



RICHMOND CONNECTS

Technical Subcommittee
2.8.2023 1:00-3:00pm
Teams

Agenda

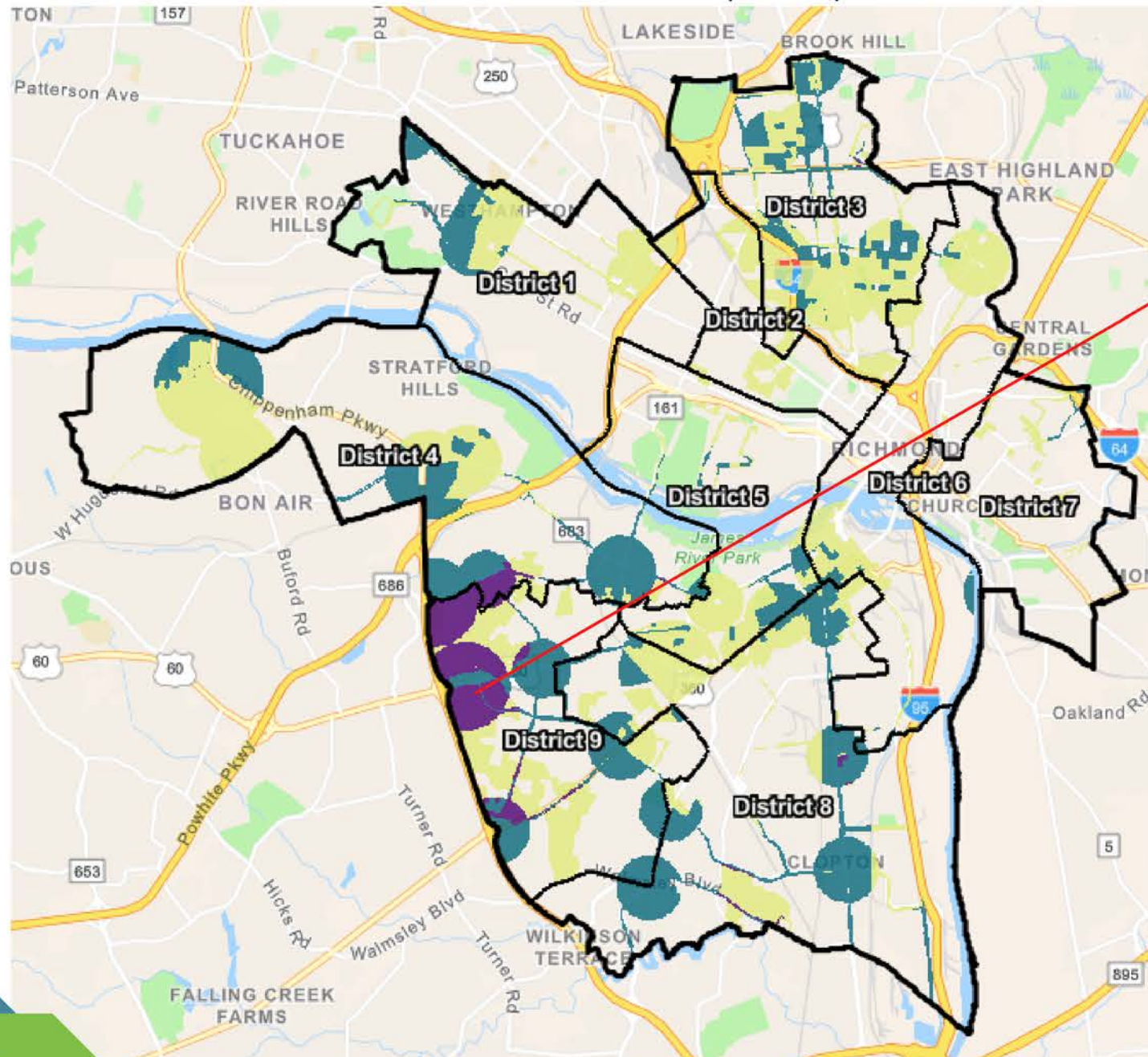
- 1 Needs Map Updates
- 2 Methods for Using Public Input to Stratify Needs
- 3 Scenario Planning Levers & Constants
- 4 Defining Scenarios
- 5 Scenario Planning Measures

1. Needs Maps Updates

We're almost there!!

What will the final results look like?

Tiered Transit Needs (INC 2)



Example

Midlothian/Chippenham

High transit need because:

- Infrequent, unreliable bus service, lacking shelters and benches
- On high injury network
- Great Street
- in a Node
- High concentration of Communities of Concern
- Inner ring suburb,
- Car-centric planning

High pedestrian need...

High bicycle need...

High land use need...

High connectivity need...

11 maps: 1 for each Investment Need Category

Areas/street segments assigned to a level of need:

- High Need
- Medium Need
- Low Need
- Lowest Need

1. Needs Maps Updates

What's missing?

1. Pushing the area-based bike, pedestrian and freight needs onto the network
2. Incorporating the public input into the need levels

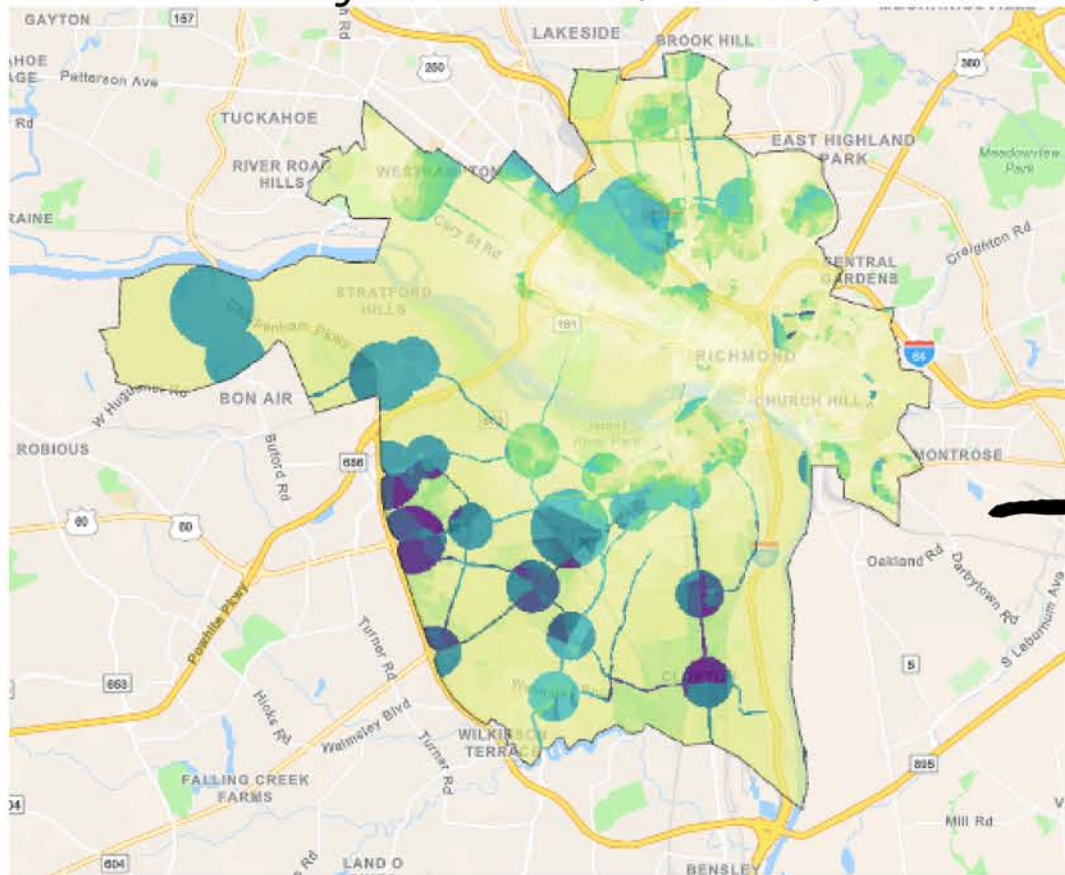


1. Needs Maps Updates

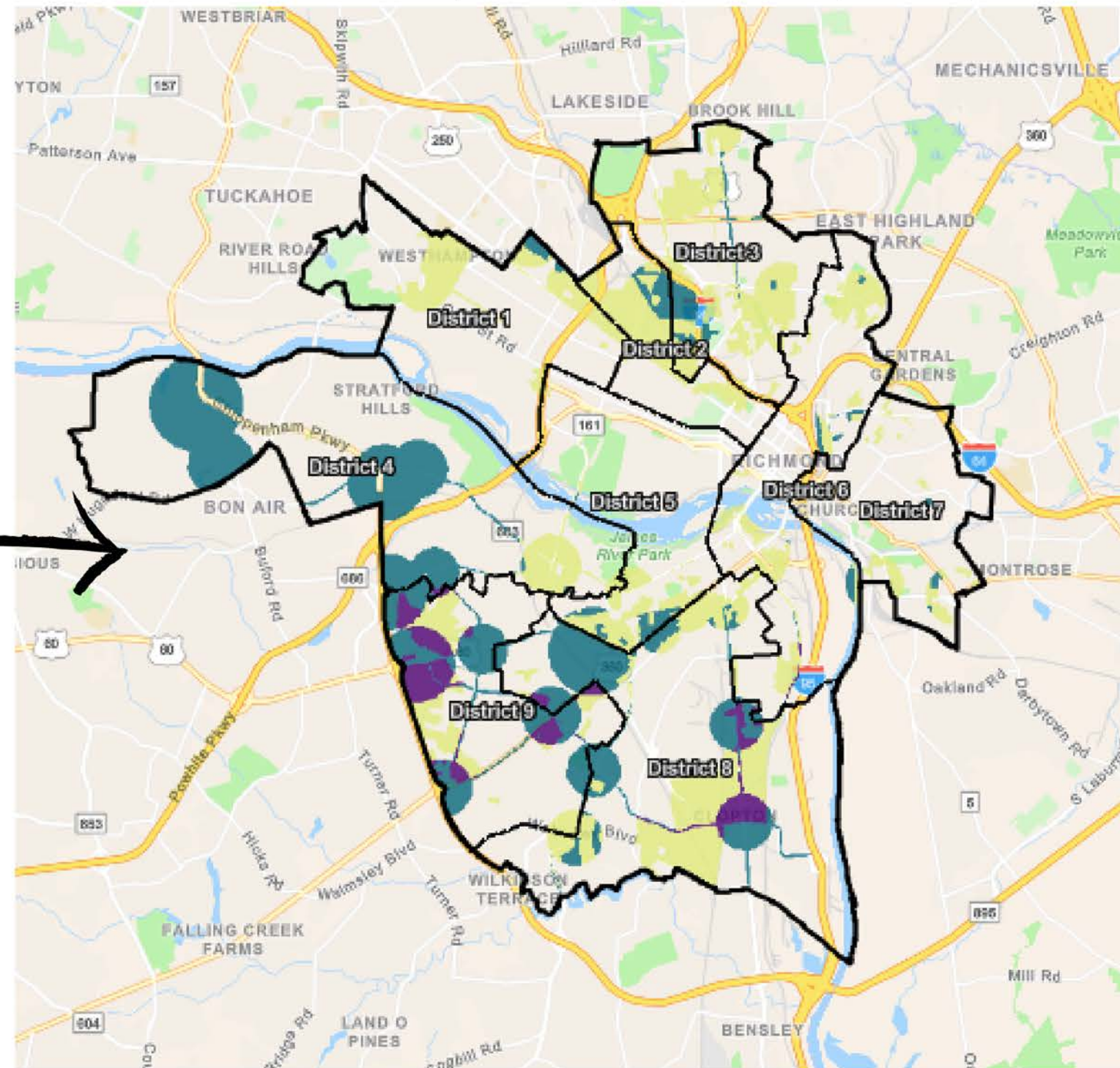


Tiered need map for Bicycle Needs (INC 1a)

Weighted need map for Bicycle Needs (INC 1a)



Top 10% of Zones are Purple/Dark Blue



BUT...Bike, Pedestrian, Freight need to be pushed to network

Maps for other INCs will remain area-based

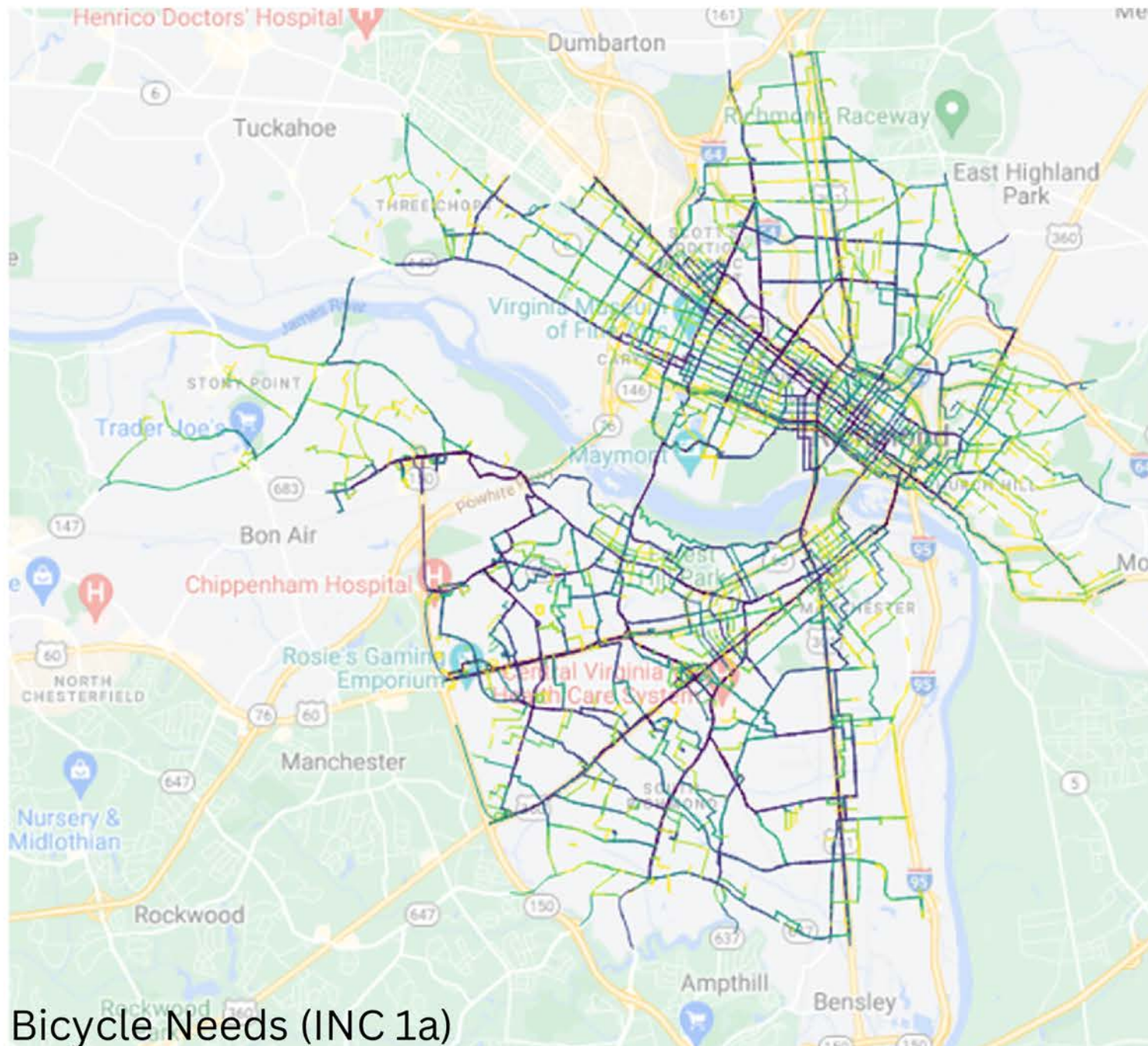
Yellows imply lowest need, purples and dark blues imply highest need

1. Needs Maps Updates

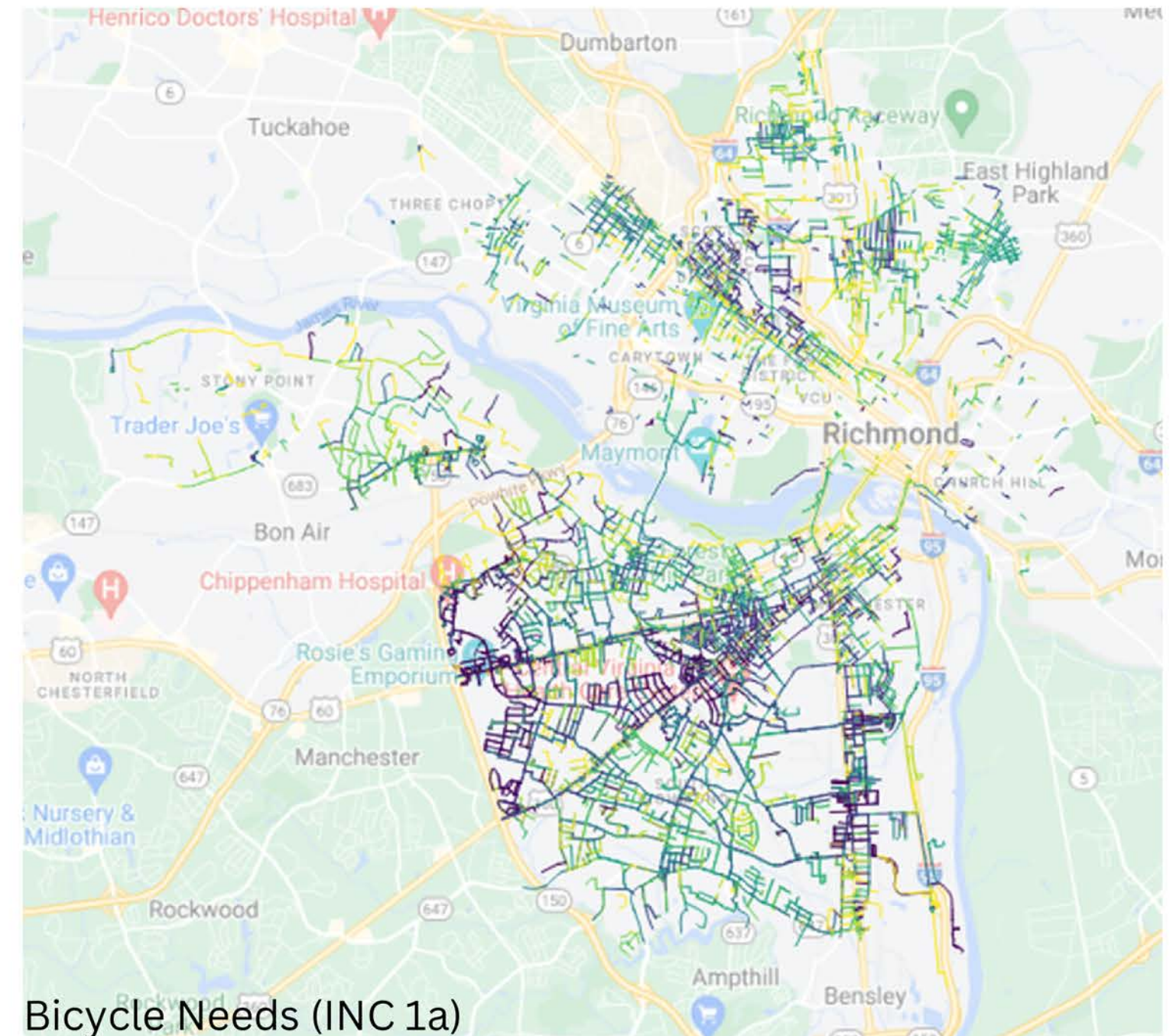


Sum

Mean



Bicycle Needs (INC 1a)



Bicycle Needs (INC 1a)

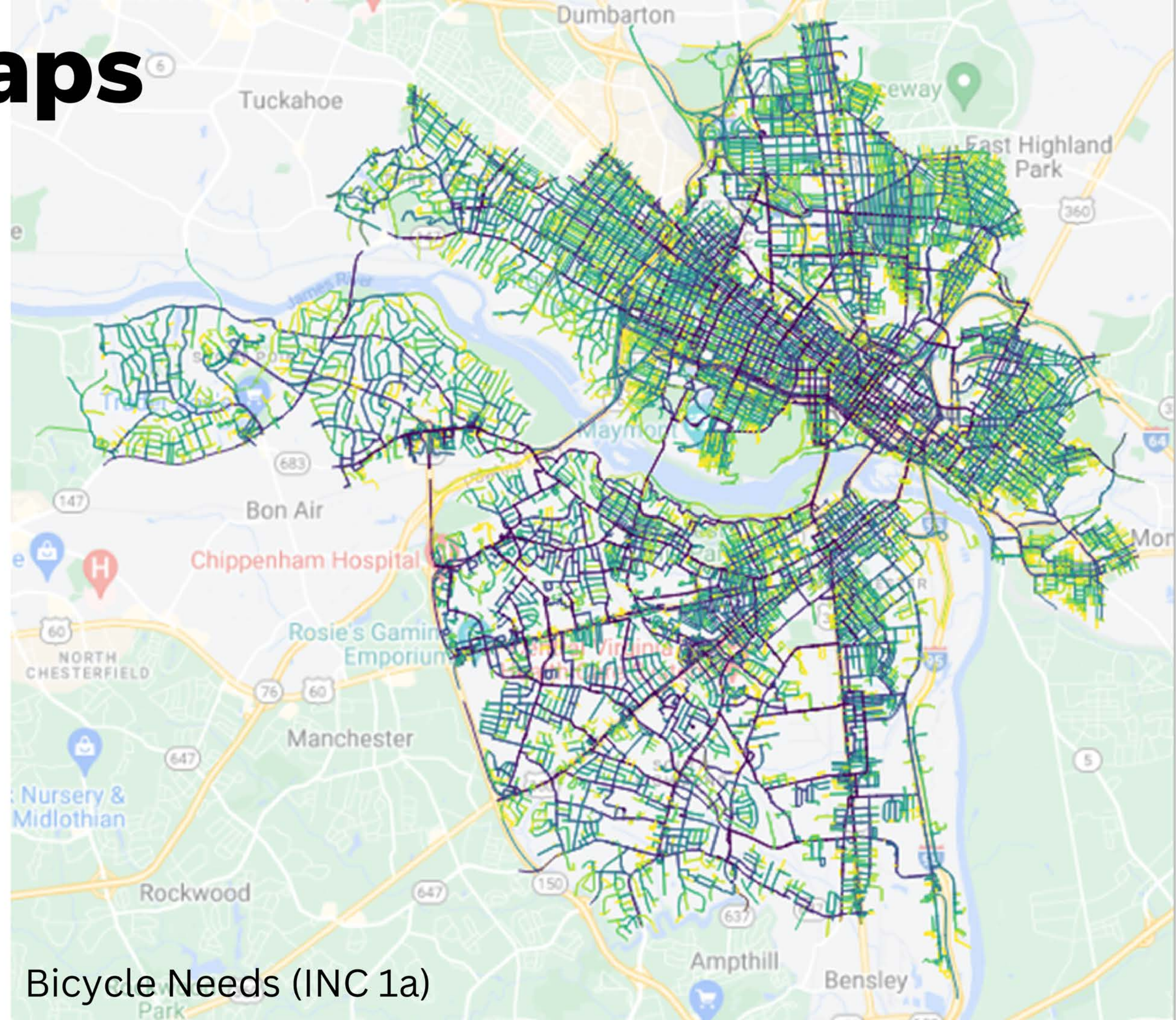
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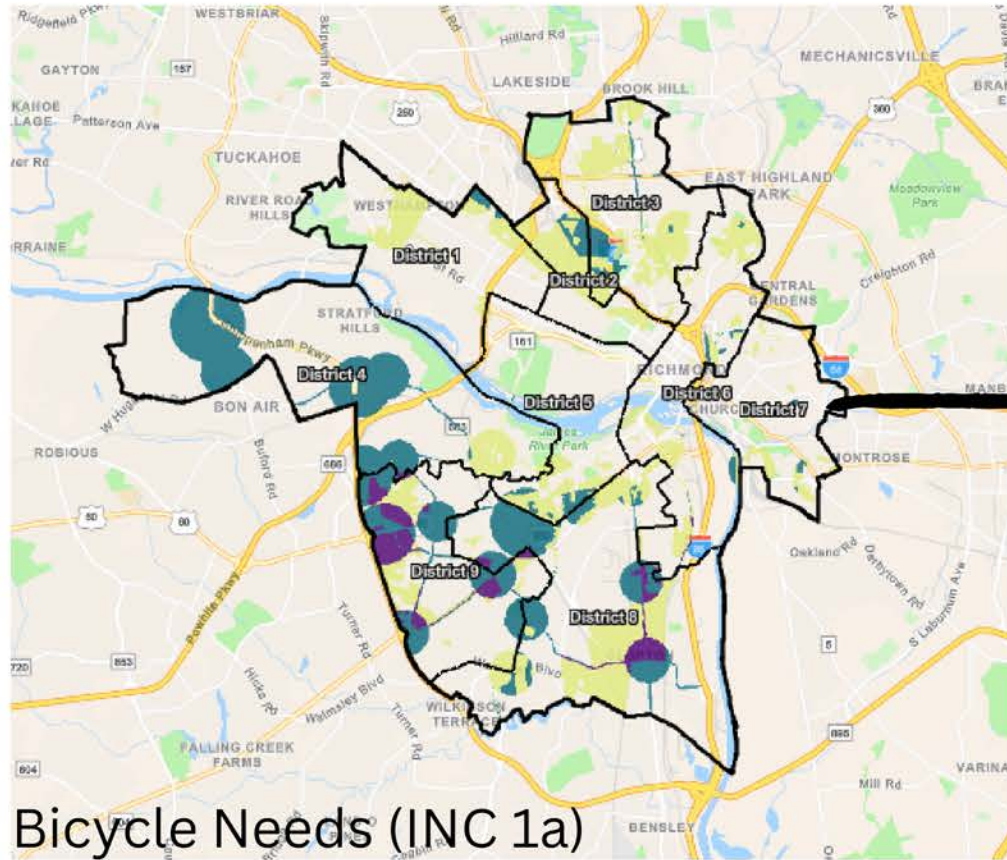
Composite

- "mean" score for links inside growth nodes
- "sum" score for links outside growth nodes

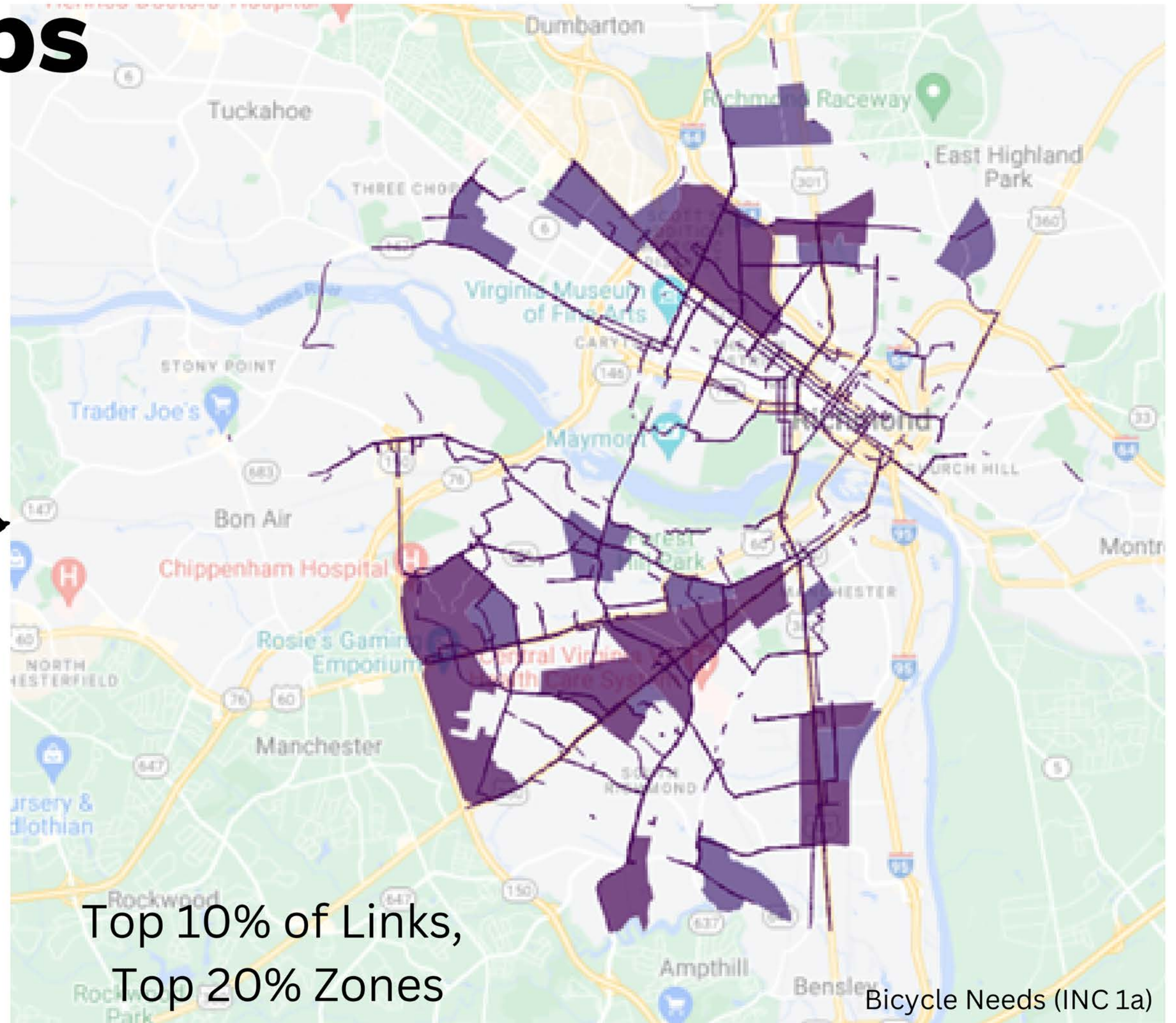
Yellows imply lowest need, purples and dark blues imply highest need



1. Needs Maps Updates



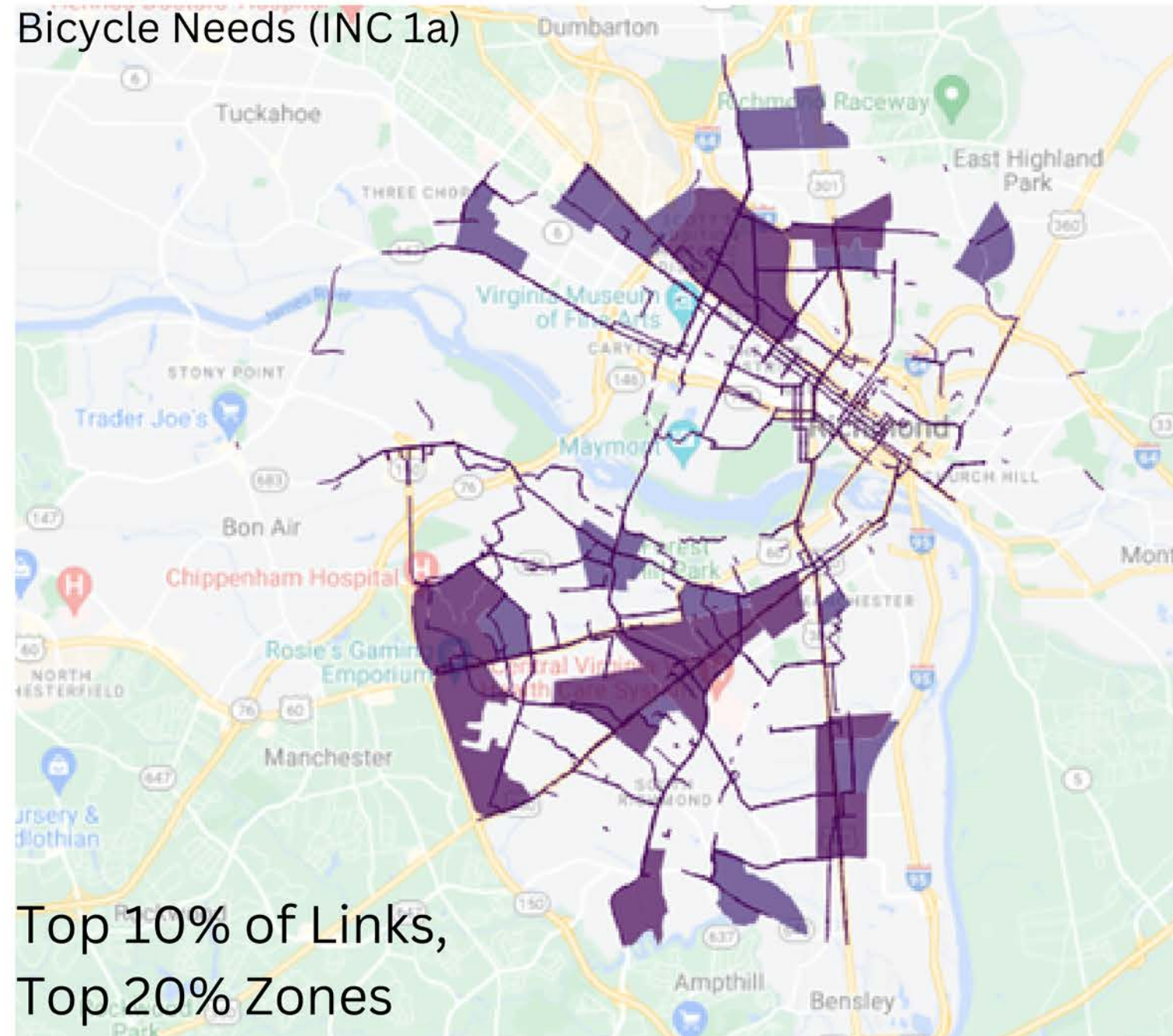
**Bike, Pedestrian,
Freight needs to be
pushed to network**



1. Needs Maps Updates



How did we push the needs to the network?



Top 10% of Links,
Top 20% Zones

Block Group Scoring

- Aggregate needs scores from raster cells to Census block groups
- Replica requires this for travel demand and routing
- Considered 3 methods: **median**, percent qualifying, cutoff

Link Summarization

- Replica routes the trips from the block groups to the networks and assigns the needs score to the links that trips use
- Considered 3 methods: sum, mean, **composite**

Non-Observed Trips

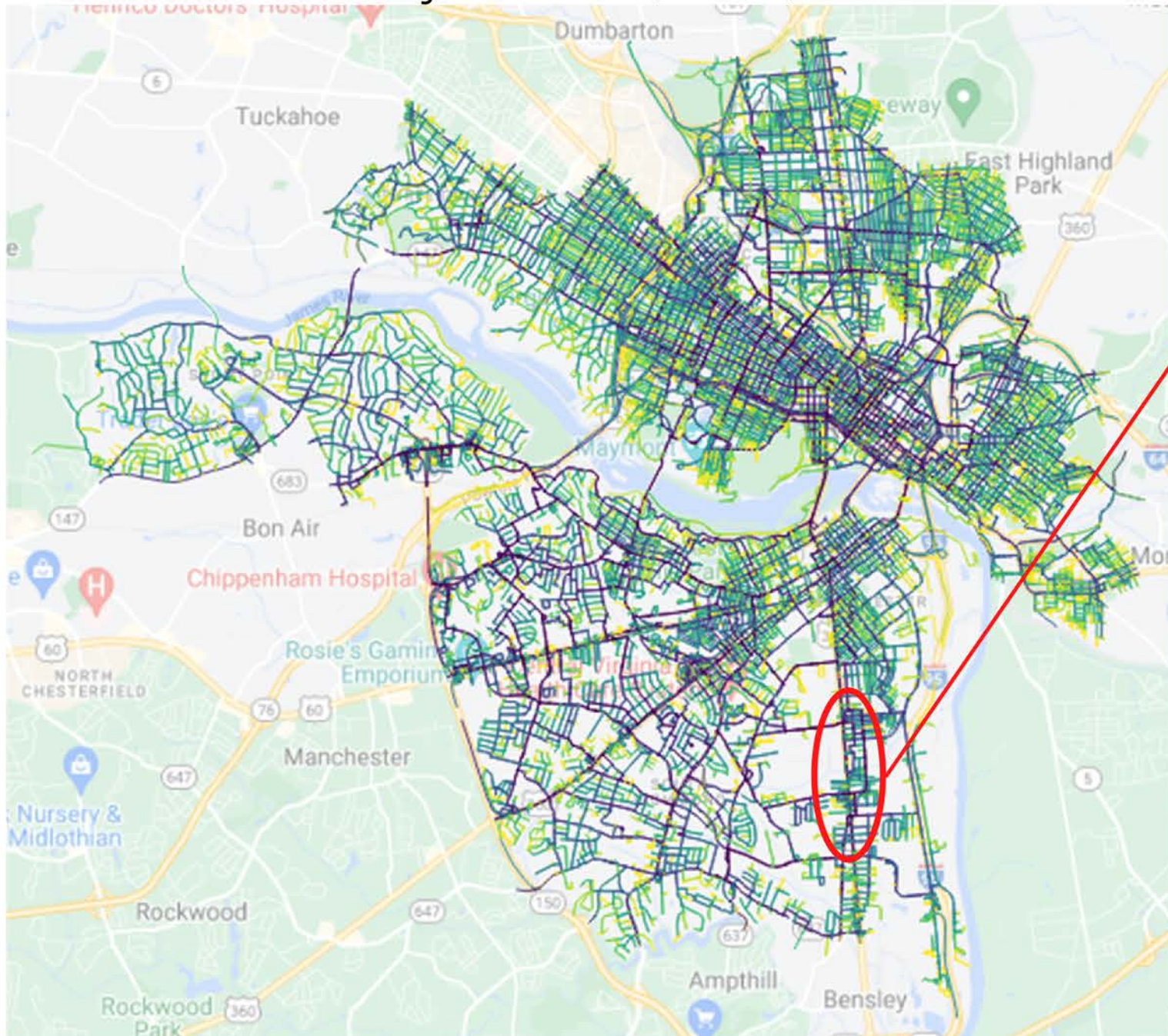
- Candidate Bike Trips: Trips < 4 miles by another mode
- This definition is flexible

WANT to know more? We can send you more info.

1. Needs Maps Updates

The 'so what'? Each high need area and segment will have a narrative about why it is a high need.

Bicycle Needs (INC 1a)



Example

Route 1 in Southside

High bicycle need because:

- Poor bike access
- On high injury network
- Great Street
- in a Node
- High concentration of Communities of Concern

High pedestrian need...

High transit need...

High freight need...

Land use need...

Connectivity need...

Bike, pedestrian, and freight needs will be street segments.

Needs for all other investment need categories will be areas.

1. Needs Maps Updates

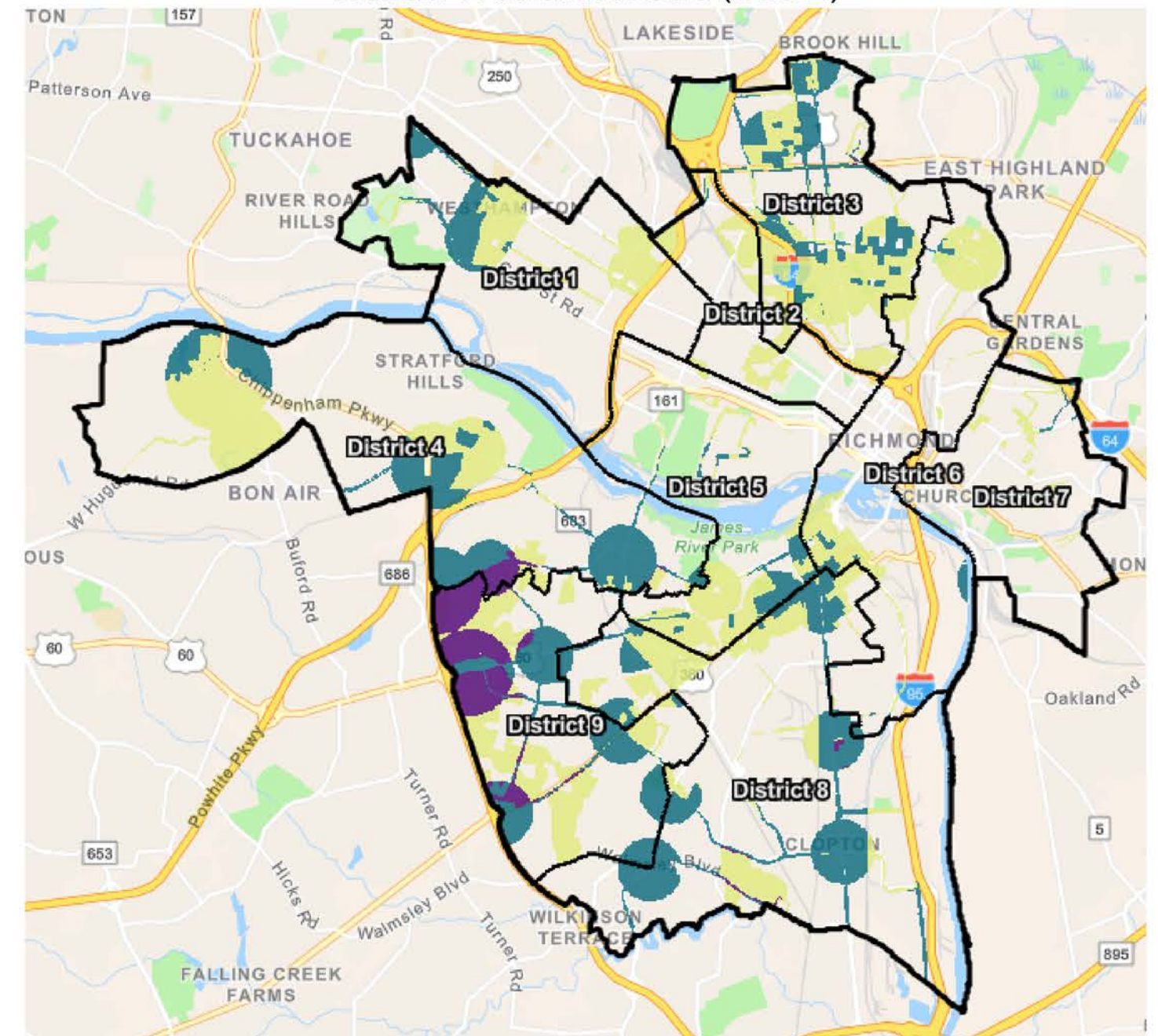


We are considering pushing the area-based needs to the network for **transit**, but it's more complicated and potentially less useful.

- Use of transit network
- Stop infrastructure (i.e. shelters and benches)
- Route reliability

We will report on this soon, thinking juice isn't worth the squeeze.

Tiered Transit Needs (INC 2)



1. Needs Maps Updates



**Reactions to routable needs going to the
network?**

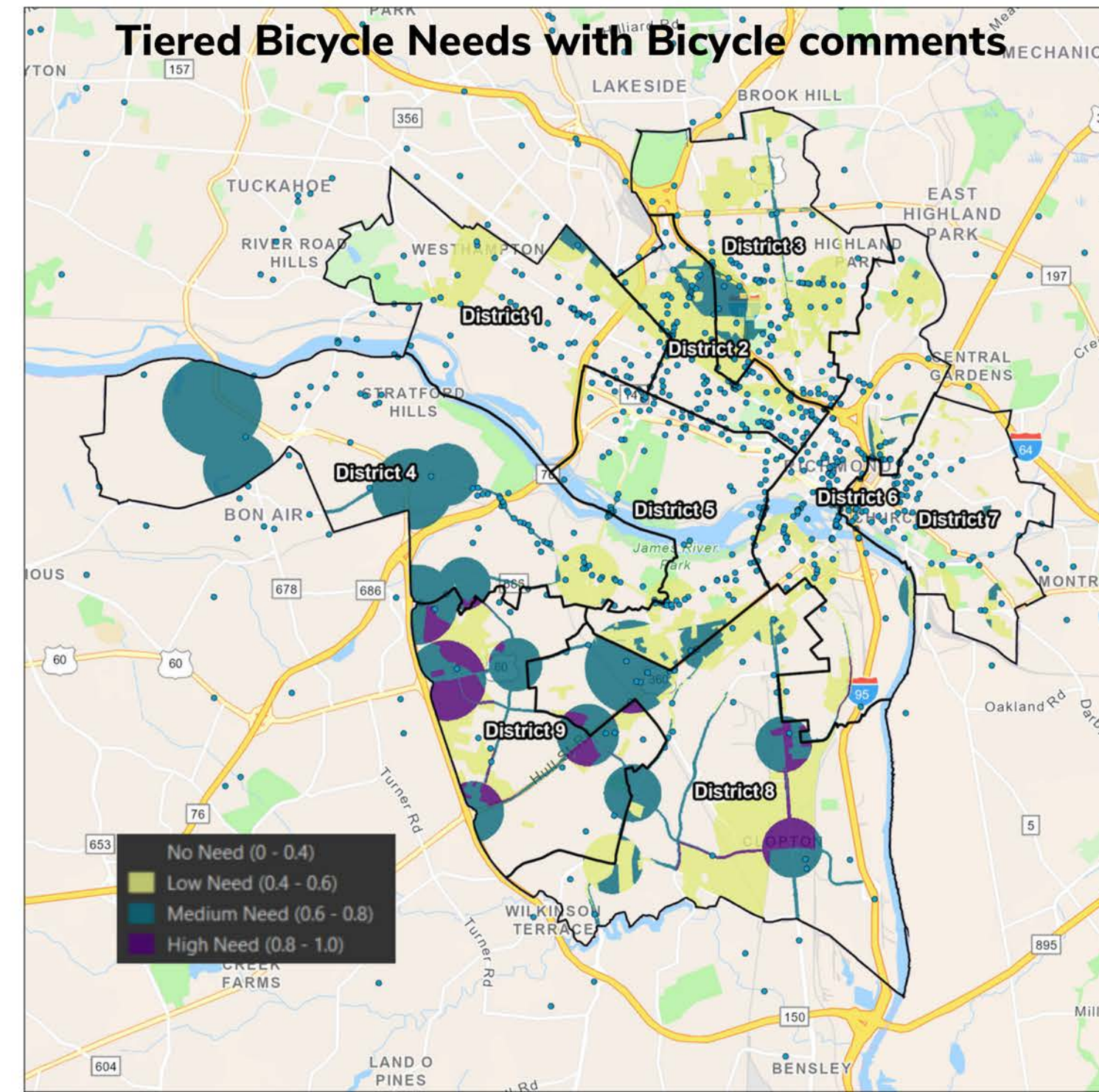
Reactions to the methodology?

2. Methods for Using Public Input to Stratify Needs

Public input can bump up an area to the next Need Level

- The discrepancy between the data-based high-need areas and the high input areas shows that our approach is valid because neither data-driven alone or public-comment alone would have yielded a fair result
- Medium Need areas with high levels of public input can become High Need areas, etc.

How did we determine which areas have high public input?



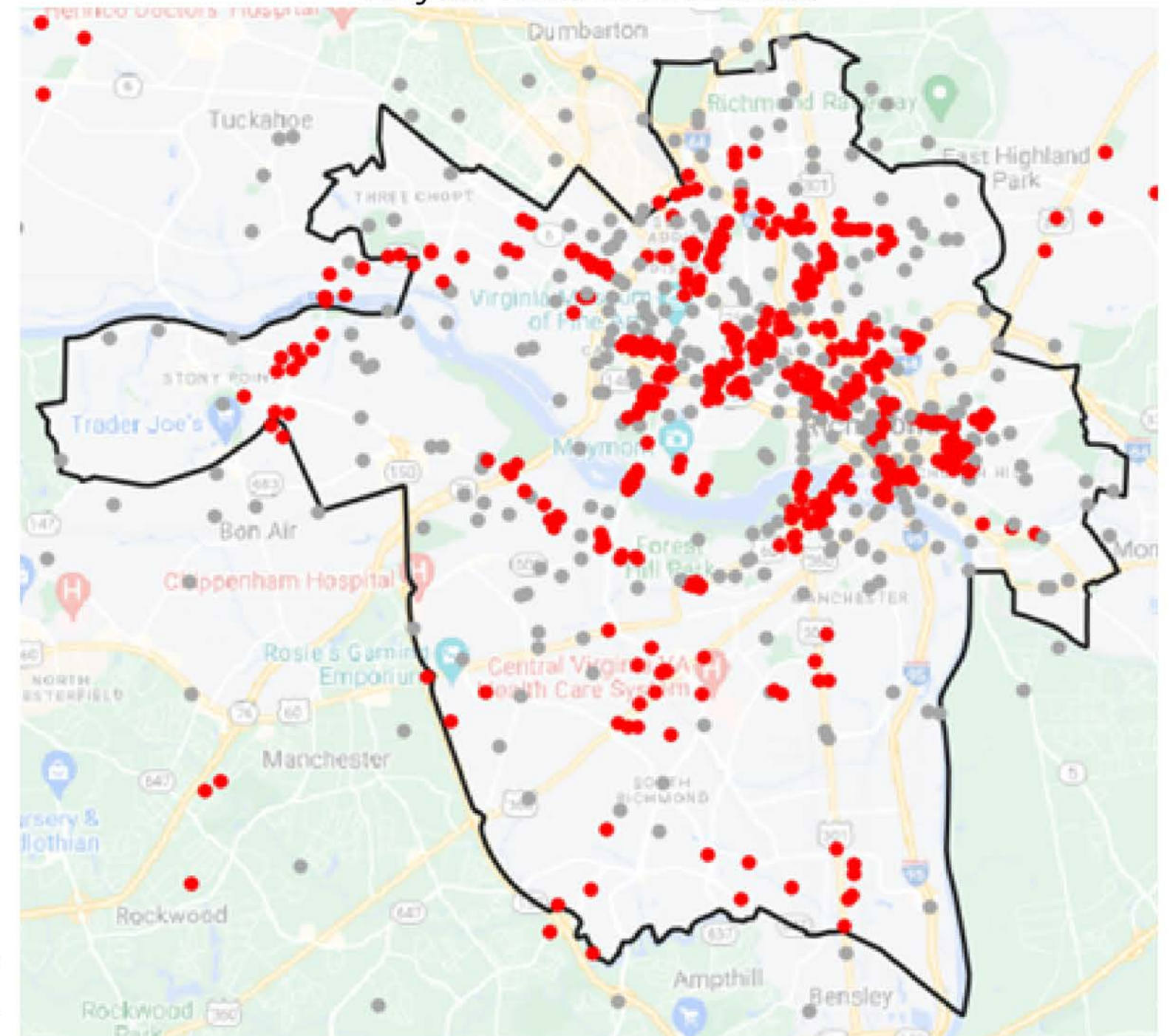
2. Methods for Using Public Input to Stratify Needs

- Tried two different methods of identifying clusters of comments
 - DBSCAN
 - HDBSCAN

HDBSCAN clustering of Bike comments with minimum cluster size = 3

Grey: Bike comment not in a cluster
Red: Bike comment in a cluster

Bicycle-related comments



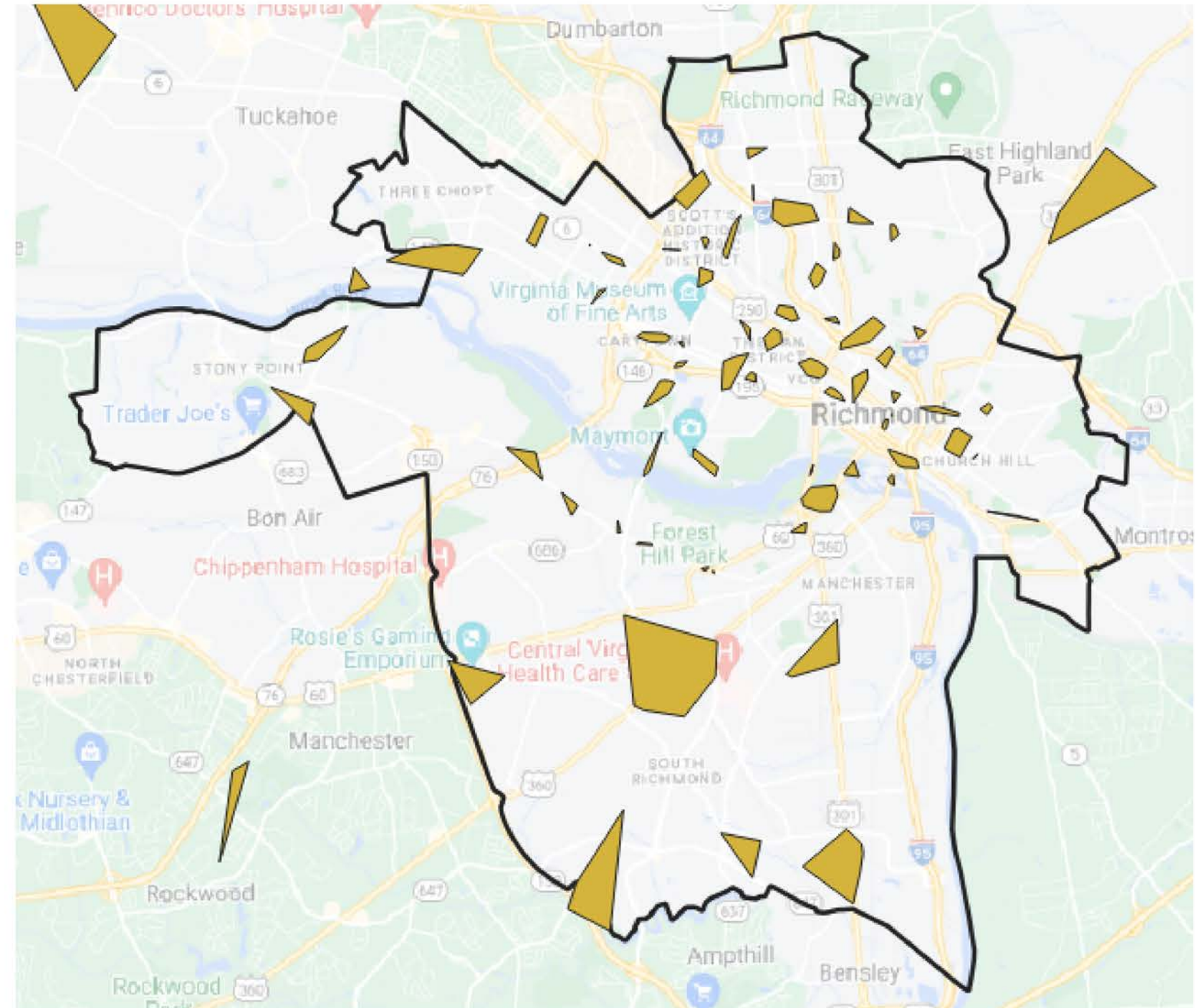
2. Methods for Using Public Input to Stratify Needs

Next Step:

Draw polygons around the clusters.

These become the areas that bump up to the next need level.

HDBSCAN clustering of Bike comments with minimum cluster size = 3

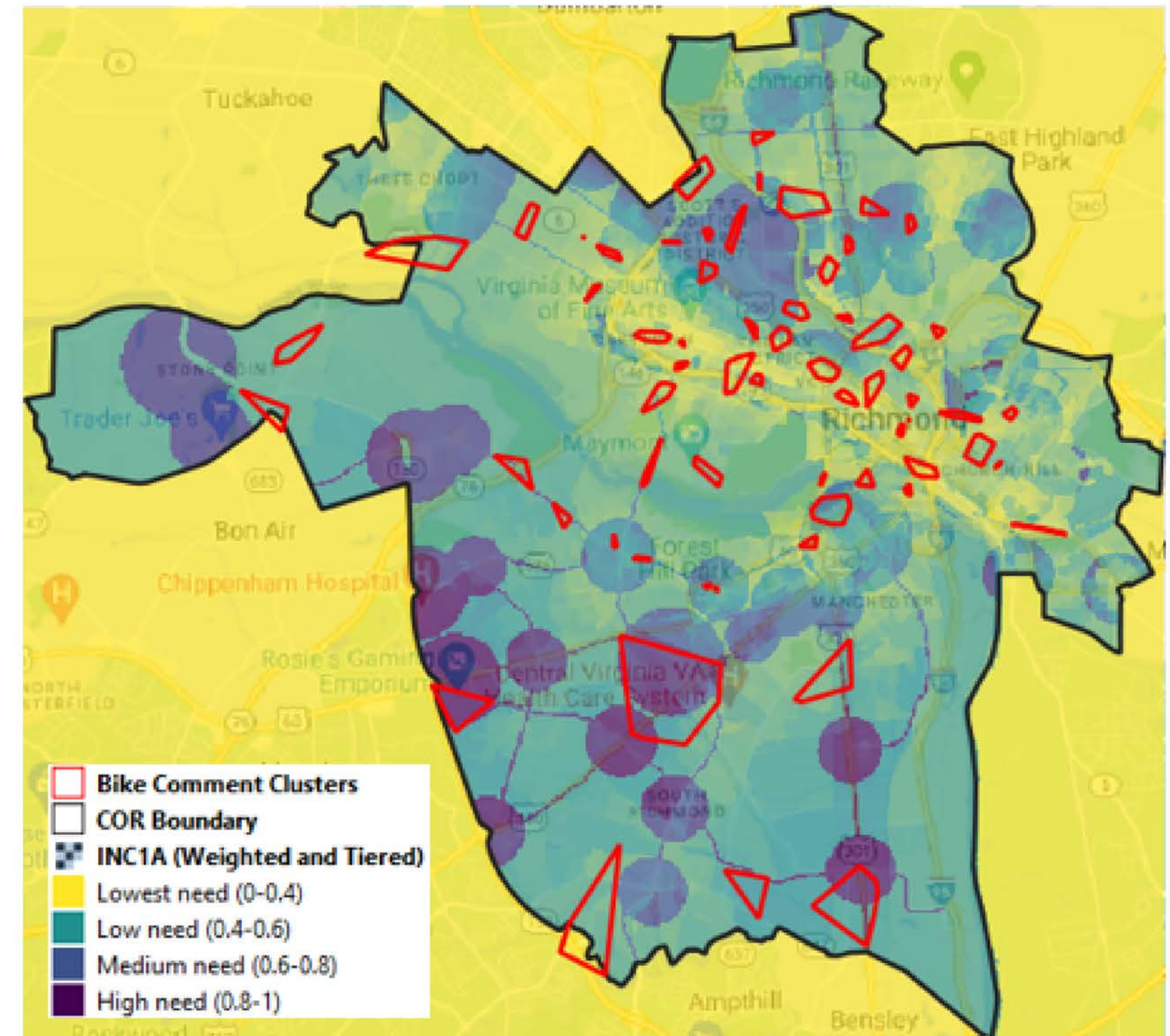


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2. Methods for Using Public Input to Stratify Needs

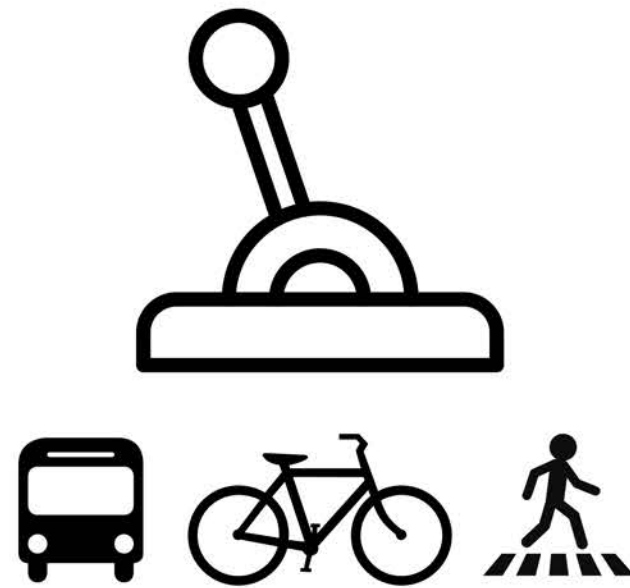
Reactions to this method/algorithm for clustering comments?



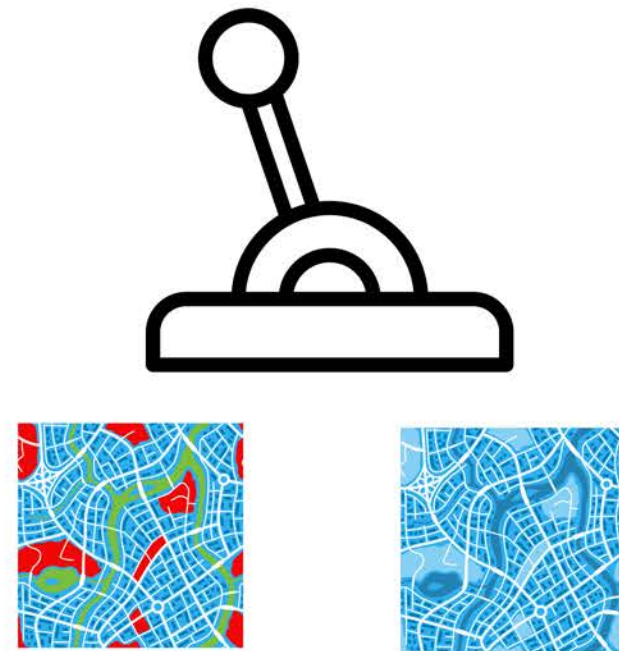
Scenario Planning

3. Scenario Planning Levers

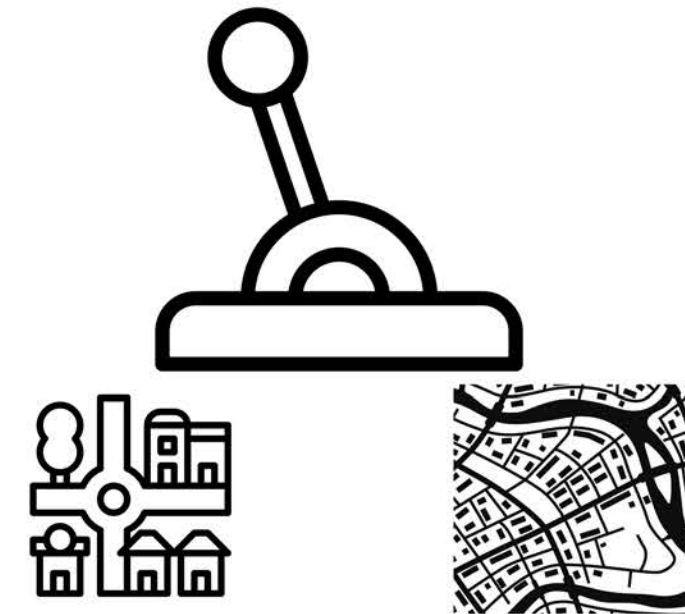
Modal Levers



Spatial Levers



Scale of Investment



**Unprogrammed transportation network improvements are 'independent variable'
i.e. they are what we change in each scenario**

3. Scenario Planning Constants

Programmed network improvements	Constant across all scenarios	Take projects with funding and add to networks in all scenarios.
Future population growth allocated to Census block groups	Constant across all scenarios	Regional travel demand model (refined through AECOM tabletop exercise)
Demographic characteristics (COCs) of populations allocated to Census block groups	Constant across all scenarios	Richmond Connects team - we do our best guess using available trends and local knowledge of gentrification risks and potential displacement "receiving" areas
Destinations (jobs and non-job destinations) allocated	Constant across all scenarios	RC team applies regional travel demand model growth projections at a finer grained level, enhanced through other available info (e.g. approved building permits)

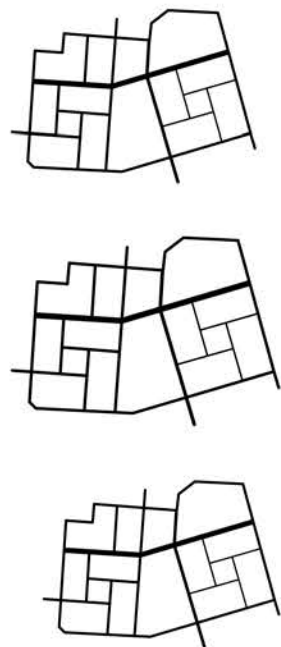
4. Defining Scenarios



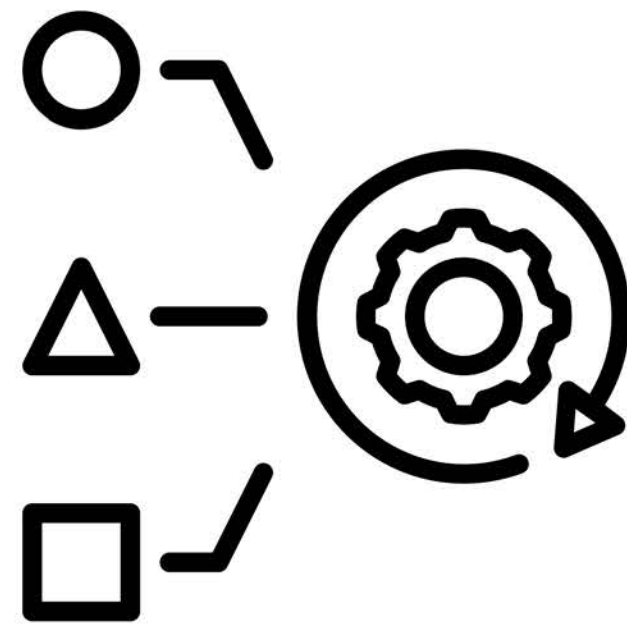
	Modal Emphasis	Spatial Lever	Scale of Investment Lever
Scenario A: Equitable Transit	Majority of investments go to better transit service. Bike/ped improvements are focused on access to high-frequency transit stops.	City-based: improve transit service from COC areas to good-paying jobs	Fewer projects funded. Projects that are funded are high cost, higher capacity transit
Scenario B: Active (Walkable & Bikeable) Nodes	Majority of investments go to bike & ped infrastructure and micro-mobility	Neighborhood-based; focused on Nodes	Lots of small (lower cost) projects.
Scenario C: Emerging Technology	Invest in preparing for electric vehicles, e-bikes, and shared economy	Regional-based: Investments focused on reaching long distance destinations outside the city	A mix of small localized infrastructure investment with large programmatic investments.

5. Scenario Planning Measures

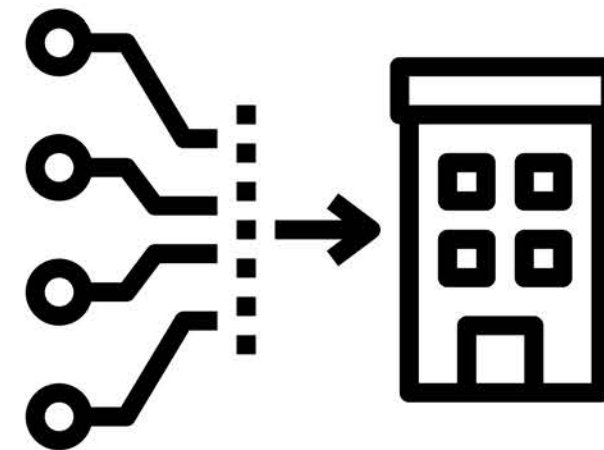
3 Scenario
Networks



Run in
Accessibility
Model

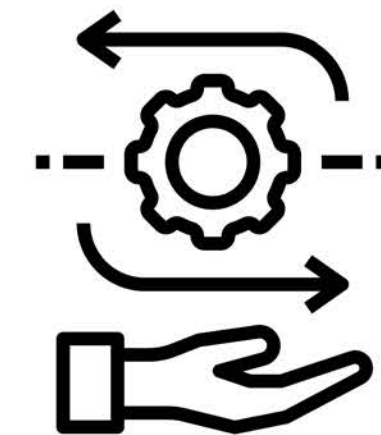


Outputs
Accessibility
Scores



See how different packages of investments improve access for Communities of Concern to jobs, green space, etc.

Post Processing
Qualitative
Measures



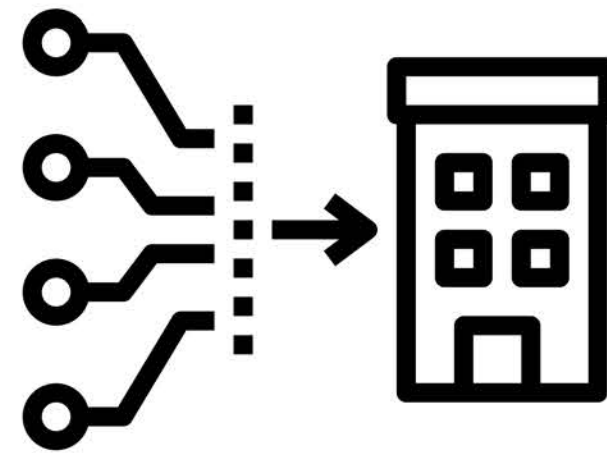
Assess the risks of the different scenarios on climate vulnerability, housing affordability, gentrification, etc.

5. Scenario Planning Measures

Quantitative comparison of changes to access for Communities of Concern current areas and predicted areas vs. non-CoC

Access to: green space, relevant jobs, healthcare, food

Outputs
Accessibility
Scores



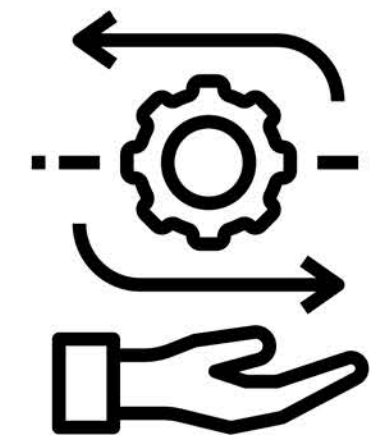
5. Scenario Planning Measures



What are the risks of each scenario on:

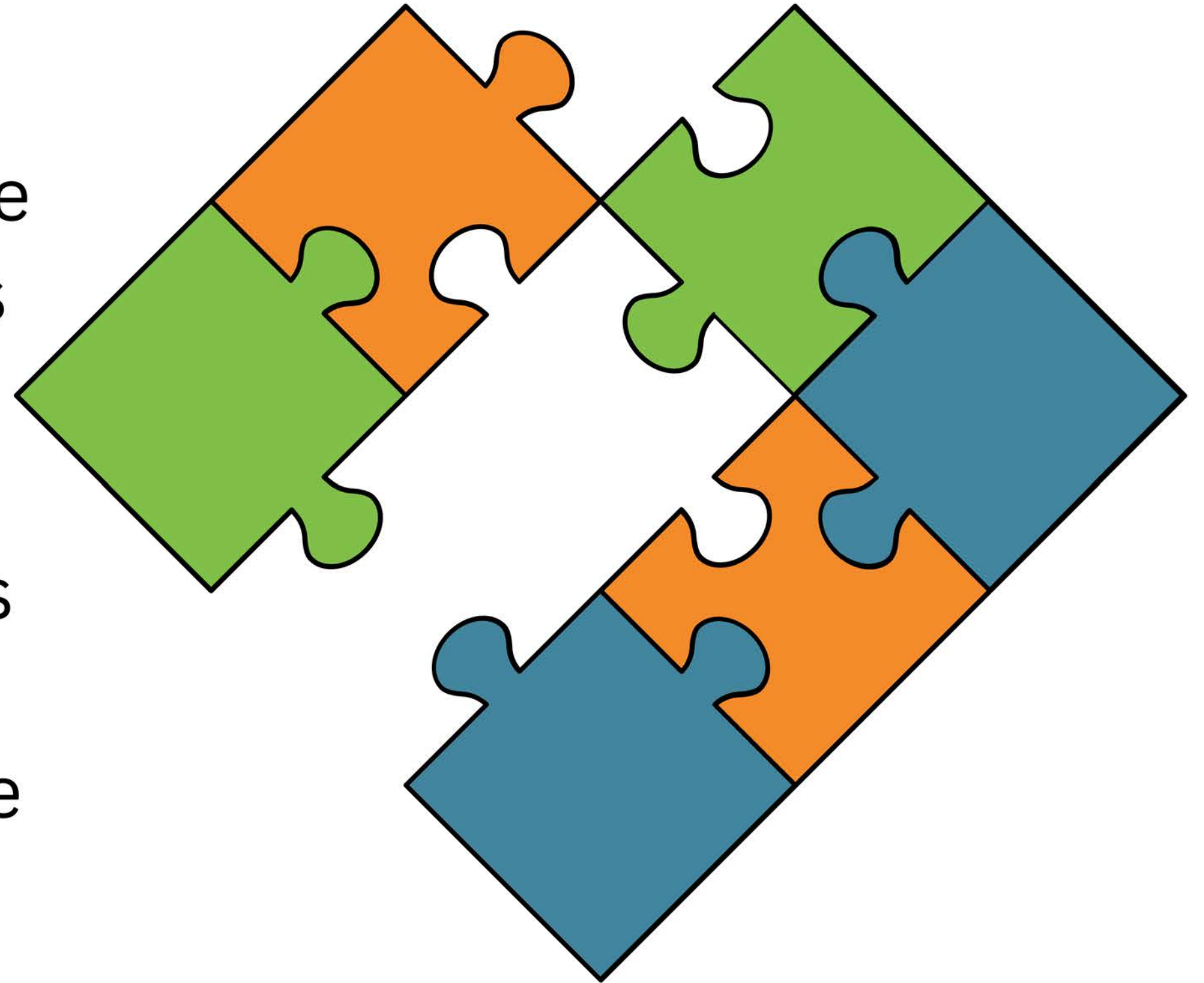
- Climate vulnerability
- Housing affordability
- Gentrification and displacement
- Economic resiliency'
- Transportation Costs/Affordability

Post
Processing
Qualitative
Measures



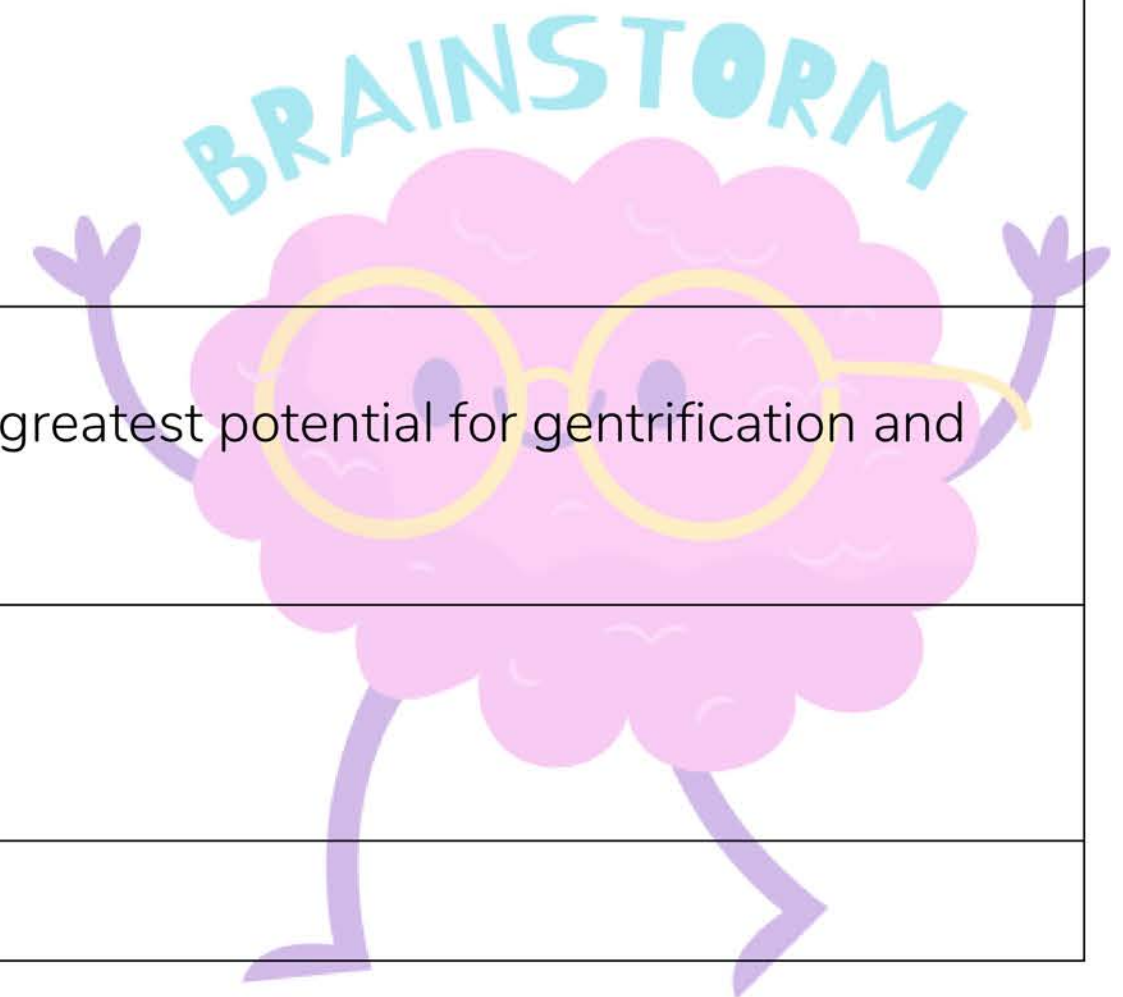
Discussion on Scenarios

- What future forces might be missing from the scenarios that your department is interested in testing?
- What investment scenarios had you imagined?
- Are there any critical future conditions you think this exercise is missing?



5. Scenario Planning Measures

What are the risks on...		Source	Potential Metric(s)
Climate vulnerability areas	Constant across all scenarios	RVAGreen work, enhanced where possible	<ul style="list-style-type: none"> • % of Network improvements in climate vulnerability areas • % of accessibility improvements that occur in climate vulnerability areas • e.g. 80% of investments in Scenario A occur in flood-prone areas
Housing affordability risk areas: Areas that are not affordable to area median (or lowest quantile) income, based on projected changes in property value or rent, compared to income	Constant across all scenarios	H+T index	
Gentrification and displacement risk areas: Overlap of housing affordability risk areas and areas with high improvement in accessibility	Varies for each scenario	Accessibility model outputs of scenarios	<ul style="list-style-type: none"> • Scenario A has the greatest potential for gentrification and displacement.
Economic Resiliency: What if the COC areas are not in the places we think they will?			
Transportation Costs/Affordability			



5. Scenario Planning Measures

Additional Qualitative Assessments:

- What land-use would be needed to actually support this scenario?
- What policies will be needed to ensure folks are not involuntarily displaced?



Next Steps



Advisory Committee on 2/21

- **draft prioritized needs complete!**
- **begin discussing public outreach phase 3**
 - a.introduce scenario planning**
 - b.input on recommendations to meet top needs**