

INVEST IN DATA TO IMPROVE STORMWATER RESILIENCY



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The human losses and infrastructure damage from the Ida cloudburst were clearly terrible, but to some extent also expected. Though the City has put major effort into addressing stormwater driven flooding, including 10,000 green infrastructure installations designed to increase stormwater absorption capacity, these efforts have mainly focused on decreasing the volume of stormwater entering sewer systems where stormwater and sewage water are combined. Investing at the scale needed to reduce surface flooding during extreme rainfall events such as Ida requires investment on another scale entirely. A dramatic transformation in our flood resilience will likely cost hundreds of billions of dollars and take years to decades to implement. But there is much we can do now, and it requires data.

First, we need better information on where flooding occurs. The city has limited information from 311 calls, but many communities do not report flooding through 311 and when they do it often lacks critical information such as flood depth, flow rates, how long water is standing or pooling in an area, when flooding began and when water receded. Better flood data is key to more fully understanding the flood problem so we can ensure that solutions we invest in are designed for the local neighborhood context. It is exactly

this kind of data that can be gathered by installing real-time, cloud-based flood sensors in areas we know are likely to flood or where the recent NYC Stormwater Resiliency Plan flood scenario maps have suggested are areas most likely to be exposed to flooding, including from extreme rainfall or even extreme rainfall combined with coastal storm surges and affected by sea level rise. Investing in small, powerful, real-time, cloud-based IoT sensing can do many things for improving our knowledge of when and where flooding occurs, and provide the nuanced information needed to design solutions to fit. In some cases, we may need to raise roads or curb heights, in others we may need to install temporary storage bases, in others we may need hybrid grey and green infrastructure to improve temporary stormwater storage and absorption. Ultimately, what will work best depends on improving our flood knowledge system with better flood event data.

We can also do a better job of asking and listening to New Yorkers who are on the front lines of flood exposure in their neighborhoods. Many people take photos, post them on social media, or otherwise share critical time-stamped information about where flooding occurs, approximate depths, and what human and infrastructure impacts are occurring, often in real-time. We need to better coordinate and mine this information from social media

sources including Twitter, Instagram, and other places where people are already providing key information that can improve our knowledge.

“MODEL PROJECTION INFORMATION IS KEY TO MAKING SMART, LOCAL, AND CONTEXT SPECIFIC INVESTMENTS TO DECREASE IMPACTS OF MULTIPLE FORMS OF STORMWATER FLOODING IN THE CITY, BUT WE MUST IMPROVE OUR KNOWLEDGE ABOUT FLOODING WHEN IT HAPPENS”

Investing in data is not only important for assessing damage. Improving real-time data flow on flood extent, depth, and damage can improve emergency response and help prioritize where critical services need to be restored. These data can also help us better predict where flooding is likely to occur from different kinds of storms. Most of our information about where flooding may occur in the city comes from hydrological models such as those used in the NYC Stormwater Resiliency Plan (2021) flood scenarios, which you can see and interact with at stormwater. However, flood projection models, no matter how sophisticated, are only

as good as the data that we feed them. And any model projection needs to be validated for accuracy. Flood sensor, camera, and social media data are all critical information for model validation, which essentially allows us to see where models are accurate, and where they make mistakes. The more accurate and precise our models the better information we’ll have for designing resiliency solutions for the multiple drivers of flooding from cloudbursts, moderate rain events, rainfall that is combined with high tides, or extreme rain combined with coastal storms that may have high, medium or low storm surge.

The future of flooding in NYC is certain. We will have more floods. But what combination of sea level rise, tidal action, storm surge, and rainfall we may face in any future event is all unknown. However, we have the capability to improve our understanding of where different types of events will flood, how much flooding may occur with different scenarios, and even the ability to project potential damages, especially if we invest in improving knowledge and data gathering. Model projection information is key to making smart, local, and context specific investments to decrease impacts of multiple forms of stormwater flooding in the city, but we must improve our knowledge about flooding when it happens. This means investing in the sensors, social media data mining, and analysis of camera feeds in real time to improve the emergency response and to make sure that we are learning from every storm, no matter how small or large, to build preparedness and resiliency over time into every at-risk neighborhood in the city.

