What's Changed in the Alberta Compost Game – Application of the Code of Practice for Compost Facilities and Lessons Learned from new Compost Facility Development

SWANA Northern Lights

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Alberta Brief Compost History

Regulatory/Policy

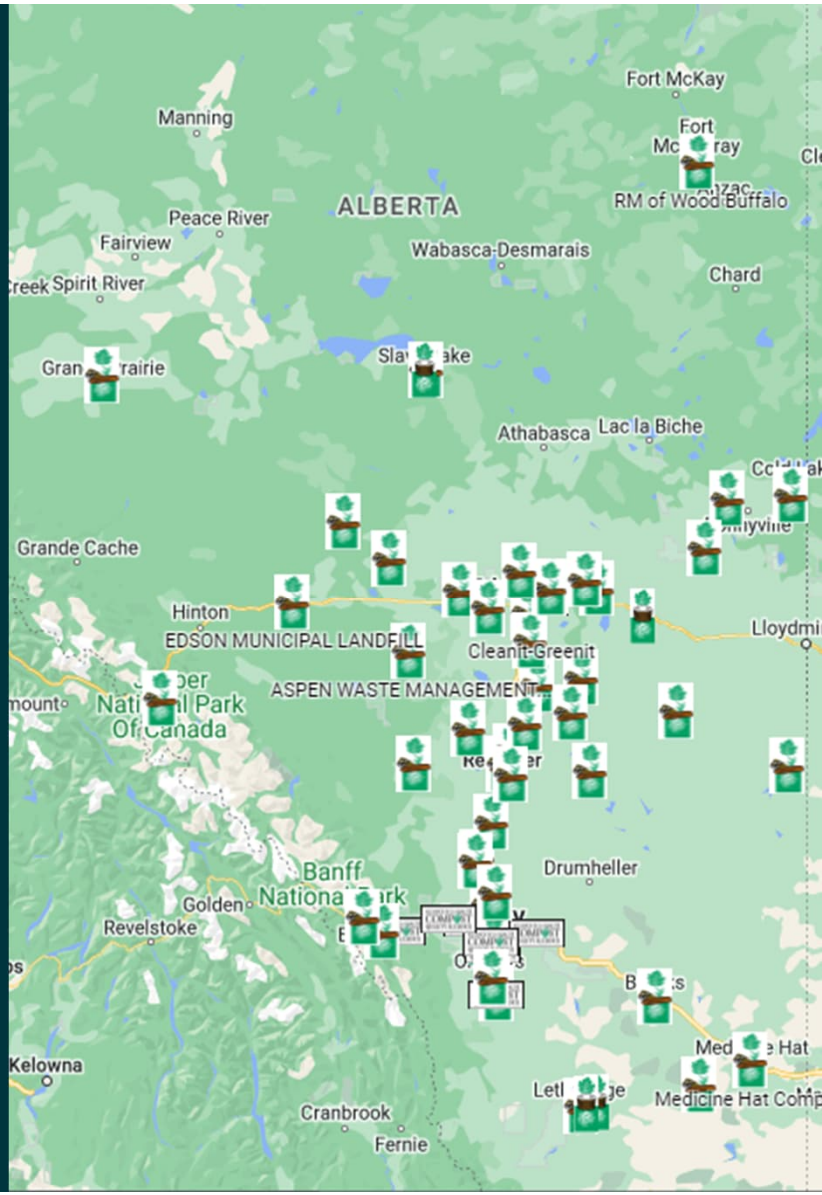
- Action on waste – 1990's
  - Variety of waste diversion goals and compost guidance documents
- Code of Practice – 1996
- Grant Programs – waste management assistance/resource recovery (ended 2005/6)
- Certified Operator Program 1996
- Standards and Guidelines for Compost Facilities 2007
  - NRCB, EUB, and AEP stakeholders
- Compost guidance for deadstock/foreign animal diseases
- compost-facility-operator-study-guide.pdf (alberta.ca) – 2018
- New Code of Practice 2022

Alberta Brief Compost History

Facilities (55) as of 2019/20

- Organics Recycling in Alberta • The Compost Council of Canada
- Variety of small scale windrow or static pile compost facilities at operating landfills and transfer stations and a few larger aerated facilities
- Sources are leaf & yard waste, wood waste SSO, commercial SSO, biosolids

Canmore Biosolids Composting 2001



Alberta Brief Compost History

Carstairs Aerated bins
L&Y compost

Facilities

- Most facilities developed at landfills for small scale operations, leaf and yard waste.
- Government policy on waste diversion stalled – staff changes, government priority changes.
- Communities would develop based on local waste diversion policy and if could obtain grant funding
- Odour and non-compliance issues
- Ex\ Stickland Farms - accepted SSO after Bowden stopped composting program. Stickland was a turned windrow operation and after odour complaints converted to an aerated static pile which dramatically reduced odours

Alberta Brief Compost History

Advocates/Training

- Olds College Composting Program – Trail Blazer
- Alberta Environment – Licia Paddison, Natasha Page, Dr Donna Chaw
- Composting Council of Canada – Susan Antler
- University of Alberta
- Industry (consulting and owners)

Agriculture composting 2002, Old College Slaughterwaste compost 2000

Policy- Code of Practice 2022

- Alberta Environment replaced the 1996 Code and Compost Standards and Guidelines with a new Code of Practice
- New Code located at COMPOST.PDF (alberta.ca)
- Acceptable Feedstock and Amendment List at afred-acceptable-feedstock-and-amendments-list-2022-01.pdf (alberta.ca)
- Highlights at Code of Practice for Compost Facilities : Fact Sheet (alberta.ca)
- Greenhouse Gas Credits at Quantification protocol for aerobic composting. Version 3.0 - Open Government (alberta.ca)

Policy- Code of Practice 2022

Highlights

- Monitoring plan for moisture content, bulk density, pH measurements
- Vermi and deadstock composting
- 1.0 m separation between groundwater table and bottom of liner for pond and facility liner
- Class I no groundwater monitoring if double liner for all areas but storage with leachate collection and leak detection system and within a vessel/structure
- Facility layout to be defined (capacity for feedstock, bulking agent, windrows, curing, storage)
- Provides maximum windrow size and capacity for turned windrow operations
- Financial security

Policy - On Farm Handbook

[On-Farm Composting | Recycling Council of Alberta (recycle.ab.ca)]

[An-Introduction-to-On-Farm-Composting-F8-July-2021.pdf (recycle.ab.ca)]

Development

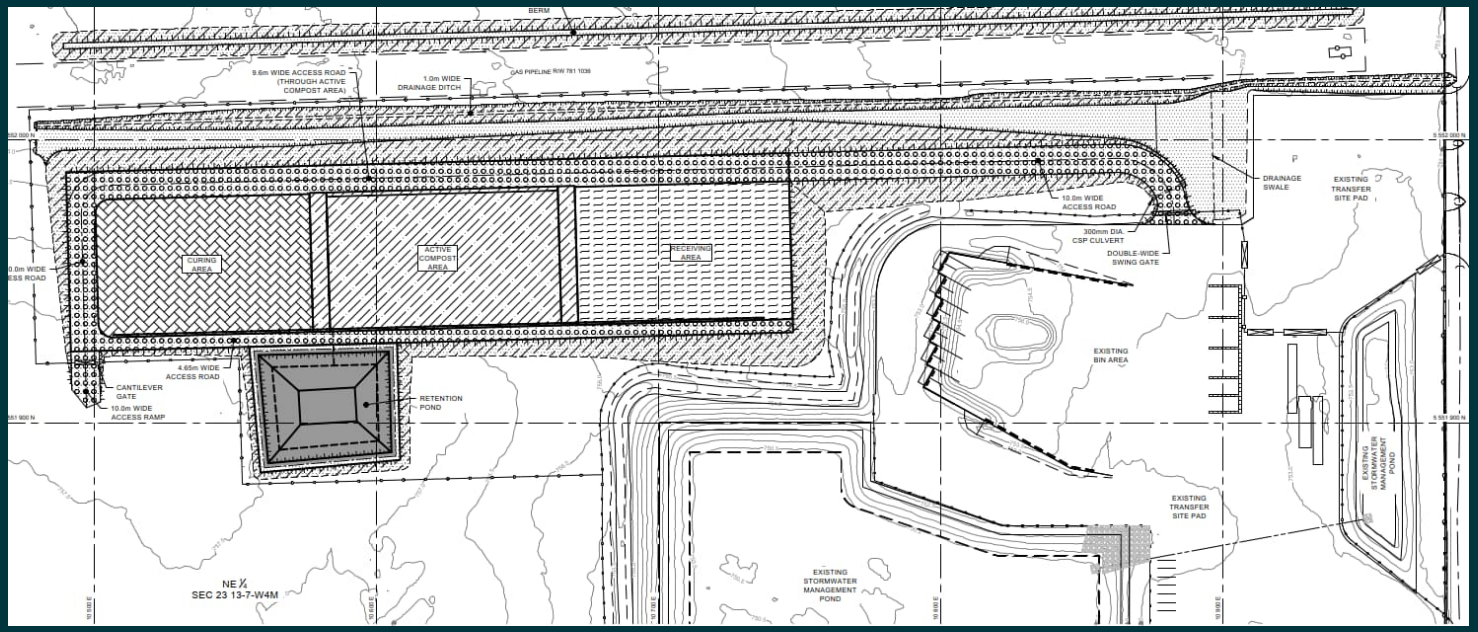
Organics Diversion

- Municipalities implementing SSO programs for multiple reasons (landfill space, GHG credits, waste diversion goals/Zero Waste/Circular Economy, agriculture, public)
- Facility capacity changes
  - Edmonton region
- Funding?
- Private companies

Lessons Learned – Redcliff - 2020

Authority obtained a federal ICAP grant for composting

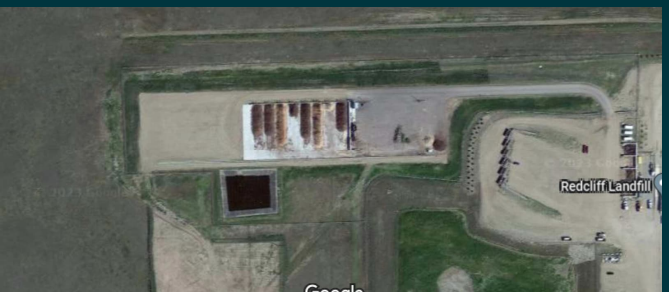
Design – Positive aerated windrow on concrete, asphalt, and gravel surfacing over a clay liner. Concrete headwall. BGM leachate pond liner. 5 HP blowers. Feedstock predominantly greenhouse waste

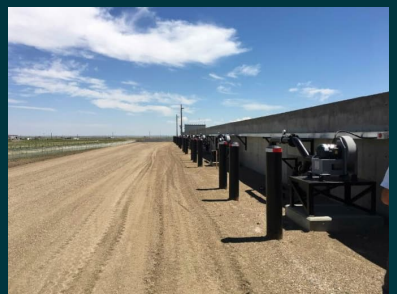


Lessons Learned – Redcliff - 2020

Regulatory

- Code of Practice was in draft form, worked with regulator for Approval amendments for compost facility
- Active landfill site – compost siting work not required beyond additional piezometers, surface water systems simple to implement
- Operations Plan, Odour Management Plan – AECOM and Transform developed plans specific to meet Code of Practice requirements and reflect the facility
- Shortage of bulking agent with greenhouse waste peak is in winter months





Lessons Learned – Redcliff - 2020

- COVID – essential worker, virtual bidder tours, construction application
- Electrical building – make bigger
- Headwall – snow drift issues
- Pipe selection – PVC over HDPE

Heartland Compost 2021 - 3

- AECOM contacted for 3rd party review of a proposed SSO compost facility in Sturgeon County on leased private land
- AECOM/Transform Compost completed regulatory portion of project for <20,000 tonnes per year aerated static pile on private land

Heartland Compost 2021-3

Compost facility siting

- Hydrogeological and geological testing program
- High groundwater table and sand seam issues for design (groundwater 1 m separation to bottom of liner requirement) and construction (clay quality, water table for surface water pond)
- Supplemental testpitting program to add to prior geotechnical program
- Changed compacted clay liner grading design (cut/fill, groundwater offset)

Heartland Compost 2021-3

- 20 active aerated windrows
- 16 curing piles
- 6 storage piles
- Heavy traffic area aggregate surfacing
- Light traffic aggregate surfacing
- Topsoil pile/screening berms
- HDPE pond with no discharge

Heartland Compost 2021-3

AEP Regulatory- first application with the new Code

- AEP staff unfamiliar with requirements
  - Requested variance from groundwater table for HDPE lined pond
  - To prove HDPE equivalence to clay liner
- Developed an application audit checklist to demonstrate original & application amendment details
- Revised prior application (i.e. hydrogeological/geotechnical report, design, operations plan, environmental monitoring plan, odour plan, fire plan, nuisance plan, financial security)
- No offsite release of water so no Water Act Approval

Heartland Compost 2021-3

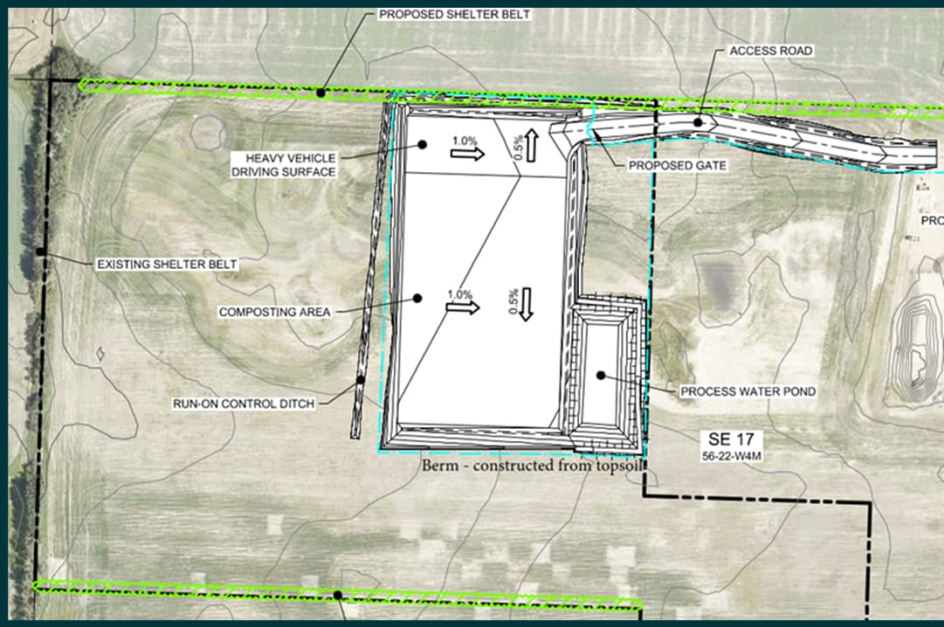
County Regulatory

- Appeal hearing due to concern from seed potato farmers
  - Spore monitoring to included with Operations plan
  - Visual berms required
- Surface water drainage tie in with existing County ditches

Heartland Compost 2021-3

Budget

- Changed surfacing to include Mirafi geofabrics to reduce aggregate layer thickness
- Power connection costly
- Compacted clay liner changed to HDPE
- Site size reduced
- Changed operation from aeration system to turned windrow for initial operation



Claystone Compost 2022/3

- AECOM/Transform to develop ASP for <20,000 tonnes per year on active landfill site
- Compost operation included in existing Approval
- Compost contemplated in development permit

Claystone Compost 2022/3

Compost facility siting

- Hydrogeological and geological testing program done by others for landfill expansion
- Groundwater table information by quarter section

Claystone Compost 2022/3

Regulatory- first application with the new Code under Approval.

- Had issue with seasonally high groundwater interpretation; had to develop a maximum surface from approximately historical elevation data. Process took several months for approval amendment
- Naturally suitable geology (very tight clay soils); still had to develop a clay liner for a small area due to groundwater setback
- Variance application for BGM liner over compacted clay liner for storm pond and construction into groundwater table

Claystone Compost 2022/3

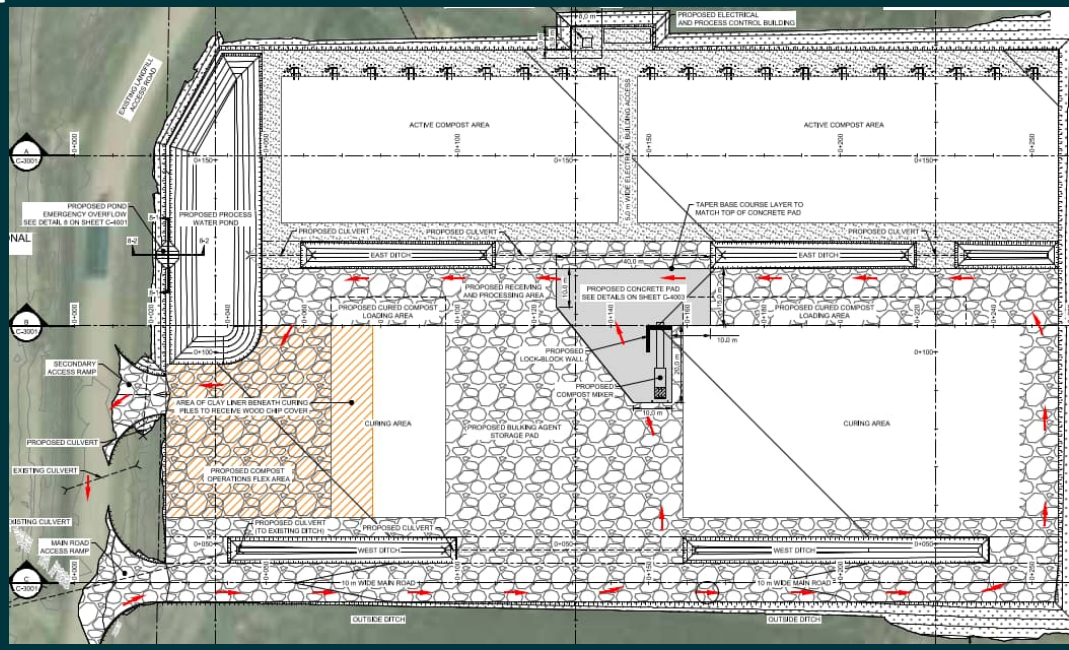
County Regulatory Process

- Typically the AEP application is all that is required for County DP
- County had a new planner and contracted officer that requested information beyond Code application
- Developed an application with direction on where to find information in the submission
- Claystone held a virtual meeting with County on the development

Claystone Compost 2022/3

Design

- Size limited to accommodate landfill development
- Up to 20 positive aeration windrows with two HDPE pipes on grade for each windrow, no more than 50 m long
- Use of Mirafi products to reduce aggregate for heavy and light traffic areas
- Concrete pad for receiving and mixing
- Traffic routing optimized with Claystone hauling staff
- Due to site flat grades to import soil to build grade and arch culvert required



Claystone Compost 2022/3

- Bid process – construction costs exceeded budget; broke into smaller contracts and some will be self performed
- Long lead times for electronics and other materials; owner preordered up to 8 months in advance
- Woodchip supply shortage

Small Farm

Organic farming & greenhouse operations wanted to take organics from a Town. Static pile to windrow operation contemplated on their own farmland

- Owners did some work on their own and met with regulator
- Consultation with AECOM findings:
  - Hydrogeological siting program – to costly for owner as no additional funding. Preliminary information from owner test pit program and published information showed high groundwater table
  - Discussions with regulator on options. Can not vary from Code - would require an Approval

Undisclosed Proposed Operation

- Private compost facility, proposed aerated bunker design for source separated organic waste. Development permit obtained
- Site location in foothills with limited geological and hydrogeological information
- Preliminary groundwater information showed ground water depth could be 40 to 60 m below grade
- Cost evaluation between double liners and installing piezometers resulted in drilling program
- First well artesian at roughly 85 m below grade. Lithology gravel over shale/siltstone and sandstone alternating

Undisclosed Proposed Operation

- Second well progressed to similar depth and didn't locate groundwater. Installed piezometer – gas pressure increased. Determined VERY shallow Coal Bed Methane. Closed well and reporting in process

LESSONS Learned

- Good news as more facilities being developed
- Costly for siting and hydrogeological for compost facility start up if not on existing landfill
- On Farm compost development unlikely without municipal support
- Developing in agriculture area far away from municipality still may have issues with public
- Woodchip sourcing issues
- Construction costs increases