FloodMapp

THE CITY OF NORFOLK

RISE
Resilience Innovations

Innovative Solutions for Flooding:

The City of Norfolk & FloodMapp

Norfolk, Virginia

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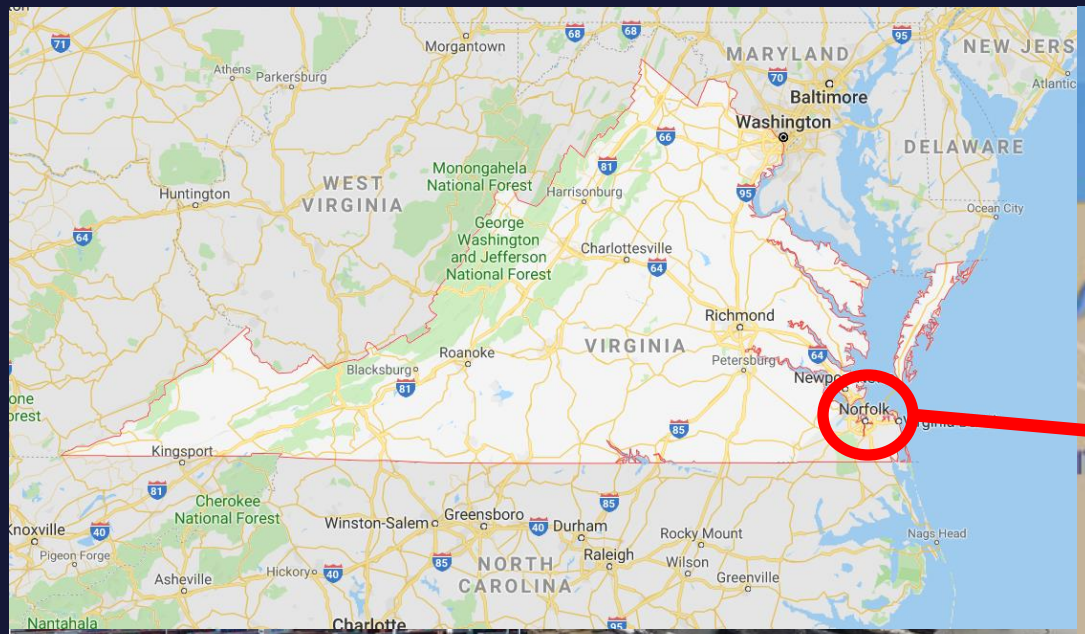
A City Defined by Water



Flooding Challenges in Norfolk

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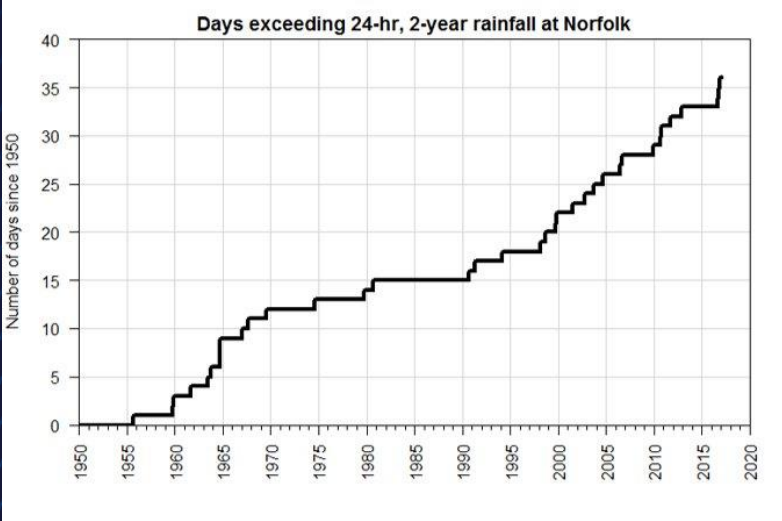

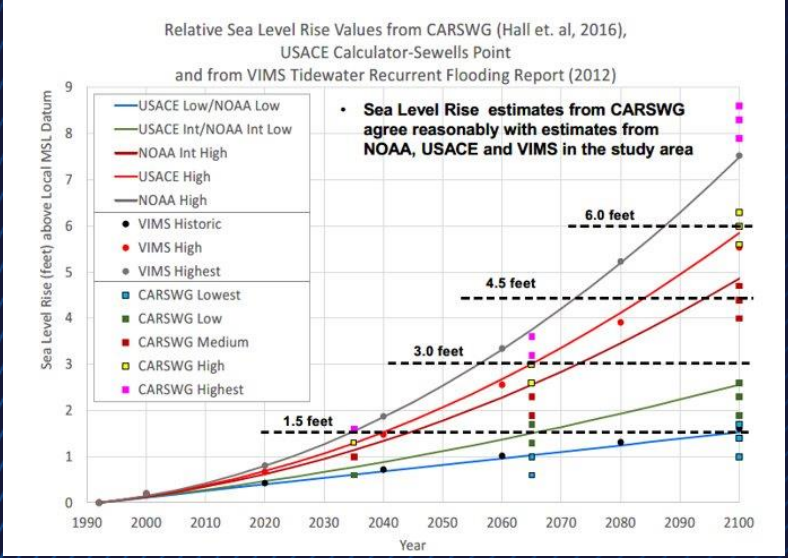

Blue Sky Flooding

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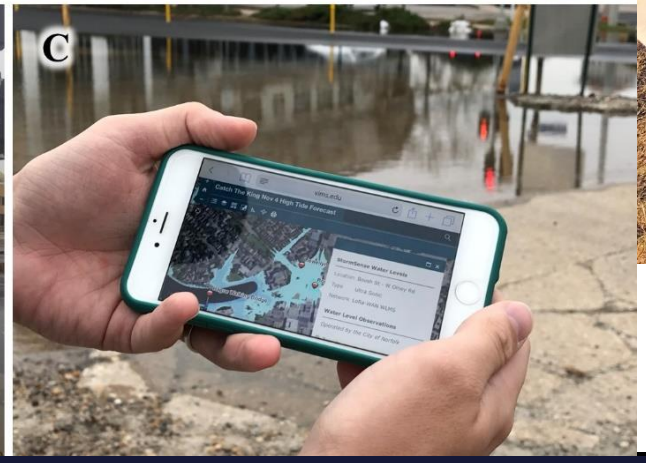
Water Level Sensor Design Comparison



RISE Resilience Innovations

Homeland Security

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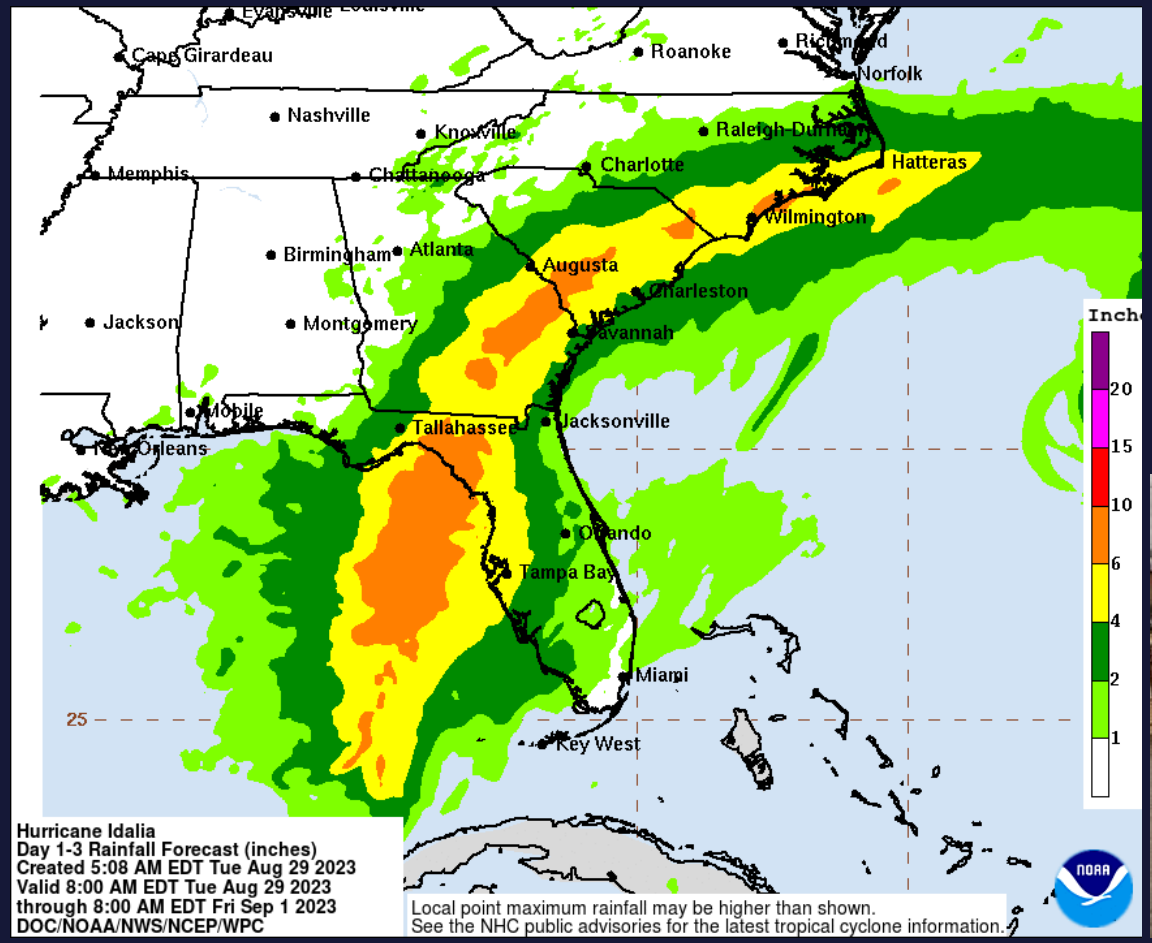
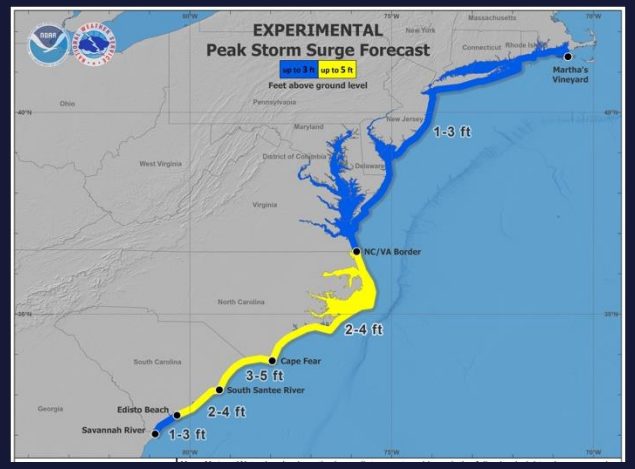
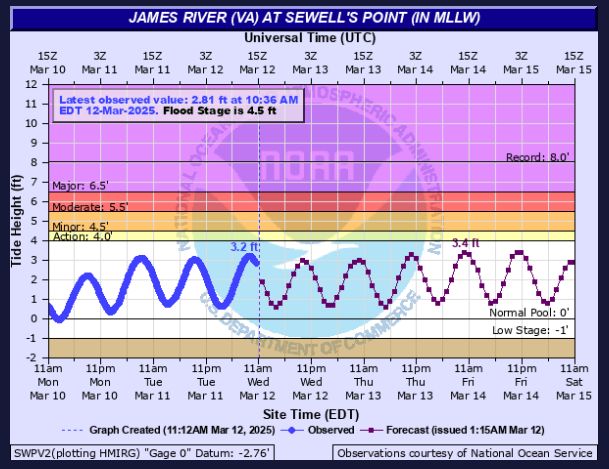
Challenge: Access to localized road impacts







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Search for a Solution

RISE
Resilience Innovations

- Early warning for residents:
- Text message, Email, Alexa, Google Home, Facebook, Google+, Twitter
- Updates to social mapping/traffic applications (Waze)
- Targeted location-based notifications
- Early warning to emergency services (EOC, fire, rescue, traffic center)
- Redirect to avoid flooding
- Data can support calibration of water level models.
- Foundation for a predictive model.

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RISE Resilience Innovations

Norfolk, Virginia

Who: RISE is a non-profit organization 501(c)(3), based in Virginia

Mission: To catalyse innovation & growth around creative solutions in the areas of sea-level rise, recurrent flooding, & economic resilience

Aims:

- To enable businesses to develop, demonstrate & scale innovations that help coastal communities adapt to changing climate
- Select and support resilience solutions that work effectively, can scale, can replicate, and do all of this cost-effectively

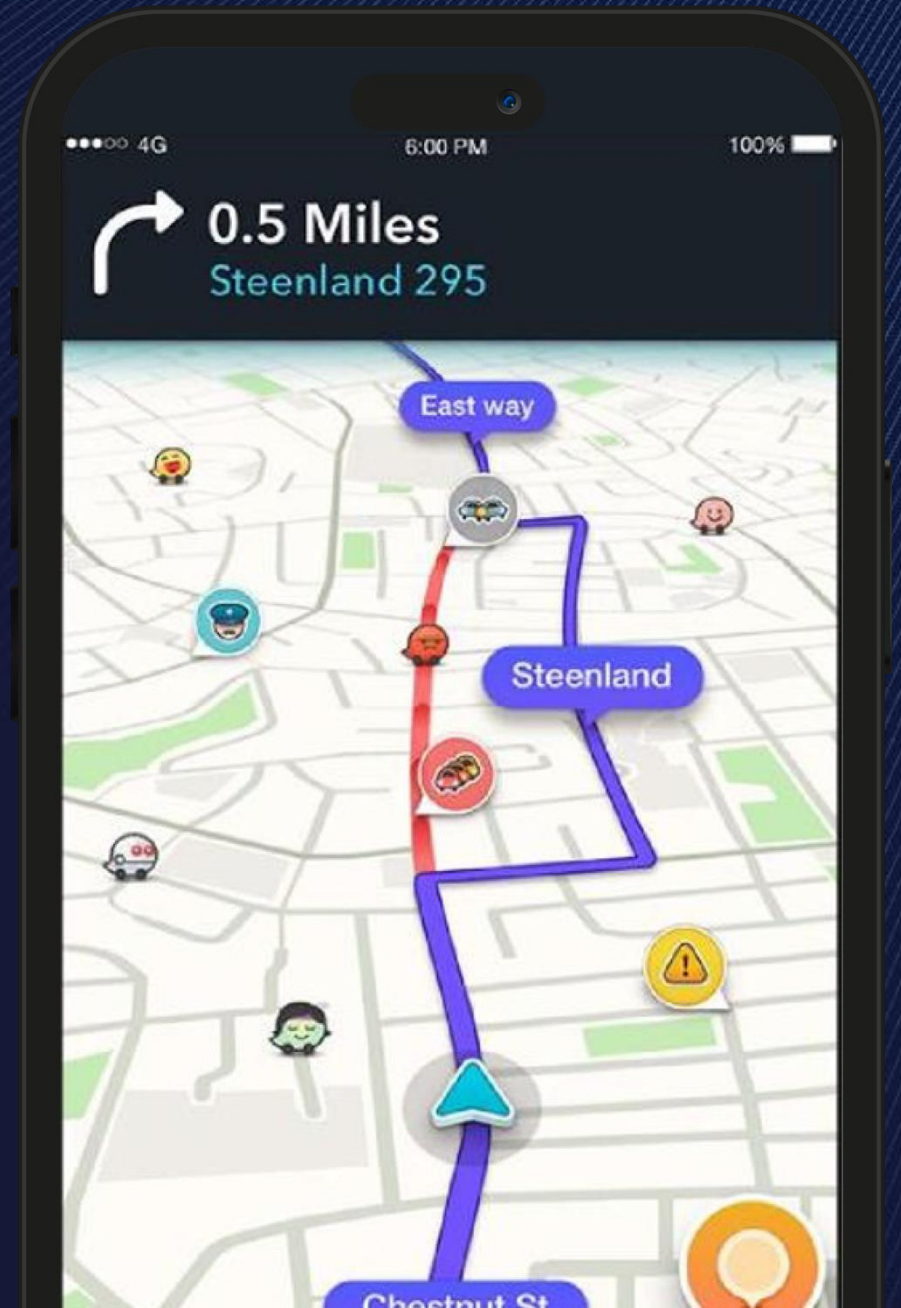
Funding:

- This project is made possible by a grant from RISE, which is funded through **Community Development Block Grants from the U.S. Department of Housing and Urban Development** and administered through the **Virginia Department of Housing and Community Development**

Waze for Cities Overview

What is Waze?

- ✓ Free, real-time, crowdsourced
- ✓ Traffic and navigation app
- ✓ Save every driver 5 minutes every day
- ✓ 185+ Countries, 42+ Languages & Voices
- ✓ 76M monthly active users (drivers)
- ✓ 50,000+ volunteers (map editors)



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Flooded Roads & Re-routing

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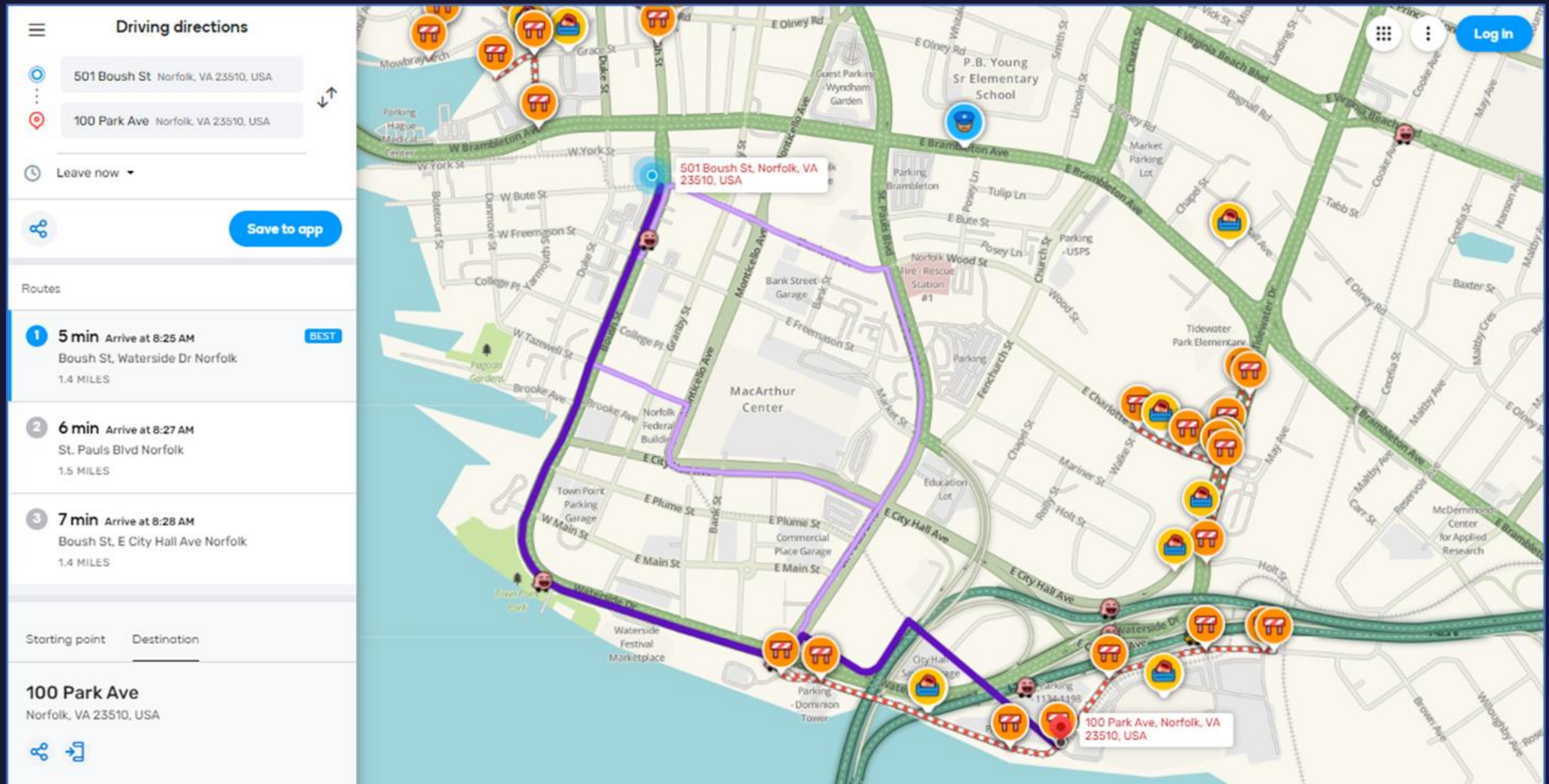

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Challenge

Every flood is different.

You might have several sensors, but there are 14,000 road segments in Norfolk.

You might have a 1% or 0.2% Flood risk map, but every flood is different.

Even some of the hot spots are well outside of the flood plain.

Bridging the gap from data to action.

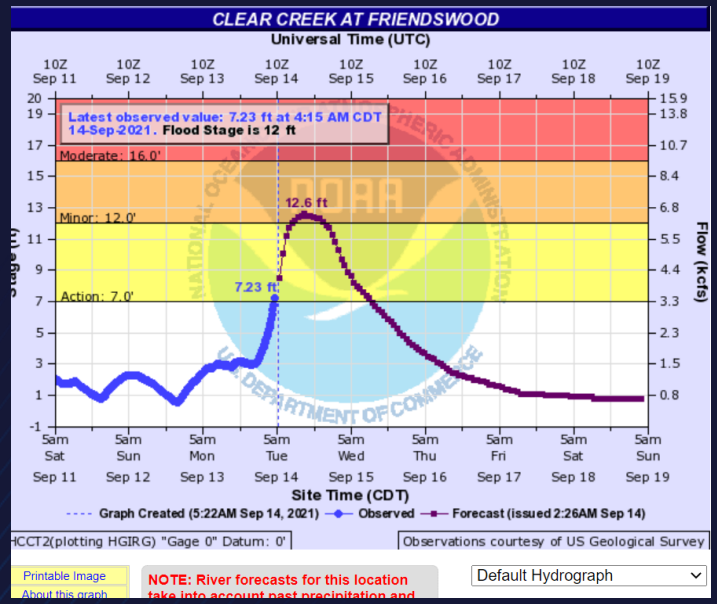
It’s not feasible to have a sensor on every street or even every hot spot.

Risk maps are not live maps.

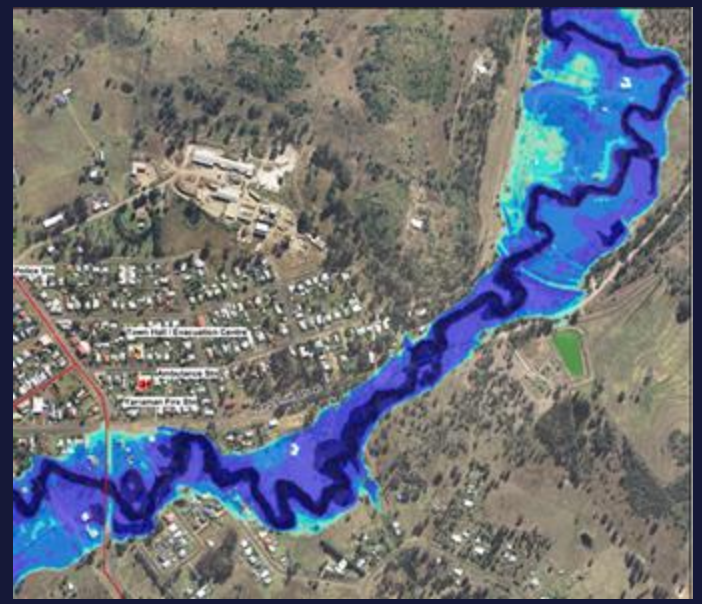
A Wicked Problem

1. Climate modelling
Where will the rain fall?

2. Hydrology
How high will rivers peak?



3. Hydraulics
Where will the water spread?



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FloodMapp DASH

Live, **operational** impact intelligence

- Purpose built **for emergency management**
- **Real-time** situational awareness
- Flood **extent, depth, and impacts** delivered via API into any GIS system.
- Dynamic **hourly updates to reflect** changing conditions using live rainfall & flood sensor data.
- Enhances physical hydrology and hydraulics with **AI and Machine learning**
- **Scalable** from **property level** to **national** scale. 10m - 1m resolution.
- Up to **96% accuracy**

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FloodMapp DASH - Inputs

Sensors

- NWS, NOAA, USGS, 3rd Party

Land Surface Data

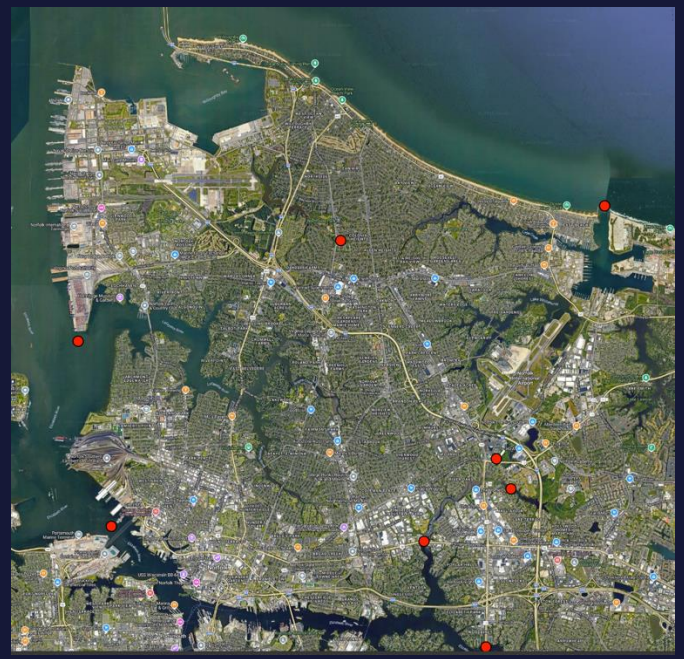
- DEMs, Land use etc.

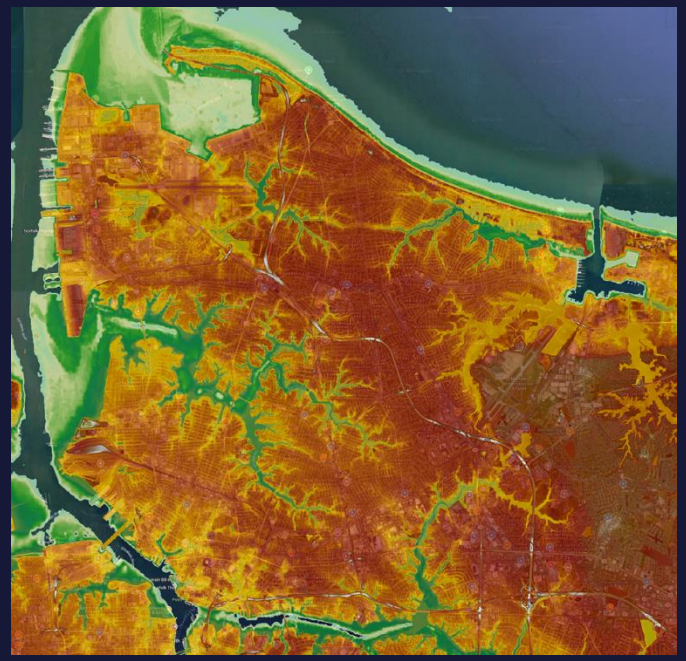
Meteorology Data

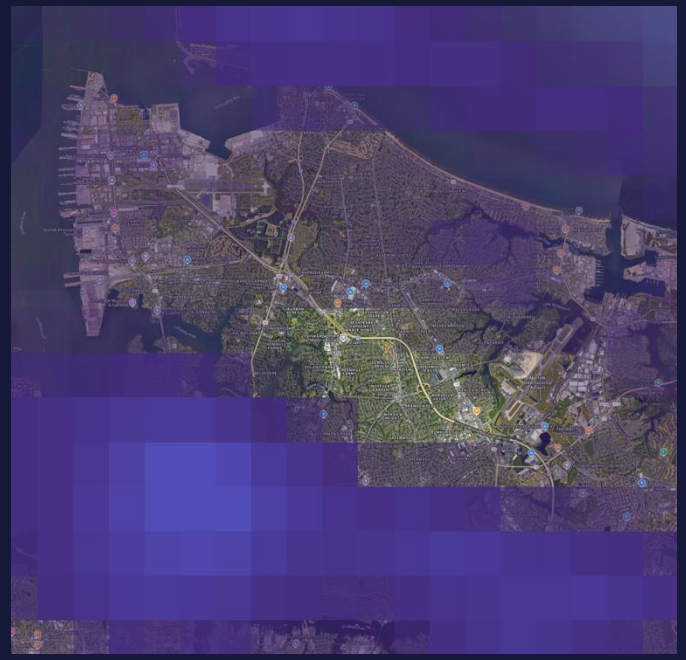
- Precipitation, Wind, Soil Moisture

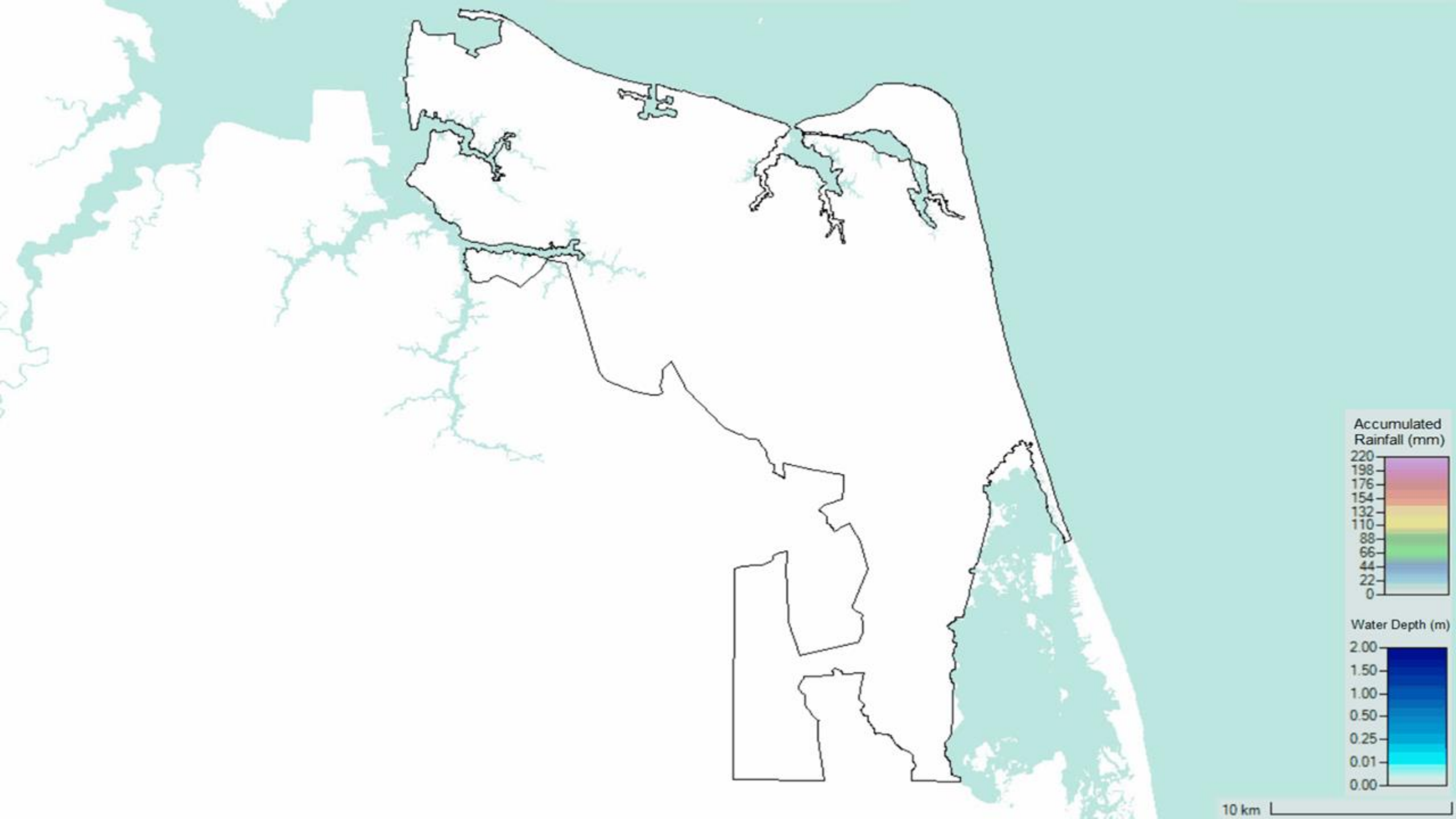
Impacted Assets

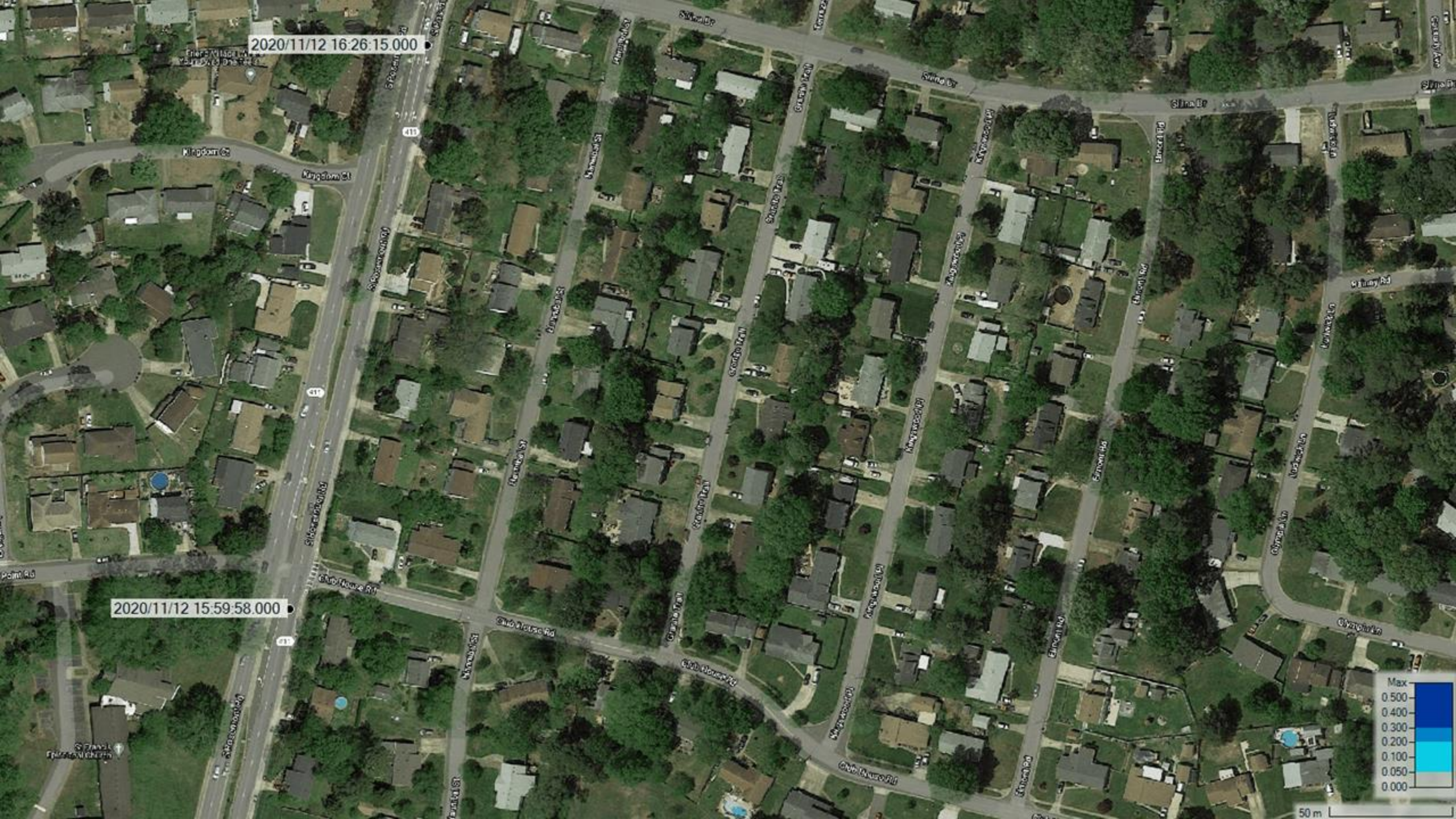
- Roads, Buildings, etc.








Accumulated Rainfall (mm)
220
198
176
154
132
110
88
66
44
22
0
Water Depth (m)
2.00
1.50
1.00
0.50
0.25
0.01
0.00
10 km


2020/11/12 16:26:15.000
2020/11/12 15:59:58.000
Max
0.500
0.400
0.300
0.200
0.100
0.050
0.000
50 m

Calibration & Validation

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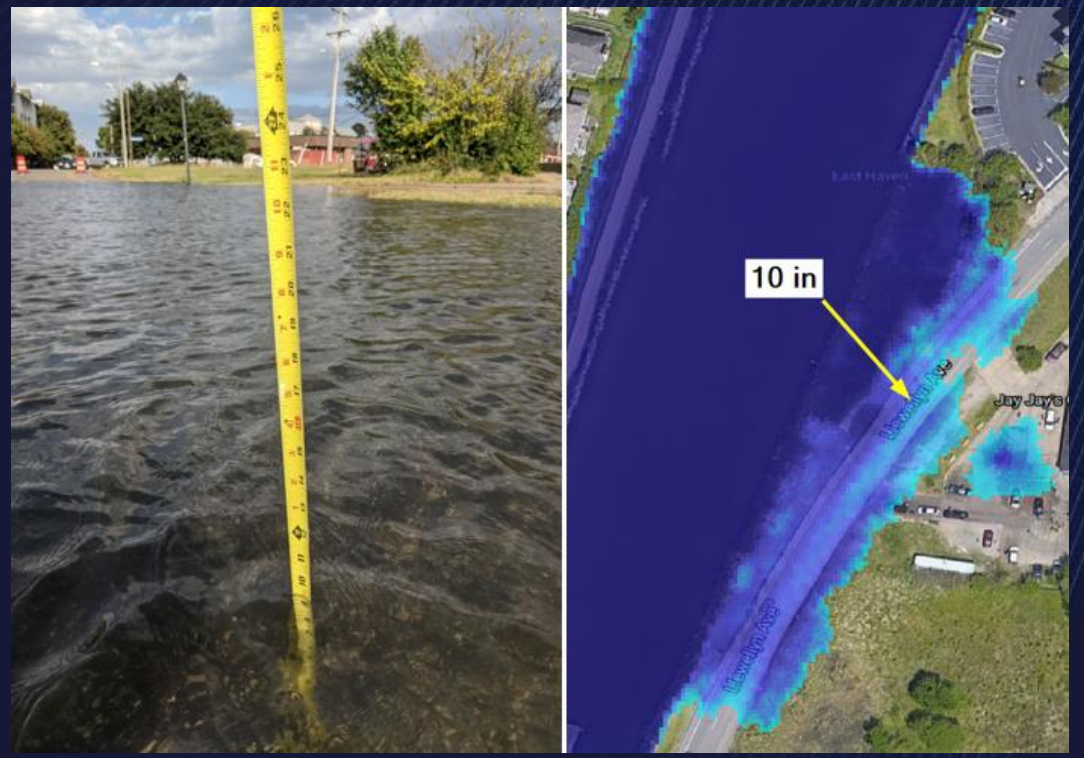
- ✓ Media imagery
- ✓ Drone videos
- ✓ Pre-existing flood studies
- ✓ Traffic camera imagery
- ✓ Social media photos/videos
- ✓ High water marks
- ✓ Satellite imagery



Flooding in Norfolk, VA.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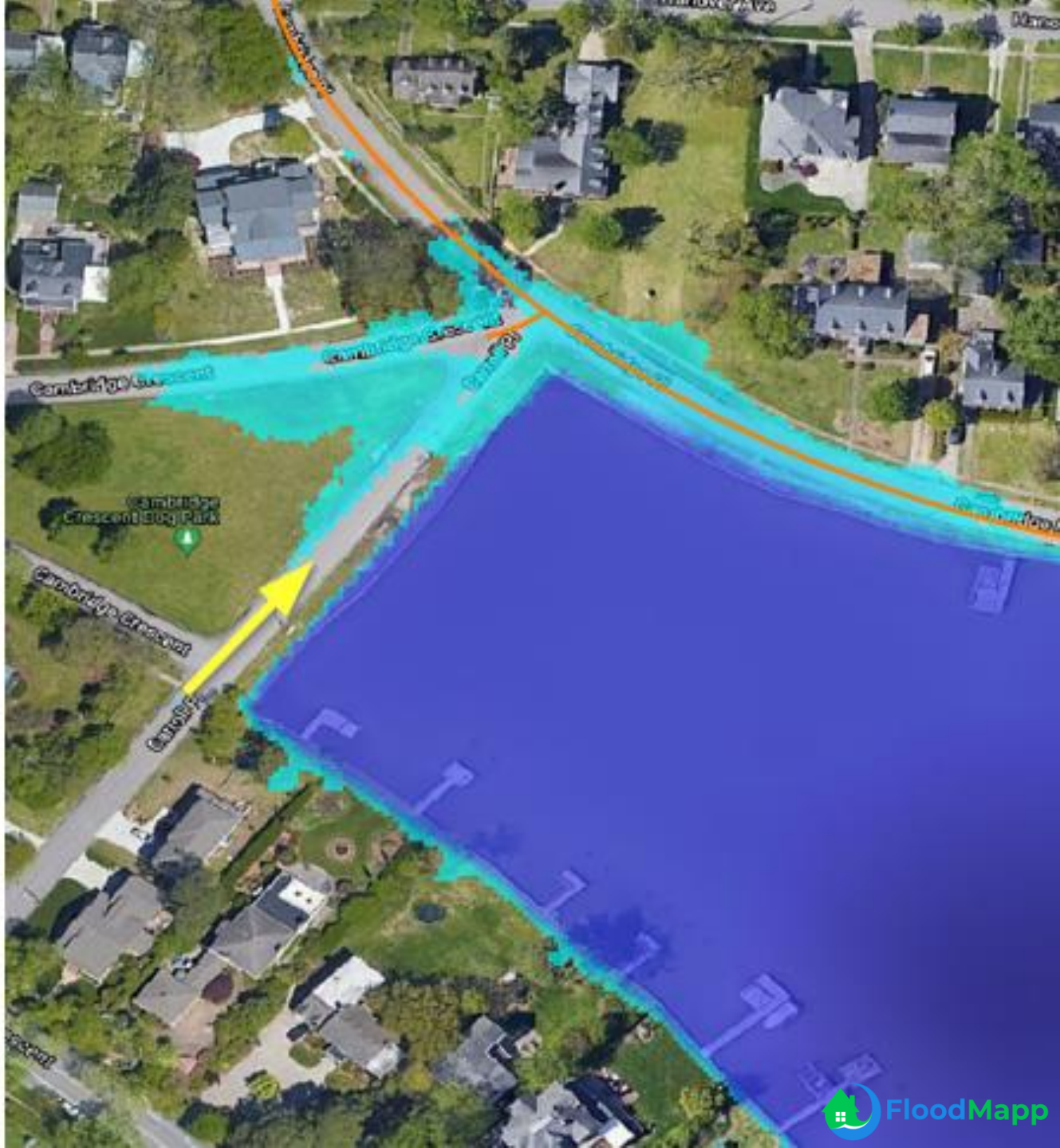
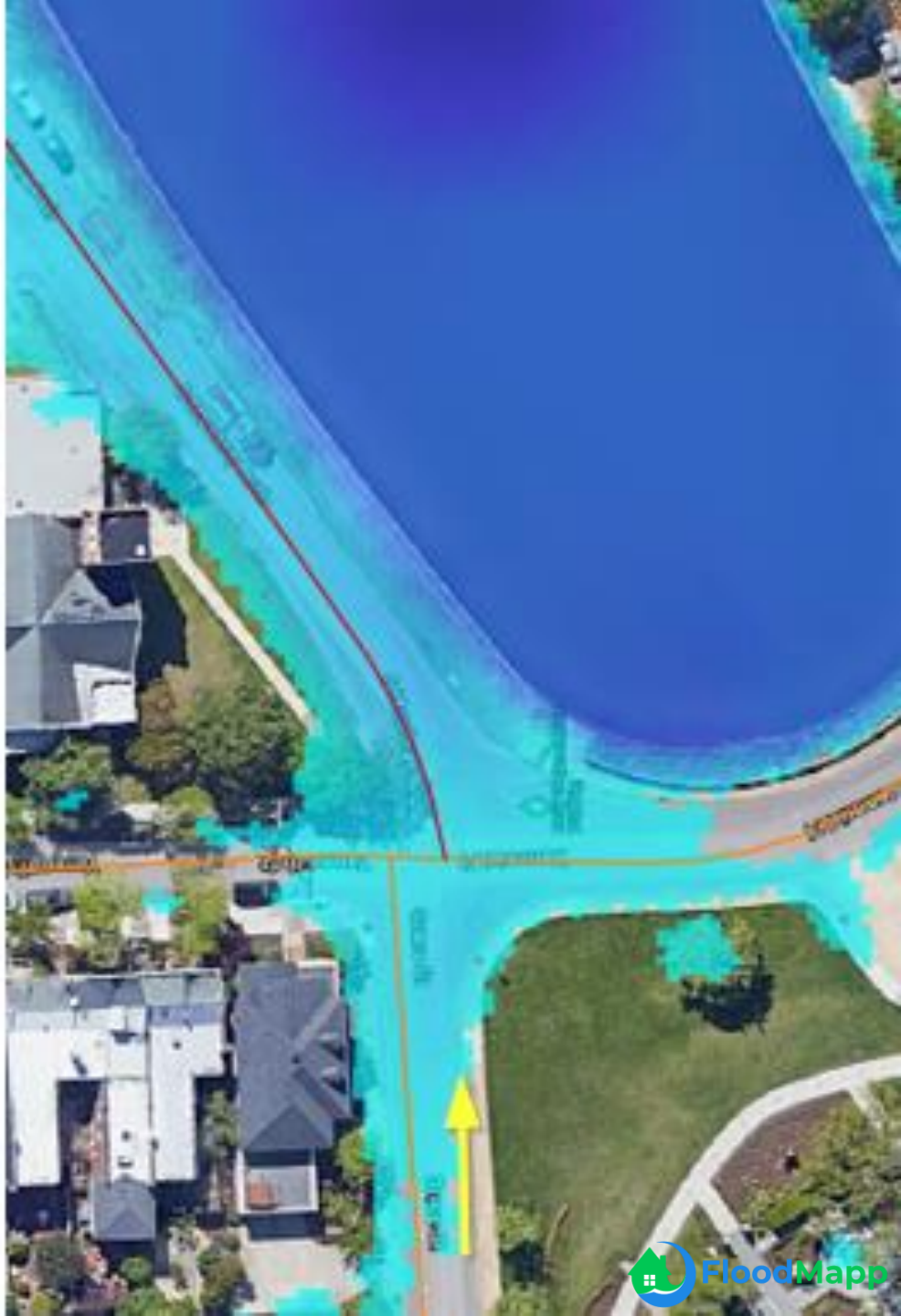

Cambridge Crescent Dog Park
Cambridge Crescent
FloodMapp


STOP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Live Flood Intelligence

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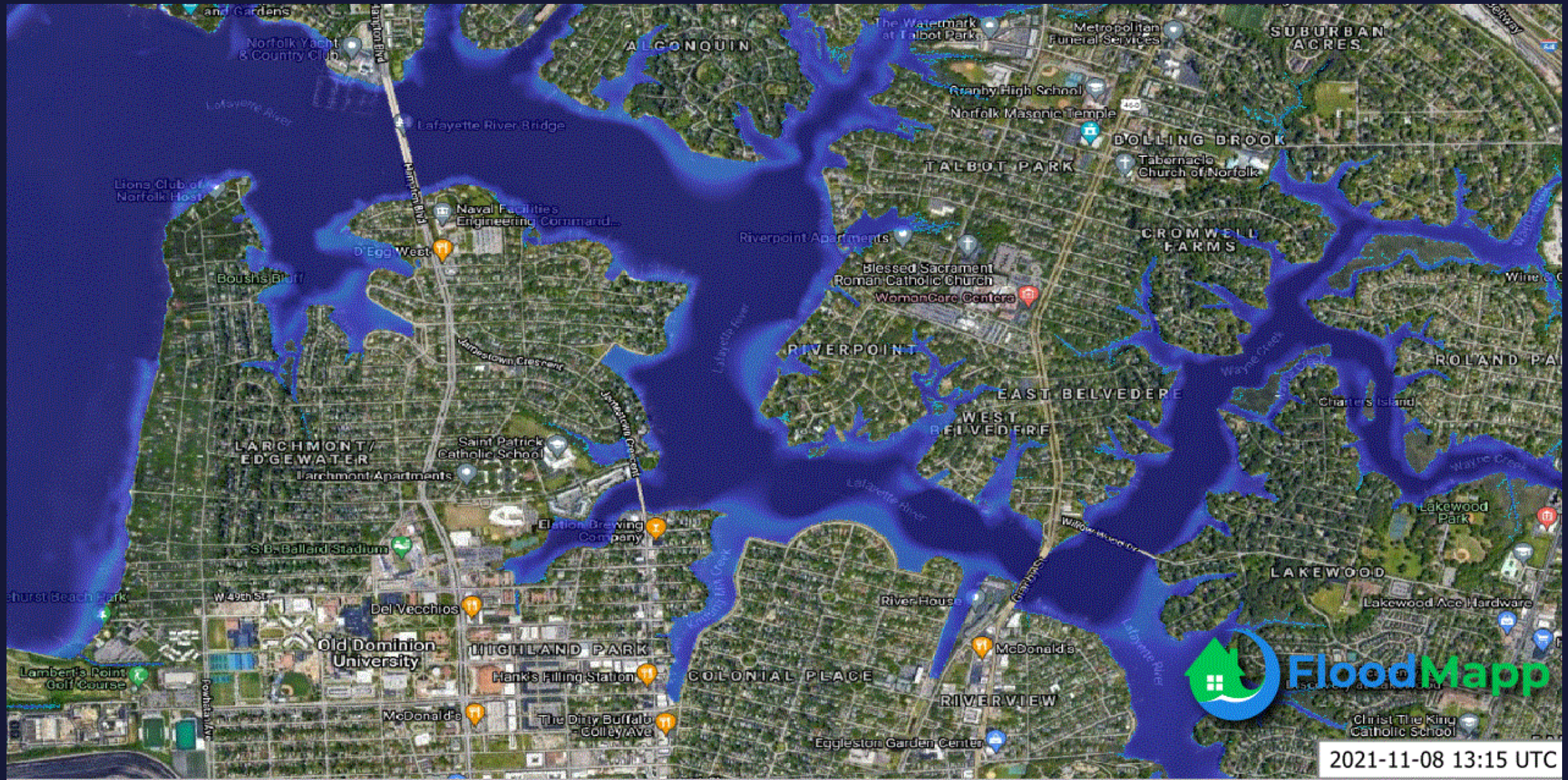
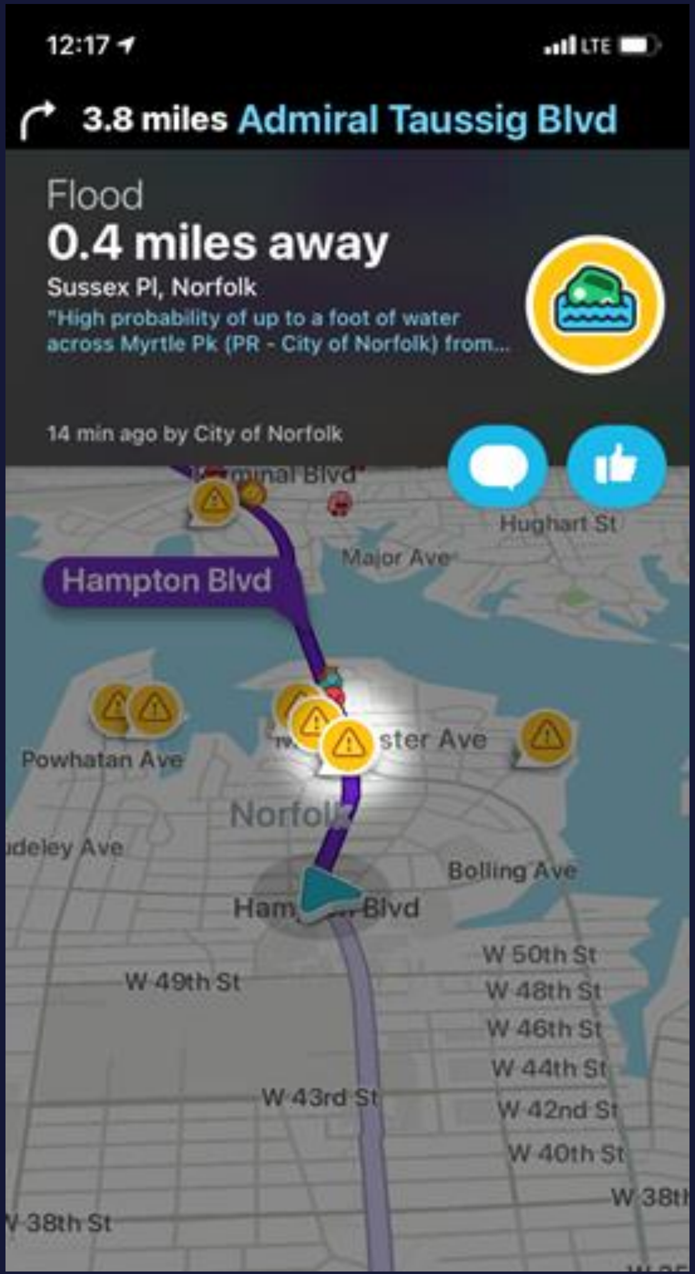



Chrysler Museum
Mowbray Arch
Memorial Pl
Yarmouth St
Grace St


12:17
LTE
3.8 miles Admiral Taussig Blvd
Flood
0.4 miles away
Sussex Pl, Norfolk
"High probability of up to a foot of water across Myrtle Pk (PR - City of Norfolk) from...
14 min ago by City of Norfolk
Hughart St
Major Ave
Hampton Blvd
Powhatan Ave
Norfolk
Bolling Ave
W 50th St
W 49th St
W 48th St
W 46th St
W 44th St
W 43rd St
W 42nd St
W 40th St
W 38th St

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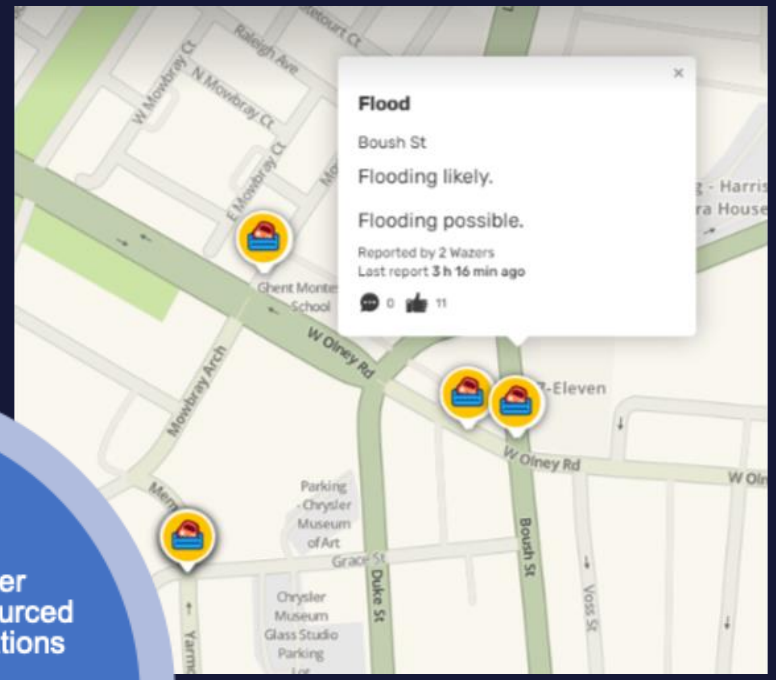
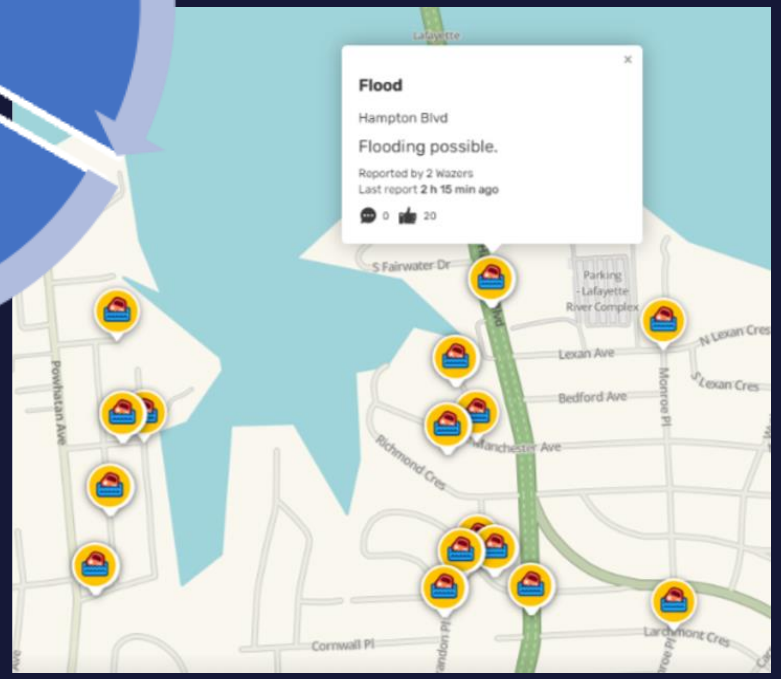
Crowdsourced Observations

- Total number confirmed flood hazards: **16,604**
- Total thumbs up: **39,341**
- Most thumbs up for single hazard: **74**
- Average thumbs up per hazard: **2.37**





Crowdsourced Observations

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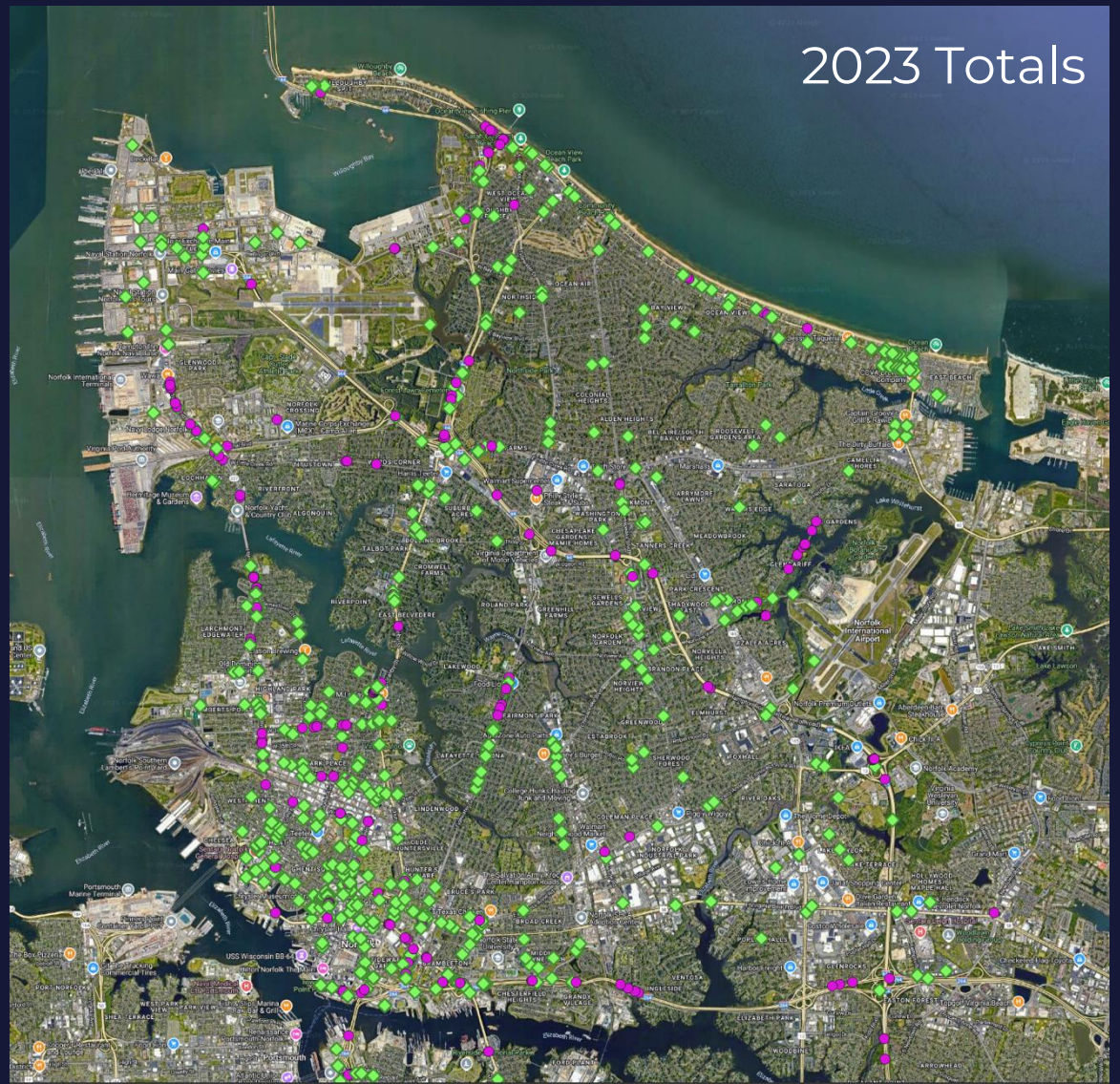

Outcomes

Live flood intelligence improved disaster outcomes in Norfolk through:

- **Improved safety** by alerting drivers to route around actively flooded roadways
- **Prevented damage** to private and public assets through public notification
- **Helped the community adapt to climate change** through incorporation of a dynamic, scalable live flood intelligence solution

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Matthew Simons, AICP CFM · 2nd
Norfolk Deputy Resilience Officer
6d ·

+ Follow ···

I'm amazed how accurate these tools from FloodMapp are. It's fully integrated into Waze, re-routes drivers in real time. This will change the insurance game as carriers start to see the data on reduced water losses; part of the City of Norfolk, VA "Drive Safe/Park Safe" flood message for the NFIP Community Rating System. CRS points keep flood insurance rates low for Norfolk policyholders. All working together for good.

FloodMapp
12,585 followers
2w ·

"If we'd had just 10 more minutes..." It's something said too often after a flood.
At FloodMapp, we're giving that time back.

Our real-time flood intelligence tools help you:
✅ Predict and visualize rising water at street level
✅ Close roads before they're under water
✅ Send earlier, more accurate public alerts

In Norfolk, VA, they went live with FloodMapp and predicted 4,348 flooded roads before drivers hit them — verified in Waze by over 9,000 user confirmations.
That's real-time situational awareness that helps save lives.
⏱️ See how Norfolk did it: https://hubs.ly/Q03lWqTV0

Outcomes

Live flood intelligence improved disaster outcomes in Norfolk through:

- **Reduction of NFIP insurance premiums** for eligible policy holders through the Community Rating System (CRS) program.
- Norfolk's CRS Class 5 status saves all policyholders a total of ***$1.9M*** annually; an average savings of ***$273*** *annually* per home located within the Special Flood Hazard Areas (SFHA).

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Outcomes

Live flood intelligence improved disaster outcomes in Norfolk through:

- **Expedited delivery of federal assistance**, should Norfolk experience a large disaster we hope to enable rapid damage assessments and reducing funding delays to those who were impacted.

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Live Impact Dashboard

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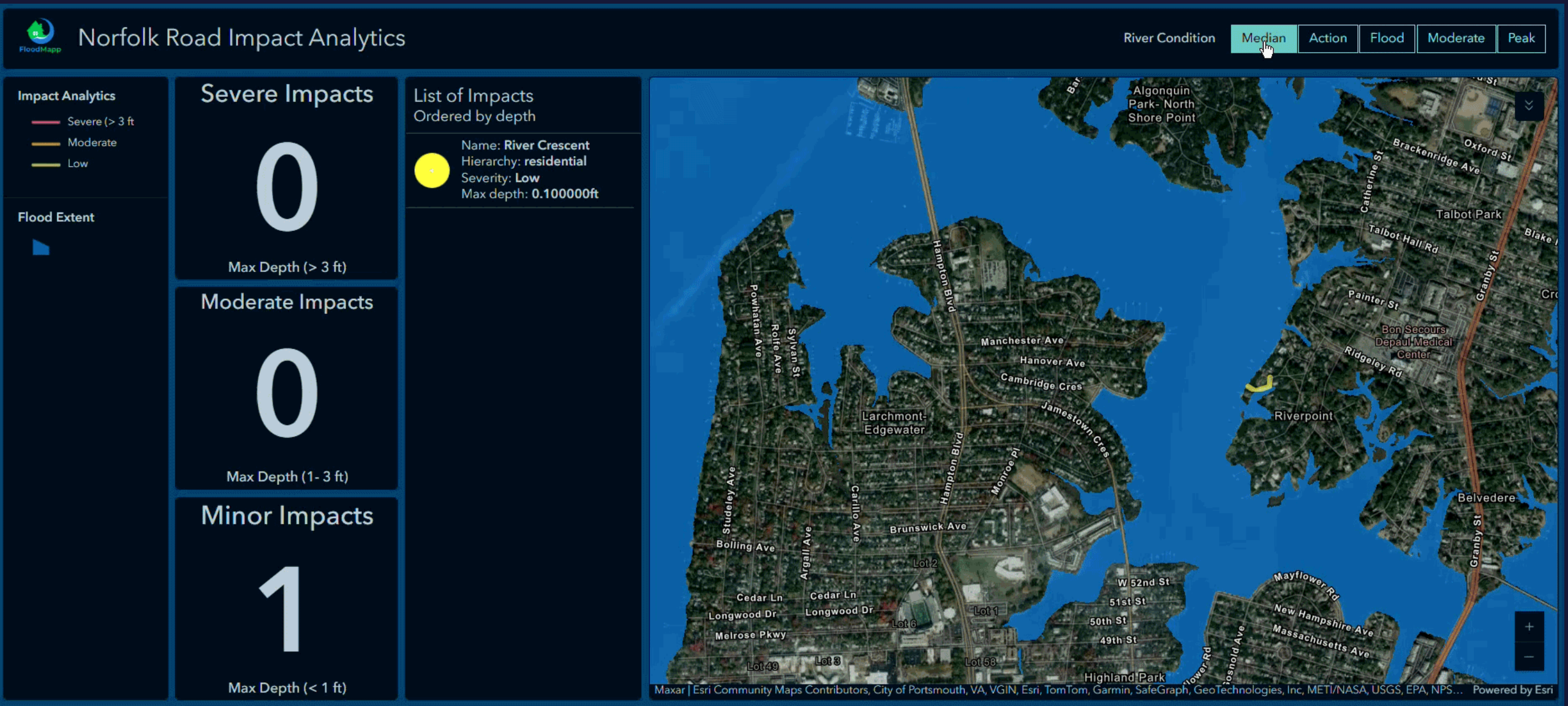

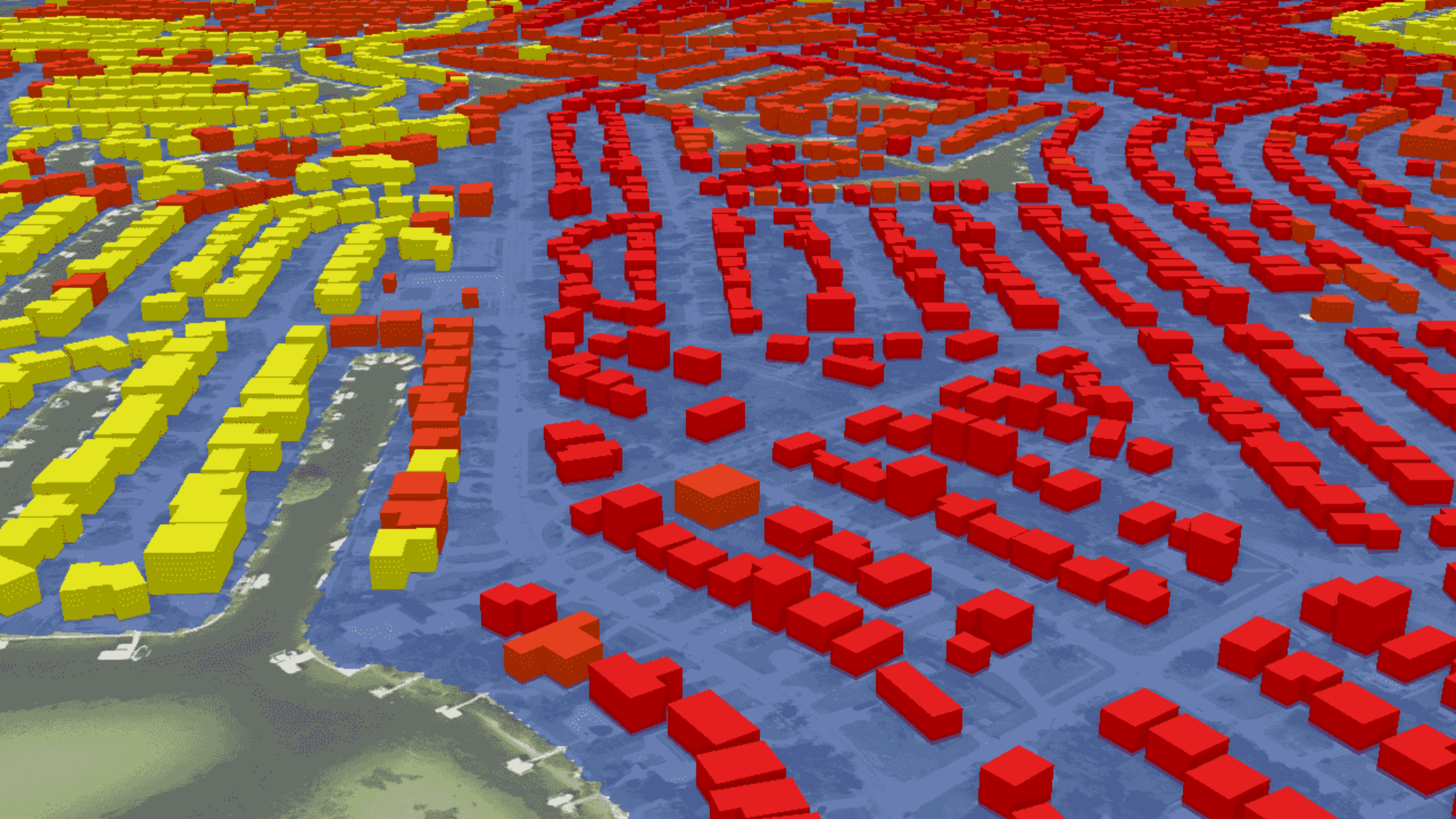

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Questions & Answers

CONTACT US
hello@floodmapp.com