INTERNATIONAL HUMANITARIAN PARTNERSHIP IHP

IHP OFFICE AND ACCOMMODATION HANDBOOK

PART 2: PRACTICAL FIELD GUIDE

- The site and site planning
- Services and functionalities

Version 2020.1

Contents

Chapter 1 – The site

1.1 Site selection and site planning overview

The following provides an overview of the aspects that should be considered when planning a camp site. This chapter further on provides more details on the aspects listed.

- Land Ownership
- Political and legal related issues
- Safety and Security related Issues
- Social and cultural issues
- Size of site
- Site features
- Location and conditions of the site (including access, available resources, infrastructure etc.)
- Access to consumables
- Environmental impact
- Hazards and risks
- Considerations for possible future development and needs

1.2 Site Selection and site planning

This section does not include exhaustive descriptions of every aspect of an office and accommodation set-up, but acts as a guidance to support the right questions and aspects to be considered. The site of a compound and how it is planned, have a critical impact on the surrounding area, health and well-being of guests, possibility to manage daily activities, environment, as well as sustainability.

Construction of the IHP Base Camp in Port Loko, Sierra Leone, 2015 (Ebola Outbreak).

1.2.1 Site selection

Following non-technical and technical aspects should be considered when selecting a site:

Non-technical aspects	Description
Land ownership	How can the land be used? Some agencies have policies of not offering financial compensation for land use
Political and legal related issues	Are there any sensitivity regarding the land or the location that may affect the use of the land.
Safety and Security related issues	Are there any safety and security implications and risks associated with the site and area?
Social and cultural issues	Cultural aspects such as ritual sites and holy places, land rights, seasonal usage etc.

Technical aspects	Description
Size of site	Enough space for planned facilities and potential augmentation.
Site features	Soil type, topography, vegetation, access routes etc.
Location	The first consideration is the location of the site, surroundings, central or periphery, isolation aspects, logistics and access etc.
Access to consumables	Water, fuel, food and other relevant consumables
Environmental impact	Is the site and the area sensitive? How will an IHP intervention affect the environment?
Hazards and risks	Are there any hazards, such as floods, that may have to be taken into account? What are the risks in the area and for the site?

Weighing/ranking - site selection methodology[1]

In most cases not all these considerations will be met and therefore it could be useful for the selection process to reflect on the relative importance between the various criteria. Try to define which of the variables are most important in the particular context and also define if there are some criteria which have a "veto" status and hence have to be fulfilled if a site can be selected.

A basic site selection methodology is to use the site aspects listed above, ensure that local authorities, land owners and requesting organization is included in the selection process, obtain suitable maps (or

[1] Jan Davies & Robert Lambert (2002), *Engineering in Emergencies 2nd edition*, 593-604

observations) topography, road networks, water sources, identify issues related to land use and ownership, make simple estimates of size (through GPS or vehicles trip meter or other tool).

Two main questions that should be asked are:

- If the land is not already being used for settlement, why not?
- If the land is being used for some purpose, what will happen if an office and accommodation facility is set up instead?

1.2.1.1 Land ownership

The requesting organization has the main responsibility to arrange with land owners and local authorities regarding land ownership, contractual arrangements and potential payments for the use of the land. It is preferred to have an agreement outlining the roles and responsibilities between the owner and the user.

Land ownership may be controversial in many countries, e.g. proper documentation might not be available, and in some instances government practice can be to overrule local/private land ownership. These factors may in some cases only be clear after the facilities has already been assembled, resulting in local animosity targeted towards IHP or the requesting organization. Land ownership issues must be identified and addressed as early as possible, and should preferably be confirmed before the start of construction and other preparations. Most often IHP is not able to choose from a selection of sites, but rather only one site is being made available.
The usage and/or potential payments for the use of land has been confirmed with land owner, and preferably outlined in an agreement with requesting organization.

1.2.1.2 Size of the site

The overall compound layout must be clearly envisaged when determining if a proposed site has the appropriate size. In emergencies, various agencies may be competing for the best site, and a 'first-come, first-served' basis is often the rule. Therefore IHP must be clear on whether the proposed site is suitable and also bear in mind that office and accommodation facilities, generally within the IHP history, have lasted longer than originally requested as well as has been expanded in terms of size.

Considerations:

Calculate the minimum requirement size of the compound by the following equation: 1500 m^2 + 20 m^2 per person accommodated person + 20 m^2 per office space + 15 m^2 per vehicle. Note that this equation does not offer space for a welfare area, and this should be added as needed.

Consider possible future changes and uncertainties and plan for possible expansion of the facilities

"The Sphere Project"

Fire distance between tents: min. 4 m. (wall to wall), and min. 2 meters between guy ropes.

1.2.1.3 Site features

Soil conditions

Soil conditions are important to consider when selecting and preparing for a site. For example what soil is covering the site and what is the condition of the soil, inclination etc.? How water will be absorbed or run off? Soils which absorb surface water easily are preferred, in particular for the construction and proper functioning of latrines. If soils are too sandy, latrines and other structures could collapse. Excessively rocky ground will hinder shelter and latrine construction. In general, the main structures of the camp should be at least three meters above the rainy season water table[2].

Geology and Topography

A gentle slope between 2–6% gradient will facilitate natural drainage. Flat sites may face drainage problems where water is abundant and could become muddy in the wet season. This can also lead to the accumulation of standing water bodies which, in turn, can become breeding centers for disease-carrying vectors such as mosquitoes. Very hilly areas – above a 6% gradient – are also not acceptable due to the lack of suitable building surfaces, the risk of landslides and water run-off problems. [3]

Trees and Vegetation

Trees, vegetation and topsoil at the site should be preserved to the extent possible in order to provide shade, reduce soil erosion, cut down on dust and speed the eventual rehabilitation of the site.[4]

Considerations:

Assess the soil conditions: Whether it is a soft clay or hard rock will create varying conditions for how water can pass through. Soil conditions will also affect the way to level the site.

To hinder erosion and flooding, the site should have a natural inclination up to 6 % but not less than 1 %. Also, the lowest point of the site should be at least three metres above the water level in the rainy season. Local information is most often available regarding how soil conditions vary throughout the year.

[2] NRC and the Camp Management Project (2008), *The Camp Management Toolkit,* 193-207
[3] NRC and the Camp Management Project (2008), *The Camp Management Toolkit, 193-207*
[4] NRC and the Camp Management Project (2008), *The Camp Management Toolkit,* 193-207

1.2.1.4 Location

When assessing the site, it is pertinent to consider not only if the site is large enough, but also if it is suitable in terms of location. What is the proximity of local neighbors, roads, markets, other humanitarian organizations etc.? What has the site previously been used for?

Considerations:

Assess what are the key benefits vis-à-vis the challenges of the location, for example regarding; distances to other actors, road networks etc.

Access to necessary resources: water, fuel and local markets (food and other consumables).

Accessibility – How can the site be reached by guest as well as temporary visitors?

Assess the risks and threats in connection to the site and the immediate surroundings and neighbourhood/area.

1.2.1.5 Hazards and risk reduction

Risks posed by hazards such as natural, biological, technological, intentional and environmental hazards should inform the planning of office and accommodation solutions. The facilities should not be prone to diseases or contamination or have significant vector risks. Potential hazardous materials and goods can be de-positioned or exposed following a natural disaster such as earthquakes and floods. When assessing and selecting a site it is important to take hazards into account. For example, are there any particular risks with the site or the area surrounding the site? For example, are there risks for flooding, mudslides, chemical accidents etc.? What risk reduction measures can be arranged for? Working in emergencies as a result of natural disasters, buildings are often affected structurally. The stability of on-site structures must be assessed by appropriately trained personnel.

Be aware and analyse hazards for the site and the area, regarding:

1) Natural hazards
    a. Geological – Earthquakes, landslides, sand storms, drought, wild fires etc. (In earthquake affected surroundings, consider the risk of collapsed buildings and infrastructure such as roads and bridges)
    b. Hydro metrological – rains, cyclones, hurricane, flooding etc.
2) Biological – diseases, pandemics, infestations etc.
3) Fire safety – risks inside camp as well as risk posed from surroundings (see also annex)
4) Technological – industrial, chemical spills, explosions, nuclear, transportation accidents
5) Intentional – bombings, shootings, kidnappings, assault, theft, sabotage, war etc.
6) Environmental – Land degradation, deforestation, pollution etc.

Considerations:

Consider risks due to hazards and inform the decision about site selection, for example: are the risks too high and the site should be changed? Can we mitigate the risks and remain? Can the site be moved?

Analyze the hazardous risks and put in place preventive or mitigating measures. Depending on the risk and probability of the risk to happen

Additional equipment (e.g. fire systems, protective equipment etc.)

Use of local materials (sun protection, wind barriers etc.)

Drainage

Water resources

Position of hazardous substances (e.g. fuel, chemicals nearby etc.)

Establish fire distances and cut vegetation, planting of trees

Secure infrastructure – Secure things to the ground, strong/additional rain covers etc.

Hygiene measures – both in terms of materials available, daily routines, procedures, behavior

Access routes, diversion of traffic, access of people etc.

Additional or specific medical equipment

Information sharing and contingency plan

Safety marking of the passage / fire break between tents. An example of a simple yet important safety measure to prevent accidents from people stumbling on pegs or guy ropes – as well as marking passages and escape routes inside the camp.

1.3.1 Site planning

Site planning is one of the most vital aspects for the physical establishment and construction of the office and accommodation facilities. To a large extent the site selection and land ownership determines the limitations and opportunities for the IHP support team to establish the facilities.

The physical organization of the site will markedly affect the health and well-being of the guests staying in the compound. Properly arranged site planning will also facilitate an efficient delivery of services. Site planning should preferably, and to the furthest extent possible use an inclusive approach when deciding about the characteristics and set-up of the facilities. That means that it is important to discuss and get an approval of the site plan by the requesting organization (I.e. the main user of the facilities.) and potential other stakeholders. This is even more important when constructing more permanent structures such as local construction of fixed buildings and prefabs.

The key aspects outlined below should be an integral part of a site assessment and site planning. The key aspects of site planning are:

1) Master plan or site plan - A "master plan" or overall site plan should show the overall configuration of the site, its surroundings and characteristics, and its proximity to natural and existing features, such as buildings and roads, as well as the measurements of the site.

2) Functions - The following functions (or sub-modules), services and infrastructure should be referred to when preparing the master plan:

Type of facility		Properties (Measures/no./sizes)	Notes
Total camp area	Total space	Minimum 30-45 m2 per person	Minimum requirement of 30-45 m2 does not include area for parking space, generators, water purification, storage etc.
Living area	Covered space	Minimum 3-5 m2 per person	Should preferably be located separate from office area
	Fire breaks	50 m of empty space every 3000 m2 of built area	Firebreaks should be situated between blocks. If space allows, the distance between individual buildings should be adequate to prevent collapsing, burning buildings from touching adjacent buildings. The distance between structures should therefore be a minimum of twice the overall height of any structure. Walking between facilities is important, especially

			from a security perspective, and hence tent straps should not prevent that possibility. It should be clearly marked if a certain space is usable for escape or walking path or not.
	Water points	No standards currently	
	Latrines	One toilet per 8 persons, plus urinals	Gender separated. Located close to the water distribution point to reduce the need for lengthy piping.
	Washing facilities	No standards currently	
	Refusal	Sufficient refusal stations/bins, preferably close to origins of refuse	Should be designed not to attract animals and vectors
Working area	Covered space		Should preferably be located in connection to meeting rooms and reception area. Should be separate from accommodation
	Water points	No standards currently	
	Latrines	No specific standard ratio for working area	Gender separated. Separate from accommodation latrines and for temporary visitors
	Washing facilities	No standards currently	Consider the need for washing facilities for guests, guards etc.
	Refuse bins	Sufficient refuse stations/bins, preferably close to origins of refuse	Centrally located and emptied regularly
Health area	Infirmary		Located in a calm area. Access to water and sanitary facility is important.
Roads and pathways		A site should have access and internal roads and pathways connecting the various areas and facilities. Access roads should be all-weather roads above flood	Trade-offs should be made between networks of roads which allow privacy and protection and those which allow quick access to

		levels and have adequate drainage. If there has to be a significant amount of vehicle traffic on the site, it should be separated from pedestrian traffic.	emergency vehicles and good lines of sight for security patrols. All roads and pathways need to be cleared of surrounding bushes and should, where possible, be provided with some lighting during the night for security reasons.
Common areas	Meeting room	Should preferably be positioned close to the office and entrance to the site. Should be kept separate from the accommodation area.	Can be made with local materials – e.g. "Tukul".
	Recreational areas	Ensure that there is some shaded space for leisure activities, such as a small gym, social area etc.	For security reasons, recreational areas should be relatively centrally located, cleared of surrounding thick bushes and at safe distance from roads used for heavy traffic.
Dining area	Kitchen		For hygienic reasons kitchen staff should always have access to separate toilet including hand wash
	Canteen		
	Storage		
Reception		Administrative and other facilities should be located and designed so that they are accessible to all and preferably close to the entrance	
Water supply	Water pipes	Water pipes should be kept at a depth that traffic or other surface activities do not cause damage (40 to 60 cm). In countries with very low temperatures, the pipes must be positioned at frost free	Overflow and used water from water supply points should be well-drained and eventually absorbed in soakage pits or used to irrigate gardens.

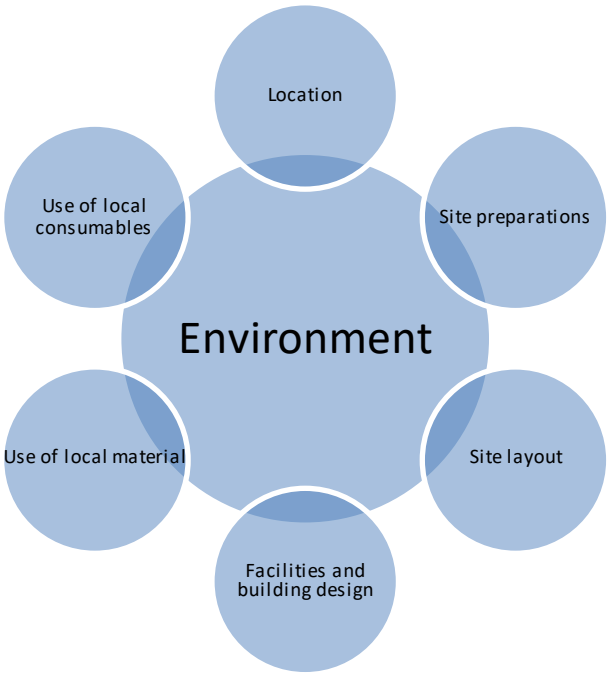
		depth (60 to 90 cm)	
Power supply		Consider the distances to the accommodation area, since generators can be quite noisy.	Power supply should always be located close to entrance, for easy fuel delivery. Consider constructing a wall to shield from the noise.
Dangerous goods		Should be located in a safe area with limited access and traffic. Also consider distance to external walls etc.	
Religious facilities	Praying rooms/area	Consider the need to establish praying rooms. Should be located with easy access.	Consider also a calm location, e.g. not close to generators.
Access	Enter points and exits aspects	Consider incoming supplies, such as fuel, water, staff etc. Access points – gates – minimum two access points.	
Security			
Lightning		Perimeter lighting and area lighting	
Parking area		Consider the size of the parking area.	Parking area should always be close to the entrance.
Persons with specific needs			Consider need for wheelchair access – build ramps of local materials

1.3.1.1 Environmental considerations

Environmental considerations should be integrated into site selection and site planning from the very start of the operation. Location and layout, and the use of local resources for construction and fuel can have a negative environmental impact. Environmental damage has health, social and economic consequences for the local population, and can have political repercussions. It can also affect the guests staying in the facilities.

Sites that are exposed to flooding, high winds, significant snowfall and other environmental risks should be avoided. In some cases, these risks may not be evident until a new season approaches. Consulting with local actors can help prevent or at least predict environmental risks.

Please refer also to *Annex 6: IHP and UN common standards for base camps and sustainable solutions.* This annex lists a broad aspect of important factors, regulations and recommendations with regards to the construction and running of a base camp and the greening options implied.

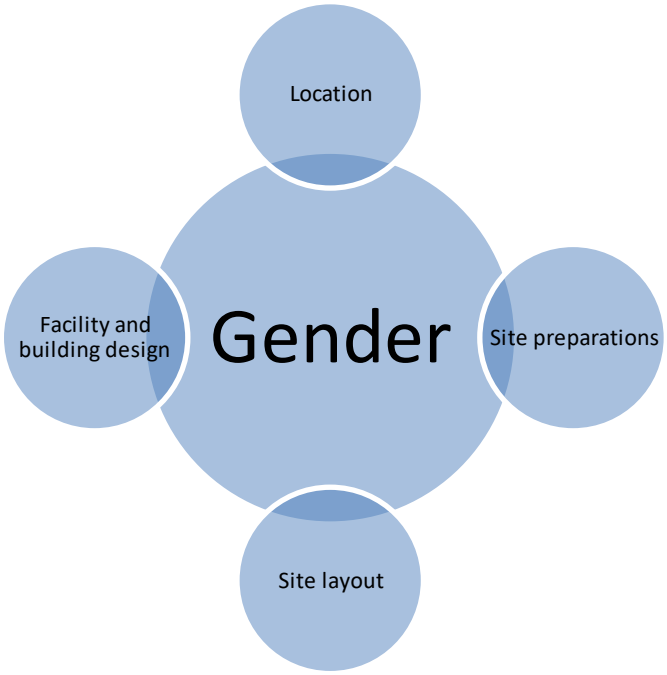


Aspect	Description/guide	Notes
Location	Avoid sites close to environmentally protected or sensitive areas.	
Site preparation	Discriminately preserve existing vegetation and top-soil. Plan carefully for drainage canals and their possible impact on the surroundings (erosion, water accumulation).	
Site layout	The layout (particularly roads) should follow contour lines. This will reduce erosion, preserve topsoil, and	

	avoid the creation of dangerous gullies.	
Facility and building design	Energy-saving through insulation: in cold climates, with extended winter seasons where continuous heating is needed, passive energy saving measures, e.g. sufficient insulation of roof, walls, and floors can save significant fuel and prove cost-effective over time. In hot climates insulation is equally important to ensure efficient air conditioning and keeping generator fuel burn low.	
Use of local materials	Materials for construction and development of a base camp often come from the immediate surroundings and markets of the site. It is crucial at the outset to initiate a system to manage and control the use of local natural resources including cement, wood for construction etc.	
Use of local consumables	Consumables (water, fuel and food) often come from immediate surroundings and markets close to the site. Consider consumption reducing measures in order not to overload the available local resources.	

1.3.1.2 Gender considerations

It is important that the specific needs of persons are taken into account in site selection and site planning. Consider who will be living and working in the facilities and ensure that the overall planning takes various needs into account. Gender aspects may affect several aspects of site planning as per the following:



Aspect	Description/guide	Note
Location	Staff movement, closeness, risks	
Site preparations		
Site layout	Zone-division – e.g. office and accommodation	
Facility and building design	Gender - separate/distances/lighting Local vs. international	

Target group - Identify as early as possible who will be using and potentially affected by the planning and design of the facilities and how this affects the implementation.

A condition for the participation of more women in international assistance is that the accommodation is adjusted both for women and men by, for example, there being separate shower rooms and privacy when changing. That is why it is important as early as the planning stage to think about how the facilities will function and be acceptable to everyone: by finding out which particular needs women and men have and how they can be met.

Make sure that a gender analysis is carried out during the planning of the intervention. This analysis involves, among other things, finding out from where information is gathered and gaining an impression of women's and men's needs. Establish who will live and work in the facilities. Find out if they have any expressed wishes and needs on how it should be designed. Do women and men have different needs? In this way you can try to minimize the risk of being surprised by problematic situations and needs that you had no prior knowledge of.

If you plan to set up an inner cabin as a divider and it requires extra electricity–do not forget to inform the electricians, preferably as early as the planning stage.

If a prayer facility is to be erected make sure that there is a separate section for women to congregate for prayers.

Have you asked or listened to women in order to find out their needs and points of view?

What will the hygiene areas look like? Is it okay for the women to shower in the same area as men or is there a need for divided space for separate showers? Are private areas for changing clothes and hanging up underwear needed? Do you plan to have washing facilities out in the open for personal hygiene (e.g. shaving, washing hands and face)? Be sure to consider possible gender issues here also.

What will the sleeping areas look like? In what way do they correspond to women's and men's different needs?

How is the lighting set up in the different parts of the camp? How does it correspond to women's and men's different needs?

Are the areas of the camp where women stay near lighting and people or out of the way and private?

1.3.1.3 Physical access considerations regarding patients and disabled[5]

In some cases it might be necessary to take into account the physical access conditions for patients and disabled persons. This chapter lists some of the most important considerations.

Generally:

- Pathways to places accessed by patients (such as latrines) should be flat or ramped where necessary, and the ground should be compacted or levelled to facilitate safe, independent access for people with restricted mobility, such as those using a wheelchair or crutches, older people and pregnant women.

[5] WHO guide for Emergency Medical Teams: *Minimum Technical standards and recommendations for rehabilitation.*

- At least one latrine should be gender neutral to allow a care provider of the opposite sex enter with the patient.
- Any ramp should have a gradient of 1:20 and be equipped with a handrail 85–95 cm high (adjusted to the average height of the population).
- Doors should be 90 cm wide; if possible, sliding doors should be used, otherwise, they should open outwards.

Latrines

- The minimum surface of a latrine should include a turning circle of 150 cm to allow full manoeuvring of a wheelchair (ISO measurements are 80 × 130 cm).
- Grab bars should be mounted at a height of 85–95 cm from the floor.
- Latrines, commodes or other seat adaptations should be 45–50 cm high and 45–50 cm from the wall on which the grab bar is positioned.
- Washbasins should be 65–70 cm from the ground and extend 35–45 cm from the wall.

Doorways

- Operational devices on doors, such as levers or pull handles, should be easy to grip with one hand.

Showers and washrooms

- Showers or washrooms should have a seat 45–50 cm high, positioned for easy access to the showerhead or water source.
- A grab bar should be positioned on the wall opposite the seat and around the back wall, mounted at a height of 85–90 cm.

1.3.1.4 Site planning and construction plan[6]

When planning for the establishment of the site and starting the construction it is important to accurately plan for the various activities and in what sequence they need to be handled. The following construction plan is a tool for structuring the site planning and construction. There are several positive aspects of using the chart as per the following;

- It clarifies dependencies between tasks
- It clarifies tasks and time frames
- It simplifies the communication and information with the team
- It simplifies the communication with requesting organization and contractors
- It specifies roles and responsibilities

[6] Jan Davies & Robert Lambert (2002), *Engineering in Emergencies 2nd edition*, 593-604

Example of construction planning chart and timeline							
	Task	Responsible	Week				
			1	2	3	4	5
1	Security assessment						
2	Location of site						
3	Plan layout and master plan						
4	Site drainage and ground preparations						
5	Start of construction						
6	Water supply system						
7	Site ready for guests						
8	Other						

1.3.1.5 Site preparations

Identify what necessary site preparations are needed. Once a decision has been made by the IHP Team Leader and relevant parties regarding the proposed site, it is time to prepare the site and make it suitable for the construction of the facilities. Be aware that the requesting organisation and others will very often have the need to accommodate and use the facilities even while the construction is not finalized. The Team Leader should make a plan for when the first guests will be able to move in and communicate this clearly. When addressing this issue, consider whether it will be possible to temporarily erect a few tents or prefabs instantly, which can be used at an early stage before the full compound is finalized.

Considerations:

Consider if it is relevant to level the site before establishing the facilities?

Consider if equipment or heavy machinery is needed?

Consider if it is necessary to harden the area? If relevant, buy stones, gravel or slabs etc. to harden roads and pathways.

Assess the soil conditions, with regard to how stones can rupture a tent floor over several months, how will the soil wear the tents or affect the prefabs or other structures? If water manages to wash under tents, it will reveal more stones/rock. Is it possible – with regard to time and resources – to distribute a layer of soft sand under the tents?

Establish a plan for the guests to move in and notify the requesting organization.

Consider if it is possible to dig in the ground (for wells, infiltration beds etc.)

Preparation of foundations for prefabs

1.3.1.6 Drainage

It is paramount to prepare the site with sufficient drainage; failure to do so has previously implied that sites have had to be rearranged, which is a time-consuming activity. Even small amounts of rain can wash away the foundation under tents and prefabs. The IHP Team Leader should plan for a complete drainage network, taking into account the natural contours.

Drains should be dug along the facilities and other structures. A drain should be roughly 20 cm deep, and if filled with large stones, the drain will not collapse and the stones will allow passage of the water. Note that stone-filled drains will clog easier and does require maintenance. If drains need to cross pathways, use pipes.

Considerations:

Drains should be dug along tents and other structures, minimising erosion and flooding.

Consider the drainage system's impact on the immediate surroundings to prevent problems there.

A drain should be roughly 20 cm deep, and if filled with large stones, the drain will not collapse and the stones will allow passage of the water.

If a drain needs to cross a pathway, use a pipe to lead the water under.

Plan for any waste water, which might eventually add pressure on the drainage network.

Maintenance of drains is important – keep an eye on them regularly, especially after rainfall.

Chapter 2 – Functionalities

2.1 Maintenance and service

Correct handling of facilities in all of the phases is pertinent. If the equipment is set up without proper training and is not maintained accordingly, it will rapidly degenerate and reduce the life span drastically and potentially become unusable.

All tools are important for the maintenance and further life of the facilities and should therefore be taken care of and maintained deliberately.

All equipment is vital to the functioning of the facilities and should be maintained, and if necessary repaired in such a way that it can still perform its duty to the fullest extent possible.

All parts not used should be saved as they might be needed for repairs later on. This also includes spare parts.

2.1.1 Maintenance and service plans

In order to take necessary care of the facilities and provide required maintenance and service of all facilities, equipment and tools it is recommended to develop maintenance and service plans. Preparing maintenance and service plans will also support the handover of facilities to requesting organisation and their personnel. The plan intends to define the maintenance requirements and the necessary timing, for example as per the following time frames:

- Daily maintenance
- Weekly maintenance
- Monthly maintenance
- Yearly maintenance

Sample maintenance plan (Maintenance and Service checklist)

Aspect	Type of maintenance and service	Interval	Responsible	Notes
Sanitation	Daily cleaning and inspection of hygiene aspects. Refilling of consumables.	Daily	Cleaners	
	Monitoring of pipes to detect leakage. Emptying of collection tanks.	Weekly	Camp Technician	
Accommodation	Cleaning	Daily	Cleaners	
	Inspection of equipment	Monthly	Camp Technician	
Power supply	Refueling of generators	Daily	Electrician	
	Control of cables and switches for damage	Monthly	Electrician	

Water supply	Monitoring and maintaining water purification- and water supply system, incl. water quality testing	Daily	Camp Technician/Plumber Water purification technician	

2.2 Accommodation

The accommodation facilities of the base camp are fundamental to the entire living conditions in the camp. Here the IHP aims at providing comfortable, sound and private conditions to the largest possible extent. One may argue that a tented base camp has its natural limitations. Still, experience confirms that living conditions and experienced standards can be quite high and satisfactory in an IHP Heavy Base Camp. Even higher standards can be achieved by using or supplementing the Heavy Base Camp with prefab construction. (Prefab solutions will be described further in a later version of this handbook).

As a standard IHP provides individual cabins/rooms for each resident. A cabin is usually equipped with the following:

- Comfortable field bed with mattress
- Sleeping gear (duvet/quilt or sleeping bag, pillow and linen)
- Small table
- A simple wardrobe or storage solution for clothing and personal belongings
- Lighting
- Power sockets

The cabin and accommodation tents should be able to be closed completely in order to keep free from insects etc. Each cabin should be able be locked by means of a padlock.

Example of an accommodation tent with individual cabins installed.

The camp administration should continuously maintain a booking and resident plan in order to keep a detailed overview of who is living in the camp at any given time. This is a safety issue as well as a practical matter in order to be able to plan for and provide necessary cleaning and washing of sleeping gear during accommodation and in between inhabitants.

Please refer also to Annex 6 regarding common IHP and UN accommodation standards. For booking and resident overview please refer to the "IHP occupancy and booking tool" (excel sheet).

Accommodation tents as well as other tents such as kitchen/canteen, offices and sanitary facilities should be ventilated as well as heated and/or cooled according to the actual climate.

Tents such as accommodation and office tents are installed with fire detectors and escape lighting.

2.3 Water supply and distribution

Water is one of the key consumables and prerequisites for being able to deliver and run an office and accommodation facility. Any facility should be able to supply running water for washing, cooking and drinking.

2.3.1 Water supply system[7]

A water supply system is a combination of structures with the following components:

- Water supply and demand - Extraction from the source, and its protection
- Purification/treatment of the water
- Distribution network
- Storage
- Waste-water disposal

2.3.1.1 Water supply and demand – Extraction from the source, and its protection

Office and accommodation facilities should be provided with running water for washing, catering and drinking. In emergencies the demand for water is high, scarcity of water due to damages to supply systems and sources, and limited reliability of supply. Hence, there needs to be continuous monitoring and maintenance of the water supply system as well as adequate water storage for spare capacity to meet temporary shortage of water. Hence, it is important to consider the efficiency of the water system, for example to avoid water wastage from tap stands, other system losses and ineffective water usage.

Ensure that the aspects of water supply are taken into account during the site selection and planning stages as well as in connection with environmental consideration and sanitation measures.

Rain water, ground water from springs and wells or water from public and private systems are usually of better quality than surface water from sources such as rivers, lakes or dams.

- Surface water should be considered to be contaminated and must be treated prior to use

[7] UNHCR (2007), *Handbook for Emergencies 3rd edition,* 239-245

- Physical protection of the source from pollution will be essential
- New or repaired sources and equipment should be disinfected before use

Any use of groundwater use must be checked in regards to what IHP has the possibility to do as per local regulations.

Source and mean of delivery	Description	Advantages	Disadvantages
Water truck or tanker	Local contractors managing the supply of water.	Support to local market. Benefitting from local know-how and logistics.	Reliability, quality and capacity of supplier.
Well	Gravity, ground conditions, location – not close to waste, septic tanks	Independence	Environmental concerns, legal and local restrictions, availability of water.
Pipeline			Seldom available or closely located to the sites that IHP operates. Often not possible to connect to local networks.
Bottled water	Bottled water may be the only option for safe water supply in the early stages of a sudden onset emergency. Either brought in or procured locally.	High quality.	Only a short term solution, environmental impact in terms of large amount of waste. Costly.
Surface water			High risk of pollution

2.3.1.2 Water quality and quantity – Purification/treatment of the water

Water is a valuable natural resource; over consumption will affect the local communities. Therefore, calculate the water requirement and try to design your water system as efficiently as possible. The water requirement calculation should be based on the expected number of staff residing in the compounds, and as a standard figure of 50 liters per person per day (excluding leakage). 7 liters for absolute minimum

survival at any time must be ensured. Note that minimum water needs vary, and it increases with temperature and physical exercise.

The camp must keep a reserve of water of 3 times the daily use - e.g. 150 liters per person. This can be stored either as raw water or purified water, depending on what is deemed most appropriate under the given circumstances.

	Standard
Minimum for survival	7 liters /day/person
Minimum	20 liters/day/person
WHO target	70 liters/day/person
IHP target	50 liters/day/person

Explore potential water sources and assess all sources in terms of their water quality and yield. Water quality can be difficult to evaluate in the early stages of an emergency. Therefore, as a starting point always consider that treatment will be needed to make the water safe to drink, due to the assumption that all water during emergencies is contaminated.

Monitoring of water quality - The water must be safe, and therefore it is required to test the physical, chemical and bacteriological quality of water before use. The water should be regularly tested in a camp lab. The camp lab is a designated area where the conditions for testing are good. IHP should bring equipment to test the quality of the water and the qualified personnel to perform it. The water quality should be in accordance with WHO standards.

Usual water quality testing parameters include:

- Indicator tests - physical properties:
  - Turbidity
  - Conductivity/TDS/Salt
  - pH
  - Color, odor, taste

- Chemical parameters - depending on the actual raw water properties and quality in the particular area. For instance:
  - Calcium carbonate, magnesium carbonate (results in scaling)
  - Metals
  - Nitrate
  - Ammonia
  - Chlorine
  - Phosphorous
  - Arsenic

- Biological parameters. For instance:
    - Total coliform bacteria
    - E. Coli
    - Enterobacter
    - Overall indication of living organisms (e.g. ATP-metry)

Groundwater levels of wells should be checked frequently to verify the sustainable use of the resource capacity. Also the quality of the raw water should be tested regularly in order to assess implications on the water purification plant and its performance and ultimately the quality of the drinking water.

2.3.1.3 Distribution network

Water has to be distributed within the compound to the users, for example from water storage to toilets and showers and kitchen. The following components of the water system distribution network should be considered:

- Water pressure
    - Water tower
    - Pumps
    - Hydrator (hydrophore)

- Piping
    - Dimensions (capacity)
    - Distances from supply and utilization (pressure drop)
    - Marking of pipes – especially important in a larger or complex network
    - Underground piping to prevent the water from heating in the sun, or freezing in the cold

- Minimize distances to consumptions
    - Kitchen
    - Toilets
    - Showers
    - Laundry
    - Hygiene / washing stations

2.3.1.4 Water storage

Water storage may be the only means of ensuring a constant availability of water to cover the needs. Bear in mind that 3 times the amount of the daily use must be stored at all times. This may be either in raw or purified form or a combination of the two. . (The camp manager can deviate from this demand if access to bottled water is guaranteed and abundant). The following must be considered when storing water (none exhaustive list):

- Once purified water is stored, there is an increase in risk of living organisms proliferating. Therefore, do not store more purified water than necessary from a consumable perspective. Running water, and a good balance between production and use, is a good precaution for ensuring safe drinking water.

- Storing raw water is often the better approach – as long as the purifications plants are stable and safely working. Storing raw water automatically increases settling of impurities and particles which enables a cleaner intake of raw water in the purification plant, bearing in mind that raw water must always be taken in from the top of the raw water tank.

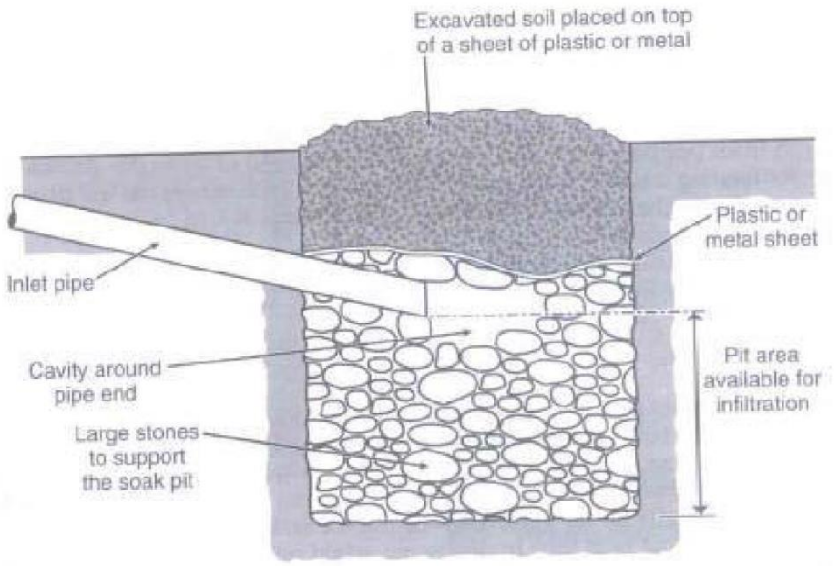
- If a raw water tank is exposed to direct sunlight for longer periods of time it may result in heating of the water resulting in even higher proliferations of living organisms and increasing stress on the purification plant due to impurities as well as and high temperature. Therefore, shade the raw water tanks.

2.3.1.5 Waste-water disposal

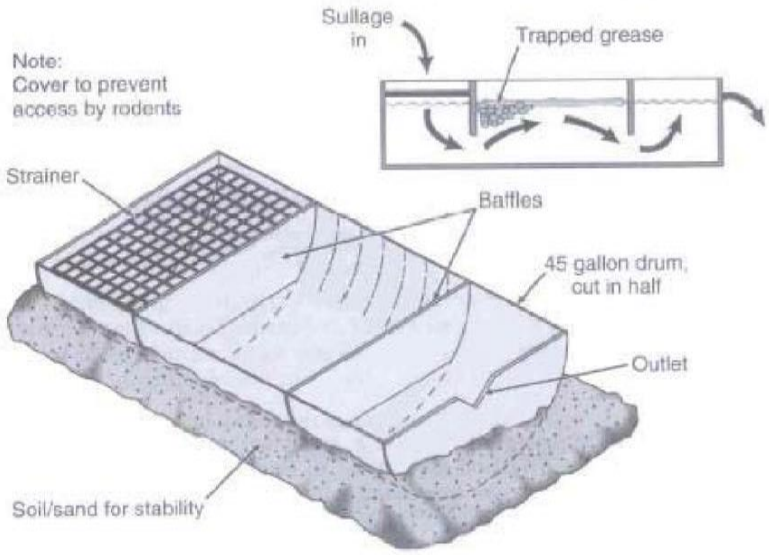
Wastewater is produced in large quantities, from showers, water taps, hand washing stands, kitchen facilities or similar. Environmental issues must be considered when diverting this water into the local ecological system. Also, local rules and regulations are to be considered and observed.

In the early stage of a base camp construction it might be necessary to collect and dispose black and grey water together. But **as soon as possible black and grey water should be separated and disposed individually**. The black water is always the more critical part. Make sure that the black wastewater is disposed in a hygienic and suitable manner not causing problems – neither health, cultural or political problems.

A relatively simple way of dealing with the grey waste water is to construct a soak away digging a large hole or channels and fill with stones and pebbles. From here the water will permeate into the ground. See figure below.



From the kitchen amounts of fat and grease from food production will be discarded. This grease will tend to clog pipes and drainage. Therefore a grease trap is a good measure in order to ensure the continuous outflow of the grey waste water from the kitchen. See figure below for a simple construction of a grease trap.



2.3.2 Environmental concerns/hazards regarding water[8]

Sustainable exploitation of water sources, wastewater management, improved drainage for storm water to avoid water-induced hazards etc. The following provides a generic list of potential environmental impacts associated with water and related activities:

- Depletion of the source as a result of unsustainable extraction or collection of water.
- Contamination of the local water (surface and subsurface) regime due to improper disposal of waste water and human-waste, faulty design and operation/maintenance of the piped water network, excessive extraction of groundwater (salt water intrusion in case of coastal zones and other harmful constituents in the local geological formation).
- Impacts to local environment due to construction and operation of water supply system (physical structures and chemicals if used). Impact on social environment caused by potential conflicts with the host communities when sharing the same water sources.
- Inappropriate drainage, soil and water conservation measures as well as poor water management in irrigation systems may lead to erosion, floods, groundwater contamination and soil salinization.
- Sites close to open streams or over unconfined aquifers may cause downstream contamination

[8] UNHCR emergency handbook

2.3.3 Water management

- Protect existing water sources from pollution and provide good quantities of water of a reasonable quality.
- Improve access to supplies by developing sources and a storage and distribution system to deliver a sufficient amount of clean water, including a reserve supply.
- Ensure regular testing of water quality.
- Set up a support system for operation and maintenance as well as carrying out adequate monitoring.

2.3.4 Water supply and distribution checklist

- Protection of water sources and scarcity of water is considered when planning for water supply into the site
- The best use of water source is considered depending on available options and efficiency of the system is monitored.
- Regular testing of water quality is conducted
- Water storage capacity is developed to create additional capacity in times of water scarcity.
- Water distribution networks
- Safe waste water solutions are implemented and contamination of ground water and the ground is avoided.
- Acknowledge that IHP's responsibility does not only lie within the boundaries of the site. Hence all waste water handling through local contractors should be monitored closely.
- Depletion of water sources is avoided

2.4 Sanitation

Sanitation is of highest importance in a base camp and a request for high service levels can be expected from client, partners, staff and users in general. Tented sanitation solutions are quickly established and they are also traditionally the "standard" solution in a Heavy Base Camp provided by IHP. However, sanitation facilities in the form of prefab solutions should also be considered – especially in longer term missions – as they provide the possibility of achieving even higher hygienic standards.

The IHP base camp should provide all residents with the availability of regular showers and toilets. Further, showers and toilets should under normal circumstances be able to provide the user with absolute privacy.

The physical form of toilets should take into account culture sensitive issues, such as gender separate entrances to toilet areas, and whether it should be a bowl or a squatting toilet. The importance of proper hygiene after defecation cannot be overestimated. Hence there should be a plentiful supply of soap, disinfectant and running water in connection with toilet facilities.

The camp manager should consider:

- Showers must be cleaned every day. Inform the inhabitants when the showers are closed for cleaning.

- Toilets should be cleaned at least once every day, if possible continuously throughout the day. Ensure several daily inspections of toilets as well as of soap, toilet paper, etc.

- If combustion toilets are installed, it should also be checked that there are enough filter bags for these. The combustion toilet needs some instructions before use and should primarily be used for/by staff.

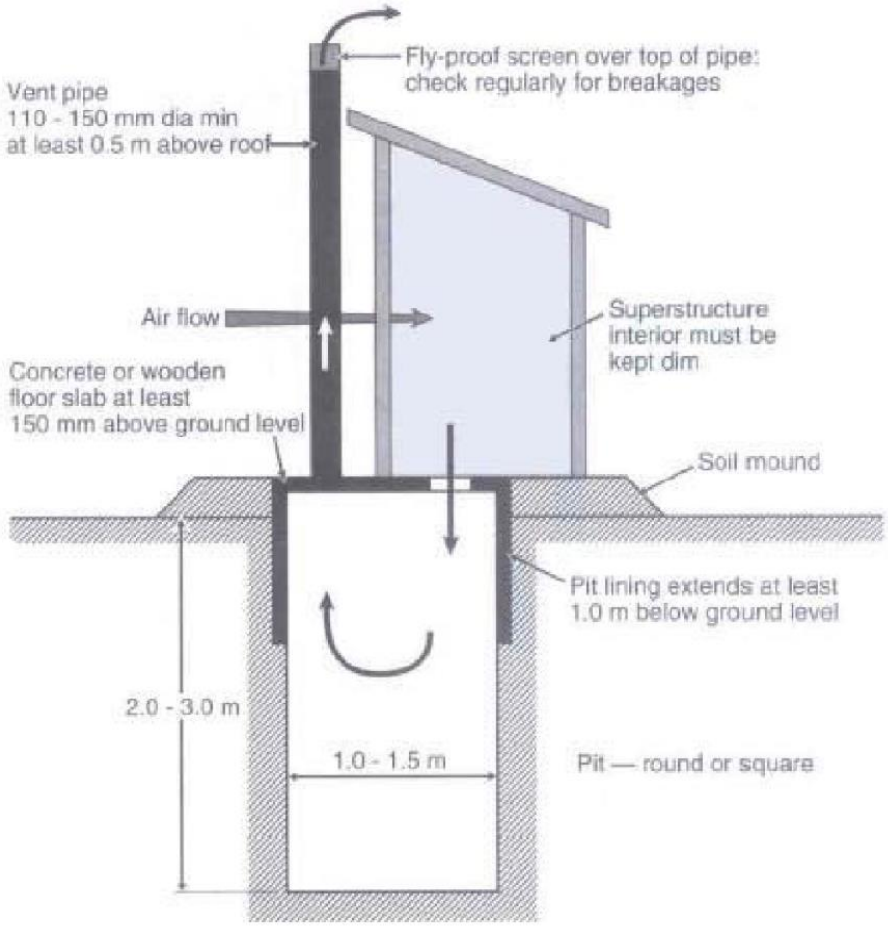
- Ensure hand washing facilities in more than one place:
    - In front of the dining hall to lessen the risk of bacterial infections
    - Next to toilets
    - Other strategic places depending on hygienic circumstances, disease outbreak situation etc.

- In some cases (due to religious reasons) facilities should be separate for women and men

- In some cultures it is not correct having your backside in a certain direction, e.g. some Muslims refrain from having their back towards Mecca when defecating.

	Standard	Distances	Other
Toilet	Max 20 people/toilet (Sphere) Max 6-10 people/toilet (UNHCR) Max 8 people/toilet, plus urinals (IHP/WFP)	Not more than 50 m or 1 min walking distance. 30 m from groundwater source. Bottom of latrines should be at least 1,5 m above	Drainage or spillage from toilets does not run towards surface water or groundwater sources. Should be gender separated and ensuring personal privacy.

		water table.	
Showers	8 people/shower (IHP/WFP)		Should be gender separated and ensuring personal privacy
Solid waste		Minimum 15 m from a refuse container or refuse pit (sphere)	
Key planning indicators (Jan Davies & Robert Lambert (2002), *Engineering in Emergencies 2nd edition,* 608)			



The availability of water will be a factor in deciding on a sanitation system. Pit latrine systems do not need water to function; but showers, washing, laundry or pour-flush toilet facilities all require water. Consider the following aspects when designing your sanitation system:

- Gender separated /cultural differences
- Location – where to locate at the site (smells, guest/public toilet, accommodation, walking distance etc.)
- Location vis-à-vis septic tanks
- Confidentiality
- Lighting - preferably equipped with sensors, which allow it to only illuminate when the toilet is in use. This to avoid accumulation of insects that are attracted to light sources.
- Drainage
- Sanitary facilities for kitchen staff preferably to separate

Sewage

- Infiltration
- Septic tank – has to be ensured from water not coming in or out – safe connections. Ventilation to be installed.
- Waste water truck – important to monitor and ensure that the end location of the waste water is safe.
- Re-use of waste water – Consider how to reuse the waste water – E.g. grey water may be reused.

2.5 Power supply

In an emergency, four most important uses of electrical power are usually lighting, pumping water, air conditions and ICT.

The camp must be able to provide electricity for the running of the camp 24 hours a day. Electrical safety is of high concern, and electrical connections and sockets should be safe and protected from intruding water. Electrical installations and components remain the responsibility of the camp electrician as long as IHP is running the camp.

Electricity standard:
400/230 Volt 50 Hz

Electrical safety rules[9]

Ensure that workers understand and follow simple safety rules and apply them:

- If the work is remote from a distribution board or generator, disconnect the supply at the isolator, remover the fuses and leave a notice explaining what is happening
- Never assume wires, equipment or electrical enclosure or panels are dead, always check first. When using a tester, check that the tester is working correctly by trying it on a known live circuit first.
- If in doubt, do not try something to see if it works. Always ask first
- Damp or sweaty skid reduces resistance, so keep hands dry when working

[9] Jan Davies & Robert Lambert (2002), *Engineering in Emergencies 2nd edition*, 438

- Before switching on after installation or maintenance work, ensure that everyone concerned has completed their work and that everyone knows power is coming on again.
- When installing electrical equipment, ensure that all cables are properly insulated and protected and that proper grounding is provided, fuses and circuit breakers are an essential safety feature. Do not try to override them.
- RCD's should always be installed in the camp.

If a person is receiving an electric chock:

Do not touch them or you will also receive a chock

Switch of the power

Of the power cannot be switched off quickly, pull the person clear using dry non-conducting material such as thick clothing or a loop of rope. Alternatively, push them clear using a dry stick.

Carry out artificial respiration ti the person is not breathing.

Obtain medical help as soon as possible.

2.5.1 Generators

A generator must not be run inside a building without adequate ventilation and removal of the exhaust gasses. A generator must not be operated unprotected in the rain unless covered with weatherproof protection. A major breakdown of a generator would cause critical problem, it will be necessary to have a complete standby generator available as an immediate replacement for the damaged unit.[10]

2.5.2 Solar power

Solar power may be appropriate for low-power applications, especially in remote locations where fuel supply is problematic. To maximize input, modules should be tilted towards the sun at the same angle as the latitude of the location. However, it is recommended to tilt panels at a minimum angle of 10^{o}.

Solar powered solutions should be implemented to the greatest possible extent, especially for longer term applications.

2.5.3 Diesel and fuel

Diesel and petrol is a major risk factor, due to flammability and the risk of theft. It is therefore important to have safe storage, established routines and practices when handling the fuel. Fuel records should be established and close monitoring of fuel levels should be arranged.

Prevention measures:

[10] Jan Davies & Robert Lambert (2002), *Engineering in Emergencies 2nd edition*, 438

- Marking drums, jerry cans and other containers with the content appropriate color (diesel: green, petrol: red, oil: orange, water, blue) to minimize mistakes.

- Various fuel items, lubricants should be stored separately from water and other liquids. Also, fuel and other hazardous materials should be stored away from accommodation, office and catering facilities.

- Post signs clearly stating:
  a) no smoking, and
  b) position of fire-fighting equipment

- When running generators and re-fueling them, experience has shown that diesel is often spilled on the ground. Therefore all generators and fuel handling mechanisms should have a concrete foundation; any fuel spilled on the concrete can then be picked up with dry sand, a spill kit or similar. IHP cannot allow for the camp to pollute the soil, not even in emergencies.

- It's a good idea to use a diesel purification unit for maintaining stable operation and saving the length of the gen-set.

NOTE:

Petrol will deteriorate quickly in high temperatures. Diesel is not as sensitive as petrol but can show negative effects in low temperatures.

Analyze the quality of diesel, and if diesel purification is not available, do not refuel from a storage tank that has been filled in the past 24 hours, in order to allow for sediments to settle in the tank.

Place all the fuel drums in shaded area to hinder condensation and pressure expansion.

2.6 Health and hygiene

Health and hygiene aspects at office and accommodation facilities are important as they affect the well-being of IHP personnel and residents.

The following should be considered: **Smoking is not allowed inside any tents, prefabs or other structures.**

Hygiene promotion - A dedicated staff member should be assigned responsible to monitor and supervise hygiene related issues. This 'hygiene promoter' should as part of his daily routine inspect toilets, showers, hand washing facilities etc. Likewise, he/she should supervise kitchen staff and kitchen hygiene. It is crucial to have proper kitchen hygiene, minimizing dietary infections. Hand washing should be promoted to both residents and staff regularly.

The IHP hygiene checklists should be utilized to the fullest. Ensure that the IHP personnel and local personnel are aware of hygiene aspects and their respective responsibilities. Ensure that one staff has a dedicated responsibility for hygiene control and evaluation.

2.6.1 Laundry

As a minimum, the facility should provide the opportunity to do washing of relevant items, i.e. clothes, bed linen and kitchen clothes (dish towels, rags etc.) Proper washing and laundry service helps to ensure proper hygienic conditions, minimizing bacteria and scabies etc.

1) Local staff to carry manual washing
2) Laundry facility with washing machines
3) Use of private contractor outside the facility

Residents, when they go on R&R, at times sleep in local hotels with poor standards. Therefore they may bring back pests such as scabies. Washing the linen is an effective way of dealing with this. Items that cannot be washed should be aired for at least 24 hours, alternatively put in the freezer.

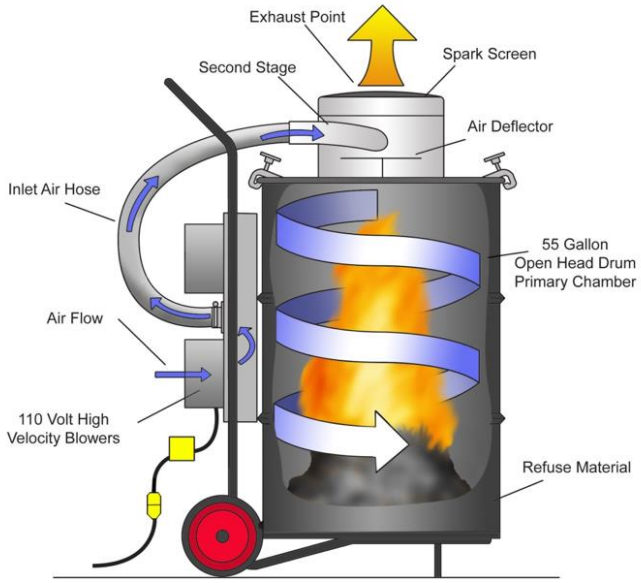
Laundry facilities also use an amount of water and power, requiring some level of control over how many are using it.

2.7 Waste handling

A large amount of solid waste is generated when a camp is servicing a large number of people; one of the commonly encountered problems is how to handle this large amount of garbage. It can be a serious problem; not only does it disturb the image of the IHP intervention, as a clean and well organized place, but it can also be a major health risk, attracting rats, flies etc. Often, there is no public refuse management in the area, and hence the communal areas in and around towns are littered with refuse.

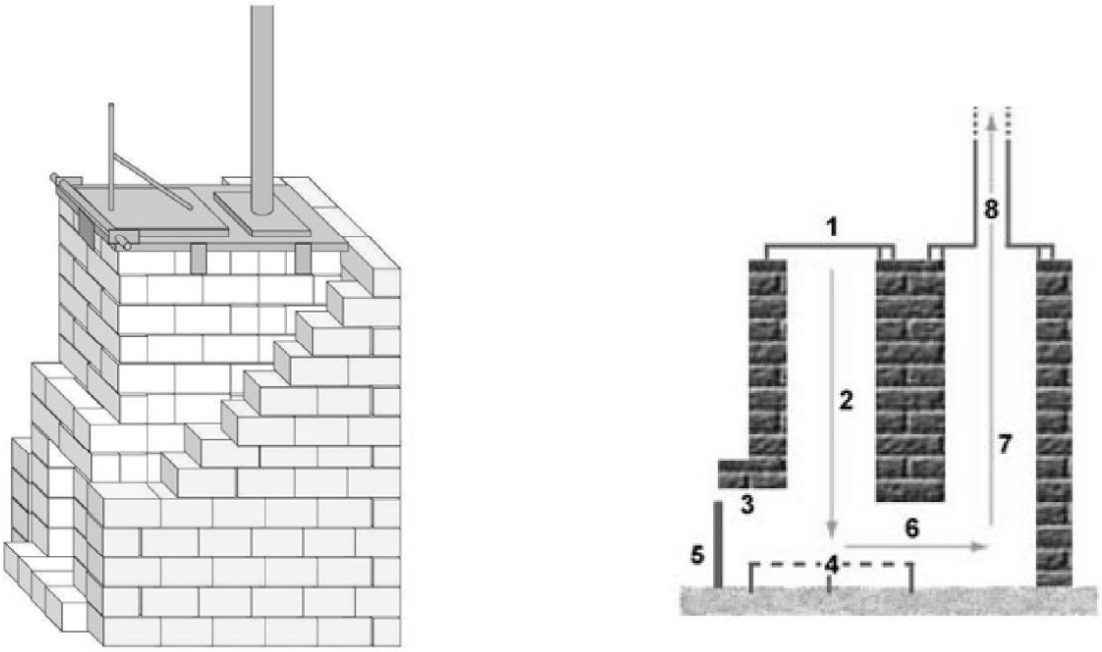
When IHP is operating under such conditions, it is important to display as professional and biologically safe routines as possible. In the initial stage it may be necessary to stock large amounts of refuse, until a workable solution has been reached. During the later stages it may be possible to burn the refuse in open pits. This solution, though, will not be able to achieve the high temperatures needed to destroy pathogens and effectively incinerate high moisture contents, such as food waste.

A practical solution, however, is to purchase small, mobile incinerators/waste burners.

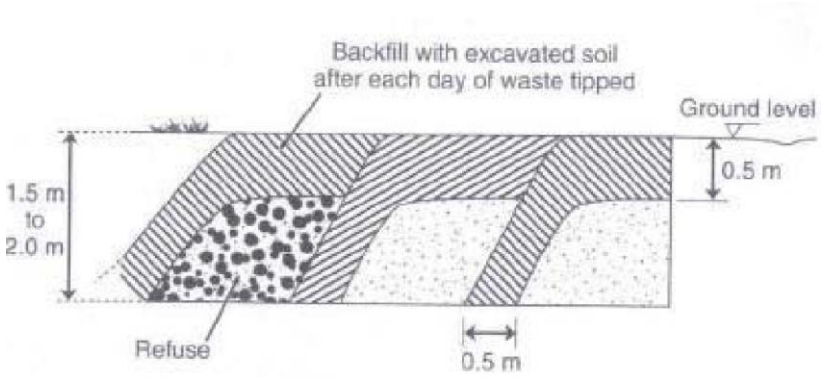


Example on commercial waste burner.

Constructing a waste incinerator is also an option. It must be able to reach degrees no less than 800 ◦C. An example of such a construction is the De Montfort incinerator mark 8a (see figure XX), which was originally constructed for destroying medical waste. Firstly, the materials and methods for constructing it has been intentionally designed for construction in situations with low resources, secondly it can be operated with little training, and finally it has proved to be a solid construction with more than 1,000 units in various developing countries. Thus it is also suitable for our needs. Estimated construction time is approximately 5 days.



e. 9.5 The De Montfort incinerator mark 8a (Left: not finished. Right: schematic drawing)



9.6 Solid waste burial trench[9]

2.7.1 Waste management

Establish a system for refuse collection, with refuse bins being emptied at least once a day. As a rule of thumb sort waste into the following categories:

- Food waste
- Paper and cardboard
- Plastics
- Metal
- Residual

On top of this remains of course specific items such as batteries and different chemicals which also must be disposed properly.

Find a buffer zone where the refuse can be stored temporarily until incineration. Be wary of scavenging.

Plan for a more permanent system for handling refuse. Consider using the existing communal system, if such exists. Otherwise plan from the outset to use an incinerator. Place it in some distance from the facilities due to smoke.

Example on waste sorting station for different categories of waste. Please note that the bins should be clearly marked with signs describing and illustrating the types of waste in each bin.

2.8 ICT

IHP base camps are equipped with the needed office facilities and ICT equipment according to the agreement between IHP and client. For standard module: refer to IHP Support Modules Concept Paper.

2.9 Medical services

For further information find the medical guide (currently work in progress).

An emergency medical technical should be part of the camp staff. The EMT is often also the hygiene promoter. The EMT is responsible for the maintenance of the camp's medical facilities, medicine etc., and he /she should also prepare and maintain a medical emergency plan, including a list of the nearest hospitals.

A medical emergency plan must include:

a. A list of the nearest hospitals
b. The capacities and expertise at various hospitals (x-ray, emergency ward, intensive care, heli-pad etc.)
c. Modes of transport and plan for emergency evacuation (MEDEVAC).

2.10 Catering - Kitchen and canteen

International staff often contract diarrhea through the consumption of contaminated food and water. Limited immunity, changes in diet and climate, stress, limited knowledge of local food and water sources are some of the factors causing the problem.

Malnutrition will make staff tired, mentally and physically, which increases the risk of workplace accidents. Contaminated food or water can sometimes sicken workers within minutes and can also lead to falls, spills or other accidents that can kill or injure. Employers must approach nutrition as they would other aspects of occupational safety and health[11].

2.10.1 Food safety

Food safety encompasses preparation, and storage of food in ways that prevent foodborne illness. It includes routines and guidelines that should be followed to avoid health hazards.

The five key principles of food hygiene, according to the World Health Organisation (WHO)[12], are:

1. Prevent contaminating food with pathogens spreading from people, pets, and pests.
2. Separate raw and cooked foods to prevent contaminating the cooked foods.
3. Cook foods for the appropriate length of time and at the appropriate temperature to kill pathogens.
4. Store food at the proper temperature.
5. Use safe water and cooked materials.

2.10.2 Kitchen facility

If a kitchen is included as part of the IHP intervention it should cater for the IHP support staff as well as all the residents. The kitchen is as a basic rule not dimensioned for catering for external guest, e.g. people not living in the facilities. The camp manager may on an individual basis, based on the current buffer in kitchen and dining hall capacity, allow for work related meetings to be supplied with catering.

Catering facilities and food storage is a potential source for disease, if proper hygienic procedures are not observed. It is the camp manager's absolute responsibility to ensure that this area is prioritized. The kitchen staff should be required to do their own self-control on procedures, clothing, storage etc. But the camp manager may also successfully appoint a non-catering staff member to keep external control and supervision on health and hygiene (see IHP Hygiene checklist ANNEX XX).

Food and water and dining areas must be free of chemicals or other hazards that could be ingested. Kitchen staff needs washing facilities with soap and water to wash before preparing and handling food.

Staff living in the camp need washing facilities for washing hands when enter the canteen fore dining

If using local kitchen staff, IHP should provide working clothes and warrant that they are washed on a daily basis, ensuring that they have clean clothing items for each day.

[11] Food at work: Workplace solutions for malnutrition, obesity and chronic diseases, 50

[12] http://www.who.int/foodsafety/consumer/5keys/en/



A look inside a Heavy Base Camp kitchen. In this case an example from DSB Norway.

2.10.3 Food preparations

The food prepared in the kitchen should be served three times a day, and being both varied and healthy.

People on special diets for health or religious reasons often are faced with a limited selection of food options at work. Employers need to understand the dietary needs of the employees, whether these workers refrain from meat products, pork, foods high in salt, fat or cholesterol, or foods that might cause an allergic reaction.[13]

Monitoring and supervision of local food preparation…to adhere to hygiene regulations and the key principles of food safety as mentioned above.

2.10.4 Food storage

Area for food items should be connected or adjacent to the kitchen area. The storage can be either a tent or a more permanent facility. Depending on which materials are parts of the original camp package, it can be relevant to procure locally a number of freezers, refrigerators, shelves etc. The storage should allow for easy inspection of the stored food. The kitchen staff should be instructed to have a daily routine, whereby they inspect the storage for pests, petty thievery and the condition of the food items stored there. Food and water must be stored in suitable and clean containers

2.10.5 Dining facilities

Dining facilities should be provided, where the inhabitants of the camp are able to come and have their meals in a hygienic and well organized manner. Dining facilities should be separate from office and accommodation facilities.

Considerations:

a) Due to hygienic reasons, the dining hall must be cleaned once every day; and if possible also light cleaning between meals.
b) Dust can in some areas be a serious pollutant; therefore dining facilities require thorough cleaning and careful use of decorative items where dust may settle.

[13] Food at work: Workplace solutions for malnutrition, obesity and chronic diseases, 50

c) The dining hall may be used for other purposes as well, e.g. non-formal gathering point, meetings, security briefings, welfare activities etc. Inform residents how the facility can be utilized.

In hot, dry climates: Construction should be heavyweight to ensure high thermal capacity, allowing changes in night and day temperatures to alternately cool and heat the interior, or lightweight with adequate insulation. Care should be taken in the structural design of heavyweight construction in areas with seismic risks. If only plastic sheeting or tents are available, a double-skinned roof should be provided with ventilation between the layers to reduce radiant heat gain. Door and window openings positioned away from the direction of the prevailing wind will minimise heating by hot winds and heat radiation from the surrounding ground. Flooring that meets the external walling without gaps should be provided to minimise dust and vector penetration.

In warm, humid climates: Shelters should be oriented and designed to maximise ventilation and minimise entry of direct sunlight. The roof should have a reasonable slope for rainwater drainage with large overhangs (Sphere standards).

Chapter 3 – Cold conditions[14]

This chapter covers the impact of cold and provides advice on how to protect personnel and equipment when operating in cold weather conditions.

Several natural disasters have recently taken place in areas of extreme weather conditions. Operations in cold conditions are extremely challenging and present great demands to clothing, nutrition, equipment and personnel. Thus, operations must consider cold weather conditions from the perspective of camp and staff equipment.

Experience plays a significant role in adapting to extremely cold conditions, which is why training for the operations is essential, as is careful preparation for the various conditions. Cold conditions may significantly hinder or slow down various tasks and assignments in comparison to carrying out the same tasks in so-called normal conditions.

It is important to note that cold conditions can be found in both northern and southern areas, in warm countries during the winter months, and at high altitudes in mountain areas. In addition, great temperature variations from high temperatures during the day to sub-zero temperatures during the night pose challenges for personnel. The lack of sleep resulting from cold nights alone can radically reduce the functional abilities and efficiency of aid workers. It is equally important to acknowledge that a cold climate is defined differently in different countries.

[14] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 6-7

3.1 Setting up camps in cold conditions[15] [16]

When assembling a camp, the effects of the climate, direction of wind, and any snow piling up in storms and blizzards must be taken into consideration to mitigate structures and equipment from being covered by snow. The points and shape of the terrain, as well as any protective locations in the terrain, such as hills and buildings should be considered in the selection of the site for the accommodation and service tents whenever possible. Determine the prevailing wind direction, and based on it, decide where to place the door openings of the structures, so that when the doors are opened, wind will not get directly inside. For the duration of setting up and taking down the camp, a sufficient amount of dry foods where only water needs to be added should be reserved. This serves to ensure that the meal chain does not break. In cold conditions, the human body needs more energy than in normal conditions.

Camp assembly in cold conditions must be made as simple as possible. Everything must be doable "gloves on". The way the different materials conduct cold must also be considered, for instance in the selection of tools. Special tools and equipment for cold conditions are needed for the erection of tents and other structures that require guide ropes. Durable steel pegs are needed for the frozen ground, and a proper heavy sledge hammer or dead blow hammer for hitting them into the ground. In soft snow, pieces of plank wood or waste bags filled with snow that are buried under the snow for anchoring the guide ropes can be used. In sub zero conditions, snow will crystallise in approximately one hour, after which the anchor will endure pulling quite well. In time, snow will turn hard, and even just one day after the piling snow, the anchor can take heavy pulling. If the temperature is above five degrees frost, the snow will not crystallise as hard. When using snow machinery, particular care must be paid for not to damage the tent anchoring, heating devices, or any other objects that may be covered by snow.

The tents must be insulated carefully. The amount of air in the inflated fabric arches of tents must be checked when the temperature drops under –5 degrees Celsius, or in lower temperatures, twice a day. The snow load on tents and other structures must be inspected several times every day. The camp should be equipped with a sufficient number of snow tools, such as snow pushers, shovels and brushes.

In snowy conditions, the majority of snow should be cleared or trodden into the ground for insulation purposes. The snow will act as an additional insular against the icy ground. Snow can also be utilised by building windshields in the camp. Even the very soft powder snow will crystallise in just a few hours, when the temperature drops below five degrees frost. Lightly trodden powder snow becomes hard in 12 hours. Snow is excellent for building various kinds of banks and barriers that protect from the wind. Within 24 hours, walking paths trodden in the snow will be hardened.

The camp should offer a possibility for drying clothes and equipment separately on designated racks in tents set up for maintenance purposes. Snowy, wet, and damp equipment cause extra humidity in the accommodation tents, causing humidity problems inside the tent. Humidity reduces the temperature inside the tents. Thus, it must be ensured that snow cannot get inside any tents to cause humidity problems. This can be prevented for instance by having one pair of shoes for outdoor use and another pair for indoor use. Shoes should be kept in the entrance tent in a designated rack, which is kept off the floor.

[15] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 10-11

[16] EU Cold Condition Module Project II/CMCFinland (2012), Equipment and operations in cold conditions, 25-26

Think about how to locate the electric cables and bear in mind that they will melt through the snow and ice and eventually be frozen to the ground, unless insulated against the ground with for instance pieces of plywood. Electric cables must be located so that they will not be damaged in the daily operations. In addition, they should be clearly marked and their location known to all persons in the camp, so that they will not be accidentally damaged, thus causing a risk of electric shock.

3.1.1 Accommodation and shelter[17]

Tents offer protection from the weather as well as an opportunity to rest and to dry clothes and equipment.

Quantitatively and qualitatively sufficient rest is crucial for ensuring the long-term ability to function in cold conditions. The quality of sleep suffers both in too low and too high temperatures. Protecting the feet in particular when sleeping in cold conditions is very important, as the temperature drop in feet and toes can distract sleep.

Tired personnel are very vulnerable to the effects of frost. Lack of sleep reduces the ability to observe and the level of performance, which increases the risk of frostbite and other damage caused by the cold. Lack of sleep is first visible in tasks requiring precise manual dexterity. In long-term operations, the rotation of breaks must be planned so that the operations are not interrupted. Approximately 90 percent of people can work with three to five hours of sleep for approximately nine days, if the sleep is uninterrupted and the conditions are stable.

A temporary shelter made of snow, can provide emergency accommodation with the purpose of providing protection from the impacts of weather. It can be a lean-to, or it can be located under the thick branches of a snow-capped pine or spruce. Snow provides good thermal insulation, but when staying overnight in a snow cave, particular attention should be paid to sufficient ventilation. The sufficiency of the ventilation can be monitored with a burning candle. No wet clothes or equipment should be taken inside, and in order to avoid moisture from forming, a camp cooker should not be used for cooking inside a snow shelter.

3.2 Equipment and the human body in cold conditions[18]

In cold conditions, the significance of the right equipment becomes even more important. In cold conditions, the way the equipment functions is put to the test: what works in warm conditions, may be rendered useless in sub zero temperatures or wet and cold conditions. All gear and equipment must protect its user when working, remain functional, and be easily maintained and serviced in camp conditions. Cold conditions set high demands for equipment, and the harsher the conditions, the easier the functionality of the equipment is compromised. For instance, accumulators and batteries lose their power, and clothes get wet and lose their insulating qualities. In cold conditions, a long day's work increases the body's need of fluids and energy more than in warmer conditions. The choice of the right equipment in

[17] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 12-13

[18] EU Cold Condition Module Project II/CMCFinland (2012), Equipment and operations in cold conditions, 7-8

relation to the prevailing conditions, the appropriate use of the equipment, and the maintenance of the equipment after use, all affect their functionality.

Different kinds of cold conditions affect the choice of the equipment. When the body loses heat, cold is experienced. In order to keep the body warm, the gear and equipment should first and foremost keep dry. Even the warmest clothing is useless if it gets wet in the rain, or if too many layers of clothing are worn and sweat is soaked by the clothes during the work.

Outside temperature, humidity, and wind are the three most significant external factors that affect the way cold is experienced. The risks of operating in cold conditions and freezing become significant in temperatures below zero Celsius degrees. However, the significant disadvantage of wind, both in cold and wet conditions as well as in extremely low sub-zero degrees when the air is dryer and there is less moisture, must also be taken into account. In terms of the equipment, the conditions turn harsh when the alternation between cold and wet conditions and dry, subzero conditions takes place within a short time period. The sun may also cause the conditions to change quickly by turning a shady location to a warm one due to solar radiation. Similarly, when the direction of sunlight changes and the work site is left in the shade, the temperature may drop to freezing degrees, which may cause damage to the equipment.

3.2.1 Clothing[19]

Wearing several layers of clothing in cold conditions is extremely practical. This way, the clothing can be adjusted to the work at hand and the prevailing conditions easily by adding or taking away items of clothing. When undertaking strenuous work, any extra warming layers should be removed, and when working in a stationary position, insulating layers should be added. This is worth the effort, as otherwise the gear will get wet from sweat and become very cold once the work is done.

The purpose of the **base layer** is to transfer the moisture from sweat away from the skin, thus keeping the skin dry. Wool and synthetic fibres are excellent materials for the base layer. In camp conditions, wool is easy to maintain, as it gets clean simply by airing it outside and will not smell, unlike synthetic fibres.

The purpose of the **intermediate layer** is to collect and transfer moisture and operate as an insulating layer. The material of the intermediate layer can be wool, wool blend, fleece, or synthetic fur. The intermediate layer is excellent for heat regulation, and by adding or removing items of clothing, the outfit can be adjusted to suit the requirements of the work task.

The purpose of the **outer layer** is to protect the body from wind and rain. When operating in cold conditions, clothes should be more loose-fitting than normally. The outer layer should be breathable so that the moisture from sweating can evaporate through it.

When selecting **footwear**, make sure that the shoes are sufficiently insulating, water-proof, and comfortable. In order to keep the feet dry and warm for as long as possible, wear two pairs of socks on top of each other, so that the thinner socks are worn against the skin and thicker on top. At least one pair of socks should be made from wool or a wool blend. Properly insulating shoes absorb the sweat from the feet and keep them dry throughout the operations. The soles of the shoes must also have excellent insulating

[19] EU Cold Condition Module Project II/CMCFinland (2012), Equipment and operations in cold conditions, 15-18

qualities and the shoes should have high-quality insoles that prevent the heat from the feet from being conducted to the cold earth. The insulating layer should be removable so that the shoes can be dried during maintenance also in camp conditions. In cold and wet conditions, the footwear has to be waterproof. When operating in cold conditions, the footwear should be slightly larger than normal size. Soft and bendy shoes sustain the blood circulation of the feet better than stiff shoes, and are warmer, too.

We lose a significant amount of heat through the area around our head and neck (up to 70%). The physical work strain and harsh surrounding conditions affect the choice of **headgear**. When moving or carrying out strenuous work, a knitted beanie is often sufficient. When in a stationary position, as the temperature drops, and in windy conditions, windproof and possibly waterproof headgear is required. The headgear should protect the head, face and neck, and it can be equipped with a peak to be used as a rain cover, and a flap that protects the forehead from heat loss.

When working in cold conditions, special attention should be paid to protecting the hands, in order to sustain their ability to function and to prevent cold-related injuries. **Gloves** suited for the task at hand should always be worn. Using tools with bare hands in cold conditions increases the risk of cold-related injuries and frostbite, as the materials of the tools often conduct cold very well. Touching metal with bare skin at a temperature of –4 °C may cause frostbite and cold-related injuries within one minute; at a temperature of –10 °C, in 5 to 15 seconds, and at a temperature of –15 °C, in just 2 to 6 seconds.

3.2.2 Overnight gear[20]

In addition to a sufficiently warm sleeping bag, insulation against the cold ground is equally important. A camp bed is a good option, as it keeps the body off the ground. Camp beds should be equipped with an insulating roll mat. A practical and reliable solution is a closed cell foam pad which is at least 12 mm thick, as it will not break and does not contain valves that might get stuck in sub zero degrees, as the moisture freezes. In order to ensure a better quality rest and additional insulation, a light air mattress can also be used. Please note, however, that an air mattress is not suitable as the only mat in cold conditions, because if broken, it will not provide sufficient insulation for the cold that is conducted from the ground.

3.2.3 Fuel, generators, heaters and electricity[21]

Fuel

The camp must be equipped with multi-fuel camping stoves that operate at different temperatures. A thing to consider when using these is that the different fuels from gas to petrol use nozzles of different sizes.

In the selection of liquefied petroleum gas (LPG), the proper ratio of propane and butane must be noted for ensuring operation in cold conditions. The higher the propane content in the LPG, the better it works in cold conditions. The boiling point of propane is –45 degrees Celsius.

[20] EU Cold Condition Module Project II/CMCFinland (2012), Equipment and operations in cold conditions, 27
[21] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 14-15

Warm rubber gloves suitable for fuelling must be used when filling in fuel. A spill mat should be available in order to keep the fuel from staining clothes or polluting the environment. Fire-fighting equipment must be placed so that it cannot be buried in snow. The designated smoking area must be located at a sufficient distance from the fuel storage place.

Generators

When placing the generators, sufficient air supply must be ensured by making sure that the air inlets cannot be clogged by snow during a snowstorm. In cold conditions, the power loss of generators is approximately 0.1 to 0.2Kw at a temperature of –5 degrees Celsius. The initial temperature of the generator is +20 Celsius degrees. When the outside temperature is –20 Celsius degrees, the power loss of the generator is approximately 0.8–1.6Kw, depending on the model of the generator. When placing the generators, it must be ensured that the generators cannot be buried in snow and that they can be fuelled and serviced safely and quickly. The pour point of diesel used as a generator fuel must also be taken into account. Different diesel types have different filterabilities, which affects their operation in cold conditions. Diesel types designed for cold conditions are available via separate orders, or, during the cold season, from the gas stations in cold areas. The pour points are –15, –34 and –44 degrees Celsius. In everyday use, the different diesel fuel types are known as summer, winter and arctic diesel fuel types. As the filtering temperatures drop, paraffin, which is used as an additive in diesel, may cause various problems in the filters of machines and equipment. The generator should be also winterized by replacing the lubricants and removing water residue from the fuel system.

Heaters

In the placing of the heaters, the safety distance to the tents must be considered, as well as the fact that the heating tubes of the heaters warm the ground. The fuel containers of the heaters must be set on a level surface where there is no risk of melting to prevent the fuel containers from falling over and causing environmental damage. The heat source in a tent can be a stove or a similar piece of equipment. Stoves use wood, peat, or gasoline/diesel for burning.

Electricity

When using electric cables, the connectors must be water-tight. For the safe transmission of electricity, the water-proofness of any electric cables used at the camp must comply with the applicable standards and the cables must be sufficiently strong. This means cables of 2.5mm2 at minimum. The cables must be marked with separate sticks or other markings so that they can be easily located under the snow. This marking will also act as a warning for hazard of electric shock. The outdoor lights used at the camp must be weather-proof.

3.2.4 Electronic equipment[22]

Electronic equipment should always be protected from extreme cold and from the effects of ice and snow. The main difficulty with electronics in the cold is the fast depletion of batteries and the lowered output of power sources. Also electronic equipment should be kept at a stable temperature. Often rapid changes of temperature are more damaging to electronics than mechanical equipment.

[22] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 38-39

In all situations, connectors, switches and antennas of the electronic equipment should be kept dry and clean from snow. If large electronic equipment such as field radios are not stored and used in warm spaces, they should be placed in an insulated container. This preserves the charge on the batteries and power sources and reduces condensation.

The batteries used for the equipment should be either nickel-cadmium (NiCa) or lithium sulfur dioxide (Li-SO2) as they have better performance in cold conditions. Dry cell batteries are not recommended for cold temperatures.

Personal and smaller electronics (hand held radios, GPS-receivers, various measuring equipment etc.) can be protected from the cold by keeping them inside the users clothes thus insulating the equipment alongside the user. Breathing directly at the equipment should be avoided as moisture from the breath will freeze on the equipment.

Some electronics are designed to be used in cold and arctic temperatures. In these cases the equipment is usually better shielded against the environment and may contain special design features (such as routing heat produced by the equipment through the LCD-display preventing the display from freezing). It should be noted that even this kind of equipment can rarely stand direct exposure to the elements for longer periods.

3.2.5 Other materials[23]

Cold affects all materials in some way and therefore, it must always be considered what materials are used in the tools and equipment brought to cold climates. Rubber and plastic can become brittle and for example rubber coated cables can easily break, if not warmed before bending. Metals cannot withstand stress or shock as much as in warmer conditions. Fabrics stay flexible if kept dry, but if they get wet and freeze, they will lose flexibility very fast. As a general rule to prevent unnecessary damage to equipment, all items should be kept as dry as possible and should not be bent, twisted or stressed unnecessarily in the cold. If equipment can be warmed, even slightly, it should be done.

3.2.6 Condensation

Condensation, also called sweating, is water appearing on metal surfaces due to change of temperature from cold to warm. Condensed water commonly appears on equipment when it has been moved indoors from cold or when the equipment has warmed during use. As condensation occurs on all metal surfaces, equipment can also freeze from inside. Condensation can be avoided easily by storing equipment outdoors, if possible, or in storages with lower temperatures thus reducing the temperature change. If the equipment is brought indoors for maintenance, the maintenance should be started only after approximately one hour, when the condensation water has dried.

If the equipment is wet due to condensation or melted snow or frost, it should be dried before exposing it to the cold. If the water in the equipment freezes, it can cause severe malfunction and damage to the

[23] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 37-38

equipment. Fuel systems malfunction, if there is water or ice inside. After the equipment is dry it should be treated with lubricants designed for cold and arctic temperatures. If these are not available, for example some petrol products (e.g. kerosene/paraffin/etc.) can be used as a surface lubricant.

3.2.7 Vehicles[24]

Procedures to be carried out in order to ensure the working order of vehicles include:

- Maintenance of the cold starting equipment;
- Maintenance and condition inspection of the batteries;
- Protecting the components and connectors of the electric system from moisture;
- Changing the oil of the engine and the transmission gear to a fluidity that is suitable for winter conditions;
- Ensuring the frost resistance of the coolant;
- Removing water from the fuel system and refueling with a fuel suitable for winter or arctic conditions;
- Removing water from the pneumatic brake system daily.

When protecting a motor vehicle from the cold, the thermal energy stored in the engine and transmission gear components should be utilised by protecting the engine air inlets and outlets with cardboard sheets or covers. The effect of cold wind to parked vehicles should also be considered.

When the temperature is below –10 degrees Celsius, the engine must be preheated before starting. One cold start at a temperature of –20 degrees Celsius without preheating wears down the engine as much as driving 300 to 400 km. An engine block heater, a cold start pump, or an external heater powered by the vehicle's fuel can be used to assist in cold-starting the vehicle.

In case of an emergency, the engine sump can be heated with a blowtorch. Cold starting can be made easier by running the engine regularly for a while in regular intervals. The warm-up running should be executed the more often the more the temperature drops. For example, at a temperature of –20˚C, it should be performed every three to four hours, and at a temperature of –40˚C, every one to two hours. Run the engine at least 15 minutes each time.

3.3 Food and water[25]

A stove is needed in order to prepare food and boil water. A good stove will work with various fuels simply by changing the burner nozzle. Liquefied petroleum gas (LPG) will not work properly in cold conditions. With multifuel stoves, liquid fuels work well. A sufficiently large container should be reserved for melting

[24] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 40-41

[25] EU Cold Condition Module Project II/CMC Finland (2012), Equipment and operations in cold conditions, 21-22

snow. Filling up canteens, thermos flasks and food packs is carried out safely when water melted from snow is poured into a large pot, heated until boiling, and then poured from the spout to the desired place.

The need for energy and drink increases in cold conditions as the kidneys function faster and produce more urine in cold temperatures. It is best to schedule meals during rest and maintenance breaks at the camp. Warm meals should be consumed upon waking up and when returning from the task. Food should be available at the camp at all times. Freeze-dried meals that only need the addition of hot water are practical when mealtimes are irregular and no joint meal times can be arranged. The catering facility should also have other easily edible food to offer, such as cookies, snackbars, bread, and toppings for bread. Hot water must also be easily available or easy to heat. In addition to the possibility of preparing warm drinks, energy drinks should be available. Never eat frozen food! In order to sustain energy levels and to keep warm, snacks, such as muesli bars, cookies or chocolate should be consumed every two hours.

When working in cold conditions, the need for fluids increases. At least three litres of water should be consumed per day. In cold conditions and when performing strenuous work, the need for fluids increases significantly. Thus, fluid consumption should also take place during the work. Approximately 1.5 decilitres of every 30 minutes should suffice. The consumed fluid must not be too cold, as the body uses its energy to warm cold drinks, and this energy is needed elsewhere. Avoid consuming drinks that are too hot. Do not drink cold water directly, as it may cause stomach upsets and diarrhoea. If there are no other means available for warming up the water, let it get warm in your mouth before swallowing.

In cold conditions and when mixed with cold water, the functioning of water purification tablets may be insufficient, as they do not necessarily dissolve in water. As temperatures drop below zero, the technical functionality of various water filters may be significantly hindered or even disabled. Passing the water through a coffee filter may be used as a temporary solution to removing solid matter and humus from murky water before boiling it.

Clean snow can be melted to be used as domestic water. Water melted from snow does not contain minerals, which makes it a poor substitute for fluids. However, water melted from snow makes a good drink when a tablespoonful of sugar and a teaspoonful of salt is mixed with one litre of water. Alternatively, sports drink powders can be used. The cysts of echinococcosis (Echinococcus multilocularis), spread by dogs and foxes, can also survive in cold conditions, which means that any water melted from snow must be boiled so that the cysts die for certain.

3.4 Hygiene[26]

In cold conditions, the importance of good hygiene becomes all the more pronounced.

Clothes should be kept as clean as possible as clean clothing is the best protection against the cold. Hands, face, armpits, and private parts should be washed regularly. In case there is no water available for this purpose, soft powder snow is a good temporary solution. If there is only a limited supply of water available, a damp cloth, hand towel or freshen-up towel can be used as well.

[26] EU Cold Condition Module Project II/CMCFinland (2012), Equipment and operations in cold conditions, 23

Clean feet keep warmer than dirty feet. Feet can be washed in the snow or at the very least they can be wiped with the legs of the socks when changing into clean socks.

Do not use soap in sub zero temperatures. Only use clean water for cleansing. The best protection for the skin is the skin's own sebum.

3.4.1 Sanitary facilities[27]

Waste management and toilet equipment should be placed so that they will not disappear in the snow. The operation of the toilets must be ensured for instance by enabling the washing of hands in a warm facility, where there is no risk of freezing. The cold resistance of hand disinfectants must be taken into account in selecting them. Certain hand disinfectants may freeze even in low sub-zero temperatures. Toilet waste must be sorted if possible. Faeces are collected into a durable bag, and urine in canisters, or buried into a safe spot in the ground. Waste must be collected either in a plastic barrel or a closable metal barrel. When selecting the hand washing location, ensure that neither the water used for washing the hands nor the waste water can freeze. In addition, it should be ensured that waste water cannot for instance freeze routes or tents.

3.5 Cold conditions checklist

Personal care

- Rest, eat and drink adequately.
- Protect your head and neck from cold, as this ensures your hands, feet, and the rest of your body stays warm.
- Protect your hands especially when handling tools or filling up fuels.
- Avoid unnecessary sweating by wearing appropriate layers of clothing.
- Consider the effect of wind.
- Consume small amounts of fluids regularly, at least once every hour.
- Eat energy-rich snacks every two hours.
- Take good care of yourself and your hygiene.
- Watch out for your colleagues by paying attention to any signs of frostbite on bare skin and the risk of hypothermia.

Cold environment

- Pay attention to changes in the weather and estimate the effect on the geographical safety (avalanches, ice conditions, skidding on roads, ice dams/floods, wind conditions etc.) in terms of moving, working, and the location of the camp. Be prepared to adjust operations and activities to the changing conditions.

Equipment

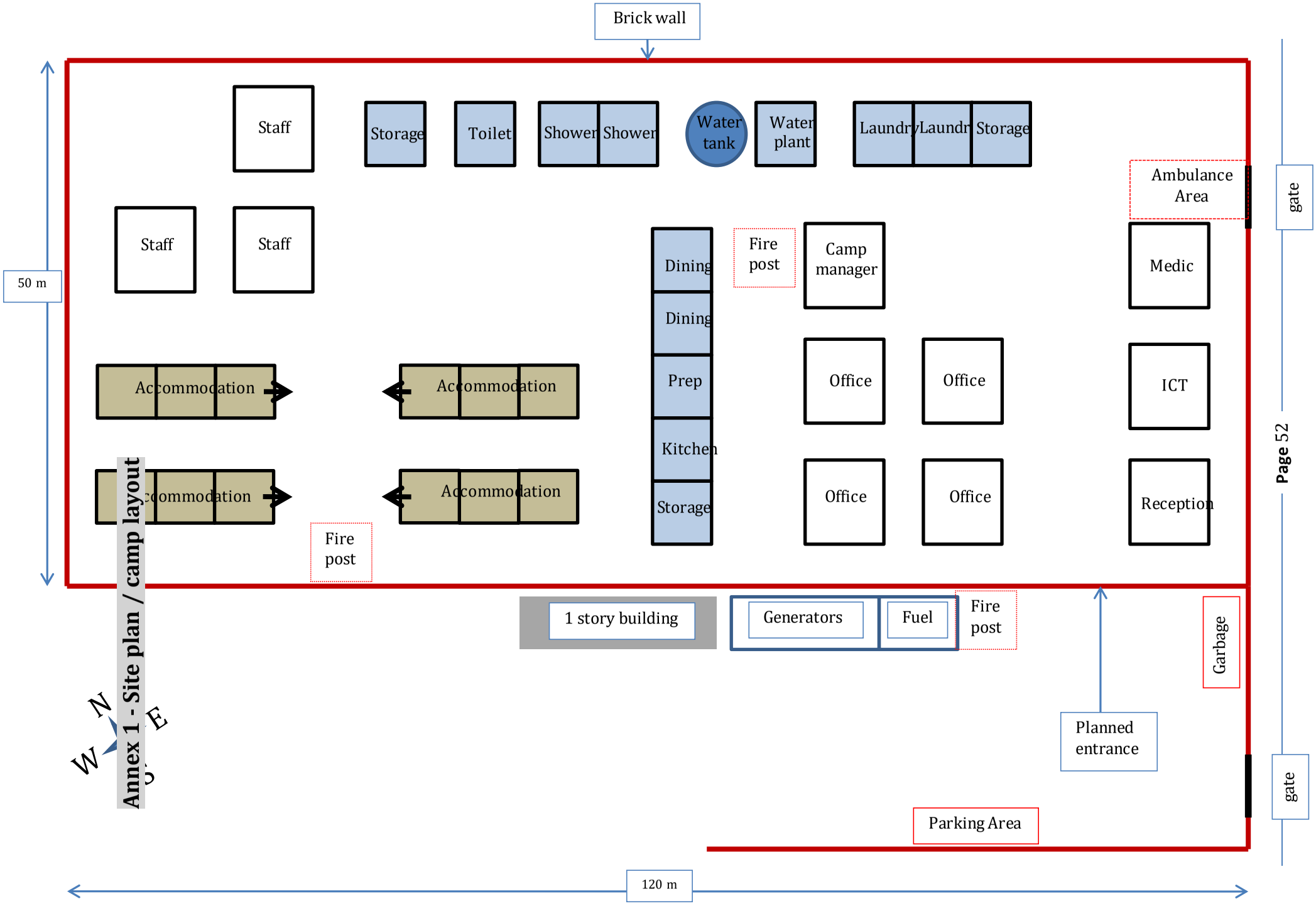
- Electronic equipment should be kept warm under your clothes to save battery life.
- Pack electronic equipment in sealable plastic bags/containers to prevent condensation and moisture build-up.

[27] CMCFinland/MSB/EU, Responding to Emergencies, manual for cold conditions, 14

- Turn on any equipment brought inside from the cold only once they have warmed sufficiently.
- Air the sleeping bag for 15 to 20 minutes before packing it away for the day.
- Clean and dry your shoes.
- Woolen clothes are cleaned by airing them outside.

Vehicles

- Use preheater/engine-block heater.
- Check the oils and other fluids.
- Check that there is no snow or ice in the engine compartment.
- Check that the fan or variator belt can rotate freely.
- If it suddenly snows excessively, tyre pressure can be reduced to increase tyre traction.
- Make sure to use fuels suitable for the prevailing conditions (winter diesel etc.)
- Never handle fuels or pumps with bare hands because of the risk of frostbite and cold-related injuries.


Brick wall
Staff
Storage
Toilet
Shower
Shower
Water tank
Water plant
Laundry
Laundr
Storage
Ambulance Area
gate
Staff
Staff
Staff
50 m
Dining
Dining
Prep
Kitchen
Storage
Fire post
Camp manager
Medic
Accommodation
Accommodation
Office
Office
ICT
Accommodation
Accommodation
Office
Office
Reception
Fire post
1 story building
Generators
Fuel
Fire post
Garbage
Planned entrance
gate
Parking Area
120 m
N
E
W
Annex 1 - Site plan / camp layout
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Annex 2 – Site Assessment

Assess seasonal changes – How does the weather change and how would that affect the site and the base camp facilities?

Topography - General topography, avoid being close to a slope, what happens when the rain comes? Link to natural hazards. Inclination?

Soil conditions – What type of soil is it? Bearing capacity of ground? Land preparations required? Is vegetation negative or positive (for example used for natural shading, but can also be a safety and security risk (animals etc.))

- **Water and waste management**
- Availability of an adequate amount of water
- Quality of water, will your purifying equipment be sufficient?
- Possibility to get water by trucking?
- If available water source, will your pumping system manage?
- What are the local customs for waste management? Is there a system in place?
- What are our possibilities to dispose our waste and waste water?
- Location – What are the risks and threats and likelihood in the area? Hazardous environment close by? Who are your neighbors?
- Should be easily secured to keep out unwanted visitors – Perimeter security
- Overhead power lines, pipelines, fuel tanks
- Access routes and control - Two different entry and exit routes
- Stand-off distances
- Fire safety (EE 610-611)
    - Create awareness
    - Draw up a contingency plan
    - Leave sufficient space between facilities to create fire escapes, escape routes, and emergency access
    - Clear vegetation and create fire breaks
    - Establish a fire alarm system

- Provision of large enough meeting space for UNHCR to discharge its coordination responsibilities through coordination meetings.
- Room for expansion: in emergencies the numbers of staff can fluctuate considerably

Annex 3 – Hygiene Checklist

Checklist hygiene - Check-list for hygiene inspection in field situations				
Item	Satisfactory	Less than satisfactory	Unacceptable	Remarks
Kitchen and canteen - Preparation of food				
Rooms are clean and tidy				
Inventory, machines and tools are clean				
Separation between raw and prepared food products				
Proper lighting of work areas and storage facilities				
Staff clothing and hygienical appearance				
Hand washing facilities for staff				
Freezer and refrigerator				
Facilities are clean and tidy				
Adequate capacity				
Thermometer is present and daily log of temperature				
Correct temperatures Refrigerator <5 C Freezer <8 C				
Kitchen procedures				
Date marking of short term food items				

Correct rotation of food in storage (“first in first out”)				
Freshness of food items (compared to date marking)				
Cooling of warm food (65 C – 10 C in max 3 hours)				
Defrosting in refrigerator (never in water)				
Dining facilities				
Tidy and clean				
Clean utensils and dishes stored hygienically				
Dish washing facilities are working and hygienic				
Storage facilities				
Tidy and clean				
Orderly and functional storage of goods				
Adequate temperature in relation to stored goods				
No good requiring cooling (e.g. semi-conserved fish or canned meat)				
Cleaning				
Schedule for cleaning (how? How often? By whom?)				
Cleaning mainly in hours with nor or little production				
Daily cleaning and disinfection of surfaces, which have contact with food				

No pile-up of garbage				
Proper cleaning equipment available				

* Items marked with a single asterisk are particularly important
** Items marked with a double asterisk should always lead to immediate action. Item

Annex 4 – Services Checklist

Item	Satisfactory	Less satisfactory	Unacceptable	Remarks
Accommodation				
Tidy and clean				
Proper lighting				
Proper ventilation				
Possibility for aeration of bed linen				
Sanitary facilities				
Facilities in adequate numbers				
Maintained and odorless				
No flies				
Proper lighting				
Proper ventilation				
Suitable distances from accommodation and kitchen (<50m)				
Toilet paper available and dry				
Facility for hand washing or disinfection				
Other				
Soak ways where necessary and appropriate				
Grease traps				
Control of rodents, insets and other vectors				

Drinking water				
Disinfection in accordance with regulations				
Controlled with regular intervals				
Water source and containment protected against pollution				
Water level is at a limit that it cannot be polluted by liquid waste				

Annex 5 – Example of Fire Escape Plan

FIRE ESCAPE PLAN

Emergency Exit

IN CASE OF FIRE:

Inform Guards AND Fire Brigade immediately by dialing XXX for Fire Brigade Call XXXX for guards

If it's possible, use fire extinguisher to stop fire.

Do not panic and follow the Fire Safety Instructions.

Use emergency Fire Exits.

(Include Diagram outlining all the fire exits/ assembly points and where fire fighting equipment is located!)

Annex 6 – IHP and UN common standards for base camps and sustainable solutions

HEAVY BASE CAMP		
Sub module	**Components description and standards**	**Greening solutions - Environmental Sustainability**
Overall Capacity of the base camp	HEAVY BASE CAMP In compliance with IHP standards.	
Accommodation	Tents, beds and mattress, sleeping bags, lighting, chair, internal cabins for private space, lock for cabin. Insect safe cabins. Cabin size: 4 m2 preferably. Heating/cooling, Electrical power outlet, smoke detectors, fire safety, emergency lighting. *Regarding WFP standards: Locker, wardrobe, shelf, desk must be procured locally. As well as fans for each cabin.*	Tents, beds and sleeping bags containing a percentage of recycled material; Lighting: portable solar lights and chargers (e.g.https://waka-waka.com/), LEDs; Heating/cooling: low energy appliances according to 'energy star' rating or similar, using shade cloth/reflecting materials over tents to increase insulation and reduce heat gains/losses, use of inner tents; use tents of light colors in hot areas (absorb less heat).
Kitchen, and sewage	Cooking facilities 300 meals/day + cafeteria/dining area, Cooker, refrigerator, freezer, kitchen utensils, seperate toilet. Water supply equipment, internal power net, wastewater handling, smoke detectors, waste handling, heating and cooling.	Low energy appliances; avoid use of disposable tableware, utensils, cups and bottles preferring reusable and long-lasting materials (depending on water availability at specific base camp location); consider procuring compostable tableware if economically viable; oil and grease from kitchen waste separated (manually at source when low quantities are produced, or installing an oil and grease trap when large quantities are produced); kitchen sewage (without oil) properly disposed in a soak pit, septic tank or similar.
Laundry	2 washing machines, 2 tumble dryers. Capacity to fulfill the needs for running the camp. Not for all guests personal needs. Expanding capacity can be done through local procurements. This is advisable.	Low energy and water models; minimize use of tumble dryers where temperature/space allows by substituting it with drying racks; ensure washing cycles carried out at full load and use eco-friendly detergents avoiding toxic substances. Ensure water supply to washing machines is tested for sediment content prior to installation. A pre-filter may be required to avoid costly damage to the appliance.

Water production	Purification plant, distribution, tanks, pumps, testing included, clean water to be used for showers. Preferably water production should be deployed with kitchen and sanitation from same country. Chemicals for cleaning purification plant. Capacity: approx. 50 liter/day/person Storage of water: 3 days emergency reserve of raw water (150 liters/person)	Solar powered water purification units; rainwater harvesting for shower and sanitation needs; use of high-efficiency water filtration systems (reduce amount of energy, brine water, chemicals and filters); consider the use of soak pit for brine water if produced; proper chlorination of treated drinking water; use of watertight tanks for raw and treated water (reduce water losses), avoid stagnation of water (risk of mosquito breeding).
Water and sanitation A	Drinking water distribution system & waste water system. Piping, septic tanks, pumps, hose etc. Water heaters needed for shower and kitchen. Low pressure water taps.	Solar powered water heaters; use of water aerators in taps and showerheads; proper use of sealants in pipes and fittings; use of watertight fittings when possible to minimize water leaks.
Water and sanitation B	Toilets, showers, pumps, hose, tents. Black water solution, septic tanks or local solution. Ratio 1:8, plus urinals.	Water-less toilets (e.g. composting toilets); low water showerheads; low or dual flush toilets; installation of soak pits, septic tanks, portable wastewater treatment module or similar when required; ensure periodic and safe emptying of septic tanks to avoid overflowing and soil contamination. Separate grey water (sinks, shower) from black water (sewage) and reuse grey water (i.e. irrigation).
Power supply	Generators, electrical equipment - tools, back up system, 400/230V, 50hz. Incl. Generator service kit.	Use of hybrid generators (solar and battery backup); rightsizing of generators; spill kits and absorbent materials (contingency measure in case of oil spill).
Area Lighting and perimeter lighting	Area lighting and perimeter lighting LED based, low power consumption. Complete power distribution system.	Stand-alone solar perimeter lights. Consider cabling LED perimeter lighting to central PV system and battery bank. Experience with stand-alone solar lights shows high incidence of battery failure/fires due to high temperatures when batteries are pole-mounted.
Solar power system	To the biggest possible extent where sufficient. E.g. perimeter lightning, WiFi access points etc.	
Diesel purfication	Diesel purifier, fuel tanks/bladders. Can be a closed system from raw diesel to purifier to generator. Fuel pump optional (for cars etc.).	Use of spill kits, absorbent materials or bunds (spills containment pallets) as contingency measures in case of oil spills.
Cold conditions	Cold weather package: Heating for the tents. Oil drum warmer, insulation of tents, insulation of pipes and plumbing.	
Security equipment	Perimeter barriers, barbed wire etc.	

Reception area and office	Tents, reception desks, tables, chairs, lighting, whiteboard/flip chart.	Sustainable wood materials (e.g. FSC certified), consider furniture made of recycled materials or a percentage of it. Establish double-sided printing.
Medical facility		Use of proper containers for medical waste segregation (specific container for infectious waste, hazardous waste, expired drugs and general waste). Consider disposal methods for medical waste before the deployment (e.g. incineration).
ICT	ICT is provided from ICT module according to actual need.	Low energy appliances according 'energy star' rating or similar; switch off equipment when not in use.
Radioroom	Provided if needed. E.g. together with office and ICT.	
Machinery	Lifting capacity, wheel loader or similar.	Safe storage/transport/disposal of machinery components, and related hazardous material (e.g. lubricants, oils, tiers) to avoid spillages/leakages during operations and maintenance activities (see related factsheet attached)
Food and water	Food and water to establish 10 days of self-sufficiency for IHP Team. 2-3000 kcal pr. day	Use of water dispensers and refillable bottles and cups. Minimize plastic packaging and prefer packaging that biodegrades easily (e.g. cardboard, and paper)
Social area	Outside area with a roof / shadow	
Tools and maintenance	Workshop with proper tools for setting up and maintaining the camp, electrical adaptors (international standards), water line adaptors where needed	Safe storage/transport/disposal of hazardous components (see factsheets attached)
Fire suppression equipment	By each tent, power station, fuel station, kitchen	
Environment	Waste disposal system and procedures, recycling.	Dispose all plastic waste (camp packaging), as possible, before deployment. Ensure separation of waste types. Where possible, separate organic waste from other waste types to facilitate low-cost, low-tech, on-site composting. Separate hazardous waste and if no safe disposal option is available consider safe storage (e.g. not in direct contact with soil, shaded/covered and aerated).
Vehicles		Use fuel-efficient vehicles where possible, fuel-efficient driving training (see WFP fuel-efficient driving tips attached). Storage/transport/disposal of machinery components, and related hazardous material (e.g. lubricants, oils, tiers) to avoid spillages/leakages.

LIGHT BASE CAMP		
Sub module	**Components description and standards**	**Greening solutions - Environmental Sustainability**
Overall Capacity of the base camp	12 person base camp in light version, very primitive, only the minimum needs. For commercial flight and immediate deployment, short term accommodation (few weeks).	
Accommodation	Tents, sleeping mat, sleeping bags, light. Internal power distribution, smoke detectors, internal dividers/cabins to the best possble extent (private space). Field beds optional. Fans optional.	Tents, beds and sleeping bags containing a percentage of recycled recycled material; Lighting: portable solar lights and chargers (e.g. https://waka-waka.com/), LEDs; Heating/cooling: low energy appliances according 'energy star' rating, using shade cloth/reflecting materials over tents to increase insulation and reduce heat gains/losses,use of inner tents
Kitchen, and sewage	Multifuel burner, water kettle, simple dining area, kitchen utensils. Water supply equipment. No sewage system.	Low energy appliances; avoid use of disposable tableware and utensils, preferring reusable and long-lasting materials (depending on water availability at specific base camp location); consider procuring compostable tableware if economically viable;
Laundry	None	Low energy and water models; minimize use of tumble dryers where temperature/space allows by substituting it with drying racks; ensure washing cycles carried out at full load and use eco-friendly detergents avoiding toxinc substances.
Water production	Small purification unit if needed in the specific case. Approx. 50 liter/day/person Reserve capacity only drinking water, 15 liters/person (5 liters/day/person)	Solar powered water purification units; rainwater harvesting for shower and sanitation needs.
Water and sanitation A	No water distribution system	Solar powered water heaters.
Water and sanitation B	Toilets: bag solution, tented. Shower: Shower bags, sun heated, tented or improvised solution (tarp). Soap and hand disinfectant.	Water-less toilets (e.g. composting toilets); low water showerheads; low flush toilets; ensure periodic and safe emptying of septic tanks to avoid overflowing and soil contamination. Separate grey water (sinks, shower) from black water (sewage) and reuse grey water (i.e. irrigation)
Power supply	Small generators - 1-5 kVA. Solar power solution is supplementary	Hybrid generators (solar and battery backup); rightsizing generators
Area Lighting	Area lightning sufficient to move around safely inside the camp	Stand alone solar perimeter lights
Solar power system	Prefererably supplement to generators	
Cold conditions	Small heaters, diesel. Optional.	
Office and coordination	Tent is standard. Office and ICT equipment from ICT module -	

facilities	depending on need.	
Security equipment	Not included.	
Reception area	Not included, improvised or together with office	Sustainable wood materials (e.g. FSC certified), consider furniture made of recycled materials or a percentage of it. Print on both side of paper.
Medical facility	Not included as a standard Small camp first aid kit provided	
ICT	Depending on need ICT is provided from the ICT module	Low energy appliances according 'energy star' rating (switch off equipment when not in use)
Radioroom	Together with office and ICT if needed.	
Machinery	Not included (not needed)	Safe storage/transport/disposal of machinery components, and related hazardous material (e.g. lubricants, oils, tiers) to avoid spillages/leakages during operations and maintenance activities (see related factsheet attached)
Food and water	Food and water to establish 14 days of self-sufficiency for the whole camp. MRE's.	Use of water dispensers and refillable bottles and cups. Minimize plastic packaging and prefer packaging that biodegrades easily (e.g. cardboard, and paper)
Tools and maintenance	The needed tools and most critical spare parts to maintain the camp.	
Supplementary fire equipment	Fire extinguishers, small spray can type, fire blankets etc.	Safe storage/transport/disposal of hazardous components (see factsheets attached)
Environment	No specific systems provided. Must be implemented on site.	Dispose all plastic waste (camp packaging), as possible, before deployment. Ensure separation of waste types. Where possible separate organic waste from other waste types to facilitate low cost, low tech on site composting. Separate hazardous waste and if no safe disposal option is available consider safe storage (e.g. not in direct contact with soil, shaded/covered and aerated).
Vehicles	Not included	Use fuel efficient vehicles where possible, fuel efficient driving training (see WFP fuel efficient driving tips attached). Storage/transport/disposal of machery components, and related hazardous material (e.g. lubricants, oils, tiers) to avoid spillages/leakagestrainings.