Environmental Justice (EJ) Video Challenge for Students
Community Capacity Building Strategy

Video Title:	Pollution to Prosperity: Tackling Landfill Impacts for a Thriving Future
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Community Organization Name(s):	Concerned Citizens of Charles City County (C5)

A. Strategy Proposal Summary

Through identifying environmental justice concerns around a mega-landfill in rural Charles City County, Virginia in Phase I, we learned how waste management practices directly impact the air and water quality of communities that live nearby. The present strategy puts forth 5 goals for addressing the environmental justice concerns around the landfill. (1) Water testing, (2) air quality monitoring, and (3) health surveys, will focus on studying and collecting data to address water, air, and health concerns surrounding the landfill. Then, (4) landfill diversion and (5) building electrification focus on resilience.

(1) Water Testing: Grassroots Data Collection on Local Waterways

The health of nearby waterways is essential in Charles City County because most residents source water from private wells. There are dozens of wells within a half mile radius of the landfill that are susceptible to groundwater contamination. This is particularly concerning as the Charles City Landfill has a documented history of violations since the 1990s[1]. More recently, in 2014, the Virginia Department of Environmental Quality (DEQ) caught Waste Management with a number of unmitigated seeps of toxic leachate into Bradley Run and the Chickahominy River. In 2019, a DEQ report found that contaminants from the landfill were leaking into waterways again and inspection reports of the facility were not being conducted at the required frequency.[2] 5 acres of wetland and 4,679 linear feet of stream channel were impacted by erosion from the landfill.

Despite these violations, steps have not been taken by local or state authorities to investigate how pollutants from the landfill might impact public health. Furthermore, community members report concern about high levels of illness and cancer within a mile radius of the landfill. During a focus group conducted on 1/20/23, we heard from community members about this issue. Residents noted how the water is often cloudy, brown, and needs to be boiled before drinking, while also alerting us to the alarm of seeing white sediment from the water after the boiling process. This ultimately creates a cost burden for residents when they have to buy bottled water and water filters for safe drinking water. It is extremely costly to install electronic filtration systems in older homes with an already degrading plumbing system.

Due to local concern over public health and the lack of data on water quality, we propose regular chemical and micro vertebrate water quality testing across Charles City County in predetermined coordinates. This grassroots method of data collection on a monthly basis for 24 months will be done in collaboration with community members and partnering organizations. Alliance for the Chesapeake Bay and Izaak Walton League of America are examples of such organizations that harness the power of grassroots organizing to mitigate environmental injustices in vulnerable communities. Both programs aim to empower citizens by providing training, equipment, and technical support to conduct chemical and micro vertebrate water quality monitoring in their communities.[3] While chemical water testing will be supported by Alliance for the Chesapeake Bay, C5 will work with a 'Save Our Streams' Mid-Atlantic Coordinator to carry out micro vertebrate testing; micro vertebrates are used as bioindicators because they can absorb and accumulate contaminants from the water they live in, reflecting the quality of the water and helping to identify potential health hazards. All data collected will be

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[1] Lipton, Eric. "Imported Garbage Piles Up, So Do Worries." Washington Post, 12 November 1998.;Krevitz, E. (2000). Not in my landfill: Virginia and the politics of waste importation. Policy Perspectives. 7(2): 5-13; Timberg, C." Medical Waste Found at More VA Facilities." Washington Post, 19 February 1999.

[2] https://www.c5groupinform.com/_files/ugd/3176fe_be3e9d023857459ab8c0d6ab77924170.pdf

[3] https://www.allianceforthebay.org/project/rivertrends/#:~:text=Launched%20in%201985%2C%20RiverTrends%20is,quality%20monitoring%20 in%20their%20 communities.

submitted to the Chesapeake Data Explorer and sent to the Virginia DEQ; the data is publicly accessible for further use by community groups.

(2) Air Quality Monitoring: A Citizen Science Approach for Monitoring Landfill Gases

Emissions from the Charles City County Landfill are another major concern for Charles City residents. Through our strategy, static air quality monitoring devices would be placed in several "zones of interest" in Charles City. The monitors will collect data on particulate matter (PM) and volatile organic compounds (VOCs) and data would be shared through a web-based mapping application.

The air quality monitoring strategy includes a short-term and long-term resiliency plan. In the short-term, we propose the installation of a network of PurpleAir monitors, a particulate matter monitoring system that aims to empower local communities with accessible data. According to Sonibare et al., particulate matter (PM) can be emitted from landfills, which can have effects on public health.[4] Short-term exposure can cause asthma attacks, increase susceptibility to respiratory infections, and cause heart attacks for those with heart disease. This is of great concern in Charles City, where heart disease and asthma rates are high. There is currently limited data for PM in the community surrounding the landfill. The nearest DEQ PM monitoring device is 13 miles away according to AirNow (See Appendix A). PM 2.5 monitors closer to the landfill would help to detect higher concentrations of PM 2.5 than current DEQ air monitors could register. Data from the sensors are uploaded automatically, which can be accessed through a mapping application on the PurpleAir website.

In the long-term, C5 seeks to monitor for VOCs, methane, and carbon dioxide around the landfill. The release of methane and off gassing occurs as a result of garbage decomposition. Research shows that landfill gasses can move into buildings, through soil, and into private wells.[5] Moreover, VOCs can have a variety of health effects, including and damage to the liver, kidneys, or central nervous system. However, state agencies do not adequately monitor off-gassing. C5 has identified monitoring devices from Vaisala, an air quality monitoring company, that would monitor for these compounds and automatically upload data to an online web-mapping application. Seeing that these instruments will take more time and coordination to install, they would be installed after the PurpleAir devices.

(3) Health Surveys: Assessing Variance in Health Conditions by Residents' Proximity to Landfill

Postcards sent out to residents in 2021 indicate a pressing citizen concern towards the landfill for issues such as health impacts, impacts on wetlands and wildlife, truck traffic, methane and climate quality, historical preservation, and fairness of economic factors [Appendix B]. The majority of residents expressed concern regarding toxic substances leaching into the water. Despite documented violations, local authorities have neglected to test for how landfill pollutants might be impacting the health of nearby residents. Pastor F. Wayne Henley of Cedar Grove Baptist Church, residing nearby the landfill with many residents living in close proximity, reports an influx of deaths in the community related to rare forms of cancer and illness in recent years.

To address public health concerns, a health study should be conducted for residents both living nearby the landfill and the INGENCO waste-to-energy facility and farther away from the landfill site. This comparable data will be used to assess the discrepancy in health conditions such as cancer and asthma for those living in close proximity to the site compared to the same rates for residents living farther away.

(4) Waste Diversion: Re-Envisioning the Future of Waste Management

The future of waste management is at a pivotal point- landfill space is running out as sites such as Charles City County seek to expand cells to make way for more waste to be brought in through future years. What is done now with waste will have an monumental impact on the future. At a local level, C5 can address this by starting a compost and recycling program to provide an option for waste diversion. To do so, C5 can use EPA toolkits as a resource for recycling and composting at a community level and social marketing for collection, starting a collection program with local drop-off and pick up services.[6] In 2022, C5 announced their ambitions for BLACC, Barnetts Learning and Cultural Center– an elementary school for students of color that was closed down in 1992– to be reborn as a workforce development program. This closed schoolyard was the site of C5's community garden program last summer, and it has been identified as a future site location for composting. Additional drop-off locations could be formed in partnership with churches in the community, as these locations are regularly

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[4] Sonibare, O. O., Adeniran, J. A., & Bello, I. S. (2019). Landfill air and odour emissions from an integrated waste management facility. *Journal of Environmental Health Science and Engineering*, *17*(1), 13–28. https://doi.org/10.1007/s40201-018-00322-1

[5] https://www.health.ny.gov/environmental/outdoors/air/landfill_gas.htm

[6] https://www.epa.gov/transforming-waste-tool/examples-and-resources-transforming-waste-streams-communities-51-100#85

attended. This compost program will work to build community resilience and new sustainable jobs, creating nutrient rich soil for local growing purposes and food production.

A truly environmentally just future would not just rely on dumping waste into landfills in outside communities, but rather encourage the landfill industry to circulate reusable and/or recyclable materials back into the economy. La'Veesha Rollins, Executive Director of C5, suggests building recycling and composting infrastructure in rural communities impacted by landfills can help them to create a workforce rooted in sustainable circular economy principles. While just a mere fraction of the billions of dollars in revenue made each year at the site by Waste Management, the landfill does provide some revenue into the county and questions arise as to other ways economic opportunity can be driven in these areas. C5 emphasizes the necessity of job training programs that enable the community to provide its own means of opportunity. For successful models, we look to community-driven case studies like Detroit Dirt which uses its compost business to involve Detroit in climate equity planning and environmental justice practices.[7]

(5) Building a Brighter Future: Green Workforce Development to Promote Economic Resilience

Low-income, rural communities, especially those with a high percentage of African American residents, are more likely to be affected by energy poverty, which is defined as the inability to afford adequate heating and cooling for one's home. These communities often have older and less energy-efficient homes, which can lead to high energy bills and a lack of access to basic energy services. Building electrification in Charles City County advances economic resiliency by reducing energy costs, improving energy efficiency, and creating job opportunities in the clean energy sector. At its core, building electrification builds economic resiliency in Charles City by increasing economic resilience apart from the landfill. Due to the Charles City landfill providing $10,000,000 in revenue for the county in 2022, and $3,000,000 in host fees, the county is tied to the fortune of this industry. By building economic resilience apart from the landfill, residents can reduce their exposure and vulnerability to environmental hazards.

Our proposed weatherization and electrification workforce development program will provide job training and career opportunities for institutionally underserved individuals, which ultimately promotes equitable labor outcomes. This program will garner statewide support, especially with the ongoing bipartisan Senate proposal to consolidate workforce development programs under a centralized department; a consolidation that would streamline the current system, which includes six cabinet secretaries, 12 state agencies, and 35 different programs. Additionally, there are 9 active and growing building electrification programs carried out by the Virginia Department of Social Services(1), Clean Energy Advisory Board(1), U.S. Department of Health and Human Services(1), Virginia Department of Housing and Community Development(3) and utilities- Dominion Energy(2) and Appalachian Power(1)to support low to moderate income residents. These programs seek to subsidize weatherization installation, energy efficiency upgrades, health and safety measure upgrades, and offer rebates for the installation of solar infrastructure for income-qualifying households. Clearly, there is a great need for equitable green workforce development at the nexus of such statewide programming efforts so rural communities do not get left behind as Virginia further ventures into the clean energy transition. Partners will include Sierra Club Virginia Chapter, Viridiant, Charles City County High School, and Bridging the Gap in Virginia.

B. Community Partner Collaboration

Our student team has collaborated with Concerned Citizens of Charles City County (C5) through weekly group meetings, individual phone calls, and a focus group to create a dynamic and multi dimensional strategy to address the environmental injustices in Charles City. One student team member has been deeply engaged in addressing EJ issues in the Charles City County community since 2020, primarily focused on energy justice and burden work, while the other two student team members have been closely involved in waste management research and GIS analysis since the beginning of 2022. Moreover, ½ of the Phase I student team helped C5 lead several chemical water quality testing days for individual households late last spring of 2022, while ⅔ of the student team for Phase 2 received water quality testing training with C5 in the fall of 2022 to prepare for routine testing. They were also involved in an organizational planning retreat with C5 in December, where the future and goals of the organization were put forth.

On January 17th, the student team participated in a C5 monthly group meeting to discuss a preliminary outline of the Phase II strategy. Each student pitched their ideas to address the environmental injustices in Charles City, and welcomed feedback and critique from meeting participants. On the same day, students had a zoom meeting with faculty mentor, Dr. Mary Finley-Brook to receive feedback on strategy ideas and discuss potential

[7] https://www.detroitdirt.org/

barriers to implementation. On Jan. 20, ⅔ of the student team conducted a focus group at Cedar Grove Baptist Church to better understand opinions and concerns of some of the people most impacted by the landfill. 5 residents living in close proximity to the site attended the meeting. On Jan. 24, the team met with La'Veesha Rollins to further discuss the Phase II strategy. Rollins aided the team by providing feedback on the strategy and emphasizing the need for community empowerment. Lastly, the team met with C5 for a final open feedback session on the strategy and video.

C. Description of the Use of Publicly Available Data/Tools

EJScreen was used to identify the community surrounding the landfill as an environmental justice community. Seeing that asthma and heart disease can be aggravated by landfill emissions, we first used the tool to identify the prevalence of these conditions. According to the data, Charles City County is in the 80th-90th percentile for both these conditions on the national scale (See Appendix C). A further look at this data through the National Environmental Public Health Tracking Network showed that Charles City has an 11% prevalence of asthma compared to a 8.6% state-wide rate (See Appendix D). It is widely known that cancer rates are often underreported in rural communities. A third data source used in this research process was EPA Enforcement and Compliance History Online (ECHO) in order to find a detailed facility report for the landfill. The report showed that 260 people live within 1 mile of the landfill; 62% of these residents are people of color and 20% are seniors 65 years and older. Comparatively, only 28% of people in the U.S are people of color, and 16.5% are 65 and older. This data is incredibly validating as it proves the motivation and necessity for implementing an air quality monitoring project.

Despite the utility of the aforementioned online platforms, we identified several limitations on their data. First, EJScreen is limited by the scale at which it has data for. For example, PM 2.5 data is aggregated at the county level, when we need data for a much smaller scale. Not to mention, there is inadequate data on cancer rates in Charles City on these sites. Charles City residents report high rates of cancer in their community, which is missing from the online data. If this data was better collected and reported, there would be a more holistic understanding of the health conditions and vulnerabilities of residents.

D. Resource Needs for Strategy Implementation

(1) C5 has no funding needs for water quality monitoring due to support from Alliance for the Chesapeake Bay. This project requires time and commitment from the C5 team, community members, and collaboration with a Sierra Club staff member.

(2) C5 seeks to install a network of 10-15 PurpleAir monitors ($200-300 each) and 2 Vaisala monitors (estimated at $7,000 each). Funding will be required for these devices. A GIS trained individual is required to determine the location for the air monitoring network. Once the air monitors are purchased, individuals are needed to install the devices.

(3) To conduct a robust health survey, Charles City would need funding to recruit a trained medical expert with high ethical standards for defending community rights and the ability to show results in a court of law. Both C5 and community members would need training, medical knowledge, and funding for conducting these household surveys with support from organizations such as EJ Action Hub. Without these barriers, the goal of the surveys would be to assess the health conditions of everyone in Charles City to be able to show the difference in rates according to proximity to the polluting facilities. However, with limited funding the health study would begin at residences reporting water quality issues, allowing the data to dictate where to go from there.

(4) In addition to the building of a compost processing site, a paid staff member responsible for community outreach and composting would be necessary for this strategy implementation, as well as 2-3 staff members that process the material. This team would also track recycling in Charles City County and advocate for best practices in recycling, working to increase diversion through accountable collection of materials.

(5) C5 has no funding needs for a management staff time due to support from Sierra Club's Building Electrification Campaign. However, funding is needed in order to have several paid staffers carry out training modules that train participants to evaluate moisture hazards like mold, perform incidental safety repairs, replace appliances with energy-efficient models, and insulate, and/or repair heating and cooling systems, ventilation and vent systems, foundational insulation, storm windows and doors, window films, motor controls, and light sources. Material and overhead cost for the training module demonstrations will be a primary cost in the development of this program.

E. Barriers to Strategy Implementation

While C5 is working to address these environmental justice concerns around the mega-landfill, there are a number of policy recommendations we suggest. We believe that revised EPA methane policy for landfills must

also address human health toxicity impacts and the strong need for transparency within impacted communities across the nation. For future statewide policy recommendations, the Virginia DEQ should perform more regular checks of water and wells within proximity of the site, being more intentional in assessing how waste water may be impacting drinking water. Due to the distrust involved in outside members coming in to collect data, a community watchdog role is needed. This person would oversee water and air testing performed at the landfill to ensure accountability.

The vast majority of waste in the Charles City Landfill does not come from Charles City, with a quarter of waste dumped into Virginia landfills coming from out-of-state in 2020.[8] Southern states like Virginia and West Virginia have become a dumping ground for northern states, as more and more of their landfills are reaching capacity and charge higher tipping fees. Therefore, policy needs to be made nationwide that addresses these inequities burdened on EJ communities by diverting waste from even reaching landfills. To address the expansion of landfill cells, there should be a stronger focus at the national and local level on policy that requires the sorting, recycling, and composting of items so often placed in the landfill but could be re-integrated through circular economy principles.

Another barrier is reflected in the lack of adequate statewide landfill policies. In reflecting on how to mitigate this, we believe that academics and grassroots organizations in Virginia such as Sierra Club, Appalachian Voices, and POWHR, play a crucial role in driving legislative reform to improve environmental conditions. They bring research and knowledge to the public discourse, raising awareness of environmental disparities and the ways to engage in direct action. They also work to engage communities and build support for policy changes that benefit the environment and public health. Ultimately, legislative reform can address issues such as the lack of sound building electrification and equitable energy efficiency expansion policies in the Commonwealth and the shortcomings of waste management.

F. Measures of Successful Strategy Implementation

(1) Successful implementation of the water monitoring program will produce reliable data on water quality in Charles City. This data will be shared with the DEQ to inform the Virginia Water Quality Monitoring, Information, and Restoration Act. This will help the DEQ to determine whether waters meet quality standards.[9]
(2) A successful air quality program will provide accessible data to citizens concerned about landfill off-gassing. The two citizen science projects (1&2) are crucial in democratizing data and empowering the community to tackle environmental issues in Charles City.
(3) Health survey efforts will be successful if they will be able to verify whether there are or are not any statistically significant variations in health conditions for residents living in close proximity to the landfill. This data can then be used in a court of law to use as evidence for the need for reparations and to use as a basis for further studies on health impacts of landfills and the technology necessary to prevent this. Additionally, the statistics would be made accessible on data platforms such as EJScreen.
(4) To acquire measures for successful implementation of a local composting and recycling program, a survey should first be conducted and sent out to residents via postcard and email asking if they compost and/or recycle, and if not, what barriers are in place preventing them from doing so. The program can then be set up to address these barriers, offering a local pickup service and providing bins and bags for collection at no cost to residents. To measure the effectiveness of this strategy implementation, a survey would be sent out one year following the collection program to residents to assess change in waste behavior at a local level. Additionally, the compost program would measure intake by mass, with hopes of increasing collection rates as the program continues.
(5) Measures of successful strategy implementation for the proposed equitable building electrification and weatherization green workforce development program include: (i.) Tracked participation and graduation rates of trainees in the program. (ii.) Placement and increased employment rates of program graduates in weatherization and building electrification adjacent jobs. (iii.) Increased income and reduced poverty levels among program graduates. (iv.) Positive feedback and satisfaction levels from trainees, employers, and stakeholders involved in the program. (v.) Integration of the program into the broader ecosystem of green workforce development initiatives and policies across the Commonwealth.

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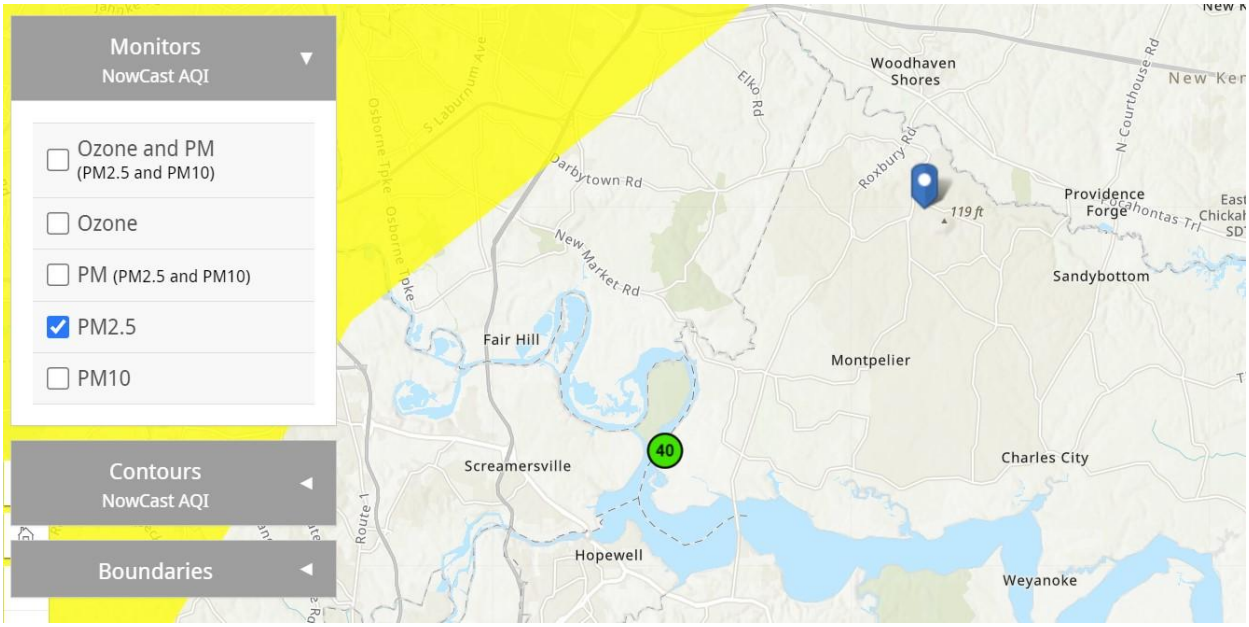
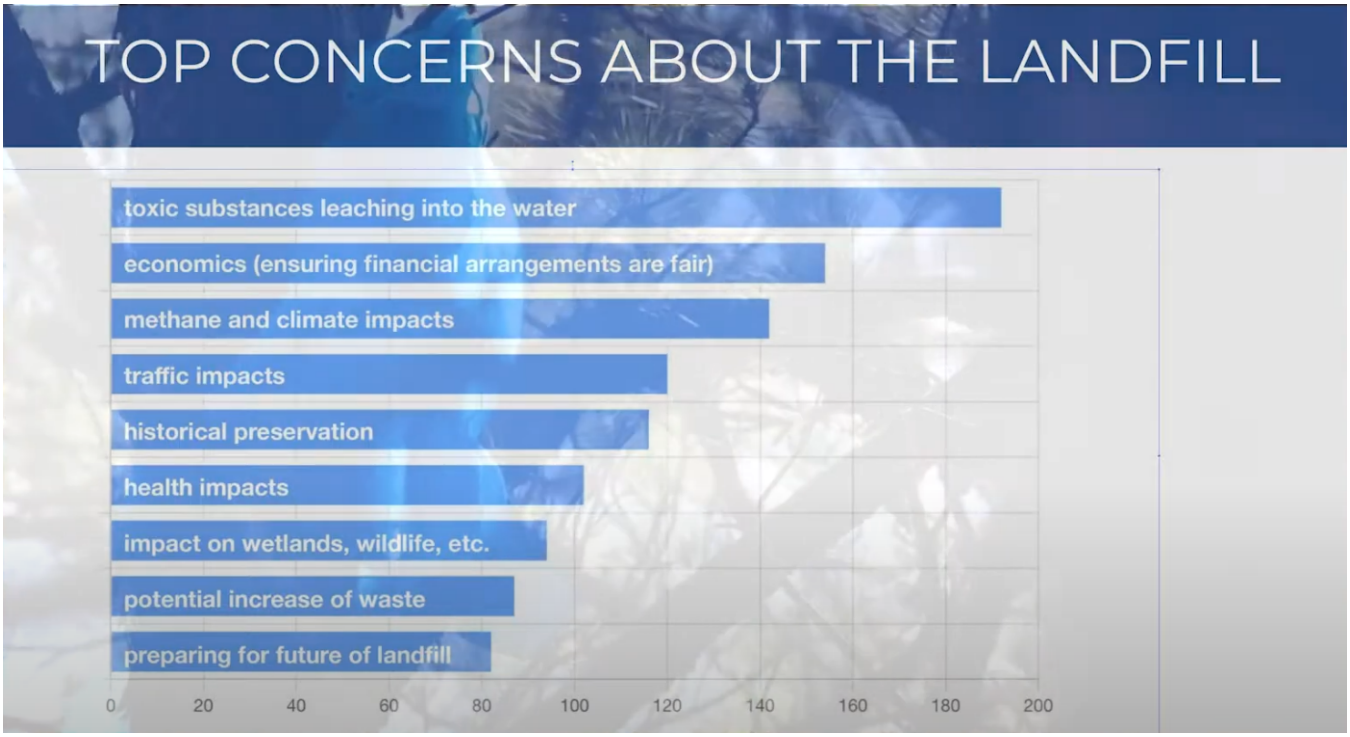
[8] https://www.virginiamercury.com/blog-va/a-quarter-of-virginias-waste-continues-to-come-from-out-of-state/
[9] https://www.deq.virginia.gov/water/water-quality/assessments/integrated-report

Appendix A



Appendix B



Appendix C

Figure 1 (EJScreen)

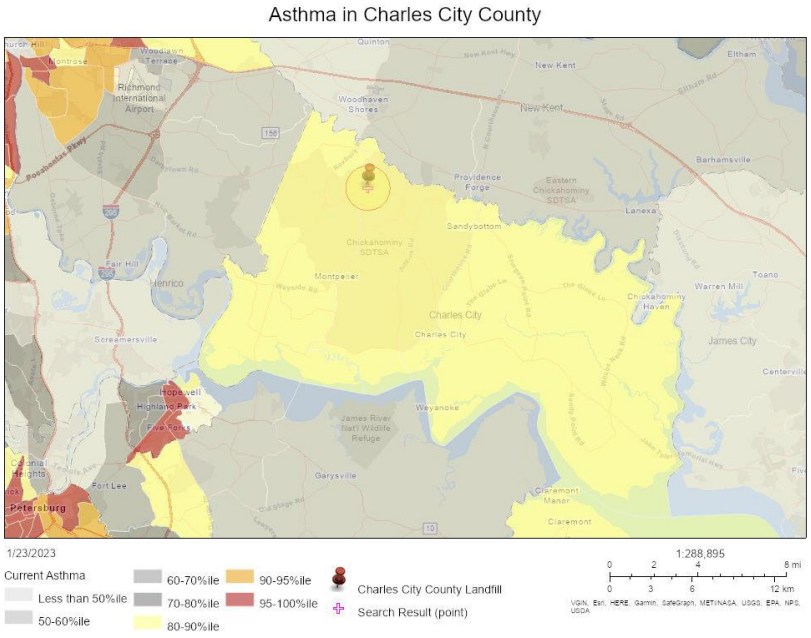
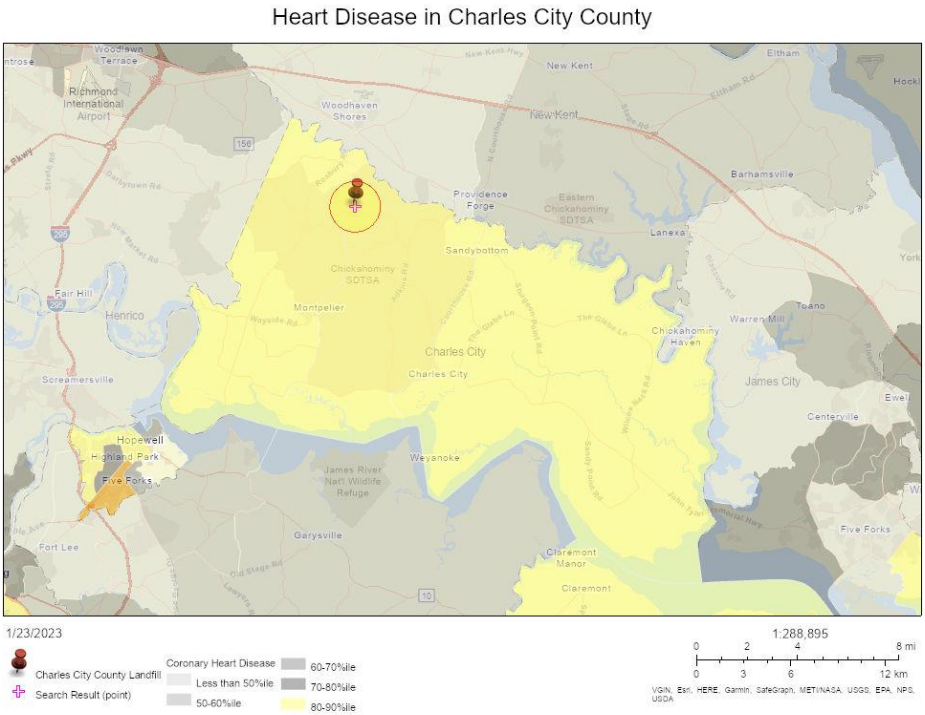
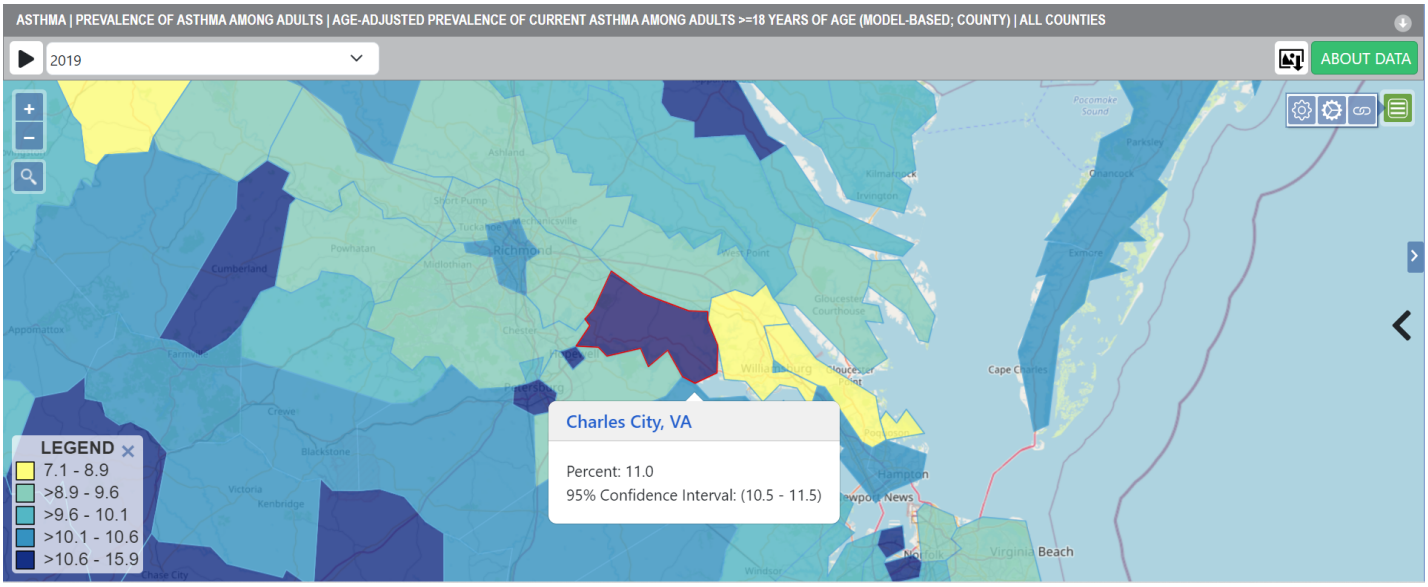


Figure 2 (EJScreen)



Appendix D



*For further reading, see student team's StoryMaps related to the Charles City County Landfill:

1) Reimagining Consumption Amidst Toxic Infrastructure: https://arcg.is/1D00WW
2) Environmental Justice in Charles City County: https://arcg.is/1HiPSj0