Wastewater Treatment Facility (WWTF) Biosolids Dryer – Lifecycle Cost Analysis Summary

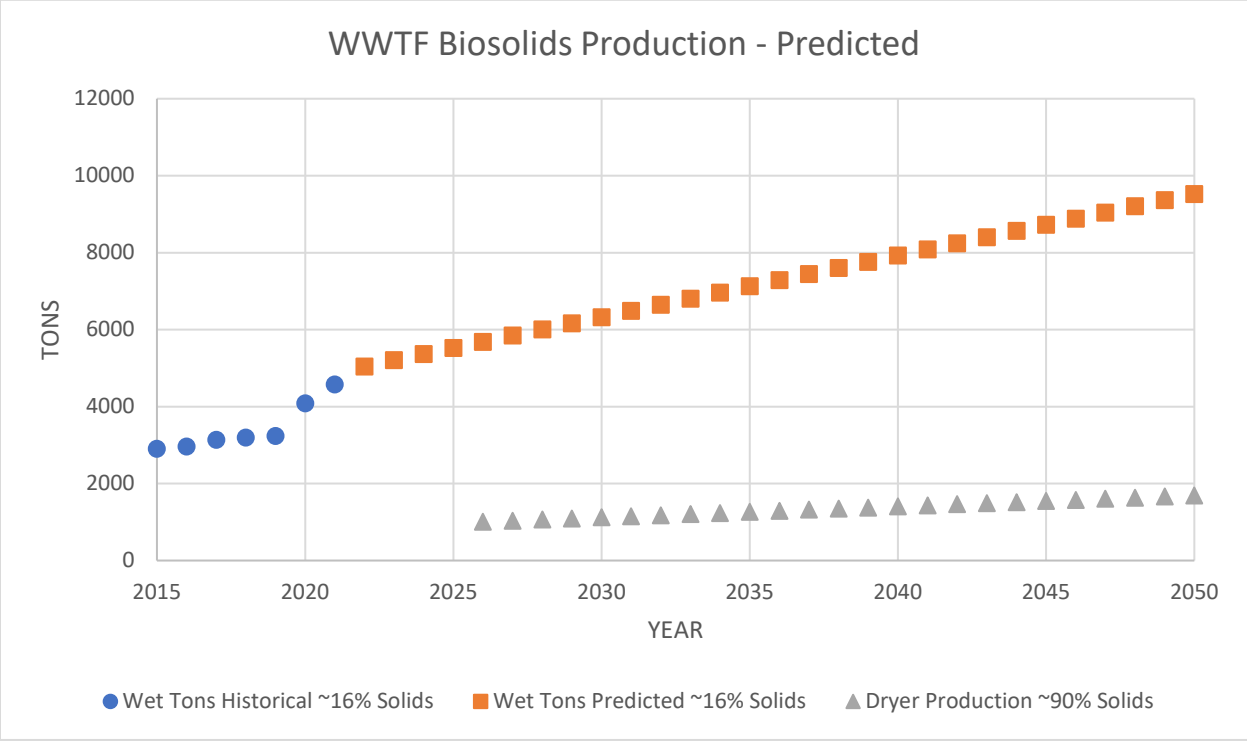
City of Hendersonville

March 2022

WWTF Biosolids Production – Historical and Projected

WWTF Historical Biosolids Production		
Calendar Year	**Biosolids Production (wet tons)**	**Annual Increase (wet tons)**
2015	2906	-
2016	2969	63
2017	3138	169
2018	3200	63
2019	3238	38
2020	4088	850
2021	4575	488

- Currently biosolids produced at WWTF are ~16% solids (~84% water). The City's biosolids are currently classified as a non-hazardous solid waste and disposed in permitted landfills.
- The large increase in biosolids production in 2020 and 2021 is generally due to WWTF aeration basin process modifications that improved wastewater treatment operations.



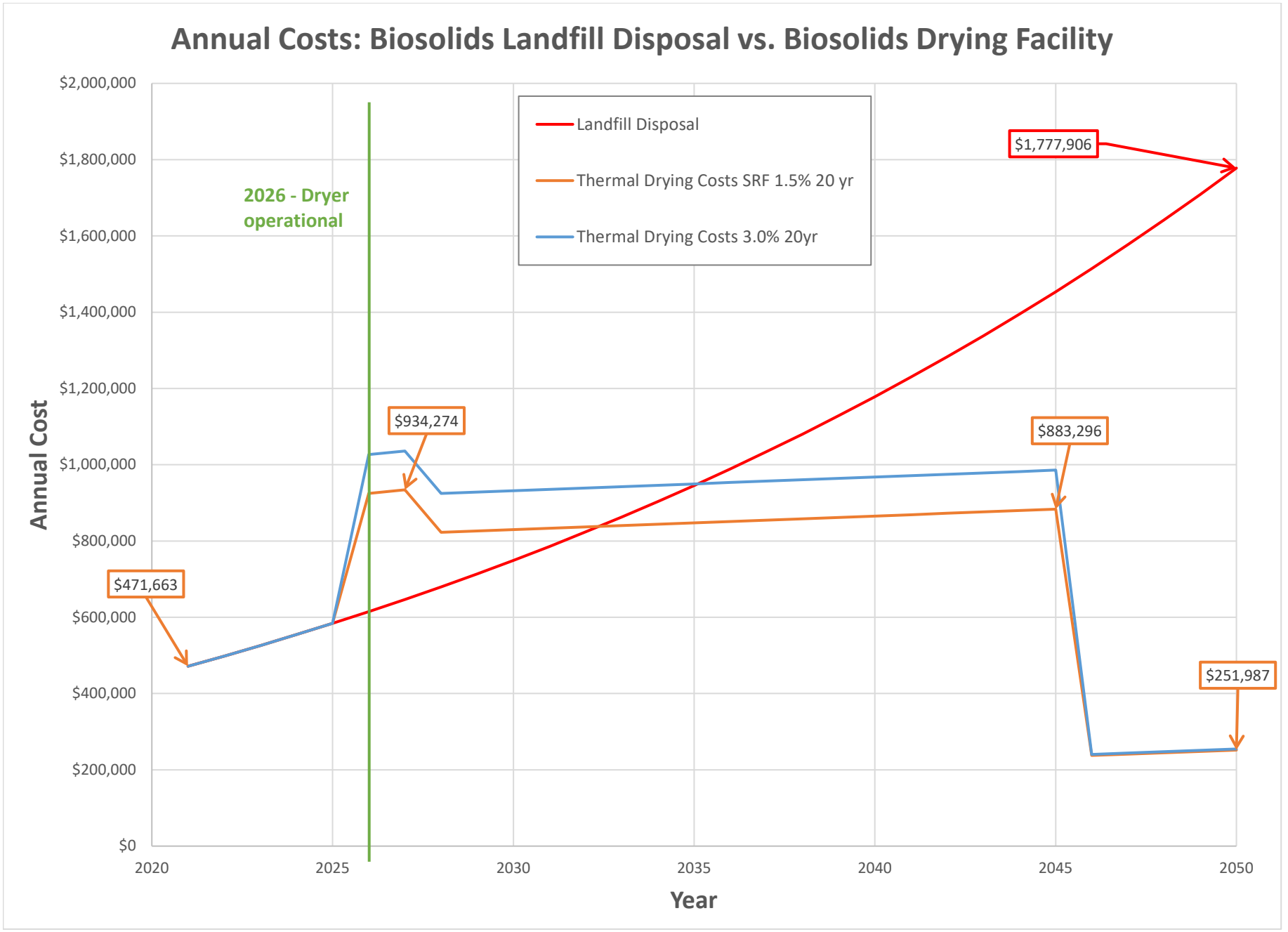
- For purposed of this analysis, future predicted WWTF biosolids production assumes a linear production increase of 160 wet tons per year, which is the average annual production increase for the past 6 years excluding 2020. Please note the City's 2019 *Sewer Collection System Master Plan* assumes a future biosolids production rate increase of 295 wet tons per year. Increased biosolids production can be directly attributed from addition flows received at the WWTF from projected new development and system growth.
- The proposed biosolids dryer will produce a material that is ~90% solid (~10% water), drastically reducing the mass of material.
- The proposed biosolids dryer will produce a "Class A", nutrient-rich, material that can be beneficially used in agricultural land application, landscaping, landfill cover etc.

Current WWTF Biosolids Disposal Costs

- Current landfill disposal costs (transportation and disposal) are ~$95/ton. Until recently, these costs were ~$55/ton.
- For purposes of this analysis, landfill disposal costs are projected to increase 2.32% annually. Henderson County uses this rate to project future hauling and disposal costs for its solid waste operation.
- Current landfill disposal of WWTF biosolids has become unreliable. Some landfills have abruptly refused to accept any biosolids while others have significantly increased tipping fees or placed limits on the quantities accepted. The City's current reliance on the volatile private hauling and landfill markets as it only biosolids disposal outlet, is not quantified in this analysis but should be considered.

Proposed WWTF Thermal Dryer Biosolids Disposal Costs

- Different biosolid strategies were evaluated in the City's recent *Solids Management Plan Evaluation*, including composting, aerobic digestion, and thermal drying. The proposed biosolids dryer was the recommended alternative best aligning with the City's goals and having the lowest net present value.
- The proposed WWTF Biosolids Dryer has an estimated capital project cost of $11,144,000.
- A Clean Water State Revolving Fund (CWSRF) low-interest loan application will be submitted to fund the capital project. These 20-year low-interest loans are at half the market rate. This analysis assumes a CWSRF 20-year loan at 1.5%. A market rate 20-year loan at 3.0% is also used in the analysis, assuming the funding application is not successful.
- The analysis assumes the proposed WWTF biosolids dryer will be operational by 2026. The dried biosolids will be landfilled for the first two years of operation, 2026 and 2027, until market outlets are well established. After 2027, all thermally dried biosolids will be given away to the public or used elsewhere with no associated disposal costs.
- Additional operational costs including natural gas, electrical, maintenance, and labor associated with the proposed biosolids dryer have been included in the analysis.


Annual Costs: Biosolids Landfill Disposal vs. Biosolids Drying Facility
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
Annual Cost
2020
2025
2030
2035
2040
2045
2050
Year
Landfill Disposal
Thermal Drying Costs SRF 1.5% 20 yr
Thermal Drying Costs 3.0% 20yr
2026 - Dryer operational
$471,663
$934,274
$883,296
$1,777,906
$251,987

City of Lenoir, NC - WWTF Biosolids Drying Facility