

Ottawa County 10th Annual Water Quality Forum

*Waste Management - Autumn Hills
Landfill Construction for Water Projection*

THINK GREEN.®



Sustainability - “Landfill Free” - “Zero Waste”

- Haworth - “Zero Waste to Landfill Goal”
- Herman Miller - “Zero Waste Goal by 2023”
- Gentex - “Robust Recycling to prevent scrap commodities from ending up in landfill”
- Shape Corporation - “Action Plan to divert 50% of our landfill waste”
- Waste Management
 - “Embracing the Zero Waste Challenge”
 - 5% Revenues from Traditional Landfill
 - 15 Million Tons Recyclables Managed

Waste Generation - Landfilling

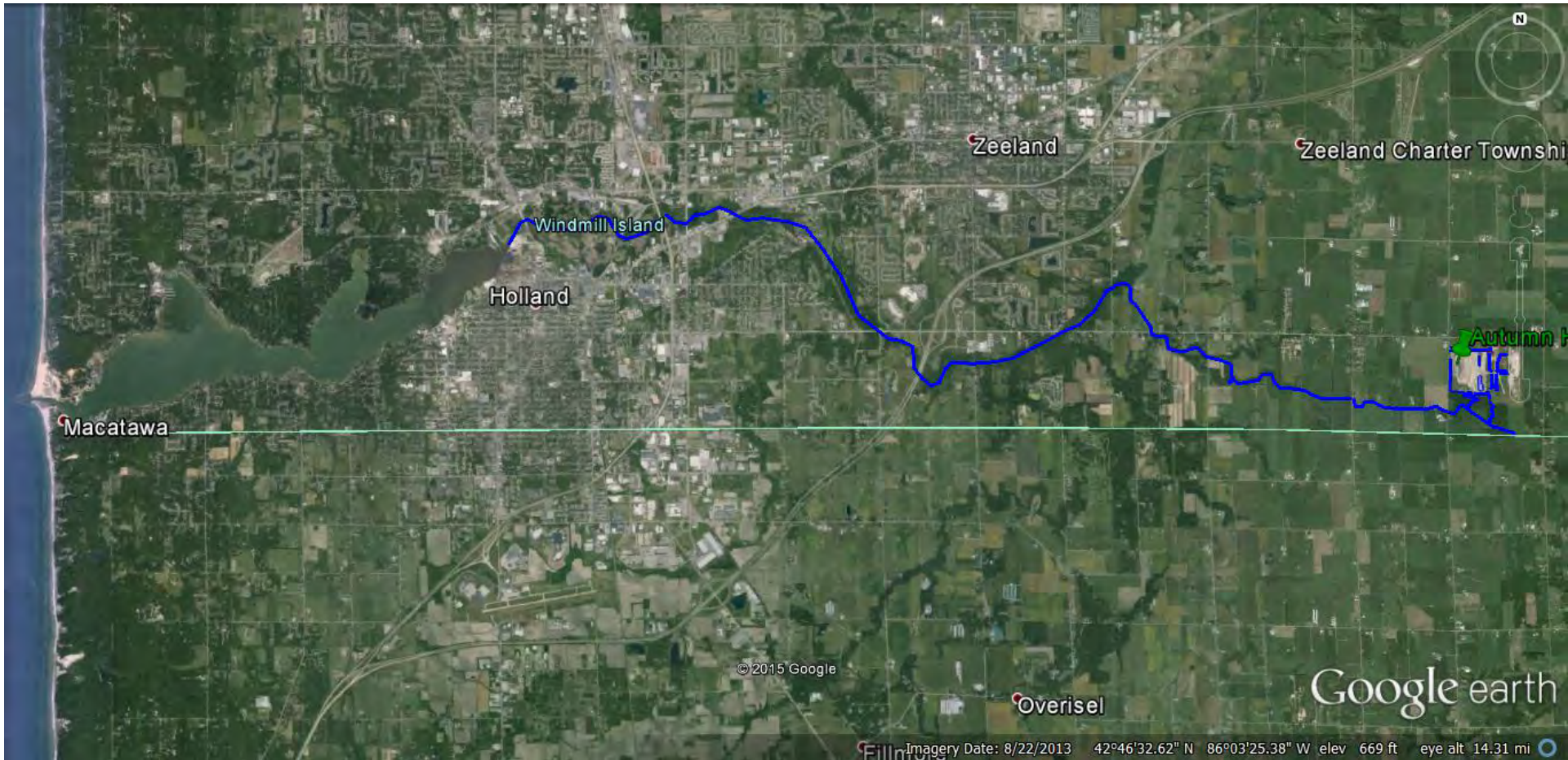
- In 2012, 164,000,000 tons of Waste Disposed (U.S. EPA)
- Michigan - 2014 Generation - est. 14,000,000 tons Landfill
- Ottawa County - 2014 Generation - est. 400,000 tons Landfilled



Autumn Hills Recycling & Disposal Facility

- Licensed Type II Solid Waste Landfill - Began December 1992
 - * Municipal Solid Waste
 - * Construction & Demolition Debris
 - * non- Hazardous Industrial / Special Waste (flyash, WWTP Sludge, impacted Soils)
 - * Current Volumes 390,000 tons per year (1,500 tons/day)
 - * Remaining Life - 78 Years
 - * 150 acres Permitted Landfill on 400 acres of Property
- Registered Yard & Food Waste Composting Facility - since 1995
 - * Grass
 - * Leaves
 - * Biodegradable Organics
 - * 20,000 tons Yard/Food Waste; 14,000 tons Wood

Upper Macatawa River Basin



Autumn Hills Recycling & Disposal Facility Environmental Protection

- Groundwater
- Surface Water
- Air
- Wastewater

Groundwater Protection

- Basal Sand & Gravel Aquifer
- +150 feet Gray, Lean Silty Clay - Glacial Till
 - * Hydraulic Conductivity $<1 \times 10^{-8}$ cm/s
 - * Vertical Gradient $>1,000$ years
- Upgradient & Downgradient Semi-Annual GW Monitoring
 - * Statistical Analysis (Inorganic Parameters)
 - * Heavy Metals, VOC, sVOC

Landfill Liner Construction

- Natural Soil Barrier - 10+ Feet of $<1 \times 10^{-7}$ cm/s
- GeoSynthetic Clay Layer - Bentonite Mat
- High Density Polyethylene Liner System
- Leachate Collection System / Protection Layer
- “Dry Tomb”

Liner Construction



Liner Construction



Surface Water Protection

- Runoff Control from Waste Placement Area
 - Sediment
 - Heavy Metals, Organics
- Sediment from Soil Excavation & Cover Placement
- Yard Waste Processing
 - Fertilizers, Pesticides, Sediment, Nutrients
- Truck Tracking
- Oil, Chemical & Wastewater Storage

Surface Water Protection

- Best Management Practices
 - Sedimentation / Retention Basins
 - Vegetative Strips
 - Drainage Control
 - Dust Control & Sweeping
- Quarterly Surface Water Monitoring of Outfalls & Drain
- Surface Water Pollution Prevention Plan
- Spill Prevention, Control & Countermeasures
- Employee Training

Autumn Hills RDF



Autumn Hills RDF



Autumn Hills RDF



Autumn Hills RDF



Air Protection

- Landfill Gas
 - 55-60% Methane; 40% CO₂; 1% Oxygen; 0-5% Nitrogen
 - <1% Sulfur Compounds, VOC's
 - Methane is potent Greenhouse Gas
- Dust (Roads, Active Area, Wood Grinding)
- Landfill Gas Collection for Flare or Beneficial Reuse
- Landfill Cover
- Paving & Dust Control
- Monthly Wellfield Tuning & Surface Emission Monitoring

Flaring - Gas Treatment



Landfill Gas - Beneficial Reuse



Beneficial Reuse

- Zeeland Farm Services
 - Boiler Fuel for Steam Generation
 - Electrical Generation
- Electrical Generation for City of Zeeland
- 4,000 House Equivalencies

Wastewater Discharge

- 17,000,000 gallons Landfill Leachate Collected Annually
- Pretreatment at Landfill
- Industrial Discharge Permit to Holland Board of Public Works

Wildlife Habitat Certification

