



MAX*Separation*[™] Screening, Sorting, & Separating Process & Equipment



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www.VortexEnergyGroup.com



The following is a description of our **MAXSeparation™** Waste Material Screening, Sorting, & Separating technology. This technology is based on large scale sorting or classification facilities that process 1,000 tons per day (tpd), and screen out very small items. A large facility like that would make sense for a landfill, if there was no further process, such as our waste-to-energy (WtE) system.

We only need to screen, sort, and separate dirt and rocks, plus any glass or metals from what is dug up doing a landfill reclamation project. To the best of our knowledge, there is no system like this that is contained onsite at a landfill. Conventional landfill reclamation efforts use a process where they dig up the material, shred it and size reduce it, then chemically neutralize it, and then rebury it. The problem is that with this method, no structures can be built over it, due to the ongoing methane release, which could be dangerous if trapped in anything built on the land.

Our technology is much simpler – we dig up the buried landfill material, shred it, then as we sort out the dirt and rocks, the remaining material goes through a screening and sorting process to remove any glass and metal, and at that point, the material is introduced into our **ThermoMAX™** Thermal Vortex Combustion System chamber with a 2,000°F, 90mph tornado or vortex. The waste material will burn in full suspension inside the vortex. This material will destroy 99.998% of the original combustible material. The land can now be have buildings and structures built on it, with no concern of any possible gas emissions.

As part of a WtE process, the super-heated exhaust goes from the combustion chamber into a waste heat boiler, where steam is created, that then goes into a steam turbine to generate substantial volumes of clean energy.

Combining this thorough screening, sorting, and separation process with our complete WtE system, we can offer an extremely efficient and sustainable process, with a revenue stream available if the electricity will be sold off on the grid. For islands and restricted land use areas, the electricity can be used as a dependable base load generation that can help reduce costs, as well as supply electricity in areas that currently endure brown-outs and black-outs as common practice.



Landfill Reclamation Process

A comprehensive landfill reclamation system is designed to excavate, sort, and separate various materials—such as dirt, rocks, hard minerals, glass, and metals—from landfill sites. This process not only recovers valuable resources but also prepares the land for potential reuse. Below is a detailed description of the equipment and processes involved in such a system.

Overview of the Landfill Reclamation Process

1. **Excavation:** Heavy machinery like excavators and loaders remove waste material from the landfill.
 2. **Primary Screening:** Initial separation of large debris and fine materials using trommel screens or vibrating screens.ecostar.eu.com+5alamavani.com+5mswsorting.com+5
 3. **Secondary Separation:** Further sorting of materials based on size, weight, and magnetic properties.
 4. **Material Recovery:** Extraction of reusable materials such as metals, glass, and clean soil.nerc.org
 5. **Waste Management:** Residual waste is processed for energy recovery or disposed of appropriately.
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Key Equipment and Their Functions

1. Trommel Screen (Rotary Drum Screen)

- **Function:** Separates materials based on size.
- **Application:** Efficiently separates fine soil from larger debris.alamavani.com
- **Advantages:** Handles large volumes and is effective for basic landfill reclamation.epa.gov

2. Vibrating Screen

- **Function:** Further separates materials by size using vibration.
- **Application:** Ideal for separating smaller particles like sand and fine glass.
- **Advantages:** Compact and mobile, suitable for various site conditions.aeiscreens.com

3. Magnetic Separator

- **Function:** Removes ferrous metals (e.g., iron, steel) from the waste stream.mswsorting.com
- **Application:** Extracts valuable metals for recycling.peaks-eco.com+1almarwan.com+1

- **Advantages:** Efficiently recovers metals, reducing environmental impact .

4. Eddy Current Separator

- **Function:** Separates non-ferrous metals (e.g., aluminum, copper) using induced currents.en.wikipedia.org
- **Application:** Recovers valuable non-magnetic metals.sciencedirect.com+4en.wikipedia.org+4norditek.se+4
- **Advantages:** Effective for sorting non-ferrous metals from mixed waste .en.wikipedia.org+1mswsorting.com+1

5. Air Classifier

- **Function:** Separates materials based on weight using air flow.
- **Application:** Removes light materials like plastics and paper from heavier items.edgeinnovate.com+4mclanahan.com+4aeiscreens.com+4
- **Advantages:** Enhances the purity of recovered materials .aeiscreens.com

6. Density Separator (Water Bath or Spiral Separator)

- **Function:** Separates materials based on density differences.
- **Application:** Distinguishes between materials like glass and plastics.mclanahan.com
- **Advantages:** Provides high-precision separation for complex waste streams .



Materials Recovered and Their Uses

- **Soil:** Cleaned soil can be reused as landfill cover or construction fill .p2infohouse.org+3epa.gov+3ijtre.com+3
- **Metals:** Ferrous and non-ferrous metals are recycled into new products.
- **Glass:** Crushed and processed for use in new glass products or as aggregate.
- **Rocks and Hard Minerals:** Used in construction as aggregate material.
- **Residual Waste:** Non-recyclable materials may be processed into refuse-derived fuel (RDF) or sent to waste-to-energy facilities.en.wikipedia.org+1ijtre.com+1

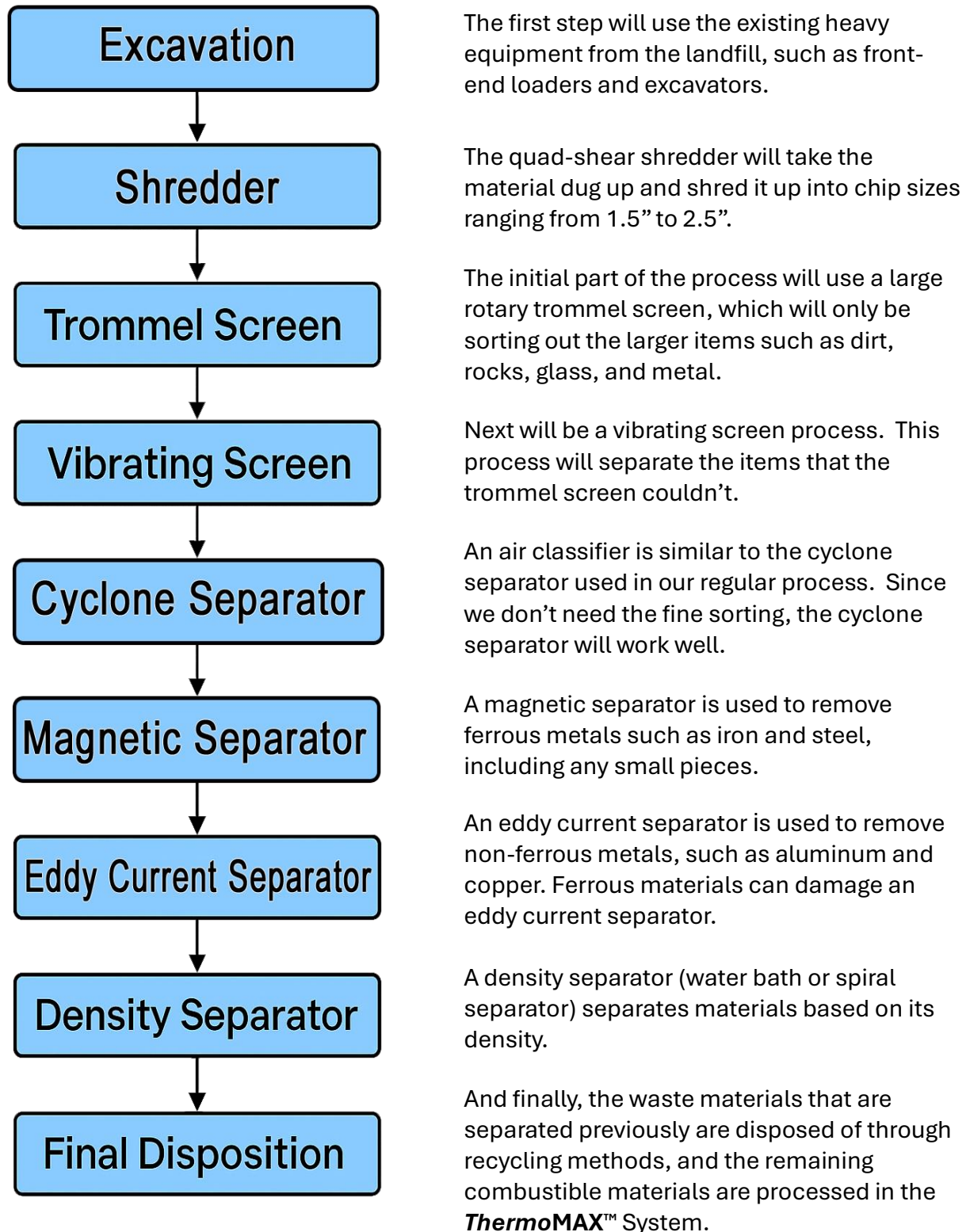


Benefits of Landfill Reclamation

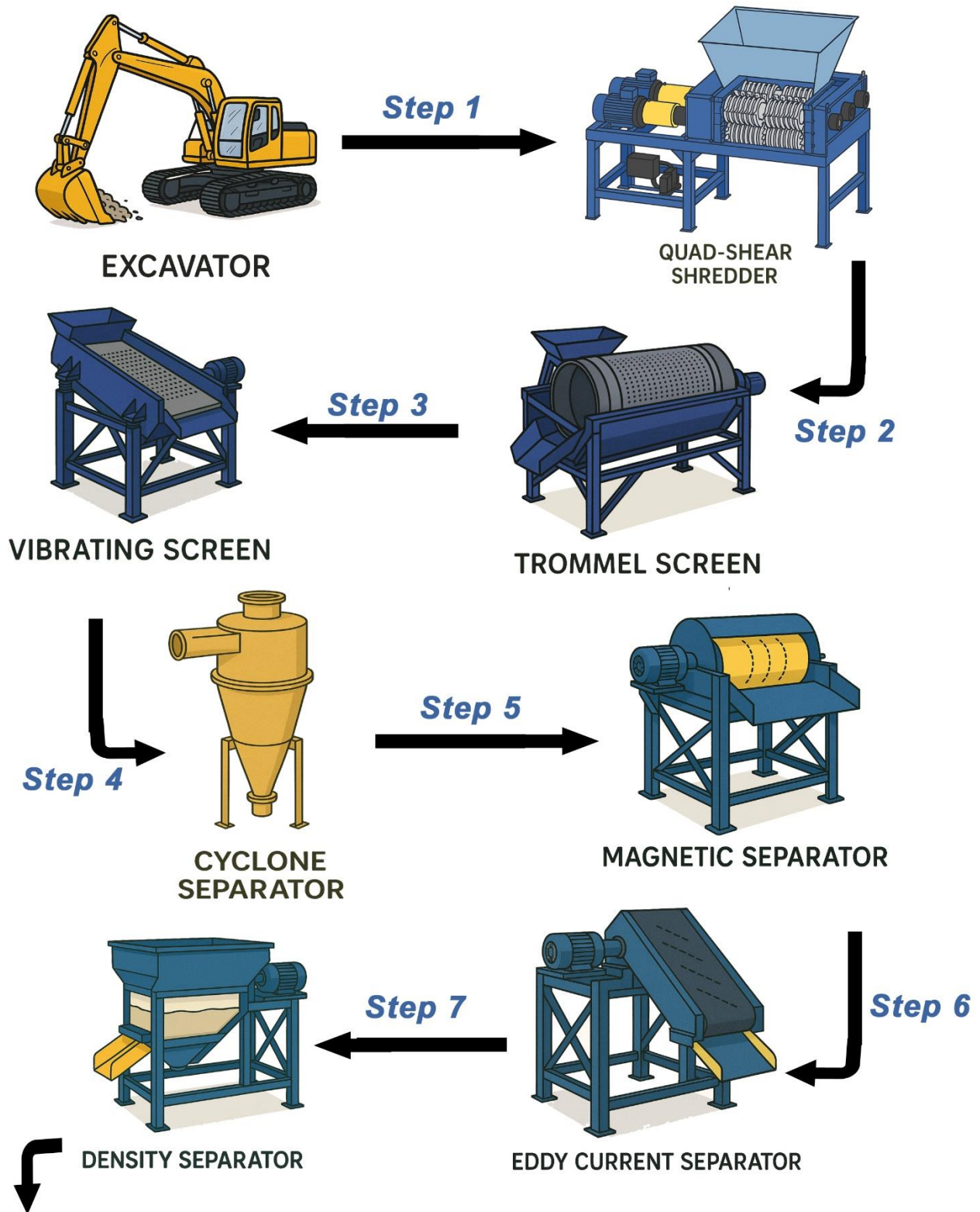
- **Environmental:** Reduces landfill volume and recovers valuable resources.
- **Economic:** Generates revenue from recycled materials and reduces the need for new landfills.mswsorting.com
- **Land Use:** Reclaimed land can be repurposed for development or green spaces.epa.gov+1ijtre.com+1

MAXSeparation™ Waste Material Screening, Sorting, & Separating

Following is an outline and description for our **Standard** screening, sorting, and separation process in a landfill. This is based on a large process that handles up to and over 1,000 tons per day (tpd). Since we don't need to do the same level of screening for very small materials, basic sorting and separating will work well. We are only needing dirt, mud, rocks, glass, and metal to be sorted and separated. Everything else will be combustible materials that we will process through the **ThermoMAX™** system.

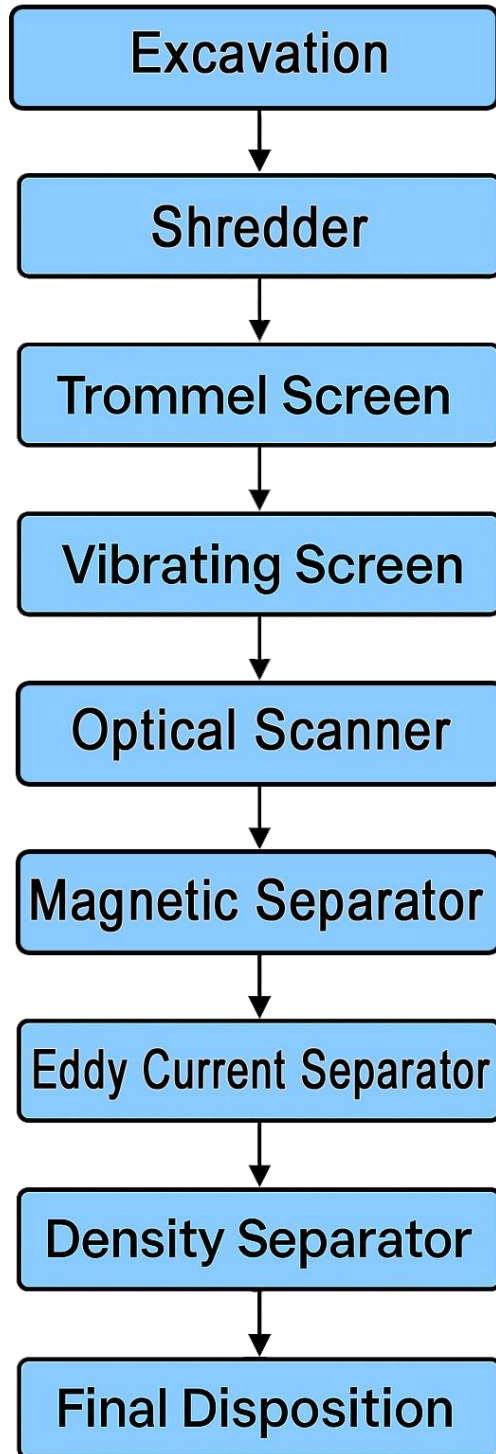


Standard MAX*Separation*™ Waste Material Screening, Sorting, & Separating



MAXSeparation™ Waste Material Screening, Sorting, & Separating

Following is an outline and description for our **Advanced** screening, sorting, and separation process in a landfill using **Advanced Optical Scan**. This is similar to our **Standard** process but using an optical scanner in place of the cyclone separator. This would be used to screen for very small materials, including valuable metals and minerals. Everything else will be combustible materials that we will process through the **ThermoMAX™** system.



The first step will use the existing heavy equipment from the landfill, such as front-end loaders and excavators.

The quad-shear shredder will take the material dug up and shred it up into chip sizes ranging from 1.5" to 2.5".

The initial part of the process will use a large rotary trommel screen, which will only be sorting out the larger items such as dirt, rocks, glass, and metal.

Next will be a vibrating screen process. This process will separate the items that the trommel screen couldn't.

In place of the cyclone separator, in this process we will use an advanced optical scanner to separate valuable metals and minerals.

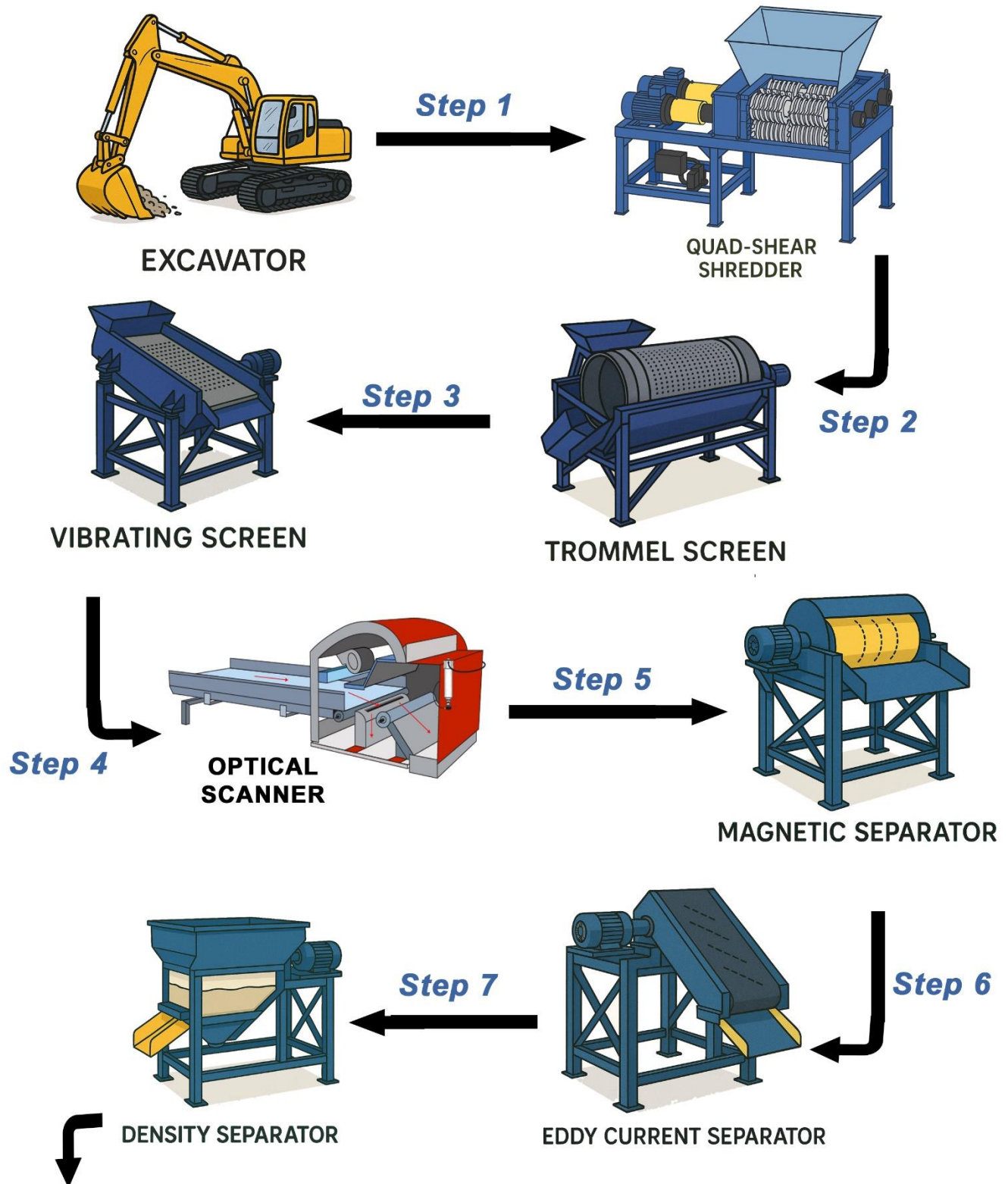
A magnetic separator is used to remove ferrous metals such as iron and steel, including any small pieces.

An eddy current separator is used to remove non-ferrous metals, such as aluminum and copper. Ferrous materials can damage an eddy current separator.

A density separator (water bath or spiral separator) separates materials based on its density.

And finally, the waste materials that are separated previously are disposed of through recycling methods, and the remaining combustible materials are processed in the **ThermoMAX™** System.

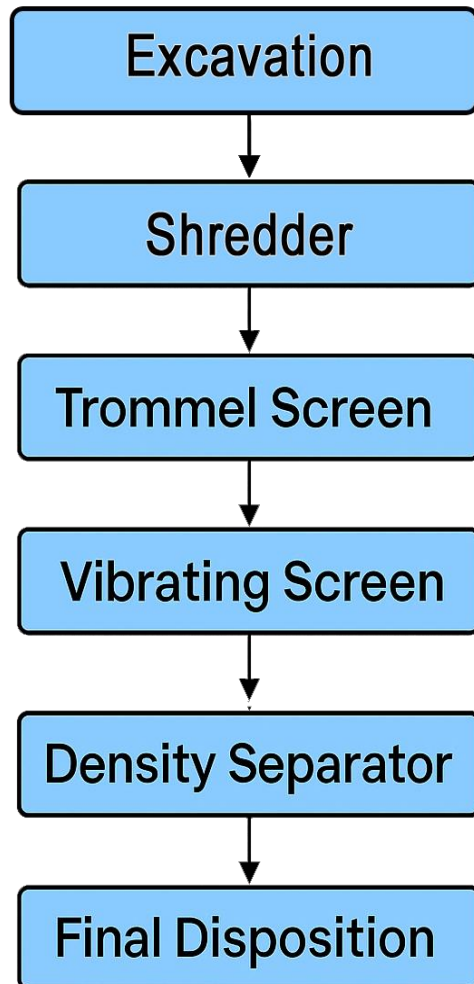
MAXSeparation™ with *Advanced Optical Scan*
for Waste Material Screening, Sorting, & Separating



FINAL DISPOSITION - ThermoMAX™ System or Recycling

MAXSeparation™ Waste Material Screening, Sorting, & Separating

Following is an outline and description for our **Simplified** screening, sorting, and separation process in a landfill. This is based on a large process that handles up to and over 1,000 tons per day (tpd). Since we don't need to do the same level of screening for very small materials, basic sorting and separating will work well. We are only needing dirt, mud, rocks, glass, and metal to be sorted and separated. Everything else will be combustible materials that we will process through the **ThermoMAX™** system.



The first step will use the existing heavy equipment from the landfill, such as front-end loaders and excavators.

The quad-shear shredder will take the material dug up and shred it up into chip sizes ranging from 1.5" to 2.5".

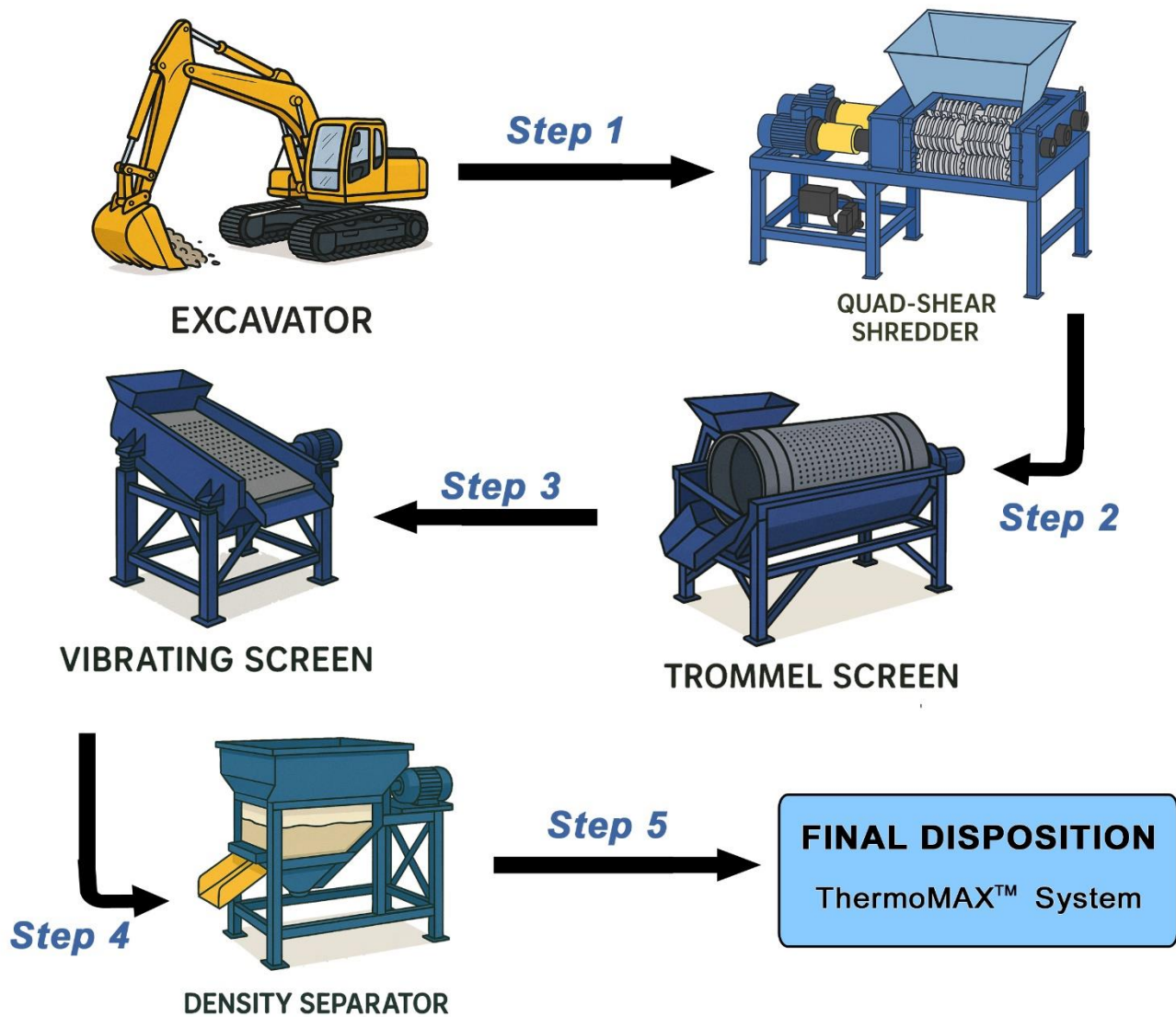
The initial part of the process will use a large rotary trommel screen, which will only be sorting out the larger items such as dirt, rocks, glass, and metal.

Next will be a vibrating screen process. This process will separate the items that the trommel screen couldn't.

A density separator (water bath or spiral separator) separates materials based on its density.

And finally, the waste materials that are separated previously are disposed of through recycling methods, and the remaining combustible materials are processed in the **ThermoMAX™** System.

Simplified MAX*Separation*™
for Separating Dirt & Rocks only



Landfill Reclamation Equipment Costs

Here's an overview of the key equipment used in landfill reclamation for sorting and separating materials like dirt, rocks, hard minerals, glass, and metals, along with representative images and approximate pricing ranges:

1. Trommel Screen

Function: Separates materials based on size using a rotating cylindrical drum.[exportersindia.com+28west-trak.co.nz+28minejxsc.com+28](#)

Approximate Price: \$2,000 – \$40,000, depending on size and capacity. [surplusrecord.com](#)

2. Vibrating Screen

Function: Utilizes vibratory motion to separate materials by size.[cfs-web.com+3mswsorting.com+3m.zenithcrusher.com+3](#)

Approximate Price: \$1,200 – \$10,000, varying with design and capacity.
[exportersindia.com+35alibaba.com+35jonogroup.en.made-in-china.com+35](#)

3. Magnetic Separator

Function: Extracts ferrous metals from the waste stream using magnetic fields.[foruimining.com](#)

Approximate Price: \$5,000 – \$50,000, depending on type and strength.

4. Eddy Current Separator

Function: Separates non-ferrous metals (like aluminum and copper) using induced eddy currents.

Approximate Price: \$20,000 – \$100,000, based on capacity and technology.

5. Air Classifier

Function: Separates materials based on weight and aerodynamic properties using air flow.[west-trak.co.nz+4foruimining.com+4metso.com+4](#)

Approximate Price: \$10,000 – \$60,000, depending on design and throughput.

6. Density Separator

Function: Separates materials based on density differences, often using water or air as the medium.

Approximate Price: \$15,000 – \$80,000, varying with system complexity and capacity.

Note: Prices are approximate and can vary based on manufacturer, specifications, and additional features. For detailed specifications and current pricing, it's advisable to consult equipment manufacturers or suppliers directly.

The wide **cost range** for each piece of sorting, screening, and separation equipment used in landfill reclamation is primarily due to **five key factors**:

1. Capacity (Throughput)

- **Higher-cost models** handle much larger volumes per hour (e.g., 100–500 tons/hour).
- **Smaller units** process less material and are better suited for pilot or small-scale operations.

Example:

A **trommel screen** for 10 tons/hour might cost \$5,000, while one for 250 tons/hour with heavy-duty lining and hydraulic drive may exceed \$40,000.

2. Automation and Controls

- Systems with **automated controls, sensors, and programmable logic controllers (PLCs)** cost more.
- Manual or basic mechanical systems are cheaper but require more labor and supervision.

Example:

An **eddy current separator** with integrated touch-screen controls and data logging will cost significantly more than a manually adjusted unit.

3. Material of Construction and Durability

- **Heavy-duty, wear-resistant materials** (like stainless steel or reinforced steel linings) are more expensive.
- **Corrosion resistance**, especially in damp or acidic landfill environments, adds to cost.

Example:

A **vibrating screen** made for mining-grade durability with rubberized liners and dust suppression will cost 2–4× more than a lightweight version used for basic soil separation.

4. Type and Complexity of Separation Mechanism

- **Basic** screens (trommel, vibrating) rely on physical sorting, which is simpler and cheaper.
- **Advanced** separation tech (eddy current, air classifier, density separator) uses physics—magnetism, airflow, fluid dynamics—which requires precision engineering.

Example:

A **magnetic separator** may cost \$5,000 for a basic belt magnet, but one with rare-earth magnets and self-cleaning functions could cost \$50,000+.

5. Portability and Integration

- **Skid-mounted or mobile units** cost more due to added engineering for mobility.
- Some equipment is built into **modular systems** for continuous processing, driving up cost but increasing efficiency.

Example:

An **air classifier** in a trailer-mounted unit for mobile landfill sorting will command a premium over a stationary plant-based model.

Summary Table: Why Prices Vary

Factor	Low-End System	High-End System
Capacity	Small volumes (<20 TPH)	Large volumes (100+ TPH)
Automation	Manual or minimal electronics	Fully automated with diagnostics
Build Quality	Basic steel, minimal enclosure	Corrosion-resistant, ruggedized
Separation Tech	Simple mechanical	Advanced physical/chemical methods
Mobility	Stationary only	Mobile or modular designs
