

# WA State Proviso to collect roadside sidewalks data In WA State Start at 4 min past the hour



**ITS4US**  
IT'S TRANSPORTATION FOR ALL OF US

**W** PAUL G. ALLEN SCHOOL  
OF COMPUTER SCIENCE & ENGINEERING

UNIVERSITY of  
WASHINGTON

**TCAT** The Taskar Center for  
Accessible Technology

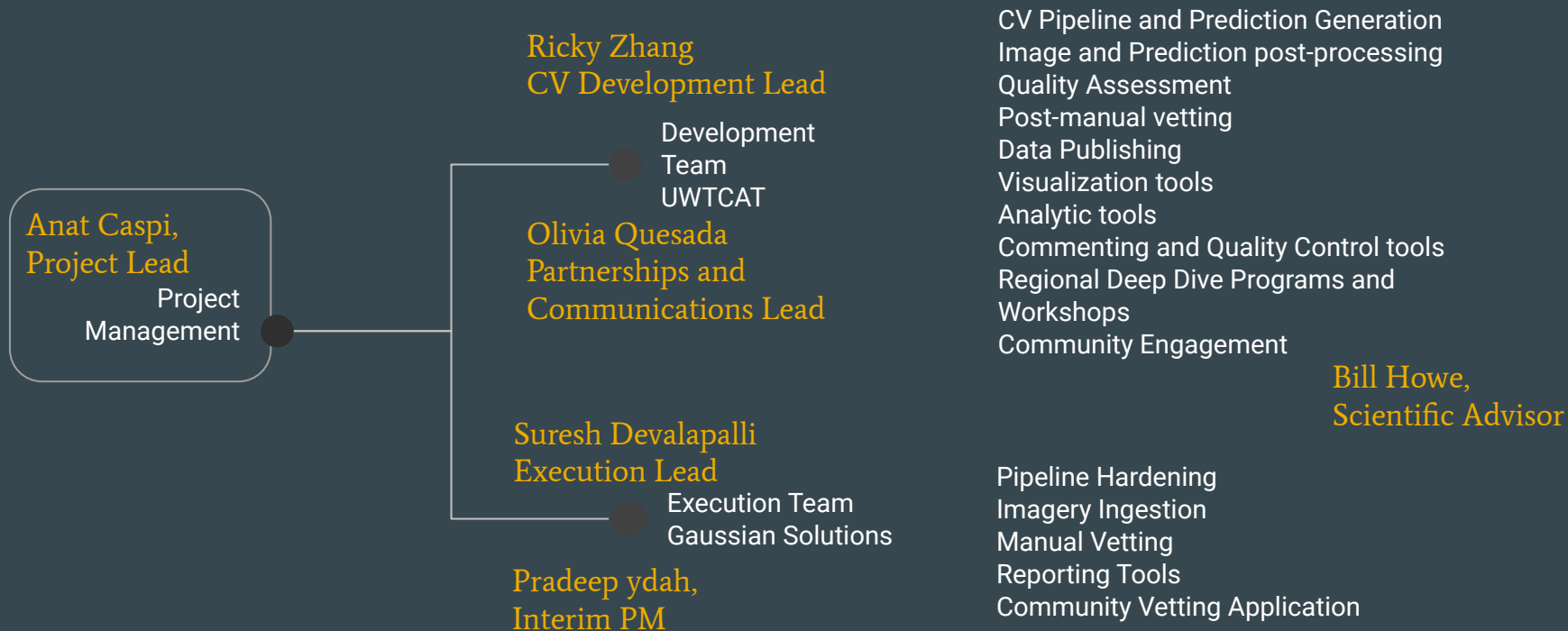
# OVERVIEW

- Team & Introductions
- Proposed work-streams for Proviso work
- Current state of sidewalks data project
- Pipeline for Data Collection & QC
- Preparation for next meeting:
  - Annual Report
  - Any priority region of interest for sidewalks deep dives?
  - Clarifying the analytic paths for Nov/Dec

# Project Team & Introductions



# Project Organization



# PLEASE INTRODUCE YOURSELF

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

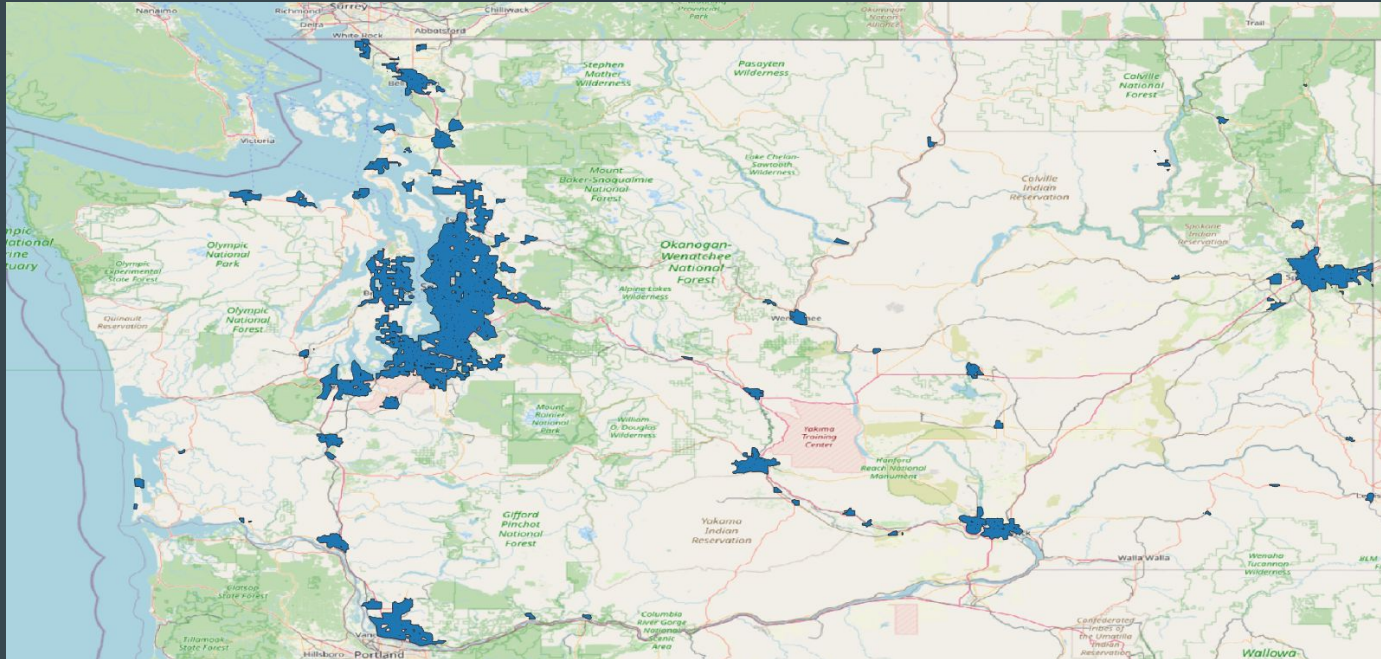
# Project Overview

- Create a statewide consistent, connected, graph routable open sidewalk data
- Motivation: Furthering the needs and prioritization of WA State Transportation Plan, including supporting activities in Active Transportation, Pedestrian Safety and Vision Zero, Complete Streets, Sustainable resilient ecologically sound communities, correcting the harms in traditionally underserved communities.
- Key Deliverables: WSP Pedestrian Dataset in OSW v0.2 schema

The logo for OpenSidewalks is displayed within a light blue rectangular box with a black border. The word "Open" is in a black sans-serif font, with a small globe icon integrated into the letter 'o'. The word "Sidewalks" is in a larger, bold, black sans-serif font.

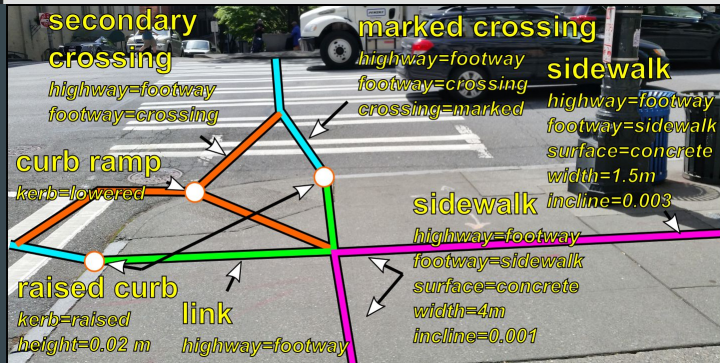
# Project Scope :

- Areas in scope: census tracts that allow for coverage of 80% of the state's population, plus the densest population centers and transit facilities in the missing counties

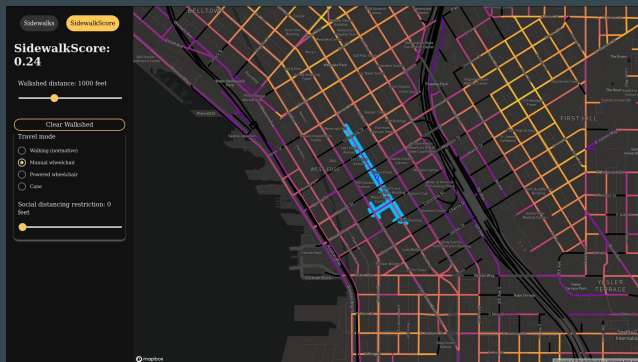


~ 6400 km<sup>2</sup>  
to be mapped

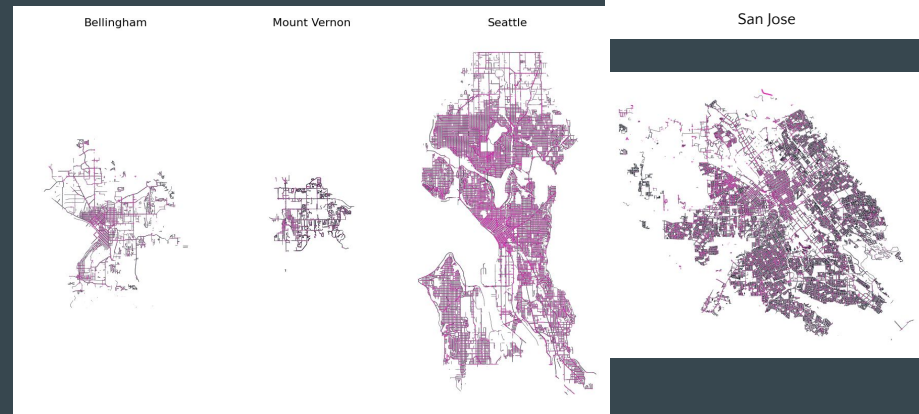
# OpenSidewalks



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



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



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

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



# Proposed work-streams for Proviso work



# PROJECT OVERVIEW



1. Review Jurisdictional Data



2. State of the Practice



3. Workgroups: Local Communities Focus



4. Sidewalk Collections: Schema and full collection+ QC Pipeline



5. Sidewalk Accessibility Demo Apps



6. Sidewalk Data Summary & Outcomes



# 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 and Accessibility 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.

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2. State of the Practice



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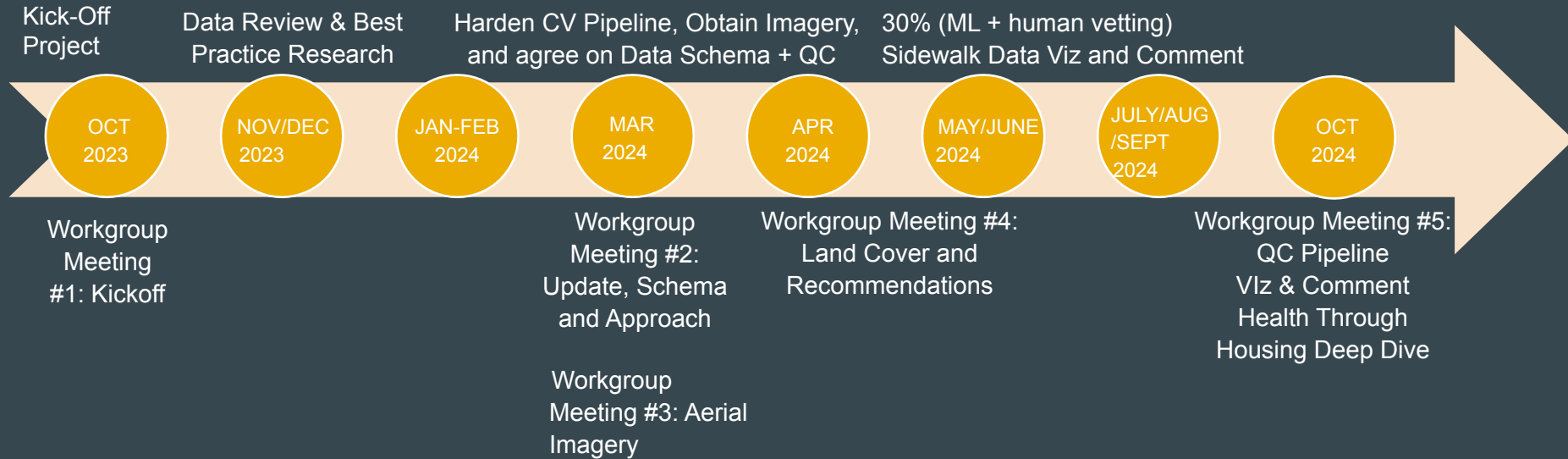
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# TIMELINE Up to Now



# Current state of sidewalks data



# Current Pipeline Predictions + Initial Human Vetting

Report, Courtesy of Gaussian, at: [tinyurl.com/WASProviso2410](https://tinyurl.com/WASProviso2410)

## Proviso Mapping Stats

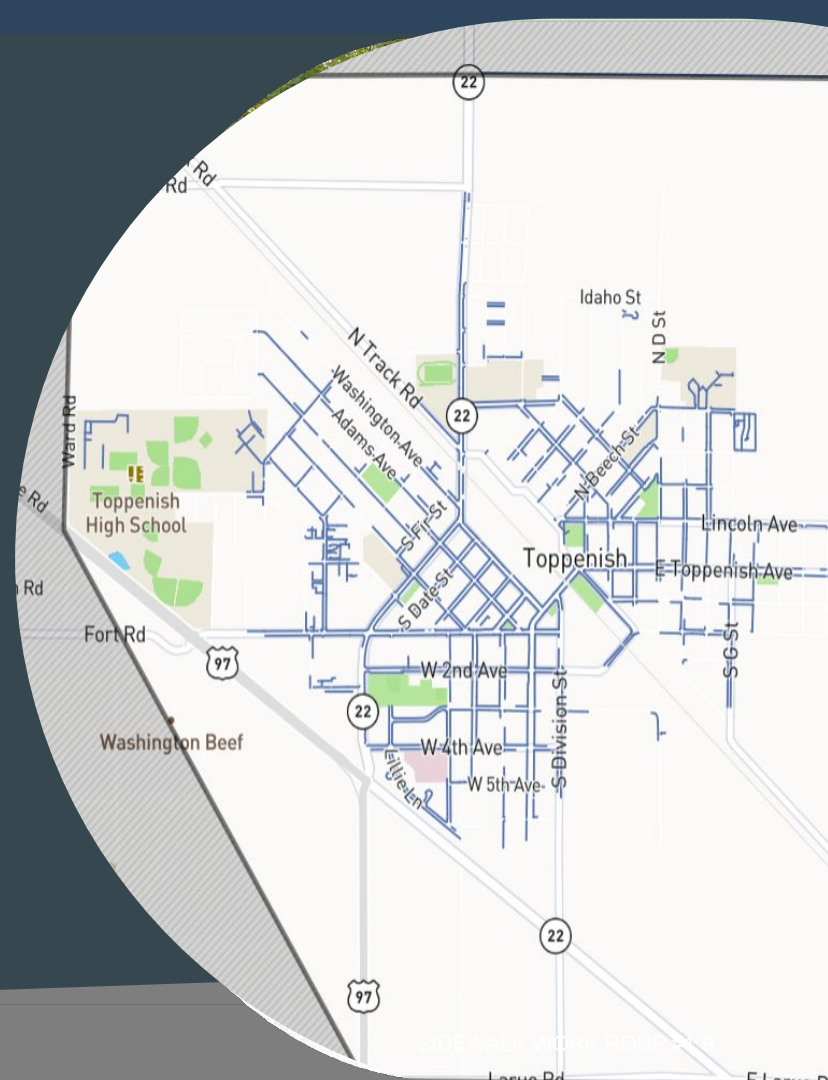
Generated at: 01 Oct 2024 15:00

### Status wise Report

Status	Percentage	Area (km2)	Sidewalk Count	Kerb Count	Crossing Count	Kerb Crossing Ratio	Sidewalk Length (km)	Crossings Length (km)
● Ready to Release	28.89	1835.57	195671	138122	84535	1.694	13620.56	1124.86
● Validation In Progress	0.63	40.26	8334	6562	3697	1.975	483.05	49.36
● AI Inference Done. Scheduled for Mapping	0.34	21.78	1565	1010	591	1.377	136.15	7.91
● Not Scheduled	70.13	4455.37	0	0	0	nan	0.0	0.0



# Current state of visualization tools

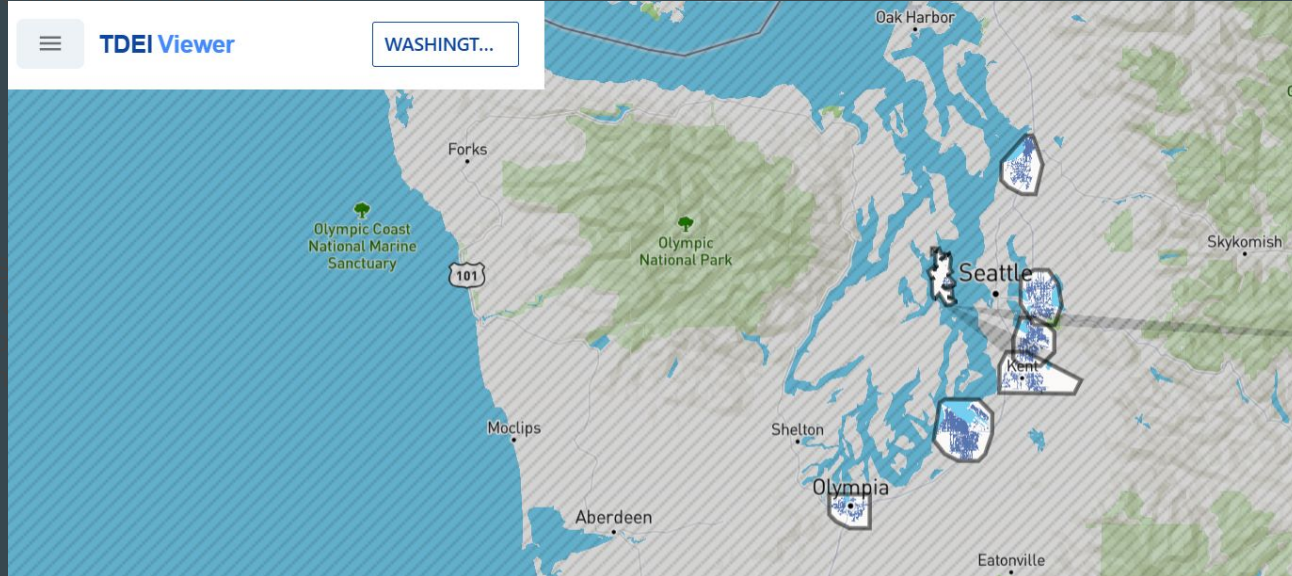




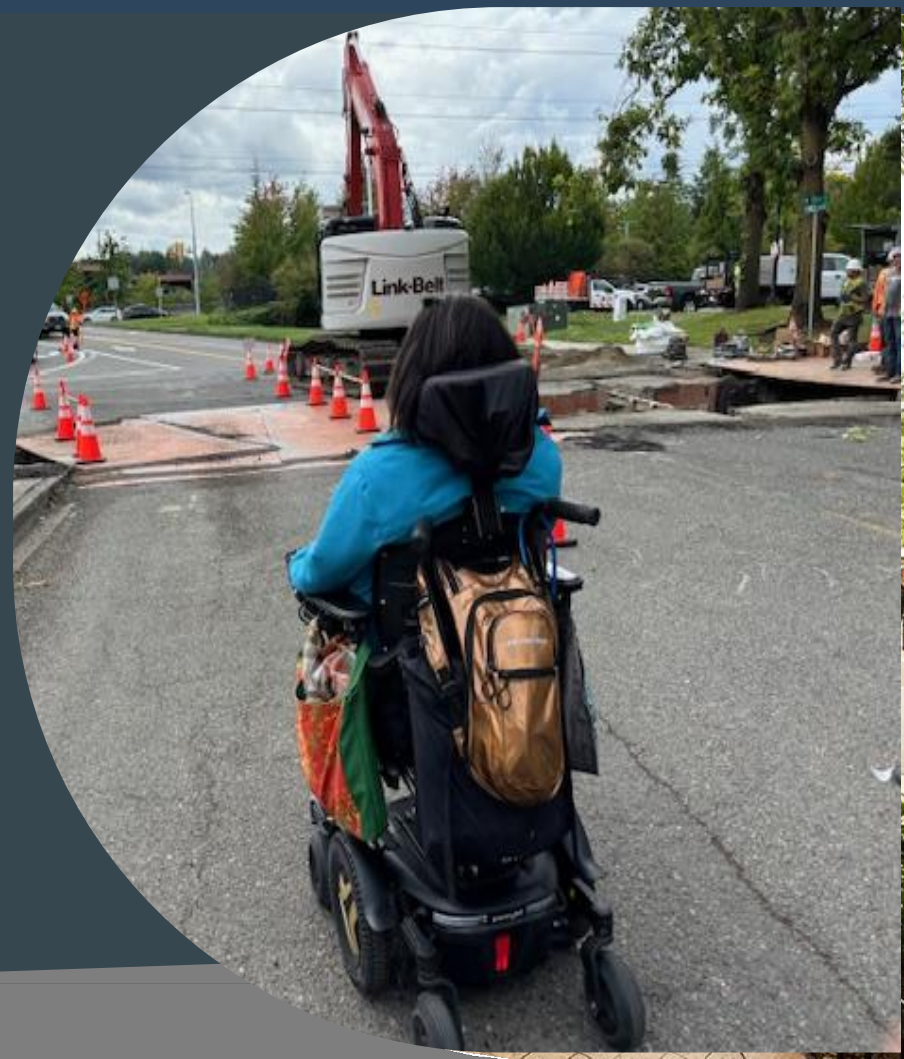
# TDEI Visualization and Commenting Tool:

[Viewer.sidewalks.washington.edu](http://Viewer.sidewalks.washington.edu)

WILSON WALKSHED 1: Top panel of map



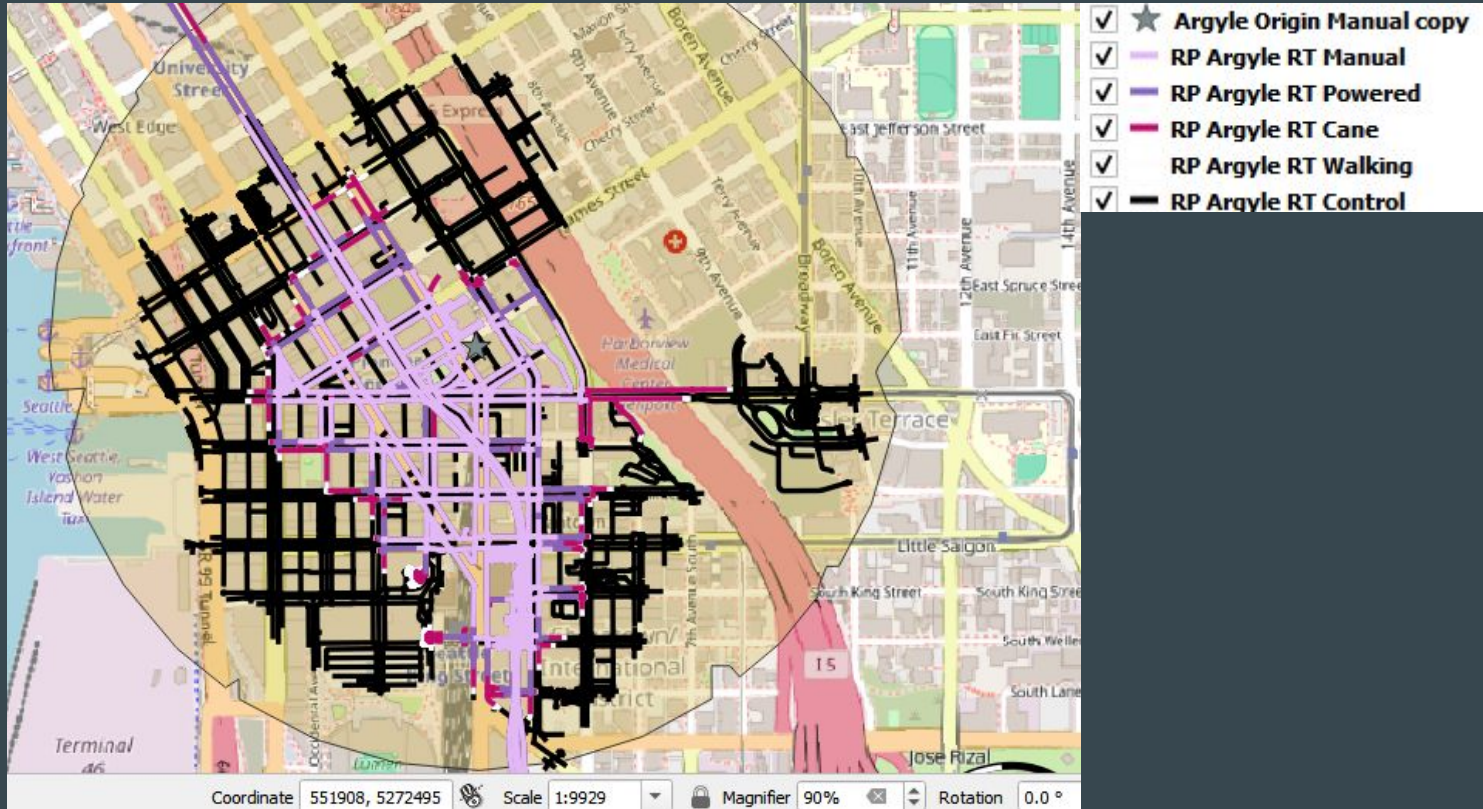
# Current state of Community Deep Dives AND Accessibility Assessment Tools



# Local Communities Focus: KCM Health Through Housing, KC Connected To Transit, EMPOWER, HopeLink CTNs

- ❑ Objectives for the recent sprint:
  - ❑ Continue Walk Audits/GIG for locations
    - ❑ GoInfoGame Audits
    - ❑ Team Challenges
    - ❑ MapToTheVote
  - ❑ Tasks in Tasking Manager for pedestrian accessibility project
    - ❑ Adding data attributes for schema defined by King County 'Connected To Transit Team'
      - #15 Burbridge: COMPLETE 382
      - #18 E Republican: 329 unmapped, COMPLETE(411)
      - #19 Extended Stay: COMPLETE (382)
      - #20 Gateway: COMPLETE (381)
      - #21 Kirkland: COMPLETE (201)
      - #22 MPilgrim: 190/385 unvalidated; COMPLETE (385)
      - #23 Northstar: COMPLETE (396)
      - #24 Redmond Location: COMPLETE (552)
      - #25 Sacred Medicine: COMPLETE (298)
      - #26 SalmonBerry: 130 mapped, COMPLETE (460)
  
      - #16 Buriem: 444 unmapped– October milestone
      - #17 Don's Place: 218 unmapped - October milestone

# Sidewalk Accessibility Walkshed Application

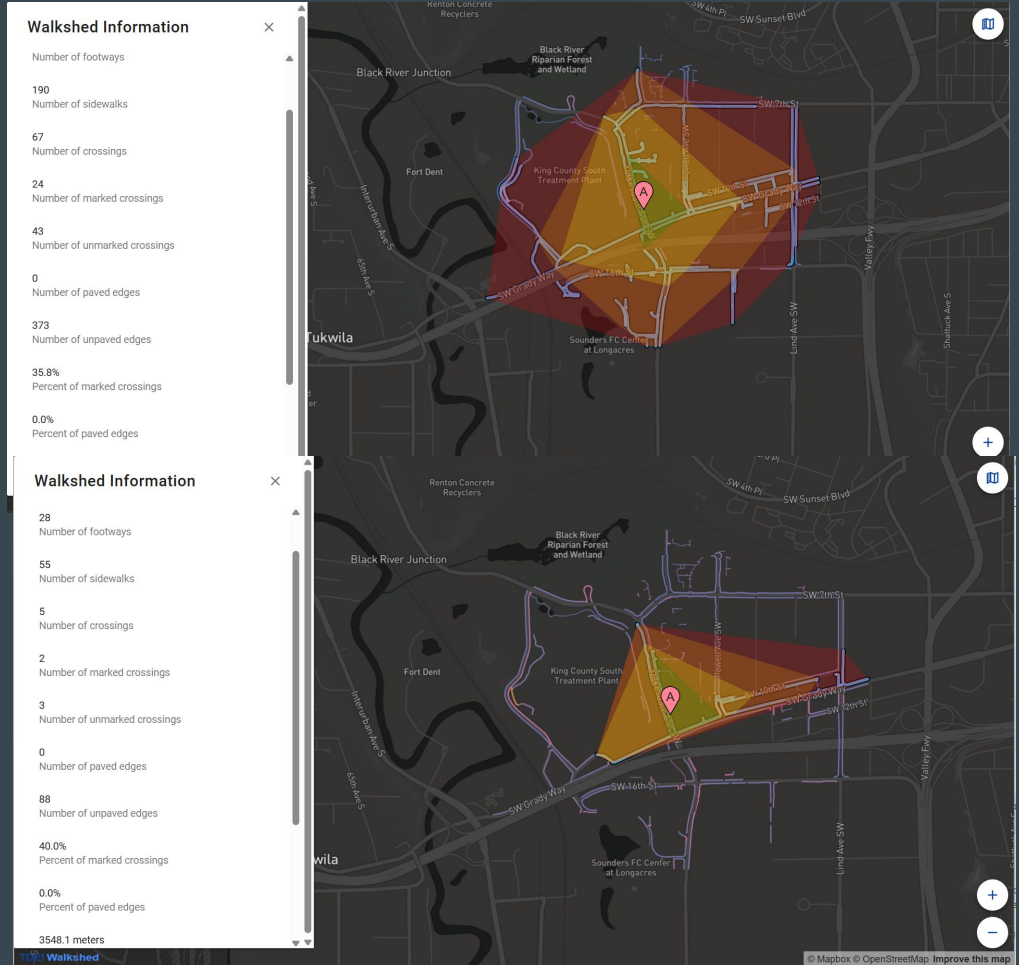


# Sidewalk Accessibility WALKSHED

## S Wilson HTH

WILSON WALKSHED 1: No pedestrian restrictions, 1200 second

SIDNEY WILSON WALKSHED 2: Pedestrian restrictions, uphill/downhill max 8.5%, street preference, sidewalks only, curb ramps necessary, time Cost+ 1200 second



# Project Workstreams

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# Data Collection and QC Analysis Pipeline

## Status

-  Ready to Release
-  Validation In Progress
-  AI Inference Done. Scheduled for Mapping
-  Not Scheduled

## Pedestrian Prediction Model

**Data Sources:** Multiple sources such as satellite imagery, OSM road network, crowdsourced data.

**Metadata Documentation:** Ensure all data sources are well-documented with metadata including source, date of collection, and confidence metrics.

**In-Silico Validation:** Perform basic checks for data completeness, format consistency, and plausibility using scripts.

## Manual Review and Expert Vetting

**Remote Verification:** Conduct satellite mapping, validate critical nodes & paths, for all predictions.

**Expert Review:** Assemble panels of experts in transportation, GIS, and urban planning to review and validate the data, especially in areas with high discrepancies or importance.

**Community Feedback:** Engage local communities and stakeholders to provide feedback and report issues through tool platforms.

## Quality Checks

**Automated Quality Checks:** Topological Consistency and Connectivity metrics; Attribute Consistency; Geometric Validation (spatial geometry of paths and nodes aligns with known geographic features)

**Cross-Referencing with External Data:**

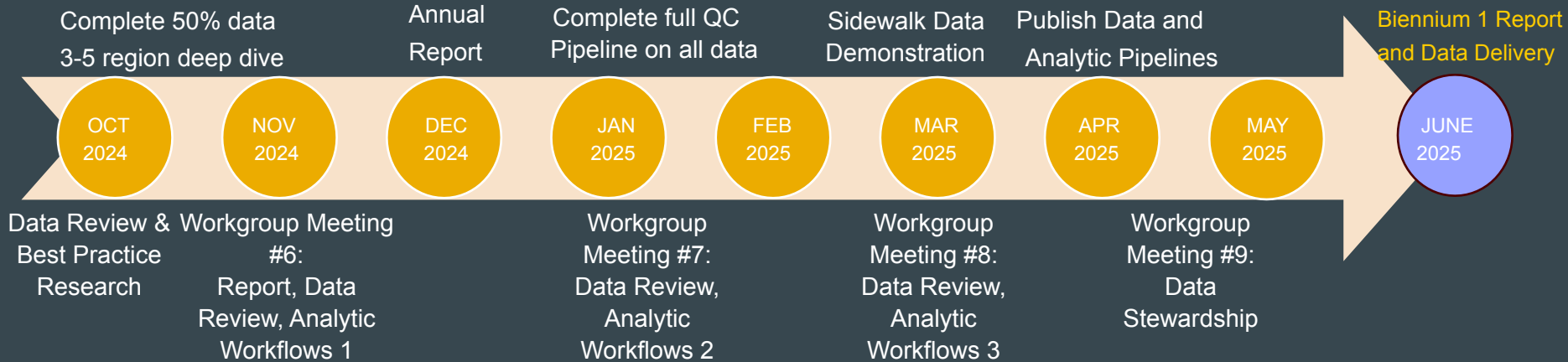
- Scenario-based evaluations: Walksheds validation for Access and Reach Targets
- Integration with Authoritative Data, where it exists.
- Zoning & GPS Data Comparison: Compare with GPS trace data to detect significant changes or anomalies that may indicate errors. Confidence metrics conditioned on zoning, where zoning data exists.

## Iterative Refinement & Feedback Loop

**Model Retraining**

- Establish a regular schedule for retraining the model based on new data and feedback. This ensures that the model remains up-to-date and continues to perform well over time.
- Error Correction: Viewer system for logging, tracking, and correcting errors identified during the vetting process.
- Continuous Improvement: Provide Tooling to Regularly update the dataset with new data and feedback, ensuring continuous improvement and accuracy.
- Documentation and Reporting: Maintain detailed documentation of the vetting process, decisions made, and changes implemented.
- Publication and Access: Publish the vetted dataset with appropriate access controls and stewardship guidelines.

# TIMELINE Till Biennium End





# Preparing for WORKGROUP Mtg #6

- Preparation for next meeting:
  - Annual Report
  - Any priority region of interest for sidewalks deep dives?
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- 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

# Analytic Paths 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
	<ul style="list-style-type: none"><li data-bbox="1309 327 1850 513">▪ Initial buildout of inventory could be challenging, especially in jurisdictions with limited staff</li><li data-bbox="1309 546 1850 862">▪ On-going maintenance would require mechanisms for tracking/triggering updates based on construction or other environmental changes</li><li data-bbox="1309 884 1850 993">▪ Identifying champions at jurisdiction level to partner with WSDOT</li></ul>



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- 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



# Agenda

- Project Overview
- Project Scope
- Timelines and Milestones
- Roles and Responsibilities
- Communication Plan
- Risks and Mitigations
- Next Steps
- Q & A

# Project Scope in Numbers

- Washington State Area: ~ 185000 sq kms
- Area to cover: ~ **6400** sq kms
- Number of images to analyze through AI: ~ 2 Million Images (x model updates)
- Length of Centerline Roads to analyze: ~ 62000 km
- Intersections: > 37500
- Crossings: > 60000
- Kerbs: > 42000
- *Estimated sidewalks length in kms: ~ 45000 kms*

\* numbers estimated from open datasets and analysis

# Timelines

June 2024 - June 2025

## Q1: Jun - Aug, 24

- Teams in place
- Infrastructure set up
- Scope cleared
- One iteration of data collection done
- 15% of the area mapped
- *Process focussed*

## Q2: Sep - Nov, 24

- 40% area mapped
- AI mapping to Human validation and back ironed out
- AI models improved for curb ramp, and crosswalk types
- *Pipeline focussed*

## Q3: Dec - Feb, 25

- 90% area mapped
- AI models updated with sidewalk-width updates
- Identify the areas where we may need on ground mapping
- *Execution focussed*

## Q4: Mar - Jun, 25

- 100% area mapped
- Finalization of datasets
- Project wrap up documentation
- Prepare for biennium 2
- *Data usability and Quality focussed*

*\* Subjected to change*

# Elements to map in scope

Feature	Notes
sidewalks	Presence of a sidewalk, in a LineString format.
crosswalks	LineString crosswalk available now.
links	LineString - between crosswalks and sidewalks
crosswalk-markings	LineString - crosswalk type, and markings on it. Marked vs unmarked
Curb locations	Point feature for where curbs are
Curb ramps	Point features, with lowered, raised, or flush where possible
Path incline	Elevation change and direction of the elevation change, as perceptible from USGS data
sidewalk-width	Path width with .5m tolerance level

# Roles and Responsibilities

Name	Role	Responsibilities
Dr. Anat Caspi	Project Lead	Buck stops here
Suresh Devalapalli	Execution Lead	Delivery of the project Unblock any roadblocks
Cole Anderson	Data Czar	Data Quality Incharge
Naresh Devalapally	Development Lead	Tools, scripts, integration and infrastructure
Ravi & Dr. Ricky	AI Engineers	Model development, Aerial Imagery management
Cy Rossignol	OSM Stack Developer	Workspaces, TM, POSM

# Communication Plan

- Azure Devboards: [Summary - Overview \(azure.com\)](#)
- File tickets to yourself and others when needed
- Devboards ticket should be the primary way in which development is communicated
- Weekly Progress Meeting (See next slide on what to cover)
- MS Teams or Slack for short / quick questions
- No external entity communication without approval from Dr. Anat
- Monthly updates to WA State:
  - Stats updates and new dataset release
- Annual Reports



# Weekly Meeting Template

- Progress on the mapping: Preliminary Statistics needed ([#1013](#)) - 10 mins
  - Explain any issues in the speed of data collection
  - Next mapping areas priority
- New Issues identified in the data/imagery - 10 mins
  - Prepare with images and discuss resolutions
- Infrastructure Issues - 10 mins
- Upcoming demos/external meetings and their requirements - 10 mins
  - Aim to provide a month's lead time
- AI updates - 15 mins
- “Wish we had...” list to improve efficiency - 10 mins

# Risks and Mitigations

- Large Area - Limited Time: Execution speed is of utmost importance. Requires contribution from everyone, and a good strategy
  - Start early, work on improving AI and processes
- Quality Assurance: As downstream applications rely on this data, making sure the quality of data is good.
  - Quality check tools to auto check the quality and ask for human assistance when needed

# Next Steps

- Get the infrastructure up and running
- Figure out the dependencies, and how each piece interacts with each other
- Identify any gaps, and come up with strategies to address them
- Improve the training material for mappers
- Start populating the data: start with the areas that AccessMap already covers?
- *Everyone should map a small area to understand the issues and complain about things they didn't like: ETA: July 4th*
  - *Also helps us figuring out the KPIs we can establish for the manual mappers/validators*

# Proviso Language



The appropriation in this section is subject to the following conditions and limitations: state 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.



## Designing for the Fullness of Human Experience

Q & A