An Environmentally Sound Landfill

Few people may realize how much planning goes into a landfill. The DMASWA works to ensure our local landfill reflects the overall commitment the Agency has for the environment. Specifically, the DMASWA is working hard to reduce greenhouse gases, protect groundwater, and facilitate well-planned, community-driven conservation alternatives. The Agency believes proper management of waste disposal is key to its commitment to Dubuque area communities and will continue to look for ways to make it as environmentally sound as possible.

Dubuque Metro Landfill

A landfill is much more than a “dump” or a hole in the ground where trash is buried. It is a complicated, carefully engineered system designed to protect groundwater from contamination. Landfills require years of planning and development and represent a significant environmental and financial investment. The Dubuque Metropolitan Area Landfill is divided into nine cells or designated areas where the land is prepared for trash disposal.

The Cell 9 Phase III Project

The DMASWA is nearing the completion of a $3.2 million landfill expansion project at its location at 14501 Highway 20 West outside Dubuque.

- The expansion project is the third of five phases for the landfill’s cell #9, which is the ninth cell created at the site since 1976.
- DMASWA staff estimate that the current location has the potential to meet the area’s needs for up to 60 years.
- The new cell will hold approximately 689,300 cubic yards of material, or an additional 448,000 tons of materials to fill it.
- It will create an additional four to five years of landfill capacity. The landfill’s permitted capacity is 19-20 years and its “lifespan” at the site is expected to be another 50-60 years.
Total project cost is estimated at $3,176,393.
- Construction contract for $2,425,143.08 awarded to Connolly Construction of Peosta
- Project funded through a solid waste revenue bond held by Dubuque County that will be repaid by the DMASWA
- Engineering plans and specifications for project were prepared by AECOM
- Project plans reviewed and approved by Iowa Department of Natural Resources

Building a new landfill cell takes months and involves multiple stages of construction. Many of the steps in building the cell must be tested to make sure standards/requirements are met before moving on to the next phase.

Step-by-Step Landfill Cell Construction

1. **Site Preparation**
   - a. Remove all vegetation and stockpile any topsoil.
   - b. Excavate or fill to the bottom of the sub-grade.
   - c. Excess material hauled to one of two on-site stockpiles. One for general fill used for filling operations, berm construction and daily cover and a second for liner quality clay.

2. **Groundwater Collection Layer**
   The purpose of this layer is to allow the ground water to move freely to be collected and discharged at the surface to keep hydraulic pressure from pushing the liner up.
   - a. Floor is graded/sloped to direct any ground water to dug out trenches.
   - b. Geocomposite liner is laid over the entire surface to allow water to flow freely.
   - c. Clean rock is placed in the trenches and a perforated HDPE pipe is embedded in the rock.

3. **Clay Liner**
   - a. 6-inch Earth Barrier Layer is placed over the Geocomposite Groundwater Drainage Layer to provide a firm surface to compact 2-foot Clay Liner against.
   - b. 2-foot Clay Liner is constructed.
     - i. Liner quality clay is placed in four 8-inch (loose) or 6-inch (compacted) lifts.
     - ii. The Clay Liner construction tested for density and permeability to verify it meets the IDNR standard.

4. **Textured Liner**
   - a. 60-mil White HDPE Textured Liner is placed over the Clay Liner, overlapped 6-inches, and seamed with a double-fusion machine.
   - b. The HDPE seam air channels is tested for leaks to confirm the seam is sealed.
5. **Leachate Collection Layer**
   a. 32-oz Cushion Geotextile is placed over the HDPE Liner to prevent the leachate collection media from making holes in the HDPE liner.
   b. 12-inch Perforated HDPE DR 11 pipe is placed in the trench over 4-inches of 1-inch calcareous clear rock (not limestone). Then the trench is filled with the same rock. The top of the filled trench is covered with an 8-oz Separation Geotextile to prevent clogging.
   c. 24-inch Leachate Collection Layer consisting of Tire Derived Aggregate (TDA) is placed over Geotextile.

6. **Temporary Berms**
   a. Temporary berms with rain guards are built around the perimeter and inside the cell to prevent stormwater from entering the leachate collection system.

7. **Clean Layer**
   a. The cell is ready for a “clean” layer. The “clean” layer is typically residential trash and does not contain bulky items. This layer provides a filter to prevent the Leachate Collection layer from clogging.

8. **Gas Collection Wells**
   a. Once the cell is filled, wells are drilled thru the waste to capture the landfill gas (methane) that results from the decomposition of waste materials. Eventually, the gas will travel through pipes to a flare on the property where it will be burned/destroyed to reduce greenhouse gas generation. This voluntary investment was a policy decision by the Agency board.

9. **Final Closure System**
Dubuque Metropolitan Area Solid Waste Agency

The DMASWA is an intergovernmental entity formed in 1973 under Chapter 28E of the Code of Iowa. Formed originally to own and operate a sanitary landfill, the DMASWA has since broadened its mission.

DMASWA Mission Statement

In order to control current and future economic and environmental liability, the mission of the Dubuque Metropolitan Area Solid Waste Agency is to provide environmentally sound, financially stable, fiscally responsible, community recognized, solid waste management services that include appropriate waste reduction, resource conservation, and disposal activities.

Board of Directors members include the City of Dubuque, with two board representatives, and Dubuque County, with one representative. All remaining municipalities in Dubuque and Delaware Counties have signed “Non-Member Service Agreements.”

Current Agency Board Members

- Ric Jones, Dubuque City Council
  Agency Board Chair
- Jay Wickham, Dubuque County Board of Supervisors
  Agency Board Vice Chair
- David Resnick, Dubuque City Council
  Agency Board Member

Agency Administrative Staff

- John Klostermann, City of Dubuque Public Works Director
- John Foster, Agency Administrator
- Doug Hughes, Facility Supervisor
- Bev Wagner, Communication & Education Coordinator

For more information on the DMASWA, visit www.dmaswa.org or call 563-557-8220.

Community Impact of the Dubuque Metro Landfill

The DMASWA landfill is a regional facility that services not only Dubuque county but Delaware county, portions of Jackson and Clayton counties, Grant county in Wisconsin, and Jo Daviess county in Illinois.

The DMASWA spends over $300,000 annually on routine regulatory services to track water and air emissions to monitor its impact on the environment.

Over $5 of the tipping fee is used to subsidize diversion and household hazardous waste programs offered to residents of Dubuque and Delaware counties.

In FY 2017, the DMASWA received over 130,000 tons of waste with 86,000 from Dubuque county and 12,000 from Delaware county. The remaining tonnage assists with reducing the Agency’s fixed costs.

By voluntarily flaring the DMASWA landfill gas, the DMASWA destroys over 98% of the methane gas generated, which equates to a greenhouse gas reduction of over 80,000 tons of CO2 annually.

If the DMASWA landfill gas it collects is cleaned, it would provide an equivalent of over 1,000,000 gallons of gasoline annually.

Over 242,500 cubic yards of soil have been removed as part of this project. This is the equivalent to filling 75 Olympic-sized swimming pools.

Over 13,000 tons of recycled tires will be used to filter the leachate in the landfill. This is the equivalent of over 1 million car tires.

In just this Cell 9 Phase III project, there will be over one mile of piping installed to transport ground water and leachate.