



Comprehensive Solid Waste Management Plan

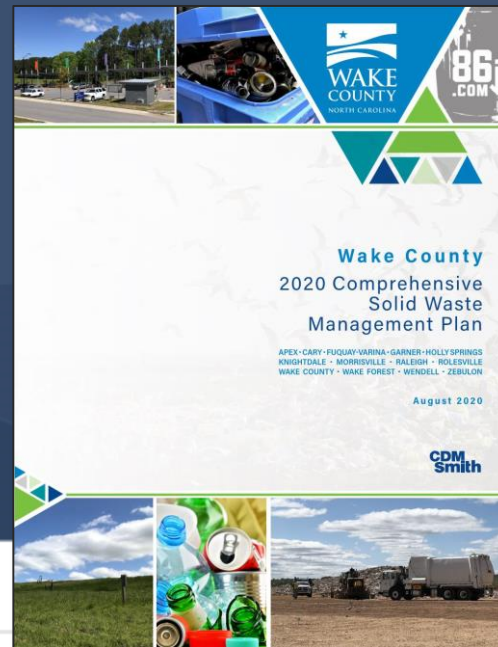
With a focus on SWLF Odor Management & Control

September 14, 2020

BOC Work Session

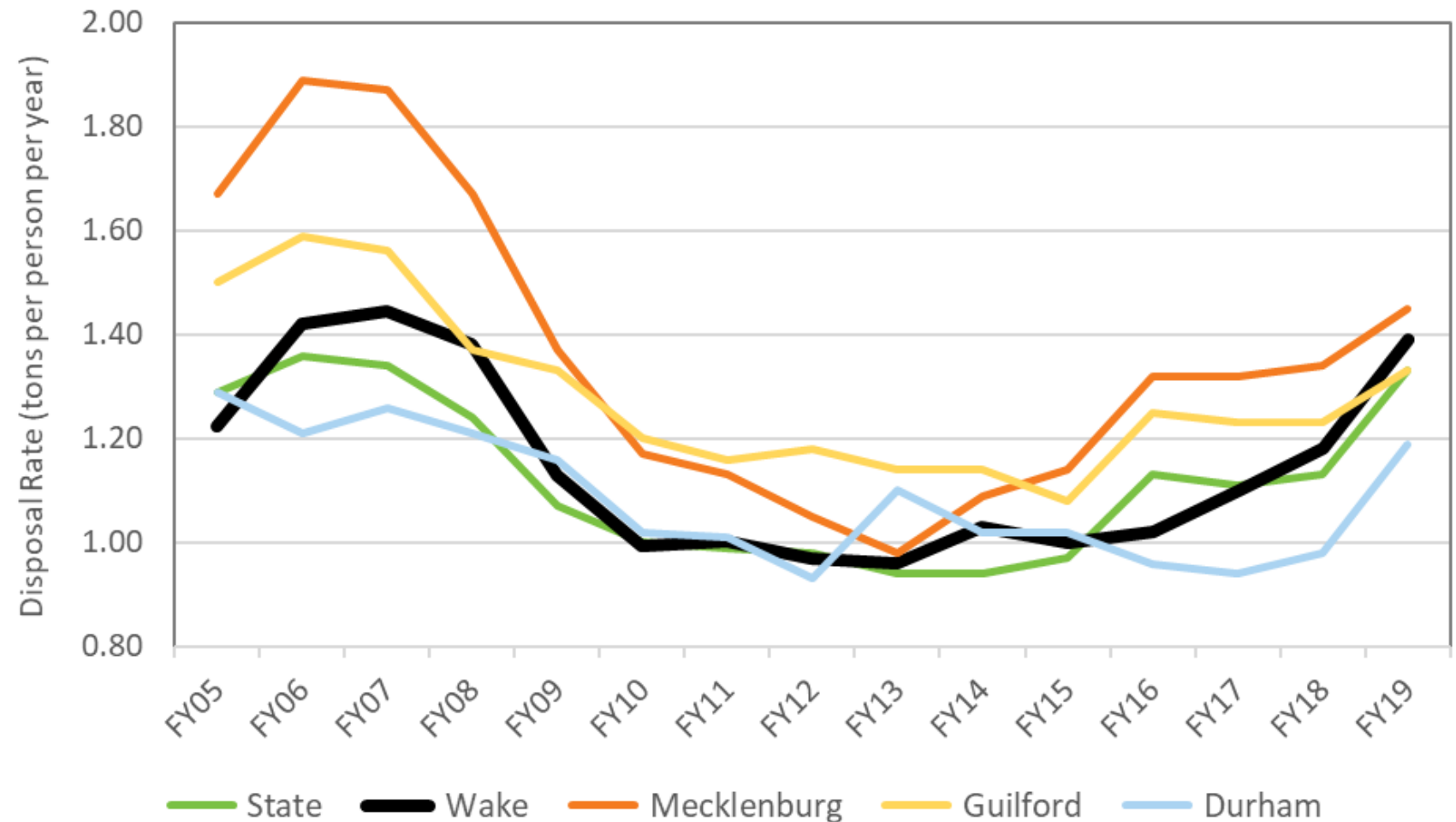
2020 Comprehensive Solid Waste Management Plan

Solid Waste Facts, Figures and Trends



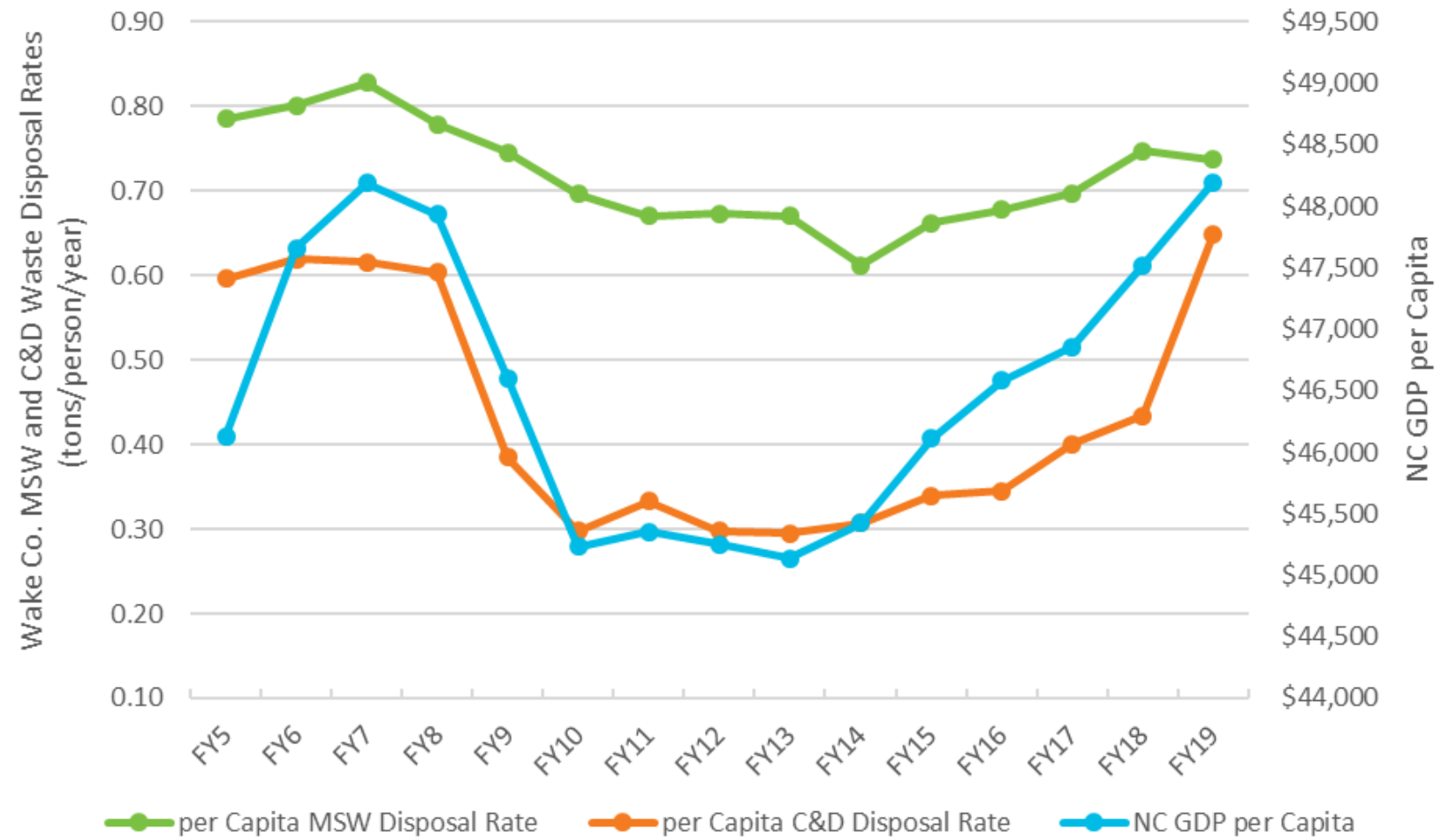
Per Capita Disposal Rate Peer Comparison

Wake County's per capita disposal rate is increasing at a slightly higher rate than peer counties, primarily due to strong construction starts and the generation and disposal of C&D waste.

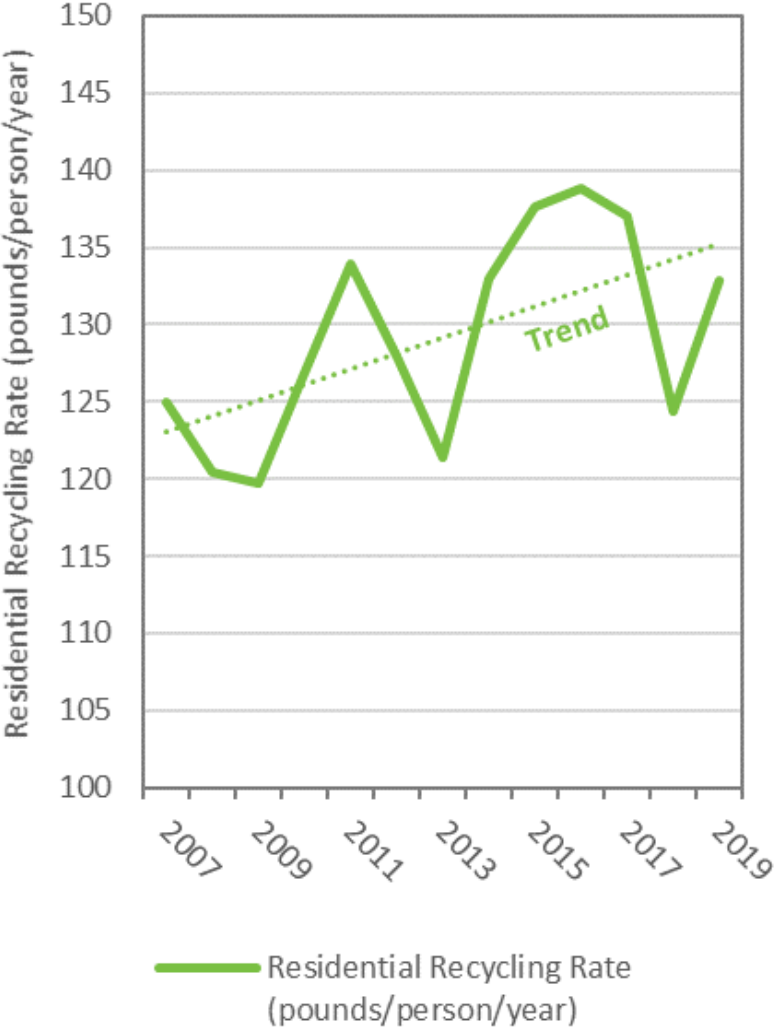


Wake County Per Capita Disposal MSW and C&D Disposal Rate Compared to North Carolina's GDP

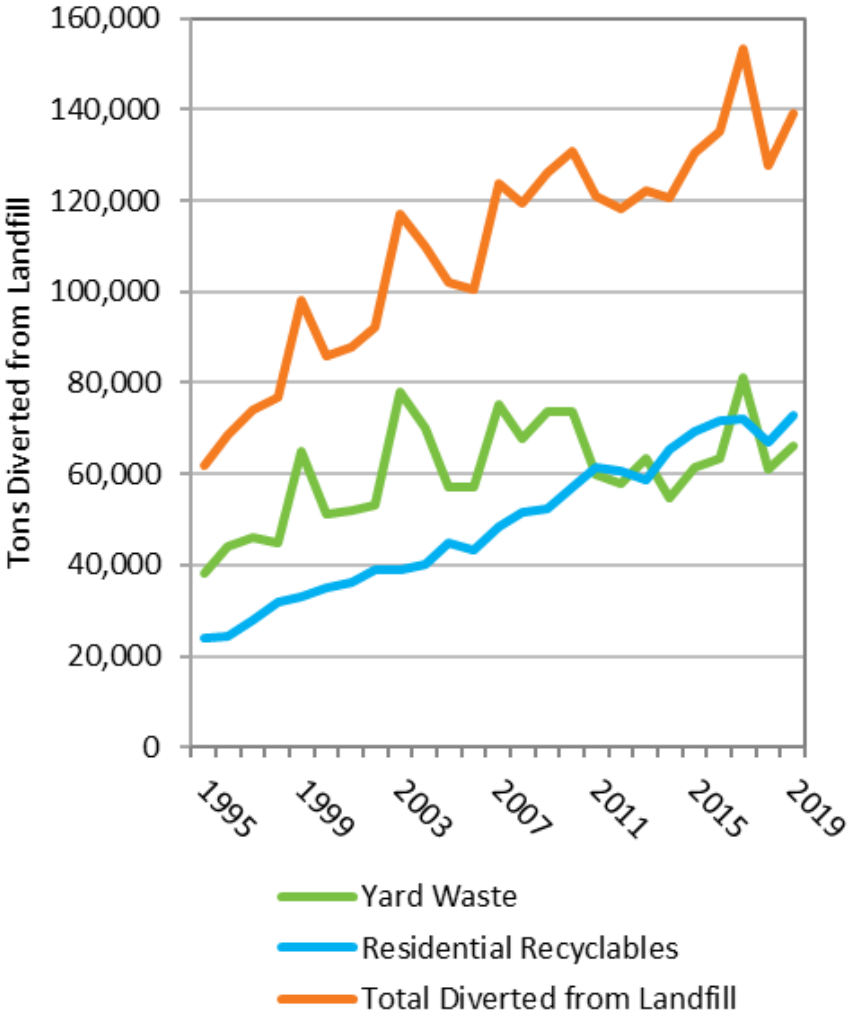
Wake County's per Capita C&D waste disposal rate closely follows North Carolina's per capita Gross Domestic Product (GDP).



Residential Recycling and Yard Waste Trends



On a per capita basis, the residents of Wake County have demonstrated a modest increase in recycling. Each resident of Wake County is recycling about 1 additional pound each year, on average.



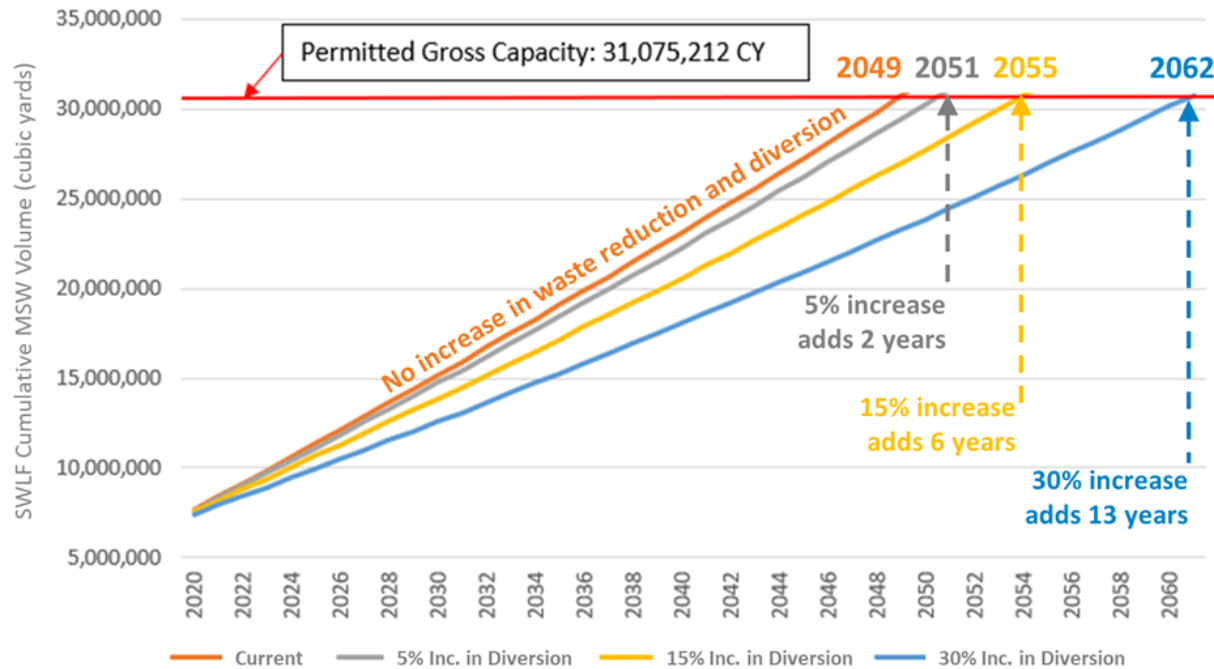
Local Government Recycling Percentages

Collectively, the local governments of Wake County have slightly increased the percentage of waste recycled since 2011

Jurisdiction	2018 Population	Tons of Waste Disposed	Tons Recycled	Pounds Recycled per Person	Percentage of Waste Recycled 2019	Change in Percent from 2011
Apex	52,909	15,177	4,241	160	27.9%	-4%
Cary	162,341	36,460	11,512	142	31.6%	-5%
Fuquay-Varina	26,936	9,369	1,690	125	18.0%	0%
Garner	30,787	8,030	2,825	184	35.2%	11%
Holly Springs	34,071	9,917	2,353	138	23.7%	-5%
Knightdale	15,305	5,383	806	105	15.0%	-4%
Morrisville	26,041	3,731	1,347	103	36.1%	3%
Raleigh	464,435	92,524	27,966	120	30.2%	11%
Rolesville	6,638	3,045	530	160	17.4%	-19%
Wake Forest	37,279	10,865	3,089	166	28.4%	1%
Wendell	7,132	2,667	525	147	19.7%	-2%
Zebulon	4,986	1,783	288	116	16.2%	-5%
Wake County (unincorporated)	227,548	64,697	15,453	136	23.9%	-2%
Overall	1,096,408	263,648	72,625	132	27.5%	3.7%

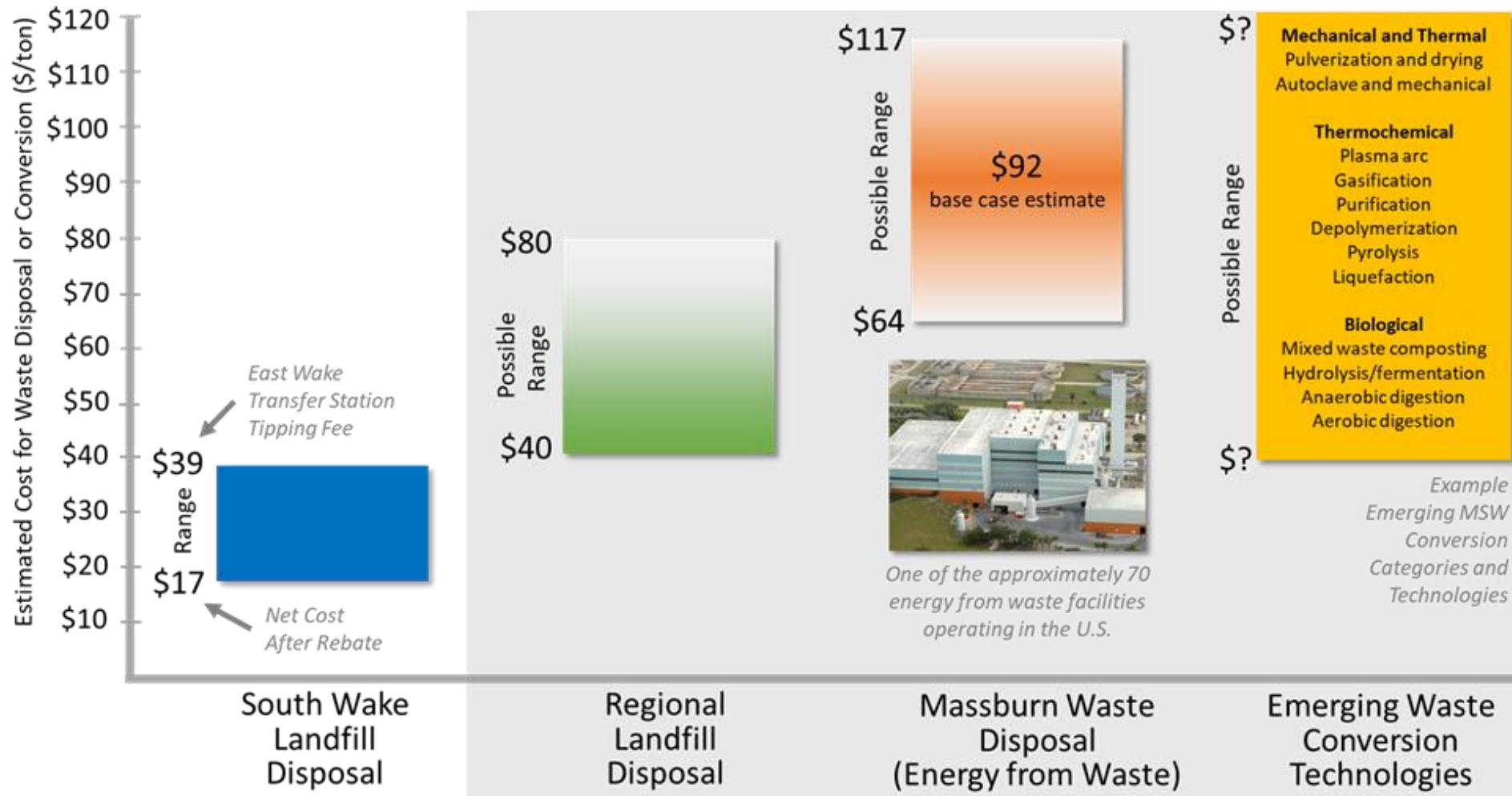
Source: FY19 Solid Waste Management Annual Reports

Impact of Increased Waste Reduction and Diversion Rates on SWLF Life

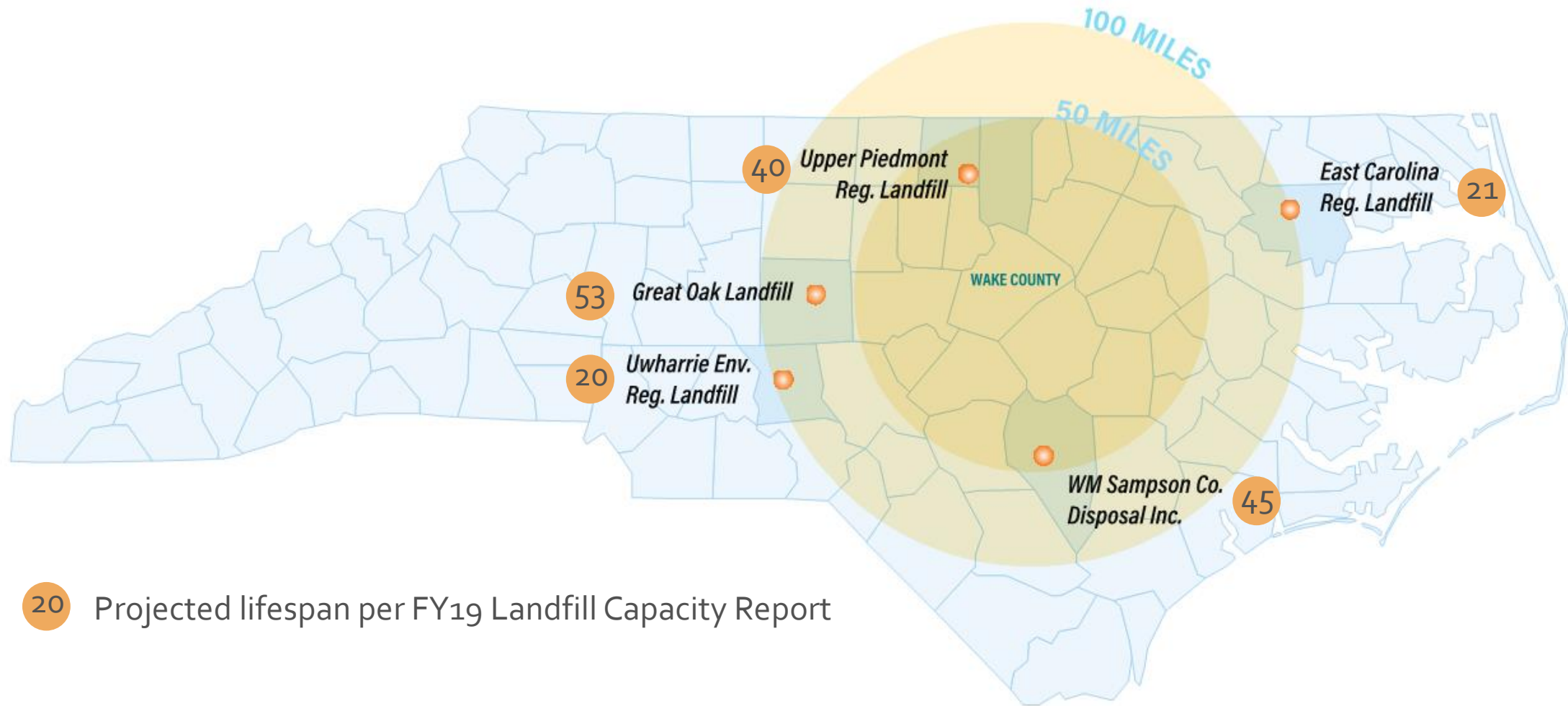


For each year that the landfill is extended, the local governments could collectively expect to save at least \$6M to \$7M annually in avoided disposal cost. The savings are even higher when factoring in the annual rebate that the SWLF Partners receive.

Estimated Cost Range for Wake County's Future Waste Management Options



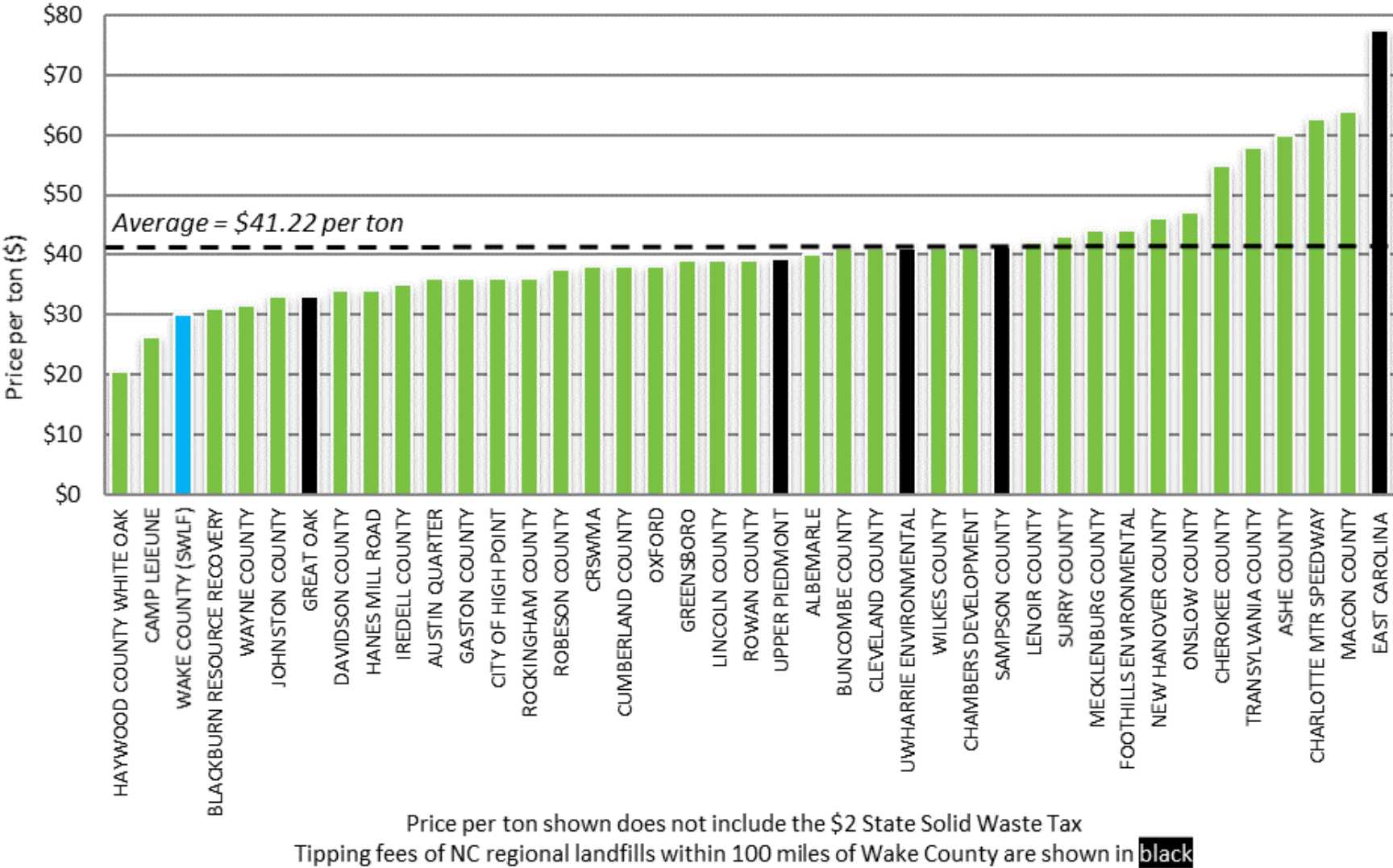
Regional (NC) Landfill Disposal Options within 100 Miles of Wake County



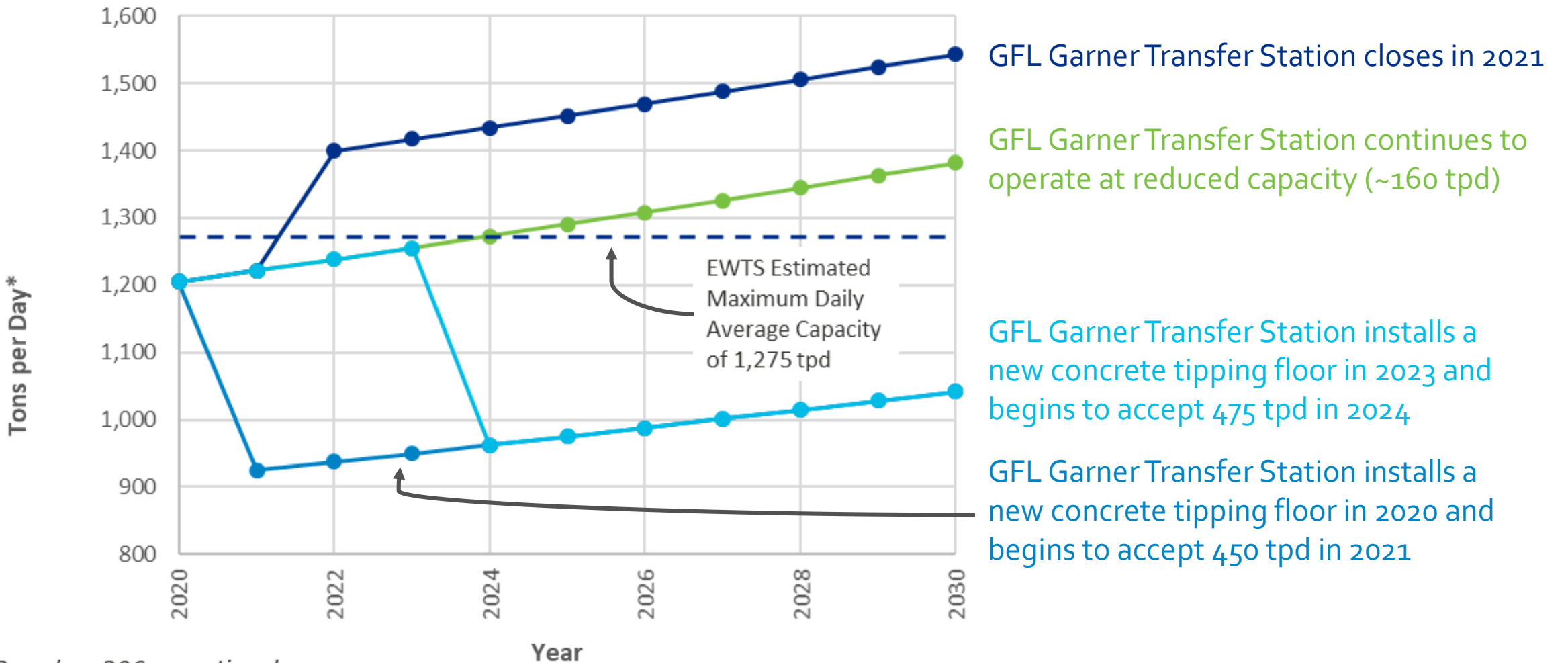
20 Projected lifespan per FY19 Landfill Capacity Report

NC Landfill Tipping Fee Comparison

Disposal costs remain very low in Wake County compared to other areas of the State, driven by a SWLF tipping fee that is among the lowest the State. The SWLF rebate further reduces the cost.








Future Transfer Station Scenarios Evaluated









*Based on 306 operating days per year

Long-Term Waste Management Options

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Continue to Evaluate and Implement Strategies that Extend the Life of the Landfill			
Continue to Consider Energy from Waste as a Potential Method of Waste Disposal Before the South Wake Landfill Begins to Reach Capacity			
Participate in Discussions with other Triangle-area Governments to Investigate Regional Solutions			
Monitor and Track Changes in Factors that Will Affect the Feasibility of Long-Term Waste Management Options			
Agree on the Criteria that are Important to the Selection of the Next Long-Term Waste Management Option			




Recycling and Reuse

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Consider Separate Collection Containers for Glass Bottle and Jars at Drop off Sites			
Promote and/or Incentivize Recycling in Unincorporated Wake County			
Implement Steps to Reducing Contamination			
Improve Household Capture Rates			
Consider Incentives, Grants or Tax Breaks to Lure Companies that Use Recyclable Material			
Consider Incentives, Grants or Tax Breaks to Lure Companies with Emerging Conversion Technologies that Convert Plastics to Fuel, Syngas and Other Useful Outputs			



Recycling and Reuse

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Consider Making Recycling Mandatory for Businesses that Generate Large Amounts of Wastes			
Continue to Explore Opportunities for Cooperative Contracting			
Continue Expansion of the WCPSS Recycling Program			
Consider a C&D Waste Deposit System			



Education and Outreach

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Implement the Near-Term Goals Established by Wake County's Outreach Team			
Provide a Consistent Message Regarding Recycling			
Conduct Coordinated Outreach to Reaffirm the Collective Commitment of the Wake County Local Governments to Keeping Recyclables Out of the Landfill			


Special Wastes

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Implement a Special Tip Fee for Bulk Loads of Mattresses			
Pursue Shredding Mattresses and Select Tires Prior to Disposal at the South Wake Landfill			
Reassess the Tire Management and Disposal Contract			





Illegal Disposal/Litter

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Implement Recommendations from the 2019 86it Campaign Evaluation			
Improve Litter Collection and Monitoring Around the South Wake Landfill Entrance			

Waste Transfer

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Wake County, the City of Raleigh, and other South Wake Landfill Partners should continue to collaborate on the need and the timing of a new transfer station in western Wake County			

Program Costs and Funding

Recommended Actions	In Progress	Near-term (in 5 yrs.)	Long-term or Further Consideration
Work collectively to integrate and coordinate services and programs or collaboratively bid out services to achieve potential economy of scale savings			
Participate in regional planning and decision-making activities to address regional opportunities for reducing cost.			
Consider Adjusting the SWLF Rebate Formula to Incentivize Waste Diversions and Reduction			
Consider Adjusting the South Wake Landfill Rebate Formula to Establish a Fund for Studying and Potentially Developing the Next Long-Term Disposal Option			



South Wake Landfill Odor Management and Control Plan

Topics/Agenda

- Q&A from/after March 9th BOC work session
- Timeline of the landfill
- On-site Landfill Manager Change
- Process of Dirt/Soil cover (w/ tarps) only nightly coverage
- Envirosuite system fully integrated
- Review of Recommendations from Odor Management & Control Plan (report included)
- Piloting Bio-Catalyst (report to be completed by 9/18)
- Conclusions

Updated Questions & Answers from March 9th

- March 9th BOC Meeting Comments and/or Questions with updated responses - summary below:
 - Conversion to dirt/soil with tarps as nightly cover not completed until 7/28 – elimination of Posi-Shell for nightly cover
 - Landfill gas system expansion construction this fall
 - New on-site Landfill Manager with urban landfill experience
 - South Wake Odor Management Plan report developed for review
 - Bio-Catalyst pilot project report developed for review

General Questions & Answers

- Questions raised since March 9th meeting – document included – summary below:
 - How are landfill tipping fees established?
 - How does the system of rebates work for SW Partners?
 - Can the SLWF Municipal Partnership ILA be dissolved and if so, what are the impacts?
 - Enforcement of contract provisions?
 - What contracts/ILAs are there between the County and Holly Springs regarding the landfill?

Can the SWLF Close Early?

- Current projections for landfill to remain open until 2040+
- Municipalities in Wake County benefit from significantly reduced costs by having the SWLF (2 to 3 times more costly to ship waste out of county)
- ILA would have to be dissolved (all parties must agree) – unlikely due to cost impacts to all Partners

South Wake Landfill Timeline

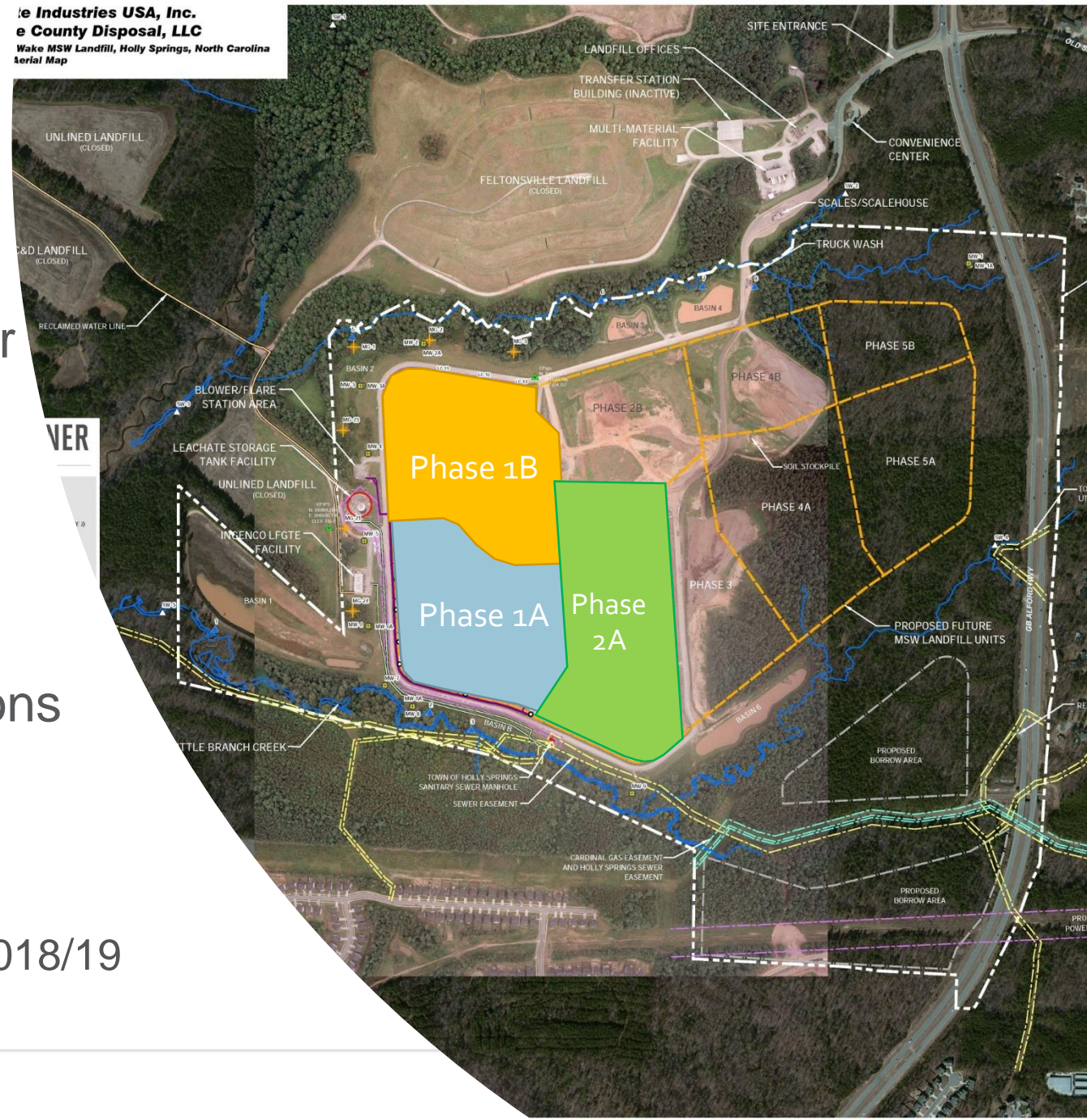
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- 1990 – Land purchased for future landfill
 - 1994 – ILA with Holly Springs approving landfill
 - 1999 – Initial DEQ Permit to construct
 - 2001 – Finalized DEQ Permit to construct SWLF
 - 2005 – ILA with municipal partners for use of SWLF
 - 2006 – Contract established with Waste Industries (GFL)
 - 2007 – Construction of SWLF started
 - 2008 – SWLF opened in February

25-year design life (2033) at 450,000 tons/year
(with certain assumptions for density and cover ratio)

South Wake Landfill Timeline

- 2008/2013 – 400,000 tons/year (recession related)
- 2013/2019 – grows to 500,000 tons/year
- 2021 – Projected at 520,000 tons
 - Total landfill size is 179 acres
 - 75 acres are in operation
 - 20 acres permanently closed in 2018/19

Waste Industries USA, Inc.
Wake County Disposal, LLC
Wake MSW Landfill, Holly Springs, North Carolina
Aerial Map



South Wake Landfill Manager Transition

- On August 1st, 2020, GFL Introduced a new General Manager for South Wake Landfill
- George Metcalf Introduction and Background
 - Joined Waste Industries/GFL in 2014 as a General Manager
 - Fresno State University Alumni – Bachelors Degree in Agricultural Science
 - George has 18+ years of experience managing Landfills, Transfer Stations and Landfill construction
 - From 2002-2014 George managed six waste facilities (three landfills/three transfer stations) averaging over 10,000 tons of waste daily
 - Prior to his relocation to South Wake, George managed several landfills in the State of Tennessee for GFL

Conversion to Dirt/Soil Cover (w/ tarps)

Significant Equipment acquired since March of 2020

GFL South Wake Landfill - Critical Assets			
Asset Type	Asset Quantity March 2020	Asset Quantity August 2020	+/-
Excavator	1	2	+1
Dirt/Rock Haul Trucks	2	4	+2
Waste Handling Dozers	2	3	+1
Grading Dozers	2	3	+1

March of 2020 original asset purchase commitment value = \$365,000

March of 2020 through August of 2020 assets purchased value = \$2.1 million

GFL acquired assets – Photos



Conversion to Dirt/Soil Cover (w/ tarps)

- Since 7/28/20 GFL has achieved closure at night with the application of dirt/soil and tarps only
- From 2008 through 7/28/20 GFL utilized other State compliant forms of Alternate Daily Cover
 - Posi Shell an approved form of ADC was the primary material used with the addition of the County's Latex Paint
 - In late 2019 GFL conducted a pilot of another form of ADC called Rusmar foam which did not meet our expectations

Conversion to Dirt/Soil Cover (w/ tarps)

- GFL has adjusted operational practices to significantly reduce the waste placement area during operating hours
 - The area of exposed waste must be managed closely to ensure a timely closure with dirt/soil and tarps
- A few examples demonstrating closure with posi-shell versus with dirt/soil and tarps have been provided in the next few slides

May 8, 2020 at 4:58:02 PM
6512 Old Smithfield Rd
Apex NC 27539
United States

Prior to converting to dirt/soil (with
tarps), waste many times was covered
with Posi-shell primarily



Prior to converting to dirt/soil (with tarps), waste many times was covered with Posi-shell primarily

Mar 16, 2020 at 6:25:36 PM
6512 Old Smithfield Rd
Apex NC 27539
United States



33-40 26.717 N -78-50 57.902 W
Old Smithfield Road
Apex
Wake County
North Carolina

Upon converting to dirt/soil (with
tarps), no waste can be seen



6512 Old Smithfield Rd
Apex NC 27539
United States
Aug 29, 2020 at 6:35:36 PM

Upon converting to dirt/soil (with
tarps), no waste can be seen



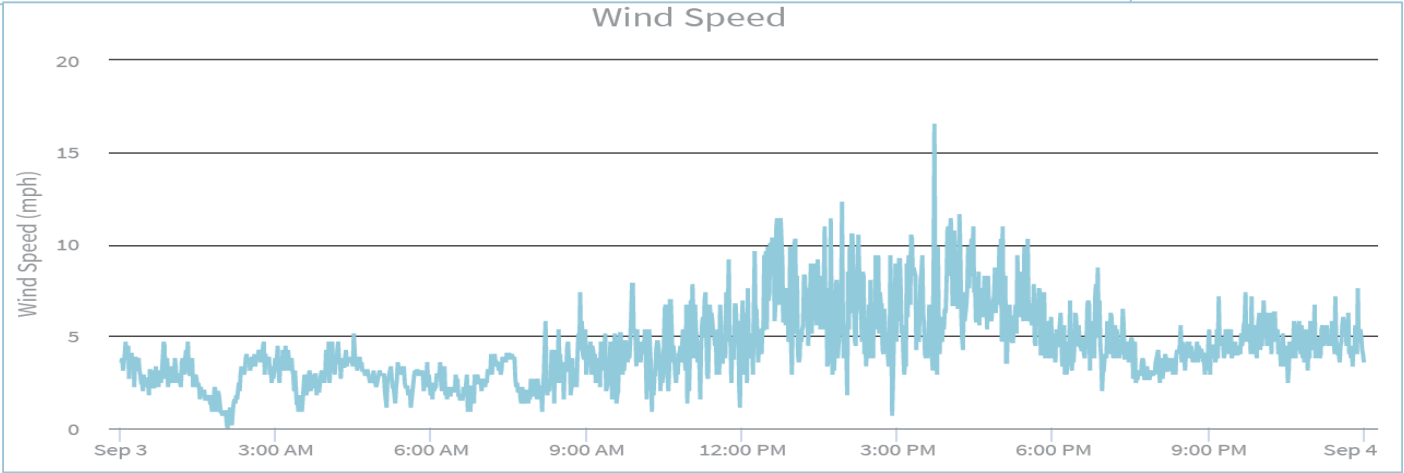
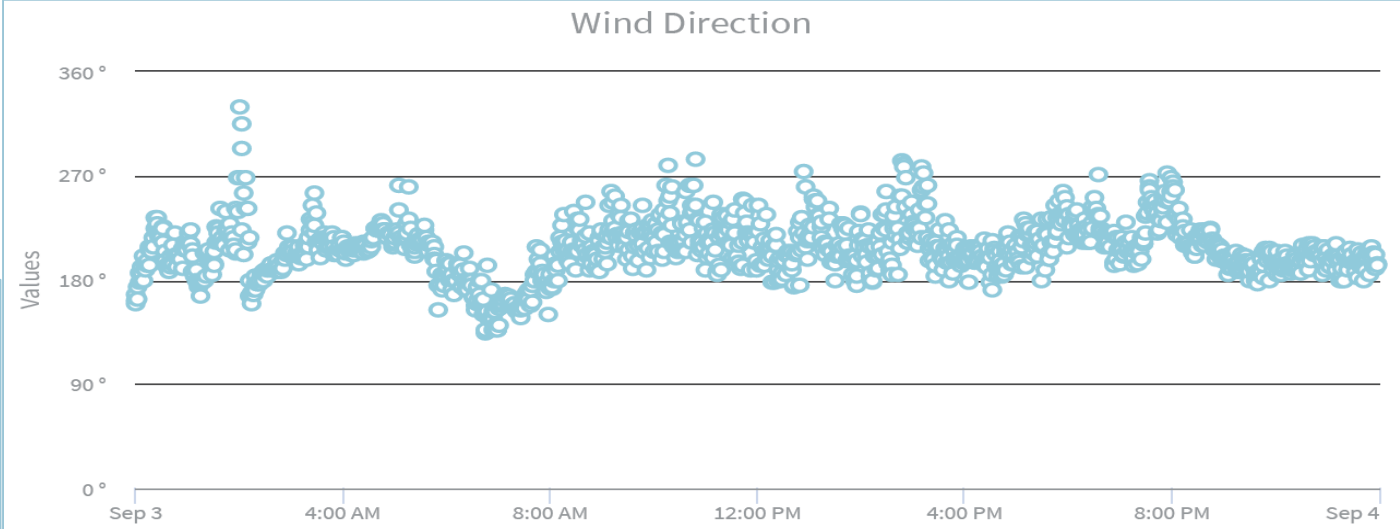
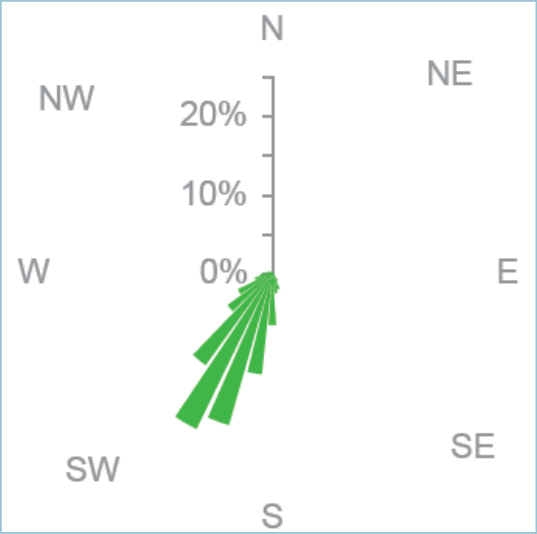
Impacts of Eliminating Posi-Shell

- County collects over 1 million lbs. of latex paint each year
- Until 2017, almost all latex paint collected was used in Posi-Shell and considered a re-use/recycling effort by DEQ
- As of July 2020, all latex paint collected will be disposed of (hardened via mixing with sawdust, etc.) in order to help with odor control at SWLF at significant additional cost

Envirosuite Software

- eNoses installed late 2019 (3 on-site)
- New weather station (data reported every minute) installed in Feb. 2020
- Odor Reporting tool implemented March 6, 2020
- Provides both historic and predictive modeling of wind speed/direction with topographic information applied
- Graphically presented data

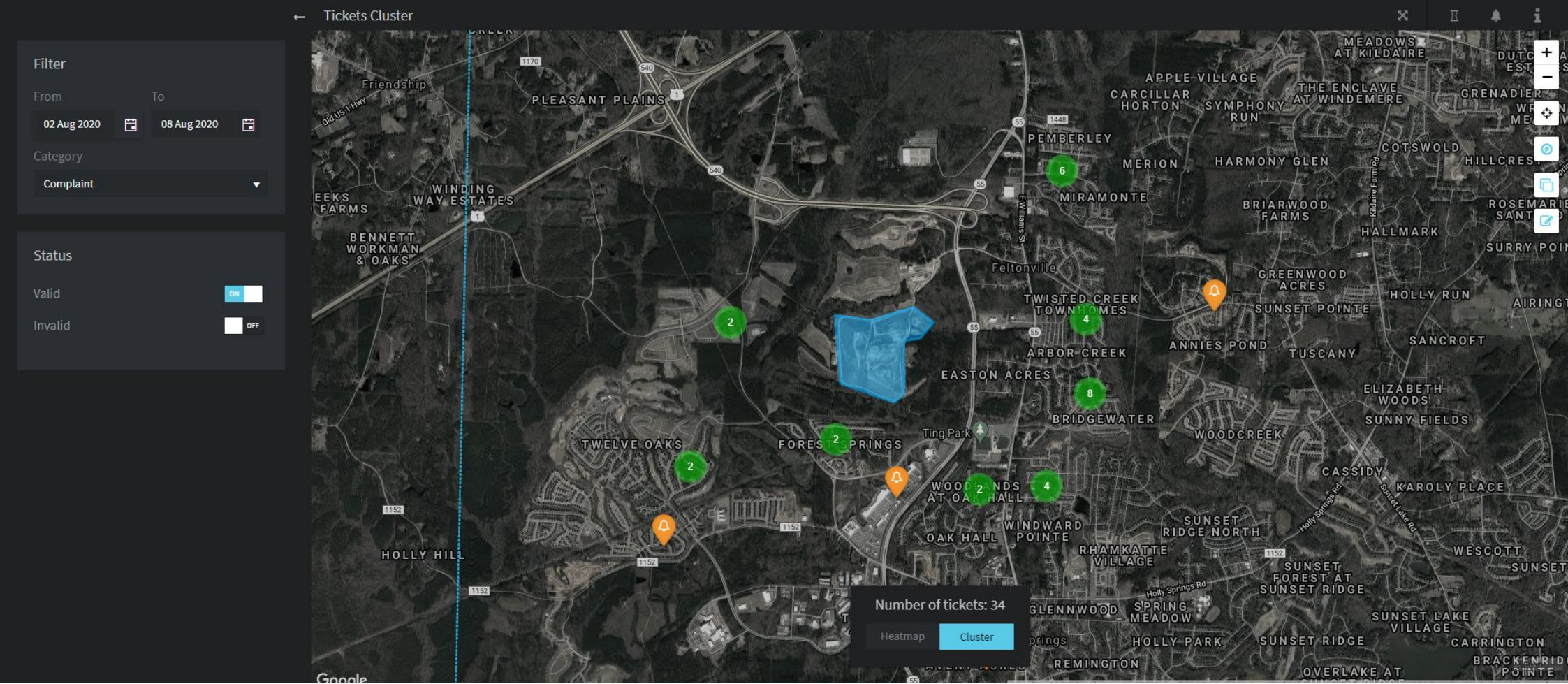
Weather Data Reporting



Predictive Weather Tools



Odor Reporting Tool



Odor Report Data

Week of (Sunday - Saturday)	No. of Odor Reports	Comments (as needed)
July 5th	224	Equipment issues
July 12th	237	Working to fix prior issues with size of working face
July 19th	69	Reductions in work face size
July 26th	62	Nearing implementation of dirt/soil cover
August 2nd	34	Dirt/soil cover established
August 9 th	124	Increases for the weeks of the 9 th and 16 th appear to be attributable to ongoing Phase 2B cell construction and tie-ins to old landfill cell. Efforts being made to reduce going forward.
August 16 th	279	
August 23 rd	69	
August 30 th	82	

Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Section 3.1 - LFG Collection & Control System	
<ul style="list-style-type: none">• Increase comprehensive infrastructure• Increase frequency of assessing system efficiency and routine O&M• Accelerate LFG system installation in conjunction with waste placement operations prior to regulatory obligations	<ul style="list-style-type: none">• Assess potential to install horizontal collectors, slope collectors, sacrificial wells, shallow direct-push wells, vertical well target piles, caisson bottom-up wells, etc. for LFG extraction• Assess potential to install near-surface collectors and additional bottom-of-cell LFG infrastructure

Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Section 3.2 - Odor Neutralizing System	
<ul style="list-style-type: none"> Expand and/or relocate vapor-phase OCM Increase/implement direct-application products (e.g., NWC SWAT, Odor No More, Bio-Organic Catalyst) OdorBoss odor control equipment to enhance odor neutralizing system 	<ul style="list-style-type: none"> Moving vapor-phase OCM with start of waste placement in Phase 2B or 3 Consider separation and/or treatment of waste streams at transfer stations <div> <ul style="list-style-type: none"> Adding odor masking/neutralizing agent “misters” to certain equipment Applying odor neutralizing agent to select incoming waste collection/transfer vehicles </div>

Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Section 3.3 - Working Face Operations	
	<ul style="list-style-type: none"> • Containerizing odorous materials before delivery to working face • Increasing air flow and dispersion
Section 3.4 - Cover Materials	
<ul style="list-style-type: none"> • Working face to a minimum size and the exclusive use of dirt and tarps • Continued pilot study demonstration of ADC products and protocols • Accelerated deployment of final cover 	<ul style="list-style-type: none"> • Installing additional final cap ahead of schedule • Installing interim cover systems such as exposed geomembrane cover • Use of hybrid final cover systems

Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Section 3.5 - Waste Receipt	
<ul style="list-style-type: none"> Prohibition of WWTP sludge and biosolids Curtailment of C&D materials 	<ul style="list-style-type: none"> Identification and curtailment of odorous wastes and restricting hours for this material to be delivered Regular odor assessment of incoming waste loads
Section 3.6 - Leachate	
<ul style="list-style-type: none"> Covered leachate storage tank with aeration 	<ul style="list-style-type: none"> Leachate minimization and prevention of infiltration
Section 3.7 - Cell Construction	
<ul style="list-style-type: none"> Procedures to limit LFG emissions during new cell construction Minimize the impact from onsite projects 	

Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Section 4 - Monitoring & Remediation	
<ul style="list-style-type: none"> Standard LFG monitoring Off-site odor monitoring in response to odor reports SEM on an as-needed basis Envirosuite Ambient eNose Odor Sensors and associated dispersion models Cover integrity monitoring of final closure cap 	<ul style="list-style-type: none"> Analyze samples of LFG from LFG collection and control system Olfactory odor evaluation at LFG well pipe penetrations <div> <ul style="list-style-type: none"> Regular voluntary SEM events at the working face (use of Drone technology?) Ambient air sampling at off-site locations Cover integrity monitoring on non-closed areas of landfill </div>

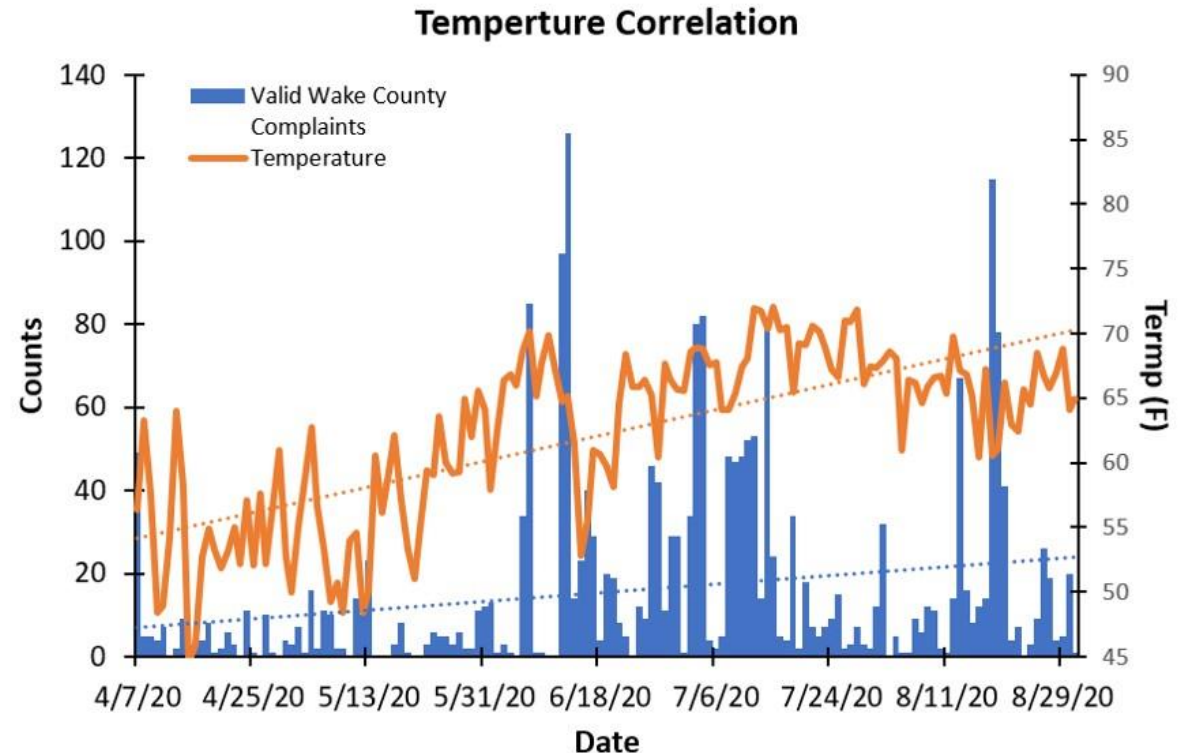
Odor Mitigation Strategies

Actionable Solutions Summary

Current Strategies (with Planned Improvements)	New Strategies Under Development
Miscellaneous	
<ul style="list-style-type: none"> Receiving and responding to odor reports from the public Community outreach and education – including tours, Nextdoor notifications, and meetings of the South Wake Landfill Citizens Committee 	<ul style="list-style-type: none"> Annual evaluation and update of Odor Management and Control Plan
	<ul style="list-style-type: none"> Hiring staff to oversee odor-related activities Expanded public notification of landfill activities using a 3rd party PR or communication group
	<ul style="list-style-type: none"> Presentations at HOA meetings Collecting stormwater from active filling area to divert infiltration

Bio-Catalyst Pilot Project

- Eco-Cat Product
 - *“The product increases dissolved oxygen (DO) and reduces odors and most importantly, will shift the biological conditions that produce odors”.*
- Initiated on April 6, 2020 and concluded on August 31st
- Over 2300 observations performed.
- Numerous variables to consider
- Operations, Atmospheric, and Seasonality are key factors
- Report is still under development – to be completed by 9/18/20



Conclusions

- Landfill (County & GFL) have implemented multiple proactive odor abatement initiatives under 7 primary categories
 - OMCP identifies approximately 30 distinct actionable solutions (improvements of current strategies or new strategies) within the 7 categories
- Landfill (County & GFL) have initiated multiple monitoring programs, air dispersion modeling, odor reporting tools or community outreach protocols.
 - OMCP identifies approximately 20 distinct actionable solutions (current programs or new programs)

Conclusions

- Landfill has invested millions in infrastructure, equipment, technology platforms and other resources related specifically to odor management and control
- Efforts are still underway to continually improve – immediate next steps:
 - LFG system expansion
 - Hiring an Outreach Coordinator to provide better communication
 - Expansion of surface emissions monitoring (SEM) into Phase 2A and potential use of drone technology for additional SEM efforts
 - Continued piloting of various odor masking &/or neutralizing products
 - Full evaluation of interim cover systems for areas not in regular use
 - Incorporate “bottom-of-cell” LFG system infrastructure in Phase 2B



Questions and Discussion