GREATER LAWRENCE SANITARY DISTRICT
ORGANICS TO ENERGY PROJECT
The Next Step Towards Net Zero Operation

Wastewater Advisory Committee to the MWRA

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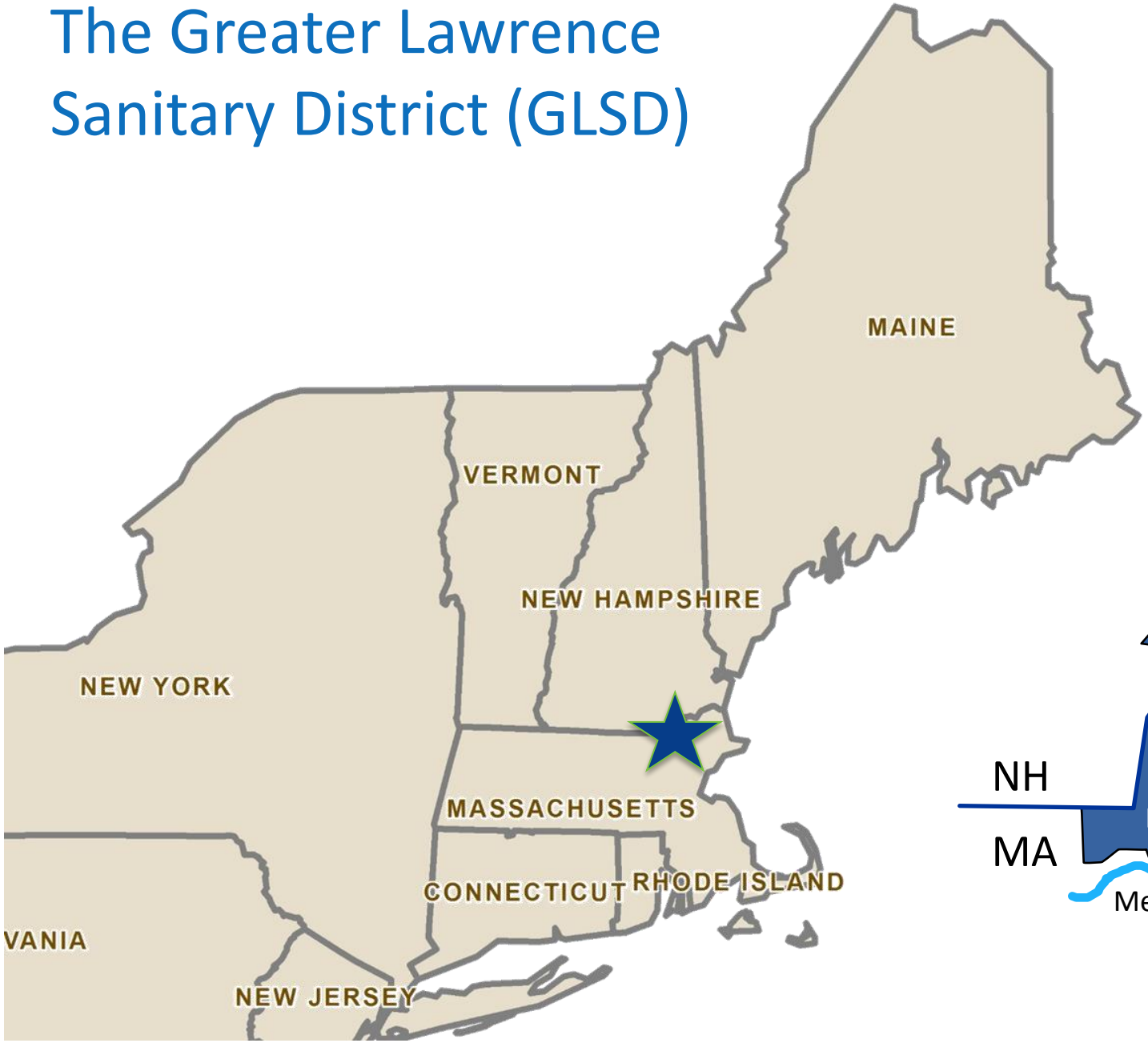
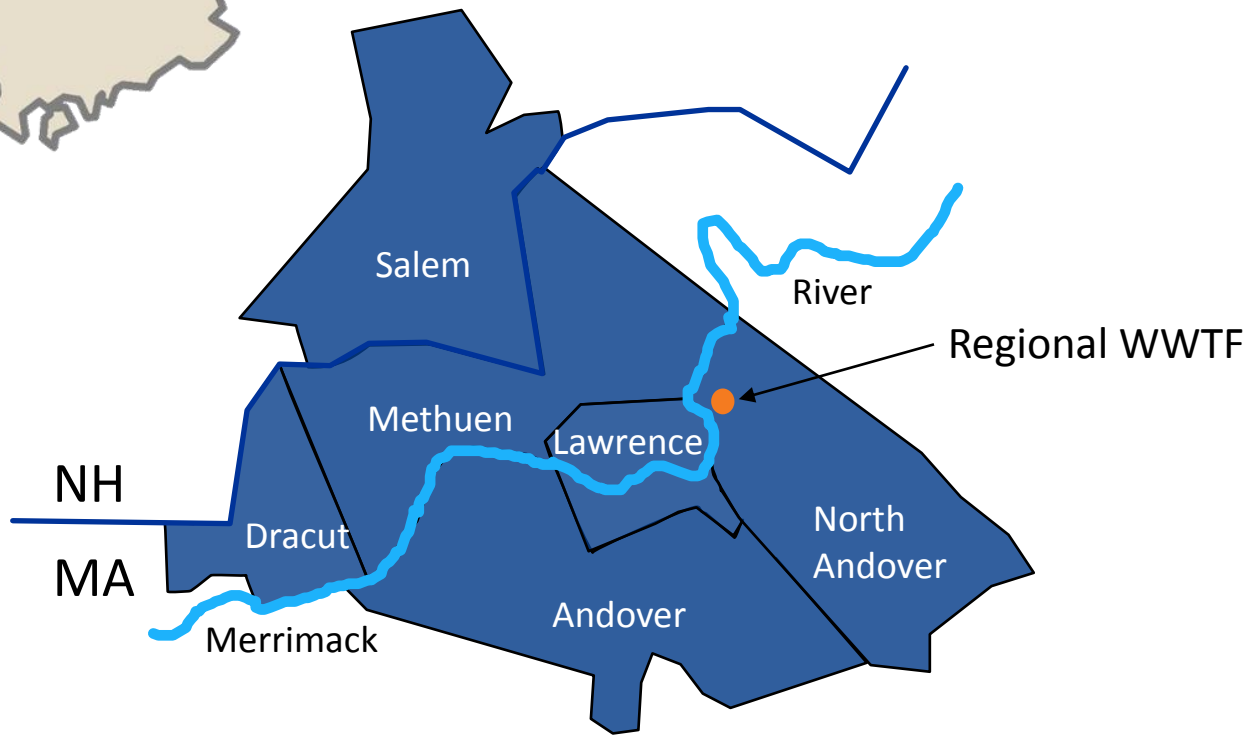
BACKGROUND

- Established by Massachusetts Legislation in 1968
- Operational Since April 1977
- Governed by a Board of Commissioners
- Second largest WWTP in Massachusetts (52 mgd average / 135 mgd peak design)
- Interceptors
  - 9 Miles
  - 24” through 108”
- Riverside Pump Station
  - 2 - 800 HP pumps
  - 2 - 1,250 HP pumps

The Greater Lawrence Sanitary District (GLSD)



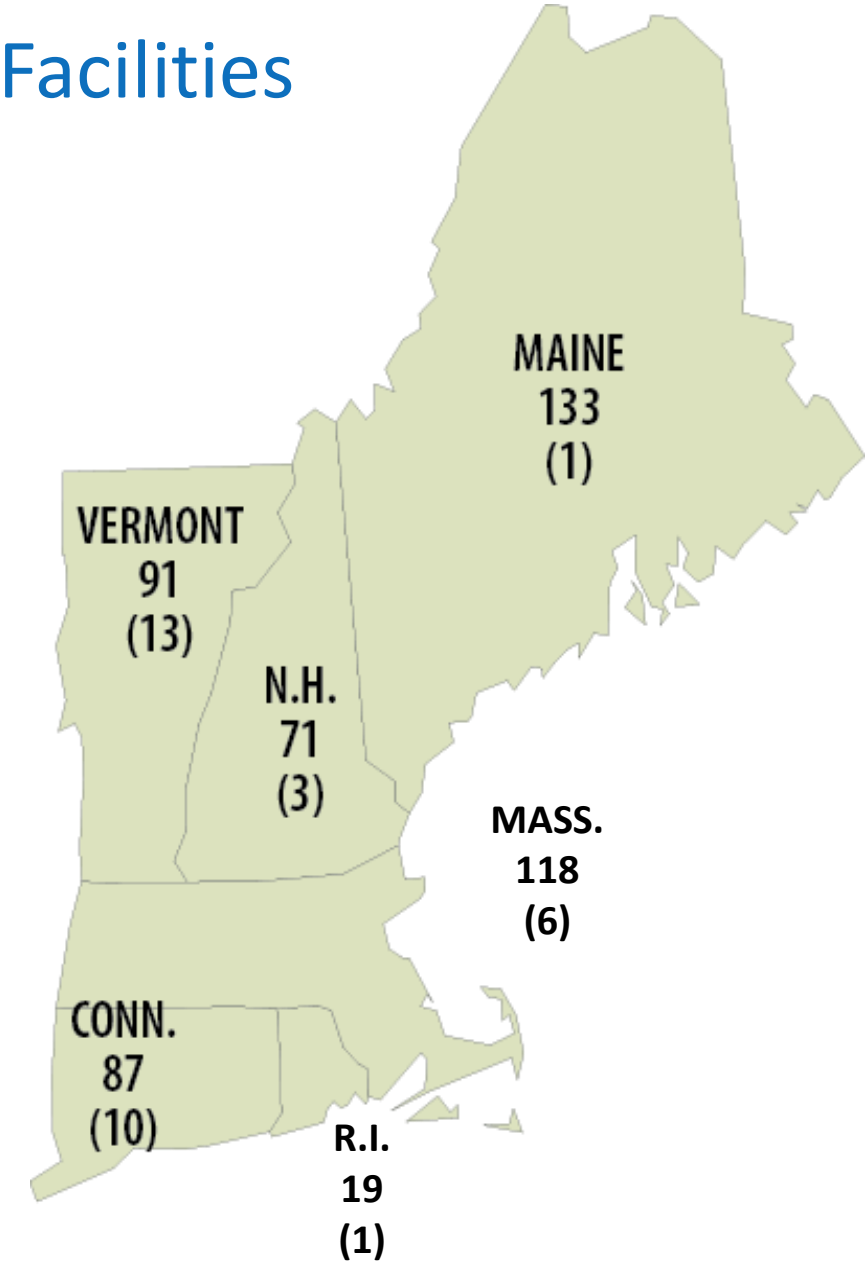


Massachusetts Organic Waste Disposal Ban

- Effective October 1, 2014 – Producers of >1 ton of food waste per week banned from landfills or incinerators
- Impacts hotels, restaurants, universities, hospitals, supermarkets, food processors and wholesalers
- MassDEP estimates 350,000 tons of organic waste will be diverted from landfills yearly
- GLSD will be utilizing 40% of this volume

Limited New England Digestion Facilities

- Acceptable outlets include digestion facilities
- GLSD is one of only six in Massachusetts
- Second largest digestion facility in Massachusetts
- Other Farm Based Digesters are available



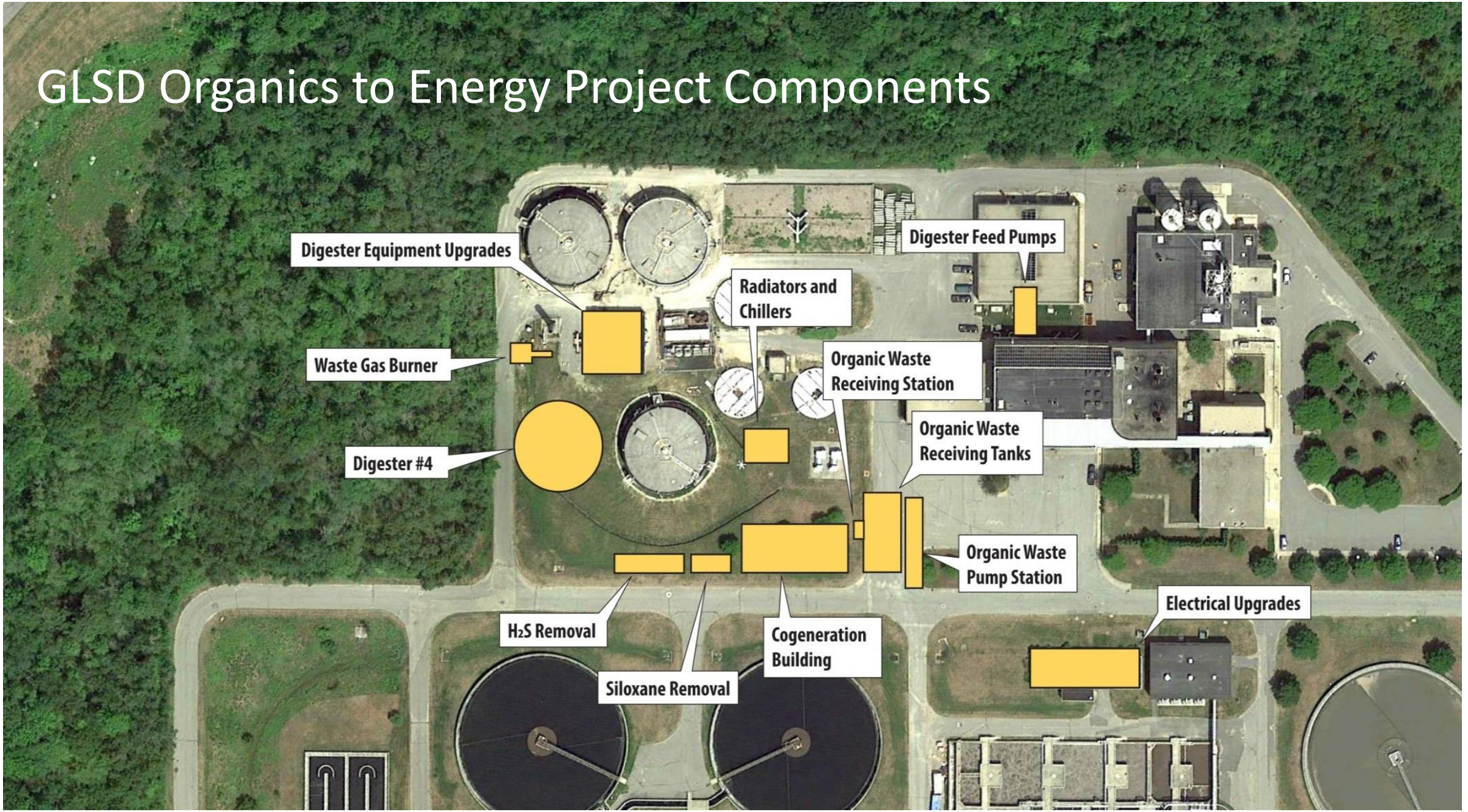
Contract Operator: New England Fertilizer Co.

- 11,000 Square Foot Building
- Two Thermal Drying/Pelletization Trains
- Design Capacity = 38 Dry Tons per Day
- On-site Product Storage/Removal by Truck

The 10-Year Report Card: Product Beneficial Use

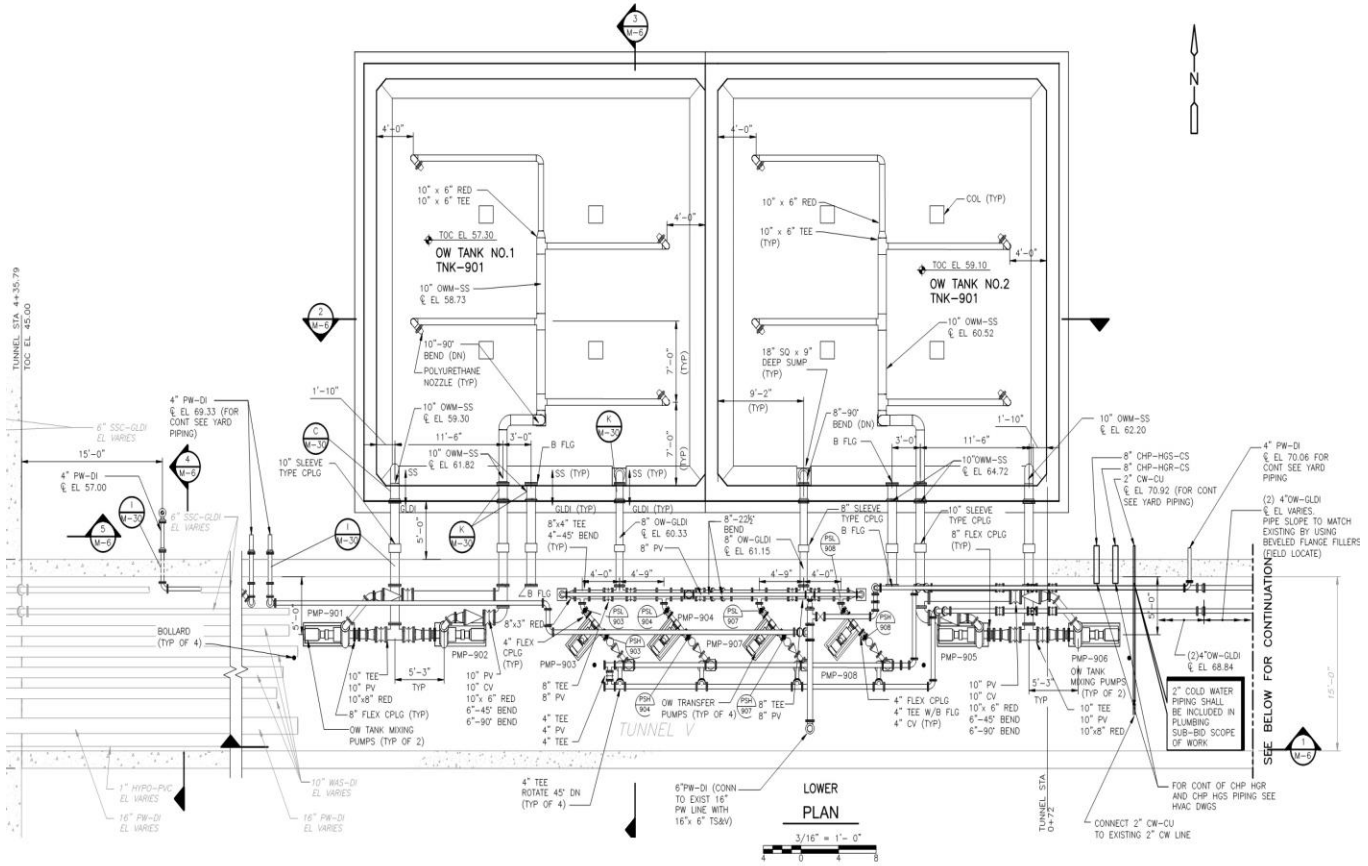
- 100% of GLSD Biosolids to Beneficial Use
- Originally, Land Applied in Florida
- Currently, Land Applied in Massachusetts
- Distribution Managed by Casella Organics

GLSD Organics to Energy Project Components



ORGANIC WASTE RECEIVING TANKS AND PUMP STATION

- Organic (SSO) Tanks
  - Two Separate Tanks
  - 119,000 gallons each
  - 35‘ x 35’ x 13’
- Organic Waste Transfer Pumps
  - 2 per tank
  - 10 horsepower
  - 50 gallons per minute
- Organic Waste Mix Pumps
  - 2 per tank
  - 25 horsepower
  - 1,500 gallons per minute



Biogas Conveyance and Treatment

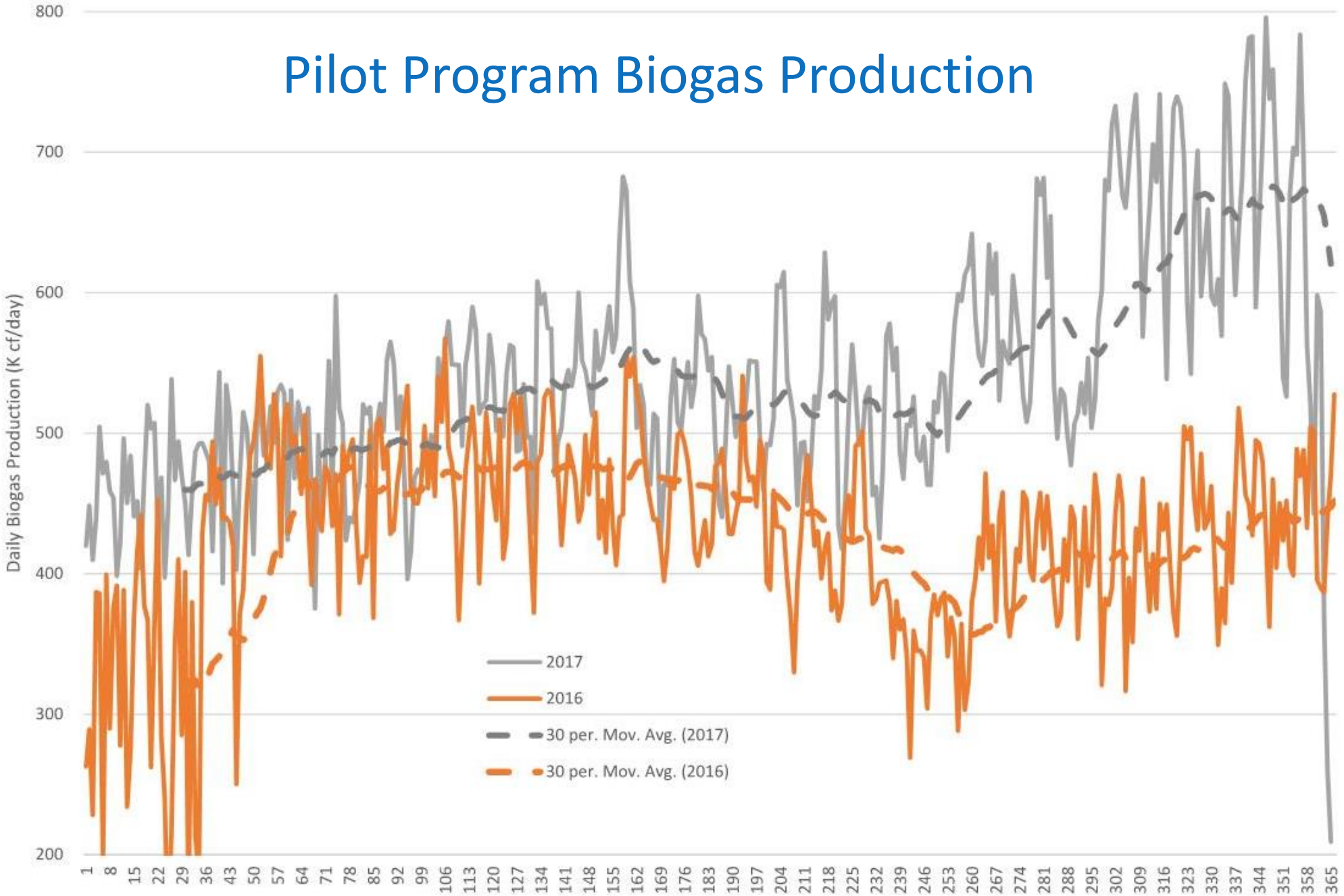
Fixed media (iron sponge) for hydrogen sulfide treatment

Carbon media for siloxane treatment

Expanded gas conveyance capacity

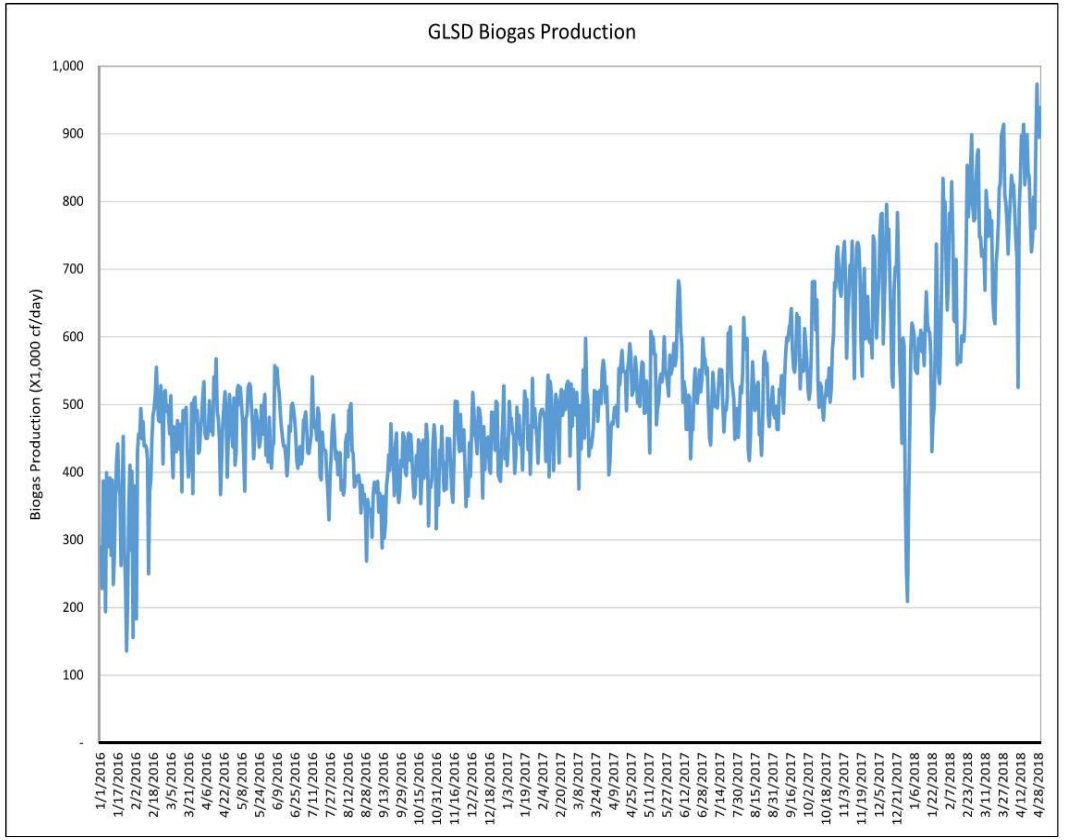
New flare for increased capacity

Pilot Program Biogas Production



Pilot Program Biogas Production (through 4/28/18)

- Began Receiving SSO on 2/1/17
- Feeding Schedule
  - 5,000 gpd up to 28,000 gpd
  - Mixing SSO with primary and secondary sludge
- Monitoring these parameters for stability of the digesters
  - Volatile solids loading rate
  - COD loading rate
  - Specific energy loading rate
  - Total Dissolved Solids
  - COD
  - Sulfate
  - Ammonia and Phosphorus
  - Alkalinity and pH
  - Potential Rapid Rise and Foam Generation
  - Biogas Quality and Quantity



The Next Step Towards Net Zero Operation at GLSD

- One of two Caterpillar 1.6 MW CoGen engines during factory testing

CHP Engine Emissions Control

- Oxidation Catalyst (OC) technology to remove volatile organics carbons and carbon monoxide
- Selective Catalytic Reduction (SCR) technology to remove nitrogen oxides
- Best Available Control Technology (BACT) as determined by MassDEP

CLEAN ENERGY FOR OUR KIDS FUTURE