

# **TRB Webinar: Creating Inclusive Mobility**

**April 5, 2022**

**11:30- 1:00 PM Eastern**

**@NASEMTRB  
#TRBwebinar**

# PDH Certification Information:

- 1.5 Professional Development Hours (PDH) – see follow-up email for instructions
- You must attend the entire webinar to be eligible to receive PDH credits
- Questions?  
[trbwebinar@nas.edu](mailto:trbwebinar@nas.edu)

**#TRBwebinar**

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**REGISTERED CONTINUING EDUCATION PROGRAM**

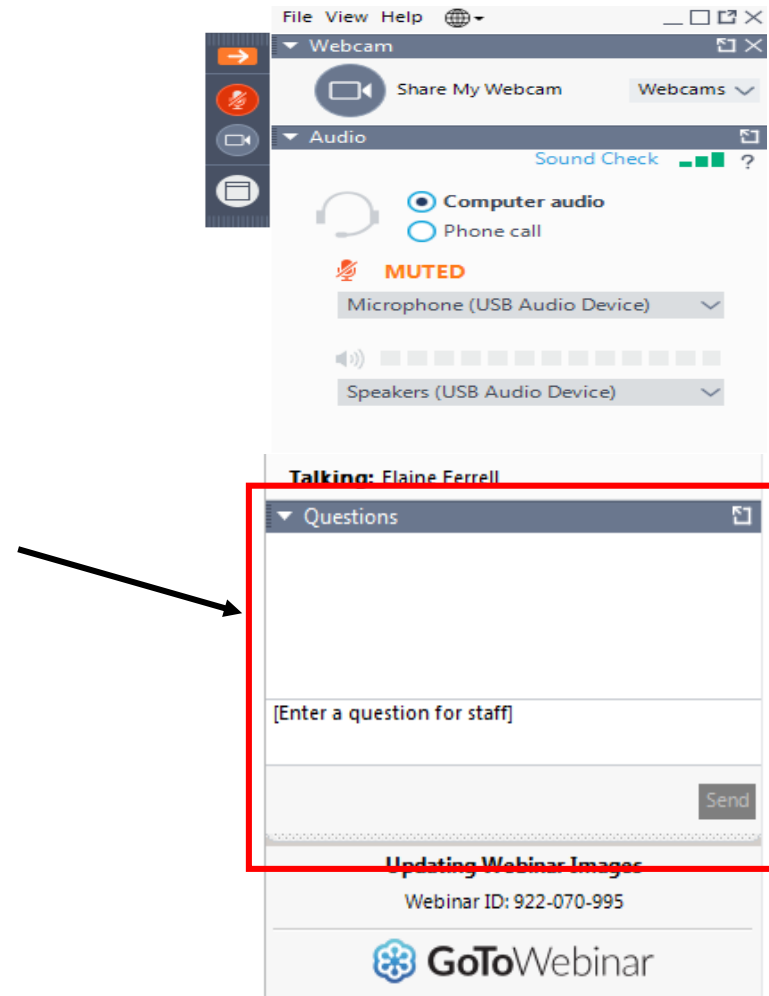
# Learning Objectives

- Identify the characteristics of a complete trip that represent accessible travel
- Understand the steps necessary to successfully implement coordinated approaches to integrated mobility
- Identify the barriers to accessible travel

**#TRBwebinar**

# Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



**#TRBwebinar**



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# **“Public” Transportation and Shared Modes in a “New” Mobility Landscape**

**Presented by:  
Gary Thomas  
Transit Market Director- Americas  
Gary.thomas1@jacobs.com**

# The Role of Transit, Shared Modes, and Public Policy in the New Mobility Landscape

Transportation Research Board

Special Report 337

2021

# Public Transit and Inclusivity

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- Traditional Public Transit
- We've always done it this way
- Ridership Pre-Pandemic
- Accessibility
- Other modes and motivations
- One size fits all
- Public “vs” Private



# Mobility as a Service (MaaS)

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- Traditional Public Transit vs MaaS
- Mobility on Demand
- Meet Customers where they are!
- Who controls what?
- TNCs, Scooters, Bicycles, Sidewalks
- Autonomous vehicles, the solution?
- Success stories



## Space Required To Transport 48 People



Car



Electric Car

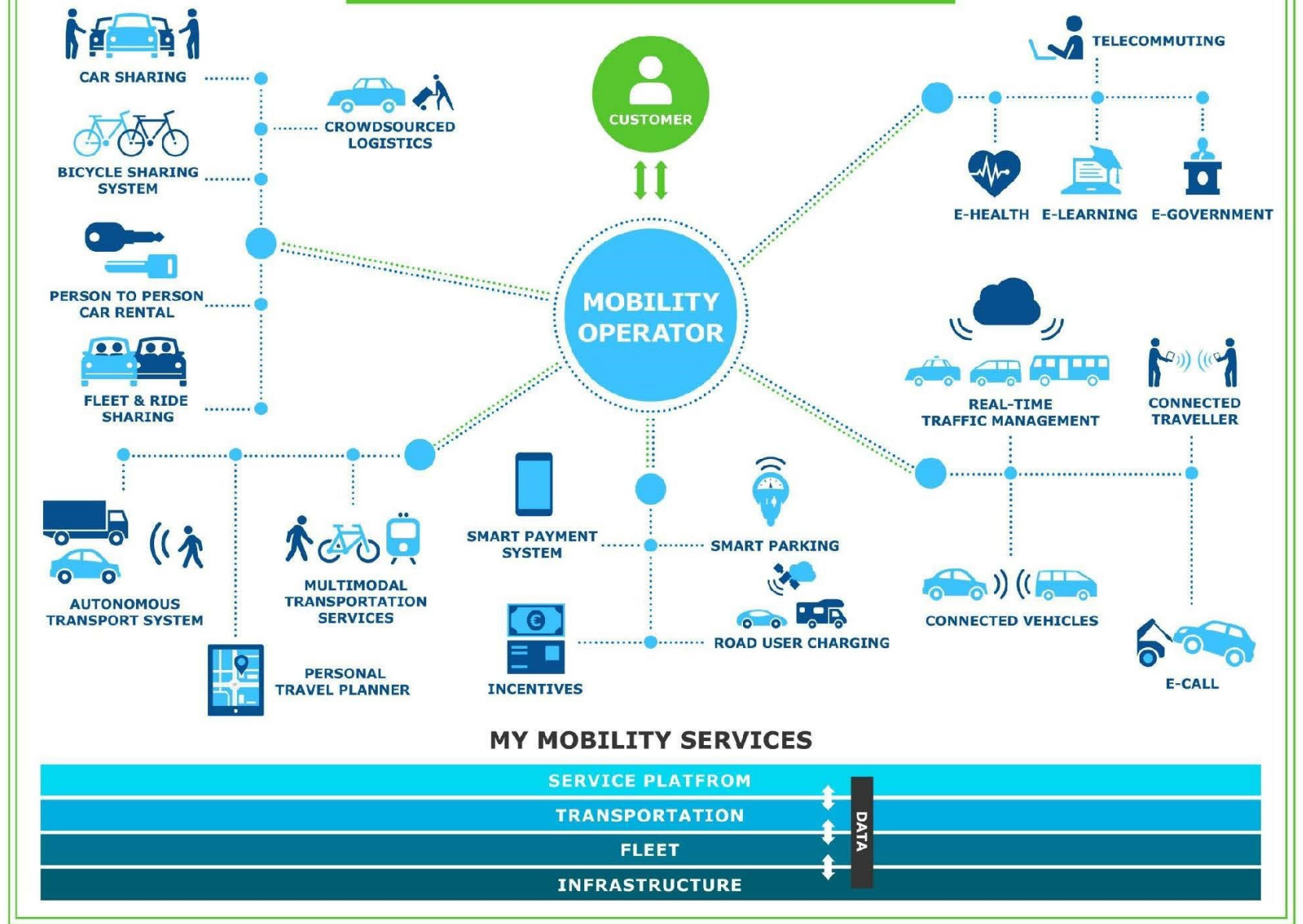


Autonomous Car

# Why MaaS matters to transit

- *Introduces seamless multimodal travel*
- *Strategy for helping urban density as it continues to grow*
- *Plan for managing rapid changes in the ecosystem of transportation infrastructure, services, information and payment acceptance*
- *Vehicle for matching demand with supply*
- *Response to expected real-time needs and wants of customers*
- *Approach for reducing traffic congestion*
- *Increases job access for low income riders*

# MOBILITY AS A SERVICE FRAMEWORK



# Positive Impacts for Low Income Riders

- Provides cash-to-mobile options
- Equitable connections for people to jobs throughout the region
- Creates tailor-made mobility solutions



# Key Take Aways

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High level of interest in MaaS has sparked rampant software development activity and various P3 agreements



Although there are many pieces to an integrated journey planning and payment “ecosphere”, a mastery solution has not been developed



Determining who “owns and controls” integrated mobility solutions is open for debate



Negotiating acceptable agreements with the TNCs for shared ride service and access to data to evaluate the program has proven more difficult than anticipated



“Everything-As-a-Service thinking” to provide activity planning for a complete life-cycle solution

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# Transit, MaaS and the Pandemic, what's next?

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# Thank You!

**Gary Thomas**

Transit Market Director - Americas

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# Creating Inclusive Mobility- What's Ahead Post Pandemic

TRB Webinar

April 5, 2022

Marlene Connor, Principal, Marlene Connor Associates

# Moving Forward from TRB Consensus Report

Consensus report identified barriers and opportunities to establish critical thinking with respect to mobility, technology and public transit with the following recommendations:

- ▶ Prioritize Transit
- ▶ Price Appropriately
- ▶ Promote Equity and Accessibility
- ▶ Partner with and for Paratransit
- ▶ Test and Analyze by Sharing Best Practices
- ▶ Overcome Fragmentation and Expand Geographically

# The Goal Remains the Same

- ▶ The post pandemic goal for the Industry regarding mobility management/integrated mobility remains the same:
  - “How to move people - customers and communities- more efficiently and effectively”
- ▶ What the pandemic has highlighted is the importance of connecting these pieces together into **One System as a Complete Trip**

# What is “One System”

- ▶ **One System/Complete Trip** connotes the idea that all of the pieces of the mobility system work together to provide one connected trip for customers, often using multiple modes, providers, etc.
- ▶ Those that have shown the need for service for shopping trips, general mobility, quality of life
- ▶ Driving towards the concept of universal access/ibility for all customers

# How Has Our Knowledge Evolved

- ▶ The changes in technology were already happening, TNCs were evolving into microtransit pilots and platforms were connecting many information, communication and use modes in enhancing mobility to our communities and customers whether urban, suburban or rural
- ▶ The pandemic re-emphasized the importance of ensuring a customer focused multimodal system with an emphasis on transit and shared mobility centered around choices while furthering social and societal goals - improve efficiency, reduce emissions, and improve equity and accessibility

# What Has Changed Since the Pandemic?

- ▶ Conditions on the ground for both transit and communities
- ▶ Information we have learned about our communities-essential jobs and people
- ▶ Who else does that impact - who else needs to be included?
- ▶ How then do we rethink our industry of public transportation?

# What Has Been Magnified

Our understanding of the role of public transit, public sector

- ▶ Those taking essential trips - providing essential trips
  - ▶ Their families, friends, neighbors
  - ▶ Fares - ability to pay
  - ▶ Work force - operators/mechanics
- 
- ▶ How do we build a system that best serves all people?

# Where Do We Go From Here

- ▶ Raise the bar by incorporating accessible features and components into technology
- ▶ Integrating dynamics of new ideas and technology with the balance points of how people, both those with disabilities and the general public travel
- ▶ Can we use these dynamics to add value to customers through a One System/Complete Trip infrastructure
- ▶ Ties back to integrated approach and equity and inclusion



# USDOT ITS Joint Program (ITS4US) Complete Trip Program

## ► Buffalo:

- Blending full range of accessible features into the deployment area
- Improve mobility to, from and within the Buffalo Niagara Medical Campus
- Accessible transportation services- indoor and outdoor navigation services, universally designed intersections
- Deploying technologies that address existing mobility/accessibility
- Integrates accessible trip planning tool with current transit services, indoor/outdoor wayfinding, community-based on-demand shuttle services that include a fleet of fully autonomous shuttles, and intersection pedestrian safety technologies

# Barriers That Remain

- ▶ Data, information, integrated payment or at least back-office systems
- ▶ How do we expand shared mobility options to broaden community partners
- ▶ Who are the “targeted” populations in this broader context

# Re-Imagined Systems

- ▶ Multiple modes and providers
- ▶ Connecting complete trips
- ▶ Measuring value to customers and communities - develop consistent community of practice in measuring value and outcomes

# Thank You!

▶ Happy to answer any questions...

▶ *Marlene Connor*

[MBConnor@mcntp.com](mailto:MBConnor@mcntp.com)



# PROJECT SIDEWALK

CROWD + AI TOOLS TO MAP & ASSESS URBAN  
ACCESSIBILITY ACROSS THE WORLD

Jon E. Froehlich  
University of Washington

TRB Seminar  
April 5, 2022



**SIDEWALKS ARE  
CRITICAL PUBLIC  
INFRASTRUCTURE**



**NO CURB RAMPS**



**PHYSICAL OBSTACLES**



**SURFACE PROBLEMS**



**INCOMPLETE SIDEWALKS**



**PHYSICAL OBSTACLES**

**NO CURB RAMP**

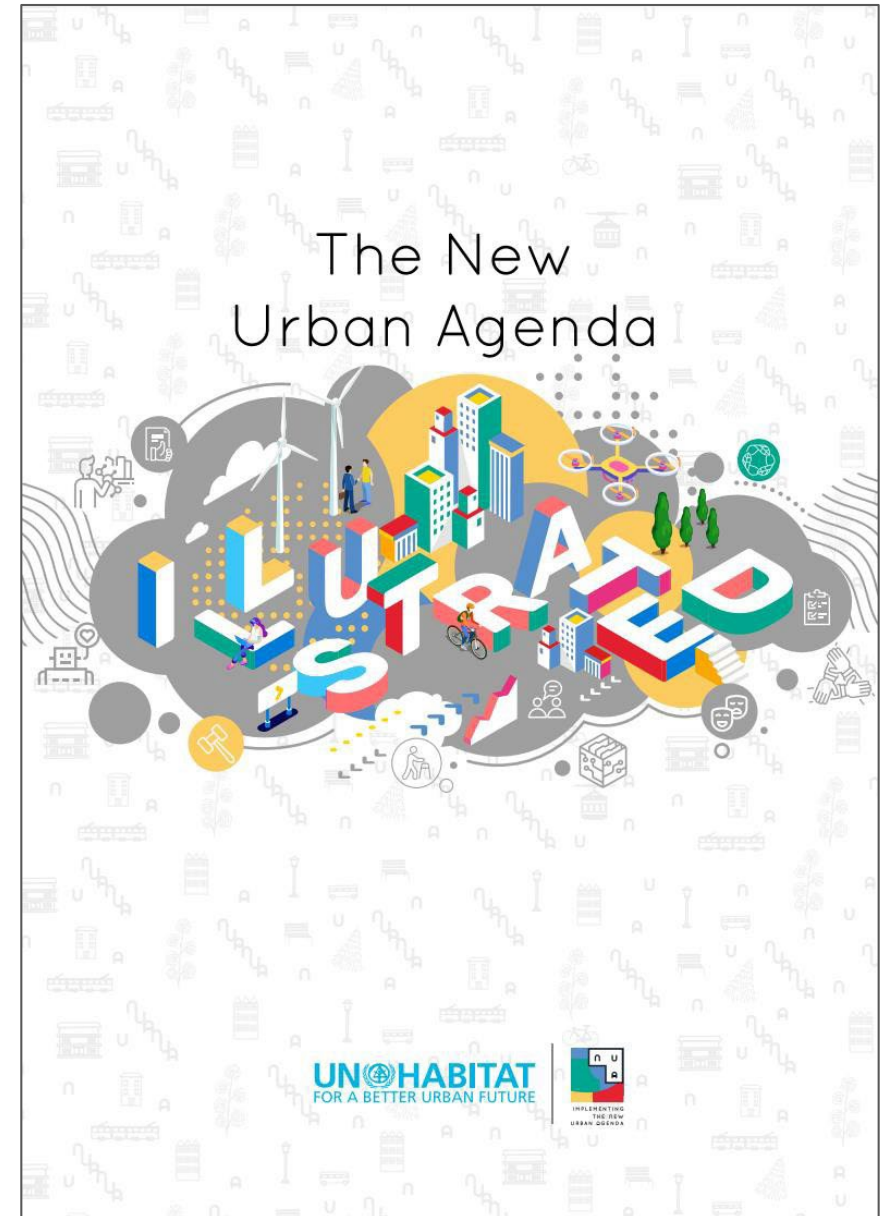
**SURFACE DEGRADATION**



This designed inaccessibility contributes to and further reinforces systemic inequalities in economic opportunity and access to basic health and educational services for people with disabilities

**- UN NEW URBAN AGENDA 2020**

See [Section 1.1.3](#)



**THE PROBLEM IS  
NOT JUST A LACK  
OF ACCESSIBLE  
SIDEWALKS**

**A LACK OF DATA**



The National Council on Disability notes that there is **no comprehensive information** on “the degree to which sidewalks are accessible” in cities.



**National Council on Disability, 2007**

The impact of the Americans with Disabilities Act: Assessing the progress toward achieving the goals of the ADA

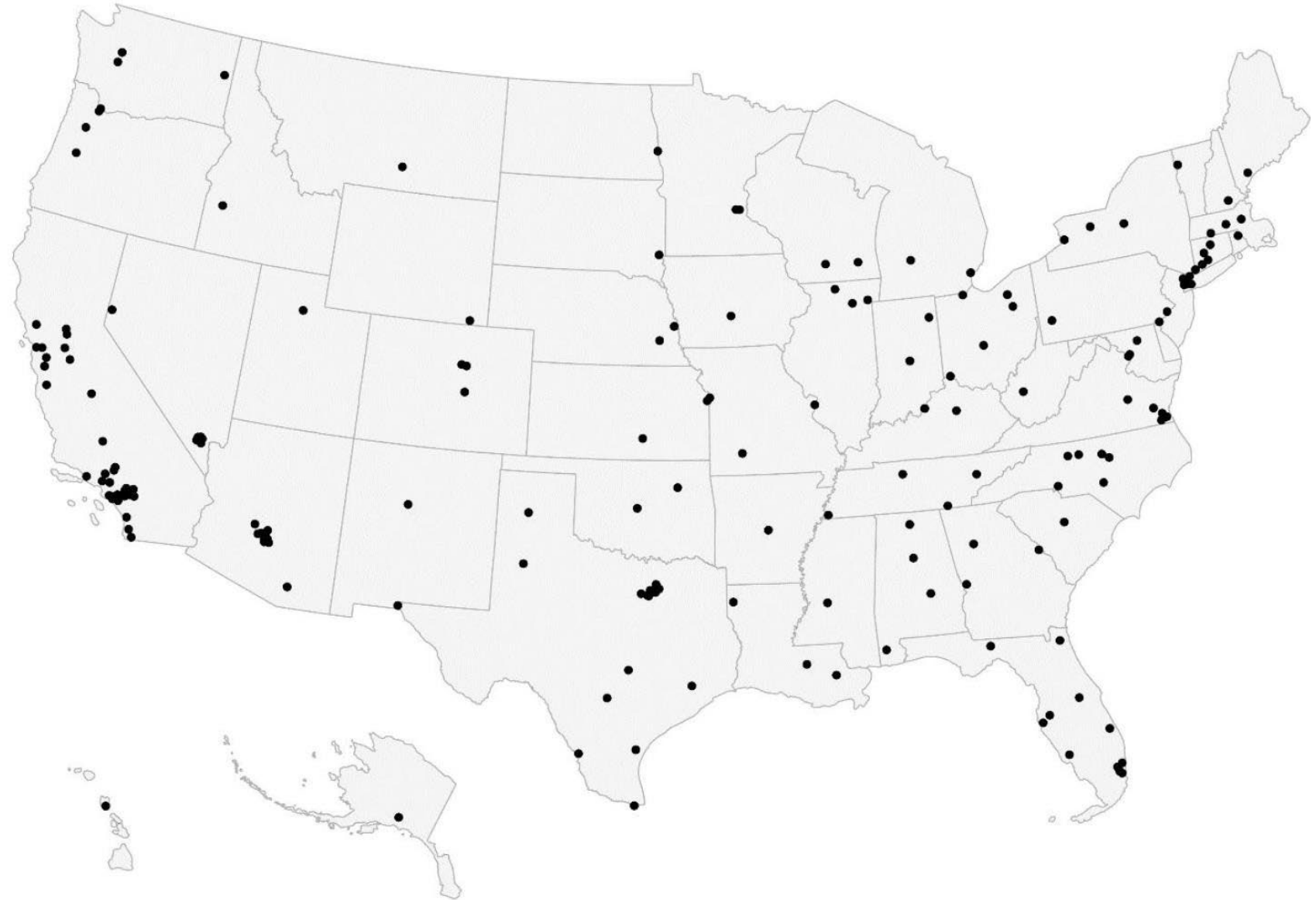
# 178 US CITIES

54% OPEN STREET DATA

20% SIDEWALKS

10% CURB RAMPS

<5% BASIC ACCESSIBILITY INFO



CALIFORNIA



# L.A. agrees to spend \$1.3 billion to fix sidewalks in ADA case



A buckled sidewalk at 4th and Main streets in downtown L.A. (Gary Friedman / Los Angeles Times)

BY EMILY ALPERT REYES | STAFF WRITER

APRIL 1, 2015 3:34 PM PT

Los Angeles is pledging to spend more than \$1.3 billion over the next three decades to fix its massive backlog of broken sidewalks and make other improvements to help those with disabilities navigate the city as part of a tentative deal being described as a landmark legal settlement.

The proposed agreement would resolve a lawsuit filed by attorneys for the disabled, who argued that crumbling, impassable sidewalks and other barriers prevented people in wheelchairs or others with mobility impairments from accessing public pathways in violation of the Americans With Disabilities Act.

The final terms must still be approved by a federal judge, but attorneys described it as

### SUBSCRIBERS ARE READING >

#### MOVIES

Concerns about Bruce Willis' declining cognitive state swirled around sets in recent years

#### CALIFORNIA

Sacramento police seek multiple gunmen in mass shooting that killed 6, wounded 12

#### CALIFORNIA

Bruce Willis' aphasia battle: Living in a country where you don't speak the language

#### HOUSING & HOMELESSNESS

##### FOR SUBSCRIBERS

Bidding wars make buying a house in L.A. a nightmare. These buyers found a way around it

#### ENTERTAINMENT & ARTS

Bruce Willis is not alone: Other celebrities diagnosed with aphasia

#### ADVERTISEMENT

For Adults with Moderate to Severe Ulcerative Colitis (UC)\*

Sideline by symptoms of ulcerative colitis?

\*When certain other UC medicines have not worked well enough.

# Suit Seeks to Make Sidewalks More Accessible for Disabled New Yorkers



By Matt F  
July 30, 20

# Seattle may have to spend millions making sidewalks more accessible to people with disabilities

Originally published April 3, 2017 at 6:30 am | Updated April 17, 2017 at 11:28 am



1 of 2 | Seattle city employees work on building sidewalks and a curb ramp on Southwest Admiral Way in West Seattle on Thursday. (Erika Schultz/The Seattle Times)

The city is headed toward a court settlement that could end up costing millions of dollars to make sidewalks more usable for people with disabilities.

By David Gutman  
Seattle Times staff reporter

### Share story

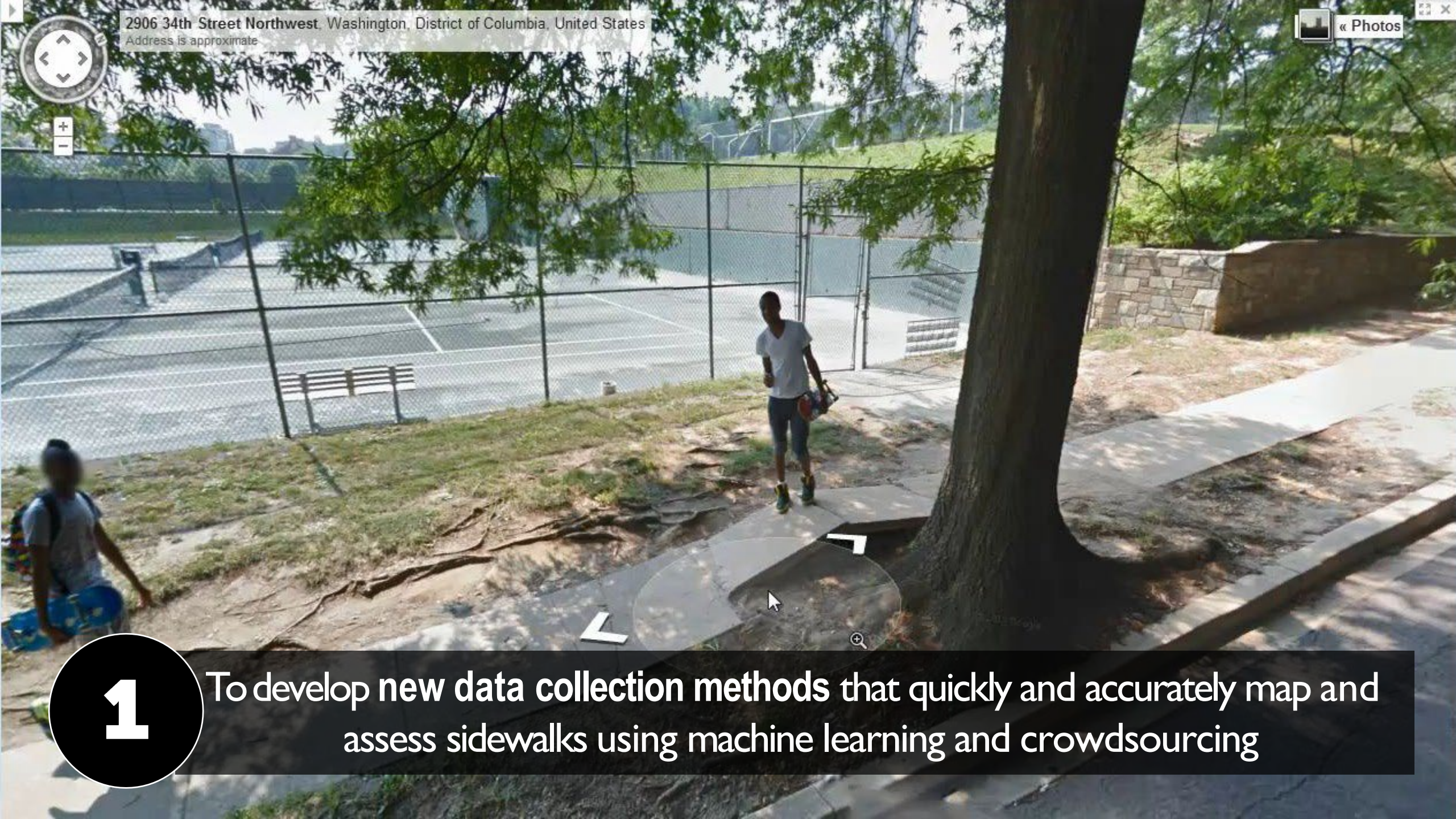


Our team is pursuing a **two-fold solution**

2906 34th Street Northwest, Washington, District of Columbia, United States

Address is approximate

Photos



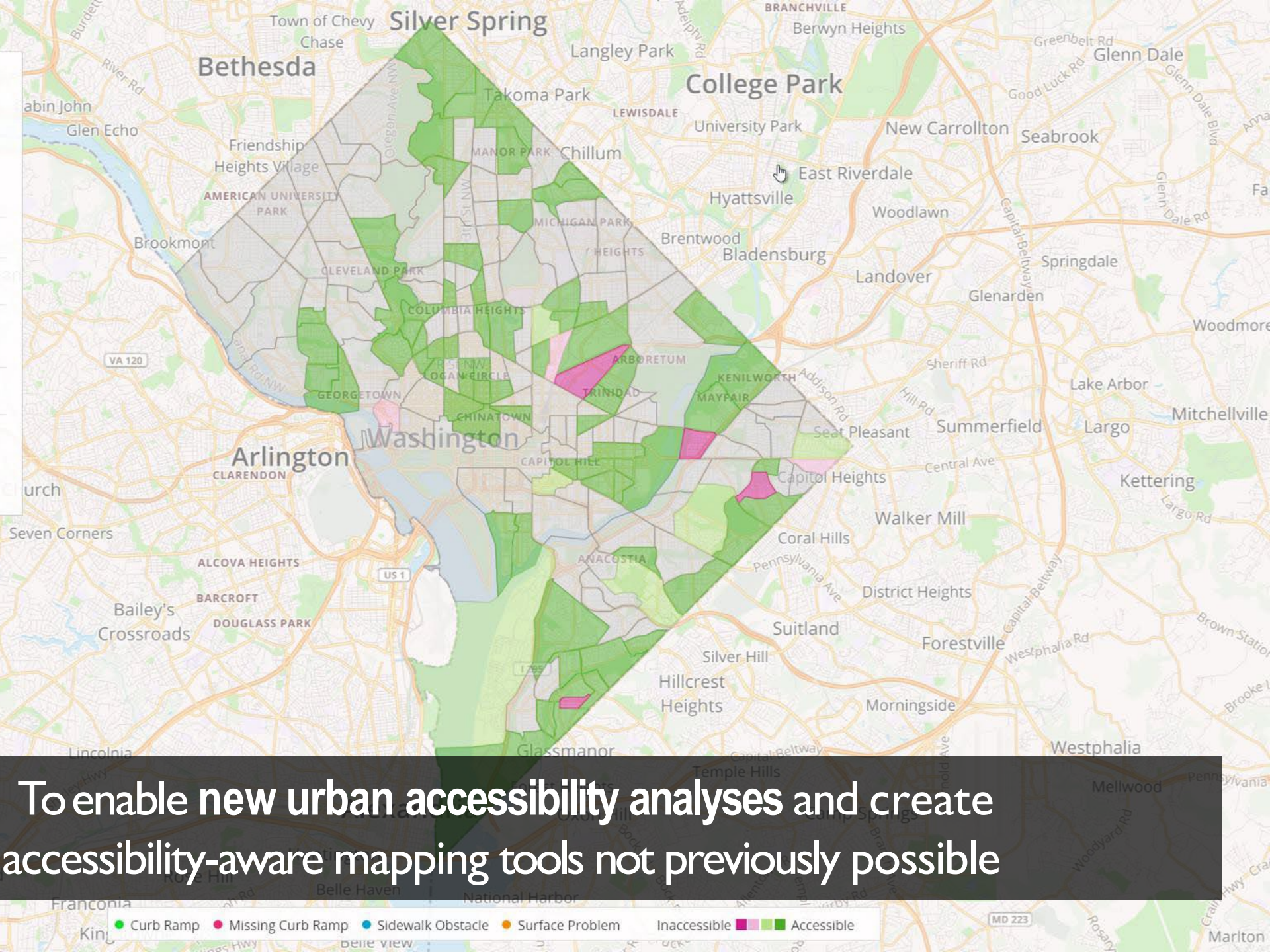
1

To develop new data collection methods that quickly and accurately map and assess sidewalks using machine learning and crowdsourcing

## Access Score<sup>beta</sup>

Use the sliders below to adjust the significance of each accessibility feature.

	Significance
Curb Ramp	<input type="range" value="52"/> 52
No Curb Ramp	<input type="range" value="100"/> 100
Obstacle	<input type="range" value="50"/> 50
Surface Problem	<input type="range" value="48"/> 48



To enable new urban accessibility analyses and create accessibility-aware mapping tools not previously possible





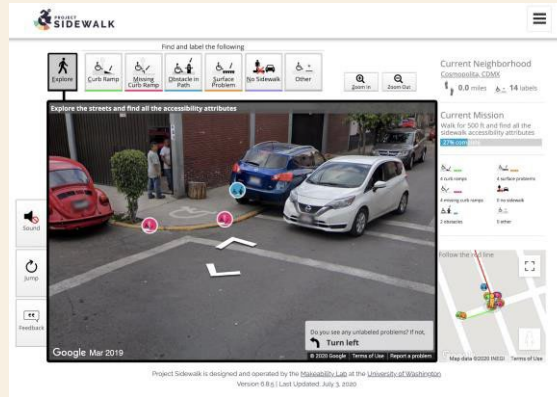
## **OUR OVERARCHING VISION**

Develop Crowd+AI techniques to map and assess every sidewalk in the world

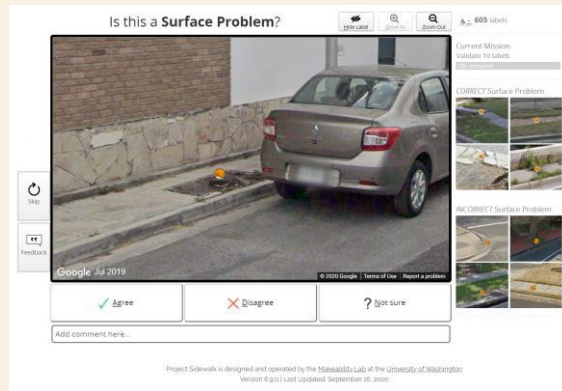
# ONLINE MAP IMAGERY



# REMOTE CROWDSOURCING INTERFACES

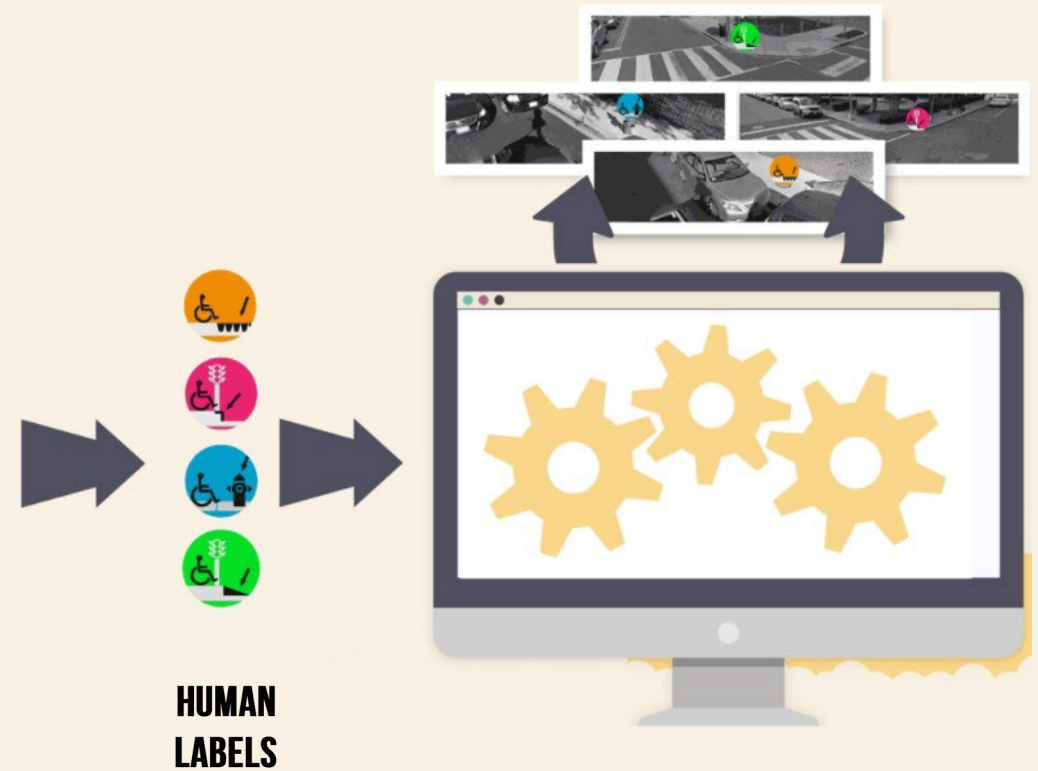


Labeling missions

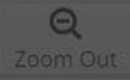
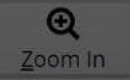


Validation missions

# MACHINE LEARNING



Find and label the following



Current Neighborhood

Dupont Circle (North), D.C.

0.3 miles 23 labels

Current Mission

Audit 1/2mi of this neighborhood

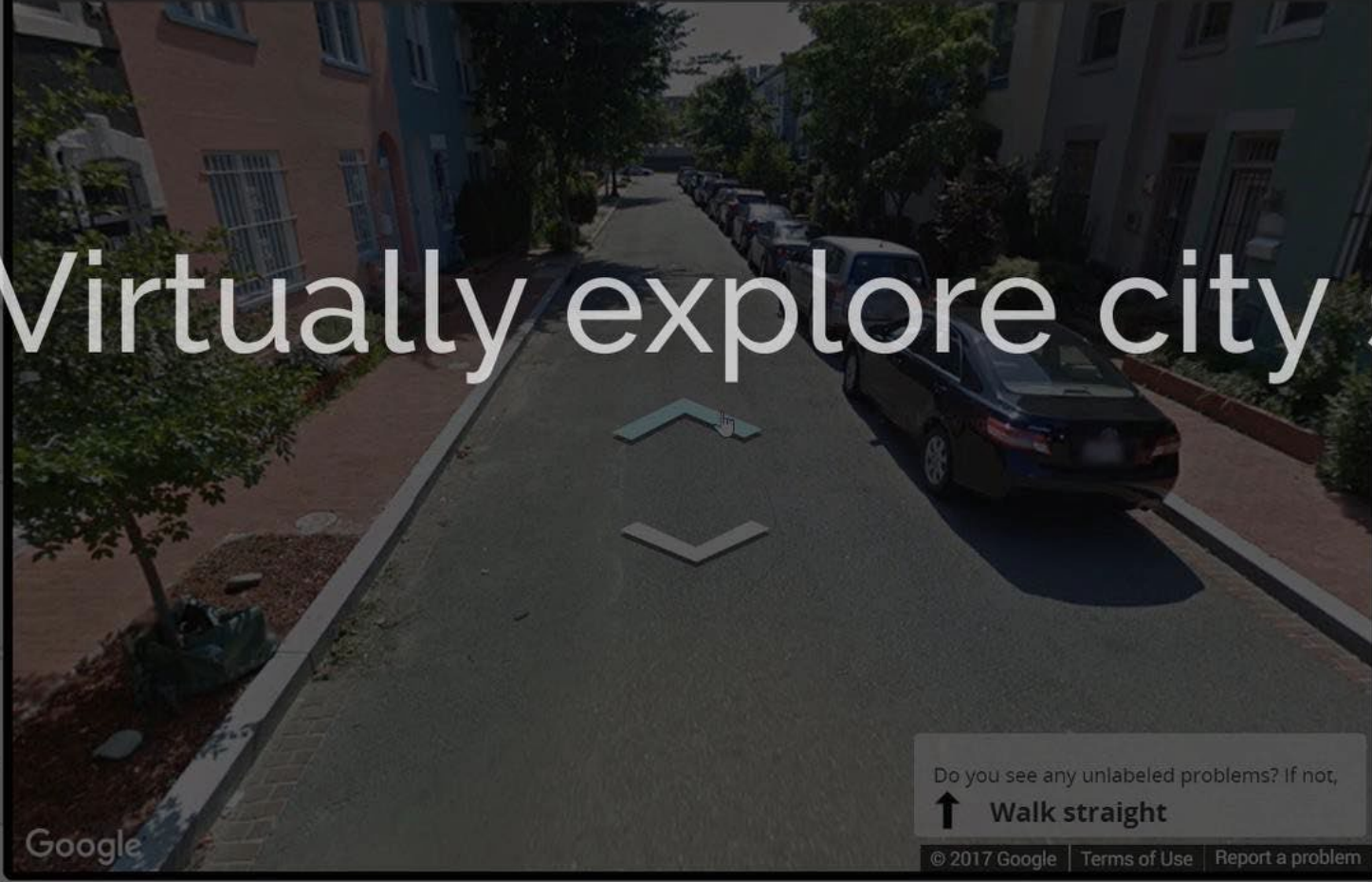
3% complete

- 0 curb ramp
- 0 missing curb ramp
- 0 surface problem
- 0 obstacle
- 0 other

Follow the red line



Audit the streets and find all the accessibility attributes



Do you see any unlabeled problems? If not,

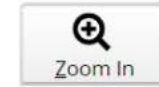
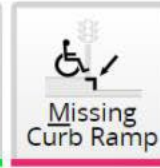
↑ Walk straight

© 2017 Google Terms of Use Report a problem

# Virtually explore city streets



Find and label the following



Current Neighborhood  
San Pedro, SPGG

0.0 miles 3 labels

Explore the streets and find all the accessibility attributes



Current Mission  
Explore 500 ft of this neighborhood

2% complete



2 curb ramps



0 missing curb ramp



1 obstacle



0 surface problem

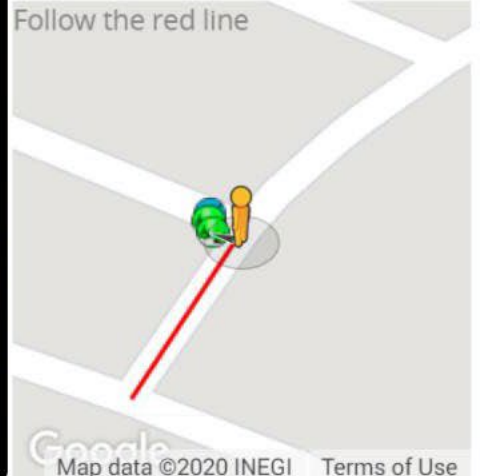


0 no sidewalk



0 other

Follow the red line



Sound



Jump



Feedback

Do you see any unlabeled problems? If not,

Turn left

Google Jan 2017

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Google Map data ©2020 INEGI Terms of Use

Encuentra y etiqueta lo siguiente



Colonia actual

El Jaguey-Estacion Pantaco, CDMX

1.0 millas

133 etiquetas

Misión actual

Explora 1000ft de esta colonia

36% completado



1 rampa peatonal



2 rampas peatonales ausentes



0 obstáculo



4 problemas en superficie

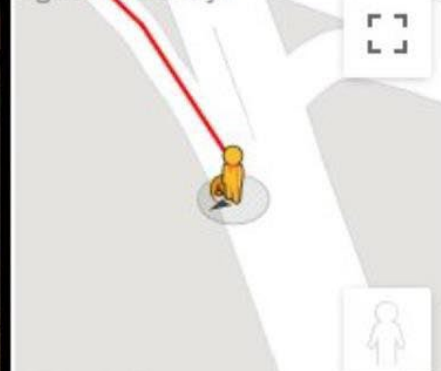


2 no hay banquetas



0 otro

Sigue la línea roja



Explora las calles y encuentra todos los atributos de accesibilidad



¿Ves algún problema sin etiquetar? Si no,

**Gira a la derecha**



Sonido

Saltar

Retroalimentación

Google Jun 2019

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Condiciones del Servicio

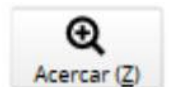
Informar un problema

Google

Datos del mapa

Condiciones del Servicio

Encuentra y etiqueta lo siguiente



Colonia actual  
San Pedro, SPGG

3.7 kilómetros

585 etiquetas

Misión actual

Explora 304 m de este barrio

63% completado

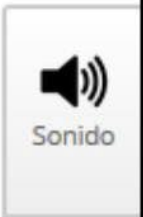
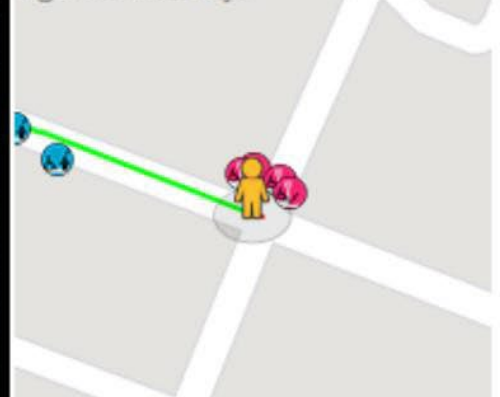
- 0 rampa peatonal
- 1 problema en superficie
- 20 rampas peatonales ausentes
- no hay banqueta
- 3 obstáculos
- 0 otro

Explora las calles y encuentra todos los atributos de accesibilidad



¿Ves algún problema sin etiquetar? Si no,  
↑ **Camina derecho**

Sigue la línea roja



CURB RAMP LABELS

SIDEWALK LABELS

OTHER ACCESSIBILITY LABELS



Explore



Curb Ramp



Missing Curb Ramp



Obstacle in Path



Surface Problem



No Sidewalk



Crosswalk



Pedestrian Signal



Other

Current Neighborhood  
South Linden, Columbus

0.2 miles 155 labels

Locate and label a surface problem

Explain this!



Current Mission

Explore 500 ft of this neighborhood

0% complete

8 curb ramps

3 surface problems

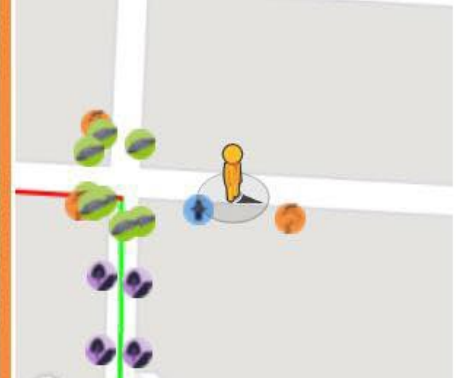
0 missing curb ramp

0 no sidewalk

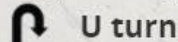
1 obstacle

0 other

Follow the red line



Do you see any unlabeled problems? If not,



Google Jun 2021

PROJECT SIDEWALK

# REMOTE CROWDSOURCING



**LABELING MEXICO  
CITY FROM GERMANY!**



# TWO DATA COLLECTION MISSIONS

CURB RAMP LABELS      SIDEWALK LABELS      OTHER ACCESSIBILITY LABELS

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

**Locate and label a surface problem**      **Explain this!**

Current Neighborhood: Nieuwe Kerk e.o., Amsterdam  
0.2 miles   10 labels

Current Mission: Explore 500 ft of this neighborhood  
16% complete

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

Follow the red line

Do you see any unlabeled problems? If not, **Go straight**

Google Nov 2018      © BERNARD LE Pirate   Terms of Use   Report a problem   Google Map Data   Terms of Use

Is this an **Obstacle**?

Hide Label   Zoom In   Zoom Out   71 labels

Current Mission: Validate 10 labels  
10% complete

**Correct Examples**

**Incorrect Examples**

Agree   Disagree   Not sure

Add comment here...

**1** FIND, LABEL, & ASSESS SIDEWALKS

**2** VALIDATING & CORRECTING LABELS

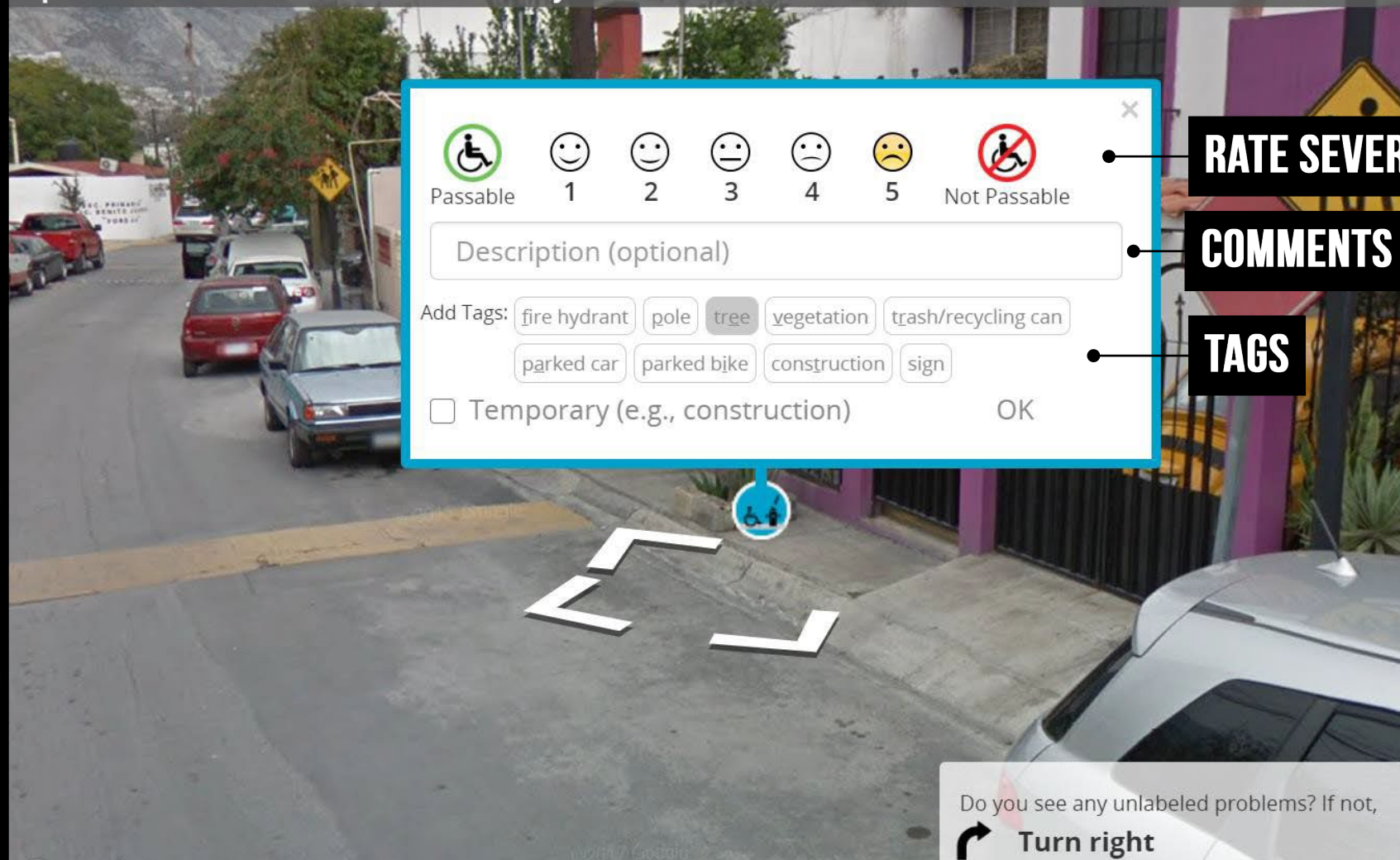
Find and label the following



Current Neighborhood  
San Pedro, SPGG

0.0 miles 7 labels

Explore the streets and find all the accessibility attributes



Passable   
  1   
  2   
  3   
  4   
  5   
  Not Passable

Description (optional)

Add Tags:  fire hydrant  pole  tree  vegetation  trash/recycling can

parked car  parked bike  construction  sign

Temporary (e.g., construction)    OK

RATE SEVERITY

COMMENTS

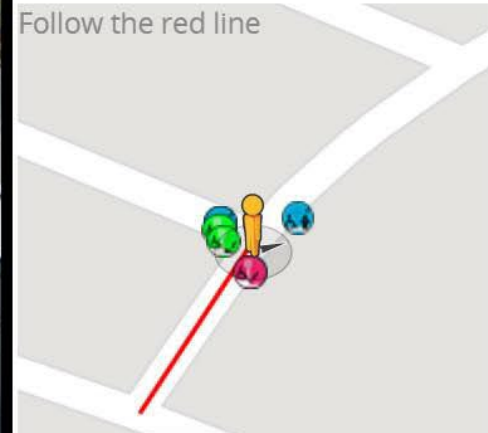
TAGS

Current Mission  
Explore 500 ft of this neighborhood

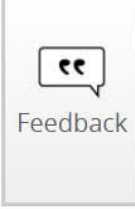
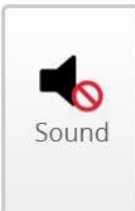
20% complete

2 curb ramps	0 surface problem
1 missing curb ramp	0 no sidewalk
4 obstacles	0 other

Follow the red line



Do you see any unlabeled problems? If not, Turn right

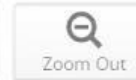


# TWO DATA COLLECTION MISSIONS

**1** FIND, LABEL, & ASSESS SIDEWALKS

**2** VALIDATING & CORRECTING LABELS

# Is this an **Obstacle**?



71 labels



Current Mission  
Validate 10 labels

10% complete

## Correct Examples



## Incorrect Examples



✓ Agree

✗ Disagree

? Not sure

Add comment here...

Hide Label

# Is this an **Obstacle in Path**?

Zoom In

Zoom Out

4 labels



## Current Mission

Validate 10 labels

40% complete

## Obstacle in Path



## NOT an Obstacle in Path



Skip

Feedback

✓ Agree


✗ Disagree

? Not sure

# Is this a Missing Curb Ramp?

 Hide Label

 Zoom In

 Zoom Out

 1113 labels

Current Mission  
Validate 10 labels

50% complete 

*CORRECT* Missing Curb Ramp



*INCORRECT* Missing Curb Ramp



Agree

Disagree

Not sure

Add comment here...

# Is this a Missing Curb Ramp?

 Hide Label

 Zoom In

 Zoom Out

 1258 labels



Google Jul 2019

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Skip



Feedback

Agree

Disagree

Not sure

Add comment here...

Current Mission  
Validate 10 labels

0% complete

## CORRECT Missing Curb Ramp



## INCORRECT Missing Curb Ramp



Hide Label

# Is this a **Surface Problem**?

Zoom In

Zoom Out

9 labels

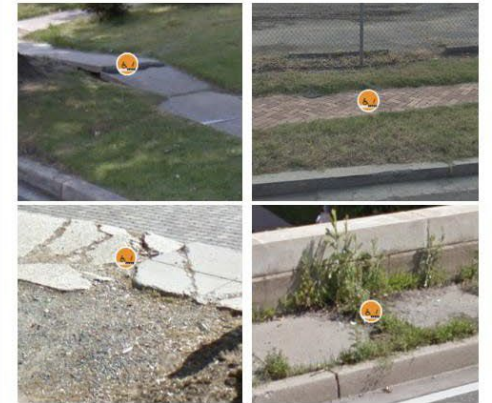


## Current Mission

Validate 10 labels

90% complete

## Surface Problem



## NOT a Surface Problem



Skip

Feedback

✓ Agree


✗ Disagree


? Not sure



# Is this a **Surface Problem**?

 Hide Label

 Zoom In

 Zoom Out

 3337 labels



Current Mission

Validate 10 labels

0% complete

## Correct Examples



## Incorrect Examples



Skip



Feedback

Agree

Disagree

Not sure

Add comment here...

# Is this an **Obstacle**?

 Hide Label

 Zoom In

 Zoom Out

 934 labels



Current Mission  
Validate 10 labels


0% complete


### Correct Examples



### Incorrect Examples



 Skip

 Feedback

Google May 2019

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Agree

Disagree

Not sure

Add comment here...



Frontage  
Zone

Pedestrian  
Zone

Planting/  
Furnishing

Curb  
Zone

Bike  
Facility

Buffer



### Your missions



140

### Distance



2.03 mi

### Labels



568

### Validations



1249

### Accuracy



90.7%

## Achievements

### Missions

Congratulations, you've earned all mission badges!



### Distance

Thanks for helping! **2.97 more miles** until your next achievement.



### Labels

Great job! **432 more labels** until your next achievement.



### Validations

Amazing work! **3751 more validations** until your next achievement.



#### PROJECT SIDEWALK

- About Us
- Terms of Use
- Help
- Labeling Guide

#### DEVELOPER

- Sidewalk API

#### CONNECT

- Github
- Twitter
- Email Us
- Facebook



# Overall Leaderboard

Leaders are calculated based on their labels, distance, and accuracy

#	Username	Labels	Missions	Distance	Accuracy
1	mariana.velasco	2894	150	9.6 miles	85.3%
2	maria	1918	51	9.0 miles	89.1%
3	abarragan99	1895	81	2.7 miles	86.5%
4	marian.trevino	1543	66	9.4 miles	82.2%
5	dordaz	1483	46	3.5 miles	84.2%
6	Gerardo R	1274	86	5.4 miles	87.6%
7	mariagarza	1205	62	9.4 miles	87.2%
8	ana.alvarezc	1053	63	9.8 miles	84.8%
9	Gari01234	848	62	4.6 miles	89.1%
10	Luis Gonzalez	812	59	9.7 miles	94.1%

Want to make it into the Top 10? [Start exploring!](#)



- Results Map
- Label Map
- Gallery
- Leaderboard
- Sidewalk API

# Let's create a path for everyone

Start Exploring CDMX

We are also in: [San Pedro Garza García, MX](#) [Pittsburgh, PA](#) [Seattle, WA](#) [Columbus, OH](#)

City  
Oradell, NJ

Show  
All

Filter By  
Severity  
☺ ☺ ☺ ☹ ☹



Missing Curb Ramp  
Severity ●●●●●● Tags no alternate route



Curb Ramp  
Severity ●○○○○○



Missing Curb Ramp  
Severity ●●●●●○



Surface Problem  
Severity ●○○○○○ Tags grass



No Sidewalk  
Severity ●●●●●● Tags street has no sidewalks



Obstacle in Path  
Severity ●●●●○○ Tags vegetation narrow



City  
Oradell, NJ

Show  
Surface Problem

Filter By  
Severity  
☺ ☹ ☹ ☹ ☹

Tags  
bumpy cracks grass  
narrow sidewalk brick  
construction uneven/slanted  
very broken height difference  
rail/tram track tag.sand/gravel



Surface Problem  
Severity ● ○ ○ ○ ○ ○ Tags grass



Surface Problem  
Severity ● ○ ○ ○ ○ ○ Tags cracks height difference



Surface Problem  
Severity ● ○ ○ ○ ○ ○ Tags height difference



Surface Problem  
Severity ● ● ○ ○ ○ ○ Tags cracks



Surface Problem  
Severity ● ○ ○ ○ ○ ○ Tags uneven/slanted height differ..



Surface Problem  
Severity ● ● ○ ○ ○ ○ Tags uneven/slanted height differ..

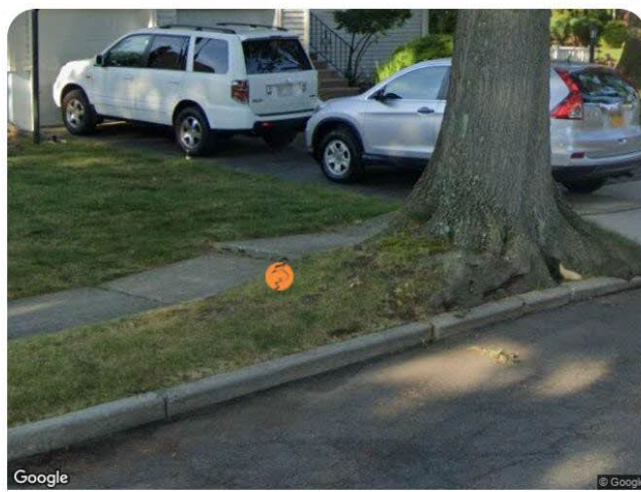


City  
Oradell, NJ

Show  
Surface Problem

Filter By  
Severity  
☺ ☺ ☹ ☹ ☹

Tags  
bumpy | cracks | grass | narrow sidewalk | brick | construction | uneven/slanted | very broken | height difference | rail/tram track | tag.sand/gravel



Surface Problem  
Severity ●●●●● Tags uneven/slanted



Surface Problem  
Severity ●●●●● Tags uneven/slanted height differ... +1



Surface Problem  
Severity ●●●●● Tags uneven/slanted



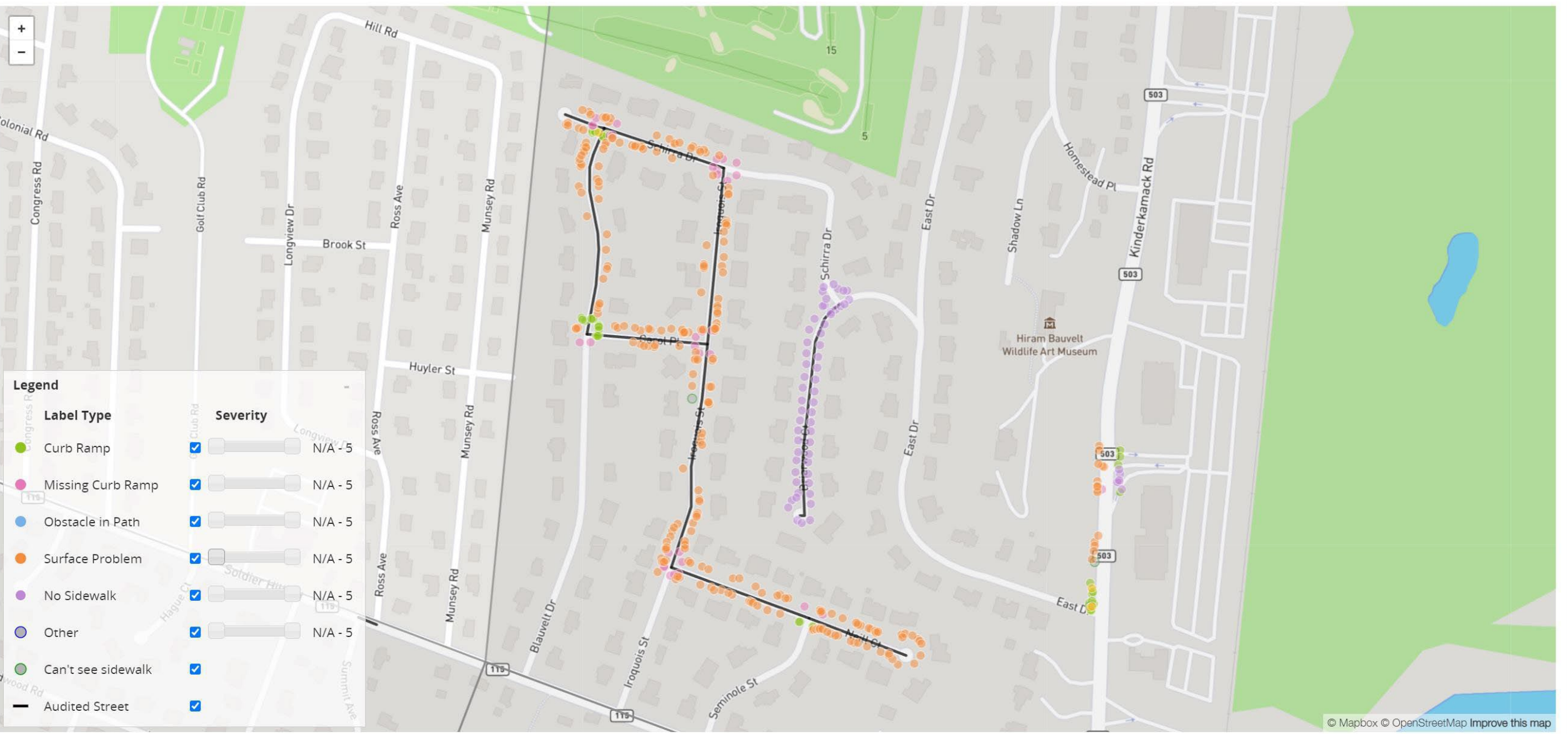
Surface Problem  
Severity ●●●●● Tags uneven/slanted



Surface Problem  
Severity ●●●●● Tags uneven/slanted



Surface Problem  
Severity ●●●●● Tags uneven/slanted



**Legend**

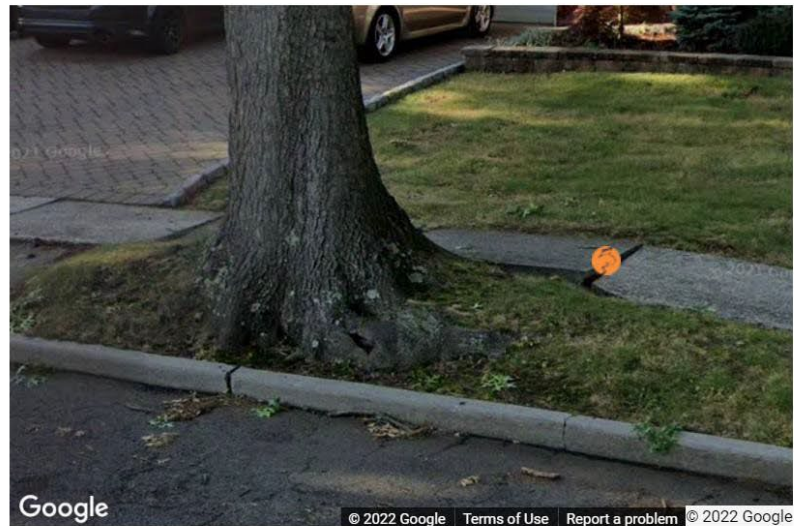
Label Type	Severity
Curb Ramp	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Missing Curb Ramp	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Obstacle in Path	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Surface Problem	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
No Sidewalk	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Other	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Can't see sidewalk	<input checked="" type="checkbox"/> <input type="range"/> N/A - 5
Audited Street	<input checked="" type="checkbox"/>



**Legend**

Label Type	Severity
Curb Ramp	<input checked="" type="checkbox"/> N/A - 5
Missing Curb Ramp	<input checked="" type="checkbox"/> N/A - 5
Obstacle in Path	<input checked="" type="checkbox"/> N/A - 5
Surface Problem	<input checked="" type="checkbox"/> 5
No Sidewalk	<input checked="" type="checkbox"/> N/A - 5
Other	<input checked="" type="checkbox"/> N/A - 5
Can't see sidewalk	<input checked="" type="checkbox"/> N/A - 5
Audited Street	<input checked="" type="checkbox"/>

### Label Type: Surface Problem



### Is this label correct?

<b>Severity</b>	5
<b>Temporary</b>	No
<b>Tags</b>	uneven/slanted
<b>Description</b>	No description
<b>Validations</b>	1 Agree, 0 Disagree, 0 Not Sure
<b>Labeled</b>	March 7, 2022, 5:49 PM (22 days ago)
<b>Image Date</b>	May 2018
<b>Pano ID</b>	nYTK1xpDwgYmEAlieAkBig

Oradell Reservoir

Haworth Country Club

White Beeches Golf and Country Club

© Mapbox © OpenStreetMap Improve this map

# PILOT DEPLOYMENT IN 2017

Find and label the following

Explore Curb Ramp Missing Curb Ramp Obstacle in Path Surface Problem Other

Zoom In Zoom Out Undo Redo

Current Neighborhood  
Monumental Core, D.C.  
0.1 miles 0 labels

Current Mission  
Audit 1000ft of this neighborhood  
43% complete

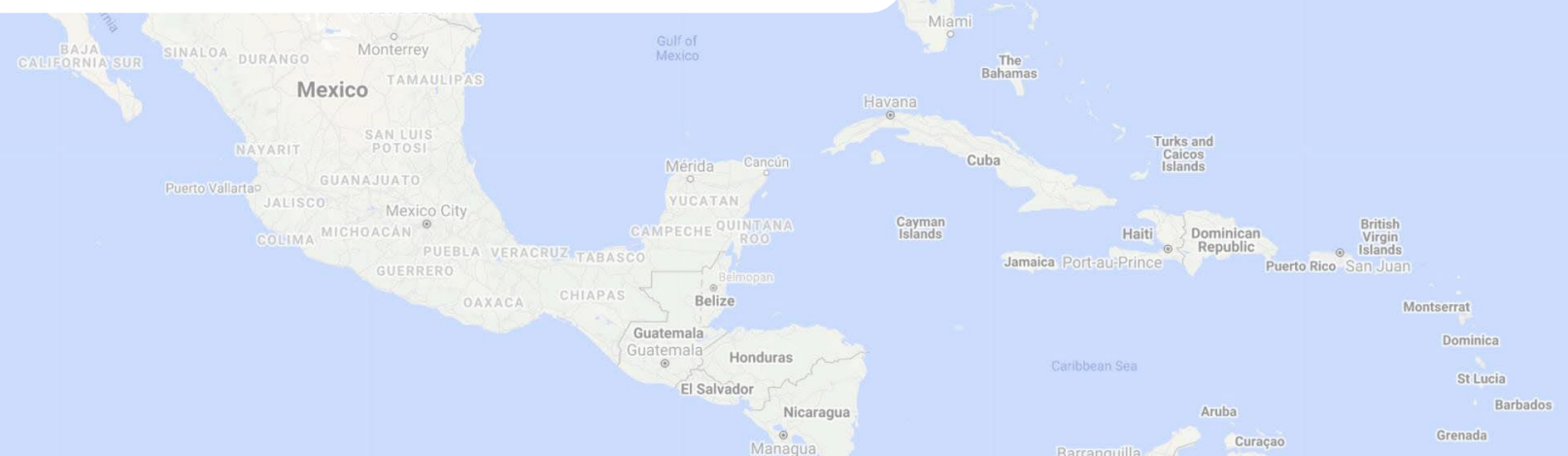
5 curbs ramps  
0 missing curb ramp  
0 surface problem

0 obstacle  
0 other

Follow the red line

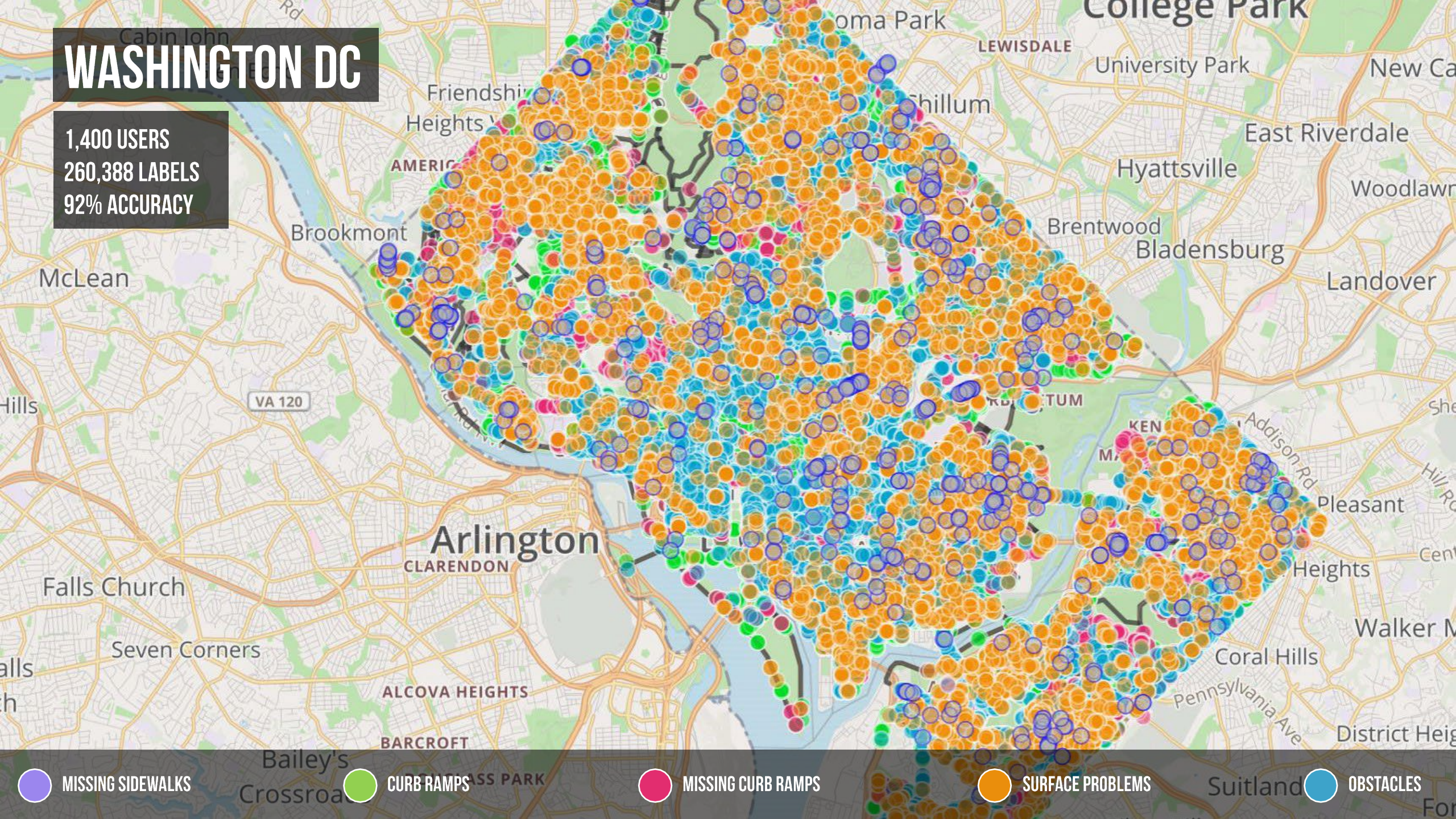
Do you see any unlabeled problems? If not, Turn right

© 2017 Google Terms of Use Report a problem



# WASHINGTON DC

1,400 USERS  
260,388 LABELS  
92% ACCURACY



 MISSING SIDEWALKS

 CURB RAMPS

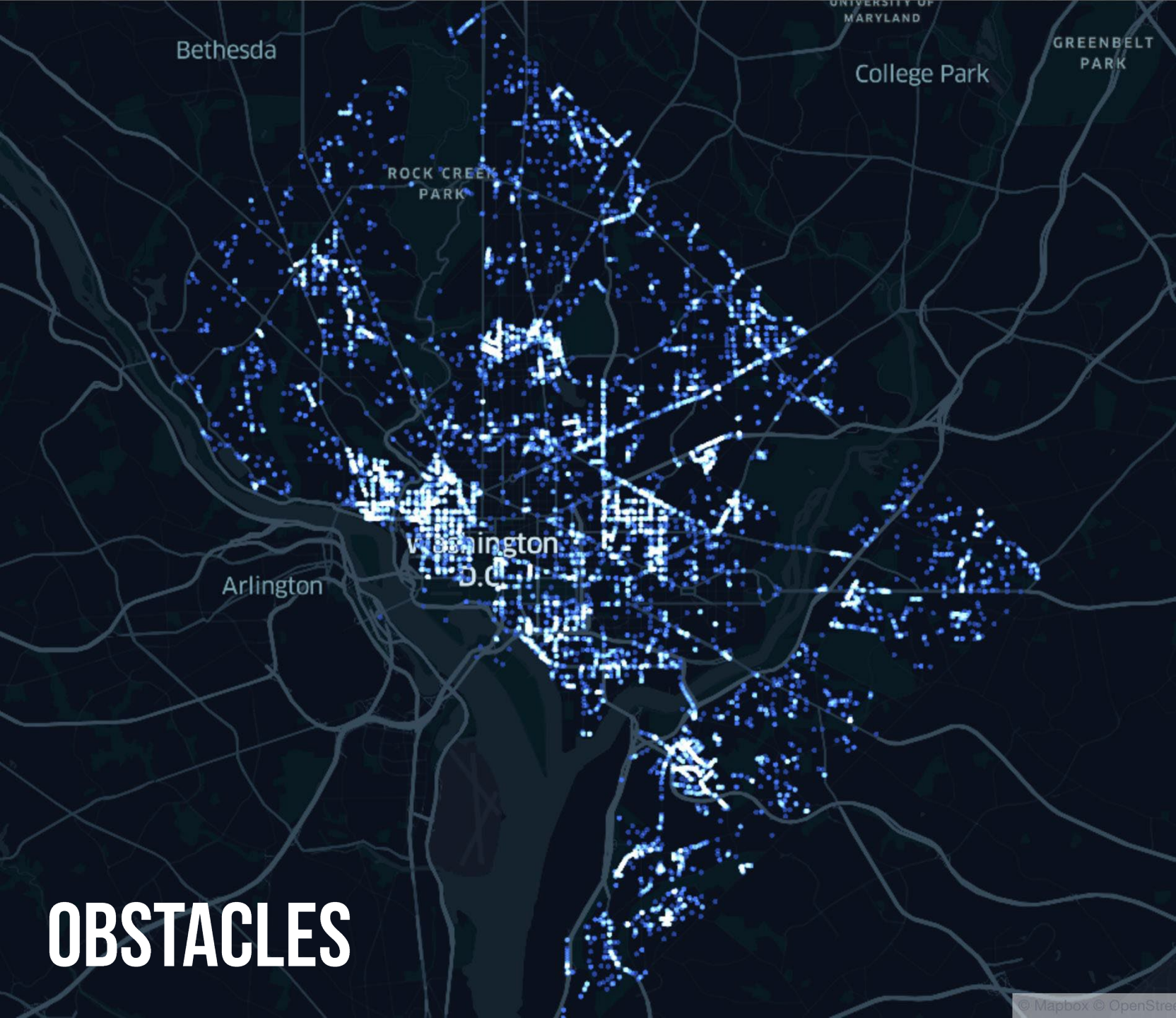
 MISSING CURB RAMPS

 SURFACE PROBLEMS

 OBSTACLES

# STREET ACCESSIBILITY SCORE VISUALIZATION

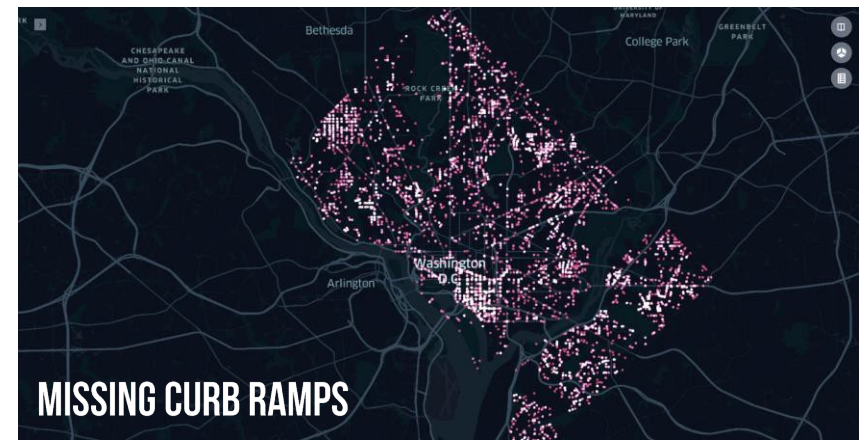




# OBSTACLES



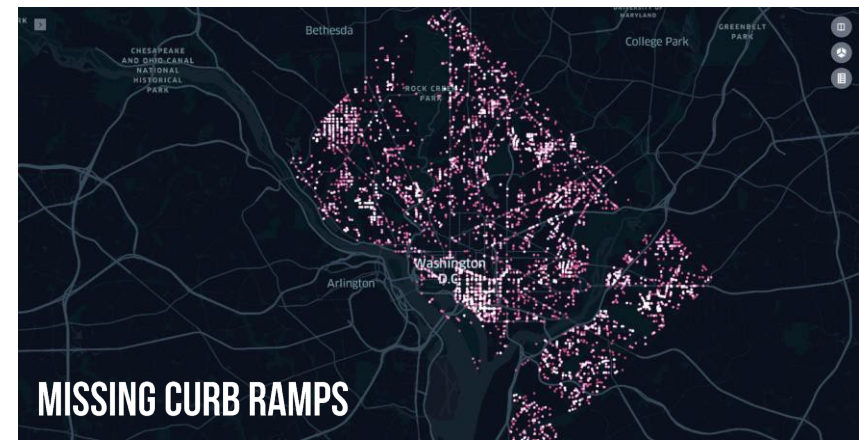
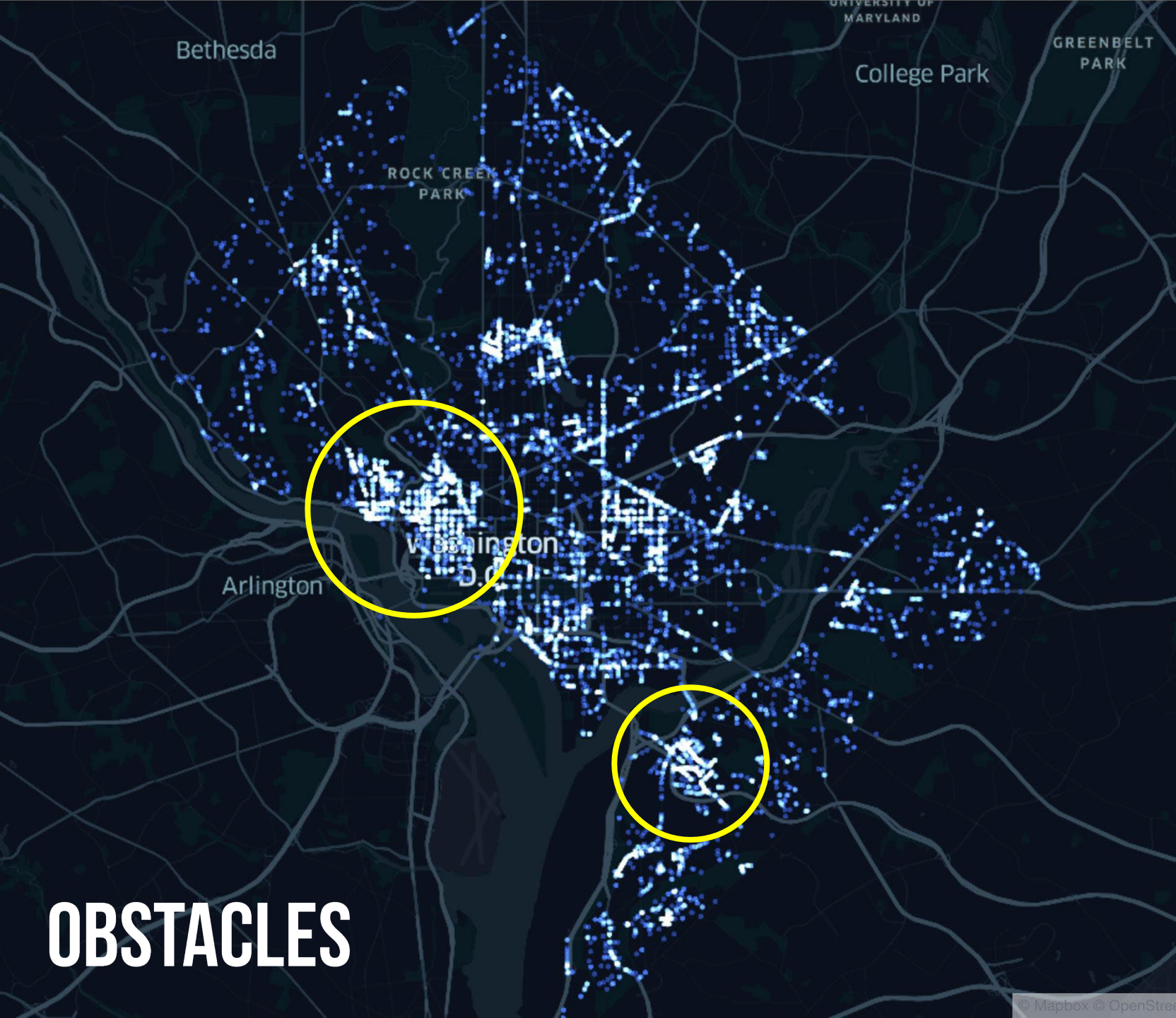
# CURB RAMPS



# MISSING CURB RAMPS

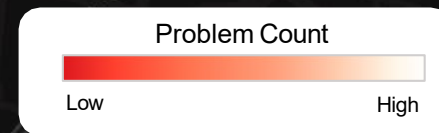


# SURFACE PROBLEMS

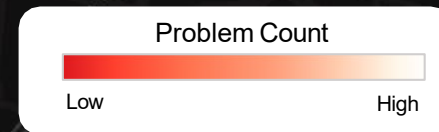


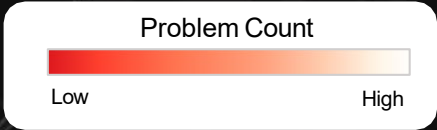


# AGGREGATE PROBLEM DENSITY HEATMAP

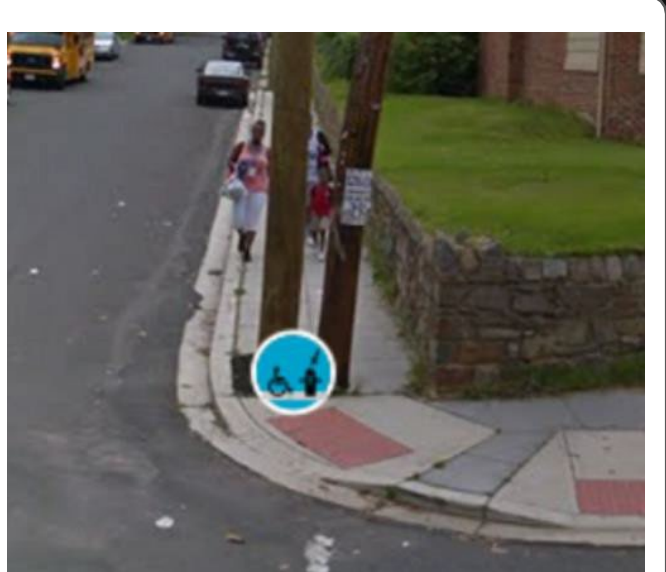


# AGGREGATE PROBLEM DENSITY HEATMAP





**Georgetown**  
Highly affluent, historic area  
82% White, 8.7% Asian, 6.2% Black,



**Anacostia**  
Lower socio-economic area  
92% Black, 5% Non-Hispanic White, 3% Other

This is the potential of **data-driven urban accessibility analytics** using Project Sidewalk data.

# ALL OUR CODE + DATA IS 100% OPEN SOURCE

The screenshot shows the GitHub profile for Project Sidewalk. At the top, it says "Project Sidewalk" and "Project Sidewalk is operated by the Makeability Lab at the University of Washington and University of Maryland, College Park". Below this, there are statistics for Repositories (14), People (15), Teams (1), and Projects (0). A search bar for repositories is present, along with filters for "Type: All" and "Language: All".

Several repositories are listed:

- SidewalkWebpage**: Project Sidewalk web page. Languages: JavaScript, HTML, Shell. Stars: 27, Forks: 6. Updated 17 hours ago.
- Sidewalk\_CV**: Jupyter Notebook. Updated 8 days ago.
- sidewalk-data-analysis**: Holds all offline data analysis scripts for Project Sidewalk required for our forthcoming paper submission. Languages: HTML. Stars: 3. Updated 19 days ago.
- SidewalkWebpageDC**: Project Sidewalk DC web page. Languages: JavaScript. Updated on Aug 24.

On the right side, there is a "Top languages" section showing JavaScript, HTML, Shell, Python, and Java. Below that is a "People" section with a grid of profile pictures and an "Invite someone" button.

<https://github.com/ProjectSidewalk>

The screenshot shows the API documentation for Project Sidewalk. At the top right, there is a "Start Mapping" button and the name "Jon Froehlich".

**Access Features**

This API serves point-level location data on accessibility features. The major categories of the features include: "Curb Ramp," "Missing Curb Ramp," "Obstacles," and "Surface Problem." You would occasionally find an accessibility feature like "No Sidewalk."

**URL**: `/v1/access/features`

**Method**: GET

**Parameters Required**: You need to 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.

- `lat1=[double]`
- `lng1=[double]`
- `lat2=[double]`
- `lng2=[double]`

**Success Response**: 200. The API returns all the available accessibility features in the specified area as a **Feature Collection** of **Point features**.

**Example**: `/v1/access/features?lat1=38.909&lng1=-76.989&lat2=38.912&lng2=-76.982`

**Access Score: Streets**

This API serves Accessibility Scores of the streets within a specified region. Accessibility Score is a numerical value between 0 and 1, where 0 means inaccessible and 1 means accessible.

**URL**: `/v1/access/score/streets`

**Method**: GET

**Parameters Required**: You need to 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.

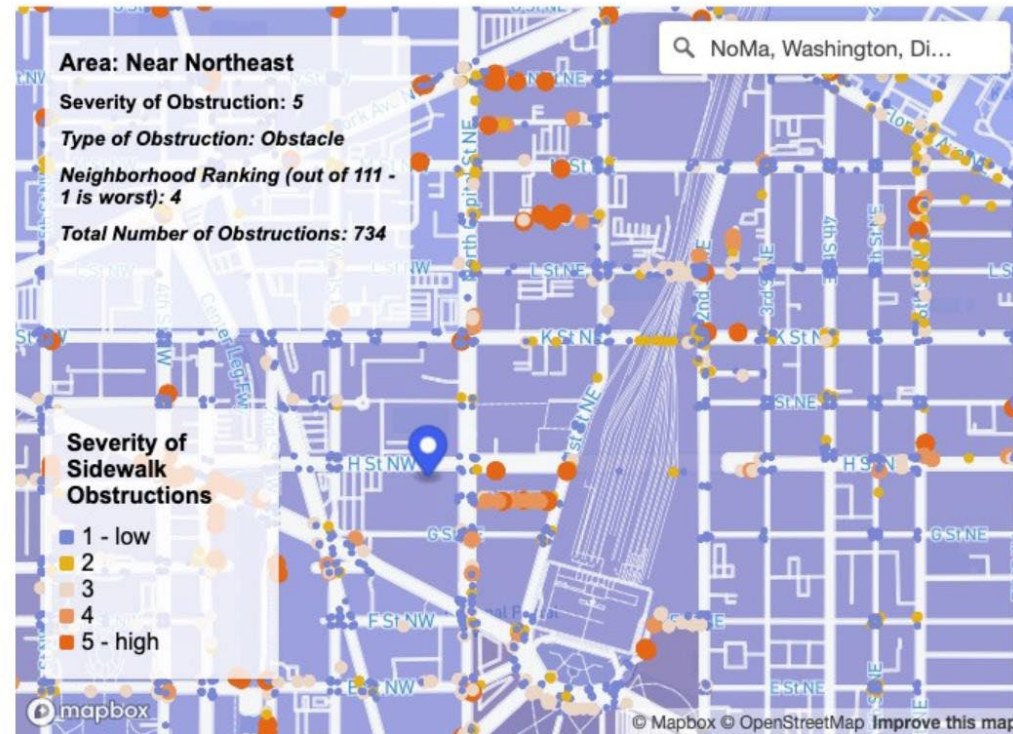
- `lat1=[double]`
- `lng1=[double]`
- `lat2=[double]`

<http://projectsidewalk.io/api>

# A city is only as accessible as its sidewalks. This map shows DC's are often blocked.

WALKING By [Barbara Moreno](#) (Guest Contributor) September 10, 2019 32

SHARE



*A snapshot of sidewalk obstructions on NoMa's streets. by the author.*

When Washingtonians like myself look for new apartments, we pay close attention to [the walk score](#) of a neighborhood. Any score upwards of 90 on a hundred point scale marks an area as a “walker’s paradise,” meaning major needs such as grocery stores and transit are within walking distance. However, what is *not* factored into the walkability score is the actual condition of the sidewalks.

## ALSO OF INTEREST

### WALKING

A pedestrian-only block in Alexandria may become a reality this spring 8

### TRANSIT ANALYSIS

The good, the bad and the unexplained: what you need to know about the WMATA budget 27




### DEVELOPMENT

Innovation Center Metro won't get a corporate name (for now), but a lot is already happening there. 17

### TRANSIT

Baltimore's transit system is not meeting residents' needs. Can this plan change that? 17

Get daily updates via email

 **Seattle, WA** **Newberg, OR** **Chicago, IL** **Columbus, OH** **Pittsburgh, PA** **Washington DC** **San Pedro Garza García, MX** **Mexico City, MX**

# GROWING DATA



11,000+  
USERS





650,000  
LABELS



260,000  
VALIDATIONS

 Seattle, WA

 Newberg, OR

 Chicago, IL

 Columbus, OH

 Pittsburgh, PA

 Washington, DC

 San Pedro Garza García, MX

 Mexico City, MX




newbergoregon.gov/publicworks/page/project-sidewalk

City of **Newberg** Government Community Business How Do I City Home Contact Us

Search

### Project Sidewalk



AS OF 2019 100% OF STREETS HAVE HAD A 1st REVIEW AND 62% HAVE HAD THE 2nd CALLED "VERIFICATION"

**WE NEED YOUR HELP TO LOG IN AND "VERIFY" LABELS OTHERS HAVE ENTERED. Over 300 people have participated so far!**

**Newberg will be the first city in Oregon to map its entire pedestrian network with Project Sidewalk!**

Click this [link to begin](#).

Newberg has over 116 miles of pedestrian pathways used for travel to work and school; for exercise and business; and community events. For people with sensory or mobility restrictions it is critical that sidewalks are safe and accessible.

A lack of current information makes it difficult to track conditions and plan improvements.

Enter [Project Sidewalk](#)

A learning computer database managed by the University of Washington Computer/Engineering Dept. that uses interactive "crowd sourcing" to collect data. It is already in use in Seattle and Washington D.C and now its been made available in Newberg!

This is a perfect activity anyone who lives, works or visits Newberg.

From any [desktop or laptop computer](#) you can "virtually" explore sidewalks in Newberg and label conditions you find.

Click this [link to begin](#) assessing local sidewalks.

This project will provide Newberg with:

### Public Works

**Jay Harris, PE.**  
Public Works Director  
PO BOX 975 Newberg, OR 97132  
[jay.harris@newbergoregon.gov](mailto:jay.harris@newbergoregon.gov)

Engineering (503) 537-1273  
Maintenance (503) 537-1234  
Operations (503) 537-1252  
Compost (503) 537-1252  
Report damage 24hr (503) 538-8321  
Utility Billing (503) 537-1205

- Engineering
- Maintenance
- Operations
- Optional Sewer and Water line Insurance
- Current Projects
- Surplus Stock
- Frequently Asked Questions-Who do I Contact?



**Newberg, OR**

<http://newberg.projectsidewalk.org>

# NEWBERG, OR

<http://newberg.projectsSidewalk.org>



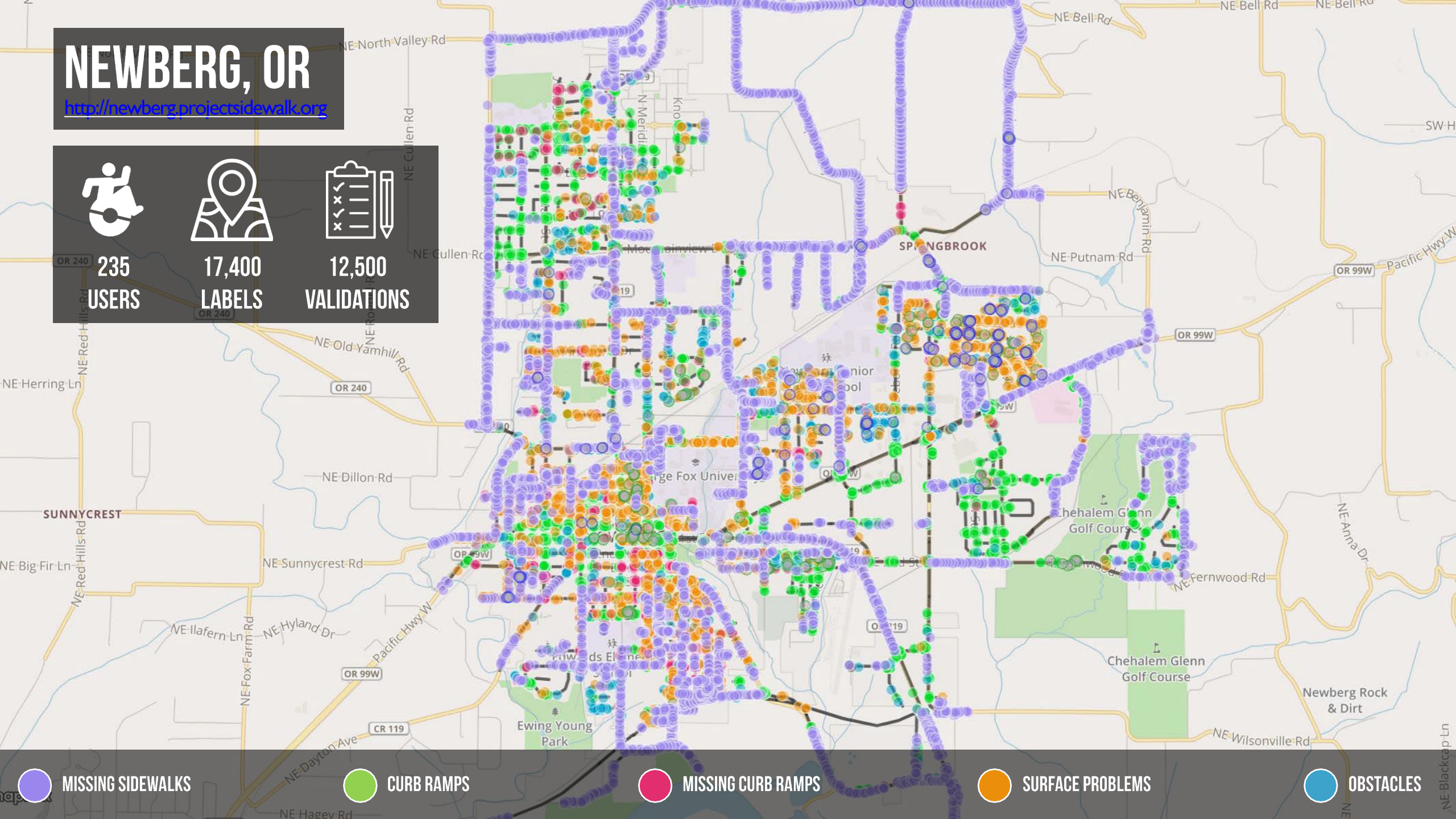
235  
USERS




17,400  
LABELS



12,500  
VALIDATIONS



 MISSING SIDEWALKS

 CURB RAMPS

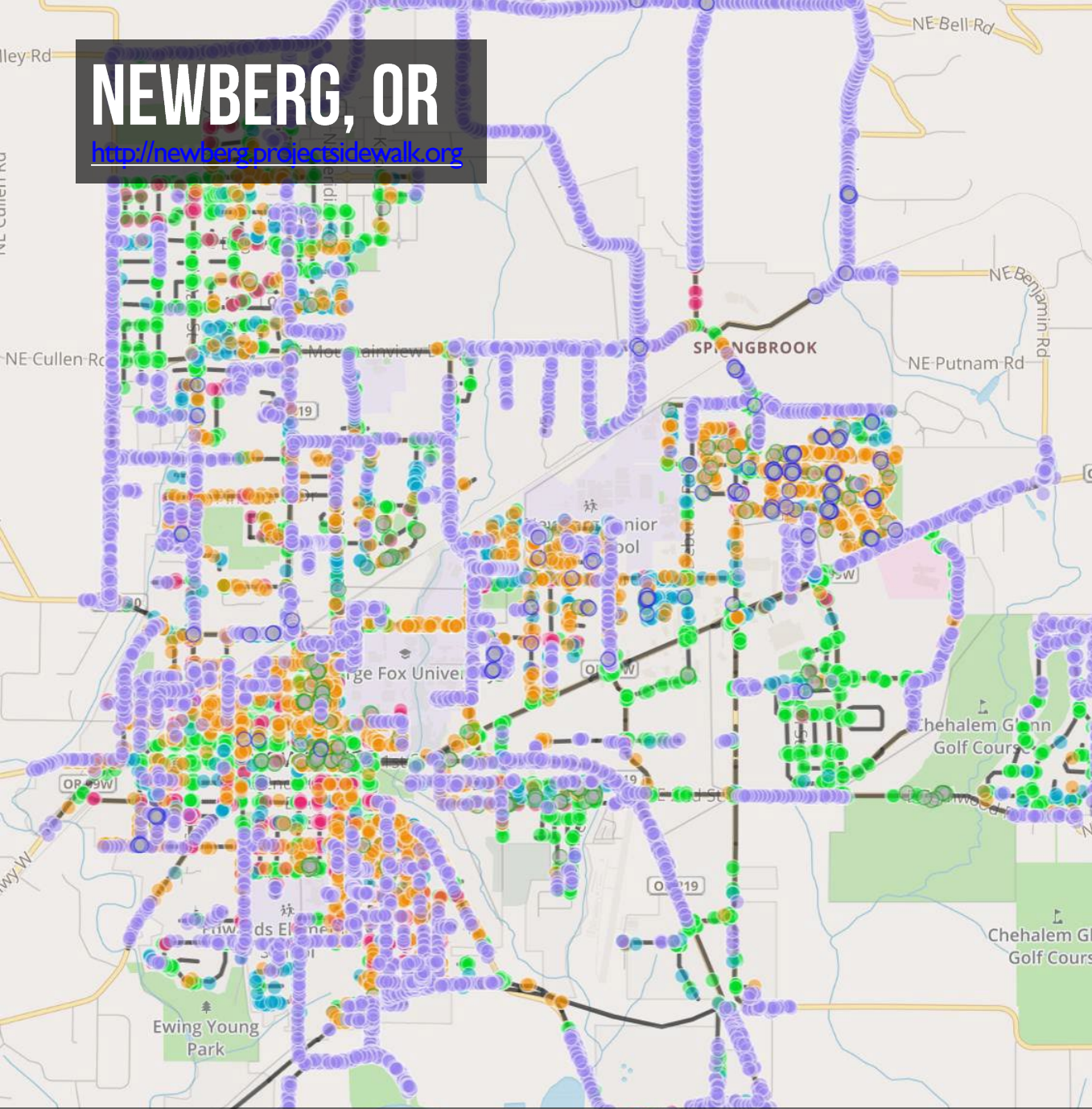
 MISSING CURB RAMPS

 SURFACE PROBLEMS

 OBSTACLES

# NEWBERG, OR

<http://newberg.projects Sidewalk.org>



MISSING SIDEWALKS CURB RAMPS MISSING CURB RAMPS SURFACE PROBLEMS OBSTACLES



City of Newberg

January 30 at 9:29 AM · 🌐

Like Page

Congratulations and THANK YOU to the citizens of Newberg for putting in the work to map 100% of Newberg through Project Sidewalk. That's over 107 miles covered with 264 local users who contributed to the data.

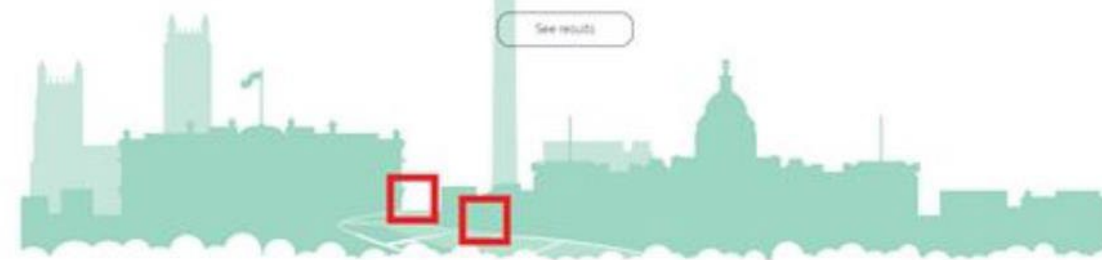
This information will be used to identify areas in Newberg that need sidewalks, need sidewalk repairs, and need to be updated to become more accessible. Through your efforts, Newberg can become a safer, more accessible community.

Looking to help? Verifications are still needed for the collected data. Click the link below to learn more.

Your work is making a difference

We did it! Users like you have mapped all 107 miles of Newberg, OR. However, we are not done. The more users who contribute, the better quality data. So start exploring today!

See results



100.0%

of Newberg mapped

107.5

miles covered

16,930

labels

11,237


validation

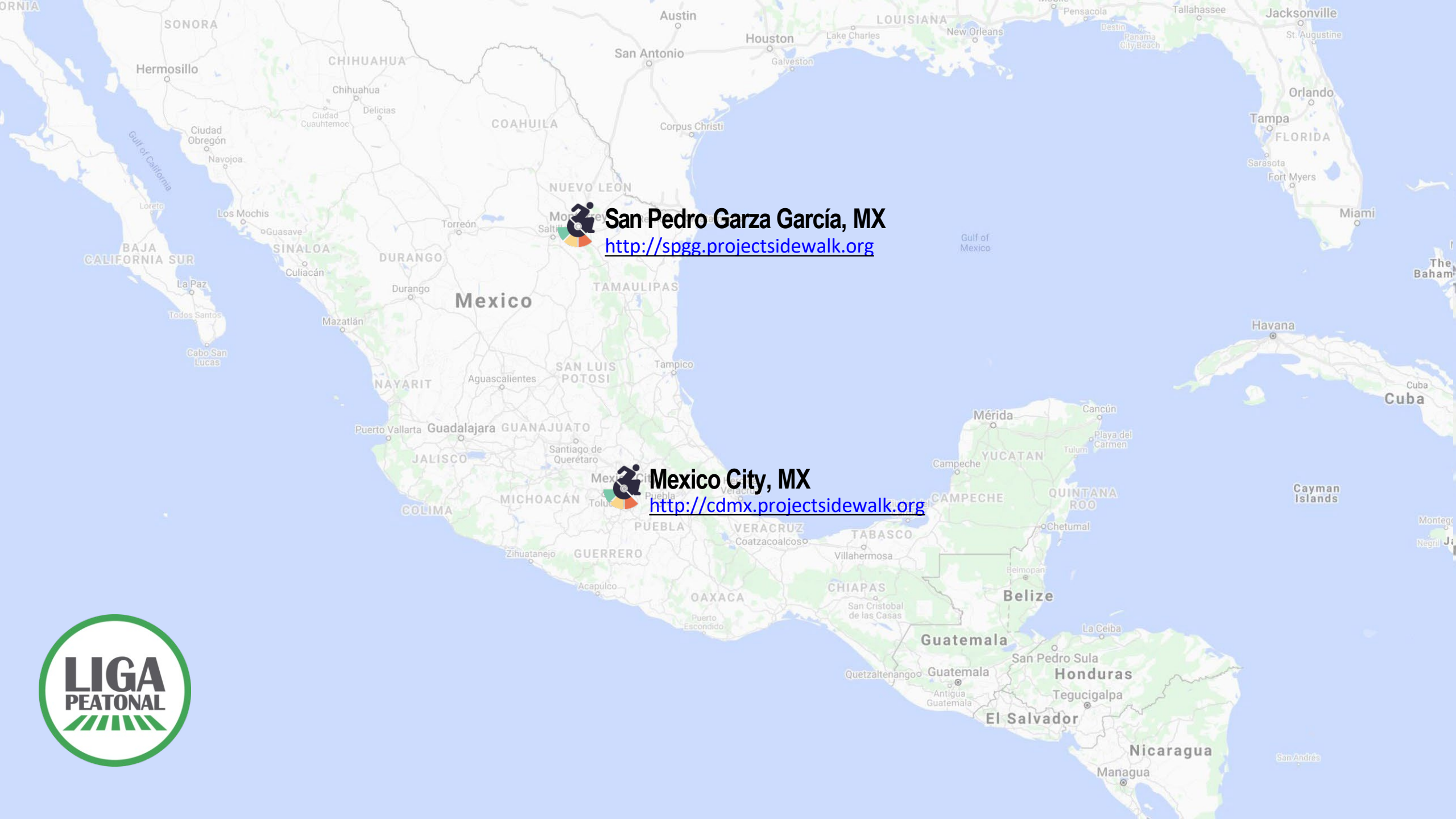


[SIDEWALK-NEWBERG.CS.WASHINGTON.EDU](http://sidewalk-newberg.cs.washington.edu)

[sidewalk-newberg.cs.washington.edu](http://sidewalk-newberg.cs.washington.edu)



 **Newberg, OR**



**San Pedro Garza García, MX**

<http://spgg.projectsideshow.org>



**Mexico City, MX**

<http://cdmx.projectsideshow.org>



# MEXICO PARTNERS



Tecnológico  
de Monterrey



Encuentra y etiqueta lo siguiente

Explorar

Rampa peatonal (C)

Rampa peatonal ausente (M)

Obstáculo en la banqueta

Problema en superficie

No hay banqueta

Otro

Acercar (Z)

Alejar

Colonia actual  
San Alvaro, CDMX

0.0 millas


3 etiquetas

Misión actual  
Explora 500ft de esta colonia

5% completado

0 rampa peatonal	2 problemas en superficie
0 rampa peatonal ausente	0 no hay banqueta
1 obstaculo	0 otro

Explora las calles y encuentra todos los atributos de accesibilidad



¿Ves algún problema sin etiquetar? Si no,  
Gira ligeramente a la derecha

Sigue la línea roja

Google Jul 2019

© 2020 Google Condiciones del Servicio Informar un problema

Google Datos del mapa Condiciones del Servicio

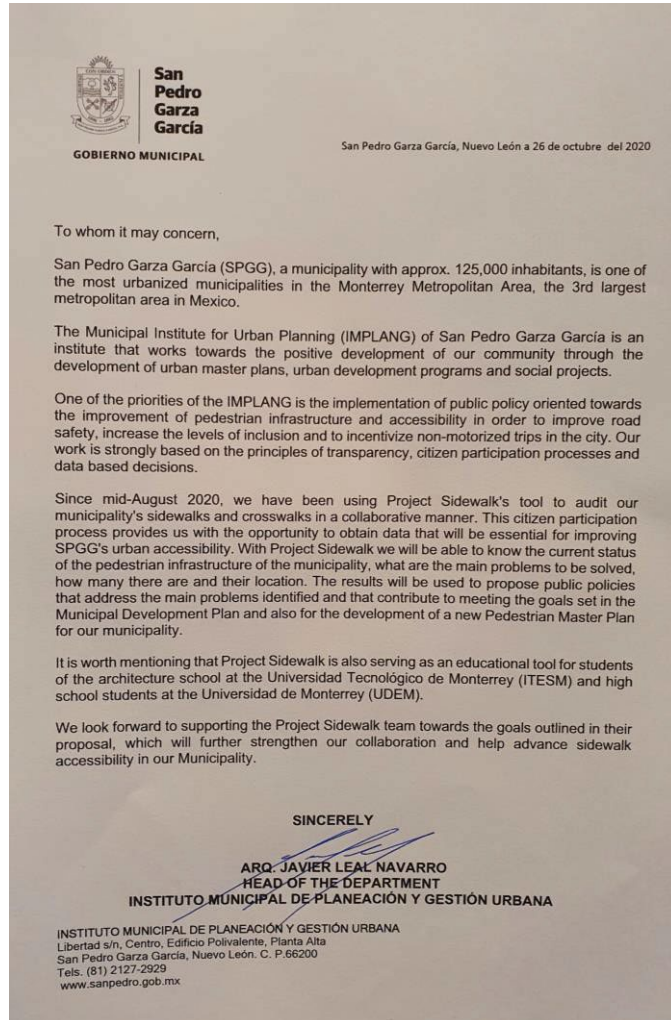
Sonido

Saltar

Retroalimentación

# PROJECT SIDEWALK MEXICO

# SAN PEDRO, MX



Project Sidewalk provides us with data that is **essential to improving San Pedro's urban accessibility.** With Project Sidewalk, we **know the main problems** to be solved, how many problems there are, and their location... The results will be used to inform a **new Pedestrian Master Plan** for our municipality.



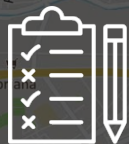
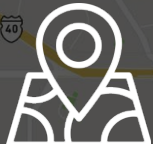
**San Pedro Garza García**

GOBIERNO MUNICIPAL



# SAN PEDRO, MEXICO

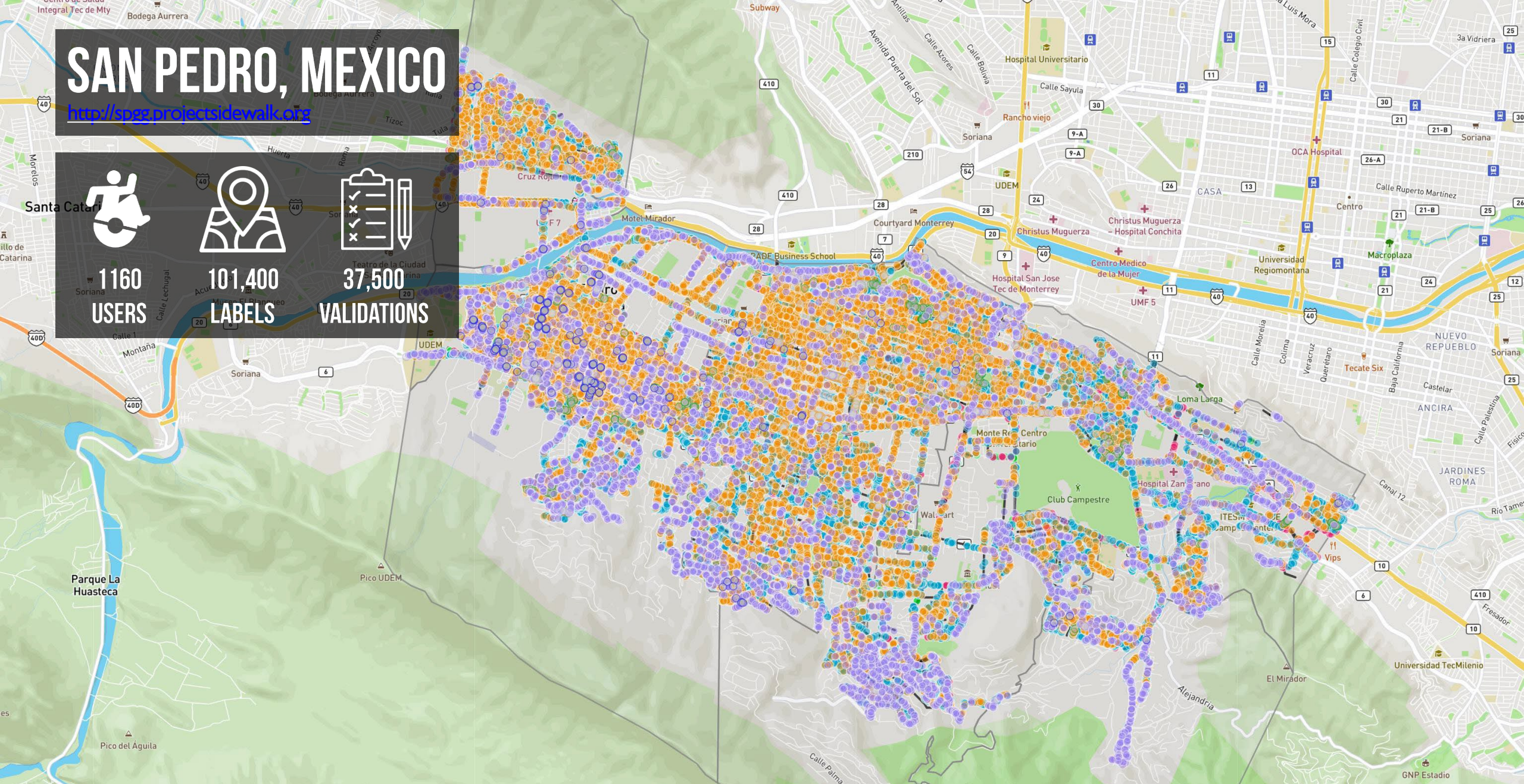
<http://spgz.projectsSidewalk.org>



1160  
USERS

101,400  
LABELS

37,500  
VALIDATIONS



 MISSING SIDEWALKS

 CURB RAMPS

 MISSING CURB RAMPS

 SURFACE PROBLEMS

 OBSTACLES

Find and label the following



Current Neighborhood  
Cosmopolita, CDMX

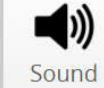
0.3 miles 69 labels

Current Mission  
Explore 750 ft of this

Explore the streets and find all the accessibility attributes



**NEW CURB RAMP IS NOT ACCESSIBLE. CAN ONLY BE ENTERED FROM ONE DIRECTION**



Sound



Jump



Feedback

Passable 1 2 3 4 5 Not Passable

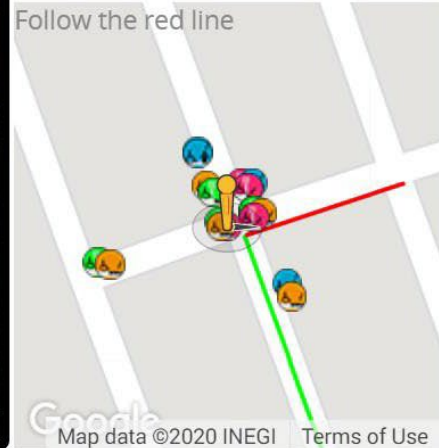
Can only be entered from one direction. Has a steep

Add Tags: narrow points into traffic missing friction strip steep not enough landing space

Temporary (e.g., construction) OK

0 missing curb ramp	0 no sidewalk
1 obstacle	0 other

Follow the red line




Do you see any unlabeled problems? If not,


Turn slightly left

Google



 Seattle, WA

 Newberg, OR

 Chicago, IL



 Pittsburgh, PA


 Columbus, OH

 Washington DC


 San Pedro Garza García, MX

 Mexico City, MX

 Seattle, WA  
 Newberg, OR

 Chicago, IL

 Columbus, OH

 Pittsburgh, PA

 Washington DC

 San Pedro Garza García, MX

 Mexico City, MX

 Amsterdam, NL

# NINE CITIES



**11,000+**  
**USERS**



**700,000**  
**LABELS**



**300,000**  
**VALIDATIONS**

A man with glasses and a dark jacket is sitting in a wheelchair on a paved path. He is looking to the right. The background shows trees and a grassy area.

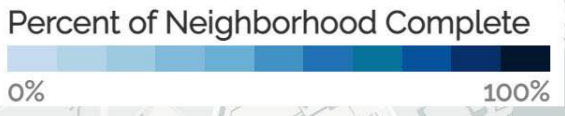
# Laten we een pad voor iedereen creëren

[Start met Verkennen Amsterdam](#)

We zijn ook in: [Pittsburgh, PA](#) [San Pedro Garza García, MX](#) [Mexico City, MX](#) [Seattle, WA](#)

## Hoe je kunt helpen

Nieuwe Kerk e.o.: 100% Complete!  
[Click here to help finish this neighborhood](#)





**Following**

## Project Sidewalk

@projsidewalk Follows you

Our mission: map the world's sidewalks and their accessibility using remote crowdsourcing, artificial intelligence, and online satellite & streetscape imagery

📍 Seattle, WA [🔗 projectsidewalk.org](https://projectsidewalk.org) 📅 Joined June 2016



# THANK YOU!

Jon E. Froehlich | [jonf@cs.uw.edu](mailto:jonf@cs.uw.edu)





Dr. Judy L. Shanley  
[jshanley@easterseals.com](mailto:jshanley@easterseals.com)



Gary C. Thomas  
[jshanley@easterseals.com](mailto:jshanley@easterseals.com)



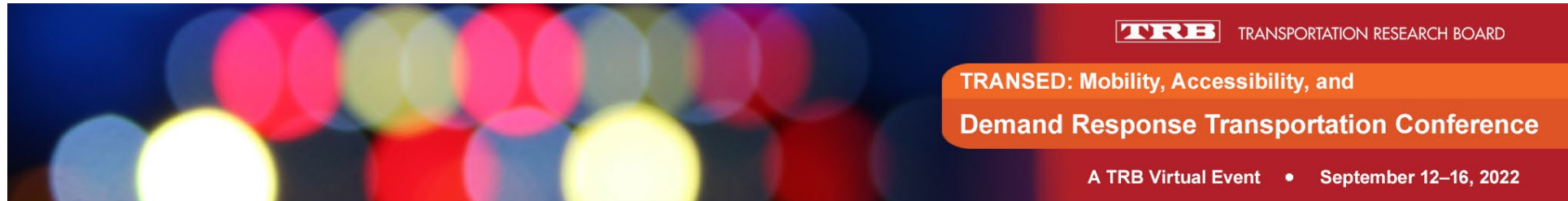
Marlene Connor  
[MBConnor@mcatp.com](mailto:MBConnor@mcatp.com)



Dr. Jon E. Froehlich  
[jonf@cs.uw.edu](mailto:jonf@cs.uw.edu)



# Other Events for You:



## Consider Attending the 2022 TRANSED-DRT 2022 Virtual Conference

Registration is now open for the TRB Committee on Accessible Transportation and Mobility's **TRANSED-DRT 2022 Virtual conference**. Join us on September 12-16, 2022, to address the theme of “Inclusive Accessible and Sustainable Demand Response Transportation”. The Conference aims to describe current global research, services to improve mobility and accessibility for individuals with disabilities and for older adults, and best practices in providing demand responsive transportation (paratransit). [Access program highlights](#) and [register here. https://web.cvent.com/event/2452154a-17ea-464f-a191-12cc0b3284d1/websitePage:18647cf2-f444-46d9-8b37-39c723ad529e](https://web.cvent.com/event/2452154a-17ea-464f-a191-12cc0b3284d1/websitePage:18647cf2-f444-46d9-8b37-39c723ad529e)

# TRB Weekly

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<https://bit.ly/ResubscribeTRBWeekly>

# TRB's Podcast!

- Have you heard TRB's Transportation Explorers?
- Listen on [our website](#) or subscribe wherever you listen to podcasts!

#TRBExplorers



# Get involved with TRB

- Receive emails about upcoming webinars:  
<https://mailchi.mp/nas.edu/trbwebinars>
- Find upcoming conferences:  
<https://www.nationalacademies.org/trb/events>

#TRBWebinar



# Get Involved with TRB

*Getting involved is free!*

**Be a Friend of a Committee** [bit.ly/TRBcommittees](http://bit.ly/TRBcommittees)

- Networking opportunities
- May provide a path to Standing Committee membership

**Join a Standing Committee** [bit.ly/TRBstandingcommittee](http://bit.ly/TRBstandingcommittee)

**Work with CRP** <https://bit.ly/TRB-crp>

**Update your information** [www.mytrb.org](http://www.mytrb.org)