SCIENTIFIC DISPOSAL

KUSHAAGRA® Innovations Foundation

SCIENTIFIC DISPOSAL

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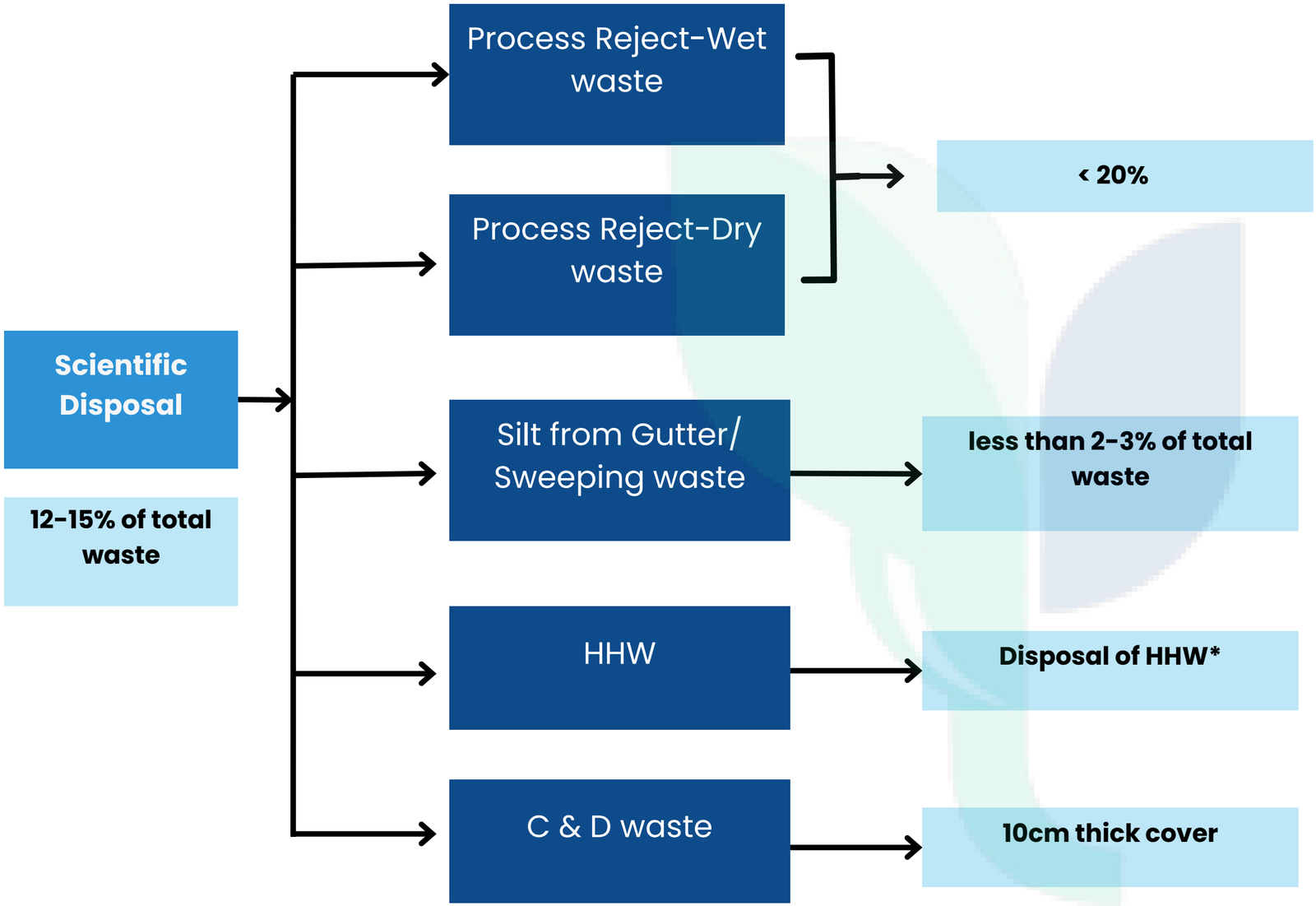
Scientific Disposal of waste



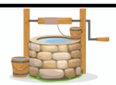
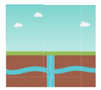
Sanitary Landfill Definition as per SWM Rule 2016

A carefully engineered disposal facility for municipal solid waste (MSW) designed and operated to ensure the protection of the environment and public health. It is a fully engineered structure which is lined with a clay liner to prevent leachate from entering the groundwater and a synthetic liner to prevent landfill gas from escaping.

*2 liners and leachate management system is mandatory.

CONSTUCTION OF SANITARY LANDFILL

Criteria for site selection

Attributes	Details
Lake or Pond	200 m
River	100 m
Flood Plain	within a 100 year flood plain
Highway	200 m
Habitation	500 m
Public parks	300 m
Water Supply Well 	500 m
Airport/airbase	20 km
Ground Water Table 	A landfill should not be constructed in areas where water table is less than 2m below ground surface
Critical Habitat Area, Coastal Regulation Zone, wetlands, Unstable Zone such as landslide prone areas, fault zone etc. There should be a Buffer zone.	

Criteria for Special Provisions For Hilly Areas

Landfill site of N. Dum Dum (Kolkata)

- **Hills towns:** Implement specific solid waste disposal approved by State Pollution Control.
- Establish processing facilities for organic waste utilization in hill areas.
- Recycle non-biodegradable materials periodically; store and send for recycling.
- Utilize inert waste for road construction or filling appropriate hill areas.
- If land constraints in hills, dispose unsuitable waste in regional plain landfills.

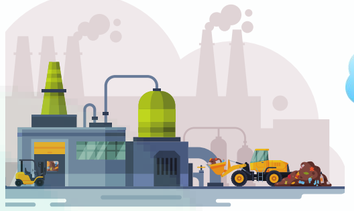
Source CPCB Report

CONSTUCTION OF SANITARY LANDFILL

Criteria for constrution of sanitary landfill

Land Allocation and Notification

Sanitary Landfill Planning and Development



Integration with Waste Processing Facilities

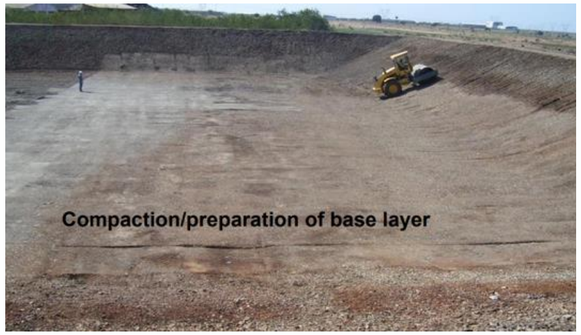
Compliance with Guidelines

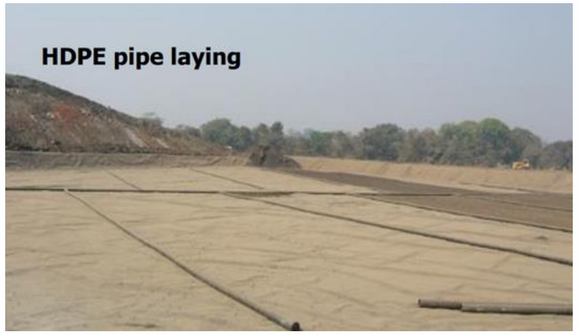
Improvement of Existing Landfill Sites

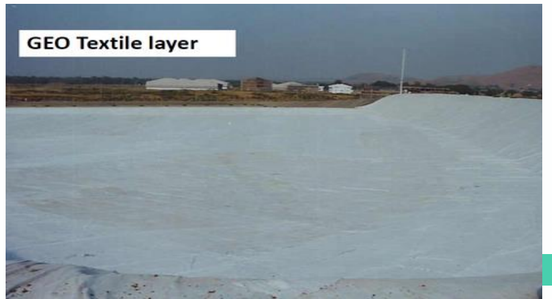
Criteria for development of facilities at SLF

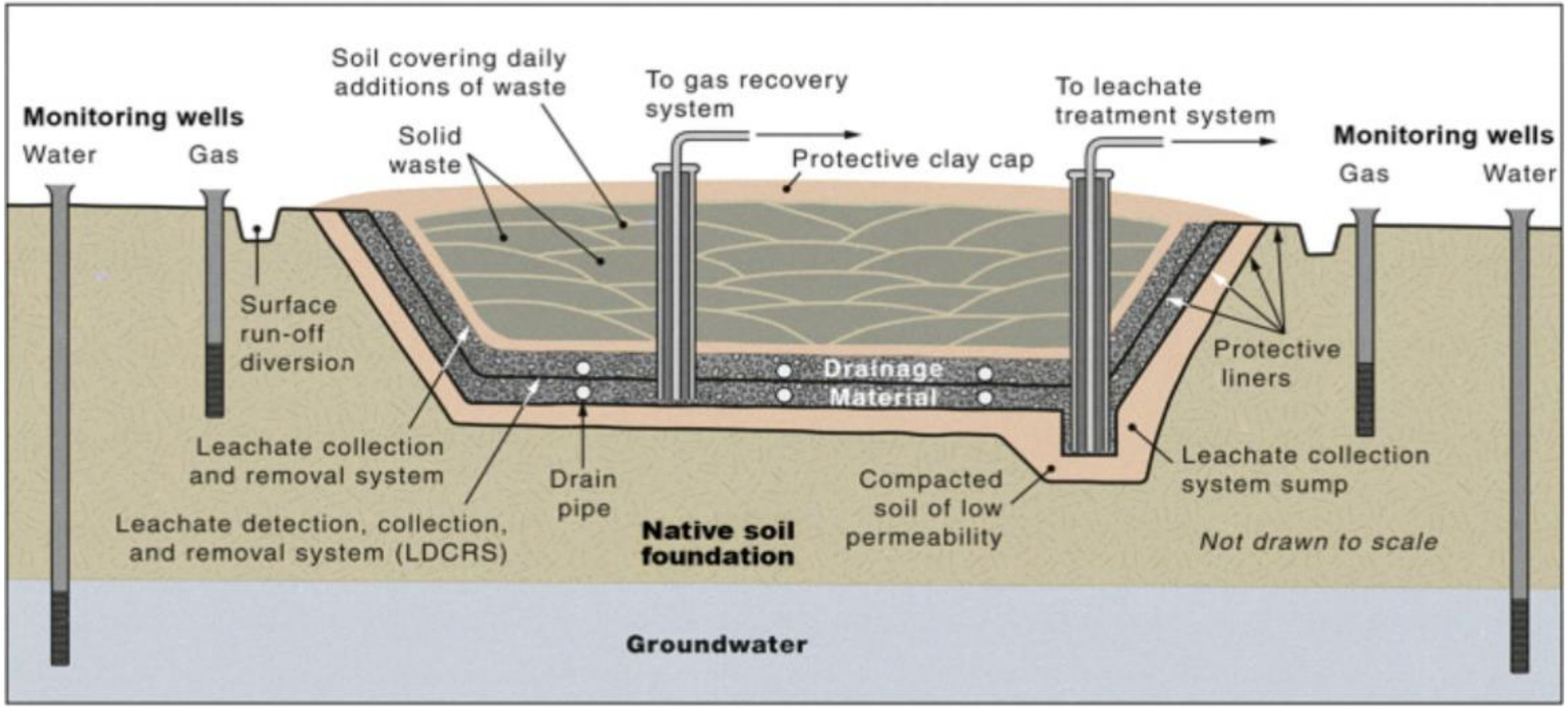
Landfill site security	**Roads infrastructure**	**Facilities at landfill site**	**Essential provisions**
Improvement of Existing Landfill Sites	**Utilities and amenities**	**Safety and health measures**	**Transport vehicle provisions**

Essential Components of Sanitary Landfill









Scientific Landfill Methods – Based On Site Condition/Geography

Area Method (Above ground level)

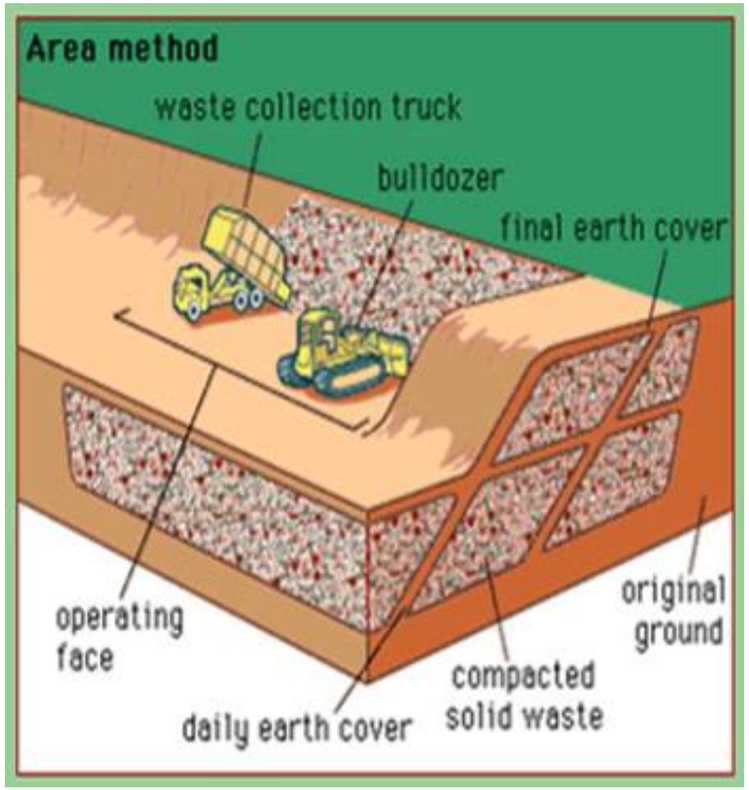
- Used on flat ground.
- An earthen levee is constructed before landfilling against which wastes are placed in thin layers & compacted.
- Thickness of layer reaches a height of 200 to 300 cms
- Cover material of 15-30cm thickness is placed after each layer.

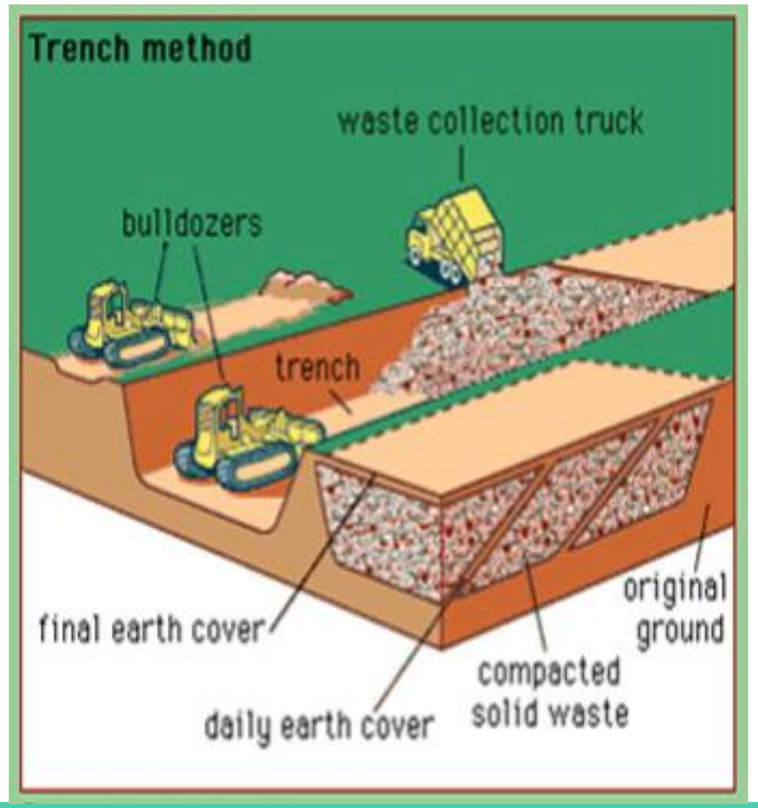
Trench Method (Below ground level)

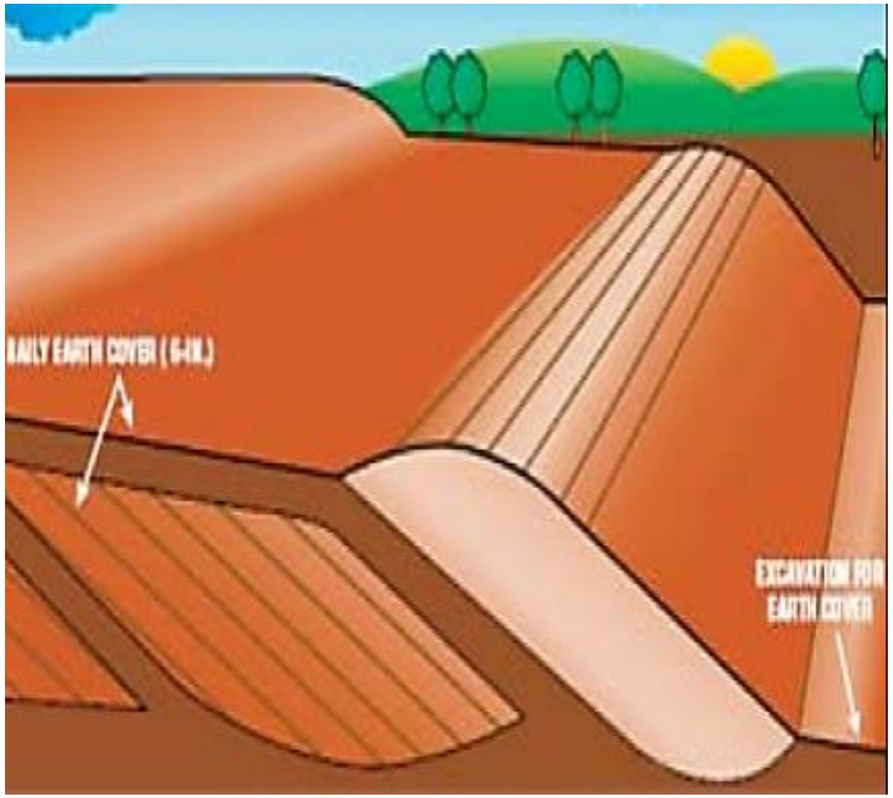
- Used where adequate cover material is available & water table is well below the
- surface.
- Waste are placed in trench & compacted in thin layers.
- After compacted height reaches design height, cover material is placed over the
- compacted layer.

Ramp method

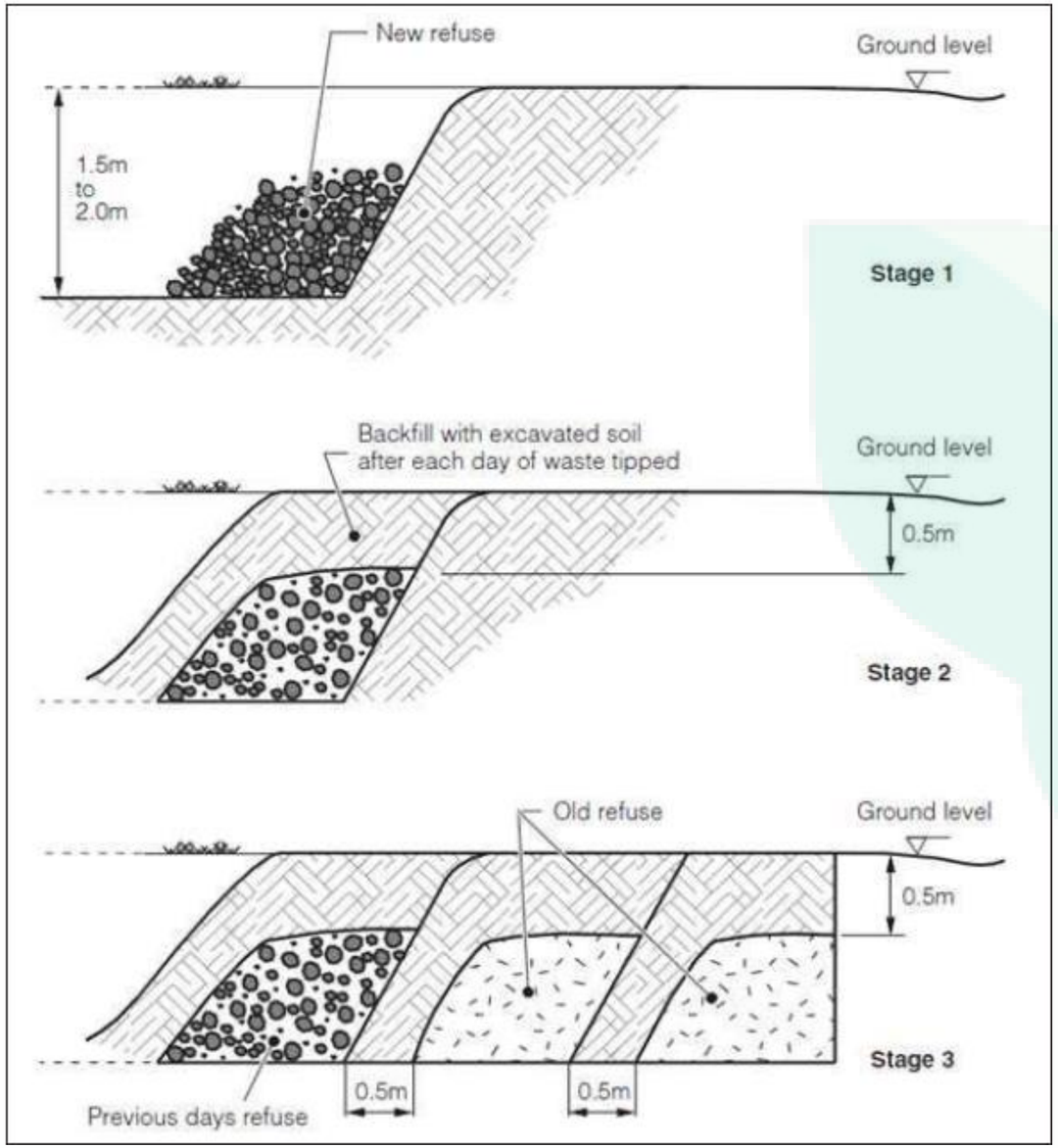
- Combination of area & trench method.
- Waste is spread and compacted on an existing slope.
- Cover material is excavated directly in front of the waste. It is then spread over the waste and compacted.
- Ramp method is considered ideal by some operators because they do not have to haul in cover material

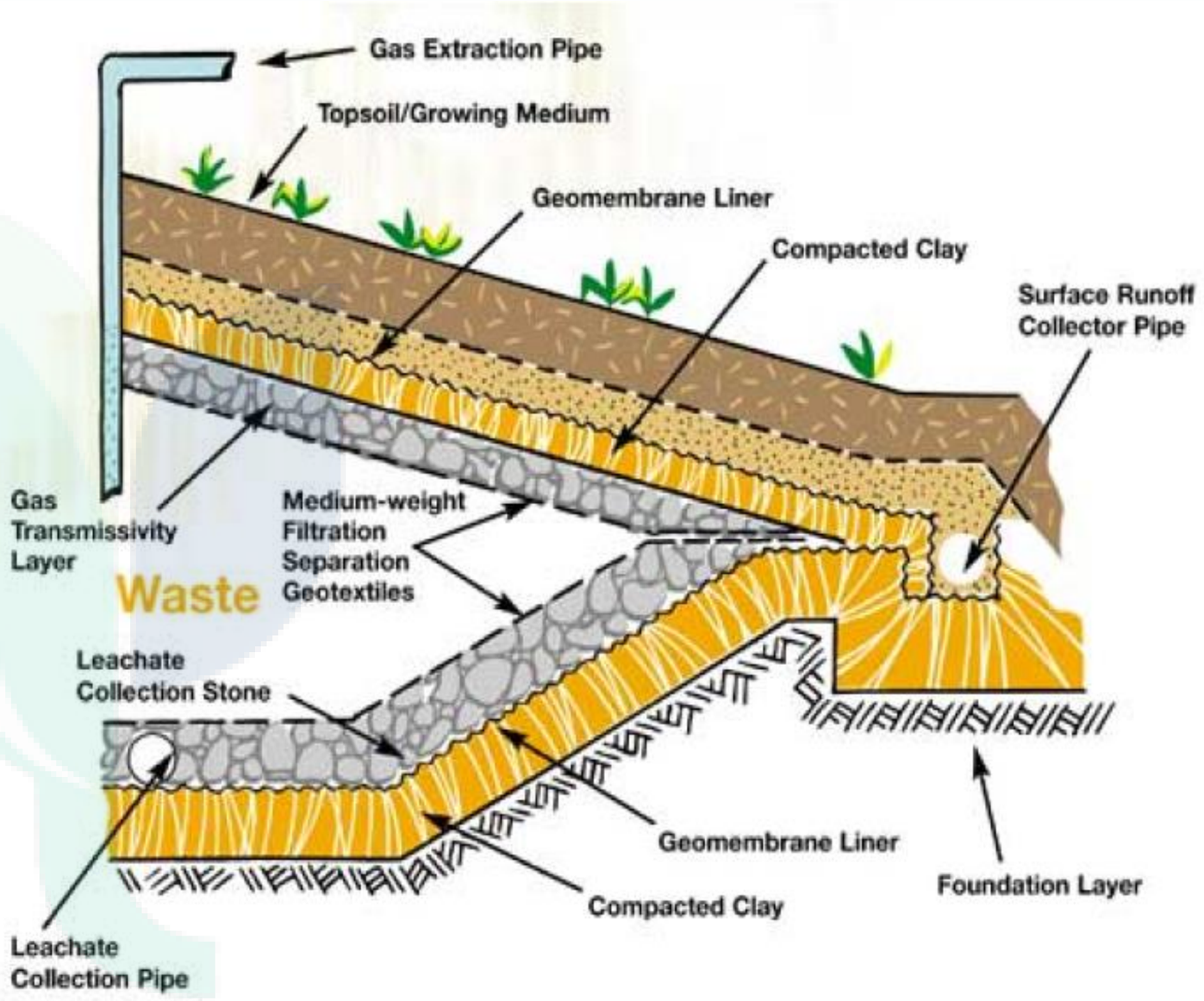




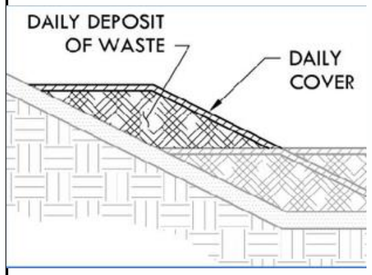


Scientific Landfill Methods

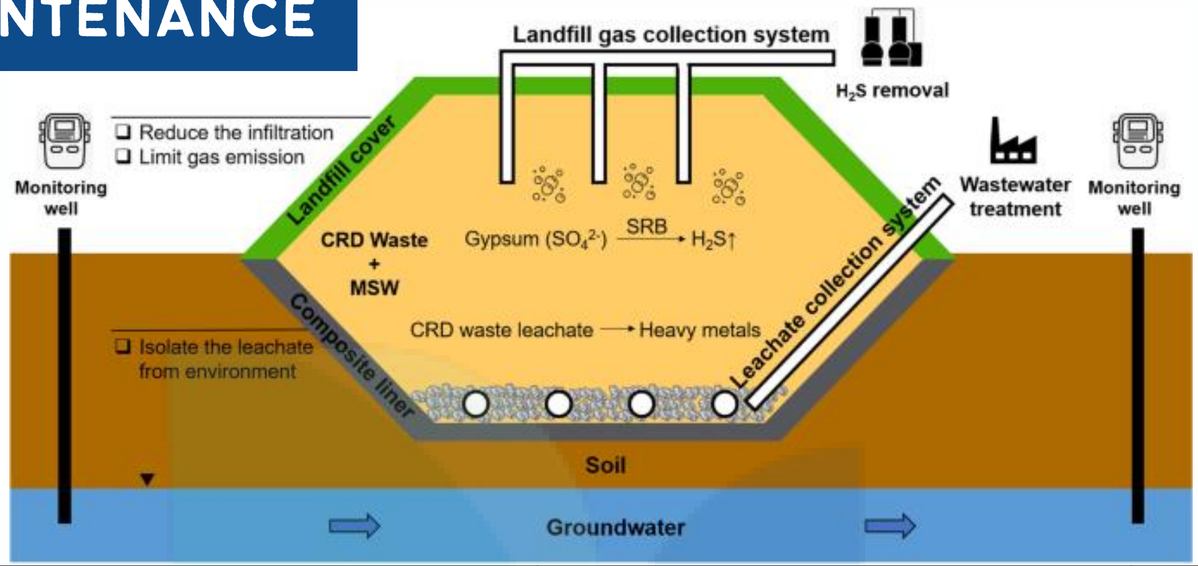




Operation and Maintenance

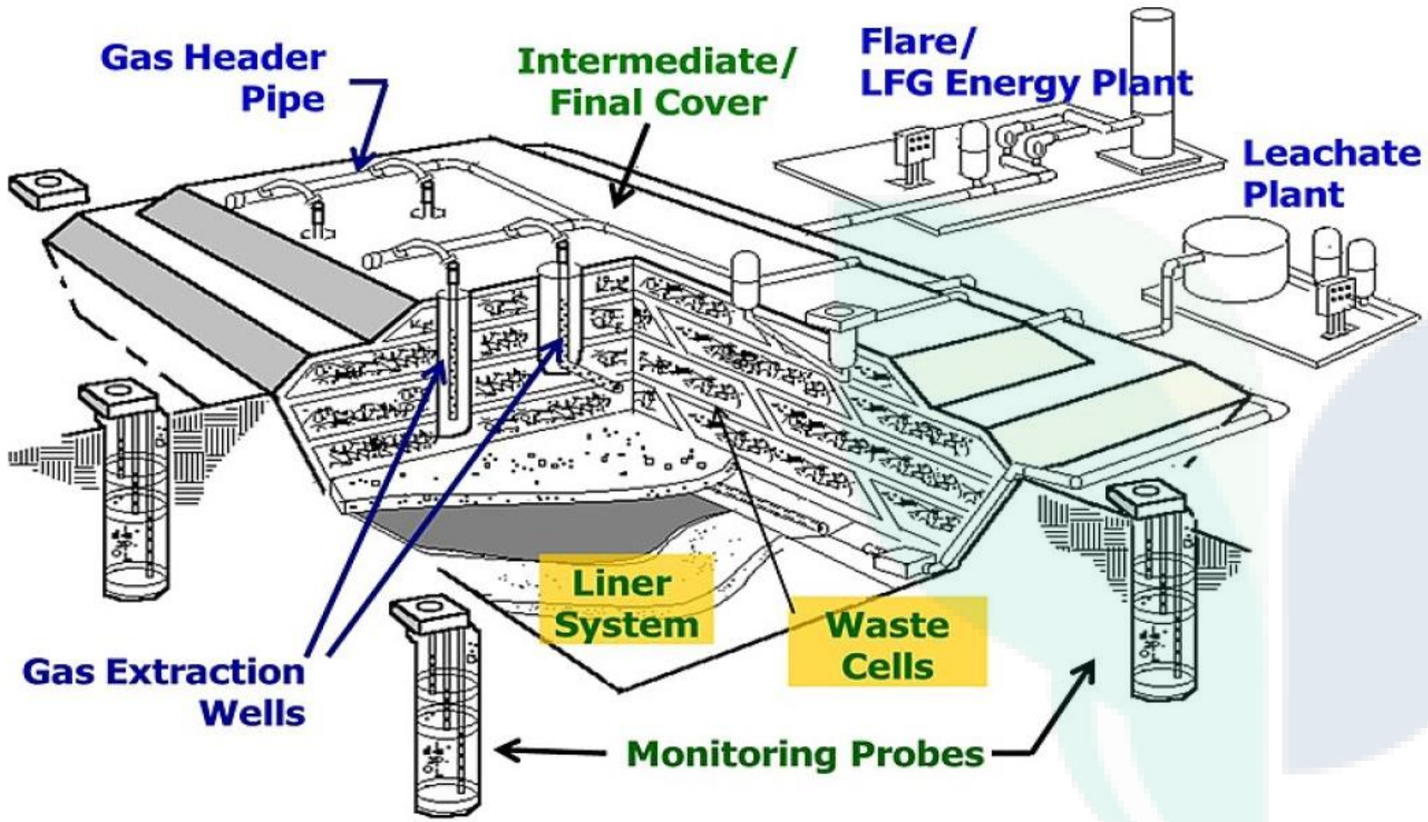
Aspect	
 Waste Acceptance and Spreading	- Only authorized waste types should be accepted at the landfill. - Waste should be spread and compacted in layers to minimize void space.
 Final Cover	- Final cover with a minimum thickness of 1 m of compacted clay or a combination of clay and synthetic geomembrane after filling is complete.
 Daily Cover	- Daily cover of waste with a minimum of 150 mm of compacted soil to prevent odors, flies, and windblown litter.
 Monitoring and Reporting	- Regular monitoring of groundwater, surface water, air quality, and landfill gas. - Recordkeeping of all monitoring data and operational activities. - Reporting of monitoring results to the regulatory authorities.

Operation and Maintenance



Aspect	Requirement/Guideline	Operation	Maintenance
Closure and Post-Closure Care	- Proper closure of the landfill after filling is complete. - Post-closure care for a minimum of 30 years to ensure the long-term stability and environmental protection of the landfill.	- Implementation of a closure plan as per the landfill permit. - Removal of landfill gas collection and treatment systems. - Grading and shaping of the final cover. - Planting of vegetation on the final cover.	- Regular inspections of the closed landfill for signs of settlement, erosion, or leachate leakage. - Maintenance of the final cover and vegetation. - Monitoring of groundwater and surface water quality.

Criteria for Post-Care of Landfill Site



(1) The post-closure care of landfill site shall be conducted for **at least fifteen years** and long term monitoring or care plan shall consist of the following, namely:-

(a) Maintaining the **integrity and effectiveness of the final cover,** making repairs, and preventing run-on and run-off from **eroding** or otherwise damaging the final cover;

(b**) Monitoring leachate collection system** in accordance with the requirement;

(c) Monitoring **of groundwater** in and around landfill;

(d) Maintaining and operating the landfill gas collection system to meet the standards

(2) Use of closed landfill sites after fifteen years of post-closure monitoring can be considered for human settlement or otherwise only after ensuring that gaseous emission and leachate quality analysis complies with the specified standards and the soil stability is ensured.