Complete Streets Integrated Implementation

2022 CEAM Conference
April 14, 2022

Presenters:
Ray Moravec, PE
Larry Marcus
Nick Wall, AICP, GISP

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Complete Streets Integrated Implementation

Presenter's Biographies:

- Ray Moravec, Vice President Planning (Moderator)
  - 30+ years experience
  - Multi-modal Transportation Planning and NEPA Experience
- Larry Marcus, Senior Transportation Planner (Baltimore City Complete Streets Manual)
  - 30+ years experience
  - Complete Streets, Vision Zero and Mobility Experience
  - NACTO and ITE National Committee Member
- Nick Walls, AICP, GISP – Associate Vice President GIS (Transportation Equity Gap Analysis)
  - 20+ years experience
  - Geospatial, Planning and Asset Management Experience

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Complete Streets Integrated Implementation

Objectives – Encouraging Excellence:

- Understanding of complete streets and why important
- Overview of Baltimore City's approach to development of the Complete Streets Manual
- Knowledge of key elements for Complete Streets
- Understanding the importance of equity in transportation
- Awareness of GIS opportunities to identify and address transportation needs in underserved communities

PDH Value – 1.0 Hour

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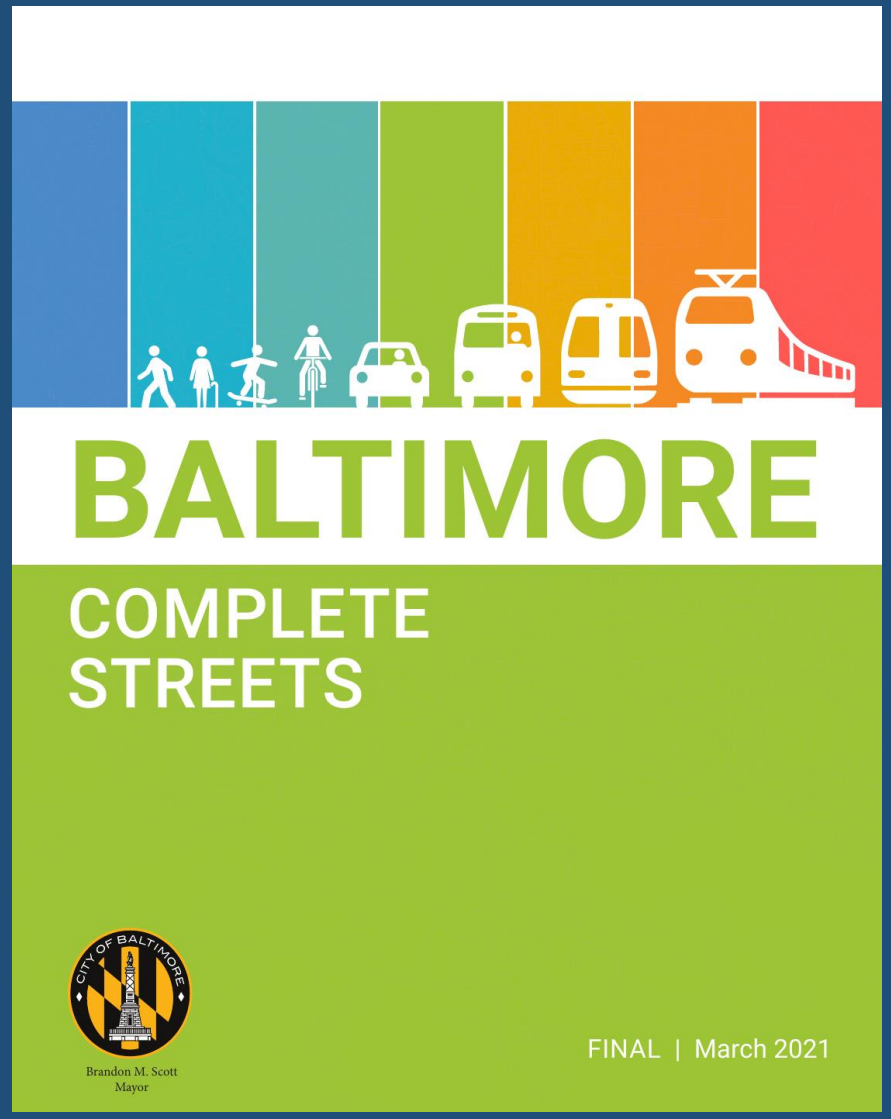
Baltimore's Complete Streets Manual Addressing Equity

1. Baltimore's City Council Ordinance
2. Baltimore's Approach
3. Why are Complete Streets Important?
4. Equity: From Policy to Implementation



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Baltimore City Council Complete Streets Ordinance Requirements

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Ordinance Requirements: *Standards*

§ 40-30. DoT to use latest and best standards.

In constructing and operating its Complete Streets Transportation System, the Transportation Department must use the latest and best standards, including:

(1) National Association of City Transportation Officials:

(i) "Global Street Design Guide".

(ii) "Urban Street Design Guide".

(iii) "Transit Street Design Guide".

(iv) "Urban Bikeway Design Guide".

(v) "Urban Street Stormwater Guide".

(2) American Association of State Highway and Transportation Officials:

(i) "Guide for Planning Design and Operation of Pedestrian Facilities".

(ii) "Guide for the Development of Bicycle Facilities".

(3) Federal Highway Administration:

(i) "Separated Bike Lane Planning and Design Guide".

(ii) "Report on Incorporating On-Road Bicycle Networks into Resurfacing Projects".

(4) Institute of Transportation Engineers, "Manual for Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities".

(5) National Cooperative Highway Research Program, Report 616, "Multi-Modal Level of Service Analysis for Urban Streets".

(Ord. 18-197.)

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Ordinance Requirements: *Lane Widths*

§ 40-29. Lane widths.

(a) *"Shared street" defined.*

In this section, "shared street" means a street developed for mixed use by low volumes of slow-moving vehicular traffic mixed with high levels of walking.

(b) *In general.*

Except as provided in this section or otherwise required by law, the lanes of any street may not be more than 10 feet wide, but 9 feet shall be the preferred width.

(c) *Exceptions.*

(1) *Local streets.*

On a street designated on the Baltimore City Roadway Functional Classification Map as "local", lanes shall not *{may not}* be more than 9 feet wide.

(2) *Transit streets and truck routes.*

On a transit street or truck route, 1 lane in each direction may be up to 11 feet wide.

(3) *Shared streets.*

On a street designated as a "shared street", lane width restrictions do not apply.

(Ord. 18-197.)

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Baltimore's Complete Streets Manual: Tailor to Baltimore's Culture

1. Modal Hierarchy
2. Guiding Principles
3. Project Prioritization
4. Street Types
5. Street Design Guidance
6. Addressing Equity to Help Disadvantaged Communities

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Guiding Principles

System Performance

Address Safety First: Baltimore streets will be designed to eliminate severe injuries and fatalities.

Be Accessible by Everyone: Baltimore streets will be accessible by all modes, for people of all ages and abilities.

Improve Mobility: Baltimore streets will efficiently and reliably move people and goods to, from and around the City.

Community Enhancement

Represent Baltimore's Culture: Baltimore streets will reflect neighborhood values and promote economic vitality.

Be Sustainable: Baltimore street design methods will align with the City's broader goals of urban sustainability and protecting the environment.

Ensure Equity: Baltimore streets will reflect equal opportunities for travel regardless of race, income, age, disability, health, English language proficiency, and vehicular access.

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Baltimore's Complete Streets Manual: Tailor to Baltimore's Culture

- Project Prioritization Guidance

Capital Improvement Projects (CIP)

Project Prioritization Process

Step 1: Evaluate CIP Factors

Evaluate and rank areas and/or projects using the following factors:

CIP Factor	Description	Weighting
Equity	Equity assessment of geographic area	2
Infrastructure Condition	Condition of the current infrastructure	1
Economic Development Potential	Potential economic development resultant from infrastructure investment	1
Safety	How well projects/roadways in the area align with the TowardZERO Baltimore Initiative and have the potential to address safety issues	1
Existing or Planned Work by Other Departments	Potential to leverage/ combine resources from projects being planned or constructed by other departments	1
Transit Dependency and Commute Times	Transit dependency of the population in the geographic area. Consider average commute times and the potential for projects in this area to improve commute times.	1

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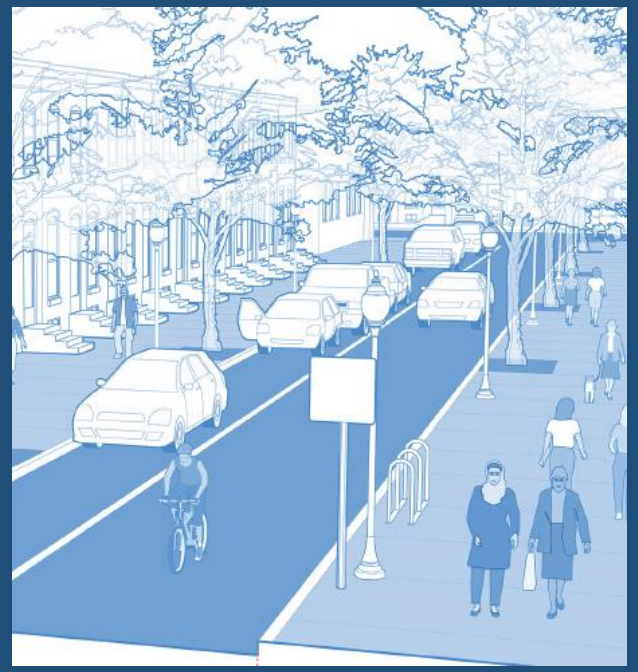
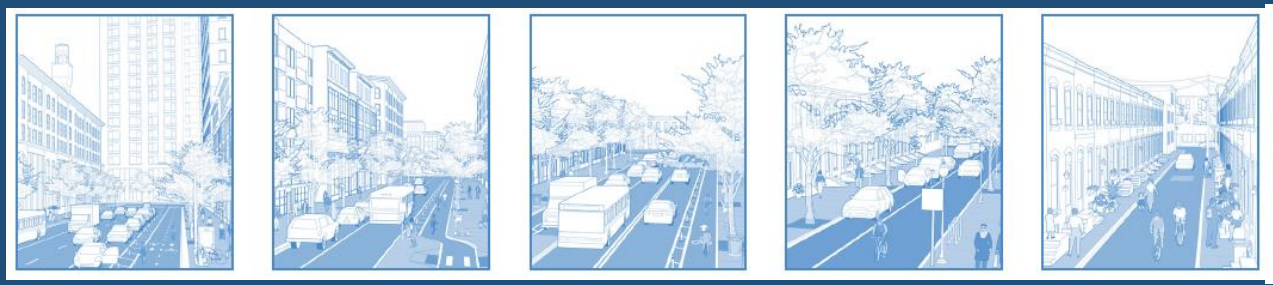
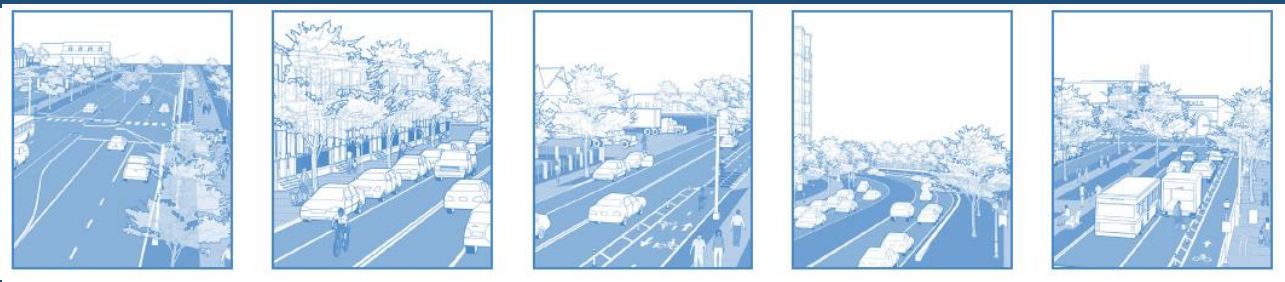
Baltimore's Complete Streets Manual: Tailor to Baltimore's Culture

- Ten New Street Types
- Reflect Community Environment and Street Function







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Boulevard

Pedestrian Zone	Curb Space	Travel Way Zone	Median Zone	Travel Way Zone	Curb Space	Pedestrian Zone

Image Source: Dallas Complete Streets Manual

Pedestrian Zone				Curb Space Management				Curb Side Lane				Travel Way Zone				Median Zone			
Feature	Target	Maximum	Constrained	Feature	Target	Maximum	Constrained	Feature	Target	Maximum	Constrained	Feature	Target	Maximum	Constrained	Feature	Target	Maximum	Constrained
Building Frontage Zone	2'	-	0'	Curb zone	20"	20"	8"	Cycle track (one-way)	10'	-	8'	Travel Lane	10'	11'	9'	Pedestrian refuge	10'	-	6'
Walking / Sidewalk Clear Zone	12'	-	8'-10'	Parallel Parking	10'	12'	8'	Cycle track (two-way)	15'	-	11'	Transit Lane	11'	11'	11'	Continuous with landscaping	10'	-	6'
Shared Use Path	N/A	N/A	N/A	Loading / Transit / Aligning	11'	12'	10'	Buffered Bike Lane	8'	-	6.5'	Truck Route	11'	11'	11'	Continuous without landscaping	N/A	N/A	N/A
Furnishing Zone	10'	-	5'					Traditional Bike Lane	6'	7'	5'	Turn Lanes	11'	12'	10'				
								Bus/Shared Transit Lane	12'	12'	11'								
								Side Board Island Stop	9'	-	6'								

REQUIRED WIDTHS
RED = ORDINANCE AND CITY STANDARDS
PURPLE = AASHTO & PROWAG

SUGGESTED WIDTHS
GREEN = NACTO
BLUE = OTHER COMPLETE STREET GUIDES
ORANGE = CONSULTANT TEAM RECOMMENDATION

*4' requires (5'x5') passing zone every 200' maximum

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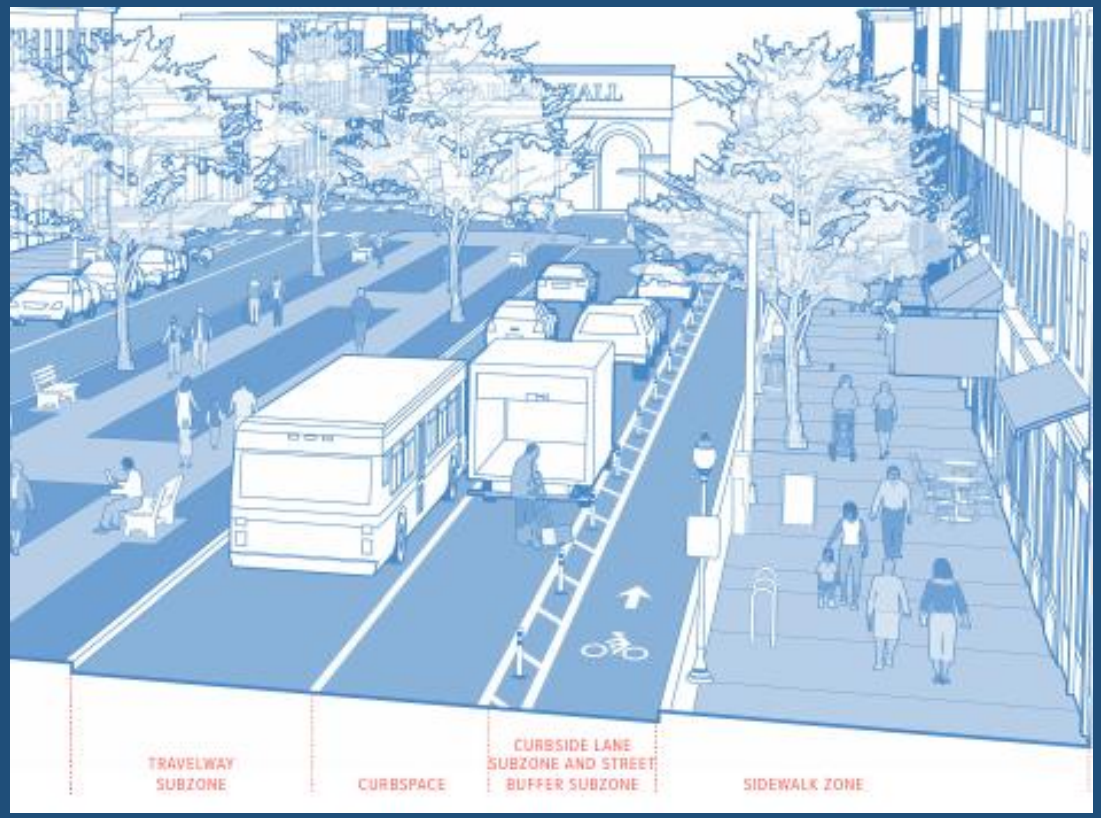
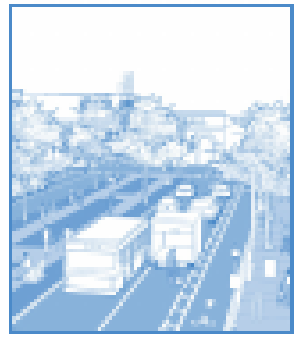
Industry Best Practices: Guidance on ROW Prioritization



STREET TYPOLOGY



See Boulevard on page 28.

Table 1. Limited Right-of-Way Priorities

	Sidewalk Zone		Roadway Zone			
Street Type	**Pedestrian Subzone**	**Furnishing Subzone**	**Curbspace**	**Curbside Lane Subzone**	**Travelway Subzone**	**Median Subzone**
Downtown Commercial	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	4	3	5	6
On Truck Route	1	2	4	6	3	5
Downtown Mixed-Use	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	3	4	5	6
On Truck Route	1	2	4	6	3	5

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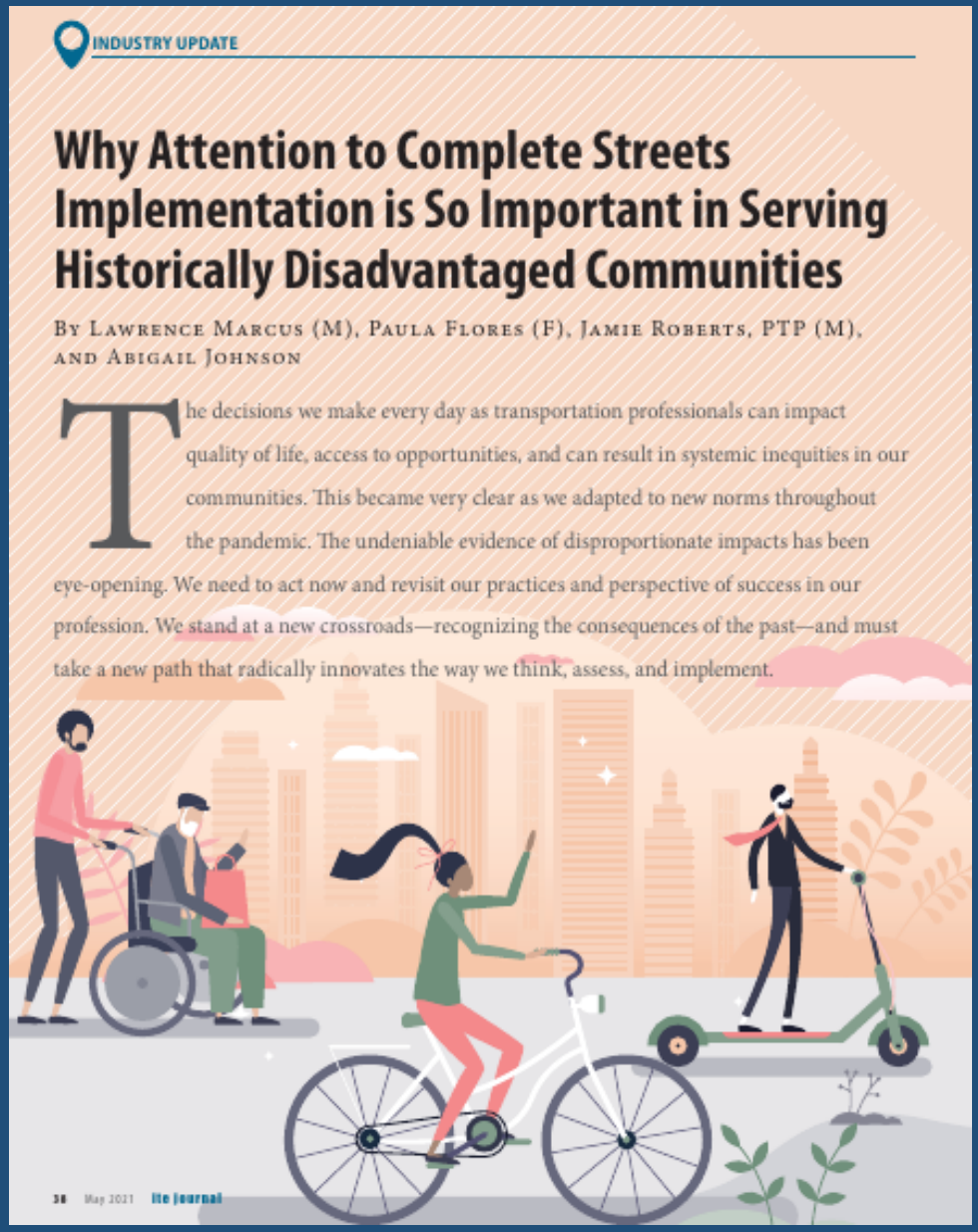
Why Complete Streets are So Important



INDUSTRY UPDATE

Why Attention to Complete Streets Implementation is So Important in Serving Historically Disadvantaged Communities

By Lawrence Marcus (M), Paula Flores (F), Jamie Roberts, PTP (M), and Abigail Johnson

The decisions we make every day as transportation professionals can impact quality of life, access to opportunities, and can result in systemic inequities in our communities. This became very clear as we adapted to new norms throughout the pandemic. The undeniable evidence of disproportionate impacts has been eye-opening. We need to act now and revisit our practices and perspective of success in our profession. We stand at a new crossroads—recognizing the consequences of the past—and must take a new path that radically innovates the way we think, assess, and implement.

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Why Complete Streets are So Important

What is the purpose of our project:

Building a beautiful street / bridge or helping disadvantaged communities get access to essential services?

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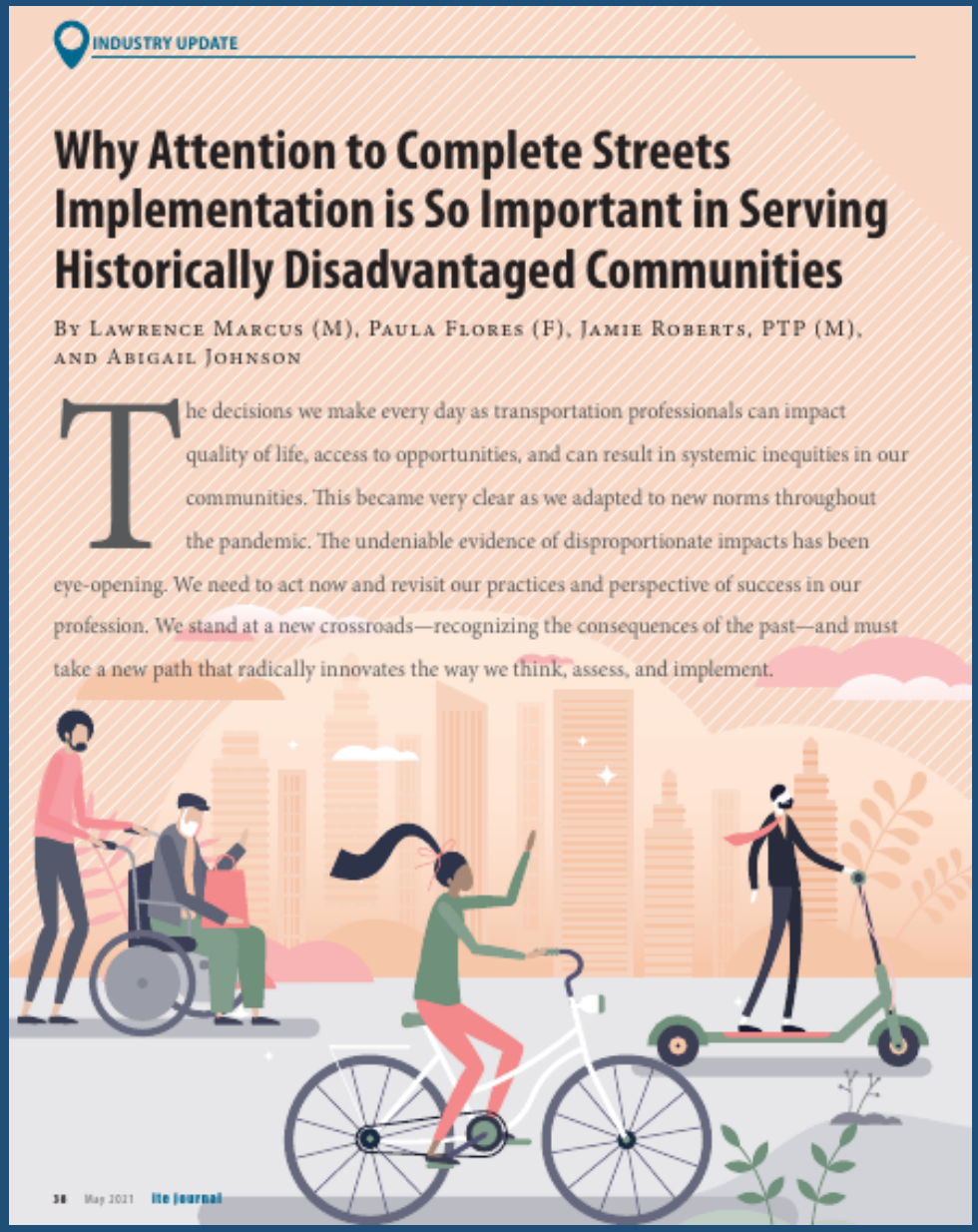
Why Complete Streets are So Important

- Disadvantaged community members often cannot afford private automobiles
- These communities rely on transit, walking, and cycling connections to essential services



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Addressing Equity

Equity in Community Engagement

Using an Equity Lens when preparing the Annual Report

Include an Equity Assessment in the Project Prioritization Process

§ 40-41. Equity in community engagement.

The Complete Streets Manual must include community engagement policies that overcome barriers to engagement associated with race, income, age, disability, English language proficiency, and vehicle access of populations affected by a project, including a means of measuring success in overcoming these barriers.

(Ord. 18-197.)

§ 40-48. Equity lens.

(a) *Separate reporting by geographic subunit.*

In preparing the annual report, the Department must separately report data by geographic subunit (e.g., census tract, traffic analysis zone, or the like).

(b) *Process to include equity assessment.*

This project prioritization process shall include an equity assessment. The equity assessment shall consider transportation disparity trends based on race, gender, sexual orientation, age, disability, ethnicity, national origin, or income and recommend ways to reverse these trends. It shall assess and recommend ways to eliminate structural and institutional discrimination in transportation based on immutable characteristics.

(Ord. 18-197.)

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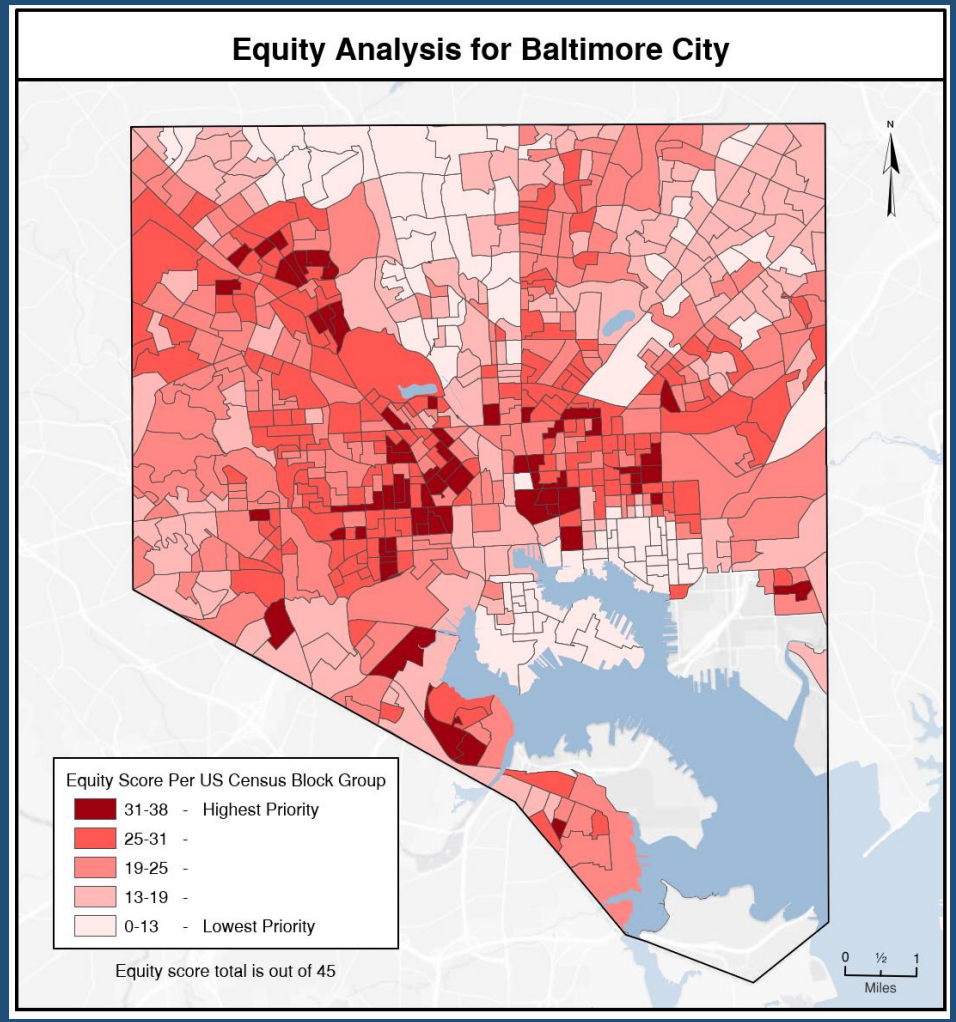
Ensuring Equity:

Now that we know which communities are disadvantaged, how can the City improve project delivery?

- Measuring the Success of a Project
- Prioritizing Projects
- Engaging the Public
- Designing Streets



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Implementing Complete Streets: Equity in Public Engagement

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Addressing Equity

Equity in Community Engagement Policies:

Race/Gender/Culture

Policy: Complete Streets project outreach efforts will be sensitive to race, gender and ethnicity, and will be tailored to the affected community to help achieve comprehensive participation.

Income

Policy: Complete Streets project outreach efforts will identify communities with socio-economic challenges and customize communication methods and meeting locations to optimize participation and engagement with the project.

Age

Policy: Complete Streets project outreach efforts will engage community members of all ages by customizing communication methods and meeting locations to optimize participation with the project.

Accessibility:

Policy: Complete Streets project outreach efforts will ensure all residents have equal opportunity to participate in the public process regardless of vehicle access, physical disability, or other factors.

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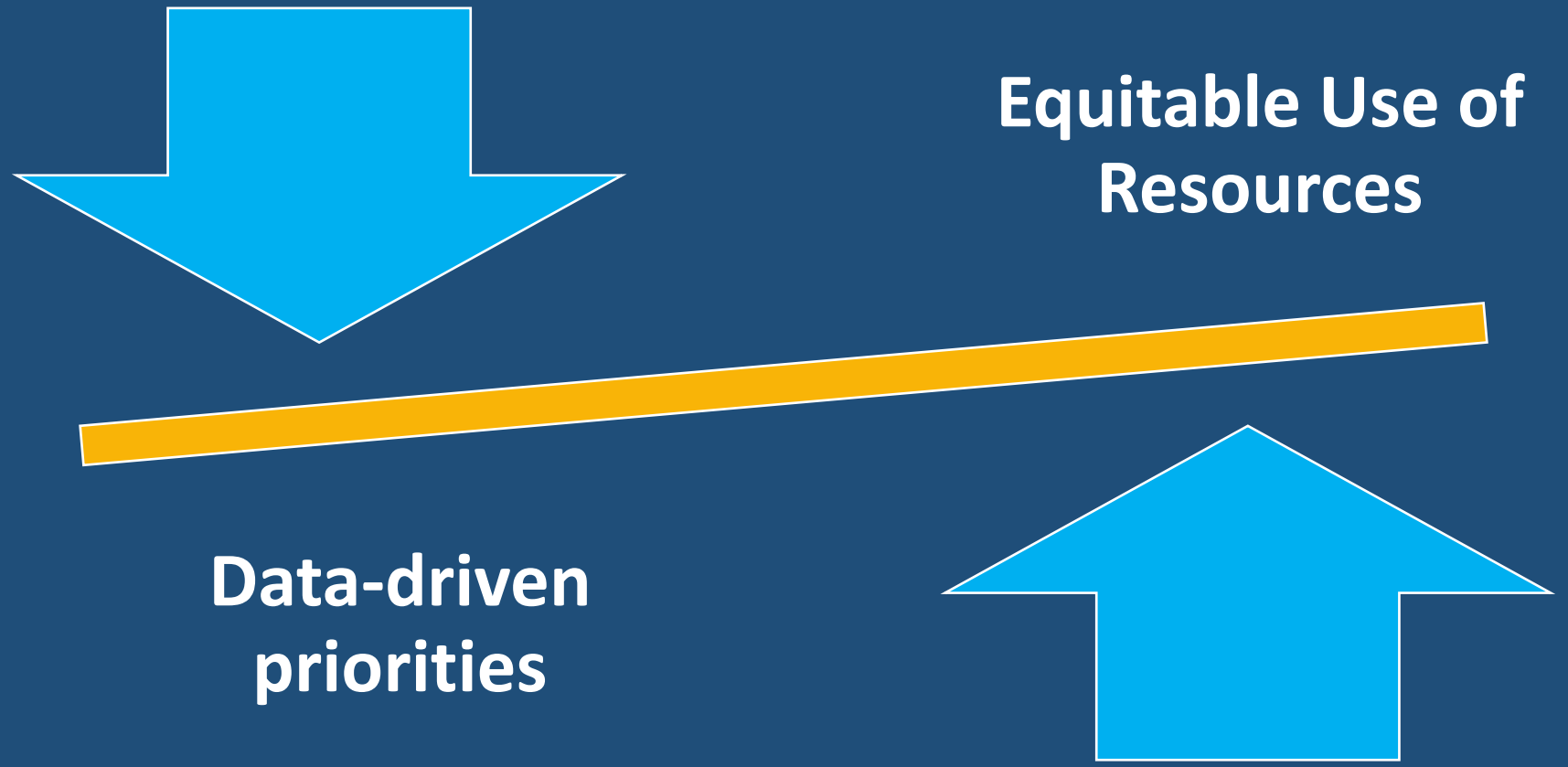
Priority Setting: Ensure a Balance Between Technical and Equitable Measures



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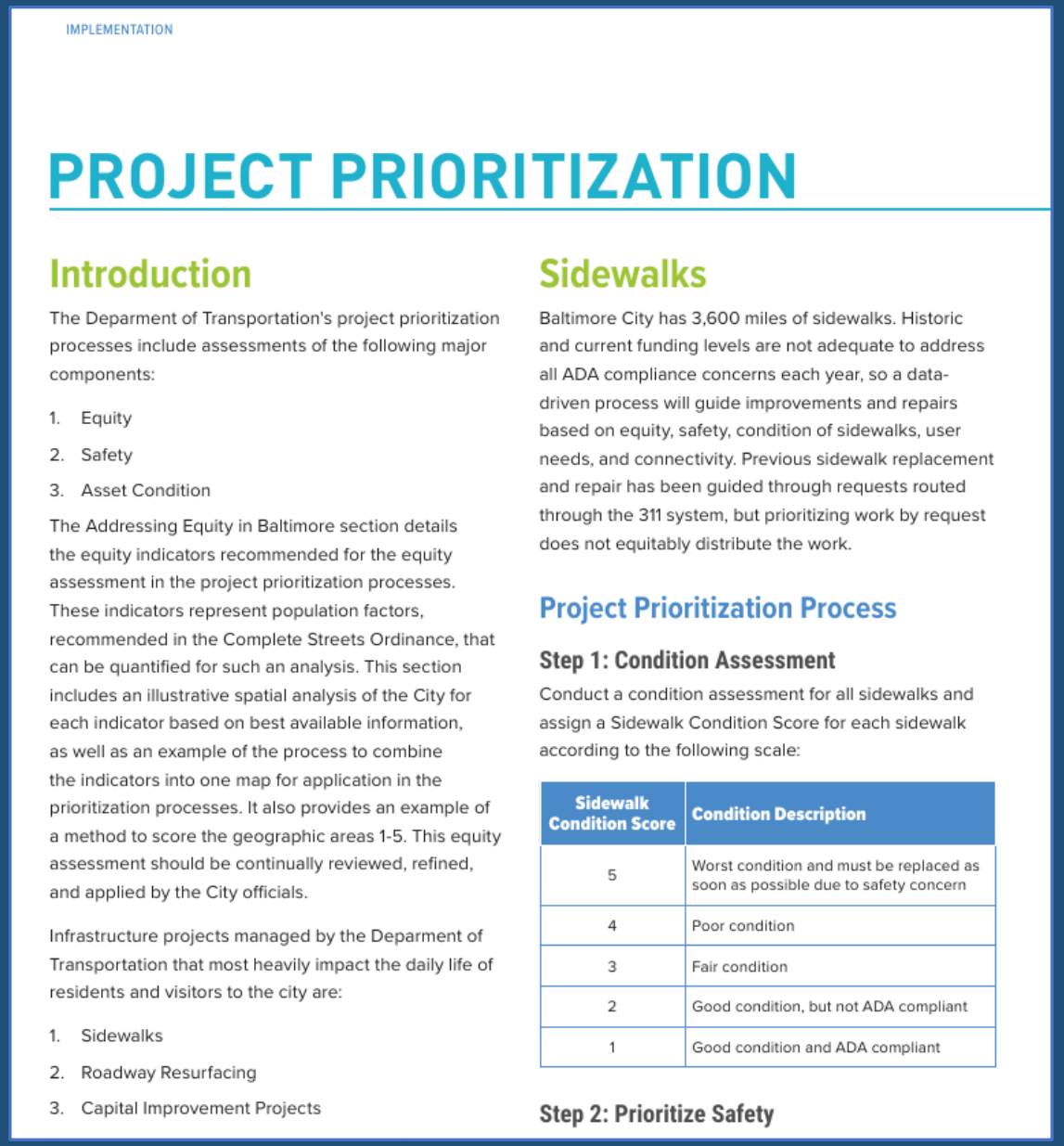
Ensure Equity:

- Include an Equity Component in Project Selection



IMPLEMENTATION

PROJECT PRIORITIZATION

Introduction

The Deparment of Transportation's project prioritization processes include assessments of the following major components:

1. Equity
2. Safety
3. Asset Condition

The Addressing Equity in Baltimore section details the equity indicators recommended for the equity assessment in the project prioritization processes. These indicators represent population factors, recommended in the Complete Streets Ordinance, that can be quantified for such an analysis. This section includes an illustrative spatial analysis of the City for each indicator based on best available information, as well as an example of the process to combine the indicators into one map for application in the prioritization processes. It also provides an example of a method to score the geographic areas 1-5. This equity assessment should be continually reviewed, refined, and applied by the City officials.

Infrastructure projects managed by the Deparment of Transportation that most heavily impact the daily life of residents and visitors to the city are:

1. Sidewalks
2. Roadway Resurfacing
3. Capital Improvement Projects

Sidewalks

Baltimore City has 3,600 miles of sidewalks. Historic and current funding levels are not adequate to address all ADA compliance concerns each year, so a data-driven process will guide improvements and repairs based on equity, safety, condition of sidewalks, user needs, and connectivity. Previous sidewalk replacement and repair has been guided through requests routed through the 311 system, but prioritizing work by request does not equitably distribute the work.

Project Prioritization Process

Step 1: Condition Assessment

Conduct a condition assessment for all sidewalks and assign a Sidewalk Condition Score for each sidewalk according to the following scale:

Sidewalk Condition Score	Condition Description
5	Worst condition and must be replaced as soon as possible due to safety concern
4	Poor condition
3	Fair condition
2	Good condition, but not ADA compliant
1	Good condition and ADA compliant

Step 2: Prioritize Safety

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Thank you and Questions!

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UTILIZATION OF GIS FOR Baltimore City's Transit Equity Analysis

Nick Walls AICP, GISP

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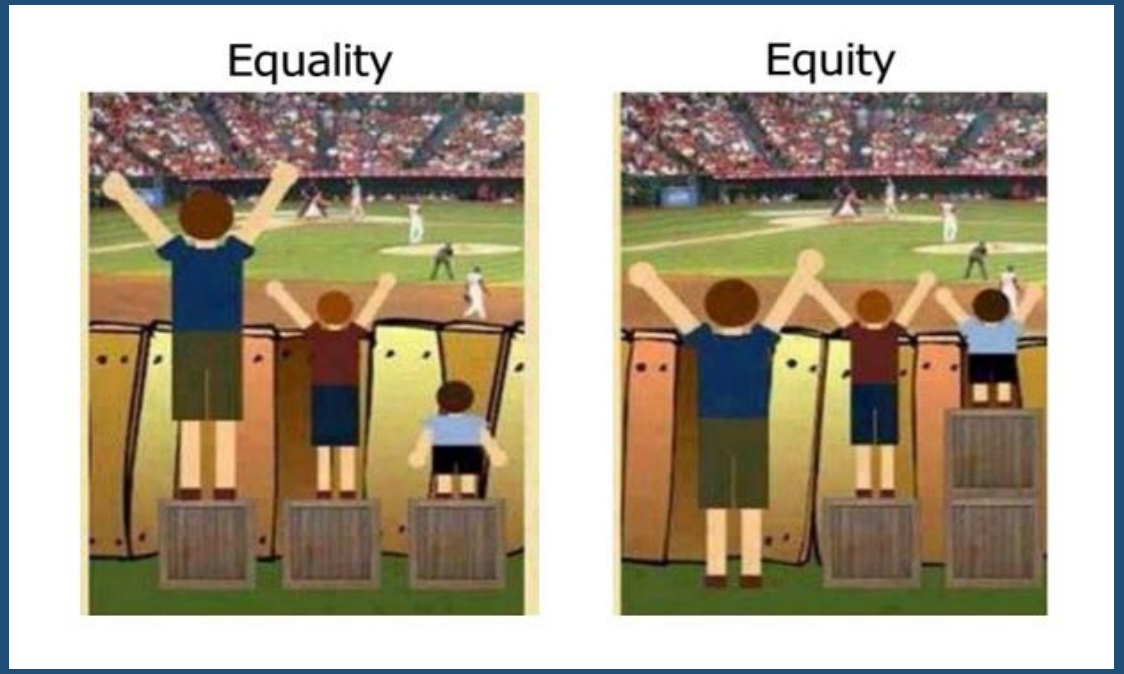
From Complete Streets to Equity Analyses

- Ordinance required integration of equity concerns throughout implementation of Complete Streets
- It's not just about comparing demographics and statistics between areas – we must look at the transit outcomes to perceive discrepancies in opportunity and infrastructure



"This Transportation System must, to the greatest extent possible, ensure equity by actively pursuing the elimination of health, economic, and access disparities."

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Equity is the fair treatment, access, opportunity, and advancement for all people, while at the same time striving to identify and eliminate barriers that have prevented the full participation of some groups

Okay, but what is equity?

- Equity can mean many things to many people
  - Need to recognize that it is not our role to tell City staff and residents what they should be concerned with regarding Equity
- Our job was to listen and translate their input to data analysis without involving our own preconceptions

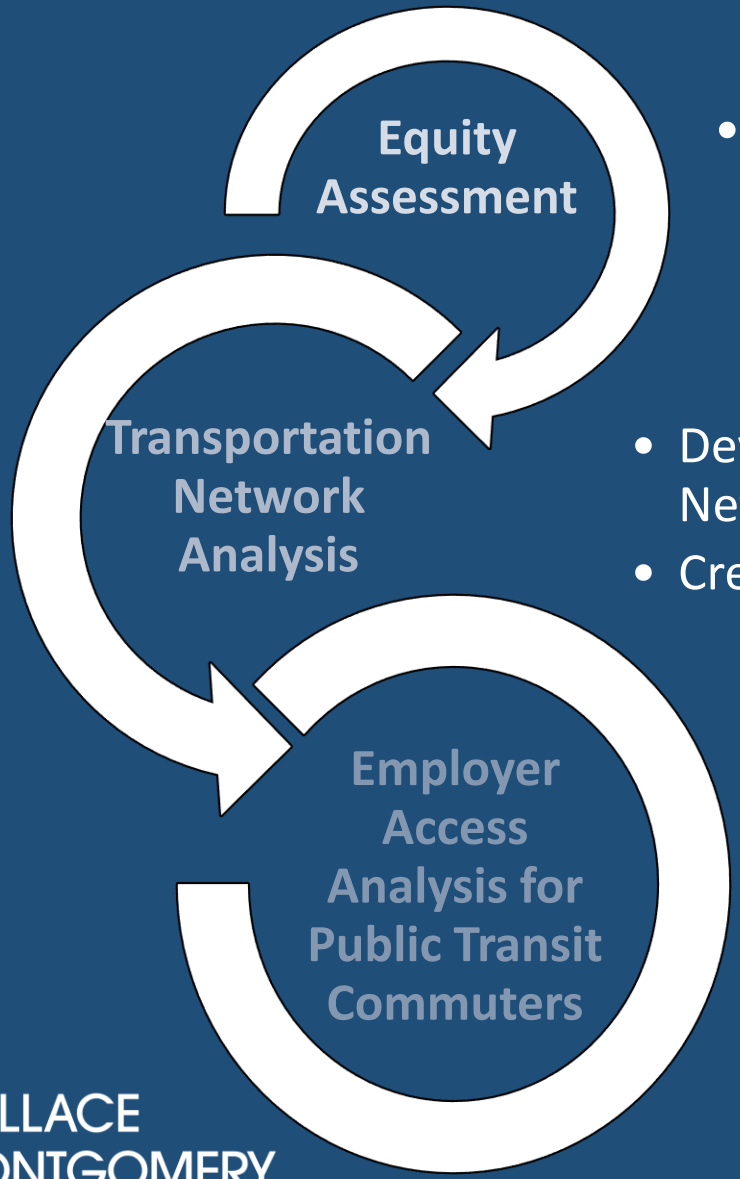
The Starting Point

- Where are the areas of historic disenfranchisement?
  - Identified via Equity Lens Dataset
- Which of these areas has the greatest disadvantage in transit options to access employment opportunities?
  - Transit service area analysis
  - Integration of Employment data

How do we eliminate discrepancies in transit access due to historic inequitable infrastructure investments?

Our analysis is not prescriptive – we can offer suggestions and calculations of impacts, but this is ultimately a policy and funding question to be answered by the City and shaped by the residents

Process Overview



- Develop data-driven analysis tool to identify underserved communities

Part 1

- Develop the Baltimore City Public Transit Network dataset for existing services
- Create public transit service area boundaries

Part 2

- Identify employment opportunities reachable by public transit commuters
- Identify transit employment access deficiencies

Part 3

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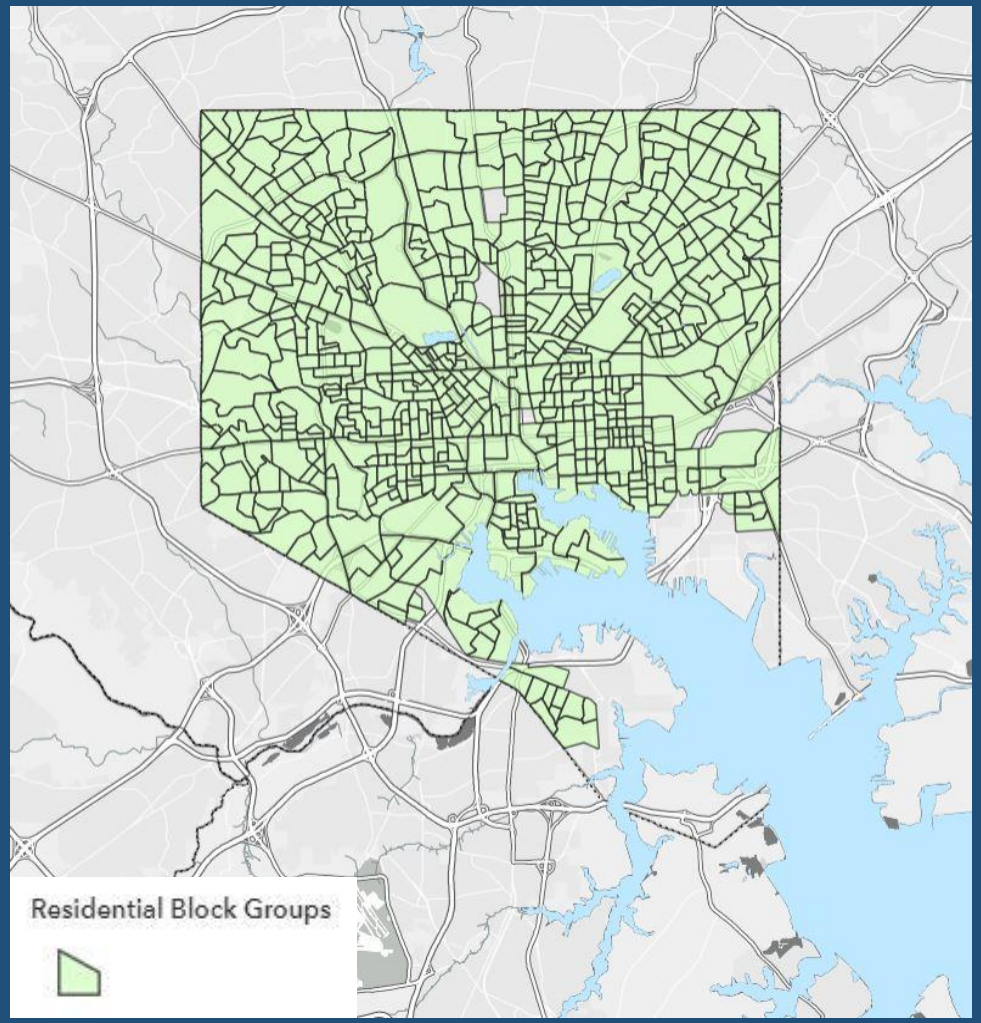

Units of analysis

- US Census Block Group boundary shapefile for Baltimore City
- Block Groups excluded from this analysis include:
  - Residential block groups with less than 80 residents
  - Industrial Areas
  - JHU Campus, Jails & Prison
- US Census Bureau's American Community Survey Data Results for the 5-year estimates for 2013-2017 used for demographic analyses

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Part 1

Developing the Equity Composite Index score

STEP ONE

- Identify core demographic indicators & desired weighting of each
- Perform initial analysis to calculate raw demographic values for each block group

STEP TWO

- Apply data classification strategies for each indicator
- Apply the indicators' weighted value to the raw score

STEP THREE

- Combine each individual indicator's weighted score in a Composite Equity Index score
- Calculate each residential block groups score

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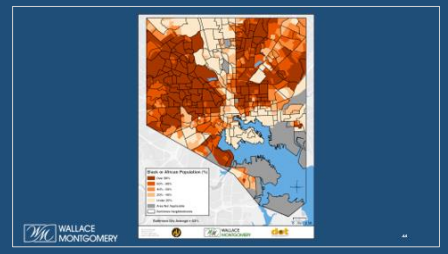
Individual Demographic Indicators

Race - Black and African American	Hispanic or Latino Ethnicity	Poverty	Median Household Income	Unemployment
Households with No Vehicle Access	Public Transit Commuters	Median Age	Education - High School Diploma or GED	Disability

Various stakeholders played a key role in determining and finalizing the demographic indicators and the weighted index values used in the development of Equity Composite Index Score for the Baltimore City Equity Lens



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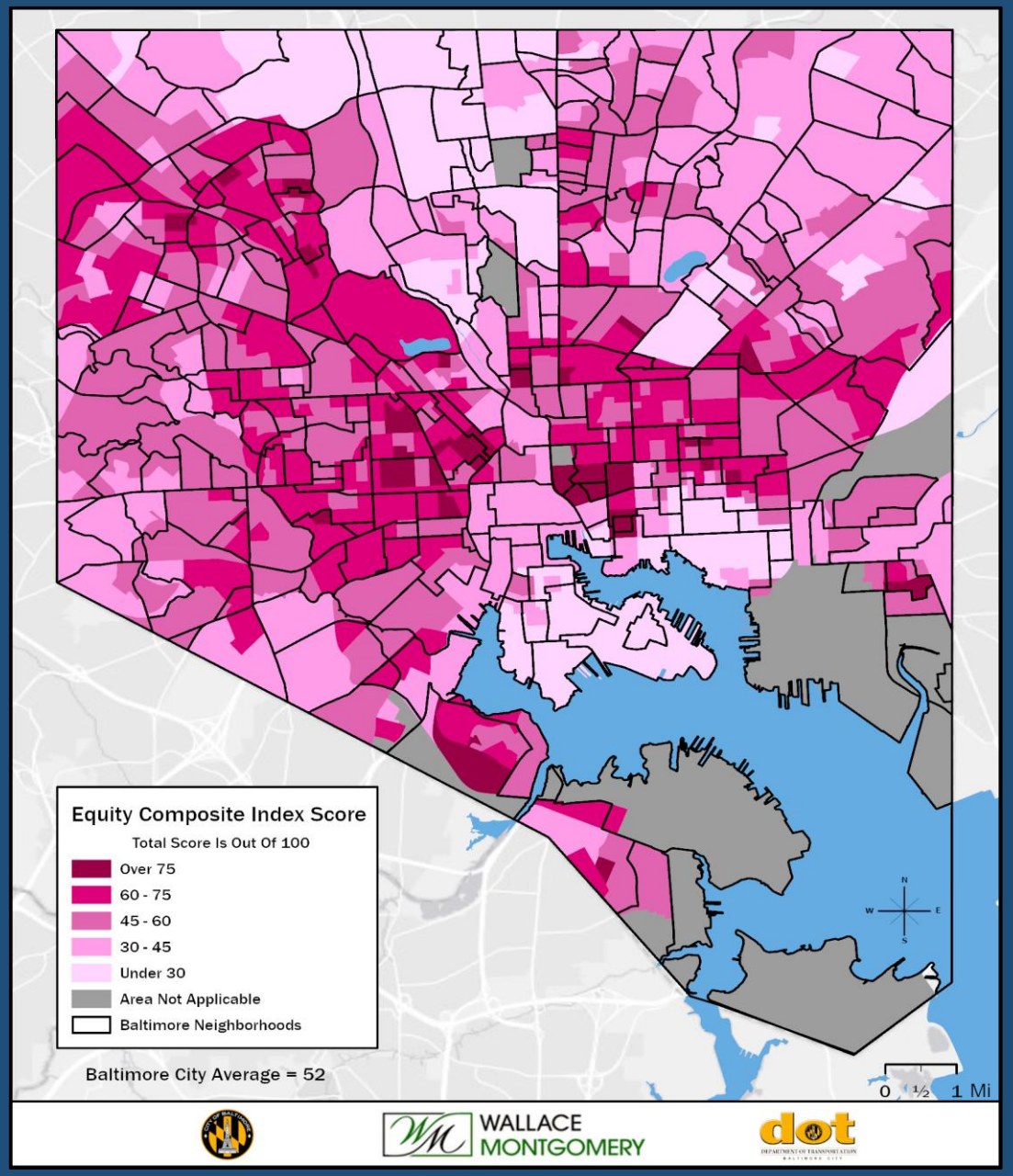
Weighting Of Demographic Indicators

Indicators	Weighted Value	Max. Indicator Score
Poverty	3	15
Household Income	3	15
Race	2	10
Hispanic/Latino	2	10
No Vehicle Households	2	10
Public Transit Commuters	2	10
Educational Attainment	1.5	7.5
Disabled Population	1.5	7.5
Unemployed	1	5
Median Age	1	5



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Equity Composite Index Score results

Equity Score Range

20.5 ⟷ 80.5

Median Equity Score

52

Standard Deviation

15.37

Equity Scores that are **1.5** standard deviations above the median are used in this analysis

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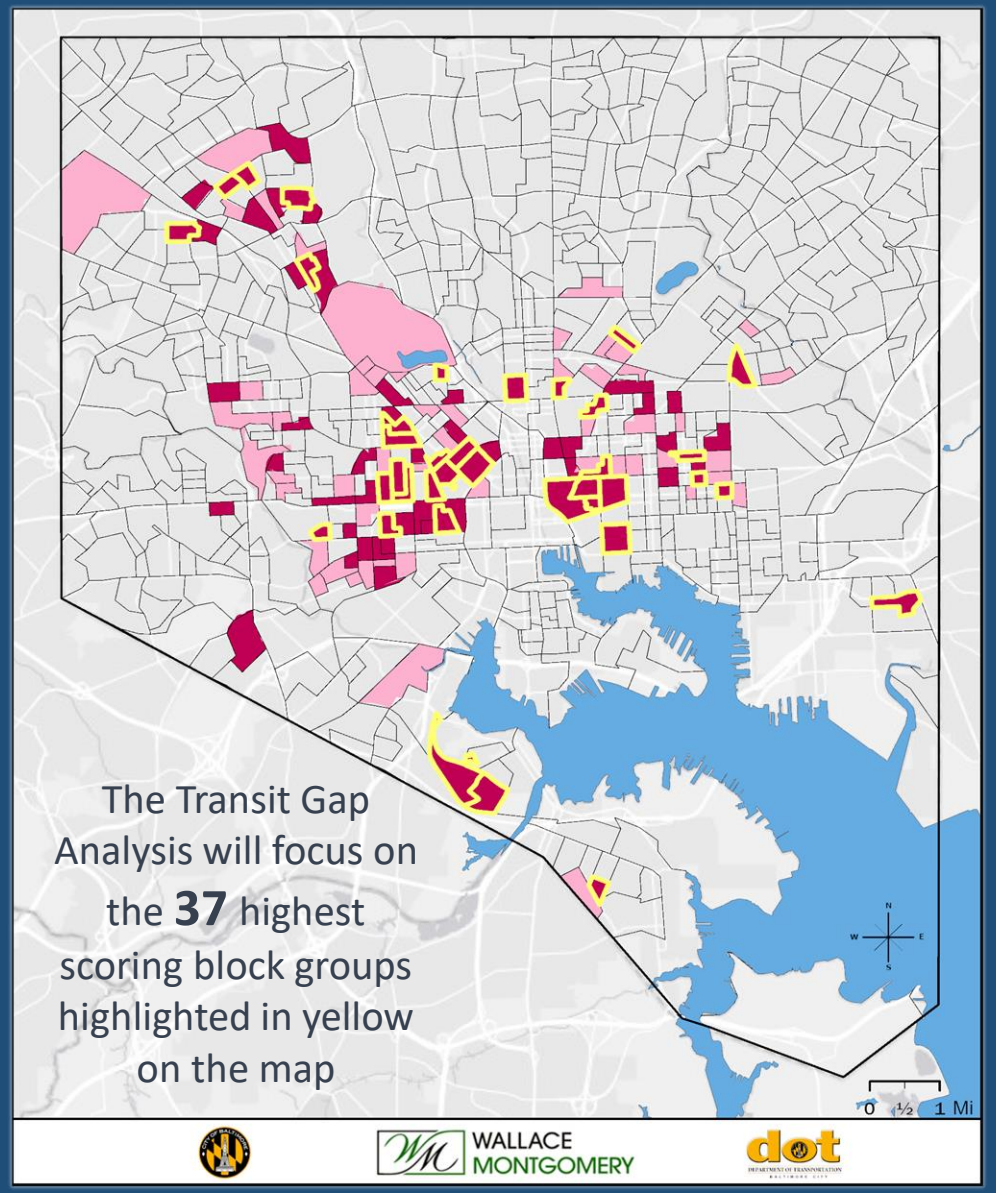
Block groups scoring **75+** will be the analysis areas of focus



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Part 2

Transit gap analysis for underserved communities

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Step One:

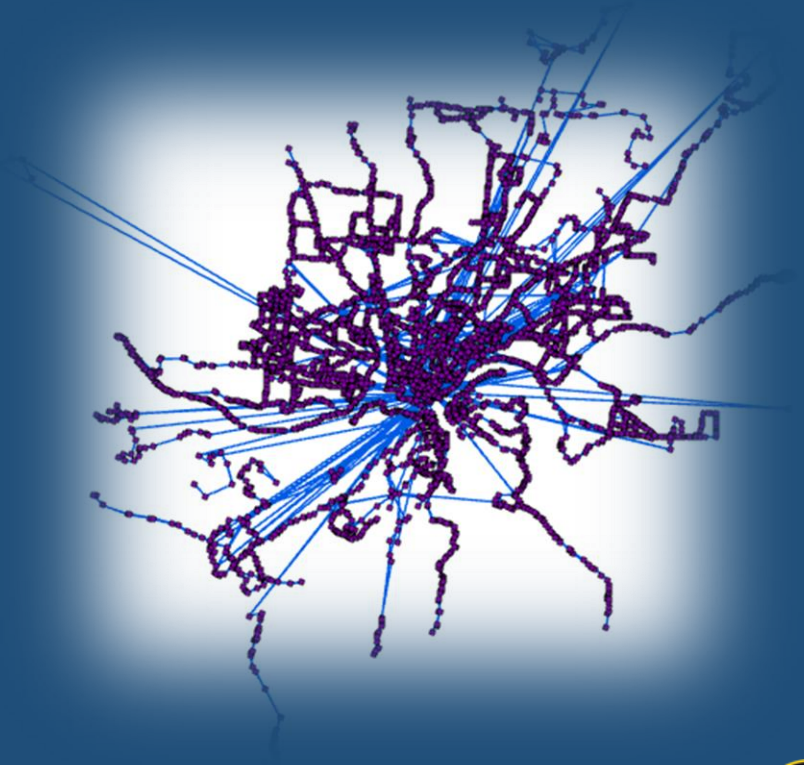
Build a Public Transit Network Dataset for Existing Transit Services

Software:

- ArcGIS Pro 2.7
- Network Analyst Toolbox
  - *Network Analyst Extension is required*
- Conversion Tools Toolbox – Transit Feed (GTFS) Toolset

Existing Public Transit Services

- Baltimore Circulator Bus
- MTA Bus system
- Baltimore Light Rail
- Baltimore Metro-Subway
- MARC train



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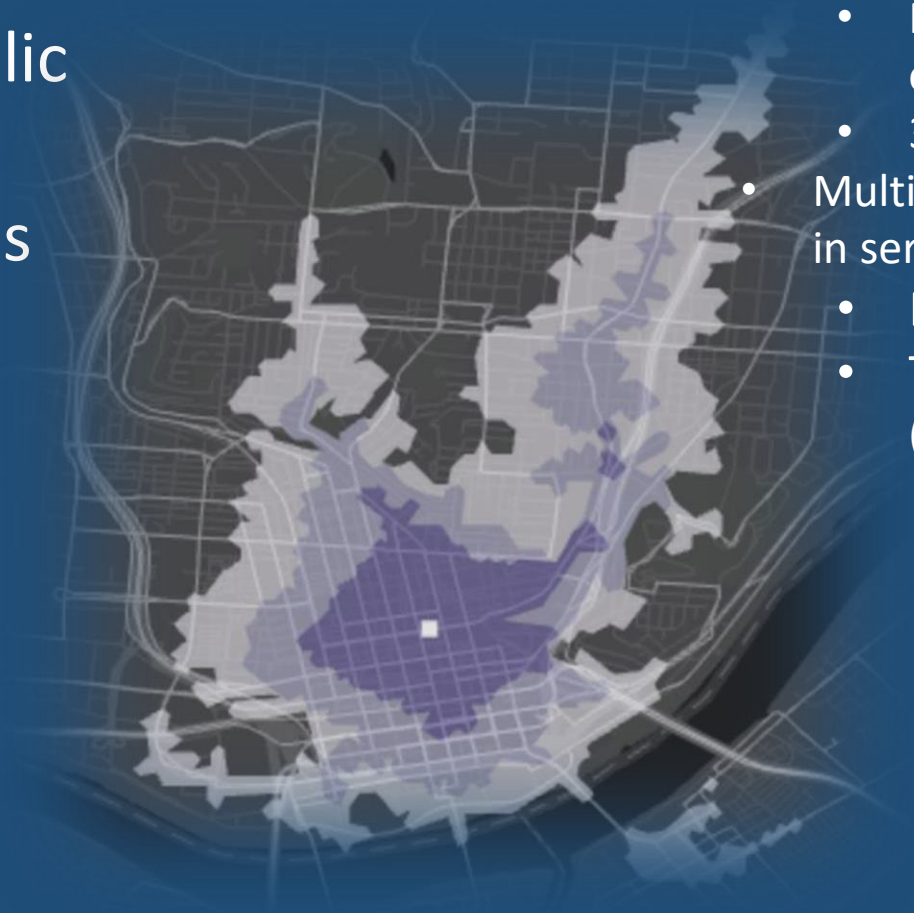
Step Two:

Develop the Public Transit Service Areas Boundaries



Network Analyst Toolset - *Make Service Area Analysis Layer*

1. Create a centroid for each of 37 selected block groups to use as the origin features
2. Generate service area boundaries
   - Service constraints:
     - Maximum ¼ mile walking distance from origin or destination
     - 30- and 45-minute commute duration
   - Multiple runs were performed to capture variation in services based on:
     - Day of the week (Wednesday & Saturday)
     - Time of day (8am, 10am, 12pm (noon), 2pm, 4pm, 6pm, 8pm, 11pm)

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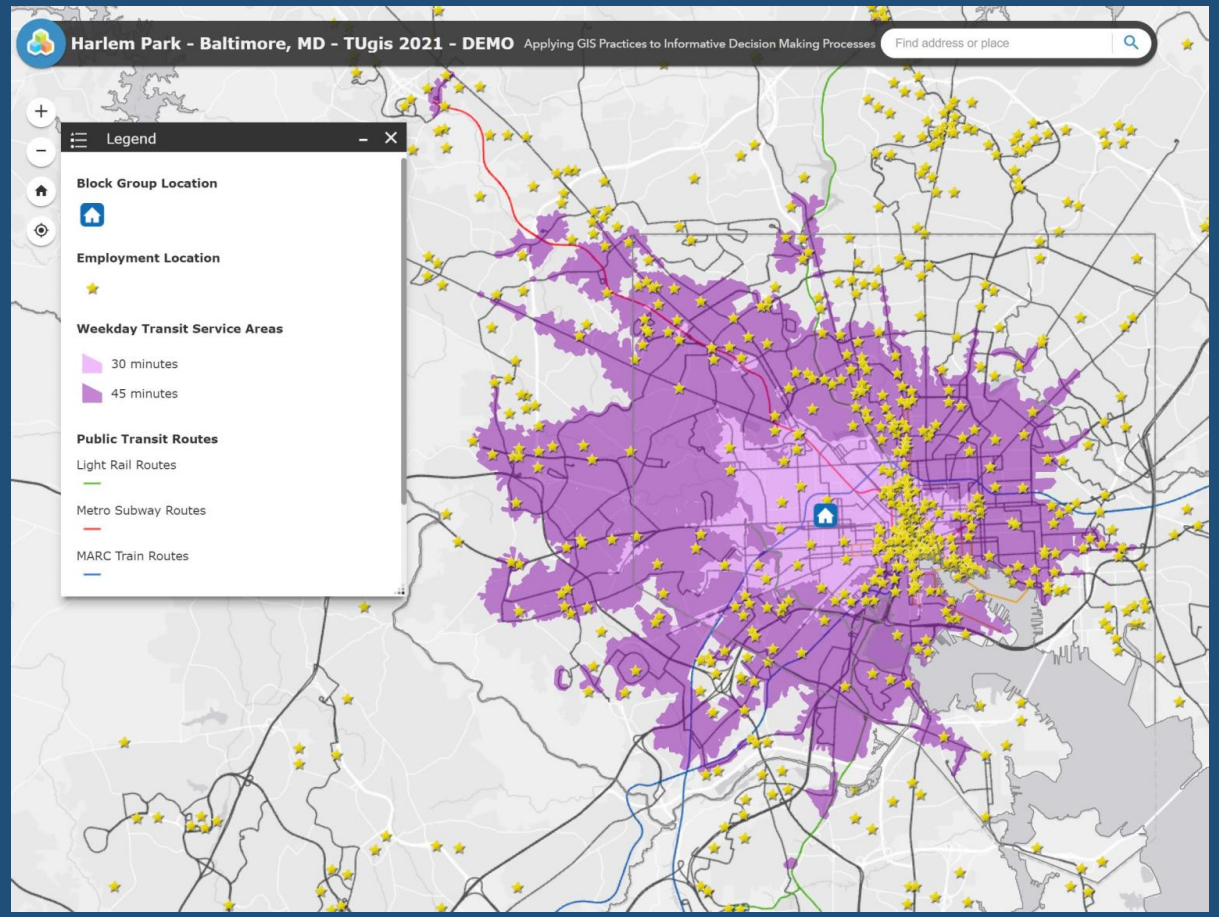
Part 3

Public Transit EMPLOYMENT ACCESS ANALYSIS

Goal:

- Identify those block groups from the Equity Assessment that have the fewest employment opportunities accessible via public transit
- Use this data to prioritize infrastructure improvements to reduce access discrepancies



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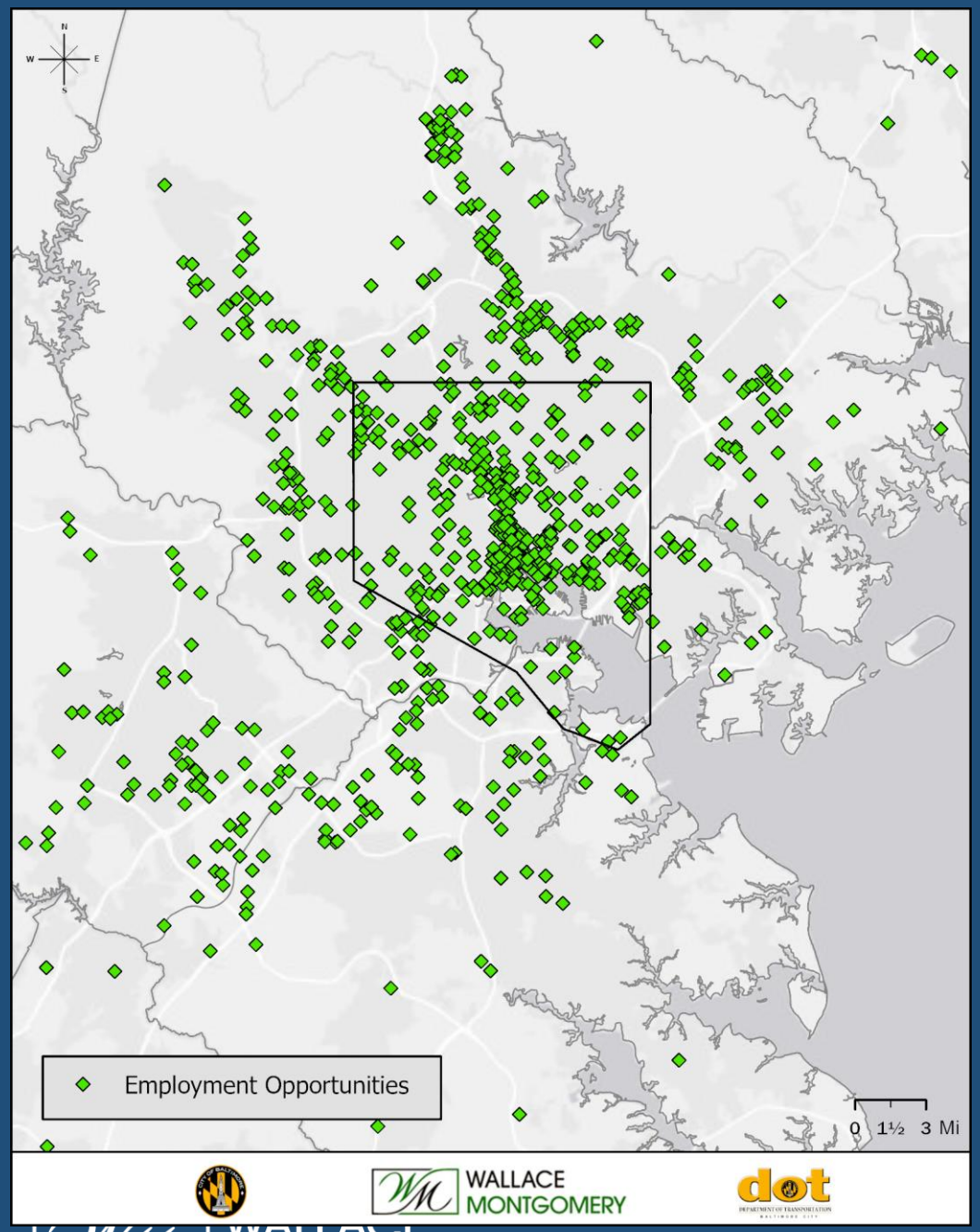

Employment Data

- Data Source
  - LODES 2017 at the US Census block level of analysis
- Create a feature class for employment opportunities within US Census block boundaries
  - Join LODES data to block shapefile using the block geoid field
- Employment Criteria
  - More than 50 employees
  - Within ¼ mile walking distance from a transit stop
  - Monthly wage is greater than $1,250.00
  - Education Attainment required for position is less than a Bachelor's Degree
  - Applicable Employment Industries

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Accessibility Analysis Results - Example

30-Minutes

Neighborhood	Block Group ID	Equity Index Score	Population	Total Accessible Jobs	% Meeting Wage	% Meeting Education	Minimum Per Person Opportunities
Central Park Heights	245101512005	80.5	743	102,292	79.23	53.75	74
Sandtown-Winchester/Harlem Park	254101602003	79.5	736	140,041	81.94	53.80	102
Cherry Hill	245102502042	78.0	1,352	60,845	81.54	55.19	25
Brooklyn	245102504022	80.0	679	7,284	78.46	54.49	6
Belair-Edison	245102603026	78.0	737	58,023	80.99	56.57	45
Canton	245102606043	77.0	737	18,980	75.23	57.00	15
Oldtown/Middle East	245102805001	80.5	796	153,392	81.85	53.83	104

- *Note –*
- *The table above identified jobs accessible within a 30-minute commute*
- *The employment values shown here represent one service area calculation, run at 8 AM on a Weekday.*
- *Subsequent iterations will match these totals to the commute departure times of the plurality of residents for each block group.*

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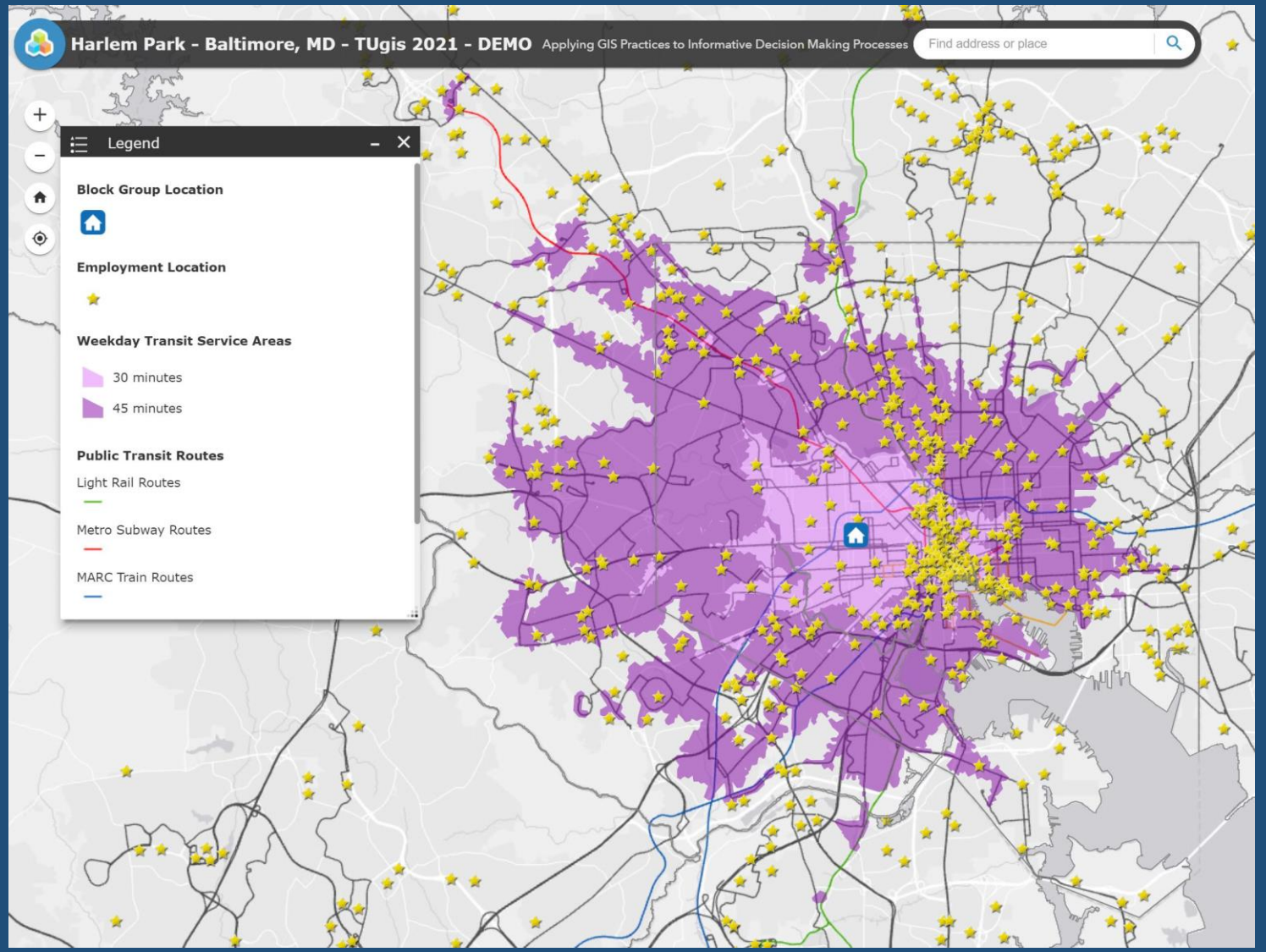
What is next?

- Large amount of public outreach remains to be addressed due primarily to COVID
- Preliminary concepts identified to build new transit infrastructure – moving through City processes
- We built the equity lens data to allow it to be used for many purposes, not just transit
  - Food Deserts
  - Public Meeting Spaces
  - Community Health Resources
- Need to sustain the focus and continue to build support for implementation



(Link to web mapping application demo)

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Complete Streets Integrated Implementation

THANK YOU!!!

Questions?

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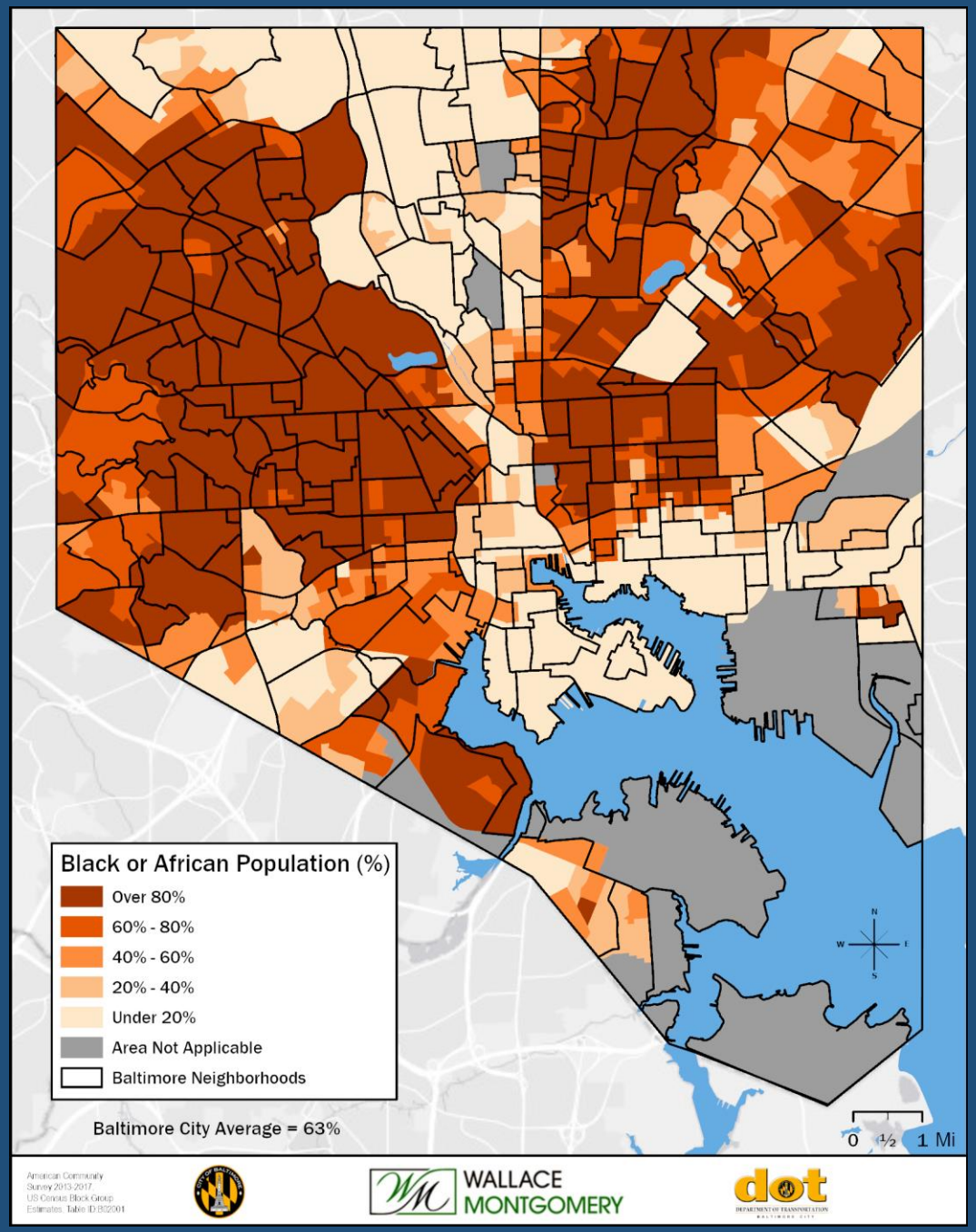
COUNTY ENGINEERS ASSOCIATION OF MARYLAND 1953 CEAM



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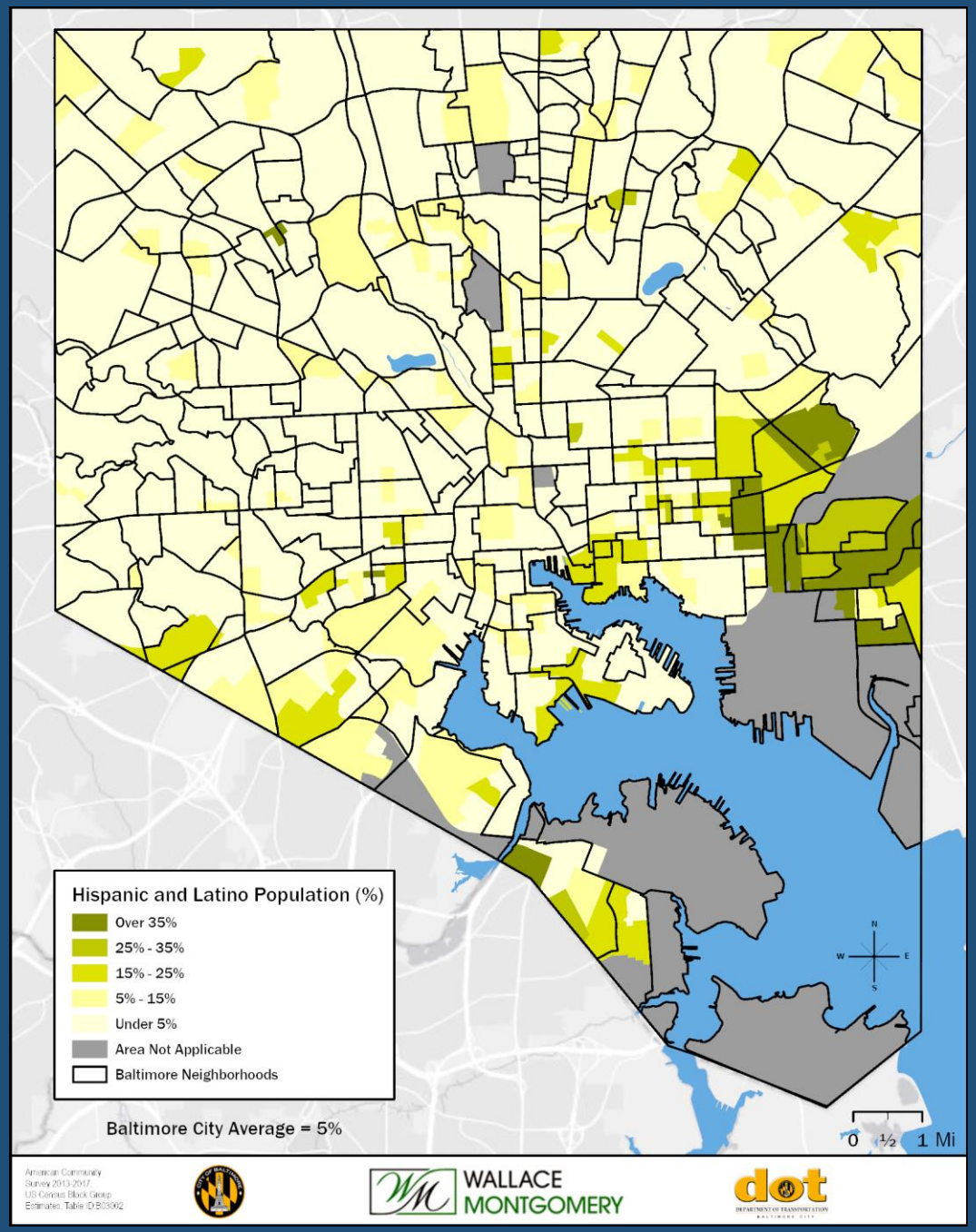

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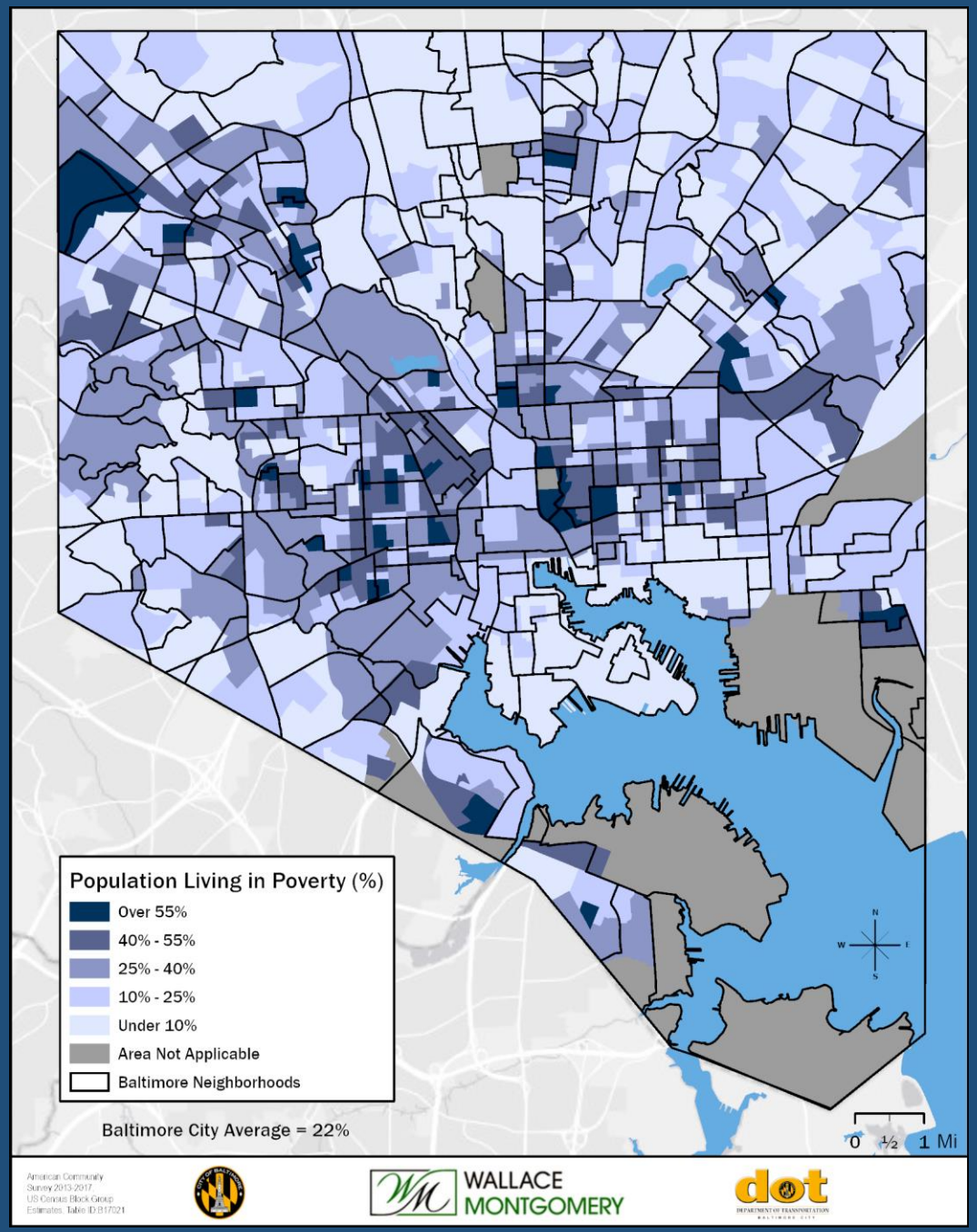

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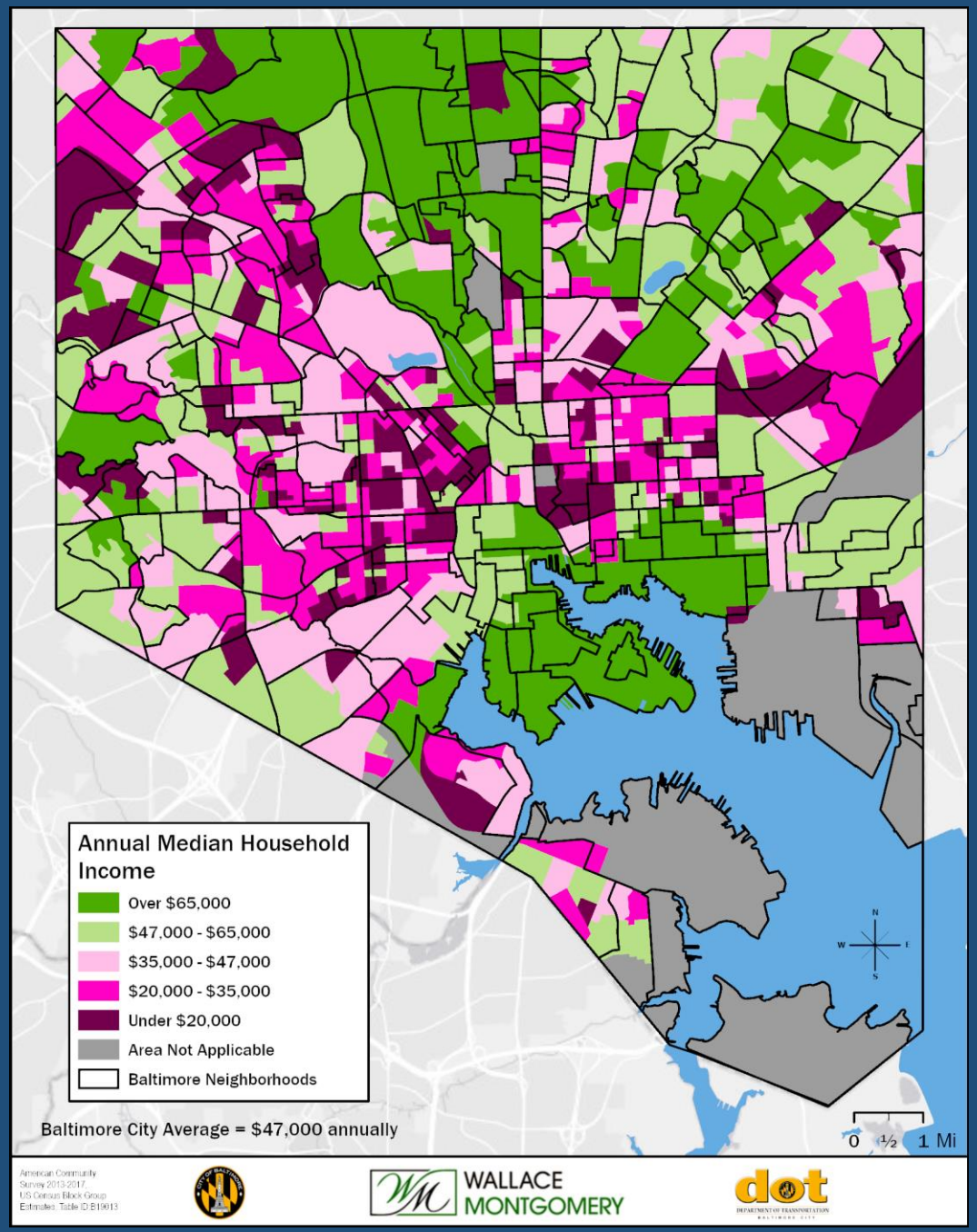

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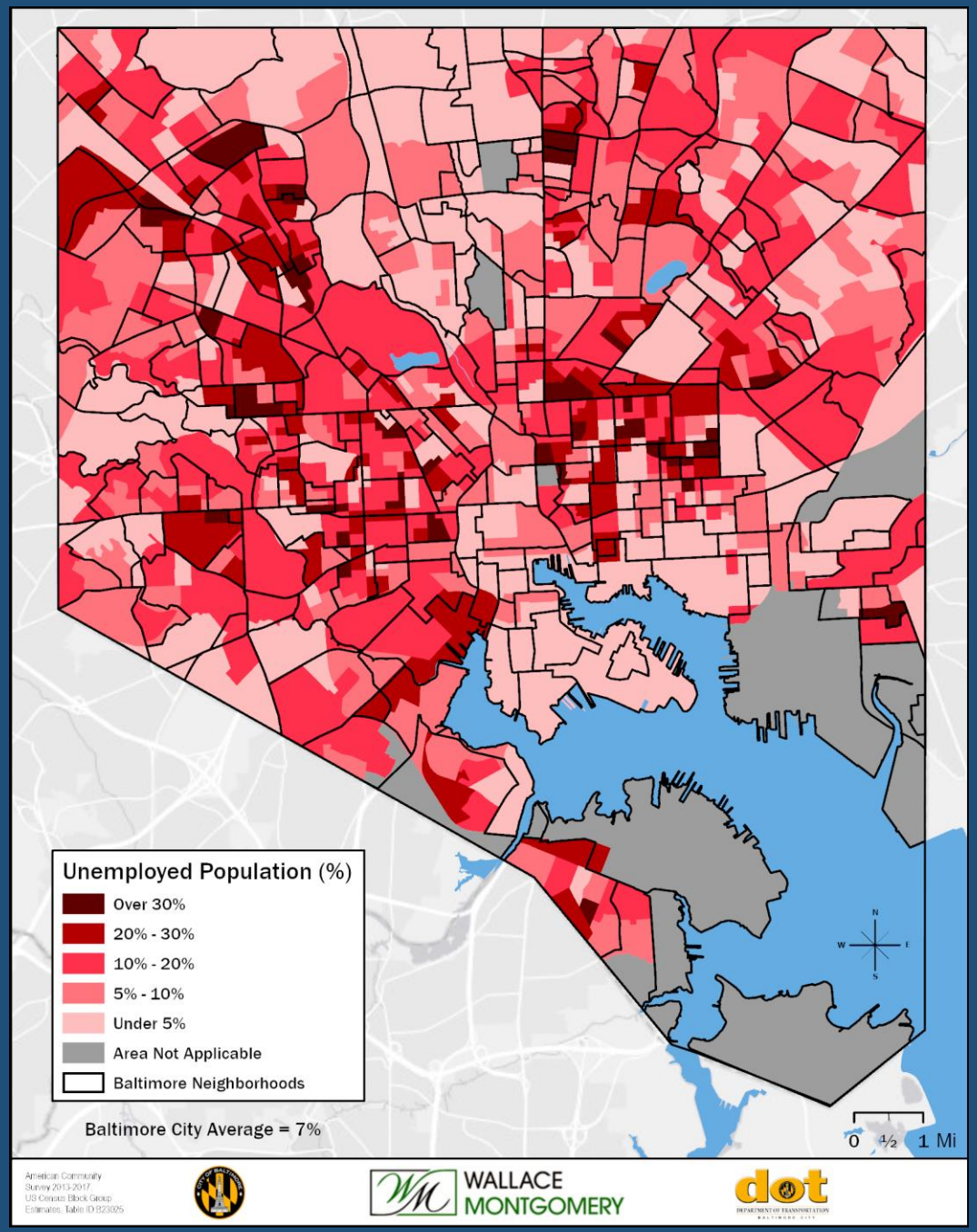

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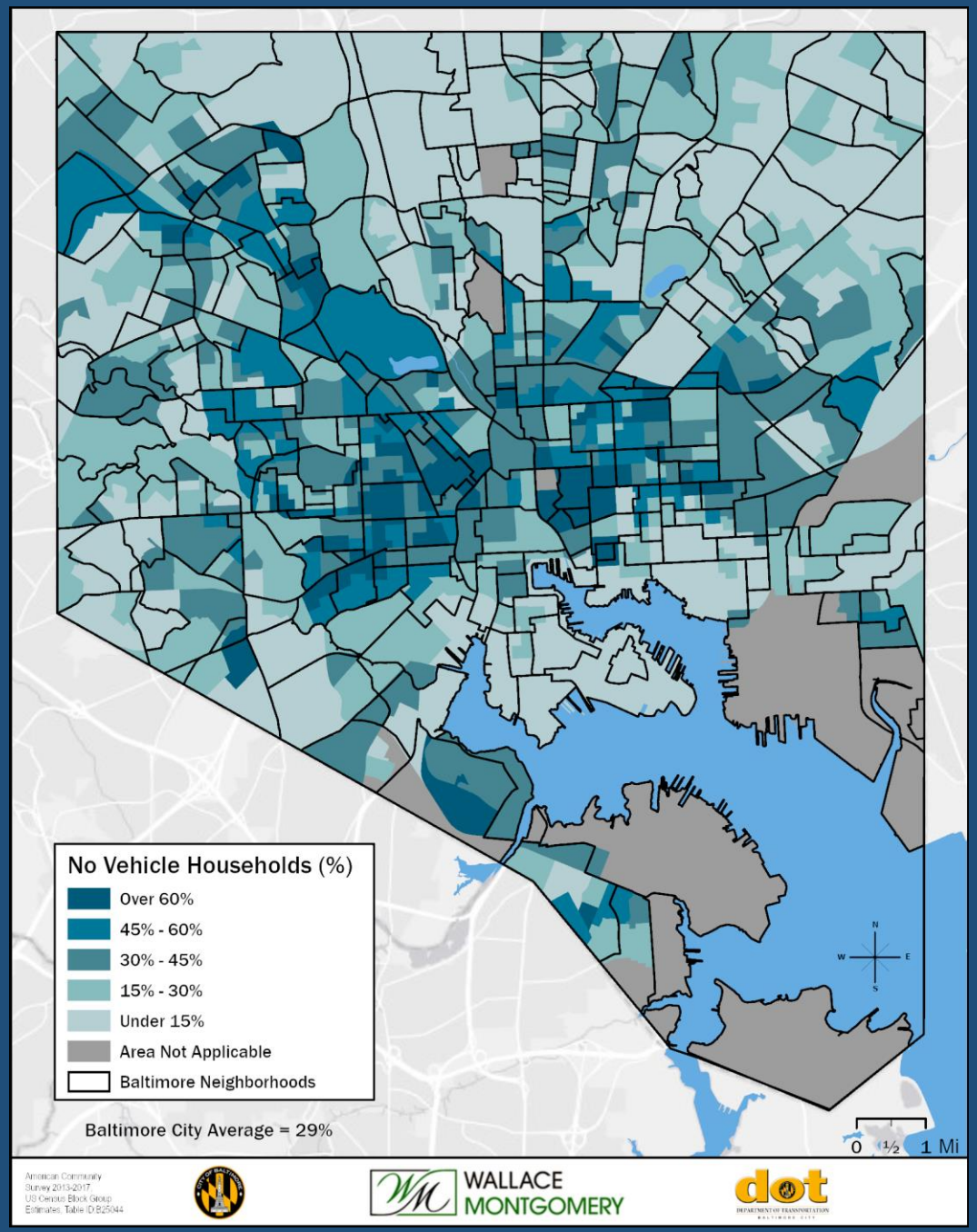

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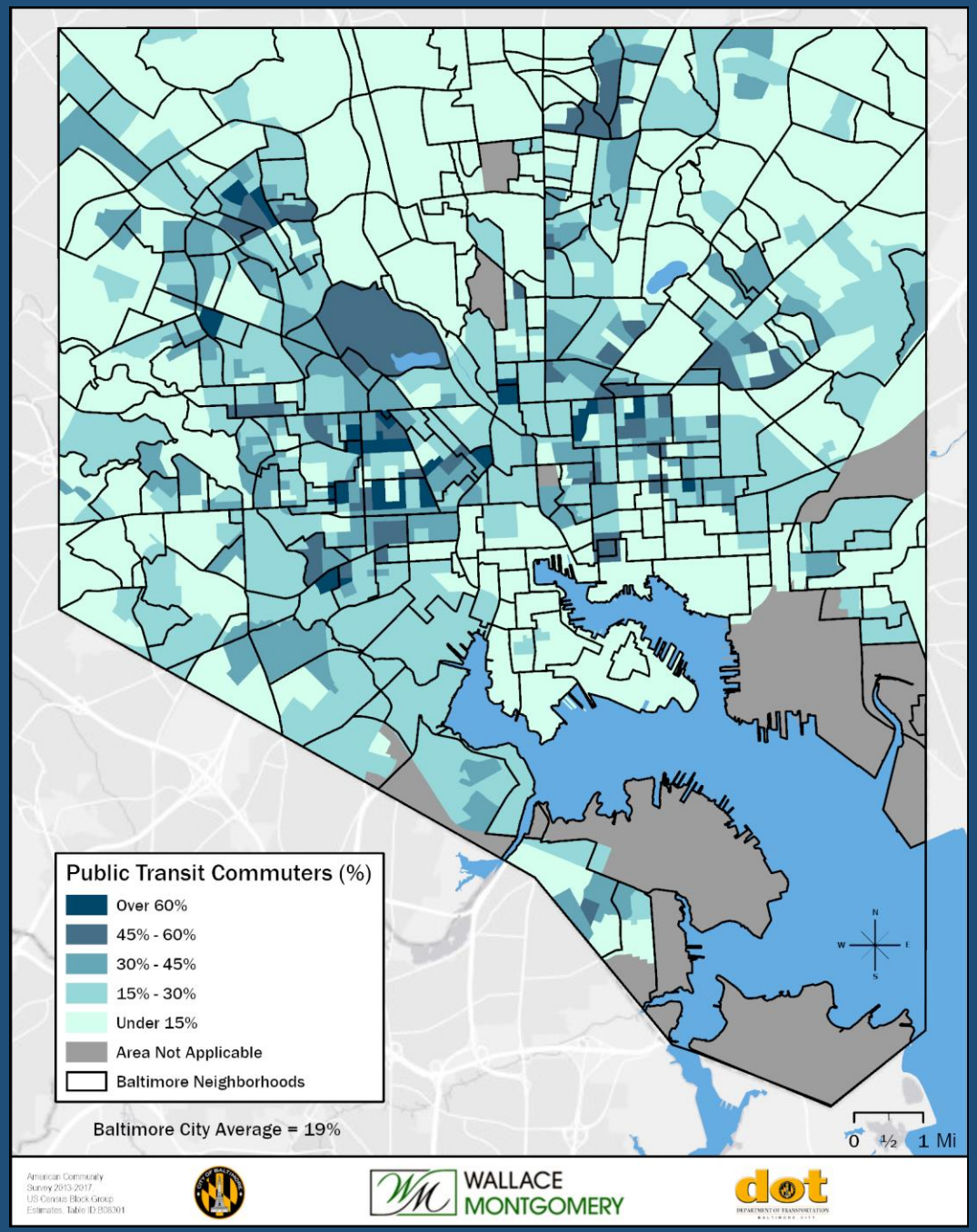

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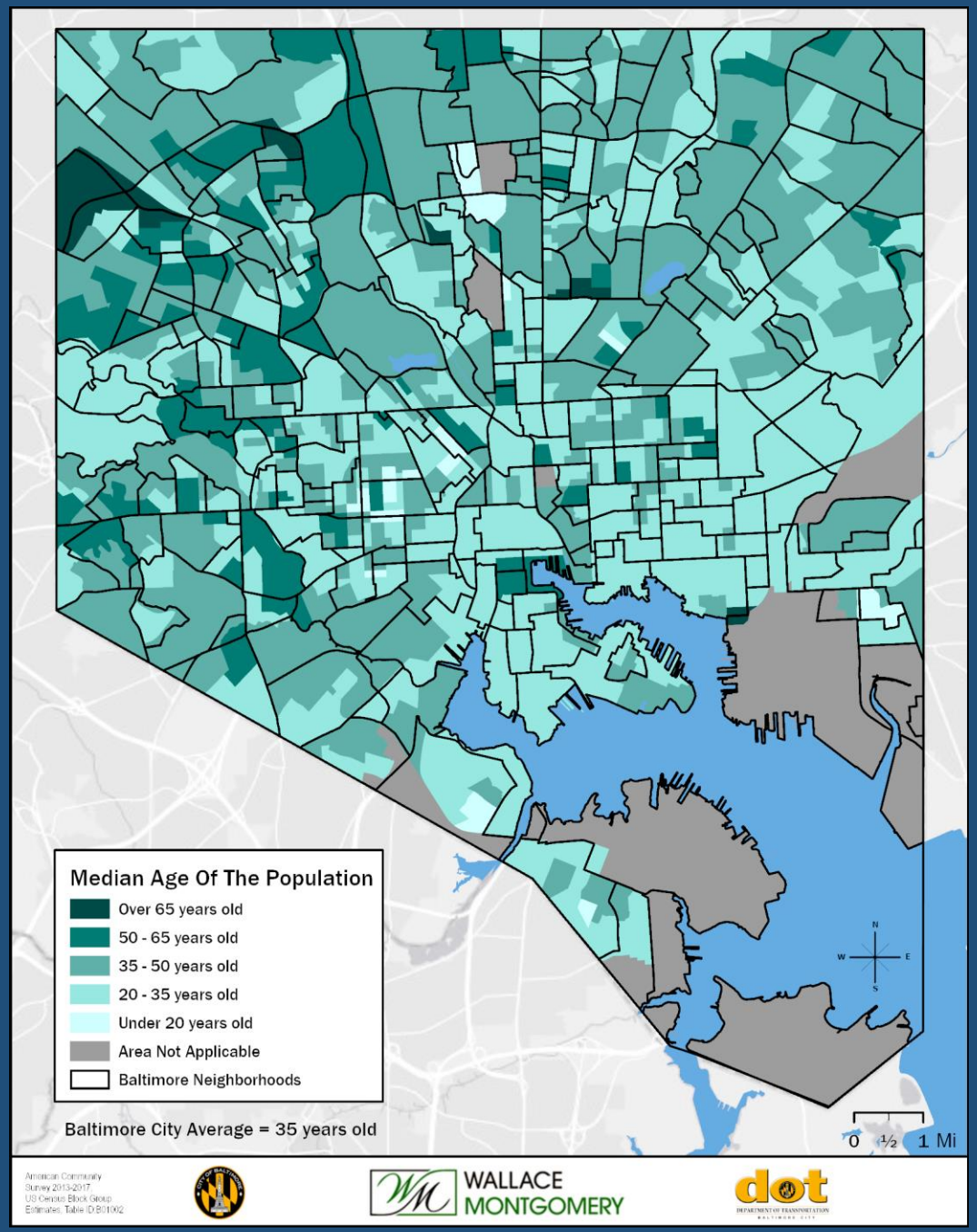

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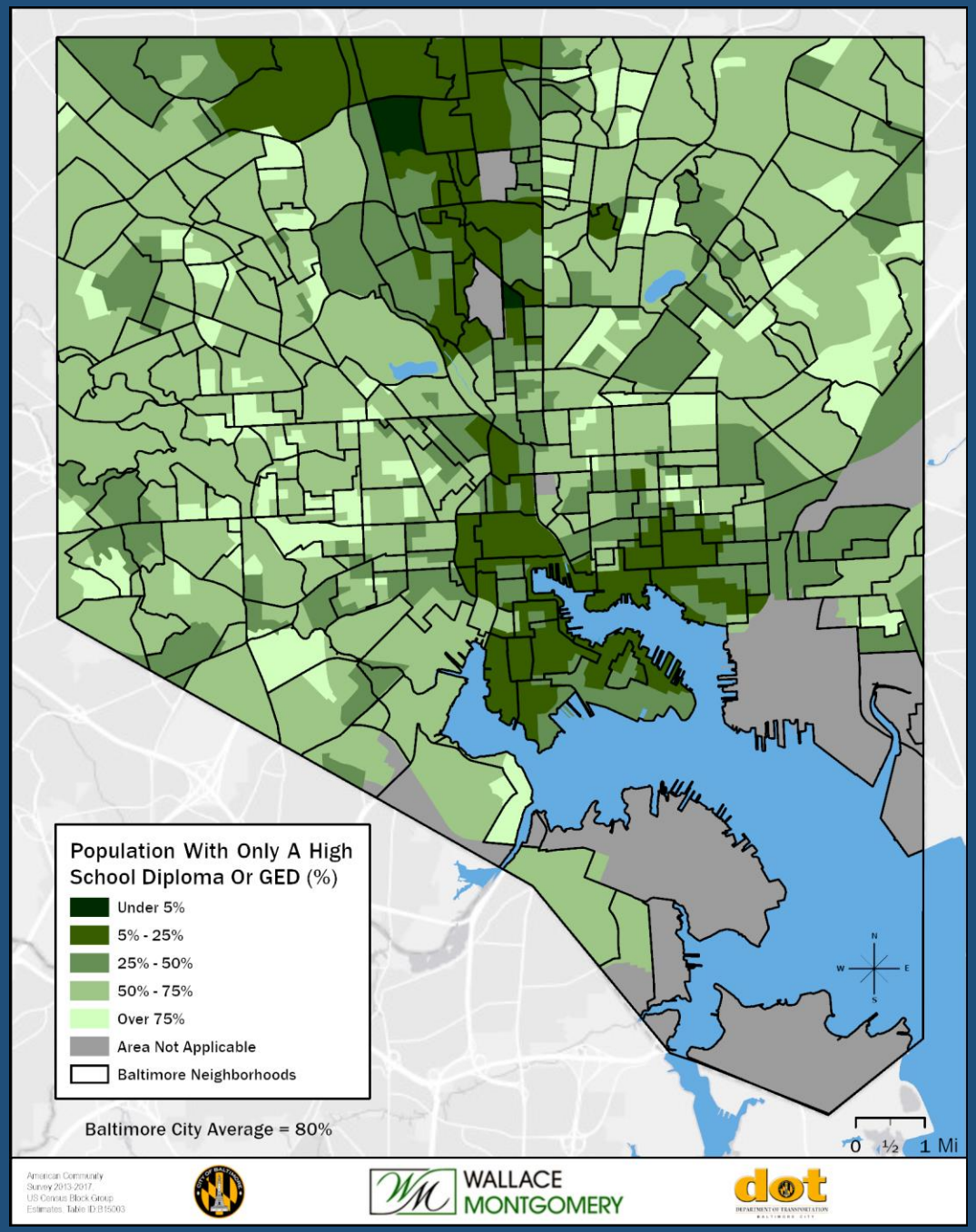

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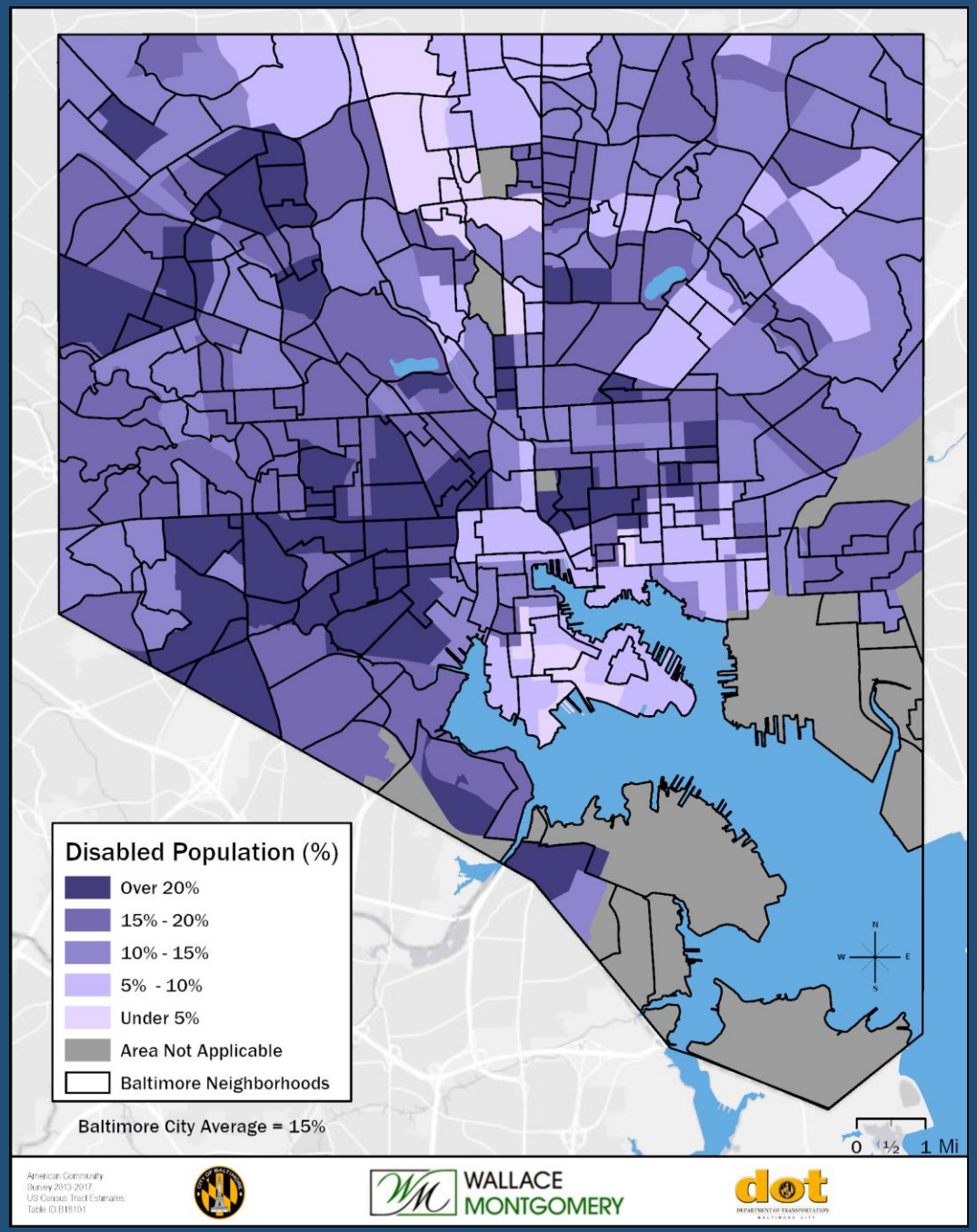

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