

# **UNHCR Tapstand Design**

**D31-2015a**

**Tools and Guidance for  
Refugee Settings**



**UNHCR**  
The UN Refugee Agency

**D-31/2015a**

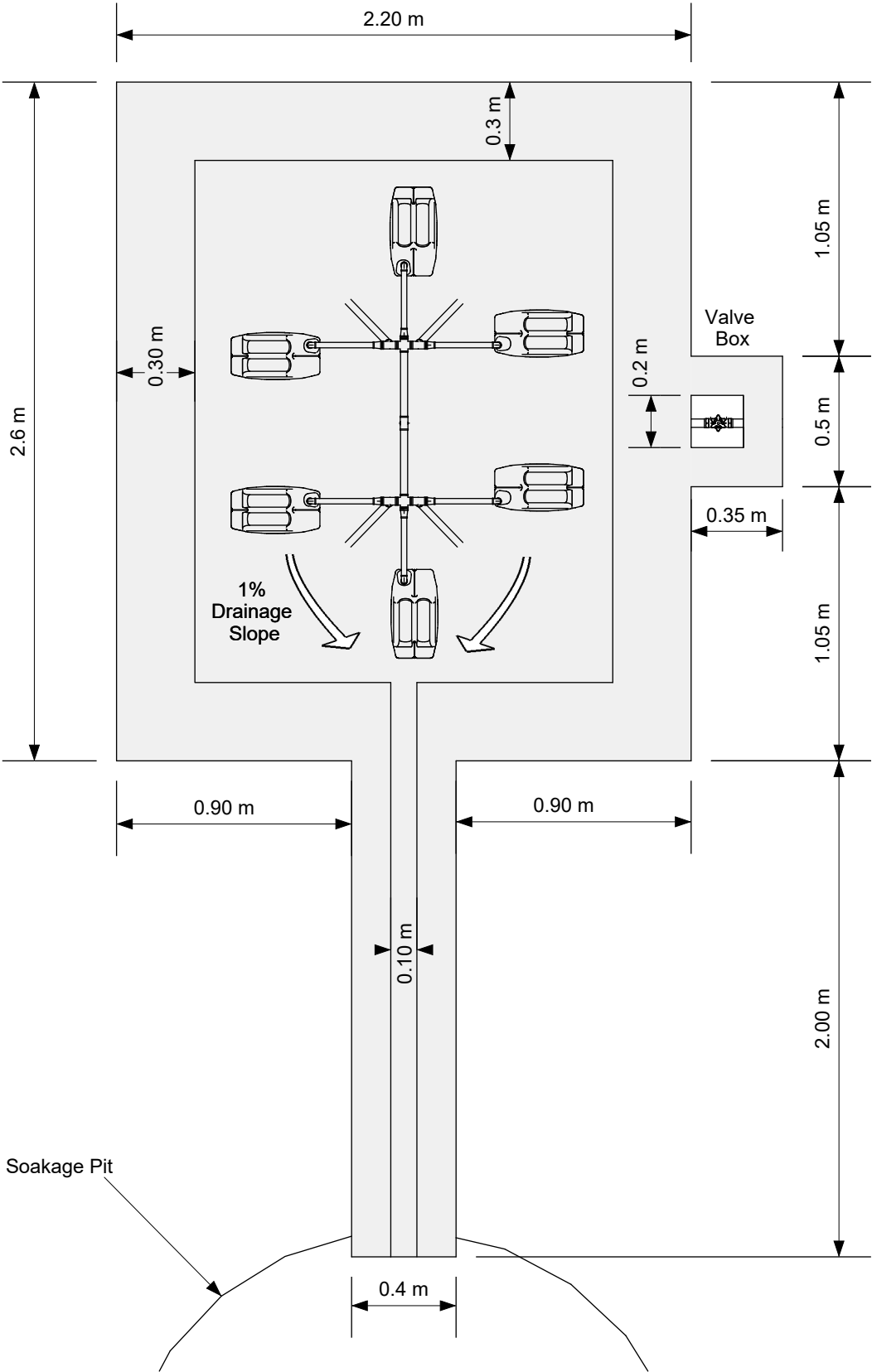
# **UNHCR Standardized Designs for Refugee Settings Post Emergency Tapstand with Drainage**

## **FOREWORD**

These post emergency tapstand designs form part of UNHCR's series of Standardized WASH Design Guidelines for Refugee Settings which are the result of an extensive review process with WASH actors active in refugee settings. It is recognized that the Standardized WASH Designs will require continuous review and amendment in response to changes in engineering best-practice and feedback from the field. Therefore further review will be managed by a Technical Review Committee which will meet regularly to discuss issues related to the use of the design and an annual review will be reported back to the WASH community. More urgent amendments will be reported as, and when, required. Note that this tapstand is based on a design shared by OXFAM GB.

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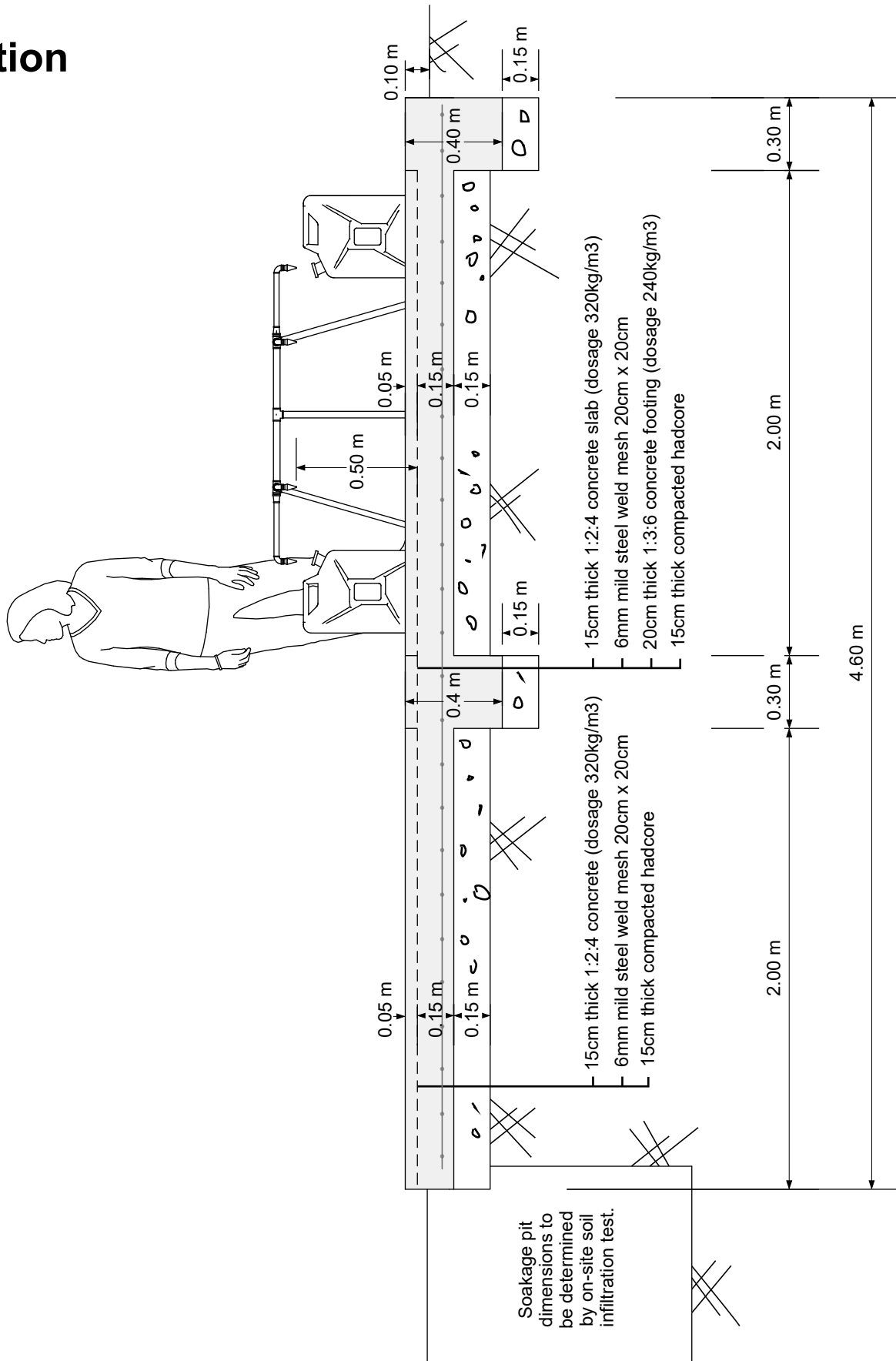
# General Layout



**NOTES**

1. Tapstand to be positioned centrally with tap spouts exactly 50cm above concrete surface.
2. Concrete surface to be finished with non-slip (lightly brushed) surface with 1% slope to soakage pit.
3. Soakage pit dimensions to be determined by on-site soil infiltration test (see Appendix 20 of Engineering in Emergencies. Alternatively refer to the table of typical soil infiltration rates on page 213 of the UNHCR WASH Manual).

## Section

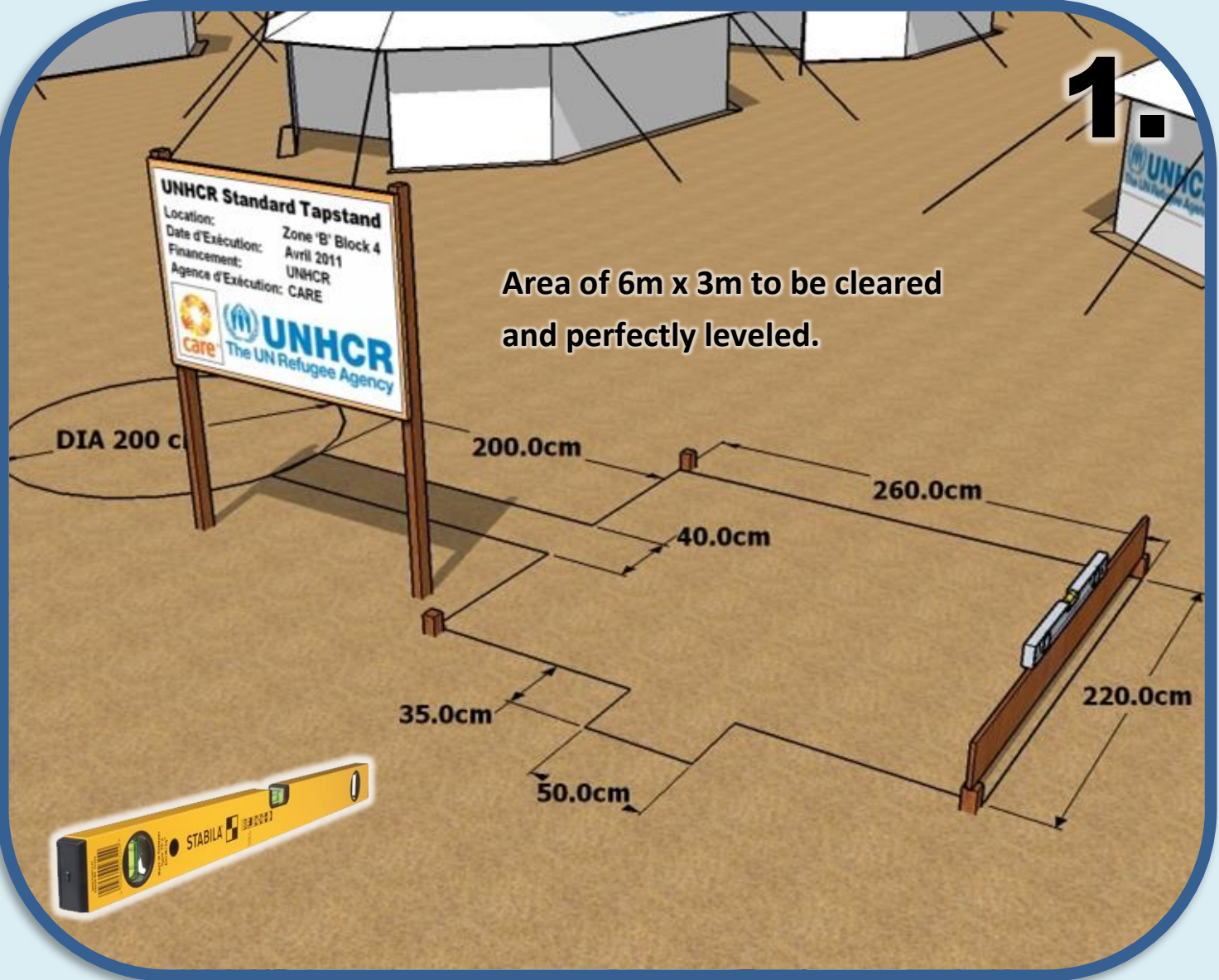


## NOTES

1. Mass concrete footings 1:3:6 (min 240kg/m<sup>3</sup> cement dosage). Slab concrete 1:2:4 (min 320kg/m<sup>3</sup> cement dosage).
2. 15cm compacted hardcore layer to be covered with 1mm sand blinding before pouring concrete.
3. Slab reinforcement to consist of high tensile mild steel 6mm weld mesh 20cm x 20cm positioned 3cm above compacted hardcore.

# 1.

Area of 6m x 3m to be cleared and perfectly leveled.

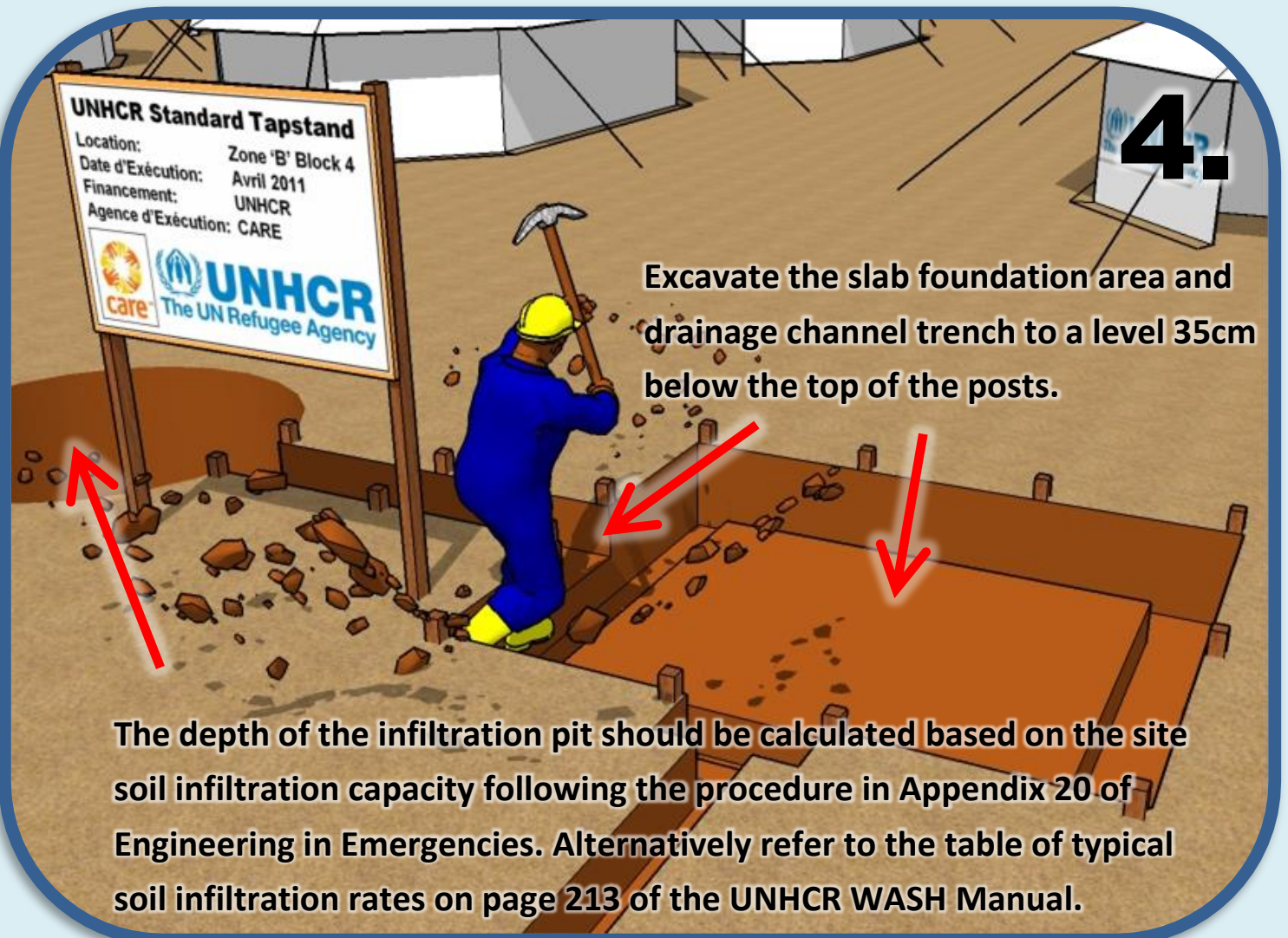
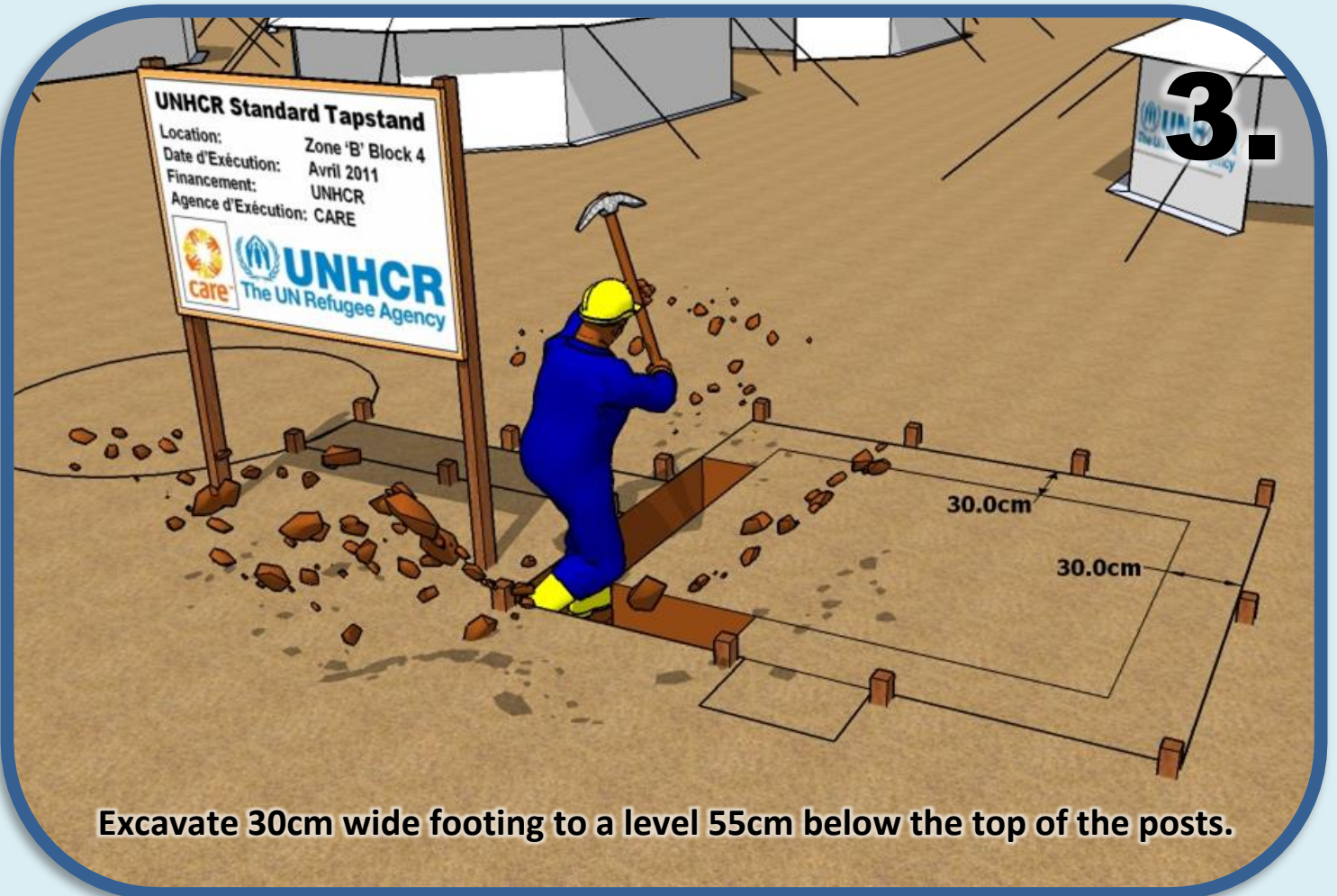


# 2.

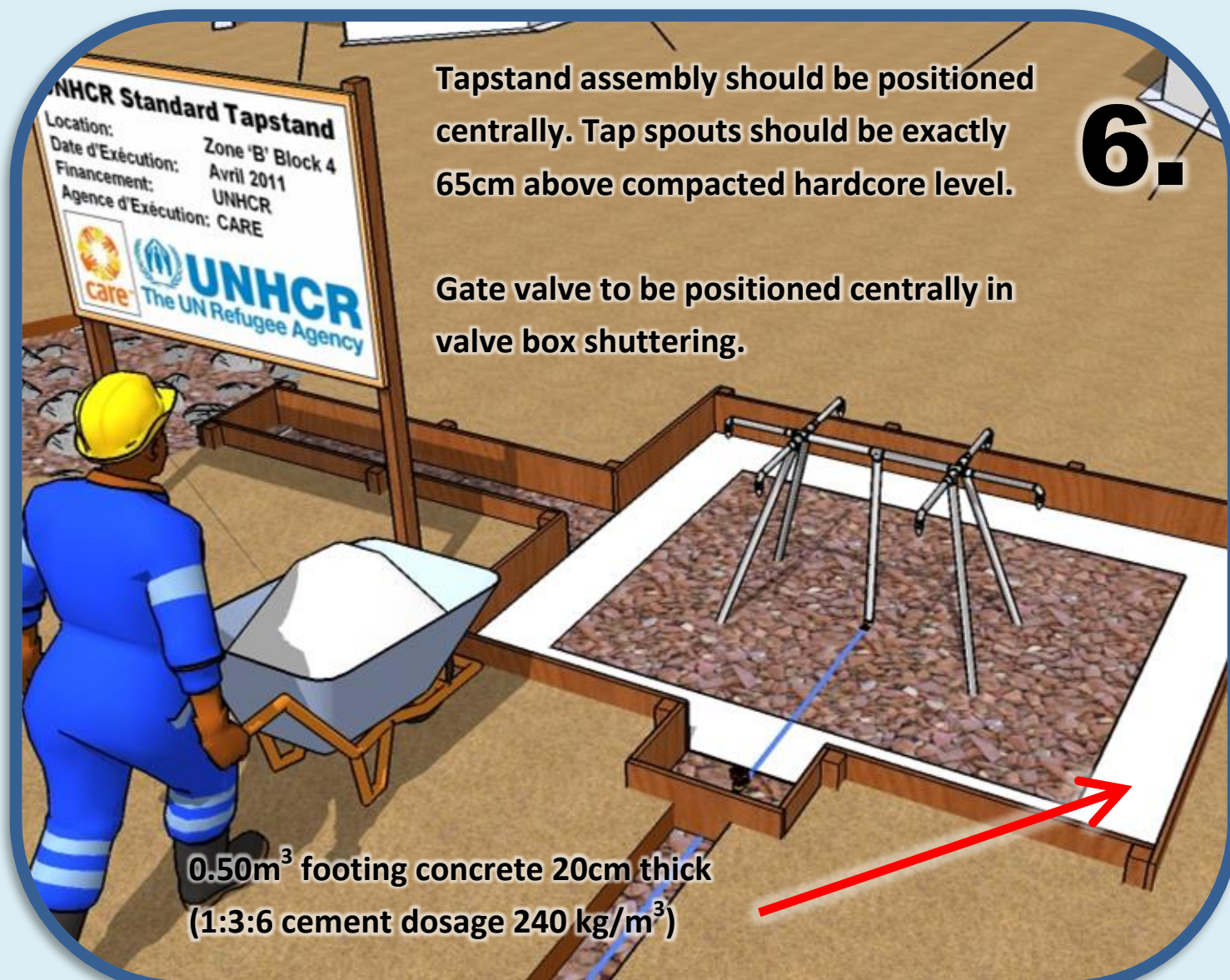
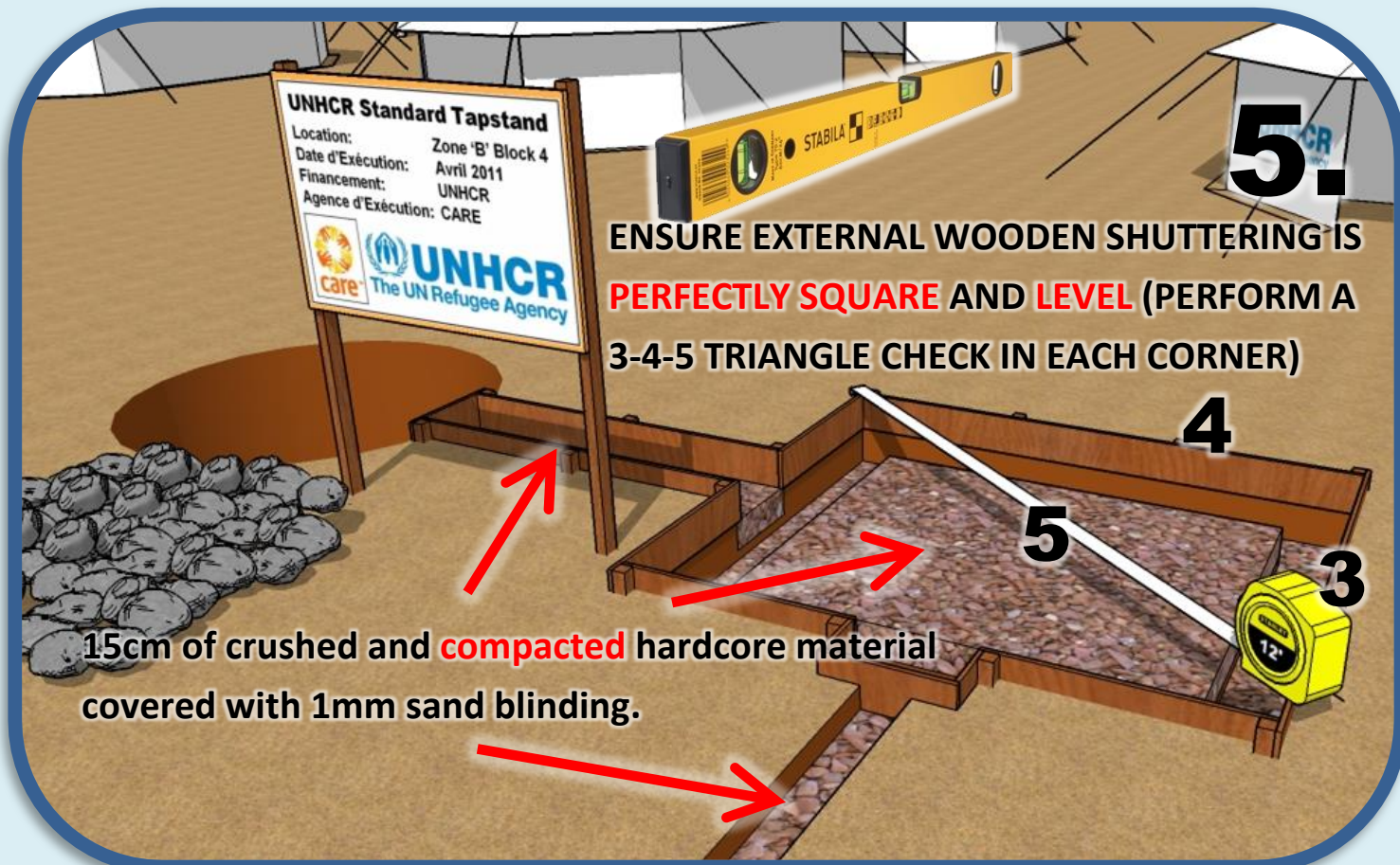
Corner posts 10cm above ground and exactly the same level.  
 This level will become the upper edge of the tapstand.













**7.**



High tensile mild steel 6mm weld mesh 20cm x 20cm positioned 3cm above compacted hardcore.

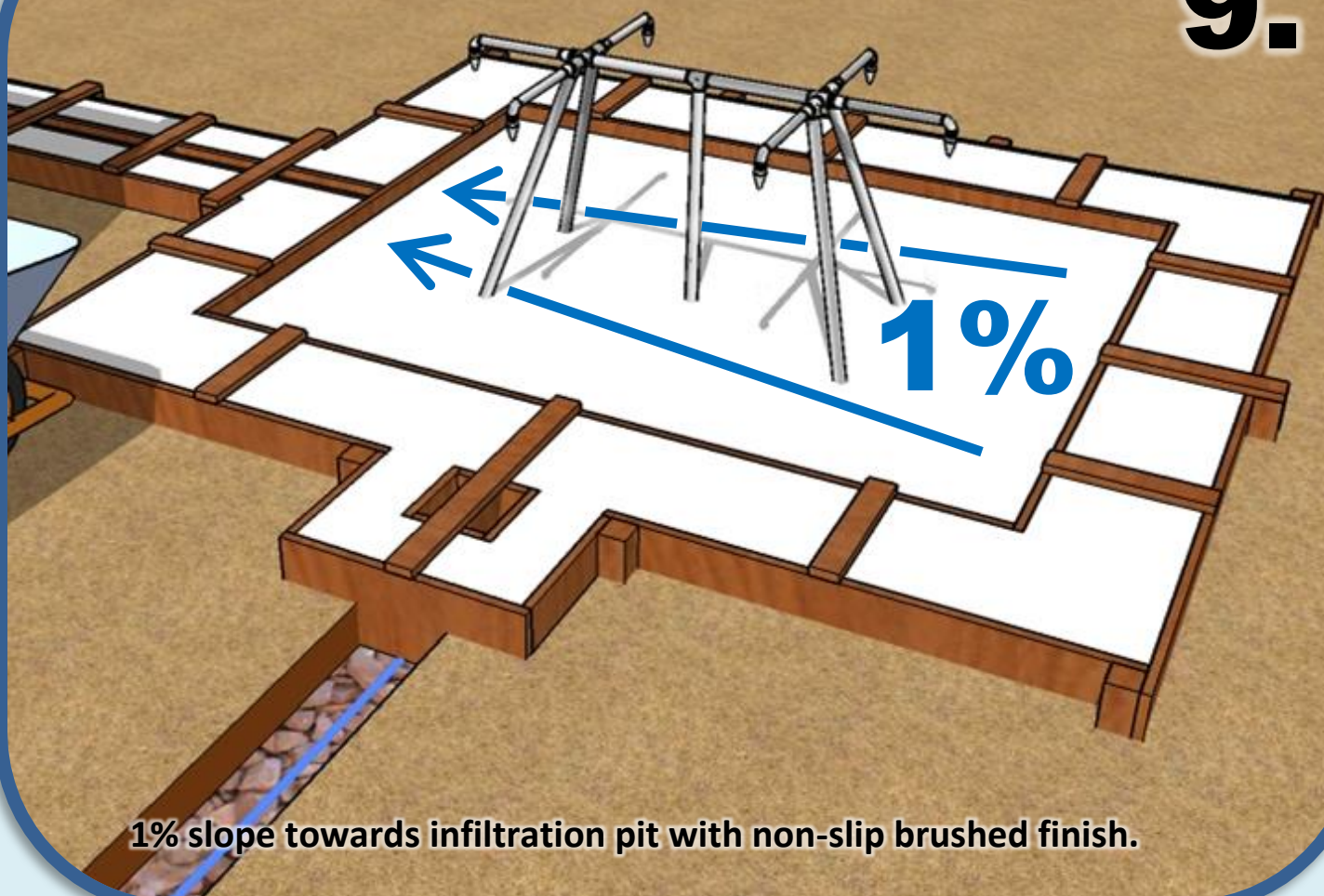
**8.**



1.1m<sup>3</sup> concrete 15cm thick slab with 20cm thick sides (1:2:4 cement dosage 320 kg/m<sup>3</sup>).

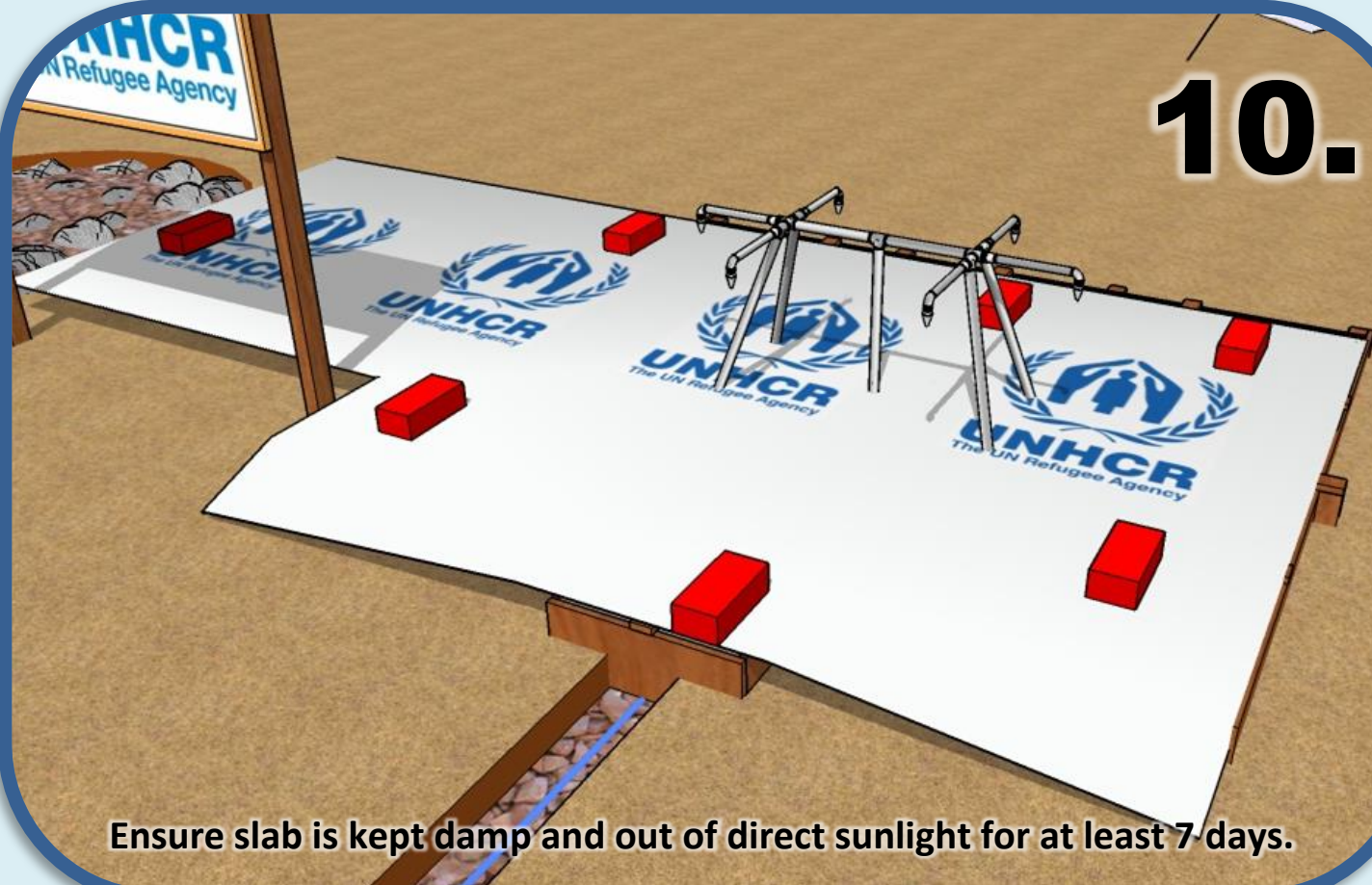


9.



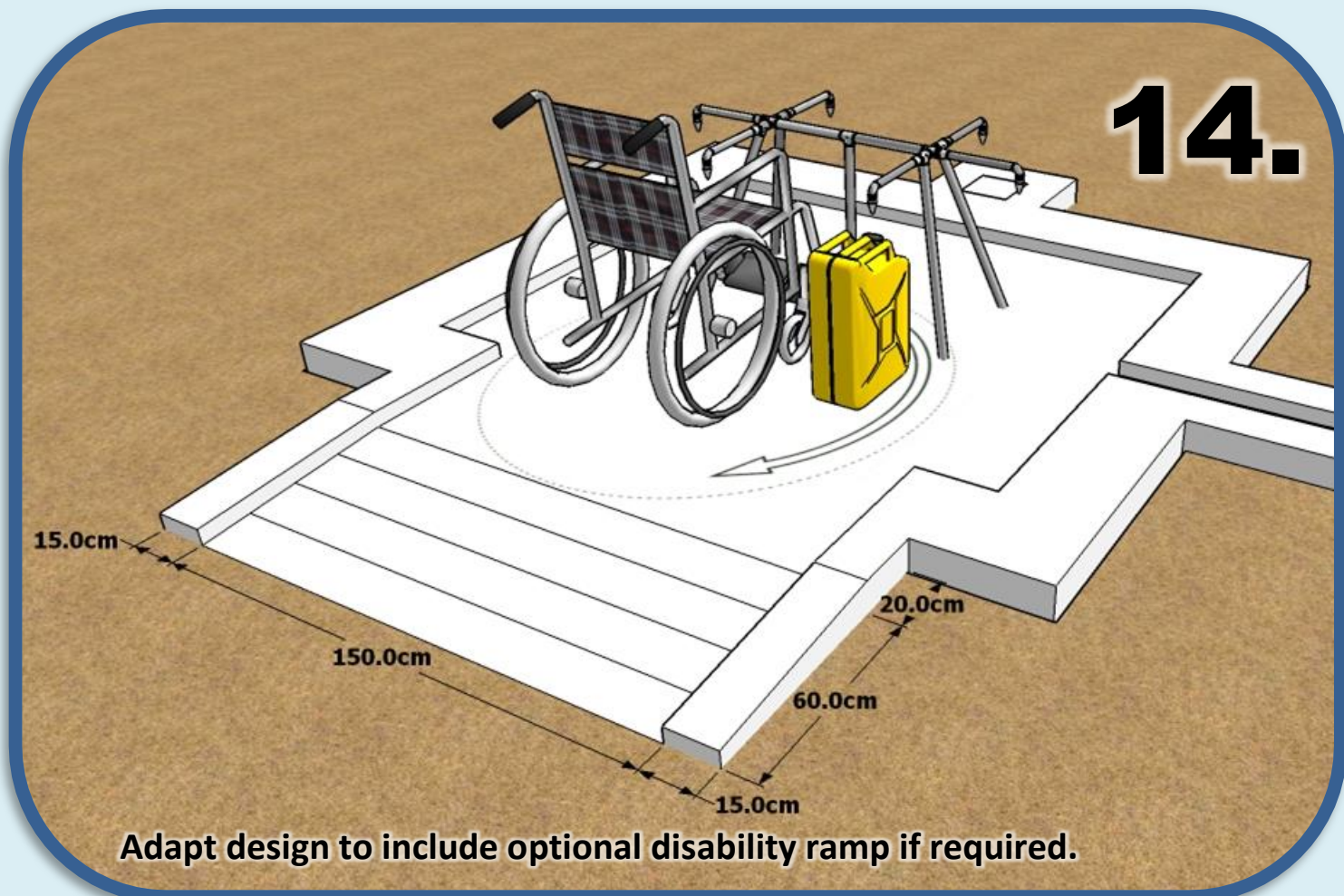
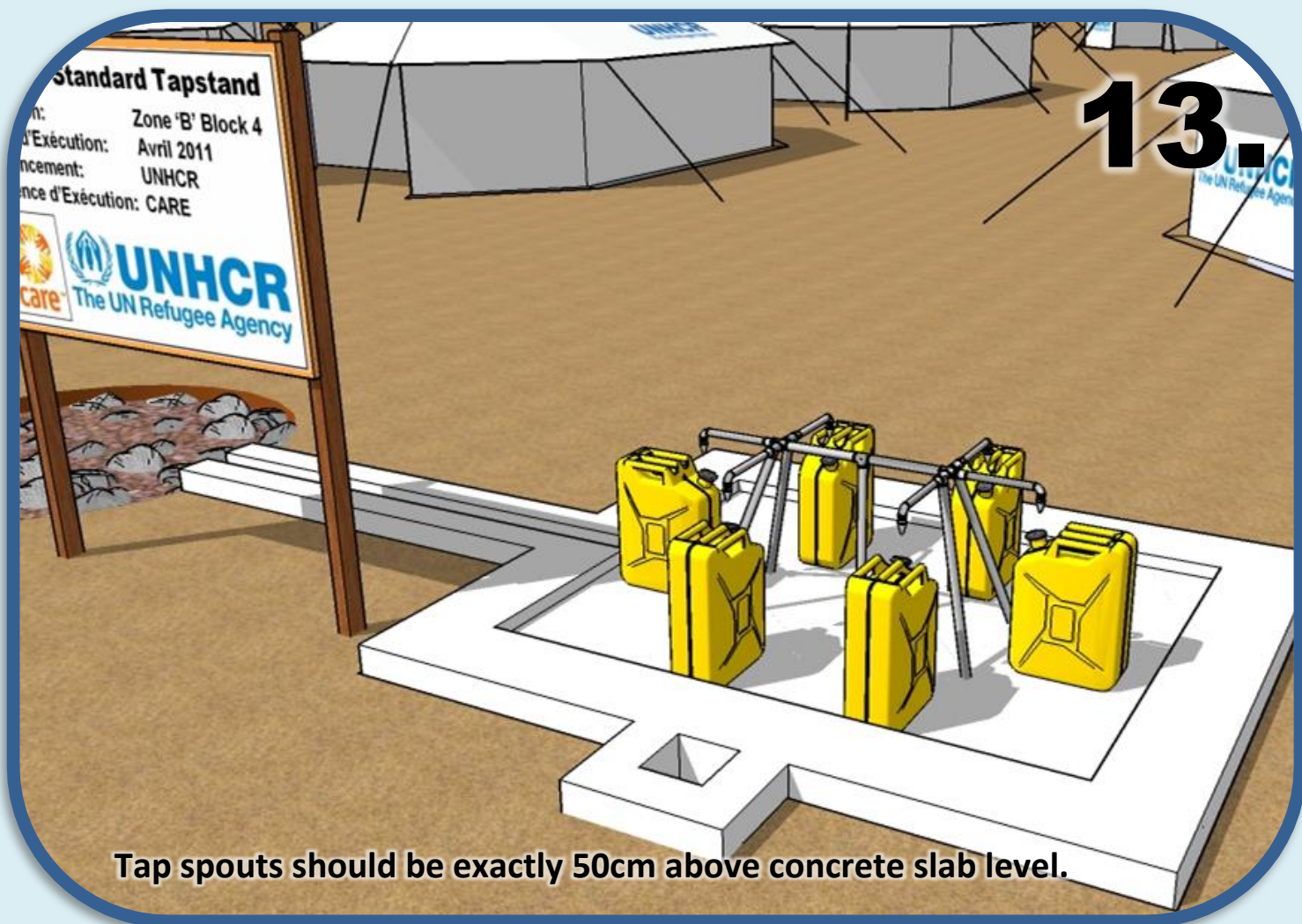
1% slope towards infiltration pit with non-slip brushed finish.

10.



Ensure slab is kept damp and out of direct sunlight for at least 7 days.







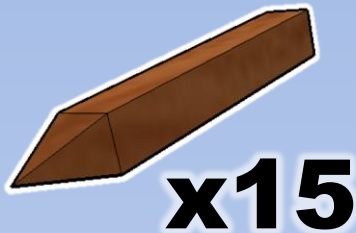
**D-31/2015a**

## BILL OF QUANTITIES

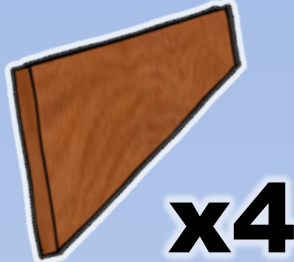
Description	QTY
Wooden Posts (65cm x 5cm x 5cm)	15 pcs
Wooden Planks (4m x 20cm x 2.5cm)	4 pcs
Wooden Planks (4m x 5cm x 2.5cm)	5 pcs
Nails (6cm Galvanized)	1 kg
High Tensile Steel Weld-Mesh Ø6mm 20cm x 20cm	10 m <sup>2</sup>
Plastic Sheeting	10 m <sup>2</sup>
Complete Tapstand Assembly (Tapstand, Taps x 6, Elbow, Pipe)	1 pc
Coarse Sand	0.9 m <sup>3</sup>
Coarse Gravel (6mm – 10mm)	1.5 m <sup>3</sup>
Cement (50kg sacks)	10 sacks
Compacted Hardcore Sub-Base	1.5 m <sup>3</sup>

# Bill of Quantities

1. Wooden Posts (pc)  
5cm x 5cm x 65cm



2. Wooden Planks (pc)  
2.5cm x 20cm x 4m



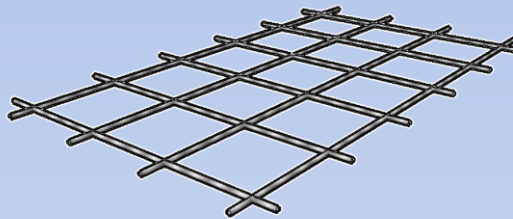
3. Wooden Planks (pc)  
2.5cm x 5cm x 4m



4. Nails 6cm (kg)



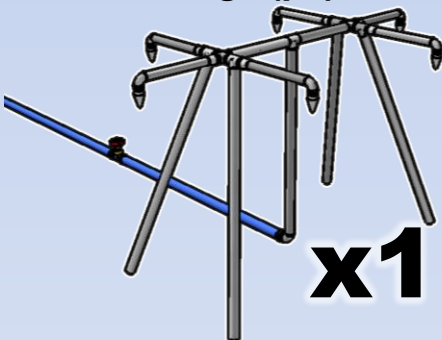
5. Steel Weld-Mesh  
6mmØ x 20cm x 20cm



6. Plastic Sheeting



7. Tapstand Assembly  
and Fittings (pc)



8. Cement 50kg (sacks)



9. Sand (m3)



10. Gravel (m3)



11. Compacted Hardcore  
Sub-Base (m3)





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## **SPECIFICATIONS FOR CONSTRUCTION OF WATER SUPPLY RELATED INFRASTRUCTURE IN REFUGEE SETTINGS**

### **300 SCOPE**

300.1 These design guidelines specifically define the quality of materials and workmanship to be used when constructing water supply related infrastructure in refugee settings. A description of principles of water supply programmes in refugee settings, in addition to technical options and their advantages and disadvantages, can be found in the UNHCR WASH Manual.

### **301 SITE SELECTION**

301.1 A basic requirement is that the site selected for water supply related infrastructure is free from the risk of high winds, flooding, subsidence, or erosion.

### **302 PREVENTION OF SURFACE OR GROUNDWATER CONTAMINATION**

302.1 UNHCR and WASH actors must ensure that all water supply related infrastructure including treatment systems and soakaway systems do not contaminate surface water or shallow groundwater sources. Risks are generally low and related to contamination from water treatment chemicals, water treatment by-products and sludges and contamination from wastewater.

302.2 All tapstands, or other water collection and usage points, should be equipped with adequately designed soakage systems located at least 30 metres away from groundwater sources. The bottom of any pit or soakaway must be at least 1.5m above the highest average groundwater table level. These distances should be increased for fissured rocks and limestone.

302.3 In some situations temporary groundwater contamination from on-site soakage systems may not be of immediate concern if the groundwater is non-potable. An example of this can be found in areas where groundwater is heavily saline beyond drinking water health limits of 1,500µS/cm<sup>2</sup>. In all cases, local legislation should be respected.

### **303 SPECIFICATIONS OF COMMON CONSTRUCTION MATERIALS**

303.1 Gravel used for constructing concrete footings and slabs must be clean and free from mud, dust and plant material. UNHCR and WASH actors must ensure that only aggregates between 6mm and 10mm are used to prevent inter granular crack propagation across load bearing concrete structures (e.g. tapstand floor slabs, water reservoir roof slabs, and columns used in reinforced concrete water towers) and to ensure an adequate covering of steel reinforcement bars.

303.2 Sand used for water supply related concrete works should be coarse (no fines), clean and free from mud, dust and plant material.

- 303.3 Water should be non-saline and free from organic matter.
- 303.4 Cement must be fresh (manufactured in the last three months) dry, and should be stored in a safe, dry, place at least 15cm off the ground. Mass concrete footings should be cast with a 1:3:6 concrete mixture with a minimum cement dosage of 240 kg/m<sup>3</sup>. Concrete slabs and drainage channels should be cast as single continuous structures using a 1:2:4 concrete mixture with a minimum cement dosage of 320kg/m<sup>3</sup>. Care should be taken to ensure that concrete mixtures are not over watered (bucket slump test should show no greater than ¼ reduction in the slump height). Cast concrete works should be immediately covered with plastic sheeting, straw, cement bags, sacking or leaves to keep the concrete moist and cool during the full curing period. The concrete should be cured with frequent watering at least twice daily for at least 10 days before use.
- 303.5 Reinforcement bars should be free from rust and of the correct type and size for concrete construction work (typically a characteristic yield stress of at least 210 N/mm<sup>2</sup>). Steel reinforcement should be placed as per the designs (to ensure the bars function correctly in tension) with at least 12mm concrete covering under every bar.

## 304 UNHCR STANDARD DESIGNS FOR WATER SUPPLY

- 304.1 The following drawings should be used in conjunction with these technical design guidelines.

D-30/2015a	Tapstand Design with Drainage – EMERGENCY
D-31/2015a	Tapstand Design with Drainage – POST EMERGENCY
D-32/2015a	Handpump Apron Design with Drainage
D-33/2015a	Hand Dug Well Design with Drainage
D-34/2015a	Generic Spring Design with Drainage
D-35/2015a	Raised Water Bladder Design - EMERGENCY
D-36/2015a	Raised Metallic Water Reservoir Design - EMERGENCY
D-37/2015a	Stone Masonry Water Reservoir Design – POST EMERGENCY
D-37/2015a	Brick Masonry Water Reservoir Design – POST EMERGENCY



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