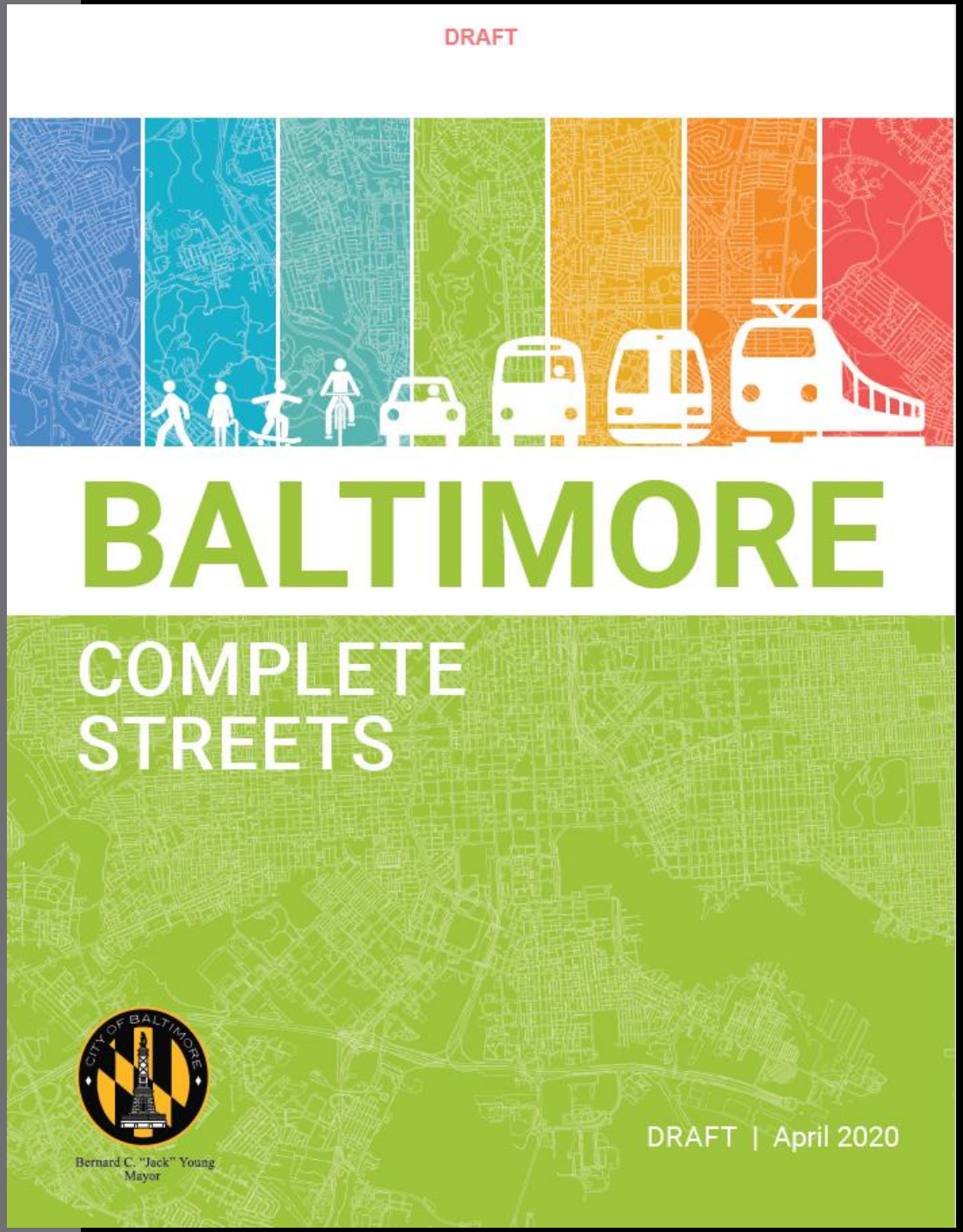

Baltimore Regional Transportation Board

Bicycle and Pedestrian Advisory Group

May 20, 2020

What it is, how it came about

ARTICLE 26
SURVEYS, STREETS, AND HIGHWAYS

(As Last Amended by Ord. 19-332)

Published by
BALTIMORE CITY DEPARTMENT OF LEGISLATIVE REFERENCE
Avery Aisenstark, Director
2020

SUBTITLE 40
COMPLETE STREETS

EDITOR'S NOTE TO SUBTITLE: This subtitle was enacted by Ordinance 18-197. Ord. 18-197, Section 3, provides for Part V {"Complete Streets Manual"} of this subtitle to take effect on that Ordinance's date of enactment (December 3, 2018), subject to certain time-phased activities mandated to be undertaken pending the later, effective date for the rest of the subtitle. In turn, Section 5 of Ord. 18-197, as that Section was subsequently amended by Ordinance 19-303, provides for the rest of the subtitle to take effect on the later, amendatory Ordinance's date of enactment (September 30, 2019). For a description of the interim time-phased activities, *see* **Editor's Note** following Part V.

Process of Manual Development

- Get a Consultant that's Done it Before

- Establish Advisory Committee

BALTIMORE CITY
DPW
DEPARTMENT OF PUBLIC WORKS

Department of Planning

Process of Manual Development

- Establish Working Groups

Acknowledgments

This Manual represents a collaborative effort between City and State agencies, consultant teams, and industry professionals, with oversight from the Complete Streets Advisory Committee. Each section within this Manual was developed based on research of industry best practices by the project team, then crafted with input from Complete Streets working groups and one-on-one sessions with City subject matter experts. The Advisory Committee and working groups met regularly throughout the development of the Manual to review project team recommendations and contribute to the shaping of the Manual to reflect Baltimore's unique culture and communities. The following is a list key participants in the development of the Complete Streets Manual.

PHOTO PLACEHOLDER

Baltimore City Complete Streets Advisory Committee

PHOTO PLACEHOLDER

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All photographs provided by Wallace Montgomery and Toole Design except where otherwise noted.

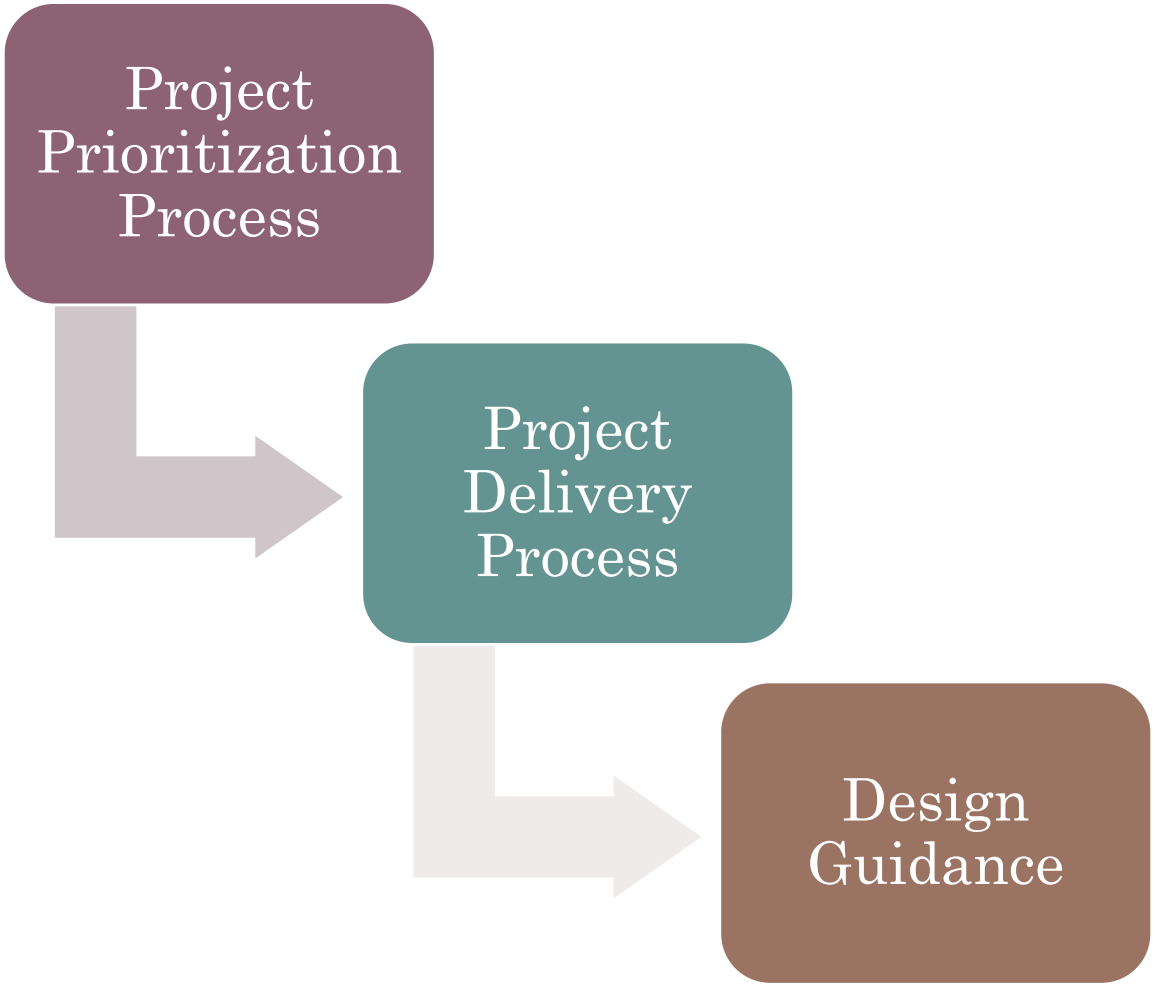
Process of Manual Development

- Establish Modal Hierarchy

- Establish "Guiding Principles"

    1. Safety First
    2. Be Accessible by Everyone
    3. Improve Mobility
    4. Ensure Equity
    5. Reflect Unique Communities

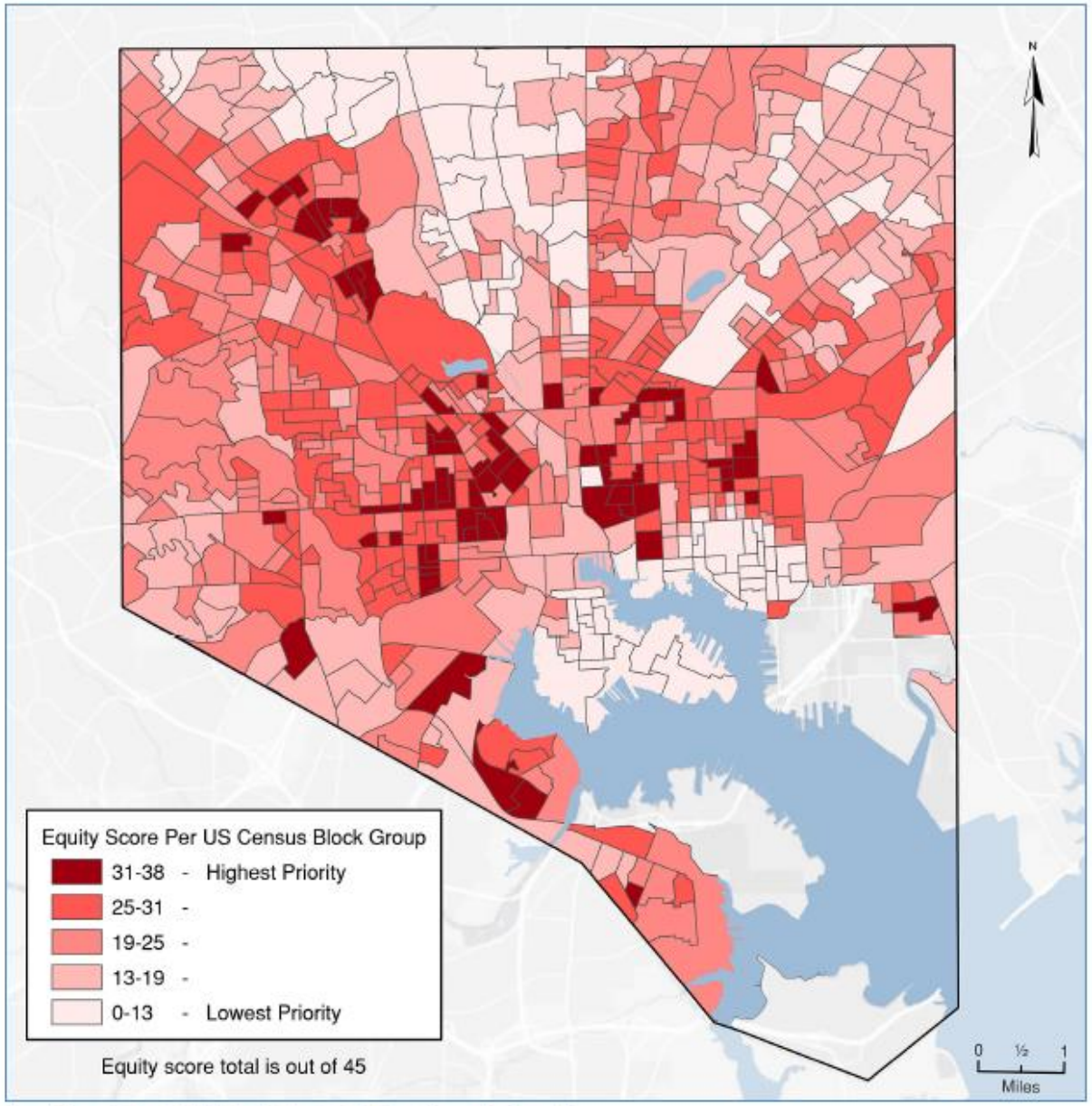
How Does This Manual Actually Get Things Done?



Project Prioritization

- Keep it Simple or it Won't Get Used
- Acknowledge Different Needs for Different Types of Work
- Lead with Safety and Equity

Figure 8. Equity Analysis for Baltimore City.



Example Composite Map of Multiple Equity Indicators for Baltimore Communities, Steps 1–5.

Project Prioritization

PROJECT PRIORITIZATION

Introduction

The Deparment of Transportation's process for Project Prioritization includes 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 this project prioritization process. These indicators represent population factors, recommended in the Complete Streets Ordinance, that can be quantifled 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 process. 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 offlcials.

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

This section provides guidance on how the Deparment of Transportation will prioritize projects from these three major categories. Following the prioritization of projects, the Project Delivery Process for each project shall be followed per the project delivery process section.

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

All sidewalks with a Sidewalk Condition Score of 5 will be prioritized and repaired regardless of other factors. The 311 system's role in this process will be used primarily to identify immediate safety issues, or sidewalks of the poorest ranking.

Step 3: Identify Sidewalk Needs

Identify sidewalks scored as a 4 on the Condition Assessment.

Step 4: Apply Equity Assessment

After immediate safety issues are identifled, the remaining sidewalk budget will be dedicated to sidewalks with a Sidewalk Condition Score of 4 that are in the two highest-rated equity zones.

Additional Considerations

- The equity assessment is the primary factor in the Prioritization Process for sidewalk projects, excluding immediate safety needs.
- Baltimore City Code, Article 26 Subtitle 10 defines the maintenance responsibilities for sidewalks adjacent to private properties. It is currently the owner's responsibility to maintain a state of good repair on the sidewalk adjacent to their property.
  - Historic Deparment of Transportation policy splits the cost of sidewalk repair and replacement 50/50 with the adjacent property owner.
  - The Prioritization Process cannot be an equitable process until the City assumes full responsibility for funding sidewalk repairs and replacement. Prioritizing work in disadvantaged areas of the city is equitable; charging the owners of adjacent properties in these areas that did not request the work is not equitable.
- Streetscape projects involving sidewalk work are excluded from this specifc project prioritization process.

Resurfacing

The City is responsible for maintenance of over 2,000 miles of roadways. All roadways are assigned a functional classifcation of:

- Local—lower traffc volume
- Collector—medium traffc volume
- Arterial—high traffc volume

The Deparment of Transportation typically resurfaces all local roads in-house and utilizes contractors for the resurfacing of collector and arterial roadways. The resurfacing of collector and arterial roadways occurs more often because of the increased traffc loads. collector and arterial roads are also usually wider than local roads.

Roadway resurfacing city-wide has historically been programmed based on requests and a Condition Assessment, which yields a Pavement Condition Index (PCI) value for each roadway segment. While certain roads can be subjectively chosen for resurfacing, there is a point at which the condition of a road is poor enough that prolonging planned resurfacing could lead to required roadway reconstruction, which involves signifcant added cost.

Project Prioritization

Project Prioritization Process Local Roads

Step 1: Set PCI Threshold

Establish a PCI threshold that triggers mandatory prioritization for roadway resurfacing to avoid future more costly reconstruction.

Step 2: Set PCI Ranking

Establish a PCI ranking to identify and map roadways in poor condition.

Step 3: Apply Equity Assessment

With the available resurfacing budget, apply the equity assessment by prioritizing projects on roadways in poor condition using the following chart as a guide

Equity Ranking	Percentage of Resurfacing Projects
4–5	55%
2–3	35%
1	10%

Collectors and Arterials

Step 1: Set PCI Threshold

Establish a PCI threshold that triggers mandatory prioritization for roadway resurfacing to avoid future more costly reconstruction.

Step 2: Set PCI Ranking

Establish a PCI ranking to identify and map roadways in poor condition.

Step 3: Apply Weighted Resurfacing Factors

Use the following chart to prioritize resurfacing projects on a weighted scale:

An assessment for each factor should be scored and mapped, with written justification for the score assigned.

Resurfacing Factor	Weighting
Equity	25%
PCI	25%
Traffic Volume	25%
Safety	25%

Additional Considerations

- The equity assessment is the primary factor in the prioritization process of local roads.
- Per the project delivery process, safety improvements and Complete Streets treatments should be considered and implemented when possible during the resurfacing process.

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

Step 2: Prioritize Projects

Identify potential projects according to area ranking and then evaluate and prioritize them according to the project delivery process, considering factors such as schedule, costs, permits, utilities and right-of-way.

Additional Considerations

- Due to CFR 650, federal requirements require bridge inspections to follow a strict sufficiency rating to identify structures in poor condition and mandate prioritization for improvements; therefore, bridge repair/reconstruction may not follow the outlined Prioritization Process.
- The CIP Prioritization Process must be applicable to a wide range of project types and thus should allow for subjectivity when used to identify potential project areas. Furthermore, the CIP Prioritization Process should be regularly evaluated and modified as program needs and resources change.

Project Delivery

- Projects Selected through Prioritization Process 
- Project Delivery Process Leverages Existing Work to Implement Complete Streets
  - “If This, Then That”

Appendix 2: Project Delivery Matrix

		Stage 1: Project Identification		Stage 2: Scoping																
		Goal: Identify / Promote Complete Streets in Project		Goal: Address All Needs Identified During Scoping																
				Research						Site Visits						Mapping and Analysis				
	Types of Work Done by Baltimore City DOT	Identify Project Initiation	Identify Project Budget	Examine Crash Reports	Examine Relevant Planned/Programmed Roadway Projects	Examine Neighborhood and Modal Plans	Examine Notable Developments In or Near Project	Review Prior Transportation & Traffic Studies	Summarize Prior Public Engagement	Initial Observation	Identify Desire Lines	Building Form and Function	Roadway Form and Function	Relate Crash Data to Field Conditions	Typical Sections	Determine Equity Factor/ Weighting	Analyze and Determine Street Type and Target Speed	Generate and Analyze Traffic Volume Map	Generate and Analyze Crash Diagram	Modal Deficiencies and Hierarchy Identification
ATVES	Automated Red Light Camera Program			x										x		x	x		x	
	Automated Speed Camera Program	x		x	x	o	o	x		x			x	x		x	x		x	
Conduit	Conduit Inspection/Repair																			
	Conduit Replacement	x	x	o	o/x	o	o	o	o	x	o	o	o	o	x	o	o	o	o	o
Maintenance	Grass Mowing																			
	Guardrail Installation/Maintenance																			
	Landscaping and Tree Planting				o	o	o					o	o		o	x				
	Pavement Marking Installation (Maintenance)				o	o					o		o			o				
	Pedestrian Light Installation/Repair																			
	Snow Removal		o																	
	Street Light Installation/Repair	x	x	x	x		x			x		x	x	x		x			x	x
	Street Pothole Repair															x				
	Street Repair	x	x							x						x				
	Street Resurfacing (Local)	x	x							x						x				
	Traffic Sign Installation																			
Planning	Freight Projects																			
	Placemaking Activities	x	x	o	o	o	o	o	o	x	x	x	x	x	x	o	x	o	o	x
	Safe Routes to School Study															x				
	Transportation Planning Study	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ROW	Permits for Special Events in the Right-of-Way																			
	Permits for Work in the Right-of-Way																			
Tec	ADA Curb Ramp Construction/Repair	x	x							x	x									
	Alley Reconstruction/Resurfacing																			
	Bridge Construction/Reconstruction	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Bridge Inspection																			
	Bridge Repair																			
	Sidewalk Repair									x						x				x
	Sidewalk Replacement	x	x		x	x	x			x	x	o	o		x	x				
	Street Reconstruction	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Street Resurfacing (Collector, Arterial)	x	x	x	o	o	o	o	o	o	o	o	x	x	x	x	o	o	x	x
	Streetscaping Projects	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Traffic	Pedestrian Safety Improvements	x	x	x	o/x	o/x	o/x	x	o	x	x	o	o	x	x	x	x	o	x	x
	Quick-Build Treatments	x	x	x	x	x	x	x	x	x	x	o	x	x	x	x	o/x	o	o	o/x
	Traffic Calming Study	x	x	x	x	x	x	x	x	x	x	o	o	x	x	x	o/x	o	o/x	x
	Traffic Circulation Study (One-Way/Two-Way Conversions)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Traffic Signal Design/Reconstruction/New Construction	x	x	x	x	o	o	x	o	x	x	o	x	x	x	x	x	x	x	x
	Traffic Signal Repair																			
	Traffic Signal Timing	x	x	x	o	o	o	o	o	x	o	o	o	x		x	x	x	o	x
	Transit Projects (Dedicated Lanes, TSP)	x	x	o	x	x	x	x	o	x	o	o	x	x	x	x	x	x	o	x
Transit	Bike Facility Planning and Design	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Shared Mobility Management	x	x													x	o	o	o	o

x = required o = optional ___ = N/A

Stage 3: Design													Stage 4: Construction			Stage 5: Measurement		Stage 6: Maintenance		
Goal: Address all Objectives Identified During Scoping													Goal: Ensure Project is Built as Designed for Complete Streets			Goal: Measure the Effectiveness		Goal: Ensure all users are accommodated for lifespan		
Create Design Alternatives				Schematic Design					Obtain Feedback and Approvals				Construction			Measurement		Maintenance		
Summarize Project Information from Scoping	Cross Section Development	Identify Complete Streets Features	Initial Public Engagement	Analyze Crashes and Design for Safer Streets	Apply Street and Intersection Designs and Policies	Create Geometric Layout	Conduct Signal Timing Analysis Related to Modal Priority	Review Intersection Design	Engage Internal Partners	Engage External Agencies	Engage Public Stakeholders	Prepare Preferred Alternative	Communicate Project Objectives to Staff and Contractors	Apply Modal Hierarchy to Maintenance of Traffic Plan	Public Outreach	Safety	Mode share	Identify Maintenance Needs	Establish Program Maintenance and Replacement Cycle	Program Funding for Maintenance
									x		x	x				x				
x	x	x	o	o	o	o	o	o	x	x	o	x	x	x	x			x	x	x
	o					o				o	o				o			o	o	o
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x	x	o	x	o	x	x	o	x	o	o	x	x	x	x	x	o	o	x	x	o
x	x	x	x	x	x	x	x	x	x	x	x	x						o	o	o
														x	o					
									o	o			o	x	o					
						x		x			x/o		x	x	x					
											x				x					
x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	o	x	x	x
														o						
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															o					
x	x	o	o	o	x	x		o	o	o	x	x	x	x	x					
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x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x
																	x	x	x	x

x = required o = optional ___ = N/A

Stage 3: Design													Stage 4: Construction			Stage 5: Measurement		Stage 6: Maintenance		
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									x		x	x				x				
x	x	x	o	o	o	o	o	o	x	x	o	x	x	x	x			x	x	x
	o					o				o	o				o			o	o	o
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					x		x		x		o	o				x				
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x
																	x	x	x	x

x = required o = optional ___ = N/A

Design Guidance

- Projects Selected through Prioritization Process 
- Project Delivery Mandated Complete Streets Improvements 

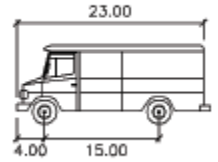
- Design Guidance Helps Make Decisions about Priorities and Actual Design

Design Guidance: Overall Design Guidance

- Design Vehicles
- Curb Radii
- Lane Widths

General Design–DL-23

This is a standard delivery vehicle often used for package delivery services to both residential and business locations. The DL-23 shall be the design vehicle on any street that does not accommodate a transit route or a truck route. This is based on the most recent edition of NACTO *Urban Street Design Guide* as specified in Baltimore City Code Art. 26 Subtitle 40 Complete Streets SS 40-27(B).



DL–23

Travelway Width

The width of the travelway lanes is established by law and is based on the functional classification in the *Baltimore City Roadway Functional Classification Map* as follows:

1. Local Designated Roads
   Maximum 9' wide lanes
2. Collectors and arterials
   Maximum 10' wide lanes
3. Transit Streets and Truck Routes
   On a transit street or truck route, one lane in each direction may be up to 11' wide. For further details, see Transit Facilities.

This criteria is reflected in the travel lane widths provided for each Street Type in Appendix 1.

Table 9. Standard Radii for Intersection Design/ Redesign and Quick-Build Projects

Street Intersections	Effective Curb Radius
Residential Streets	10 feet
Mixed Use/Commercial (Not Transit/Truck Routes)	15 feet
Transit Streets	20 feet
Local Truck Routes	25 feet
Major Truck Routes	25–30 feet

Strategies and Guidance for Minimizing Curb Radii

Minimizing curb radii slows turning vehicles, improves sightlines, and shortens crossing distances, all of which increase the safety and comfort of vulnerable users at intersections. The following strategies should be employed by designers to ensure curb radii is minimized while still serving the appropriate design and control vehicles:

Design Guidance: Street Types

- Street Types are the Foundation
  - Not Just Functional Classification
  - Not All About Traffic Volumes

02

STREET TYPOLOGY

The City of Baltimore's Street Typology is a collection of ten different Street Types that, taken together, form a new vision of how Baltimore's streets can better serve all who use them. Created to consider the adjacent land uses and diverse range of conditions in Baltimore, each Street Type establishes priorities that will guide both future development and current road design projects. Guidance throughout this document will show how different elements of the public realm, such as sidewalks, roadways, intersections, and uses along the curb should function with respect to the Street Types.

See Downtown Commercial on page 12.

See Downtown Mixed-Use on page 14.

See Urban Village Main on page 16.

See Urban Village Neighborhood on page 18.

See Urban Village Shared on page 19.

See Urban Center Connector on page 20.

See Neighborhood Corridor on page 22.

See Industrial Access on page 24.

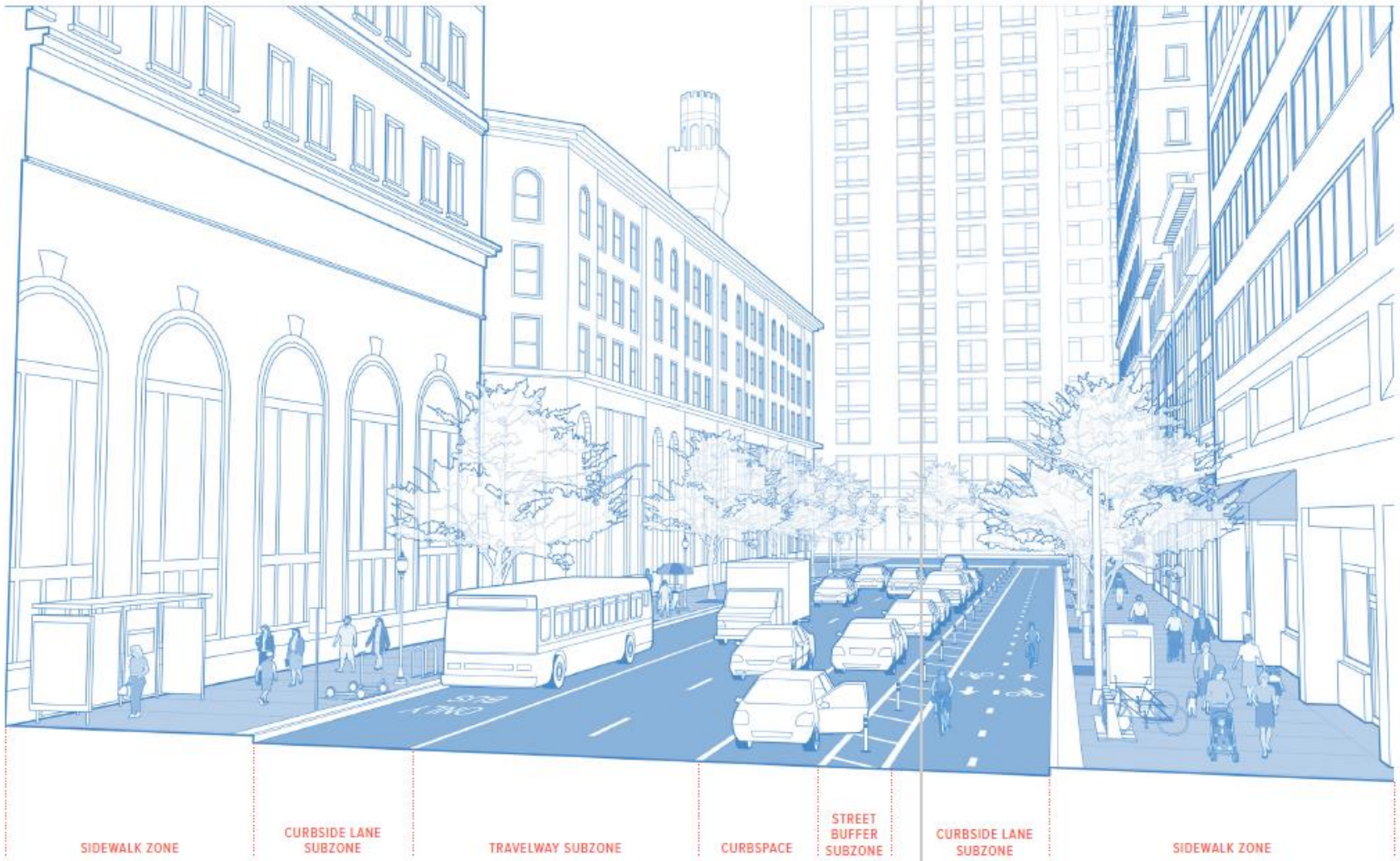
See Parkway on page 26.

See Boulevard on page 28.

Design Guidance: Street Types

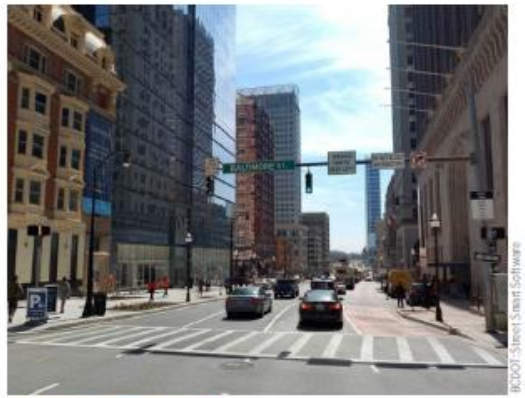
Downtown Commercial

Downtown Commercial Streets have a vibrant streetscape that supports active street-level uses and provides access to downtown businesses, residences and transit services. Lined primarily with high density commercial uses forming a continuous street wall, these streets require wide sidewalks to accommodate high pedestrian volumes and amenities that provide comfortable and attractive public space. These streets support frequent transit in many cases, and therefore on-street parking and loading may be limited to off-peak hours. These functions may be additionally be accommodated by the presence of nearby Downtown Mixed-Use Streets. High demand for space in the right-of-way on Downtown Commercial and Downtown Mixed-Use Streets often limits green infrastructure options to prioritizing street trees, both retained and new. Despite these limitations, there remains an emphasis on canopy cover to provide optimum benefits compatible with the spatial requirements for other infrastructure.



Examples of Downtown Commercial Streets in Baltimore

East Lombard Street in Downtown Baltimore



Light Street in Downtown Baltimore

Design Guidance: Allocating Space within the Right of Way

Table 1. Limited Right-of-Way Priorities

Street Type	Sidewalk Zone		Roadway Zone			
	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
Urban Village Main	1	2	3	6	4	5
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	3	5	4	6
On Truck Route	1	2	4	6	3	5
Urban Village Neighborhood	1	2	3	5	4	6
On Bicycle Network	1	2	4	3	5	6
On Transit Network	1	2	3	5	4	6
On Truck Route	N/A	N/A	N/A	N/A	N/A	N/A
Urban Village Shared Street	1	3	4	N/A	2	N/A
On Bicycle Network	1	3	4	N/A	2	N/A
On Transit Network	1	3	4	N/A	2	N/A
On Truck Route	N/A	N/A	N/A	N/A	N/A	N/A
Urban Center Connector	1	4	5	6	2	3
On Bicycle Network	1	5	6	2	3	4
On Transit Network	1	4	3	6	2	5
On Truck Route	1	4	5	6	2	3

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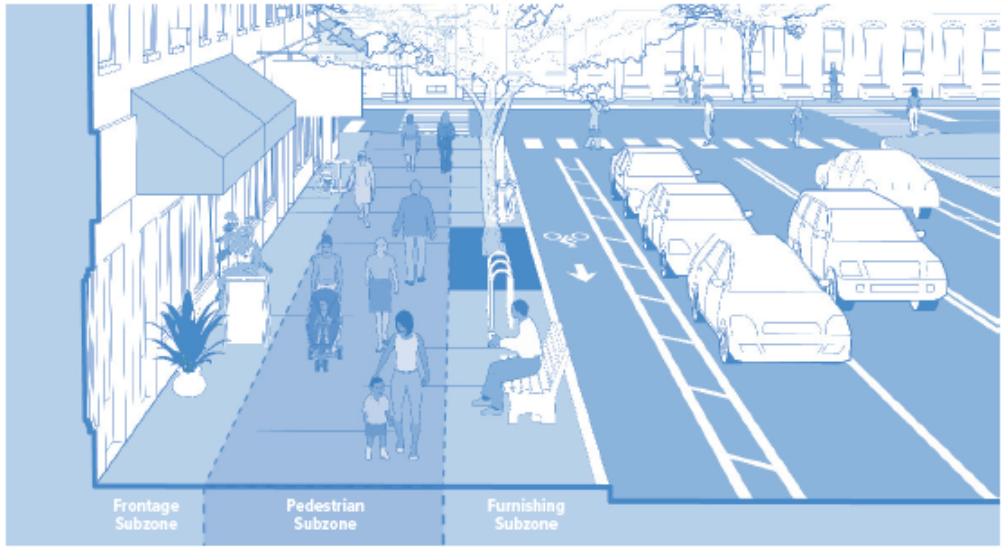
Street Type	Sidewalk Zone		Roadway Zone			
	Pedestrian Subzone	Furnishing Subzone	Curbspace	Curbside Lane Subzone	Travelway Subzone	Median Subzone
Neighborhood Corridor	1	2	4	6	3	5
On Bicycle Network	1	2	4	5	3	6
On Transit Network	1	2	4	6	3	5
On Truck Route	N/A	N/A	N/A	N/A	N/A	N/A
Industrial Access	1	5	3	6	2	4
On Bicycle Network	1	5	6	3	2	4
On Transit Network	1	4	3	6	2	5
On Truck Route	1	5	3	6	2	4
Parkway	1	4	5	6	2	3
On Bicycle Network	1	5	6	2	3	4
On Transit Network	1	4	3	6	2	5
On Truck Route	1	4	5	6	2	3
Boulevard	1	2	5	6	3	4
On Bicycle Network	1	2	6	3	4	5
On Transit Network	1	2	3	5	4	6
On Truck Route	1	3	5	6	2	4

(1) If a street has more than one modal priority, the most vulnerable user will be the highest priority.
(2) On Street Types with low priority for the curbspace, curbside lane subzone, or median subzone, these facilities may be eliminated. A high priority indicates that it is desirable to include them.
(3) The target Walking Sidewalk Clear Zone as indicated in Table 2 should be met in all conditions. Constrained widths should only be used under special circumstances as approved by the Baltimore City Department of Transportation.
(4) The bicycle network shall include any future micromobility network.

Design Guidance: Going Beyond the 5' Sidewalk

SIDEWALK ZONE



The sidewalk zone is an integral part of each of Baltimore's unique Street Types, as it reflects community values and provides movement through the public space. This realm functions as a gathering space for residents who use the amenities for economic, social and leisure activities. The sidewalk zone is split into three sections that include the frontage, pedestrian and furnishing subzones. Each of these subzones has a unique role in the sidewalk zone and facilitates a Complete Street. Table 2 provides width requirements for each subzone by Street Type. For a complete list of design criteria requirements for a Complete Street, see Appendix 1. This section also includes detailed descriptions of each of the subzones.

Frontage Subzone

The frontage subzone is the portion of the sidewalk zone that is between the right-of-way line (buildings/private property) and the pedestrian subzone. Depending on the Street Type, adjacent land use, and neighborhood density, the look and use of the frontage subzone can vary greatly. The Street Types guide the specifications of the frontage subzone, reflecting the environment and right-of-way. The potential uses for the frontage subzone include sidewalk cafés, store entrances, retail displays, landscaping, bicycle parking, benches, stoops, utility meters, etc.

Design

- Accessible entrances to buildings shall be provided in accordance with City of Baltimore Standards Specification 2006 C (as amended).
- The frontage subzone should not encroach on the pedestrian subzone.
- The frontage subzone may be expanded with modification to the pedestrian subzone to provide for sidewalk cafes.

Table 2. Sidewalk Zone Requirements

Street Type	Requirements	Subzone		
		Frontage	Pedestrian (1,2)	Furnishing (2)
Downtown Commercial	Maximum	—	—	—
	Target	2'	12'	7'
	Constrained	0'	8'	4'
Downtown Mixed-Use	Maximum	—	—	—
	Target	2'	10'	7'
	Constrained	0'	8'	4'
Urban Village Main	Maximum	—	—	—
	Target	2'	8'	7'
	Constrained	0'	5'	3.5'
Urban Village Neighborhood	Maximum	—	—	—
	Target	2'	6'	7'
	Constrained	0'	5'	3.5'
Urban Village Shared Street	Maximum	—	—	—
	Target	2'	5'	—
	Constrained	0'	5'	—
Urban Center Connector	Maximum	—	—	—
	Target	2'	5'	7'
	Constrained	0'	5'	3.5'
Neighborhood Corridor	Maximum	—	—	—
	Target	2'	5'	7'
	Constrained	0'	5'	3.5'
Industrial Access	Maximum	—	—	—
	Target	2'	5'	7'
	Constrained	0'	5'	3.5'
Parkway	Maximum	—	—	—
	Target	2'	6'	10'
	Constrained	0'	5'	5'
Boulevard	Maximum	—	—	—
	Target	2'	12'	10'
	Constrained	0'	8'	5'

(1) Sidewalk designed to Baltimore City Standards.
(2) For width requirements of raised cycletracks, side paths, and shared use paths refer to Bicycle Facilities.

Design Guidance: Going Beyond the 5' Bike Lane

Bicycle Facilities

A Complete Streets network includes bicycle infrastructure that allows bicyclists and other micromobility users safe and stress-free transportation throughout the City. The number micromobility users is expected to grow based on Baltimore City's recent experience with dockless e-scooters (see Micromobility), but for now all facilities will be referred to as "bicycle facilities" in line with national standards. The most recent version of the Baltimore City *Bike Master Plan* and the supplemental Baltimore City *Separated Bike Lane Network* identify the recommended bicycle network for the City.

This Manual further refines the facility type decision process with two resources: (1) the facility type shown within the street's designated Street Type, and (2) NACTO's *Choosing an All Ages & Abilities Bicycle Facility* (modified to fit the needs of Baltimore), shown below.

Standards

The following are summaries of the types of bicycle facilities that can be implemented as part of a Complete Streets network. Designers should also refer to the most recent versions of the AASHTO *Guide to the Development of Bicycle Facilities*, the FHWA *Bikeway Selection Guide* and the NACTO *Urban Bikeway Design Guide* for the latest guidance. The following table provides design criteria for bicycle facilities based on Street Type. For a complete list of design criteria requirements for a Complete Street, see Appendix 1.

Table 3. NACTO's Choosing an all Ages & Abilities Bicycle Facility, Modified to be Baltimore-Specific

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed	Target Motor Vehicle Volume (Single Direction ADT)	Motor Vehicle Lanes	Key Operation Considerations	
Any			Any of the following: • high curbside activity • high frequency bus service • high levels of motor vehicle congestion • high number of turning conflicts	Separated Bike Lanes or Shared-Use-Path
<10 mph	Less relevant	No Centerline or single lane one-way	Pedestrians share the roadway	Urban Village Shared Street
≤20 mph	1,000–2,000		<50 motor vehicles per hour in the peak direction at peak hour	Bicycle Boulevard, Contra-Flow Bike Lane (1)
≤25 mph	500–1,500			
	1,500–3,000	Single lane each direction or single lane one-way	Low curbside activity or low congestion pressure	Traditional or Buffered Bicycle Lane, Left-Side Bike Lane (1), Buffered Counterflow Bike Lane (1) or Separated Bicycle Lane
	3,000–6,000			Buffered Bicycle Lane, or Protected Bicycle Lane
	> 6,000			Separated Bicycle Lane
	Any	Multiple lanes per direction		Separated Bicycle Lane
>25 mph	≤6,000	Single lane each direction	Low curbside activity or low congestion pressure	Separated Bicycle Lane, or reduce speed
>25 mph		Multiple lanes per direction	Low curbside activity or low congestion pressure	Separated Bicycle Lane, reduce to Single Lane or reduce speed
>25 mph	>6,000	Any	Any	Separated Bicycle Lane
High-speed limited access roadways	Any	Any	High pedestrian volume	Shared-Use-Path with Separated Walkway or Separated Bicycle Lane

(1) Facility is not included within NACTO's *Choose an All Ages & Abilities Bicycle Facility*. Facility is provided as an available option with approval from Baltimore City Department of Transportation.
(2) While an improvement relative to having no bike facility, shared bus-bike lanes should not be considered part of the low stress bike network and are not included within NACTO's *Choose an All Ages & Abilities Bicycle Facility*. Shared transit lanes are currently in use within Baltimore and can be implemented with approval from Baltimore City Department of Transportation and Maryland Transit Authority.

Table 4. Bicycle Facility Design Criteria

		Bicycle Facility					
Street Type	Requirements	Shared Use -Path	Separated Bike Lane (1)	Two-Way Street Separated Bike Lane (2)	Buffered Bike Lane (3)	Traditional Bike Lane	Shared Facility
Downtown Commercial	Maximum	N/A	-	-	8'	N/A	N/A
	Target	N/A	10'	15'	8'	N/A	N/A
	Constrained	N/A	8'	11'	6.5'	N/A	N/A
Downtown Mixed-Use	Maximum	N/A	-	-	8'	7'	N/A
	Target	N/A	10'	15'	8'	6'	N/A
	Constrained	N/A	8'	11'	6.5'	5'	N/A
Urban Village Main	Maximum	N/A	-	-	8'	7'	N/A
	Target	N/A	10'	15'	8'	6'	N/A
	Constrained	N/A	8'	11'	6.5'	5'	N/A
Urban Village Neighborhood	Maximum	N/A	N/A	-	8'	7'	(4)
	Target	N/A	N/A	15'	8'	6'	(4)
	Constrained	N/A	N/A	11'	6.5'	5'	(4)
Urban Village Shared Street	Maximum	N/A	N/A	N/A	N/A	7'	(4)
	Target	N/A	N/A	N/A	N/A	6'	(4)
	Constrained	N/A	N/A	N/A	N/A	5'	(4)

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Design Guidance: Fix Our Signals

Table 8. Desirable Signal Timing Based on Street Type

Street Type	Timing Method	Peak Hours Cycle Length (sec.) (3)	Non-Peak Hours Cycle Length (sec.) (3)	Clearance Intervals	Pedestrian Phases	Coordination	Green Time Allocation
Downtown Commercial	(1)	60-90	60	(4)	(5)	(7)	(8)
Downtown Mixed-Use	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Main	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Neighborhood	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Village Shared Street	(1)	60	40-60	(4)	(5)	(7)	(8)
Urban Center Connector	(1), (2)	90-120	60-90	(4)	(6)		(9)
Neighborhood Corridor	(1)	60	40-60	(4)	(5)	(7)	(8)
Industrial Access	(1), (2)	90-120	60-90	(4)	(6)		(9)
Parkway	(1), (2)	90-120	60	(4)	(6)		(9)
Boulevard	(1)	60-90	60	(4)	(5)	(7)	(8)

(1) Pretimed (Coordinated where feasible).
(2) Actuated.
(3) Peak hours assumed to be 7AM-9AM and 4PM-6PM. Unique circumstances require exceptions.
(4) Yellow clearance intervals shall be calculated based on the target and posted speed and be kept as short as permitted by law. Red clearance intervals should be based on ITE clearance interval calculation formulas but consider engineering judgment. The goal should be to keep the red clearance interval as short as possible but minimize conflicts resultant from vehicles not clearing the intersection prior to a conflicting phase.
(5) Pedestrian Phase—Urban
- Pedestrian phases shall be recalled every cycle regardless of pedestrian presence.
- Pedestrian walk interval time can be decreased to 4 seconds to allow for a shorter desired cycle length, if this is determined to be adequate based on the characteristics of the crossing and pedestrians utilizing the intersection.
- Minimum pedestrian clearance time calculations shall include the yellow change/buffer interval. The pedestrian change interval may:
  - Include or exceed all of the minimum pedestrian clearance time or

(table continued from previous page)

- Pedestrian walk interval can be decreased to 4 seconds to allow for a shorter desired cycle length.
- Minimum pedestrian clearance time calculations shall include the yellow change interval.
- To obtain the goal of a short cycle length while providing adequate time for crossing, the pedestrian change interval shall be set on the assumption that the minor approach can receive up to the same amount of green time as the major approach.

(7) Coordination:
- When progression is desired, offsets/coordination parameters should be set based on the target speed. For the majority of urban roadways, this should be 20 mph.
- Offsets may need to be set differently to consider complex queue interaction.

(8) Green-Time Allocation—Urban
- To obtain the goal of a short cycle length while providing adequate time for crossing, the pedestrian change interval shall be set on the assumption that the minor approach can receive up to the same amount of green time as the major approach.
- The minor approach should receive no less than a 2/3 ratio of the green-time that the major approach receives.

(9) Green-Time Allocation—Suburban/Industrial
- The minor approach should receive no less than a 1/2 ratio of the green-time that the major approach receives.

- Where they're Placed
  - Real life Guidance (Not Just the MUTCD)
- How They're Timed
- Specific Guidance

Design Guidance: Fix Our Signals

Figure 2. Corridor-Based Signal Timing with Longer Cycles

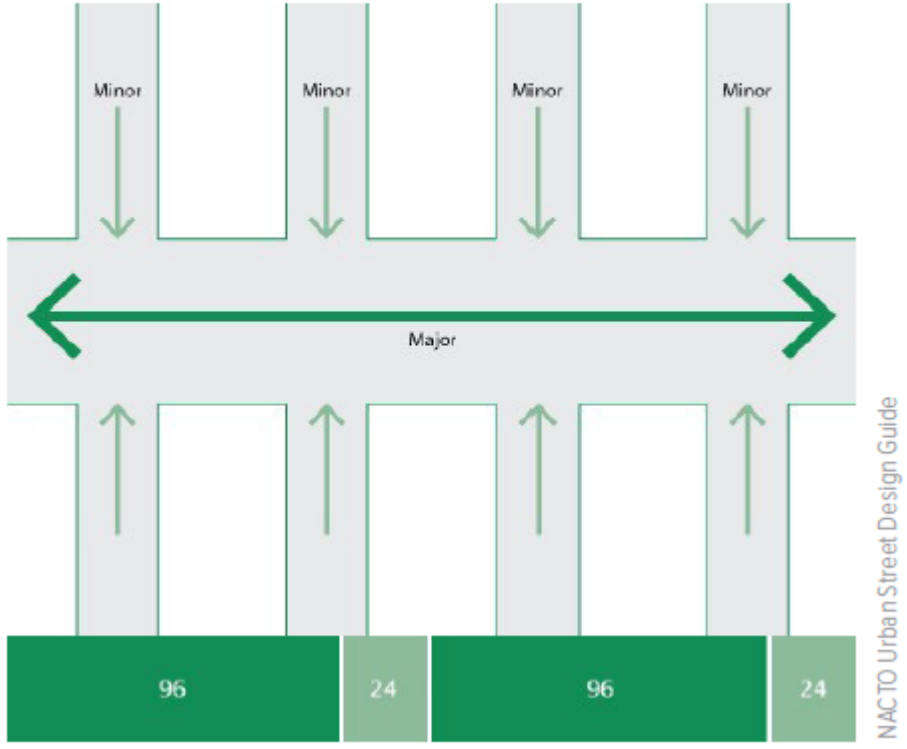
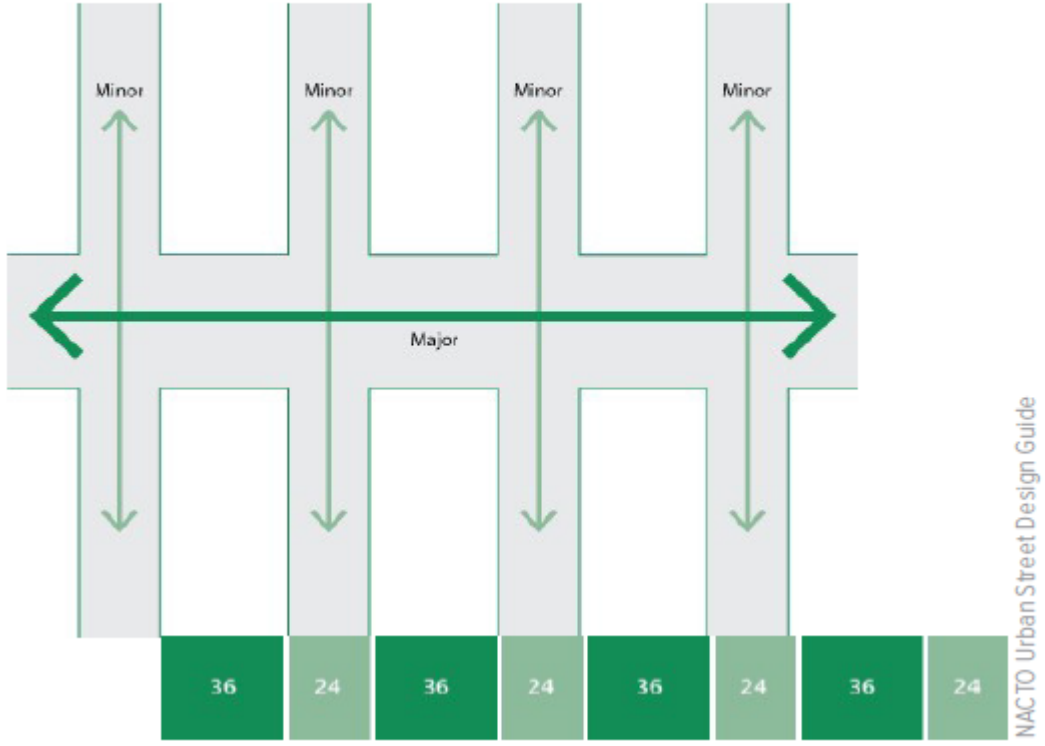


Figure 3. Balanced Signal Timing with Shorter Cycles



Public Engagement

- Equity in Engagement
  - Establishing Ambassador Program to Reach People
  - Family Friendly Meetings
- Stages at Which to Engage:
  - Project Identification
  - Funding/CIP Stage
  - Project Initiation
  - Concept Development
  - Pre-Final Design
  - Pre-Construction

Things Included but not Mentioned

- Curbspace Management
- Micromobility
- Transit Facilities (Largely Defer to MDOT MTA's Bus Stop Design Guide
- Traffic Calming Treatments
- Intersection and Crossing Treatments (Passive vs. Active)
- Sustainable Stormwater Management

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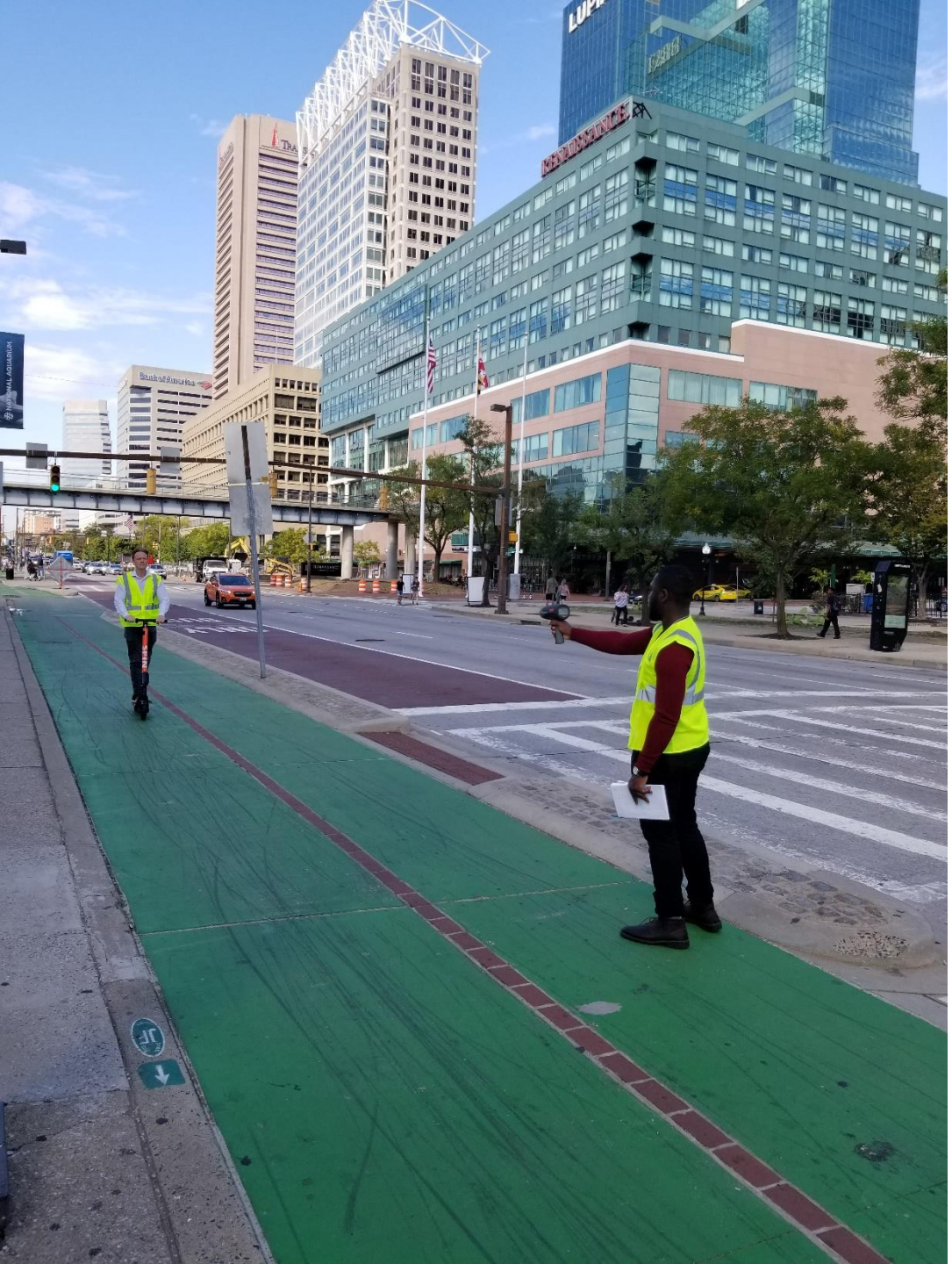

Feel Free to Follow-up With Questions

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