

GetOnBoardBRT

BUS RAPID TRANSIT IN MONTGOMERY COUNTY

Bus Rapid Transit Station Prototype Designs

TPB Regional Public Transportation Subcommittee
July 25, 2017

Darcy Buckley, MCDOT

Overview

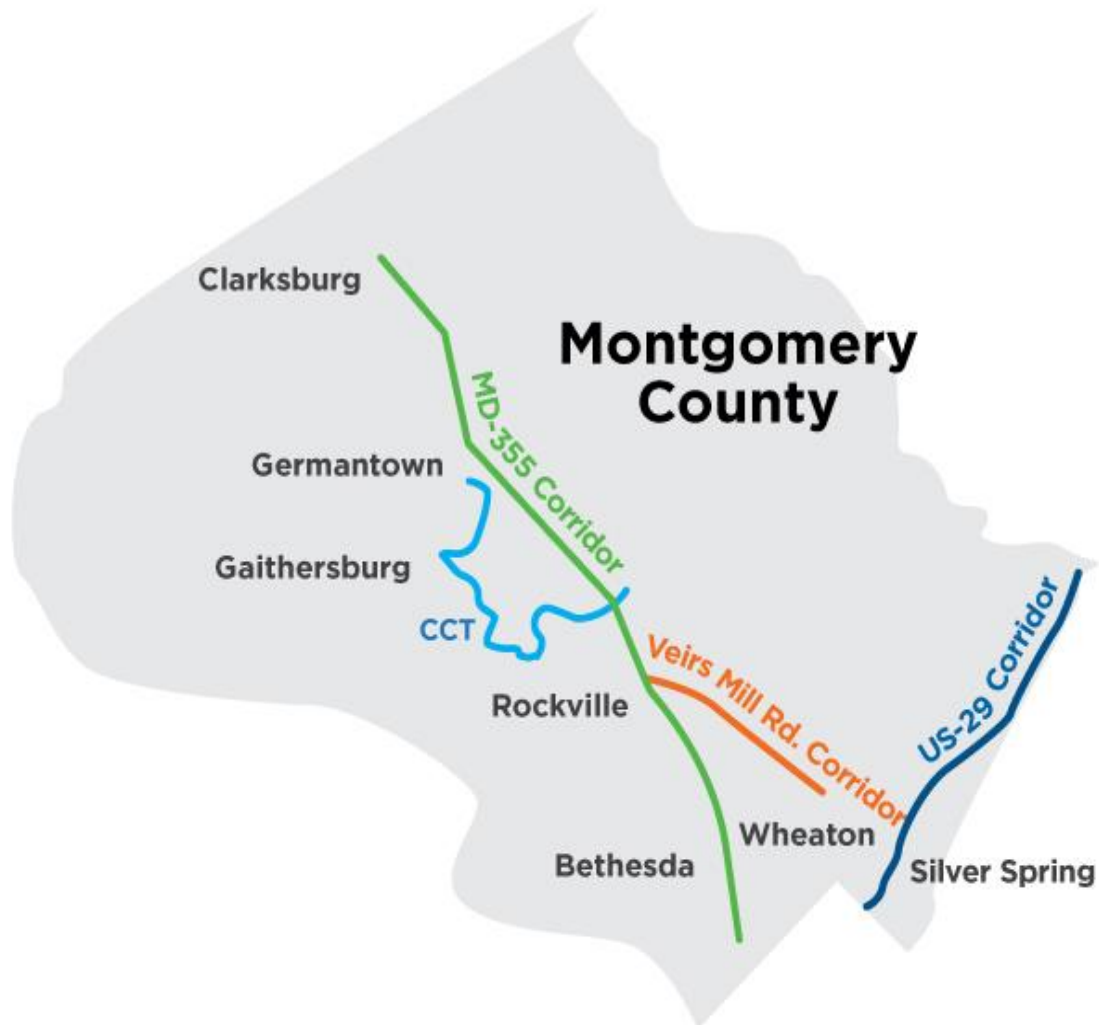
- Project Overview
- Prototype Design



APPENDIX STUDY PROCESS EXHIBITS

WORKSHOPS AND OPEN HOUSES :: July 2017

BRT in Montgomery County



- Functional Master Plan, 2013
- Four corridors under study
- US 29 opening in 2020

Design Criteria

1. Easy to Find and Use
2. Accessible
3. Safe and Comfortable
4. Adaptable and Context Sensitive
5. Maintainable
6. A Good Life-Cycle Investment



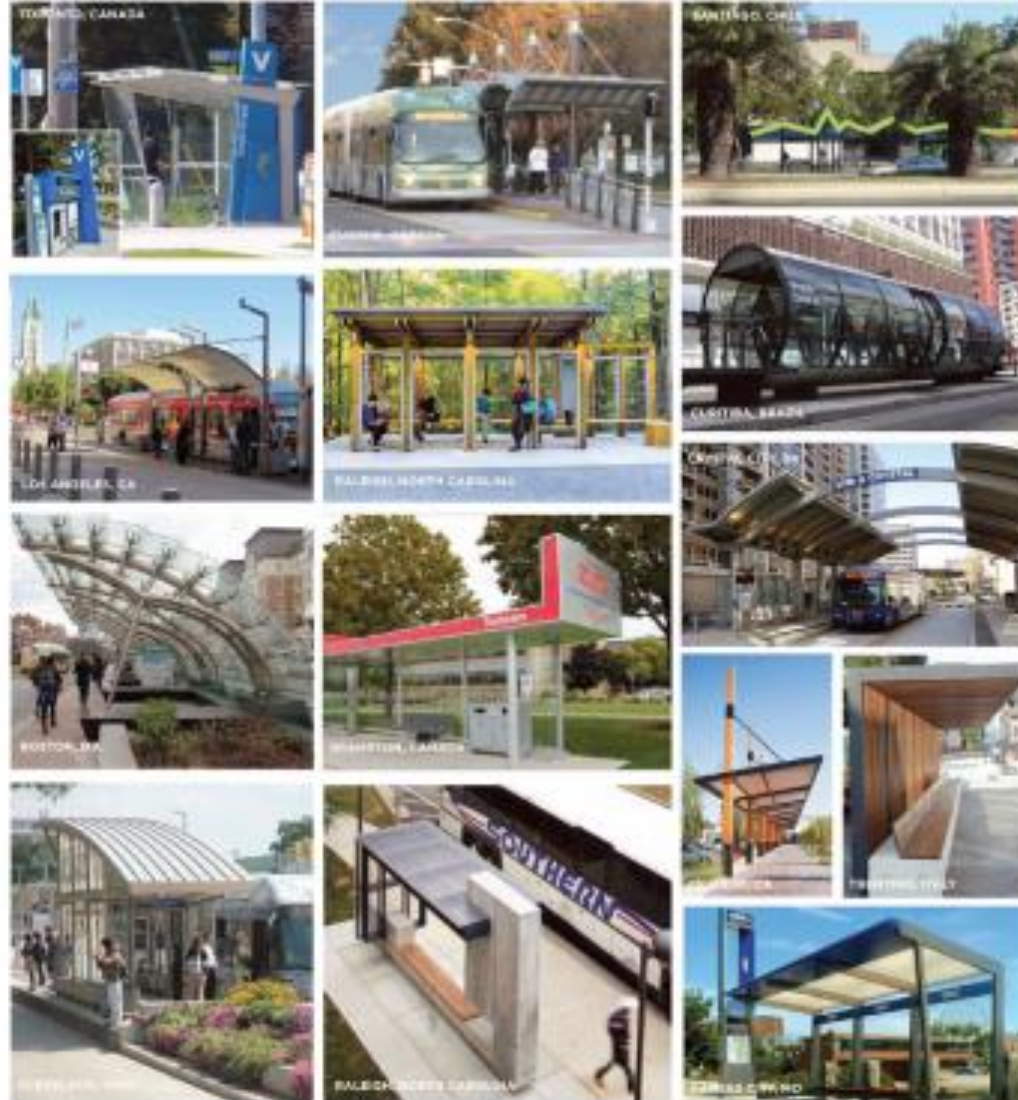
Design Process

Technical Advisory Group

Open House Word Clouds

Discussions with CACs

SCALE, FORM, IMAGE & ENCLOSURE



OPEN HOUSE WORD CLOUD ASPIRATIONS

MD 355 - DESCRIBE IN ONE WORD HOW A DESIGN MIGHT REFLECT THE CHARACTER AND QUALITY OF MONTGOMERY COUNTY?



LOCAL MATERIALS

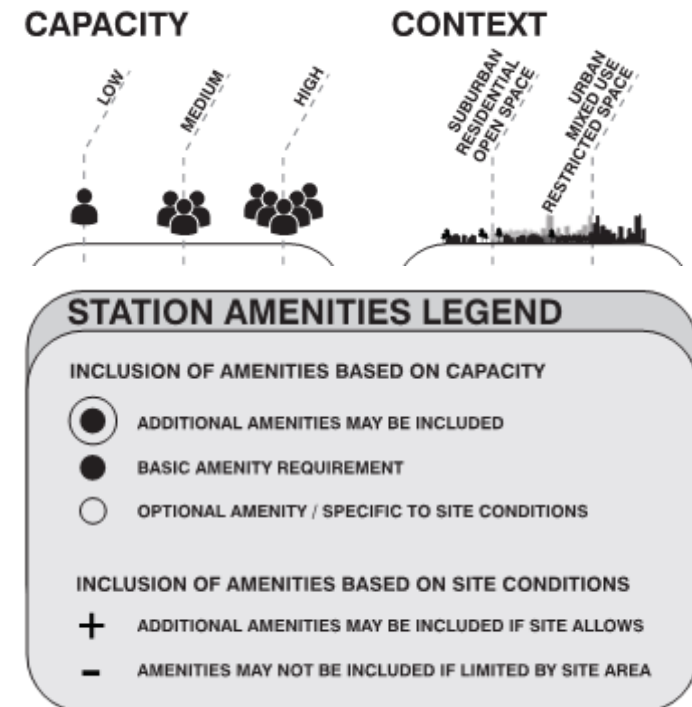
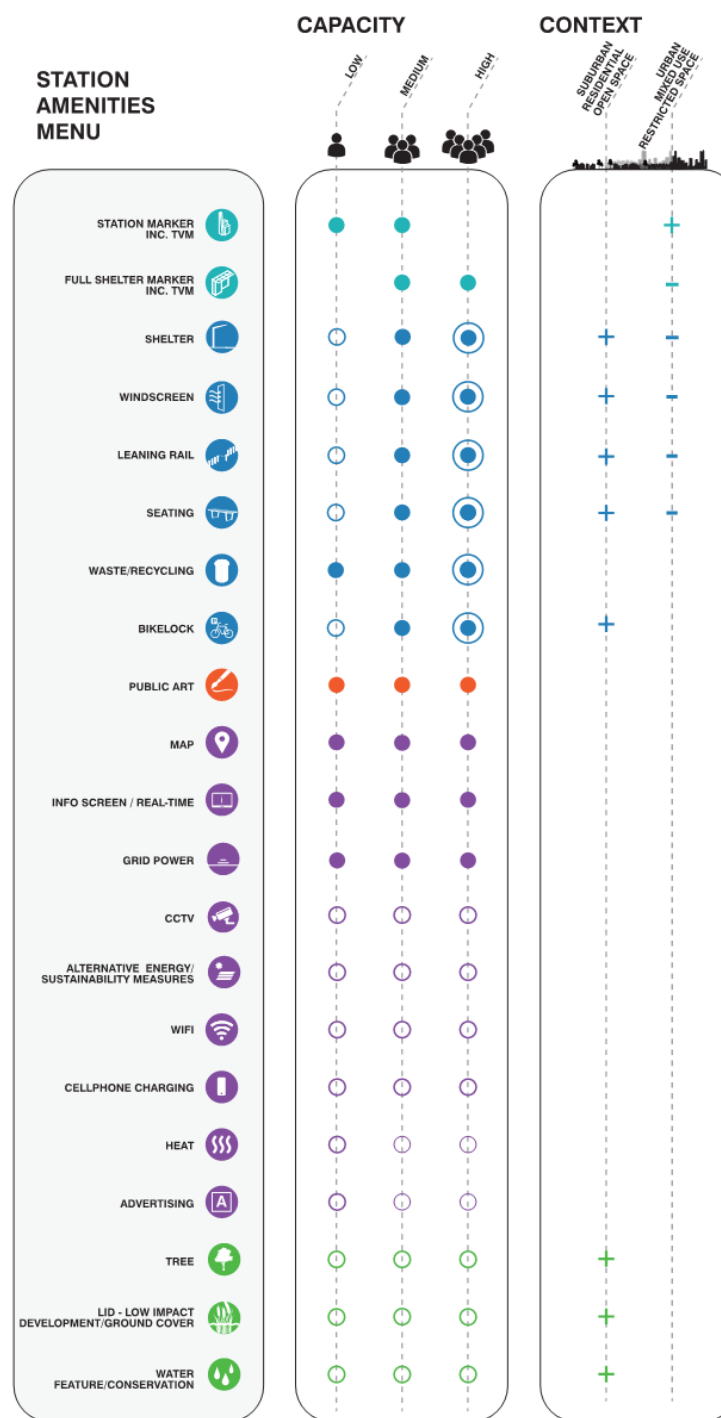
SENECA QUARRY, CIRCA 1890



Program of Requirements

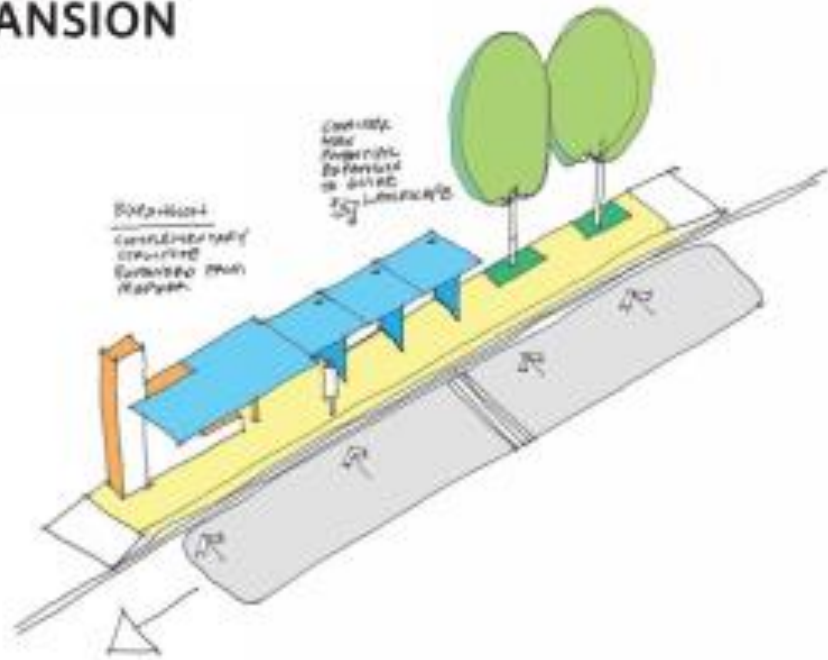
Station Amenities

- Base Station Types
- Shelter & Furnishings
- Public Art
- Communications and Utility
- Landscape and LID

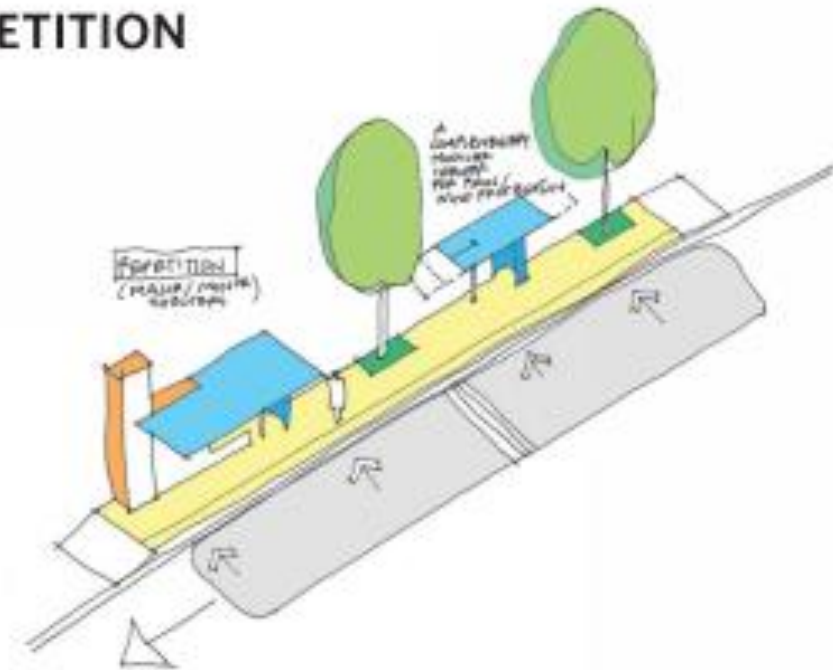


Strategies for Flexibility, Adaptation and Phasing

EXPANSION

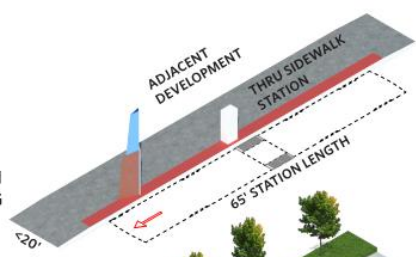


REPETITION

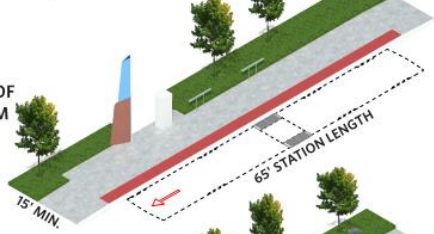


Design Framework

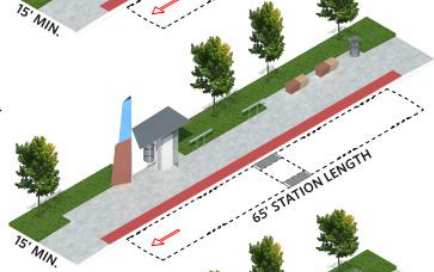
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CONTEXT
- MARKER
AND TVM IN
FURNISHING
ZONE



TYPE 2
MARKER
AT BACK OF
PLATFORM



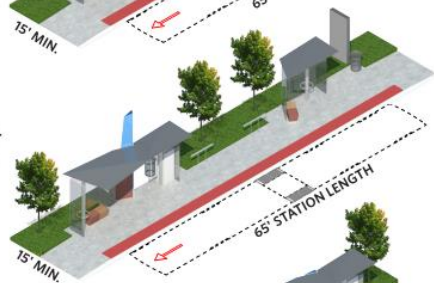
TYPE 3
MARKER +
SMALL
SHELTER



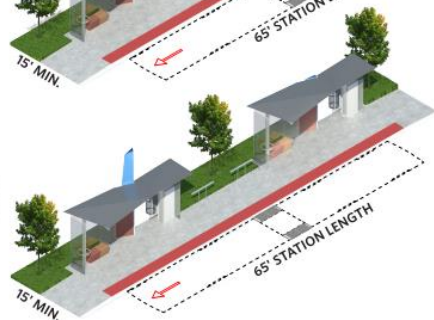
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LARGE
SHELTER



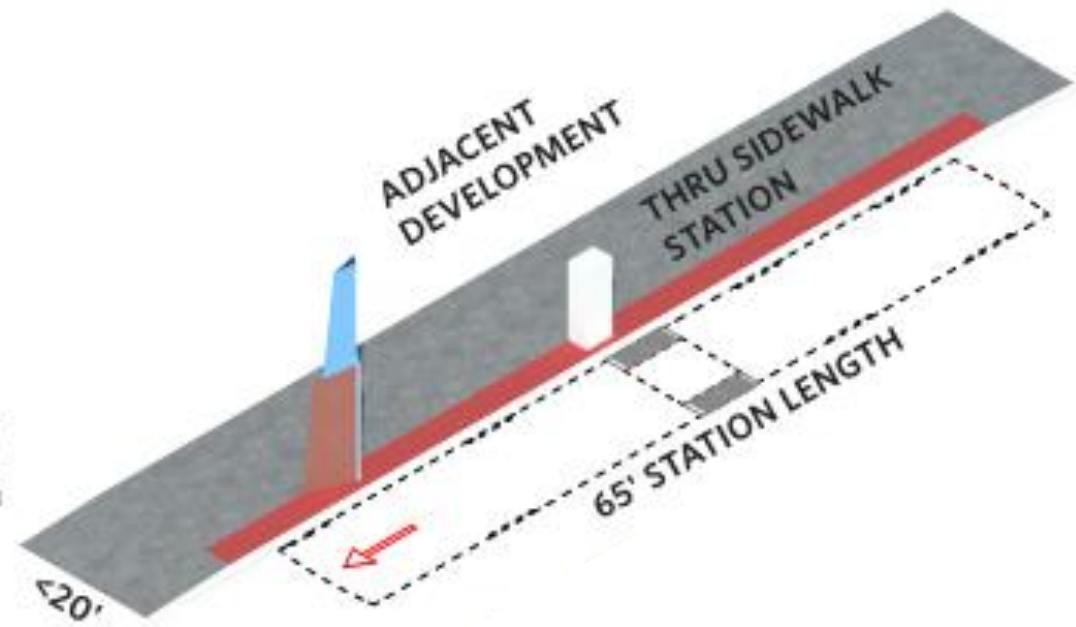
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MARKER +
1 LARGE &
1 SMALL
SHELTER



TYPE 6
MARKER
+ 2 LARGE
SHELTERS

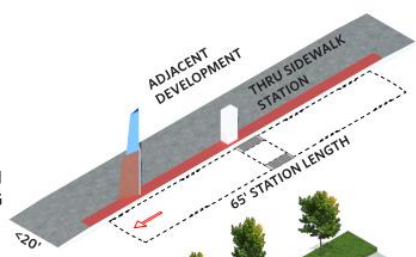


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CONTEXT
- MARKER
AND TVM IN
FURNISHING
ZONE

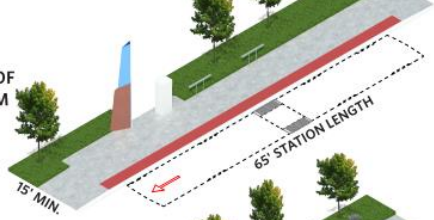


Design Framework

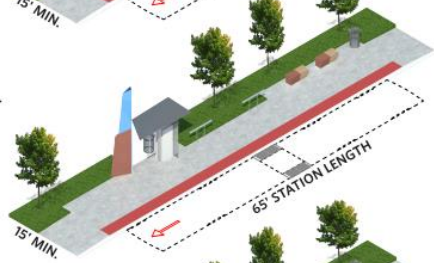
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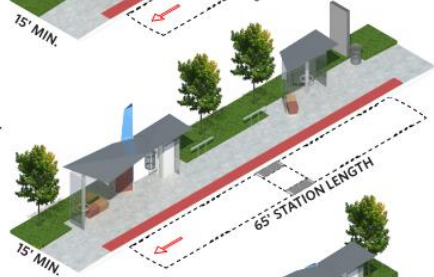
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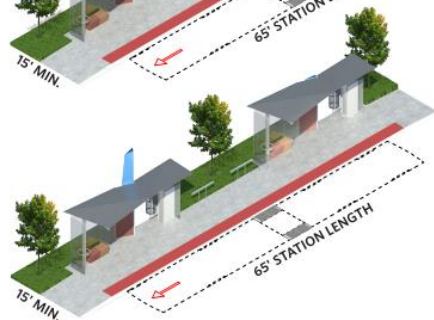
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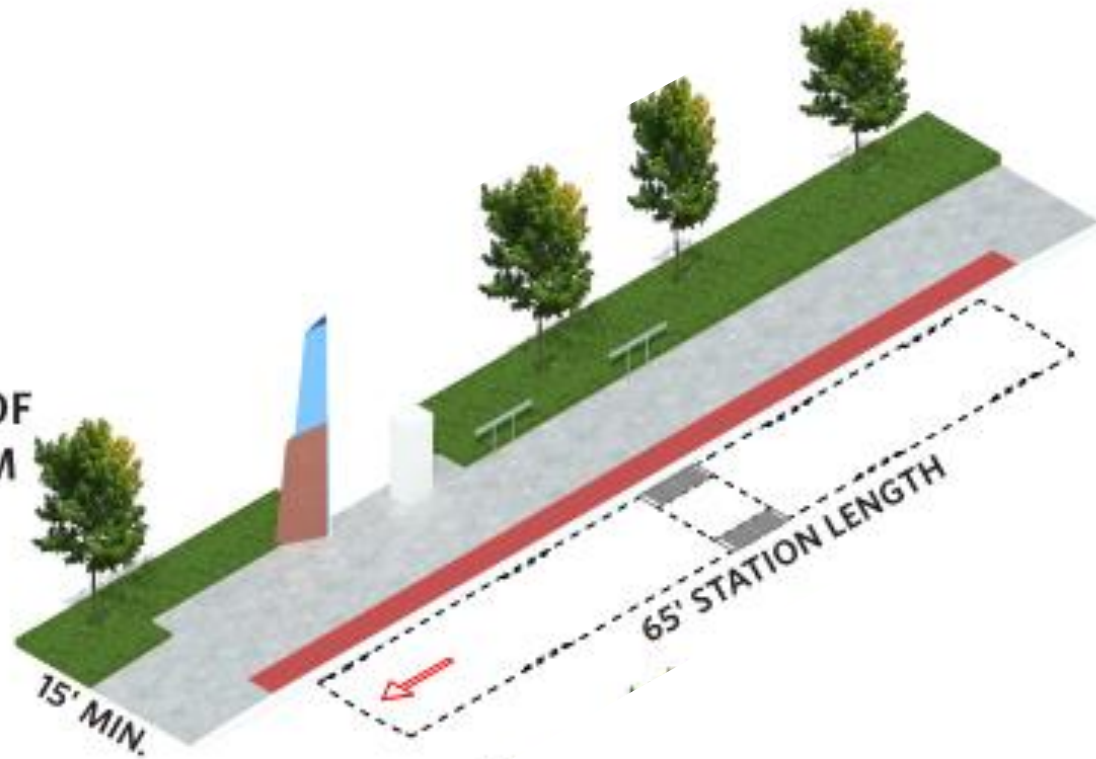
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1 SMALL
SHELTER



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MARKER
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SHELTERS

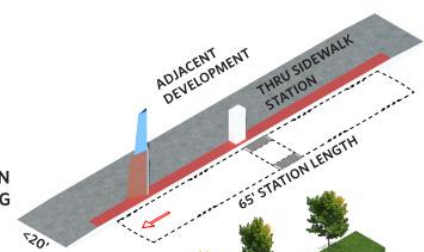


TYPE 2
MARKER
AT BACK OF
PLATFORM



Design Framework

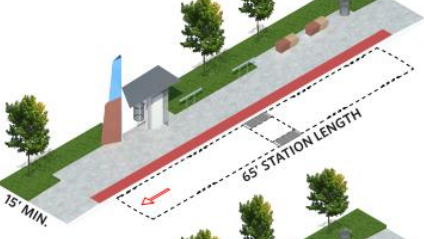
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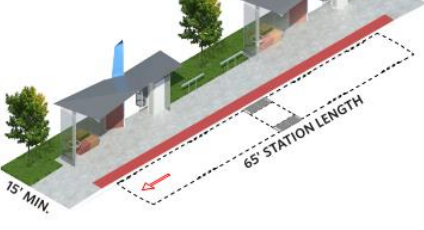
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SHELTER



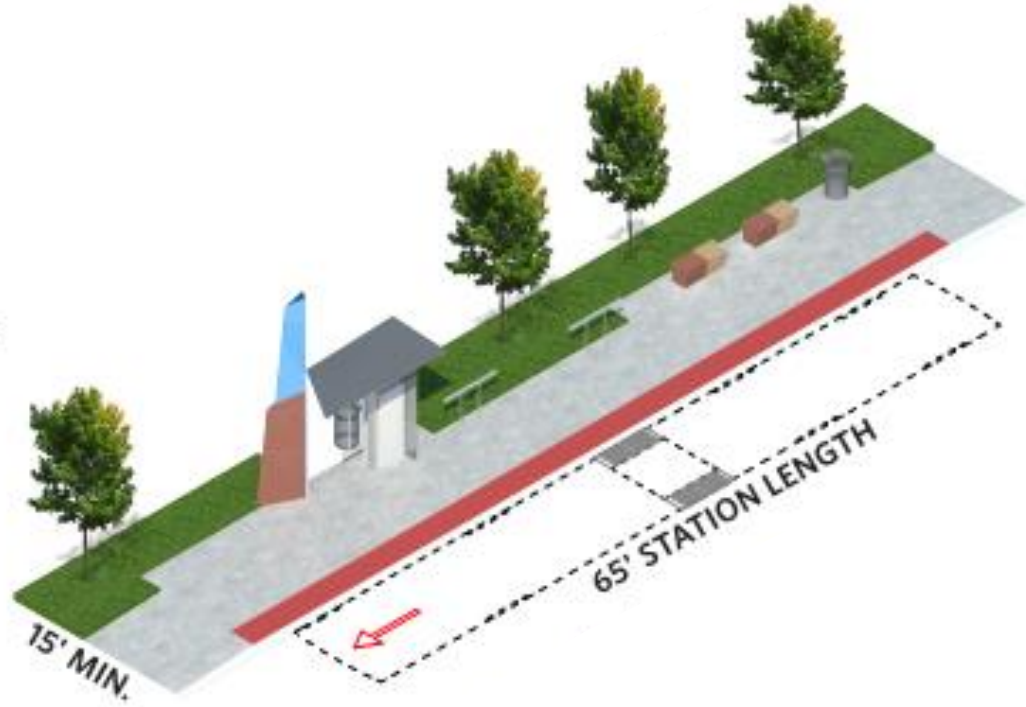
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1 SMALL
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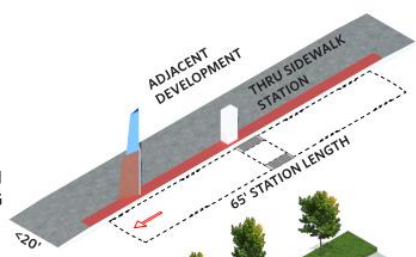


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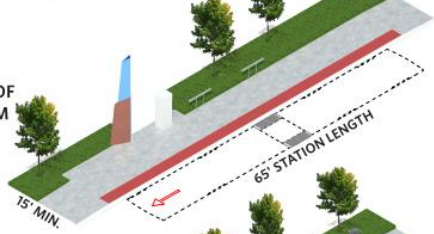


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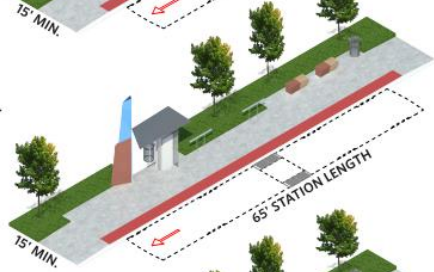
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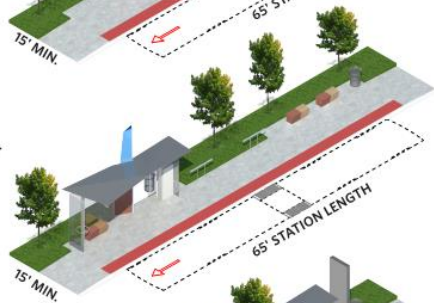
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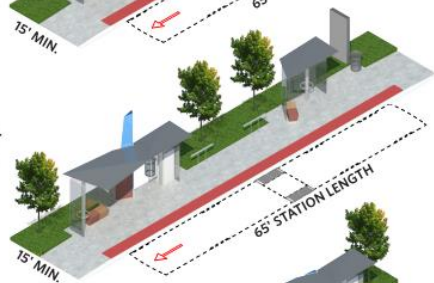
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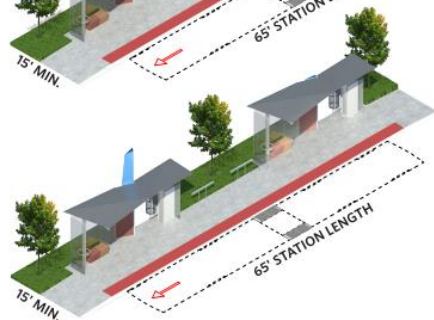
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SHELTERS

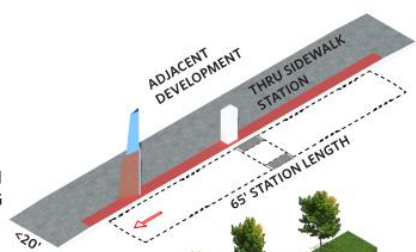


TYPE 4
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Design Framework

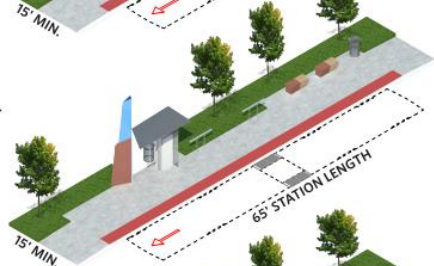
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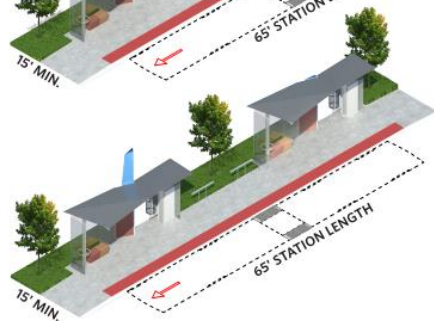
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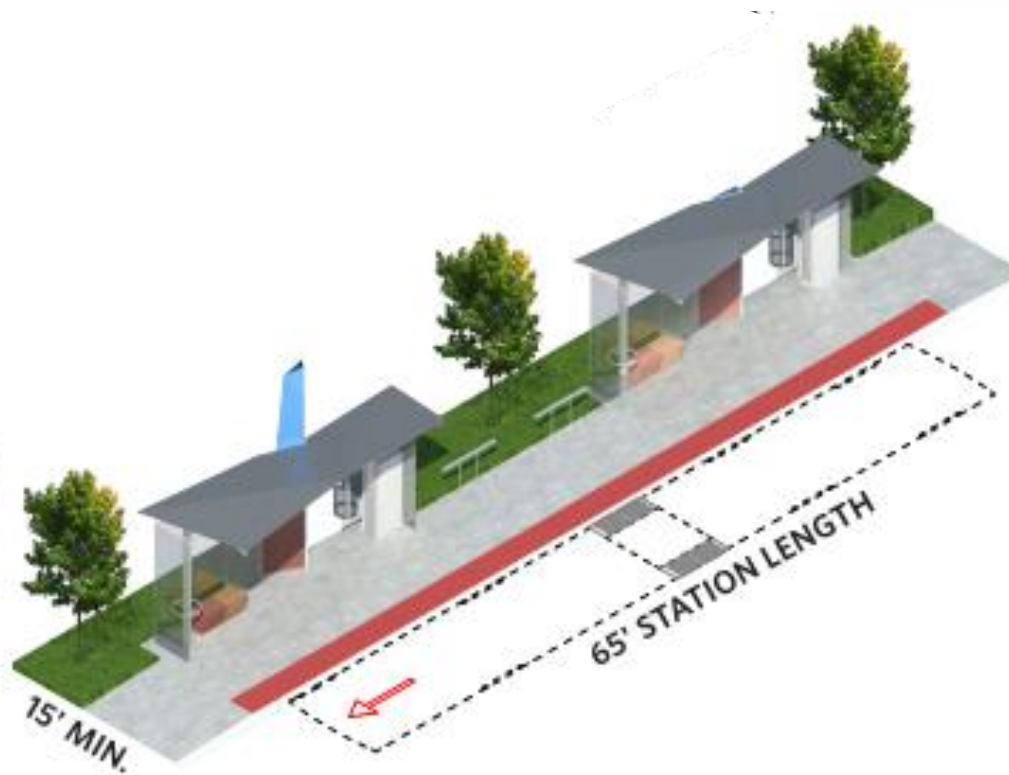
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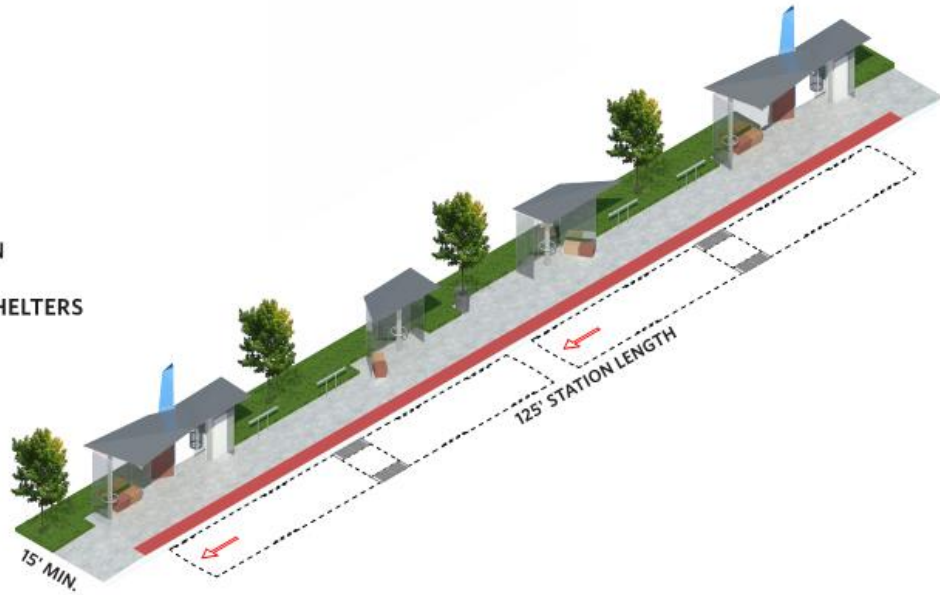


TYPE 6
MARKER
+ 2 LARGE
SHELTERS



Design Framework

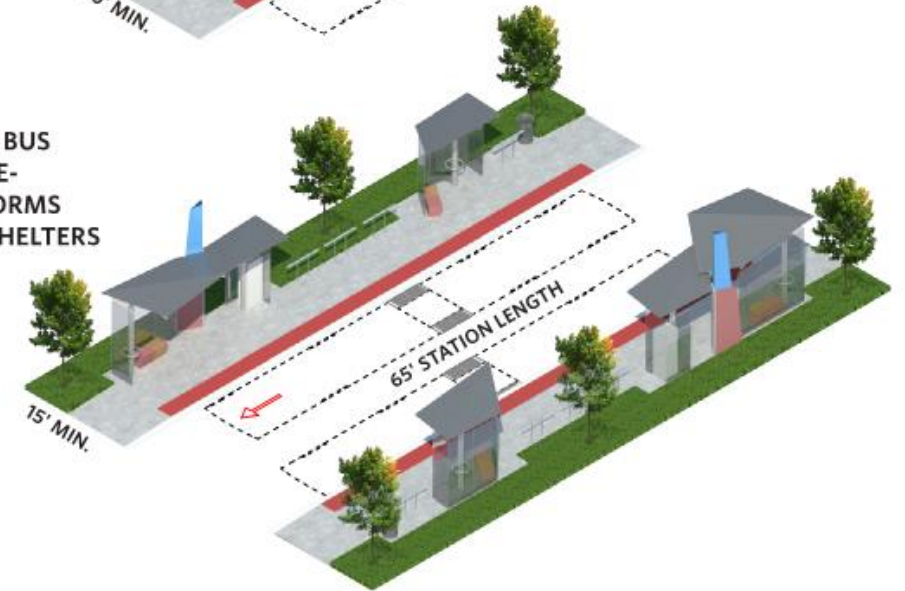
TYPE 7
DOUBLE STATION
HIGH CAPACITY -
2 MARKERS + 4 SHELTERS



TYPE 8
CENTER MEDIAN STATION
2 MARKERS + 2 SHELTERS

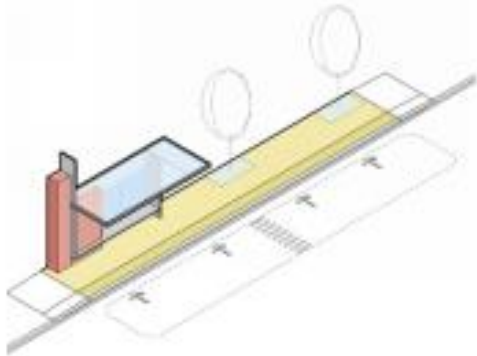
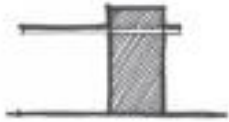


TYPE 9
CENTER MEDIAN BUS
LANES WITH SIDE-
LOADING PLATFORMS
2 MARKERS + 4 SHELTERS

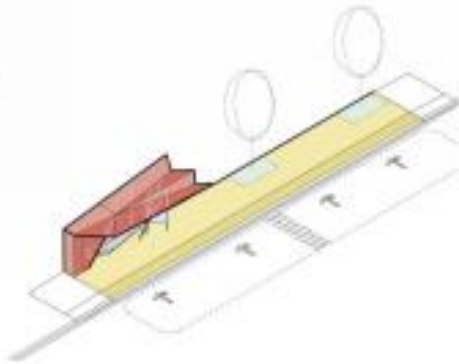


Preliminary Station Concepts

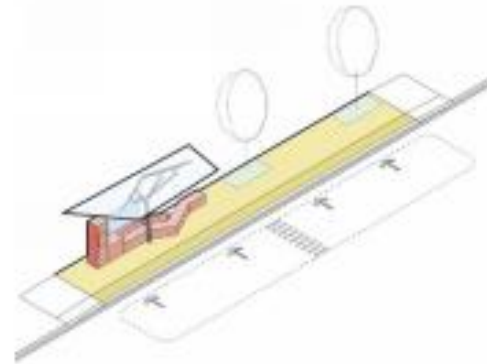
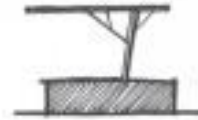
PLAINS



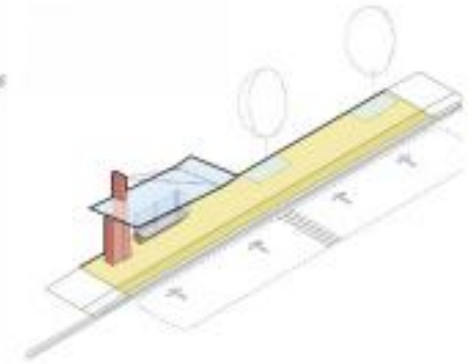
FACET



UPLIFT



SAILS

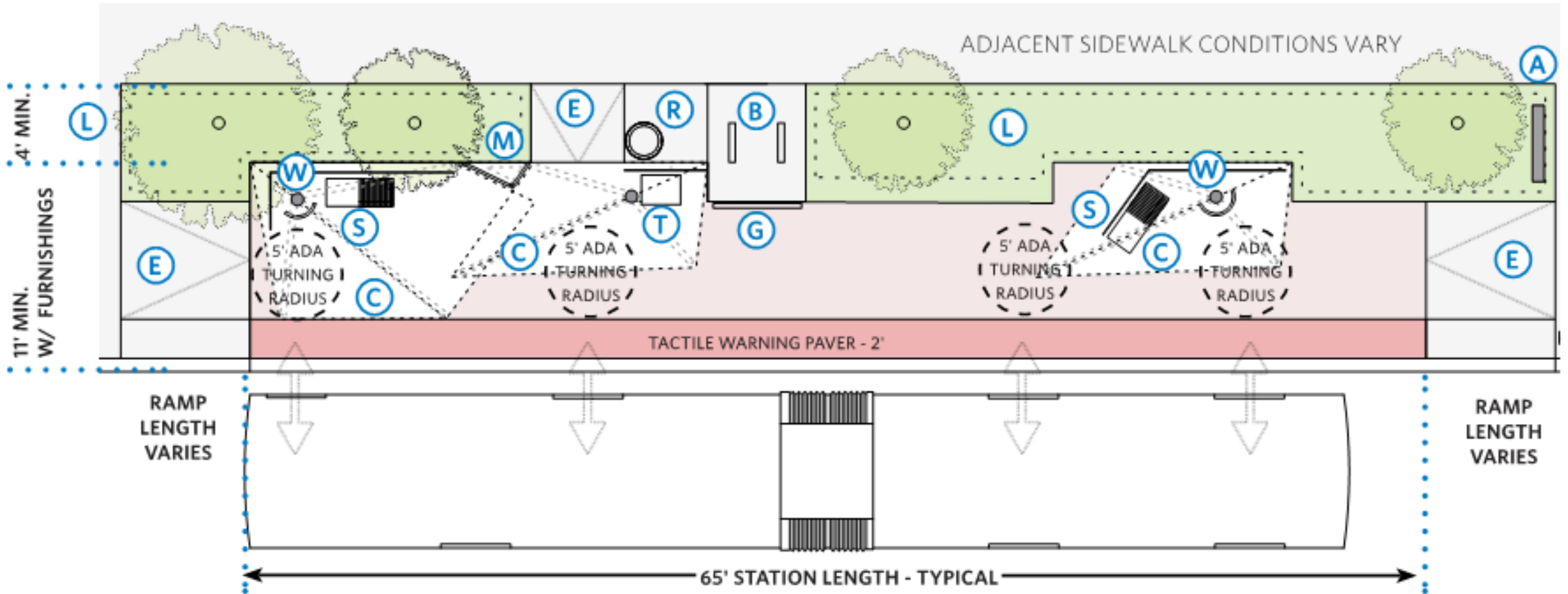


Station Architecture



- Preferred Concept**
- Station Marker
- Real Time Information
- Platform
- Canopy Structure
- Landscape
- Windscreens
- Leaning Rails
- Seating
- Furnishings
- Advertising Panel

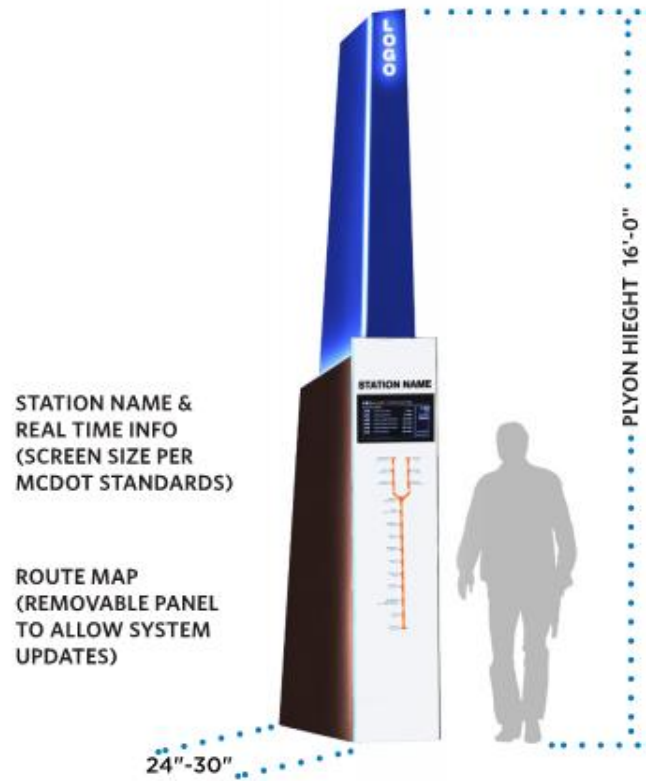
Station Architecture



Station Architecture

Integrated Lighting & Signage

STATION MARKER

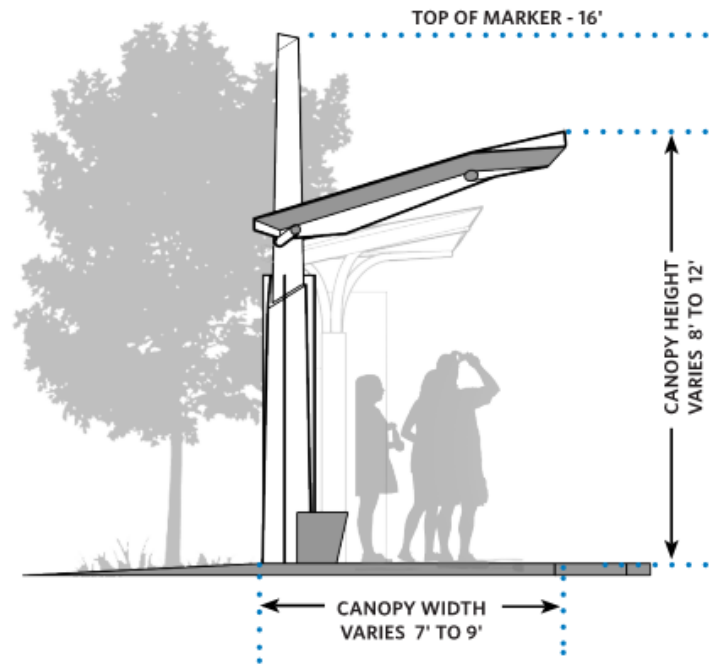


NOTE: MARKER IS SHOWN WITH A BLUE COLOR SCHEME FOR ILLUSTRATIVE PURPOSES. FINAL COLOR SCHEME(S) MAY VARY BY ALIGNMENT



Station Architecture

Platform Capacity
Area: 423 SF
Occupant Load: 60-141



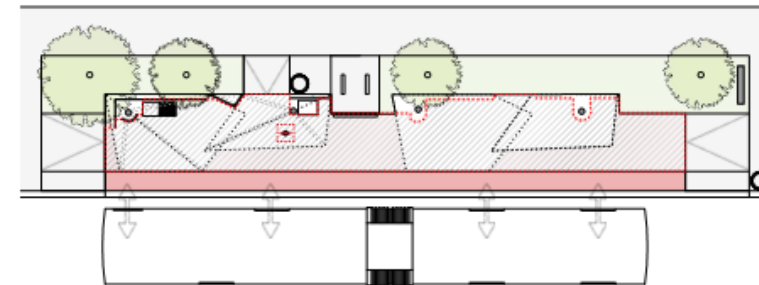
PLATFORM CAPACITY

The development of the Conceptual Design for the Prototype Station considered platform capacity and weather protection.

The diagrams, and information below, and to the right, provide an overview of each factor, by Square Foot area (SF) and Occupant Load.. For the Occupant Load, a range of 3 to 7 SF per person has been used for a Level of Service D to C, which for this study has been assumed to be the highest range of platform congestion (American Public Transportation Association BRT Recommended Practice, October 2010).

The plan diagram below illustrates the platform area for passengers exclusive of areas used for furnishings, canopy structure and the tactile warning area. The 423 square feet (SF) will accommodate from 60 - 141 occupants based on the 3-7 SF metric per person.

PLATFORM PLAN - CAPACITY

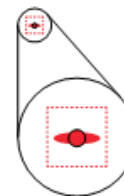


PLATFORM CAPACITY (TYPICAL)

Area: 423 SF
Occupant Load: 60-141

PLAN DIAGRAM KEY

1 Person /
3 SF



Area
Represented
in Calculation



Design Visualizations

URBAN MIXED-USE / CONSTRAINED CONDITIONS

US 29 - FENTON ST



STATION W/O SHELTER



STATION W SHELTER



Adapting to Context

SUBURBAN RESIDENTIAL / SHARED BUS STOP

MD 586 - TWINBROOK



Design Visualizations

SUBURBAN COMMERCIAL
MD 355 - WATKINS MILL ROAD



Adapting to Context

PARK & RIDE / HIGHEST CAPACITY
US 29 - BURTONSVILLE PARK & RIDE



Design Features



LOW IMPACT DEVELOPMENT EXAMPLES

Top Image - Potential platform access improvements
Bottom Image - LID planters separating sidewalk from platform zone



PHOTOVOLTAIC EXAMPLES

Top Right - Boston Bus Station, Typical Solar Panel
Lower Right - Columbia Heights Plaza, DC, BIPV Panel

Sustainability

Low Impact Development

Energy Production

Design Features

Public Art

Neighborhood Oriented

Integrated and Complementary

On Platform and with Adjacent Improvements

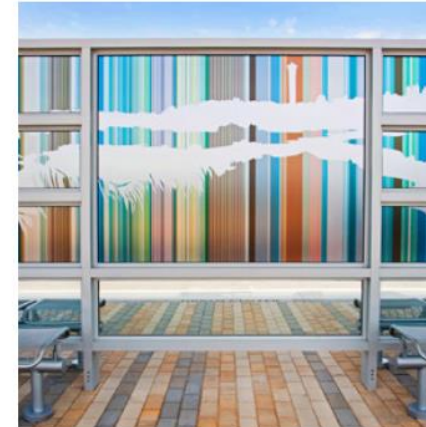
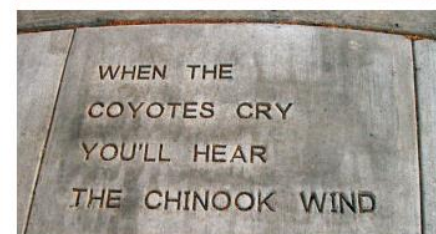
Public Art

OPPORTUNITIES

The incorporation of public art into the stations provides an opportunity to customize the stations for each site, encourage community stewardship, and has also been shown to reduce vandalism.

With the prototype station design providing the overall unifying architecture for the system identity, the following station components may be designed to incorporate public art:

- Windscreens
- Canopy Roof
- Seating
- Leaning Rails
- Paving
- Stand-alone Station Area Art Pieces



PUBLIC ART EXAMPLES

Top Left - Clockwise: Windscreen, Shelter Columns (Dallas), Shelter Glass Canopy Frit Pattern, Seating, Leaning Rail, Paving, Stand-Alone Station Area Art Feature (Portland)

Design Features

Branding

System, Line, & Station Identification

Branding

SYSTEM AND STATION IDENTIFICATION

The Branding for the Montgomery County BRT system shall be developed to include:

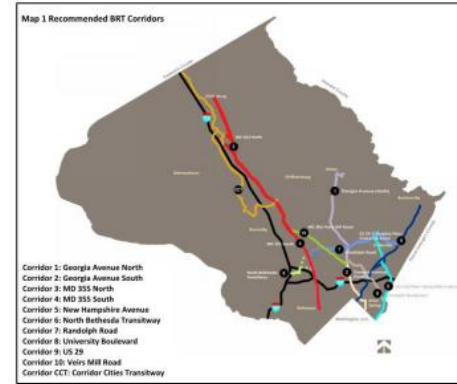
- System Identification, including System Maps and Logo for the Station Marker
- Line and Station Maps, potentially providing differentiation between BRT Lines and with ability to expand per implementation phasing plans.
- Station Identification including braille and on-demand verbal options for sight impaired patrons

To support Rider understanding of the BRT system within the regional transit system, it may be beneficial for the branding design to be developed as complementary to the WMATA system map. This could be a similar approach to the BRT Prototype Station Markers being developed as a companion to the WMATA Station Pylon - a similar design strategy to create an iconic feature, though each have their own identity.

In recognition of the County's diversity, some graphic cues may also be taken from other systems, such as the Mexico City Metro. The system signage was developed with graphic station icons in addition to station names to facilitate non-spanish and indigenous language speakers who would be using the system. If this approach is used, it may also provide an opportunity to identify and celebrate neighborhood features.

BRANDING ELEMENTS

Top Right to Lower Right:
Montgomery County BRT Master Plan Alignments
WMATA System Map
Mexico City Metro (Interior and Station Signage) -
Example of Iconic Station Names



Station Planning

Conceptual Budget Estimate

Summary - Standard 65' Platform, Side Loading w/ Landscape

Item	Description	Unit	Measure	Unit Cost	Subtotal
Platform					
			Dimension		
Platform - Slab & Foundations	CIP Concrete	SF	11'x65'	715 \$ 40	\$ 28,600
Platform Ramp Access (Allowance)	CIP Concrete	SF	11'x25'	275 \$ 30	\$ 8,250
Tactile - ADA Pavers		SF	2'x65'	130 \$ 35	\$ 4,550
Trees/LID/Landscape	4 Trees + Landscape Tree Well	SF	4'x85'	340 \$ 50	\$ 17,000
Station Area Furnishings					
Marker (1)	Metal, Stone, Lighting, Signage	Unit	Each		\$ 30,000
Canopy & Structure (1 Pair - 1 large + 1 small)	Roof Area - Approx 125 sf, Lighting	Unit	Each		\$ 110,000
Windscreen	Metal Frame, Tempered Glass	LF	20'x8'	20 \$ 600	\$ 12,000
Seating	Stone/Precast	LF	10	10 \$ 300	\$ 3,000
Leaning Rail	Ptd Metal	LF	10	10 \$ 150	\$ 1,500
Waste/Recycle	Montgomery County Standard	Unit	2	2 \$ 1,200	\$ 2,400
Bike Racks	Montgomery County Standard	Unit	3	3 \$ 400	\$ 1,200
Public Art					
Integrated Approach	Allowance per Station				\$ 50,000
Communications and Power					
Ticket Vending Machine				Allowance	\$ 25,000
Real Time Signage				Allowance	\$ 25,000
Utility Grid Power + Circuit Panels	Will Be Site Specific			Allowance	\$ 50,000
Station Development - 1 Canopy Pair + Windscreens					\$ 368,500
Station Development - 2 Canopies + Windscreens					\$ 490,500
Potential Policy Decisions / Add Alternates					
CCTV	TBD	Unit			TBD
Shelter Canopy Heating	TBD	Unit			TBD
Sustainability - PV Panels / Energy Offset	TBD	Unit			TBD

Next Steps

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Darcy.Buckley@montgomerycountymd.gov
(240) 777-7166

