TPB REGION HIGH-CAPACITY TRANSIT (HCT) NETWORK NEEDS

Analysis

Eric Randall
TPB Transportation Engineer

Kyle Hearing
Project Manager & Senior Transportation Planner, Foursquare ITP

TPB Technical Committee
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National Capital Region
Transportation Planning Board

Agenda Item 7

Agenda

- Project Goals
- Methodology
  - Accessibility Analysis
  - Station Classification
  - Prioritization
- Case Studies
- Planning Dashboard
- Toolkit

Web Application:

bit.ly/46KqTOV

PROJECT GOALS

Understanding HCT Service

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Transportation Planning Board

Understanding HCT

- Contextualize HCT with analyses of:
  - Accessibility
  - Connectivity
  - Transit service
  - Population/employment density
  - Projected growth
- Identify and prioritize station-level needs

METHODOLOGY

Access | Connectivity | Classification

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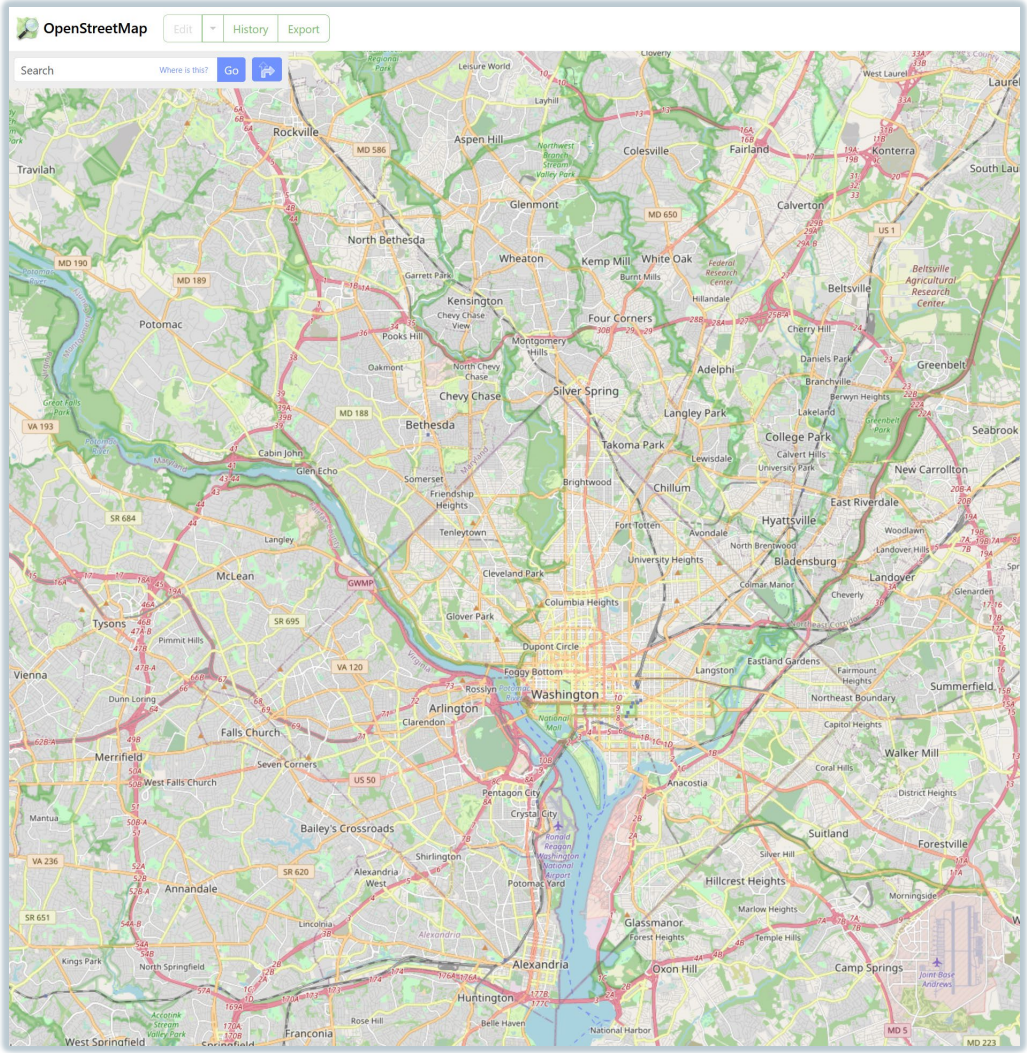
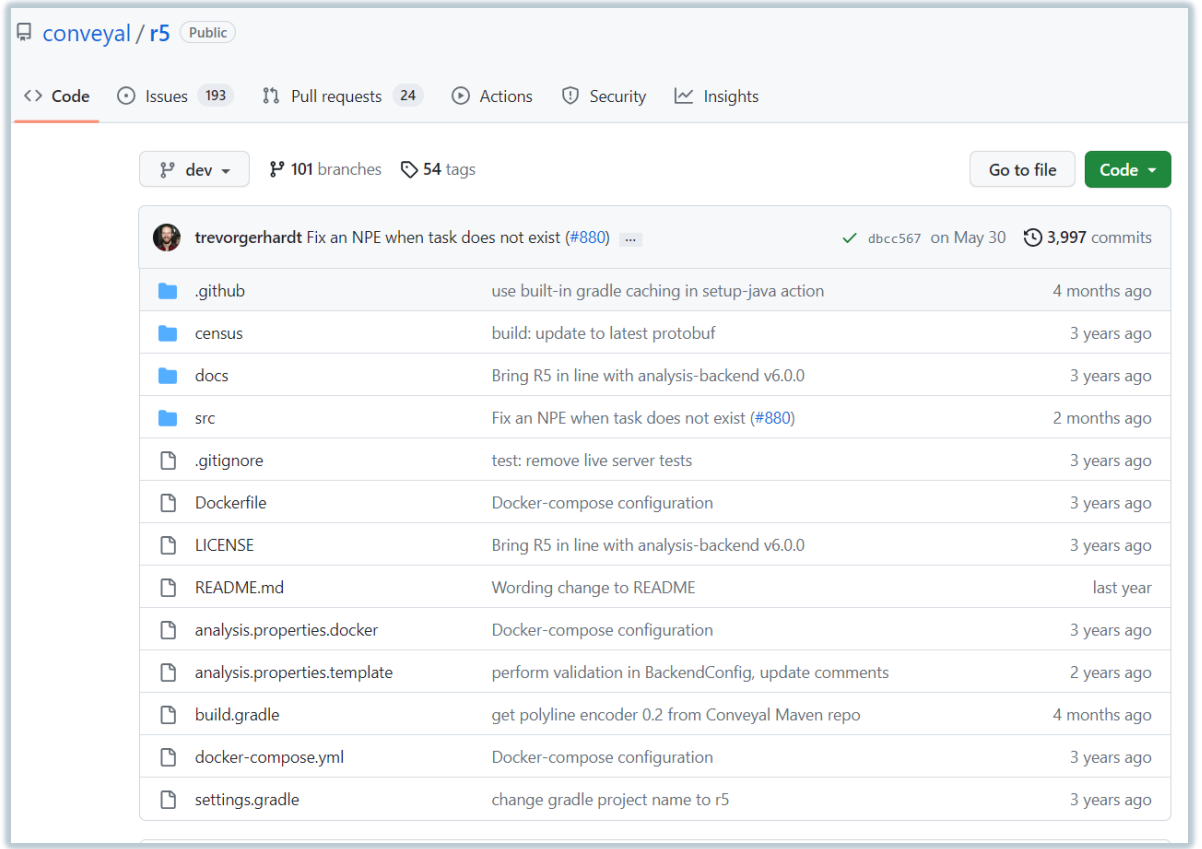
Framework

- Creating a multimodal network
  - OpenStreetMap
    - Allows for replicable, regional comparisons
  - GTFS data
    - Transit service



Framework

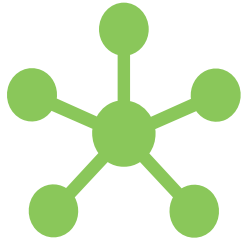
- Modeling travel
  - Conveyal R5 Routing Engine
    - Models trips every minute over the course of an hour, returning the median travel time between origin-destination pairs
  - Evaluated 30 minutes of travel time across three modes:
    - Walking
    - Bicycling
    - Transit (includes walking)



Overview

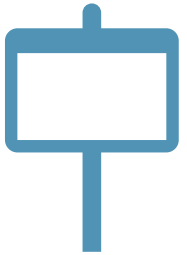
Accessibility Analysis

- Visualizes average travel time to the nearest HCT station
- Highlights gaps in infrastructure and transit



Connectivity Analysis

- Explores connections between HCT stations and residents, jobs, and points of interest
  - Evaluates walking, bicycling, and transit trips
- Provides framework for mode-specific recommendations

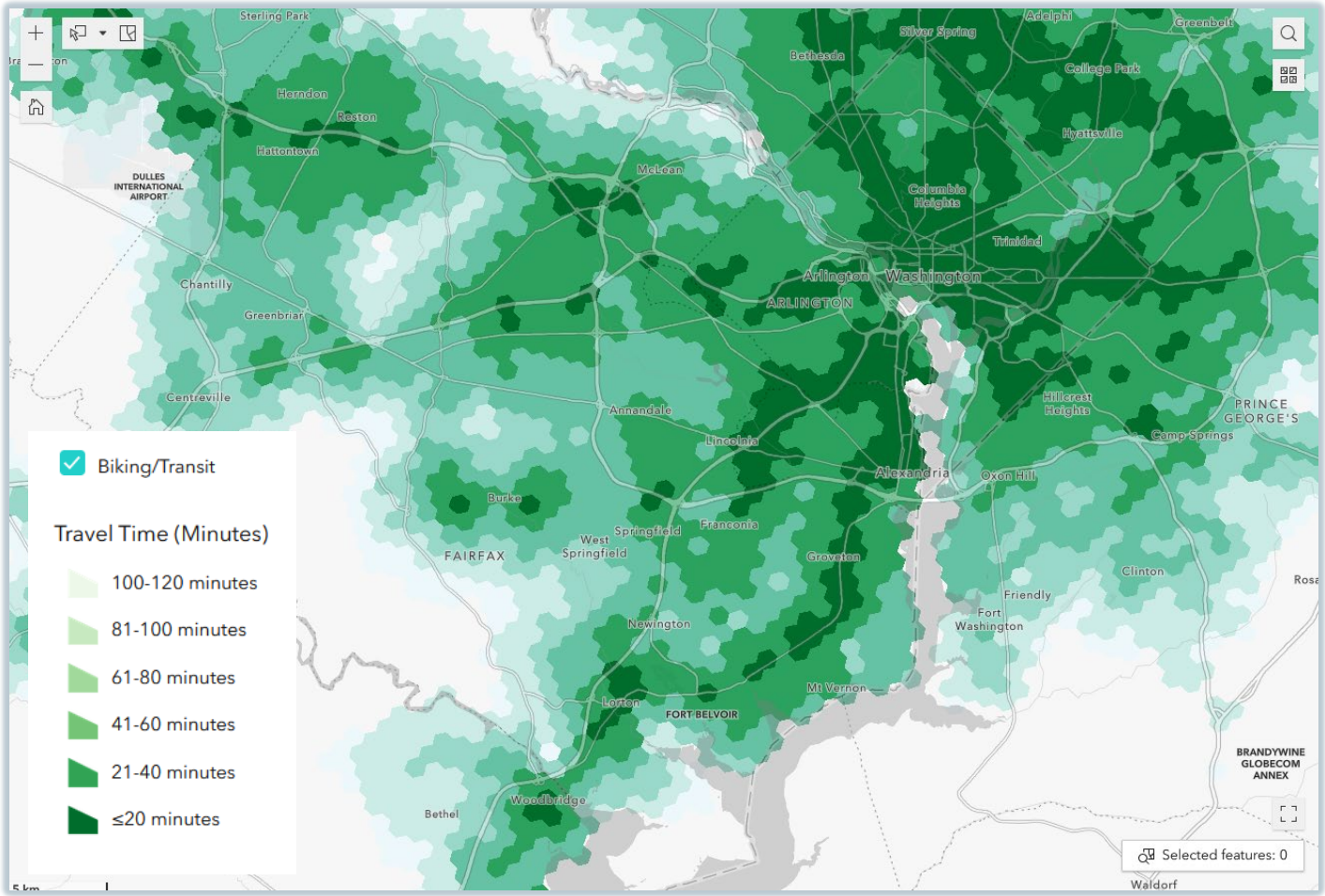


Station Classification

- Defines level of service and people and destinations served by each HCT station
- Contextualizes gaps identified in connectivity analysis (i.e., specifies magnitude of modal gap)

Accessibility Analysis

- Regional network modeling of the median travel time to the closest HCT station
  - Walking, transit
  - Biking, transit



Connectivity Analysis

- Measure connectivity of HCT stations to:
  - Residents
  - Jobs
  - Points of interest

Relative Connectivity:

Percentage of Points of Interest, Residents, and Jobs Near HCT Stations Accessible on the Existing Street and Transit Network

=

Practical Connectivity:

Estimated Points of Interest, Population, and Jobs Accessible via the Existing Street and Transit Network from each HCT Station

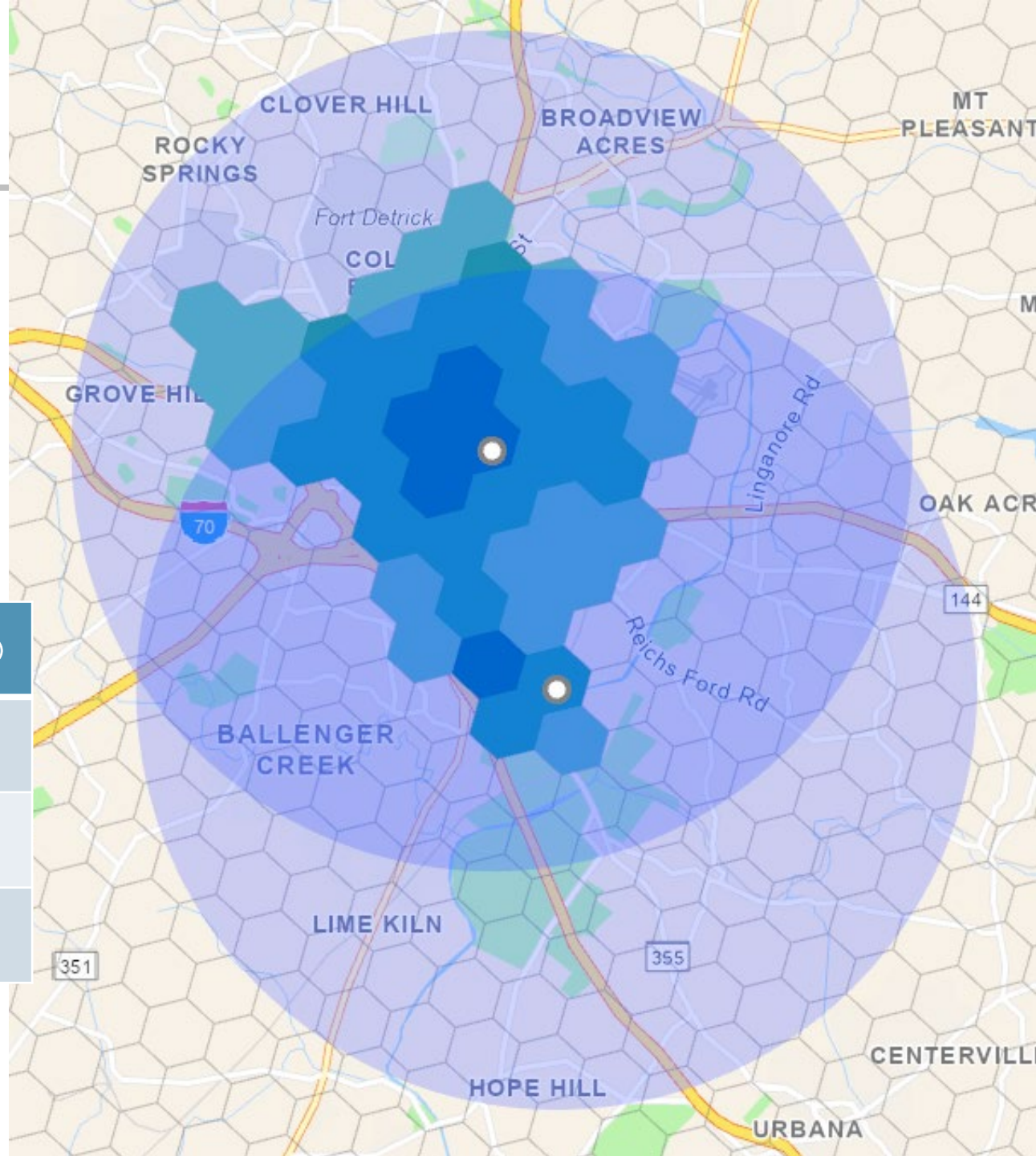
Theoretical Connectivity:

Points of Interest, Population, and Jobs Near HCT Stations

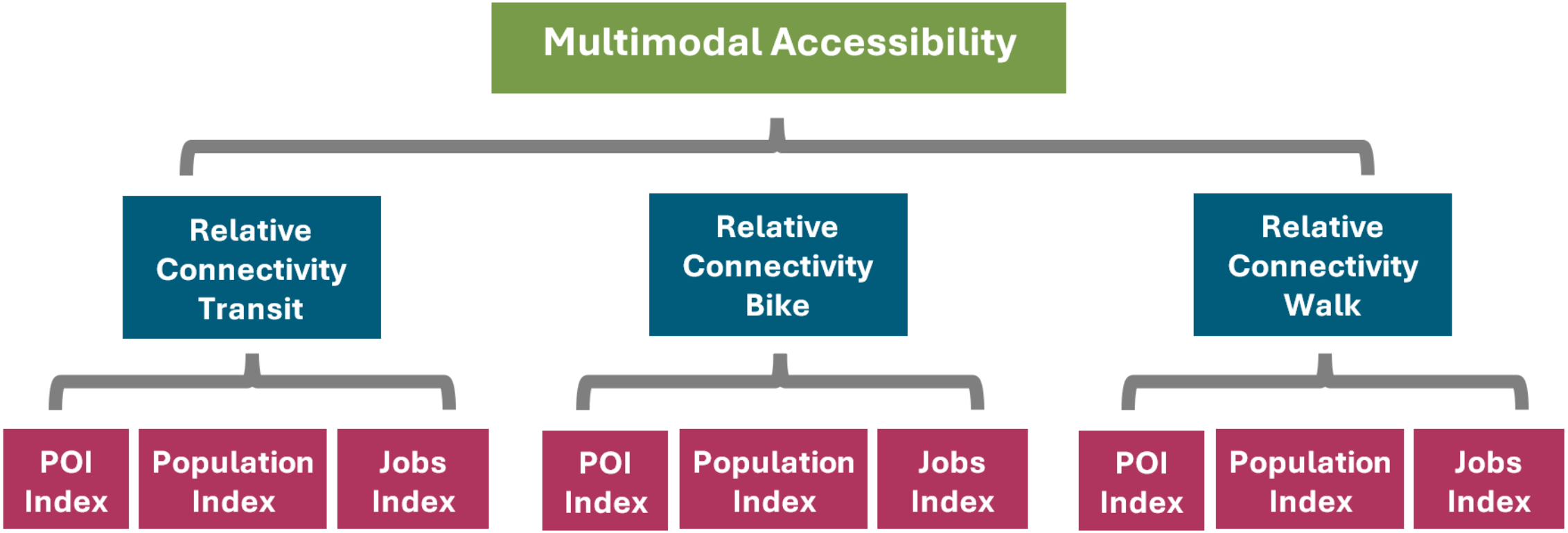
Connectivity Analysis

- Leverage travel time limitations in the R5 model to compare accessibility (green hexes) with geometric buffers

Mode	Speed (mph)	Buffer (mi)
Walking	2.2	1.1
Bicycling	7.5	3.7
Transit	10	5.0



Connectivity Analysis



Station Classification

Level of Service

- Number of trips serving each HCT station

Transit Potential

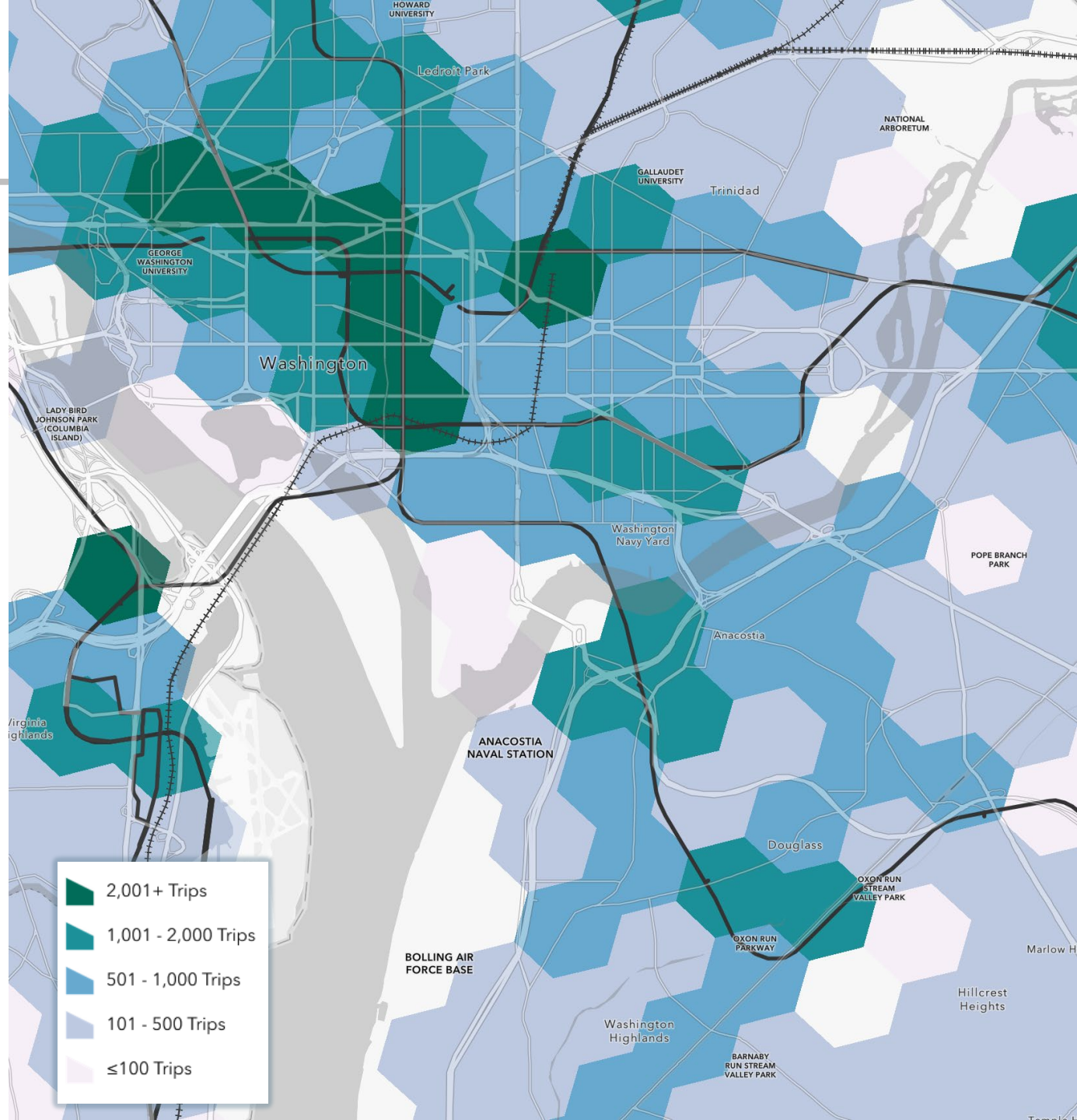
- Population and employment density, calculated using figures interpolated to hexes to match accessibility/connectivity analysis
  - Existing (ACS 2021 5-Year Estimates)
  - Forecast Cooperative Forecast 10.0

Gap Analysis

- Magnitude of gap in HCT station accessibility
  - Evaluated at the modal level and indexed across modes

Station Classification

- Level of service
  - Retrieved GTFS for each agency in COG region
  - Dissolved stops by route to sum trips with ¼ mile of each HCT station
  - Produced layer of trips by hex



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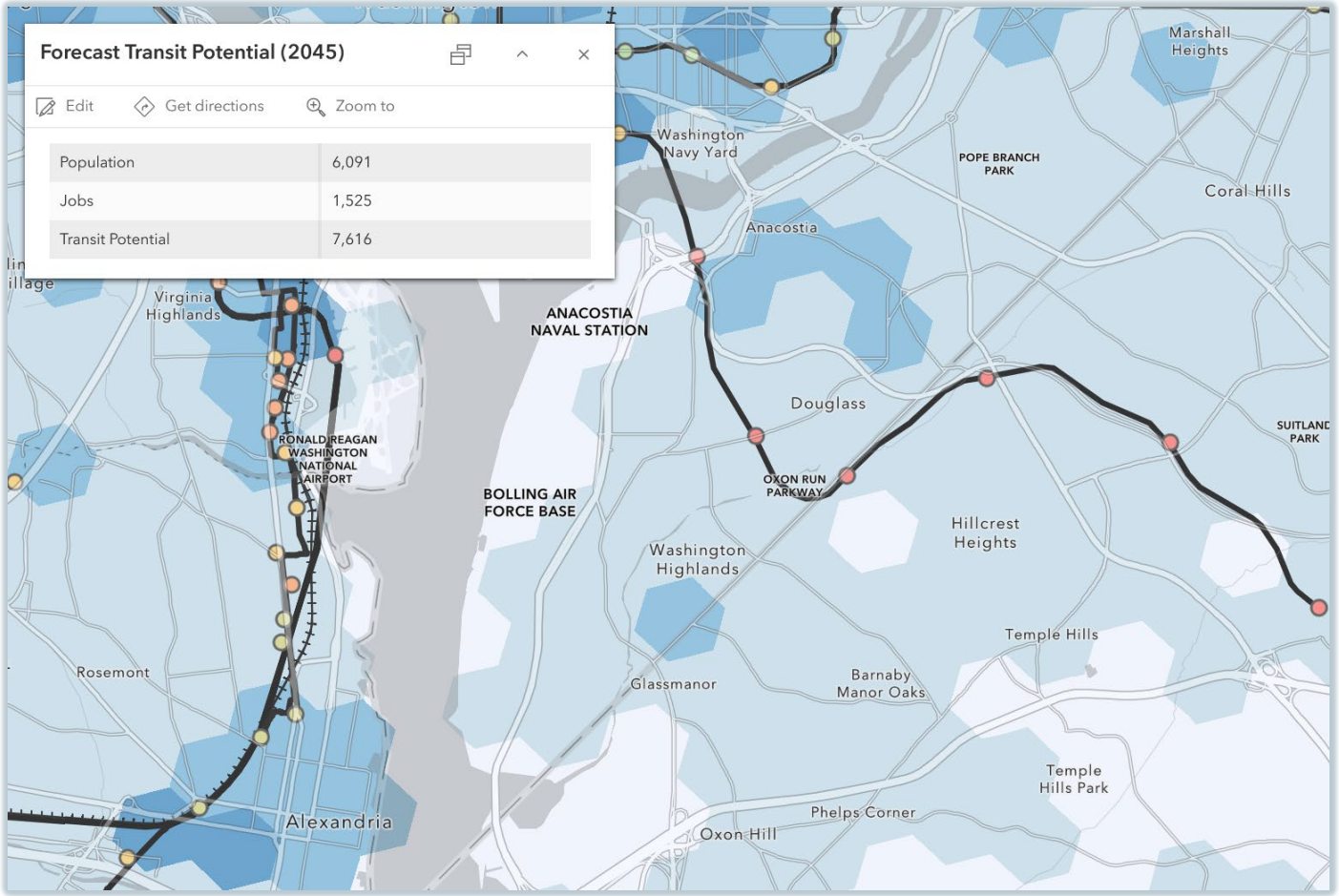
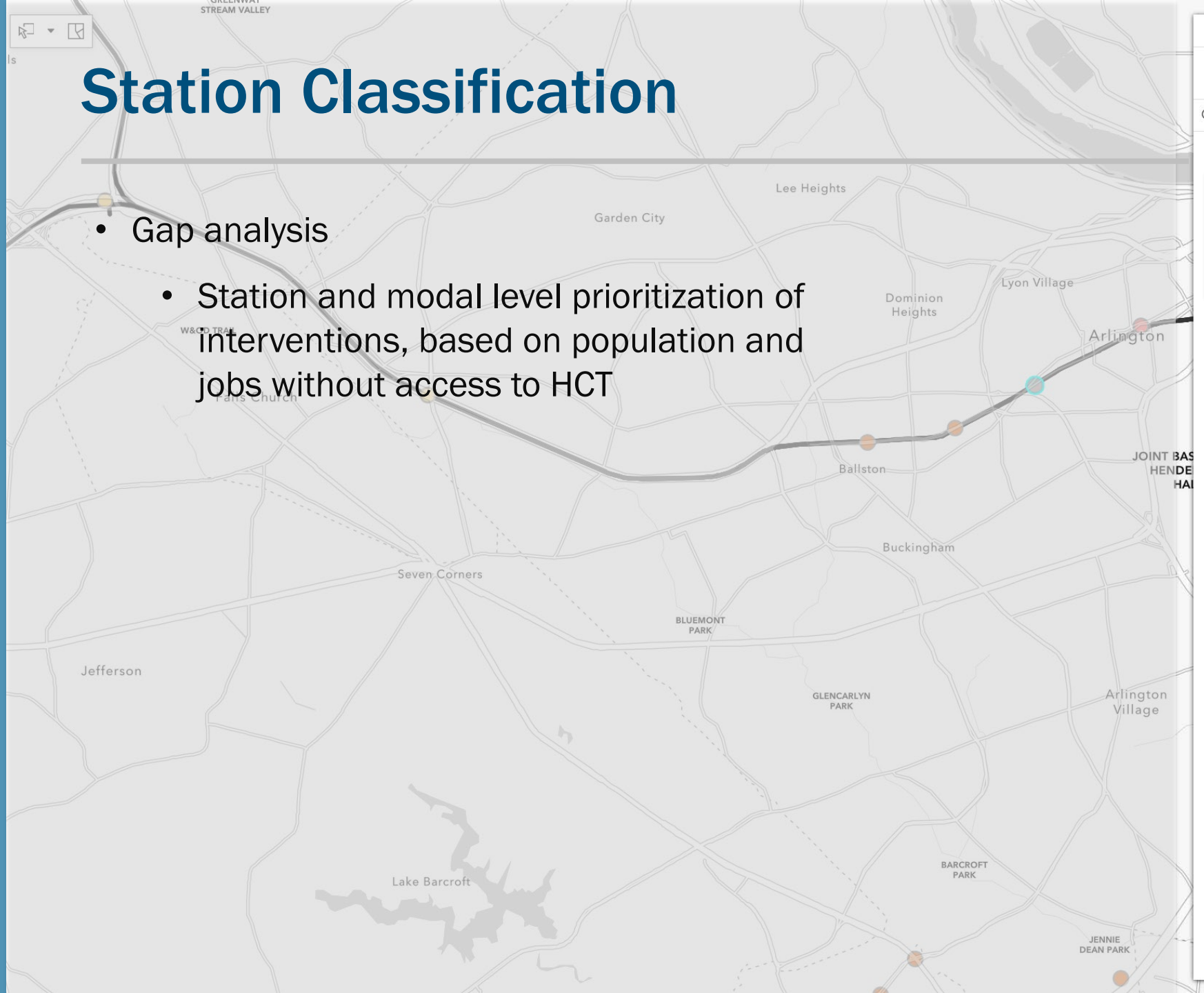
Station Classification

- Transit potential
  - Interpolated population and jobs to hexes
    - ACS 2021 5-Year Estimates
    - Cooperative Forecast 10.0 (2045)
  - Describes existing/future demand for transit infrastructure
  - Quantifies expected growth



Station Classification

- Gap analysis
  - Station and modal level prioritization of interventions, based on population and jobs without access to HCT



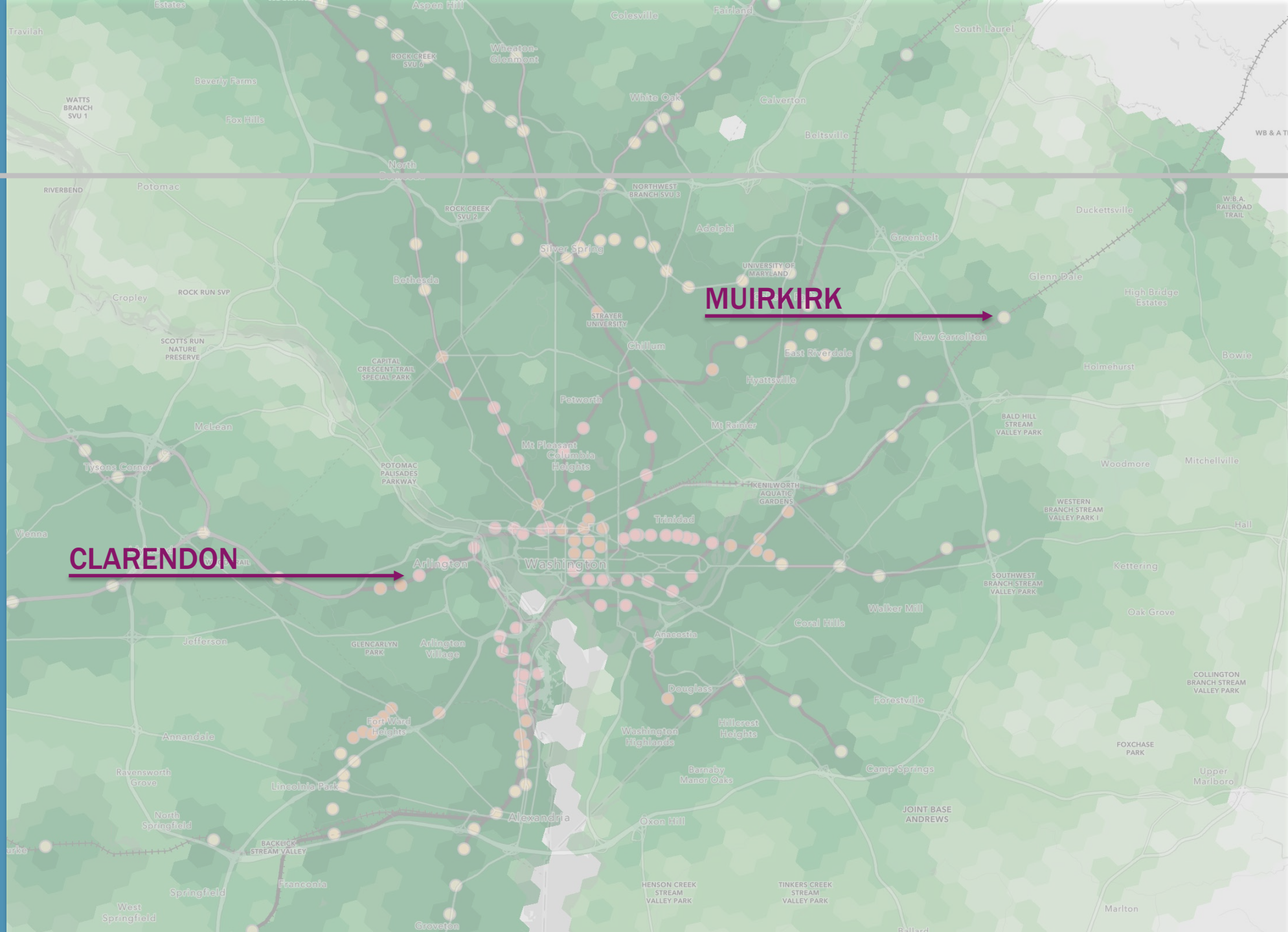
1 of 3

Clarendon

Zoom to

Multimodal Accessibility	Moderate - High
Multimodal Improvement Priority	High
Transit Improvement Priority	High
Walking Improvement Priority	Low
Bicycling Improvement Priority	High
Forecast Growth	Low
Weekday Service Level	High
Total Weekday Trips	898
Total Saturday Trips	706
Total Sunday Trips	773
Transit Accessibility	Moderate
Transit- Population with Access (Percentage)	14.9
Transit - Jobs Accessible (Percentage)	13.2
Transit - POIs Accessible (Percentage)	13.8
Walking Accessibility	High
Walking - Population with Access (Percentage)	84.4
Walking - Jobs Accessible (Percentage)	95.5
Walking - POIs Accessible (Percentage)	90.3
Bicycling Accessibility	Moderate
Bicycling- Population with Access (Percentage)	41.3
Bicycling- Jobs Accessible (Percentage)	26.5
Bicycling- POIs Accessible (Percentage)	34.8

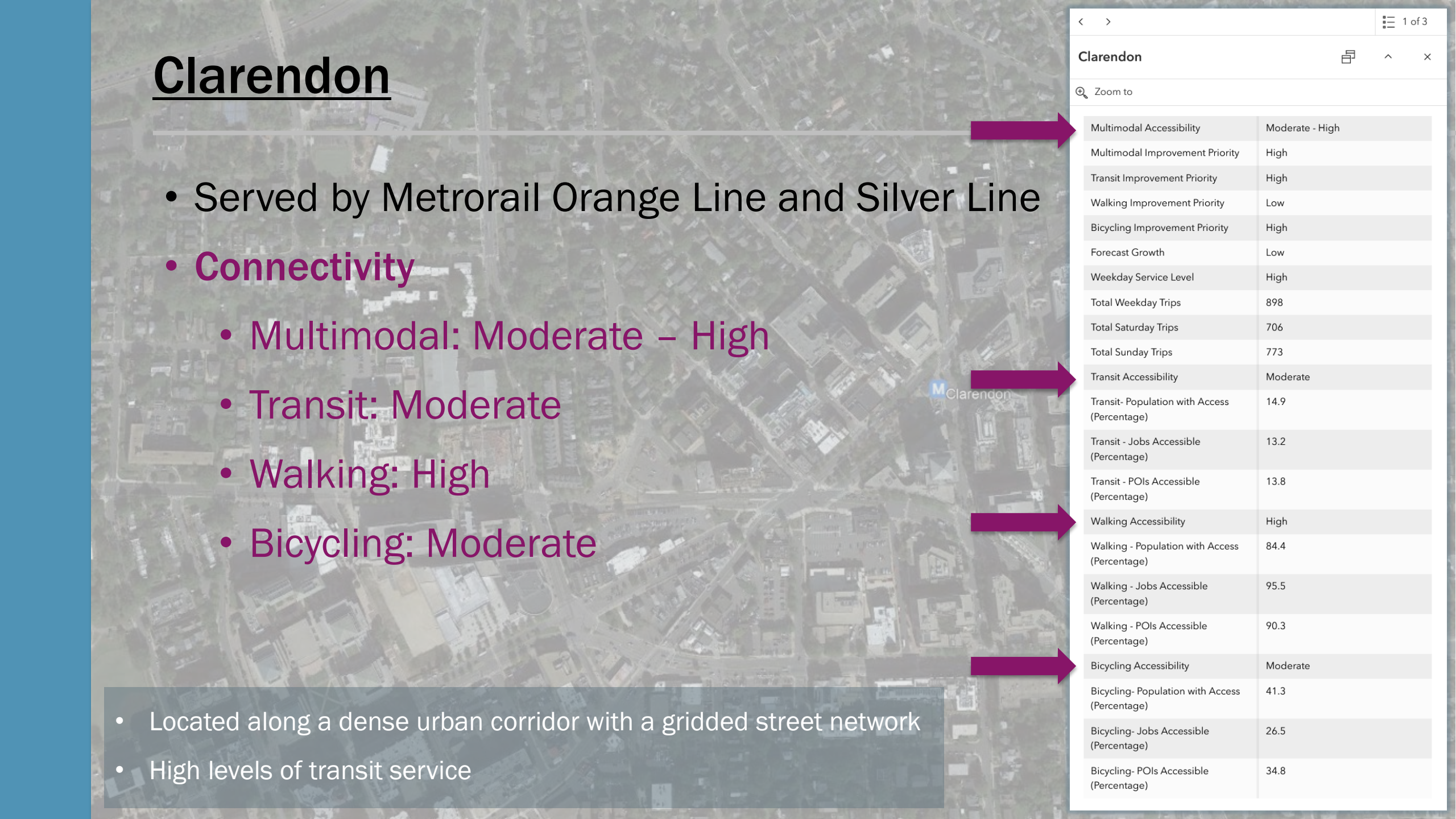
CASE STUDIES



Clarendon

- Served by Metrorail Orange Line and Silver Line
- **Connectivity**
  - Multimodal: Moderate – High
  - Transit: Moderate
  - Walking: High
  - Bicycling: Moderate

- Located along a dense urban corridor with a gridded street network
- High levels of transit service



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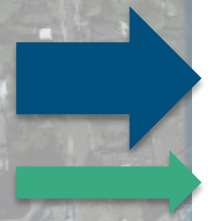
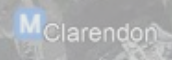
Clarendon

- **Improvement priority**
  - Multimodal: High
  - Transit: High
  - Walking: Low
  - Bicycling: High
- **Forecast growth**
  - Low

- Transit potential results in high need (improvement priority), despite strong connectivity
- Existing development precludes substantial growth





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Muirkirk

- Served by MARC Camden Line
- **Connectivity**
  - Multimodal: Low
  - Transit: Low
  - Walking: Low
  - Bicycling: Low

- Surrounded by low-to-moderate density development
- Lacks complementary local transit service
- Development patterns introduce accessibility challenges

1 of 2

Muirkirk

Zoom to

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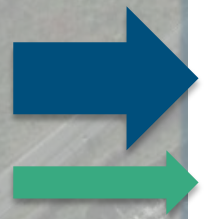
Multimodal Improvement Priority	Low
Transit Improvement Priority	Low
Walking Improvement Priority	Low
Bicycling Improvement Priority	Low
Forecast Growth	High
Weekday Service Level	Low
Total Weekday Trips	18
Total Saturday Trips	0
Total Sunday Trips	0
Transit Accessibility	Low
Transit- Population with Access (Percentage)	1.5
Transit - Jobs Accessible (Percentage)	3.5
Transit - POIs Accessible (Percentage)	0.8
Walking Accessibility	Low
Walking - Population with Access (Percentage)	57.5
Walking - Jobs Accessible (Percentage)	44.0
Walking - POIs Accessible (Percentage)	60.0
Bicycling Accessibility	Low
Bicycling- Population with Access (Percentage)	2.9
Bicycling- Jobs Accessible (Percentage)	8.8
Bicycling- POIs Accessible (Percentage)	3.2

Muirkirk

- **Improvement priority**
  - Multimodal: Low
  - Transit: Low
  - Walking: Low
  - Bicycling: Low
- **Forecast growth**
  - High

- Transit potential results in low need (improvement priority), despite weak connectivity
- Dense development forecast over the next 20+ years



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PLANNING DASHBOARD

Demonstration

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NEEDS-BASED IMPROVEMENTS

Planning Toolkit

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Toolkit

MODE	IMPROVEMENT	DESCRIPTION	APPROPRIATE CONTEXTS
Walk	Pedestrian infrastructure	Infrastructure improvements enhancing the safety and comfort of pedestrian access to transit.	Low walking accessibility
	Pedestrian-scale lighting	Street lighting that illuminates the sidewalk and is positioned lower and spaced closer together than roadway lighting, located in areas with high pedestrian activity to improve safety and visibility.	Moderate – high transit potential
	Digital and physical wayfinding	A guidance system that directs pedestrians to nearby mobility services, amenities, and key points of interest.	Moderate – high transit potential; moderate – high level of service
	Street furniture	Objects placed or fixed in the public right-of-way that activate sidewalks and establish a sense of place (e.g., benches, planters).	Moderate – high transit potential

Toolkit

MODE	IMPROVEMENT	DESCRIPTION	APPROPRIATE CONTEXTS
Bike	Bicycle infrastructure	Roadway improvements that facilitate low-stress bicycling connections to transit.	Low bicycling accessibility
	Micromobility stations and drop zones	Designated areas for users to pick-up and drop-off shared bikes or scooters.	Moderate – high transit potential; moderate – high level of service
	Long-term bike parking	Bicycle infrastructure that provides a convenient and secure place to park and repair bikes. Consists of bike lockers, bike cages, or indoor bike parking that provides covered long-term parking.	High transit potential, high level of service
	Bike racks	Adequate bike racks available for short-term parking.	All contexts

Toolkit

MODE	IMPROVEMENT	DESCRIPTION	APPROPRIATE CONTEXTS
Transit	Local transit service	New and/or more frequent local transit service connecting people, jobs, and POIs with HCT.	Low transit accessibility
	Transit shelters and seating areas	Covered structures at transit stops that provide a safe and comfortable place to wait for transit.	All contexts
	Digital screens for booking and trip planning	Touch screen kiosks that digitally display nearby mobility options and allow users to book and plan their trip.	High transit potential; high level of service
	Real-time information	Information that shares the status of nearby mobility options to enable travelers to make informed decisions about their trips (e.g., estimated arrival/departure times, location of services).	Moderate – high transit potential; moderate – high level of service
	Service area maps, amenity information, and bulletins	Physical displays that help orient users and direct them to nearby amenities and relevant announcements.	Moderate – high transit potential, moderate – high level of service
	Clear connections to bus and other transit modes	Adequate access to nearby bus stops and shelters for simple and safe transfers.	All contexts

Kyle Hearing

Project Manager & Senior Transportation Planner
(301) 637-0248
khearing@foursquareitp.com

FoursquareITP.com

777 North Capitol Street NE, Suite 300
Washington, DC 20002

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Geographical Framework

- Uniform
- Hierarchical