

SUMMARY FINDINGS

The following high level themes summarize findings from this study:

1. Compounded Risk and Natech Events in Vulnerable Communities

Climate hazards have become a growing concern for communities, yet the compounded risks from Natural Hazard-Triggered Technological Accidents (Natech) events need greater recognition, especially in already vulnerable communities. This document presents an overview of the unique challenges posed by these risks, focusing on high-vulnerability areas in Southwest Philadelphia and Delaware County, particularly Delaware Riverfront communities facing intensified exposure to industrial accidents, coastal flooding, and structural vulnerabilities due to sea level rise.

2. Social Capital as the Foundation for Adaptation

Effective adaptation requires immediate action, beginning with efforts to recognize, build, and strengthen the social capital within communities. This report emphasizes the critical need for empowering residents through collaboration and capacity-building, to ensure they are resilient and prepared to address challenges at the local level.

3. Policy Strategies Across the Adaptation Process

Policy makers must align their support with where communities currently stand in terms of capacity and their adaptation journey. This document outlines a broad spectrum of policy strategies tailored to various stages of resilience, emphasizing flexible, community-centered approaches that evolve with the needs and readiness of each community.

4. Connecting Regional Recognition to Local Impact

This document is not an isolated analysis; it's rooted in a broader regional effort to acknowledge local issues and achieve actionable, on-the-ground results alongside longer advocacy and planning efforts. The relevance of these findings hinges on a cooperative process in which planners and policy makers actively involve community members, advancing shared solutions alongside strategic, long-term approaches.

5. Pathways for Adaptive Change: Building Awareness, Mapping Benefits, and Tailored Frameworks

Successful adaptation pathways rest on frameworks that foster awareness, unite communities, and provide accessible data for assessing progress and benefits. Pathways must be customized to each community's social fabric, infrastructure, economic status, and environmental conditions. The policy recommendations in this report lays out actions across scales, encompassing local and regional strategies to mitigate risks and enhance community outcomes.

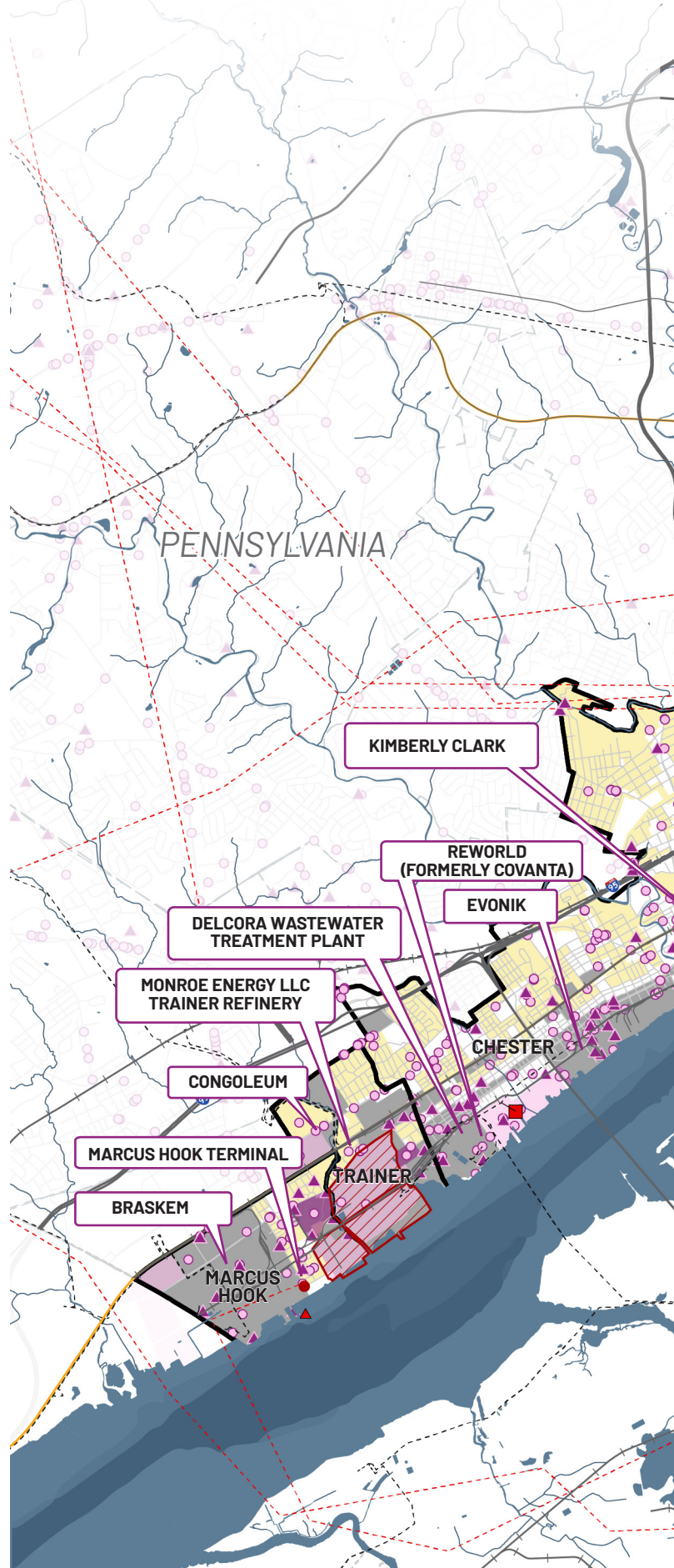
The following pages outline chapter summaries of the report (chapters 2-7). Chapter 1 is an introduction and chapter 8 outlines next steps.

02 INDUSTRIAL RISK



The industrial landscape of Southeast Pennsylvania is characterized by a dense concentration of facilities, including over 558 industrial and brownfield sites within the study area. These sites, regulated by federal and state programs, pose direct environmental risks through toxic air emissions as well as soil and water contamination. The region's industrial history dates back to the 19th-century oil revolution, which transformed Philadelphia and Delaware County into a national oil hub. This legacy continues in the form of hundreds of brownfields and Superfund sites, such as the Metro Container Corporation and Lower Darby Creek Area, which require rigorous, long-term remediation.

Risks at these facilities are categorized into three main threats: fires and explosions, leaks and spills, and air pollution. Specific hazards are tied to facility types; for instance, tank farms are susceptible to explosions and tank dislodgement during floods, while pipelines risk acute spills that can contaminate local waterways. Managing these risks is complicated by a fragmented data landscape where contamination datasets are siloed across different agencies, making it difficult for community members to fully understand the environmental and health risks they face.



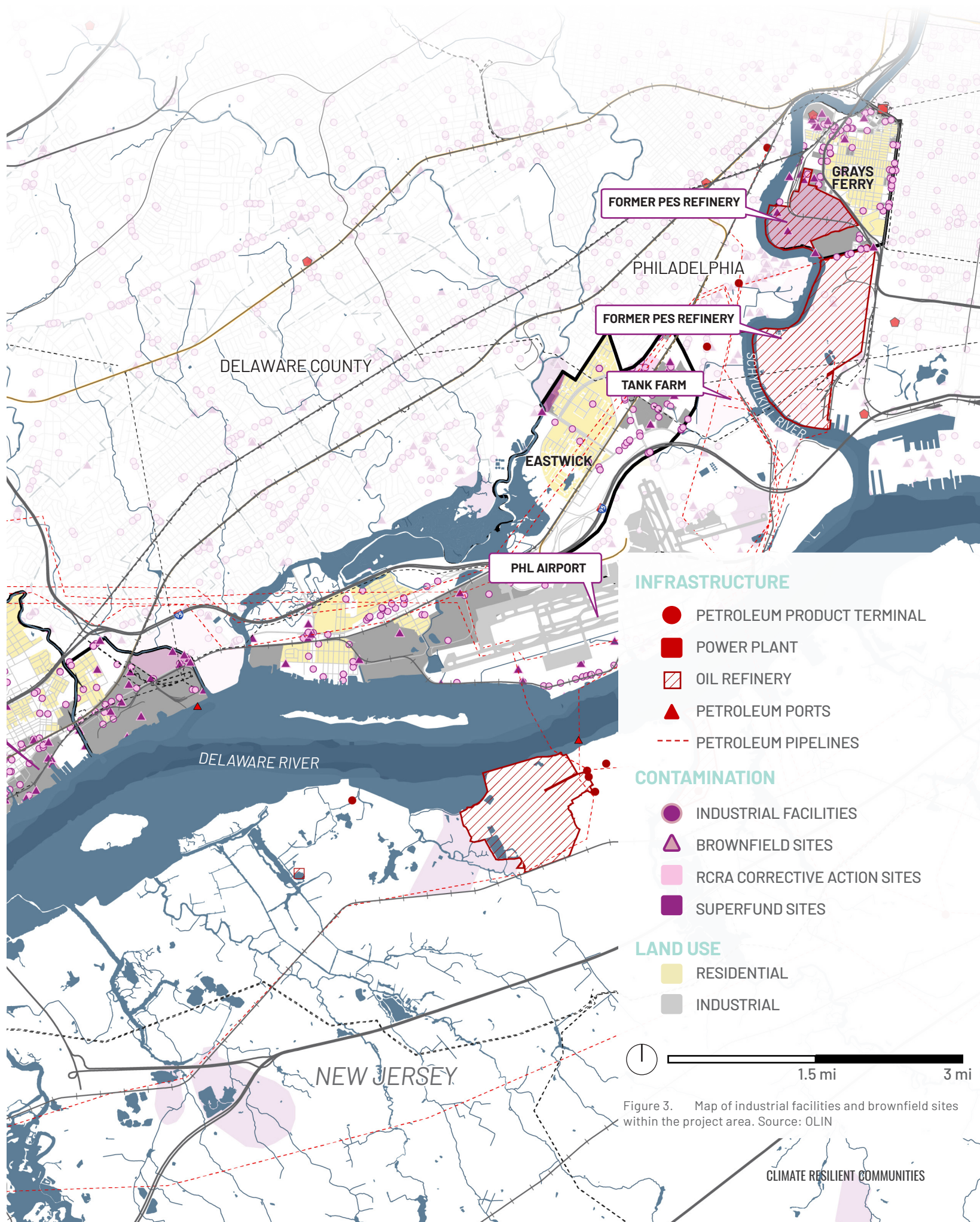


Figure 3. Map of industrial facilities and brownfield sites within the project area. Source: OLIN

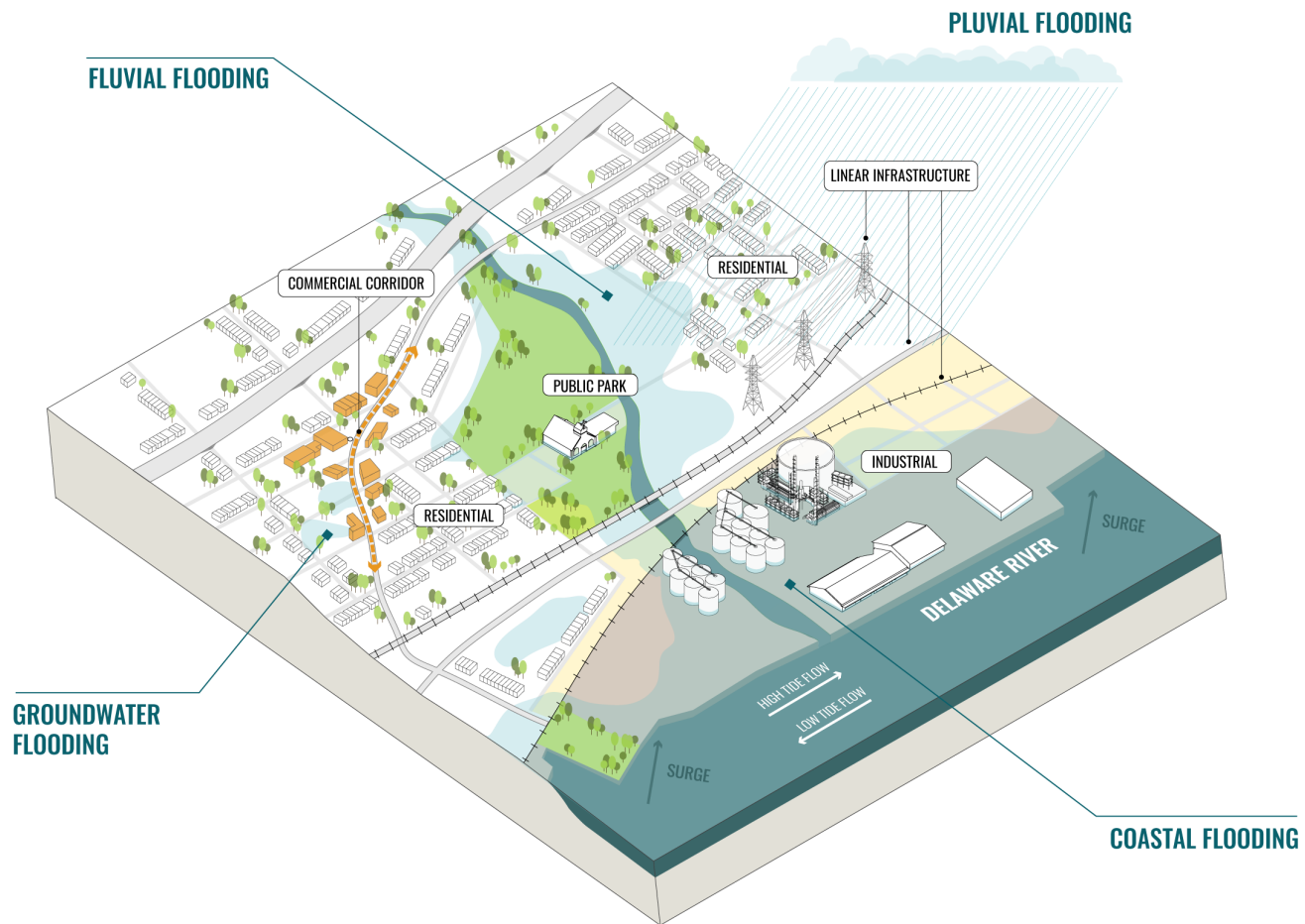


Figure 5. Diagram showing compound flooding processes. Source: OLIN

03 NATURAL HAZARDS



Communities along the Lower Schuylkill and Delaware Rivers are facing a mounting hazard as natural disasters increasingly intersect with industrial zones. The area is threatened by multiple types of flooding: fluvial (river), coastal (tidal), and pluvial (inland rain). These risks are expected to intensify significantly due to climate change, which is driving both sea-level rise and more frequent extreme rainfall events.

Beyond flooding, heat waves and the urban heat island effect present severe public health challenges. In areas like Chester, the combination of sparse tree canopy and vast impervious surfaces causes local temperatures to remain higher than the regional average. These natural hazards do not act in isolation; they are compounding factors that increase the likelihood of both industrial accidents and community risk while further straining the region's aging infrastructure.



-  Focus Community Engagement Meeting Series #1
-  Focus Community Engagement Meeting Series #2
-  Focus Community Engagement Meeting Series #3
-  Client Presentations, Stakeholder Advisory Meeting, Technical Advisory Meetings

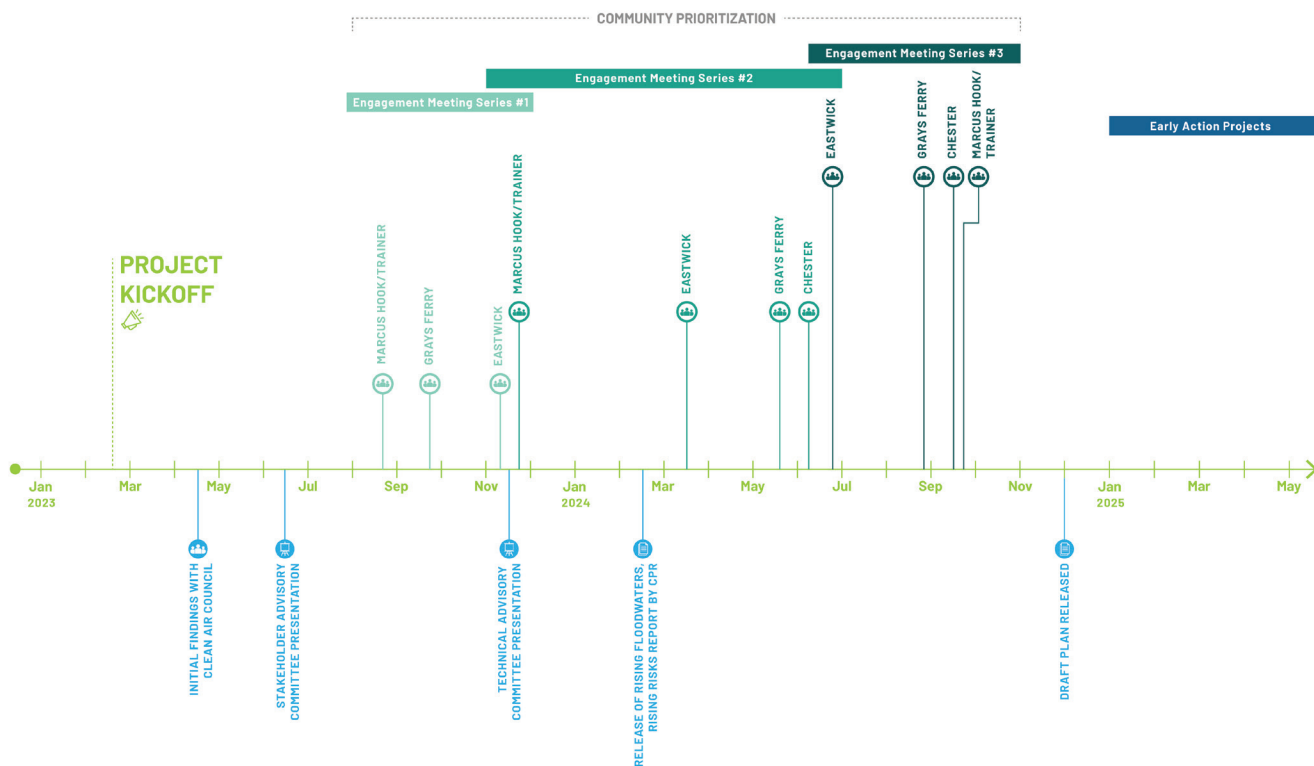


Figure 6. Diagram showing engagement timeline.
Source: OLIN

04 COMMUNITY OVERVIEW



The project study area focuses on seven communities: the Grays Ferry and Eastwick neighborhoods in Philadelphia, and the municipalities of Chester, Trainer, and Marcus Hook in Delaware County. These areas were selected based on their high levels of social vulnerability and their proximity to both heavy industry and recurring flood zones. For generations, residents here have lived in the shadow of industry, providing the labor that powered the regional economy while bearing the brunt of its environmental impacts.

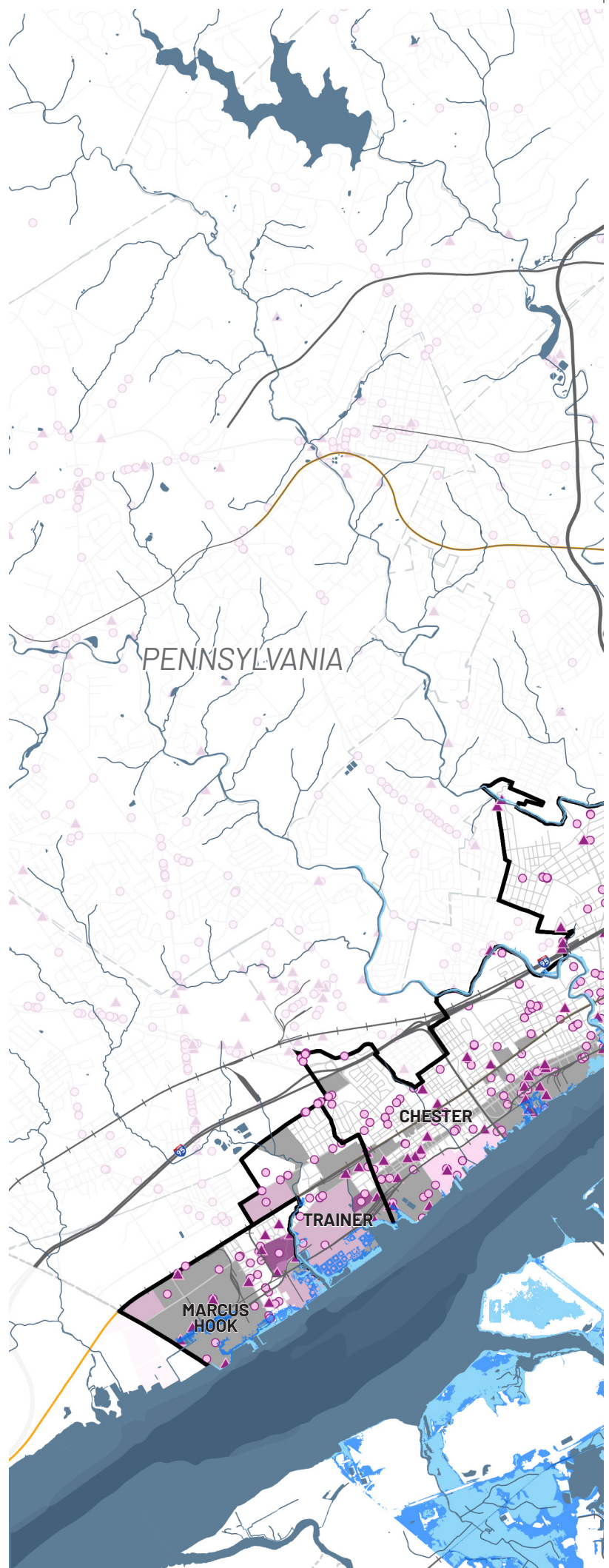
Community engagement revealed that most residents are already experiencing the effects of these hazards, with many reporting recurrent flooding in their homes and streets. Feedback highlighted a strong desire for early warning systems, improved emergency preparedness, and better access to community open spaces like parks and gardens. This study also acknowledges that these communities are situated on the traditional territory of the Lenni-Lenape, emphasizing the need for future adaptation efforts to collaborate with indigenous partners.

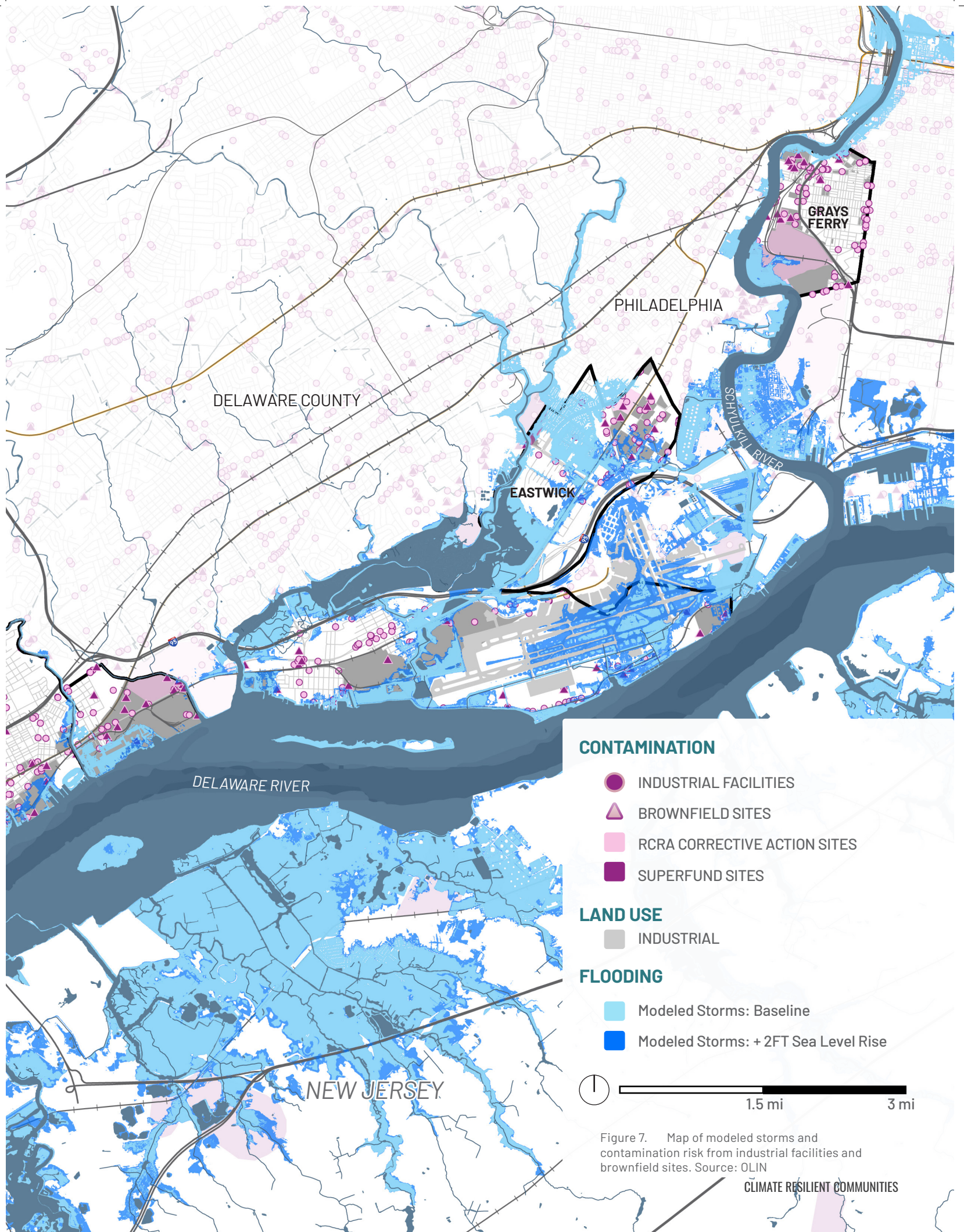
05 INCREASED COMMUNITY RISK

Increased risk is driven by the intersection of social vulnerability and environmental exposure. Using the CDC/ASTR Social Vulnerability Index, the report identifies communities with limited resources—due to factors like poverty, lack of transportation, or language barriers—that face the greatest difficulty in responding to and recovering from disasters. These vulnerabilities are often a result of historical discrimination and disinvestment, leaving these populations with the least adaptive capacity.

A critical concern is the emergence of Natural Hazard-Triggered Technological (Natech) events. Of the 556 industrial sites in the area, 49 toxic sites are considered flood-exposed to potential river flooding or storm surges. This means that a natural disaster, such as a hurricane, could trigger a secondary technological disaster, such as a chemical leak or refinery fire, creating a double disaster for already vulnerable fenceline communities.

Using flood modeling of historic storms plus a two-foot sea-level rise by Drexel's Consortium for Climate Risk in the Urban Northeast (CCRUN), this map highlights compounding climate and industrial risks. It shows the intersection of environmental and social vulnerability, where 160 of the region's 556 industrial and brownfield sites lie within highly vulnerable census tracts.





CONTAMINATION

- INDUSTRIAL FACILITIES
- BROWNFIELD SITES
- RCRA CORRECTIVE ACTION SITES
- SUPERFUND SITES

LAND USE

- INDUSTRIAL

FLOODING

- Modeled Storms: Baseline
- Modeled Storms: + 2FT Sea Level Rise



Figure 7. Map of modeled storms and contamination risk from industrial facilities and brownfield sites. Source: OLIN



Figure 8. Diagram illustrating scales of recommendations. Source: OLIN

06 RECOMMENDATIONS

The recommendations are organized into three scales: community toolkit, regional interventions, and policy recommendations. No single approach is sufficient to address the complexities of these challenges; instead, the report advocates for layered solutions.

Community Resilience Toolkit: Near-term, local actions such as expanding tree canopy, implementing green stormwater infrastructure, and creating social spaces to strengthen the networks residents rely on during crises.

Regional Interventions: Larger-scale hard infrastructure projects like levee systems and nature-based solutions like watershed restoration as well as the centralization of climate data into a public platform to ensure coordinated emergency responses.

Policy Recommendations: Regulations to ensure facility-specific protection, such as requiring industrial sites to anchor floatable equipment and elevate critical infrastructure, as well as municipal ordinances to preserve affordable housing to prevent displacement in at-risk areas.





Figure 9. (Left to right) 3rd Street/Wilcox Street Garden at Trainer, Sun Village Park at Chester, Community Meeting at Eastwick, Growing Together Garden at Grays Ferry. Source: OLIN, CAC.

07 COMMUNITY PROFILES



Each community profile provides a localized analysis of specific risks and tailored recommendations. For example, the Chester profile highlights the city's risk from fluvial flooding from the Delaware River and Chester Creek, as well as the urban heat island effect. It identifies high-priority assets at risk, such as the Chester Community Charter School and the Eddystone Fire Department.

The Marcus Hook and Trainer profiles focus heavily on the Natural Hazard-Triggered Technological (Natech) risk, given the dense concentration of oil refineries and terminals along the waterfront. For communities like Eastwick, which is bordered by landfills and tank farms, the recommendations emphasize both physical flood protection and social resilience, aiming to build on existing community advocacy to build resilient living environments.

The chapter also outlines three Early Action Projects. In Trainer, the 3rd Street/Wilcox Street Park project activates an underutilized neighborhood lot with an accessible nature storybook walk and native pollinator plantings. In Chester, the Sun Village Park project improves park connectivity by linking existing recreational areas with a new ADA-accessible storybook path, alongside the management and planting of native trees. Finally, in Grays Ferry, the Growing Together Garden project introduces a new native plant garden and picnic gathering space sited to accommodate localized stormwater drainage. Together, these projects represent near-term steps toward building climate-adaptive, accessible community amenities.