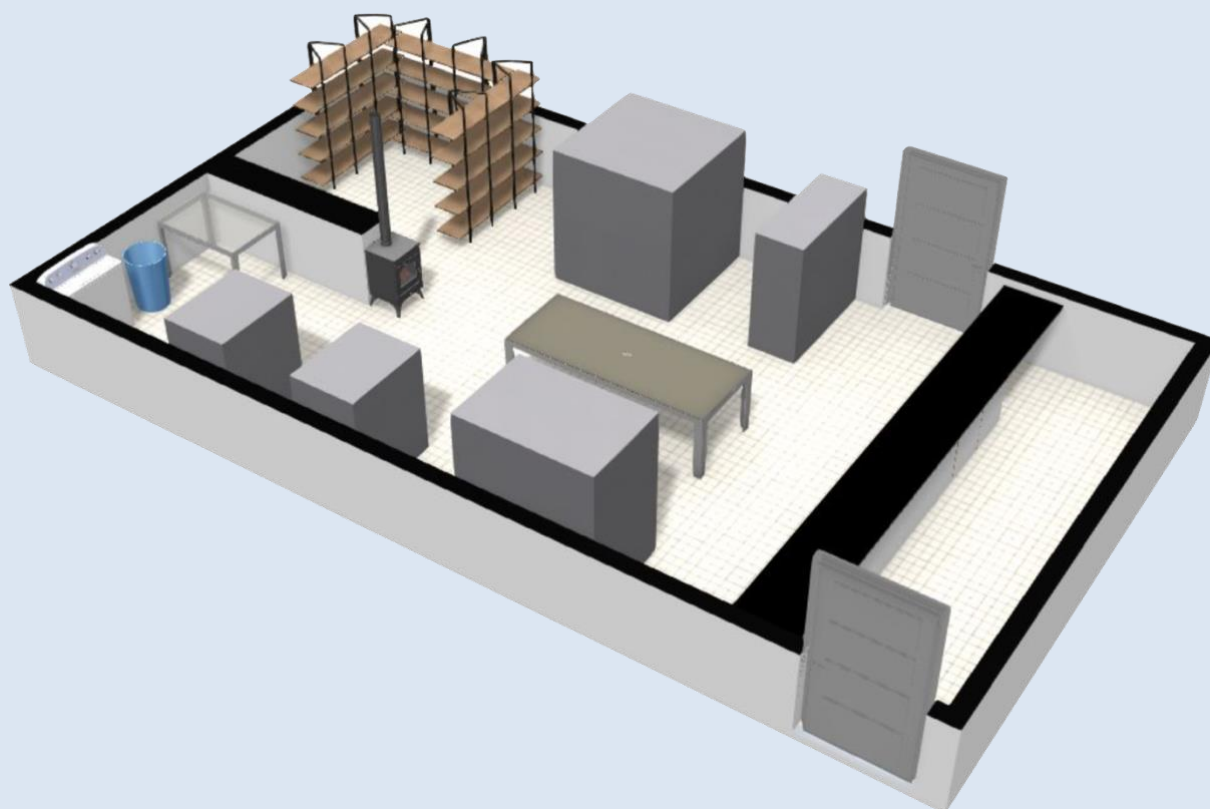




# RECOMMENDATIONS FOR WASTE MANAGEMENT SCHEME IN KHISHIG-UNDUR SOUM



Written by **Pierre Guerber**, Ecosoum's Director  
Validated by **Narantuya Gursed**, Ecosoum's President

V2 - JUNE, 2021

(UPDATED FROM V1 INITIALLY PUBLISHED IN APRIL, 2021)

This publication was produced under the “Sustainable Plastic Recycling in Mongolia” project funded by the European Union, but it does not necessarily reflect the views of the European Union.

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## INTRODUCTION

As a part of the project “Sustainable Plastic Recycling in Mongolia” funded by the SWITCH-Asia-II program of the European Union, Ecosoum produced recommendations to establish an efficient waste management scheme in Khishig-Undur soum. These recommendations are based on the findings of the baseline study published in January, 2021, available on Ecosoum’s website:

[www.ecosoum.org/en-resources-and-reports](http://www.ecosoum.org/en-resources-and-reports)

Our recommendations for the main components of the overall waste management scheme for Khishig-Undur soum are presented below in successive sections, following the logical order of the waste stream from production and sorting to recycling and elimination.

### 1. AT SOURCE WASTE SORTING

#### WASTE SORTING GENERAL RULES AND CATEGORIES

**All waste producers** – households (both villagers and herders), public institutions and private businesses – **should sort their waste** according to the categories recommended by Ecosoum and validated by soum administration.

**Main categories** of waste, according to which it should be mandatory for all waste producers to separate/sort waste, are (color-coding below matches the colors used in our awareness-raising material):

- **Recyclable waste;**
- **Food residue and other organic waste;**
- **Ash;**
- **Hazardous waste;**
- **Ultimate waste.**

The **recommended subcategories** for at-source-waste-sorting are the following:

- **Hard plastics** (including PET bottles and other containers);
- **Soft plastics** (including plastic bags and wrapping);
- **Glass** (bottles and jars, broken and intact);
- **Paper, carton, Tetra Pak and fabric** (in the same bag or separated depending on amounts);
- **Metal** (cans and other scrap metal);
- **Electronic waste and batteries;**
- **Vegetal waste** (vegetable peels, other green waste, etc.);
- **Animal waste** (meat, bones, fat, food leftover, etc.);
- **Wood ash** (with livestock dung ash if in limited amount);
- **Coal ash** (strictly separated from wood ash);
- **Hazardous waste** (such as oils, paints, etc. – each type separated from one another);
- **Ultimate waste** (all remaining non-recoverable waste).

Each waste producer should be free to determine the level of segregation (only with main categories or following subcategories) and the way to practically organize at-source sorting within its own premises, as long as it concretely allows him/her to ultimately sub-segregate his/her waste according to relevant subcategories at waste management facility (or by possible waste collection/transportation service) - as explained below.

## **WASTE SORTING AND EQUIPMENT BY TYPE OF WASTE PRODUCER**

**For households in the soum-center**, sorting bins manufactured and distributed by Ecosoum on behalf of soum administration should be used along with any additional personal equipment to segregate waste into previously mentioned subcategories, as explained in dedicated guidance leaflets distributed to all recipients (available on Ecosoum’s website).

**For herder households outside the soum-center** (who do not receive such sorting bins), strong reusable bags should be used to sort and keep waste safely until disposal. Herder households may find it more convenient to sort at source only according to main categories, in order to reduce the number of sorting bags in their camps, and to divide recyclables into subcategories only in the second phase at waste management facility.

**For public institutions**, large metal bins provided by Bulgan aimag administration should be used as temporary outdoor sorting containers, if possible, by sub-categories. Practical ways to sort waste inside the buildings should be defined by the staff themselves to best suit their own organizational needs (in line with requirements above).

**For private businesses**, practical ways of at source waste sorting and temporary storage of recyclable should be defined and organized by themselves in line with requirements above.

## **2. WASTE COLLECTION AND TRANSPORTATION**

### **RESPONSIBILITY OF WASTE PRODUCERS**

Unless proper collection service is organized by soum administration or Ecosoum, all waste producers – households (both villagers and herders), public institutions and private businesses – are responsible to bring their own waste (sorted at source) by their own means to the waste management facility.

### **PARAMOUNTCY OF WASTE MANAGEMENT PROCESSES AT FACILITY**

All categories of waste – including ash and ultimate waste – shall be transported exclusively to the waste management facility where they will be processed according to the established processes (which may involve the active participation of waste producers – as explained below). No waste (even considered ‘ultimate’) is to be dumped by waste producers directly at the landfill (and even more so in other locations).

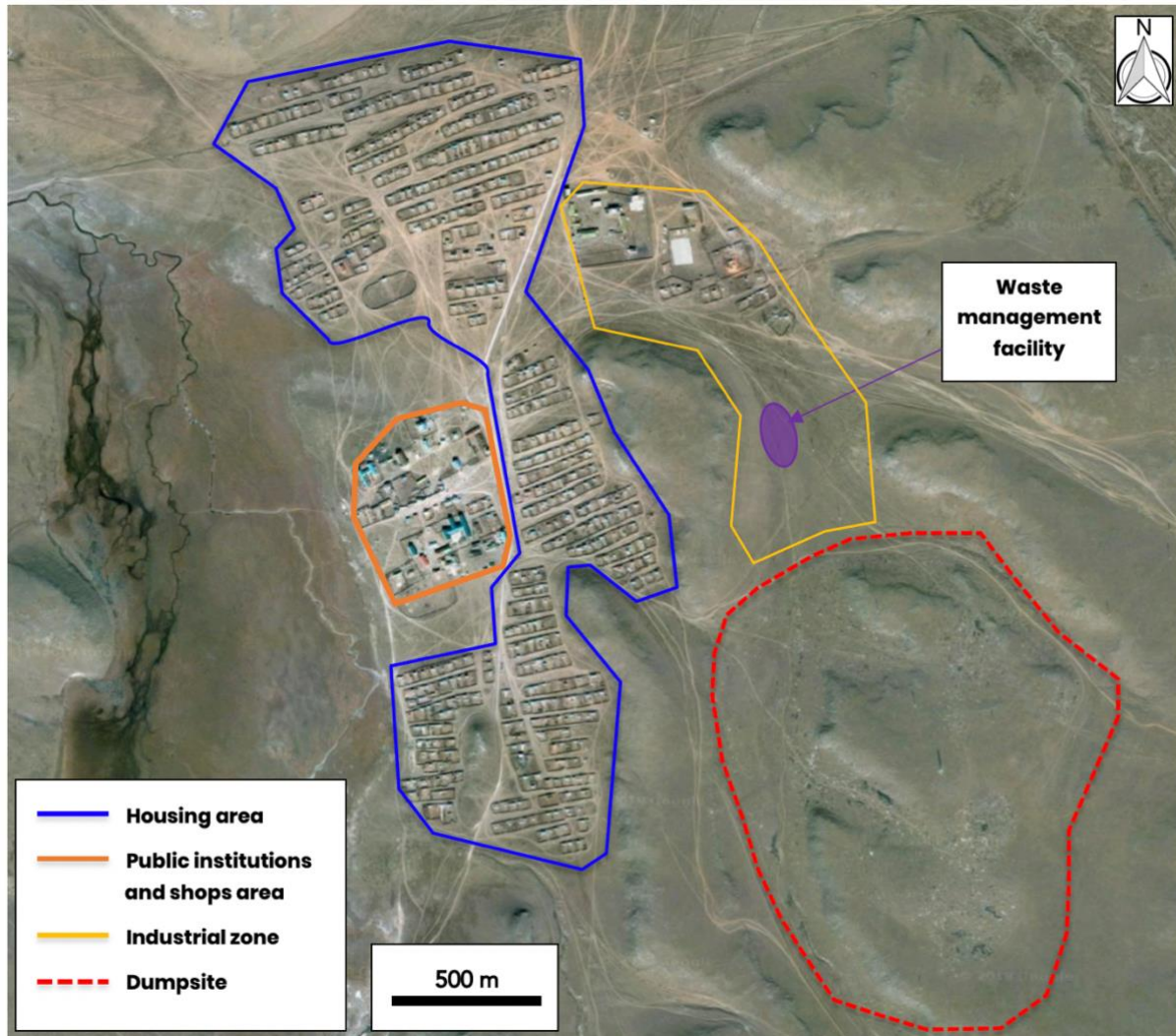
If waste collection service is eventually organized, for some or all groups of waste producers, such service should be carried out in a way that does not compromise neither the established processes nor the local waste management system as a whole. For instance, the degree and effectiveness of at-source waste-sorting should always be sufficient and consistent to allow processes in place at waste management facility to remain unchanged (especially when the aforesaid processes involved the participation of waste producers themselves before the launch of waste collection service).

Incidentally, waste collection service can be phased in for waste producers that proved they perfectly sort their waste (after bringing sorted waste several times by themselves to the facility). Progressively introducing monthly waste collection service this way can thus serve as incentive for waste producers to properly sort their waste. Such introduction of collection service shall not lead to significant additional costs because proper at-source sorting will translate into less work for waste management staff at the facility: as the workload associated with sorting at the facility will decrease, more time will be available to collect waste.

### 3. WASTE MANAGEMENT FACILITY

#### WASTE MANAGEMENT FACILITY LOCATION

Waste management facility is to be located in the industrial zone of Khishig-Undur soum, East of the housing area and North of the main dumpsite/landfill. Location map is presented below.



#### GENERAL PLANNING AND INFRASTRUCTURES OF WASTE MANAGEMENT FACILITY

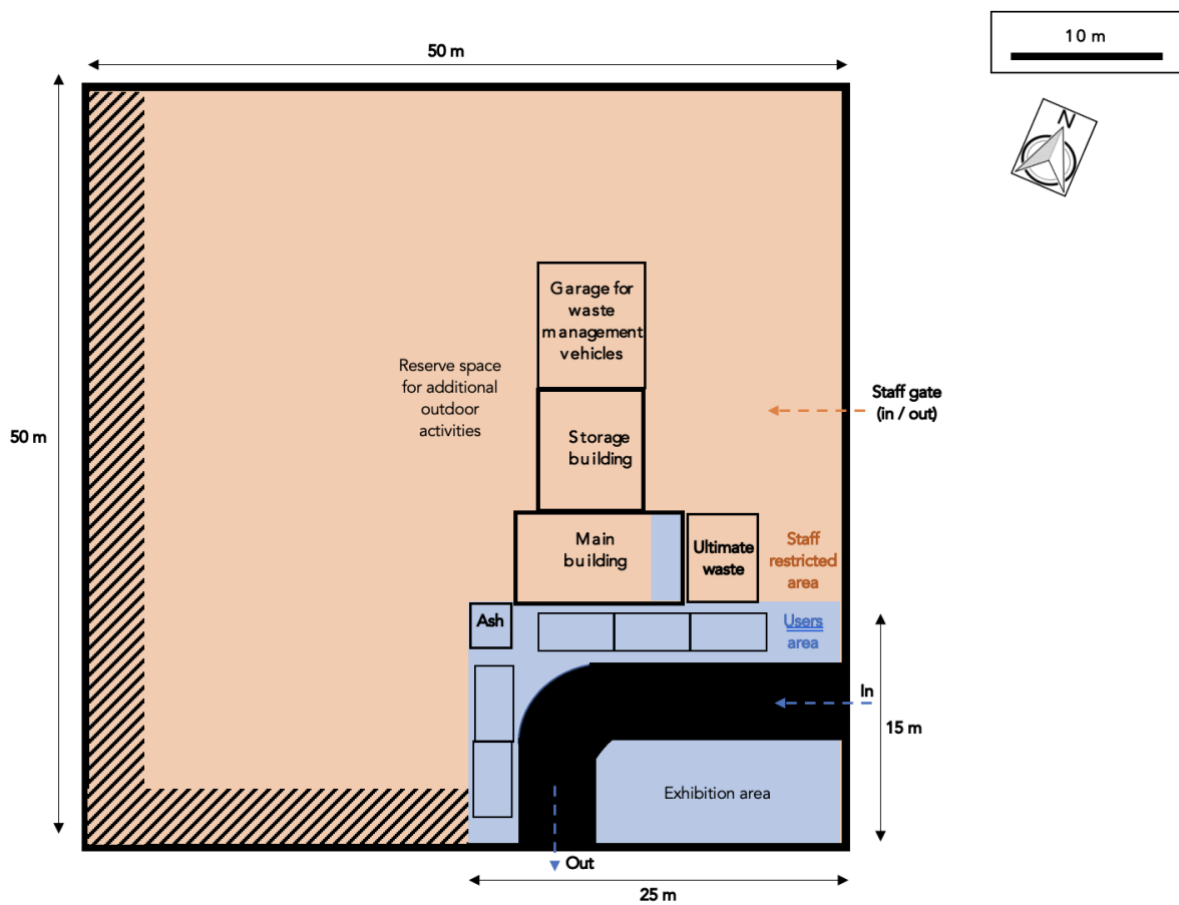
The waste management facility covers a square surface of 2,500m<sup>2</sup> (50x50m). Local topography shows a slight slop (app. 7%) from West (high point) to East (low point).

The waste management facility is intended to include:

- a main building, where recyclables are brought by waste producers ('users' of the facility) and recycled or processed by waste workers (waste management facility staff) in different ways;
- an annex storage building where sorted and processed waste is temporarily and properly stored until final elimination (either deliver to urban recyclers or recycle locally);
- a garage, where waste management vehicles can be protected from extreme weather conditions in winter;

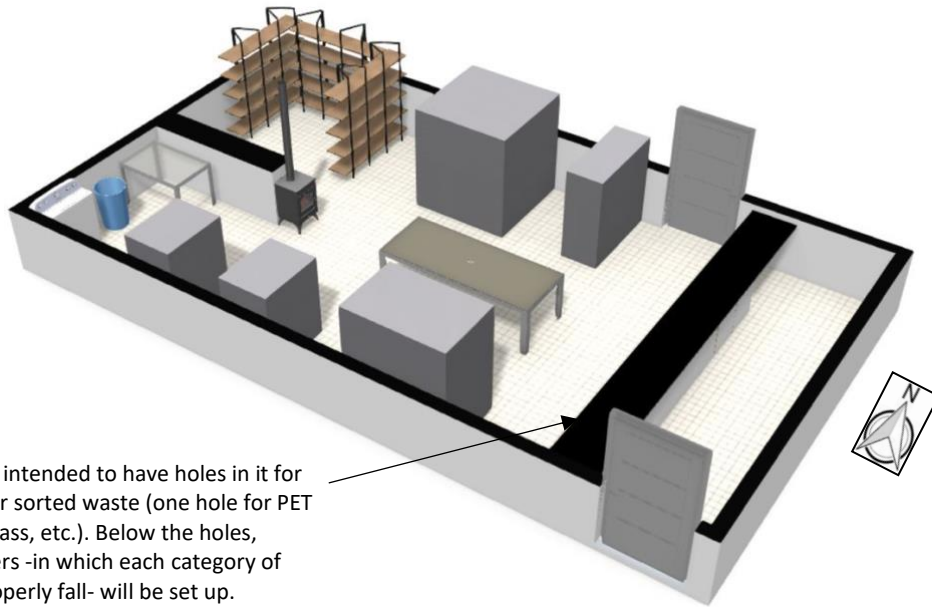
- an ultimate waste collection container, where ultimate waste is temporarily gathered and stored until elimination to the landfill;
- a separate ash container, next to ultimate waste container, to collect valuable wood ash that can be used in agriculture;
- If necessary, a composting area for food waste (which should be separated between vegetable and animal waste);
- if necessary, extra sheds, containers and other small infrastructures and equipment for tools and secondary waste management processes can also be set up in relevant area.

General layout and drawing of the facility are presented below.

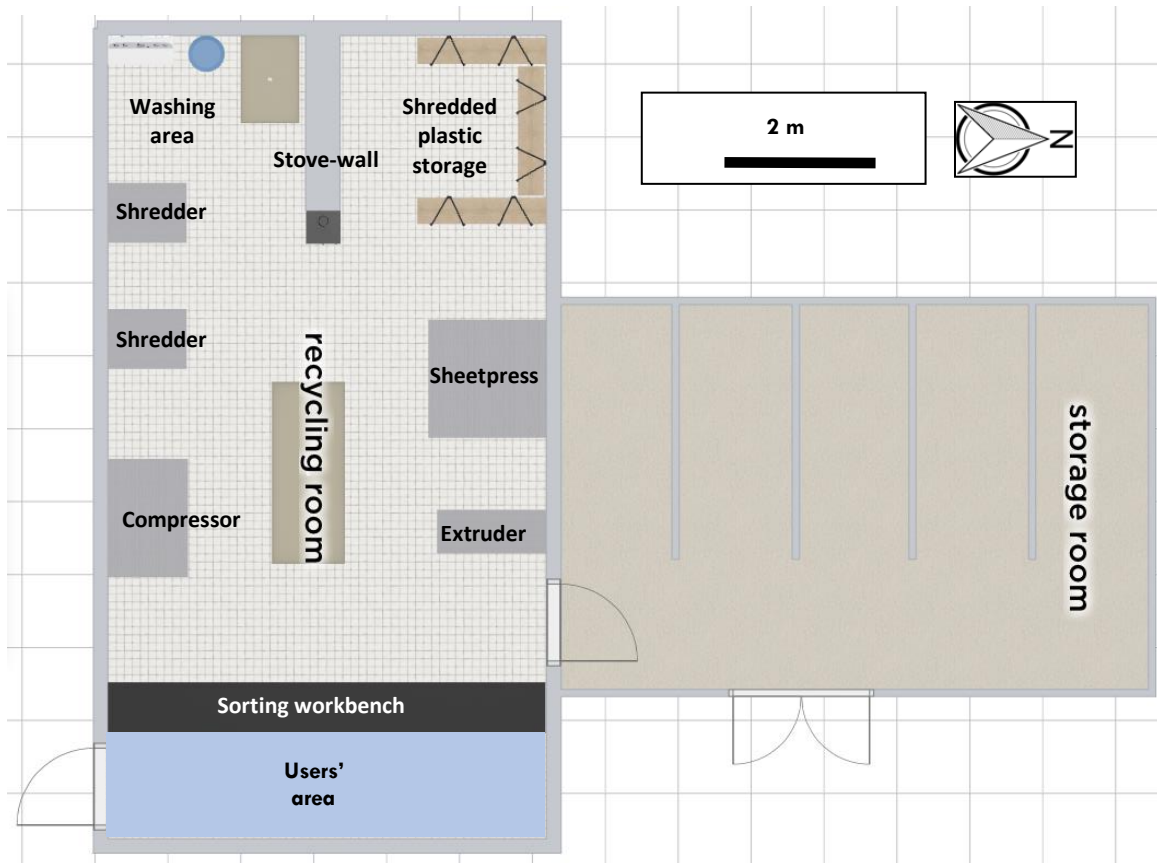


### **MAIN WASTE MANAGEMENT BUILDING AND STORAGE AREA**

The main building is divided into one limited area for users to come and drop their sorted waste, and another staff restricted area where waste is further sorted and recycled (in the drawing below: the grey blocks are recycling machines and the black strip is sorting table/workbench for users). Storage building is accessible from main building and offers enough space to temporarily store valuable recyclables by category until they are taken out for transportation to urban recycling industries or for local recycling.



The workbench is intended to have holes in it for users to drop their sorted waste (one hole for PET bottles, one for glass, etc.). Below the holes, separate containers -in which each category of recyclable will properly fall- will be set up.

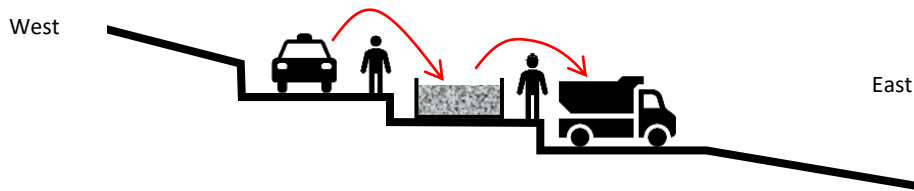


### **ULTIMATE WASTE COLLECTION CONTAINER**

The ultimate waste collection container needs to be designed to be practical both for people to drop their waste and for staff to subsequently take it back and put it in the truck for transportation and dispose at dumpsite. Considering that the waste management facility land is sloping eastwards, it could be possible, with limited landscaping, to set up a two-level or three semi-levels (as illustrated below) system where users can park above (West of) the container to easily drop



their waste while staff can park the truck under (East of) the container to easily take waste out to the truck.



### **WASTE PRODUCERS' ROUTE**

Users (waste producers) bringing their waste to the waste management facility will start their route by passing the South main gate and parking in front of the main building, where they will enter with their recyclables in bags.

In the limited public area to which users will have access, they will have to empty their bags of recyclables in the proper holes spread over the sorting/disposal workbench, under which containers on wheels will receive disposed recyclables sorted by category. Users will be assisted in this task by waste management facility staff (standing on the other side of the workbench), who will make sure waste is properly sorted and will offer support and explanation if necessary.

Although users can't enter the restricted recycling area, they will be able to watch the entire room in which recyclables are further sorted and recycled by staff, who can provide curious visitors with interesting information about waste management and recycling. Recycled items will also be displayed.

After disposing recyclables in the main building, waste producers will still have some ash and ultimate waste to dispose from their vehicle. They will thus move the car next to the appropriate containers and dispose their remaining waste. A waste worker will join users during this process so he can assess the alleged ultimate waste and make sure no valuable recyclables have been improperly mixed with ultimate waste. If some recyclables are still recoverable, they will be taken back to the main building.

At this point, users will have disposed all their waste and can exit the waste management facility, without ever having to go to the landfill.

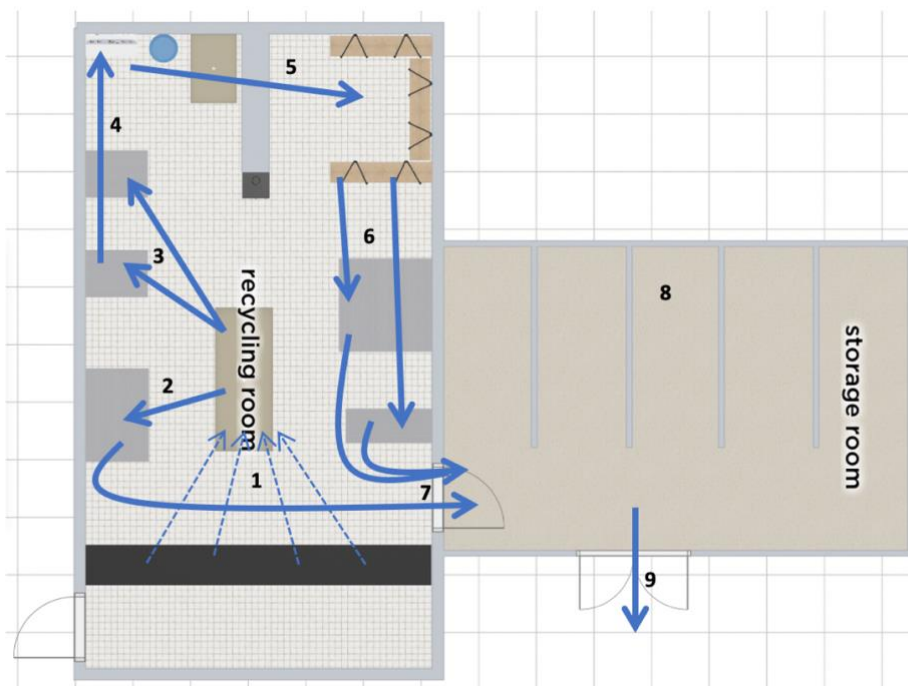
If, on an exceptional basis, waste workers and producers agree there is a good reason for waste producers to dispose their waste directly at the landfill (for instance, if they have a truck full of demolition waste), waste workers will accompany them to oversee the process and make sure waste is disposed properly and safely.

### **RECYCLABLE WASTE MANAGEMENT BY WASTE WORKERS**

Once recyclables are dropped off by users in the sorting workbench, they will be taken from containers under the workbench and further sorted into relevant subcategories. Then, each type of recyclable will be processed by local staff according to pre-established processes. These processes may evolve over time depending on needs and opportunities, but main guidelines in the first place are:

- PET bottles will be compressed with the compressor and PET blocks will be stored in storage building until they are taken to urban recyclers. Other types of plastic recyclables can also be processed the same way if urban recycling industries accept them. The rest of plastic waste will be shredded, washed, temporarily stored by type and color and finally recycled with sheetpress or extruder machines.
- Glass bottles and jars that are taken back by industry will be carefully stored until they are transported to the respective industry. Other types of glass waste will be crushed and stored until further reuse/recycling.
- Food waste will be either given to animals (livestock or dogs) or composted.
- Reusable cartons will be locally given away or directly used for packaging/storage, while non-reusable paper and carton will be properly stored until transportation to urban recyclers or local valorization (for compost or dry toilets for instance).
- Aluminum cans will be pressed and stored similarly to PET bottles before to be sold to urban recyclers.
- Other types of waste for which no proper waste management channels are currently available in Mongolia (Tetra Paks, e-waste, etc.) will be:
  - whenever possible/relevant: sorted, audited to produced data, and stored until processing channel is available;
  - in other cases: disposed in landfill.

Locally recycled items will be locally given or sold according to processes discussed with local population and validated by local administration. For recyclables that are not recycled locally, they will be taken from the storage room through the Western door and loaded on a truck for transportation to urban recyclers (once there is enough material to fill a truck to Ulaanbaatar or Bulgan city).



**1.** Recyclables are taken from under workbench and further sorted on sorting table. **2.** PET is compressed in compressor. **3.** Other plastics are put in shredder. **4.** Shredded plastic is washed in washing machine and dried on stove-wall. **5.** Clean shredded plastic is stored by type and color. **6.** Plastics are recycled with sheetpress or extruder. **7.** Sorted/processed recyclables are taken to annex building for storage. **8.** Recyclables are properly stored in separate compartments. **9.** When relevant, stored recyclables are taken to truck for transportation.

## **ELIMINATION OF WASTE BY WASTE WORKERS**

When there are enough stored recyclables, local staff will charter a truck for transportation to urban industries.

Once ultimate waste container is full, truck will be loaded by local staff, who then will transport ultimate waste to the dumpsite.

## **4. MAIN LANDFILL**

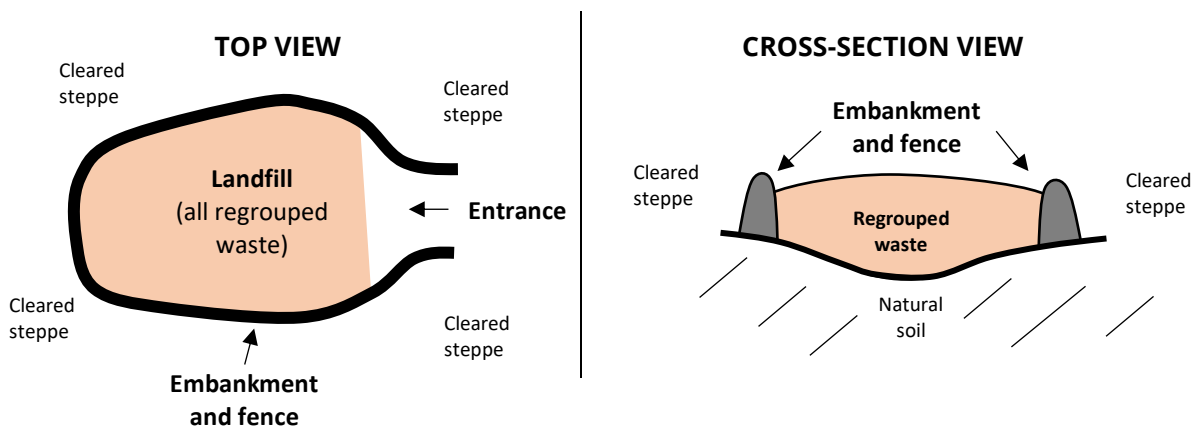
### **REDUCING AND SECURING THE OLD DUMPSITE**

The open dumpsite shall be reduced and secured into a relatively proper landfill, which shall henceforth be managed properly in an organized fashion.

Reduction work should be carried out by regrouping all existing waste in a limited area of maximum 4 ha (as opposed to above 100 ha currently – see map below). As much as possible, this work shall be carried out using relevant engines, but finalizing the clearing operation will still require waste picking by hand, especially in the rocky areas.



Securing work should entail the creation of an embankment and the installation of fences all around the reduced landfill area (see pictures below). A single entrance, closed with an appropriate gate, should be planned in embankments and fences. Security cameras shall be installed to cover at least the entrance of the landfill and, if possible, the entire premises and borders. All regrouped waste, including if present in the embankment, shall be covered with soil or other appropriate material to prevent wind scattering and direct contact with humans and animals.



### **USE OF SECURED LANDFILL**

After the reduction and securing work is finalized (and, if possible, even during the operation), entrance of landfill shall be strictly limited to authorized personnel of the waste management facility. Waste producers may be authorized to enter the landfill on exceptional basis (if there is a good reason that they need to dump waste directly from their own vehicle), but only under supervision of the aforesaid authorized staff.

All waste disposed at the landfill shall have initially been assessed by waste workers to make sure it cannot be recovered or recycled any further.

If possible, disposed ultimate waste should be compacted with a bulldozer. In any case, it should strictly be covered with soil or other appropriate material (such as heavy coal ash from local heating plant) regularly to prevent waste scattering. Covering operation should be carried out at the very least once a month, but if possible, more frequently (after each disposal would be best), especially when light and easily-scattered types of waste are disposed of.

## **5. OTHER SPECIFIC DISPOSING AREAS**

### **HAZARDOUS WASTE**

If relevant and applicable solutions in line with Mongolian law can be implemented for transporting and properly processing hazardous waste in specialized facilities in Ulaanbaatar, such solutions shall be favored.

In case hazardous waste has to be handled locally in Khishig-Undur, it should be stored in the soil in the safest possible way. A specific area should be delimited for hazardous waste in the landfill so that it is never mixed with other types of non-hazardous waste.

Different types of hazardous waste should not be mixed together in order to avoid that they react together. Hazardous waste should be stored in solid waterproof barrels, which should be constituted of a relevant material (metal or plastic) according to the nature of the stored substance/waste.

Buried hazardous waste should be monitored and content of barrels should be registered. Burial location should be recorded and physically marked on site.

## **CARCASSES**

A specific area should be defined to dispose animal waste such as livestock carcasses, bones, fat and so on. This area should be perfectly fenced to avoid people and livestock entering the area. Only wild scavenger birds could enter the perimeter from the sky. They could then eat and eliminate the disposed animal waste in the most natural way.

The only exception would be carcasses of livestock suspected to carry contagious diseases. These carcasses should be buried carefully in another specific and protected area. A long trench should be dug in summer when soils are not frozen, so dead animals can still be buried and covered in winter when soils can't be dug.

When a herder will bring a carcass to the waste management facility, waste management staff shall accompany him to the appropriate dedicated area so the carcass can be disposed properly.

## **SLUDGE**

Sewage sludge should be composted. The composting area for sludge shall be either within the premises of the waste management facility or in another dedicated area, depending on the volume of sludge to compost and thus the surface required to carry out the process safely.

# **6. FINANCING SOURCES AND OPERATIONAL ACTORS**

## **SOURCES OF FUNDING**

The operational costs will be primarily covered by a dedicated waste management local tax. This tax shall be introduced and collected by local administration to raise enough money to pay at least two full-time waste management staff.

Additional funding should be gathered by selling recyclables to urban recyclers. This money shall be used to cover running costs (maintenance, electricity, gas and transportation costs, etc.) and, if possible, eventually hire more staff and improve the waste management system (including introducing waste collection service).

If necessary, occasional investments (new truck, new machine, etc.) shall be covered by soum or aimag general budget.

## **OPERATIONAL ACTORS**

Local administration shall remain in charge of waste management at all time, in order to make sure that the waste management system remains exhaustive and general interest-oriented (rather than being turned into a private profit-making operation disregarding non-valuable types of waste). As such, the best option would be that local administration directly hires relevant staff and keeps daily waste management operation under its direct control.

If this first option cannot be implemented and waste management has to be subcontracted to a private actor, it should be preferably contracted to a non-profit operator, or at least to a locally-based community organization (such as soum-based cooperative).

In case of such subcontracting, a clear framework and terms of references should be contractually clarified – rather than leave the subcontractor operate however he intends. More precisely, the

subcontractor should be fully remunerated by local administration for a specific service (e.g. properly managing all types of waste according to local waste management Master Plan) rather than asking him to remunerate himself by trading valuable recyclables (which would turn soum-level waste management into a market-oriented business, with all the risks associated with such an approach). Therefore, the money raised from trading recyclables should be used exclusively to improve the waste management system and/or be added to soum general budget (which, in turn, can be used to pay part of subcontractor's fee).