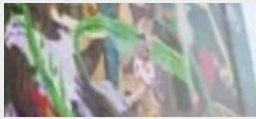
USDOT Sept 2023

WA State Proviso to collect roadside sidewalks data

In WA State



Start at 4 min past the hour

Transportation Data Equity
an initiative by TCAT & UW TRAC

ITS4US
IT'S TRANSPORTATION FOR ALL OF US

TCAT The Taskar Center for Accessible Technology

UNIVERSITY of WASHINGTON
PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING

Centering Community Co-Design

OVERVIEW

- Introductions
- Current state of & interest in sidewalks data
- Proposed work-streams for Proviso work
- Beginning the discussion for next meeting's goal:
    - Clarifying the goal
    - Defining 3-5 regions of interest for sidewalks deep dive
    - What is the criteria for "qualifying regions"
    - What is the criteria for those regions' outcomes

INTRODUCTIONS

PLEASE INTRODUCE YOURSELF

- Name / Pronouns
- Organization / Department
- A hope/goal for this project

Federal Transit Equity Context

September 22, 2020	2022-26	2022	2022
Executive Order 13895	**U.S. DOT Strategic Plan**	**U.S. DOT Equity Action Plan**	**Justice 40 Initiative**
Advance civil rights and support underserved/underrepresented communities	**Transportation** **Equity** 	**Power of Community** **Expansion of Access**	**Identification of innovative transit disadvantaged populations and methods to increase and measure transit access**

Proviso Language

Transportation Data Equity
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The appropriation in this section is subject to the following conditions and limitations: tate appropriation is provided solely for the University of Washington's sidewalk inventory and accessibility mapping project to develop a public dataset under an open license and develop the tools needed to publish that data according to an open data specification. The project must include, but is not limited to, utilization of existing data sources, imagery, detailed surveys, and manually collected, detailed data for city streets, county rural and urban local access roads and collectors/arterials, state roads of all types, and roads owned by other entities. The project may draw on partially developed sidewalk data for all state facilities. To the extent practicable, the final product must be suitable for use by the department of transportation, local and regional agencies, tribal governments, and the general public. For the 2023-2025 fiscal biennium, the project will produce a base active transportation data layer for all counties, with priority given to counties with high proportions of overburdened communities. A project status report is due to the transportation committees of the legislature on December 1st of each year until the work is completed.

PROJECT OVERVIEW

1. Review Jurisdictional Data
2. State of the Practice
3. Workgroups: Local Communities Focus
4. Sidewalk Collections: Schema and Meth
5. Sidewalk Accessibility Demo Apps
6. Sidewalk Data Summary & Outcomes

Current state of & interest in sidewalks data

WORKGROUP GOAL

Understand and set expectations for dataset, functionality, and how data will be used and maintained in the future.

- Promote communities' buy in and data stewardship
- Understand what / how you are using sidewalks data
- Understand what /how you might use such data
- Identify limitations or barriers to maintaining such a dataset
- Share findings and vet recommendations

What do you think is the benefit of a state-wide sidewalk dataset?

- Statewide routable network
- Trip planning, measurable access to X over the pedestrian network
- Agencies Complete Streets initiatives tied to Level of Traffic Stress (pedestrians) and understand the infrastructure available to them
- For analysis, including safety, so that data driven decisions can be made about improvements and additions to active transportation facilities.
- Ability to assess environments and walksheds of community services and destinations (schools, healthcare, etc)
- Ability to analyze different investments & effects/impacts on increasing network scale, reach, access,
- Transit planning: bus stop location, route locations.
- Grant writing
- Grant review
- Safe Routes to School route planning
- Travel Trainers--route planning for an individual
- Data stewardship, maintain data and keep it current— demonstrate measurable improvements over time (evaluate)
- Equity planning & EJ perspective ... It might allow us to take a closer look at what routes and destinations are actually available to people of all ages and abilities.
- Match statewide funding to need; demonstrate need
- inform the future state-wide trip planner.

- **Consistent sidewalk data quality and coverage**
- **Easier to systematically identify gaps in pedestrian access**
- **Integration into WSDOT data facilities increases opportunities for multimodal analysis**
- **Ability to conduct accessibility analysis for non-motorized modes**
- **Aligns with WSDOT and USDOT goals for safety, complete streets, etc**

What do you think is the benefit of a state-wide sidewalk dataset?

- Statewide mapping – open source, trip planning
- Gives smaller jurisdictions w/o GIS staff ability to collect & steward data
- Prevent ped injuries, fatalities
- Sidewalk Gap analysis – long range planning
- Tool/App sharing
- Authoritative State-level / comprehensive methodology / tools / apps
- Support for Emergency Operations / 311 requests
- Compliance with ADA
- Equity – look at distribution of ped resources, access, look at equity emphasis areas

Do you have an existing sidewalks collection you are willing/able to share? Last maintained date? Do you know what format it is in? (please raise hands via zoom or write in chat)

- WSDOT developed a sidewalk and curb ramp inventory this year, with crosswalks being inventoried at this point. It is in SQL server/GIS spatial format that works with Open Sidewalks
  - WSDOT is actively stewarding the data.
  - WSDOT sidewalk data: https://wsdot.maps.arcgis.com/home/item.html?id=4aa10f4d58254d3c8f5d827ffd73854f
- PSRC has comprehensive sidewalk network data for all facilities in the PSRC region (King, Kitsap, Snohomish, Pierce counties). It was last updated in 2020 and only covers facilities on arterials (minor and principal). The data shows existence and completeness (complete or partial). We are currently updating the data.
  - Link to PSRC data - https://psrc-psregcncl.hub.arcgis.com/search?groupIds=78f16f9b7e4743c78dde2cd2fe45da13
- SDOT has two sets of data specific for sidewalks that are open and available to all. One is a sidewalk observation data which are points along sidewalks where there are uplifts/displacements/etc. which was collected in 2019. We also have sidewalk polylines which have general sidewalk metadata (material/width/etc.) along with a condition metric which is based on number of observations/width/and cross-slope. The data is updated as work is completed, but no inspection has been done since the initial inspection. Data is available as a GIS shapefile, GeoJSON, and other exportable formats through ESRI.
- City of Bellevue has two, one in progress and one over 10 years old which included ranging slopes and is available in GIS.
- Transportation Improvement Board started to inventory sidewalks for all cities under 5,000 but stopped— there were challenges due to the fact they were drive byes and as the roads turned, data became confused- ie north versus south side of streets
- Spokane has out of date dataset, last maintained 2010s. Regionwide with EWU. Included lines on either side with sidewalk attributes. Old GIS file available

What would you like to use a sidewalk dataset for? What are some of your most pressing questions? (inventorying, maintenance, prioritization, access, equity etc) Do you already have a schema?

Prioritization schemas
Sidewalk presence joined with crash data
Optimizing investment in repairs to improve accessibility
Sound Transit might use this data to make better informed decisions around placement of our bike parking infrastructure (racks, lockers) and micromobility (scooter) parking zones around our stations.
Asset management purposes is probably the highest importance. Bellevue also wants to have data that is timed with updates to our transition plan so that we can report how well the city is doing in removing barriers to accessibility.
Being able to tell informed stories - gaps, success cases, progress made, etc.

- **Cross-jurisdictional analysis**
- **Comparable analysis/evaluations between grant applicants**
- **Routable ped network analysis**
- **Integration into state assets increases opportunities for multimodal analysis**

What do you see as the biggest challenges/ barriers to creating / maintaining such a dataset? How could we overcome those challenges?

CHALLENGES / BARRIERS	SOLUTIONS

- Initial buildout of inventory could be challenging, especially in jurisdictions with limited staff
- On-going maintenance would require mechanisms for tracking/triggering updates based on construction or other environmental changes
- Identifying champions at jurisdiction level to partner with WSDOT

What do you see as the biggest challenges/ barriers to creating / maintaining such a dataset? How could we overcome those challenges?

CHALLENGES / BARRIERS	SOLUTIONS
▪ Building the initial dataset / digitizing – requires lots of resources/ppl. ▪ Coordination between Dept: People building/digitizing data (GIS/Planners) may not be the ones also responsible for building or maintaining infrastructure ▪ Knowing when something changes and updating the data ▪ Right of Way: where there are gaps, we may not be able to address them due to ownership of real property ▪ Schema – variations between jurisdictions ▪ Updating / size of data file itself. ▪ Gathering data from developers who are building sidewalks – ▪ Manual/paper processes that are antiquated processes that would need to be modernized in order to alert GIS about changes. ▪ Even if we use AI – still need to have QAQC process	

- **Initial buildout of inventory could be challenging, especially in jurisdictions with limited staff**
- **On-going maintenance would require mechanisms for tracking/triggering updates based on construction or other environmental changes**
- **Identifying champions at jurisdiction level to partner with WSDOT**

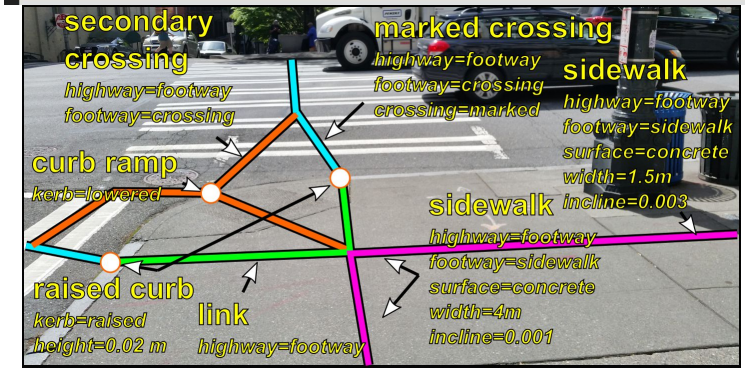
Accessible cities via human-centered, AI-informed data standardization

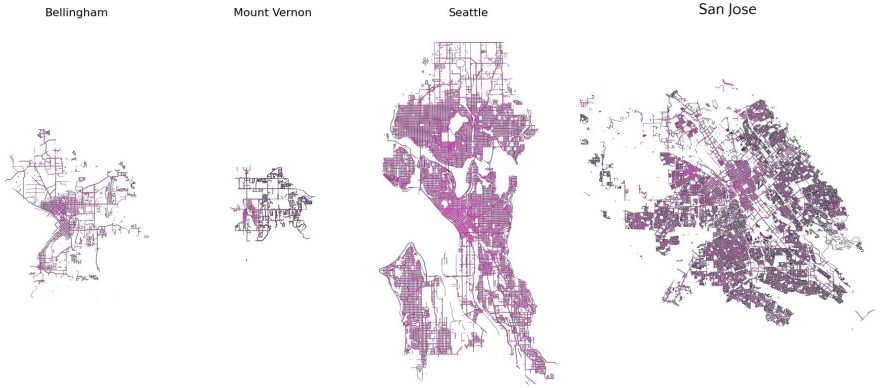
TCAT's OpenSidewalks Project envisions a world where people can choose from multiple options for travel that are accessible to them, whether by walking, rolling, cycling, and specifically **using public right of way.**

Our team strives to make it **easy and efficient for travelers of all abilities and means** to access integrated modes of transportation wherever they go.

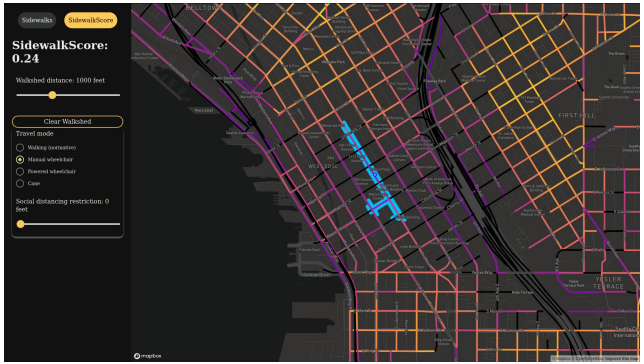
OpenSidewalks

OpenSidewalks





Defines a **baseline data schema**
Downstream use cases use **schema extensions**



Collect baseline data for the entire state via machine learning and aerial imagery. Even AI requires QAQC.

Collect locally relevant “deep dive” data as a community-led & stewarded effort

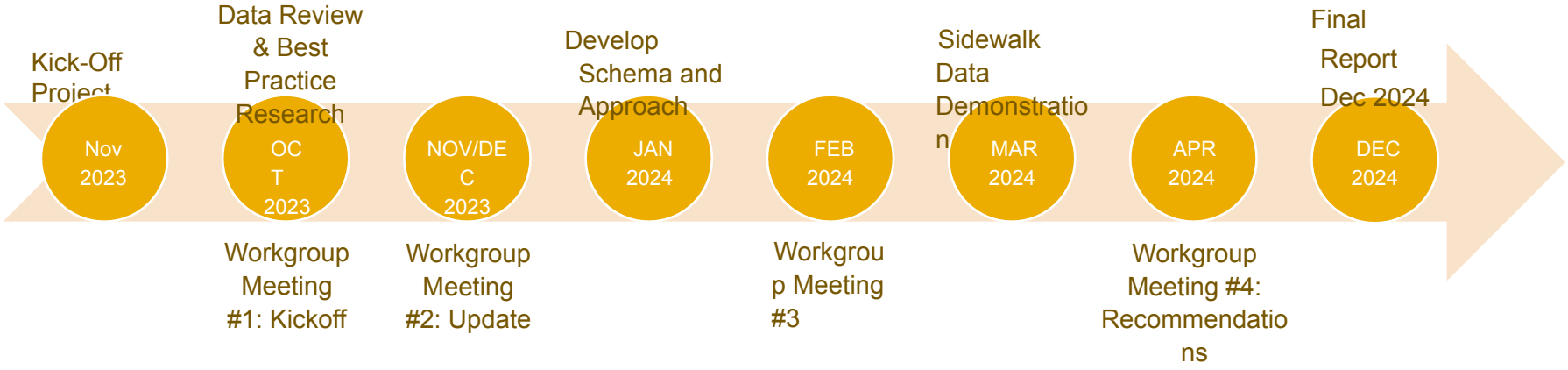
Use the data - understand access, plan trips, plan infrastructure, etc.

Proposed work-streams for Proviso work

Project Workstreams

1. **Data Collection and Compilation:**
   - Identify the counties and order of counties to be included in the analysis based on defined criteria.
   - Collaborate with selected counties and other relevant agencies to access existing sidewalk data.
   - Develop a standardized data collection methodology for areas where data is incomplete or unavailable.
   - Compile and integrate data from multiple sources to create a comprehensive statewide inventory of **“baseline pedestrian graph”**
2. **Accessibility Analysis and Mapping: Exploration in 3-5 select regions**
   - Incorporate accessibility analysis into the dataset, considering suitability for individuals with disabilities.
   - Identify and integrate relevant data on vulnerable populations, tribal lands, and essential service locations.
   - Apply the Safe System Approach principles to assess sidewalk safety for pedestrians and bicyclists.
3. **Data System Development:**
   - Establish a data management system to store, update, and maintain the statewide sidewalk inventory.
   - Develop an open data specification for publishing the dataset and ensure compliance with open data principles.
   - Implement appropriate data security measures and protocols to protect sensitive information.
   - [WSDOT partners intend to: Design user-friendly interfaces and tools to facilitate access and utilization of the sidewalk data by stakeholders.]
4. **Stakeholder Engagement for Deep Dives in 3-5 Locales:**
   - Engage with local jurisdictions, tribal governments, and transportation agencies throughout the project.
   - Conduct outreach and training sessions to do deeper mapping per community concerns and promote local vetting through use of the statewide sidewalk dataset and tools.

TIMELINE


Kick-Off Project
Nov 2023
Data Review & Best Practice Research
OCT 2023
Workgroup Meeting #1: Kickoff
NOV/DEC 2023
Workgroup Meeting #2: Update
Develop Schema and Approach
JAN 2024
FEB 2024
Workgroup Meeting #3
Sidewalk Data Demonstration
MAR 2024
APR 2024
Workgroup Meeting #4: Recommendations
Final Report Dec 2024
DEC 2024

Engagement discussion, starting the conversation to identify goals for next workgroup meeting

- Clarifying the goal of “deep dives” in local communities.
- Defining 3-5 regions of interest for sidewalk deep dive in this biennium
- What is the criteria for "qualifying regions"
- What is the criteria for those regions' outcomes

Community-based participatory design is key

- Designing with and for communities with lived experience of transportation exclusion is the first core principle
- Developing Capacity-Building Tools and Ecosystems to sustain the work by communities is a second core principle
- Designing interoperable shared data pipelines for relevant transportation data supports the two preceding principles

Perceived Goal of deep dives

- With stakeholders, identify a particular problem in a local community–
  - Access to frequent transit or other amenities
  - Sidewalk surface disruptions
  - Active transportation
- Collect additional “extension” data beyond baseline
- Create the downstream capacity to
  - Join the extension data collection with the baseline
  - Provide meaningful analysis of the joined data.

Did this challenge your view of a deep dive?
What do you hope to see as the outcomes of 3-5 community-based deep dives?

- Initial buildout of inventory could be challenging, especially in jurisdictions with limited staff
- On-going maintenance would require mechanisms for tracking/triggering updates based on construction or other environmental changes
- Identifying local champions to partner with WSDOT, DRW, F&C

What is the criteria for "qualifying regions"
What is the criteria for those regions' outcomes?

- Equity, Environmental Justice concerns,
- Nondriver-enriched communities
- Historic disinvestment
- Pedestrian crashes
- Size of the community
- Communities that have not has resources/ de-prioritized collecting map information
    - Klickitat County (white salmon) +1 (https://accessiblegorge.com/)
    - Pasco/Tri-cities
    - Yakama Tribe +2 (porschia?)
    - Parkland/ Lakewood (Tacoma)
    - Vancouver area
- Suburban/rural poverty
- (11/9 addon- Kitsap, South King County <skyway>,
- building community capacity / sustaining engagement of those most impacted with local gov
- 1) make sure to include rural representation (small towns, towns with long stretches in-between town centers);
- 2) don't stress too much about which communities you pick--frontline communities are everywhere--but be sure to work with and resource diverse and local partners in the communities you select.
- Clarify the reasoning for choices

- **Underserved communities**
- **Identified Local PROW problems**
- **Local data stewards**
- **Local champions to partner with WSDOT, DRW, F&C**
- **Other local funds to pair with the proviso effort**

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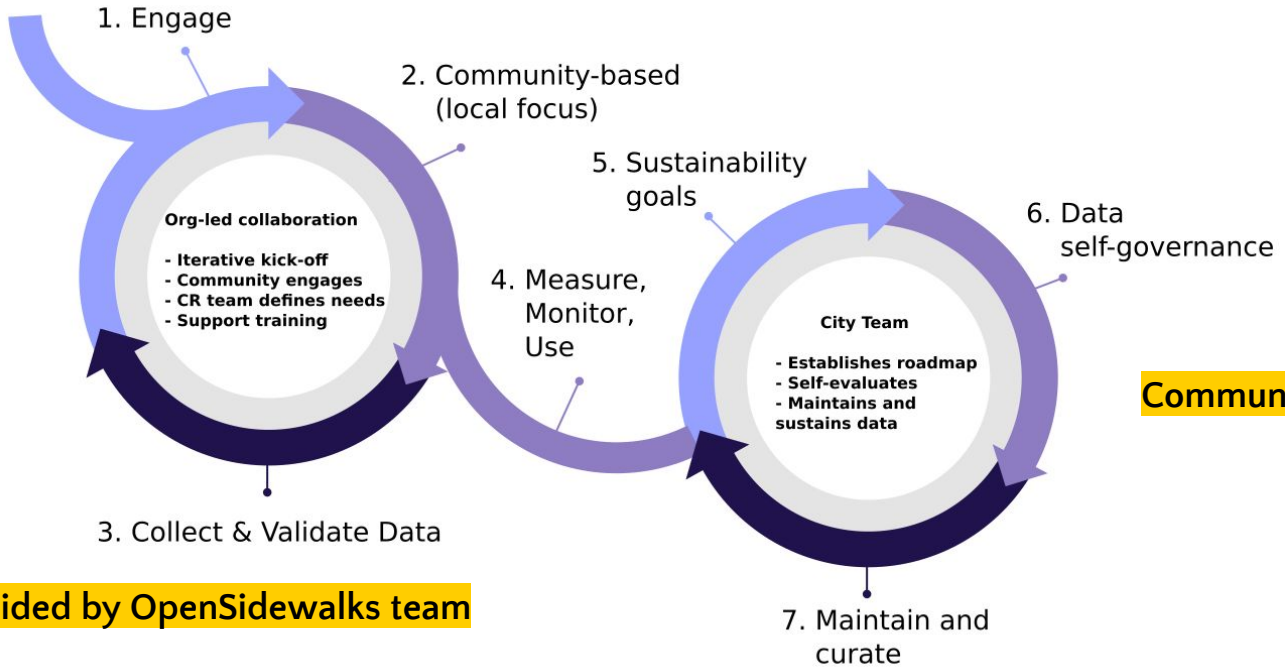
Engagement Pipelines: Previous Local Communities Deep Dives

Overall engagement strategy



Guided by OpenSidewalks team

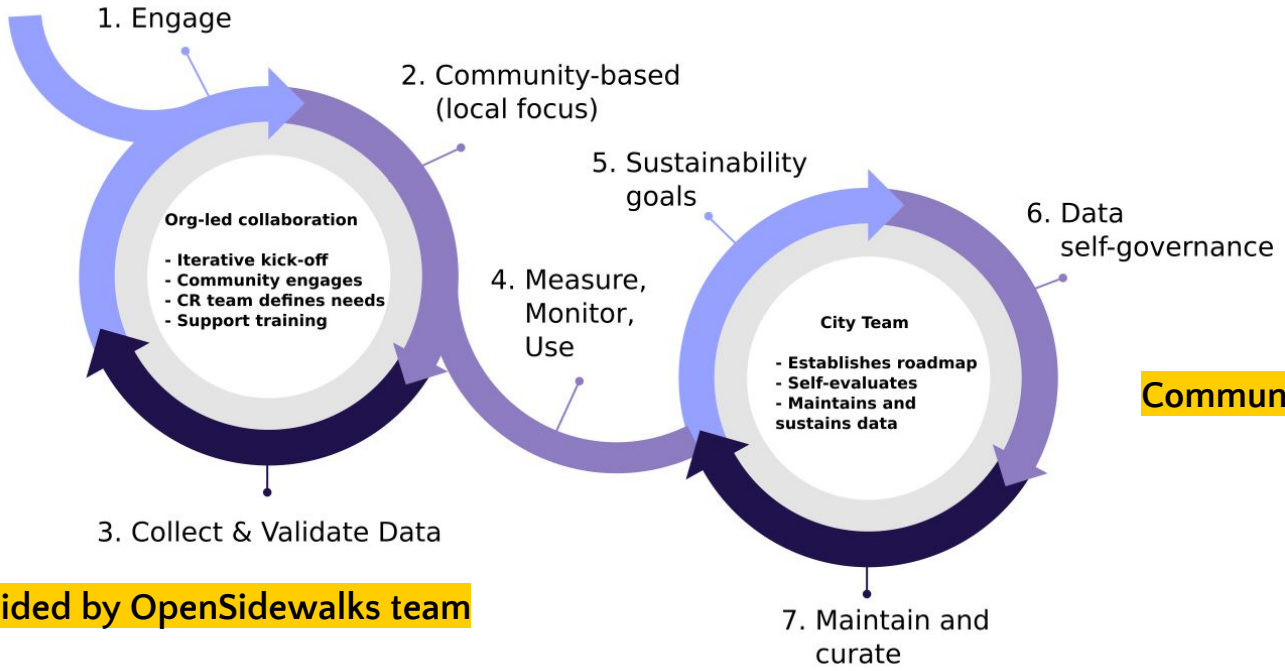
Community-guided

- Challenges to sustainable **collection** within local communities, questions of power:
  - Technical:
    - Tooling is unintuitive, learning it is a large time investment
    - Discoverability
    - Documentation
    - Coordinating and monitoring data collection tasks
  - Community organization:
    - Which communities?
    - How do they structure the effort?
    - What data should be collected? Who decides?
    - How do we keep people interested and organized?
  - Sustainability:
    - How is the data kept up-to-date?
    - Why collect the data?
    - Who will use the data?

- Our approach:
  - Technical:
    - Improve tooling around OpenStreetMap to assist in data collection
      - New accessible desktop and mobile applications
      - Provide a trip planning application (and other ways to actively use, not just visualize the data) to demonstrate use cases, show the impact of mapping.
    - Create a central online location at which to coordinate mapping
      - Tasking Manager
      - Private OSM
    - Create extensive documentation of how to map the data
      - Community Engagement tools
        - Pdf
        - Canvas online
        - Team Organizer Folder

- Our approach:
  - Local Community organization:
    - Start with a manageable set of partners across several organizations. Some mix of:
      - G1 - people with accessibility concerns, embedding people with disabilities in the process (paid contributors)
      - G2 - local mappers
      - G3 - local technical stewards
      - G4 - local elected officials, influencers, evangelists, place-makers
    - Use a “train-the-trainers” approach to disseminating mapping knowledge, supplementing the documentation (and revealing any inadequacies in it).
      - Required: mapping training material available in multiple languages
    - Follow the 5 Workshop guidance
      - W1: why is data connected to individual stories
      - W2: raising local concerns and community self-prioritizes concerns
      - W3: beginning the data collection process
      - W4: review progress, provide validation feedback
      - W5: creating a local, sustainable data stewardship agreement

Overall engagement strategy



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AI4Accessibilty model Employed in 5 cities

- Los Angeles, United States
- Quito, Ecuador
- Santiago & Gran Valparaiso, Chile
- São Paulo, Brazil

Selected to leverage existing community relationships via our partner, G3ICT. G3ICT further supported this work by mediating between wider community contacts, handling compensation for participants, and providing translations.

“Train-the-trainer” model Employed in Korfu, Greece; Columbus OH, San Jose, CA, New York City.

- Start with a primary contact that already has community embeddings, train them extensively
- Allow this contact to then self-organize

Supplementary trainings for all

- Involve teams in kick-off events where we did higher-level explanations of mapping approaches.
- Attended by over 400 participants.
- Facilitated by 2 people, 5 translators, 2 ASL interpreters & G3ICT

4

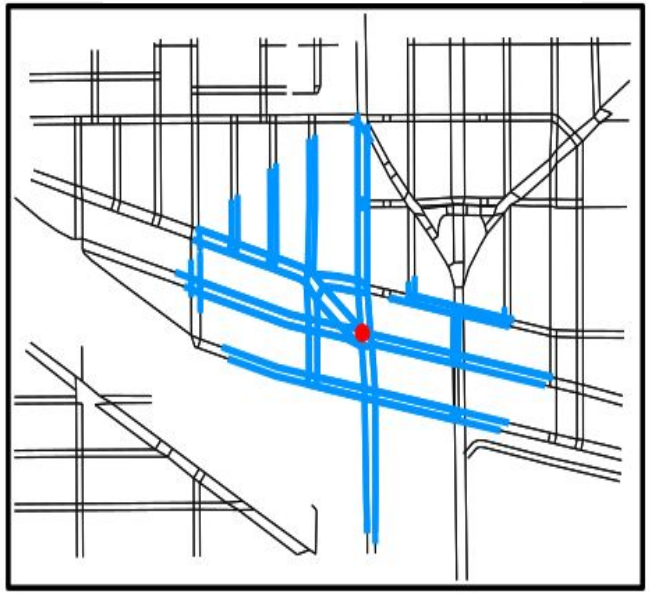
Lessons Learned from AI4Accessibility Mapping Engagement Pipeline

Hot Take 1: Community defines local data priorities

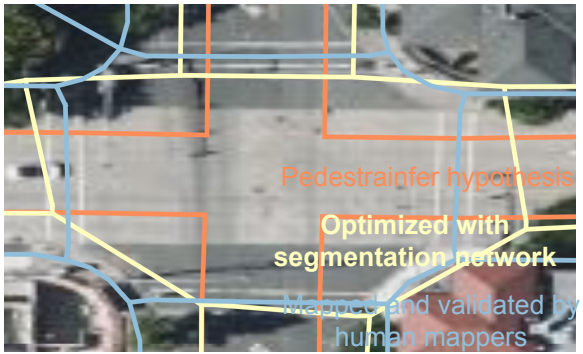
An open shared data schema, compatible with OpenStreetmap, elevating the voices of community concerns about the built environment

- **Pedestrian network graph**
  - **Includes sidewalks, crossings, path and how they are connected**
- **Attributes on the path are decided on and prioritized by local community**
- **Participation by people most affected: Explicitly incorporate people with disabilities into the process - ~10% of all data contributors self-identified as having a disability.**

personalized pedestrian network analysis

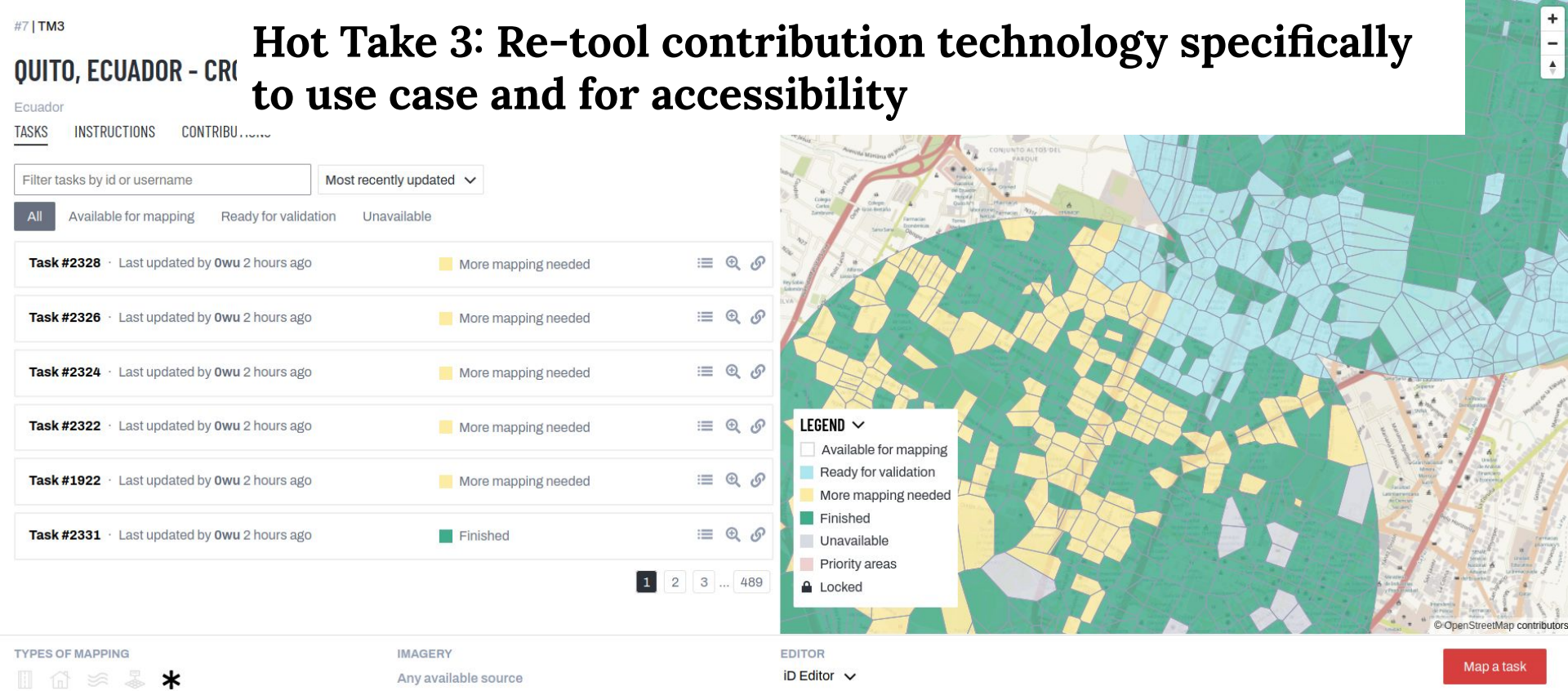


Hot Take 2: Technology-assisted mapping of pedestrian spaces



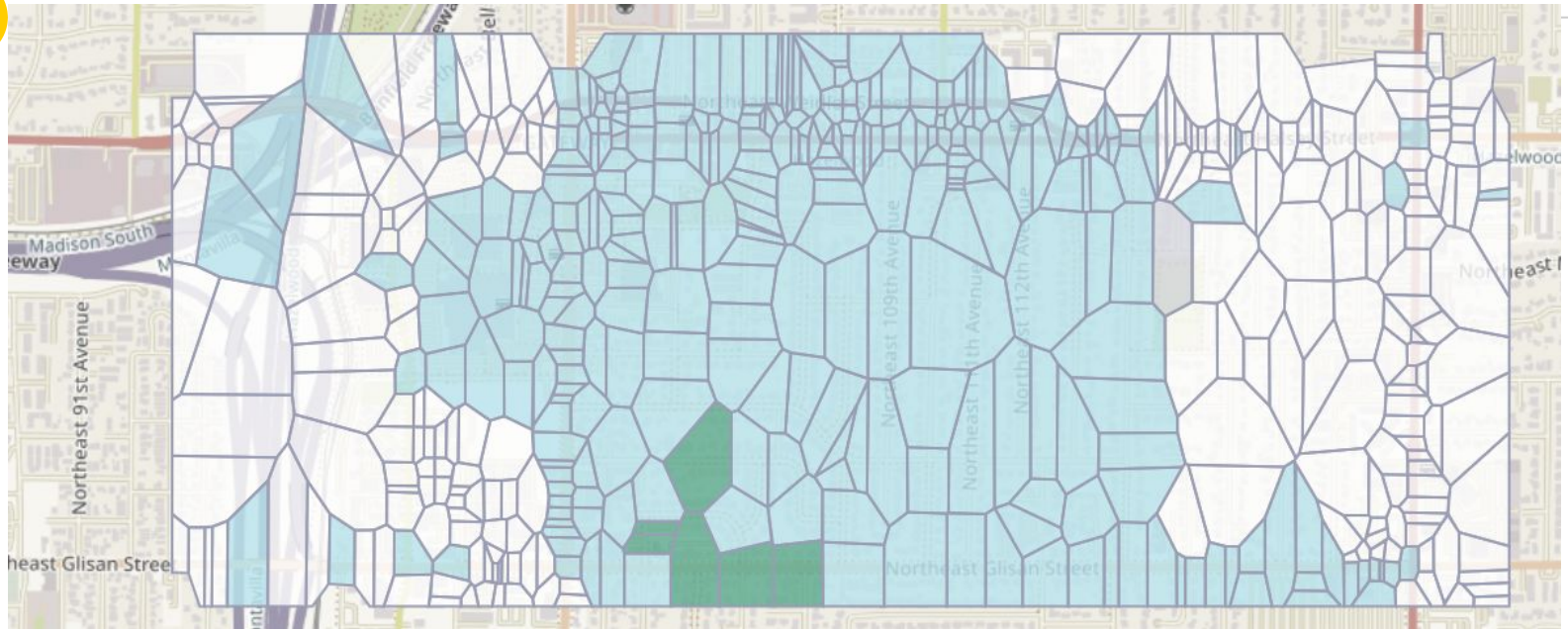
- Data is entered on a laptop or desktop using overhead and street-level imagery
- Collect a basic urban pedestrian network (street crossings, sidewalks, curb interfaces).
- Also collect data of interest identified by the local community.
- Data is entered on location via an accessible mobile phone application
- Machine Learning used as assistant, not the focus

Hot Take 3: Re-tool contribution technology specifically to use case and for accessibility



We adapted existing software and applications to the specific challenges of pedestrian mapping.

Hot Take 3: Re-tool contribution technology specifically to use case and for accessibility

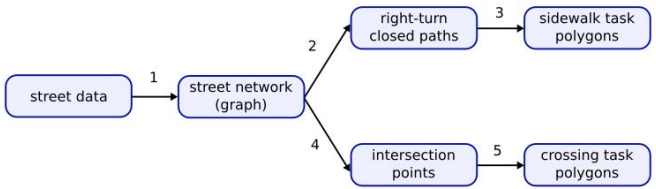


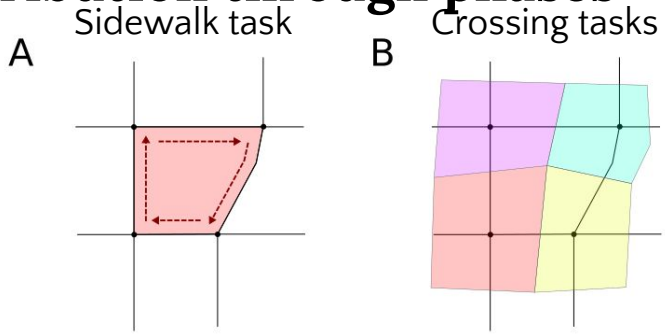
We adapted existing software to the specific challenges of pedestrian mapping.

Hot Take 3: Re-tool contribution technology specifically to use case and for accessibility

Hot Take 4: Simplifying data contribution through phases

Data pipeline for tasks

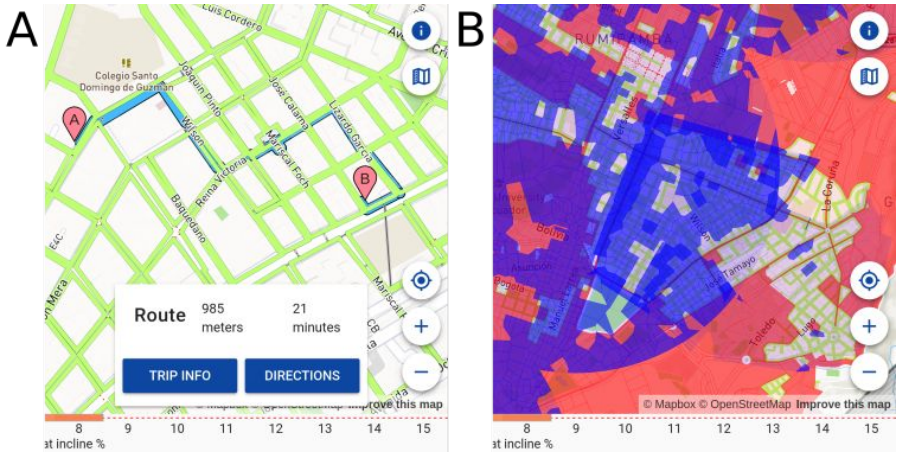




- Need to split up spaces to coordinate mapping, as we prevent conflicting edits.
- Mapping sidewalks, crossing, and curb ramps as a network is complicated.
- Solution: create separate task areas for mapping either sidewalks or crossings, use a “tasking manager” website to coordinate between contributors.

Hot Take 5: Driving engagement through use, not just visualization

- A version of AccessMap that automatically updates with contributors' data was used to drive engagement.

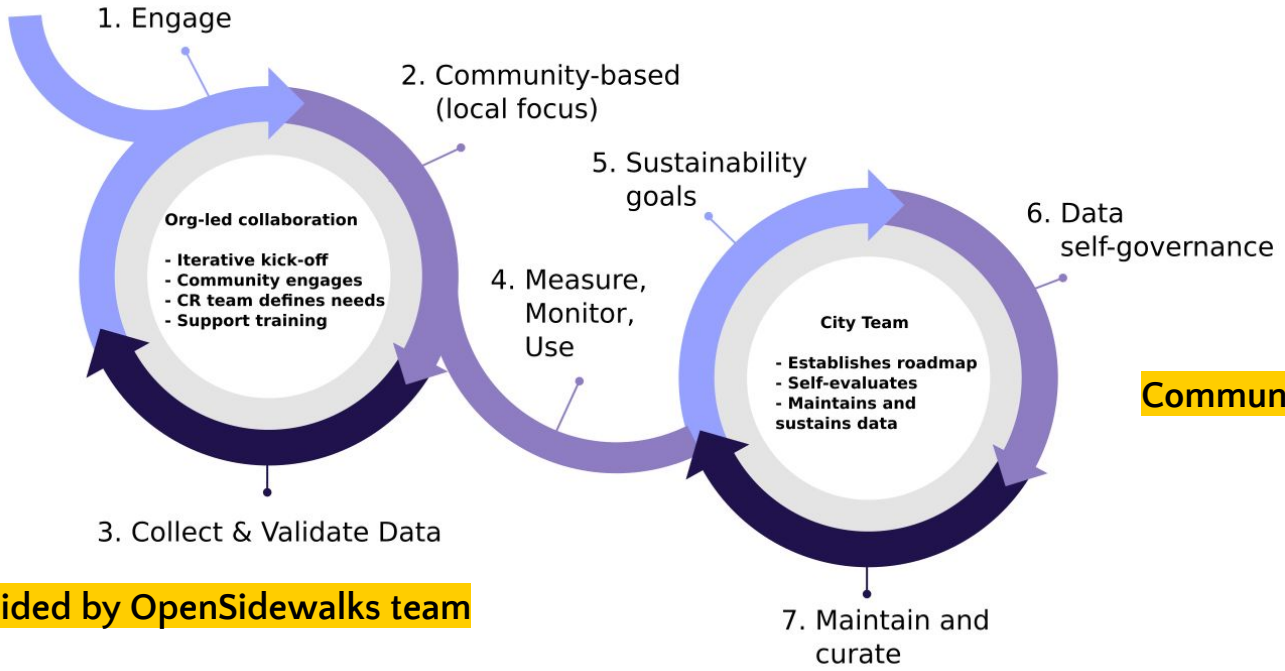


CHECK OUT
https://incremental-beta.accessmap.io/

Hot Take 6: Driving engagement through competition

- A well scoped team challenge reinvigorated engagement in cities

Overall engagement strategy



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Community-guided

3

More structured description of AI4Accessibility engagement results

Bolten, Nicholas, and Anat Caspi. "Towards operationalizing the communal production and management of public (open) data: a pedestrian network case study: A pedestrian network case study in operationalizing communal open data." *ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies (COMPASS)*. 2022.

Train-the-trainers

Number of participants in our teams challenge (people who consistently engaged):

- Brazil: 3-4
- Chile: 10-20
- Ecuador: 20-40
- United States: 1

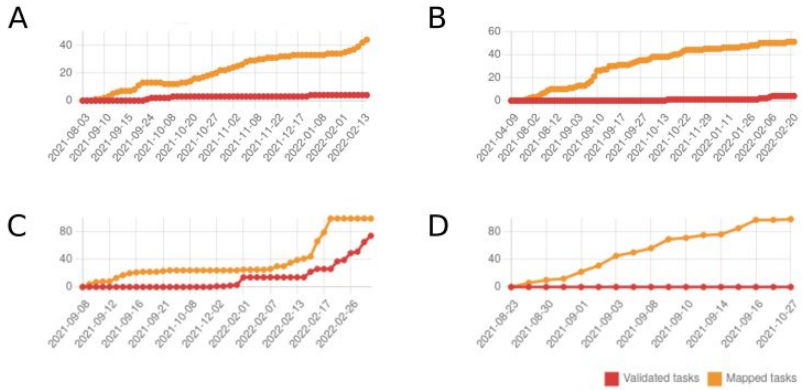
- Brazil: academics and officials, organized a small but dedicated team with technical expertise. Slow start, but became much more engaged over time.
- Chile: academic-led, organized a team of students and incorporated into coursework. Ties to local transportation officials and got significant engagement from people with disabilities. Consistent progress, but faced data equity issues.
- Ecuador: academic-led, organized team of students and other local community members. Explicitly incorporated the input of blind community members to prioritize the mapping of trees and bollards.
- United States: one official, did not organize their community - self-contributed all data (was a domain expert).

Progress over time

- First ~⅓: more hands-on trainings.
- Second ~⅓: teams transition to more self-organization.
- Last ~⅓: we issued a friendly competition, the “teams challenge”.

Over 300 accounts participated on our tasking manager instance over the study period.

Valparaiso is missing due to **data inequities**

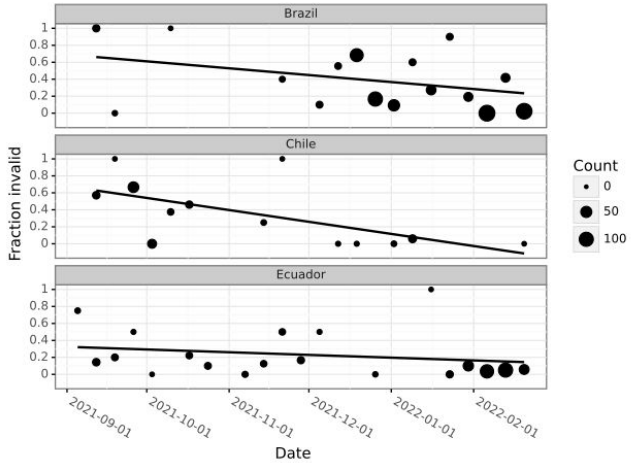


Data quality and assessment

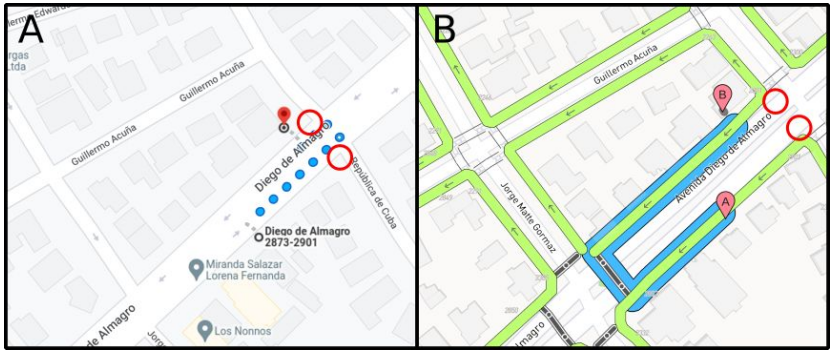
Number of participants in our teams challenge (people who consistently engaged):

- Brazil: 3-4
- Chile: 10-20
- Ecuador: 20-40
- United States: 1

- Our mapping process includes a review step in which a given task may be labelled as incomplete or incorrect.
- Over time, the rate of invalidations decreased between all countries.
- (USA was not evaluated)



Data impact and applications



- Popular tools like Google Maps lack pedestrian-specific data and appropriate logic.
- In this case, Google Maps suggests crossing a busy street at a location with raised curbs and no crosswalk.
- AccessMap recommends the use of a marked crossing with pedestrian signals and curb ramps.
- In the study period, approx. 160 kilometers of pathways were contributed by this effort.

Sustainability

- Quito, Ecuador is still actively mapping, with the majority of the city's area audited for sidewalks and street crossings. Quito had:
  - A wider set of stakeholders actively engaged from early in the project, including people with disabilities.
  - Acceptable imagery data for remote mapping work.
  - A long-term "home" for engagement, i.e. an academic and their students.
- São Paulo, Brazil is still actively mapping, having completed a majority of the 3 neighborhoods on which they have focused. São Paulo had:
  - Stakeholders in academia, agencies, and private enterprise.
  - A small but highly-engaged set of contributors.

Data equity

- Our approach depends on aerial and street-level imagery, but the availability and quality of these data vary geospatially and certainly by socioeconomic factors.
- Our strategy is also compatible with on-the-ground surveys, but as the study was undertaken during the COVID-19 pandemic, this was infeasible.
- Gran Valparaiso, Chile was significantly impacted by data inequity: the only imagery available was of low-resolution and taken at an angle, making it so that pedestrians pathways and streets were obscured by buildings.

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