



# EXPANDING COMPOST FACILITY CAPACITY WITH AERATED STATIC PILES AND HEAT RECOVERY

Presentation to Vermont  
Organics Recycling Summit

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WINDHAM  
SOLID WASTE  
MANAGEMENT  
DISTRICT  
COMPOST  
FACILITY



Brattleboro  
Residential  
Organics  
10 -15 tons per  
week  
600 tons per  
year



# BRATTLEBORO CURBSIDE LEAVES





## Bread Company Egg Shells

- ▶ Egg contents automatically sucked out of shells
- ▶ Gluten free bread products
- ▶ Two compactor loads per week
- ▶ Occasional off-spec bread

# PERMITTED AS SMALL FOOD WASTE COMPOSTING FACILITY

Up to 2,000 cubic yards per year of food waste

Up to 3,000 cubic yards of yard waste

Also permitted to compost soiled paper and cardboard

Low-tech operation using turned windrows

Batches tracked in weekly piles

Temperature of windrows measured at 1' and 3' depth

WSWMD employees have taken Vermont ANR class to become certified compost facility operators

BRATTLEBORO  
CURBSIDE  
COLLECTION:  
TOTAL TONS OF  
FOOD SCRAPS,  
PAPER,  
CARDBOARD

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FY 2019- 535 tons

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FY 2020- 575 tons

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FY 2021- 588 tons

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FY 2022 - 664 tons

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TOTAL TONS  
OF FOOD  
SCRAPS,  
PAPER,  
CARDBOARD,  
LEAVES,  
WOOD CHIPS

FY 2021 - 2,377 tons\*

FY 2022 - 2,536 tons

\*VT Bread Co. closed 4/21  
425 ton/yr

\*Diverted Keene State  
College 125 ton/yr



# SOURCE SEPARATED ORGANICS FROM:

- ▶ Brattleboro Curbside Pickup by Triple T Trucking
  - 2,000+ Residences Served Weekly
  - Up to 4 Unit Apartments
- ▶ Commercial/Institutional Collection By Area Haulers
  - Restaurants
  - Bread Manufacturers
  - Vitamin Manufacturer
  - Schools, Colleges
  - Food Coops, Supermarkets
- ▶ Transfer Station Drop-Off (WSWMD)





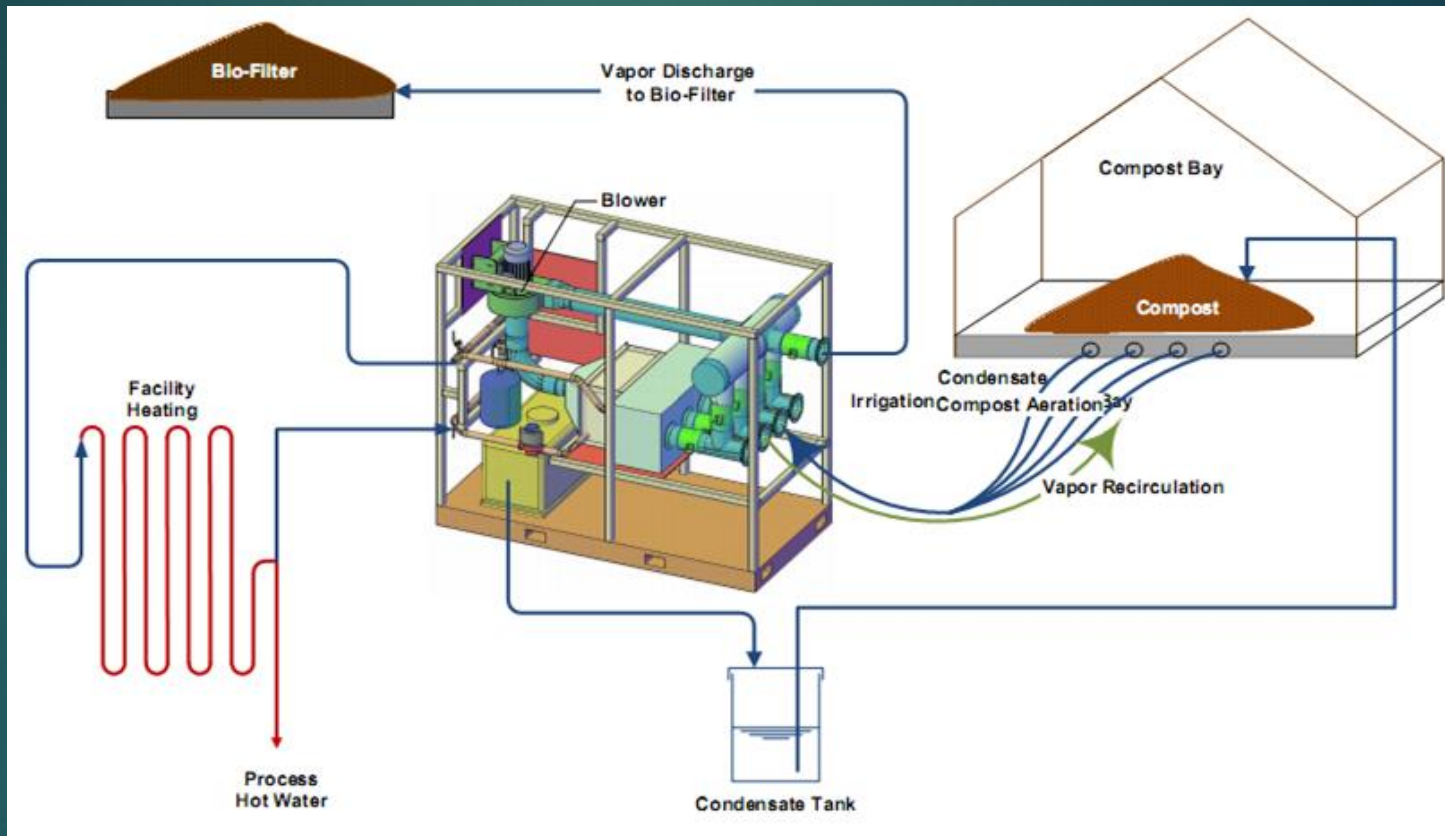
GOAL:

INCREASING PROCESSING CAPACITY WITH  
AERATED STATIC PILE (ASP) AND HEAT  
RECOVERY USING AGRILAB TECHNOLOGIES  
DESIGN

# Design goal details

- ▶ More capacity on same physical footprint
- ▶ Faster cycle time from inbound feedstocks to outbound product
- ▶ Add aeration to composting process with current turned windrow operation
- ▶ Include heat recovery for extended winter operations, facility heating and/or product drying
- ▶ Develop plan with reasonable budget that can be financially viable
- ▶ Stay in compliance with VT Agency of Natural Resources both for permitted solid waste processing and stormwater management

# Compost Aeration and Heat Recovery (CAHR) Flow Diagram



# Compost Facilities with AGT CAHR Installations

- ▶ VernMont Farm – Vernon, VT
- ▶ VT Natural Ag Products/Foster Brothers Farms – Middlebury, VT
- ▶ Tamarlane Farm/Kingdom View Compost – Lyndon, VT
- ▶ Magnan Brothers Dairy – Fairfield, VT
- ▶ Catlin Farmstead/Black Gold Compost – Winchendon, MA
- ▶ Country Oaks Landscape Supply – Burton, MI
- ▶ University of New Hampshire, Organic Research Dairy Farm – Lee, NH
- ▶ Mix of on-farm and commercial composting facilities with a wide range of feedstocks, as well as process and heating needs

# Construction Plan – Aeration Channels and Drainage



# Construction Plan– Note insulation around aeration zones



# Aeration Pipes Through Sump Box and Ready for Hot Box 250-R



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Liquids in aeration pipes must be drained via traps to avoid blockages in aeration lines. Liquids are mostly condensate with some leachate



Typical  
construction -  
Sections formed,  
prepped with  
mesh prior to  
pouring concrete



# AGT Compost Hot Box 250-4R set in place, aeration channels and base materials graded



# Recessed aeration channels filled with coarse clean wood chips as plenum under windrows



Loaded batch at left and open zone to right. Windrows typically 18 ft. wide and 8 ft. high. Chips are checked between batch loads for compaction and packing of wet material. Full replacement every 3-5 years.

Perforations  
in aeration  
pipe  
– set in  
trenches or  
on-grade



# AGT Compost Hot Box 250-4R connected to vapor pipes, plumbing, electrical and data

Negative aeration used  
90% of timed cycles and  
approximately 10%  
positive recirculation of  
vapor. Note vapor from  
exhaust pipe of AGT  
Compost Hot Box 250-4R  
is from active windrows  
on working pad



Aeration  
blower, heat  
exchanger,  
actuated  
valves,  
ductwork and  
control panel  
inside container



# Field check of initial maps, visualize equipment movement



Bob Spencer and Jason McCune-Sanders measure site near planned receiving and mixing pad – Dec. 2021

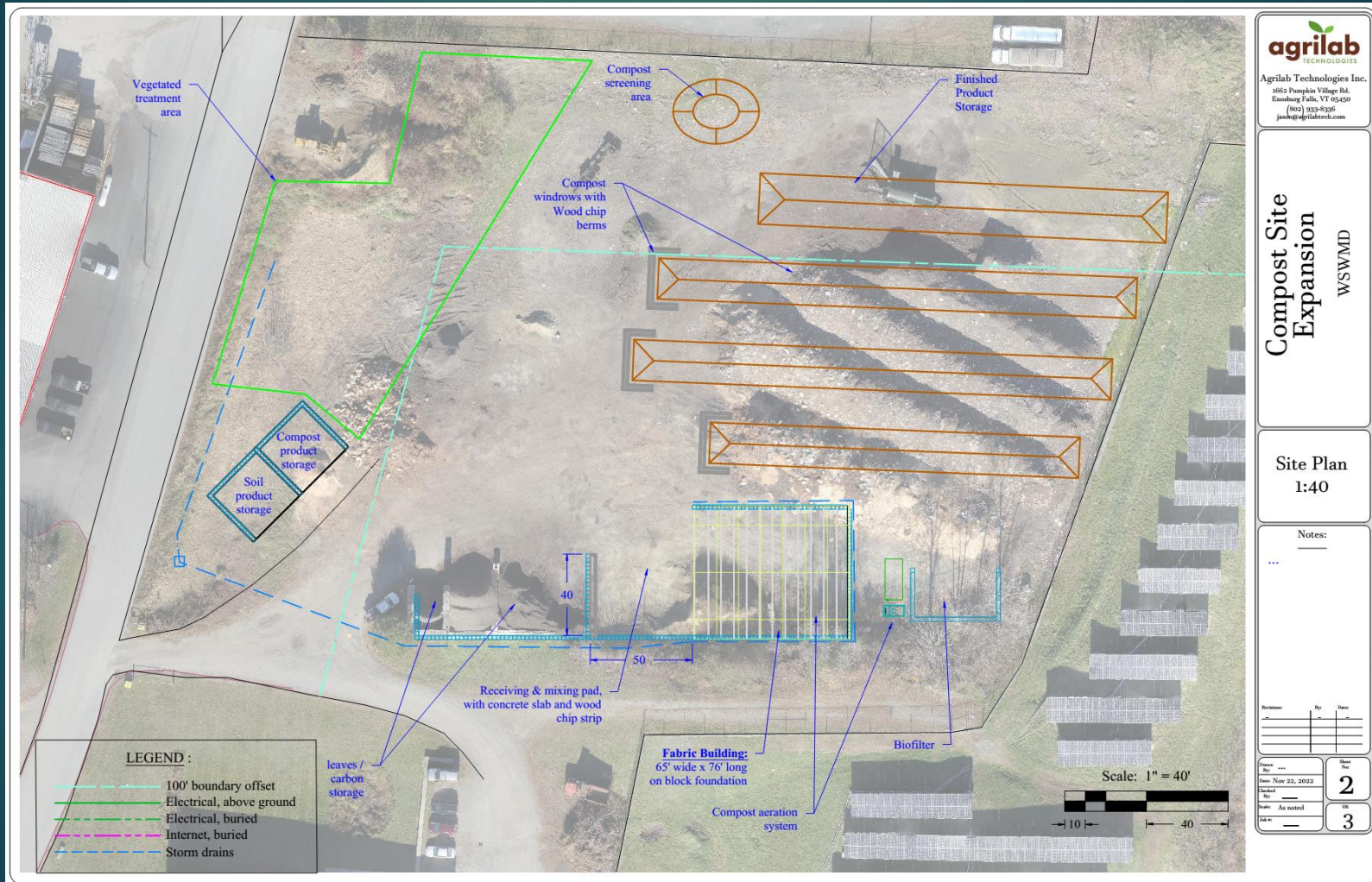
# Planned site of covered aerated working pad

Considerations include loader access and shuttle distance, set backs for drainage off roof and upslope areas and space for adjacent mechanical, sensor and control equipment

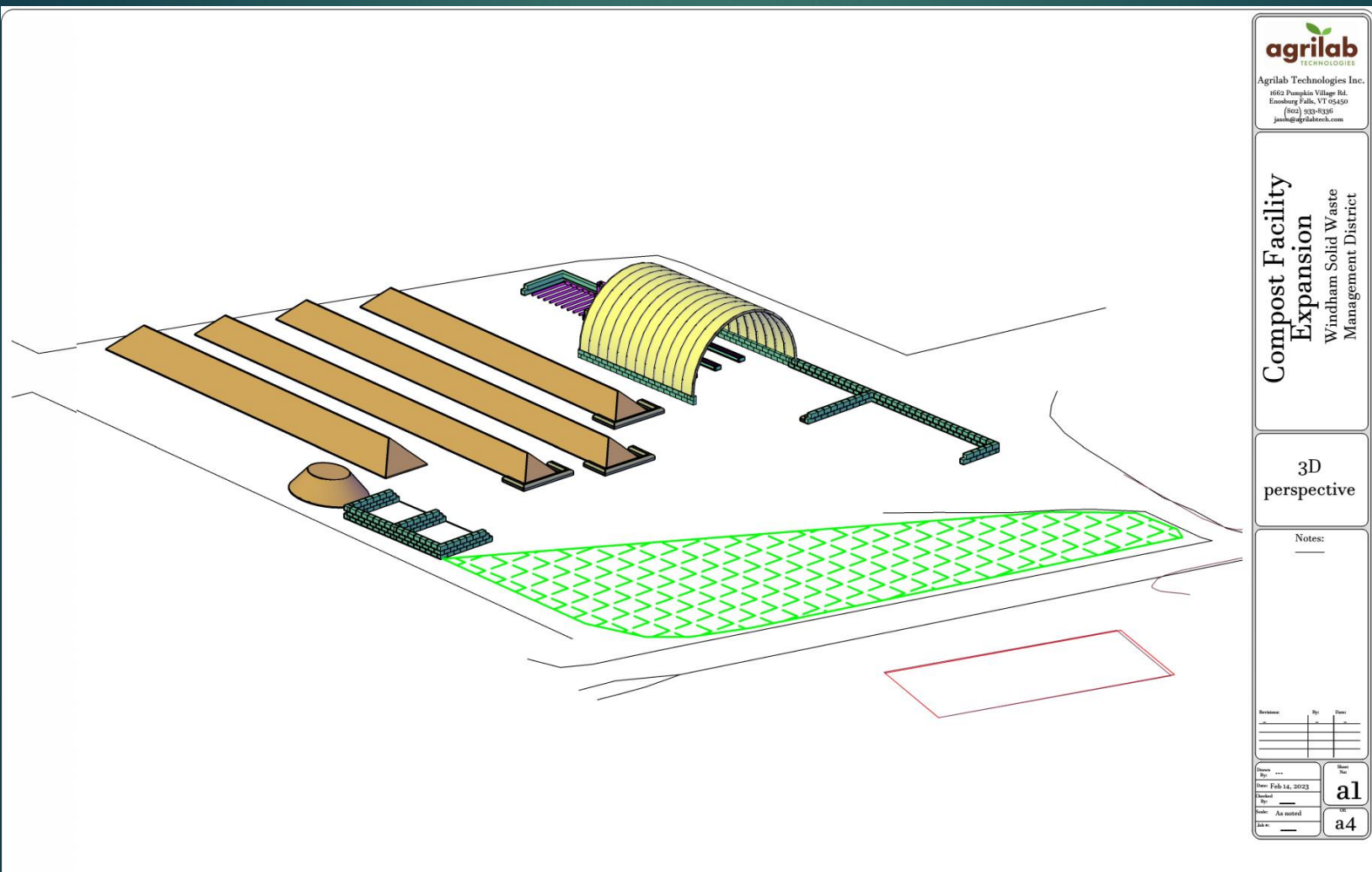




# Conceptual site design – drafts and iterative process



# Design updates – 2D and 3D perspectives



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**Compost Facility  
Expansion**  
Windham Solid Waste  
Management District

3D  
perspective

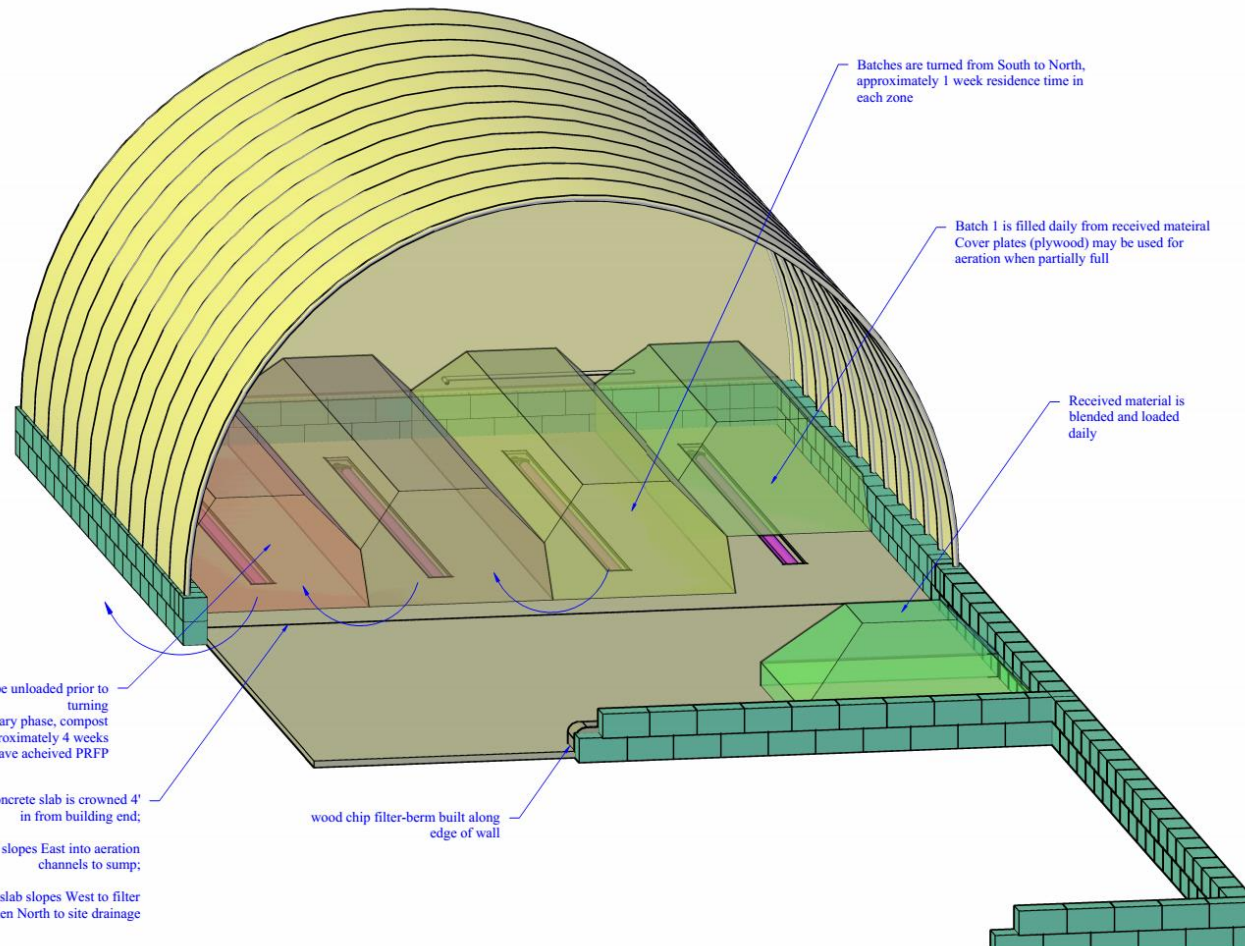
Notes:  
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Revisions	By	Date

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Issue Date: Feb 14, 2023	Scale: al
By: _____	
Note: As noted	

a4

# Include details for Facility Management Plan



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**Compost Facility Expansion**  
Windham Solid Waste Management District

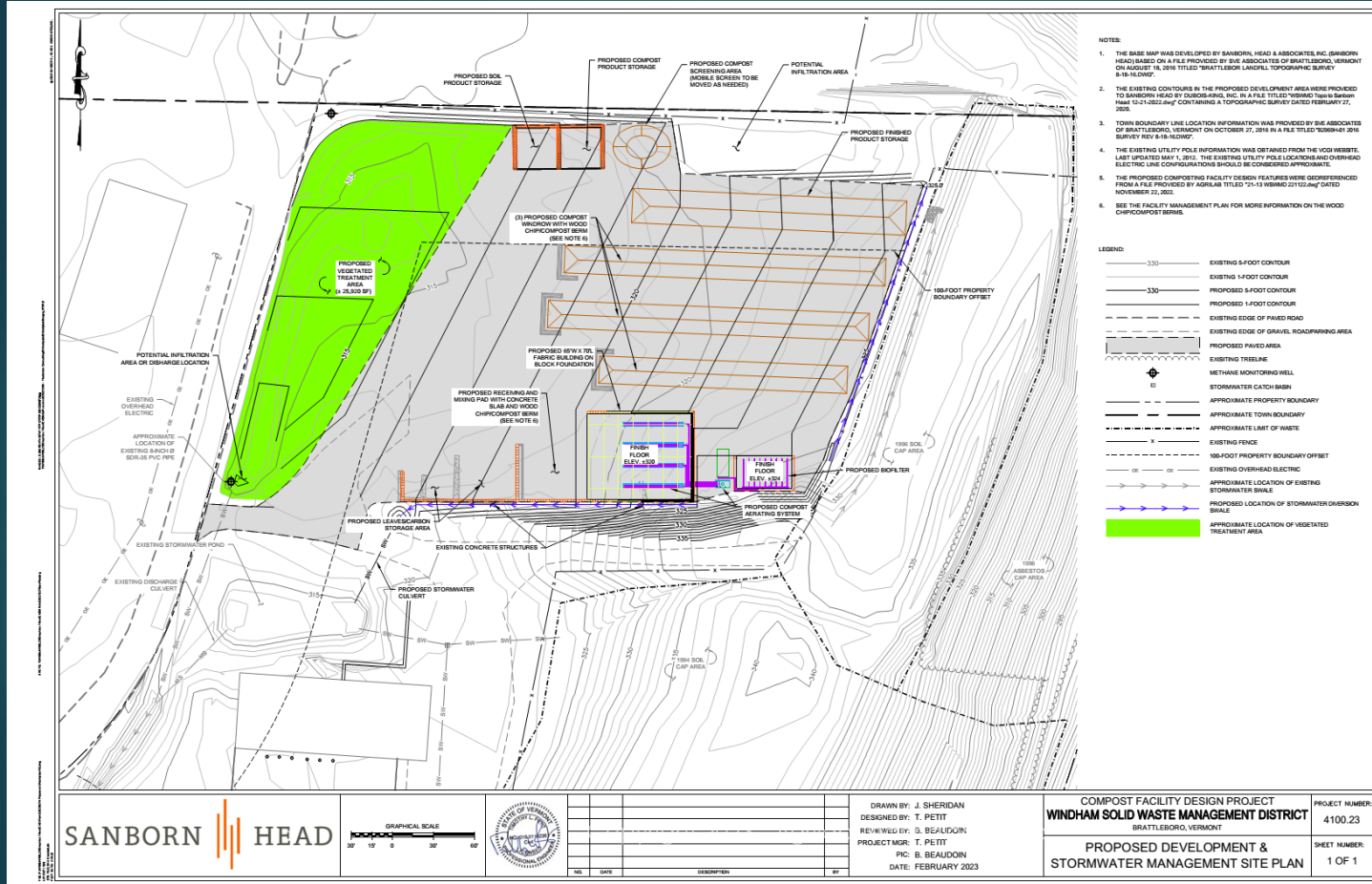
**Primary batch sequence**

Notes:

Revision	By	Date

Sheet No.	<b>a2</b>
Date: Apr 3, 2023	
Scale: As noted	<b>a4</b>

# Site plan submitted for permitting



Details include aerated and turned windrows, receiving and mixing pad, filter berms, vegetated treatment area and property line setbacks

# Preliminary review with DEC staff

- ▶ Check for compliance with material handling – Process to Further Reduce Pathogens (PFRP)
- ▶ Vegetated treatment area (VTA)
- ▶ Berms downslope of compost windrows to reduce sediment and nutrient runoff
- ▶ Request for variances with adequate justification (reduced VTA and setbacks from property lines)
- ▶ Multiple video meetings as conceptual designs were updated



# LEACHATE COLLECTION, TREATMENT, OR PREVENTION

VT DEC compost regulations for a medium food waste composting facility require collection and treatment of leachate, or

Enclosure of the active composting pad to prevent leachate generation



# LEACHATE COLLECTION AND TREATMENT COST ESTIMATE

- ▶ \$415,000 construction
- ▶ \$45,000 - \$63,000 per year for hauling and treatment at wastewater treatment plant
- ▶ Possible odor treatment

# EXPANDED COMPOST FACILITY 2023

- ▶ New enclosed facility to be constructed ~\$700,000
- ▶ Continue composting operations during construction
- ▶ New gravel pad
- ▶ Fabric building with concrete slab and aerated static piles
- ▶ Compost aeration and heat recovery (CAHR) for accelerated composting
- ▶ Heat also used to dry compost for more efficient screening
- ▶ Biofilter for odor treatment
- ▶ Capacity 5,000 cubic yards of food scraps
- ▶ Up to 40,000 cubic yards of organics per year (by permit) – site capacity approx. 10,000 CY/YR



# FINANCING WAS A CHALLENGE WITH NO LONG- TERM DEBT

- ▶ WSWMD: \$225,000 Cash required vote of board
- ▶ USDA Community Facilities Grant: \$150,000 required arduous application process
- ▶ Vermont ANR Infrastructure Grant: \$277,000 for 40% of project cost
- ▶ U.S EPA SWIFR Grant: \$1.2 million applied for for an expanded project including a paved compost pad and a mixer for blending feedstocks

# PERMITTING A MEDIUM FOOD WASTE COMPOST FACILITY

- ▶ Vermont ANR Facility Re-Certification for 10 years includes medium food waste composting facility rather than a separate permit application
- ▶ Town of Brattleboro Zoning Permit
- ▶ Vermont Stormwater Permit
- ▶ Act 250 Permit Amendment

# Next Steps

- ▶ Prepare Requests for Proposals – needs to comply with USDA funding requirements
- ▶ Conduct stormwater management final design, dig test pits and confirm soil infiltration capacity
- ▶ Work with Steve Horton Construction Management and Sanborn Head Engineering on bid documents based on conceptual design
- ▶ Continually update budget projections (due to inflation, permit requirements, etc.)
- ▶ Review and select general contractor
- ▶ Proceed to construction – fall 2023? Start up and commissioning before end of year
- ▶ Actively solicit additional food scrap generators as facility will have increased regional composting capacity

# Thank You!

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