Appendix G: Bicycle Parking Space Recommendations at Transit Stations

Bicycle parking is needed at all Metrorail Red Line, MARC, Purple Line and Corridor Cities Transitway stations. This appendix includes recommendations for the number of long-term and short-term bicycle parking spaces, as well as the spatial requirements, at each station using the six-step process outlined below.

STEP #1: FORECAST AM PEAK PERIOD BOARDINGS IN 2040

The starting point for determining the recommended number of bicycle parking spaces at transit stations was to request ridership forecasts from the Washington Metropolitan Transit Authority (WMATA) and Maryland Transit Authority (MTA). The information provided by these transit authorities was presented in different formats. The Planning Department converted the data to 2040 AM peak period boarding forecasts as follows:

- Red Line: WMATA provided 2040 peak period (both AM and PM) boarding forecasts at Red Line stations. These forecasts were converted to AM peak period boarding estimates by applying a factor based on 2016 ridership data.
- Purple Line: MTA provided 2040 daily boarding forecasts for Purple Line stations and indicated that AM peak period boardings were estimated to be 12.5 percent of total daily boardings.
- Corridor Cities Transitway: MTA provided 2040 AM peak period boarding forecasts by station.
- MARC Brunswick Line: MTA provided 2016 AM peak period boardings for each station. A one percent annual growth factor was assumed for each station to forecast 2040 AM peak period boardings.

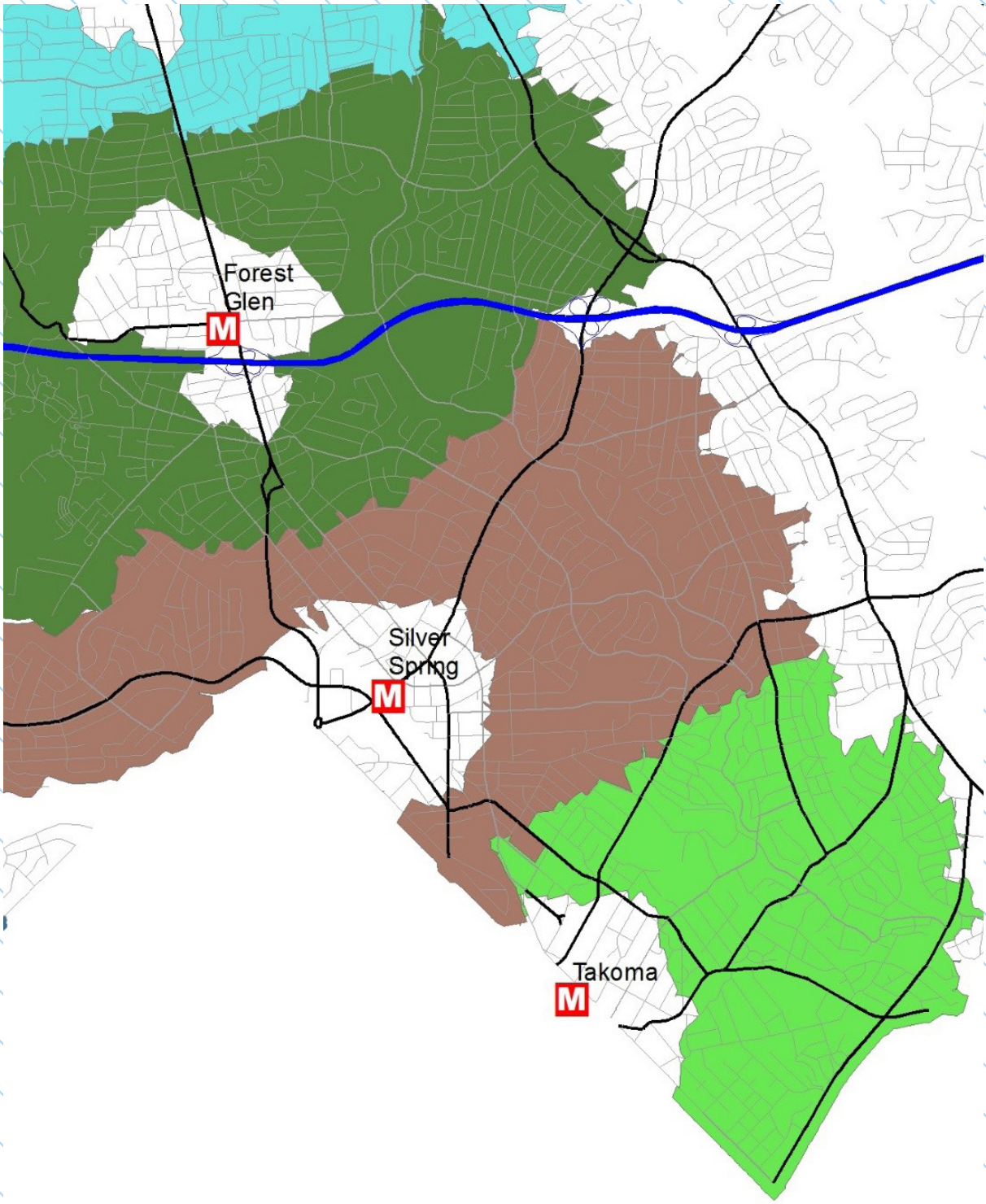
STEP #2: DETERMINE CATCHMENT AREA OF EACH TRANSIT STATION

To determine the recommended number of bicycle parking spaces at each transit station, a catchment area (or bike shed) was assumed for each transit station based on the existing road network, rather than a simple radius. The catchment areas were assumed to be between 0.5 and 2.0 miles from commuter rail stations (Red Line and MARC) and between 0.5 and 1.0 miles for light rail (Purple Line) and bus rapid transit (Corridor Cities Transitway) stations.

The lower threshold is intended to reflect that it is generally more efficient to walk than to ride a bicycle within a distance of about 0.5 miles from a transit station. The upper threshold is intended to reflect a rough spacing between stations and the distance that most people can bicycle in a 10 to 15-minute trip, which is typically assumed to be the amount of time people will spend traveling to a transit station.

Next, the number of dwelling units was calculated within each transit station's catchment area. Dwelling units located within two station catchment areas on the same transit line were assigned to the closest station. For each transit station, the total number of dwelling units in its catchment area was calculated as a percentage of dwelling units in all station areas for each transit line. For example, the Forest Glen catchment area contains 7,500 dwelling units within a 0.5 to 2.0-mile distance. This number is 9 percent of the 85,100 dwelling units located within the catchment area of Red Line stations in Montgomery County.

See the map to the right.



Map shows transit station catchment areas for Takoma, Silver Spring and Forest Glen stations

STEP #3: DETERMINE GOAL-BASED ESTIMATE OF BICYCLE PARKING SPACES PER TRANSIT LINE

The number of bicycle parking spaces recommended for each transit line was calculated by setting a goal of 6.5 percent of AM peak period station boardings arriving at stations by bicycle. This percentage is based on guidelines established by the Association of Pedestrian and Bicycle Professionals (APBP) that recommends providing long-term bicycle parking spaces for 5 percent of AM peak period boardings and providing short-term bicycle parking spaces for 1.5 percent of AM peak period boardings[1].

For example, about 68,000 AM peak period boardings are forecast to be shared among the 10 Red Line stations located within Montgomery County and outside of the City of Rockville. If 6.5 percent of boardings access Red Line stations by bicycle, this number would equate to 4,412 bicycle parking spaces at all Red Line stations in Montgomery County.

STEP #4: DETERMINE GOAL-BASED ESTIMATE OF BICYCLE PARKING SPACES PER TRANSIT STATION

The number of recommended bicycle parking spaces per station was determined by apportioning the total the number of bicycle parking spaces for each transit line based on the number of dwelling units in each station area as a percentage of the total. For example, because the Forest Glen Red Line station is about 9 percent of the total dwelling units located within the catchment area of all Red Line stations in Montgomery County, the Forest Glen Station requires 388 bicycle parking spaces or 9 percent of the total 4,412 total spaces for the Red Line.

STEP #5: RECOMMENDED LONG-TERM AND SHORT-TERM BICYCLE PARKING SPACES BY STATION

The recommended number of long-term and short-term bicycle parking spaces was based on the guidelines established by the Association of Pedestrian and Bicycle Professionals. These guidelines that recommend providing long-term bicycle parking spaces for 5 percent of AM peak period boardings and providing short-term bicycle parking spaces for 1.5 percent of AM peak period boardings. Numbers are rounded and it was assumed that all stations should have at least 10 short-term bicycle parking spaces.

For those stations located in residential neighborhoods with little opportunity for redevelopment, no long-term bicycle parking spaces are recommended. These include Purple Line stations at Dale Drive and Manchester Place.

For those stations that do not yet have demand estimates, including the proposed White Flint MARC station and the Corridor Cities Transitway Phase 2, it is recommended that they have a minimum of 20 long-term spaces and 6 short-term spaces. As ridership estimates become available, these recommendations should be updated.

For the Boyd MARC station, whose existing boardings are heavily constrained by parking availability, 20 long-term bicycle parking spaces are recommended.

Additional long-term bicycle parking spaces are recommended at the Lyttonsville Purple Line station. Unlike the other transit stations where bicycle parking requirements are likely to be driven by residential access, the Lyttonsville station is likely to be driven by access to employment at the Forest Glen Annex of the United States Army.

STEP #6: ESTIMATING SQUARE FOOTAGE REQUIREMENTS BY STATION

The final step is to estimate the square footage requirement for bicycle parking at each transit station. Long-term bicycle parking spaces are assumed to require 9 square feet per space and short-term bicycle parking spaces are assumed to require 20 square feet per space. A 20 percent contingency is applied to each station.

[1] Bicycle Parking Guidelines 2nd Edition, Association of Pedestrian and Bicycle Professionals, 2010, page 3-3.

The following tables summarize the recommended number of long-term and short-term bicycle parking spaces and square footage for each transit station.

Red Line Bicycle Parking Analysis

STATION	STEP 1	STEP 2				STEP 3 & 4	STEP 5		STEP 6	
	2040 AM PEAK PERIOD BOARDINGS	DUS WITHIN DISTANCE OF STATION				GOAL-BASED ESTIMATE	RECOMMEND BIKE PARKING SPACES		SPATIAL REQUIREMENTS (SF)	
		1/2 MILE	2 MILES	DIFFERENCE	% OF TOTAL		LONG-TERM	SHORT-TERM	LONG-TERM	SHORT-TERM
Shady Grove	20,459	758	8,444	7,686	9%	398	300	100	3,200	2,400
White Flint	7,505	3,426	9,512	6,086	7%	315	250	50	2,700	1,200
Grosvenor	4,644	2,660	11,657	8,997	11%	466	350	100	3,800	2,400
Medical Center	1,606	725	6,213	5,488	6%	284	200	50	2,200	1,200
Bethesda (North)	6,668	1,500	4,413	2,913	3%	151	100	50	1,100	1,200
Bethesda (South)		3,499	10,296	6,797	8%	352	250	100	2,700	2,400
Friendship Heights	4,611	3,484	8,789	5,305	6%	275	200	50	2,200	1,200
Glenmont	4,797	1,432	11,962	10,530	12%	546	400	150	4,300	3,600
Wheaton	4,088	2,748	12,968	10,220	12%	530	400	100	4,300	2,400
Silver Spring	10,911	7,908	21,512	13,604	16%	705	550	150	5,900	3,600
Forest Glen	2,589	1,444	8,934	7,490	9%	388	300	100	3,200	2,400
Total	**67,879**	**29,584**	**114,700**	**85,116**	**100%**	**4,412**	**3,300**	**1,000**		

Brunswick Line Bicycle Parking Analysis

STATION	STEP 1	STEP 2				STEP 3 & 4	STEP 4		STEP 5	
	2040 AM PEAK PERIOD BOARDINGS	DUS WITHIN DISTANCE OF STATION				GOAL-BASED ESTIMATE	RECOMMEND BIKE PARKING SPACES		SPATIAL REQUIREMENTS (SF)	
		1/2 MILE	2 MILES	DIFFERENCE	% OF TOTAL		LONG-TERM	SHORT-TERM	LONG-TERM	SHORT-TERM
Dickerson	32	22	84	62	0%	0	0	10	0	200
Barnesville	106	0	105	105	0%	0	0	10	0	200
Boyds	24	6	805	799	1%	2	20	10	200	200
Germantown	1102	631	18,701	18,070	30%	45	30	10	300	200
Washington Grove	64	243	6,474	6,231	10%	15	10	10	100	200
White Flint (planned)	N/A					N/A	20	10	200	200
Kensington	232	979	14,835	13,856	23%	34	30	10	300	200
Silver Spring	740	6,666	28,037	21,371	35%	53	40	10	400	200
Total	**2,300**	**8,547**	**69,041**	**60,494**	**100%**	**150**	**150**	**80**		

Purple Line Bicycle Parking Analysis

STATION	STEP 1	STEP 2				STEP 3 & 4			STEP 5	
	2040 AM PEAK PERIOD BOARDINGS	DUS WITHIN DISTANCE OF STATION				RECOMMEND BIKE PARKING SPACES			SPATIAL REQUIREMENTS (SF)	
		1/2 MILE	1 MILE	DIFFERENCE	% OF TOTAL	ESTIMATE	LONG-TERM	SHORT-TERM	LONG-TERM	SHORT-TERM
Bethesda	1,875	2,943	8,820	5,877	31%	110	80	30	900	700
Connecticut Avenue	278	718	2,255	1,537	8%	29	20	10	200	200
Lyttonsville	167	623	2,478	1,855	10%	35	50	10	500	200
Woodside	203	2,067	3,212	1,145	6%	21	20	10	200	200
Silver Spring Transit Center	1,618	5,817	6,759	942	5%	18	10	10	100	200
Silver Spring Library	377	2,491	4,744	2,253	12%	42	40	10	400	200
Dale Drive	120	897	1,813	916	5%	17	0	10	0	200
Manchester Place	239	1,948	2,932	984	5%	18	0	10	0	200
Long Branch	111	1,419	2,810	1,391	7%	26	30	10	300	200
Piney Branch Road	155	893	1,533	640	3%	12	10	10	100	200
Takoma-Langley Transit Center	274	495	1,819	1,324	7%	25	20	10	200	200
Total	**5,415**	**19,816**	**39,175**	**18,864**	**100%**	**352**	**280**	**130**		

Corridor Cities Transitway Bicycle Parking Analysis (Phase 1)

STATION	STEP 1	STEP 2				STEP 3 & 4			STEP 5	
	2040 AM PEAK PERIOD BOARDINGS	DUS WITHIN DISTANCE OF STATION				RECOMMEND BIKE PARKING SPACES			SPATIAL REQUIREMENTS (SF)	
		1/2 MILE	1 MILE	DIFFERENCE	% OF TOTAL	ESTIMATE	LONG-TERM	SHORT-TERM	LONG-TERM	SHORT-TERM
Shady Grove	3,531	0	529	529	9%	43	30	10	300	200
East Gaither	249	2,675	3,195	520	9%	42	Rockville	Rockville	Rockville	Rockville
West Gaither	609	337	650	313	5%	25				
Crown Farm	1,488	1,487	2,017	530	9%	43	Gaithersburg	Gaithersburg	Gaithersburg	Gaithersburg
DANAC	243	709	1,877	1,168	20%	94	0	20	0	500
LSC Central	390	0	1,009	1,009	17%	81	60	20	600	500
LSC West	717	86	553	467	8%	38	90	10	1,000	200
LSC Belward	n/a	73	1,360	1,287	22%	104	80	20	900	500
Total	**7,227**	**5,367**	**11,190**	**5,823**	**100%**	**470**	**260**	**80**		

As some station areas serve more than one transit line, the following table provides a summary of the total number of bicycle parking spaces recommended at each transit station.

Recommended Number of Bicycle Parking Spaces

STATION	LONG-TERM BICYCLE PARKING		SHORT-TERM BICYCLE PARKING	
	# OF SPACES	SQUARE FEET	# OF SPACES	SQUARE FEET
Barnesville	0	0	10	200
Bethesda (North)	100	1100	50	1200
Bethesda (South)	3300	3600	130	3100
Boyds	20	200	10	200
Connecticut Avenue	20	200	10	200
Dale Drive	0	0	10	200
DANAC	0	0	20	500
Dickerson	0	0	10	200
Forest Glen	300	3200	100	2400
Friendship Heights	200	2200	50	1200
Germantown	30	300	10	200
Glenmont	400	4300	150	3600
Grosvenor	350	3800	100	2400
Kensington	30	300	10	200
Long Branch	30	300	10	200
LSC Belward	80	900	20	500
LSC Central	60	600	20	500
LSC West	90	100	10	200
Lyttonsville	50	500	10	200
Manchester Place	0	0	10	200
Medical Center	200	2200	50	1200
Piney Branch Road	10	100	10	200
Shady Grove	330	3600	110	2600
Silver Spring	600	6500	170	4100
Silver Spring Library	40	400	10	200
Takoma / Langley	20	200	10	200
Washington Grove	10	100	10	200
Wheaton	400	4300	100	2400
White Flint (Metrorail)	250	2700	50	1200
White Flint (MARC)	20	200	10	200
Woodside	20	200	10	200
Total	**3990**	**43000**	**1290**	**30300**