



DCD
planning design construction



Division of Capital Development

Seven Locks Road Sidewalk and Bikeway DRAFT Project Prospectus Volume I



Facility: Seven Locks Road
Limits: Montrose Road to Bradley Boulevard
Length: 3.3 Miles
Location: Potomac, Maryland
Study: Facility Planning, Phase I
Date: May 2007

Prepared by:
Montgomery County
Department of Public Works and Transportation (DPWT)
Division of Capital Development, Transportation Planning & Design Section
Planning Unit

PROJECT STUDY INFORMATION	
Name of project and CIP #	Seven Locks Road Sidewalk and Bikeway (SLRSB) CIP 509337
Study Phase	Facility Planning, Phase I
Transportation Category	Pedestrian/Bicycle Facilities
Study Performed by	Montgomery County Department of Public Works and Transportation (DPWT) Division of Capital Development
Phase I Project Manager	Aruna Miller, 240-777-7194
Phase I Consultant	The Wilson T. Ballard Company Shawn Burnett, 410-363-0150
EXISTING CONDITIONS	
Road Name	Seven Locks Road
Project Limits	Montrose Road to Bradley Boulevard
Project Length (miles)	3.3
Functional Classification of Roadway	Arterial Roadway
# of Lanes	2
Typical Lane width	12 to 13 feet
Average Daily Traffic (ADT)	16,500 vehicles
# of Bus Stops	24- Montgomery County Ride-On Bus Routes 36, 38 and 47
# of Signalized Intersections	1. Montrose Road 2. Postoak Road 3. Gainsborough Road 4. Tuckerman Lane 5. Bells Mill Road 6. Democracy Boulevard 7. Bradley Boulevard
Portion of Corridor that is Closed Section	Approximately 4300 Linear Feet (25%)
Posted Speed	35 mph 25 mph between Post Oak and Ivymount Terrace
# of Communities fronted by	18
# of Schools fronted by	5
# of Places of Worship fronted by	10
# of Parks fronted by	5
Other Places of Interest	Cabin John Mall / Shopping Center, Pool, Assisted Living, Scotland Community Center, Potomac Racquet Club
Portion of	Approximately 6,000 linear feet (35%) of the corridor length along the east side

Corridor that has sidewalk	of Seven Locks Road contains sidewalk. Approximately 7,800 linear feet (45%) of the corridor length along the west side of Seven Locks Road contains sidewalk.																		
Portion of Corridor that has shoulder greater than 5 feet	Approximately 13,000 linear feet (75%) of the corridor length along the east and west sides of Seven Locks Road contain shoulders greater than 5-feet in width.																		
Portion of Corridor with right-of-way at least 80 feet wide	9,100 feet (55%)																		
Existing SWM facilities	Potential SWM pond located west of Seven Locks Road between Grand Teton Drive and Matterhorn Court																		
Watershed name	Cabin John Creek Watershed																		
Delineated wetlands	<p>These locations are preliminary and have not received official jurisdictional determination by Maryland Department of the Environment or the Army Corps of Engineers.</p> <table border="1"> <tr> <td>MON-1</td> <td>Potential wetland in the southwest quadrant of the Montrose Road/Seven Locks Road intersection; west of and adjacent to Seven Locks Road.</td> </tr> <tr> <td>IVY-1</td> <td>Potential wetland in the southeast quadrant of the Ivymount Terrace/Seven Locks Road intersection; east of and adjacent to Seven Locks Road.</td> </tr> <tr> <td>SND-1</td> <td>Potential Waters of the U.S. located just north of Scotland AME Zion Church west of and adjacent to Seven Locks Road; runs in a southerly direction and joins Snakeden Branch.</td> </tr> <tr> <td>SND-2</td> <td>Potential wetland just north of Scotland AME Zion Church west of and adjacent to Seven Locks Road; surrounds a portion of a tributary to Snakeden Branch.</td> </tr> <tr> <td>AME-1 AND AME-2</td> <td>Potential Waters of the U.S. (tributaries of Snakeden Branch) with associated wetlands along the stream within the Inverness Forest Neighborhood Conservation Area just north of Bells Mill Road, west of and adjacent to Seven Locks Road.</td> </tr> <tr> <td>AME-3</td> <td>Potential wetland surrounding Snakeden Branch east of and adjacent to Seven Locks Road just north of Oracle Place; within Cabin John Regional Park.</td> </tr> <tr> <td>Pond</td> <td>West of and adjacent to Seven Locks Road; between Grand Teton Drive and Matterhorn Court.</td> </tr> <tr> <td>DEM-1</td> <td>Potential wetland in southeast quadrant of Democracy Boulevard/Seven Locks Road intersection, east of and adjacent to Seven Locks Road; within Cabin John Stream Valley Park – Unit #5.</td> </tr> <tr> <td>DEM-2</td> <td>Potential wetlands west of and adjacent to Seven Locks Road, between Democracy Boulevard and Charleston Court; within Cabin John Stream Valley Park – Unit #5.</td> </tr> </table>	MON-1	Potential wetland in the southwest quadrant of the Montrose Road/Seven Locks Road intersection; west of and adjacent to Seven Locks Road.	IVY-1	Potential wetland in the southeast quadrant of the Ivymount Terrace/Seven Locks Road intersection; east of and adjacent to Seven Locks Road.	SND-1	Potential Waters of the U.S. located just north of Scotland AME Zion Church west of and adjacent to Seven Locks Road; runs in a southerly direction and joins Snakeden Branch.	SND-2	Potential wetland just north of Scotland AME Zion Church west of and adjacent to Seven Locks Road; surrounds a portion of a tributary to Snakeden Branch.	AME-1 AND AME-2	Potential Waters of the U.S. (tributaries of Snakeden Branch) with associated wetlands along the stream within the Inverness Forest Neighborhood Conservation Area just north of Bells Mill Road, west of and adjacent to Seven Locks Road.	AME-3	Potential wetland surrounding Snakeden Branch east of and adjacent to Seven Locks Road just north of Oracle Place; within Cabin John Regional Park.	Pond	West of and adjacent to Seven Locks Road; between Grand Teton Drive and Matterhorn Court.	DEM-1	Potential wetland in southeast quadrant of Democracy Boulevard/Seven Locks Road intersection, east of and adjacent to Seven Locks Road; within Cabin John Stream Valley Park – Unit #5.	DEM-2	Potential wetlands west of and adjacent to Seven Locks Road, between Democracy Boulevard and Charleston Court; within Cabin John Stream Valley Park – Unit #5.
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<p>Location of 100 year floodplain and buffers</p>	<p>A floodplain associated with Bogley Branch runs just north of the project area; and a floodplain associated with Snakeden Branch runs west of Seven Locks Road in a southeasterly direction from Postoak Road to Tuckerman Lane, crosses to the east of Seven Locks Road near the Potomac Electric and Power Company (PEPCO) lines and terminates just north of Bells Mill Road east of Seven Locks Road.</p> <p>[Source: Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (Maps 125B/175C) for Montgomery County, Maryland]</p>
<p>Environmentally sensitive areas</p>	<ul style="list-style-type: none"> • See "Delineated Wetlands and 100-year floodplains" • The MD Department of Natural Resource's Wildlife and Heritage Service has determined that forested areas on or adjacent to the project site may contain Forest Interior Dwelling Bird (FIDS) habitat. Guidelines to help minimize the project's impacts on FIDS and other native forest plants and wildlife are contained within the DNR Wildlife and Heritage's response letter within Appendix A of the Natural Resources Inventory (separate document). • Ten specimen trees were identified within the project area. • There are five parklands within the project area: <ol style="list-style-type: none"> 1. Potomac Woods Park 2. Inverness Forest Neighborhood Conservation Area 3. Cabin John Regional Park 4. Scotland Neighborhood Park 5. Cabin John Stream Valley Park – Unit 5
<p>Historic areas</p>	<ul style="list-style-type: none"> • One county-designated historic site is listed in the <u>Montgomery County Master Plan for Historic Preservation</u>: Scotland African Methodist Episcopal (AME) Zion Church located at 10902 Seven Locks Road (Resource #29/015). The church's environmental setting is the entire parcel (N829).
<p>ACCIDENT HISTORY</p>	
<p>January 1997-December 31, 2005</p>	<ul style="list-style-type: none"> • 301 overall accidents • 11 pedestrian • 2 bicycle
<p>Fatalities</p>	<ol style="list-style-type: none"> 1. Charlestown Court/Seven Locks Road Motorcycle/Recreational vehicle 2. Scotland Drive/Seven Locks Road-March 2004 Pedestrian/Vehicle 3. Bradley Boulevard/Seven Locks Road-September 2004 Bicyclist/Vehicle
<p>FACILITY PLANNING, PHASE I SUMMARY</p>	
<p>Transportation Category</p>	<p>Pedestrian Facilities</p>
<p>Referenced Master Plans</p>	<ul style="list-style-type: none"> • 2002 Potomac Subregion Master Plan • 2005 Countywide Bikeways Master Plans
<p>Purpose</p>	<ul style="list-style-type: none"> • Pedestrian/Bicycle improvements that promote Dual Bikeway (which provides for both on-road and off-road bicycle facilities) and enhance continuous pedestrian facilities along Seven Locks Road, within the study limits consistent with the visions of the 2002 Potomac Subregion Master Plan as well as the 2005 Countywide Bikeways Functional Master Plan;

	<ul style="list-style-type: none"> • Bikeway facilities along the north side of Montrose Road between Seven Locks Road and I-270 ramp; • Left turn acceleration and deceleration lanes along Seven Locks Road at Bells Mill Road, Muirfield Drive and Grand Teton Drive; and • Developing developer guidelines for future auxiliary private developer use for the intersection Seven Locks Road and Tuckerman Lane, based on Master Plan recommendations.
Need	<ul style="list-style-type: none"> • Address bicycle facility disconnects. The roadway lacks adequate north-south, on-road/ off-road bicycle facilities necessary to provide continuity and connections between existing and future bike facilities. • Provide continuous pedestrian facilities along the east and west side of Seven Locks Road to allow access to the 18 designated communities, 25 community facilities (5 schools, 10 places of worship (2 are orthodox synagogues), one police station, 5 parks and 4 points of interest), 24 public transit bus stops, and one employment/business center. • Improve pedestrian/bicyclist safety. Crash history between January 1997-December 31, 2003 revealed 174 crashes of which 11 involved pedestrians, two crashes involving bicyclists, and one vehicular fatality. In 2004, one pedestrian and one bicycle fatality have occurred within the project area. • Improve quality of life by providing multimodal transportation facilities
Project Start Date	January 2006
Facility Planning, Phase I Completion Date	June 2007
Concepts Evaluated	<ol style="list-style-type: none"> 1. No-Build 2. Master Planned Improvements within an 80-foot Right-of-Way 3. Modified Master Planned Improvements
Recommended Alternative	<p><u>Concept 3- Modified Master Planned Improvements</u></p> <p>The Recommended Alternative contains design elements consistent with the Master Plan and Bikeways Plan, and is compatible with planned development and transportation projects (e.g., master planned pedestrian and bikeway facilities on intersecting roadways, Cabin John Mall/shopping center development) and addresses the project Purpose and Need.</p>
Recommended Alternative Impacts	<p><u>Property Impacts</u></p> <ul style="list-style-type: none"> • 5.0 acres of right-of-way • 7.7 acres of grading easement • No building impacts <p><u>Natural Environmental Impacts</u></p> <ul style="list-style-type: none"> • 160 LF of Waters of the US • 0.9 acre of wetlands • 2.0 acres of floodplains • 5.4 acres of forest (2.2 of which is parkland) • 10.2 acres of additional impervious area. • Seven specimen trees <p><u>Cultural Impacts</u></p> <ul style="list-style-type: none"> • 7,000 SF (a 16-foot wide strip, of which 12-feet will be master

	<p>planned right-of-way, and 4-feet will be easement, along the Historic Scotland African Methodist Episcopal (AME) Zion Church property)</p> <p><u>Parking Impacts</u></p> <ul style="list-style-type: none"> • 1,800 SF (Eleven of 120 parking spaces at the Buddhist Temple) <p><u>Utility Impacts/Relocations</u></p> <ul style="list-style-type: none"> • Relocation of 200 utility poles • Relocation of underground utilities such as water, sewer and gas lines • Relocation of 18 fire hydrants • Potential modification of seven traffic signals
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PUBLIC OUTREACH

Public Meetings Held	<ol style="list-style-type: none"> 1. June 2006 2. October 2006 3. March 2007
Newsletter Distributed	<ol style="list-style-type: none"> 1. May 2006 2. August 2006 3. October 2006 4. February 2007 5. April 2007

Mailing List	239
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Active Civic/HOA with President Name	<ul style="list-style-type: none"> • Turning Creek Homeowners Association, Alfred W. Effer • Potomac Pond Homeowners Association, Mr. Neil Sherman • Inverness Forest Association, Inc., Mr. Art Glazer • Inverness North Homeowners, Judy Starr • Churchill Development, Inc., Liza Durant • Montgomery Bicycle Advocates (MoBike), Mr. Jack Cochrane • Seven Locks Civic Association, Mr. Jerry Garson • COMPASS, Amy Gleklen • West Bradley Citizens' Association, Ms. Sandy Vogelgesang • Deerfield Seven Locks Citizens Association, Cyril Draffin • Regency Estates Citizens Association (RECA), Richard Blumstein • St. James' Vestry, Dan Zimmerman, Senior Warden • Potomac Crest Homeowners Association • Scotland Community Development, Inc.
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PERMITS

Permits required	<ul style="list-style-type: none"> • Maryland Department of the Environment (MDE) or US Army Corps of Engineers (COE) for determination of potential wetlands. • Potential Water Quality Plan (work with Montgomery County Department of Permitting Services and Montgomery County Department of the Environmental Protection) • Montgomery County Department of Permitting Services for Erosion and Sediment Control and Stormwater Management
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Agencies requiring coordination	<ul style="list-style-type: none"> • Montgomery County Department of Public Works and Transportation (DPWT); • Montgomery County Department of Permitting Services (DPS);
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(including permits)	<ul style="list-style-type: none"> • Montgomery County Department of Environmental Protection (DEP); • Maryland-National Capital Park & Planning Commission (M-NCPPC); • The Maryland Department of the Environment (MDE); • US Army Corps of Engineers (COE); • US Fish and Wildlife Service (FWS); • Maryland Department of Natural Resources (MDNR);
OTHER	
Unresolved issues	Schedule for installation of additional Master Planned lanes at Tuckerman Lane.
Unique features	Master Plan calls for Seven Locks Roadway to follow the Two-Lane Road Policy.
Basis for Typical Section	County standards were modified to reduce impacts.
Basis for other major decisions	Input from public to reduce Limit of Disturbance.
Basis for streetscape, landscape panel, streetlights etc.	
Park impacts	2.2 acres of parkland
Planning Board Briefing Date/Comments	April 26, 2007 Planning Board recommended using a typical section with 11-foot travel lanes with 5-foot shoulders.
Montgomery County Council's Transportation and Environment Committee (T&E) Date/Comments	TBD
Anything else you feel is relevant	

STUDY TEAM CONTACT INFORMATION

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TABLE OF CONTENTS

PAGE NO.

EXECUTIVE SUMMARY

Introduction	ES-1
Project Background	ES-1
Project Purpose	ES-1
Project Need	ES-1
Concepts	ES-2
Team Recommended Alternative	ES-2
I. PROJECT PURPOSE AND NEED	I-1
A. Facility Planning, Phase I Study	I-1
B. Seven Locks Road – Project Background	I-1
1. Existing Pedestrian Facilities along Seven Locks Road	I-3
2. Area Master Plan Recommendations	I-3
C. Project Purpose	I-5
D. Project Need	I-6
1. Community	I-6
2. Safety Issues and Crash Data	I-8
3. Transit.....	I-11
E. Summary	I-11
II. CONCEPT EVALUATION.....	II-1
A. Introduction	II-1
B. Existing Conditions	II-1
1. Roadway Geometry	II-1
a. Lane Configuration and Traffic Control	II-1
b. Public Right-of-Way.....	II-1
c. Typical Sections	II-1
d. Functional Classification.....	II-2

2.	Traffic Volumes	II-3
3.	Capacity and Level of Service Analysis	II-3
4.	Parking	II-6
5.	Transit.....	II-6
C.	Sidewalk and Bikeway Design.....	II-6
1.	Proposed Typical Sections.....	II-7
2.	Intersection Configuration and Traffic Control.....	II-9
D.	Concepts Analysis	II-10
1.	Concept 1: No-Build	II-10
2.	Concept 2 (Dropped).....	II-10
3.	Concept 3 (Recommended Alternative).....	II-10
E.	Drainage and Stormwater Management.....	II-13
III.	IMPACT ANALYSIS.....	III-1
A.	Introduction	III-1
B.	Natural Environmental Resources	III-1
C.	Cultural Resources	III-3
D.	Socioeconomic Resources	III-3
1.	Communities, Community Facilities and Employment Centers.....	III-3
2.	Private Development and Public Projects.....	III-3
3.	Parking	III-5
4.	Land Use and Zoning.....	III-5
E.	Utilities and Traffic Signals	III-5
F.	Transit.....	III-5
IV.	PUBLIC PARTICIPATION	IV-1
A.	Public Meetings.....	IV-1
B.	Public Comments.....	IV-1

LIST OF FIGURES

FIGURE NO.	DESCRIPTION	PAGE NO.
Figure ES-1.	Typical Section A – Open Section.....	ES-2
Figure ES-2.	Typical Section B – Closed Section	ES-3
Figure ES-3.	Typical Section C1 - Retaining Wall Section (East Side)	ES-3
Figure ES-4.	Typical Section C2 - Retaining Wall Section (West Side)	ES-4
Figure 1.	Seven Locks Road Sidewalk and Bikeway Improvement Project Location Map	I-2
Figure 2.	Existing and Master Plan Recommended Facilities along Seven Locks Road.....	I-5
Figure 3.	Bicyclists and Pedestrians Utilizing Seven Locks Road Shoulder	I-7
Figure 4.	Seven Locks Road Intersection Crash Summary – Number of Crashes, 1997 – 2003.	I-8
Figure 5.	Crash Types within the Project Area, 1997 – 2003.....	I-9
Figure 6.	Pedestrian and Bicycle Crash Locations.....	I-10
Figure 7.	Seven Locks Road – Existing Peak Hour Traffic Volumes, Weekday	II-4
Figure 8.	Seven Locks Road – Existing Peak Hour Traffic Volumes, Saturday	II-5
Figure 9.	Typical Section A – Open Section.....	II-7
Figure 10.	Typical Section B – Closed Section	II-8
Figure 11.	Typical Sections C1 and C2 – Retaining Wall Sections.....	II-9
Figures 12-15.	Concept 1: No-Build	II-14 - II-17
Figures 16-19.	Concept 2: Master Planned Improvements within an 80-foot Right-of-Way	II-18 - II-21
Figures 20-23.	Concept 3: Modified Master Planned Improvements (Rec. Alternative).....	II-22 - II-25

LIST OF TABLES

TABLE NO.	DESCRIPTION	PAGE NO.
Table ES-1	Summary of Potential Impacts (Build Concepts 2 and 3).....	ES-5
Table 1.	Existing Signals/Crosswalks/Sidewalks within the Project Area	I-3
Table 2.	Master Plan Recommended Bicycle Facilities within the Project Area	I-4
Table 3.	Functional Classification and Characteristics of Project Area Roadways.....	II-2
Table 4.	Functional Classification Systems.....	II-2
Table 5.	Level of Service Parameters	II-6
Table 6.	Summary of Existing Intersection Operational Analysis.....	II-6
Table 7.	Summary of Concept Features.....	II-11
Table 8.	Summary of Potential Impacts (Build Concepts 2 and 3).....	II-12
Table 9.	Specimen Trees	III-2
Table 10.	Communities, Community Facilities and Existing Employment/Business Centers	III-4

VOLUME II: Technical Backup – APPENDICES

Appendix A – 2002 Potomac Subregion Master Plan Excerpts

Appendix B – County Bikeways Guidance – 2002 Master Plan and 2005 Countywide Bikeways
Functional Master Plan Excerpts

Appendix C – Montgomery County DPWT Standards

Appendix D – Typical Sections

Appendix E – Seven Locks Road Sidewalk and Bikeway Concept 1- No Build

Appendix F – Seven Locks Road Sidewalk and Bikeway Concept 2

Appendix G – Seven Locks Road Sidewalk and Bikeway Concept 3 (Recommended Alternative)

Appendix H – Agency Coordination

Appendix I – Land Use and Census Data

Appendix J – Public Participation Materials

Appendix K – Public Comments

Appendix L – Team Meeting Minutes

Appendix M – Traffic Report (Bound Separately)

EXECUTIVE SUMMARY

INTRODUCTION

The Montgomery County Department of Public Works and Transportation (DPWT), Division of Capital Development, has completed a Phase I Facility Planning Study for the Seven Locks Road Sidewalk and Bikeway (SLRSB) project. This Prospectus concludes the Phase I Study, and will be used by the Director of the Montgomery County Department of Public Works and Transportation on whether or not the project should proceed into Phase II Facility Planning Study.

PROJECT BACKGROUND

Seven Locks Road, located in Potomac, Maryland is a two-lane arterial roadway with an Average Daily Traffic (ADT) of 16,500 vehicles. The project limits are from Montrose Road to Bradley Boulevard. Within this 3.3 mile section, the project area consists of single-family residential homes and townhouses within 18 designated communities, 25 community facilities (5 schools, 10 places of worship (2 are orthodox synagogues), one police station, 5 parks and 4 points of interest) and one employment/business center. Seven Locks Road provides access to 24 public transit bus stops and has a posted speed limit of 35 miles per hour (mph), except for a stretch of roadway between Postoak Road and Ivymount Road where the speed limit drops to 25 mph. There are intermittent pedestrian facilities provided along either side of Seven Locks Road within the project area; however, there are no existing off-road bicycle facilities along this corridor meeting current county standards. In 2004, there were two reported fatalities within the project area, one involving a pedestrian and the other a cyclist.

PROJECT PURPOSE

The purpose of the Seven Locks Road Sidewalk and Bikeway Improvements Project is to examine the need for:

- Pedestrian/Bicycle improvements that promote Dual Bikeway (which provides for both on-road and off-road bicycle facilities) and enhance continuous pedestrian facilities along Seven Locks Road, within the study limits consistent with the visions of the 2002 Potomac Subregion Master Plan as well as the 2005 Countywide Bikeways Functional Master Plan;
- Bikeway facilities along the north side of Montrose Road between Seven Locks Road and I-270 ramp;
- Left turn acceleration and deceleration lanes along Seven Locks Road at Bells Mill Road, Muirfield Drive and Grand Teton Drive; and
- Developing developer guidelines for future auxiliary private developer use for the intersection Seven Locks Road and Tuckerman Lane, based on Master Plan recommendations.

PROJECT NEED

The need for Seven Locks Road Sidewalk and Bikeway project are based on the following:

- Address bicycle facility disconnects. The roadway lacks adequate north-south, on-road/ off-road bicycle facilities necessary to provide continuity and connections between existing and future bike facilities.
- Provide continuous pedestrian facilities along the east and west side of Seven Locks Road to allow access to the 18 designated communities, 25 community facilities (5 schools, 10 places

of worship (2 are orthodox synagogues), one police station, 5 parks and 4 points of interest), 24 public transit bus stops, and one employment/business center.

- Improve pedestrian/bicyclist safety. Crash history between January 1997-December 31, 2003 revealed 174 crashes of which 11 involved pedestrians, two crashes involving bicyclists, and one vehicular fatality. In 2004, one pedestrian and one bicycle fatality have occurred within the project area.
- Improve quality of life by providing multimodal transportation facilities.

CONCEPTS

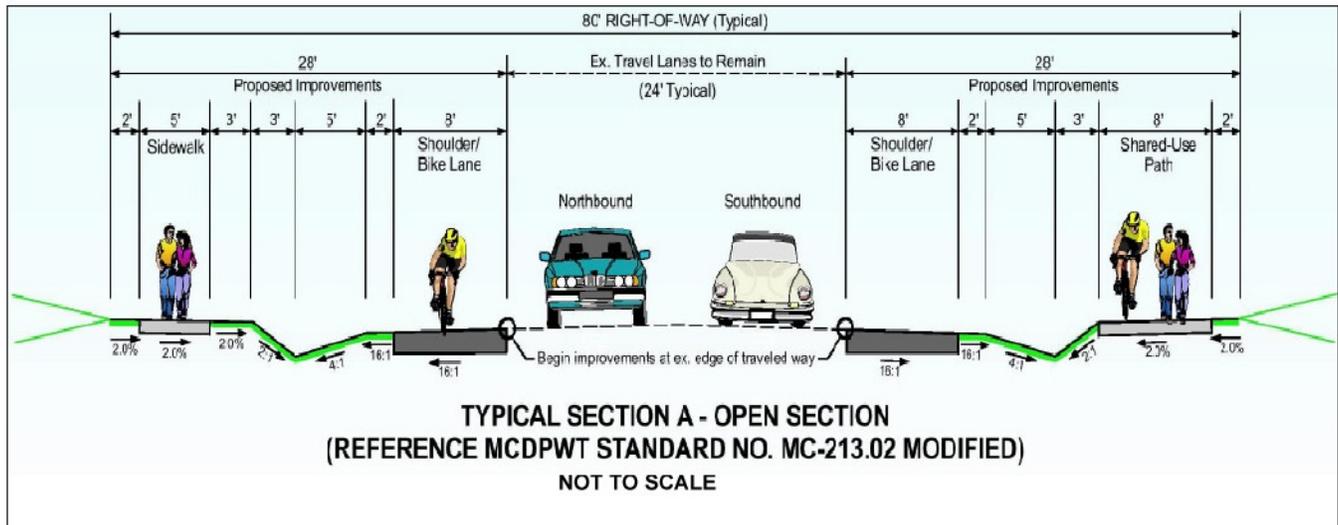
The Study Team, including representatives from several DPWT divisions and Maryland-National Capital Park and Planning Commission (M-NCPPC), with input from the public, completed an analysis of three concepts:

1. Concept 1: No-Build
2. Concept 2: Master Planned Improvements within an 80-foot Right-of-Way
3. Concept 3: Modified Master Planned Improvements (Team Recommended Alternative)

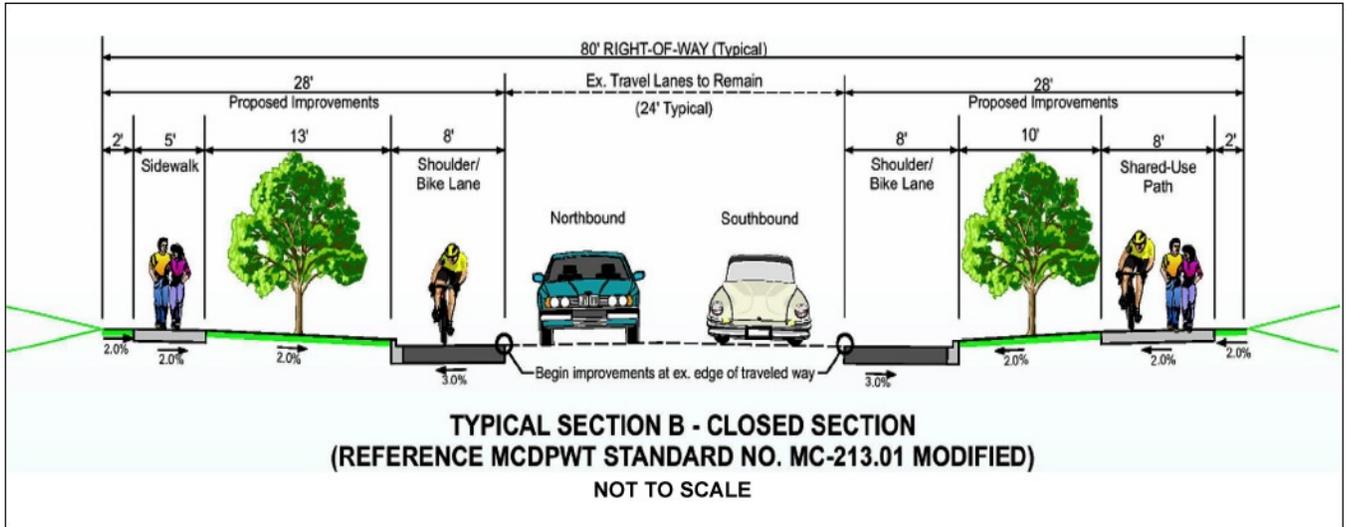
TEAM RECOMMENDED ALTERNATIVE

The Team Recommended Alternative addresses the pedestrian and bicycle disconnects within the Seven Locks Road project area by providing improved amenities as described below:

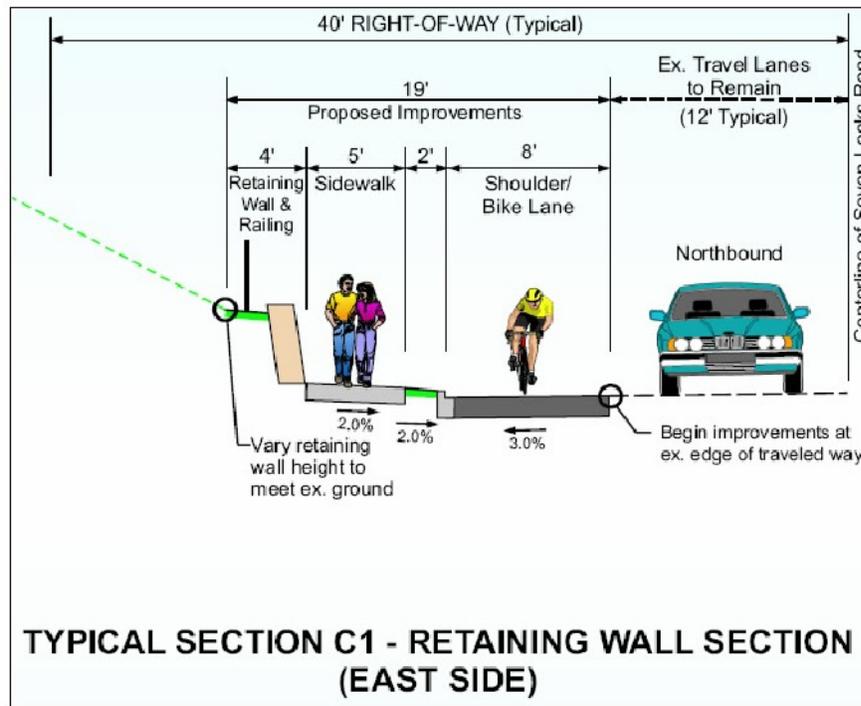
- five-foot wide sidewalk along the east side of Seven Locks Road;
- eight-foot wide Shared-Use Path along the west side of Seven Locks Road;
- eight-foot wide shoulders/On-Road Bike Lanes along both sides of Seven Locks Road; and
- eight-foot wide Shared-Use Path along the north side of Montrose Road.



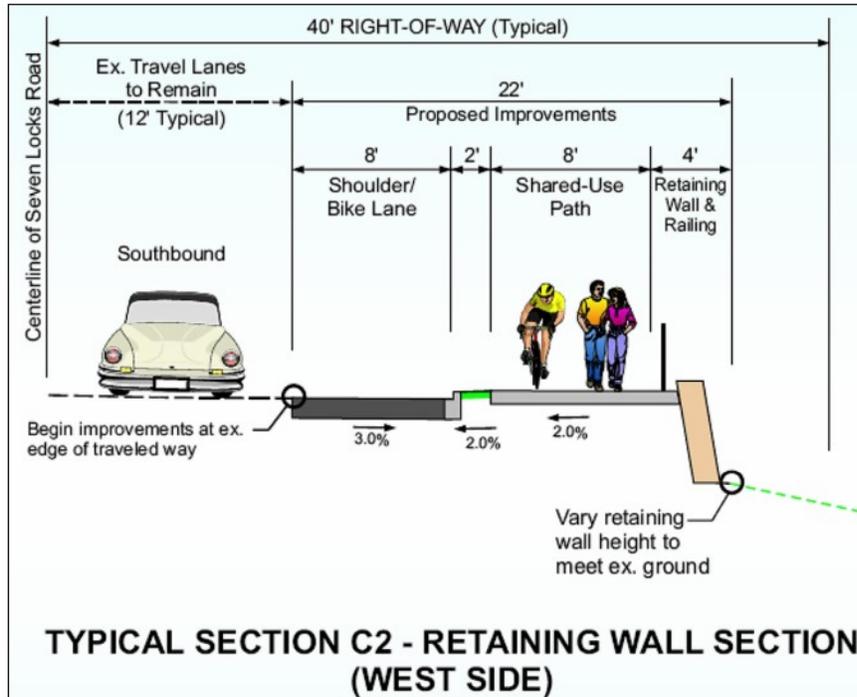
Note: Dimensions and landscaping are approximate and subject to change during Final Design and Construction.
Figure ES-1. Typical Section A – Open Section.



Note: Dimensions and landscaping are approximate and subject to change during Final Design and Construction.
Figure ES-2. Typical Section B – Closed Section.



Notes: 1) Drawings Not to Scale
 2) Dimensions and landscaping are approximate and subject to change during Final Design and Construction
Figure ES-3. Typical Section C1- Retaining Wall Section (East Side)



Notes: 1) Drawings Not to Scale
 2) Dimensions and landscaping are approximate and subject to change during Final Design and Construction

Figure ES-4. Typical Section C2- Retaining Wall Section (West Side)

The following is a summary of the potential impacts from the proposed construction of the Recommended Alternative (**more detailed information is presented in Section III, Impact Analysis**), consisting of sidewalk and bikeway improvements along Seven Locks Road from Montrose Road to Bradley Boulevard and along the north side of Montrose Road from Seven Locks Road to the I-270 ramps. In addition, a detailed discussion of the study recommendations can be found in Section II of this prospectus. **Figures 20 – 23 and Appendix G** present the Recommended Alternative.

Table ES-1. Summary of Potential Impacts (Build Concepts 2 and 3).

	Concept 2	Concept 3
Property Impacts		
Right-of-Way (acres)	5.0	5.0
Grading Easement (acres)	14.0	7.7
Impacts to Building (# buildings)	11	0
Natural Environmental Impacts		
Waters of the U.S. (LF)	800	160
Wetland (acres)	0.9	0.9
Floodplain (acres)	2.3	2.0
Forest / Portion of forest that is parkland (acres)	8.2 / 3.6	5.4 / 2.2
Additional Impervious Area (acres)	9.8	10.2
Specimen Tees (# trees)	7	7
Cultural Impacts		
Historic Property* (SF)	11,100 (a 22-foot wide strip along the Scotland African Methodist Episcopal (AME) Zion Church property)	7,000 (a 16-foot wide strip, of which 12- feet will be master planned right-of- way, and 4-feet will be easement, along the Scotland African Methodist Episcopal (AME) Zion Church property)
Parking Impacts		
Parking Spaces (# spaces / SF)	Buddhist Temple 11 of 120 / 1,800	Buddhist Temple 11 of 120 / 1,800
Utility Impacts/Relocations		
Utility Pole Relocations	200	200
Underground Utility Relocations (water, sewer, gas lines, etc.) (Yes / No)	Yes	Yes
Fire Hydrant Relocations (# fire hydrants)	18	18
Traffic Signal Modifications (# signals)	7	7

*Concept 1, No-Build would result in no impacts to property, parking, environmental resources, or utilities in the project area.

I. PROJECT PURPOSE AND NEED

A. Facility Planning, Phase I Study

The Montgomery County Department of Public Works and Transportation (DPWT) initiated a Phase I Facility Planning Study for Seven Locks Road from Montrose Road to Bradley Boulevard in Potomac, Maryland (**See Figure 1**). The Facility Planning, Phase I study analyzed the following:

- Planned dual bikeway, DB-3, which provides for both on-road and off-road bicycle facilities along Seven Locks Road, within the study limits consistent with the visions of the 2002 Potomac Subregion Master Plan as well as the 2005 Countywide Bikeways Functional Master Plan;
- Bikeway facilities along the north side of Montrose Road between Seven Locks Road and I-270 ramp;
- Continuous pedestrian facilities along the east side of the Seven Locks Road;
- Left turn acceleration and deceleration lanes along Seven Locks Road at Bells Mill Road, Muirfield Drive and Grand Teton Drive; and
- Northbound and eastbound through lanes at the intersection of Seven Locks Road and Tuckerman Lane.

B. Seven Locks Road - Project Background

Located in the Potomac Area of Montgomery County, Seven Locks Road is classified by the 2002 Potomac Subregion Master Plan (Master Plan) as a north-south arterial roadway and connects the City of Rockville to the north with the Cabin John Area to the south. The project limits are from Montrose Road to Bradley Boulevard. Within this 3.3 mile section, Seven Locks Road is primarily a two-way, two lane, open-section roadway with a posted speed limit of 35 miles per hour (mph), except for a stretch of roadway between Postoak Road and Ivymount Road where the speed limit drops to 25 mph. The roadway widens (to provide additional through and turn lanes) within the project area at the major intersections of Democracy Boulevard, Bradley Boulevard, Tuckerman Lane, and Montrose Road.

The project area consists of several pedestrian and bicyclist generating uses, such as well-established single-family residential homes and townhouses within 18 designated communities, 25 community facilities (5 schools, 10 places of worship (2 are orthodox synagogues), one police station, 5 parks and 4 points of interest) and one employment/business center. Seven Locks Road provides access to 24 public transit bus stops. There are substandard, intermittent pedestrian facilities provided along either side of Seven Locks Road within the project area. There is an off-road shared use path along the west side of Seven Locks Road from Postoak Road to Wootton Parkway; however, it does not meet current county standards. South of the project limits, there is an off-road shared use path along the west side of Seven Locks Road from River Road to Bradley Boulevard. The Average Daily Traffic (ADT) is 16,500 vehicles.

The following ten roads intersect Seven Locks Road within the project area: Montrose Road, Postoak Road, Gainsborough Road, Tuckerman Lane, Bells Mill Road/ Oracle Place, Scotland Drive, Muirfield Drive, Grand Teton Drive, Democracy Boulevard and Bradley Boulevard (MD 191).

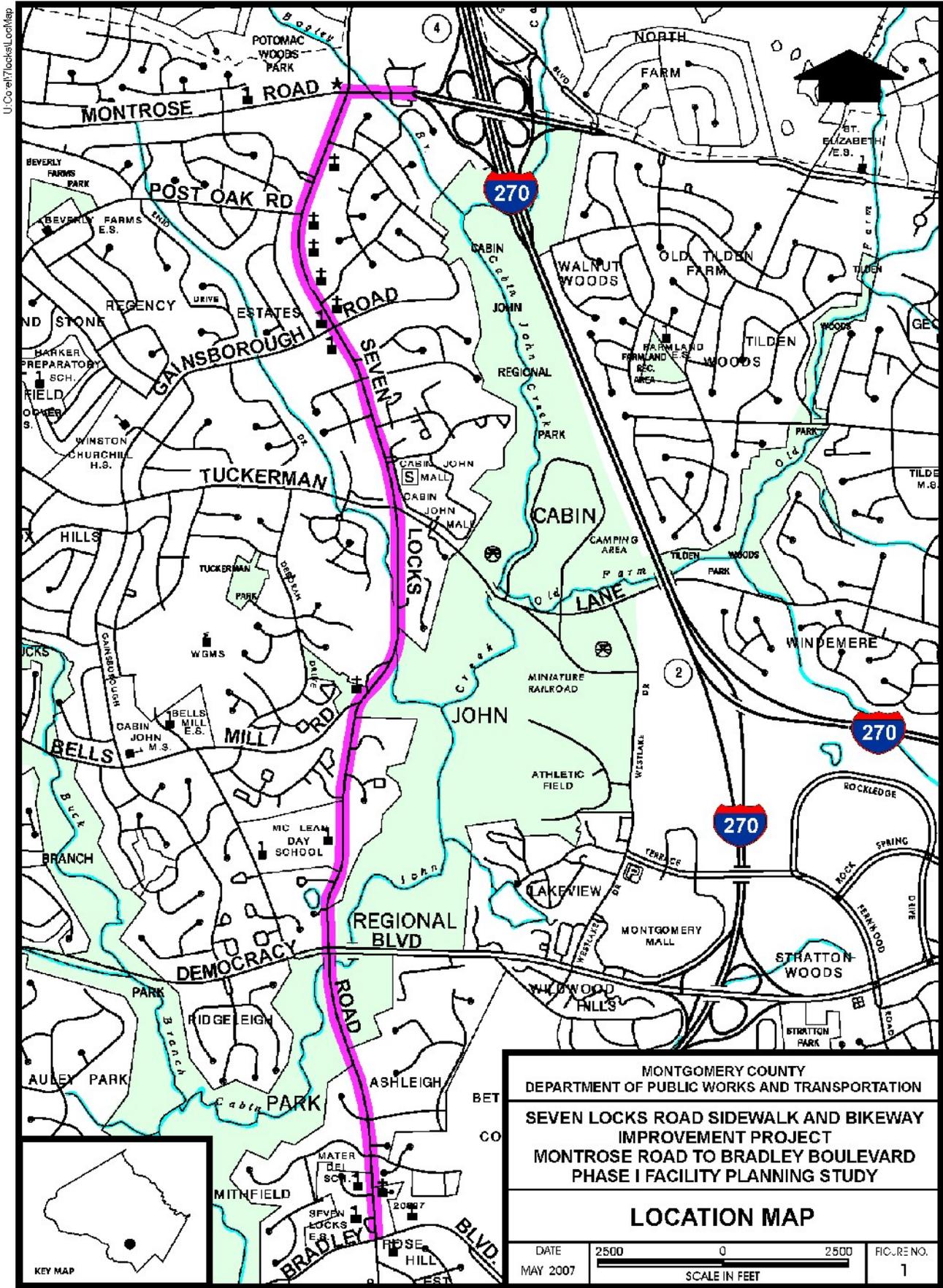


Figure 1. Seven Locks Road Sidewalk and Bikeway Improvement Project Location Map.

1. Existing Pedestrian Facilities along Seven Locks Road

Table 1. Existing Signals/Crosswalks/Sidewalks within the Project Area*

Intersection/Location	Existing Traffic Control Signal	Existing Marked Crosswalk	Existing Sidewalk**	
			West of Seven Locks Road	East of Seven Locks Road
Bradley Boulevard (MD 191)	✓	✓		
Democracy Boulevard	✓	✓	✓	✓
Grand Teton Drive				
Muirfield Drive				
Scotland Drive		✓		
Bells Mill Road/Oracle Place	✓			
Tuckerman Lane	✓	✓	✓	✓
Gainsborough Road	✓	✓	✓	✓
Postoak Road	✓	✓	✓	✓
Montrose Road	✓	✓	✓	
The Heights Private School		✓		

*There are no existing bikeways within the project area that meet current County standards.

**Existing Sidewalk locations are discontinuous.

Note: Master Plan Planned Bikeways are all planned to tie into the planned bikeway (DB-3/PB-15) along Seven Locks Road.

Field visits verified that there is an existing off-road shared use path along the west side of Seven Locks Road from River Road to Bradley Boulevard (south of the project limits) as well from Postoak Road to Wootton Parkway. However, the portion of off-road shared use path between Postoak Road and Wootton Parkway does not meet the minimum widths as stated by the County standards.

2. Area Master Plan Recommendations

As with all transportation improvement projects, the DPWT referenced the area master plans. Seven Locks Road is identified in the: (1) 2002 Potomac Subregion Master Plan and (2) 2005 Countywide Bikeways Functional Master Plan.

The 2005 Countywide Bikeways Functional Master Plan recommends a new type of bikeway, the Dual Bikeway (Route DB-3), be provided along Seven Locks Road from MacArthur Boulevard to Wootton Parkway. The Dual Bikeway was created to feature both an on-road and an off-road bike facility. A Dual Bikeway may consist of a Shared-Use Path and Bike Lanes, or a Shared-Use Path and Signed Shared Roadway (Bikeways Plan Executive Summary, page 1). Route DB-3 was added to the 2005 Bikeways Plan via recommendation in the 2002 Master Plan for a Shared-Use Path/On-Road Bike Lane route along Seven Locks Road from River Road north to Wootton Parkway. This new route expands upon the Master Plan's original planned bikeway designation (a Shared-Use Path) along Seven Locks Road from the Rockville City Line to I-495. It is noted in Table 2-2 of the Bikeways Plan that the actual bikeway type along this corridor should be determined during a facility planning study.

Below are Master Plan definitions of bicycle and pedestrian facilities:

- Shared-Use Path (off-road) – physically separated from vehicular traffic by an open space or barrier, and located either within the highway right-of-way or an independent right-of-way, and is generally eight to ten-feet wide (previously referred to as Class I in Master Plan).
- On-Road Bike Lane – a five-foot wide portion of roadway designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists typically provided in each direction of travel (previously referred to as Class II in Master Plan).
- Signed Shared Roadway (on-road) – a travel lane shared by the bicyclist and motorist, either a curb lane or a lane with little or no shoulder (previously referred to as Class III in Master Plan).

The planned Dual Bikeway (DB-3) along Seven Locks Road is an integral piece of the entire Master Plan for bikeways in the Subregion; it is planned to tie into additional planned Shared-Use Paths, all of which intersect with Seven Locks Road and continue either east towards I-270 or west towards Falls Road (See Table 2 and Appendix B).

Table 2. Master Plan Recommended Bicycle Facilities within the Project Area.

2005 Countywide Functional Bikeways Plan (Table 2-2)		2002 Potomac Subregion Master Plan	
Route No.	Bikeway Description	Route No.	Bikeway Description
DB-3	Along Seven Locks Road: Dual Bikeway from Wootton Parkway to MacArthur Boulevard	PB-15	Along Seven Locks Road: Shared-Use Path from Rockville City Line to I-495
		(Became DB-3)	Along Seven Locks Road: Complete an off-road/on-road bikeway from Wootton Parkway to River Road
SP-50	Along Montrose Road/Parkway: Shared-Use Path from Falls Road to Veirs Mill Road (MD 586)	PB-2	Along Montrose Road: Shared-Use Path from Falls Road to I-270
BL-23	Along Tuckerman Lane: Bike lanes or shared roadway from Falls Road to Old Georgetown Road	PB-3	Along Tuckerman Lane: Shared-Use Path from Falls Road to I-270
SP-2	Along Democracy Boulevard: Shared-Use Path from Gainsborough Road to Old Georgetown Road	PB-4	Along Democracy Boulevard: Shared-Use Path from Falls Road to I-270
DB-4	Along Bradley Boulevard (MD 191): Dual Bikeway from Persimmon Tree Road to Wisconsin Avenue (MD 355)	PB-5	Along Bradley Boulevard: Shared-Use Path from Persimmon Tree Road to I-495

In addition to sidewalk and bikeway improvements, the 2002 Potomac Subregion Master Plan recommends that local intersection improvements, such as auxiliary through lanes, be provided on a case-by-case basis to address safety and congestion issues using standards that will allow desirable development and limit severe community impacts. Specifically, auxiliary lanes at Seven Locks Road and Tuckerman Lane are recommended (See Appendix A), similar to those existing in the southbound and

westbound direction, and have been analyzed at a Facility Planning Phase I level as part of this Sidewalk and Bikeway Improvement Project. However, implementation of these lanes is recommended to be done by others, and not as a part of this project.

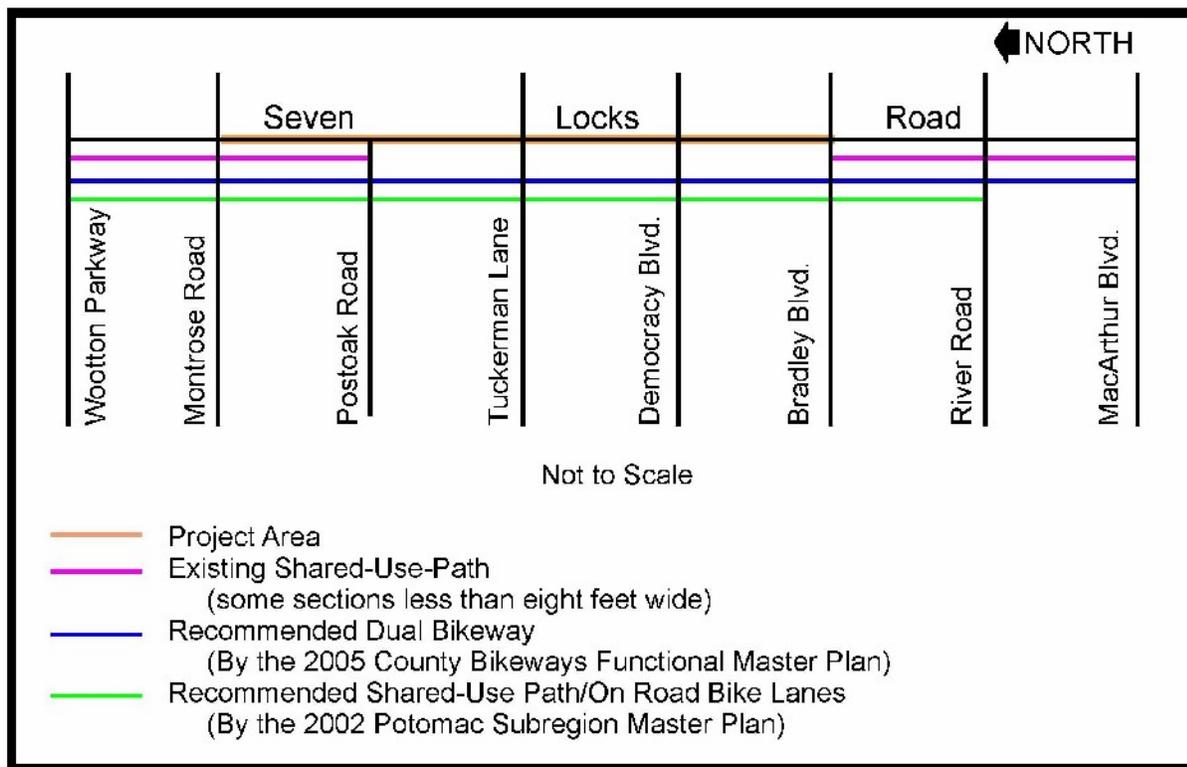


Figure 2. Existing and Master Plan Recommended Facilities along Seven Locks Road.

There are on-going redevelopment efforts at the Cabin John Mall/shopping center which may result in the developer providing auxiliary lanes at the intersection of Seven Locks Road and Tuckerman Lane. The Recommended Alternative does not preclude intersection improvements at Seven Locks Road/Tuckerman Lane and will provide guidance for future improvements at that intersection.

C. Project Purpose

The purpose of the Seven Locks Road Sidewalk and Bikeway Improvements Project is to consider and analyze:

- Providing public improvements that promote and enhance two-way bicycling and continuous pedestrian facilities along Seven Locks Road, within the study limits.
- Improving the existing substandard portions of sidewalk and bike paths and provide continuity along Seven Locks Road from Montrose Road to Bradley Boulevard.
- Providing continuity of sidewalk and bikeway facilities along the north side of Montrose Road from Seven Locks Road east to I-270.

- Providing improved pedestrian and bicycle access to residential neighborhoods, transit, commercial districts, schools, religious facilities and recreational areas.
- Promoting a safe environment for pedestrians in the project area consistent with the visions of the 2002 Potomac Subregion Master Plan.
- Developing auxiliary lane guidelines for private developer use at Seven Locks Road and Tuckerman Lane, based on Master Plan recommendations
- Installing left turn acceleration and deceleration lanes along Seven Locks Road at Bells Mill Road, Muirfield Drive and Grand Teton Drive.

D. Project Need

1. Community

Land use within the project area consists of elements that promote pedestrian and bicycle modes of travel, including well established residential neighborhoods, 24 transit stops, institutional and public facilities (places of worship/schools/parks), commercial (Cabin John Mall/shopping center) and other community facilities. Specifically, the project area consists of single-family residential homes and townhouses within eighteen designated communities, twenty-five community facilities (five schools, ten places of worship, one police station, five parks and four points of interest) and one employment/business center (from 2004 MD Property View GIS database, the 2002 Potomac Subregion Master Plan, and Montgomery County 33rd ed. ADC Map). It should be noted that of the ten places of worship, two are Orthodox, requiring members to walk to the synagogue. See **Appendix I** for an analysis of the socioeconomic resources in the project area.

Sidewalk and bikeway facility improvements along Seven Locks Road are needed to provide a north-south route that will complement the county-wide bikeway system by connecting existing and planned east-west routes as well as linking residential areas with numerous community destination points such as schools, religious facilities, and parks, including Potomac Woods Park, Inverness Forest Neighborhood Conservation Area, Cabin John Regional Park, Cabin John Stream Valley Park – Unit #5 and the Cabin John Mall/shopping center. The Master Plan notes that current pedestrian and bicycle access and circulation are unsafe near the Mall/shopping center, and sidewalk improvements at Tuckerman Lane and Seven Locks Road will facilitate pedestrian access to the center. Through public involvement efforts, the County has been made aware of the need for safe pedestrian access to worship centers along Seven Locks Road, primarily between Postoak Road and Fontaine Street. In addition, the Bikeways Plan notes that the completed Route No. DB-3 will provide a major connection between the city of Rockville to the north with the Cabin John area to the south, the Millennium Trail, Rockville Metro and MARC, and the C&O Canal Towpath.



**Figure 3. Bicyclists and pedestrians utilizing Seven Locks Road shoulder.
Top picture: Motorist utilizing shoulder for parking.**

2. Safety Issues and Crash Data

The crash analysis is based on data provided by the Montgomery County DPWT, Traffic Engineering and Operations Section for the period of January 1, 1997 to December 31, 2003. Crash data was analyzed at the intersections of Bradley Boulevard, Democracy Boulevard, Grand Teton Drive, Muirfield Drive, Bells Mill Road, Tuckerman Lane and Montrose Road. Detailed crash data and summary worksheets are included in **Appendix M (bound separately)**.

There were 301 police reported crashes in the Seven Locks Road study corridor during the study period; 174 (58%) of these crashes occurred at the seven project area intersections. Overall, the intersection with the highest total number of crashes was Seven Locks Road and Tuckerman Lane, with 48 total crashes over the seven-year study period. The second highest total number of crashes at an intersection within the project area occurred at Seven Locks Road and Democracy Boulevard (46), followed by Montrose Road (23), Bradley Boulevard (20), and Bells Mill Road (17). The fewest crashes were reported at the intersection of Seven Locks Road and Grand Teton Drive, with a total of seven crashes from 1997 through 2003. **Figure 4** summarizes the total number of crashes at each intersection.

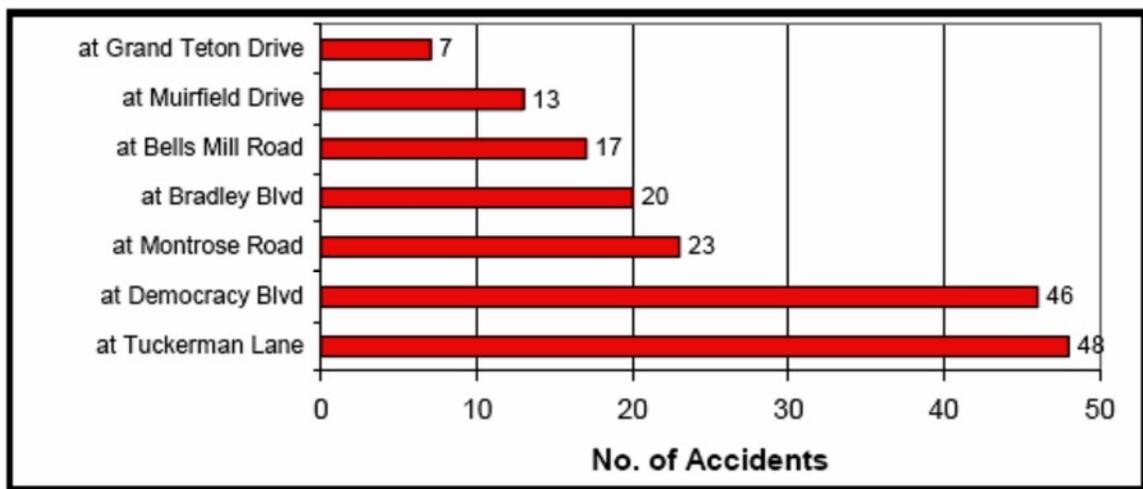


Figure 4. Seven Locks Road Intersection Crash Summary – Number of Crashes, 1997 – 2003.

As shown in **Figure 5**, the most prevalent crash type in the Seven Locks Road study corridor is a rear-end, accounting for nearly 40% of all collisions, followed by left-turn (over 25%), fixed object (nearly 10%) and angle collisions (over 8%). **There were a total of 11 pedestrian (3.7%) and two bicycle (0.7%) crashes throughout the project area.** Five of the pedestrian crashes and two of the bicycle crashes occurred at project area intersections.

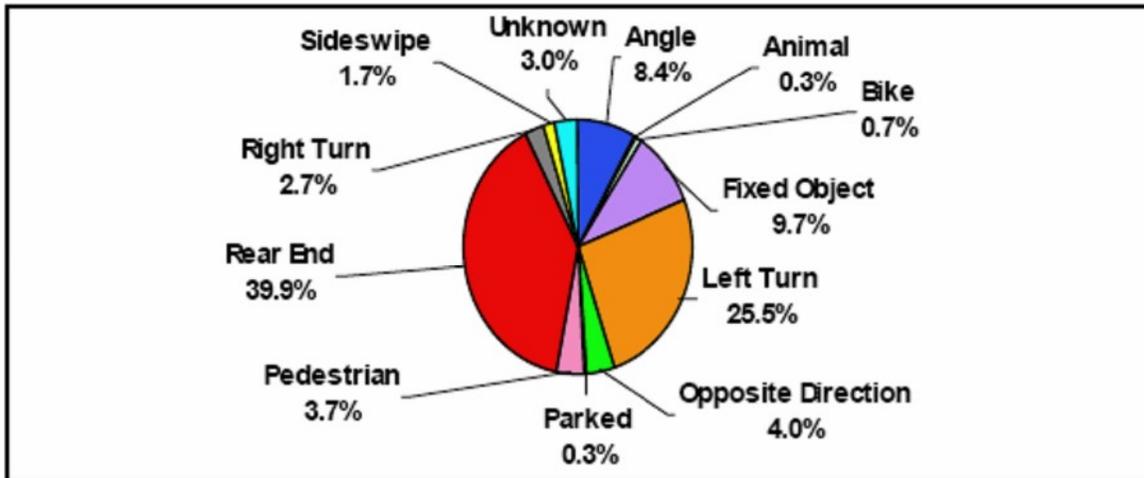


Figure 5. Crash Types within the Project Area, 1997 – 2003.

Fifty percent (50%) of all reported crashes in the study corridor were property damage only and the remaining (50%) resulted in injury.

- **Fatalities along Seven Locks Road**

- Between January 1, 1997 and December 31, 2003 there was a fatality between Charleston Court and Seven Locks Court. The fatality involved a head-on collision between a northbound recreational vehicle and southbound motorcycle.
- September 27, 2004 at 1:20 PM just north of Bradley Boulevard, there was a bicyclist fatality as a result of crash between a bicyclist and a vehicle.
- March 30, 2004 at 9:30 PM just south of Scotland Drive there was a pedestrian fatality as a result of a crash between a pedestrian and a vehicle.

Other notable findings include:

The most commonly cited probable cause of crashes in the study corridor was failure to give full attention (60%). Failure to give full attention was also the highest reported cause at the seven project area intersections (41%), followed by failure to yield right-of-way (11%), influence of alcohol and drugs (4%), and too fast for conditions and failure to obey traffic signal (2.3% each).

The locations of the 12 pedestrian and three bicycle-related crashes reported during the seven-year study period as well as in supplemental crash reports are illustrated in **Figure 6**. Reported pedestrian-related crashes occurred at or near the intersections of Grand Teton Drive (3), Tuckerman Lane (2), Postoak Road (2), Scotland Drive (1), Gainsborough Road (1) and Bradley Boulevard (1). Reported bicycle-related crashes occurred at or near the intersections of Democracy Boulevard (1) and Bradley Boulevard (2).

Nearly half (44%) of all crashes occurred between 10 AM and 4 PM, and 27% of all collisions occurred on wet pavement. It should be noted that supplemental crash data was provided by the County, and since 2003 there has been one reported pedestrian fatality and one reported bicycle fatality within the study corridor.

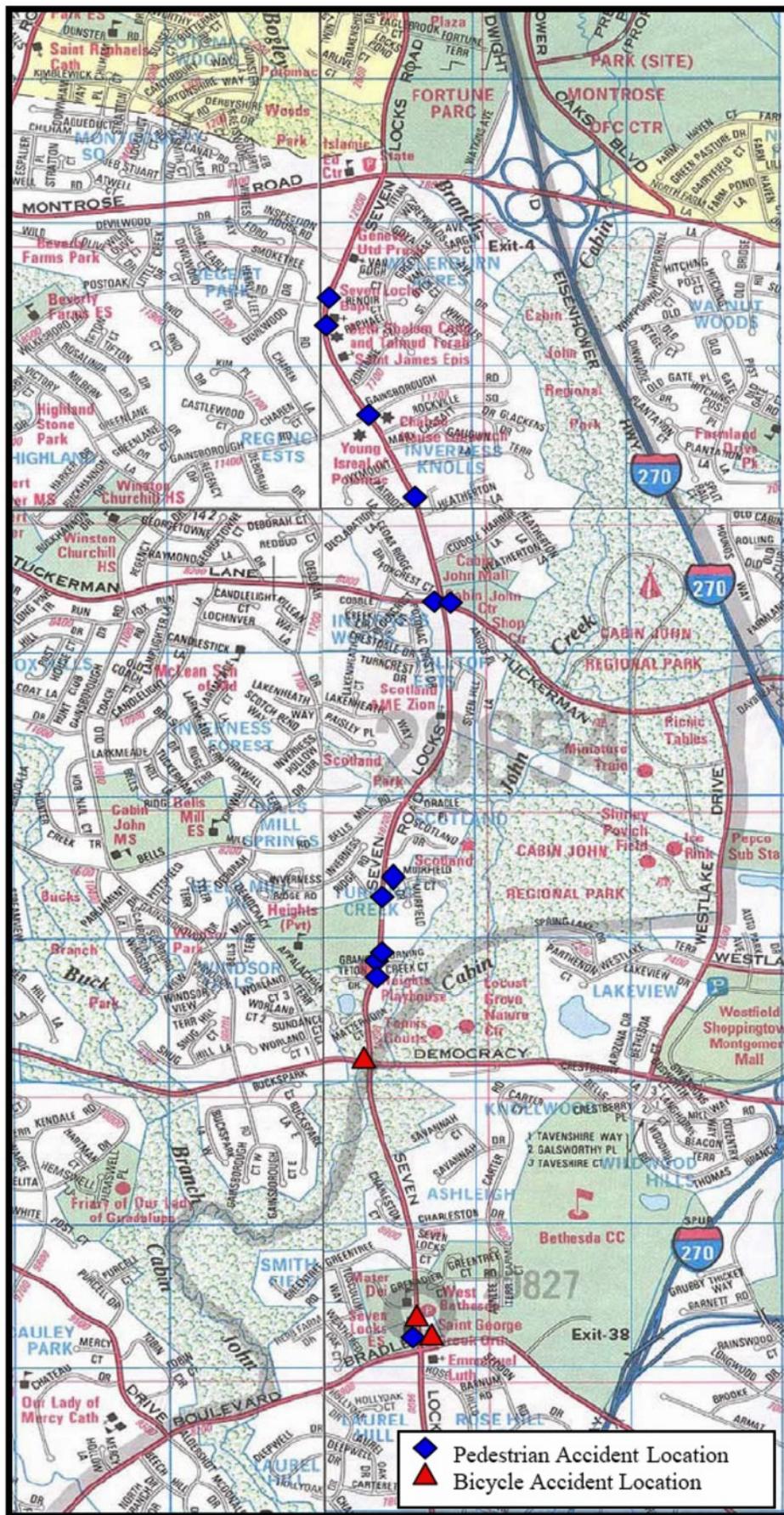


Figure 6. Pedestrian and Bicycle Crash Locations.

3. Transit

The study team identified 24 bus stops along Seven Locks Road between Montrose Road and Bradley Boulevard (**See Figures 12-15**), served by Montgomery County Ride-On Bus Routes 36, 38 and 47. The installation of two-way bicycling and continuous pedestrian facilities along Seven Locks Road, within the study limits, will provide improved access to the existing bus stops and expand transportation mode choices to those in the Seven Locks Road community.

E. Summary

Purpose:

- To eliminate the current multiple gaps in pedestrian and bicyclist amenities.
- To provide improvements that will support other planned transportation projects.
- To improve safety for pedestrian and bicyclist traffic.

Need:

- The existing Seven Locks Road project area needs improved multimodal access (e.g., continuous sidewalk and bikeway facilities) to existing Transit stops.
- Planned developments for residential areas (Potomac Park, Potomac Crest, the Burley Property), recreational/community facilities (Scotland Community Center, Cabin John Mall/shopping center) and educational facilities (Seven Locks Elementary School) are anticipated to generate additional pedestrian and bicyclist traffic.
- Seven-year crash history revealed eleven reported crashes involving pedestrians, two crashes involving bicyclists, and one vehicular fatality.
- Since 2003, one pedestrian and one bicycle fatality have occurred within the project area.

II. CONCEPT EVALUATION

A. Introduction

Following completion of the Purpose and Need Statement, and review of existing and future conditions, several improvement concepts were evaluated. Different features such as varying typical section widths and installation of retaining walls were evaluated to minimize impacts to properties along Seven Locks Road.

Three concepts, a No-Build and two build concepts, were analyzed in detail during this study. The Recommended Alternative was developed based on the following: Montgomery County's Potomac Subregion Master Plan, M-NCPPC's Bikeways Plan, and public and agency input. The Study Team also took into consideration recent and planned development and current public transportation within the Seven Locks Road project area. Below is a summary of the process undertaken in the evaluation of the Concepts.

B. Existing Conditions

1. Roadway Geometry

a. Lane Configuration and Traffic Control

The following intersections along Seven Locks Road within the study limits (Montrose Road to Bradley Boulevard) were analyzed in the project's Traffic Report: Seven Locks Road at Montrose Road, Postoak Road, Gainsborough Road, Tuckerman Lane, Bells Mill Road/Oracle Place, Muirfield Drive, Grand Teton Drive, Democracy Boulevard, and Bradley Boulevard (MD 191).

Existing intersection lane configuration diagrams are included in **Appendix M** (bound separately). All of the study intersections are controlled by a traffic signal except for Grand Teton Drive and Muirfield Drive, which are controlled by a stop sign on the minor street.

b. Public Right-of-Way

Existing right-of-way ranges from approximately 65 feet to 100 feet along Seven Locks Road throughout the project area. The minimum recommended right-of-way width for Seven Locks Road within the project area is 80 feet.

c. Typical Sections

Typical sections were measured along Seven Locks Road. Lane widths, sidewalk widths, parking restrictions, posted speed limits, turn lane storage lengths and bus stops were all noted. Detailed sketches are included in **Appendix M** (bound separately) for the following locations:

- Between Montrose Road and Gainsborough Road
- Between Gainsborough Road and Tuckerman Lane
- Between Tuckerman Lane and Bells Mill Road
- Between Bells Mill Road and Democracy Boulevard
- Between Democracy Boulevard and Bradley Boulevard

Figure 12 – 15 and Appendix E illustrate the location of existing sidewalk facilities (approximately 35% of the study corridor has sidewalks) as well as existing bus stop and unsignalized crosswalk locations. Twenty-four bus stops were identified along Seven Locks Road, served by Montgomery County Ride-On Bus Routes 36, 38 and 47. Marked crosswalks are provided at all signalized intersections except Bells Mill Road.

The Seven Locks Road public right-of-way through the project area ranges from 65 feet wide to 100 feet wide.

d. Functional Classification

As listed in the Potomac Subregion Master Plan, the functional classification and characteristics of each roadway are show in **Table 3** below.

Table 3. Functional Classification and Characteristics of Project Area Roadways

Intersection/Location	Master Plan Street/ Highway Classification
Seven Locks Road	north-south, two-way, two-lane, undivided arterial
Bradley Boulevard (MD 191)	east-west, two-way, two-lane, undivided arterial
Democracy Boulevard	east-west, two-way, multi-lane, divided arterial
Grand Teton Drive	east-west, two-way, two-lane, undivided local roadway
Muirfield Drive	east-west, two-way, two-lane, undivided local roadway
Scotland Drive	east-west, two-way, two-lane, undivided local roadway
Bells Mill Road/Oracle Place	east-west two-way two-lane primary residential roadways
Tuckerman Lane	east-west, two-way, two-lane, undivided arterial
Gainsborough Road	east-west two-way two-lane primary residential roadways
Postoak Road	east-west two-way two-lane primary residential roadways
Montrose Road	east-west two-way six-lane divided arterial roadway
The Heights Private School	N/A

Table 4. Functional Classification Systems (Source: AASHTO Green Book)

Functional System	Services Provided
Arterial (typically 50 – 70 mph)	Provides the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control.
Collector (typically 20 – 40 mph)	Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.
Local (typically 20 – 40 mph)	Consists of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

Note: The 2002 Potomac Subregion Master Plan categorizes roadways by Freeway, Major Highway, Parkway, Arterial, Primary Residential, Country Road, Rustic and Exceptional Rustic.

2. Traffic Volumes

Recent peak hour traffic volume data including vehicular and pedestrian volumes as well as vehicular classification data was provided by the County, and where not available was collected in January and February of 2006. Weekday data was evaluated for the intersections of Seven Locks Road with Bradley Boulevard, Democracy Boulevard, Grand Teton Drive, Muirfield Drive, Bells Mill Road, Tuckerman Lane and Montrose Road. Supplemental weekend vehicular, bicycle and pedestrian traffic data was also obtained in January and February of 2006 at Democracy Boulevard, Tuckerman Lane, Gainsborough Road, and Montrose Road to account for adjacent recreational, educational or religious land uses that may generate pedestrian and bicycle traffic. **Figures 7 and 8** summarize the existing weekday and weekend peak hour traffic volumes including total weekend pedestrian and bicycle traffic volumes.

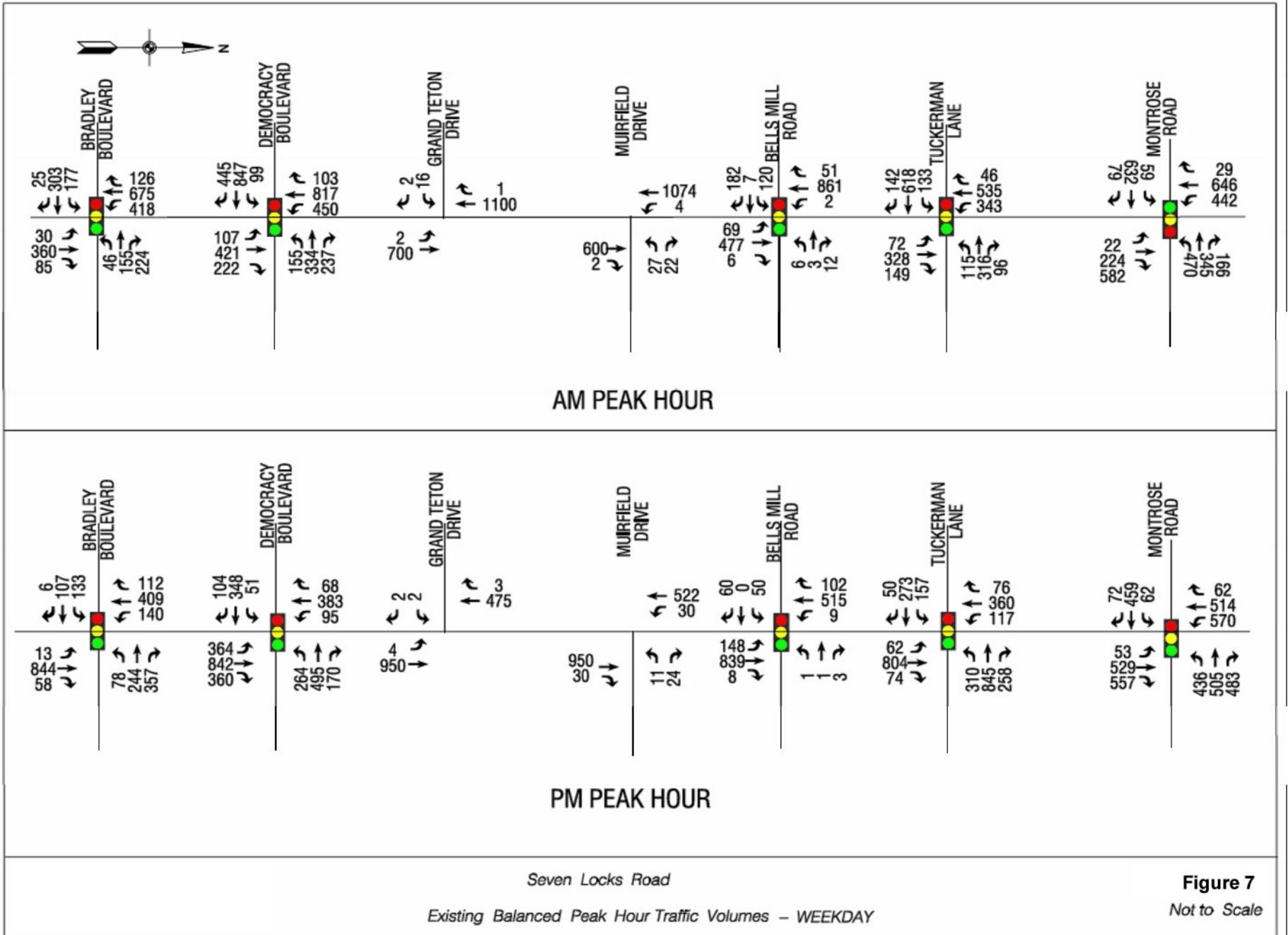
The highest total peak hour vehicular volume, 4,302 vehicles, was recorded at the intersection of Seven Locks Road and Montrose Road during the weekday PM peak. The highest total daily pedestrian traffic volume, 211 pedestrians, was recorded at the intersection of Seven Locks Road and Gainsborough Road on a Saturday. The highest total daily bicycle traffic volume, 171 bicyclists, was recorded at the intersection of Seven Locks Road and Tuckerman Lane, also on a Saturday.

3. Capacity and Level of Service

The Critical Lane Volume (CLV) Analysis methodology was used to evaluate traffic operations at project area intersections during the AM, PM and Saturday peak hours. Performance measures of effectiveness include critical lane volume (CLV), volume-to-capacity ratio (V/C ratio), and level of service (LOS). The total CLV for each peak period is calculated by combining the CLVs for the NB/SB movements and EB/WB movements. The CLV indicates the highest volume for a given approach lane configuration in a given direction. The v/c ratio is the ratio of flow rate to the capacity of the facility. This ratio is often used to determine sufficiency of capacity at a given intersection. Generally speaking, a ratio of 1.0 indicates that the intersection is operating at capacity. A ratio of greater than 1.0 indicates that the facility is failing, as the number of vehicles exceeds the roadway capacity. The LOS is a letter designation that corresponds to a certain range of roadway operating conditions. The levels of service range from A to F, with A indicating the best operating conditions and F indicating the worst, or a failing, operating condition. The LOS thresholds are summarized in **Table 5**; results of the operations analyses are summarized in **Table 5**. Detailed capacity analysis worksheets are included in the Traffic Report (**See Appendix M, bound separately**).

Based on the results of the analysis, all of the existing intersections are operating at LOS C or better during both the morning, evening and Saturday peak hours, with the exception of the following: Seven Locks Road at Montrose Road (LOS D during PM peak hour), Tuckerman Lane (LOS E, F and D during AM, PM and Saturday peak hours), Democracy Boulevard (LOS D during AM and PM peak hours) and Bradley Boulevard (LOS D during PM peak hour). See **Table 6** for a summary of the existing intersection operational analysis.

It should be noted that according to the July 2004 *Local Area Transportation Review Guidelines* published by The Maryland National-Capital Park and Planning Commission (M-NCPPC), Seven Locks Road falls within the Potomac Subregion policy area. In this policy area, CLVs of up to 1,475 vehicles per hour are considered acceptable to maintain existing congestion standards. Based on this standard, only the intersection of Seven Locks Road and Tuckerman Lane exceeds the CLV standard during the AM and PM peak hours.



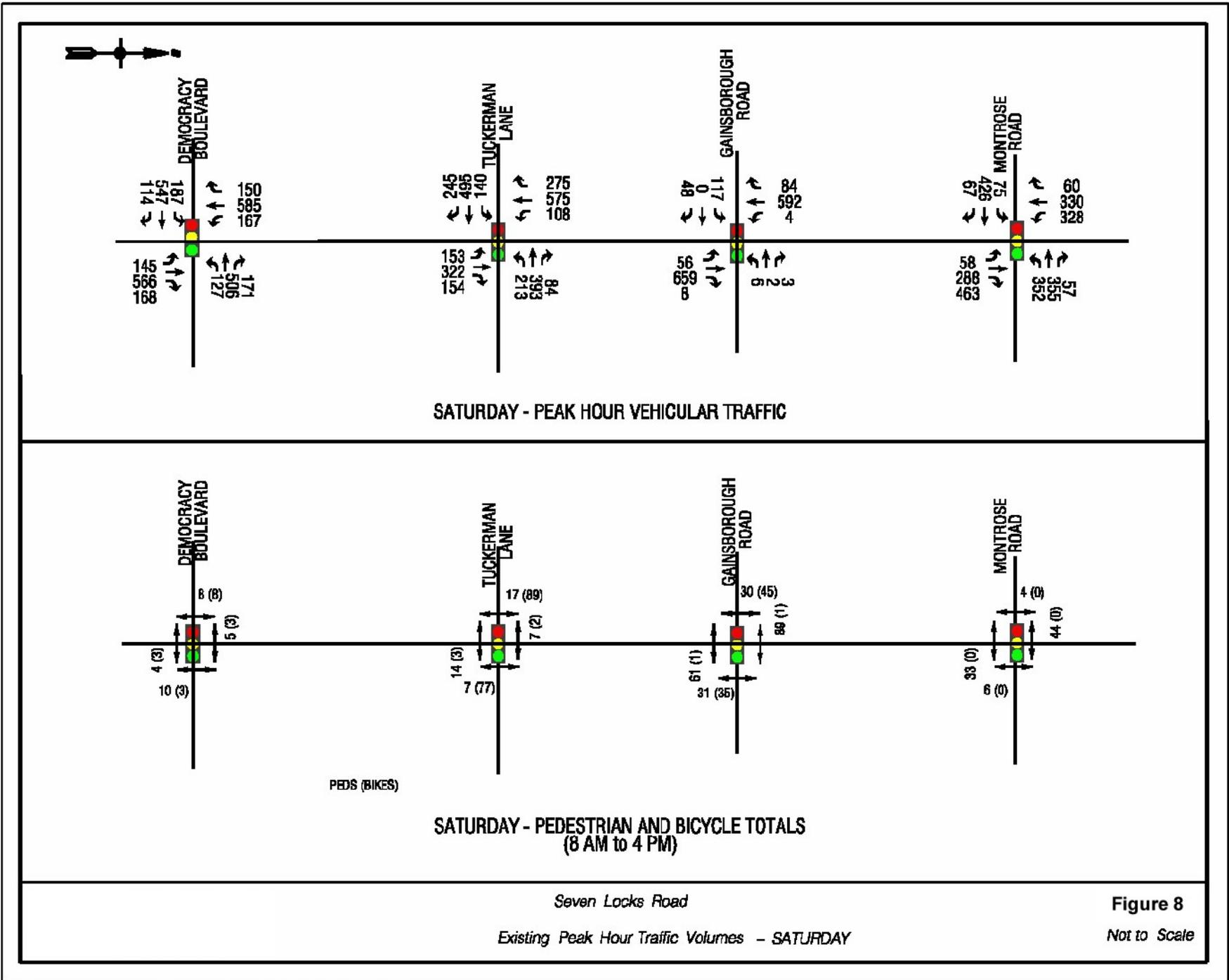


Figure 8
Not to Scale

Table 5. Level of Service Parameters (Source: MD State Highway Administration)

LOS	Volume (veh)	Expected Problems at Intersection
A	≤ 1000	Very low delay
B	>1000 and ≤ 1150	Short delay
C	>1150 and ≤ 1300	Number of vehicles stopping is significant
D	>1300 and ≤ 1450	Influence of congestion becomes more noticeable
E	>1450 and ≤ 1600	Limit of acceptable delay
F	>1600	Oversaturated and unacceptable

Table 6. Summary of Existing Intersection Operational Analysis, AM(PM) [SAT]

Location	Critical Lane Volume (vph)	V/C Ratio	Level of Service
Seven Locks Rd at Montrose Road	1110 (1301) [909]	0.69 (0.81) [0.57]	B (D) [A]
Seven Locks Rd at Gainsborough Rd	-- (--) [879]	-- (--) [0.55]	-- (--) [A]
Seven Locks Rd at Tuckerman Lane	1553 (1617) [1334]	0.97 (1.01) [0.83]	E (F) [D]
Seven Locks Rd at Bells Mill Road	1126 (912) [---]	0.70 (0.57) [---]	B (A) [---]
Seven Locks Rd at Muirfield Drive	1135 (1045) [---]	0.71 (0.65) [---]	B (B) [---]
Seven Locks Rd at Grand Teton Dr	1121 (962) [---]	0.70 (0.60) [---]	B (A) [---]
Seven Locks Rd at Democracy Blvd	1363 (1302) [1264]	0.85 (0.81) [0.79]	D (D) [C]
Seven Locks Rd at Bradley Blvd	1237 (1419) [---]	0.77 (0.89) [---]	C (D) [---]

Notes: 1) Per SHA, intersection capacity assumed at 1,600 vph.

2) [---] indicates timeframes for which counts were not available.

4. Parking

Existing on-street public parking is available along Seven Locks Road in varying locations within the project area. No metered on-street parking spaces exist; however, the wide roadway shoulders in some areas can currently accommodate parking.

5. Transit

Transit service along the three bus routes serving Seven Locks Road within the project area (Ride-On Bus Routes 36, 38 and 47), is provided every half-hour except during rush hour when buses are scheduled to arrive every 20 minutes.

C. Sidewalk and Bikeway Design

The intent of this section is to discuss and present design elements, such as typical cross-sections, intersection control, parking, and bicycle and pedestrian provisions within the Seven Locks Road study limits. These recommendations are based on the existing pedestrian, bicyclist and vehicular traffic circulation, safety conditions, planned development, and recommendations outlined in the Master Plan and Bikeways Plan.

The recommended design elements are intended to accommodate growth of vehicular, bus, bicycle and pedestrian traffic from planned development as well as serve the multi-modal needs of the area. The recommendations are intended to be consistent with the recommendations of the Master Plan,

Bikeways Plan, planned roadway improvements by private developers and other current transportation projects within the project limits.

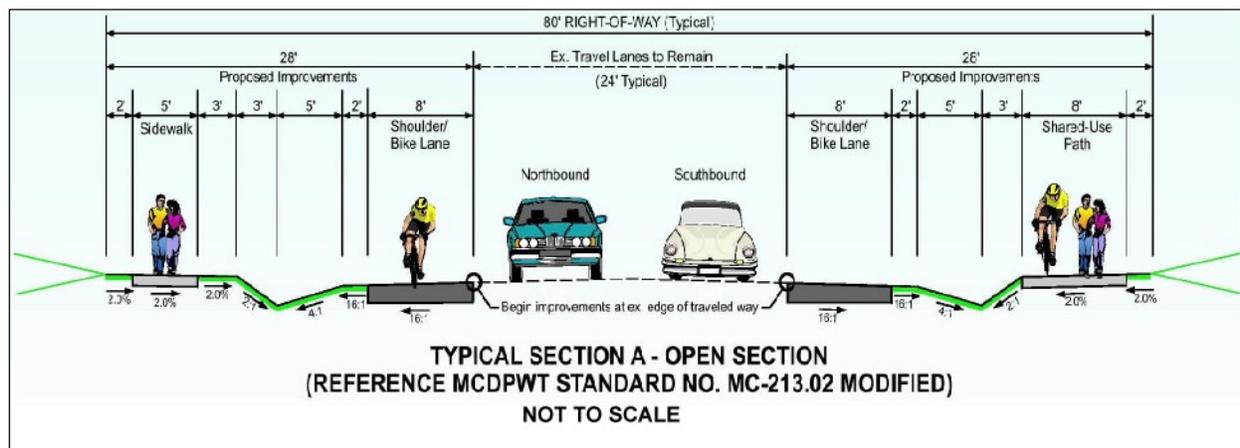
The Master Plan makes specific recommendations for required public right-of-way to define each roadway's character and number of lanes. The minimum recommended right-of-way width for Seven Locks Road within the project area is 80 feet; existing right-of-way ranges from approximately 65 feet to 100 feet.

1. Proposed Typical Sections (See Appendix D)

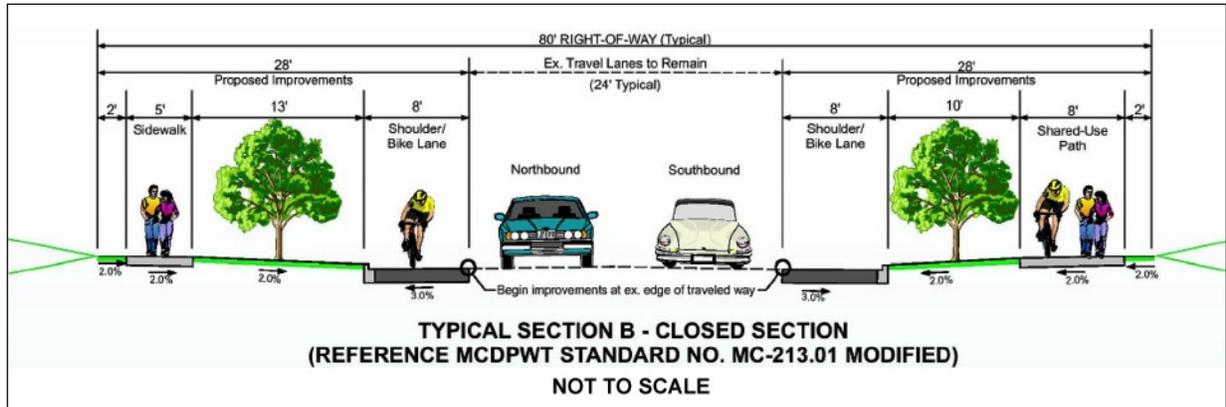
Alternative typical roadway cross-sections (drawings of the roadway defining right-of-way limits, pavement widths, shoulder widths, bicycle and pedestrian amenities, etc.) were developed to evaluate the feasibility of providing bicycle and sidewalk facilities along Seven Locks Road. An effort was made in developing the concepts to minimize the impact to private property, environmental features and drainage structures, as well as earthwork and construction cost. Four conceptual typical sections were developed, based on Montgomery County DPWT Standards (See Appendix C), and are discussed below. It should be noted that all dimensions are approximate and subject to change during Final Design and Construction.

Typical Section A (Open Section) and Typical Section B (Closed Section)

Typical Sections A (See Figure 9) and B (See Figure 10) contain the same proposed sidewalk and bikeway improvements, all within an 80-foot Right-of-Way. Typical Section A provides drainage with swales parallel to the roadway and Typical Section B provides drainage through inlets and a closed drainage system of pipes. Typical Section A is based on DPWT Standard No. MC-213.02 and Typical Section B is based on DPWT Standard No. MC-213.01.



Note: Dimensions and landscaping are approximate and subject to change during Final Design and Construction.
Figure 9. Typical Section A – Open Section.



Note: Dimensions and landscaping are approximate and subject to change during Final Design and Construction

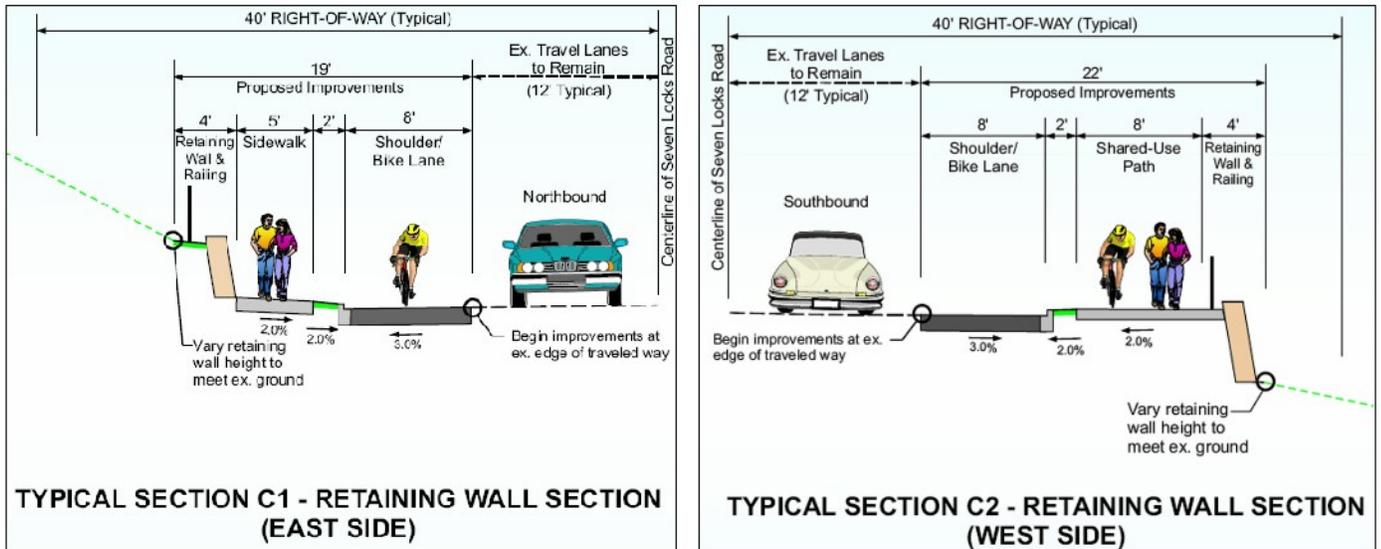
Figure 10. Typical Section B – Closed Section.

Both Typical Sections A and B have the following features:

- twelve-foot wide travel lanes in each direction (currently exist today),
- an eight-foot wide shoulder/on-road bike lane on both sides of the roadway,
- a five-foot wide sidewalk on the east side of Seven Locks Road,
- a thirteen-foot wide open space between the shoulder/on-road bike lane and the sidewalk to provide a buffer between pedestrians and the roadway as well as to provide an area for a potential future landscaping panel,
- an eight-foot wide shared-use path along the west side of Seven Locks Road, and
- a ten-foot wide open space between the shoulder/on-road bike lane and the shared-use path to provide a buffer between pedestrians and the roadway as well as to provide an area for a potential future landscaping panel.

Typical Sections C1 & C2 – Retaining Wall Section

Typical Sections C1 and C2 (**See Figure 11**) are designed to minimize impacts to properties adjacent to Seven Locks Road while incorporating all Master Plan/Bikeways Plan recommended improvements. Where retaining walls are installed, the limit of disturbance is typically reduces up to nine-feet.



Notes: 1) Drawings Not to Scale

2) Dimensions and landscaping are approximate and subject to change during Final Design and Construction

Figure 11. Typical Sections C1 and C2 – Retaining Wall Sections.

Typical Section C1, 31 feet wide, is designed for the east side of Seven Locks Road, and incorporates the following features:

- closed-section roadway to meet drainage requirements,
- a twelve-foot wide northbound travel lane (currently exists today),
- an eight-foot wide shoulder/on-road bike lane,
- a two-foot wide open space between the shoulder/on-road bike lane and sidewalk to provide a buffer between pedestrians and the roadway,
- a five-foot wide sidewalk,
- a four-foot wide area that will incorporate a retaining wall and railing.

Typical Section C2, 34 feet wide, is designed for the west side of Seven Locks Road and, incorporates the following features:

- closed-section roadway to meet drainage requirements,
- a twelve-foot wide southbound travel lane (currently exists today),
- an eight-foot wide shoulder/on-road bike lane,
- a two-foot wide open space between the shoulder/on-road bike lane and shared-use path to provide a buffer between pedestrians and the roadway,
- an eight-foot wide shared-use path,
- a four-foot wide area that will incorporate a retaining wall and railing.

Besides the utilization of retaining walls in Typical Sections C1 and C2, the main difference between the modified Typical Sections (C1 and C2) and the Standard Typical Sections (A and B) is the reduction in open space between the shoulder/on-road bike lanes and the sidewalk/shared-use path.

2. Intersection Configuration and Traffic Control

One specific intersection improvement noted in the Master Plan is the construction of northbound and eastbound auxiliary through lanes at Seven Locks Road and Tuckerman Lane, as shown in **Figures 20 - 23 and Appendix G**. This geometric improvement will provide a LOS B in the AM and C in the PM, satisfying the CLV congestion standard.

D. Concepts Analysis

The Study Team developed concepts including alignment and typical sections based on the Master Plan and Bikeways Plan recommendations, traffic requirements, safety, and constraints imposed by adjacent land uses consistent with the project's Purpose and Need. The concepts have been refined through involvement of public officials, neighborhood groups, and the general public, resulting in the creation of a Recommended Alternative. Concept 1 is the no-build option, while Concepts 2 and 3 were developed based on Master Plan and Bikeways Plan guidance. Both Concepts 2 and 3 accommodate for, and do not preclude, future auxiliary through lanes at the Seven Locks Road/Tuckerman Lane intersection. Table 7 provides a summary of Concept Features.

1. Concept 1: No-Build (See Figures 12-15 and Appendix E)

The No-Build Alternative (Baseline Alternative) will provide no new substantial construction or improvement to existing conditions. Existing roadway, pedestrian and bicycle facility network disconnects will remain.

2. Concept 2 (Dropped) (See Figures 16-19 and Appendix F)

Concept 2 consists of providing pedestrian and bicycle improvements, using a mixture of Typical Sections A (Open Section roadway) and B (Closed Section roadway), along Seven Locks Road from Montrose Road to Bradley Boulevard. This Concept includes all Master Planned improvements within an 80-foot Right-of-Way, except at intersections, and required grading easements, including:

- twelve-foot wide travel lanes in each direction (currently exist today),
- an eight-foot wide shoulder/on-road bike lane on both side of the roadway,
- a five-foot wide sidewalk on the east side of Seven Locks Road,
- a thirteen-foot wide open space between the shoulder/on-road bike lane and the sidewalk,
- an eight-foot wide shared-use path along the west side of Seven Locks Road, and
- a ten-foot wide open space between the shoulder/on-road bike lane and the shared-use path.

Concept 2 was removed from further study due to the amount of property impacts incurred.

3. Concept 3 (Recommended Alternative) (See Figures 20-23 and Appendix G)

The Recommended Alternative is created based on public comments and Study Team review of the concepts developed for this study. The Recommended Alternative contains design elements consistent with the Master Plan and Bikeways Plan, and is compatible with planned development and transportation projects (e.g., master planned pedestrian and bikeway facilities on intersecting roadways, Cabin John Mall/shopping center development) and addresses the project Purpose and Need.

Under the Recommended Alternative, sidewalk and bikeway improvements along Seven Locks Road will occur within an 80-foot Right-of-Way from Montrose Road to Bradley Boulevard, providing for 12-foot travel lanes (currently exist today), eight-foot shoulders/on-road bike lanes along both sides of the roadway, a five-foot wide sidewalk on the east side of the roadway and an eight-foot Shared-Use Path on the west side of the roadway. In order to minimize impacts to properties adjacent to Seven Locks Road, the Recommended Alternative utilizes a mixture of Typical Sections A (Open Section), B (Closed Section), C1 (east side modified, retaining wall) and C2 (west side modified, retaining wall) along the length of the project. C1 and C2 typical sections will still allow full master plan build out of proposed improvements; however, they will be constructed within a narrower area and will have a smaller open space distance separating the shoulder/on-road bike lanes from the pedestrian and bicycle facilities.

Table 7. Summary of Concept Features.

	Concept 1: No-Build	Concept 2 (Dropped)	Concept 3 (Recommended Alternative)
Travel Lanes	12' wide travel lanes in each direction	12' wide travel lanes in each direction	12' wide travel lanes in each direction
Shoulder	Variable	8' wide shoulder/on-road bike lane on both sides of roadway	8' wide shoulder/on-road bike lane on both sides of roadway
Sidewalk	Current Disconnects	5' wide sidewalk on the east side of Seven Locks Road	5' wide sidewalk on the east side of Seven Locks Road
Shared-Use Path	Current Disconnects	8' wide shared-use path along west side of Seven Locks Road 8' side shared-use path along the north side of Montrose Road	8' wide shared-use path along west side of Seven Locks Road 8' side shared-use path along the north side of Montrose Road
Open Space	N/A	13' wide open space between shoulder/on-road bike lane and sidewalk 10' wide open space between shoulder/on-road bike lane and shared-use path	Reduced open space distance separating the shoulder/on-road bike lanes from the pedestrian and bicycle facilities to allow full master plan build out of proposed improvements with less impacts.
Typical Sections	N/A	Mixture of Typical Sections A (Open) and B (Closed)	Mixture of Typical Sections A (Open) and B (Closed); C1 (east modified – retaining wall) and C2 (west modified, retaining wall)

Table 8 provides a summary of potential impacts for the Concepts described below, and a detailed impact analysis of the Recommended Alternative is located in Section III, Impact Analysis.

After thorough evaluation, and consideration of impacts and benefits, the Study Team recommends that sidewalk and bikeway improvements along Seven Locks Road from Montrose Road to Bradley Boulevard proceed to a Phase II Study.

Table 8. Summary of Potential Impacts (Build Concepts 2 and 3).

	Concept 2	Concept 3
Property Impacts		
Right-of-Way (acres)	5.0	5.0
Grading Easement (acres)	14.0	7.7
Impacts to Building (# buildings)	11	0
Natural Environmental Impacts		
Waters of the U.S. (LF)	800	160
Wetland (acres)	0.9	0.9
Floodplain (acres)	2.3	2.0
Forest / Portion of forest that is parkland (acres)	8.2 / 3.6	5.4 / 2.2
Additional Impervious Area (acres)	9.8	10.2
Specimen Tees (# trees)	7	7
Cultural Impacts		
Historic Property* (SF)	11,100 (a 22-foot wide strip along the Scotland African Methodist Episcopal (AME) Zion Church property)	7,000 (a 16-foot wide strip, of which 12-feet will be master planned right-of-way, and 4-feet will be easement, along the Scotland African Methodist Episcopal (AME) Zion Church property)
Parking Impacts		
Parking Spaces (# spaces / SF)	Buddhist Temple 11 of 120 / 1,800	Buddhist Temple 11 of 120 / 1,800
Utility Impacts/Relocations		
Utility Pole Relocations	200	200
Underground Utility Relocations (water, sewer, gas lines, etc.) (Yes / No)	Yes	Yes
Fire Hydrant Relocations (# fire hydrants)	18	18
Traffic Signal Modifications (# signals)	7	7

*Concept 1, No-Build would result in no impacts to property, environmental resources, or utilities in the project area.

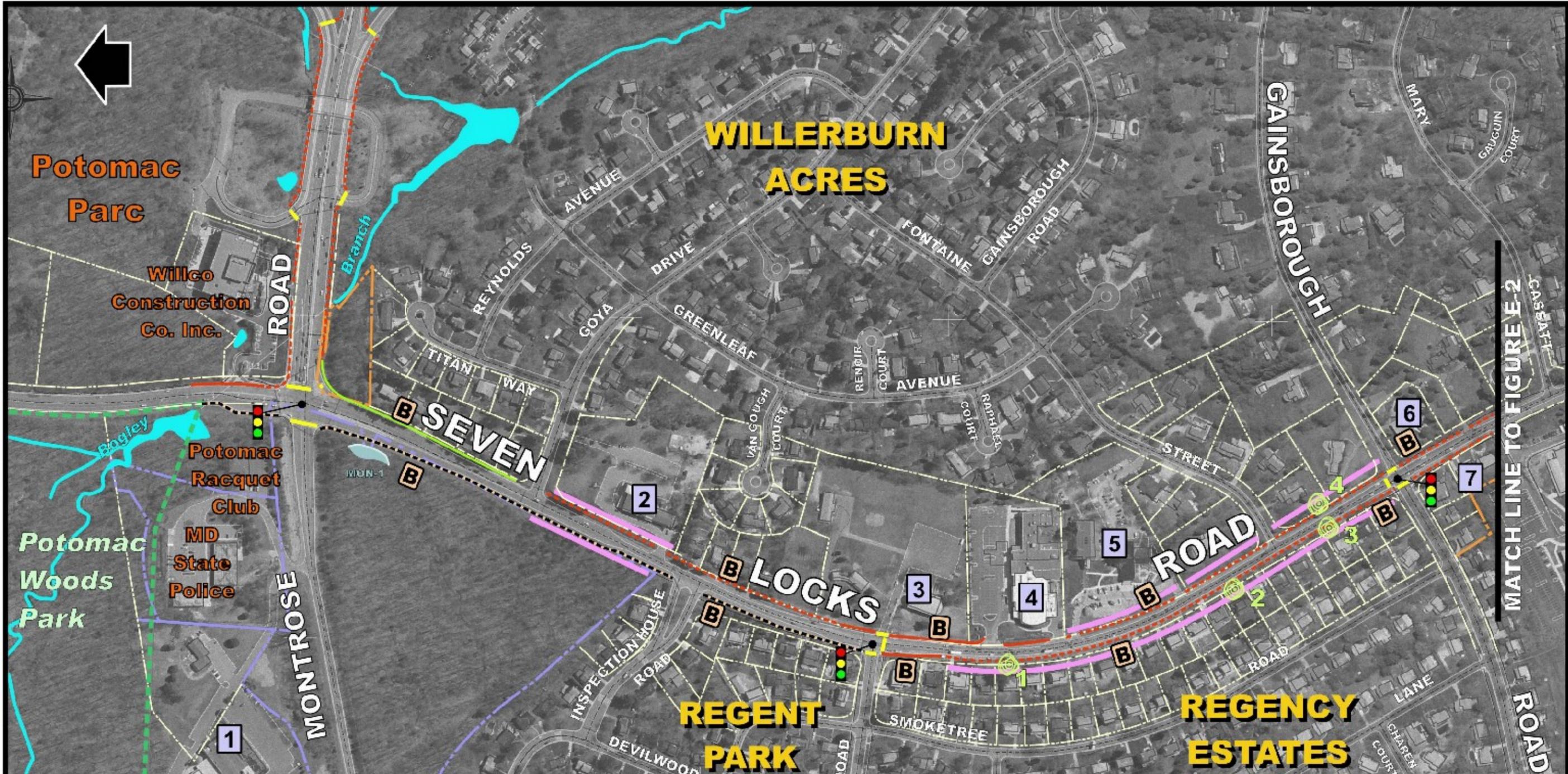
E. Drainage and Stormwater Management

Neither drainage nor stormwater management (SWM) facilities have been designed as part of this study; however, consideration has been given to the methods by which SWM could be provided.

The amount of new impervious area for each concept are as follows:

	New Impervious Area (acres)
Concept 1: No-Build (Base Line Concept)	0.0
Concept 2 (Dropped)	9.8
Concept 3 (Recommended Alternative)	10.2

If the project moves into Phase II of the Facility Planning Study, detailed hydrologic and hydraulic analyses will be performed and a preliminary SWM plan developed. It appears the required SWM will primarily be provided via grass channels (drainage swales), underground treatment and underground storage within the proposed 80 feet of right-of-way due to existing development on both sides of Seven Locks Road through the project area. The southwest quadrant of the Seven Locks Road and Montrose Road intersection, currently State of Maryland owned property, is one area where it may be possible to construct a SWM facility outside of the 80-foot right of way.



MATCH LINE TO FIGURE E-2

LEGEND

- | | | | | | |
|--|------------------------------|--|---|--|----------------------------------|
| | Park Boundary | | Existing Bus Stop | | M-NCPPC Owned Property |
| | Potential Waters of the U.S. | | Signalized Intersection | | Montgomery Co. Owned Property |
| | Potential Wetland | | Closed Section - no sidewalk | | State of Maryland Owned Property |
| | Floodplain | | Open Section - no sidewalk | | Historic Parcel |
| | Historic Site | | Closed Section with sidewalk | | Specimen Tree |
| | Existing Crosswalk | | Open Section with sidewalk | | |
| | Drainage Swale | | Shared-Use Path (as noted in Master Plan) | | |
| | | | Existing Right-of-Way | | |

Schools & Worship Centers Key

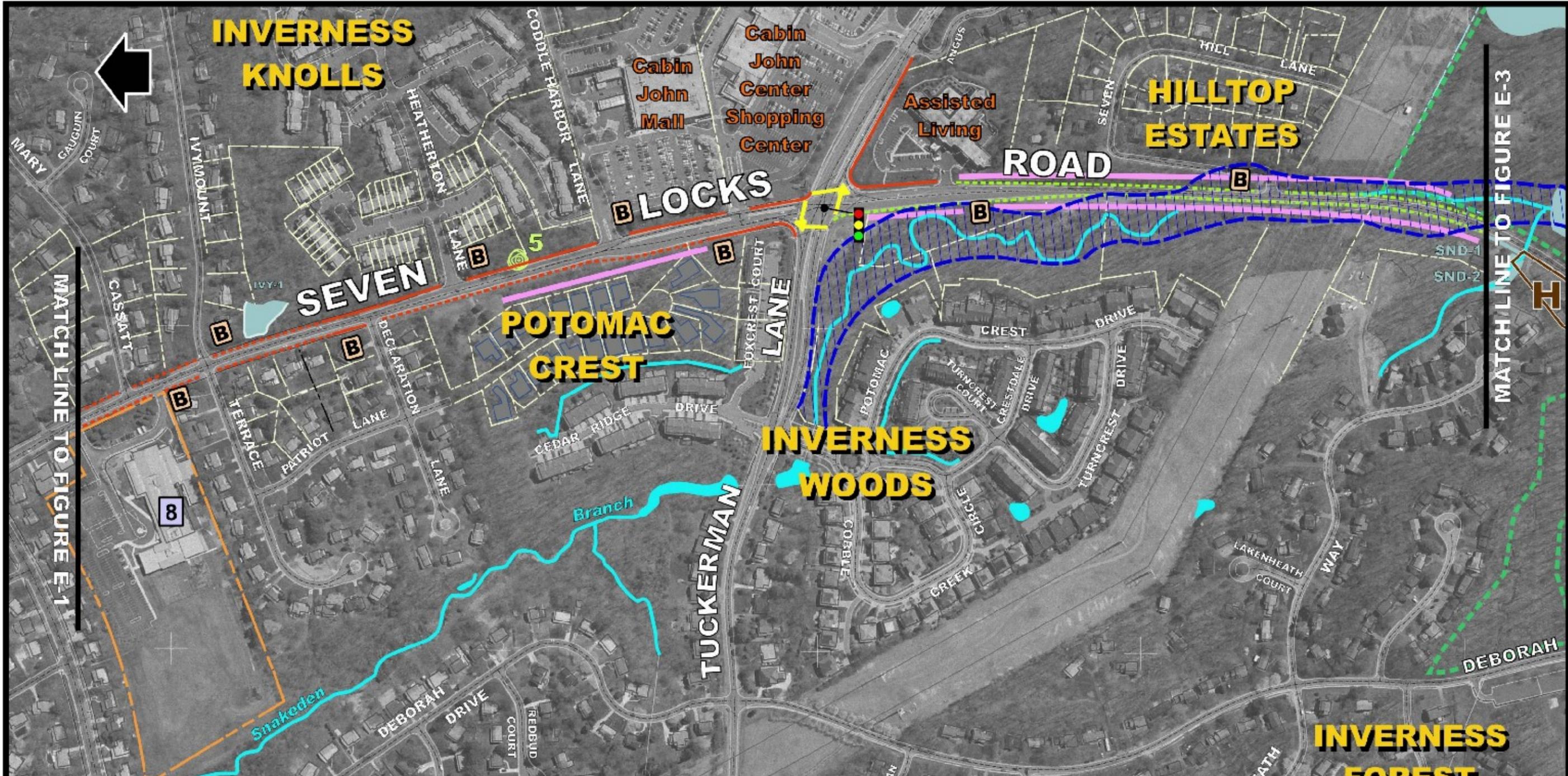
- Islamic Education Center
- Geneva United Presbyterian
- Seven Locks Baptist
- Beth Shalom Congregation & Talmud Torah
- St. James Episcopal
- Chabad House Lubavitch
- Young Israel of Potomac

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

**SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY
IMPROVEMENT PROJECT**
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 1, NO-BUILD

DATE May 2007	<p>SCALE IN FEET</p>	FIGURE 12
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LEGEND

- Park Boundary
- ~ Potential Waters of the U.S.
- Potential Wetland
- ▨ Floodplain
- H Historic Site
- Existing Crosswalk
- Drainage Swale
- B Existing Bus Stop
- Signalized Intersection
- Closed Section - no sidewalk
- Open Section - no sidewalk
- Closed Section with sidewalk
- Open Section with sidewalk
- - - - Shared-Use Path (as noted in Master Plan)
- Existing Right-of-Way
- M-NCPPC Owned Property
- Montgomery Co. Owned Property
- State of Maryland Owned Property
- Historic Parcel
- ⊙ Specimen Tree

Schools & Worship Centers Key

- 8 Ivymount School

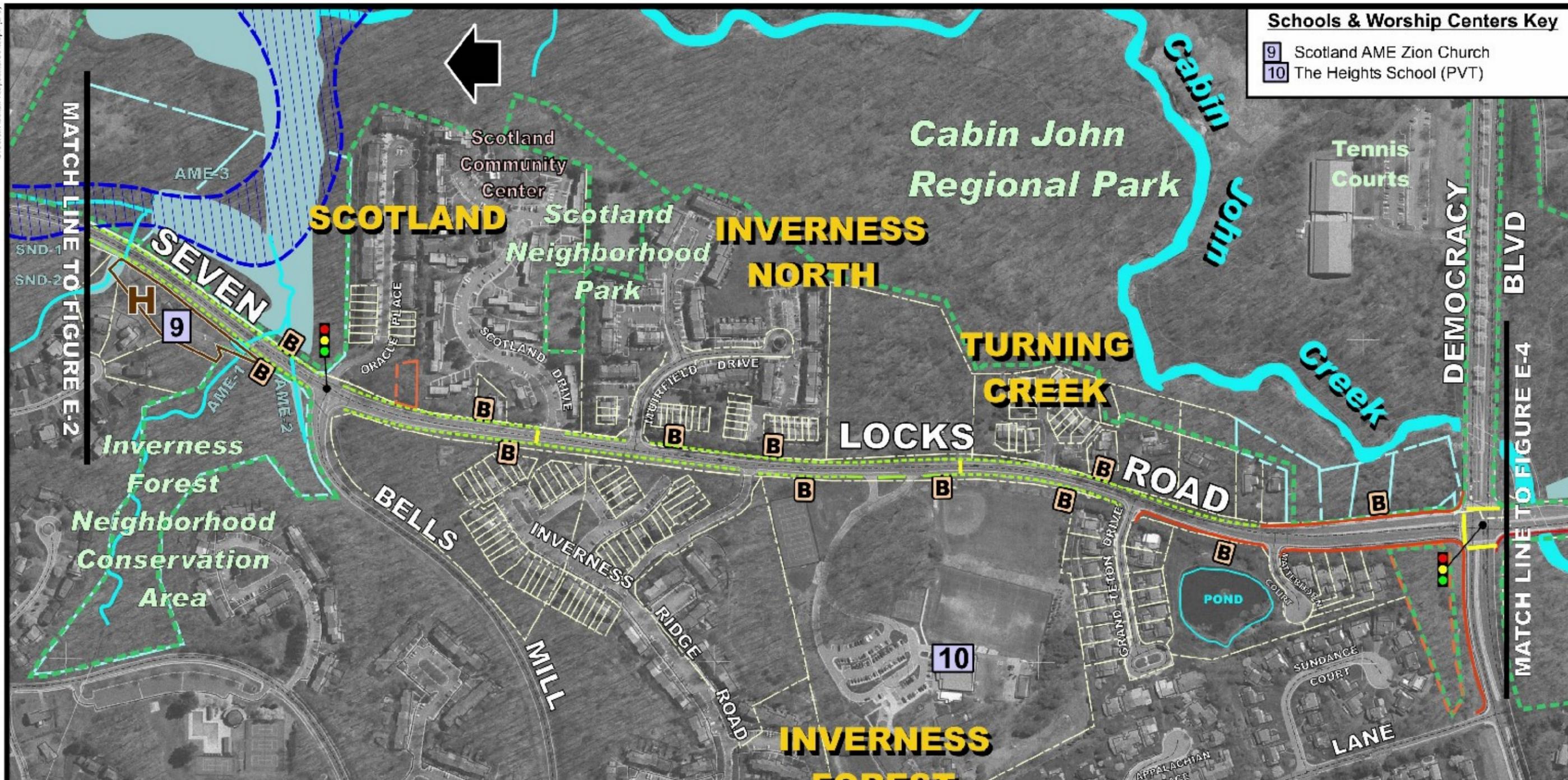
MONTGOMERY COUNTY
 DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
**SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY
 IMPROVEMENT PROJECT**
 MONTROSE ROAD TO BRADLEY BOULEVARD
 PHASE I FACILITY PLANNING STUDY

CONCEPT 1, NO-BUILD

DATE: May 2007
 SCALE IN FEET: 0 200
 FIGURE: 13

Schools & Worship Centers Key

- 9 Scotland AME Zion Church
- 10 The Heights School (PVT)



LEGEND

Park Boundary	Existing Bus Stop	M-NCPPC Owned Property
Potential Waters of the U.S.	Signalized Intersection	Montgomery Co. Owned Property
Potential Wetland	Closed Section - no sidewalk	State of Maryland Owned Property
Floodplain	Open Section - no sidewalk	Historic Parcel
Historic Site	Closed Section with sidewalk	Specimen Tree
Existing Crosswalk	Open Section with sidewalk	Shared-Use Path (as noted in Master Plan)
Drainage Swale	Existing Right-of-Way	

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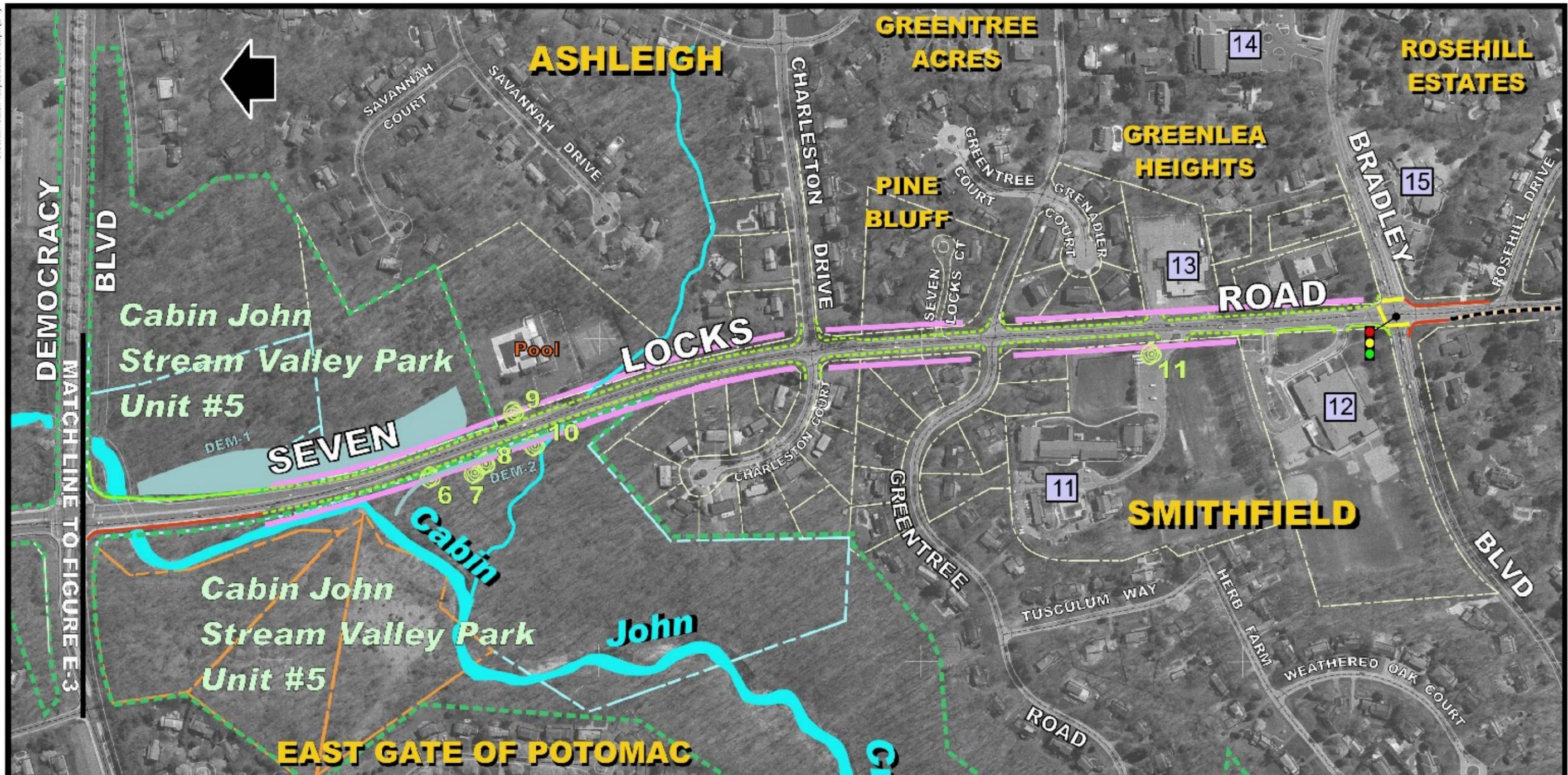
SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 1, NO-BUILD

DATE: May 2007

SCALE IN FEET: 0 200 200

FIGURE 14



LEGEND

	Park Boundary		Existing Bus Stop		M-NCPPC Owned Property
	Potential Waters of the U.S.		Signalized Intersection		Montgomery Co. Owned Property
	Potential Wetland		Open Section - no sidewalk		State of Maryland Owned Property
	Floodplain		Closed Section with sidewalk		Historic Parcel
	Historic Site		Open Section with sidewalk		Specimen Tree
	Existing Crosswalk		Shared-Use Path (as noted in Master Plan)		
	Drainage Swale		Existing Right-of-Way		

Schools & Worship Centers Key

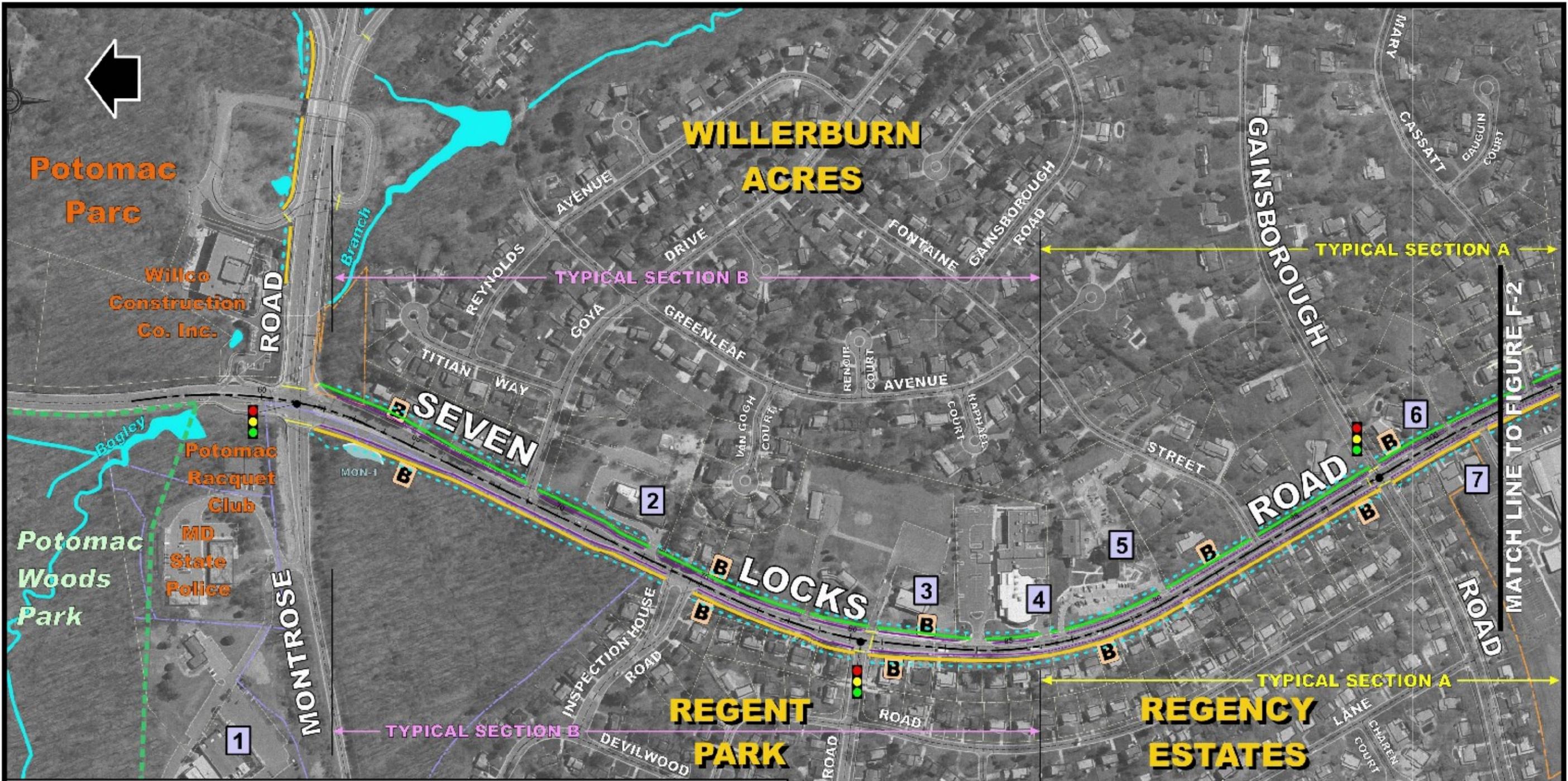
	Mater Dei Private School
	Seven Locks Elementary School
	Buddhist Temple
	St. George Greek Orthodox
	Emmanuel Lutheran

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SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 1, NO-BUILD

DATE May 2007		FIGURE 15
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LEGEND

	Park Boundary		Signalized Intersection		Montgomery Co. Owned Property
	Potential Waters of the U.S.		Proposed Curb		State of Maryland Owned Property
	Potential Wetland		Proposed Shoulder Edge		Historic Parcel
	Floodplain		Proposed Sidewalk		Future Master Plan Auxiliary Lanes By Others
	Historic Site		Proposed Shared Use Path		Potentially Impacted Structures
	Existing Crosswalk		Proposed Limit of Disturbance		Existing Right-of-Way
	Existing Bus Stop		Proposed Retaining Wall		M-NCPPC Owned Property

Schools & Worship Centers Key

1	Islamic Education Center
2	Geneva United Presbyterian
3	Seven Locks Baptist
4	Beth Shalom Congregation & Talmud Torah
5	St. James Episcopal
6	Chabad House Lubavitch
7	Young Israel of Potomac

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

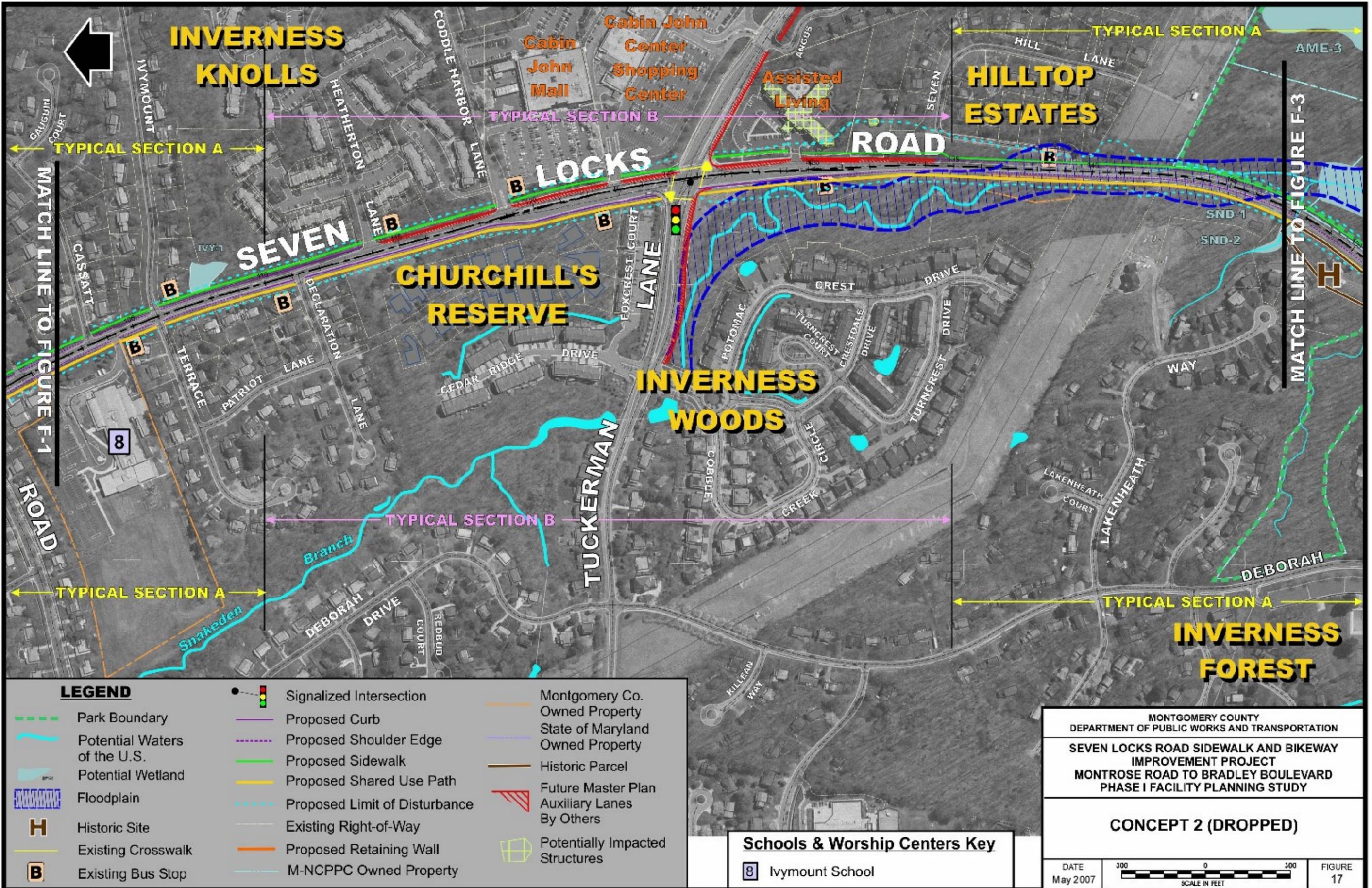
SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

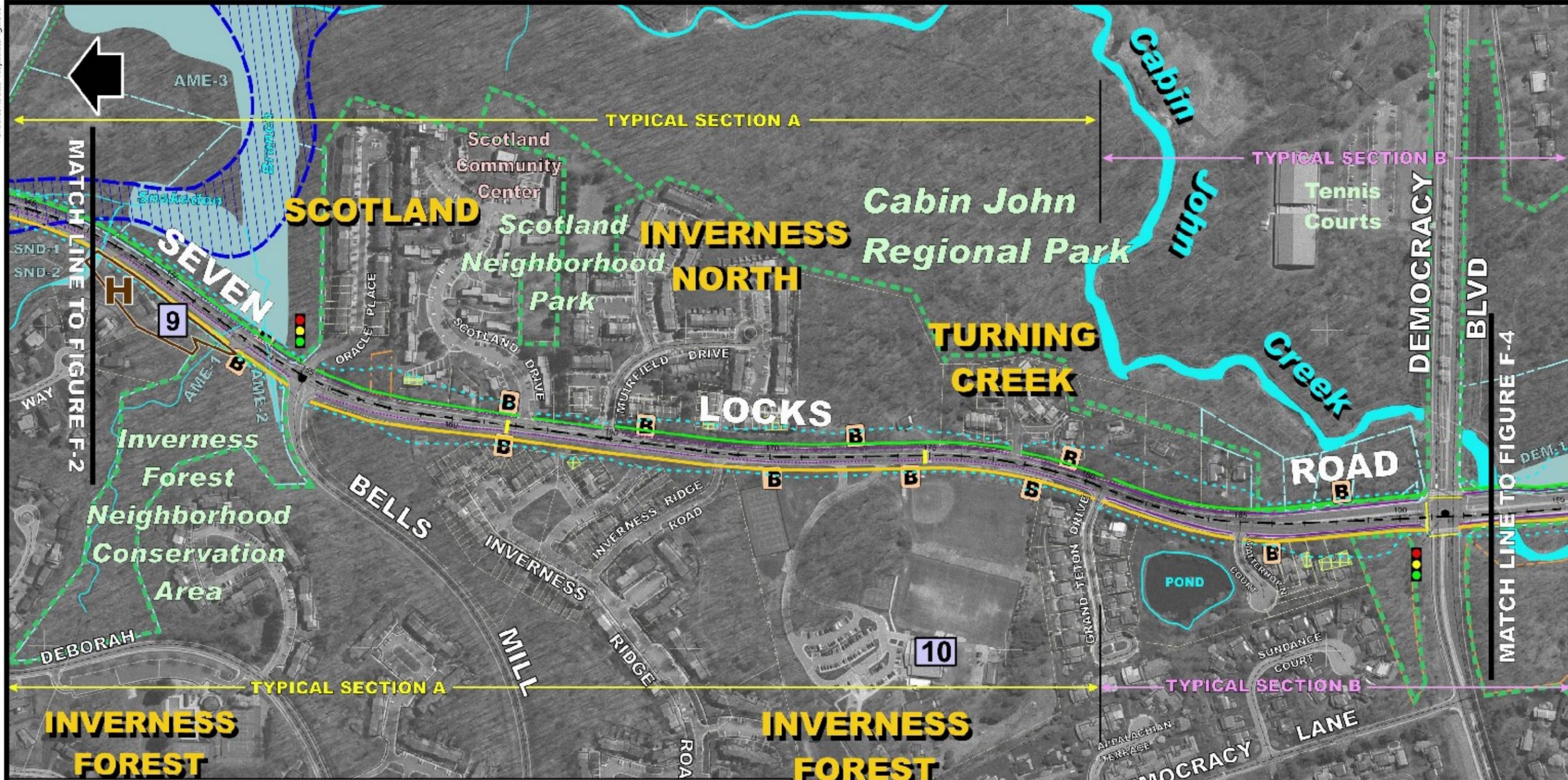
CONCEPT 2 (DROPPED)

DATE: May 2007

SCALE IN FEET: 0 300 300

FIGURE 16





LEGEND

Park Boundary	Signalized Intersection	Montgomery Co. Owned Property
Potential Waters of the U.S.	Proposed Curb	State of Maryland Owned Property
Potential Wetland	Proposed Shoulder Edge	Historic Parcel
Floodplain	Proposed Sidewalk	Future Master Plan Auxiliary Lanes By Others
Historic Site	Proposed Shared Use Path	Potentially Impacted Structures
Existing Crosswalk	Proposed Limit of Disturbance	
Existing Bus Stop	Existing Right-of-Way	
	Proposed Retaining Wall	
	M-NCPPC Owned Property	

Schools & Worship Centers Key

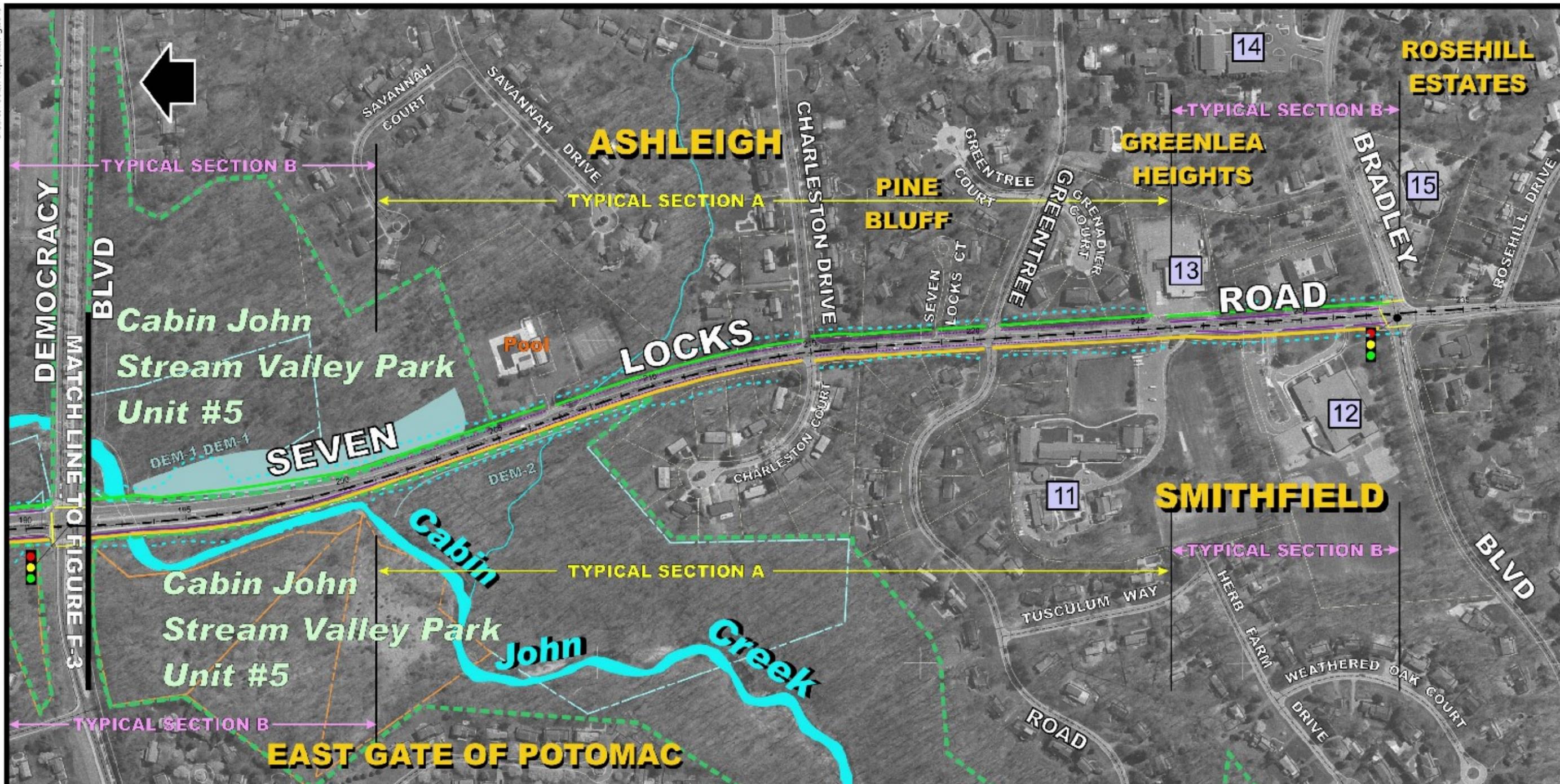
	Scotland AME Zion Church
	The Heights School (PVT)

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 2 (DROPPED)

DATE May 2007		FIGURE 18
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LEGEND

Park Boundary	Signalized Intersection	Montgomery Co. Owned Property
Potential Waters of the U.S.	Proposed Curb	State of Maryland Owned Property
Potential Wetland	Proposed Shoulder Edge	Historic Parcel
Floodplain	Proposed Sidewalk	Future Master Plan Auxiliary Lanes By Others
Historic Site	Proposed Shared Use Path	Potentially Impacted Structures
Existing Crosswalk	Proposed Limit of Disturbance	
Existing Bus Stop	Existing Right-of-Way	
	Proposed Retaining Wall	
	M-NCPPC Owned Property	

Schools & Worship Centers Key

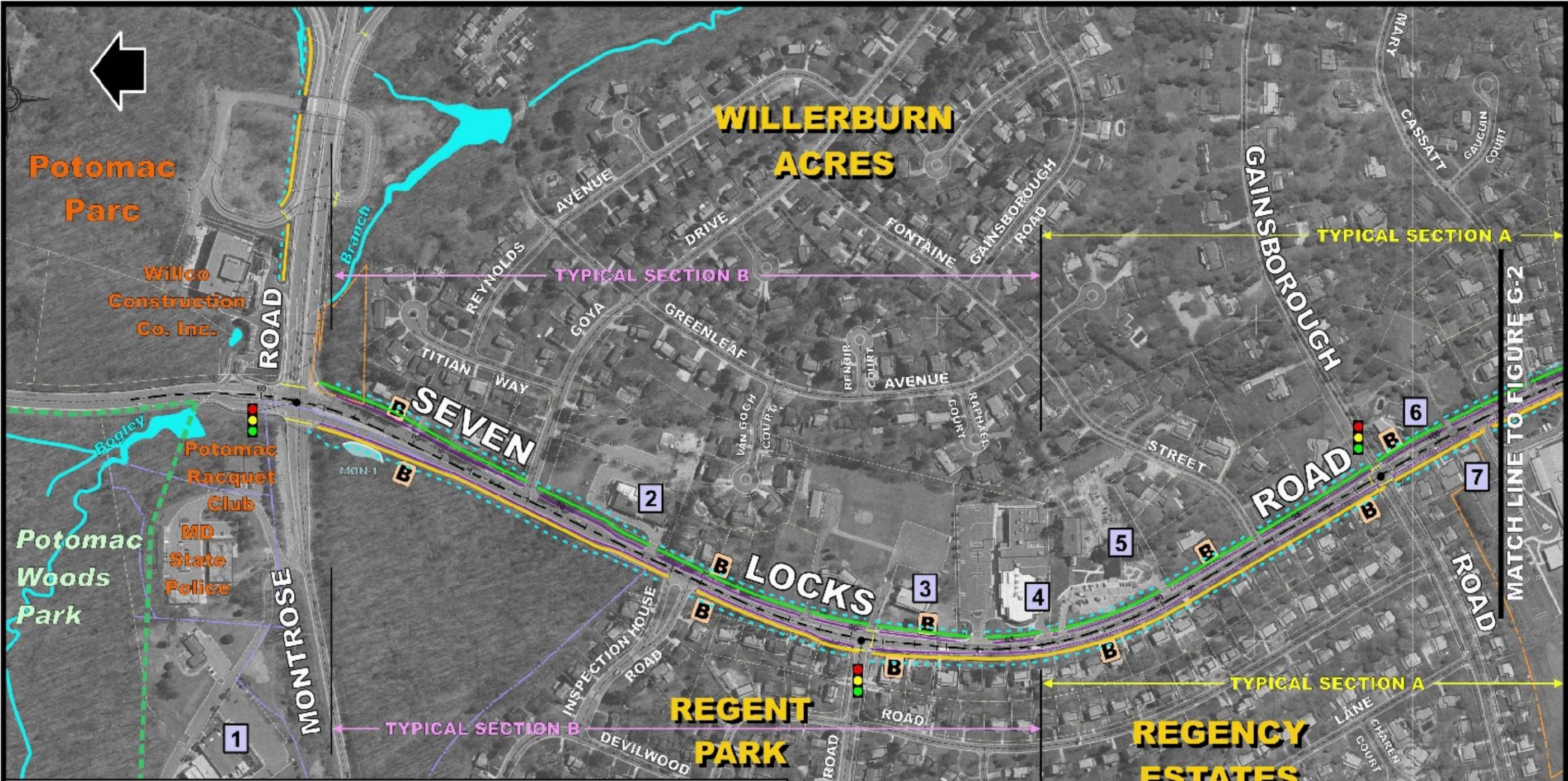
11	Mater Dei Private School
12	Seven Locks Elementary School
13	Buddhist Temple
14	St. George Greek Orthodox
15	Emmanuel Lutheran

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 2 (DROPPED)

DATE May 2007		FIGURE 19
------------------	--	--------------



LEGEND

- | | | | | | |
|--|------------------------------|--|--------------------------|--|--|
| | Park Boundary | | Signalized Intersection | | Montgomery Co. Owned Property |
| | Potential Waters of the U.S. | | Proposed Curb | | State of Maryland Owned Property |
| | Potential Wetland | | Proposed Shoulder Edge | | Historic Parcel |
| | Floodplain | | Proposed Sidewalk | | Future Master Plan Auxiliary Lanes By Others |
| | Historic Site | | Proposed Shared Use Path | | Proposed Limit of Disturbance |
| | Existing Crosswalk | | Existing Right-of-Way | | Proposed Retaining Wall |
| | Existing Bus Stop | | M-NCPPC Owned Property | | |

Schools & Worship Centers Key

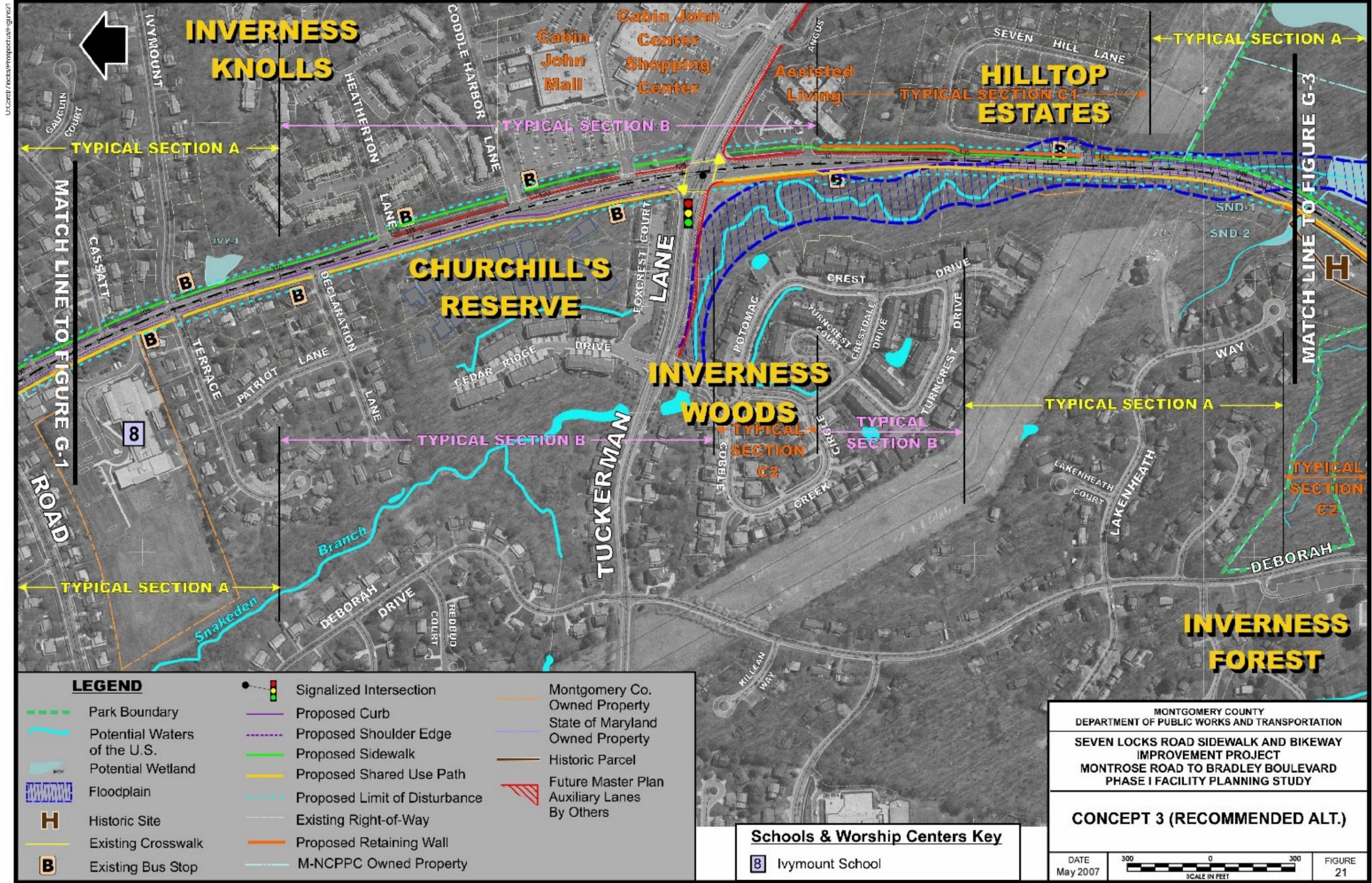
- 1 Islamic Education Center
- 2 Geneva United Presbyterian
- 3 Seven Locks Baptist
- 4 Beth Shalom Congregation & Talmud Torah
- 5 St. James Episcopal
- 6 Chabad House Lubavitch
- 7 Young Israel of Potomac

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 3 (RECOMMENDED ALT.)

DATE May 2007	<p>SCALE IN FEET</p>	FIGURE 20
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LEGEND

- Park Boundary
- ~ Potential Waters of the U.S.
- ~ Potential Wetland
- ▨ Floodplain
- H Historic Site
- Existing Crosswalk
- B Existing Bus Stop
- Signalized Intersection
- Proposed Curb
- Proposed Shoulder Edge
- Proposed Sidewalk
- Proposed Shared Use Path
- Proposed Limit of Disturbance
- Existing Right-of-Way
- Proposed Retaining Wall
- M-NCPPC Owned Property
- Montgomery Co. Owned Property
- State of Maryland Owned Property
- Historic Parcel
- ▨ Future Master Plan Auxiliary Lanes By Others

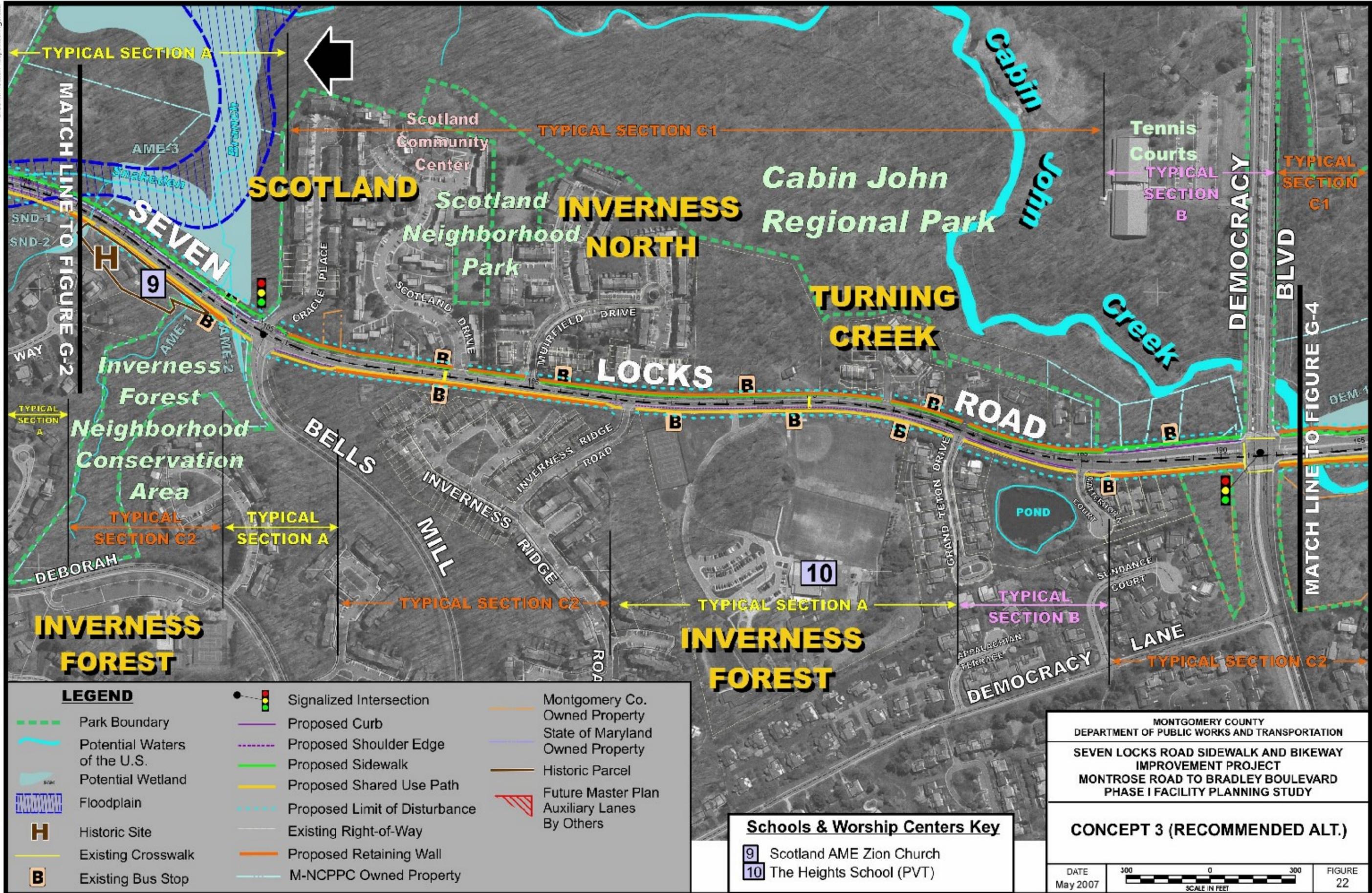
Schools & Worship Centers Key

- 8 Ivymount School

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**SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY
IMPROVEMENT PROJECT**
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 3 (RECOMMENDED ALT.)

DATE: May 2007 300 0 300 FIGURE 21
SCALE IN FEET



LEGEND

- Park Boundary
- ~ Potential Waters of the U.S.
- ~ Potential Wetland
- Floodplain
- H Historic Site
- B Existing Crosswalk
- B Existing Bus Stop
- Signalized Intersection
- Proposed Curb
- Proposed Shoulder Edge
- Proposed Sidewalk
- Proposed Shared Use Path
- Proposed Limit of Disturbance
- Existing Right-of-Way
- Proposed Retaining Wall
- M-NCPPC Owned Property
- Montgomery Co. Owned Property
- State of Maryland Owned Property
- Historic Parcel
- ▽ Future Master Plan Auxiliary Lanes By Others

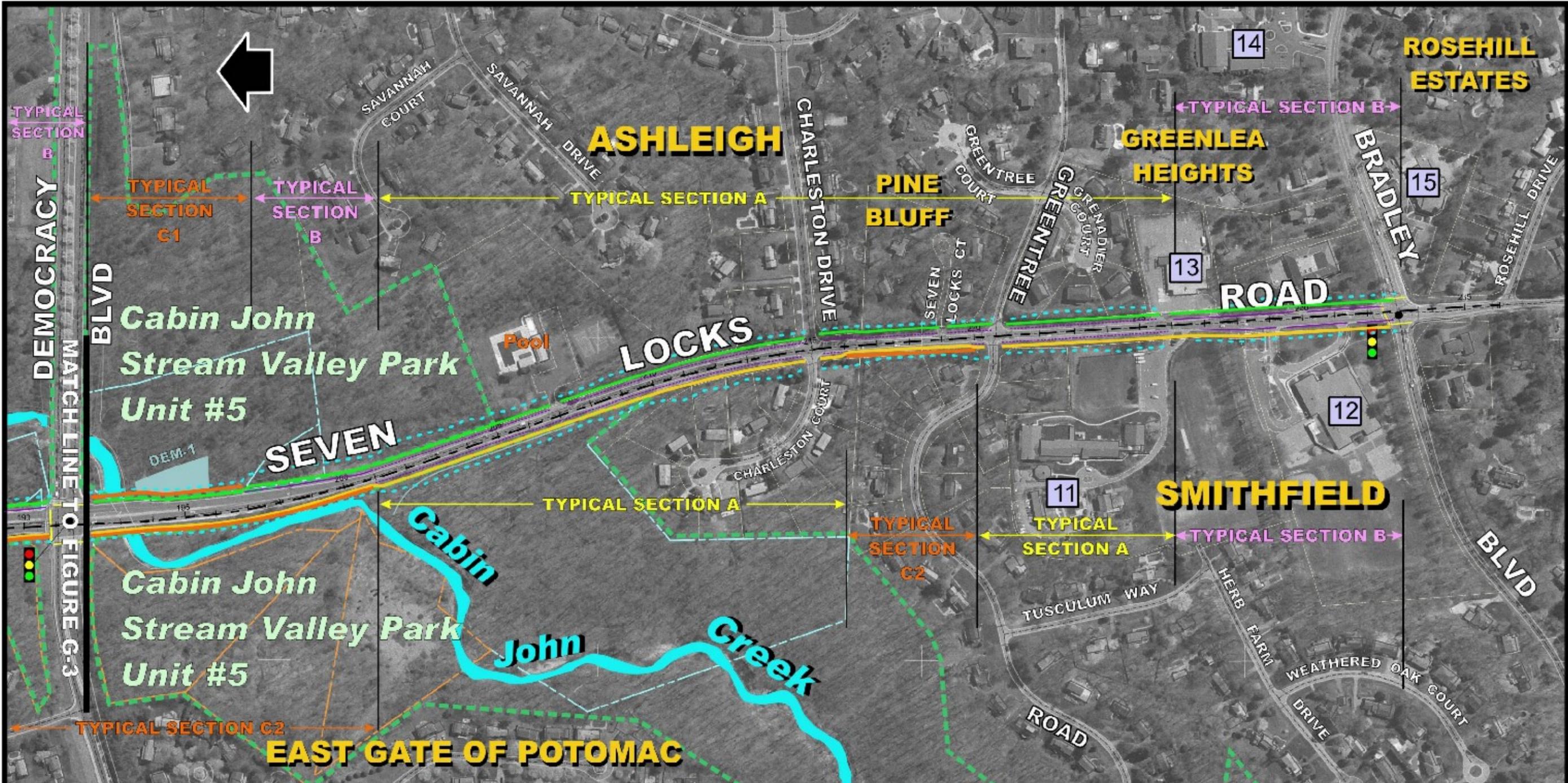
Schools & Worship Centers Key

- 9 Scotland AME Zion Church
- 10 The Heights School (PVT)

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**SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY
IMPROVEMENT PROJECT**
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 3 (RECOMMENDED ALT.)

DATE: May 2007 SCALE IN FEET FIGURE 22



LEGEND			
	Park Boundary		Signalized Intersection
	Potential Waters of the U.S.		Proposed Curb
	Potential Wetland		Proposed Shoulder Edge
	Floodplain		Proposed Sidewalk
	Historic Site		Proposed Shared Use Path
	Existing Crosswalk		Proposed Limit of Disturbance
	Existing Bus Stop		Existing Right-of-Way
			Proposed Retaining Wall
			M-NCPPC Owned Property
			Montgomery Co. Owned Property
			State of Maryland Owned Property
			Historic Parcel
			Future Master Plan Auxiliary Lanes By Others

Schools & Worship Centers Key	
11	Mater Dei Private School
12	Seven Locks Elementary School
13	Buddhist Temple
14	St. George Greek Orthodox
15	Emmanuel Lutheran

MONTGOMERY COUNTY
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

SEVEN LOCKS ROAD SIDEWALK AND BIKEWAY
IMPROVEMENT PROJECT
MONTROSE ROAD TO BRADLEY BOULEVARD
PHASE I FACILITY PLANNING STUDY

CONCEPT 3 (RECOMMENDED ALT.)

DATE May 2007	300 0 300 SCALE IN FEET	FIGURE 23
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III. IMPACT ANALYSIS

A. Introduction

As part of the Phase I Facility Planning Study, the Study Team performed an impact analysis to determine the potential effect of the Recommended Alternative on natural, cultural and historic, and socioeconomic environmental resources, including impacts to wetlands, streams, properties, communities and community facilities within the Seven Locks Road project area.

Within the project area, natural, cultural, and socioeconomic environmental resources were inventoried using field review data, census data, geographic information system (GIS) data, agency correspondence and other readily available information. Field reviews were conducted in January 2006 to verify the location of natural environmental resources and existing structures. Recent development and approved public projects on file with the Montgomery County Department of Public Works and Transportation (DPWT) and The Maryland-National Capital Park and Planning Commission (M-NCPPC) were also inventoried. An official Natural Resources Inventory/Forest Stand Delineation (NRI/FSD) for the project is typically prepared and submitted as part of any Phase II Facility Planning activities.

B. Natural Environmental Resources

Waters of the U.S. (streams and wetlands). The project area lies within the Cabin John Creek (Washington Metropolitan Drainage Area) watershed and encompasses a portion of Cabin John Creek and its tributaries (Snakeden Branch and Bogley Branch). Based on 2004 Maryland Property View (MDPV) Geographic Information Systems (GIS) data for Montgomery County and preliminary field surveys performed in January 2006, there are three streams located adjacent to Seven Locks Road (**See Figures 12-15**). Note that these locations are preliminary and have not received official jurisdictional determination by MDE or the Army Corps of Engineers. Of those wetlands and streams identified, 0.9 acre of wetland and 160 linear feet of stream are expected to be impacted as a result of the Recommended Alternative. The Maryland Department of Natural Resources (DNR) has identified Cabin John Creek and its tributaries as Use I-P streams (Water Contact Recreation, Protection of Aquatic Life, and Public Water Supply). Due to the waters' designation, in-stream construction is prohibited from March 1st to June 15th, inclusive. A Waterway Construction Permit will be required from the Maryland Department of the Environment (MDE), Water Management Administration.

Floodplains. A review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (Maps 125B/175C) for Montgomery County, Maryland indicates that one 100-year floodplain system is located within the project area (**See Figures 12-15**). The Recommended Alternative is expected to impact two acres of floodplain.

Prime Farmland Soils and Soils of Statewide Importance. As identified by 2004 MDPV GIS data (Montgomery County), prime farmland soils and soils of statewide importance exist within the project area. Although prime farmland soils were located, zoning codes (residential and/or commercial/industrial research office) in the project area exempt the project from the Farmland Policy Protection Act. Therefore, this Seven Locks Road improvement project will not impact prime farmland soils.

Forest Resources. Ten specimen trees were identified within the project area (**See Figures 12-15 and Table 9**). Specimen trees are defined by Montgomery County as a tree that is particularly impressive or unusual example of a species due to its size, shape, age, or any other trait that epitomizes the character of the species. The size criteria for classification as a specimen tree varies among species (1992 *Montgomery County Tree Technical Manual*). No state champion trees (the largest tree of an

individual species in the state) were identified within the project area. The Recommended Alternative is expected to impact seven of the ten specimen trees in the project area.

Table 9. Specimen Trees Identified within the Seven Locks Road Improvement Project Area (shaded rows depict trees impacted by the Recommended Alternative).

Tree ID	Scientific Name	Common Name	DBH (in.)	Criteria for Specimen (in.)	Criteria for State Champion (in.)
1	<i>Acer saccharinum</i>	Silver Maple	39.1	30	97
2	<i>Juglans nigra</i>	Black Walnut	31.0	30	80
3	<i>Koelreuteria paniculata</i>	Golden Raintree	17.6*	-	-
4	<i>Catalpa spp.</i>	Catalpa	36.2	30	62-66 (species dependant)
5	<i>Acer rubrum</i>	Red Maple	32.3	30	58
6	<i>Platanus occidentalis</i>	Sycamore	32.0	30	97
7	<i>Platanus occidentalis</i>	Sycamore	41.3	30	97
8	<i>Platanus occidentalis</i>	Sycamore	34.2	30	97
9	<i>Acer rubrum</i>	Red Maple	35.4	30	58
10	<i>Platanus occidentalis</i>	Sycamore	30.0	30	97
11	<i>Acer rubrum</i>	Red Maple	36.8	30	58

**Koelreuteria paniculata* (Golden Raintree) is not listed in the 1992 *Montgomery County Tree Technical Manual Size Criteria For Champion and Specimen Trees Table*.

Hazardous Materials. Through coordination with MDE and Montgomery County Department of Environmental Protection (DEP), it has been determined that there are no records of significant environmental incidents investigated by DEP, or known hazardous materials or waste sites (including underground storage tank facilities) within the project area (**See Appendix H**).

Rare, Threatened and Endangered Species. Through coordination with the US Fish and Wildlife Service (USFWS), DNR's Environmental Review Unit, and DNR's Wildlife and Heritage Service, there appear to be no state or federally listed or proposed for listing as rare, threatened, or endangered species within the project area (**See Appendix H**). However, the DNR's Wildlife and Heritage Service has determined through their analysis that the forested area on or adjacent to the project site may contain Forest Interior Dwelling Bird Species (FIDS) habitat. Guidelines to help minimize the project's impacts on FIDS and other native forest plants and wildlife are contained within the DNR Wildlife and Heritage's response letter within **Appendix H**.

The DNR's Environmental Review Unit review determined that although anadromous fish species are not present in the Cabin John Creek drainage due to natural barriers located downstream, it is expected that the perennial reach of streams in this area support resident populations of several fish species typically found in the region. Fish species documented by DNR's Maryland Biological Stream Survey (MBSS) Program that could potentially be found near the project area is located in **Appendix H**. These species should be adequately protected by the Use I instream work prohibition period, sediment and erosion control methods, and other Best Management Practices typically used for protection of stream resources and will be utilized during construction of the Recommended Alternative.

NRI/FSD. An official NRI/FSD for the project will be prepared and submitted as part of any Phase II Facility Planning activities. The official NRI/FSD will include the location of existing utilities, storm

drains, stormwater systems, topography and other physical features as outlined in the Forest Conservation Manual and Environmental Guidelines.

C. Cultural Resources

No structures were identified in the project area that are eligible for or on the National Register of Historic Places; however, the Scotland African Methodist Episcopal (AME) Zion Church located at 10902 Seven Locks Road (**See Figures 12-15**) is listed in the April 2002 *Potomac Subregion Master Plan* as a Historic Site designated on the Montgomery County Master Plan for Historic Preservation (Resource #29/015). Coordination with M-NCPPC has determined that the church's environmental setting is the entire parcel (N829). Of this parcel, a 12-foot wide strip along Seven Locks Road is master planned as transportation right-of-way. The Recommended Alternative will actually impact a strip 16-feet wide.

D. Socioeconomic Resources

Community facility data within the Seven Locks Road project area was obtained using 2004 Maryland Property View Database (GIS), the *Master Plan*, and Montgomery County ADC Map (33rd Edition). 2002 U.S. Census data was used to determine if any substantial differences exist between Montgomery County and the Analysis Area census tract data.

1. Communities, Community Facilities and Employment Centers

Eighteen communities, twenty-five community facilities (five schools, ten places of worship, one police station, five parks and four points of interest) and one employment/business center were identified within the Seven Locks Road project area, as listed in **Table 10**.

The Study Team identified preliminary right-of-way and potential land acquisition needs through the development of the concepts described in Section II. Five (5) acres of right-of-way will be required from properties adjacent to Seven Locks Road. A more thorough evaluation will be conducted during the second phase of the Transportation Facility Planning Process, in which engineering plans will be carried to 35% completion.

2. Private Development and Public Projects

Planned or recently constructed development and public works projects in the project area have been inventoried according to records on file with Montgomery County Department of Public Works and Transportation. This information is summarized below (**See Figures 12-15**):

- Potomac Parc – mixed use zoning
- Potomac Crest – residential area
- Burley Property – under application for rezoning; has active plans for development (grading and retaining walls)
- Scotland Community Center. Master Plan recommended to expand at its present location to facilitate athletic and recreational activities.
- Development at Cabin John Mall/shopping center – any future private development will require construction of auxiliary lanes at Seven Locks Road and Tuckerman Lane, and be the responsibility of the developer.
- Seven Locks Road Elementary School – expansion and modernization

Table 10. Communities, Community Facilities and Existing Employment/Business Centers within the Seven Locks Road Improvement Project Area (See Figures 12-15).

	Figure 12	Figure 13	Figure 14	Figure 15
Communities	Willerburn Acres	Inverness Knolls	Inverness Forest	Ashleigh
	Regent Park	Potomac Crest (under construction)	Scotland	Pine Bluff
	Regency Estates	Inverness Woods	Inverness North	Greetree Acres
		Hilltop Estates	Turning Creek	Greenlea Heights
		Inverness Forest		Rosehill Estates
			Smithfield	
Schools	Islamic Education Center	Ivymount School	The Heights School – Private	Mater Dei Private School
				Seven Locks Elementary School
Places of Worship	Geneva United Presbyterian	None	Scotland AME Zion Church*	St. George Greek Orthodox
	Seven Locks Baptist			Buddhist Temple
	Beth Shalom Congregation & Talmud Torah			Emmanuel Lutheran
	St. James Episcopal			
	Chabad House Lubavitch			
	Young Israel of Potomac			
Fire/Police Stations	MD State Police	None	None	None
Points of Interest	Potomac Racquet Club	Assisted Living	Scotland Community Center	Pool
Parks	Potomac Woods Park	None	Inverness Forest Neighborhood Conservation Area	Cabin John Regional Park – Unit 5
			Cabin John Regional Park	
			Scotland Neighborhood Park	
			Cabin John Stream Valley Park – Unit 5	
Employment/Business Centers	None	Cabin John Mall/shopping center	None	None

*Listed resource on the Montgomery County Master Plan for Historic Preservation.

Potomac Crest, Burley Property and Cabin John Mall/shopping center are within the project area and may have right-of-way or grading easement impacts. The proposed Recommended Alternative will enhance access to the proposed developments by providing linkages via pedestrian and bicycle path connections. Roadway improvements at the intersection of Seven Locks Road and Tuckerman Lane will be constructed in coordination with the developer's planned improvements to the Cabin John Mall/shopping center property.

3. Parking

Impacts projected to occur as a result of the Recommended Alternative will include minor impacts to parking spaces at the Buddhist Temple (eleven of the 120 parking spaces are impacted). Mitigation for any lost parking spaces to the Buddhist Temple will be coordinated with the owners.

4. Land Use and Zoning

Land use and zoning within the Seven Locks Road project area were obtained using the 2004 Maryland Property View GIS database for Montgomery County and the 2002 Potomac Subregion Master Plan (**Please refer to Appendix I for further information**).

In summary, socioeconomic impacts projected to occur as a result of the Recommended Alternative will include the creation of a link between existing and proposed pedestrian and bicycle facilities, and the connection to various communities, community facilities, and transit within the Seven Locks Road project area. Positive impacts also include the establishment of a greater travel choice and service to existing land uses. No disproportionately high and adverse impacts are expected with the Recommended Alternative.

E. Utilities and Traffic Signals

The Study Team performed cursory research to identify utilities within the Seven Locks Road Sidewalk and Bikeway Improvements project area. Based on as-built utility plans, it appears that the Recommended Alternative will require relocation of approximately 200 utility poles providing electric, telephone and cable services. In addition to the utility poles, several underground utilities exist along Seven Locks Road, including sewer, water, gas, electric, and telephone lines. It appears that 18 fire hydrants will need to be relocated.

The Potomac Electric Power Company (PEPCO) was contacted regarding their right-of-way crossing the project area south of Tuckerman Lane. PEPCO recommended that, should the project proceed to Phase II, they be contacted as early as possible to begin the process of obtaining right-of-way and grading easement through their property.

The Recommended Alternative may also require modification of all seven signals along Seven Locks Road within the project area in order to accommodate the proposed improvements.

F. Transit

The Recommended Alternative is not expected to impact existing transit services along Seven Locks Road within the project area. A purpose of this project is to provide improved pedestrian and bicycle access to transit facilities, which is provided by the Recommended Alternative.

IV. PUBLIC PARTICIPATION

A. Public Meetings

Three public meetings were held for the Seven Locks Road Sidewalk and Bikeway (SLRSB), Facility Planning, Phase I Study:

1. June 7, 2006
2. October 25, 2006
3. March 6, 2007

Additionally, 4 newsletters were mailed to adjacent property owners and area homeowner and civic associations with regular updates on the project.

The public meeting held on June 7, 2006 at The Heights private school included introductions of the Study Team, present an overview of the project and listen to community's comments and concerns. Approximately thirty (30) people attended the meeting. Team members from DPWT Office of Project Development and the Division of Engineering Services, as well as M-NCPPC and the consultant attended the meetings and were available to answer questions.

A second public meeting was originally scheduled for September 11, 2006; however, conflicts arose preventing that meeting from being held. The second public meeting was rescheduled for the Seven Locks Road Sidewalk and Bikeway Improvements project at The Heights school on October 25, 2006. The purpose of this second public meeting was to provide the opportunity for potentially impacted property owners along Seven Locks Road to voice their opinions and concerns regarding the Study Team's concepts which had been developed since the first public meeting. In addition to Study Team members, approximately forty (40) individuals attended the public meeting.

The third public meeting was held at The Heights School on March 6, 2007. The purpose of this meeting was to present the Recommended Alternative to the public. In addition to Study Team members, approximately fifty-five (55) individuals attended the public meeting.

Copies of all public meeting materials, including a summary of public comments from each meeting, is located in **Appendix J**.

B. Public Comments

Comments received (via e-mail and postal mail) from members of the community, including individual citizens, homeowners associations, and public officials can be found in **Appendix K**. Comments indicate support for, as well as opposition to, the project. A number of comments also contain general questions about the project as well as requests for improvements within the Seven Locks Road project area that are not in the scope of this study. *Responses to comments were provided when possible; however, due to the high volume of comments received by DPWT, responses were not provided to all comments received.* Those comments requesting improvements not in the scope of this study that were related to traffic and safety issues were forwarded to the Montgomery County Department of Public Works and Transportation's Office of Traffic Operations and Safety for further investigation and response. The Office of Traffic Operations & Safety will be responsible for looking into these issues and responding directly to concerned citizens.

Sources:

- Federal Highway Administration. *Flexibility in Highway Design*.
<http://www.fhwa.dot.gov/environment/flex/ch03.htm>. (23 May 2007)
- Potomac Subregion Master Plan*. 2002.
- Maryland-National Capital Park and Planning Commission. 2005. *Countywide Functional Bikeways Plan*.
(for Montgomery County).
- Montgomery County Department of Transportation. *Montgomery County Standards*.
- Federal Emergency Management Agency (FEMA). Flood Insurance Rate Maps for Montgomery County.
Panels 240049 0125B (1979) and 240049 0175C (1984).
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). 1995.
Hydric Soils of Maryland (revised).
- Montgomery County Tree Technical Manual*. 1992.
- Maryland State Geographic Information Committee (MSGIC). 1981-2002. National Wetlands Inventory
GIS.
- United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS),
1995. *Soil Survey of Montgomery County, Maryland*. Map No. 23.
- U.S. Census Bureau. Census 2000. (8 February 2007) Summary File 3. <<http://factfinder.census.gov>>