

# “I never realized sidewalks were a big deal”

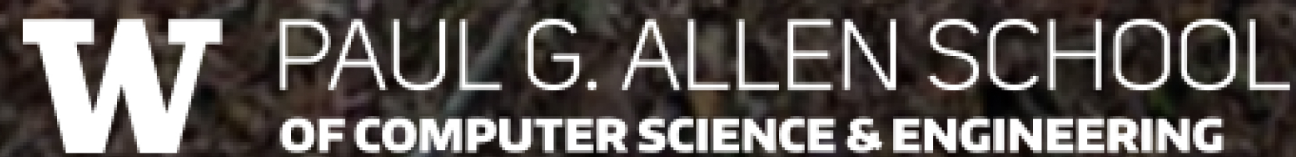
## A Case Study of a Community-Driven Sidewalk Audit Using Project Sidewalk

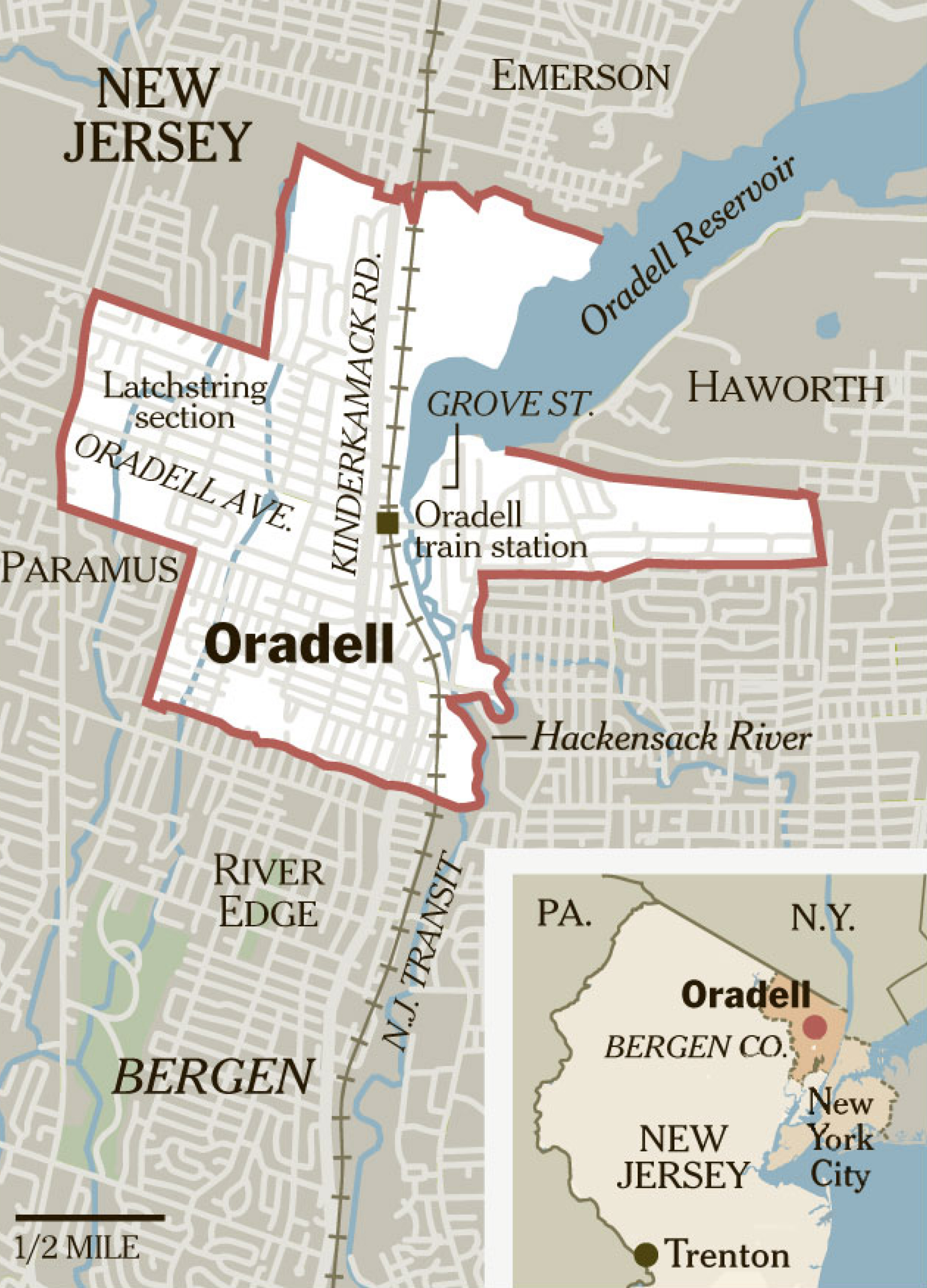
Chu Li, Katrina Ma, Michael Saugstad, Jon E. Froehlich, University of Washington

Molly Delaney, Yochai Eisenberg, Delphine Labbé, Devon Snyder, University of Illinois at Chicago

Judy L. Shanley, Easterseals

Kie Fujii, Florian P. Thomas, Hackensack Meridian School of Medicine





# Oradell

Borough in Bergen County, New Jersey

Population: 8,110; City Streets: 40 miles (64km)



# Oradell Partners



Hackensack  
Meridian *Health*



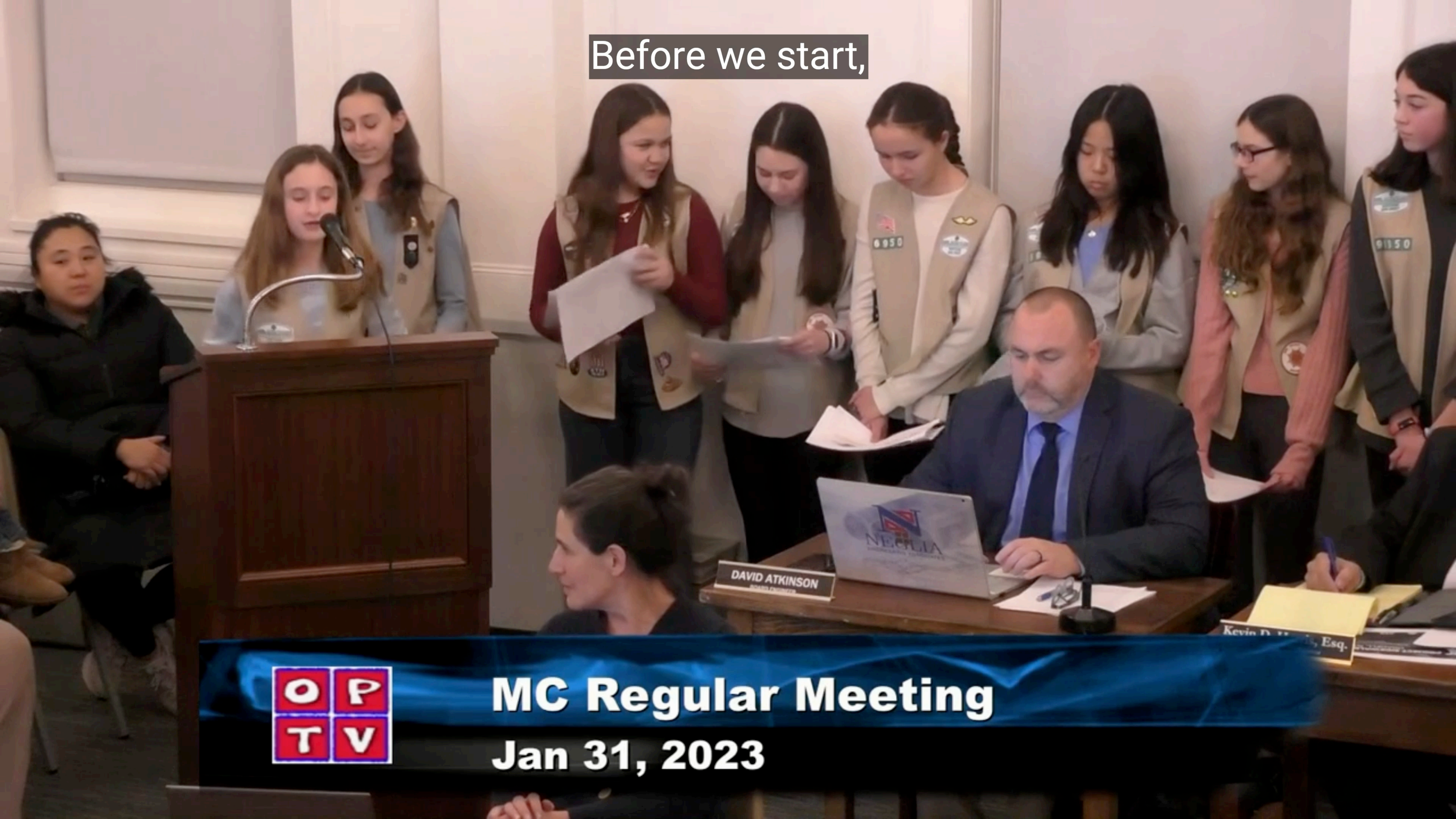
National  
Multiple Sclerosis  
Society

Before we start,



# MC Regular Meeting

Jan 31, 2023



Before we start,



# MC Regular Meeting

Jan 31, 2023

DAVID ATKINSON  
BOARD CHAIRMAN

Kevin D. ... Esq.

Before we start,

# Sidewalk accessibility lacking in many US cities despite regulations



**MC Regular Meeting**

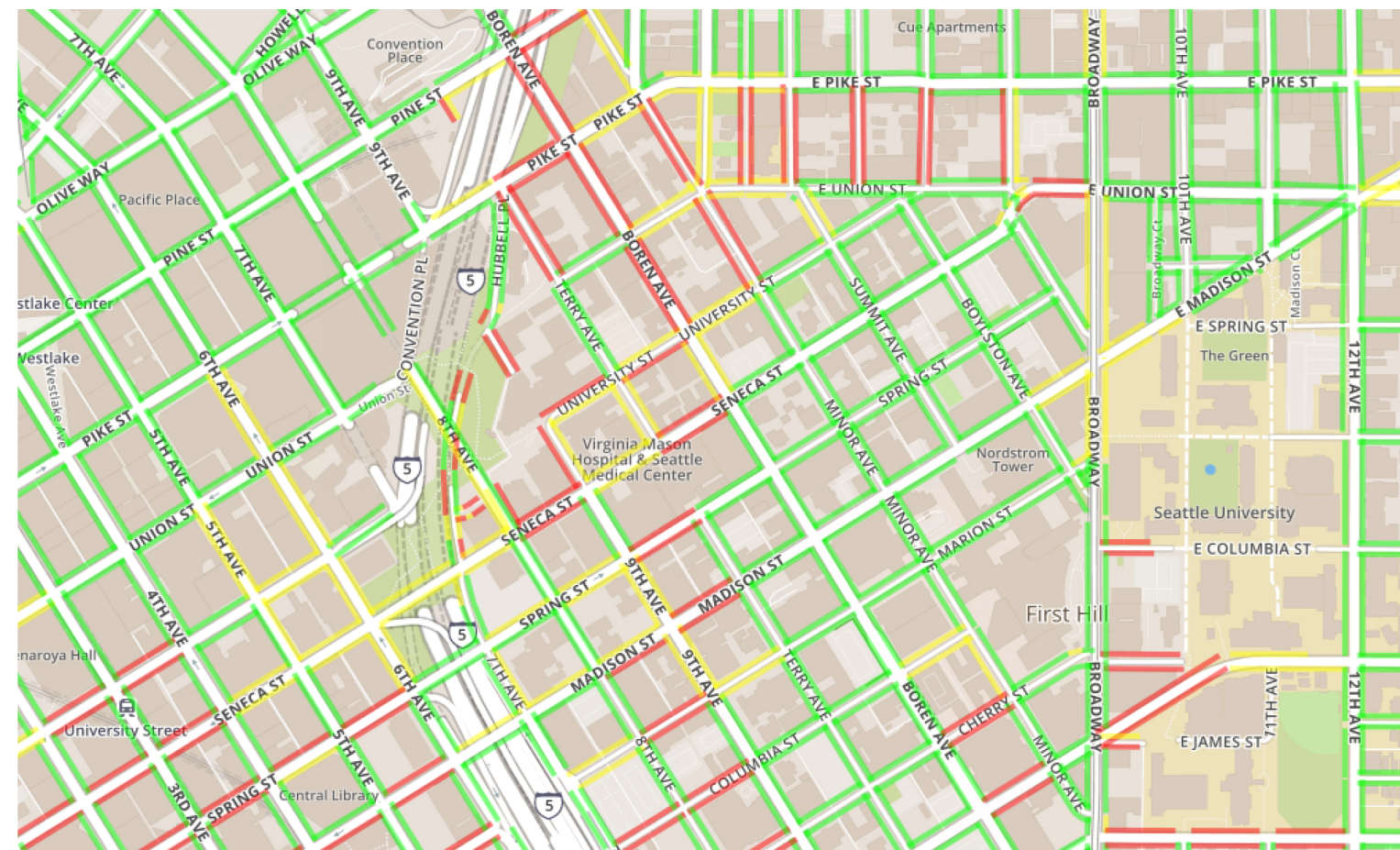
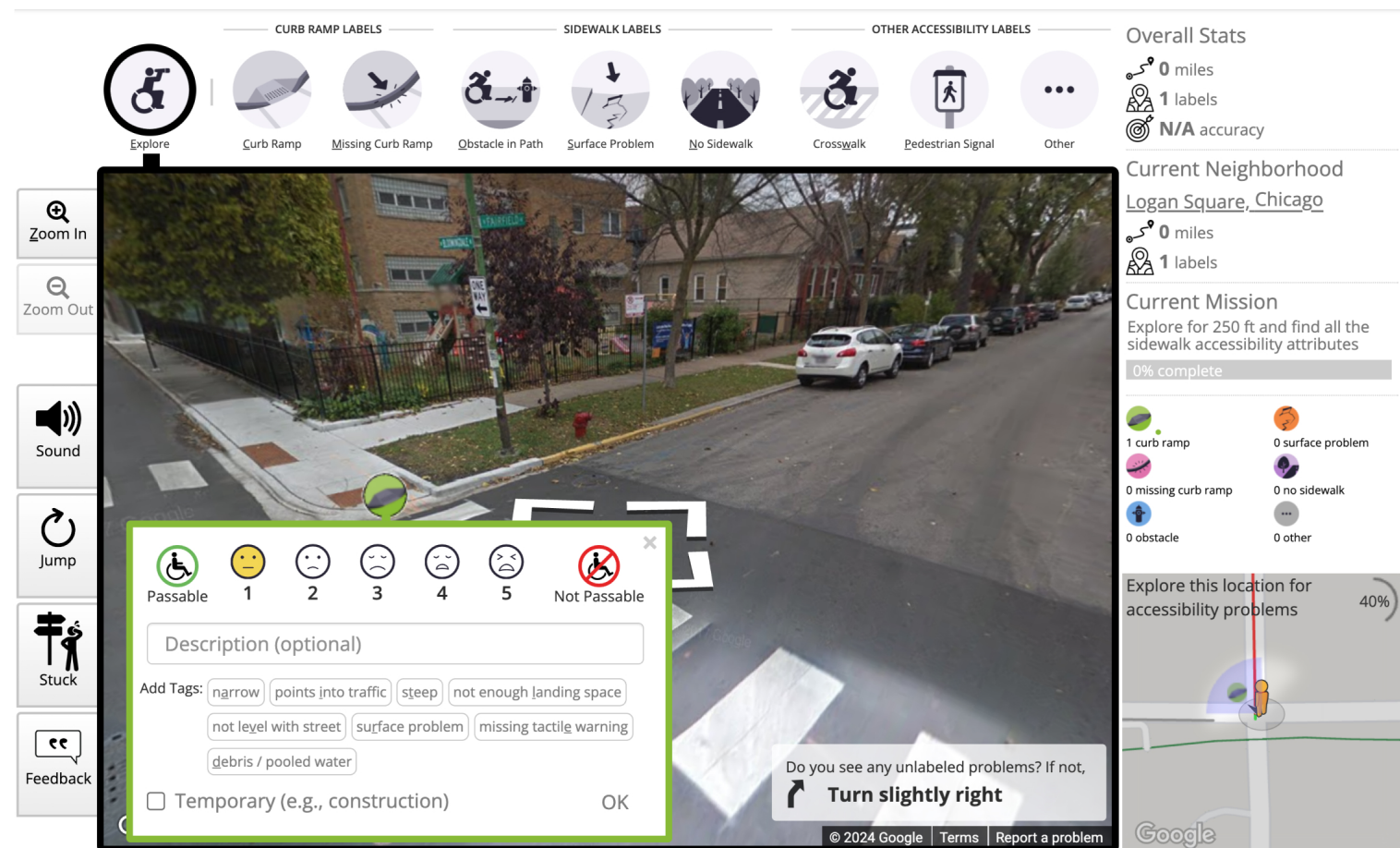
**Jan 31, 2023**

# Crowdsourcing for Urban Accessibility

The screenshot displays the Project Sidewalk mobile application interface. At the top, there are three main categories of labels: CURB RAMP LABELS (Explore, Curb Ramp, Missing Curb Ramp), SIDEWALK LABELS (Obstacle in Path, Surface Problem, No Sidewalk), and OTHER ACCESSIBILITY LABELS (Crosswalk, Pedestrian Signal, Other). Below these is a central street view camera feed. A reporting form is overlaid on the bottom left of the camera view, featuring a rating scale from 1 (Passable) to 5 (Not Passable), a description field, and a list of tags including 'narrow', 'points into traffic', 'steep', 'not enough landing space', 'not level with street', 'surface problem', 'missing tactile warning', and 'debris / pooled water'. A 'Temporary (e.g., construction)' checkbox is also present. On the right side of the interface, there are 'Overall Stats' (0 miles, 1 labels, N/A accuracy), 'Current Neighborhood' (Logan Square, Chicago, 0 miles, 1 labels), and 'Current Mission' (Explore for 250 ft and find all the sidewalk accessibility attributes, 0% complete). A progress bar shows 0% completion. Below the mission section, a list of counts for various label types is shown: 1 curb ramp, 0 surface problem, 0 missing curb ramp, 0 no sidewalk, 0 obstacle, and 0 other. At the bottom right, there is a 'Turn slightly right' instruction with an arrow icon. The bottom of the screen shows a Google logo and copyright information: © 2024 Google | Terms | Report a problem.

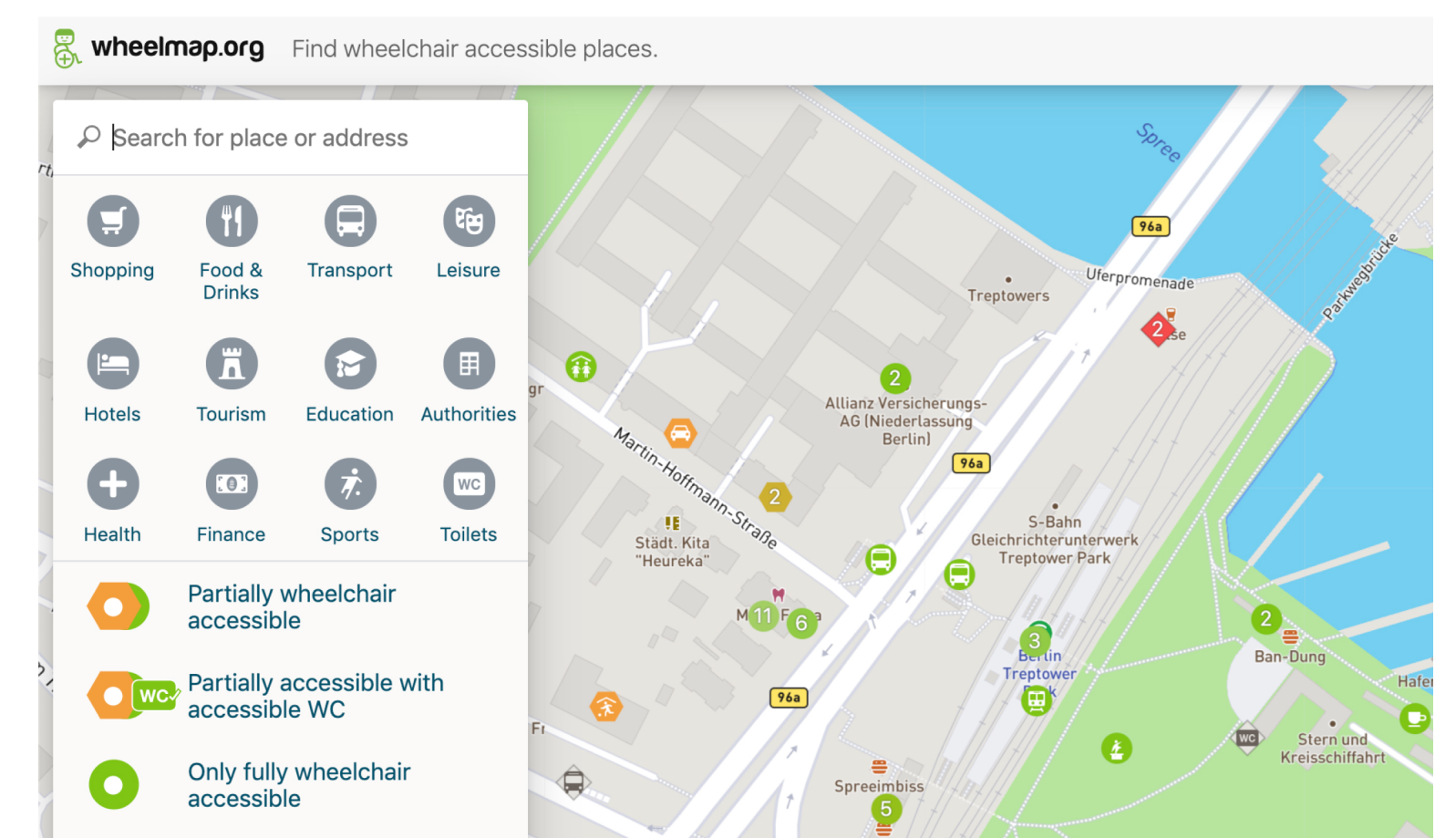
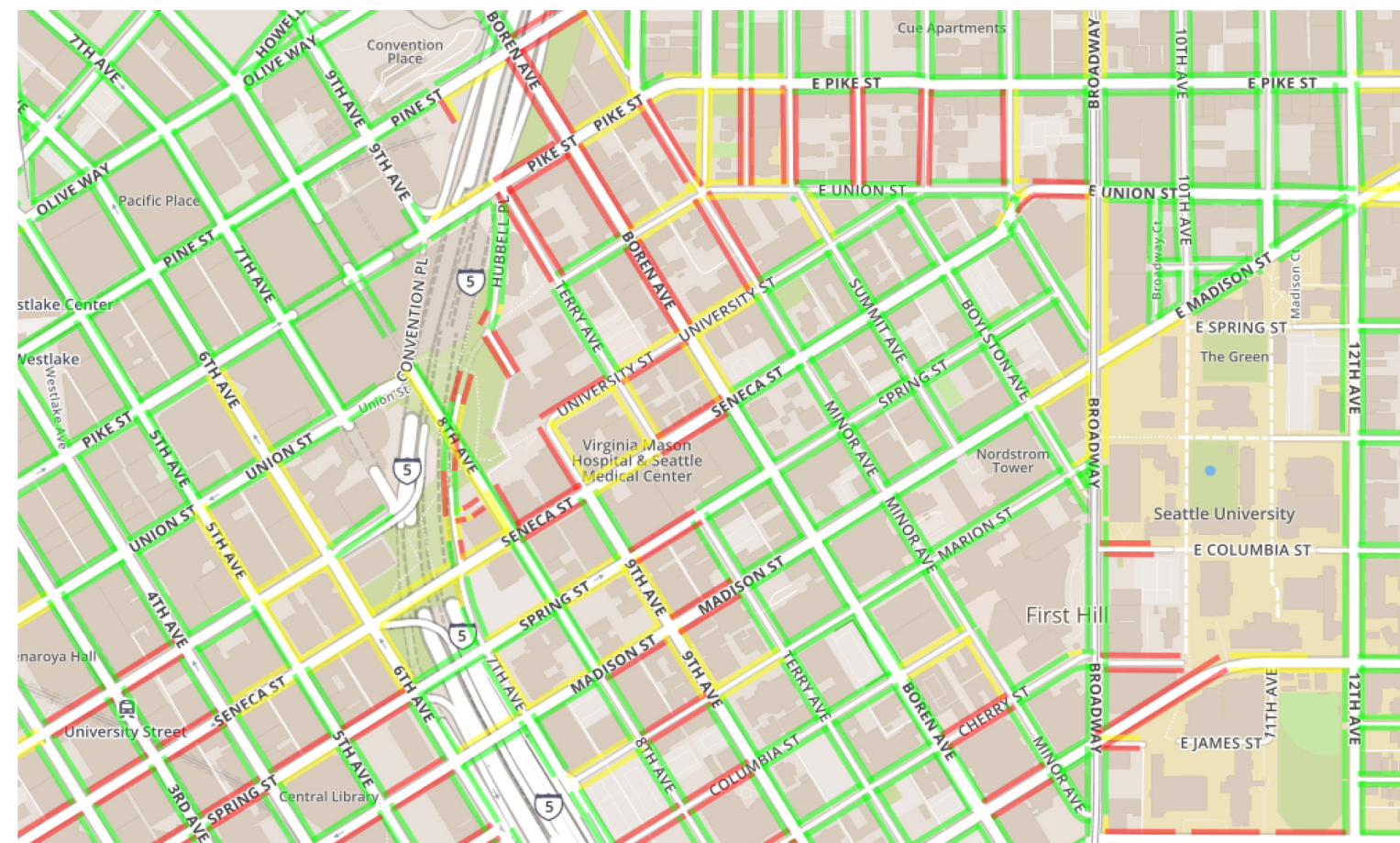
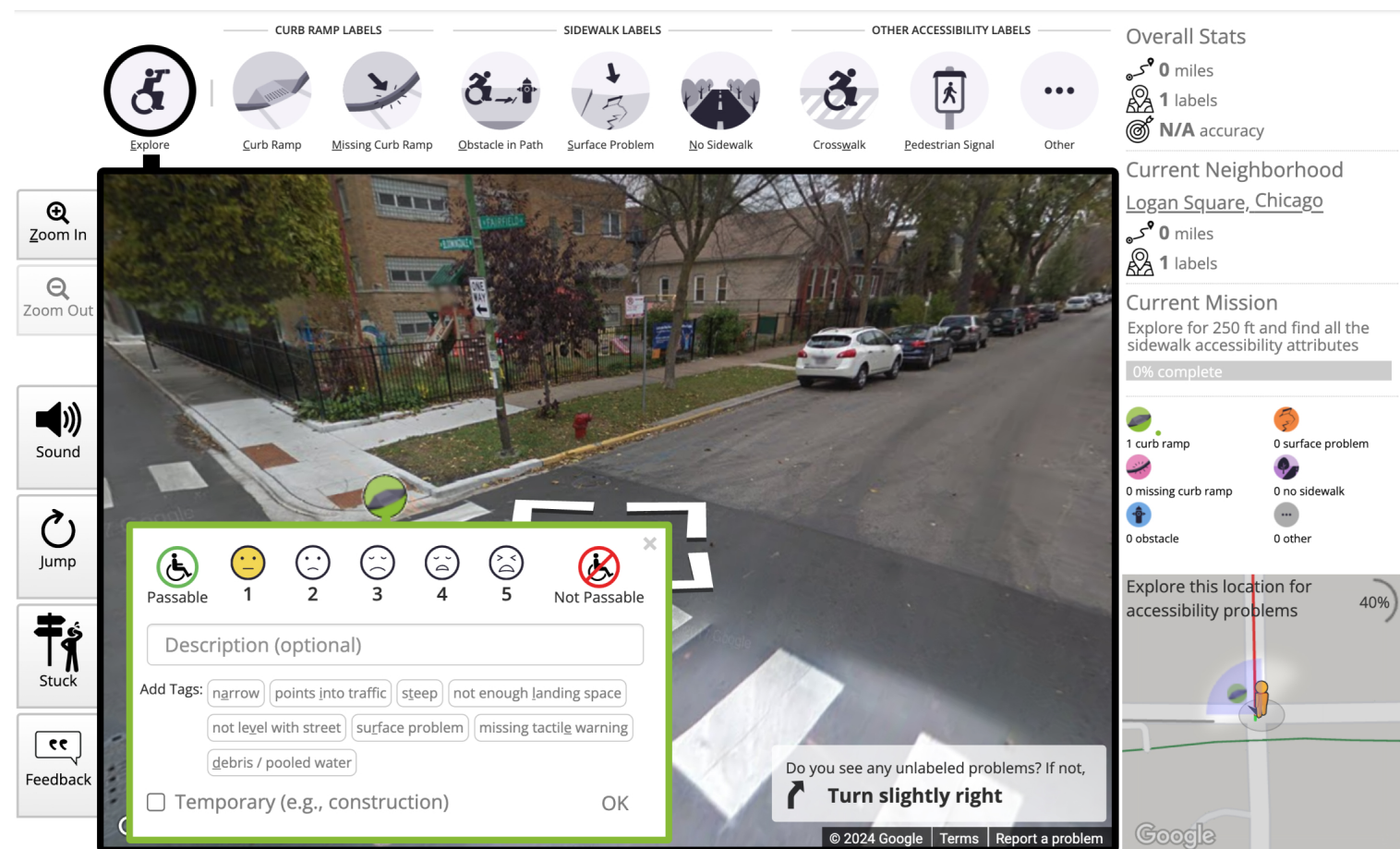


# Crowdsourcing for Urban Accessibility

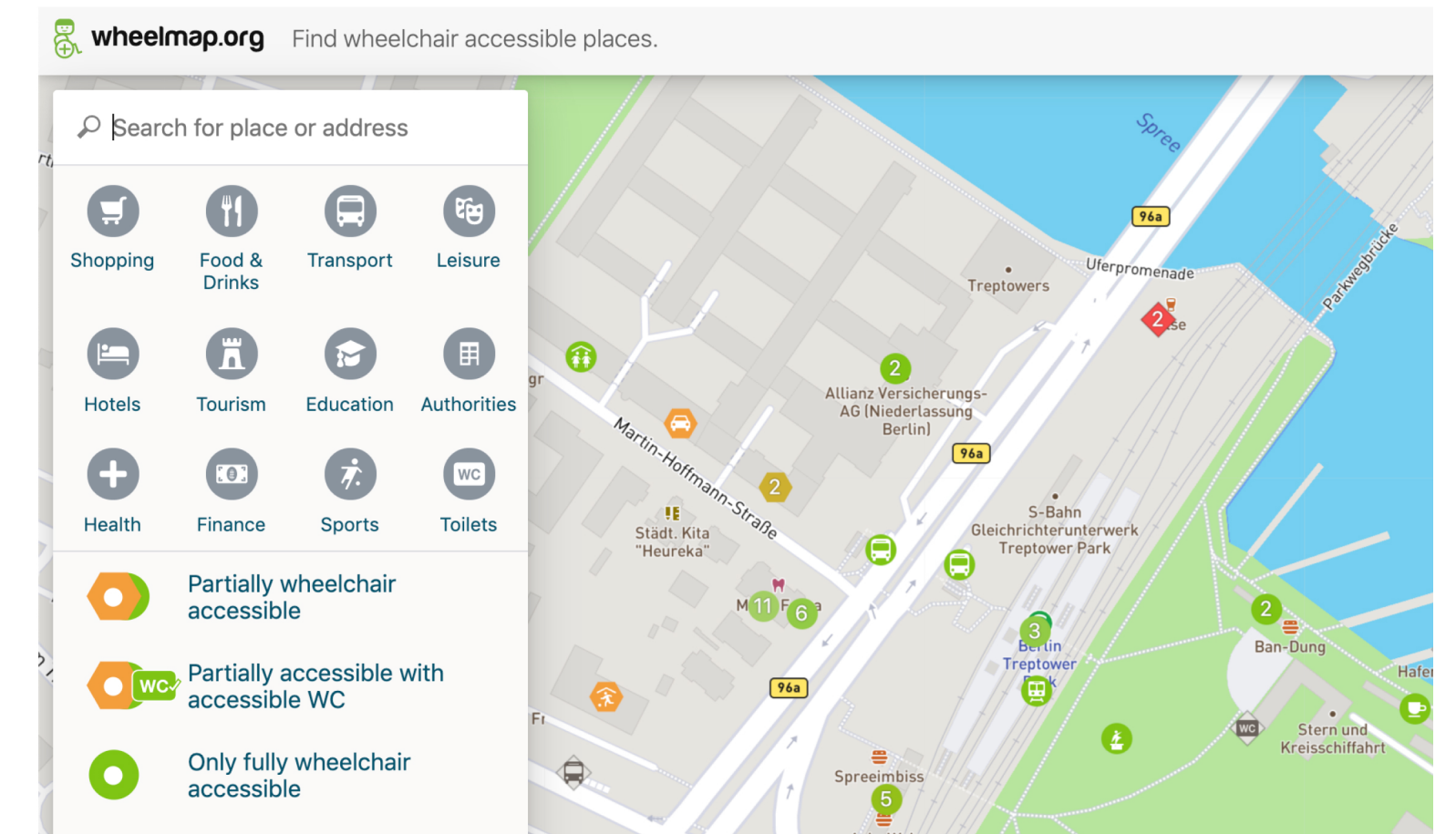
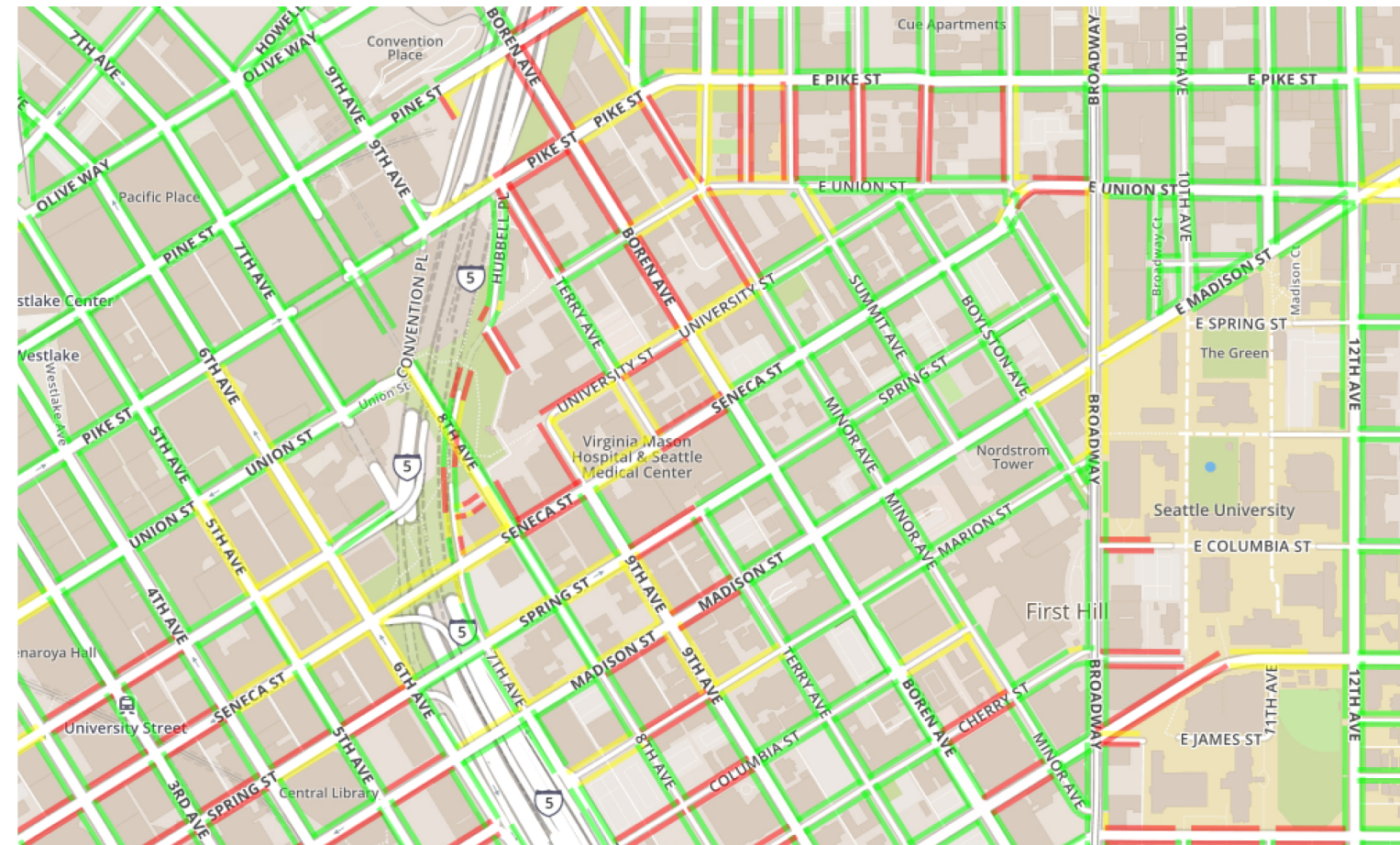
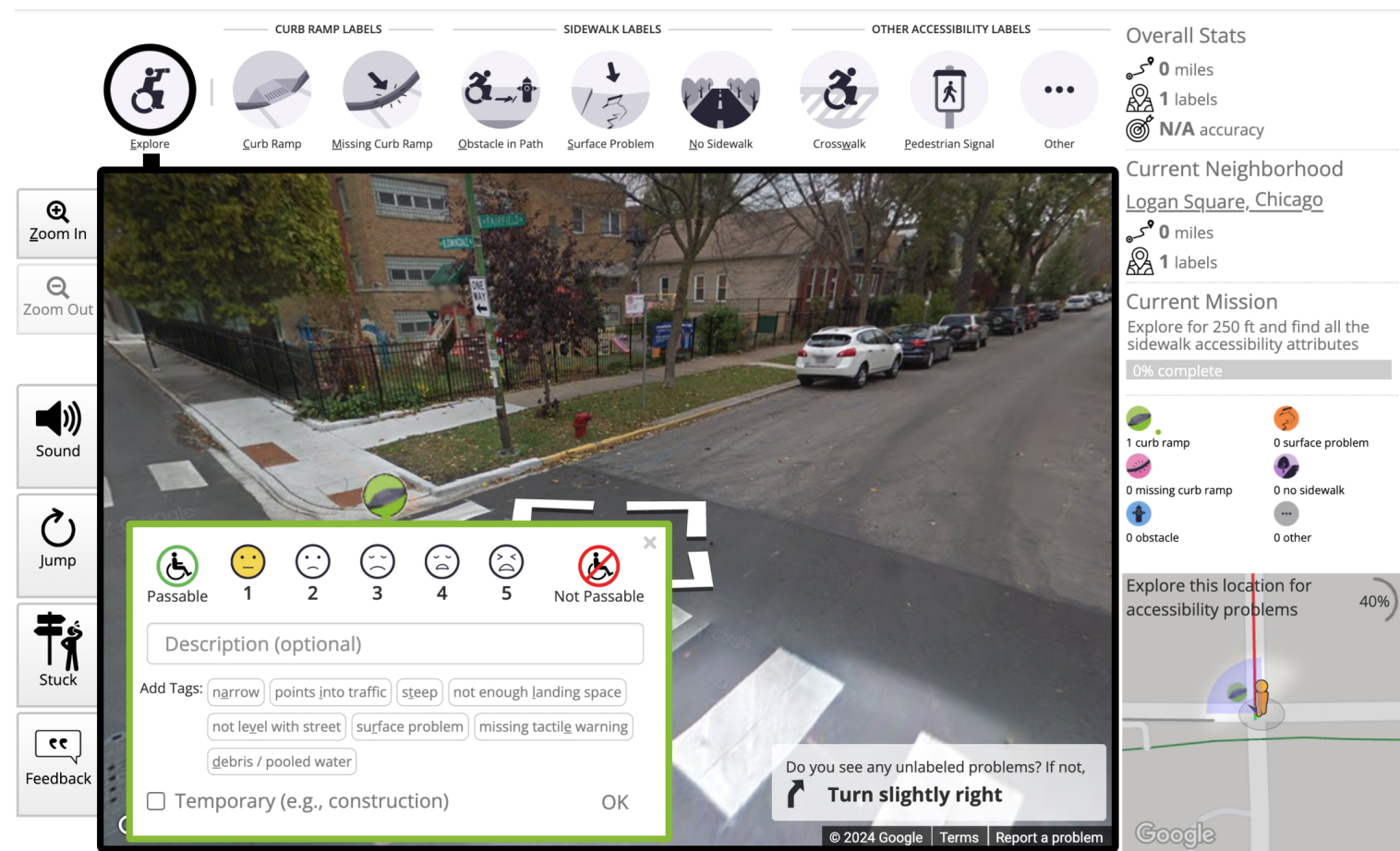




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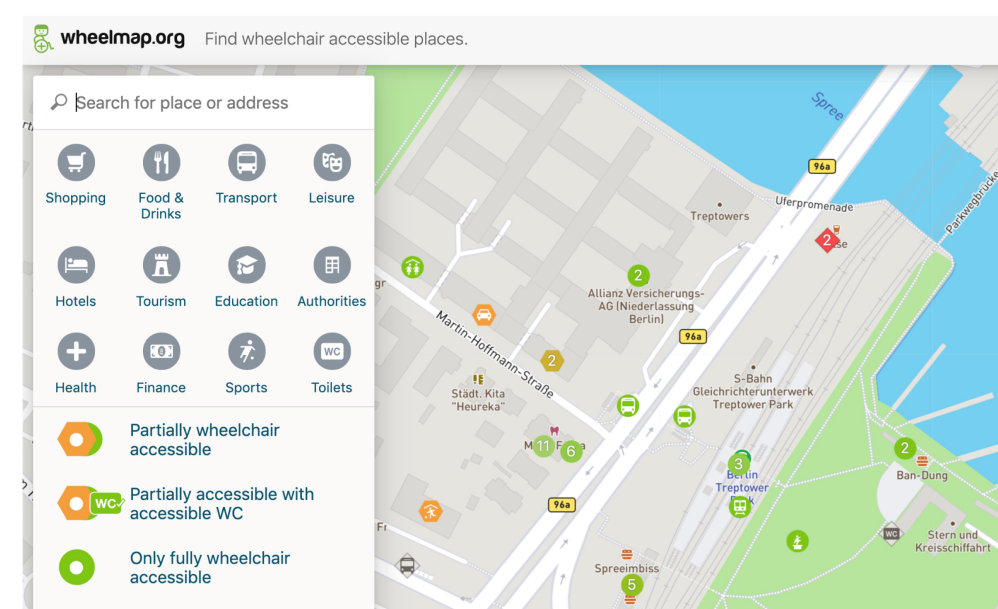
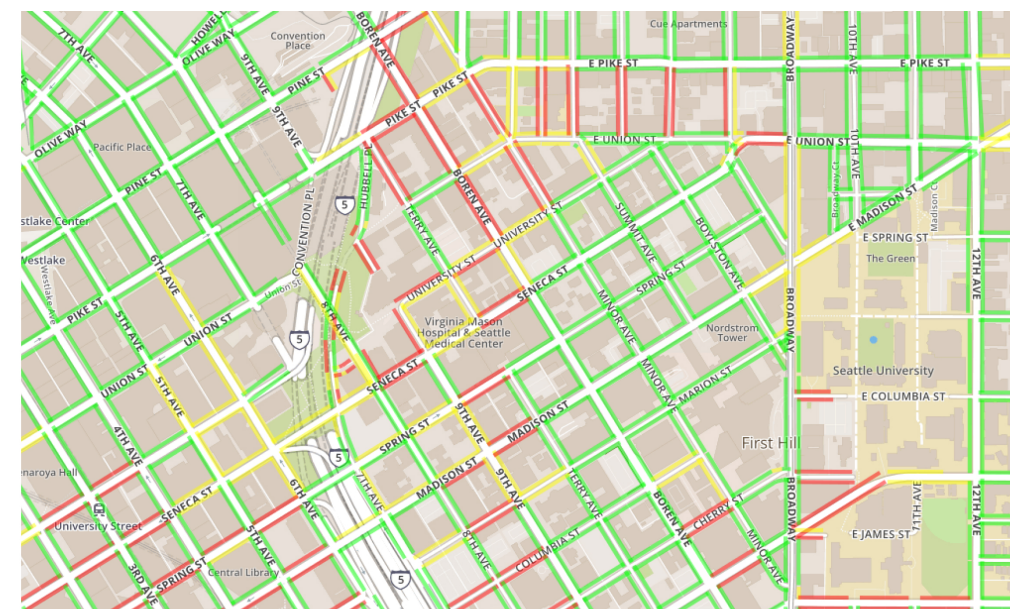


# Crowdsourcing for Urban Accessibility



data collection + urban accessibility advocacy

# Crowdsourcing for Urban Accessibility



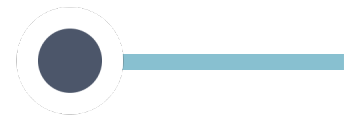
Community  
Advocacy











**Jun, 2021**  
Project Begins





**Oct-Nov, 2021**  
Girl Scouts In-Person  
Sidewalk Audits



**Jun, 2021**  
Project Begins



**Not Scalable**

**Oct-Nov, 2021**  
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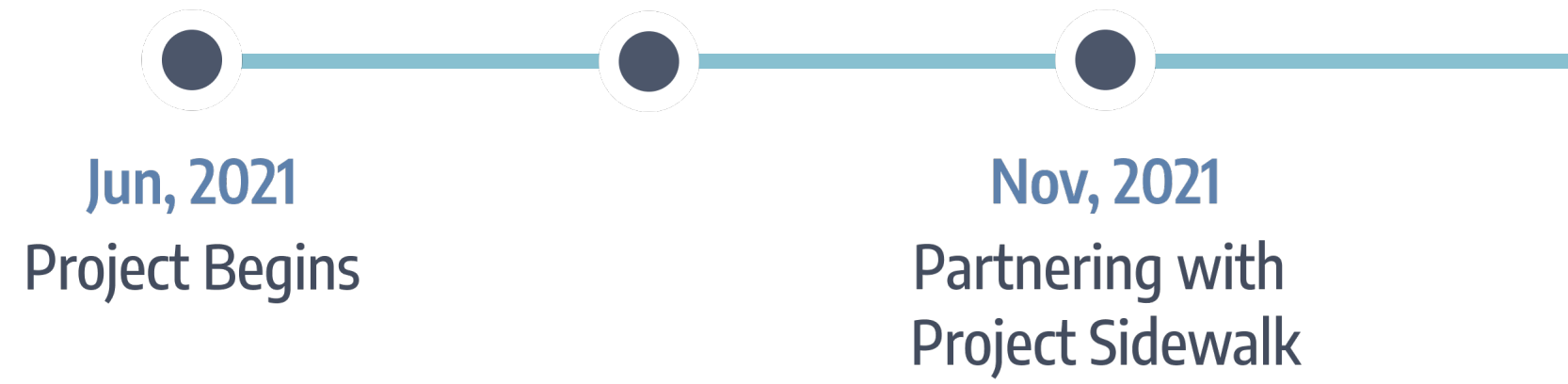


**Jun, 2021**  
Project Begins



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Sidewalk Audits





**PROJECT**

**SIDEWALK**

[projectsidewalk.org](http://projectsidewalk.org)







Explore



Curb Ramp



Missing Curb Ramp



Obstacle in Path



Surface Problem



No Sidewalk



Crosswalk



Pedestrian Signal



Other

CURB RAMP LABELS

SIDEWALK LABELS

OTHER ACCESSIBILITY LABELS

Overall Stats

0 miles  
0 labels  
N/A accuracy

Current Neighborhood

North Admiral, Seattle

0.01 miles  
0 labels

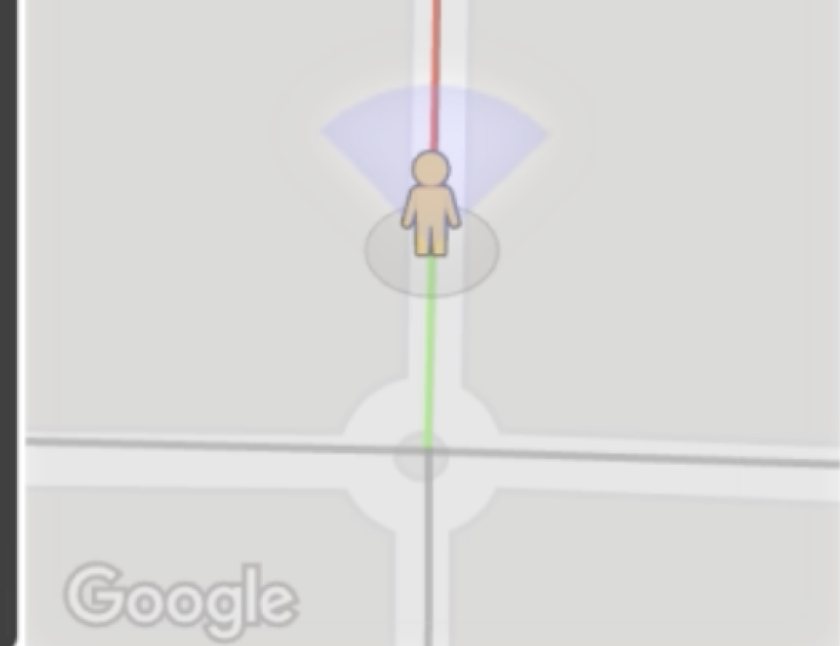
Current Mission

Explore for 250 ft and find all the sidewalk accessibility attributes

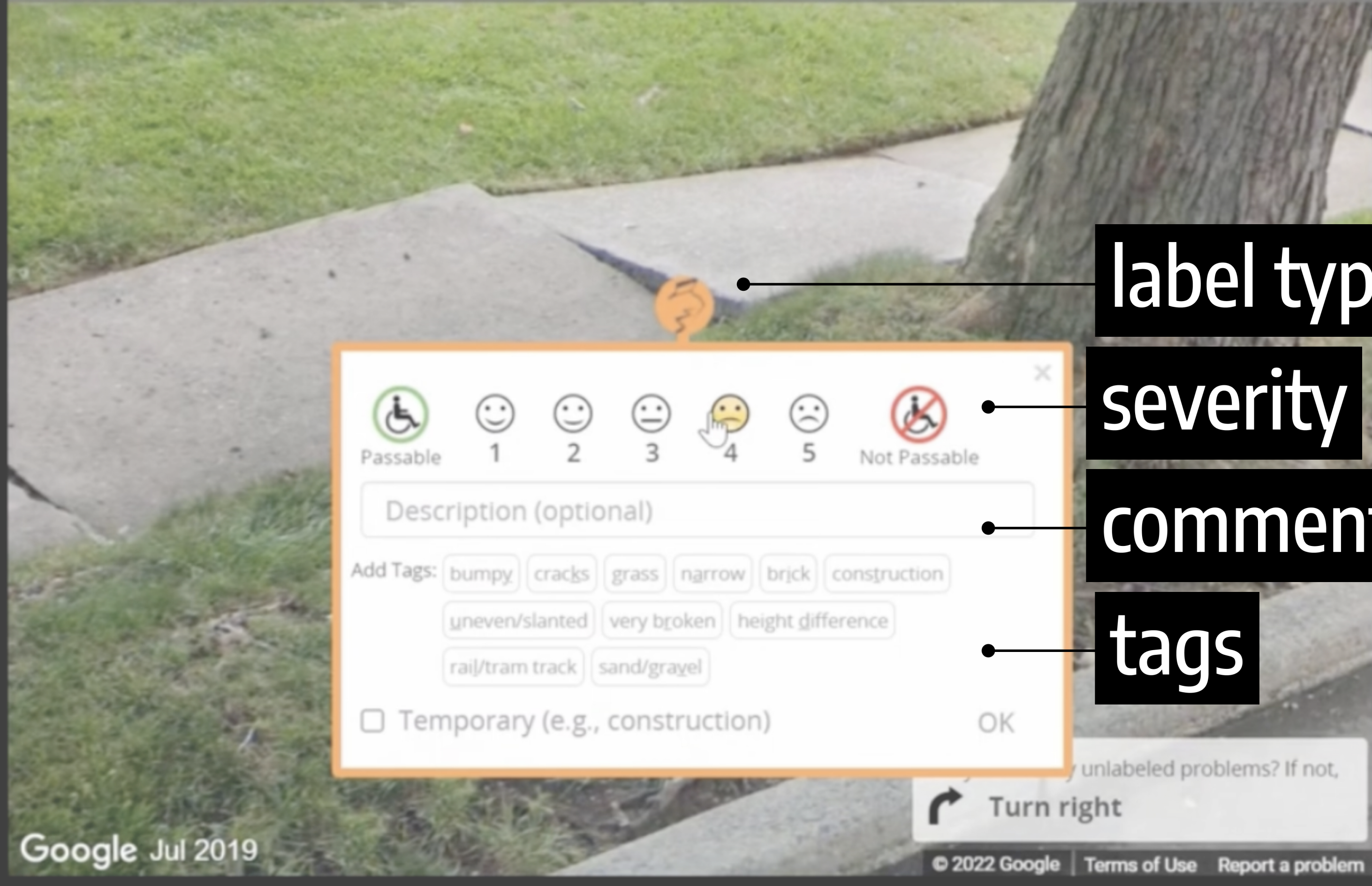
% complete

- 0 curb ramp
- 0 missing curb ramp
- 0 obstacle
- 0 surface problem
- 0 no sidewalk
- 0 other

Explore this location for accessibility problems 24%



Explore the streets and find all the accessibility attributes



Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Google Jul 2019

label type

severity

comments

tags

Passable 1 2 3 4 5 Not Passable

Description (optional)

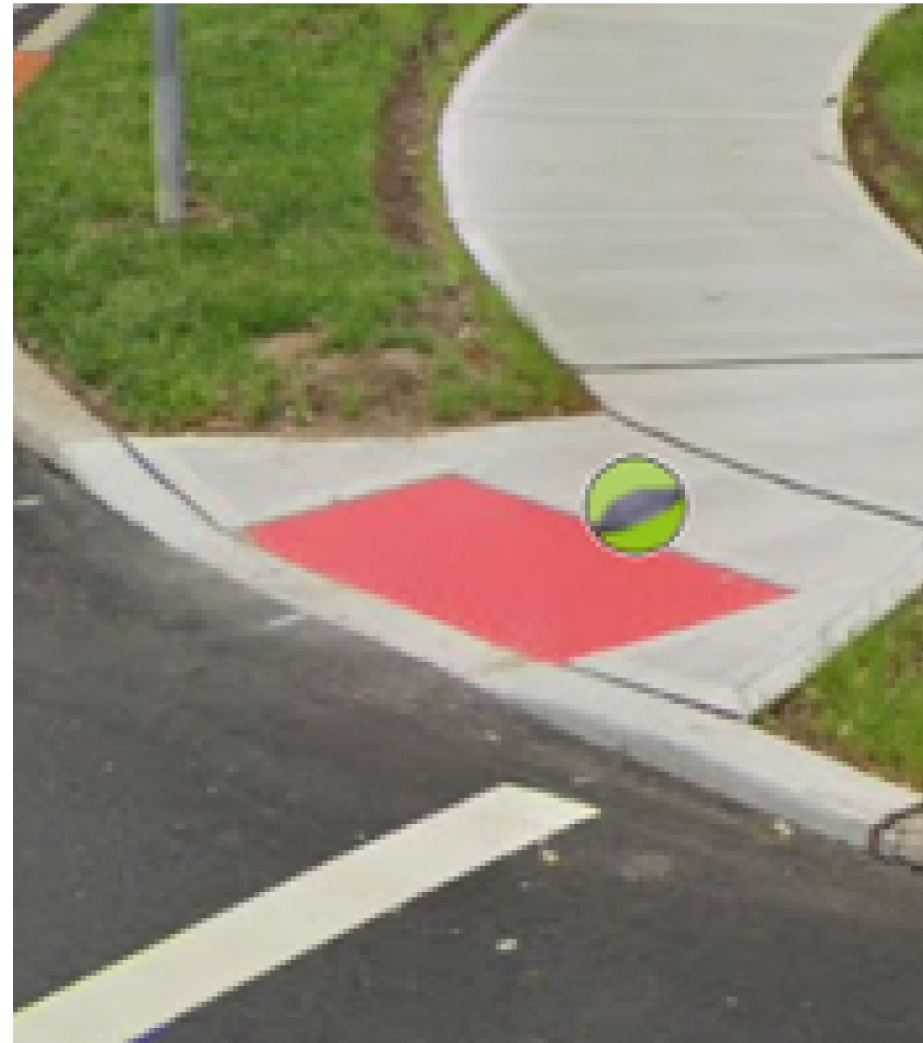
Add Tags: bumpy cracks grass narrow brick construction  
uneven/slanted very broken height difference  
rail/tram track sand/gravel

Temporary (e.g., construction) OK

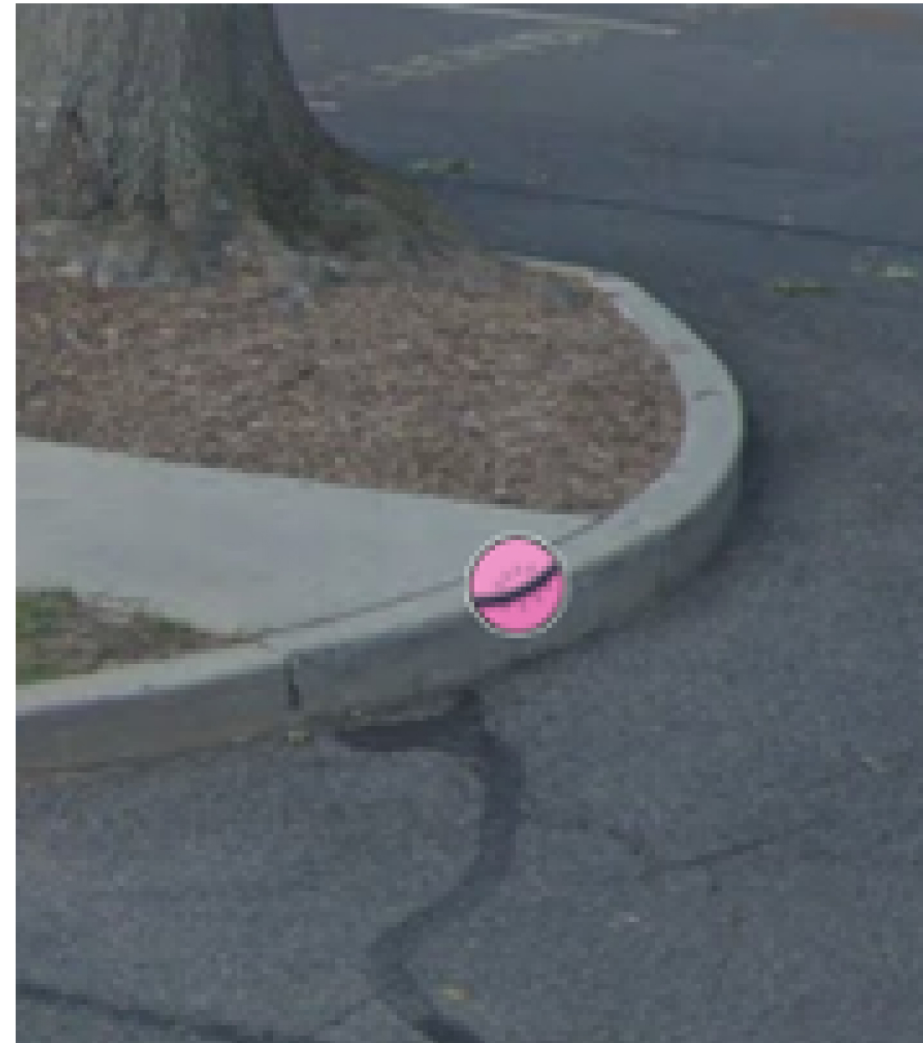
# Project Sidewalk

## 5 Major Label Types

 Curb Ramps



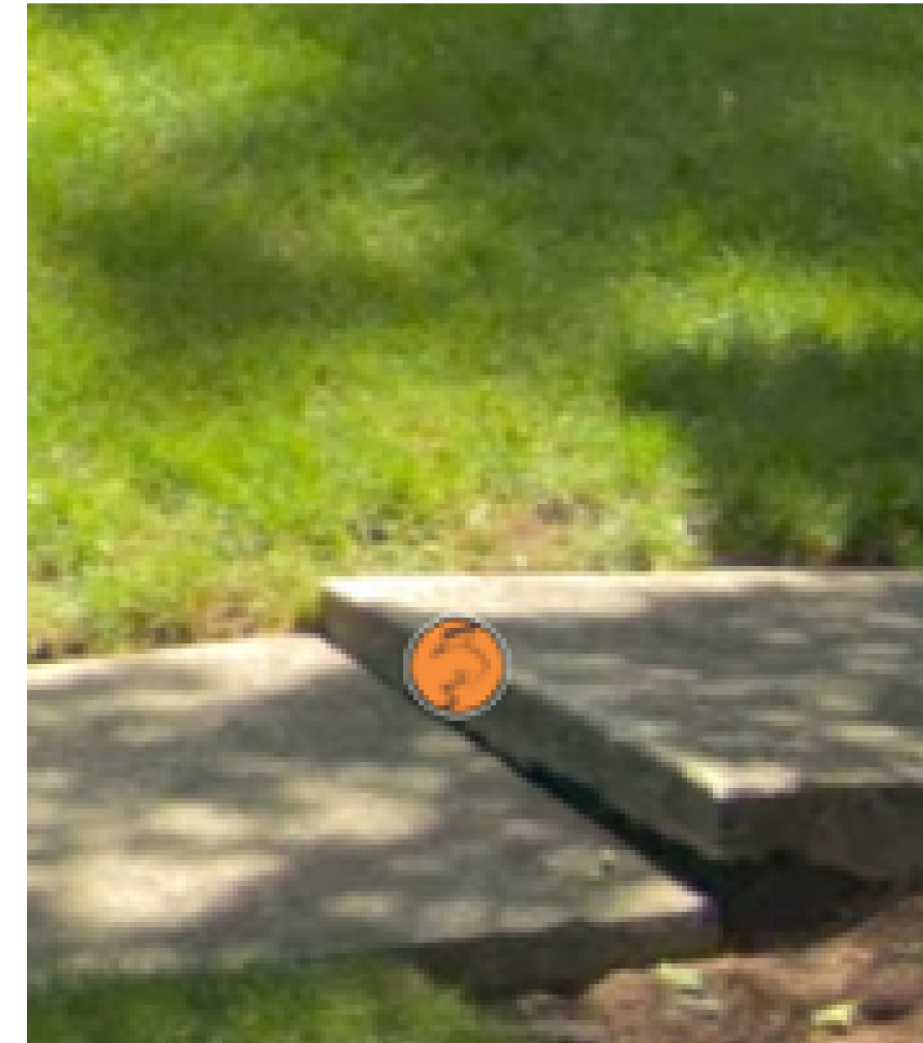
 No Curb Ramps



 Obstacles



 Surface Problem



 Missing Sidewalk





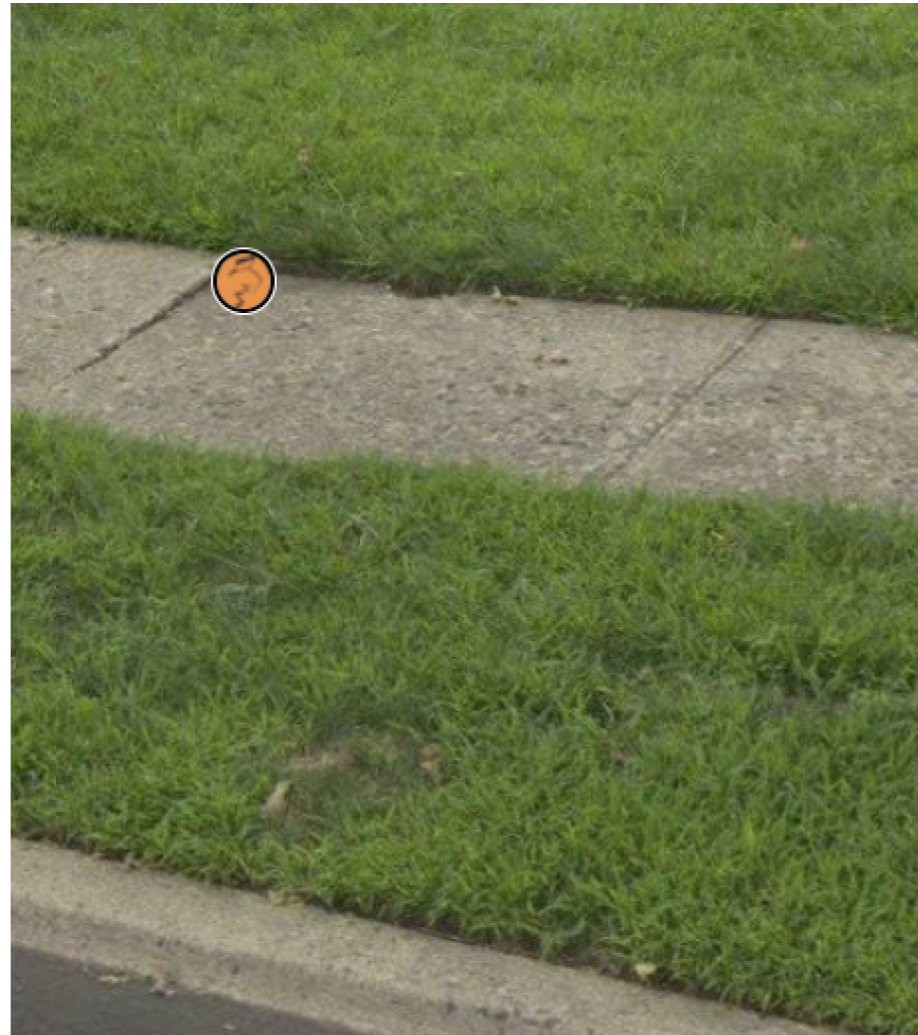
# Project Sidewalk

## 5 Severity Levels

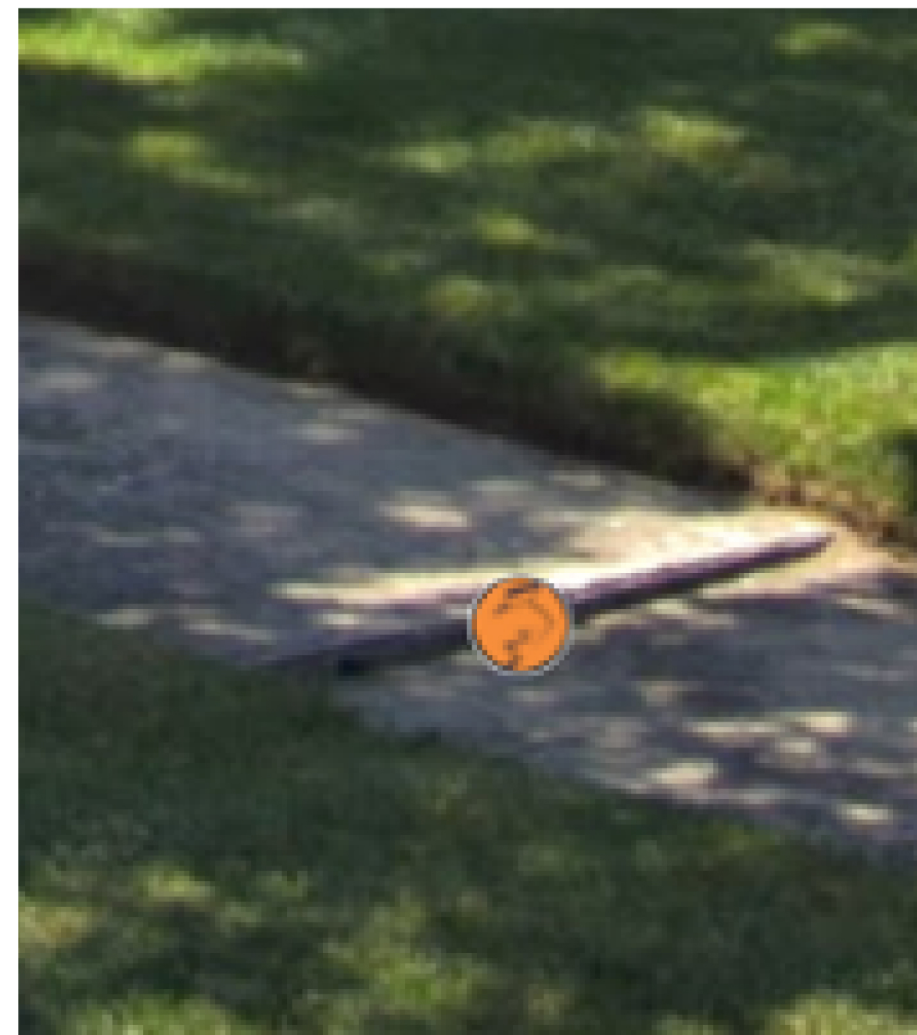
😊 Severity 1



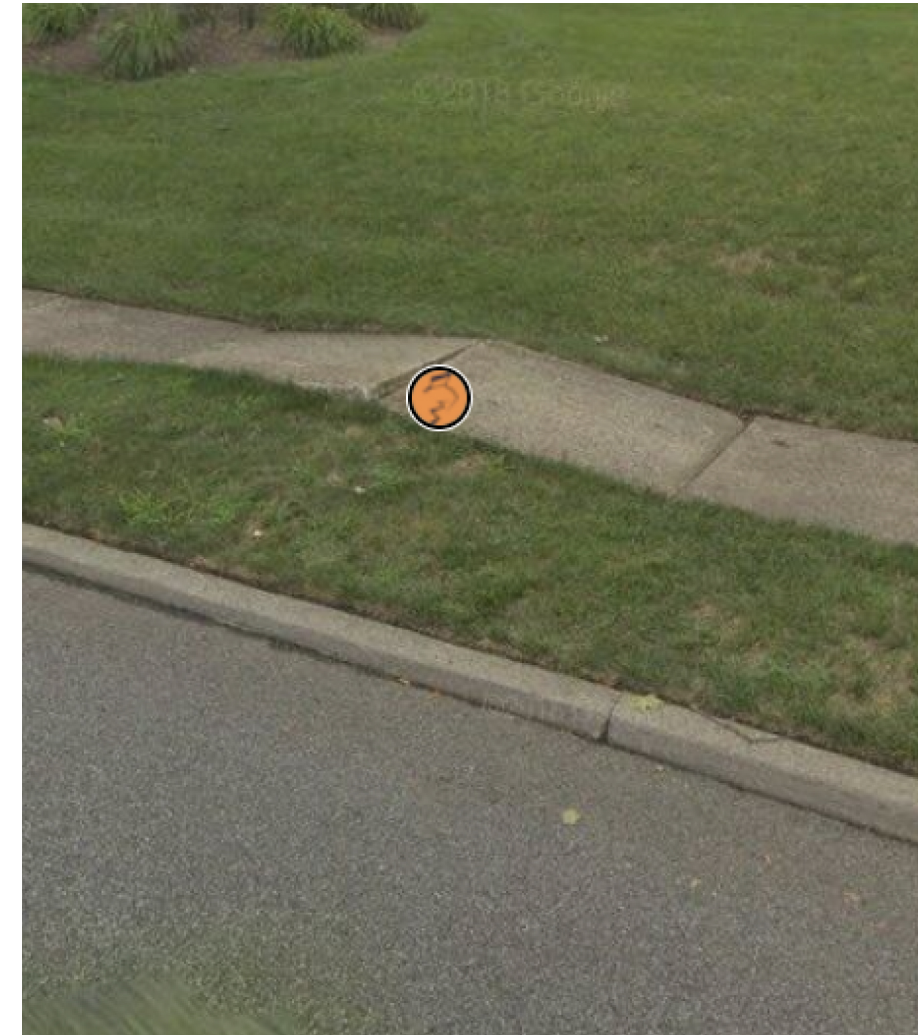
😊 Severity 2



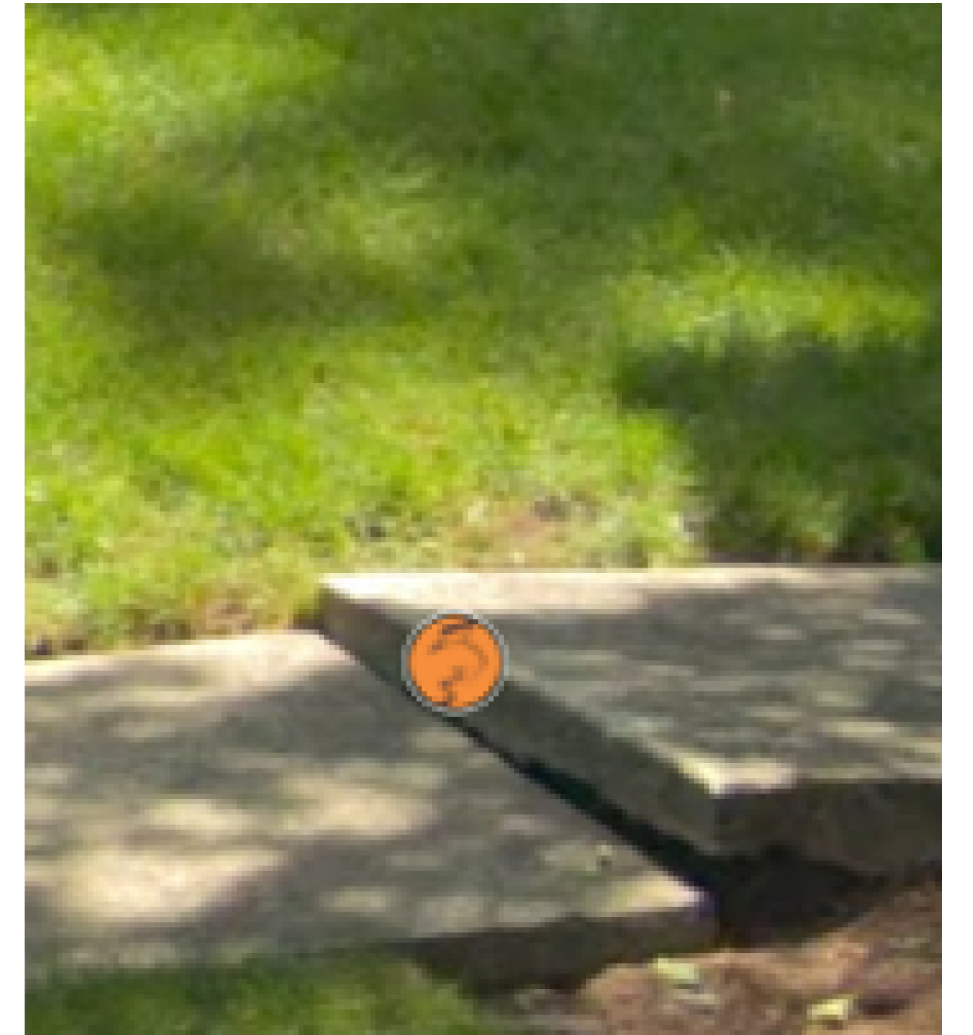
😐 Severity 3



😞 Severity 4



😞 Severity 5



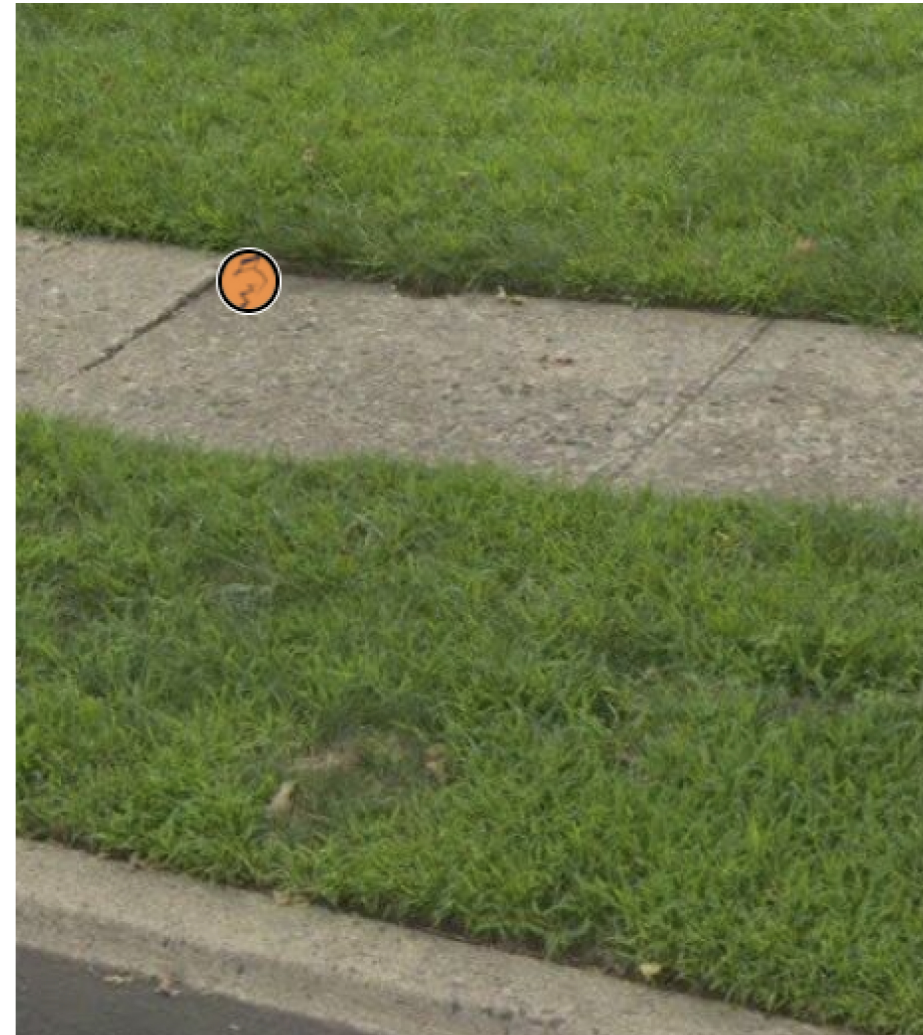
# Project Sidewalk

## 5 Severity Levels

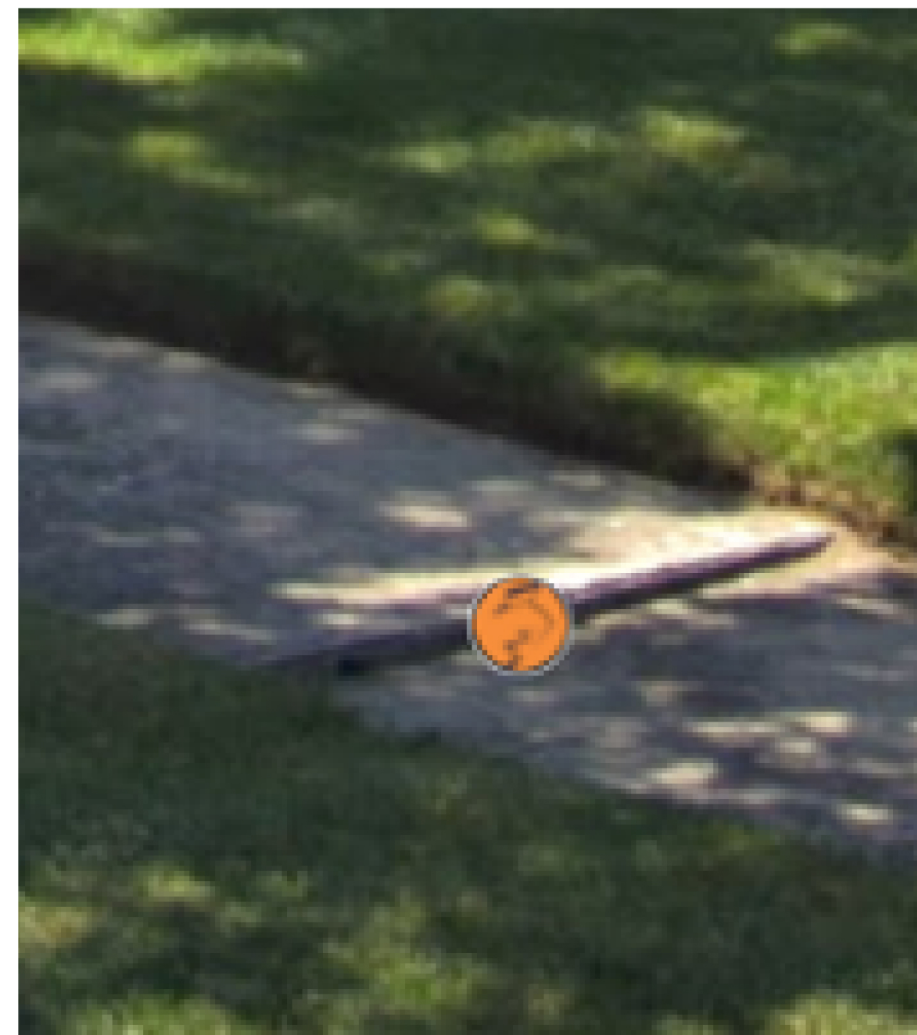
😊 Severity 1



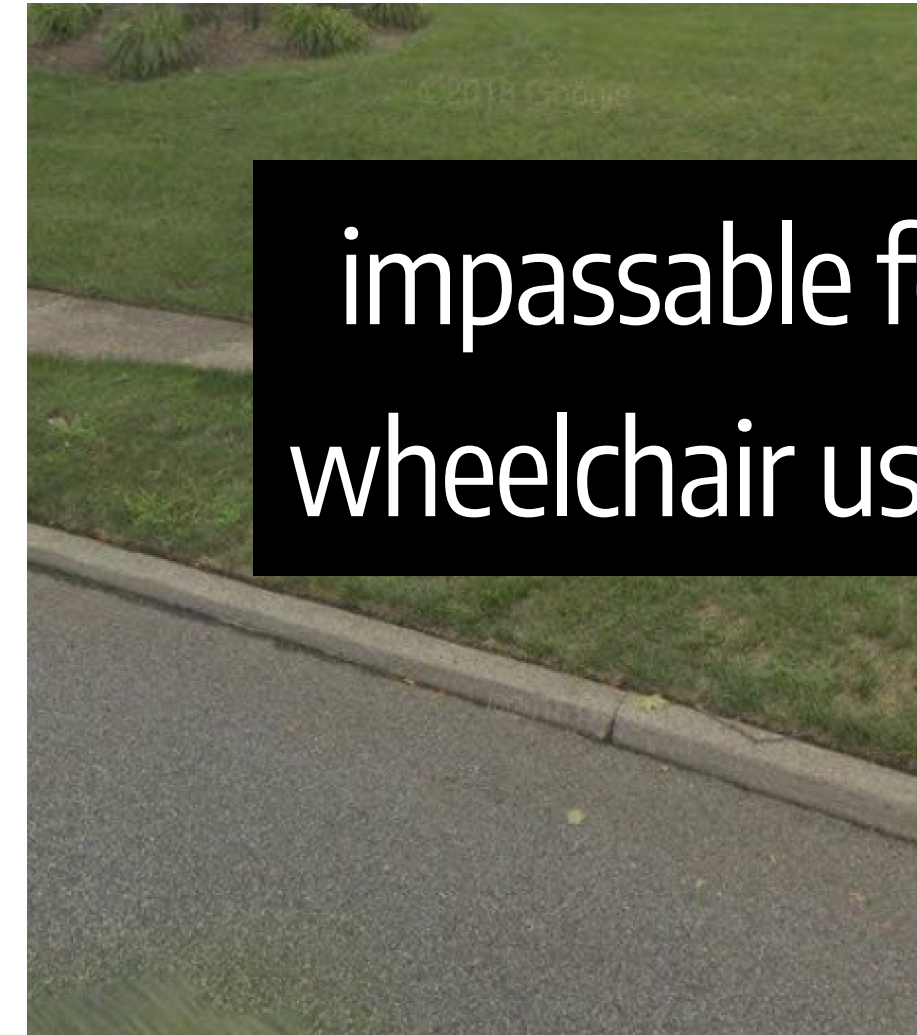
😊 Severity 2



😐 Severity 3



😞 Severity 4



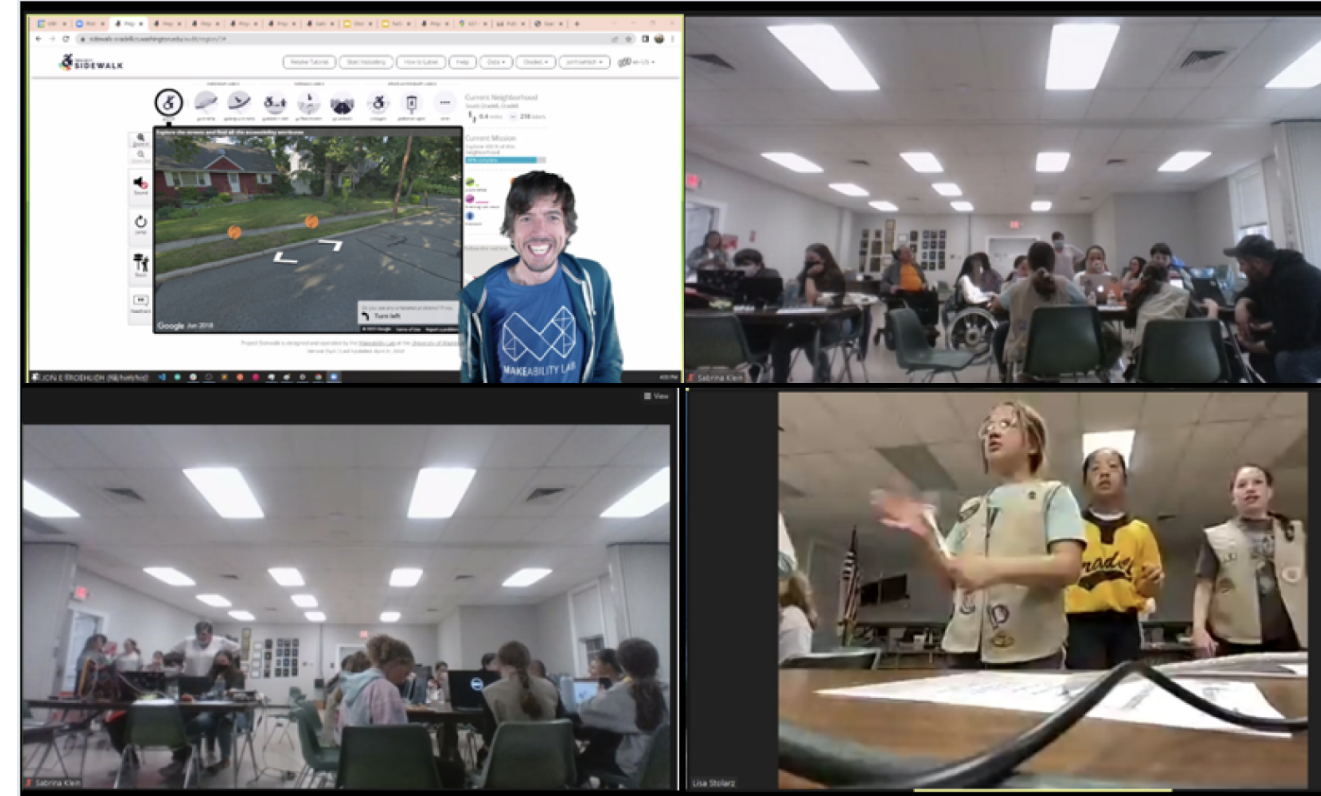
😞 Severity 5











2022-02

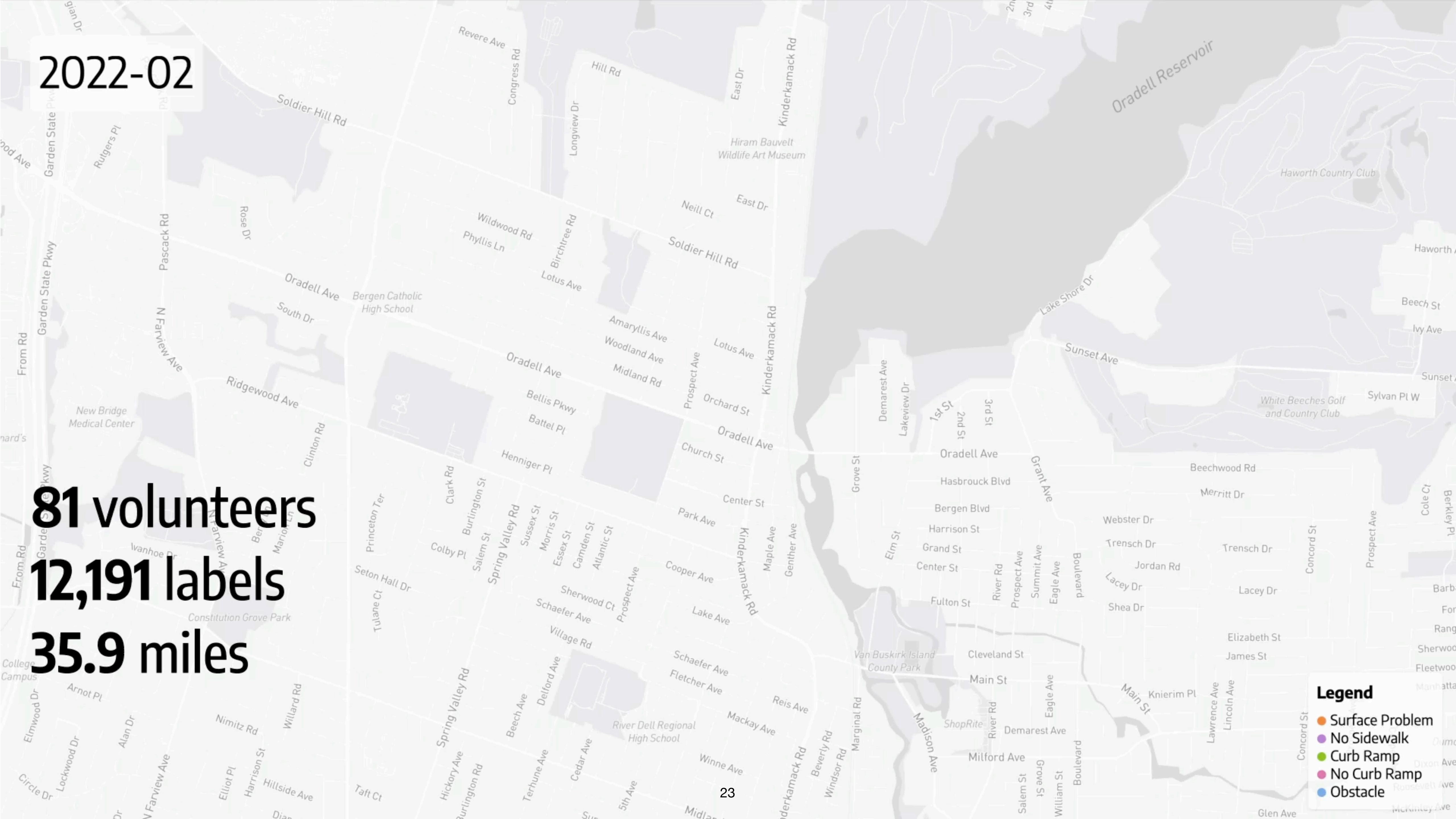
81 volunteers  
12,191 labels  
35.9 miles



- Legend**
- Surface Problem
  - No Sidewalk
  - Curb Ramp
  - No Curb Ramp
  - Obstacle

2022-02

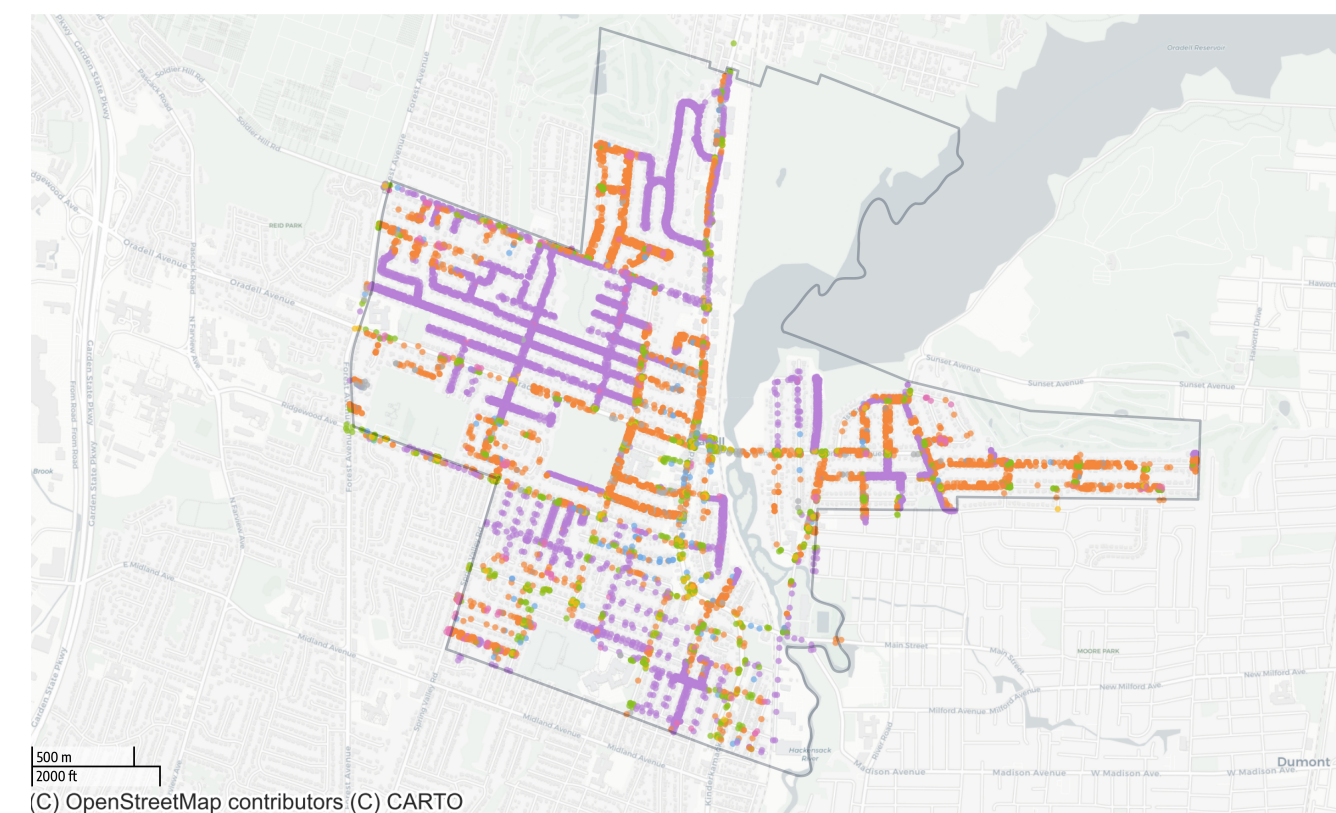
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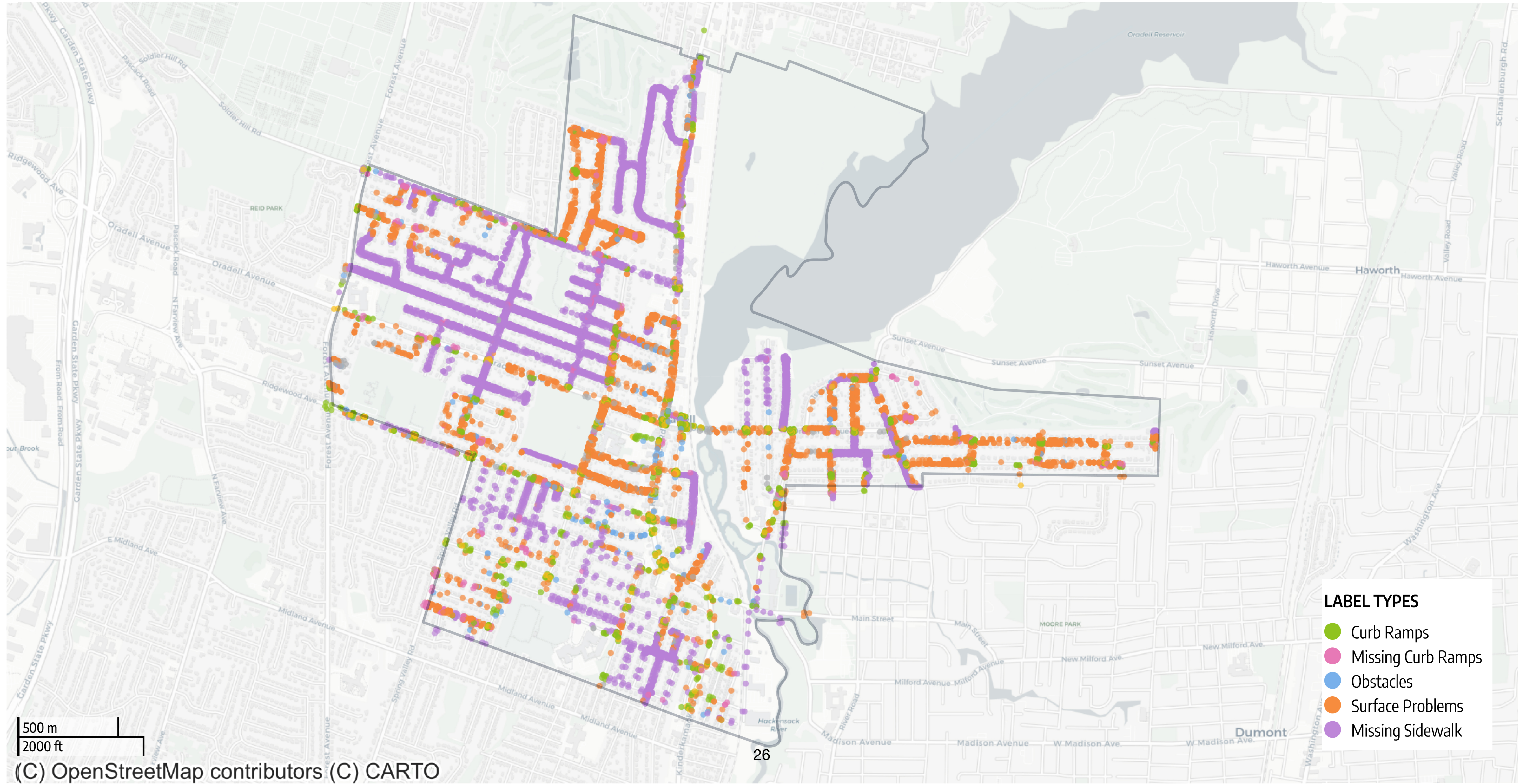
- Legend**
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  - No Curb Ramp
  - Obstacle



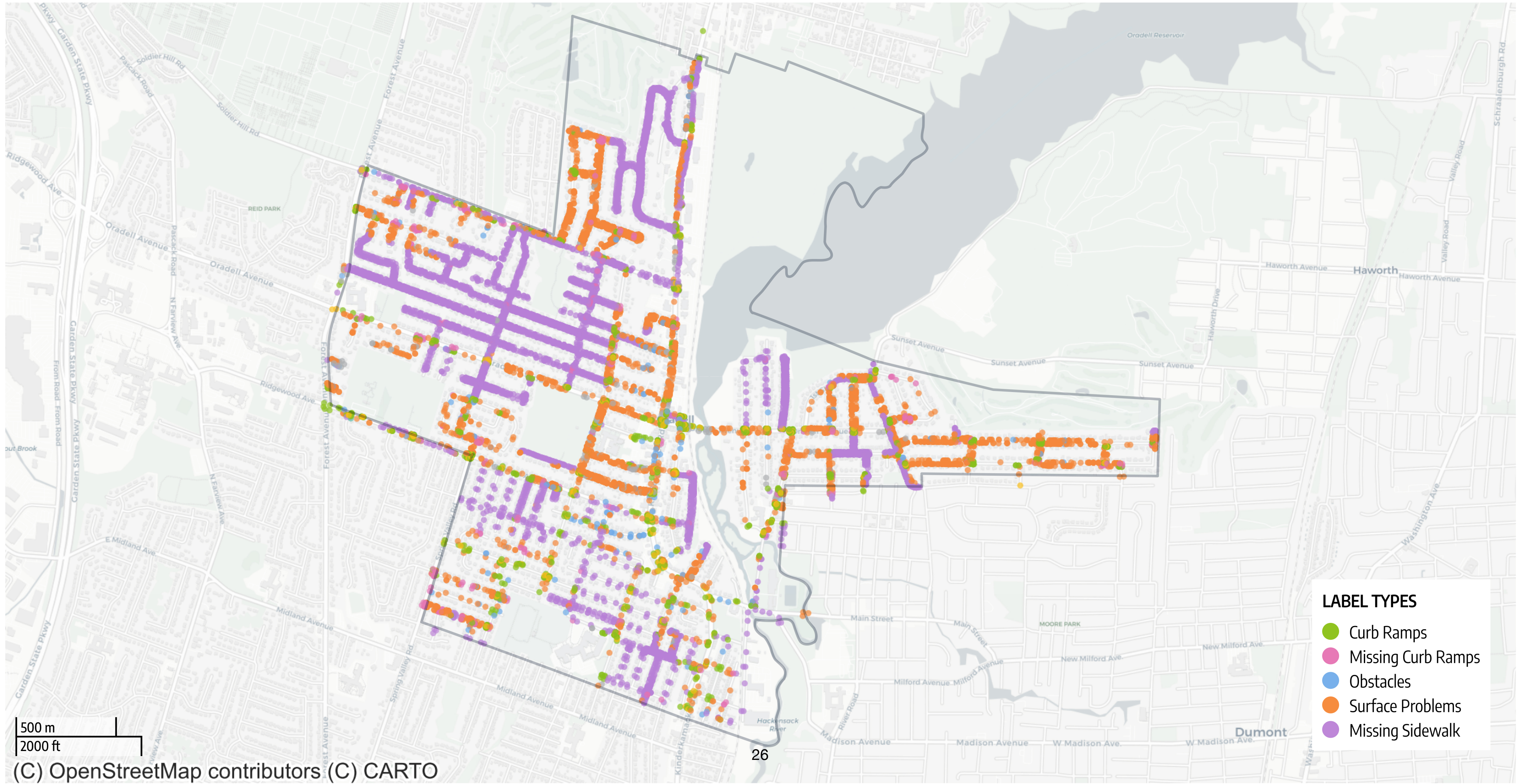




# Sidewalk Analysis



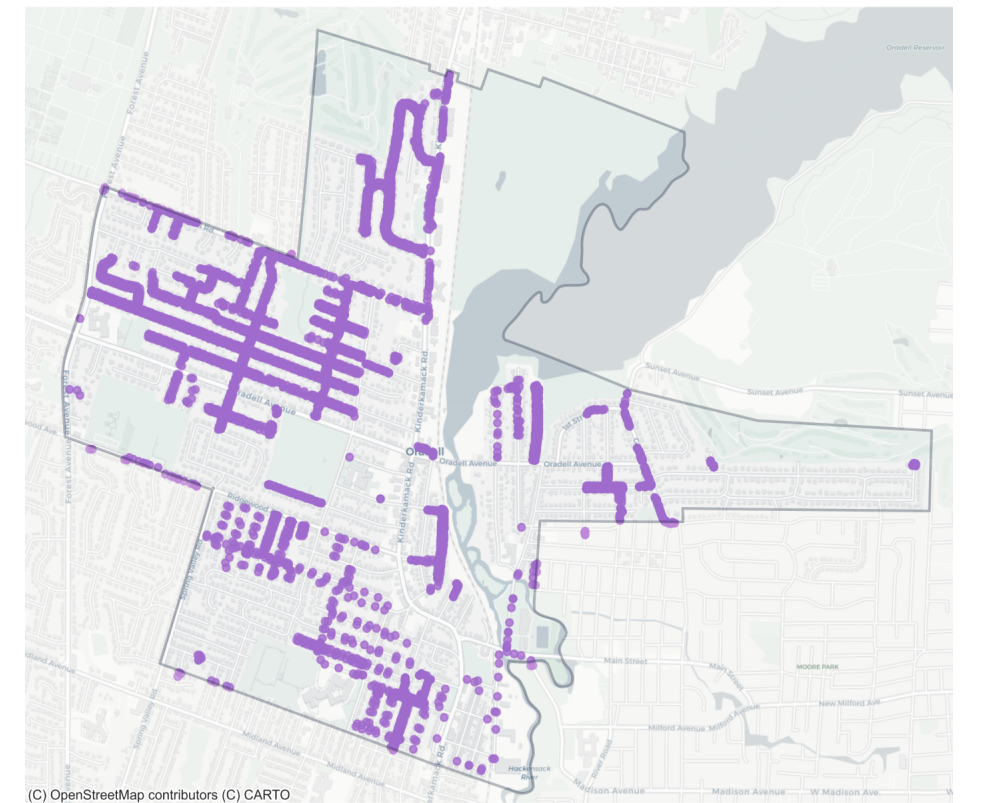
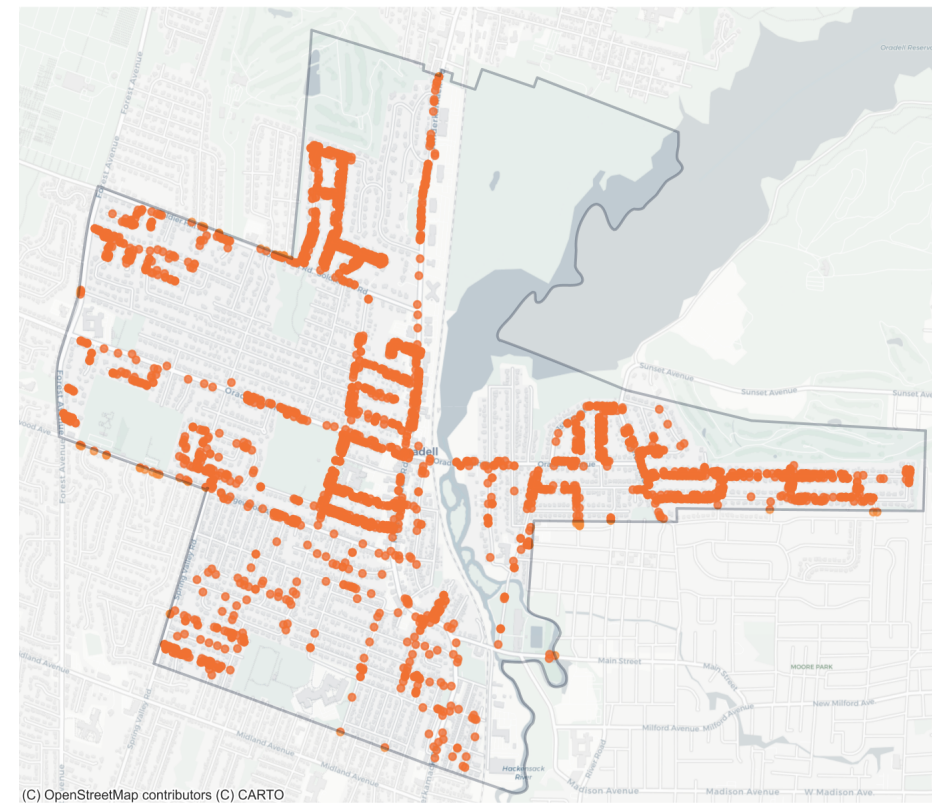
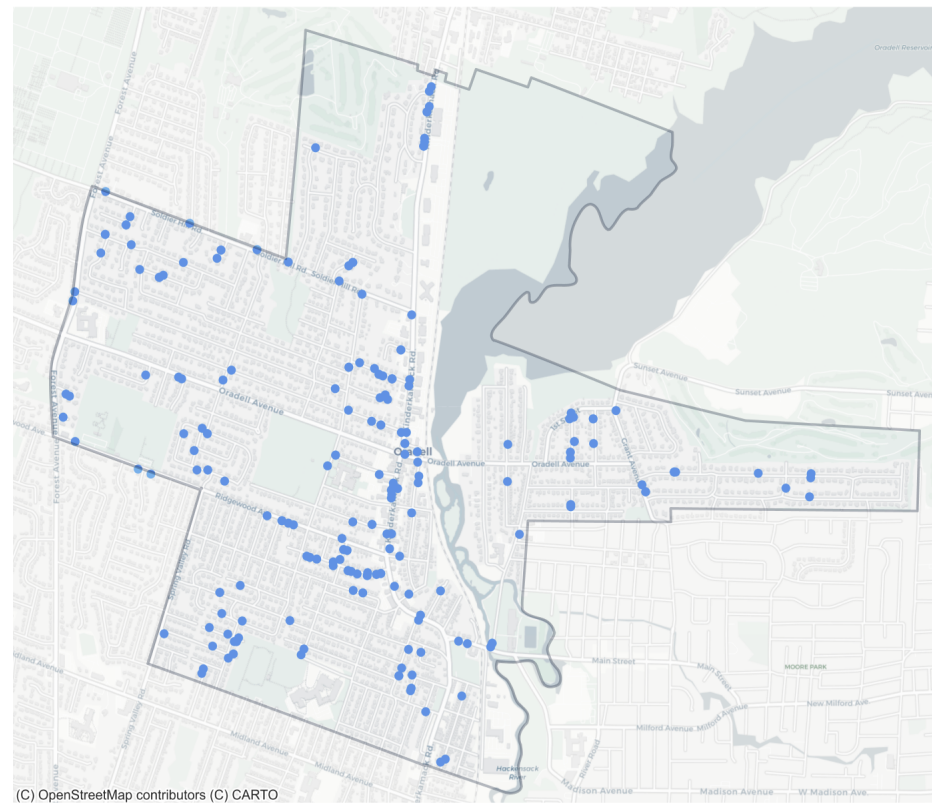
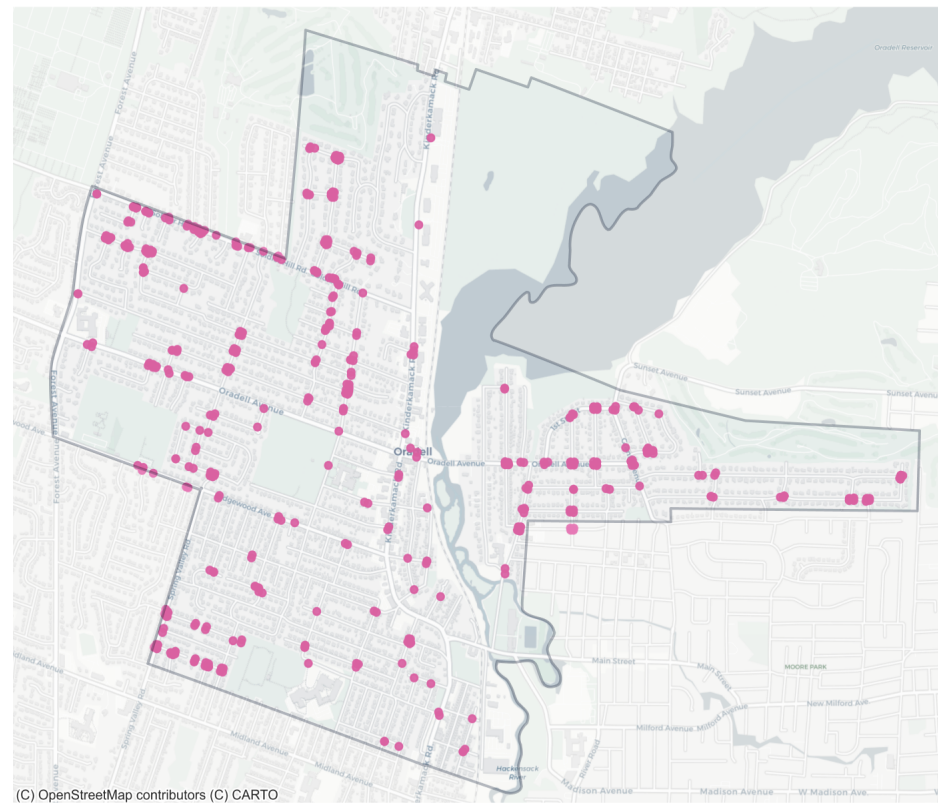
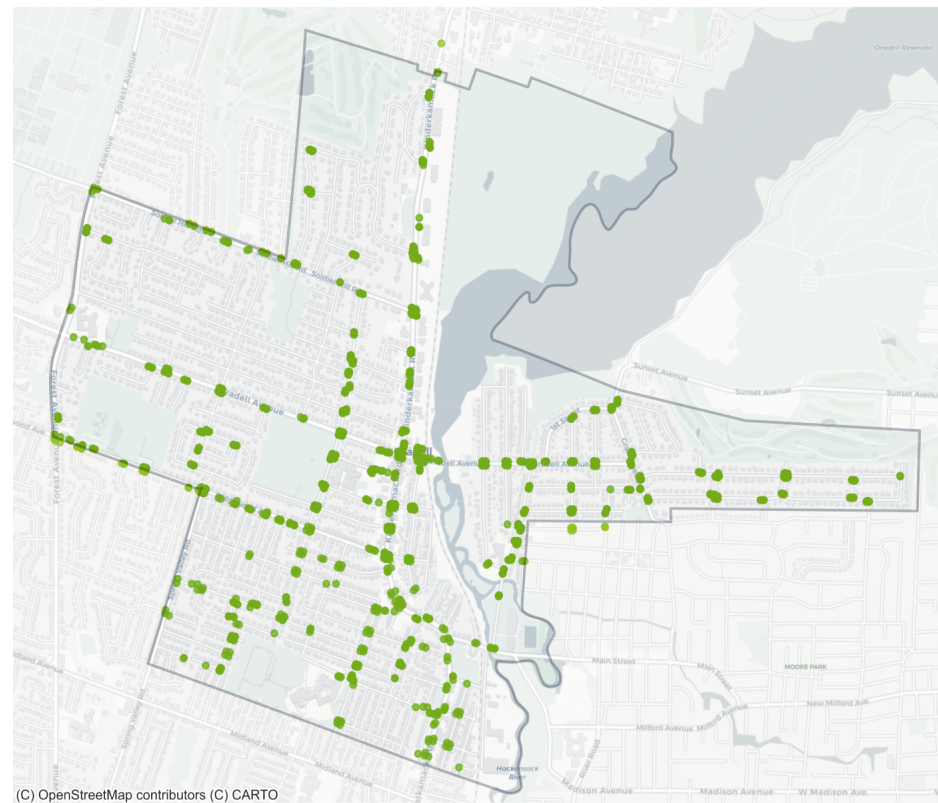
# Sidewalk Analysis




500 m  
2000 ft


(C) OpenStreetMap contributors (C) CARTO

# Sidewalk Analysis



 **curb ramps**  
1,455 labels

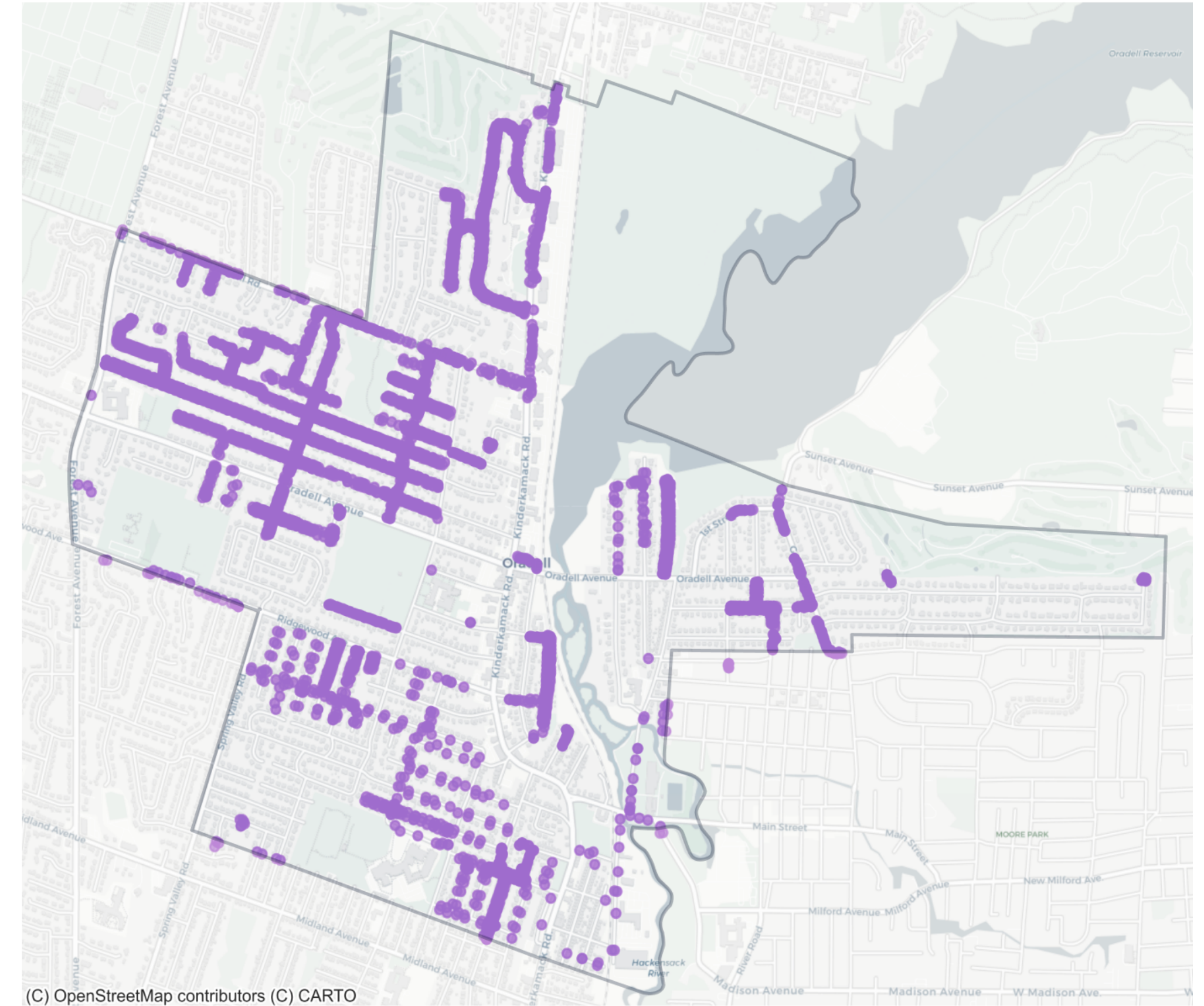
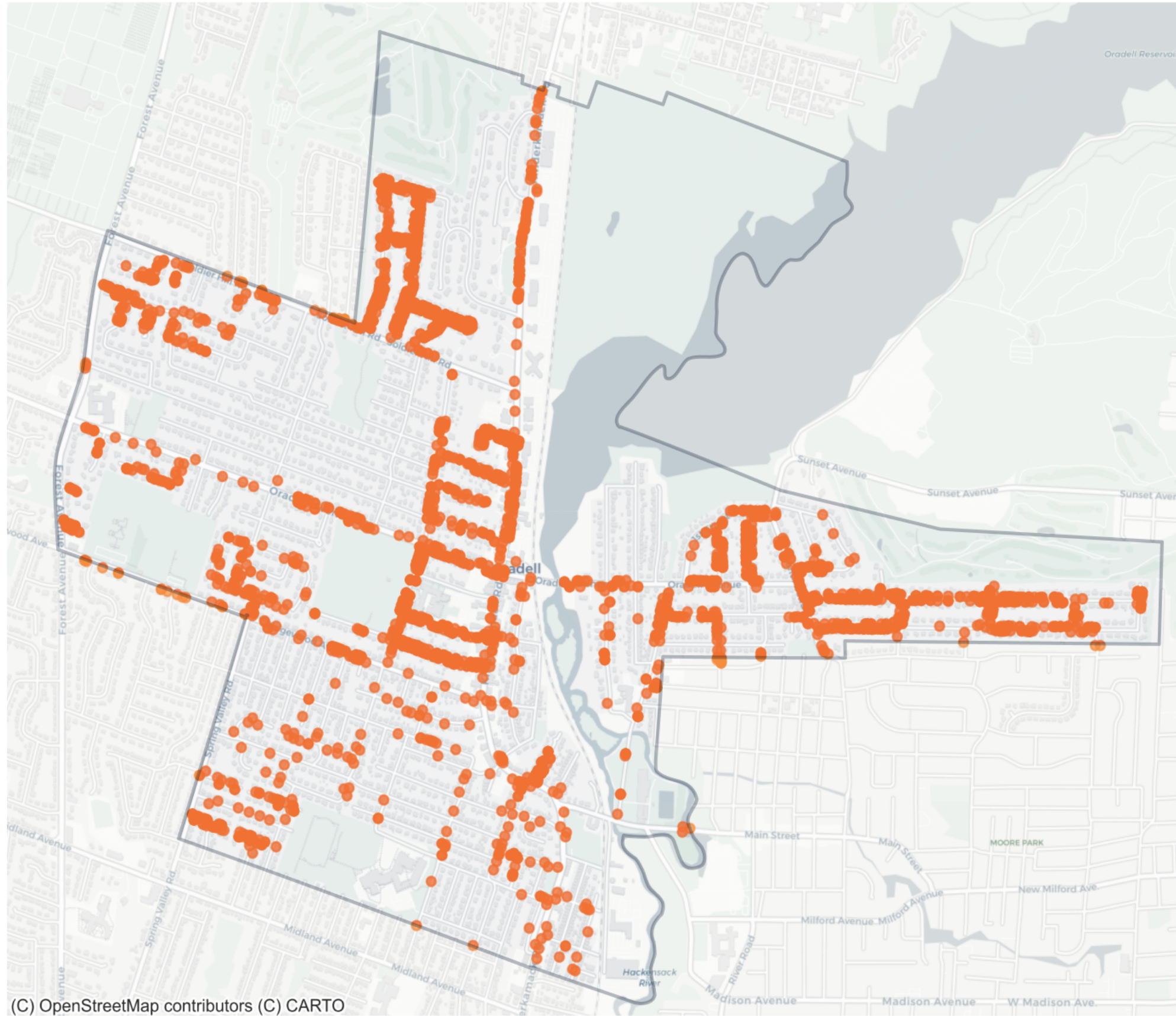
 **missing curb ramps**  
545 labels

 **obstacle**  
215 labels

 **surface problems**  
3,654 labels

 **missing sidewalks**  
5,023 labels

# Sidewalk Analysis



**surface problems**  
3,654 labels



**missing sidewalks**  
5,023 labels

# Sidewalk Analysis



**surface problems**  
3,654 labels



**missing sidewalks**  
5,023 labels

# Surface Problem Analysis

Rank	Surface Problem Tags	Count	Percentage
1	<b>height difference</b>	<b>1455</b>	<b>29%</b>
2	cracks	1256	25%
3	uneven/slanted	1031	21%
4	grass	547	11%
5	very broken	235	5%



Labeled: May 6, 2022, 5:14 PM

Image Date: Mar 2022

Severity



29

Tags





# Surface Problem Analysis

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☺ ☹ ☹ ☹ ☹

Tags

height difference uneven/slanted

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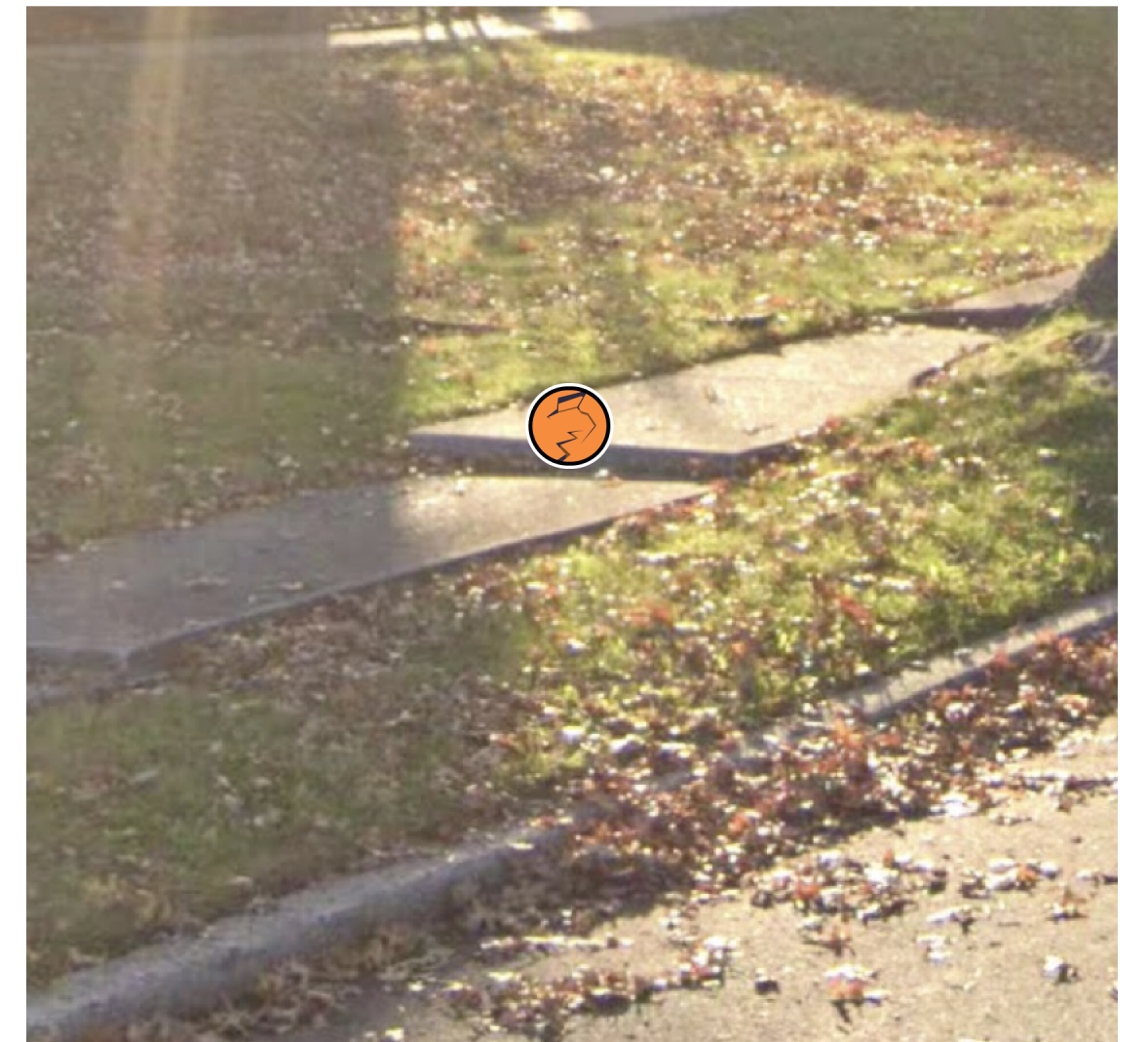
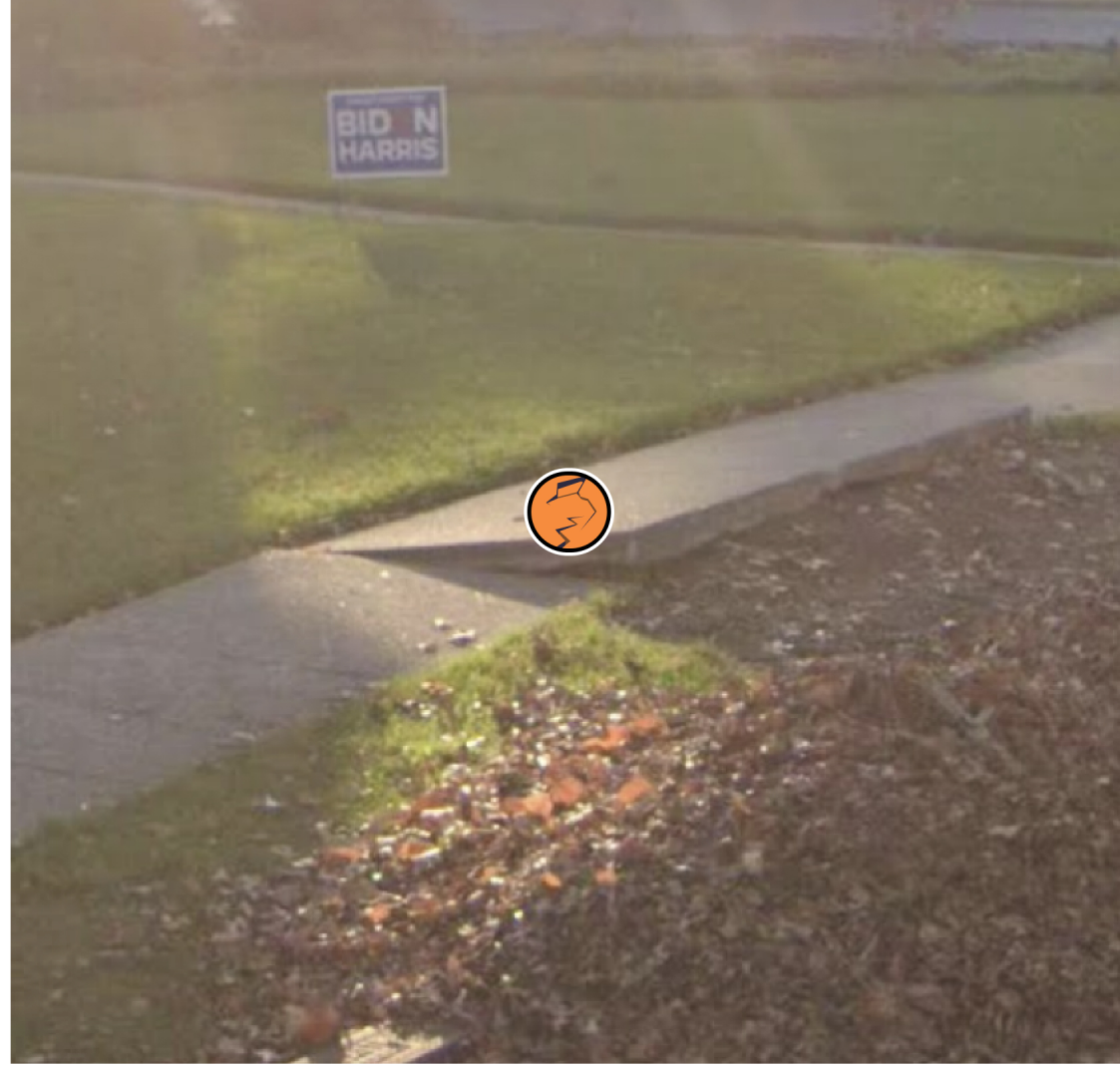


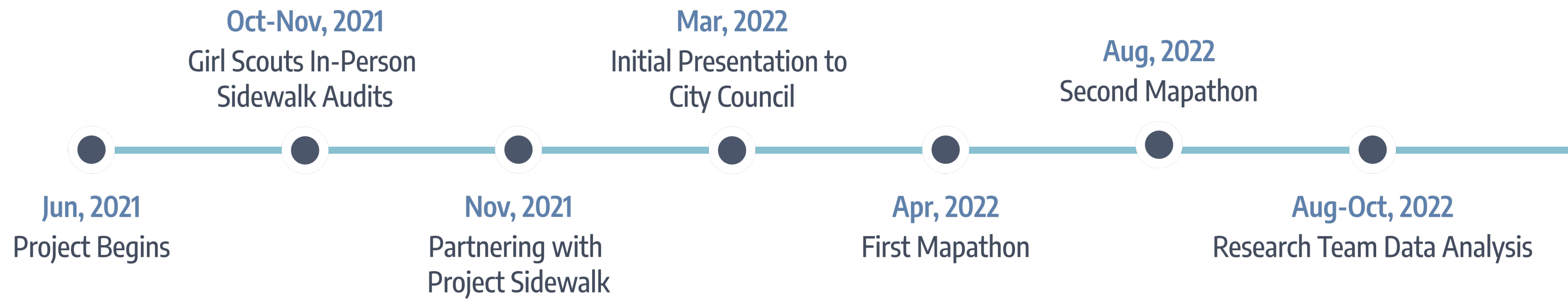
30

Tags

height difference uneven/slanted

# High Severity Surface Problems











Dianne Camelo Didio  
Mayor



# MC Regular Meeting

Jan 31, 2023



Dianne Camelo Didio  
Mayor



**MC Regular Meeting**

**Jan 31, 2023**



# Post-Deployment Interviews

## Participants



Disability  
Advocates



Girl Scouts



Girl Scouts'  
Parents



Medical  
Professionals

N= 19

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## Method

Group/individual semi-structured interviews with two researchers

Thematic analysis through deductive and inductive encoding

How can emerging tools like Project Sidewalk be used  
to support **urban accessibility advocacy**?

What did key stakeholders learn about **sidewalks & disability, urban planning, and accessibility advocacy?**

# Findings

# Findings

## Shifted Perspectives

Perceptual & behavioral changes  
towards urban accessibility

Raised awareness of civic  
responsibility

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## Civic Engagement

Scientific inquiry & data analysis

Storytelling & public speaking

Understanding real-world constraints

Collaborative interactions

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## Implications For Digital Civics

Benefits & limitations of Project Sidewalk

Sustaining engagement

Support in training, interpreting & visualization



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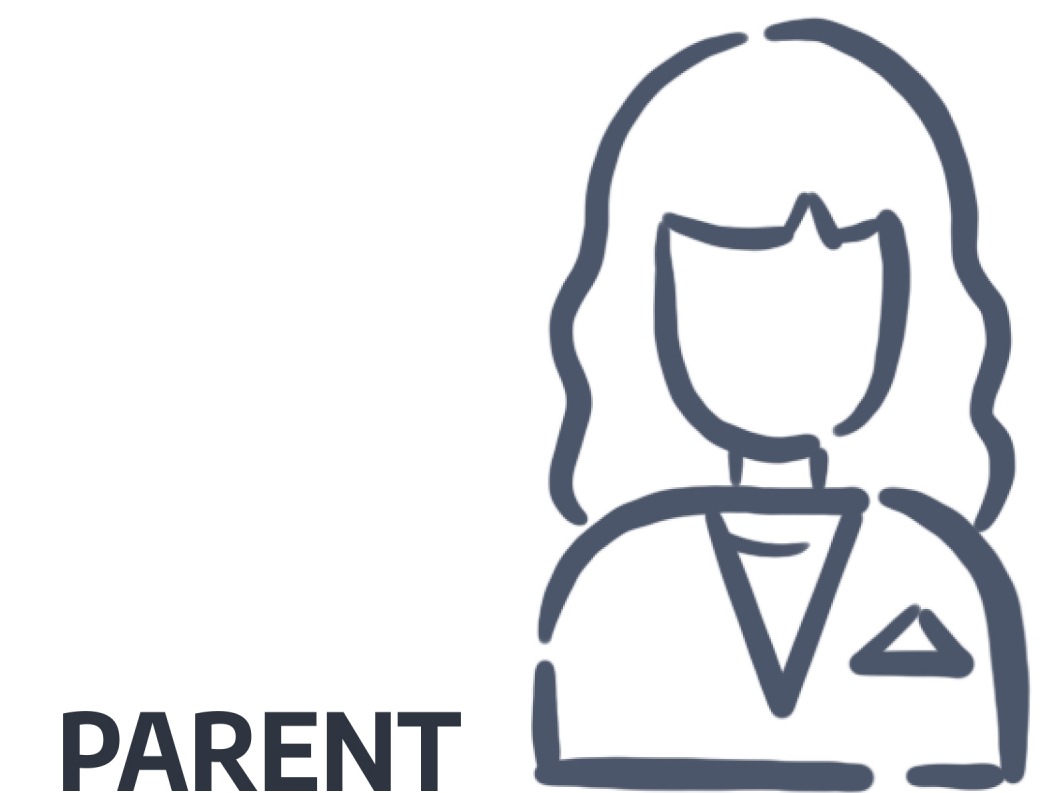


**Before Project Sidewalk, I never realized how important curb ramps are for people with disabilities...**



**GIRL SCOUT [GS4]**

“ Now when they walk down the street and see something [inaccessible], they quickly notice and say **“This is wrong!”** ”





This experience gave me a new perspective that I can use to **help change the world.**



**GIRL SCOUT [GS7]**

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DAVID ATKINSON  
BOARD CHAIRMAN


Kevin D. Harris, Esq.  
Borough Administrator

This is just another way to look at it.



This is just another way to look at it.



A group of people, including several young women in light-colored jackets, are gathered around a woman speaking at a podium. In the foreground, a man in a suit is seated at a table with a laptop and a nameplate that reads "DAVID ATKINSON". Another nameplate to the right reads "Kevin D. Harris, Esq.". The scene appears to be a community meeting or a public hearing.

# Combining research findings with local knowledge

This is just another way to look at it.

# Findings

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DAVID ATKINSON  
SCHOOL CHAIRMAN

Kevin D. Harris, Esq.  
Borough Administrator



DAVID ATKINSON  
SCHOOL CHAIRMAN

Kevin D. Harris, Esq.  
Borough Administrator



# Continued engagement and collaboration with local authorities

DAVID ATKINSON  
Mayor, Council

Kevin D. Harris, Esq.  
Borough Administrator

# Findings

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Perceptual & behavioral changes towards urban accessibility

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# Implications for Future Tools

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Much more than a well designed platform



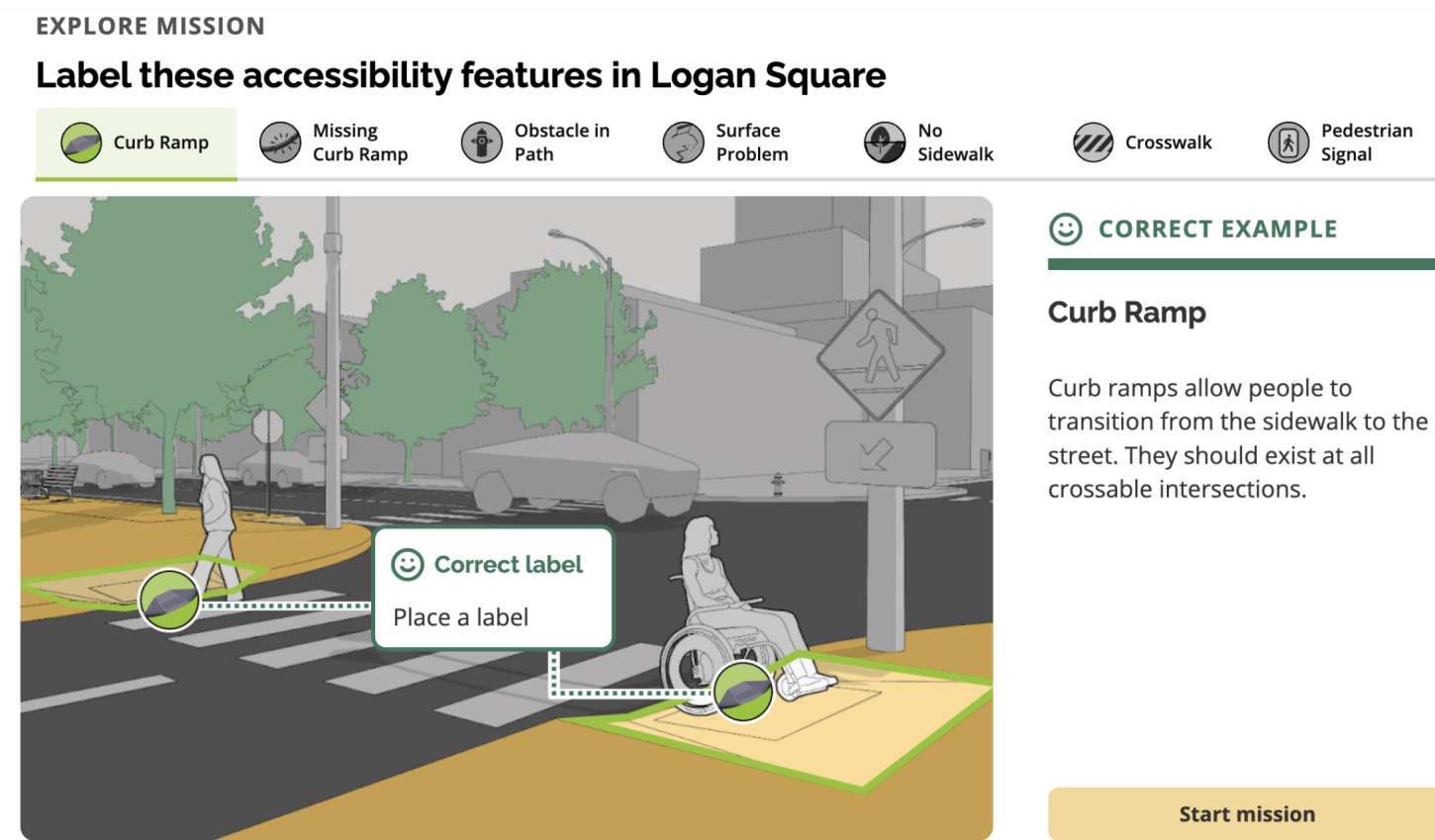
# Implications for Future Tools

Much more than a well designed platform

EXPLORE MISSION

Label these accessibility features in Logan Square

Curb Ramp  Missing Curb Ramp  Obstacle in Path  Surface Problem  No Sidewalk  Crosswalk  Pedestrian Signal



**CORRECT EXAMPLE**

**Curb Ramp**

Curb ramps allow people to transition from the sidewalk to the street. They should exist at all crossable intersections.

Start mission

Comprehensive Tutorials

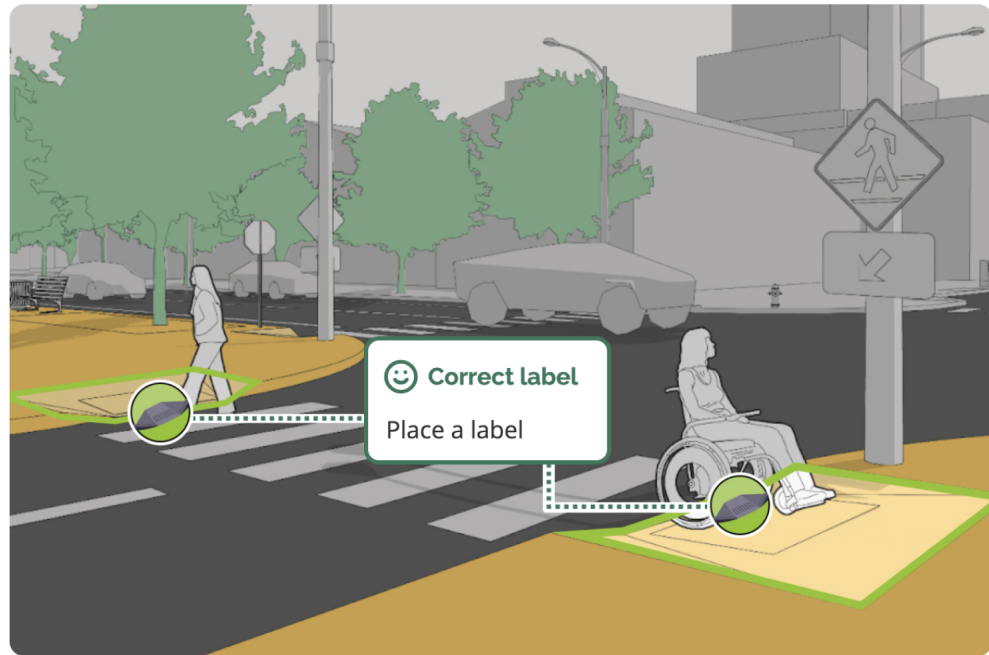
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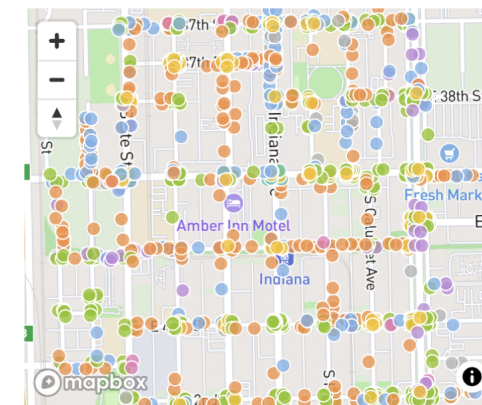
## Project Sidewalk APIs

Hey, we need your help! Use the sidewalk accessibility data that we have collected to make new technologies that support people with mobility impairments!

We serve our accessibility data in two formats: Access Attribute and Access Score. Access Attribute contains point-level information on what accessibility attributes exist and where (latitude-longitude). [See below for an example.](#) Access Score is a value that indicates how (in)accessible a given street/area is. [See the Access Score APIs for examples.](#)

You can get the data through the [REST APIs](#). You can also help [contribute!](#) The code is available on [Github](#).

## Access APIs



### Access Attributes

Download Access Attribute Data

This API serves point-level location data on accessibility attributes. The major categories of attributes include: "Curb Ramp", "Missing Curb Ramp", "Obstacle", and "Surface Problem". The less common attributes are "No Sidewalk", "Occlusion", and "Other". You can also query for the individual labels that make up the attributes.

**URL** `/v2/access/attributes`  
`/v2/access/attributesWithLabels`

**Method** GET

**Parameters** **Optional:**  
You can pass a pair of lat/long coordinates to define a bounding box, which is used to specify where you want to query the data from. If you need data for the entire city, you can use the download button above, or you can simply exclude the lat/long parameters. Note that the query could take a long time to complete if you are requesting all the data for this city.  
`lat1=[double]`  
`lng1=[double]`

Technical Support

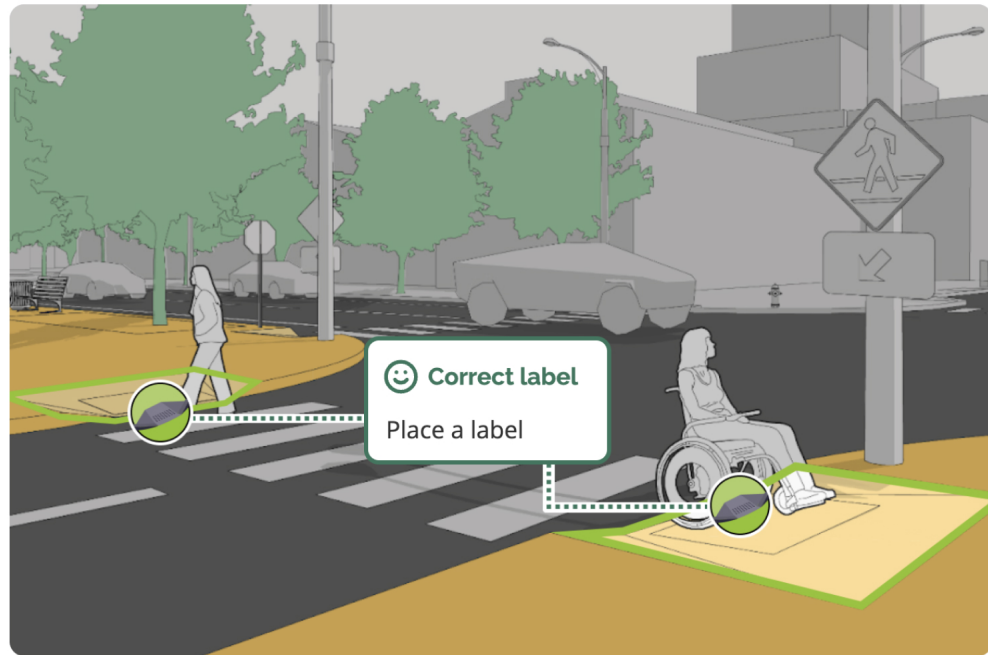
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Start mission

Comprehensive Tutorials

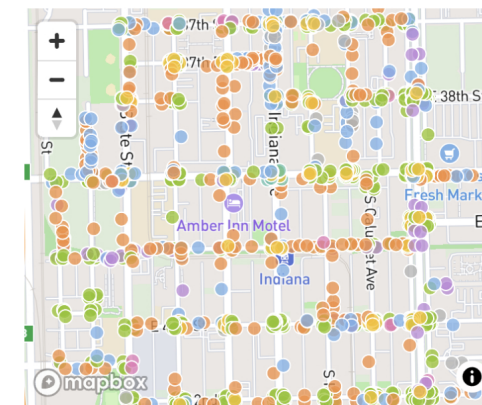
## Project Sidewalk APIs

Hey, we need your help! Use the sidewalk accessibility data that we have collected to make new technologies that support people with mobility impairments!

We serve our accessibility data in two formats: Access Attribute and Access Score. Access Attribute contains point-level information on what accessibility attributes exist and where (latitude-longitude). [See below for an example.](#) Access Score is a value that indicates how (in)accessible a given street/area is. [See the Access Score APIs for examples.](#)

You can get the data through the [REST APIs](#). You can also help [contribute!](#) The code is available on [Github](#).

## Access APIs



### Access Attributes

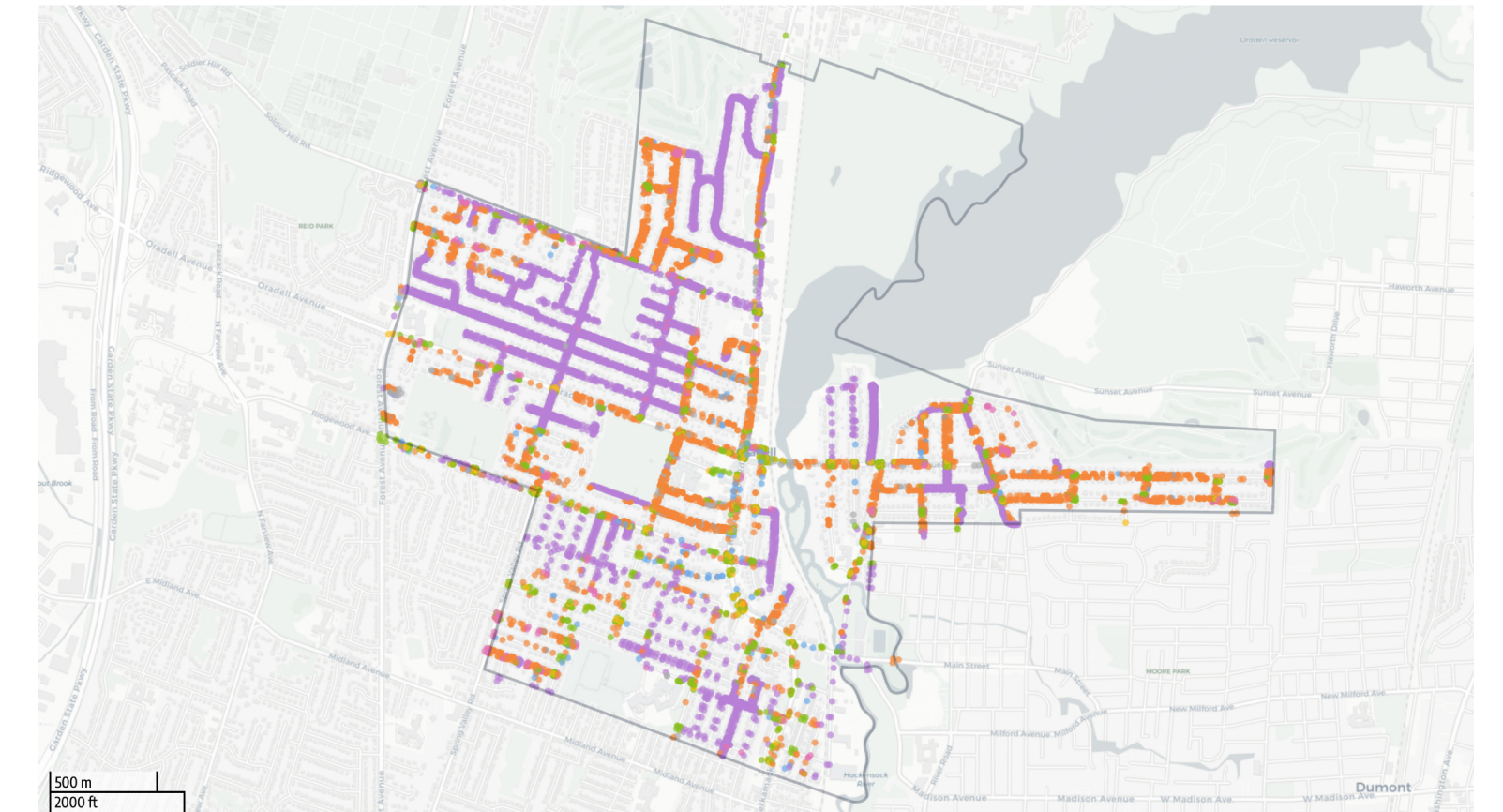
This API serves point-level location data on accessibility attributes. The major categories of attributes include: "Curb Ramp", "Missing Curb Ramp", "Obstacle", and "Surface Problem". The less common attributes are "No Sidewalk", "Occlusion", and "Other". You can also query for the individual labels that make up the attributes.

URL `/v2/access/attributes`  
`/v2/access/attributesWithLabels`

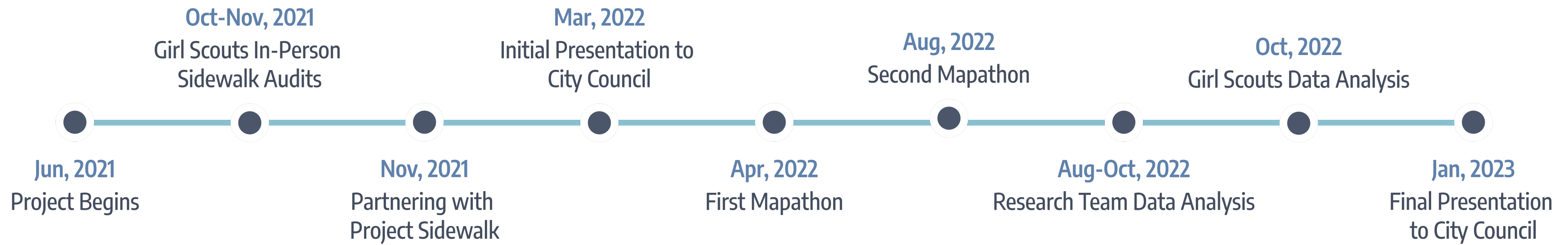
Method GET

Parameters **Optional:**  
You can pass a pair of lat/ing coordinates to define a bounding box, which is used to specify where you want to query the data from. If you need data for the entire city, you can use the download button above, or you can simply exclude the lat/ing parameters. Note that the query could take a long time to complete if you are requesting all the data for this city.  
`lat1=[double]`  
`lng1=[double]`

Technical Support



Data Interpretation



# The project continues...



# Governmental Policy



## Ordinance

Mandatory sidewalk repairs for home sales

# Governmental Policy



## Ordinance

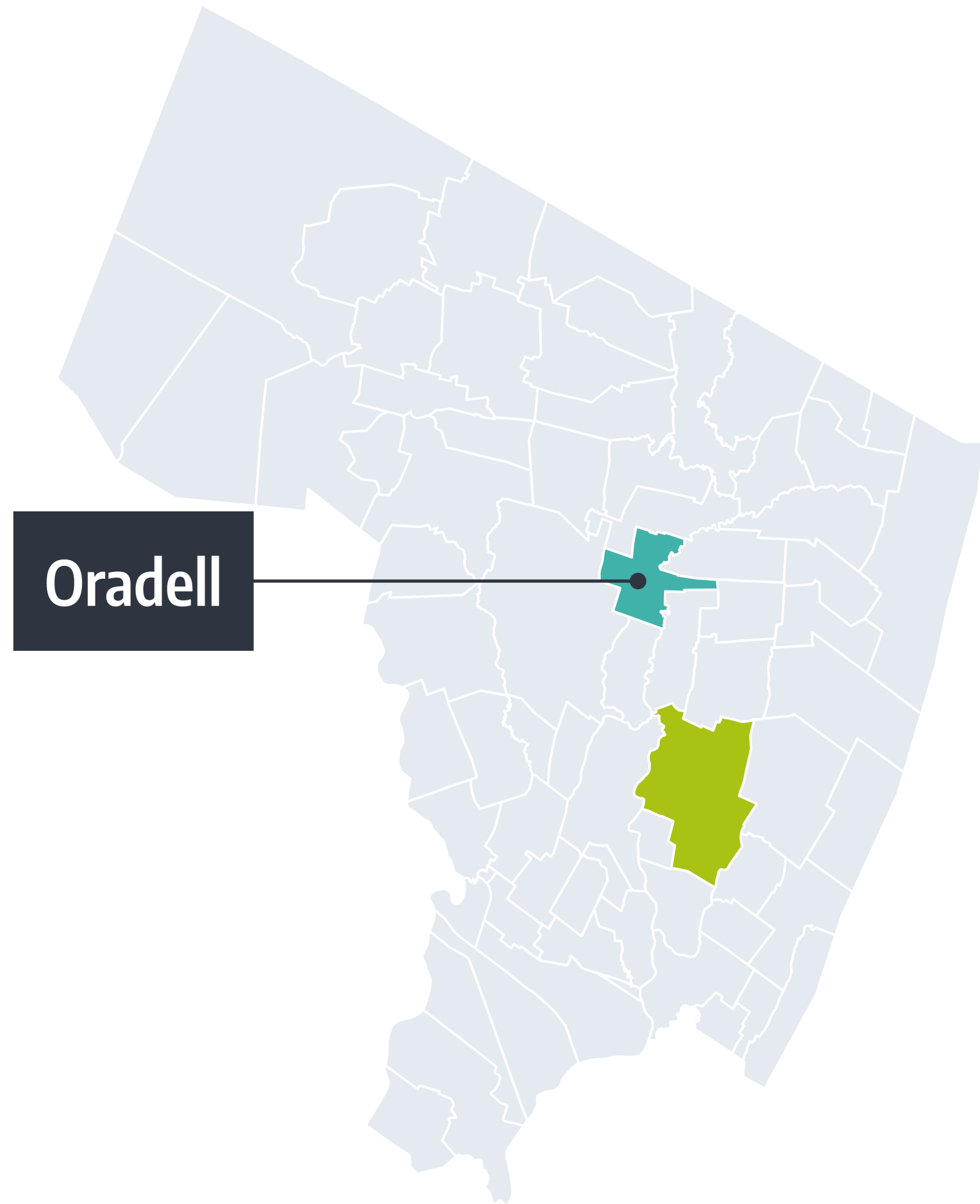
Mandatory sidewalk repairs for home sales



## Cost Offset

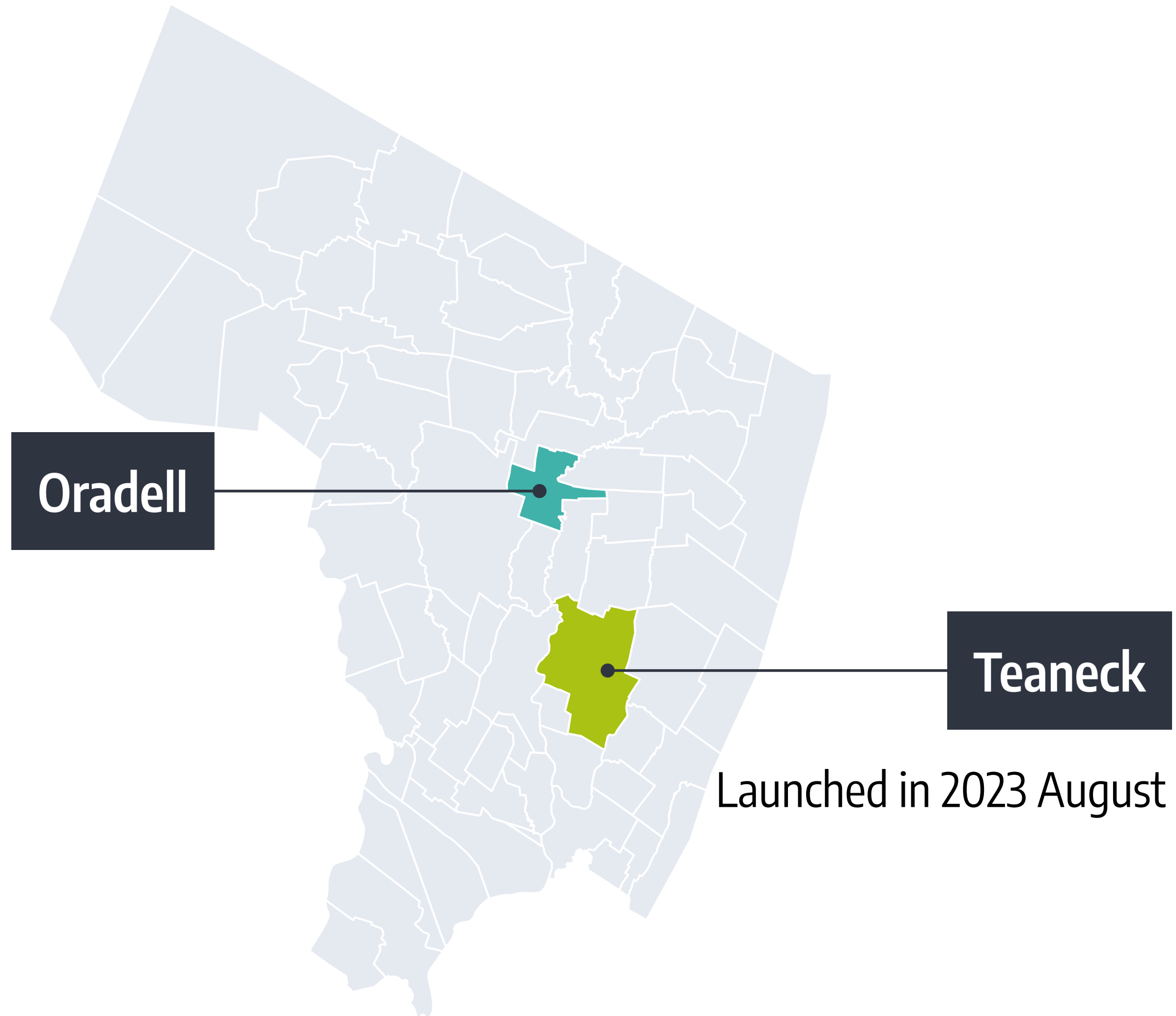
Tax incentives and contractor arrangements

# Expanding to Teaneck

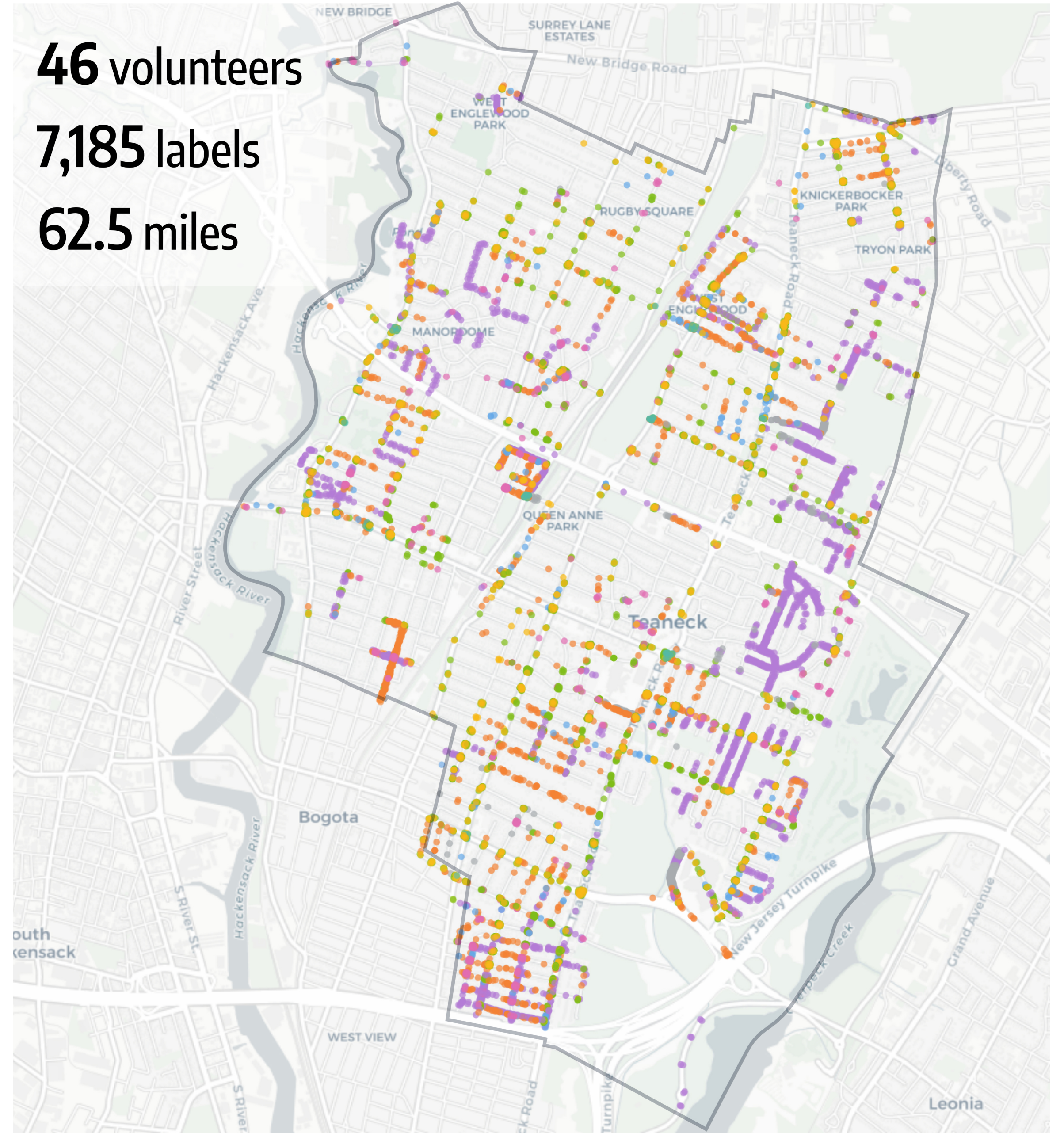
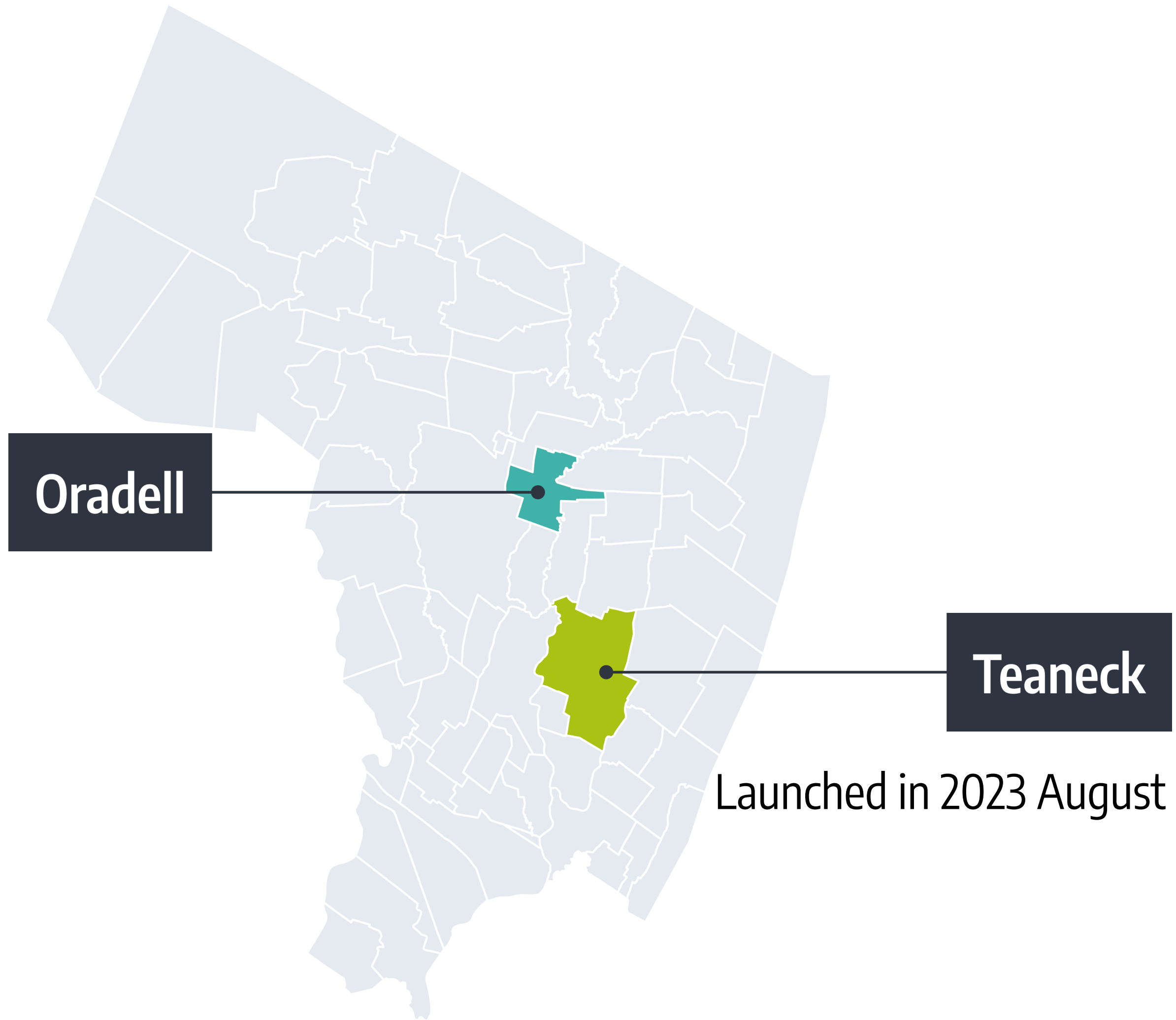




# Expanding to Teaneck



# Expanding to Teaneck

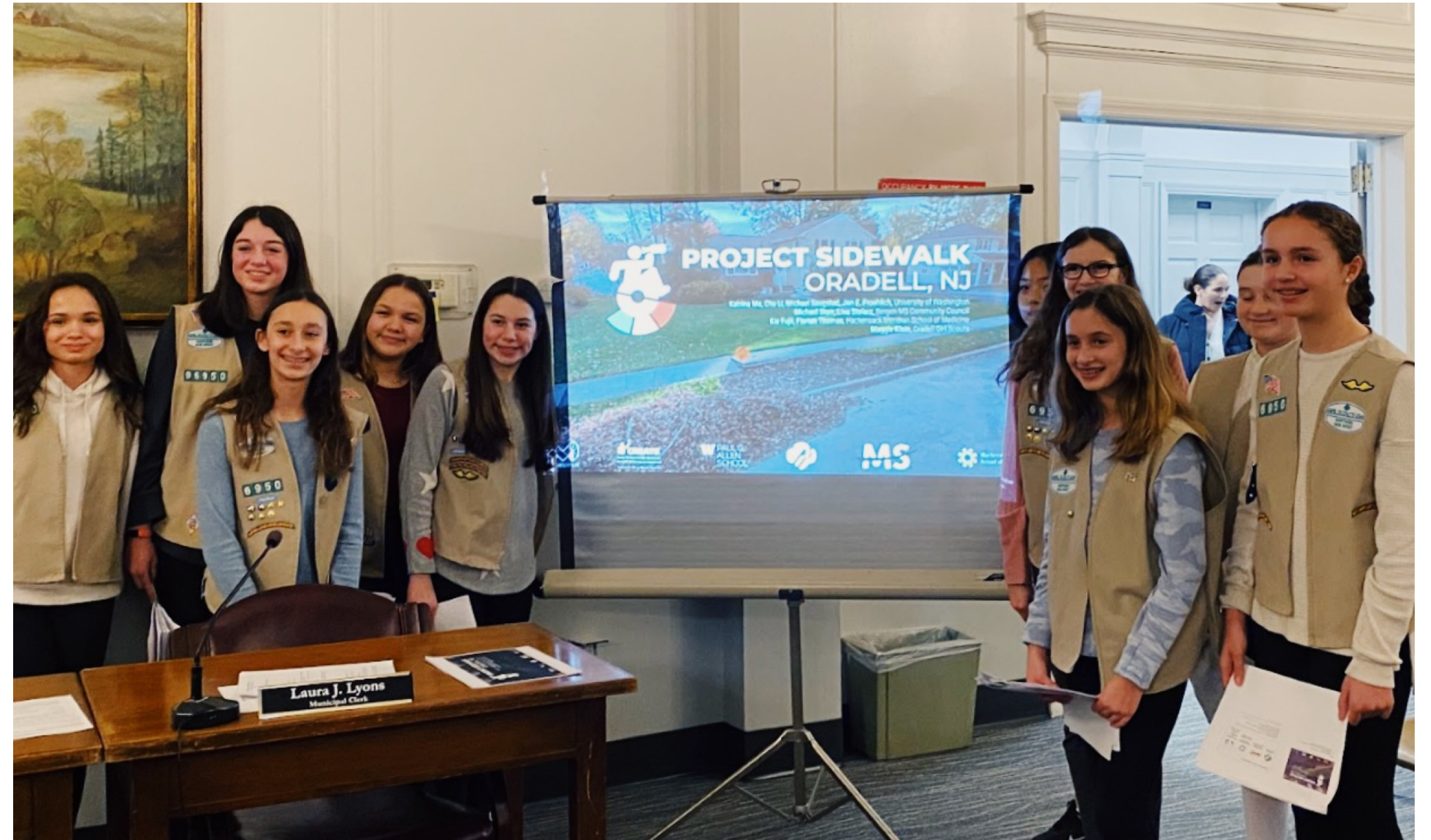


# Key Contributions



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Digital tools enhance accessibility  
advocacy & education



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Digital tools enhance accessibility  
advocacy & education

Community science fosters attitudinal  
changes & enhance knowledge

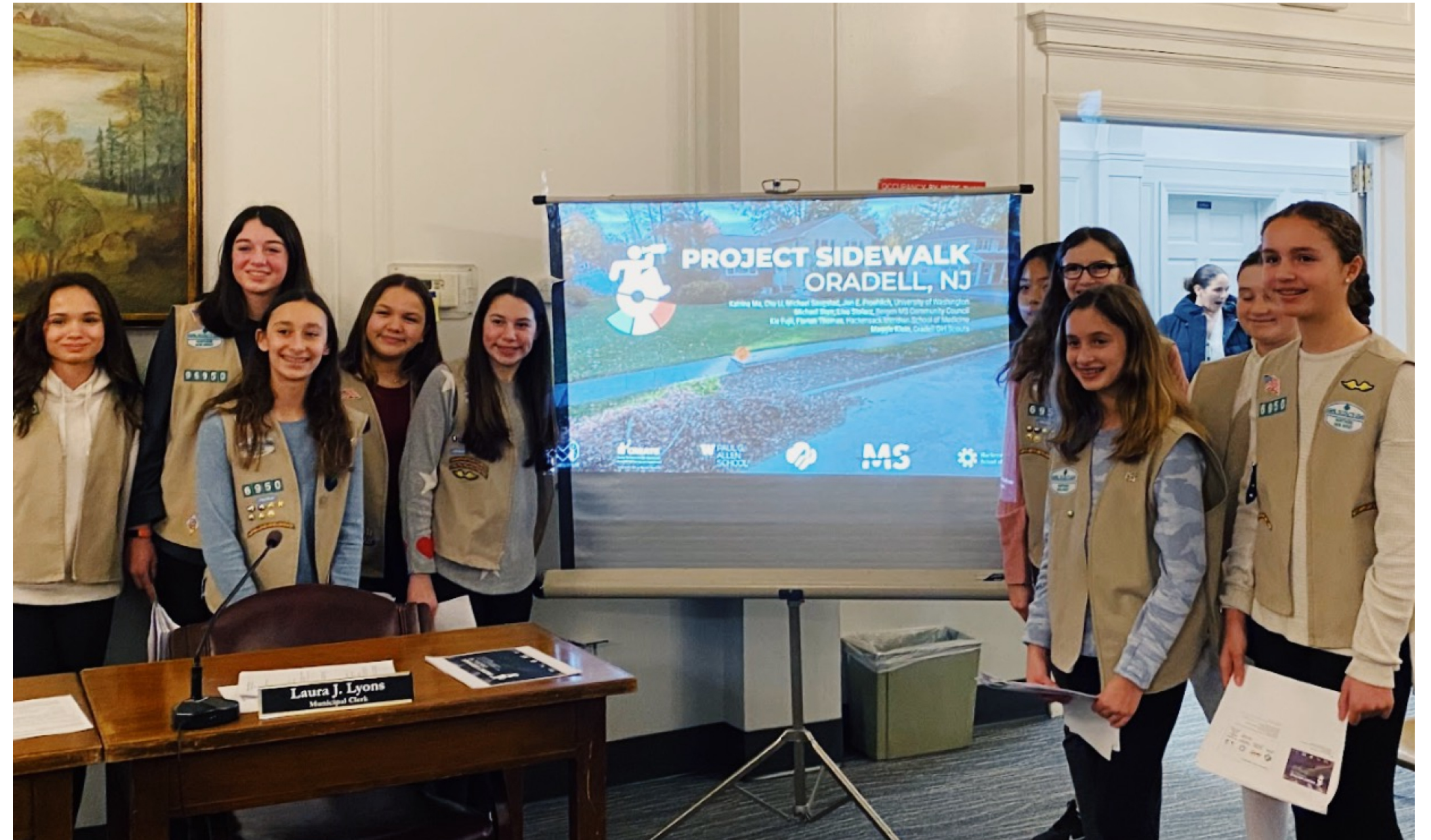


# Key Contributions

Digital tools enhance accessibility  
advocacy & education

Community science fosters attitudinal  
changes & enhance knowledge

Implications for future digital civic tools  
& community collaboration



# “I never realized sidewalks were a big deal”

## A Case Study of a Community-Driven Sidewalk Audit Using Project Sidewalk

- Digital tools enhance accessibility advocacy & education
- Community science fosters attitudinal changes & enhance knowledge
- Implications for future digital civic tools & collaboration with communities



Chu Li



Katrina Ma



Michael Saugstad



Kie Fujii



Molly Delaney



Yochai Eisenberg



Delphine Labbé



Judy L. Shanley



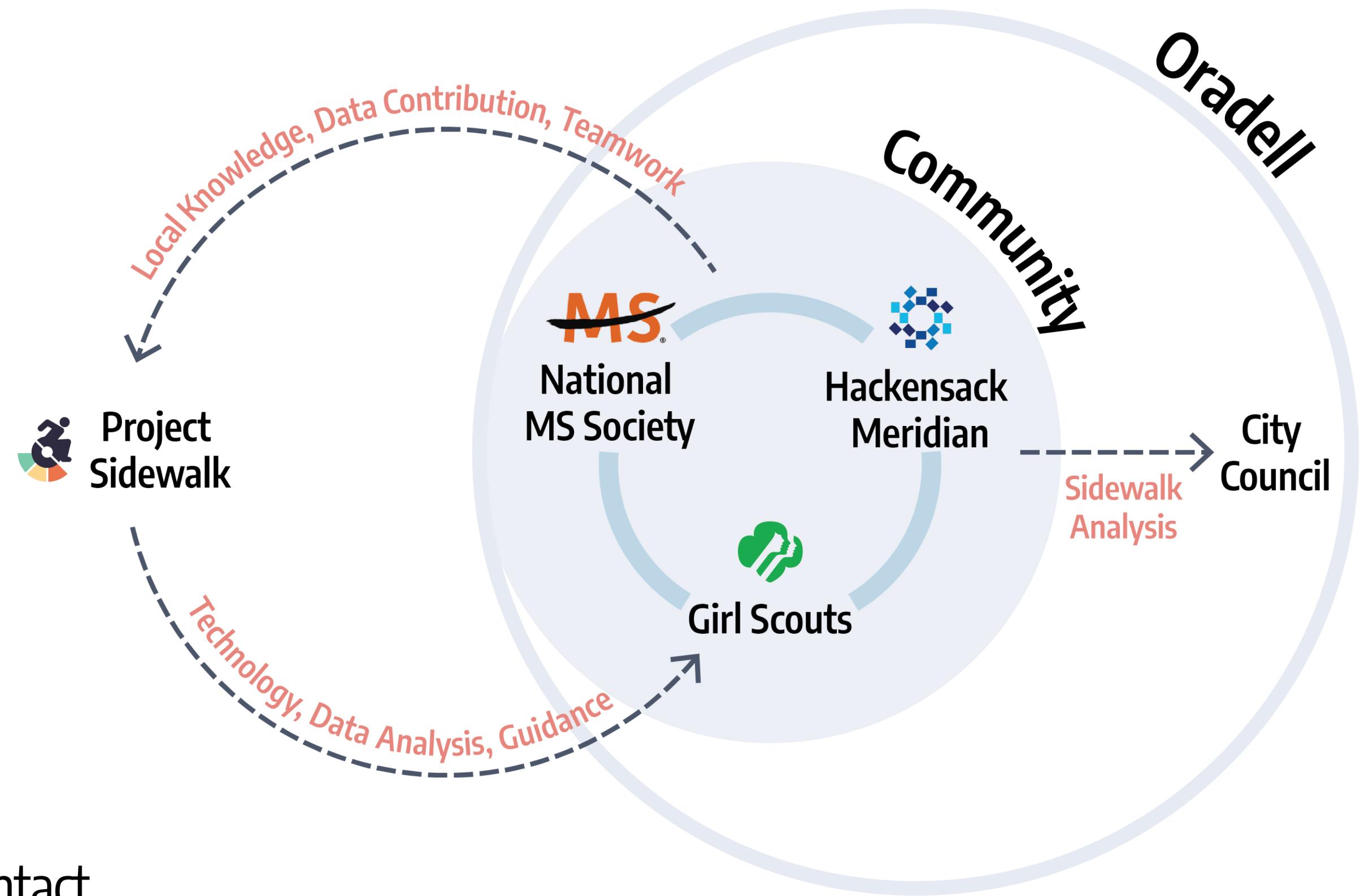
Devon Snyder



Florian Thomas



Jon E. Froehlich



Contact

[chuchuli@cs.uw.edu](mailto:chuchuli@cs.uw.edu)



PAUL G. ALLEN SCHOOL  
OF COMPUTER SCIENCE & ENGINEERING

