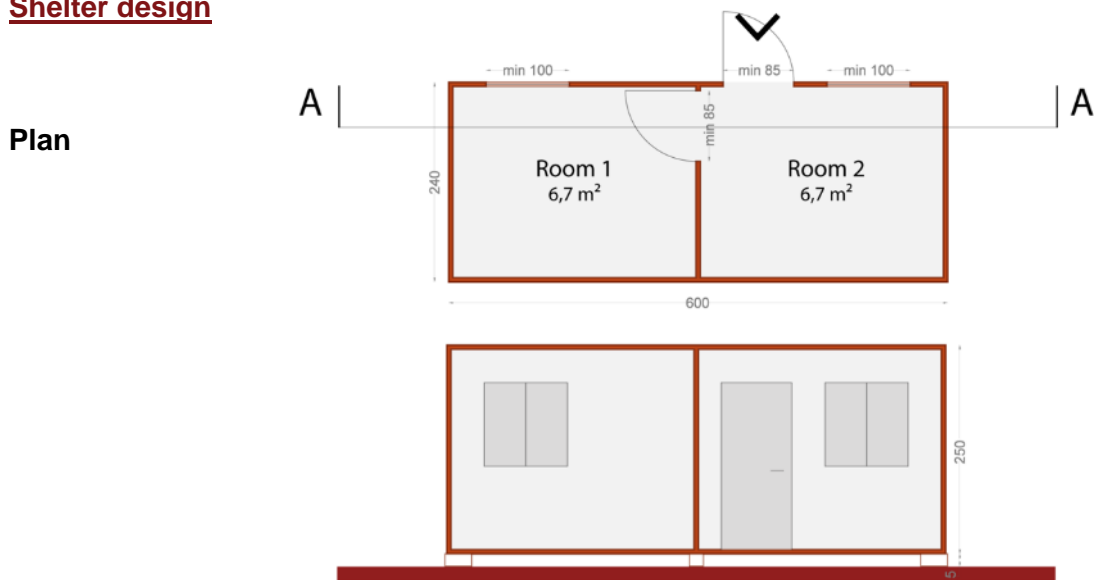
The living container should sit on 6/8 concrete blocks, 15cm above ground level. The ground should be flat and levelled. If the ground is gravelled it should be well compacted. It is not recommended to make a full concrete base under the living container as the space between the living container's floor and the ground protects it from humidity and water.

The prefabricated living container (caravan) is a very customizable structure, it is made for different purposes and with different designs. The one that is mostly in use in NW Syria has a rectangular (cuboid) framed structure with a flat roof of 2.4m x 6m x 2.5m dimensions (larger sizes are available but more expensive). The outer and inner walls, including the roof, are made of sandwich panels, no less than 4mm thick, fixed on the steel chassis. The sandwich panel core material is either Polyurethane or EPS. The floor is a 16mm thick fibre cement panel finished with PVC vinyl. The living container consists of 2 rooms separated by a wall with a door, 2 windows and an entrance on one side of the shelter unit, to ensure better privacy for families. All doors and windows are lockable and made with PVC. For better ventilation, it is recommended to add a small ventilation/chimney opening on the opposite wall of the windows in each room. The living container is equipped with a small electrical network of 2 ceiling lights, 1 entrance light, fuse box, outlets, switches, and circuit breaker.

## Shelter Performance Summary

The living container life span reaches over 10 years. The shelter is designed to withstand snow and wind loads and to have low thermal conductivity for all 6 sides for insulation. The sandwich panels are required to be fire rated (B1) and the outer and inner surfaces along with the chassis should be galvanized or electrostatically painted to ensure a good fire resistance and longevity. The roof provides good protection from rain and leakage. The living container sits on 6-8 concrete bricks, and it must be levelled and fixed properly in place with no slope or wobbling. To compensate for the small area of the living container it is recommended to build a separate latrine adjacent to each unit.

## Shelter design



## Section AA





## Overall considerations

**Design and materials** | This shelter's lifespan is long, and the chosen materials have good performances. Although, materials are not locally provided and the design doesn't take into account Syrian housing traditions.

**Foundation** | The shelter is raised from the ground level, which allows protection against severe wet conditions.

**Expected performance against hazards** | The chosen materials offer good resistance against hazard and provide thermal comfort throughout the year.

**Privacy and protection** | The shelter offers privacy thanks to the chosen materials and the lockable door. Access to WASH facilities is not secured at household level. Installation of a separate latrine or access to communal facilities will be required. Further design and budget will be required if a separate latrine is installed adjacent to each unit. The shelter is small in size and is only appropriate for a maximum of 4 people with separate cooking and WASH facilities.



## SHAFAK (being installed, March 2022)



### Summary information

<b>Living space</b>	Indoor living space: 22.4m <sup>2</sup> Private outdoor living space: 3.3m <sup>2</sup>
<b>m2 per person</b>	4.5m <sup>2</sup> (indoor living space)
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Contractors with installation skills
<b>Materials</b>	Hollow bricks, reinforced concrete, metal frame and sandwich panels. All the materials are locally available.
<b>Time to build</b>	1 month
<b>Anticipated life span</b>	5 years minimum
<b>Construction team</b>	10 workers, skilled labour
<b>Total cost</b>	2,198 USD for the Transitional Shelter Unit (TSU) and 2250 USD for PWD Adapted TSU.  The cost will include labour, procurement and transport fees for materials and a contractor will provide all these works.
<b>Cost per m<sup>2</sup></b>	86 USD



## Shelter Description

The TSU consists of two separated living room/bedrooms 18m<sup>2</sup> in size, while there is also an open area 3m<sup>2</sup> in size. The shelter unit will be mainly made of sandwich panels for walls and roof, installed on a metal frame fixed in a basement (not exceeding 20cm) and hollow bricks for walls (not exceeding 40cm height).

TSU hygiene and cooking facilities (9m<sup>2</sup>), will be constructed of hollow bricks with a basement of 20cm in concrete and a concrete cement roof (not exceeding 10cm). In addition, there is a tie concrete beam 20cm x 15cm halfway with re-bars in the middle of the height of the wall to increase the resistance of the facilities to bear loads on the roof (such as water tanks). Moreover, concrete facilities are more resistant to fire, especially for the cooking place.

TSU will be installed through pouring of the basement first, to raise the ground of each unit by 10cm, then laying reinforcement beam of 20cm x 15cm.

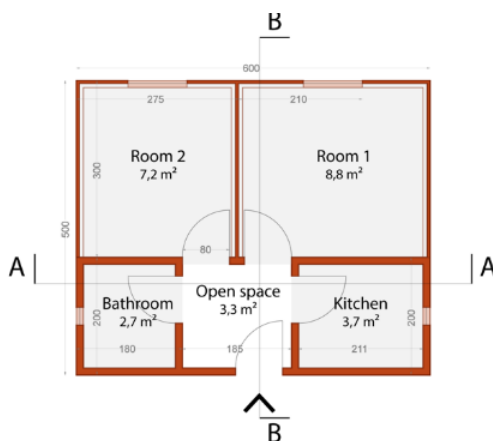
## Shelter Performance Summary

The shelter is constructed with materials which are locally available. The roofing structure and the walls are complex and require skilled workers to be constructed. It is anticipated that the wall panels may detach under high wind conditions. Performance could be improved by fixing the metal frame into the reinforced basement under the sandwich panels.

The cooking facilities are built from hollow bricks and reinforced roof that will increase the resistance to fire.

## Shelter design

### Plan



### Section AA and Section BB



## Overall considerations

**Design and materials** | The open space respects and take into consideration Syria's building typology in rural areas, offering a private gathering area of great importance for families. Although material such as reinforced concrete and cement are used for the unit's basement and part of the roof and walls, this is necessary to resist to fire in the cooking area and to accommodate the load of a water tank.

**Foundation** | The shelter is raised from the ground level, which allows protection against severe wet conditions.

**Expected performance against hazards** | Wall panels' performance against high wind conditions is weak.

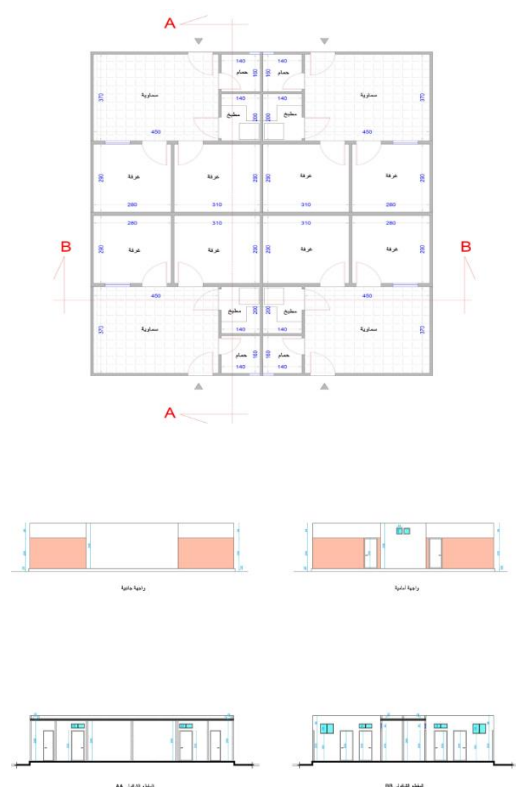
**Privacy and protection** | The shelter offers privacy and protection, thanks to the chosen materials and to the lockable door. Access to WASH facilities is secured at household level which can improve hygiene conditions as well addressing protection concerns.



## ATAA Group Housing Units – (installed since 2021)

### Summary information

<b>Living space</b>	Indoor living space: 24m <sup>2</sup> Private outdoor living space: 16.7 m <sup>2</sup>
<b>m2 per person</b>	4.8m <sup>2</sup>
<b>HH WASH facilities</b>	Yes
<b>HH cooking facilities</b>	Yes
<b>Who will install the shelters?</b>	Shelters are built together as an organized groups (500 to 1000 units), Contractor with skilled labour is implementing the whole structural works, including sub-structures.
<b>Materials</b>	Concrete for foundations, cement blocks for walls, reinforced concrete for ceiling, metal door, and PVC windows. All materials are provided from local market. Cement plastering for internal walls and roof, and for external walls
<b>Time to build</b>	250 Unit in 12 Weeks; 500 Unit in 20 Weeks; 1000 Unit in 40 Weeks; all including substructure.
<b>Anticipated life span</b>	10 years
<b>Construction team</b>	Skilled labour, the number of workers depends on the units in each site
<b>Total cost</b>	2,200 USD (including labour, procurement and transport fees of materials and including wash facilities). 2500 USD (including Sub-Structures).
<b>Cost per m<sup>2</sup></b>	61 USD



### Shelter Description

This shelter has brick bearing walls and a strip foundation is supporting the 15cm brick walls that are in term supporting the 25Mpa reinforced concrete roof. Every 4 units are built as one block to reduce both cost and time by having their 96m<sup>2</sup> roof poured together. Each unit also has a wall surrounding an open area (as a front yard) at the far four corners of the block, to achieve privacy for each family.



The shaded area consists of two living rooms/bedrooms, kitchen and a bathroom/toilet. A 1m<sup>3</sup> water tank is providing water to the unit through a water network with 3 water points.

Each group of blocks is connected to a secondary sewage wastewater pipeline. The sewage pipelines are connected to a main sewage pipeline that can connect to a water network (if available) or to a large scale septic tank.

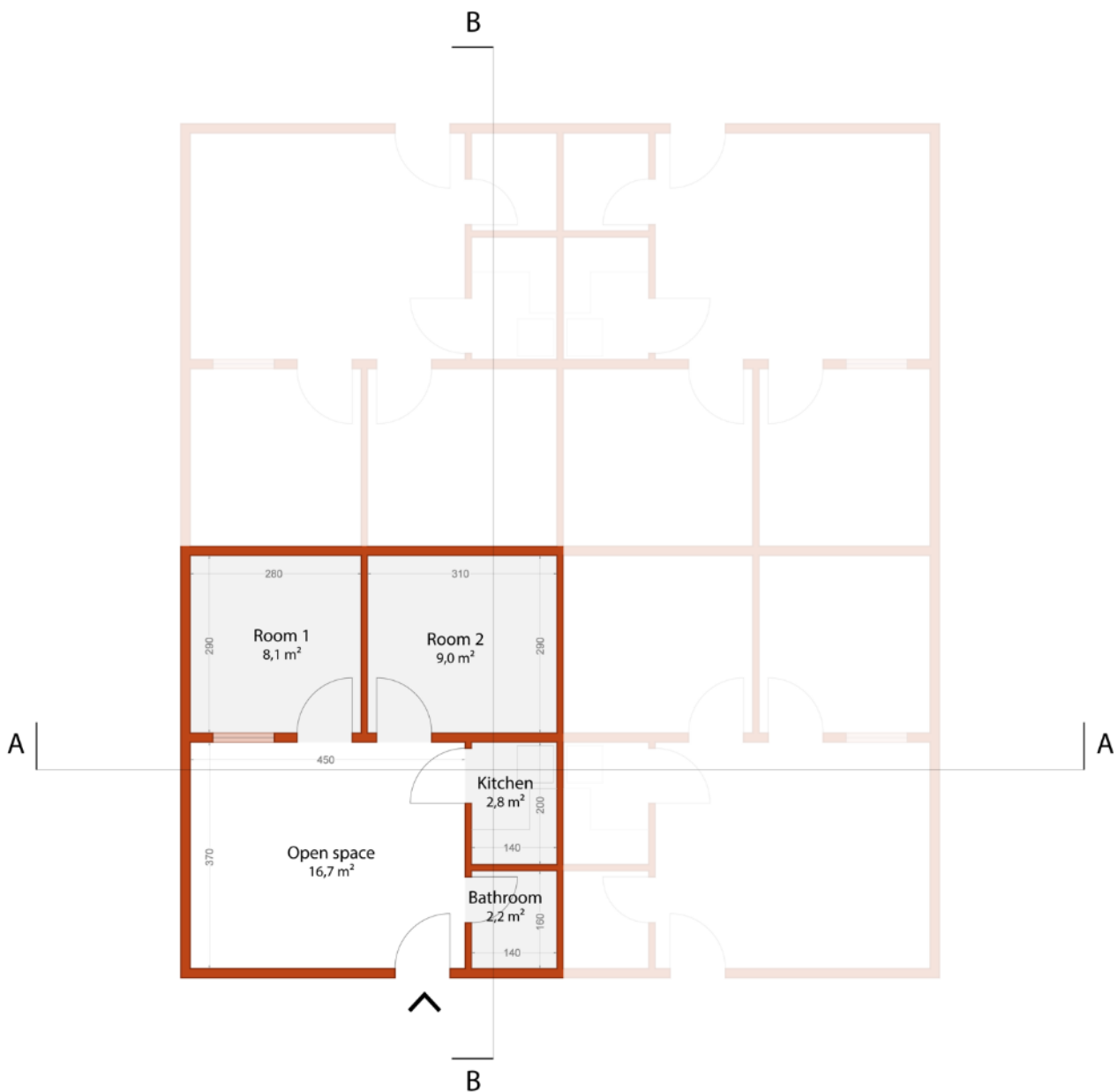
### **Shelter Performance Summary**

This shelter unit is designed to provide both protection and dignity for the beneficiaries. The installation materials are all locally available.

Although a team of skilled workers is needed to build this unit, these workers are available in NW Syria.

The structural system is a solid one that can resist high wind, heavy snow and heavy rains, generally with no fear of collapse or partial damage.

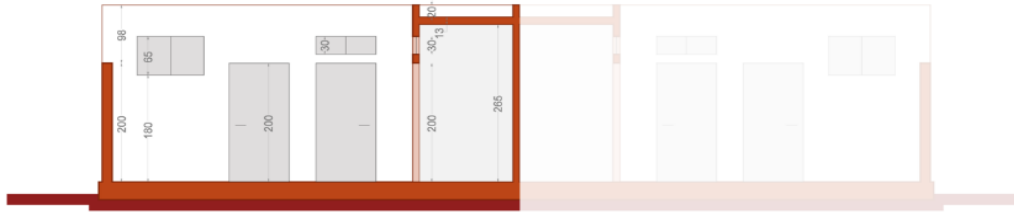
### **Shelter design**



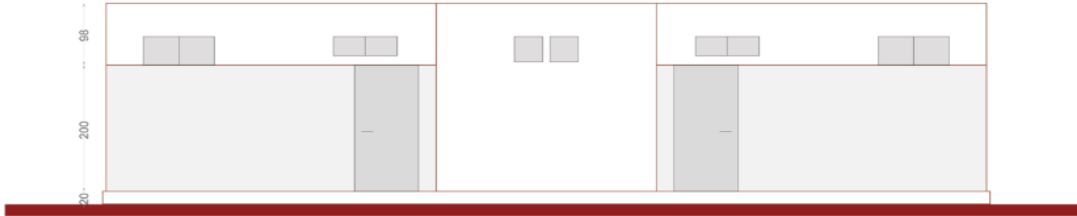
**Plan**







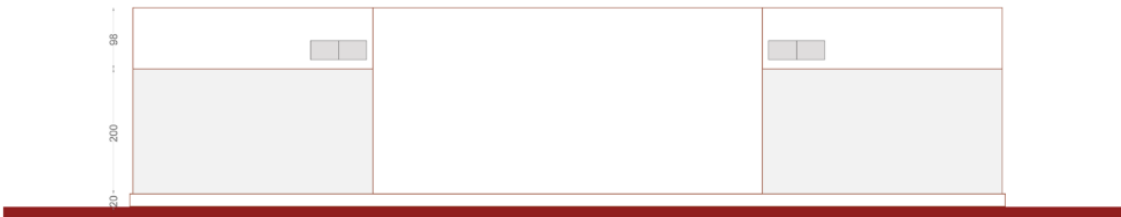
**Section AA**



**Elevation**



**Section BB**



**Elevation**

**Overall considerations**

**Design and materials** | The open space takes into consideration Syria’s building typology in rural areas, offering a private gathering area of great importance for families. The four units that compose the block allow savings but attention is needed when shelters are assigned. Disputes could emerge between households when they live so close, especially if they are IDP families from different communities. It should be noted that HLG is not supporting any installation of permanent housing and any implementation of this modality should be approached as a temporary shelter solution only.

**Foundation** | The shelter is raised from the ground level, which allows protection against severe wet conditions.

**Expected performance against hazards** | Good expected performance against high wind, heavy snow and heavy rains. Insulation is needed to provide thermal comfort through the year.

**Privacy and protection** | The shelter offers privacy and protection, thanks to the materials and to the lockable door. Access to WASH facilities is secured at the household level which can improve hygiene conditions as well addressing protection concerns.



## ATAA – RHU (installed in 2019)



### Summary information

<b>Living space</b>	17.5m <sup>2</sup> for single unit. It can be extended with multiple units to adapt to different sizes.
<b>m2 per person</b>	3.5m <sup>2</sup>
<b>HH WASH facilities</b>	Not included (need to be added extra)
<b>HH cooking facilities</b>	Not included (need to be added extra)
<b>Who will install the shelters?</b>	Implementing NGO, Cash for Shelter/work or hired local labour skilled trained staff supervised by implementing NGO)
<b>Materials</b>	High strength steel frame, lightweight roof, wall panels.
<b>Time to build</b>	4-6 hour by 4 people. Larger implementations can achieve faster speed.
<b>Anticipated life span</b>	Minimum 3 years but likely substantially longer
<b>Construction team</b>	4 people for each unit, skilled labour Or unskilled with training
<b>Total cost</b>	1,605 USD (FCA Mersin Price Per Unit). Total cost is 1,635 USD including unit cost, shipping, foundation, installation (CfW workers). WASH facilities not included.  (Costs in 2022 have increased)
<b>Cost per m<sup>2</sup></b>	93.4 USD (including shipping, foundation and installation etc)

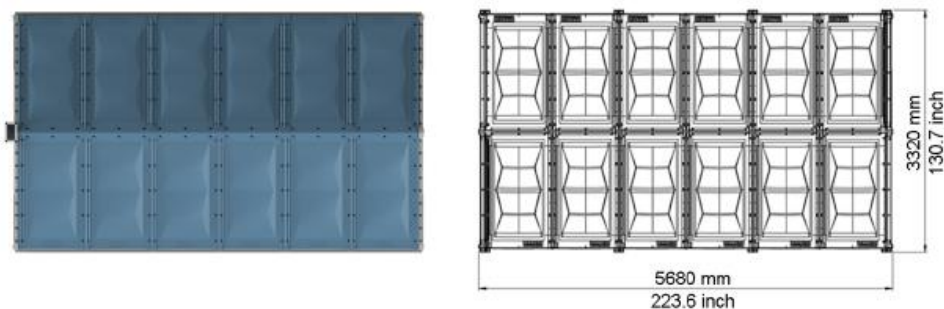
## **Shelter Description**

The RHU is delivered with complete parts ready for assembly when removed from the flat pack. It is equipped with a lightweight roof and wall panels, a lockable door and solar powered lamp and charger. The configured all-in-one flat pack allows for an immediate response effort where the shelter can be received, assembled, and occupied by residents on the same day. The interior space can be divided with a room partitioned and upgraded and adapted by IDPs. The material provides protection from the elements and the unit is easily extended with locally built WASH facilities and cooking areas. The assembly parts are standardised and hassle-free, making projects easy to plan and implement on time. The shelter features ensure a high degree of protection and provide versatility in the type of occupancy, including basic family accommodation, health, education, and other communal activities. The WASH extension can be done in several ways either using the RHU itself or constructed by locally available materials such as hollow blocks.

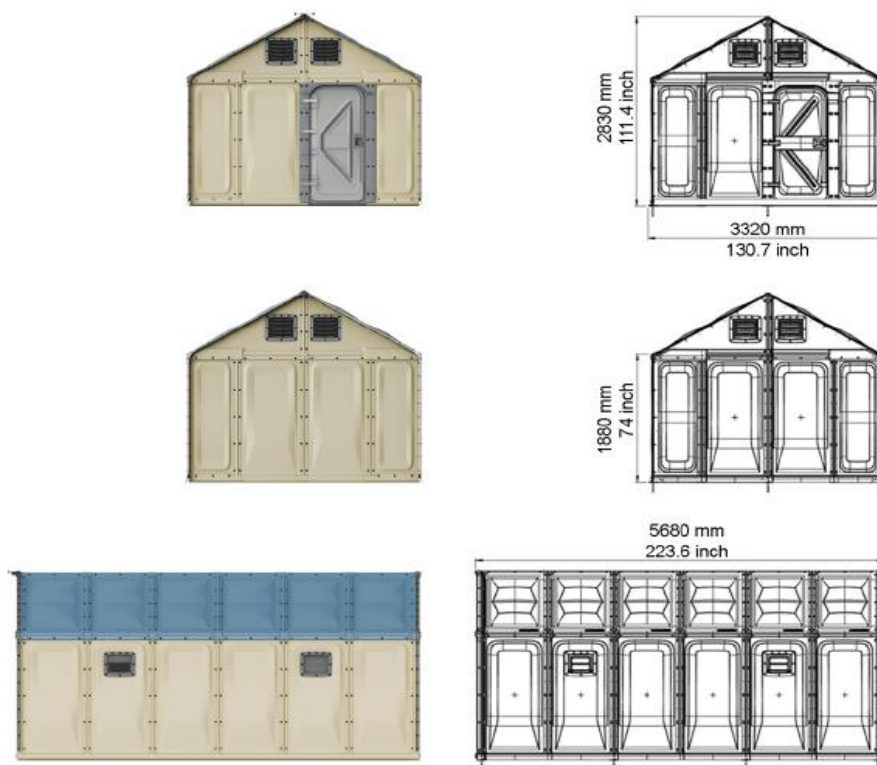
## **Shelter Performance Summary**

The reliable robust load bearing frame provides secure attachment to the ground and provides a reliable performance against high winds, rain, snow loads, and sun. The panel cladding protects from the elements and is easily maintained. The RHU has been tested in many contexts, including Syria, and provides safe and dignified shelter to IDPs. The predictable design makes the modality well suited for cash for shelter/work programmes to provide livelihood. The RHU is easily maintained by IDPs and can, and has in many places in Syria, be upgraded using a wide array of locally available materials to improve its performance and personalize the use. The modular frame and design also allow for easy extensions both to different sizes but also to many different uses in eg. health, education, and protection. Both implementation and upgrades are well suited to be done by unskilled labour due to the reliable performance of the frame that will minimize risk of damages or installation errors.

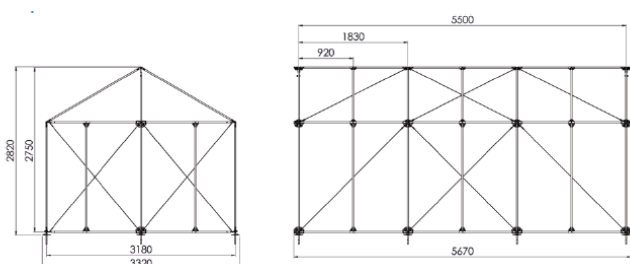
## **Shelter design**



**Roof plan**



## Elevations



## Structure

### Overall considerations

**Design and materials** | The shelter can be easily installed and maintained by IDPs and can be upgraded using locally available materials to improve its performance and personalize the use. Materials are not locally provided and the design doesn't reflect Syrian housing traditions. The shelter material has transparent properties at night if there is light in the shelter. This raises privacy concerns related to beneficiaries. The shelter has low thermal insulation properties. It heats very hot during the summer and is very cold at night. Implementation of this modality in NW Syria resulted in many beneficiaries installing concrete walls inside the RHU for added privacy and thermal insulation.

**Foundation** | Installation of a raised based is required in order to provide protection against severe wet conditions.

**Expected performance against hazards** | Good performance against wind, snow and rains. Insulation is needed to provide thermal comfort through the year.

**Privacy and protection** | The shelter offers privacy and protection, thanks to the materials and to the lockable door. However, the transparent properties of the material at night if the shelter has lighting on the inside raises privacy concerns among beneficiaries. Access to WASH facilities is not secured at household level. Installation of a separate latrine or access to communal facilities will be required. Further design and budget will be required if a separate latrine is installed adjacent to each unit.



## ATAA – Steel Structure Unit (*being installed, March 2022*)



### Summary information

<b>Living space</b>	23.1m <sup>2</sup>
<b>m2 per person</b>	4.6m <sup>2</sup>
<b>HH WASH facilities</b>	No
<b>HH cooking facilities</b>	No
<b>Who will install the shelters?</b>	Skilled labour (Blacksmith only)
<b>Materials</b>	Steel frame, sandwich panels, metal door, PVC windows. All materials are provided from local market.
<b>Time to build</b>	2 units/day for each blacksmith team
<b>Anticipated life span</b>	5 years
<b>Construction team</b>	3 workers, one of them skilled
<b>Total cost</b>	2,000 USD approximate total cost (including labour, procurement and transport fees for materials)
<b>Cost per m<sup>2</sup></b>	87 USD

### Shelter Description

This shelter is an emergency replacement solution for the available tents over gravelled ground, it is combination of a steel frame and sandwich panels forming the walls and the roof. The steel frame is compound of six columns holding the transverse and inclined beams connected by welds.

The sandwich panels are framed by steel U channels to fix the panels to the steel frame by welds, insuring strong and stiff connection. The column base is a steel base plate with sharp anchors giving the ability to be implanted in ground by pushing.

The unit also contains a metal door and two windows for ventilation. No WASH facilities are included within the unit.

### Shelter Performance Summary

The design of this shelter is simple and provides minimum requirements of protection and dignity. The sandwich panels have an effective property of insulation, to protect the beneficiaries from harsh environment conditions and to achieve privacy.

The structure is designed to resist a wind speed of 50 Mph and a roof snow load of 20 cm of ice (about 30 cm of ground snow). Unlike the tent, the metal door and windows guarantee safety for the households.





Regarding the installation, the small number of elements and the simple design make it easy to install with a skilled blacksmith and two workers with simple tools.

## Shelter design



## Plan



## Elevations

## Overall considerations

**Design and materials** | Materials are locally procured but the design doesn't reflect Syrian housing traditions.

**Foundation** | Installation of a raised based is required in order to provide protection against severe wet conditions.

**Expected performance against hazards** | Good performance against wind, snow and rains. Good thermal comfort provision thanks to the sandwich panels.

**Privacy and protection** | The shelter offers privacy and protection, thanks to the materials and to the lockable door. Access to WASH facilities is not secured at household level: attention will be needed when securing the access to shared facilities for each household to minimise the risk of violent episodes.

## 6. Resources

- [Dignified and Safer Living Conditions Guidance](#)
- [Action Plan for Dignified and Safer Living Conditions in NW Syria](#)
- [SNFI Cluster Strategy](#)
- [SNFI Guidance Note on the Shelter and NFI Response](#)
- [TWiG on Flood Risk Reduction - English](#)
- [TWiG on Flood Risk Reduction - Arabic](#)
- [SNFI Site Planning Support Webpage](#)
- [CCCM and SNFI Fire Prevention and Response Guidance Note – English](#)
- [CCCM and SNFI Fire Prevention and Response Guidance Note – Arabic](#)
- [Guidance Note: Mitigating Protection Risks in IDP Sites Exclusive to Widowed and Divorced Women and Girls \(February 2019\)](#)
- [HLP XB Turkey Due Diligence Guidelines](#)
- [Supporting HLP-Sensitive CCCM Interventions in Informal Sites in NW Syria December 2019](#)
- [Guiding Principles on Internal Displacement](#)
- [Sphere Standards, 2018](#)

## 7. Dignified Shelter Working Group Members

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