Technical Memorandum 4
Recommended Improvements

INTRODUCTION

As the origin and destination point of each ride, bus stops serve an important, yet underestimated, role in providing safe, friendly, and visible service. The following tech memo includes a summary of the recommended improvements for the surveyed bus stops in the C-SMMPO. The body of this document will provide examples of the bus stop improvements recommended at several different kinds of stops. The guidelines may also prove to be useful when working with local jurisdictions in planning pedestrian infrastructure with access to bus stops.

The field survey component of the effort evaluated each documented stop location for its amenities and ADA compliance. The survey found that few stops within the C-SMMPO had signage or passenger amenities. Technical Memorandum #2 includes a comprehensive summary of these findings. Technical Memorandum #3 provided guidelines for the appropriate placement of bus stops and the different types of street-side designs and prioritized surveyed stops by land use.

The following technical memorandum is organized into the following sections:

- **Improvement Overview** – Using the bus stop categories established in the previous tech memos, this section provides a general overview of the necessary improvements required for each stop category.

- **Prioritization Process** – Details the process used to decide which bus stops within the MPO have been prioritized for bus stop improvements.

- **Development of Cost Estimates** – Details the basis of the cost estimates provided within the study.

- **Implementation Plan** – Proposes an implementation timeline to ensure funds are responsibly distributed to bus stop improvements.

- **Potential Improvement Barriers** – Using specific examples, this section highlights obstacles to improvement and provides potential solutions to each problem.

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IMPROVEMENT OVERVIEW

The bus stop improvement guidelines that were introduced in Technical Memorandum #3 provided the basis for the improvements proposed within this section. The guidelines set forth three bus stop categories: basic, enhanced, and transit center. These categories were based on the provision of service at each stop and the surrounding land uses/major trip generators.

Each bus stop was classified as one category; however, the nature of the categorization builds upon the lower category (see Figure 4-1). For example, a bus stop that is classified as an enhanced stop must include the basic bus stop improvements before enhanced passenger amenities are installed. Utilizing this approach, the following sections summarize improvement types rather than stop classification.

Figure 4-1: Bus Stop Categorization
The pyramid shape symbolizes the building blocks for bus stop improvements

To prioritize improvements at more frequently used bus stops, this study set a threshold of five average daily boardings to install bus stop signage and basic bus stop improvements. This resulted in recommended improvements at 47 out of 106 identified pickup/drop-off locations (44%).
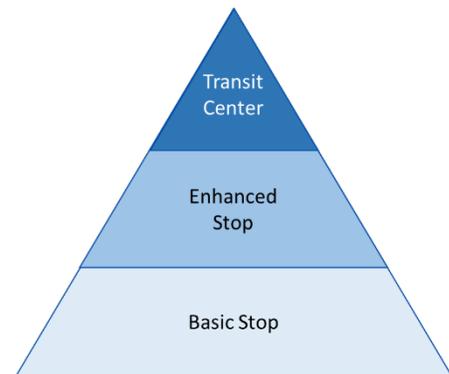
Bus Stop Signage

CCPT and STS heavily utilize flag-stop systems. There are currently only four signed bus stops within the MPO study area; one in Calvert County and three in St. Mary's County. Following the five daily boardings threshold, bus stop signage is recommended at 43 of the identified bus stops (see Figure 4-2).

Installing bus stop accessibility improvements can be costly and time-consuming. Therefore, it is recommended that the local transit systems or jurisdictions install bus stop signage ahead of accessibility improvements given the current lack of signage. However, it should be stressed that the vast majority of these stops will not be compliant with ADA guidelines and an implementation plan should be in place to guide the future installation of accessibility improvements at these locations.

Additionally, the five average daily boardings threshold was established to guide limited financial resources to be used at their highest and most effective use. If local transit agencies or jurisdictions would like to install bus stop signage at all stops, locations with lower average daily ridership should be considered for bus stops signs. The long-term vision of this plan is to transition away from the flag-stop system in favor of signed bus stops.

## Figure 4-2: Recommended Bus Stop Signage throughout CSM-MPO
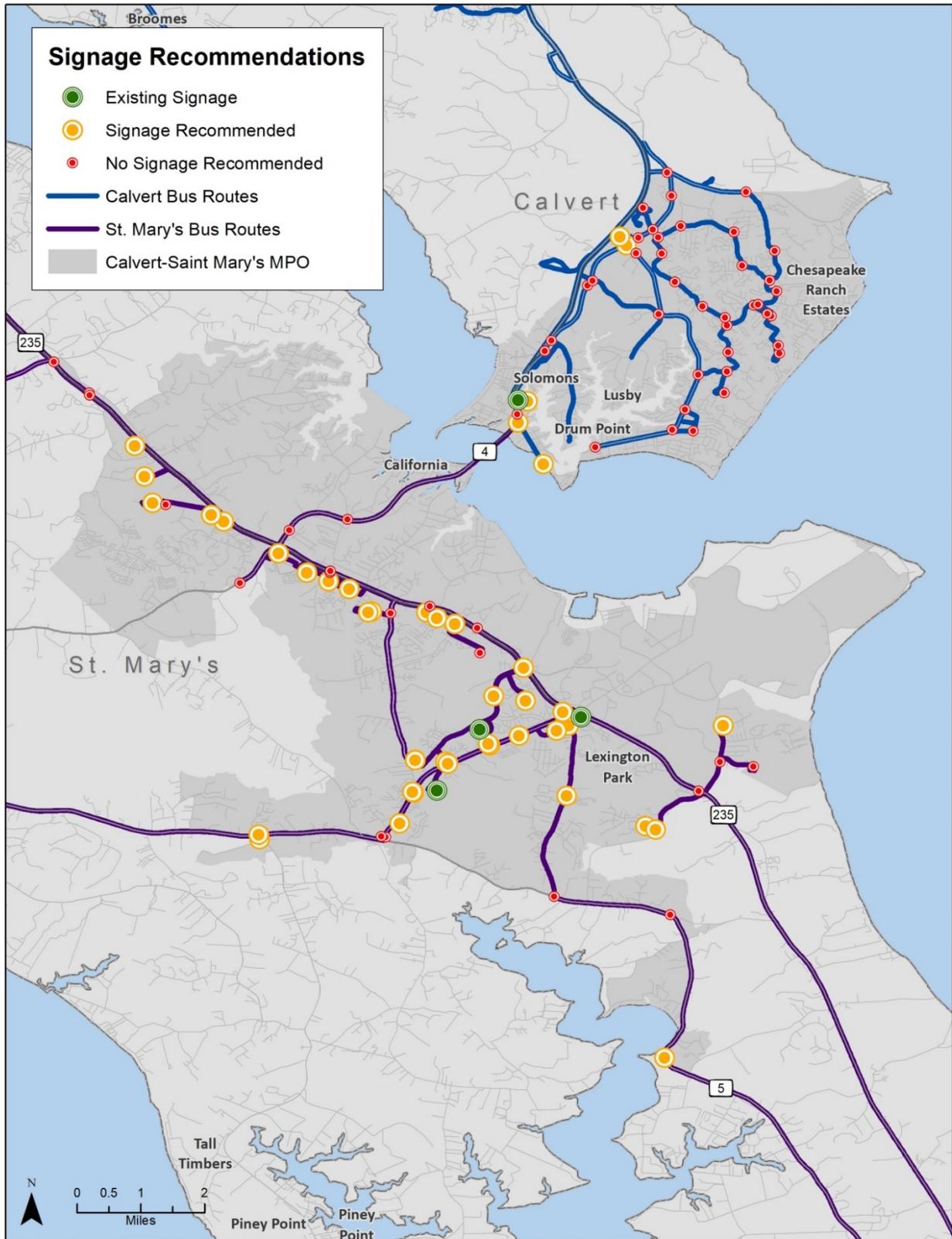
Basic Bus Stop Improvements

Basic bus stop improvements are largely defined by the ADA Guidelines detailed in Technical Memorandum #1. Under the ADA Guidelines, each bus stop must include the following basic amenities and accessibility improvements:

- **Bus Stop Sign**, while not required under the ADA, signage is essential in establishing a bus stop location.

- **Landing Pad** with a firm and level surface clear of any obstructions with a minimum depth of 8 feet and a minimum width of 5 feet.

- **Pathway or Sidewalk** with a firm, level surface and a minimum width clearance of 4 feet to the nearest curb ramp.

- **Curb Ramp** connecting the pathway/sidewalk to the greater pedestrian network; must also include a detectable warning.

Implementing these improvements will lead to ADA compliance at each bus stop. The improvements will also provide a safe and inviting experience for transit customers; especially individuals who rely on mobility assistance devices. A total of 47 bus stops were identified for recommended basic bus stop improvements. Figure 4-3 summaries the number of improvements needed at the basic bus stops within the MPO.

Figure 4-3: Basic Bus Stop Improvement Summary
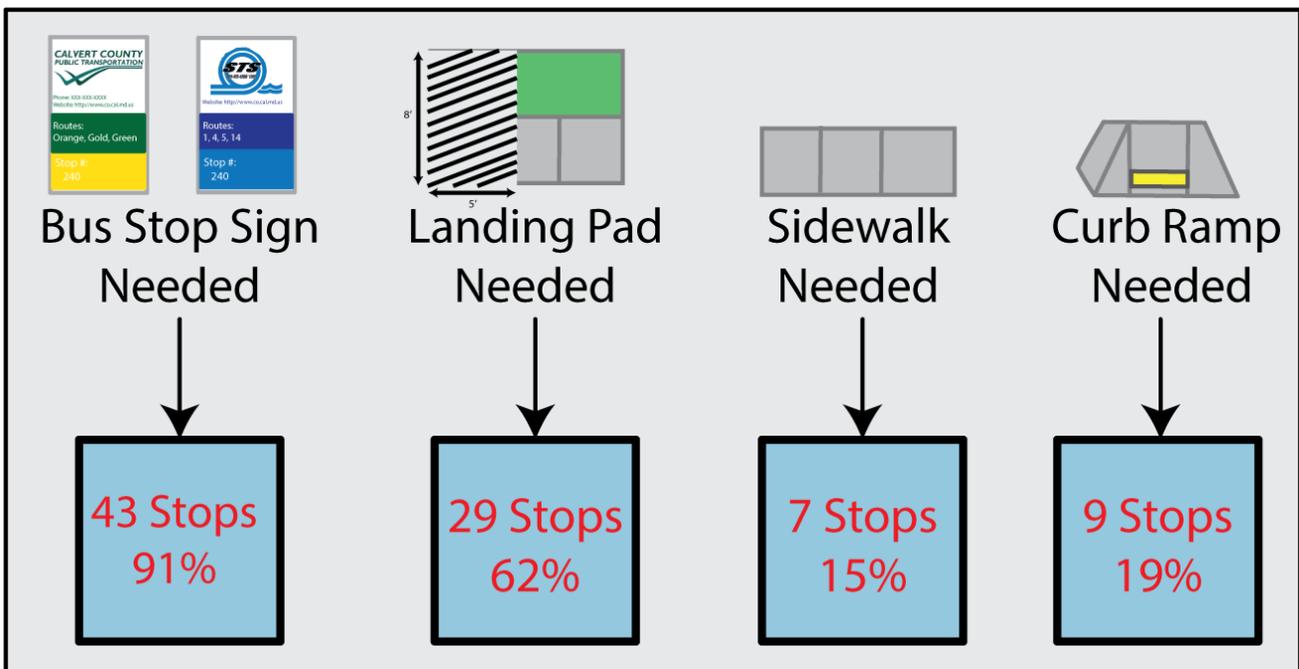
Enhanced Bus Stop Improvements

Technical Memorandum #3 defined enhanced bus stops as stops that were located at major shopping, medical, or multi-family housing centers. These stops were recommended for enhanced passenger amenities in addition to the necessary bus stop sign, landing pad, and curb ramp improvements recommended for basic bus stops. These additional improvements include:

- Benches
- Trash Receptacles
- Shelter (If ridership is greater than 25)
- Information box

Many enhanced bus stops still need basic improvements. Of the 29 enhanced stops recommended for improvements, 14 require an ADA compliant landing pad, 1 stop lacks a curb ramp and 13 stops require an updated curb ramp with a detectable warning.

Figure 4-4 displays the number of necessary improvements to improve enhanced bus stops in the region. Appendix B contains a table showing the improvements required at each individual enhanced bus stop.

Figure 4-4: Enhanced Bus Stop Improvement Summary
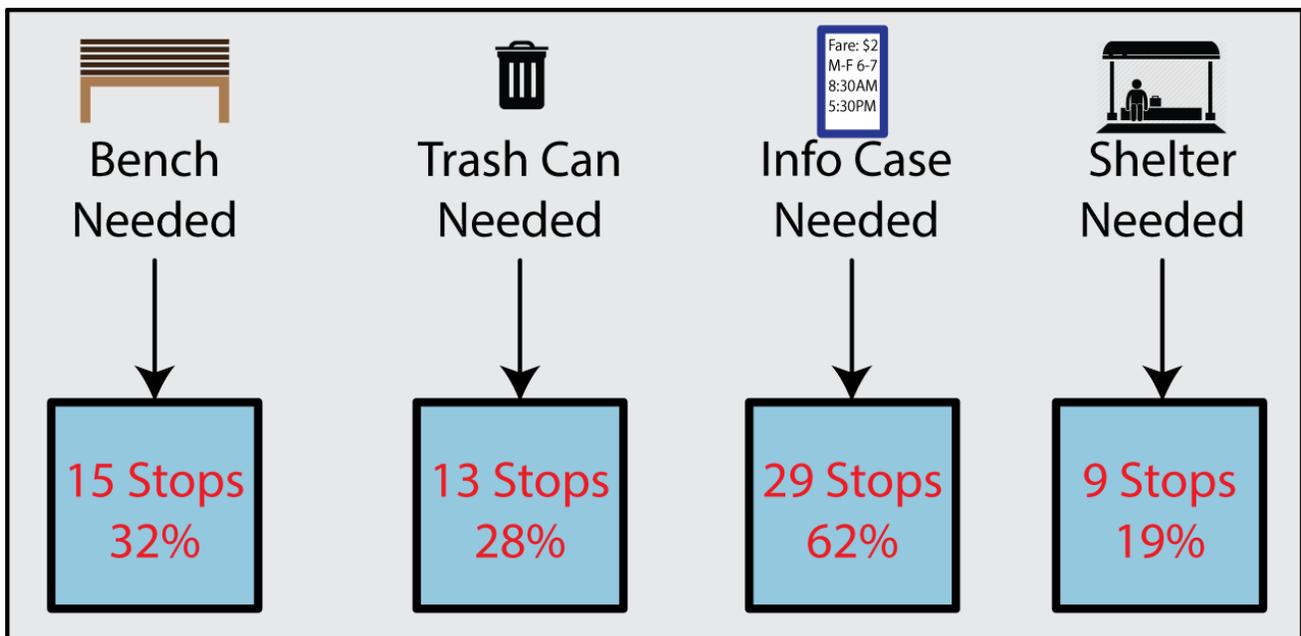
Transit Centers

Only two stops in the CSM-MPO were selected as transit centers; the Calvert Southern Library Branch in Solomon's Island and the Tulagi Place Park & Ride in Lexington Park. These locations were selected due to the transferability at each location, their daily ridership, and proximity to key destinations. In addition to the improvements recommended for basic and enhanced bus stops. These improvements consist of:

- Installing information cases with complete system maps and schedules
- Consideration of real-time arrival digital displays

Shown in Figure 4-5, Tulagi Place already has a shelter and an accessible landing pad but requires a new detectable warning and information cases. The Calvert Southern Library's overhang acts as a shelter; however, the stop would benefit from an information case, detectable warning, and trash can.

Figure 4-5: Tulagi Place (Left) and Calvert Southern Library (Right) On-Site Images

Figure 4-6, on the following page, provides an overview of the recommended bus stop improvements broken down by bus stop categories.

Figure 4-6: Recommended Improvements by Bus Stop Categories
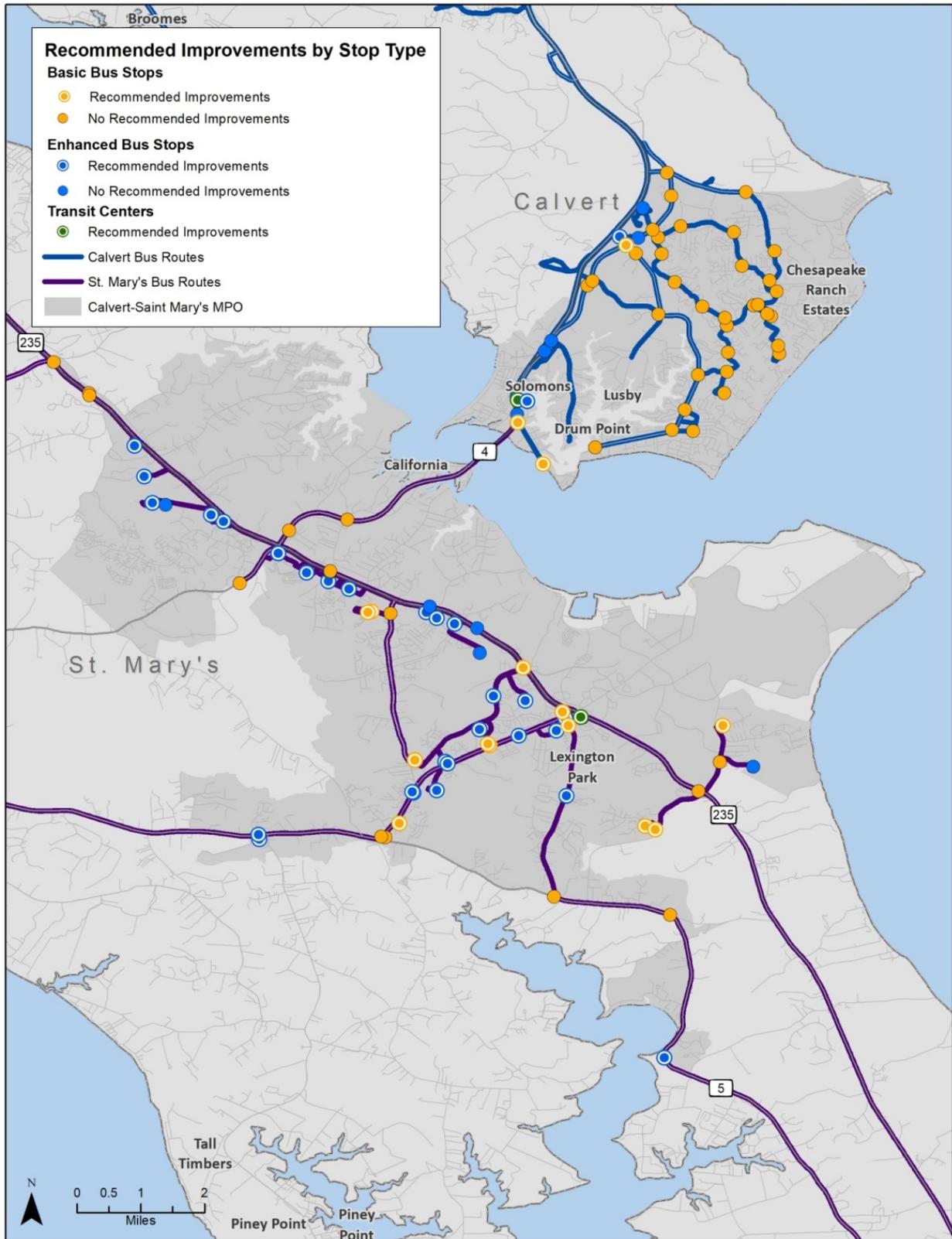
PRIORITIZATION PROCESS

Financial realities will likely prevent transit and planning staff from implementing all of the required bus stop improvements at one time. To guide a phased implementation process, a prioritization index was created to rate the conditions at each stop and rank each location in priority order. Key elements of the prioritization process and their weight factors are shown in Table 4-1.

Table 4-1: Prioritization Index Factors

Prioritization Factor	Factor Weight
ADA Compliance	30%
Bus Stop Categorization	10%
Average Ridership	30%
Nearby Trip Generators	20%
Existing Pedestrian Facilities	10%

The prioritization index generated a 1 to 100 prioritization score; with 100 being the highest priority. The distribution of the scores, shown in Figure 4-7, ranged from 21 to 91 with the majority of stops falling into the 31 to 50 range. The top 10 bus stops with the highest prioritization scores are shown in Table 4-2.
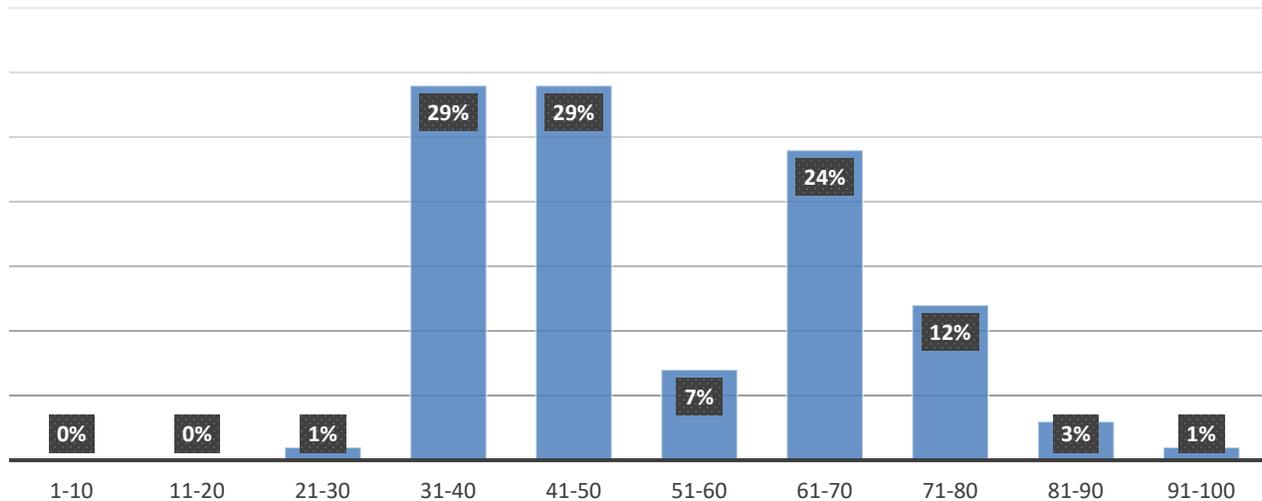
Figure 4-7: Distribution of Prioritization Scoring

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Table 4-2: Top 10 Bus Stops with the Highest Prioritization Scores

Prioritization Rank	Bus Stop	Recommended Improvements	Prioritization Score (1-100 Scale)
1	Tulagi Place P&R	Information Case, Detectable Warning	91
2	Westbury Blvd @ Great Mills Rd	Sign, Landing Pad, Information Case, Bench, Trash Can	85
3	Fox Chase Dr @ Lexington Dr	Sign, Landing Pad, Detectable Warning, Shelter	83
4	Willows Rd @ S Shangri La Dr	Sign, Landing Pad, Detectable Warning, Shelter	81
5	Library	Sign, Landing Pad, Curb Ramp, Information Case, Bench	80
6	Great Mills Rd @ Great Mills HS (NB)	Sign, Landing Pad, Information Case, Bench, Trash Can	79
7	Great Mills Rd @ Great Mills HS (SB)	Sign, Landing Pad, Information Case, Bench, Trash Can	79
8	Pathways Clinic	Sign, Landing Pad, Information Case, Detectable Warning	76
9	Dollar Tree	Sign, Information Case, Detectable Warning	76
10	St. Mary's College of Maryland	Sign, Landing Pad, Information Case, Trash Can	76

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Title VI Assessment

The results of the prioritization index were reviewed to determine compliance with Title VI of the Civil Rights Act of 1964. As recipients of federal funds, both CCPT and STS must ensure that service and improvement programs are in compliance with Title VI.

The Title VI assessment was informed by a GIS-based analysis that was completed for the MPO study area. The analysis examined the distribution of proposed bus stop improvements in regard to the study areas above and below average minority populations and low-income populations.

The Title VI assessment demonstrated that a higher percentage of low-income individuals live in California, Lexington Park, and Chesapeake Ranch Estates. 65 bus stops are located in block groups with an above-average percentage of low-income individuals. A higher percentage of minorities are in block groups in California, Lexington Park, Lusby, and Chesapeake Ranch Estates. 46 bus stops are located in block groups with an above-average percentage of minorities.

Of the 47 bus stops that have been recommended for improvements, 36 are located in block groups with an above-average percentage of low-income individuals. 32 improvement-recommended bus stops are located in block groups with above-average percentages of minorities. The following table and figures show the results of the Title VI assessment and show that the placement of bus stops and associated improvements is equitable regardless of an area's socioeconomic or racial/ethnic makeup.

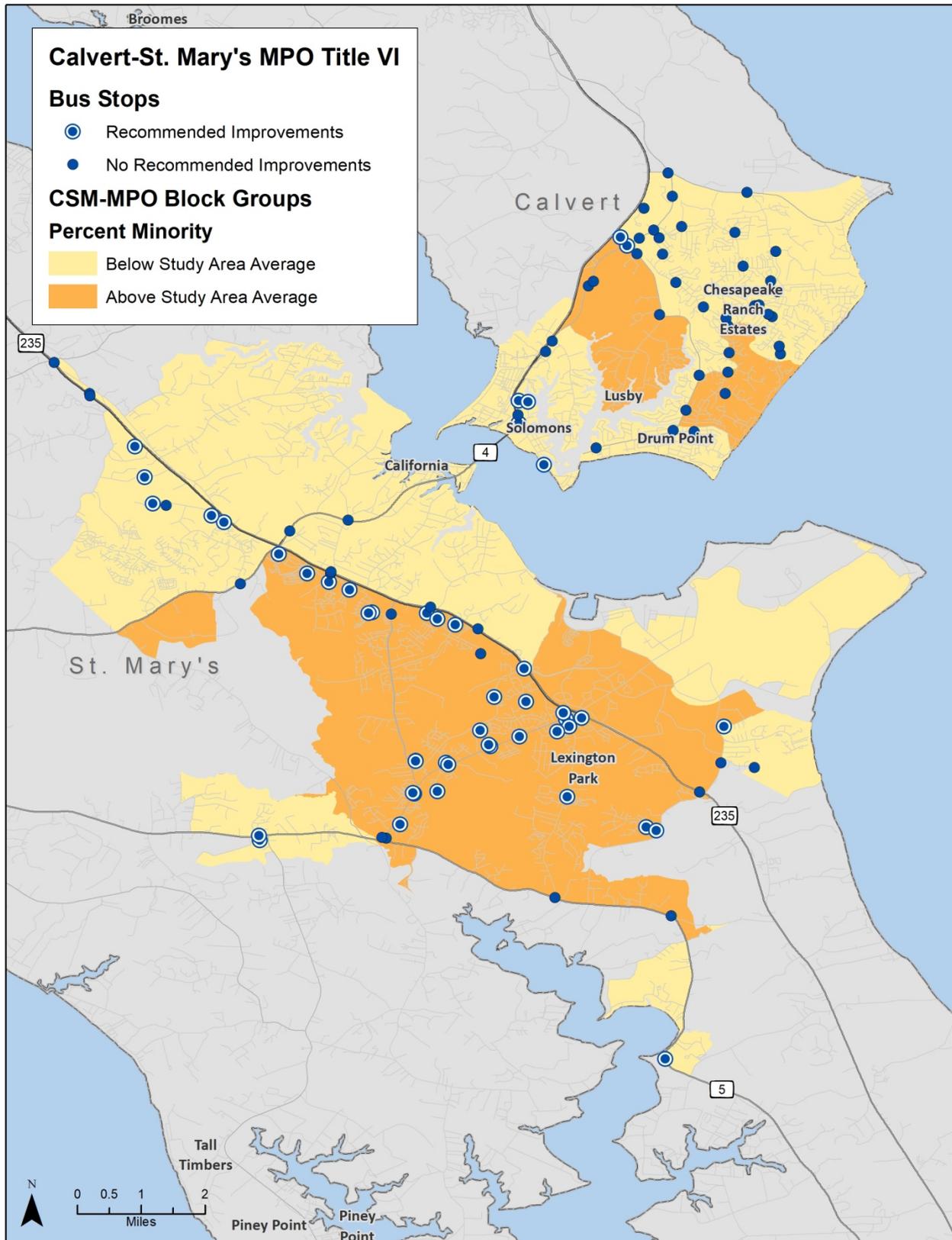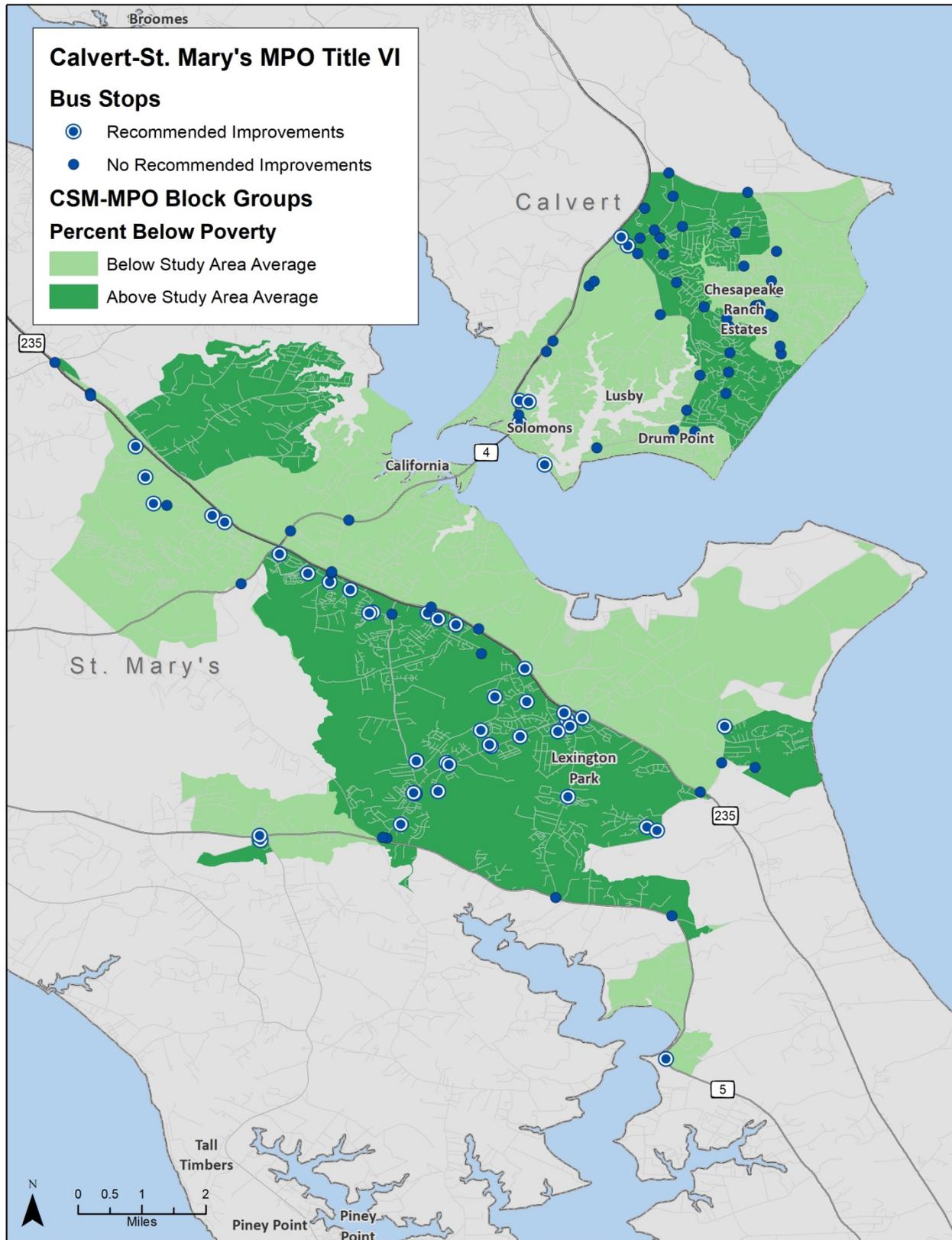**Figure 4-8: Calvert – St. Mary's MPO Minority Population Title VI Areas**

Figure 4-9: Calvert – St. Mary's MPO Low Income Title VI Areas

DEVELOPMENT OF COST ESTIMATES

To develop an implementation and financial plan, specific unit costs were developed for each proposed improvement. These cost estimates were derived from bus stop improvement projects conducted by other transit agencies in the State of Maryland and across the country. Local data on potential costs were unavailable at the time of this study.

Please note that the specific improvement costs are based on estimates that generalize construction activities/processes. Each bus stop location will need to be reviewed prior to the improvement being completed. The actual installation of improvements may require engineering assessments, permitting, coordination with landowners/local jurisdictions, additional safety measures, etc.

Table 4-3: Proposed Bus Stop Improvement Cost Estimates

Improvement	Item Cost	Number of Instances	Total Cost
Estimated Capital and Installation Costs			
Bus Stop Sign	$200	43	$8,600
Boarding and Alighting Area/Landing Pad	$4,000	29	$116,000
Sidewalk Connection	$10,000	7	$70,000
Curb Ramp	$3,500	9	$31,500
Detectable Warning (Curb Ramp)	$100	19	$1,900
Passenger Seating/Bench	$1,300	15	$19,500
Trash Can (Mounted)	$1,000	13	$13,000
Information Case	$500	29	$14,500
Shelter	$15,000	9	$135,000
Subtotal	-	-	**$410,000**
Estimated Additional Administrative & Implementation Costs			
Implementation and Coordination Activities	10% of Subtotal	-	$41,000
Survey, Design, and Inspection	50% of Subtotal	-	$205,000
Total Amount	-	-	**$656,000**

Note: This table includes planning level estimates, the cost will be refined during the design phase

IMPLEMENTATION PLAN

Based on the results of the prioritization and cost estimates, a phased implementation plan was developed to identify when improvements should occur. A five-year timeframe was utilized which resulted in annual costs of more than $100,000. The implementation plan includes all recommended improvements; including improvements that are more than likely the responsibility of local jurisdictions (e.g. sidewalks, curb ramps, etc.).

The recommended phased implementation should be viewed as a guide. Transit staff must review the need for improvements and available funding on an annual basis to determine the feasibility of implementation and to develop yearly improvement programs. Additional grants may be sought to supplement or speed up the improvement process.

Table 4-4: Phased Implementation Plan for Recommended Bus Stop Improvements

Improvement	Estimated Cost	Added Implementation Costs	Total Cost
Year 1 – 2020			
Install All Bus Stop Signage	$8,600	$5,160	$13,760
Basic Stop Improvements	$49,700	$29,820	$79,520
Enhanced Stop Improvements	$4,600	$2,760	$7,360
Transit Center Improvements	$600	$360	$960
Subtotal	**$63,500**	**$38,100**	**$101,600**
Year 2 – 2021			
Basic Stop Improvements	$36,500	$21,900	$58,400
Enhanced Stop Improvements	$32,500	$19,500	$52,000
Transit Center Improvements	$1,600	$960	$2,560
Subtotal	**$70,600**	**$42,360**	**$112,960**
Year 3 – 2022			
Basic Stop Improvements	$41,300	$24,780	$66,080
Enhanced Stop Improvements	$42,200	$25,320	$52,000
Subtotal	**$70,600**	**$67,520**	**$133,600**
Year 4 – 2023			
Basic Stop Improvements	$37,500	$22,500	$60,000
Enhanced Stop Improvements	$52,600	$31,560	$84,160
Subtotal	**$90,100**	**$54,060**	**$141,160**
Year 5 - 2024			
Basic Stop Improvements	$85,200	$51,120	$136,320
Enhanced Stop Improvements	$24,700	$14,820	$39,520
Subtotal	**$109,900**	**$65,940**	**$175,840**

POTENTIAL IMPROVEMENT BARRIERS

Categorizing bus stops can help define the minimum improvements required at each type of stop, but it does not address potential barriers to improvements that may be present at certain stops. Some of these potential barriers include:

- High speeds (45 mph+)
- Stops in parking zones
- State/local coordination
- Not-In-My-Backyard (NIMBY) Syndrome

The following sections will describe each barrier in further detail and present different methods to mitigate some of the planning predicaments they can cause. This section will include example sketches of improvements at stops within the MPO that have these barriers to improvement.

High-Speed Areas

A general rule when designing a fixed route service is to prohibit any stops on a road with a speed limit of 45 mph or higher. Higher speeds present a greater danger to drivers and riders while boarding the bus. If a bus stops on a 45 mph street to pick a rider up, the potential danger is much higher than that in a 25 mph area. It is easier to avoid breaking the 45 mph rule in dense, urbanized areas, but CCPT and STS serve both rural and urban areas. In rural areas, it is difficult to operate an efficient and comprehensive fixed-route service that does not stop on high-speed roads. On some routes in the CSM-MPO, including those traveling on Three Notch Road in Hollywood and HG Trueman Road in Lusby, stopping on these roads is somewhat unavoidable. There are a few ways to mitigate stopping in a high-speed area, including:

- Turning off the high-speed road and into the desired destination

- Building an expanded road should or bus bay that gives the bus proper space for safe deceleration, boarding/alighting, and acceleration

Figure 4-10 shows two stops located on Three Notch Road in Hollywood, where the speed limit is 55 mph. The northbound stop can turn into a parking lot, turn around, and pick up any riders. The southbound stop does not have anywhere to turn in, so the expansion of the shoulder or creation of a bus bay along the shoulder would be the best way to make the stop safer. Figure 4-10 also includes on-site pictures, showing both stops and a bus passenger beginning to cross the road after getting off an STS bus.

Figure 4-10: Hollywood Medical Center/Three Notch Road Improvement Diagram

Stops in Parking Zones

At some destinations, the curb is difficult to access because it is surrounded by parking spaces. Since cars can park in any space at any time, it is difficult to designate a specific location for pick up and drop off. The most effective way to mitigate this barrier is to:

- Create a curb bulb (this method requires the elimination of parking spaces)

Figure 4-6 uses the example of a bus stop along North Shangri La St in Lexington Park. The northbound stop is at a strip mall where the entire shoulder is made up of parking spaces. A bus could safely stop here only if a curb bulb is installed. It is estimated that a curb bulb would require the elimination of at least 10 parking spaces. This specific bus stop is in a parking rich area, so the effects on drivers would be limited.

Figure 4-11: Millison Plaza Curb Bulb Diagram

State/Local Coordination

Several state roads serve as the main arteries of the CSM-MPO. Three Notch (State Route 235), Great Mills (State Route 246), and Solomons Island (State Route 4) are all maintained by the Maryland State Highway Administration (SHA). Since the roads are not owned or maintained by local governments, the installation of improvements at these stops would require increased state and local coordination. The installation of signs, landing pads, and or shelters is more complex on state roads. Some stops have circumvented this issue by turning onto local roads and destinations (Calvert Southern Library).

NIMBY

A constant barrier to transit expansion and improvements is a "not in my backyard", or NIMBY, attitude. This attitude is most often expressed in lower-density single-family residential areas, such as Chesapeake Ranch Estates. This neighborhood, which contains a bulk of Calvert County's stops in the CSM-MPO, is entirely residential. The installation of signs at these stops would precipitate complex, and perhaps contentious, discussions and coordination between local residents, the homeowners association, and the transit provider. Since most surveyed bus stops in Chesapeake Ranch Estates are in front of single-family homes and on a road network that is circuitous and unconducive to basic bus stop improvements, it may be difficult to make any improvements in this area.

Figure 4-12: Chesapeake Ranch Estates Residential Bus Stops

AFTER THE PLAN

The following sections provide an overview of the next steps for CCPT, STS, and the MPO to consider while undertaking a bus stop improvement program.

Adopt Bus Stop Guidelines and Standards

CCPT, STS, and the MPO should consider formally adopting the bus stop guidelines included within this plan. Transit and planning staff must review the guidelines on a regular basis to ensure that all staff and related parties have a full understanding of the accessibility issues, requirements, and procedures.

Funding for Improvements

Seek capital improvement funding for improvements and investigate new funding avenues to supplement improvement efforts. Coordinate with local jurisdictions and stakeholder groups on strategies to implement improvements. Collaboration could lead to funding assistance with improvements at specific stops or the installation of sidewalks, curb ramps, and crosswalks.

Establish New and Evaluate Existing Bus Stops

This plan's scope only included bus stops with the MPO, however, CCPT and STS serve hundreds of stops throughout their respective counties. Utilizing the guidelines and standards within this plan, each system should evaluate their complete bus stop network to identify other locations for bus stop signage and basic stop improvements.

Update and Maintain a Bus Stop Inventory

CCPT, STS, and the MPO should establish procedures and staff responsibilities for keeping the bus stop inventory up-to-date and ensuring that bus stop improvements are tracked and in compliance with adopted guidelines. In the future, the bus stop inventory could be made available to customer service staff and service planners as a method to view photographs of the bus stop, a list of available amenities, sidewalk accessibility conditions, and planned improvements. GIS applications could be utilized to share the inventory.

Annual Review of Progress and Implementation Plans

Transit providers should perform an annual review of bus stop improvements and promote their efforts via press releases and marketing efforts. Staff must also review emerging needs for improvements and available funding on an annual basis to determine the feasibility of implementation and to develop yearly improvement programs.

Maintaining Bus Stop Amenities

As the amount of bus stop amenities increases, transit agencies should consider formal agreements to maintain bus stops. Regular bus stop maintenance may include trash removal, graffiti removal, replacement of damaged amenities, and snow removal.

As a general rule of thumb, a transit agency should never install a trash can at a bus stop without a plan to regularly dispose of the trash. While STS does not currently have a bus stop maintenance contract, the system has developed an adopt a bus stop program called Ride With Pride Adopt-a-SPOT. The program allows the sponsor to promote their company or organization at the bus stop (see Figure 4-13) in exchange for removing trash from the stop (and surrounding area) and promptly reporting graffiti or damage to STS.

Figure 4-13: STS Bus Stop Adoption Program Sign