

# Beyond the South Wake Landfill (2023 Update)

Growth & Sustainability Committee

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# Why Look Beyond the South Wake Landfill

- South Wake Landfill Life is Projected to last until 2045
- A conservative approach reduces this to 2040
- It is not anticipated that a new landfill will be permitted in Wake County



# BOC Goal: Growth & Sustainability

## **GS 5: Promote sustainability and address issues associated with climate change.**

Objectives (now in appendix):

- Implement procedures to minimize odors associated with the South Wake Landfill.
- Prior year goal related to updating the Comprehensive Solid Waste Management Plan



# A look into the Future



## Wake County 2020 Comprehensive Solid Waste Management Plan

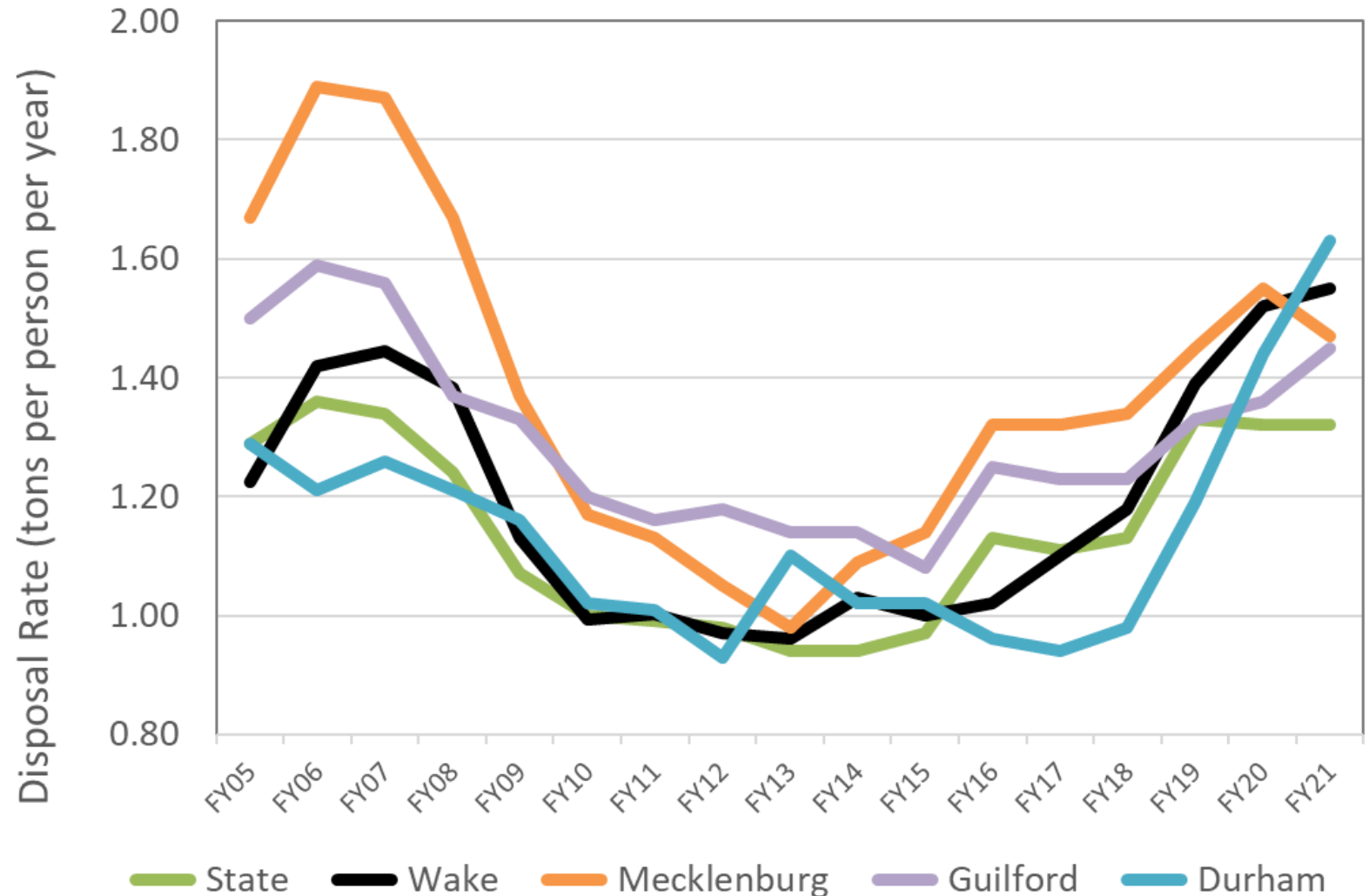
APEX • CARY • FUQUAY-VARINA • GARNER • HOLLY SPRINGS  
KNIGHTDALE • MORRISVILLE • RALEIGH • ROLESVILLE  
WAKE COUNTY • WAKE FOREST • WENDELL • ZEBULON

August 2020

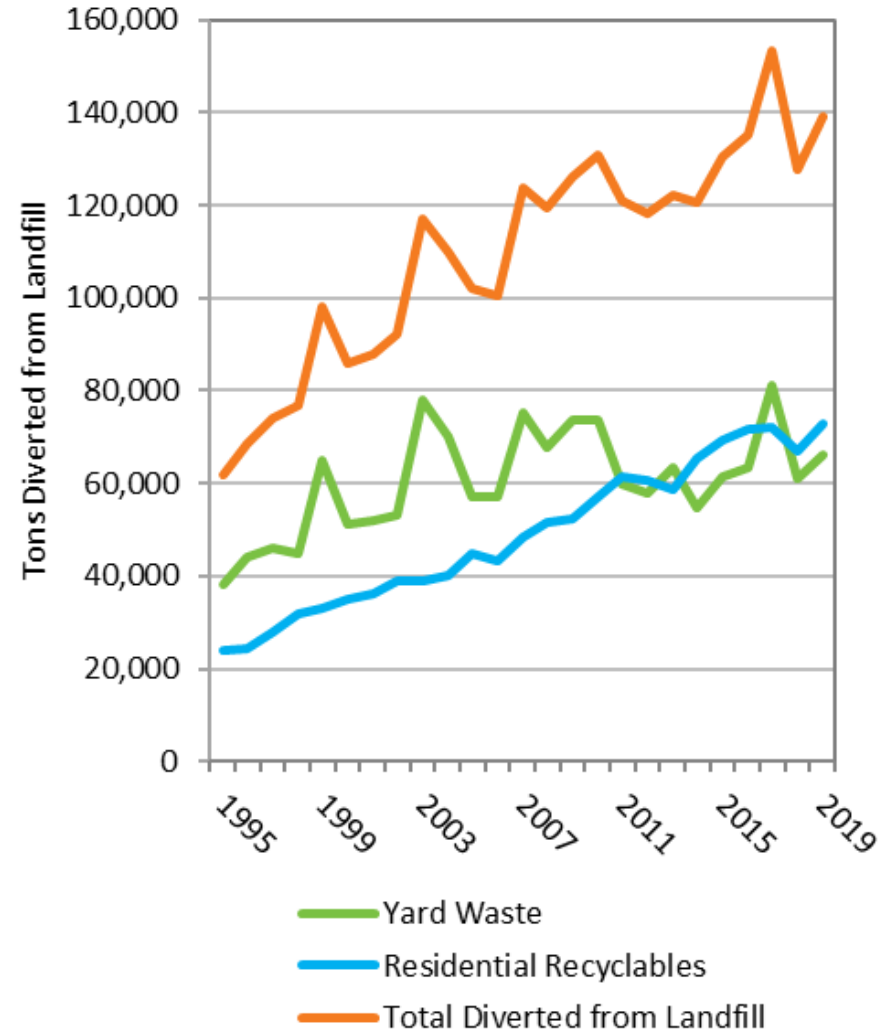
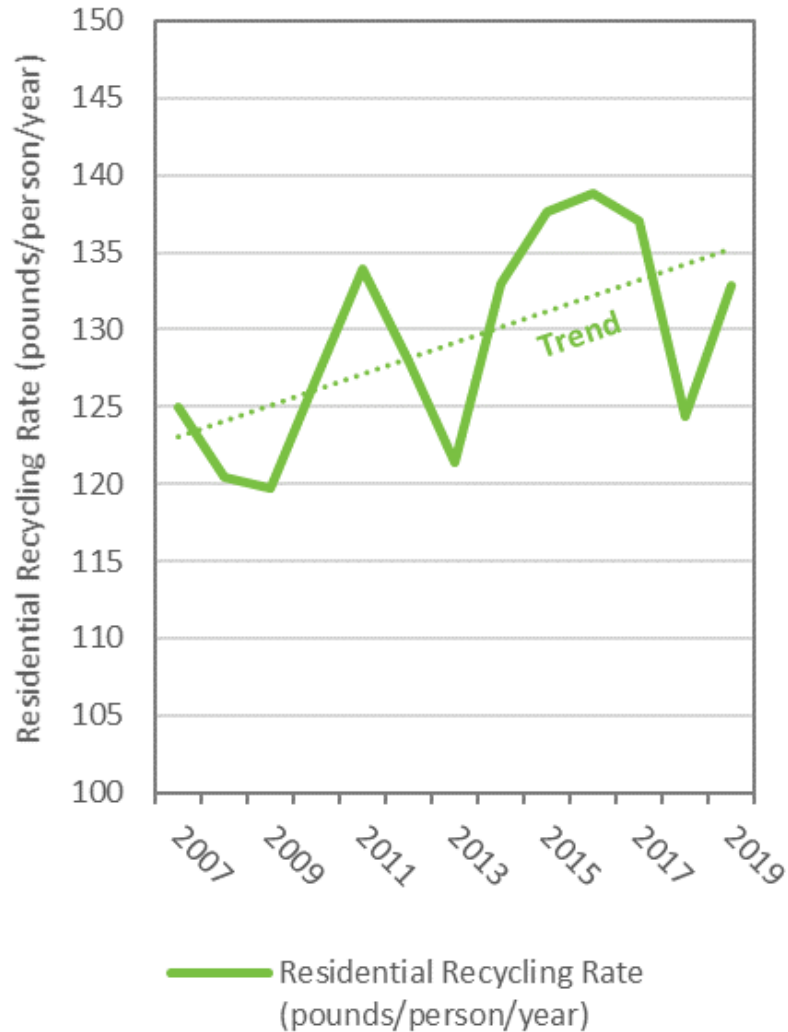
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# Per Capita Disposal Rate Peer Comparison

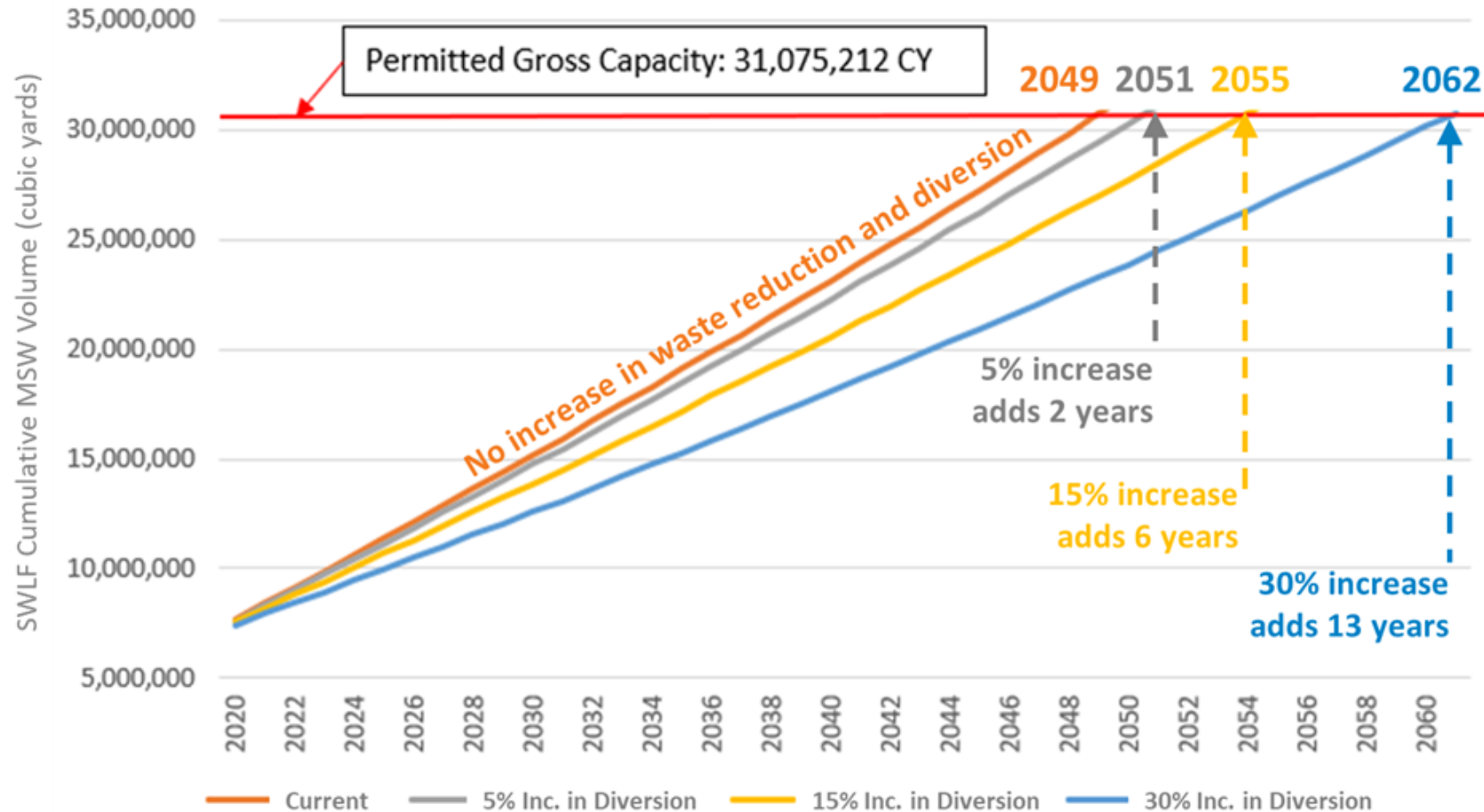
Wake County's increase is primarily linked to the construction market



# Residential Recycling and Yard Waste Trends



# Impact on SWLF Life



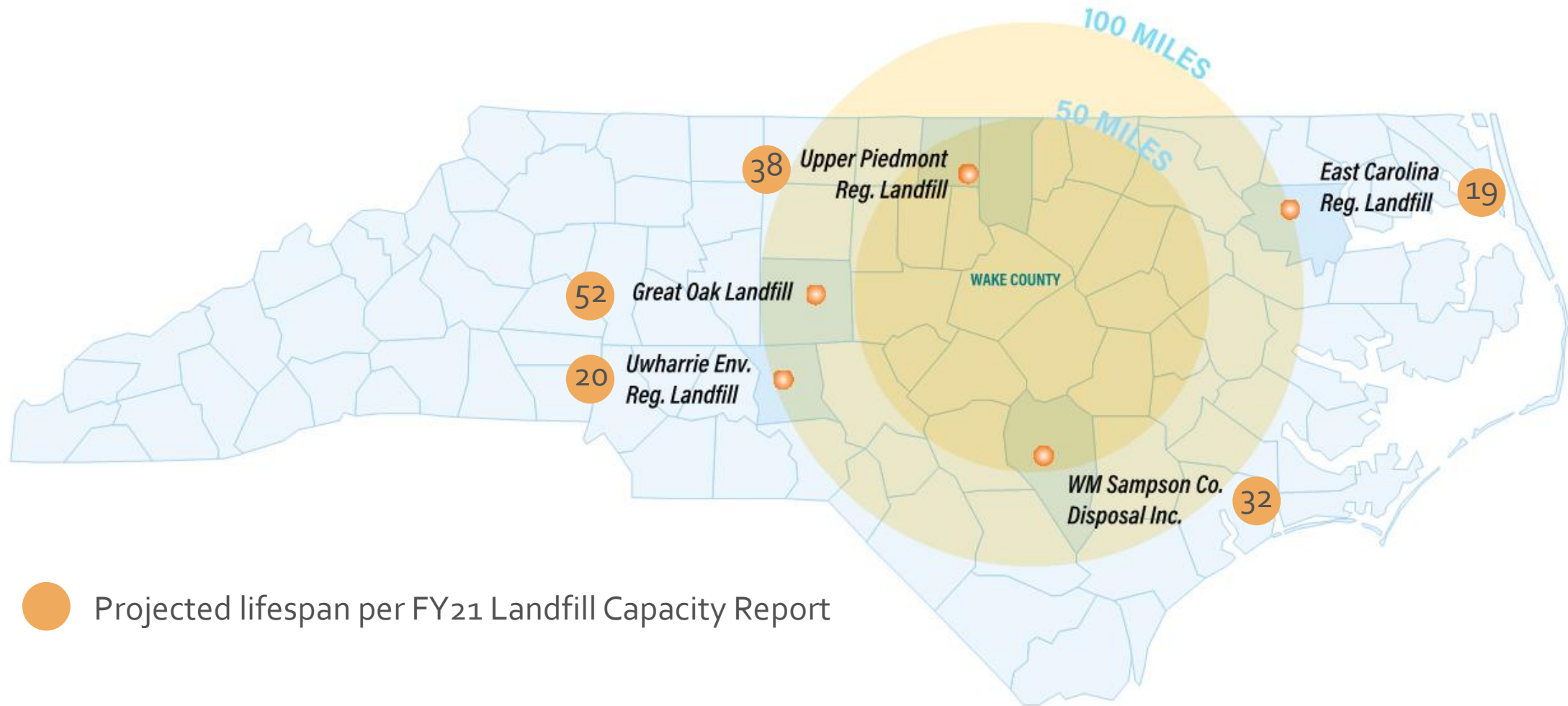
Each year that the landfill life is extended results in a \$ 6.5 million savings in disposal costs

# Risks and Rewards of Future Opportunities

- Increase SWLF capacity
  - Temporary solution
- Haul waste out of Wake County
  - Increased costs and price fluctuations



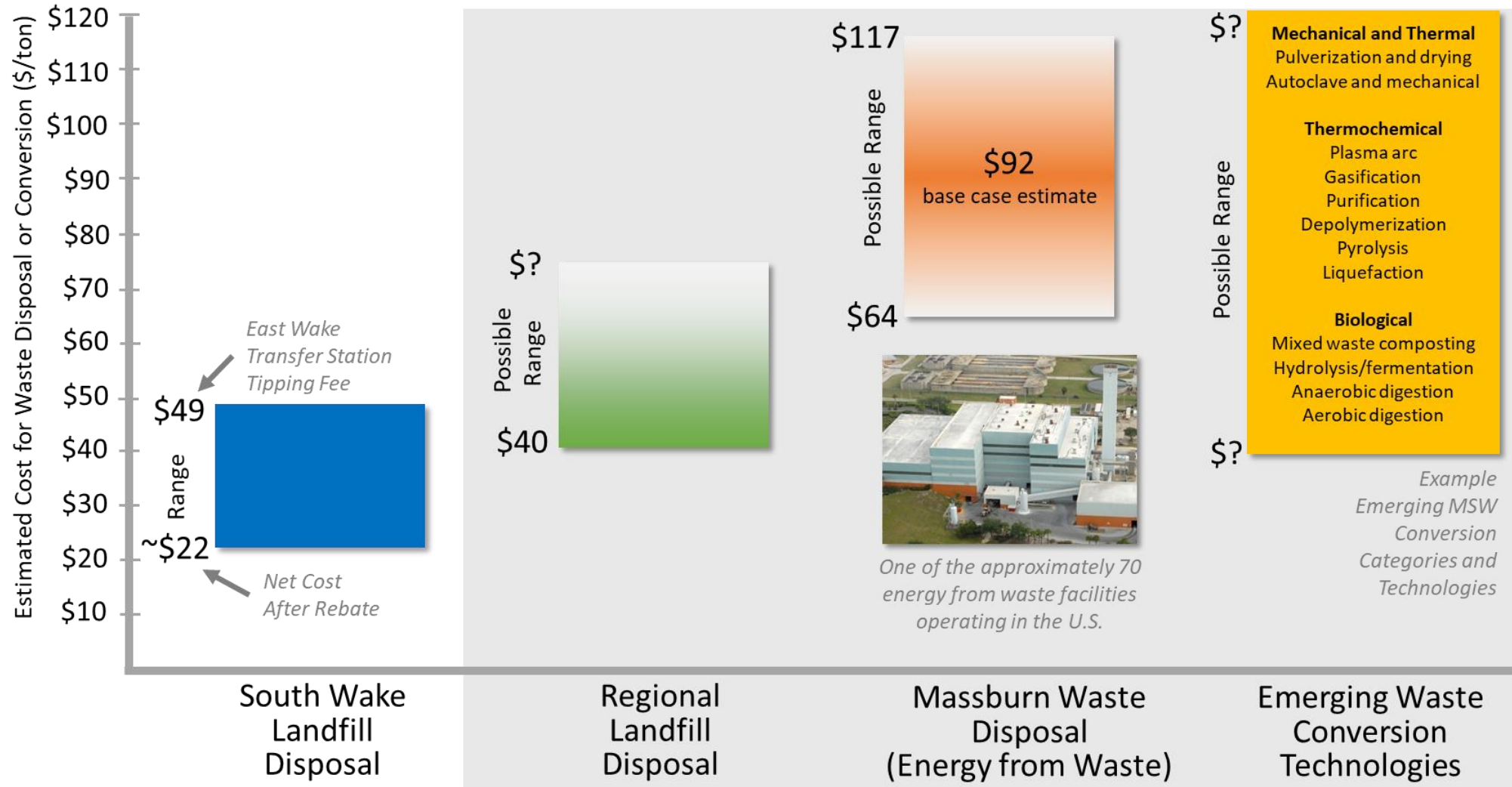
# Regional (NC) Landfill Disposal Options



# Risks and Rewards of Future Opportunities

- Increase SWLF capacity
  - Temporary solution
- Haul waste out of Wake County
  - Increased costs and price fluctuations
- Evaluate Energy from Waste (EfW) alternatives
  - Increased return on investment through energy production
  - Increased efficiency of pollutant removal from exhaust gases
  - Proven methodologies in the European Union, Canada and the US

# Estimated Costs for Future Waste Management



# Energy from Waste (EfW)

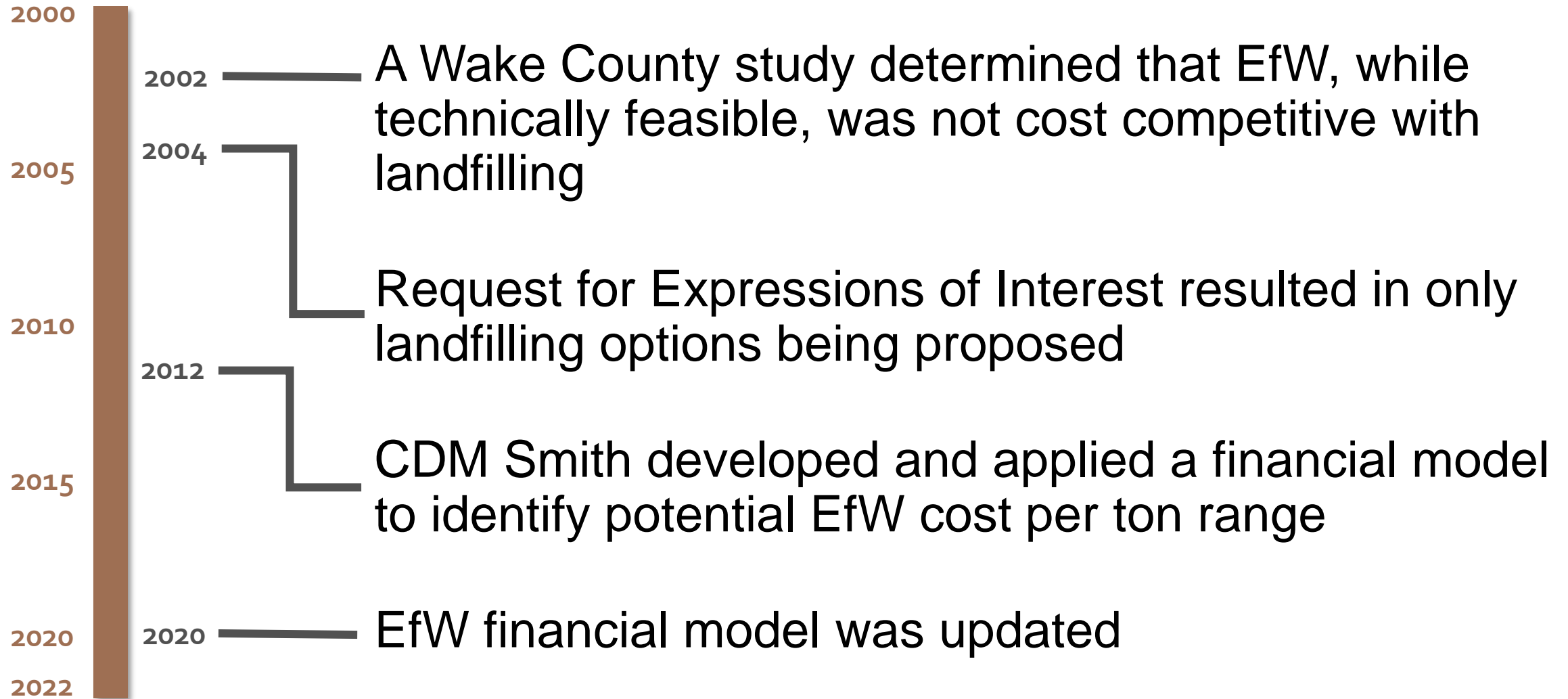


**Figure 1. Hillsborough County, Florida RRF Facility provides 2 MW of Renewable Electricity to 12 MGD AWWTP and other adjacent Public Works**

# Energy from Waste (EfW)

- A variety of methods exist within this process
- Wake County has evaluated some form of this for 20 years

# Previous EfW Evaluations



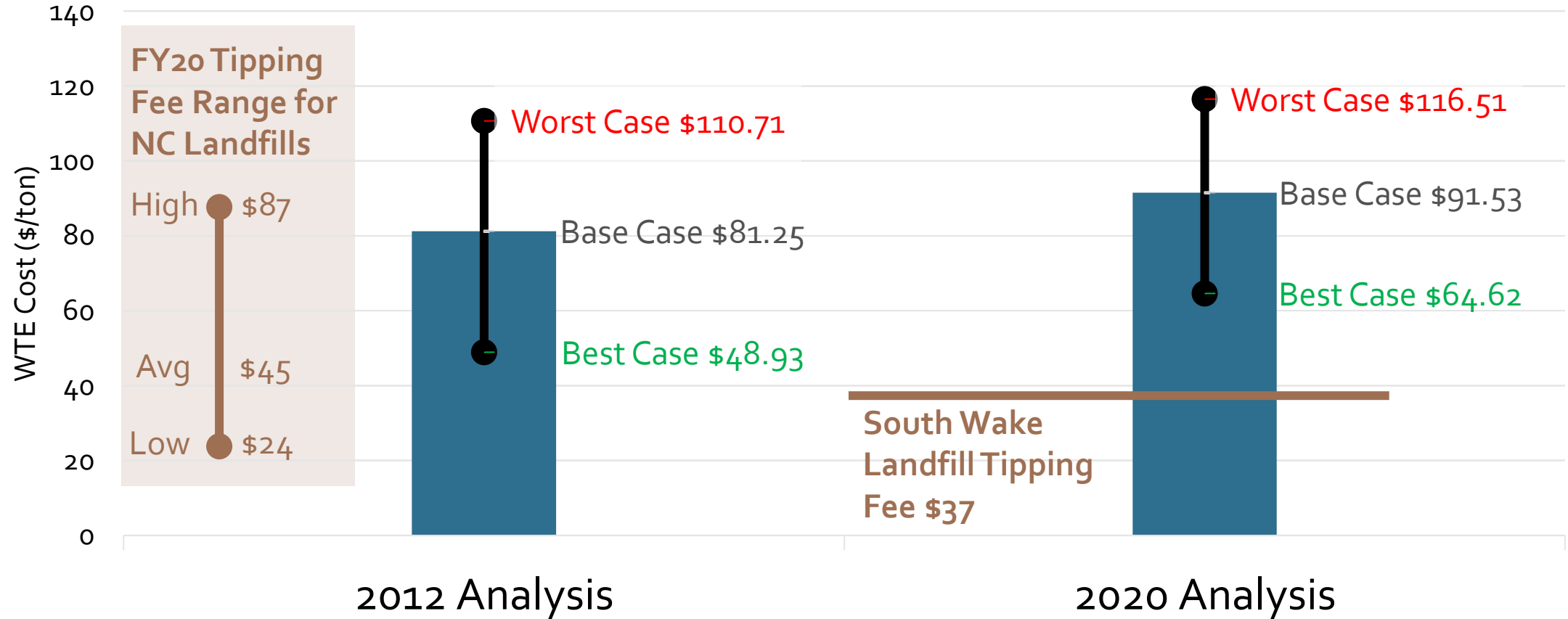
# Financial Feasibility of EfW

- **Model Assumptions**

- 1,800 tons per day (Wake County only waste)
- 592,00 tons per year
- 700 kWh/ton gross generation
- 609 kWh/ton net generation (13% parasitic load)
- 22% ash generation rate

# Financial Feasibility of EfW

## Financial Model Results





# Recent Considerations

- Utilities Goals
  - Electric – carbon neutral
  - Municipality – high reliability
- Increase in fuel prices will make hauling to out-of-county LF less attractive
- EfW emissions have decreased significantly over the last 30 years, as technology and effective controls have been developed and installed

# Other “Emerging” Technologies\*

## Waste to Bio-ethanol INEOS



Courtesy of Biocycle

## Waste to Syngas Tees Valley



Courtesy of Let's Recycle.com

## Waste to Biofuels Enerkem



Courtesy of Plastics Today

*\* These technologies are generally unproven at full scale and/or do not apply to mixed waste.*

# Next Steps

- Actively engage our consultants in this initiative
- Discuss and solidify methodology with the general public
- Discuss and solidify methodology with Triangle Area Governments
- Actively monitor and advocate for beneficial legislative actions as needed

# Phases of Project Development

## Phase 1 (Yrs 1-5)

- **Project Feasibility and Scoping**
  - *Is EfW the best option for the County and region?*
- **Preliminary Design**
  - *What technology and configuration makes the most sense?*
  - *Is it financially feasible?*
- **Permitting and Environmental Evaluation**

## Phase 2 (Yrs 5-7)

- **Procurement**

## Phase 3 (Yrs 7-12)

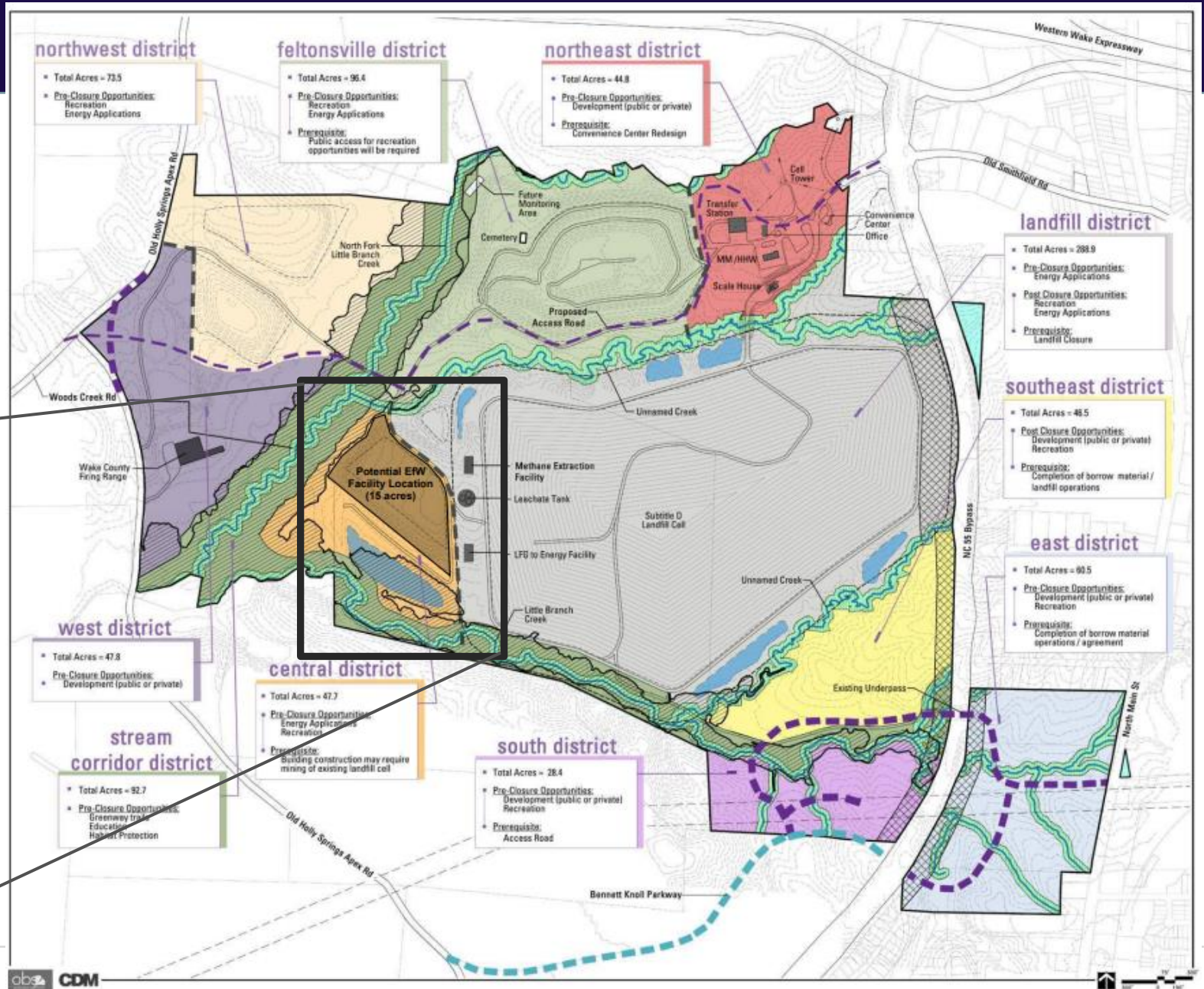
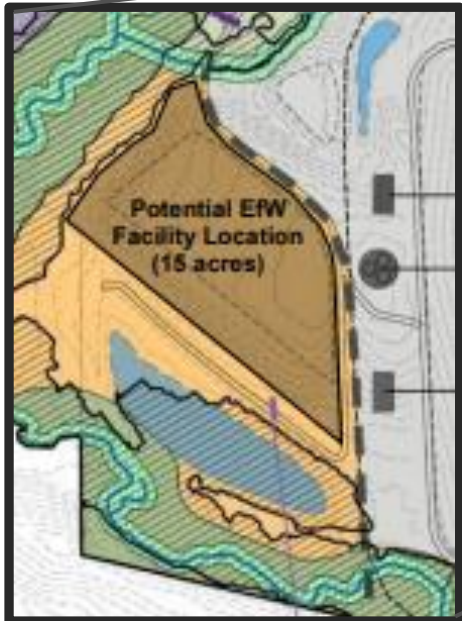
- **Design and Construction**

# Project Development Timeline

Phase	Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Phase 1	<b>Project Feasibility and Scoping</b>	\$ 300,000	\$ 350,000										
	Evaluate disposal options												
	Explore regional partnerships												
	Evaluate energy markets												
	Develop and implement public communication and regulatory strategies												
	Develop preferred option and local/regional partnerships												
	<b>Preliminary Design (assumes EfW pathway)</b>			\$ 1,500,000	\$ 1,500,000								
	Select EfW facility technology and configuration												
	Conduct EfW siting study and acquire property <sup>1</sup>												
	Finance and rate model development												
	Continue to implement public communication and regulatory strategies												
<b>Environmental and Permitting</b>			\$ 750,000	\$ 1,000,000									
Perform environmental evaluation													
Initiate permitting													
Phase 2	<b>Procurement</b>					\$ 750,000	\$ 1,000,000						
	Prepare and Issue Expression of Interest												
	Project financing												
	Negotiate Power Purchase Agreement												
	Issue RFP and select vendor for design, construction, and operations												
Finalize agreement and sell bonds													
Phase 3	<b>Design and Construction</b>							\$ 250,000	\$ 250,000	\$ 500,000	\$ 500,000	\$ 500,000	\$ 300,000
	Conduct review of vendor's detailed design												
	Monitor construction												
	Commissioning and acceptance testing and startup												
	<b>Debt Service Payments</b>									\$49,300,000	\$49,300,000	\$49,300,000	\$49,300,000
	<b>Total</b>	\$ 300,000	\$ 350,000	\$ 2,250,000	\$ 2,500,000	\$ 750,000	\$ 1,000,000	\$ 250,000	\$ 250,000	\$49,800,000	\$49,800,000	\$49,800,000	\$49,600,000

- Useful life – 50 Years

# South Wake Landfill with EFW














# Q & A



# Financial Feasibility of EfW

Model Variable	2012 Analysis (Base Case)	2020 Analysis (Base Case)
Capital Cost	\$250,000 per tpd of capacity	 \$285,00 per tpd of capacity
O&M Fee	\$32.50 per tpd of capacity	 \$37.50 per tpd of capacity
Interest Rate	5%	 4.5%
Financing Term	20 years	 25 years
Sales Price of Electricity	6 cents per kWh	 3 cents per kWh
Sales price of Ferrous Metal	\$150 per ton	 \$100 per ton
Sales price of Non- Ferrous Metal	\$1,000 per ton	 \$500 per ton
Ferrous Metal Recovery Rate	2.0%	 4.0%
Non-ferrous Metal Recovery Rate	0.35%	 0.70%
Sale of Renewable Energy Credits	None	None



# Emissions from EfW Facilities

## Emission Trends, 1990 to 2005

