To: Mayor and City Council Members
From: Environmental Advisory Board
Date: 11/14/2019
Re: Environmental Advisory Board Annual Report FY19

It is with great pleasure that we submit this summary of the work that the Environmental Advisory Board (EAB) has accomplished over the past year.

Our FY2019 work plan included five overarching objectives that have guided our monthly discussions and actions. The following report provides a summary of our work in these areas.

Highlights:

1. Hosted the 12th Annual Environmental Awards Celebration
2. Reviewed and evaluated programs, conducted additional research, participated in facility tours and prepared a report on recycling programs for Raleigh (see attached report)
3. Continued to support pollinator habitat through our Raleigh Bee City USA membership
4. Participated in activities and learned about Raleigh's Greenhouse Gas emissions and plans for the upcoming Community-wide Climate Action Plan (CCAP)
5. Participated in the GardenCorps project in support of ongoing urban agriculture and healthy living initiatives

1. Hosted the 12th Annual Environmental Awards Celebration

In April 2019, the EAB hosted another successful Environmental Awards ceremony, at Market Hall. This was the 12th celebration of the environment with impressive winners that helped to showcase the innovative people and organizations that tirelessly work to improve the environment in Raleigh. We continue to attract new individuals and businesses each year who come to support their colleagues and friends who receive awards. The Board would like to express our gratitude to the City staff who organize the Awards Ceremony and ensure that it is always a successful event that reflects well on the City of Raleigh. The EAB was one of the few boards that has raised funds for our annual event. The EAB requests funding from the City Council to cover costs for future events starting in FY21. Costs are around $10,000 for the annual event.

The 2019 winners included:

- The Highland Community Victory Garden at Highland United Methodist Church won the Raleigh Environmental Stewardship Award (RESA),

- NC State University's Wolf Pack-n-Give won the Waste/Recycling/ Compost Award
- Highland Community Victory Garden, Inter-Faith Food Shuttle's Urban Agriculture Program and the Children's Garden at Beginning and Beyond Child Development Center all won Urban Agriculture Awards, and
- Reborn Clothing Company earned a Jury's Choice Award for turning waste diversion into a business.

In addition, special awards were presented to videographers, artists, and designers whose work focused on water protection, reusable water bottles and the repurposing of waste materials.

The **Capture It! Stormwater Arts Contest** gave the following awards:

- Leigh Bazemore's animated video "Keep Our Water Clean," which demonstrates simple ways to keep pollution — animal waste, detergents, and trash — out of our local water ways won the video competition; and
- Ian Setia used acrylic paint and watercolor to create the "Water is Life" storm drain art cover featuring an American Shad fish to represent all living things that need water.

Raleigh Water (formerly Raleigh Public Utilities Department) sponsored a **Refill Raleigh Design Competition** focused on the use of reusable water bottles. The winners of the Refill Competition were:

- Kailyn Becker's poster "There is Still Time" helped illustrate how single-use bottles pollute the environment, while reusable water bottles help protect the environment; and,
- Austin Buckner's decal design, "It's That Simple" encourages reusable water bottles in all sorts of activities and helps point out where Raleigh tap water can be found.

The **Trashion Design Competition** recognized clothing made out of materials that were destined for the landfill. The goal is to change the way we think about waste and creatively reuse what might otherwise be thrown away. Trashion winners were:

- Carly Palmer created an entire clothing line for men and women — "Magic Carpet" — out of carpet samples pitched in a dumpster; and,
- Caroline Hallow's "Shipping and Handling," a tea-length dress cut from Amazon Prime packaging and accented with a bubble wrap petticoat and hand-punched aluminum can sequins.

2. **Reviewed and evaluated programs, conducted additional research, participated in facility tours and prepared the attached Recycling Report for the City Council as related to the EAB's Work Plan item #1:** Review and evaluate recycling programs with a focus on organics recycling and the specific challenges related to other recycling streams.

The research and evaluation for this report included three offsite meetings and included tours of the Wilders Grove Solid Waste Services Center, the Yard Waste Center, and the Sonoco Recycling Center. A subcommittee of Linda Watson, Justin Senkbeil, and Ben Bobay was created to prepare a report for the entire Environmental Advisory Boards consideration. The

report that the entire board is bringing forward to you identified a number of overarching issues in recycling. The five major challenges identified associated with the recycling program(s) are;

a. Contamination,
b. Recycling markets,
c. Storage space for yard waste,
d. Appropriate City approach to food waste, and
e. Future operational considerations.

In addition to the challenges, the report provided some recommendations for the city to consider. A complete copy of the report is attached to the Annual Report for your review.

3. **Continued to support the pollinator habitat in our area as a BeeCity USA community.**

The Environmental Advisory Board continues to support this initiative in partnership with the Parks, Recreation and Greenway Advisory Board. An annual report was submitted to the BeeCity USA organization highlighting the many pollinator habitat and education and outreach initiatives for our region. This past year, BeeCity USA became an initiative of the Xerces Society which is a science-based nonprofit organization that protects wildlife through the conservation of invertebrates and their habitats. The board heard from Bee Mow Aware and Apiopolis on the value of inter-planting grassy areas with clover to provide food for bees and other pollinators. We advised both organizations to contact the Parks and Recreation Advisory Board for appropriate action.

Pollinator Week was celebrated June 17-23, and numerous community groups hosted pollinator friendly events. In October, the Raleigh Convention Center and Duke Energy Center for the Performing Arts added beehives to their gardens to support of pollinators. Both venues are proud to keep Raleigh "buzzing" with hundreds of thousands of visitors each year and provides another very visible place to continue to educate the community and Raleigh visitors about the importance of pollinator habitat. The EAB also participated in a tour from the Raleigh Parks, Recreation and Cultural Resources greenhouse staff, where we learned about the various plants and city initiatives that help support pollinator habitat and species.

The Housing and Neighborhoods Department, through their Neighborhood Improvement Funds, will continue to offer funding for small grants, which may be used for community gardens, urban agriculture and pollinator habitats. The Office of Sustainability partnered with Housing and Neighborhoods to put together educational materials to help guide potential applicants on pollinator and urban agriculture friendly projects.

4. **Participated in activities and learned about Raleigh's Greenhouse Gas emissions and plans for the upcoming Community-wide Climate Action Plan (CCAP)**;

The EAB focused on many initiatives relating to reducing greenhouse gas (GHG) emissions in Raleigh through their annual work plan. The Board received an update from the Development Services Department on their operations, as well as initiatives supporting the environment. In particular, the EAB learned about Development Services' planned "Paperless Review" process that will greatly cut down on vehicle trips downtown by both customers and staff, as well as

create several other efficiencies including time savings, redirecting resources, and freeing up valuable facilities office space from previously stored paper review files. The EAB learned about alternative modes of transportation, specifically the roll out of the City's new electric scooter program. The board is interested in continuing to learn and evaluate the greenhouse gas emissions reduction value of alternative modes of transportation throughout the City. The EAB also received information about Raleigh's GHG emissions, and background on the Community-wide Climate Action Plan (CCAP) project. The EAB participated in games and activities that contributed to the strategies and actions that are being evaluated as part of the CCAP project development. Members of the EAB are participating on the Technical Advisory team, the Equity Advisors, and have given feedback on hands on activities like the "Game of Extremes" facilitation. As mentioned above, the EAB's attached Recycling Report also provides information about how important the role of waste reduction and recycling plays in reducing GHG emissions.

The board learned about the US Fourth National Climate Assessment, which noted that the impacts of climate change are already being felt in communities across the country. Raleigh is one of only five large cities nationwide which are exceeding the national average for all aspects of heat waves (timing, frequency, intensity, and duration). The report calls for cities to adapt and mitigate these risks through building codes and zoning, green purchasing, energy conservation measures, supporting tree canopies, and building greenways. These techniques can help residents cope with extreme temperatures and improve stormwater management. They also enhance air quality, recreational opportunities, and property values. One of the board's members, Dr. Aranzazu Lascurain, was a co-author of the report's Southeast regional chapter.

The board commends the City Council for adopting a city-wide goal to reduce greenhouse gas emissions by 80% by 2050. However, we as a board, understand and the urgency of the global climate crisis and will continue to seek information and understanding of what taking the city to net zero emissions would entail.

Equity is being incorporated into the climate work and the Board was introduced to the North Carolina Department of Environmental Quality's new Environmental Justice Mapping Tool. The Board will continue to be involved in climate action work in FY20.

5. **Participated in the GardenCorps project in support of ongoing urban agriculture and healthy living initiatives.**

As Council may remember, the EAB has long been a supporter of urban agriculture and healthy food initiatives in Raleigh and has had items related to this on our past work plans where we provided Council with recommendations. City Council later adopted food and urban agriculture initiatives into their Strategic Plan as part of the Safe, Vibrant Healthy Communities key focus area to align with EAB's recommendations and the recently adopted Wake County Food Security Plan. One of the outcomes of this work is the Garden Corps program, which is a large partnership developed over the past couple years between several city departments and outside partners. This program was first piloted after being identified as a key priority in the Wake County Food Security Plan and adopted as a Strategic Plan action item.

This year, the Board was fortunate to visit the Food Bank of Central and Eastern North Carolina to participate in one of the GardenCorps classes. This project is a collaboration between the Food Bank, the North Carolina Extension's - Wake County Master Gardeners, Wake County government, the City of Raleigh's Active Adults and Teen Outreach Program (TOPs) programs. The program takes place at the community garden at the Food Bank under the direction of the Master Gardeners teaching a curriculum to youth with active adult partners about food and the food system. There are also classes in the teaching kitchen about food safety and preparation and a hands-on practicum at the graduation event, where Garden Corps members can invite their parents to participate with them.

The EAB is regularly looking for ways to improve the environmental health of Raleigh and we hope to continue to advise the Council in its efforts to make Raleigh a leader in environmental stewardship. We hope that the Council will continue to consider the EAB's input and abilities and we welcome hearing from the Council, should there be opportunities for our input in the future.

Lastly, we sincerely appreciate the leadership and support of the City Council and look forward to serving the City of Raleigh in the coming year.

Sincerely,

Graham Smith, Chair
Brian Starkey, Vice-Chair
Ben Bobay
Jamie Cole
Anya Gordon
Aranzazu Lascurain
Justin Senkbeil
Coleen Sullins
Linda Watson

Attachment A: Recycling Report and Recommendations of the Environmental Advisory Board

Attachment A

Raleigh

MEMO

TO: Mayor and City Council

FROM: Graham Smith, Chair, Environmental Advisory Board

DATE: November 14, 2019

SUBJECT: **Re: Work Plan Item #1 Recycling Report**

At the December 4, 2018 City Council meeting, the FY19 Work Plan for the Environmental Advisory Board (EAB) was approved. The EAB began 2019 by working on the first item in the Work Plan as noted below:

Review and evaluate recycling programs with a focus on organics recycling and the specific challenges related to other recycling streams.
Note- Organics Recycling - The Solid Waste Reduction Task Force referred assessing the development of an organics/food waste diversion strategy or strategies to the Environmental Advisory Board.

Introduction

Raleigh is a growing city and like many other cities, continues to face challenges with the problem of waste. The current recycling program provides an opportunity to capture the value of specific materials while also reducing the environmental impact of what would otherwise be thrown away.

The recycling programs run by the City of Raleigh are administered through the Solid Waste Services Department. Our work on this Work Plan item began with the EAB conducting several meetings at the Wilders Grove Solid Waste Services Center (a LEED Platinum Certified Facility), receiving tours of the Wilders Grove Center site, the Wilders Grove Landfill (closed/capped), the Wilders Grove Yard Waste Center, and the Sonoco recycling facility. The EAB is grateful to Director Stan Joseph, the Solid Waste Services Department staff, and the Sonoco staff for their presentations and gracious assistance during this process.

In addition to the presentations and tours, a subcommittee met and prepared a draft of this report on the Solid Waste Services Department recycling programs. We have also incorporated information from Project Drawdown, a project which reviewed and prioritized 100 solutions to address climate change and compiled them in a bestselling book published in 2017. This report has been reviewed and approved by the entire Environmental Advisory Board on November 14, 2019. We are happy to put forth this report for Council's review.

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The EAB identified five major challenges associated with the recycling program(s):

1. Contamination
2. Global recycling markets
3. Storage space for yard waste
4. Appropriate City approach to food waste
5. Future operational considerations

These challenges are not unique to Raleigh with several North Carolina municipalities proactively tackling these issues with steps such as, but not limited to:

- Greensboro City Council has recently voted to end the city's glass recycling program.[1]
- Craven County recently voted to scrap their curbside recycling program but after significant public outcry from its citizens, has voted to continue the program at a cost of $4.50 per household.[2]
- City of Concord has proposed a $2.24 per household monthly Solid Waste Fee to account for ~$900,000 in increased expenses in their FY19-20 budget.[3]
- North Carolina Department of Environmental Quality's (DEQ) Recycle Right NC campaign includes extensive public education programs that several counties and cities within North Carolina (Cabarrus, Brunswick, Greene, and Pitt Counties and the Cities of Concord, Kannapolis, and Greenville) have started.

Challenge #1: Contamination

The recycling markets have changed at the national level over the last few years. For instance, China's new requirements are so strict that a whole container may be turned away because of one plastic bag.[4] As the recycling requirements shift with market demands this information should be shared clearly with the public.

Locally, many items turned in for recycling cannot be used in Raleigh programs. While an estimate wasn't available for Raleigh and Sonoco's operations, it should be noted that nationally, approximately 25 percent of what ends up in the 'blue bins' is contaminated, according to the National Waste & Recycling Association. These unwanted objects take up room in the recycling trucks and containers while also requiring separation from the desired materials at the Sonoco facility. "Tanglers," such as plastic bags, hoses, and Christmas lights, wrap around the sorting machinery, requiring time-consuming and dangerous maintenance. Contaminants may mean that the end customer pays less for the recycled materials or may reject the entire load.

Someone who tours the Sonoco recycling facility and studies the Raleigh website may still not understand what items are allowed in the blue curbside bins. (see Appendix A). Many public recycling bins have limited guidance, so "wishcyclers" toss in Styrofoam, plastic cups, and other undesirable items.

Recommendations for Challenge #1:

- Ensure that Raleigh and Sonoco are in consistent communication about market conditions and changes to the acceptable recyclable materials.
- Ensure that Raleigh's website provides a printable downloadable, up-to-date list of what items are permitted, suitable for posting on a refrigerator. The EAB understands that the market may change each year or every few months, therefore providing up-to-date lists and graphics that are readily available can be helpful.
- Improve the graphics showing what can be recycled. The current image is dominated by large numbers that don't correspond to the numbers found on the packages, while the pictures of

what can be recycled are small.

- Provide a downloadable image or small poster for restaurants, businesses, and organizations to display by their recycling bins showing what is allowed while also engaging with these entities to promote recycling.
- Provide engagement events and/or educational awareness for these restaurants, businesses, and organizations to promote the positive effects of creating consistent recycling practices for their operations while also making Raleigh more livable.
- Provide a similar poster and other education for vendors of Christmas trees and wreaths, encouraging residents to remove lights and decorations from their trees before placing them curbside and not to mix wreath forms with the trees or yard waste.
- Improve education and signage for programs that divert inorganic material from the landfill, such as the collection points for plastic bags and film at dry cleaners and grocery stores.
- Ask Sonoco to update their display in the room where tour groups gather. Make sure only items eligible for recycling are displayed. Sonoco and other processors are currently working with the State to standardize and make available their acceptable list. Currently, they have contracts that may accept items from some municipalities while not accepting from others depending on when the contract was signed and as the market has evolved.
- Promote the reduction of single-use plastic bags for business operations and if North Carolina law permits, consider the possibility of banning single-use plastic bags.
- Encourage a study about the feasibility of providing at least some multi-stream recycling opportunities, particularly for glass.

Challenge #2: Global recycling markets

The goals of our recycling program are to monetize the value of our materials (through Sonoco) and reduce the need for raw materials (trees, oil and materials), it is imperative that there be a market for each recyclable. Unfortunately, two factors seem to be affecting the markets in significant ways that are currently or will soon be significantly affecting Raleigh's operations: contamination and glass markets.

As noted above, contamination is one reason that China (formerly the largest buyer of recyclables) on January 1, 2018, restricted imports of certain recyclables, including mixed paper—magazines, office paper, junk mail— as well as many plastics. In general prices for recycled products are plummeting, with mixed-use paper going from between $87 to $100 a ton to about $37 a ton in North Carolina.[5] There are also fewer outlets for recyclable material. Philadelphia and other US cities have resorted to burning plastic, cardboard, and other items that they can no longer recycle.[6]

The second market of concern is glass recycling. After processing at Sonoco, Raleigh's glass ends up in the State's only glass recycling plant (Ardagh Group) in Wilson, NC (about an hour away), to be recycled into new bottles. This cost of hauling glass (which is by weight) and lack of alternative buyers has placed a stress on the financial value of recycling glass. Solid Waste Services staff shared the financial models behind recycling of glass and they appear to have been turned upside down within the past 12-18 months and thus there is concern about the future of glass recycling. Also, as noted by staff, if the Ardagh plant closes, Raleigh may have nowhere to take its glass, and/or the hauling costs will move upward as the distance to get the glass to 'market' will be significantly longer. An example of an innovative glass recycling program is Ripple Glass in Kansas City, Missouri.

Recommendations for Challenge #2:

- Provide engagement events and/or educational awareness for restaurants, businesses, and organizations to promote the positive effects of creating consistent recycling practices for their operations while also making Raleigh more livable.

- Encourage a study about the feasibility of providing at least some multi-stream recycling opportunities, particularly for glass.
- Consider proactively working with Ardagh or other businesses to recycle more material such as finding a way to integrate glass gravel (such as those produced by Glavel, Inc.) as a building material in new structures for insulation and drainage complements within walls and foundations (instead of often-used plastic foam).
- Consider proactively working with regional economic development entities to recruit a new glass- recycling facility to the City or region that can better support the Triangle market with newer technologies and possibly a better ability to deal with contaminated and/or mixed glass (like the solar- powered Pace Glass Recycling Facility in New Jersey).
- Invest in contamination reduction awareness programs to make the recycled material a better resource material.
- Promote awareness, via additions to the City's website or via other communicative methods, of recycled materials as a component for home renovations and landscape enhancements. The Wilders Grove Solid Waste Services Center makes beautiful use of many recycled components and more awareness of this facility and the materials utilized on its grounds (and within the marketplace). The building materials market continues to invent products from recycled products, so if the City can assist in the general promotion of recycled materials, then awareness rises throughout the City of opportunities.

Challenge #3: Storage space for yard waste

The City sends collected solid waste to the Wake County landfills and/or transfer stations. The City sends collected recycled materials to the Sonoco plant for recycling. The City sends collected yard waste material to its City-operated Yard Waste Center (located immediately east of the City's closed Wilders Grove Landfill across North New Hope Road). At the 157-acre Yard Waste Center, the material is organized into three categories: miscellaneous woody and leafy debris that can be shredded and turned into mulch; woody material that can be chipped and turned into wood chips; and leaves from the City's fall leaf collection. In addition to yard waste collected 5-days a week by City trucks, the general public and contractors can take yard waste to the center for recycling.

During the tours, it was noted that woody and brushy yard waste debris had accumulated and created a backlog of over 900,000 cubic yards of material. The current staff is working diligently to grind, mulch, and find uses for this material. Additionally, as the woody material is readied for either wood chip use/selling, or mulch use/selling, areas are needed to organize and locate these publicly available items in a centrally located area. The current operation appears to show how the large backlog piles may be hampering the location of publicly available materials.

Within the leaf collection areas, leaves are being added at a significant rate each year due to the success of the City's leaf collection system. Unfortunately, the current piles of leaf debris are quite large taking up many acres and are known as "Mount Leafmore" among the staff at Solid Waste Services. Staff noted that there are piles of leaves collected in the mid 2010's that are still present at the facility. Leaves do rot and/or turn into very useful soil compost if adequately managed. Yet, to create a successful operation of turning the leaves into compost, areas for long wind rows are needed. The staff seem to have a handle on the process and the compost material is well received in the local landscape industry, yet the space required for such an operation and the continued backlog of leaves hampers new efforts by the staff.

Recommendations for Challenge #3:

- Strongly encourage cooperation amongst all City departments to increase the use of City-provided compost, mulch, and wood chips.

- Ensure that the Yard Waste Center can continue to test and certify their mulch, wood chips, and compost material with market specific tests to prove their value to the commercial and residential landscape industries.
- Educate landscapers, farmers, and gardeners about the improved quality and low cost of compost, mulch, and wood chips available from the Yard Waste Facility via a communications and outreach campaign.
- Inform nonprofits and community gardens that the material is free for them via a communications and outreach campaign. Extend the current specials on loads of compost, wood chips, and mulch. Currently, the two-for-one sales are only good during a single weekend. Many individual gardeners find it challenging to get and spread two truckloads in a weekend but could do it during a month.
- Deliver large truckloads of compost and mulch to community centers or centralized City locations so citizens could bring bins to pick up smaller quantities of organic material.
- Explore alternative methods to provide mulch, wood chips, or compost for pick-up at the Yard Waste Center to assist with those residents to that do not own a pick-up or utility truck (currently the only sales made at the Yard Waste Center are bulk per cubic yard).
    - Explore the use of paper leaf bags identical to those used by residents on a weekly basis for curbside yard debris pick up. The added benefit of which is the bag can be reused after mulching or composting is complete for yard waste.
    - Explore the use of City trucks or a private contracted hauling company to provide delivery service across the City (with a minimum cubic yard amount) that is typically provided by the private landscape industry.
- As much as possible, collect leaves before Christmas to minimize the contamination or mixing of leaves and inorganic holiday decorations.
- If desired by Staff, consider the engagement of an outside Solid Waste consultant to review operational efficiencies at the Yard Waste Center to either provide a road map to more effectively use the acreage as well as review the possibility of what acquiring more acreage would do for the overall operations.
- Acquire additional land.

Challenge #4: Appropriate City approach to food waste

Solid Waste Services staff discussed the possibility of someday collecting residential food waste curbside. This new program would be geared towards keeping food waste out of the landfill and also seek to possibly monetize this compost for the City's benefit. At this time, food waste recycling isn't being heavily evaluated for several reasons. The City does not currently have the vehicles to create this new service, have a plan of what to do with the material that it would compost, or have the physical space right now to compost food waste at the current Yard Waste Center.

Food waste that decomposes anaerobically (without oxygen) in landfills, produces methane. Food waste that is composted aerobically (with oxygen) within a food waste composting yard/facility generally produces carbon dioxide and oxygen. Methane is a more powerful greenhouse gas than carbon dioxide.[7] Composting food waste is 60th in the Project Drawdown list of ways to reverse global warming[8] and thus is worth review by the City within the near future. Food waste recycling should be considered as one way to support the City Council goal of reducing greenhouse gas emissions.

Recommendations for Challenge #4:

- Encourage the use of existing private vendor food-composting services and use them for City of Raleigh events.
- Educate the public about the benefits of food waste composting via a communication and

outreach campaign (to possibly include compost bins at a deeply discounted price)

- Similar to the City's recent roll-out of curbside textile/soft goods recycling, solicit private-vendor partners for a 2- or 3-year pilot program.
- After the use of the trial program, evaluate the possibility of beginning a trial or pilot project of collecting food and yard waste curbside via City-provided services or continued working relationship with private vendor.
- Review the operations of the Yard Waste Center and determine if a location within that facility makes sense as the depository of the food waste or if a private composting facility is available for use within a short distance of the City.
- Acquire additional land.

Challenge #5: Future operational considerations

In addition to the many operational items that the Solid Waste staff discussed, there are also environmental justice and social equity concerns for those that live near the landfill and yard-waste facility, who are most likely to be affected by smells, particulate drift, and pollution. The first operational concern that caught our attention was the possible conversion of the Solid Waste Services fleet to alternative fuel or electric (it appears that the fleet is being converted each year more and more to alternative fuels). The City's fleet is significant in size and ranges to all vehicle types and sizes. The second item was the working conditions for Solid Waste Services Department. Truck drivers and other sanitation workers are exposed to extreme weather and to exhaust fumes and noise from internal-combustion engines along with long hours and strenuous physical labor.

From a fleet management perspective, we acknowledge the current efforts that are ongoing to add more alternative fuel vehicles each year, we strongly support the movement towards exploring electric fleet vehicles for many of the day-to-day operations. In Project Drawdown's prioritization of GHG reduction strategies, using electric vehicles was number 26 and increasing fuel efficiency for trucks was number 40. According to Project Drawdown, diesel fuel trucks comprise just over 4 percent of vehicles in the United States and 9 percent of total vehicle mileage, but they consume more than 25 percent of fuel—50 billion gallons of diesel each year.

Refuse collection may be an ideal application for electric vehicles because of several reasons:

- Regenerative braking captures the energy from the frequent stops.
- The daily range is known, so there are no worries about running out of power.
- Electric vehicles (EV) are quiet. They can be used to run routes in the early morning or at night, reducing the risk of heat stroke for workers and reducing the impact on traffic flow. A quieter truck also means less driver stress.
- Electric motors produce no particulate pollution while natural gas vehicles still emit methane.
- All-electric vehicles are easier to maintain and produce less waste than internal-combustion vehicles. They have no oil, belts, hoses, air filters, or spark plugs to replace, so there's no need to recycle spent oil or dispose of used parts. There's no liquid fuel, so it can't spill. There's no natural gas to leak and heat up the planet.
- Technology is being developed for the lithium-ion batteries in EVs to be recycled.[9]
- Electric vehicles accelerate from a stop quickly and smoothly, making them easier to drive.
- The electricity to run the EVs could be supplied from solar panels, reducing fuel costs and greenhouse-gas emissions.

Examples include:

- Seattle is already using its first all-electric Recology garbage truck, which has a range of 56 miles and 600 pickups.[10] The current recycling and garbage routes in Raleigh are typically between 60 and 100 miles, which includes emptying the contents at the transfer center each a day.

- Carson City, California, started testing its first ERV in May and will convert its whole fleet if testing goes well. The impact of each truck is like removing 57,669 passenger vehicle miles from the road each year.[11]
- Greensboro-based Mack Trucks will test its Mack LR ERV on New York City streets in 2020.[12]
- Mack Trucks is also partnering with Republic Services, a leading national recycling and solid-waste company, to build and operate an ERV.[13]

When reviewing working conditions and operational processes, the EAB was informed of several items of interest. The amount of lifting required for yard waste and the movement in and out of a truck for leaf collection is significant. The working conditions that Solid Waste Services field workers as well as Sonoco facility workers is affected by temperatures, particulate matter, rainfall, and efficiency expectations.

Recommendations for Challenge #5:

- Encourage a visit by City Council to each of the above-noted facilities to engage with the staff of Solid Waste Services, to see their professionalism, working conditions and to learn about the multi-faceted approach that the Department has to undertake each day to provide these recycling programs.
- Continue to support Solid Waste Services efforts to earlier pick up times in the hotter summer months like they did this past summer and investigate further efforts to improve working conditions.
- Pursue an evaluation of switching the fleet to all-electric vehicles from a capital cost impact, day-to-day operational cost, and expected life-cycle cost approach, including greenhouse gas emissions, noise, and other environmental factors.
- Continue to ensure that Raleigh uses best practices, appropriate safety protocols, and industry-leading monitoring to provide a safe working environment for all Solid Waste Services employees.
- Continue to ensure that Raleigh uses best practices, appropriate safety protocols, and industry-leading monitoring to provide safe and environmentally responsible environment for all residents, particularly those who may live in more dense neighborhoods who are more often affected by particulate drift, smells, emissions, and operational hazards.
- Continue to ensure that Raleigh uses best practices, appropriate safety protocols, and industry-leading monitoring for all residents that are most adjacent to any Solid Waste Services facility as people who live near these facilities are most likely to be affected by smells and/or particulate drift
- Ensure that social justice analyses and community engagement efforts are integrated into any review of service expansion, space expansion, work place improvements, and route management.

Conclusion

The EAB does not have all of the answers to the current and future challenges that Raleigh is facing in regards to recycling, yet we are hopeful that this document and the recommendations herein are seen as possible ways to move Raleigh forward as a leading voice in the United States. We are very happy to see Solid Waste Services and Sonoco working collaboratively to recycle and find new uses for Raleigh's refuse. We were truly impressed with all of the work that is being done and the professionalism of the staffs as they tackle a difficult and sometimes dangerous job.

The United States' Fourth National Climate Assessment finds that, along with increased heat stress, the climate crisis will continue to damage infrastructure, ecosystems, and social systems that provide

essential benefits to communities. Solid Waste Services can help slow the impact by burning less fossil fuel, producing less methane and other greenhouse gases, and minimizing air, ground, and water pollution from processing and storing collected material. Compost material is a valuable resource because it reduces waste and improves the soil. There are other communities, including Denver, Colorado that are recognizing the value of composting, such as the program by Denver Water.[14] These actions will benefit Raleigh residents and all beings on Earth.

While many tough decisions may have to be made by Council regarding recycling programs within the City in the near future, the EAB believes strongly that the City should take a total life cycle cost approach that includes consideration of our natural resources and environmental justice. We believe these decisions will positively impact the financial bottom line and the overall value to health and well-being of residents and visitors.

Appendix A: Comparison of Curbside Recycling Lists dated July 31, 2019

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[1] Friend, E. "Greensboro votes to scrap glass recycling, citing rising costs" *WUNC* May 23, 2019 https://www.wunc.org/post/greensboro-votes-scrap-glass-recycling-citing-rising-costs (accessed 11/12/19)

[2] Wetherington, T. "Craven Commissioners vote to continue curbside recycling" *Sun Journal New Bern*, NC 2019; https://www.newbernsj.com/news/20190426/craven-commissioners-vote-to-continue-curbside-recycling (accessed 11/12/19)

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Thank you for your consideration of this report.

The members of Raleigh's Environmental Advisory Board

Graham Smith (Chair)
Brian Starkey (Vice Chair)
Benjamin Bobay
Jamie Cole
Anya Gordon
Aranzazu Lascurain
Justin Senkbeil
Coleen Sullins
Linda Watson

Appendix A: COMPARISON OF CURBSIDE RECYCLING LISTS

Item		Raleigh website	Raleigh postcard	Sonoco website
Glass				
	bottles	yes, caps on	yes	yes, caps off
	broken	not noted	not noted	no
Metal				
	aerosol cans	not noted	not noted	yes, if empty
	aluminum foil	yes	yes	no
	aluminum food trays	yes	not noted	no
	cans	yes, lids in cans	yes	yes
Paper				
	asceptic boxes	yes, caps and straws off	noted as “cartons”	yes
	corregated cardboard	yes, flatten and max 3'x3'	noted as “paper waste”	yes
	gable-top boxes	yes, caps off	noted as “cartons”	yes, caps on in picture
	office paper	yes, no paperclips	noted as “paper waste”	yes
	paperback books	yes	noted as “paper waste”	not noted
	paperboard boxes and tubes	yes, flatten, remove linings	noted as “paper waste”	yes
	phone books	not noted	noted as “paper waste”	yes
	pizza boxes	yes, if clean	noted as “paper waste”	not noted
	shredded paper	yes, in stapled paper bag	noted as “paper waste”	no
	spiral paper cans	yes	noted as “paper waste”	not noted
Plastic				
	plastic bags	no	no	guidance for but not within system
	plastic bottles and jugs	yes, caps on	noted as “plastic containers”	yes, lids on; pumps off
	plastic clamshells	yes, clear #1 or PETE	noted as “plastic containers”	not noted
	plastic tubs	yes, lids off	noted “plastic containers”	yes, lids screwed on
Fabric, Textiles, + Soft Goods		yes, in orange plastic bag	separate postcards/company	no (separate company)
Film		not noted	not noted	guidance for but not within system
DATA COLLECTED SUMMER 2019				

Note: Sonoco and other processors are currently working with the State to standardize and make available their acceptable list. Currently, they have contracts that may accept items from some municipalities while not accepting from others depending on when the contract was signed and as the market evolved.