

# ELIZABETH, NEW JERSEY

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This project aims to better understand the environmental justice implications of urban flooding and green infrastructure investments in vulnerable communities across 4 U.S. cities. This factsheet summarizes key takeaways for the city of **Elizabeth, NJ**. [Click here](#) to access the project’s website, and the results obtained in other cities. This project is co-led by the Urban Systems Lab Research Fellow Pablo Herreros Cantis and Director Timon McPhearson with support from the Kresge CREWS Program, with additional input from Chris Kennedy, Chella Strong and Claudia Tomateo.

## IDENTIFYING THE CHALLENGES IN ELIZABETH

The City of Elizabeth is a small urban municipality located along the Newark Bay in New Jersey, South of Newark Airport, with the Elizabeth River cutting across it. It is surrounded by other highly urbanized communities such as Linden, Union and Newark, all of which devote a large portion of their land to industrial uses. Elizabeth’s stormwater management relies entirely on a combined sewer system. While the city’s combined sewer permit allows for only 4 overflow discharge events per year, more than 50 overflow discharge events take place in

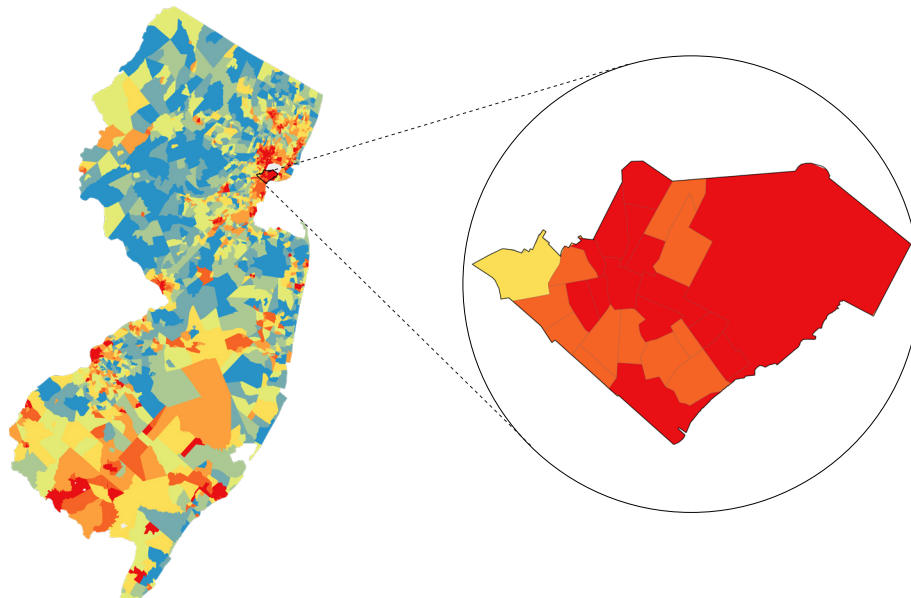
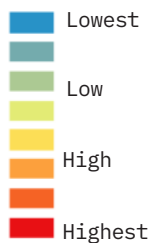
a normal year, exposing ecosystems and communities to vast amounts of polluted water. In October 2020, the city released its new Long Term Control Plan (LTCP) for its combined sewer system. In this plan, long term measures are specified to reduce the amount of CSO discharges. Currently in the process of being approved after undergoing public review, this LTCP represents a great opportunity to incorporate green infrastructure and environmental justice considerations into the planning of Elizabeth’s stormwater management practices.

## DEMOGRAPHICS

NEW JERSEY SOCIAL VULNERABILITY INDEX

ELIZABETH SOCIAL VULNERABILITY INDEX

### LEGEND



Total Area: 12.3 mi<sup>2</sup>  
 Total Pop: 137,298  
 Median HH income: \$48,407  
 % Black: 19.5  
 % Latinx: 65.0  
 % Asian: 1.90

% White: 12.2  
 % Below poverty: 17.6  
 % w/ a Disability: 6.7  
 % w/o Health Insurance: 22.7  
 No. of Buildings: 17,399  
 Miles of road: 255.5 (1.7 mi<sup>2</sup>)

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## BASELINE FLOODING RESULTS

Aggregating Results to the Census Block Group Level

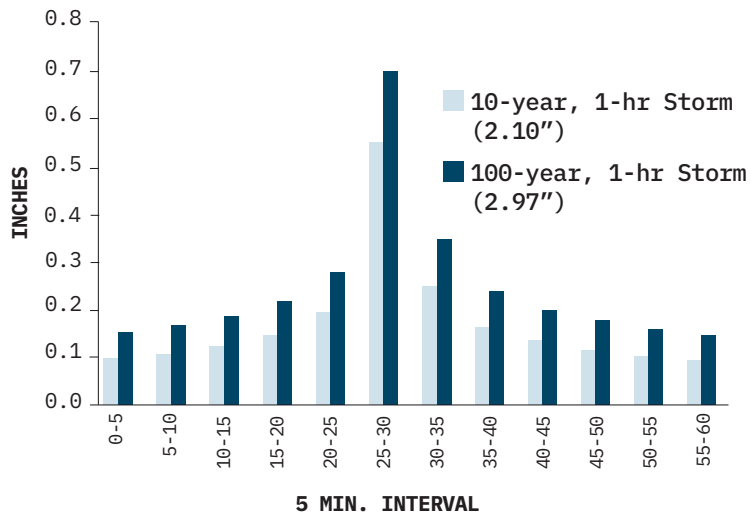
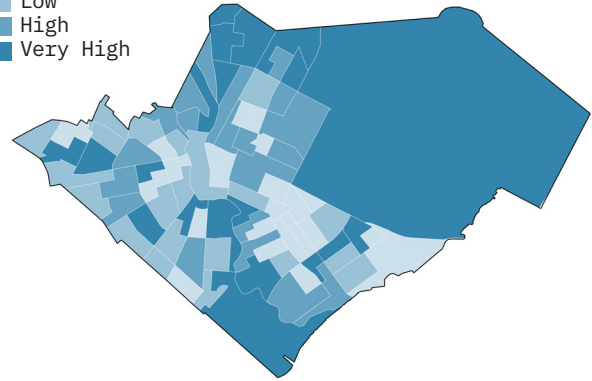
Max. Flood Depth

- Water Bodies
- Green Space
- d > 4"
- d > 1'
- d > 2'



Flood Risk

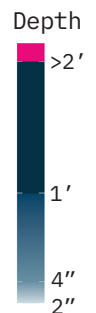
- Very Low
- Low
- High
- Very High



10 yr. storm



100 yr. storm



Areas Flooded	10 yr. storm	100 yr. storm
Total Area Flooded > 4"	1.3mi <sup>2</sup>	2.2mi <sup>2</sup>
Road Area Flooded > 4"	0.3mi <sup>2</sup>	0.4mi <sup>2</sup>
Total Area Flooded > 1'	.06mi <sup>2</sup>	.13mi <sup>2</sup>
Buildings Flooded > 4"	1130	1734
Residential Prop. Flooded > 4"	772	1234

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## RESEARCH QUESTION AND METHODOLOGY

To better understand how environmental justice issues play out in Elizabeth, we ask the following question: “Are communities that are more exposed to flooding also more socially vulnerable than those that are less exposed?” To answer this, we simulated two baseline 1-hour storms - a 10 year storm and a 100 year storm. We then grouped census blocks and block groups in quartiles of percent area flooded with more than 4 inches in each scenario, to assess the

potential differences in flood exposure among different socioeconomic and racial groups. For more details about our methodology, visit our [project website](#).

### Data Resolution:

Resolution of the simulation: 2m

Computed infiltration in Green Areas: Yes

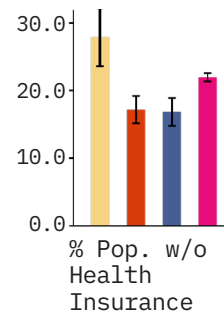
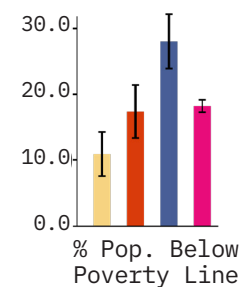
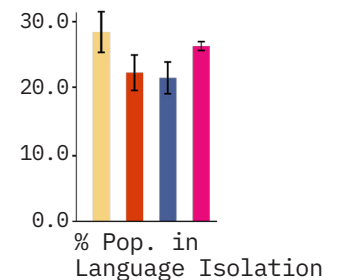
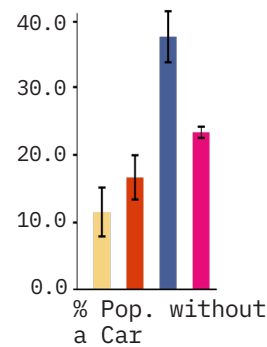
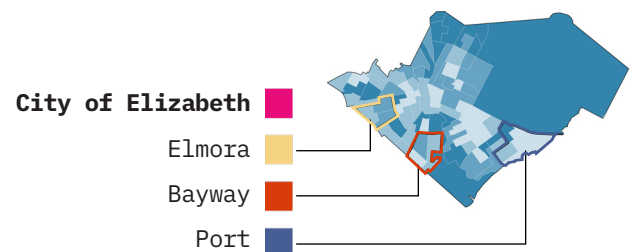
Accounted for buildings: Yes

Accounted for soil textures: No

## KEY TAKEAWAY 1:

### DIFFERENT NEIGHBORHOODS, DIFFERENT NEEDS

The results of our city-wide analysis show that flooding may not be impacting low income communities and communities of color disproportionately. Areas with a higher exposure to flooding show lower vulnerability according to specific indicators, such as access to health insurance, car ownership, and risk of language isolation. However, as demonstrated by the Social Vulnerability Index map on p. 1, the overall social vulnerability of Elizabeth is remarkably high. The lack of significant differences between differently exposed communities should not lead to the conclusion that Elizabeth is free of environmental justice issues related to stormwater and flood risk management. A closer look at specific neighborhoods in Elizabeth reveals that each of their demographic and socioeconomic characteristics imply different needs and vulnerabilities. We focus on three neighborhoods identified as case studies by [Groundworks Elizabeth's Climate Safe Neighborhoods Project](#): Elmora, Port, and Bayway. The three neighborhoods experience similar flooding overall, with Elmora suffering the highest impact on its roads and residential parcels. This comparison shows that social vulnerability is manifested differently in Elmora and Port. A high percentage of Elmora's population lacks health insurance and may be suffering language isolation, while Port has a much higher poverty rate and percentage of households without a car. Bayway does not show significantly high indicators compared to the rest of the neighborhoods. This data leads to the question: How can such specific vulnerabilities be accounted for when planning for green infrastructure?



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## KEY TAKEAWAY 2:

### ELIZABETH'S PROPOSED LTCP OVERLOOKS ENVIRONMENTAL JUSTICE, FLOOD RISK AND GREEN INFRASTRUCTURE

According to [Elizabeth's LTCP](#), published in October 2020, there are no environmental justice considerations that require attention for the implementation of the plan. However, the LTCP presents no baseline analysis of environmental justice issues in regards to the city's current stormwater and combined sewer systems. In addition, it does not account for differential social vulnerability across communities (e.g. as we do in takeaway 2) during the implementation of the plan and the siting of interventions. In addition, the plan focuses on the mitigation of CSO discharge events, while the mitigation of flood risk is only considered tangentially. In the LTCP, green infrastructure is deemed a non-viable type of intervention, and only a small pilot program is proposed instead of a larger, comprehensive plan to integrate it into the city's stormwater management. In coordination with local non-profits such as Ironbound Community Corp., New Jersey Futures and Future City Inc., the Urban Systems Lab submitted an appeal to the LTCP identifying the "need for an in-depth, systematic analysis that addresses the injustices of the current situation." [Read our appeal here.](#)

## DISCUSSION/CONCLUSION

Elizabeth's LTCP approval process presents a chance to tackle the stormwater-related challenges of the city. However, the plan's draft does not properly address the fact that Elizabeth's population is highly vulnerable (even if no significant difference was observed between more and less exposed populations), and that drivers of vulnerability vary across the city, meaning that the needs of each community are different. The realization of the LTCP entails a huge investment of money, time and resources. By ignoring the connection between water quality, flood risk, race, income, and environmental justice, we run the risk of not only leaving the problem unresolved, but reinscribing existing distributional justice issues.