

# SCRRRA Compost Facility

## Design and Permitting

Greg McCarron, March 14, 2024

# Overview

- Design considerations and approach
- Financial pro-forma
- Town of Preston Planning and Zoning approval
- CT DEEP permitting



# Compost Technologies

- Turned Windrow
- Aerated Static Pile (ASP)
- In-vessel/ In-building
- Trend to hybrid systems
  - ASP followed by turned windrow
  - ASP: process and odor control
  - Windrow: cost efficiency



# Common Goals/Requirements for All Compost Facilities

- Produce high-quality, consistent compost
- Comply with regulations
  - Odors, air emissions
  - Contact water, stormwater
- Need to be cost competitive



# The Composting Process



Aerobic decomposition of organic materials under controlled conditions



Most important conditions

Proper feedstock mix

Moisture

Oxygen

Temperature



Rutgers (1985): "Composting is a robust process; resistant to outright process failure"

# Optimizing the Process Conditions

- Proper feedstock mix
  - C:N ratio: 25:1 – 40:1
  - Bulk density: 700 – 1000 lb/cy
- Moisture: 50-60%
- Oxygen: >10%
- Temperature: 130 – 140 F
- Forced aeration
  - Heat removal via vaporization of water
  - Supply oxygen
  - Caution: moisture depletion

# Design Approach: Hybrid System

- Goal: Make stable compost without odor problems or phytotoxicity in short time period
  - Fast stabilization to minimize time and area required
  - Lots of decomposition in first 2 weeks
  - VOC generation in first 2 weeks
- ASP Component
  - Design for peak aeration and average aeration to control temperature and supply oxygen
  - Blower with VFD and temperature
- Open windrow component



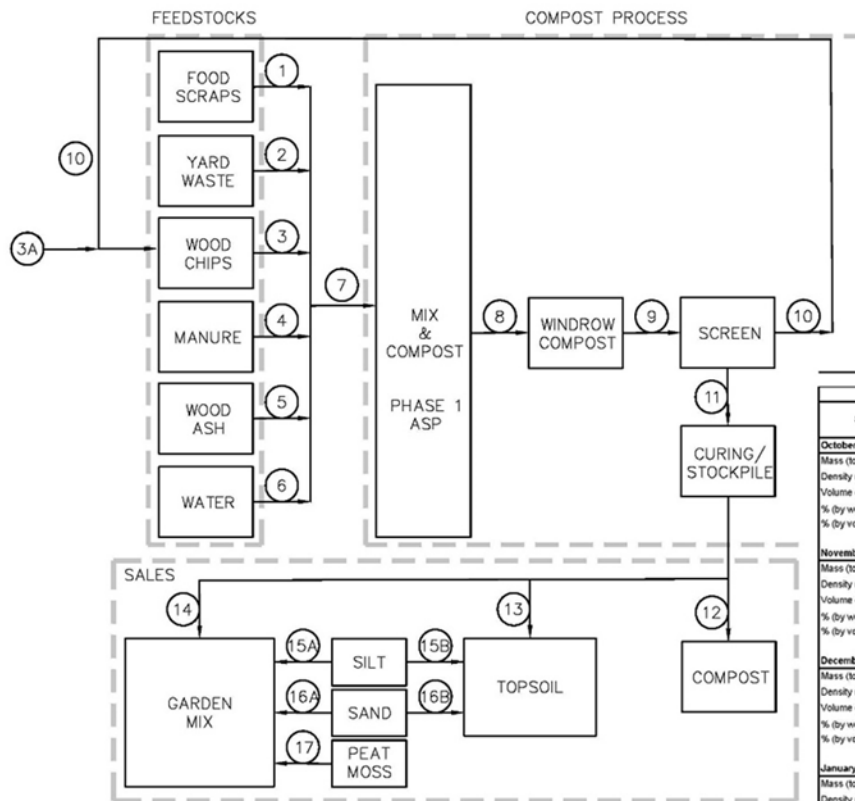
# Engineering

- Mass and volume balance
- Site layout for full and initial development
- Equipment selection
  - Aeration system sizing
  - Water management; pump/tank/pond sizing





# Process Flow and Volume Balance

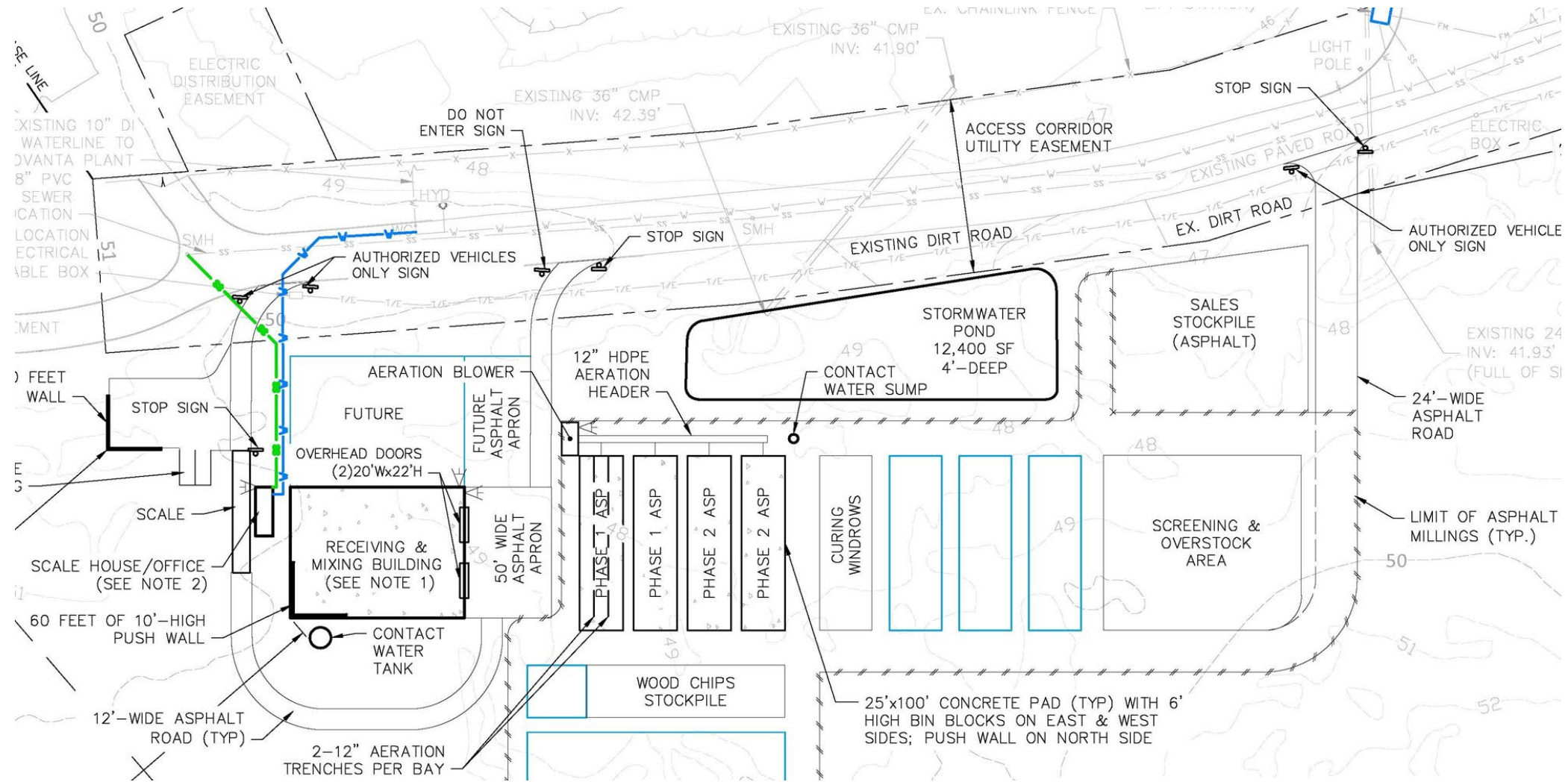


Stream Number	Feedstocks						7	Compost Process				Sales		
	1	2	3	4	5	6		8	9	10	11	12	13	14
Stream Description	Food Scraps	Yard Waste to ASP	Wood Chips to ASP	Manure	Wood Ash	Water	Total Input to ASP	Windrows	Screen	Wood Chip Recycle	Curing	Compost	Topsoil	Garden Mix
<b>October</b>														
Mass (tons)	453	458	224	104	17	237	1493			41				
Density (lb/CY)	1400	550	550	750	250	1685	843			550				
Volume (CY)	647	1665	814	277	139	281	3542	2,657	1,993	150	1,843	373	174	203
% (by weight)	30%	31%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	23%	8%	4%	8%	100%							
<b>November</b>														
Mass (tons)	388	392	198	89	15	204	1287			41				
Density (lb/CY)	1400	550	550	750	250	1685	842			550				
Volume (CY)	555	1426	721	238	119	242	3058	2,294	1,720	150	1,571	93	43	51
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							
<b>December</b>														
Mass (tons)	376	380	193	80	14	198	1248			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	537	1381	704	230	115	235	2966	2,225	1,668	150	1,519	47	22	25
% (by weight)	30%	30%	16%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							
<b>January</b>														
Mass (tons)	366	369	189	84	14	195	1215			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	522	1343	689	224	112	229	2891	2,168	1,626	150	1,476	0	0	0
% (by weight)	30%	30%	16%	7%	1%	16%	100%							
% (by volume)	18%	46%	24%	8%	4%	8%	100%							
<b>February</b>														
Mass (tons)	386	390	197	89	15	203	1279			41				
Density (lb/CY)	1400	550	550	750	250	1685	841			550				
Volume (CY)	551	1416	718	236	118	241	3039	2,279	1,709	150	1,560	47	22	25
% (by weight)	30%	30%	15%	7%	1%	16%	100%							
% (by volume)	18%	47%	24%	8%	4%	8%	100%							

# SCRRRA Design

- Receiving building
  - Mix food scraps with ground wood
- ASP
  - Phase 1 and 2
  - Two weeks each
- Open windrows
- Screening





# Financial Pro-forma

## Conceptual process design

- 2500 tpy food initial, 10% annual growth

## Capital and operating costs

- Site, facility, equipment
- Labor, utilities, maintenance

## Revenues

- Tipping fee for food only
- Compost sales

## Scenario modeling

- 6 cases

# Financing

- USDA grant; Composting and Food Waste Reduction
- SCRRRA reserve funds
- EPA grant?
- CT DEEP grant?

# Town of Preston Planning and Zoning

- Initial meeting with the Town: June 2023
- Initial application: November 2023
- Response to comments: January 2024
  - Mainly site development questions
  - Noise, odor, dust
- Board meeting and approval: January 25, 2024

# CT DEEP permitting

- Pre-application meeting on February 28, 2024
- Solid waste application; VRP
  - Forms
  - Drawings
  - O&M plan
- Stormwater registration
  - General permit
  - SWPPP
- Stormwater pond registration

# Questions?



GREG MCCARRON, PE,  
CERTIFIED COMPOST PROFESSIONAL



914-588-1368



[GMCCARRON@SCSENGINEERS.COM](mailto:GMCCARRON@SCSENGINEERS.COM)