reducing our footprint - technical appendix

more community
sustainable
walking
nature
transit
time

growing Smarter
sustainable development
design

Montgomery County 2009-2011 Growth Policy
Montgomery County Planning Department
Planning Board Draft

Growth Policy Study: Appendix A – Impact Tax Issues (Resolution 16-376 F9)

Lead Staff: Jacob Sesker

Summary:

- Very limited refinement of land use categories, adding a new category that can be applied to residential uses that are urban but which are not located in a Metro Station Policy Area.
- No new impact taxes or charges at this time.
- Executive Branch continues to support the Affordable Housing Task Force's recommendation to continue to study affordable housing linkage fees.
- The Executive Branch will be making recommendations with respect to retaining, modifying or repealing certain of the impact tax law's credit provisions.

Resolution 16-376 F9 set forth a list of questions related to impact taxes to be addressed by the County Executive by October 1, 2008.

The County Executive, with the aid of the Planning Board and the Board of Education, must address impact tax issues noted in the long-term infrastructure financing recommendations in the Planning Board's *2007-2009 Growth Policy*, including further refinement of land use categories and consideration of charging impact taxes for additional public facilities or purposes or charging "linkage" fees to non-residential development for affordable housing. The Executive and the interagency working group must review credits granted under the impact tax and develop recommendations to retain, modify, or repeal the law's credit provisions.

The objective identifies 4 separate aspects of the inquiry:

1) Potential further refinement of land use categories

2) Consideration of charging impact taxes for additional public facilities or purposes

3) Consideration of charging linkage fees to non-residential development for affordable housing

4) Review credits granted under the impact tax and develop recommendations to retain, modify, or repeal the law's credit provisions

The Executive Branch's efforts related to these F9 studies are not yet complete. Staff has met and corresponded on multiple occasions on this topic. The preliminary staff conclusions suggest that few significant changes will be made. The Planning Department supports limited refinement of land use categories, adding one new residential category which can be applied to residential uses in urban areas which are outside of a Metro Station Policy Area. As for items 2 and 3, staff at the Planning Department and in the Executive Branch agree that while these items may be considered in the future, imposing additional charges on the development industry at this time does not make sense given the state of the economy and current levels of development activity. Staff continues to discuss potential changes to the impact tax law. Executive staff is preparing a recommendation. Upon completion of the Executive Branch report and recommendations, staff will transmit to the Planning Board a summary of the work; that summary will include Staff recommendations or commentary, as appropriate. Staff has other work products to complete on impact tax modifications for transportation and schools. These products are described as part of Appendix M.

Growth Policy Study: Appendix B - Analysis of the Current/Future Pace and Pattern of Growth (Resolution 16-376 F11)

Lead Staff: Wayne Koempel

Summary:

- Between 2009 and 2030, the County's growth is concentrated in our strategic growth areas. Job growth is greatest in the I-270 Corridor and at Metrorail stations. Housing growth is greatest in Clarksburg, Gaithersburg, and at Metrorail stations.
- A substantial amount of growth is already approved. The commercial pipeline contains approximately 33 million square feet (including the municipalities), which would take until roughly 2023 to absorb under forecast growth rates. The housing pipeline might similarly be expected to be absorbed by 2016.

Employment

The Round 7.2 employment forecast shows the County's employment growing by 31,100 jobs between 2000 and 2009 (Table 1). This is about 52 percent of the 60,000 employment growth the County experienced between 1990 and 2000. Over 80 percent of this growth occurred between 2000 and 2005. The County's annual employment growth rate this decade is 0.7 percent per year, compared to an annual growth rate of 1.4 percent during the 1990s. Figure 1 shows the County's 2009 employment density per acre by traffic zone. The colors and heights of the traffic zone shapes depict the density of the County's jobs in 2009, not the actual number of jobs in the traffic zones.

Between 2009 and 2030 the County's Round 7.2 employment forecast shows an increase of 164,000 jobs. In order to achieve this job growth, the County's annual employment growth rate will have to match the 1990s rate of 1.4 percent.

In the Round 7.2 forecasts, the Cities of Gaithersburg and Rockville produced their own forecasts. Their forecasts are based on the current city boundaries and do not assume any annexations. The cities forecasts are included in the Montgomery County forecasts.

In 2005, 15 percent of the County's jobs were in the City of Rockville (76,600 jobs). During the Round 7.2 forecast period, Rockville maintains its relative share of the County's jobs. In 2030, Rockville has 100,800 jobs, 15 percent of the County total.

The Round 7.2 forecast suggests that the City of Gaithersburg will become more of an employment center. In 2005, Gaithersburg had 48,800 jobs, 10 percent of the County total. By 2030, Gaithersburg expects to have 84,200 jobs, 13 percent of the County total.

Between 2000 and 2009, almost 70 percent of the County's job growth occurred in five policy areas. Rockville City had the most growth 5,500 jobs, 18 percent of the County's job growth. The R&D Village ranked second growing by 4,400 jobs (14 percent) followed by Fairland/White Oak +4,100 jobs (13 percent), Gaithersburg City +3,600 jobs (12 percent), and the Bethesda CBD +3,600 jobs (12 percent). The Metro Station Policy Areas combined grew by 7,600 jobs, 24 percent of the County's job growth.

Between 2009 and 2030, of all the Policy Areas, Gaithersburg City and Rockville City are projected to grow the most. Gaithersburg City is projected to grow by 33,400 jobs, 20 percent of the County's growth, and Rockville City is projected to grow by 23,100 jobs, 14 percent of the County's growth. The R&D Village Policy Area is projected to have the third highest growth 16,600 jobs, 10 percent of the County's growth, followed by Clarksburg +12,500 jobs (8 percent), and North Bethesda +12,200 jobs (7 percent). These five Policy Areas are projected to have almost 60 percent of the County's job growth. The Metro Station Policy Areas are projected to grow by 19,200 jobs, 12 percent of the County's job growth. Figure 2 shows the changes in employment density from 2009 to 2030. The colors and heights of the traffic zone shapes depict the density of the County's job growth, not the actual change in the number of jobs between 2009 and 2030 in the traffic zones.

Table 1

Montgomery County Employment Growth by Policy Area

Round 7.2 Cooperative At-Place Employment Forecast

Policy Areas	2000 Total Jobs	2000 to 2009 Job Growth	% Change	% of County Growth	2009 Total Jobs	2009 to 2030 Job Growth	% Change	% of County Growth	2030 Total Jobs
Aspen Hill	6,270	(69)	-1.1%	-0.2%	6,201	113	1.8%	0.1%	6,314
Bethesda CBD	32,228	3,621	11.2%	11.6%	35,849	2,760	7.7%	1.7%	38,609
Bethesda/Chevy Chase	43,480	153	0.4%	0.5%	43,633	5,930	13.6%	3.6%	49,563
Clarksburg	2,550	1,269	49.8%	4.1%	3,819	12,543	328.4%	7.6%	16,362
Cloverly	1,255	93	7.4%	0.3%	1,348	(2)	-0.1%	0.0%	1,346
Damascus	2,372	(57)	-2.4%	-0.2%	2,315	161	7.0%	0.1%	2,476
Darnestown/Travilah	903	4	0.4%	0.0%	907	10	1.1%	0.0%	917
Derwood	16,942	1,088	6.4%	3.5%	18,030	3,332	18.5%	2.0%	21,362
Fairland/White Oak	25,082	4,100	16.3%	13.2%	29,182	9,497	32.5%	5.8%	38,679
Friendship Heights	8,100	518	6.4%	1.7%	8,618	2,221	25.8%	1.3%	10,839
Gaithersburg City	49,926	3,640	7.3%	11.7%	53,566	33,446	62.4%	20.3%	87,012
Germantown East	6,797	2,021	29.7%	6.5%	8,818	8,927	101.2%	5.4%	17,745
Germantown Town Center	3,343	656	19.6%	2.1%	3,999	3,285	82.1%	2.0%	7,284
Germantown West	9,049	1,564	17.3%	5.0%	10,613	9,997	94.2%	6.1%	20,610
Glenmont	570	64	11.2%	0.2%	634	84	13.2%	0.1%	718
Goshen	1,037	(5)	-0.5%	0.0%	1,032	6	0.6%	0.0%	1,038
Grosvenor	607	(19)	-3.1%	-0.1%	588	3	0.5%	0.0%	591
Kensington/Wheaton	14,223	(180)	-1.3%	-0.6%	14,043	117	0.8%	0.1%	14,160
Montgomery Village/Airpark	12,668	72	0.6%	0.2%	12,740	2,960	23.2%	1.8%	15,700
North Bethesda	52,250	(497)	-1.0%	-1.6%	51,753	12,230	23.6%	7.4%	63,983
North Potomac	1,441	4	0.3%	0.0%	1,445	105	7.3%	0.1%	1,550
Olney	5,393	296	5.5%	1.0%	5,689	331	5.8%	0.2%	6,020
Patuxent	2,605	15	0.6%	0.0%	2,620	510	19.5%	0.3%	3,130
Poolesville	1,744	31	1.8%	0.1%	1,775	3	0.2%	0.0%	1,778
Potomac	12,234	(151)	-1.2%	-0.5%	12,083	2,836	23.5%	1.7%	14,919
R & D Village	15,855	4,429	27.9%	14.2%	20,284	16,551	81.6%	10.1%	36,835
Rock Creek	1,898	(47)	-2.5%	-0.2%	1,851	25	1.4%	0.0%	1,876
Rockville City	72,102	5,492	7.6%	17.7%	77,594	23,083	29.7%	14.0%	100,677
Shady Grove	2,850	4	0.1%	0.0%	2,854	2,618	91.7%	1.6%	5,472
Silver Spring CBD	28,750	1,808	6.3%	5.8%	30,558	2,529	8.3%	1.5%	33,087
Silver Spring/Takoma Park	15,976	(420)	-2.6%	-1.4%	15,556	(643)	-4.1%	-0.4%	14,913
Twinbrook	9,142	1,121	12.3%	3.6%	10,263	804	7.8%	0.5%	11,067
Wheaton CBD	8,545	497	5.8%	1.6%	9,042	915	10.1%	0.6%	9,957
White Flint	6,113	(15)	-0.2%	0.0%	6,098	7,313	119.9%	4.4%	13,411
Montgomery County Total	474,300	31,100	6.6%	100.0%	505,400	164,600	32.6%	100.0%	670,000

Source: Montgomery County Planning Department, Research and Technology Center, April 2009

Households

The County's households grew by 34,500 between 2000 and 2009, an increase of 10.6 percent (Table 2). This is slower than the County's pace of household growth in the 1990s when households grew by 42,300 an increase of 15 percent. The County's annual household growth rate this decade is 1.1 percent per year, compared to an annual growth rate of 1.4 percent during the 1990s. Figure 3 shows the County's 2009 household density per acre by traffic zone. The colors and heights of the traffic zone shapes depict the density of the County's households in 2009, not the actual number of households in the traffic zones.

Between 2009 and 2030 the County's Round 7.2 forecast shows an increase of 80,900 households an increase of 22.5 percent. County's annual household growth rate during this period would be 1.0 percent per year slightly lower than the current annual growth rate.

In 2005, 6.5 percent of the County's households were in the City of Rockville (22,500). During the Round 7.2 forecast period, Rockville slightly increases its relative share of the County's households. In 2030, Rockville has 30,800 households, 7.0 percent of the County total.

In 2005, Gaithersburg had 21,700 households, 6.2 percent of the County total. By 2030, Gaithersburg expects to have 33,900 households, increasing its share of the County's households to 7.7 percent.

Between 2000 and 2009, five Policy Areas scattered around the County had over half of the County's household growth. Rockville City had the most growth 6,500 households, 19 percent of the County's household growth. Germantown West ranked second growing by 3,300 households (10 percent) followed by Clarksburg +3,200 households (9 percent), Gaithersburg City +2,700 households (8 percent), and Fairland/White Oak +2,200 households (6 percent). Between 2000 and 2009, Clarksburg had the highest rate of household growth, increasing by 417 percent. The Metro Station Policy Areas combined grew by 4,800 households, an increase of 23 percent, and they represent 14 percent of the County's projected household growth.

Between 2009 and 2030, of all the Policy Areas, Gaithersburg City and Clarksburg are projected to grow the most. Gaithersburg City is projected to grow by 9,900 households, 12 percent of the County's growth, and Clarksburg is projected to grow by 9,200 households, 11 percent of the County's growth. The Rockville City Policy Area is projected to have the third highest growth 6,400 households, 8 percent of the County's growth, followed by the Silver Spring CBD +6,200 households (8 percent), R&D Village +5,900 households (7 percent), Shady Grove +5,200 households (6 percent), and North Bethesda +5,100 jobs (6 percent). These seven Policy Areas are projected to have almost 60 percent of the County's household growth. The Metro Station Policy Areas are projected to grow by 26,600 households, an increase of 102 percent, and they

represent 33 percent of the County's projected household growth. Figure 4 shows the changes in household density from 2009 to 2030. The colors and heights of the traffic zone shapes depict the density of the County's household growth, not the actual change in the number of households between 2009 and 2030 in the traffic zones.

Table2

Montgomery County Household Growth by Policy Area

Round 7.2 Cooperative Household Forecast

Policy Area	2000 Households	2000 to 2009 Household Growth	% Change	% of County Growth	2009 Households	2009 to 2030 Household Growth	% Change	% of County Growth	2030 Households
Aspen Hill	23,742	1,122	4.7%	3.2%	24,864	130	0.5%	0.2%	24,994
Bethesda CBD	5,841	1,320	22.6%	3.8%	7,161	3,970	55.4%	4.9%	11,131
Bethesda/Chevy Chase	27,693	1,409	5.1%	4.1%	29,102	193	0.7%	0.2%	29,295
Clarksburg	757	3,155	416.8%	9.1%	3,912	9,206	235.3%	11.4%	13,118
Cloverly	5,207	273	5.2%	0.8%	5,480	72	1.3%	0.1%	5,552
Damascus	3,281	431	13.1%	1.2%	3,712	1,120	30.2%	1.4%	4,832
Darnestown/Travilah	3,306	508	15.4%	1.5%	3,814	210	5.5%	0.3%	4,024
Derwood	5,587	107	1.9%	0.3%	5,694	587	10.3%	0.7%	6,281
Fairland/White Oak	26,278	2,174	8.3%	6.3%	28,452	452	1.6%	0.6%	28,904
Friendship Heights	3,325	30	0.9%	0.1%	3,355	903	26.9%	1.1%	4,258
Gaithersburg City	20,520	2,730	13.3%	7.9%	23,250	9,933	42.7%	12.3%	33,183
Germantown East	7,196	820	11.4%	2.4%	8,016	1,795	22.4%	2.2%	9,811
Germantown Town Center	131	850	648.9%	2.5%	981	1,375	140.2%	1.7%	2,356
Germantown West	18,022	3,328	18.5%	9.6%	21,350	4,703	22.0%	5.8%	26,053
Glenmont	1,067	3	0.3%	0.0%	1,070	900	84.1%	1.1%	1,970
Goshen	4,891	421	8.6%	1.2%	5,312	256	4.8%	0.3%	5,568
Grosvenor	2,682	967	36.1%	2.8%	3,649	965	26.4%	1.2%	4,614
Kensington/Wheaton	32,101	447	1.4%	1.3%	32,548	1,238	3.8%	1.5%	33,786
Montgomery Village/Airpark	18,337	427	2.3%	1.2%	18,764	76	0.4%	0.1%	18,840
North Bethesda	13,792	762	5.5%	2.2%	14,554	5,069	34.8%	6.3%	19,623
North Potomac	8,534	472	5.5%	1.4%	9,006	1,355	15.0%	1.7%	10,361
Olney	10,725	646	6.0%	1.9%	11,371	1,697	14.9%	2.1%	13,068
Patuxent	2,969	661	22.3%	1.9%	3,630	294	8.1%	0.4%	3,924
Poolesville	2,925	164	5.6%	0.5%	3,089	442	14.3%	0.5%	3,531
Potomac	16,457	773	4.7%	2.2%	17,230	606	3.5%	0.7%	17,836
R & D Village	2,603	953	36.6%	2.8%	3,556	5,911	166.2%	7.3%	9,467
Rock Creek	1,844	414	22.5%	1.2%	2,258	422	18.7%	0.5%	2,680
Rockville City	17,193	6,479	37.7%	18.8%	23,672	6,430	27.2%	7.9%	30,102
Shady Grove	347	3	0.9%	0.0%	350	5,214	1489.7%	6.4%	5,564
Silver Spring CBD	5,187	1,092	21.1%	3.2%	6,279	6,170	98.3%	7.6%	12,449
Silver Spring/Takoma Park	29,073	172	0.6%	0.5%	29,245	698	2.4%	0.9%	29,943
Twinbrook	3	0	0.0%	0.0%	3	2,549	84966.7%	3.2%	2,552
Wheaton CBD	1,993	475	23.8%	1.4%	2,468	1,841	74.6%	2.3%	4,309
White Flint	956	947	99.1%	2.7%	1,903	4,118	216.4%	5.1%	6,021
Montgomery County	324,565	34,535	10.6%	100.0%	359,100	80,900	22.5%	100.0%	440,000

Source: Montgomery County Planning Department, Research and Technology Center, April 2009

Population in Households

The County's population living in households increased from 863,900 in 2000 to 945,200 in 2009, an increase of 81,300 about 9 percent (Table 3). The average annual growth rate was 1 percent per year, slower than the average annual growth rate of 1.4 percent that occurred during the 1990s.

The County's Round 7.2 forecast shows the household population reaching slightly over 1.1 million by 2030. Between 2009 and 2030, the County's household population is projected to grow by 177,100 an increase of almost 19 percent. County's annual growth rate during this period would be 0.8 percent per year slightly lower than the current annual growth rate of 1 percent per year.

Four of the County's Policy Areas grew by more than 10,000 people between 2000 and 2009. Rockville City's household population grew the most increasing by 13,000 16 percent of the County's growth. Germantown West grew by 11,500 14 percent of the County's growth, Bethesda/Chevy Chase grew by 11,100 almost 14 percent of the County's growth and Clarksburg grew by 10,100 12 percent of the County's growth.

Between 2000 and 2009 three Policy areas have growth rates over 100 percent: the Germantown Town Center's population increased by 1,500 an increase of 566 percent, Clarksburg's population increased by 10,100 an increase of 472 percent, and White Flint's population increased by 2,200 an increase of 136 percent.

Between 2000 and 2009 five Policy Areas showed population declines. Kensington/Wheaton's population dropped by almost 6,000 a decrease of 6.5 percent, Silver Spring/Takoma Park's population dropped by about 1,000 a decrease of 1.4 percent, North Potomac's and Montgomery Village/Airpark's populations dropped by about 900 decreases of 3.3 percent and 1.8 percent respectively, and Derwood's population dropped by about 140 a decrease of 0.8 percent. These five Policy Areas also had low household growth during this period, combined they had 4.7 percent of the County's household growth.

The Round 7.2 population in households forecast shows two Policy Areas growing the most between 2009 and 2030. Clarksburg's population is projected to grow by 25,000 an increase of 204 percent and Gaithersburg City's population is projected to grow by 24,500 an increase of 41 percent. Each of these Policy Areas will have about 14 percent of the County's household population growth. No other Policy Area has more than 8 percent of the County's population growth. Five Policy Areas are each projected to have between about 7 to 8 percent of the County's population growth. Rockville City's population will grow by 13,600 an increase of 23 percent and have 8 percent of the County's population growth. Each of the following Policy

Areas will have about 7 percent of the County's population growth: the R & D Village's population grows by 12,800 an increase of 177 percent, the Silver Spring CBD's population grows by 12,600 (+105 percent), North Bethesda's population grows by 12,000 (+32 percent), and Shady Grove's population grows by 11,900 (+1,445 percent). Along with Shady Grove, two other Policy Areas are emerging areas of population growth. White Flint's population grows by 9,900 and increase of 262 percent and Twinbrook's population grows from 8 in 2009 to about 5,300 in 2030 an increase of 66,163 percent.

Five Policy Areas show declines in population between 2009 and 2030: Fairland/White Oak's population declines by 2,100 a decrease of 3 percent, North Potomac's population declines by 1,000 a decrease of 4 percent, Darnestown/Travilah's population declines by 400 a decrease of 4 percent, Aspen Hill's population declines by 400 a decrease of less than 1 percent, and Cloverly's population declines by 200 a decrease of 1 percent.

Table3

Montgomery County Household Population Growth by Policy Area

Round 7.2 Cooperative Household Population Forecast

Policy Areas	2000 Population Living In Households	2000 to 2009 Population Growth in Households	% Change	% of County Growth	2009 Population Living In Households	2009 to 2030 Population Growth in Households	% Change	% of County Growth	2030 Population Living In Households
Aspen Hill	59,352	1,347	2.3%	1.7%	60,699	(391)	-0.6%	-0.2%	60,308
Bethesda CBD	9,023	2,540	28.2%	3.1%	11,563	7,683	66.4%	4.3%	19,246
Bethesda/Chevy Chase	70,278	11,137	15.8%	13.7%	81,415	5,032	6.2%	2.8%	86,447
Clarksburg	2,144	10,112	471.6%	12.4%	12,256	25,042	204.3%	14.1%	37,298
Cloverly	15,333	878	5.7%	1.1%	16,211	(219)	-1.4%	-0.1%	15,992
Damascus	9,984	590	5.9%	0.7%	10,574	2,552	24.1%	1.4%	13,126
Darnestown/Travilah	10,564	1,461	13.8%	1.8%	12,025	(428)	-3.6%	-0.2%	11,597
Derwood	17,647	(145)	-0.8%	-0.2%	17,502	1,448	8.3%	0.8%	18,950
Fairland/White Oak	70,685	5,360	7.6%	6.6%	76,045	(2,121)	-2.8%	-1.2%	73,924
Friendship Heights	5,058	207	4.1%	0.3%	5,265	1,905	36.2%	1.1%	7,170
Gaithersburg City	53,154	6,882	12.9%	8.5%	60,036	24,493	40.8%	13.8%	84,529
Germantown East	20,567	2,606	12.7%	3.2%	23,173	1,559	6.7%	0.9%	24,732
Germantown Town Center	271	1,535	566.4%	1.9%	1,806	2,629	145.6%	1.5%	4,435
Germantown West	47,817	11,455	24.0%	14.1%	59,272	9,024	15.2%	5.1%	68,296
Glenmont	2,579	92	3.6%	0.1%	2,671	2,399	89.8%	1.4%	5,070
Goshen	14,949	1,118	7.5%	1.4%	16,067	156	1.0%	0.1%	16,223
Grosvenor	4,467	1,815	40.6%	2.2%	6,282	3,279	52.2%	1.9%	9,561
Kensington/Wheaton	91,341	(5,960)	-6.5%	-7.3%	85,381	4,526	5.3%	2.6%	89,907
Montgomery Village/Airpark	51,771	(910)	-1.8%	-1.1%	50,861	1,214	2.4%	0.7%	52,075
North Bethesda	32,415	4,584	14.1%	5.6%	36,999	11,953	32.3%	6.7%	48,952
North Potomac	28,294	(920)	-3.3%	-1.1%	27,374	(1,013)	-3.7%	-0.6%	26,361
Olney	32,022	980	3.1%	1.2%	33,002	2,542	7.7%	1.4%	35,544
Patuxent	8,943	1,555	17.4%	1.9%	10,498	439	4.2%	0.2%	10,937
Poolesville	8,565	351	4.1%	0.4%	8,916	1,398	15.7%	0.8%	10,314
Potomac	46,801	1,913	4.1%	2.4%	48,714	208	0.4%	0.1%	48,922
R & D Village	5,821	1,383	23.8%	1.7%	7,204	12,759	177.1%	7.2%	19,963
Rock Creek	5,967	1,572	26.3%	1.9%	7,539	382	5.1%	0.2%	7,921
Rockville City	45,746	13,020	28.5%	16.0%	58,766	13,563	23.1%	7.7%	72,329
Shady Grove	614	212	34.5%	0.3%	826	11,936	1445.0%	6.7%	12,762
Silver Spring CBD	8,878	3,174	35.8%	3.9%	12,052	12,607	104.6%	7.1%	24,659
Silver Spring/Takoma Park	76,219	(1,039)	-1.4%	-1.3%	75,180	676	0.9%	0.4%	75,856
Twinbrook	8	0	0.0%	0.0%	8	5,293	66162.5%	3.0%	5,301
Wheaton CBD	5,023	193	3.8%	0.2%	5,216	4,627	88.7%	2.6%	9,843
White Flint	1,610	2,192	136.1%	2.7%	3,802	9,948	261.7%	5.6%	13,750
Montgomery County Total	863,910	81,290	9.4%	100.0%	945,200	177,100	18.7%	100.0%	1,122,300

Source: Montgomery County Planning Department, Research and Technology Center, April 2009

Development Pipeline

The Planning Department maintains Montgomery County's commercial and residential development pipelines. The pipelines include commercial and residential projects that have been approved for development but not yet built. In the commercial pipeline, the gross floor area approved is converted into a job potential for the development.

Commercial Pipeline

There are 33 million square feet of commercial space remaining to be built in the March 2009 commercial pipeline (Table 4). This represents the equivalent of about 111,600 jobs. If the pipeline would be built to capacity, these jobs would represent about 68 percent of the Round 7.2 job growth forecast between 2009 and 2030, or the jobs remaining in the commercial pipeline would fill the County's job growth to between the years 2023 and 2024.

The Round 7.2 forecasts are not only based on the current remaining pipeline but include the potential growth in adopted and proposed master plans and sector plans. Much of the potential development in these plans has not yet entered the pipeline of approved development. Most of the development potential in the adopted Shady Grove and Twinbrook sector plans has not entered the pipeline. None of the proposed new development potential in plans currently in process (Gaithersburg West, Germantown, and White Flint) has entered the pipeline. The potential new development in all these plans is considered in the Round 7.2 forecasts. The current commercial pipeline is not built to capacity by 2030 in the Round 7.2 forecast.

Housing Pipeline

There are 29,000 housing units remaining to be built in the February 2009 pipeline, 9,600 single-family units and 19,400 multi-family units (Table 5). Based on the Round 7.2 2009 to 2030 household growth forecast, the pipeline units represent about 58 percent of the single-family growth, 30 percent of the multi-family growth and 36 percent of the total household growth. The 29,000 housing units in the pipeline would fill the County's projected household growth from 2009 to between 2015 and 2016.

Table 4

Pipeline of Approved Commercial Development by Policy Area

Montgomery County, Maryland

as of: March 27, 2009

Policy Area	Square Feet		Estimated Job Capacity			Estimated Job Capacity, Remaining Development			
	Approved	Remaining	Approved	Remaining	% of Remaining	Office	Retail	Industrial	Other
Aspen Hill	62,986	62,986	80	80	0.1%	75	0	5	0
Bethesda Central Business District	500,004	500,004	958	957	0.9%	351	411	0	195
Bethesda/Chevy Chase	299,023	299,023	1,006	1,006	0.9%	721	285	0	0
Clarksburg	3,979,220	3,442,359	12,738	10,590	9.5%	9,195	1,395	0	0
Cloverly	223,148	106,172	17	16	0.0%	6	0	0	11
Damascus	3,162	3,162	13	13	0.0%	13	0	0	0
Derwood	424,643	406,793	1,565	1,564	1.4%	1,389	31	144	0
Fairland/White Oak	3,484,613	2,824,247	9,672	7,591	6.8%	4,879	199	128	2,385
Friendship Heights	760,055	760,055	3,033	3,033	2.7%	2,670	197	0	166
Gaithersburg City	4,532,096	3,827,007	15,488	15,488	13.9%	12,030	2,973	226	259
Germantown East	3,105,288	1,945,543	10,679	9,019	8.1%	8,682	274	0	63
Germantown West	1,878,570	1,702,053	7,301	7,226	6.5%	6,926	285	0	15
Germantown Town Center	150,269	145,217	15	15	0.0%	8	7	0	0
Glenmont	8,585	8,585	17	17	0.0%	0	0	0	17
Grosvenor	0	0	0	0	0.0%	0	0	0	0
Kensington/Wheaton	38,904	33,974	77	22	0.0%	14	0	8	0
Montgomery Village/Montgomery Airpark	1,304,211	1,294,711	3,213	3,213	2.9%	1,638	0	1,575	0
North Bethesda	3,473,068	2,164,153	13,740	7,913	7.1%	6,344	947	73	549
North Potomac	40,000	40,000	160	160	0.1%	160	0	0	0
Olney	579,755	579,755	208	207	0.2%	10	20	0	177
Potomac	1,446,480	1,446,480	3,485	3,485	3.1%	1,664	1,514	0	307
Research & Development Villlage	4,237,629	2,531,815	12,457	7,584	6.8%	1,600	0	3,507	2,477
Rockville City	5,628,148	5,166,720	20,197	18,556	16.6%	16,320	694	272	1,271
Shady Grove	6,400	6,400	0	16	0.0%	0	16	0	0
Silver Spring Central Business District	1,644,784	804,826	5,450	5,218	4.7%	3,285	1,629	0	304
Silver Spring/Takoma Park	203,445	183,300	284	283	0.3%	261	21	1	0
Twinbrook	447,914	447,914	1,280	1,280	1.1%	0	0	0	1,280
Wheaton Central Business District	4,000	4,000	10	10	0.0%	0	10	0	0
White Flint	1,684,937	1,603,199	5,895	5,691	5.1%	4,592	1,098	0	1
Rural	657,568	617,924	1,313	1,312	1.2%	216	954	1	141
Montgomery County Total	**40,808,905**	**32,958,377**	**130,349**	**111,565**		**83,049**	**12,960**	**5,940**	**9,618**
County (not including Gaithersburg & Rockville)	**30,648,661**	**23,964,650**	**94,663**	**77,521**	69.5%	**54,699**	**9,293**	**5,442**	**8,088**

Source: Montgomery County Planning Department, Research and Technology Center, April 2009

Table 5

Pipeline of Approved Residential Development by Policy Area

Montgomery County, Maryland

as of: February 28, 2009

Policy Areas	Approved Unit Type				Remaining to be Built Unit Type			
	Single-family Detached	Townhouse	Multi-Family	Total Units	Single-family Detached	Townhouse	Multi-Family	Total Units
Aspen Hill	92	54	46	**192**	62	48	46	**156**
Bethesda CBD	8	12	1,277	**1,297**	8	12	1,277	**1,297**
Bethesda/Chevy Chase	34	39	0	**73**	27	17	0	**44**
Clarksburg	2,945	2,627	2,621	**8,193**	1,722	1,379	1,701	**4,802**
Cloverly	70	0	0	**70**	58	0	0	**58**
Damascus	64	52	0	**116**	63	52	0	**115**
Derwood	206	256	196	**658**	206	256	196	**658**
Fairland/White Oak	98	386	0	**484**	75	258	0	**333**
Friendship Heights	0	200	733	**933**	0	200	733	**933**
Gaithersburg City	341	1,220	4,609	**6,170**	341	1,220	4,833	**6,394**
Germantown East	7	147	0	**154**	3	119	0	**122**
Germantown Town Center	0	0	604	**604**	0	0	162	**162**
Germantown West	438	225	300	**963**	215	170	179	**564**
Glenmont	0	0	0	**0**	0	0	0	**0**
Grosvenor	0	112	0	**112**	0	112	0	**112**
Kensington/Wheaton	517	446	45	**1,008**	513	440	27	**980**
Montgomery Village/Airpark	22	0	0	**22**	21	0	0	**21**
North Bethesda	10	0	1,250	**1,260**	10	0	860	**870**
North Potomac	66	85	0	**151**	53	61	0	**114**
Olney	179	103	241	**523**	141	103	141	**385**
Potomac	207	165	547	**919**	111	38	467	**616**
R & D Village	4	0	168	**172**	4	0	52	**56**
Rockville City	42	47	3,516	**3,605**	42	17	3,516	**3,575**
Shady Grove	6	36	0	**42**	6	36	0	**42**
Silver Spring CBD	0	0	2,918	**2,918**	0	0	2,918	**2,918**
Silver Spring/Takoma Park	23	121	169	**313**	22	90	169	**281**
Twinbrook	0	0	0	**0**	0	0	0	**0**
Wheaton CBD	0	0	180	**180**	0	0	180	**180**
White Flint	1	0	1,973	**1,974**	1	0	1,973	**1,974**
Rural	1,312	109	0	**1,420**	1,125	103	0	**1,228**
Montgomery County Total	**6,692**	**6,442**	**21,393**	**34,526**	**4,829**	**4,731**	**19,430**	**28,990**

Source: Montgomery County Planning Department, Research and Technology Center, April 2009

Figure 1

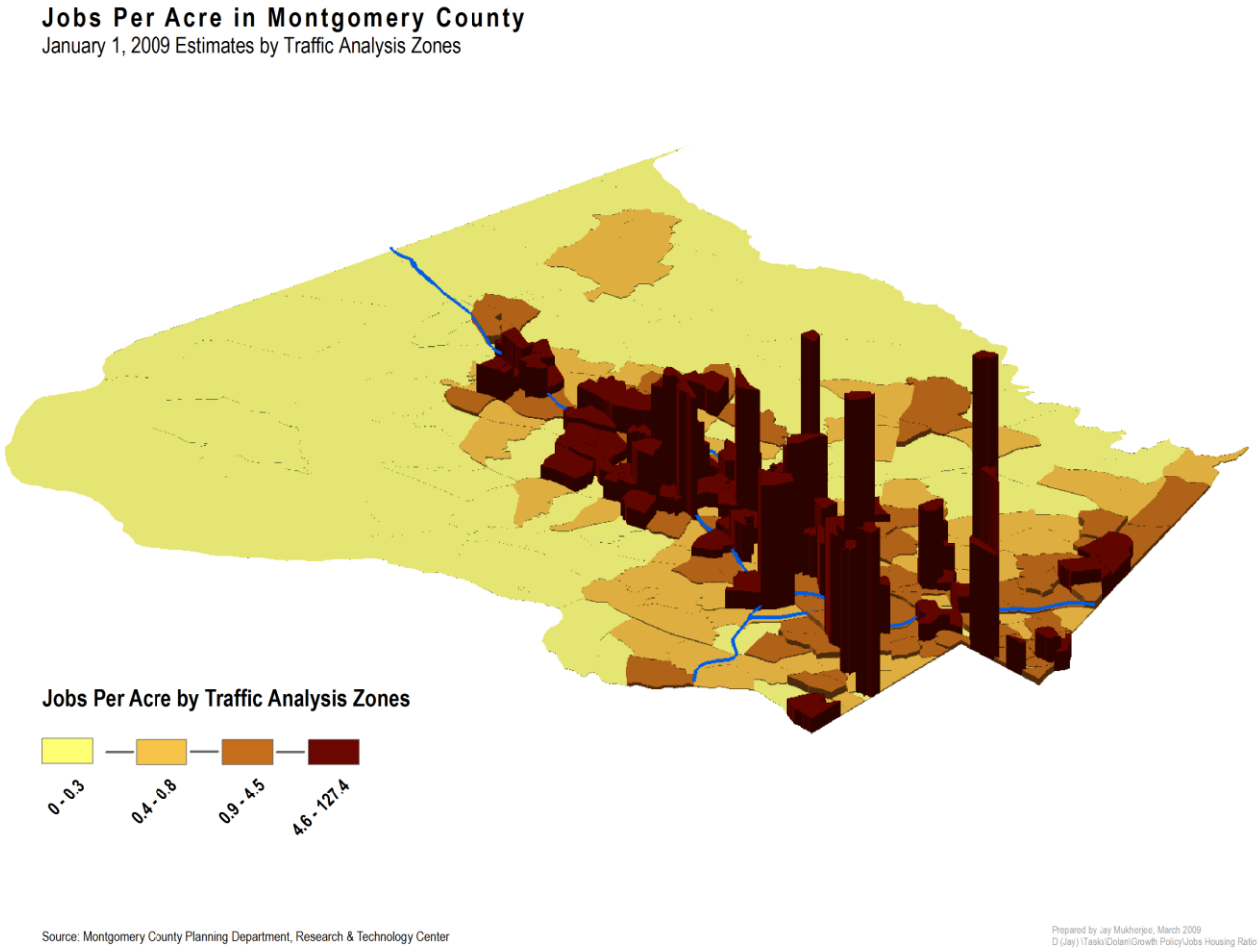
Jobs Per Acre in Montgomery County
January 1, 2009 Estimates by Traffic Analysis Zones
Jobs Per Acre by Traffic Analysis Zones
0 - 0.3
0.4 - 0.8
0.9 - 4.5
4.6 - 127.4
Source: Montgomery County Planning Department, Research & Technology Center
Prepared by Jay Mukherjee, March 2009
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Figure 2

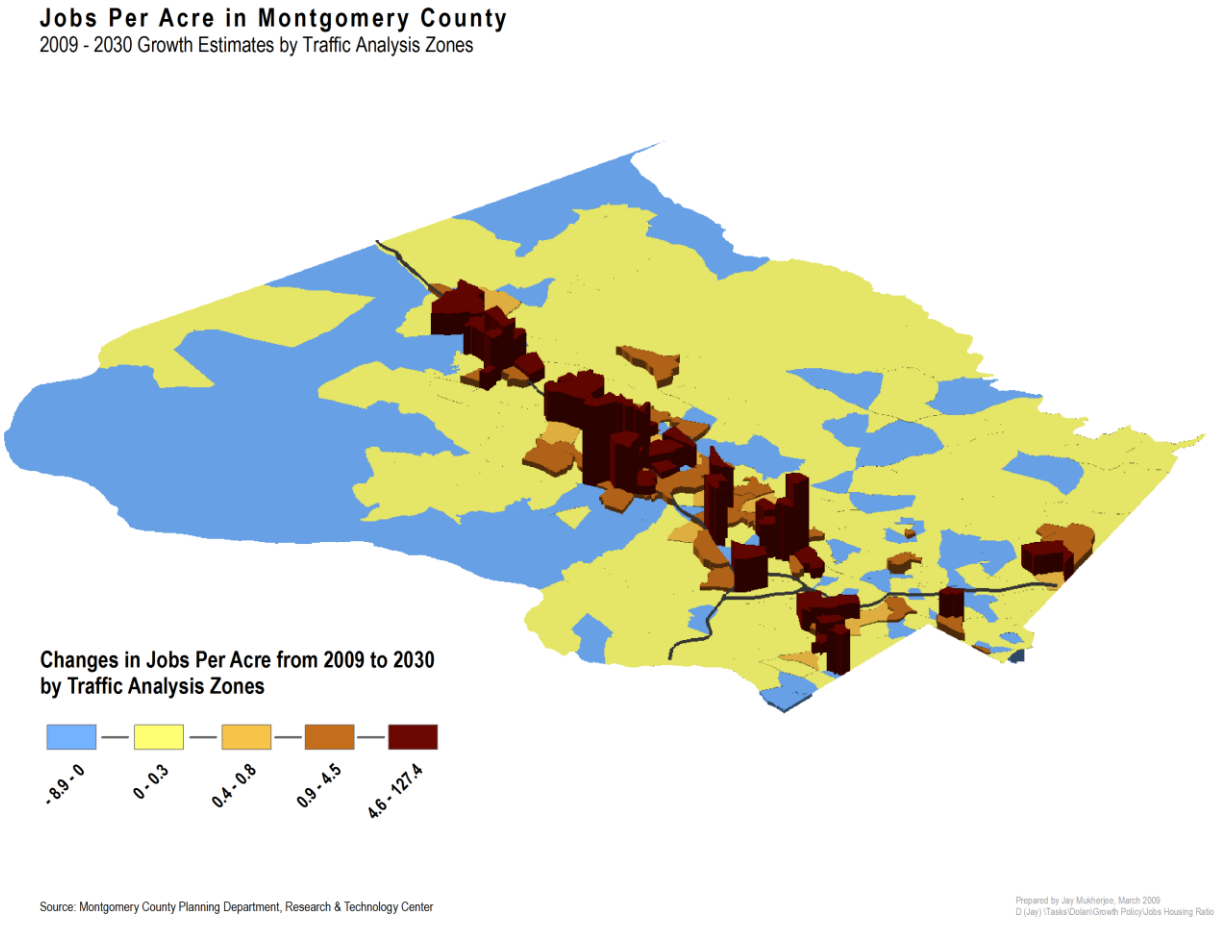
Jobs Per Acre in Montgomery County
2009 - 2030 Growth Estimates by Traffic Analysis Zones
Changes in Jobs Per Acre from 2009 to 2030
by Traffic Analysis Zones
- 8.9 - 0
0 - 0.3
0.4 - 0.8
0.9 - 4.5
4.6 - 127.4
Source: Montgomery County Planning Department, Research & Technology Center
Prepared by Jay Mukherjee, March 2009
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Figure 3

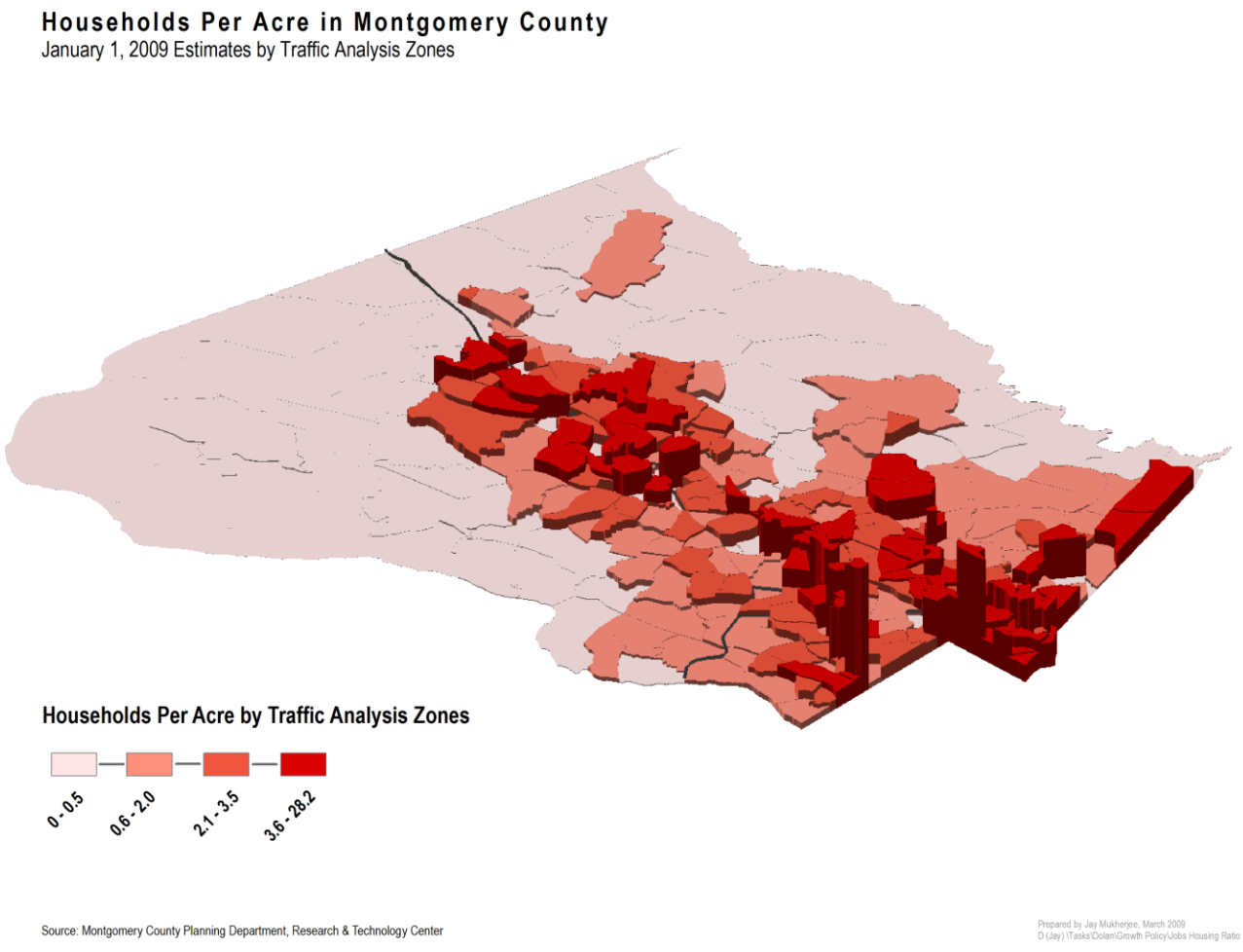
Households Per Acre in Montgomery County
January 1, 2009 Estimates by Traffic Analysis Zones
Households Per Acre by Traffic Analysis Zones
0 - 0.5
0.6 - 2.0
2.1 - 3.5
3.6 - 28.2
Source: Montgomery County Planning Department, Research & Technology Center
Prepared by Jay Mukherjee, March 2009
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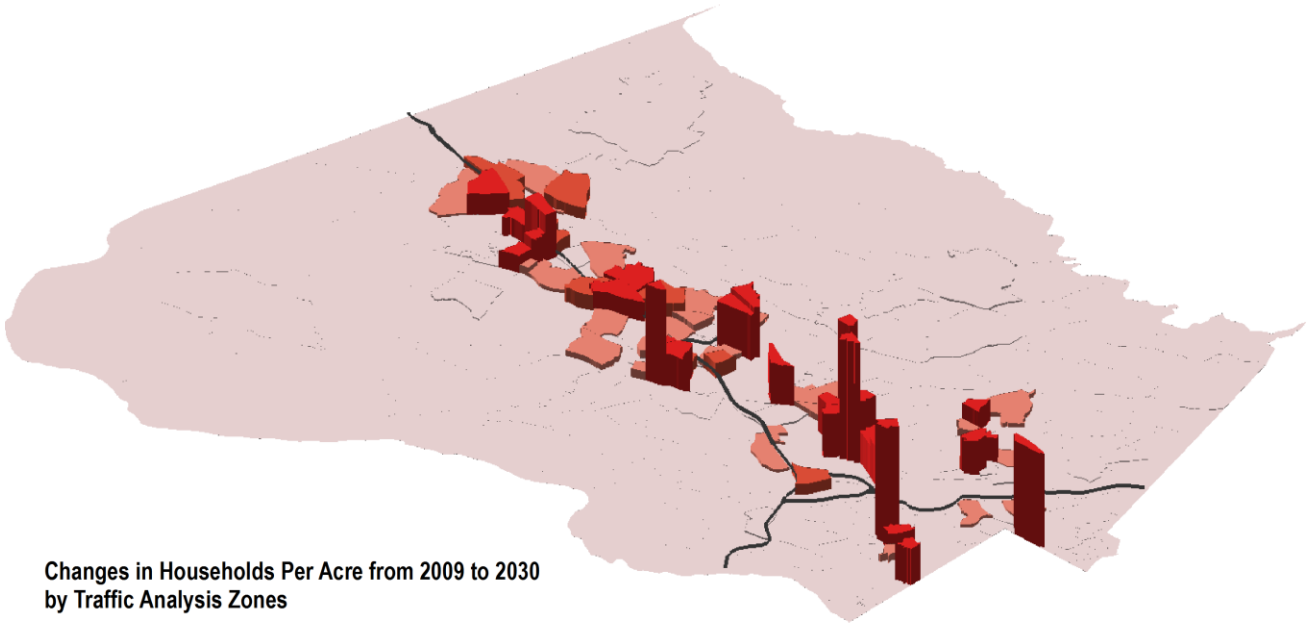
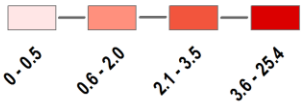
Figure 4

Households Per Acre in Montgomery County
2009 - 2030 Growth Estimates by Traffic Analysis Zones



Changes in Households Per Acre from 2009 to 2030 by Traffic Analysis Zones



Source: Montgomery County Planning Department, Research & Technology Center

Prepared by Jay Mukherjee, March 2009
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Past and Projected Growth

The County's 1990 to 2008 non-residential construction growth and housing growth will be compared to the 2009 to 2030 Round 7.2 forecasted job and household growth.

Non-residential/Jobs

Between 1990 and 2008, 46.3 million square feet of non-residential space was built in Montgomery County (Table 5). Seventy five percent of this space, 34.8 million square feet, was built in the I-270 corridor and 11.5 million square feet was built in the remainder of the County. Twenty percent of the non-residential space was built in the Metro Station Policy Areas, 9.3 million square feet.

Between 2009 and 2030, we are forecasting 88 percent of the County's job growth in the I-270 corridor, about 144,700 jobs. During the same period, the Metro Station Policy Areas are expected to have about 12 percent of the County's job growth, about 19,200 jobs.

Housing Units/Households

About 71,500 housing units were built in the County between 1990 and 2008, 66 percent were single-family units and 44 percent were multi-family units (Table 6). The I-270 Corridor had about 61 percent of the new housing construction, 43,300 units, 56 percent of the new single-family units and about 70 percent of the new multi-family units. Metro Station Policy Areas accounted for about 10 percent of the new housing construction, 7,200 units.

Between 2009 and 2030, we are forecasting 80,900 more households. About 77 percent of this household growth, 62,400, is in the I-270 Corridor. Much of this growth will be in Clarksburg, the Cities of Gaithersburg and Rockville, and the two new growth areas for housing Shady Grove and the R & D Village. About 33 percent of the County's household growth is in Metro Station Policy Areas.

Table 5

Estimate of the Square Footage of Non-residential Gross Floor Area Built 1990-2008 in Montgomery County by Policy Area

Policy Area	Total Sq. Ft.	% of Total Sq. Ft.
Aspen Hill	260,502	0.6%
Bethesda CBD	2,864,177	6.2%
Bethesda/Chevy Chase	421,732	0.9%
Clarksburg	1,502,485	3.2%
Cloverly	397,166	0.9%
Damascus	220,260	0.5%
Darnestown/Travilah	119,142	0.3%
Derwood	1,828,089	3.9%
Fairland/White Oak	1,855,625	4.0%
Friendship Heights	361,138	0.8%
Gaithersburg City	7,369,447	15.9%
Germantown East	2,274,192	4.9%
Germantown Town Center	737,364	1.6%
Germantown West	2,226,470	4.8%
Glenmont	63,402	0.1%
Goshen	175,736	0.4%
Grosvenor	191,652	0.4%
Kensington/Wheaton	369,240	0.8%
Montgomery Village/Airpark	1,204,179	2.6%
North Bethesda	3,357,504	7.2%
North Potomac	144,571	0.3%
Olney	596,383	1.3%
Patuxent	344,124	0.7%
Poolesville	203,172	0.4%
Potomac	571,960	1.2%
R & D Village	4,014,405	8.7%
Rock Creek	258,716	0.6%
Rockville City	6,252,312	13.5%
Shady Grove	390,075	0.8%
Silver Spring CBD	3,182,082	6.9%
Silver Spring/Takoma Park	336,269	0.7%
Twinbrook	695,394	1.5%
Wheaton CBD	577,957	1.2%
White Flint	983,474	2.1%
Total Sq. Ft.	46,350,396	100.0%

Table 6

Housing Units Built Between 1990 and 2008 in Montgomery County by Policy Area

Policy Area	Single-Family	Multi-Family	Total Units	% of Single-Family	% of Multi-Family	% of Total Units
Aspen Hill	987	2,413	3,400	2.1%	10.0%	4.8%
Bethesda CBD	73	1,706	1,779	0.2%	7.1%	2.5%
Bethesda/Chevy Chase	2,263	172	2,435	4.8%	0.7%	3.4%
Clarksburg	3,306	107	3,413	7.0%	0.4%	4.8%
Cloverly	717	0	717	1.5%	0.0%	1.0%
Damascus	649	108	757	1.4%	0.4%	1.1%
Darnestown/Travilah	1,422	0	1,422	3.0%	0.0%	2.0%
Derwood	334	0	334	0.7%	0.0%	0.5%
Fairland/White Oak	2,245	1,900	4,145	4.7%	7.9%	5.8%
Friendship Heights	0	379	379	0.0%	1.6%	0.5%
Gaithersburg City	4,161	2,569	6,730	8.8%	10.6%	9.4%
Germantown East	2,956	1,111	4,067	6.2%	4.6%	5.7%
Germantown Town Center	286	904	1,190	0.6%	3.7%	1.7%
Germantown West	6,651	1,588	8,239	14.0%	6.6%	11.5%
Glenmont	3	0	3	0.0%	0.0%	0.0%
Goshen	1,382	0	1,382	2.9%	0.0%	1.9%
Grosvenor	0	473	473	0.0%	2.0%	0.7%
Kensington/Wheaton	910	24	934	1.9%	0.1%	1.3%
Montgomery Village/Airpark	2,251	931	3,182	4.8%	3.9%	4.5%
North Bethesda	676	781	1,457	1.4%	3.2%	2.0%
North Potomac	2,672	25	2,697	5.6%	0.1%	3.8%
Olney	3,051	100	3,151	6.4%	0.4%	4.4%
Patuxent	1,154	133	1,287	2.4%	0.6%	1.8%
Poolesville	760	0	760	1.6%	0.0%	1.1%
Potomac	2,363	228	2,591	5.0%	0.9%	3.6%
R & D Village	831	1,723	2,554	1.8%	7.1%	3.6%
Rock Creek	1,254	0	1,254	2.6%	0.0%	1.8%
Rockville City	2,991	2,581	5,572	6.3%	10.7%	7.8%
Shady Grove	3	0	3	0.0%	0.0%	0.0%
Silver Spring CBD	57	2,178	2,235	0.1%	9.0%	3.1%
Silver Spring/Takoma Park	521	114	635	1.1%	0.5%	0.9%
Twinbrook	0	0	0	0.0%	0.0%	0.0%
Wheaton CBD	413	46	459	0.9%	0.2%	0.6%
White Flint	0	1,863	1,863	0.0%	7.7%	2.6%
County Total	47,342	24,157	71,499	100.0%	100.0%	100.0%

Growth Policy Study: Appendix C – Factors Affecting Demand for Public Facilities in Established Communities (Resolution 16-376 F11)

Lead Staff: Khalid Afzal

Summary:

A list of factors affecting the demand for public facilities has been identified. The Growth Policy staff from the Planning Department has been meeting with the County staff to discuss these and other growth policy topics. Additional factors would be added to the proposed list if deemed appropriate. Staff will continue to monitor these factors in coordination with County agencies and highlight those that need further study in the future growth policy deliberations.

The purpose of this analysis is to identify trends and future needs for public facilities, which could be recommended in future CIPs if the demand reaches a point where it cannot be accommodated through programmatic changes in existing facilities.

Typically, demographic changes would be the greatest driver for generating infrastructure needs in an established community. Neighborhoods go through a cycle of change overtime as older residents move out and new, younger families move in creating new demand for schools, playgrounds and other amenities. An example of this phenomenon occurred in the late 70s and early 80s when many of the County elementary schools we closed due to drop in enrollment. Starting in the early 90s and 2000s, with many of the adjoining neighborhoods where younger families replaced the older population, the county had to look for additional school facilities sometimes going back to the closed schools and refurbishing them as “new” elementary schools. Demographic changes could also generate additional infrastructure needs across multiple facility types such schools, parks and playgrounds, libraries, water and sewer, etc.

Factors that are cyclical in nature typically do not generate demand for new facilities in established neighborhoods. For example, recent downturn in the economy has increased demand for library services. But this is considered cyclical and the demand for increased services can be accommodated within the existing facilities. If, however, this becomes a more sustained trend due to additional factors—population growth, new families in a

neighborhood—it may need further study and may lead to the need for a new facility or expansion of an existing facility.

It appears that such changes occur over a longer period of time giving the County enough time to assess the changing needs and accommodate them in the County's infrastructure improvements through CIP and other funding mechanisms. The County experienced a cultural change with the popularity of soccer which generated demand for soccer fields. The County was able to address that need through building soccer fields as demand rose, including the Germantown soccer complex.

This analysis does not include age of the infrastructure as a factor for the purposes of this exercise since the age of the infrastructure is not related to changes in the socio-economic or physical composition of the community it serves. Older pipes or bridges may needs to be replaced regardless of the population changes or other factors.

The Growth Policy staff from the Planning Department has been meeting with the County staff to discuss these and other growth policy topics. Additional factors would be added to the proposed list if deemed appropriate. Staff will continue to monitor these factors in coordination with County agencies and highlight those that need further study in the future growth policy deliberations.

Chart follows on the next page.

Factors affecting demand for public facilities in established communities (other than new growth through redevelopment)

Factors	Cyclical	Sustained	Demand for public facilities/services											
			Schools	Roads	Transit	Police	Fire	Water	Sewer	Health	Parks	Rec Centers	Solid Waste	Libraries
Demographics														
Population change		x	x	x	x	x	x	x	x	x	x	x	x	x
Aging population		x			x					x		x		
Ethnic mix of population		x	x		x					x	x			
Household size		x	x	x	x			x	x		x	x	x	x
Economic conditions														
Unemployment	x											x		x
Higher gas prices	x	x			x									
Autos per dwelling unit		x		x										
Technological improvements														
Energy star appliances		x						x	x					
High-speed internet		x		x	x									
Changes in standards/regulations		x												
Changes in class size		x	x											
Universal Pre-K		x	x											

Cyclical: up to 10 years Sustained: more than 10 years

An "x" means that a particular factor may change demand for that facility; the change could cause increase or decrease in demand for public services. In many cases, higher demand up to a certain level can be accommodated in existing facilities by programmatic changes, such as extended hours for libraries and recreation centers.

Growth Policy Study: Appendix D – Sustainability Indicators
(Resolution 16-376 F11)

Lead Staff: Mary Dolan

Summary:

The areas of the County where greatest growth is forecast are also those with some of the greatest accessibility to public resources such as parks and transit services. These developed areas also tend to have the least forest cover and the highest percentage of impervious surface. The suburban pattern of the last three decades has produced both a strong pattern of more densely developed areas with good access and services, as well as a massive amount of lower-density development that consumed much land and resources.

On October 1, 2008, the Planning Board and the County Executive delivered a report on potential indicators of Healthy and Sustainable Communities that could be used to help plan and monitor sustainability in Montgomery County in accordance with Resolution 16-376 F11. Following that, the Executive prepared a larger set of indicators to address other areas of interest that:

- Reflect the "Results Areas" highlighted by the Executive in his Transition Report
- Could be benchmarked regionally and/or nationally
- Are collected by a single data source (such as federal agency or national interest group)

The Executive's version of Healthy and Sustainable Communities Indicators includes several measures of health that we did not include in our report:

- Percent of adults with health care coverage
- Infant mortality rate
- Injury-related death rate
- Chlamydia case rate per 100,000
- Percent of adults who are heavy drinkers
- Percent of adults who are current smokers

These measures have not been directly tied to community planning or growth policy and are not discussed in this report. A few other indicators from other "results areas" such as transportation and public safety are included where appropriate. This report focuses on the indicators from both efforts that best help guide the Planning Board in Growth Policy and master planning efforts.

In addition, the state is measuring some indicators related to the Chesapeake Bay through the "Baystat" program. The National Center for Smart Growth Research and Education measures transportation, environment, land preservation and other activities. They are using many of the same indicators that we have chosen as well others that are more appropriate (such as blue crab abundance, mid-channel clarity, bus miles travelled, etc) for statewide programs. Some indicators that are included that may be useful to adapt for Montgomery County (at least countywide) are acreage of land approved for single family homes outside the Priority Funding Area and amount of land protected by easement.

Analysis of Results by Policy Area

All the indicators that had data for different areas across the county were analyzed, to the degree possible, by policy area. The following issues were discovered and should be considered when reviewing the results:

- Year-to-year reporting or even reporting every two years for purposes of the Growth Policy may show little or no change in some indicators, depending on the data source, how often it is collected, and at what scale.

- Data sources are from different years, depending on the most recent data available. Unfortunately, the more detailed census data is available once a decade. Some information is contained in the census updates, but not the full range of variables needed for some indicators.

- Some data sources are based on modeling and estimates, while others have data from aerial photos and more detailed monitoring.

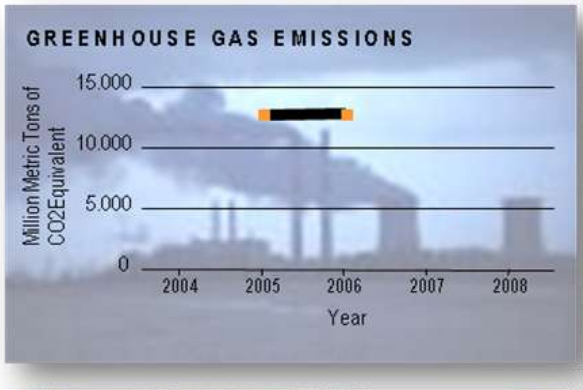
- The Policy Areas are of various sizes and some cover very large and very small areas of the county. This means that indicators are generally factored by area or population in order to get comparative data. In some cases, the data had to be geographically "sliced" to get data by policy area assuming a unified distribution of population or acreage over the underlying geography. For example, data by census block data had to be proportionately allocated to the Policy Areas, when their boundaries were not within one Policy Area.

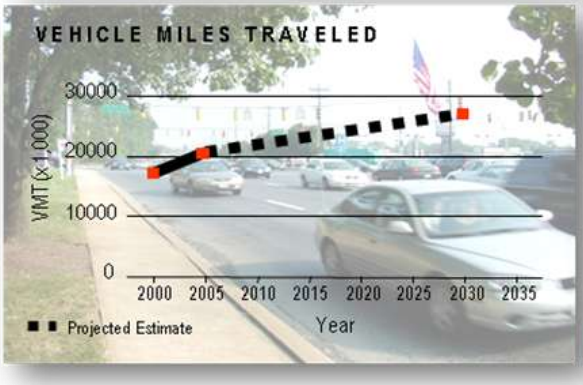
All these considerations mean that general patterns are to be observed, but some anomalies exist either from the processing of the data or the boundaries of the Policy Areas. For instance, the transit station areas are drawn so small, they may have few residences and no parks, but both may be in abundance just over the boundary. Even with these considerations, some patterns emerge that are worth discussing as part of the Growth Policy.

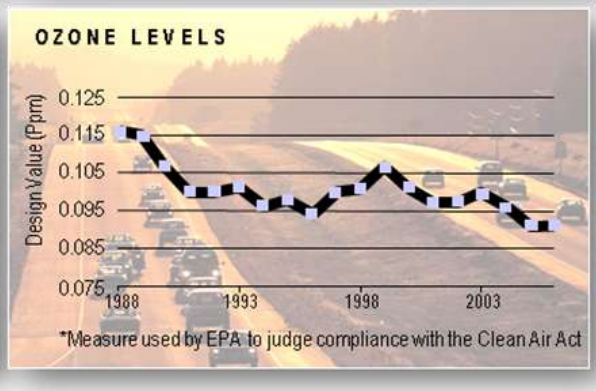
The following report shows the indicators chosen by the Planning Board, related indicators used by the Executive, and those that could be further broken down to show distribution across Policy Areas. Time did not permit detailed analysis, and some breakdowns are not yet available depending on other timelines.

Clean Air and Climate Protection:

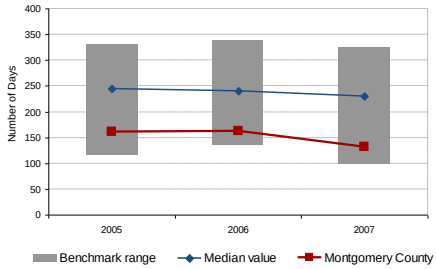
Stop increasing Carbon Emissions by 2010, reduce by 80% by 2050







Number of "good" air quality days
National Benchmark



In 2007, there were 148 "good" air quality days in Montgomery County. The median value was 259 days. Hamilton Co, IN had the lowest value; Monmouth Co, NJ and Nassau Co, NY had the highest value.

Source: Air Quality Index, EPA

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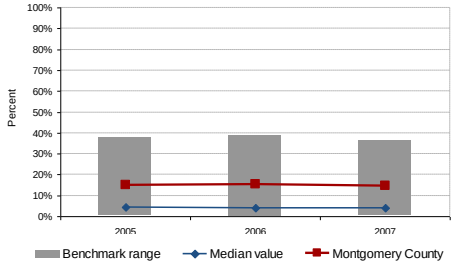
Percent of People Taking Public Transportation to Work
National Benchmark



In 2007, 14.6% residents took public transportation to work in Montgomery County. The median value was 4.2 percent. Hamilton Co., IN had the lowest value, and the District of Columbia had the highest value.

Source: U.S. Census Bureau, American Community Survey

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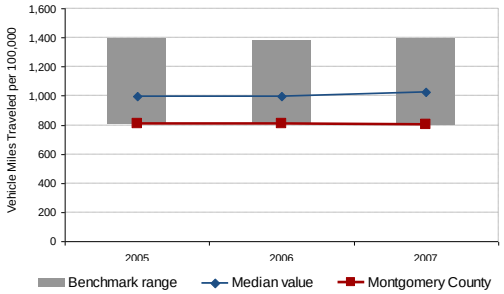
Air Quality has been improving (in terms of ozone) due to improved emission controls for vehicles and power plants, however, at the same time the standards for declaring ozone action days have been tightened. Carbon emissions continue to increase and will continue to rise unless vehicle miles traveled and building energy use remain key factors. Clean air and climate protection are influenced by many factors over which we have little control and are uniform throughout the county. The number of ozone action days or "good air" days is measured across the region and is affected by activities both in and beyond the region. Much of the energy we use is produced outside the region, and while more choices for renewable energy are available to individual, corporate and government users via the grid and on-site energy generation, there is little available data to allow a breakdown on who is using renewable energy sources. Weather also plays a role, increasing conditions that favor the formation of ozone.

Vehicles miles traveled can be measured and influenced through land use planning and zoning. The distribution of vehicle miles traveled (VMT) across the county by Policy Area shows the familiar of more miles travelled by people living in the suburban and rural areas of the county.

Vehicle Miles Traveled (VMT) Per 100,000 Population
Regional Benchmark



In 2007, there were 803 million Vehicle Miles Traveled in Montgomery County. The median value was 1.025 million. Montgomery Co, MD had the lowest value. Howard Co, MD had the highest value.

Source: Maryland State Highway Administration; Virginia Department of Transportation

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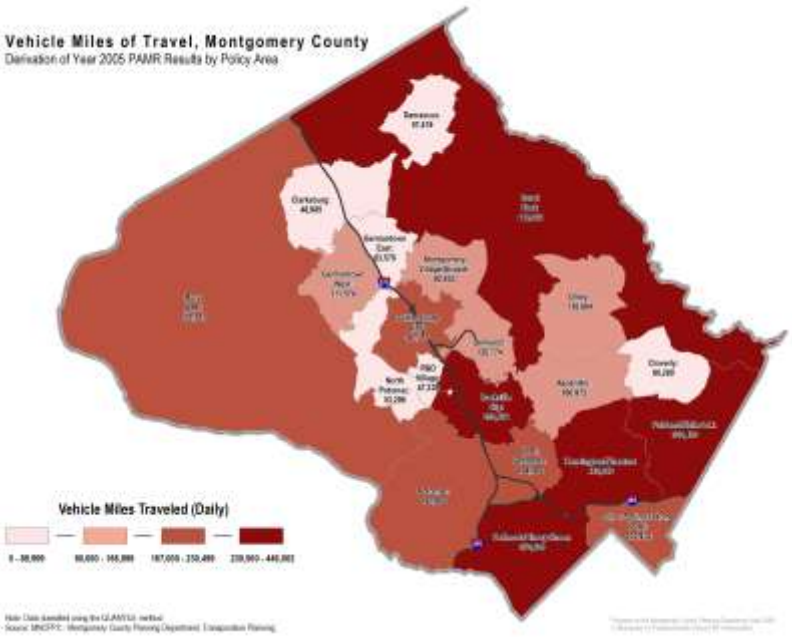
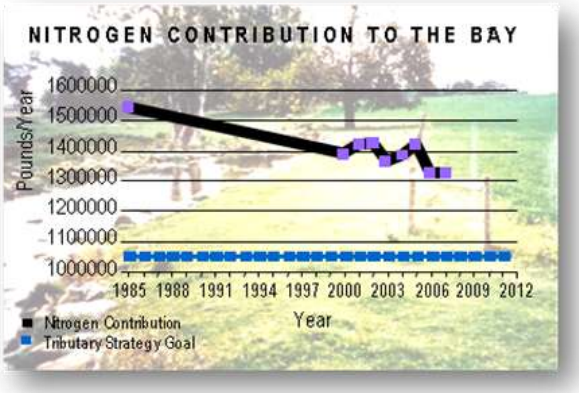
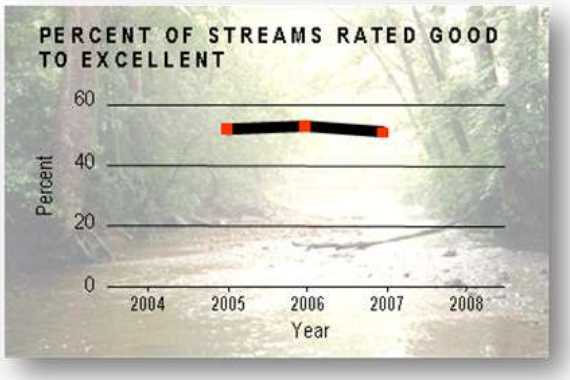
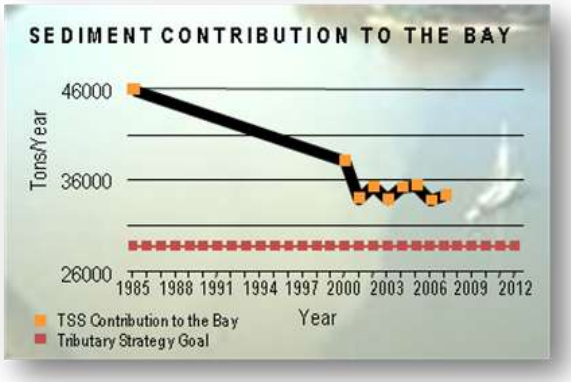


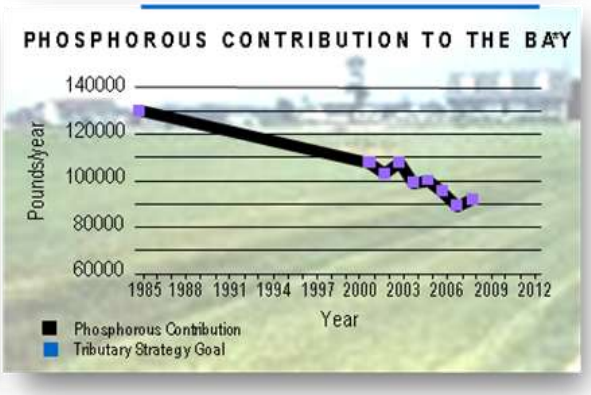
Clean Water:

Protect and improve county water resources and drinking water.







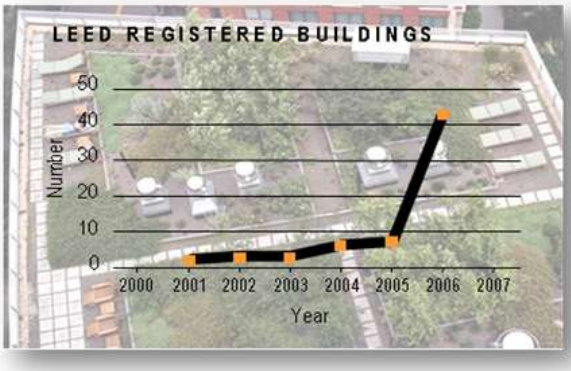


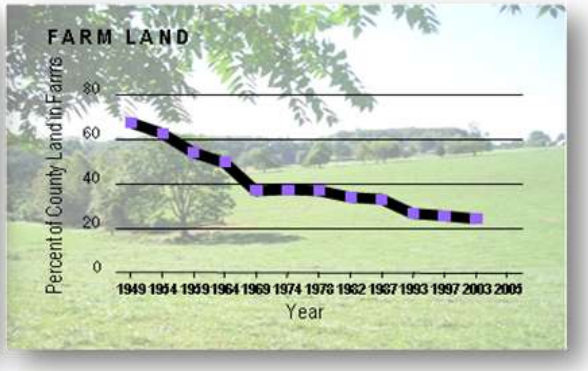
This information is not yet available at the Policy Area level. We are currently analyzing this information by watershed for the Water Resources Element of the General Plan. We also plan to work with the Department of Environmental Protection to develop a numerical measure for local stream quality that could be analyzed by policy area.

The results for nitrogen, sediment, and phosphorous are estimated from the land use factors as determined by the EPA Chesapeake Bay Program model of Bay inputs. Indirect measurement through modeling is likely to continue, although we will be developing more accurate estimates using local data through the Water Resources Element of the General Plan.

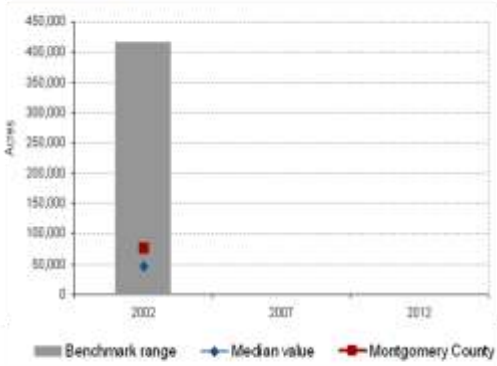
Green Economy:

Foster an economy in which businesses compete to create, produce, distribute, and recycle goods made from recycled or rapidly renewable natural resources.





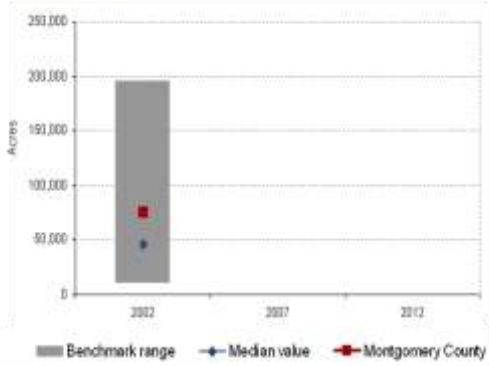
Acres of farmland
National Benchmark



In 2002, there were 75,077 acres of farmland in Montgomery County. The median value was 46,330 acres. Nassau Co, NY had the lowest value; Fort Bend, TX had the highest value.

Source: USDA Agricultural Census; Note: Census is conducted every 5 years

Acres of farmland
Regional Benchmark



In 2002, there were 75,077 acres of farmland in Montgomery County. The median value was 45,462 acres. Fairfax Co, VA had the lowest value; Frederick Co, MD had the highest value.

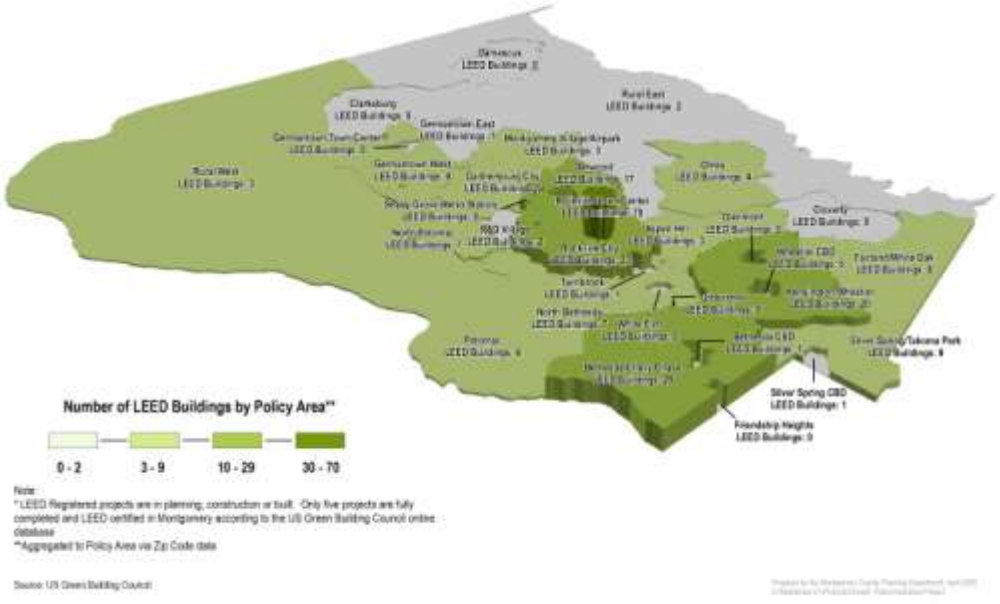
Source: USDA Agricultural Census; Note: Census is conducted every 5 years

While we have good data on farmland and LEED registered buildings, we are far from a good measure of how "green" is our local economy and there is little national guidance as yet on this emerging field.

The Executive has started a certification program that recognizes businesses that conserve resources, prevent pollution and protect environmental and public health. The program is expected to include tiered recognition so that businesses can be certified in a specific environmental category, such as energy conservation, pollution prevention or stormwater management, and then advance to higher levels of certification for more comprehensive actions. As the Executive builds the program, we can track the number of businesses in those categories across the County.

We will continue to explore ways to get better information for to monitor the green economy. The graphic below shows the distribution of green building projects registered with the U.S. Green Building Council. Only five projects have been built and fully certified, two in Silver Spring, two in Gaithersburg and two in Rockville. However the large number of registered projects indicates that many more will be built in the future. Most of the registered projects are in the 355 and Georgia Avenue corridors and in the urban ring.

LEED Registered* Buildings, Montgomery County
2009 Estimates by Policy Areas

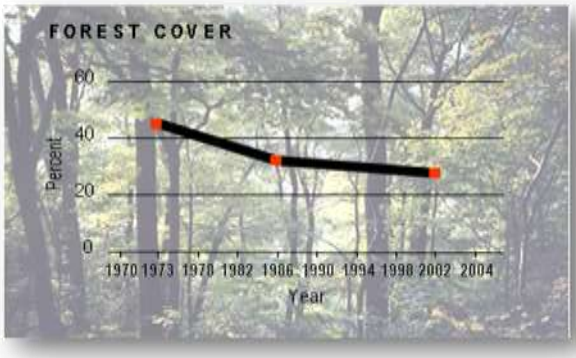


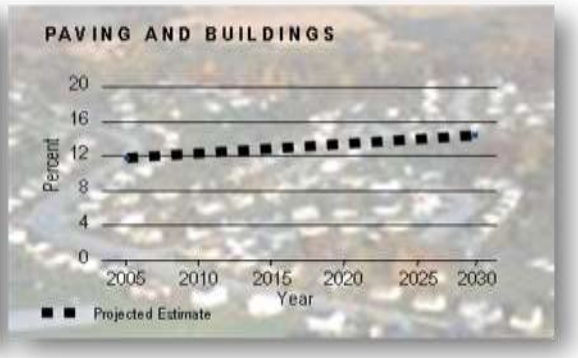
Note
*LEED Registered projects are in planning, construction or built. Only five projects are fully completed and LEED certified in Montgomery according to the US Green Building Council online database
**Aggregated to Policy Area via Zip Code data

Source: US Green Building Council

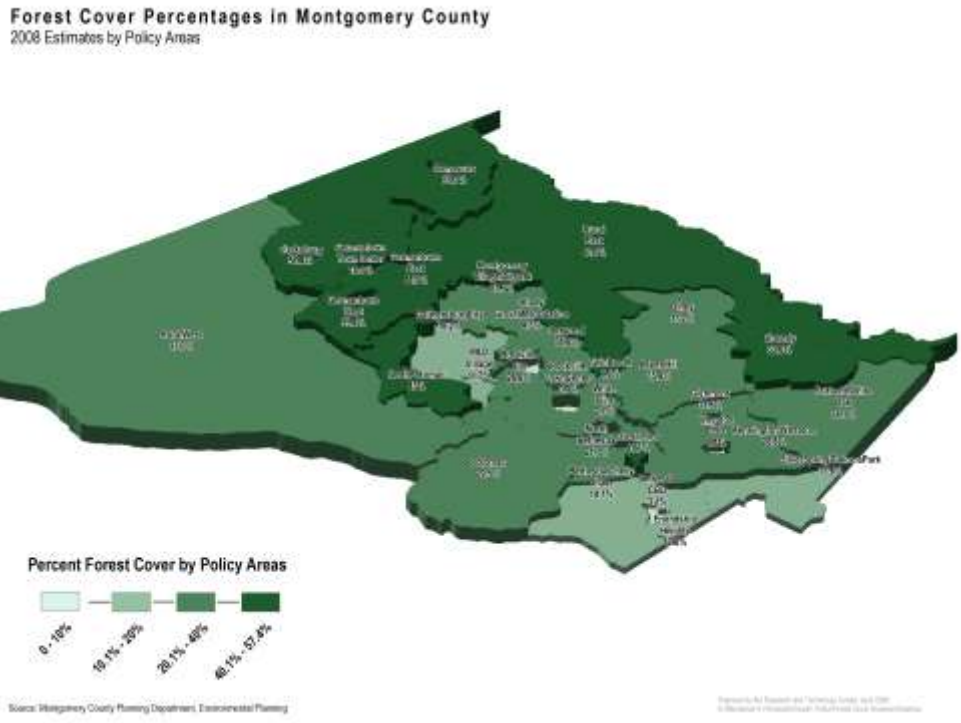
Green Infrastructure:

Preserve, manage and increase natural areas, tree canopy, and wildlife habitat.





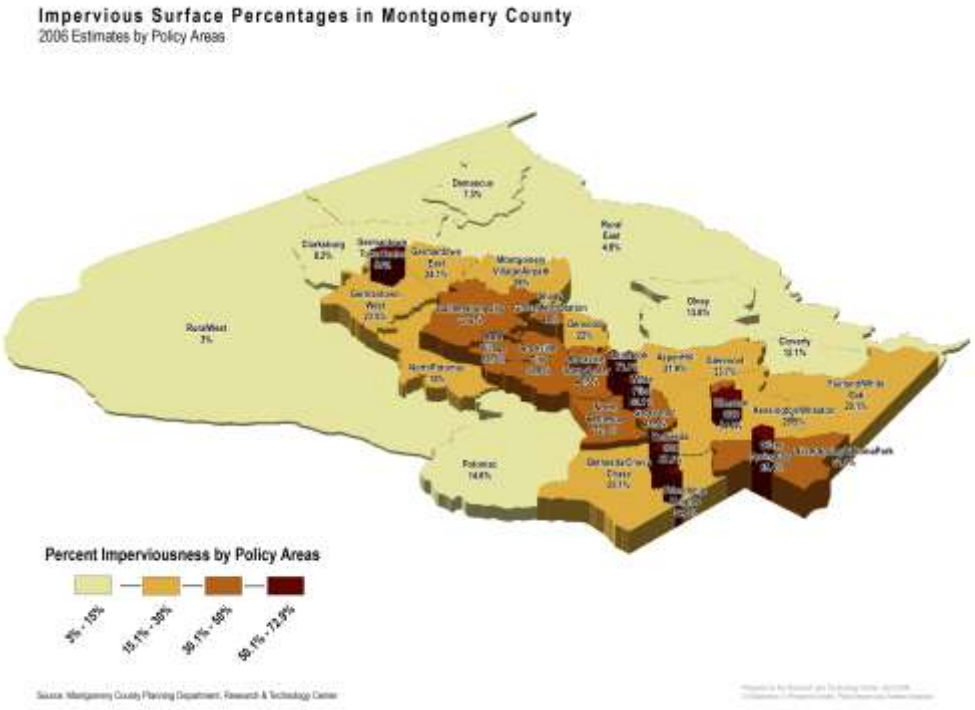
Montgomery County is still very green, with almost 30% in forest cover. While the forest cover has been declining since the 1970's, it is about the same amount of forest as it was in the 1950's, when much of the county was farmed. The forest in Montgomery County is clearly influenced by the large blocks of forest preserved in parkland. The North Potomac, Germantown, Clarksburg and Damascus Policy Areas contain the Seneca Creek State and stream valley parks as well a Little Bennett Park. Cloverly benefits from the protection of forest in Upper Paint Branch and the Rural policy areas benefit from the Patuxent State Park and the large federal holdings along the Potomac River as well as the large amount of forest remaining on private land in the Agricultural Reserve.



Two indicators are still under development. One will measure urban tree canopy (which will recognize the importance of trees in the built-up areas of the county) and the other is the Green Infrastructure layer which combines forest with other important habitats that function as part of an interconnected green network. Once the Green Infrastructure plan is approved and adopted, we intend to use this indicator to provide a yearly accounting of how much of the Green Infrastructure is protected.

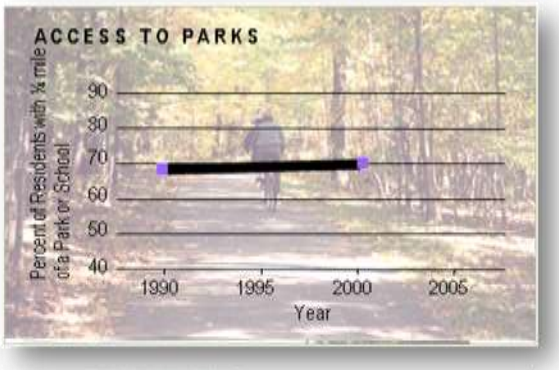
The second measure of green infrastructure is its opposite, imperviousness. This pattern clearly follows the more developed areas of the county. Imperviousness dramatically increased in the 1970's to the 1990's as the county rapidly developed in a suburban pattern.

While the goal is to reduce impervious surface, it is projected to grow in total area, however, all our policies are aimed at reducing the per capita amount and effect of paving and building footprints. Redevelopment of older areas brings new control of both the amount of water that runs off and the pollutants it contains.

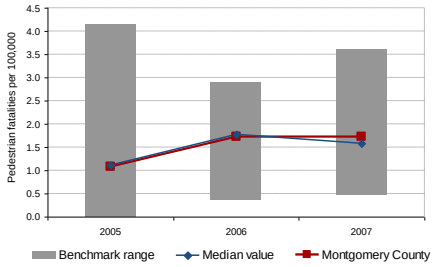


Smart Communities:

Ensure that Montgomery County's communities have a sense of place and are affordable, healthy, and energy-efficient.



Pedestrian Fatality Rate Per 100,000 Population
Regional Benchmark



In 2007, the median pedestrian fatality rate was 0.99 fatalities per 100,000 people. Montgomery County's rate was 1.72. Prince George's County, MD had the highest rate; and Arlington County, VA had the lowest.

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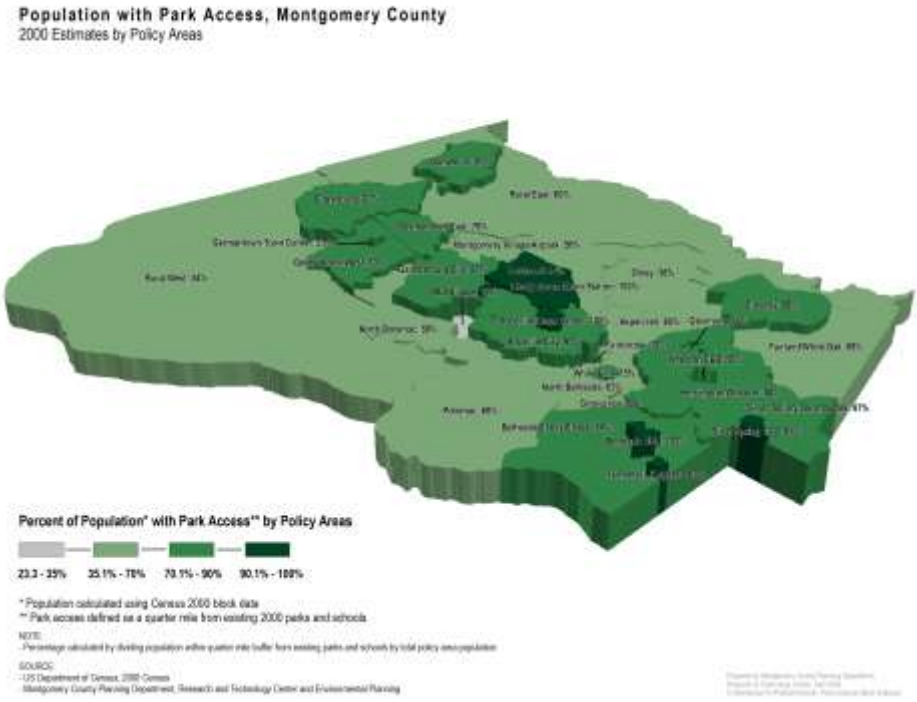
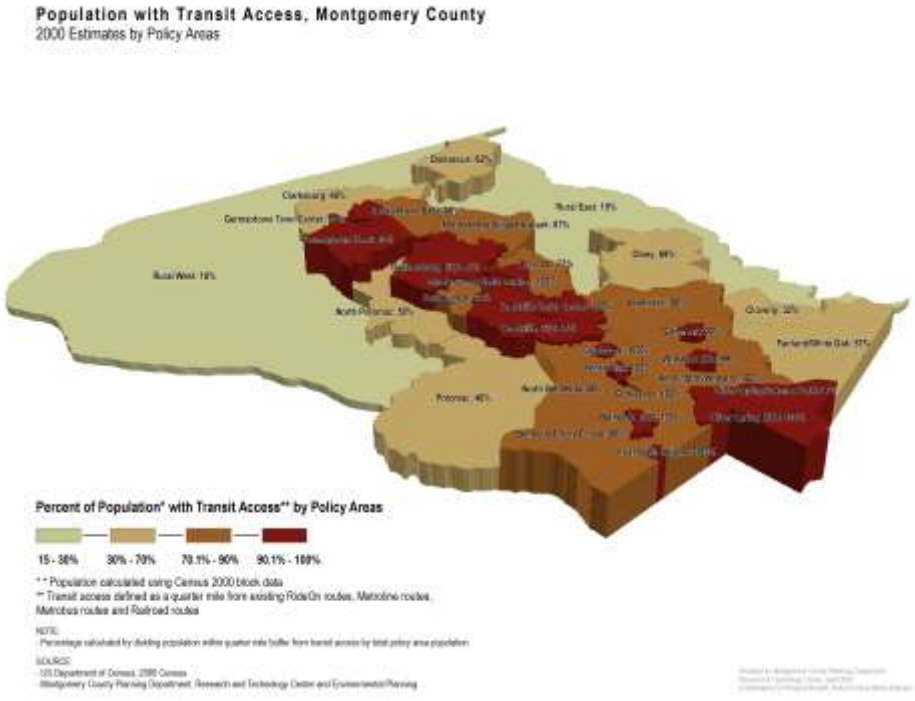
The Executive included an indicator for pedestrian fatality rate countywide. It is possible that this information could be obtained at a more detailed level if the Board feels it is a useful measure of smart communities.

The breakdown of the relative mobility data will be added later when the data is available.

The graphics on the following pages depict the Jobs/Housing Ratio by Traffic Zone and the Access to Parks and Access to Transit indicators. These graphic clearly illustrate the pattern of jobs, mobility and access to parks that follows from the General Plan. Services and facilities are greatest in the 355 and Georgia Avenue corridor and the urban ring, tapering off in other areas.

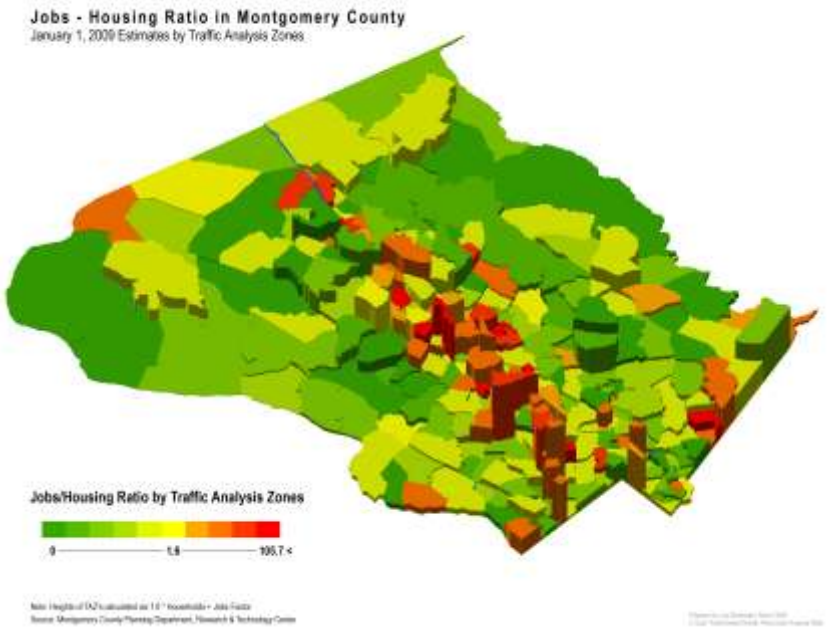




In our original countywide analysis we analyzed both park access and transit access by block groups with average low and higher incomes as attempt to examine environmental justice issues. Countywide access to parks was the same for all groups, but block groups with lower average incomes tended to be closer to transit than those with average higher incomes. We were unable to break down the data by policy area because so many block groups were split by policy area, fragmenting the data.

In addition, the income data is only available for block groups and only in the ten-year census data.

Conclusions:



The areas of the County where greatest growth is forecast are also those with some of the greatest accessibility to public resources such as parks and transit services. These developed areas also tend to have the least forest cover and the highest percentage of impervious surface. The suburban pattern of the last three decades has produced both a strong pattern of more densely developed areas with good access and services, as well as a massive amount of lower-density development that consumed much land and resources.

More discussion is needed about what indicators are useful to track both for the Growth Policy and master planning. The following questions arise:

- Should we continue to monitor all these indicators?
- Should we analyze the data by policy area or by other geographies?
- Are other indicators more appropriate?
- Is data that can only be obtained every ten years really useful? Is there any way to get this information more frequently?
- Should additional staff effort be devoted to tracking indicators that the Executive is not and to analyze them on smaller geographies to assist growth policy and master planning?

Staff looks forward to discussion of the data and these issues with the Planning Board.

Growth Policy Study:	Appendix E- Addendum to the 2008 Master Plan Implementation Status Report (Resolution 16-376 F11)
Lead Staff:	Glenn Kreger

Summary:

The addendum to the 2008 Master Plan Implementation Status Report contains the following information:

- Status Report for the December 2008 Twinbrook Sector Plan
- Shady Grove Sector Plan Implementation
- Clarksburg Staging and Buildout
- Policy Areas Map
- Status of Capital Facilities (matrices)

The report, in its entirety, can be found on the GrowingSmarter.Org website under *Resources.*

http://www.montgomeryplanning.org/research/growth_policy/growth_policy09/agp_growing_smarter.shtm

Growth Policy Study: Appendix F – Biennial Highway Mobility Report (Resolution 16-376 F11)

Lead Staff: Justin Clarke

Summary:

The Highway Mobility Report contains information and data about patterns of mobility in the County. The current report, confirms many of the findings in the 2008 report; congestion is generally most severe in down-county areas, the "priority corridors" continue to experience the most significant levels of congestion and should be targeted for congestion relief, and between 15 and 20 percent of the intersections in the County have congestion levels that are worse than their current LATR Growth Policy standards. See Figure 2 for a chart of the CLV/LATR ratio for the intersections in this year's report. The remaining notable findings in the 2009 HMR report are listed below.

- National and regional trends indicating a decline in travel and congestion since 2006 are less prevalent on the Montgomery County arterial system than they are for national data, due in part to the fact that the County has weathered the economic effects of the recession better than many other parts of the region and the County.
- The overall level of arterial system traffic volumes, travel speeds, and intersection congestion in spring 2009 is essentially unchanged from 2008 (observed reductions of up to one percent per year).
- Priority corridors for mobility improvements include the radial routes MD 355, Connecticut Avenue, Georgia Avenue and US 29 throughout the County. East-west priority routes include Veirs Mill Road and MD 28. Eight of this year's "top ten" most congested intersections are along these routes. The ICC is expected to provide relief for MD 28.
- The Growth Policy definition of a three-hour peak period remains appropriate.
- While auto travel has decreased slightly during the recession, transit travel has increased, with total Metrorail boardings in Montgomery County 5% higher in 2009 than in 2006. See Figure 4, Metrorail ridership 2006-2009.

- Observed pedestrian activity on the arterial system is concentrated along roadways with high transit ridership, particularly in the Veirs Mill Road and University Boulevard corridors connecting Rockville, Wheaton, and Takoma Park. Nearly every transit rider needs to cross the street at least once in their daily commute.

The staff draft of the 2009 Highway Mobility Report can be found on the Planning Board's website under the agenda page for June 8 (see Item #2 at the following link):
http://www.montgomeryplanningboard.org/agenda/2009/agenda20090608e.html

Growth Policy Study: Appendix G – Prioritization of Public Facilities (Resolution 16-376 F11)

Lead Staff: Larry Cole

Summary:

A set of criteria are proposed for use in the prioritization of projects requiring capital funding.

The identification and prioritization of new capital projects should reflect both the Growth Policy vision and the needs identified in Master Plans. Staff will use the following criteria in prioritizing projects for capital funding. The highest priority projects support Growth Policy principles for connectivity, design, diversity, and the environment as outlined below.

- Sustainability, in terms of cost, environmental impact, and social equity
    - giving higher priority to Metro Station Policy Areas, other urban areas, and State Priority Funding Areas
    - leveraged funds – where the County can maximize its investment by using developer, State, and/or Federal funds

- Master/Sector Plan Goals and Objectives
    - staging requirements
    - Constrained Long Range Plan (CLRP)

- Connectivity
    - meeting transportation serviceability goals
        - Highway Mobility Report (HMR)
        - traffic forecasts
        - emergency preparedness
    - coordinating public facilities with private development
    - linking jobs to housing
    - linking neighborhoods to services
- Design excellence
    - ensuring safety
    - giving higher priority to projects that serve more than one purpose
    - promoting neighborhood conservation and enhancing community identity
    - restoration of, or minimal impacts to, natural resources
    - promoting, directly or indirectly, the preservation of historic resources

- Diversity
    - promote travel other than SOV: pedestrian accommodation, bikeways, transit; multi-modal Quality of Service
    - provide community facilities that serve all types of neighborhoods and interests

The candidate projects have been evaluated in a matrix format that facilitates comparison across the evaluation criteria described above. For this first round of prioritization of projects for the CIP, the transportation projects shown generally reflect only County roads in the top ten of the HMR, the CLRP, and the candidate projects for Facility Planning-Transportation listed in the current CIP as beginning in FY11 or later. The only exceptions are bus priority projects that are already listed as candidate Facility Planning projects in the current CIP. The non-transportation projects are those the Vision team leaders see as most important to enter the CIP in the next few years.

The proposed scoring promotes the overall Growth Policy goals of prioritizing non-SOV transportation facilities that would enhance TOD and community connections and cohesiveness.

Additional topics for the Board's discussion could include:

- Giving greater weight to downcounty projects that are just outside designated urban areas and/or the ½-mile radius of Metro stations
- Adding potential County/State intersection projects since the Council has expressed a willingness to at least partially fund such projects
- Using this methodology to determine the County's priorities for State projects
- The use of additional scoring factors for non-transportation projects, to reflect, for example, school clusters with the highest student teacher ratios and planning areas with the lowest park acreage per resident.
- Making more of the criteria tied to specific measurable values, such as using over-the-norm crime and traffic crash rates for "safety".

Appendix G Project	Type	Master Plan area	Sustainability – cost and social equity		Master/Sector Plan Goals and Objectives		Connectivity						Design Excellence					Diversity		Total
			Priority area	Leveraged funds	Staging requirement	Constrained Long Range Plan	Highway Mobility Report Top Ten	Traffic Forecasts	Emergency preparedness	Coordination with private or public development	Linking jobs to housing	Linking neighborhoods to services	Safety	Multi-purpose	Neighborhood Conservation/ Community Identity	Environmental protection	Historic preservation	Promotes Non-SOV Travel	Serves multiple neighborhoods and interests	
Maximum Points		Total Points	15 points	5 points	10 points	10 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	5 points	105
Georgia Ave. Busway	BRT	Glenmont	15			10	5	5	5	5	5	5			5	5		5	5	75
Second District Police Station Relocation	Community Facility	Bethesda CBD	15	5	10	0	0	0	5	5	0	0	5	5	5	5	0	0	5	65
NIH Circulation&NBTrail Extension	Road/Ped/Bike	Bethesda Chevy Chase	10	5	0	0	0	5	5	5	5	5	5	5	5	0	0	5	5	65
County Service Park relocation	Public Facility	Shady Grove Sector Plan	15	5	10					5	5		5	5		5		5	5	65
Observation Dr	Road	Germantown Sector	15	5	10	10		5	5	5			5						5	65
UnivBlvd bus enhan tp-w	Transit	Kensington-Wheaton, Four Corners, Takoma	15	5	0	10	0	0	0	5	5	5	0	5	0	0	0	5	5	60
Veirs Mill Road bus enhan w-r	Transit	Kensington-Wheaton, Wheaton CBD	15	5	0	10	0	0	0	5	5	5	0	5	0	0	0	5	5	60
Montrose Parkway East	Road	White Flint	8	0	0	10	0	5	5	5	5	5	0	5	5	0	0	0	5	58
Randolph Rd bus enhan, MD 355 to US 29	Transit	White Flint	15	0	0	10	0	0	0	5	5	5	0	5	0	0	0	5	5	55
Clarksburg Transit Center	Transit	Clarksburg	15	0	0	0	0	0	0	5	5	5	5	5	5	0	0	5	5	55
Food Science Incubator	Community Facility	Takoma Park	10	5	10	0	0	0	0	5	0	0	0	5	5	5	0	0	5	50
InterimCapitalCrescentTrail (Stewart Ave-SS	Ped/bike	N-W Silver Spring, Silver Spring CBD	15	0	0	0	0	0	0	0	5	5	5	5	5	0	0	5	5	50
Falls Road Bike Path	Ped/bike	Potomac	3	5	0	10	0	0	0	0	0	5	5	5	5	0	0	5	5	48
Complete other trails in the bicycle network: Bethesda Avenue to Bradley Blvd	Bike Trail	Bethesda CBD	15	0	0	0	0	0	0	0	5	5	5	0	5	0	0	5	5	45
Complete other trails in the bicycle network linking NIH to Woodmont Triangle	Bike Trail	Bethesda CBD	15	0	0	0	0	0	0	0	5	5	5	0	5	0	0	5	5	45
Forest Glen BW (MD97-Sligo Creek Pk)	Ped/bike	Forest Glen	10	0	0	0	0	0	0	0	5	5	5	5	5	0	0	5	5	45
Flower Avenue SW (Piney Branch Rd-Carroll	Ped/bike	East Silver Spring	15	0	0	0	0	0	0	0	5	5	5	5	5	0	0	5	0	45
Clarksburg Library	Library	Clarksburg	15	5						5		5			5			5	5	45
Georgia Ave/Forest Glen Rd Interesection Improvements	Road	Forest Glen	10					5	5		5	5	5		5				5	45
Glenmont Metro Bikeways	Bike/Pedestrian	Aspen Hill	5							5	5	5		5	5	5		5	5	45
Hillandale Transit Center	Transit	White Oak	8	0	0	0	0	0	0	5	5	5	0	5	5	0	0	5	5	43
Olney Transit Center	Transit	Olney	8	0	0	0	0	0	0	5	5	5	0	5	5	0	0	5	5	43
University Blvd BRT	Transit	Wheaton, Four Corners, Takoma Park	8	0	0	0	0	0	0	5	5	5	0	5	5	0	0	5	5	43
Improve Wayne Ave Intersections	Road Improvement	Silver Spring CBD	15	0	0	0	0	0	0	5	5	5	5	0	0	0	0	0	5	40
University Blvd at MD 320 (Piney Branch) widen to provde right turn onto southbound MD 320	Road Improvement	East Silver Spring	15	0	0	0	0	0	0	0	5	5	5	0	5	0	0	0	5	40

Install traffic signals to provide safe pedestrian and bicycle crossing (subject to conditions and operational studies): Arlington Road at Montgomery Lane; Arlington Road at Bradley Shopping Center; Old Georgetown Road at Cordell Ave; Woodmont Ave at Montgomery Lane; Old Georgetown Road at Glenbrook Road	Bike/Ped Safety	Bethesda CBD	15	0	0	0	0	0	0	0	5	5	5	0	0	0	0	5	5	40
Provide intesection improvents within Sector plan boundary: Connecticut Ave and Bradley ln	Road Improvement	Bethesda CBD	15	0	0	0	0	0	0	0	5	5	5	0	5	0	0	0	5	40
StrathmoreAvSW(StillwaterAv-GarrettPk)	Ped/bike	North Bethesda-Garrett Park	10	0	0	0	0	0	0	0	5	5	5	5	5	0	0	5	0	40
Fields Road Local Park	Park	Shady Grove Study Area/G'burg West	15							5		5			5	5			5	40
Mid-county fire station	Fire station	SG Sector Plan	15						5			5	5	5					5	40
Jones Mill Rd Bike Lanes (Beach Dr-Jones Br	Ped/bike	Bethesda Chevy Chase	3	0	0	0	0	0	0	5	5	5	5	5	5	0	0	5	0	38
MacArthur Blvd BW (Stable La-I-495)	Ped/bike	Potomac	3	0	0	0	0	0	0	0	5	5	5	5	5	0	0	5	5	38
Improve Batttery Lane Park	Park	Woodmont Triangle	10	5	0	0	0	0	0	0	5	0	0	0	5	5	0	0	5	35
Washington Avenue streetscape/sidewalk improvements	Pedestrian Improvements	Twinbrook	15	0	0	0	0	0	0	5	0	5	0	0	5	0	0	5	0	35
Forest Glen Bikeway bet. Sligo Creek and Metro	Bikeway	Forest Glen	10								5	5		5				5	5	35
Randolph Road widening	Road	White Flint	3	0	0	10	0	5	0	5	5	0	0	0	0	0	0	0	5	33
Lake Forest Transit center modernization	Transit	Gaithersburg Vicinity	8	0	0	0	0	0	0	0	5	0	0	5	5	0	0	5	5	33
Arcola & Georgia intersection improvement	Road	Wheaton (located in K/W)	3					5	5		5	5	5						5	33
Brookville Bypass	Road	Olney				10		5					5		5		5			30
East Gude Shared Use Bikepath	Bikepath	Upper Rock Creek	3							5	5	5		5				5	5	30
Father Hurley Blvd widening	Road	Germantown	3	0	0	10	0	5	0	5	5	0	0	0	0	0	0	0	0	28
Middlebrook Rd Extended, widen	Road	Germantown	3	0	0	10	0	5	0	5	5	0	0	0	0	0	0	0	0	28
Dale Drive Sidewalk (MD97-US29)	Ped/bike	N-W Silver Spring	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Falls Road SW-Wes (River Rd-Dunster Road)	Ped/bike	Potomac	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Franklin Avenue SW (US29-MD193)	Ped/bike	N-W Silver Spring	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Goldsboro Rd BW (MacArthur Blvd-River Rd	Ped/bike	Bethesda Chevy Chase	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Midcounty Hwy BW/SW (Woodfield-Shady	Ped/bike	Gaithersburg Vicinity	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Tuckerman La SW (Gainsborough-Westlake	Ped/bike	Potomac	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Dufief Mill Sidewalk (MD28-Travilah Rd)	Ped/bike	Potomac	3	0	0	0	0	0	0	0	0	5	5	5	5	0	0	5	0	28
Sligo Creek/Wheaton Regional Park	Bike/Pedestrian	Kemp Mill	3											5	5	5		5	5	25
Shady Grove Rd /Midcounty Hwy	Road	Shady Grove	3	0	0	0	5	5	0	5	5	0	0	0	0	0	0	0	0	23
Shady Grove Rd/Epsilon/Tupelo	Road	Shady Grove	3	0	0	0	5	5	0	5	0	0	0	0	0	0	0	0	5	23
Arlington Rd widening	Road	Bethesda CBD	15	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	20
East Gude Dr/Crabbs Branch/Cecil	Road	Twinbrook	3	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	5	18
Winters Run Local Park	Park	Upper Rock Creek												5	5				5	15
Upper Rock Creek Local Park	Park	Upper Rock Creek												5	5				5	15
Olney Longwood Park&Ride	Transit	Olney	3	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	0	13
Upcounty Park&Ride expansion	Transit		3	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	0	13

Growth Policy Study: Appendix H – Changes to Policy Area Boundaries

Lead Staff: Wayne Koempel

Summary:

Major changes include: creating a new Life Sciences Center policy area, adjusting the Germantown Town Center to match master plan recommendations, adjusting White Flint to match the sector plan boundary, and adjusting for Gaithersburg and Rockville municipal boundaries.

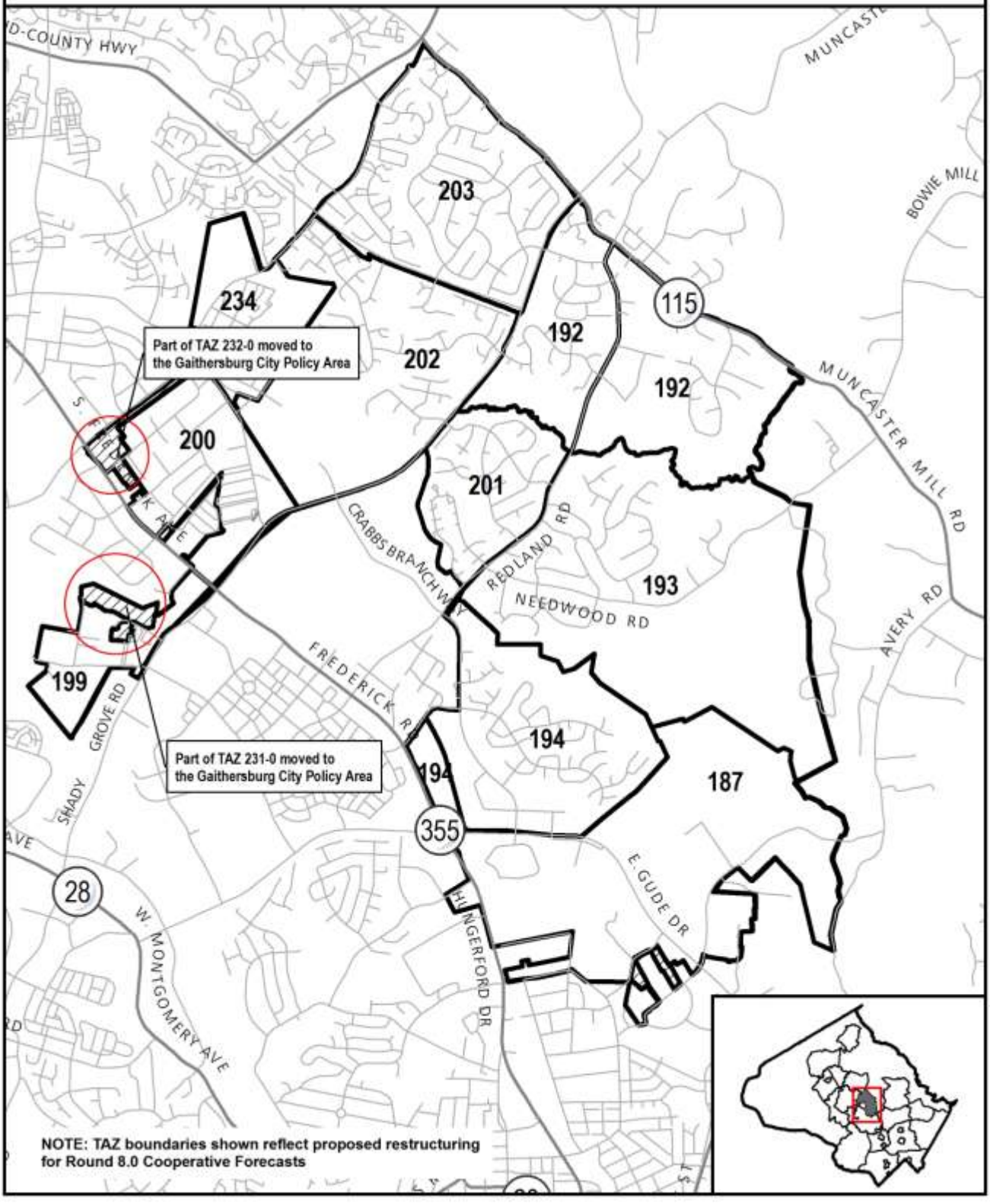
The following changes to policy area boundaries are recommended for consistency to master plans or sector plans or changes to municipal boundaries. The maps that follow show Policy Areas with recommended changes. Some of the traffic zone boundaries shown reflect the proposed restructuring of the traffic zone system.

- Expansion of the Germantown Town Center policy area east from Crystal Rock Drive to I-270 north of Germantown Road (MD 118) as recommended in the new Germantown Master Plan.
    - Restructured traffic zone 249-5005 would be shifted from the Germantown West policy area to the Germantown Town Center policy area.
    - The remainder of traffic zone 249 would remain in the Germantown West policy area.
- Creation of a new Life Sciences Center policy area from part of the R & D Village policy area.
    - The Gaithersburg West Master Plan envisions the transformation of the Life Sciences Center area into a dynamic live/work community while ensuring growth opportunities for research, medical, and bioscience.
    - The Life Sciences Center Policy Area would be created from traffic zones 218 (the Life Sciences Center), 219 (the Public Service Training Academy area), and 220 (Johns Hopkins University Belward Campus area).
    - The Gaithersburg West Master Plan recommends realignment of the Corridor City Transitway through the Life Sciences Center policy area and recommends a transit station in each of the traffic zones.

- This proposal would result in the remaining R & D Village policy area being a non-contiguous grouping of traffic zones 166, 215 (less Crown Farm), and 216.
    - Traffic zone 166 is south of the Life Science Center policy area. It includes the Universities at Shady Grove, Human Genome Sciences, Traville and Rickman.
        - Two parcels of land were moved from the North Potomac policy area to the R & D Village policy area and from traffic zone 165 to restructured traffic zone 166 so that five adjacent parcels of land under common ownership would all be in the same policy area.
        - A small area along the eastern boundary of traffic zone 166 was annexed by the City of Rockville and moved to the Rockville City policy area.
    - Traffic zone 215 south of the Crown Farm remains in the R & D Village. The Crown Farm portion moves to the Gaithersburg City policy area. The Washingtonian residential portion of traffic zone 215 remains in the R & D Village. The part of the Washingtonian residential annexed by the City of Gaithersburg has been moved to traffic zone 214 and the City of Gaithersburg policy area.
    - Traffic zone 216, the Shady Grove Executive Center area, remains in the R & D Village policy area.
- The White Flint policy area is expanded to conform to the White Flint Sector Plan boundaries. As part of the traffic restructuring effort, the White Flint traffic zones 136 and 137 have been expanded to include the areas of traffic zones 125, 127, and 133 included in the White Flint Sector Plan.
- Two minor changes are recommended for the Rockville Town Center policy area.
    - At the northeastern boundary of the Rockville Town Center policy area, the houses along Lincoln Street with even street number addresses were outside the Town center policy area. The boundary has been changed to include both sides of Lincoln Street in the Town Center policy area.
    - Part of the southern boundary was moved from E. Jefferson Street to Fleet Street so that the houses along both sides of E. Jefferson street would be in the Rockville City policy area.
- There are maps of the Gaithersburg and Rockville City policy areas showing the changes made to better conform the City policy areas to their municipal boundaries. There are also maps showing the affected County policy areas. Except for the Crown Farm which was discussed earlier the changes are minor. Most of the changes are in the Gaithersburg City policy area with the Derwood, Montgomery Village/Airpark, and North Potomac policy areas the most affected.

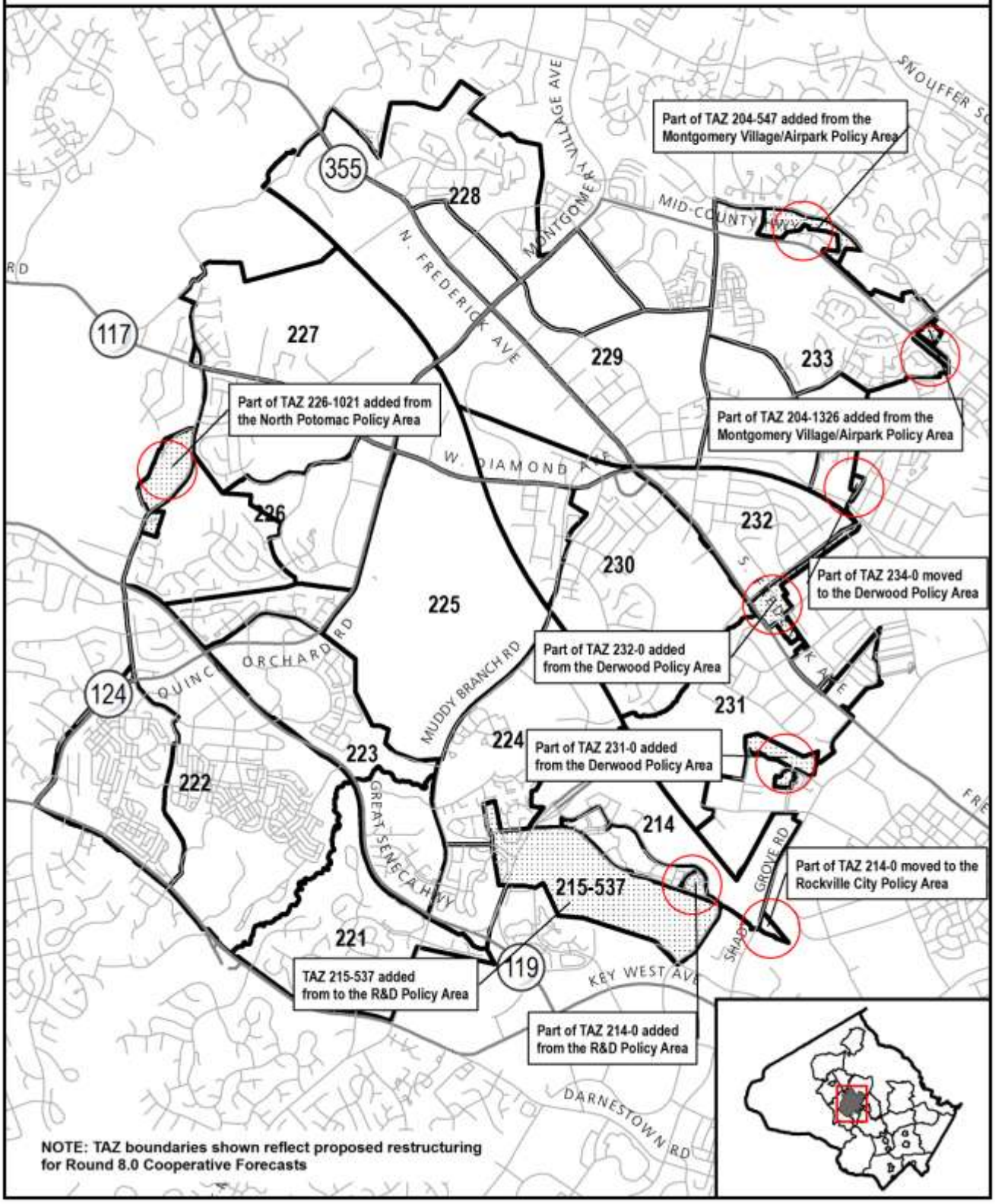
Derwood Policy Area
with Traffic Zones

MAP 7



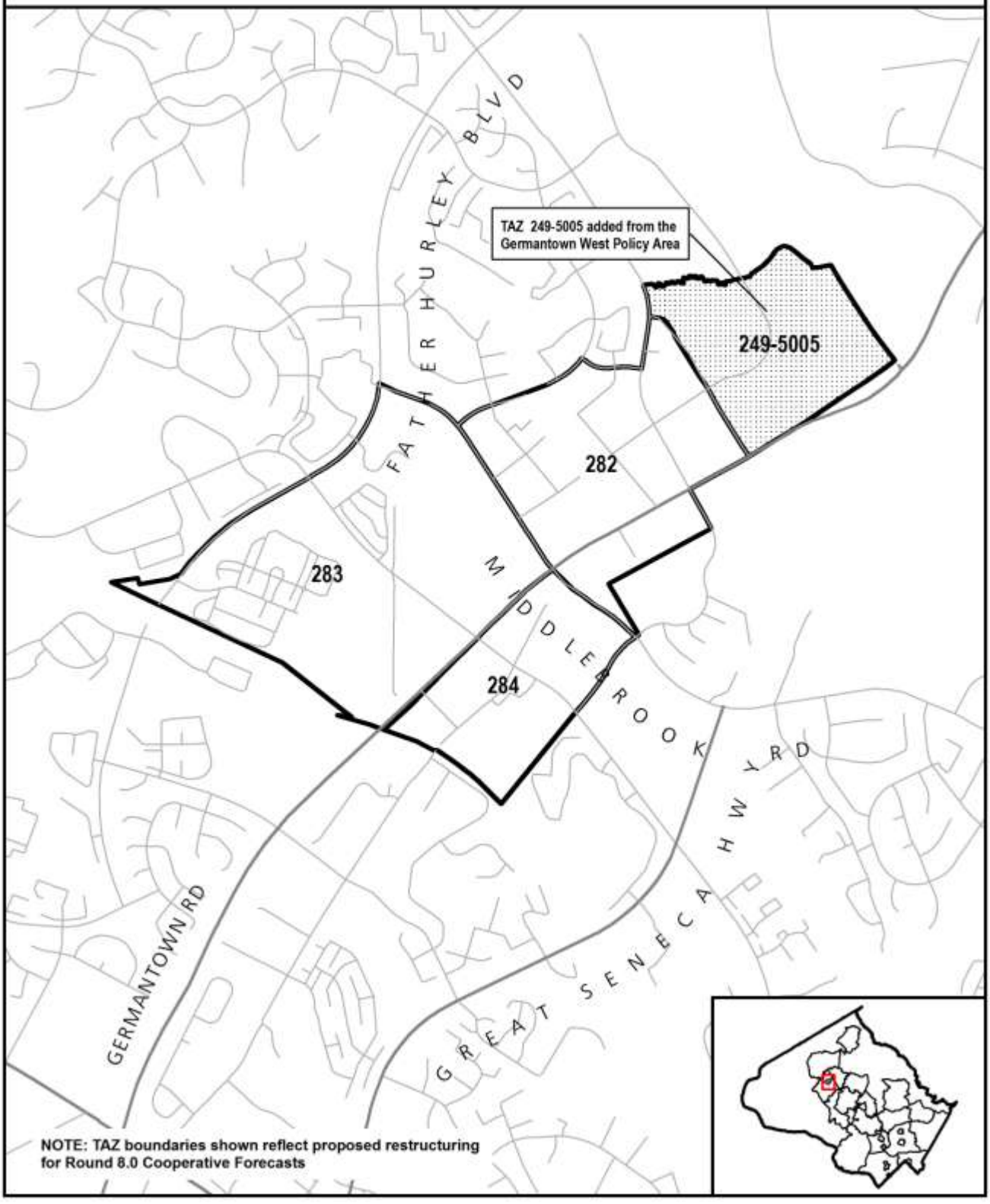
Gaithersburg City Policy Area
with Traffic Zones

MAP 10



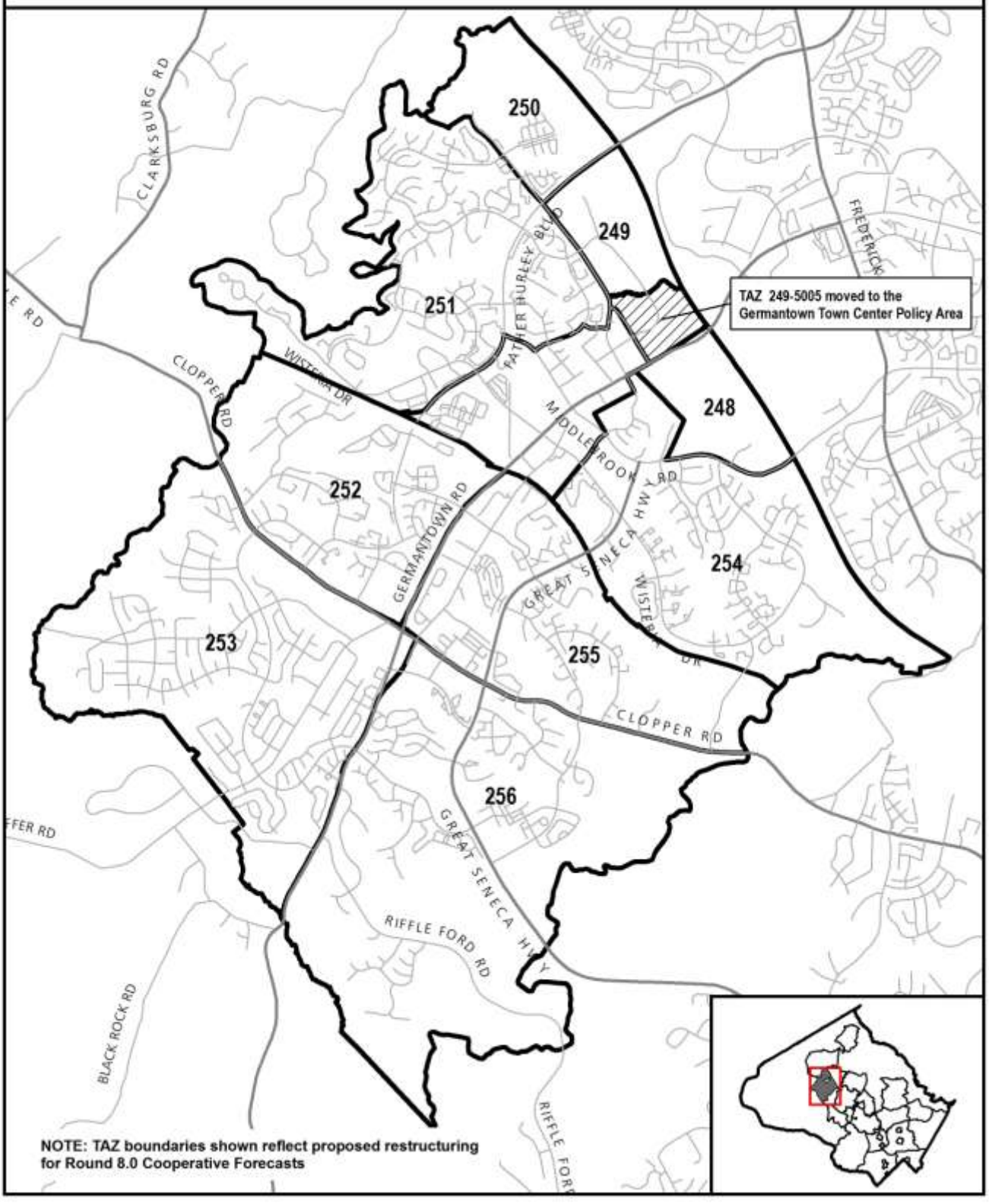
Germantown Town Center Policy Area
with Traffic Zones

MAP 12



Germantown West Policy Area
with Traffic Zones

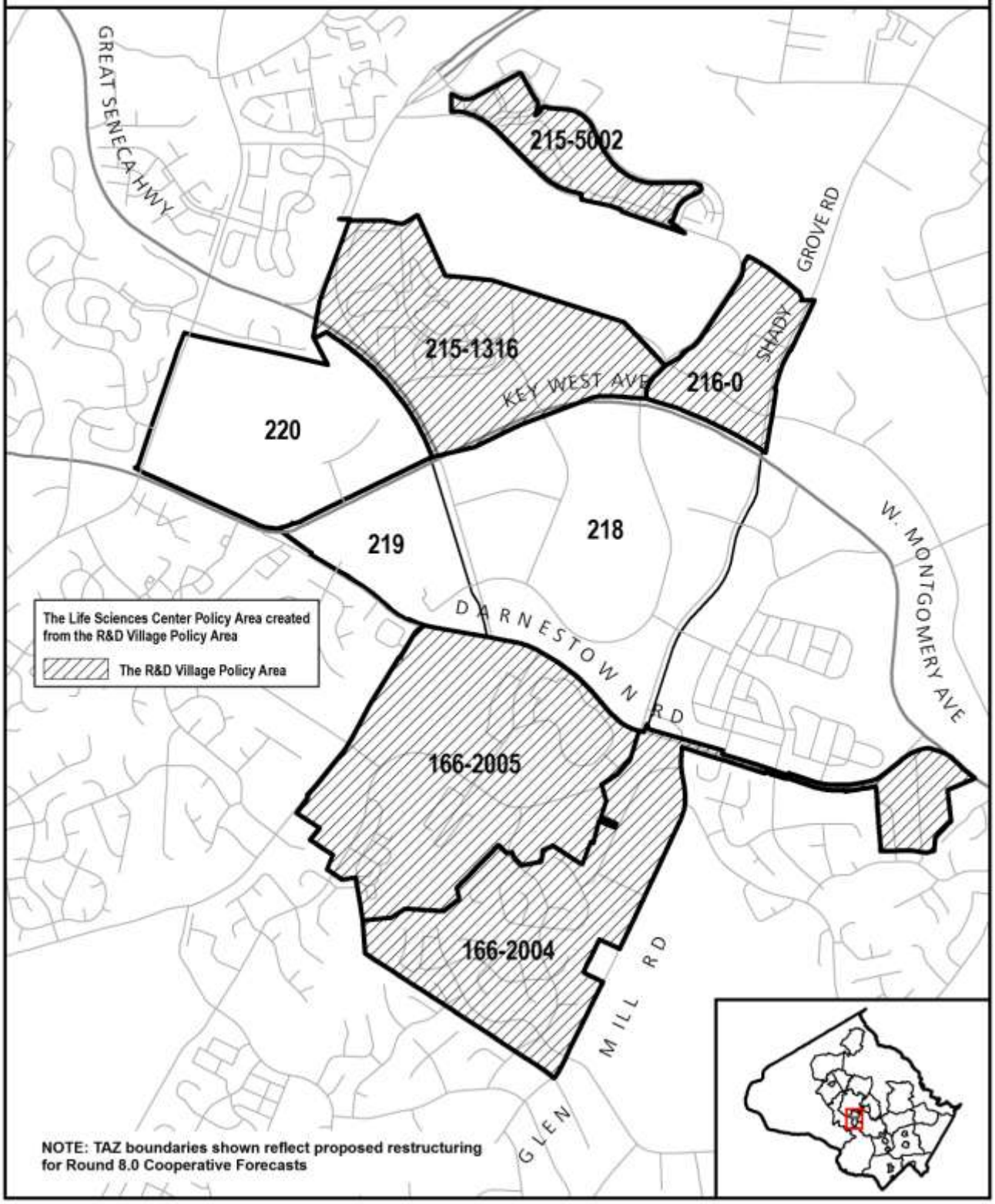
MAP 13



NOTE: TAZ boundaries shown reflect proposed restructuring for Round 8.0 Cooperative Forecasts

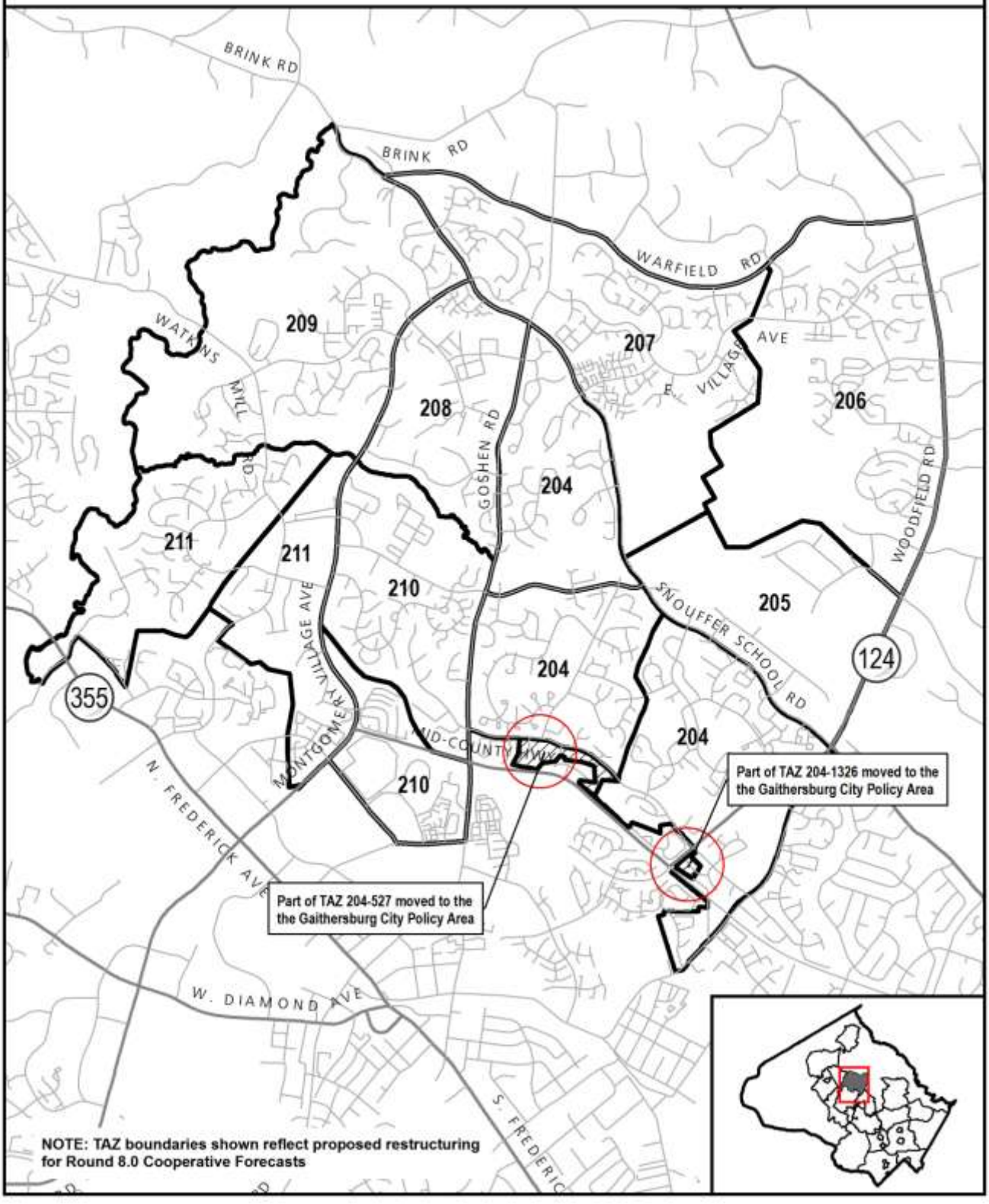
Life Sciences Center Policy Area
with Traffic Zones

MAP 17



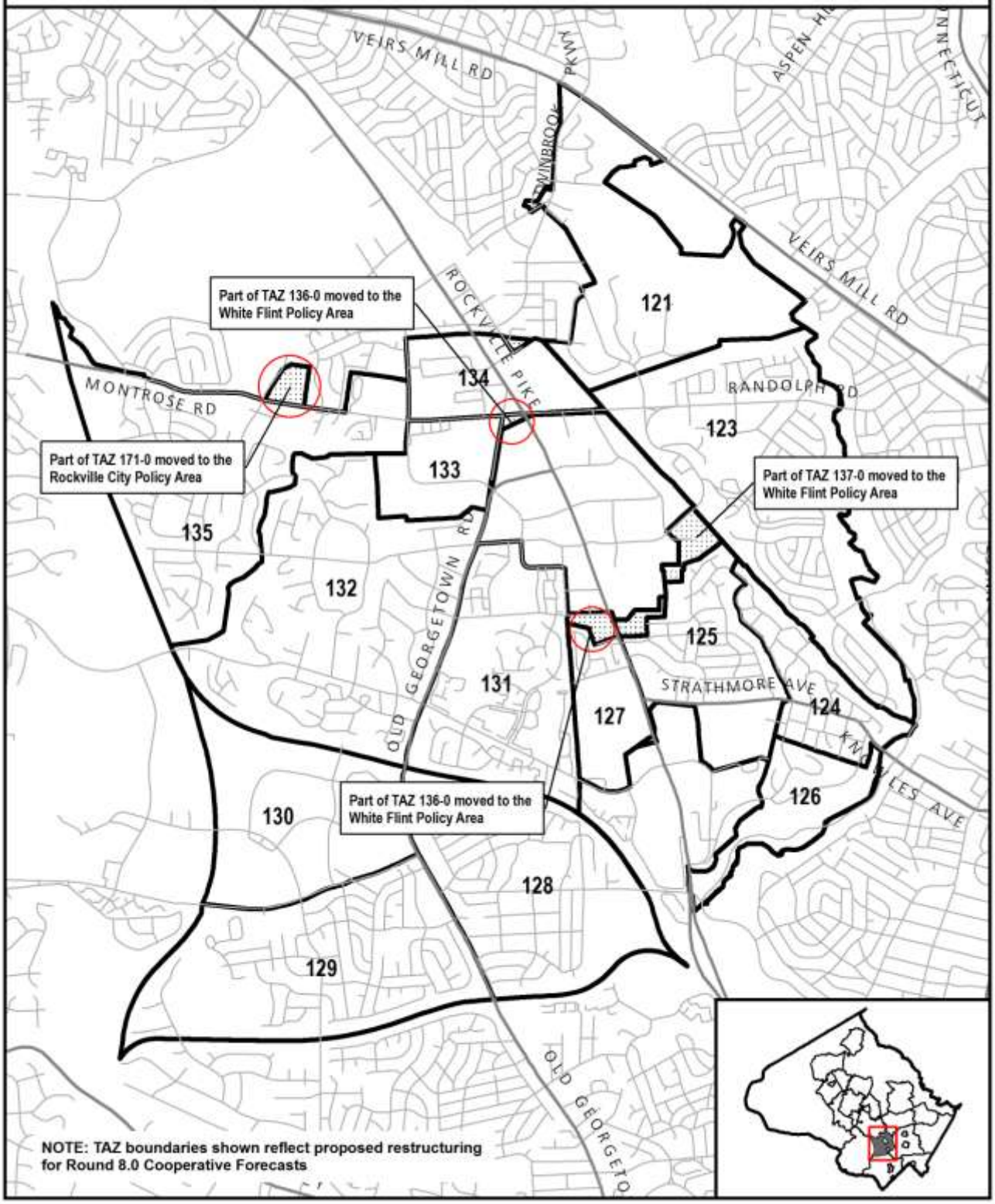
Montgomery Village/Airpark Policy Area with Traffic Zones

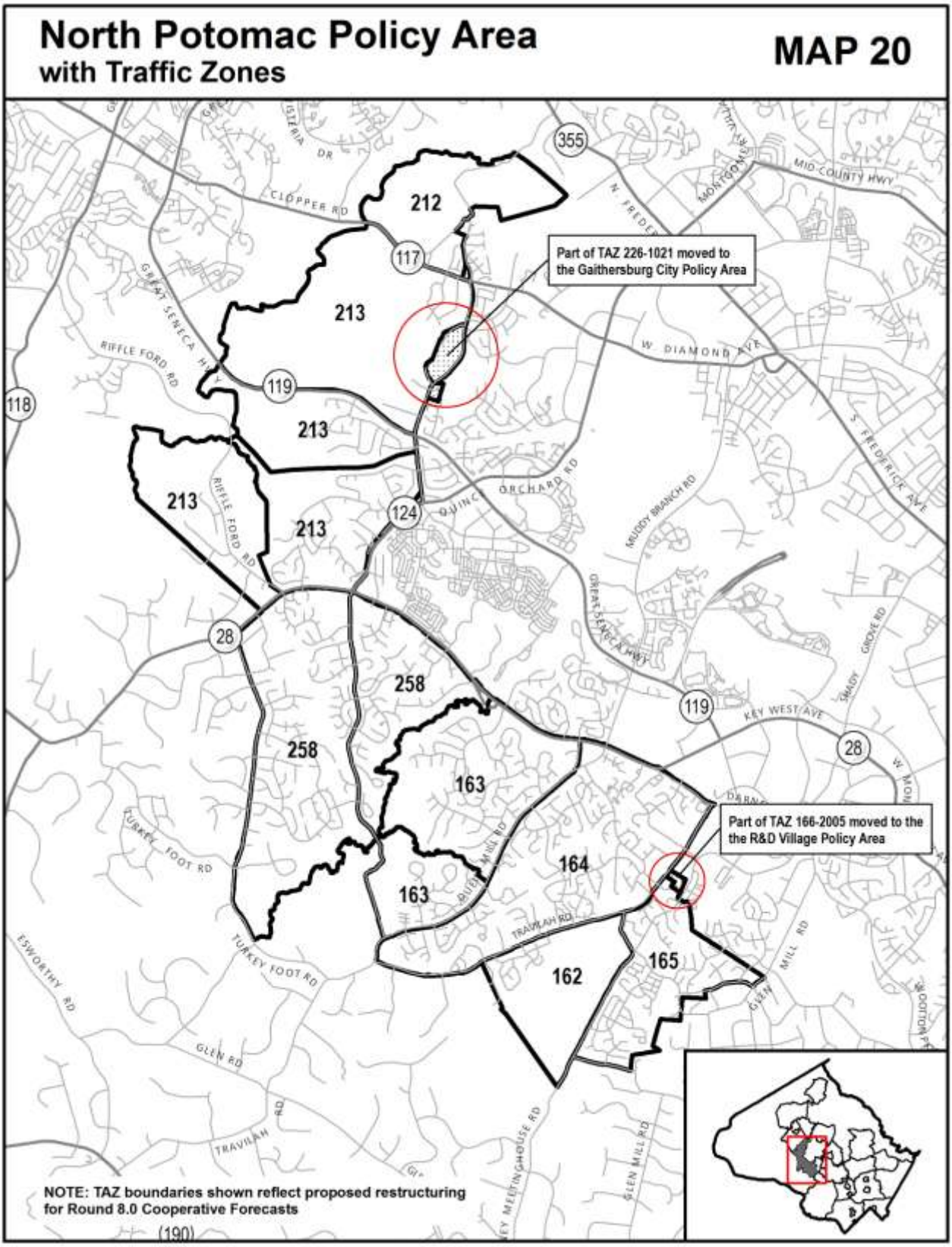
MAP 18



North Bethesda Policy Area
with Traffic Zones

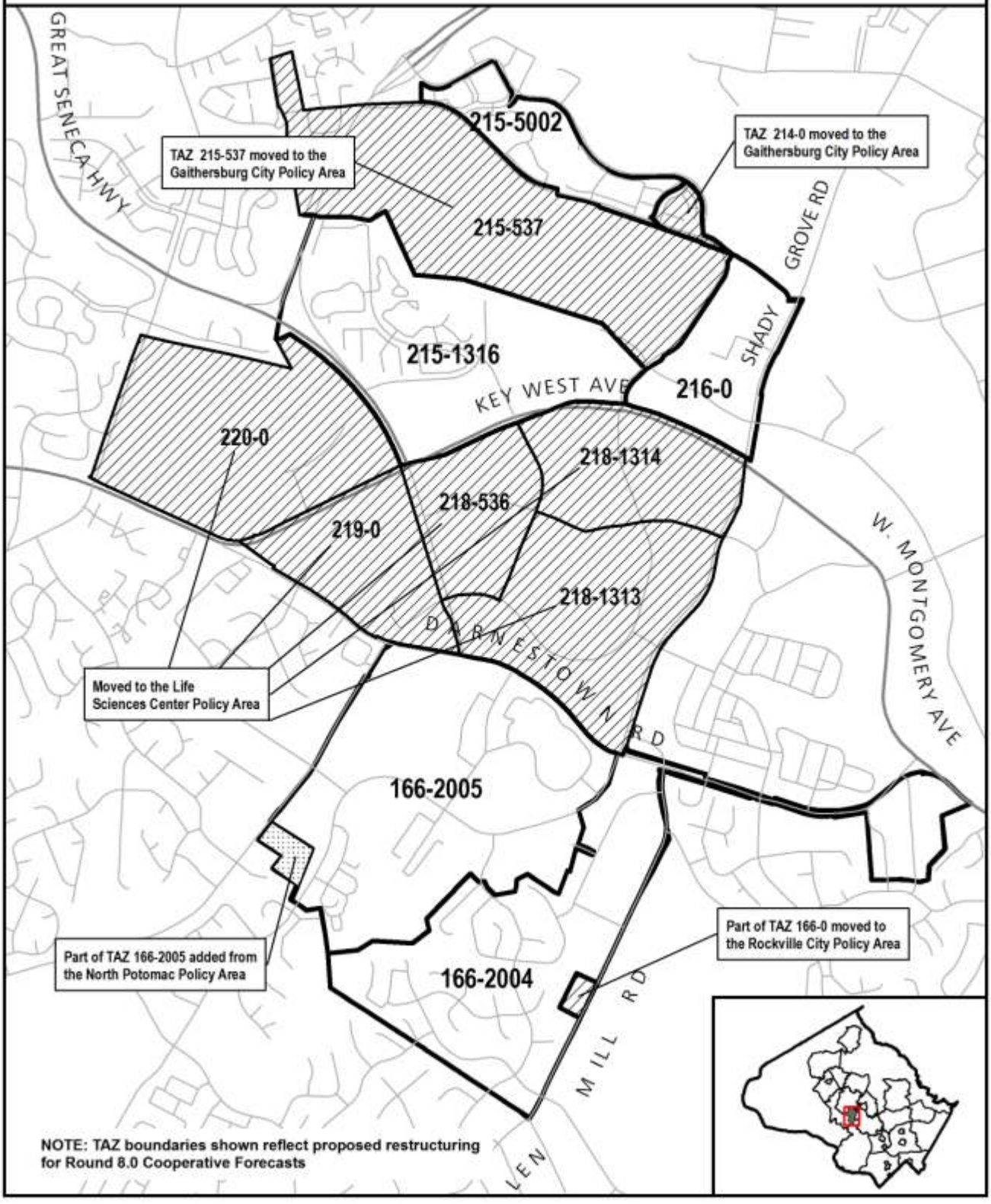
MAP 19




North Potomac Policy Area
with Traffic Zones
MAP 20
212
213
213
213
213
258
258
163
163
164
165
162
Part of TAZ 226-1021 moved to the Gaithersburg City Policy Area
Part of TAZ 166-2005 moved to the the R&D Village Policy Area
NOTE: TAZ boundaries shown reflect proposed restructuring for Round 8.0 Cooperative Forecasts
355
117
119
124
28
118
CLOPPER RD
RIFFLE FORD RD
GREAT SENECA HWY
W DIAMOND AVE
MID COUNTY HWY
MUDDY BRANCH RD
KEY WEST AVE
SHADY GROVE RD
TURKEY FOOT RD
ESWORTHY RD
GLEN RD
TRAVILAH RD
GLEN MILL RD
MEETINGHOUSE RD

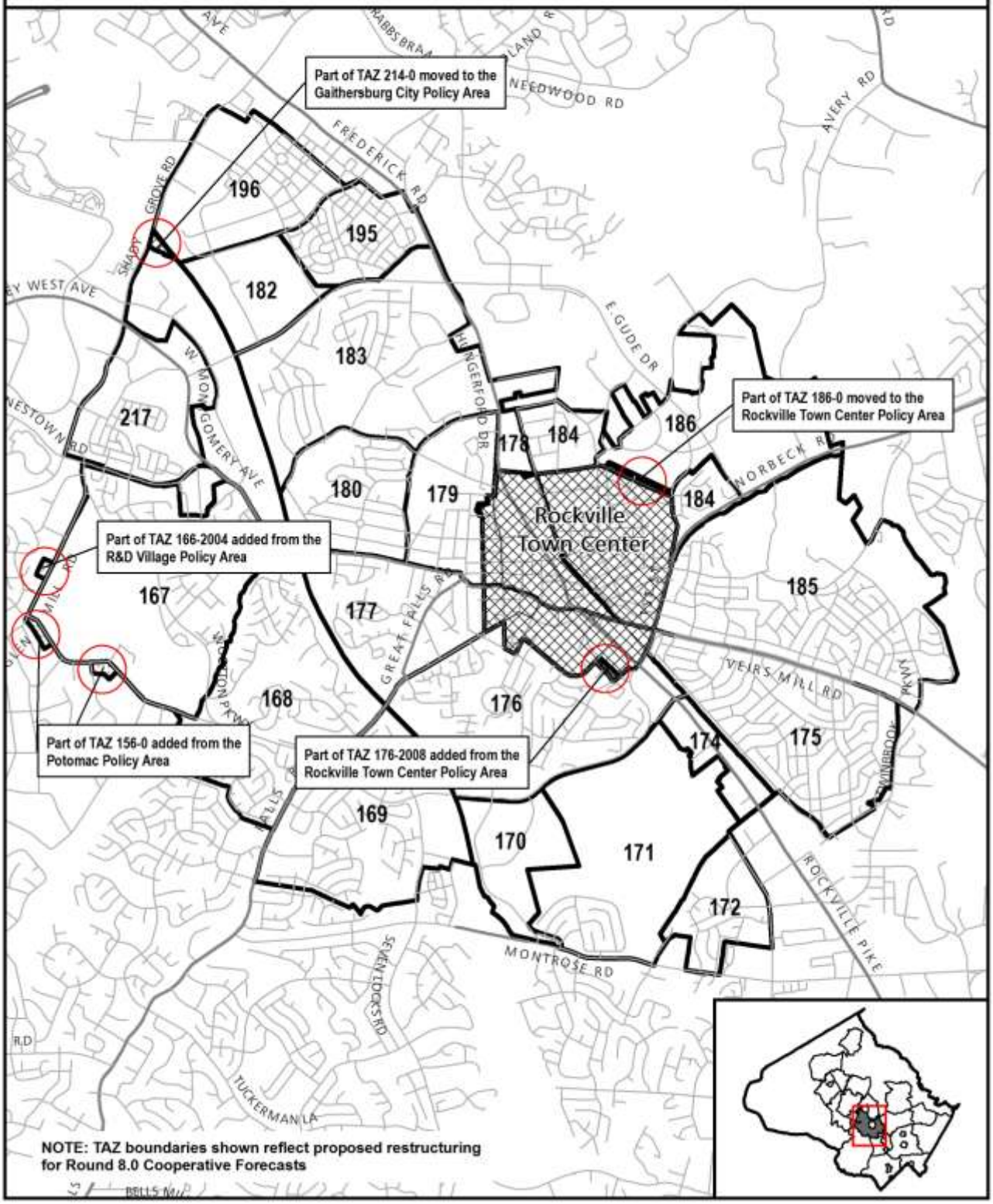
R and D Village Policy Area
with Traffic Zones

MAP 23



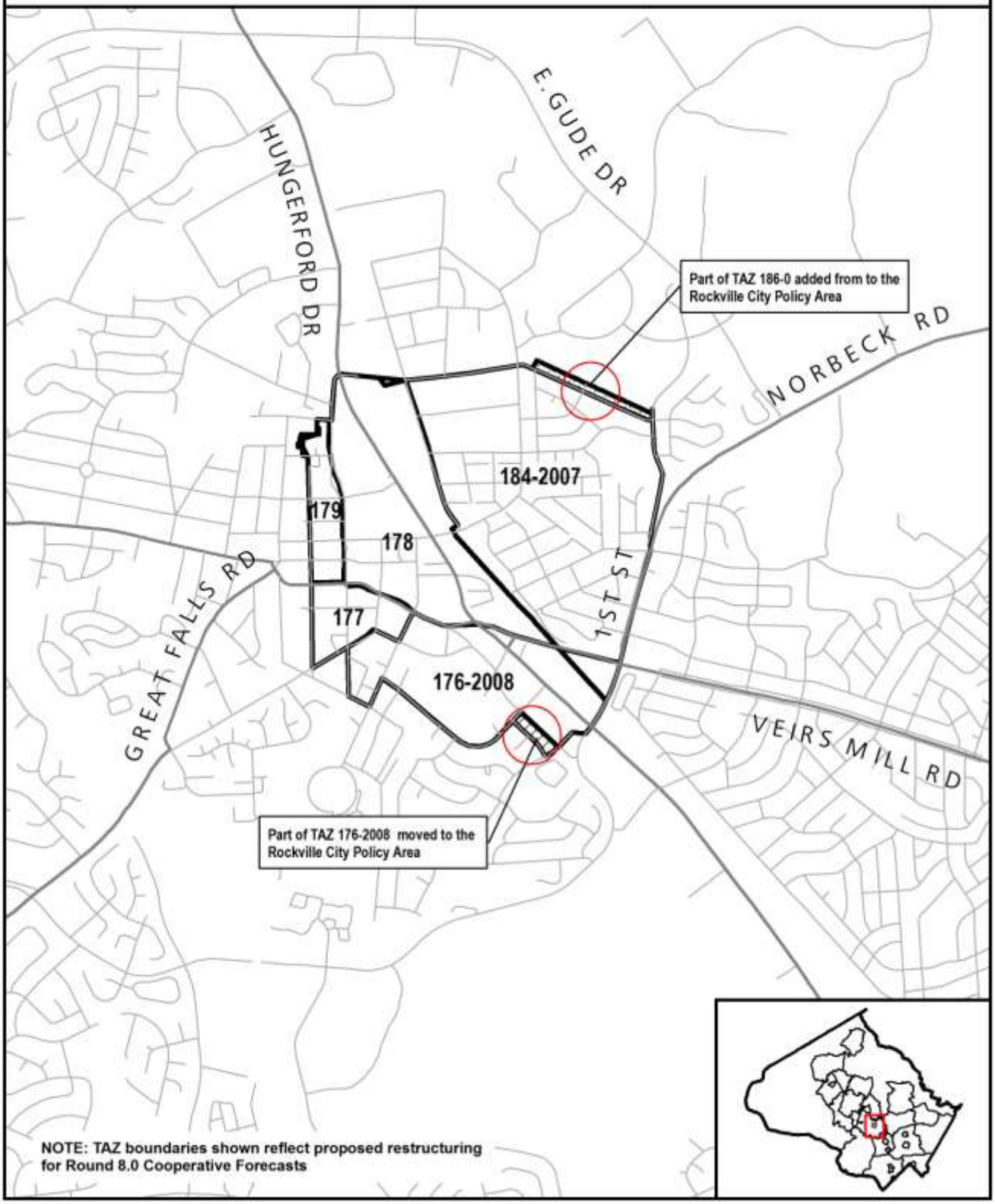
Rockville City Policy Area
with Traffic Zones

MAP 24



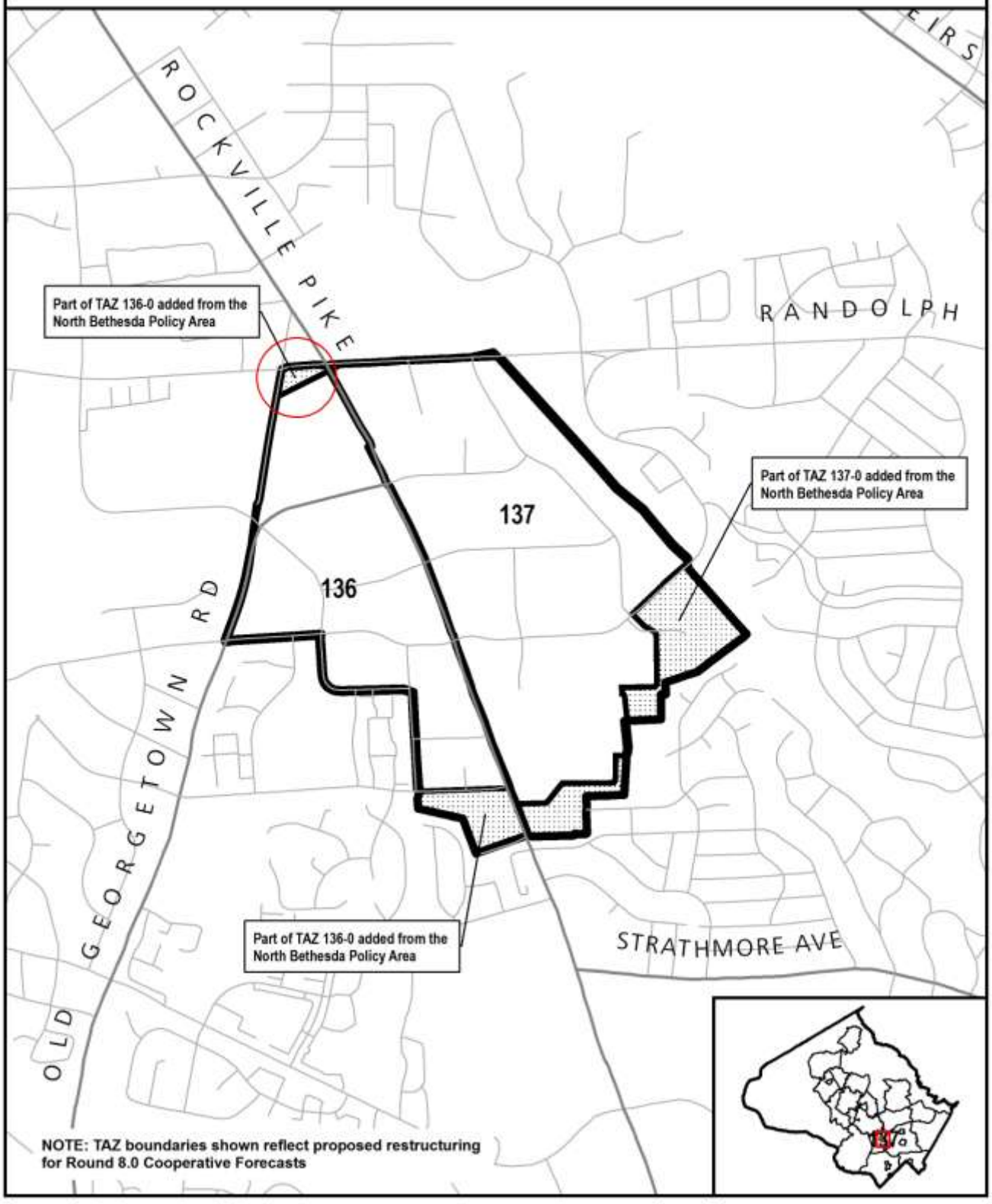
Rockville Town Center Policy Area
with Traffic Zones

MAP 25



White Flint Policy Area
with Traffic Zones

MAP 33

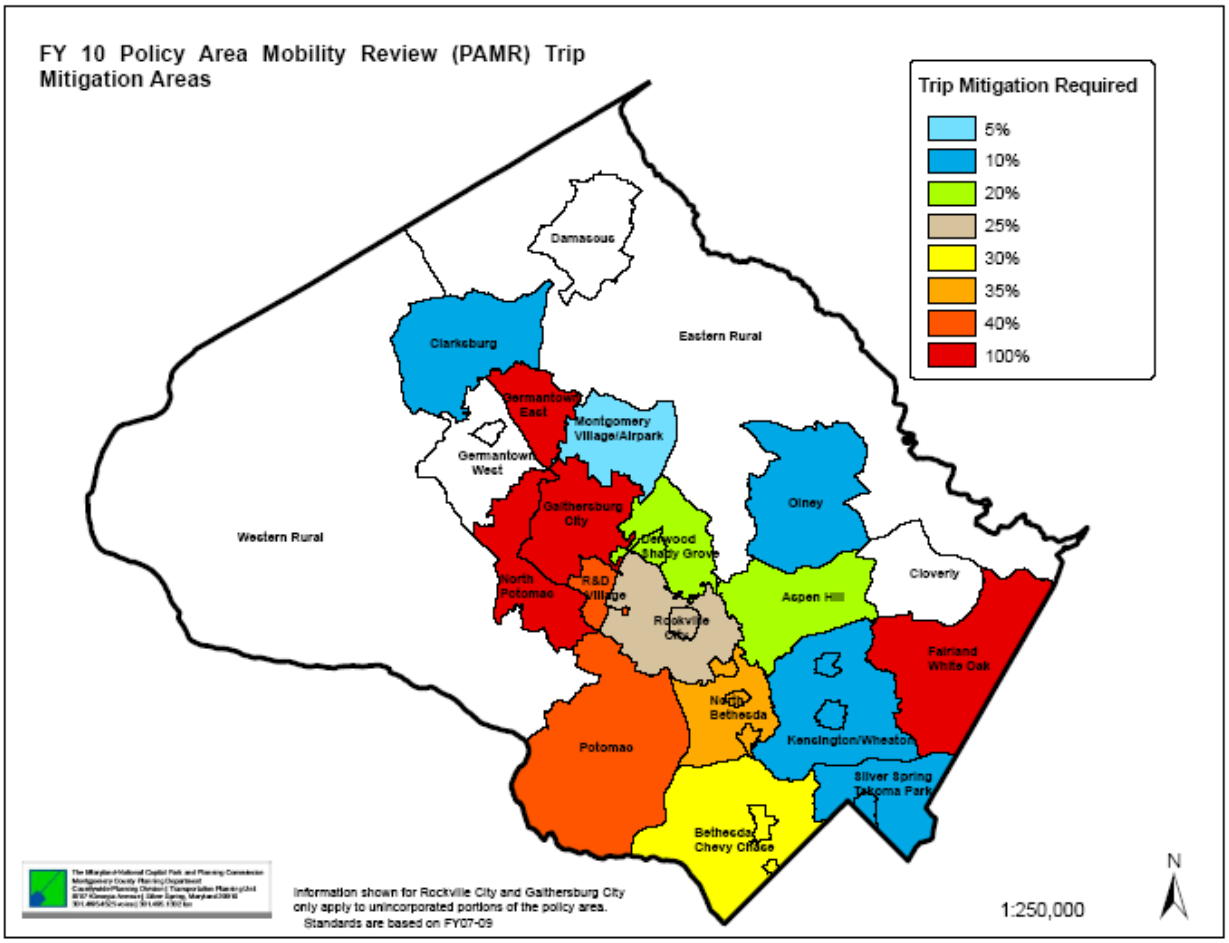


Growth Policy Study: Appendix I - Policy Area Mobility Review (PAMR)

Lead Staff: Eric Graye

Summary:

Using the Department's Travel/3 transportation model in support of the application of the PAMR methodology, staff evaluated the year 2013 relationship between the set of transportation projects fully-funded in the four-year capital program and the geographic pattern of existing and approved but un-built (i.e., "pipeline") jobs and housing units in the County. A key result of this analysis was the determination of required FY 10 trip mitigation percentages by policy area. These trip mitigation requirements (depicted below) were reviewed and adopted by the Planning Board on May 14th.



Growth Policy Study: Appendix J –School Capacity and Enrollment (Resolution 16-376 F11)

Lead Staff: Pam Dunn

Summary:

- Development approval in nine school clusters will be subject to a school facility fee.
- This is the same number of clusters required to pay a school facility fee in FY2009.
- Three clusters moved off the school facility payment list, two falling below the 105% program capacity threshold; the other moving into moratorium.
- Three school clusters will be in moratorium for residential development approvals.

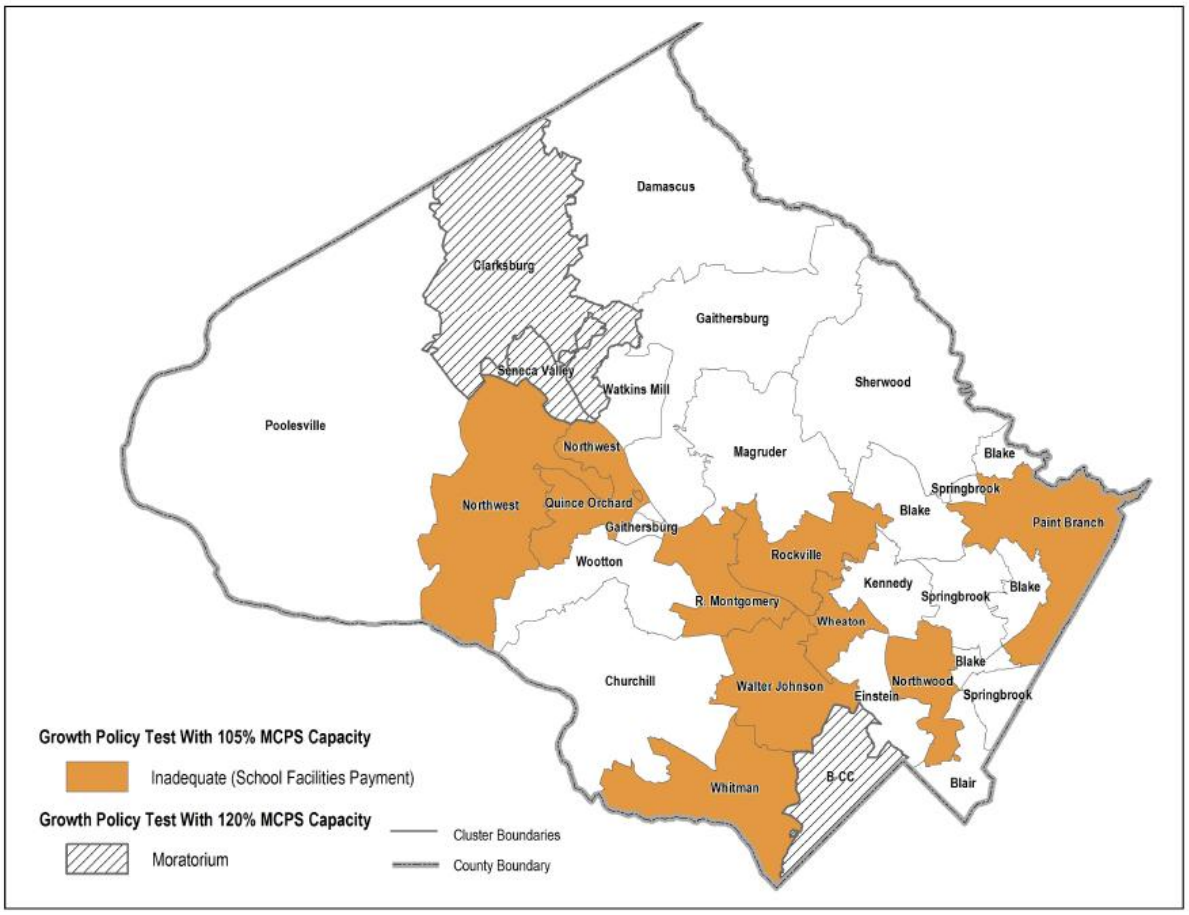
Adequate school capacity is a calculation that compares projected enrollment numbers and existing and planned facility capacity based on program needs. The annual school test determines if residential subdivisions in any school clusters should be subject to either a school facilities payment or a moratorium.

The County Council approves the school test methodology in the Growth Policy Resolution. Once the Council approves the CIP, Montgomery County Public Schools (MCPS) recalculates the projected school capacity (based on final determination of funded capacity) and provides all data for the school test as required by the Adequate Public Facilities Ordinance.

The FY2010 school enrollment and capacity information will be presented to the Planning Board just prior to the staff draft of the 2009-2011 Growth Policy.

Preliminary analysis indicates that development in nine school clusters will be required to make a school facility payment. In FY2009 there were also nine school clusters in which development approval has been subject to the payment of a school facility fee. The Wootton and Kennedy clusters are removed from the FY2010 list, while the Walter Johnson, Northwood and Paint Branch clusters are added. The B-CC cluster moves from the requirement of a school facility fee to moratorium. In addition, the Clarksburg and Seneca Valley clusters will be in moratorium in FY2010 bringing the number of school clusters under moratorium for development approvals to three.

School Test Results FY2010:



Summary of School Test for FY 2010

Based on BOE Requested FY 2009–2014 Amended CIP

Effective July 1, 2009

School Test Level	Description	Cluster Outcomes by Level		
		Elementary Inadequate	Middle Inadequate	High Inadequate
Clusters over 105% utilization School facility payment required in inadequate clusters to proceed.	5-year test Effective July 1, 2009 Test year 2014-15 Based on BOE Recommended FY 2009–2014 Amended CIP	Clarksburg (112%) Walter Johnson (106%) Richard Montgomery (119%) Northwest (120%) Northwood (112%) Paint Branch (106%) Quince Orchard (107%) Rockville (115%) Wheaton (117%) Whitman (110%)	B-CC (114%) Richard Montgomery (115%)	Clarksburg (116%)
Clusters over 120% utilziation Moratorium requred in clusters that are inadequate.	5-year test Effective July 1, 2009 Test year 2014-15 Based on BOE Recommended FY 2009–2014 Amended CIP	B-CC (137%) Seneca Valley (121%)	Clarksburg (133%)	

Cluster Percent Utilzations in 2014

Reflects BOE Requested FY 2009-2014 Amended Capital Improvements Program (CIP)

Elementary School Enrollment

Cluster Area	Projected August 2014 Enrollment	100% MCPS Program Capacity With CC Adopted FY09-14 Amended CIP	Percent Utilization in 2014	Growth Policy Test Result Capacity is:	Moratorium - Red School Facility Payment - Yellow
B- CC	3,588	2,617	137%	Inadequate	Yes
Blair	3,932	4,282	92%	Adequate	No
Blake	2,462	2,556	96%	Adequate	No
Churchill	2,552	2,784	92%	Adequate	No
Clarksburg	3,712	3,303	112%	Inadequate	Yes
Damascus	1,889	2,105	90%	Adequate	No
Einstein	2,487	2,587	96%	Adequate	No
Gaithersburg	3,855	3,932	98%	Adequate	No
Walter Johnson	3,649	3,444	106%	Inadequate	Yes
Kennedy	2,601	2,593	100%	Adequate	No
Magruder	2,610	2,493	105%	Adequate	No
R. Montgomery	2,586	2,171	119%	Inadequate	Yes
Northwest	4,178	3,478	120%	Inadequate	Yes
Northwood	2,968	2,657	112%	Inadequate	Yes
Paint Branch	2,452	2,309	106%	Inadequate	Yes
Poolesville	571	754	76%	Adequate	No
Quince Orchard	2,889	2,691	107%	Inadequate	Yes
Rockville	2,570	2,237	115%	Inadequate	Yes
Seneca Valley	2,296	1,901	121%	Inadequate	Yes
Sherwood	2,136	2,416	88%	Adequate	No
Springbrook	2,894	3,200	90%	Adequate	No
Watkins Mill	2,561	2,807	91%	Adequate	No
Wheaton	2,816	2,407	117%	Inadequate	Yes
Whitman	2,272	2,061	110%	Inadequate	Yes
Wootton	2,910	3,072	95%	Adequate	No

Middle School Enrollment

Cluster Area	Projected August 2014 Enrollment	100% MCPS Program Capacity With CC Adopted FY09-14 Amended CIP	Percent Utilization in 2014	Growth Policy Test Result Capacity is:	Moratorium - Red School Facility Payment - Yellow
B- CC	1,187	1,037	114%	Inadequate	Yes
Blair	2,015	2,261	89%	Adequate	No
Blake	1,165	1,332	87%	Adequate	No
Churchill	1,458	1,550	94%	Adequate	No
Clarksburg	1,508	1,138	133%	Inadequate	Yes
Damascus	908	941	96%	Adequate	No
Einstein	1,209	1,461	83%	Adequate	No
Gaithersburg	1,583	1,771	89%	Adequate	No
Walter Johnson	1,675	1,863	90%	Adequate	No
Kennedy	1,246	1,384	90%	Adequate	No
Magruder	1,110	1,607	69%	Adequate	No
R. Montgomery	1,123	973	115%	Inadequate	Yes
Northwest	2,036	1,966	104%	Adequate	No
Northwood	1,136	1,391	82%	Adequate	No
Paint Branch	1,271	1,308	97%	Adequate	No
Poolesville	284	472	60%	Adequate	No
Quince Orchard	1,300	1,648	79%	Adequate	No
Rockville	898	972	92%	Adequate	No
Seneca Valley	1,229	1,471	84%	Adequate	No
Sherwood	1,202	1,475	81%	Adequate	No
Springbrook	1,068	1,216	88%	Adequate	No
Watkins Mill	1,074	1,247	86%	Adequate	No
Wheaton	1,546	1,646	94%	Adequate	No
Whitman	1,208	1,267	95%	Adequate	No
Wootton	1,407	1,598	88%	Adequate	No

High School Enrollment

Cluster Area	Projected August 2014 Enrollment	100% MCPS Program Capacity With CC Adopted FY09-14 Amended CIP	Percent Utilization in 2014	Growth Policy Test Result Capacity is:	Moratorium - Red School Facility Payment - Yellow
B- CC	1,735	1,656	105%	Adequate	No
Blair	2,327	2,876	81%	Adequate	No
Blake	1,700	1,715	99%	Adequate	No
Churchill	1,928	1,972	98%	Adequate	No
Clarksburg	1,844	1,593	116%	Inadequate	Yes
Damascus	1,291	1,589	81%	Adequate	No
Einstein	1,553	1,613	96%	Adequate	No
Gaithersburg	1,906	2,067	92%	Adequate	No
Walter Johnson	2,087	2,275	92%	Adequate	No
Kennedy	1,565	1,838	85%	Adequate	No
Magruder	1,606	1,958	82%	Adequate	No
R. Montgomery	1,969	1,949	101%	Adequate	No
Northwest	2,173	2,151	101%	Adequate	No
Northwood	1,474	1,517	97%	Adequate	No
Paint Branch	1,956	1,899	103%	Adequate	No
Poolesville	1,054	1,107	95%	Adequate	No
Quince Orchard	1,788	1,774	101%	Adequate	No
Rockville	1,263	1,584	80%	Adequate	No
Seneca Valley	1,320	1,478	89%	Adequate	No
Sherwood	1,790	2,022	89%	Adequate	No
Springbrook	1,572	2,095	75%	Adequate	No
Watkins Mill	1,438	1,913	75%	Adequate	No
Wheaton	1,222	1,398	87%	Adequate	No
Whitman	1,650	1,891	87%	Adequate	No
Wootton	2,170	2,086	104%	Adequate	No

Growth Policy Study: Appendix K – Allocating Development Rights (Resolution 16-376 F12c)

Lead Staff: Shahriar Etemadi and Cathy Conlon

Summary:

The Growth Policy should allow APF rights for approved but unbuilt development in suburban or rural areas to be traded to an urban area site in the same policy area. This process would reduce our backlog of pipeline development and encourage a shift of near-term development from suburban to more efficient urban locations.

The evaluation of trading APF approvals results from an interest to both streamline the provision of transportation capacity and, over time, reduce the unused backlog of pipeline capacity that requires new development entering the queue to reflect the growth of the assumed 30 million square feet of approved commercial development already in the queue ahead of them. There are two general issues to describe in this analysis:

- The geographic areas between which APF validity could be traded, and
- The administrative methods to exchange the validity

Geographic Areas

Staff recommends that APF validity should be transferable only into urban areas and from the adjacent suburban or rural portions of the same PAMR policy area the urban area is within. So, for instance, a site in Germantown West with a valid APF approval but no plans to construct within the APF validity period could trade that APF capacity to a site in Germantown Town Center. However, APF could not be transferred from Germantown East to Germantown Town Center (as they are different PAMR areas); nor could APF be transferred from Germantown Town Center (an urban area) to Germantown West as this would reduce urban area development in favor of suburban area development.

Consider the recent case history for the application called Far North Village in the Germantown West policy area. Their APF validity was going to expire on November 28, 2008 and the applicant applied for extension of the validity period almost two years prior to November 28, 2008. The applicant needed the extension because they knew they were not going to implement their project within two years and they were not sure if they intend to change their design and density based on an ongoing master plan update in Germantown.

The Planning Board required the applicant to be tested for a new APF and renew it for another six years. Eventually, the applicant was tested again and obtained a new APF validity for six years. In this case, the applicant of Far North Village could trade their APF validity for the same number of vehicle trips they had obtained APF validity for to a new applicant who was ready to proceed with implementation of his/her project in Germantown Town Center.

Under the UATAPF scenario, some of the design and planning regulations must be modified to accommodate this request. All master plan recommendations relating to transportation design must be strictly enforced. This APF trading will facilitate the flexibility to pace and locate developments within the area.

The transfer of APF would be based on an equivalent to number of trips in both sending and receiving areas. For example if the sending location has been tested and obtained an APF approval for a development that generates 100 trips, the new location or receiving location within the urban area will receive approval for 100 trips of their development total generated trips. In case the receiving area is within an MSPA with lower trip generation rates, the transfer of the APF validity from adjacent policy area with higher trip generation rates will be equally transferred to the receiving location. For example, a 100,000 square foot office building in the Bethesda/Chevy Chase policy area generates 164 PM peak hour trips. If the APF for this building transferred to Bethesda CBD, it will be an equivalent of approval for a 110,000 square feet of office building in Bethesda CBD. The primary concern with this method would be the equity of re-evaluating transportation system requirements that were conditions of the sending development (and may have already been built). This concern should be alleviated in part by limiting the distance of the allowed transfer, only between urban areas and the adjacent policy areas.

Administrative Mechanisms

Four types of administrative mechanisms to address APF requirements for trading are described below.

- **Status quo: Multiple applicants share one improvement**

Currently, transportation improvements required for LATR may be the responsibility of more than one applicant. Each applicant affecting a substandard transportation element, such as an over-congested intersection, is conditioned to make the same improvement but whoever proceeds first with implementation of their project is responsible for completing the total improvements to gain building permits. The applicant who is making the total improvements must be compensated by other applicants responsible for the same improvement based on a pro-rata-share of their impact. The definition of pro-rata share is agreed to by the applicants themselves.

- **APF transfer within the Urban Areas and between Urban Areas and their adjacent Policy Areas.**

The recommended APF transfer process would require both sending and receiving area sites to concur on a joint set of preliminary plan applications to simultaneously "expire" the APF approval from the sending site and grant the equivalent APF approval for the receiving site. No extension of the validity period would be included in the transfer process. The applicants would need to agree on the fair market value of the transfer without any intervention from the public sector.

- **Transportation improvement cap and trade**

This policy would allow an applicant who provides more than the transportation capacity necessary to mitigate its impact, to transfer the excess transportation capacity for use of a second development or offer it "for sale" to the second applicant within the same policy area. If this policy is adopted for all areas and is not limited only to MSPAs, it encourages the applicants to provide more than necessary capacity at earlier stage of development (which means it could be provided at a lower cost). For example, the Montgomery General Hospital will likely design and construct a transit station that provides for more than their required trip mitigation. In this case, the excess credit created by the applicant could be transferred to another applicant at a value to be agreed upon between the two applicants.

At the time of review and implementation of the PAMR trip mitigation projects, the county would determine how much of that PAMR project counts for the mitigation requirement for the application being reviewed and how many additional trips were mitigated that can be applied to the applicant's second development or be sold to a different applicant for their use of PAMR trip mitigation.

- **Transportation mitigation bank**

A transportation mitigation bank similar to the Forest Conservation Bank (with modifications tailored for addressing the transportation facilities issues) could be set up to collect, spend, and keep track of all the resources to improve overall transportation in the county. In this model, the Montgomery General Hospital could theoretically collect a refund from the Transportation Mitigation Bank for the excess capacity being constructed. Any other applicant in the Olney Policy Area could then proceed by paying a deposit into the bank equivalent to the amount of capacity used.

Staff has three primary concerns with both the "cap and trade" and "mitigation bank" processes. These concerns relate to the fact that in either process, the government must be involved in establishing the value of transportation capacity in a constantly shifting market,

creating an ongoing debate about values similar to that experienced with the TDR and BLT processes.

First, unlike the Forest Conservation Bank, in which the exchange rate is always acres of forest, the multimodal and geographic aspect of transportation impacts and mitigation create a public acceptance challenge that all congested intersections or transit centers can be valued equally.

Second, this complexity requires establishment of:

- exchange currency (dollars, square feet of different types of land uses, or trips/VMT),
- cash flow management (how to incorporate construction escalation costs and completion dates into the valuation process)
- effect on taxes, fees, and credits

And finally, there is a concern that these approaches would appear to the public to be a return to the days of "pay and go".

On the other hand, the need to investigate creative infrastructure financing approaches and the equity, or "free rider" concerns associated with the fact that most infrastructure is "lumpy" suggest that the mitigation bank concept should be studied further. The concept of shared transportation infrastructure financing will be explored in the White Flint Sector Plan implementation proposals to replace LATR/PAMR exactions and taxes with a new system of assessments and fees. The carbon footprint cap and trade concepts explored in Appendix O warrant further review. And the emerging need for additional capital asset replacement and expansion, ranging from aging sewers to new transit vehicles, suggests that a comprehensive infrastructure mitigation bank might be feasible in the future and should be examined in the 2011 Growth Policy.

Growth Policy Study: Appendix L - Report on Current Jobs/Housing Balance (Resolution 16-376 F12d)

Lead Staff: Eric Graye and Pam Dunn

Summary:

- The County should continue to pursue jobs/housing balance initiatives based on literature documenting the potential for reduced vehicle travel in mixed-use communities, but it should be tempered with consideration of other trip generation characteristics.

- A preliminary analysis of a more balanced jobs/housing scenario prepared for the MWCOG CLRP Aspirations scenario indicates that countywide vehicle miles of travel (VMT) could be reduced by 16,000 VMT in a typical afternoon peak period as compared to the 2030 Round 7.2 demographic forecast. This reduction would be a step in the right direction, although the net effect is less than a one-percent change in Countywide VMT. Further review of this finding is needed, including the degree to which induced travel effects can be isolated.

- An improved balance of jobs and housing could have a marginal negative effect on housing affordability, as housing in our commercial activity centers tends to be less affordable than that in the housing-rich policy areas. These minor effects should be considered in the continuing development of affordable and workforce housing initiatives.

Jobs and housing units are considered to be "in balance" when there are roughly as many jobs as workers living in the County. On average, there are about 1.6 workers per household in Montgomery County, and roughly one household per housing unit. As a result, a ratio of 1.6 jobs per housing unit is considered "balanced".

A balance of jobs and housing is intended to meet two main goals: to provide an adequate number of employment opportunities for County residents, and to minimize the distance a worker has to travel to his or her job. These goals have important secondary affects: a balance of jobs and housing helps to minimize the impact of growth on the transportation network and helps improve housing affordability through reduced transportation costs. The County's current and forecast jobs/housing ratios are being calculated as part of the Round 7.2 forecast. These ratios will be evaluated in relationship to the new PAMR analysis. Evaluation of jobs/housing in relationship to PAMR by policy area can provide useful information on the significance of congestion thresholds or Master Plan Staging. For example, a policy area with PAMR mitigation over fifty percent and a

jobs/housing balance below .5 could indicate the need for either increased transit (due to the high proportion of households and low proportion of jobs), or prioritization of planned road improvements, or exemption from all/part of PAMR mitigation for high job growth development.

Over the past decade, the County and the region have moved to the current 1.6 jobs-per-housing unit ratio. This ratio is used by the Metropolitan Washington Council of Governments (COG). The Metropolitan Washington Council of Governments is currently developing a Constrained Long Range Plan (CLRP) "Aspirations" Scenario using the 1.6 ratio as a regional goal.

MWCOG CLRP Aspirations Scenario

The MWCOG CLRP Aspirations Scenario builds upon the MWCOG Regional Mobility and Accessibility (RMAS) Study, examining changes in both land use patterns and transportation scenarios. The RMAS study found that by shifting land uses, regional reductions in VMT of up to 1.3% could be effected.

Last fall, MWCOG has asked each jurisdiction to develop a CLRP Aspirations demographic scenario that retains the Round 7.2 jurisdictional "control" totals. Staff has developed this scenario using a set of assumptions to improve the jobs/housing balance to the extent practical at the Transportation Analysis Zone (TAZ) level while retaining the same general development totals within each TAZ as well as the Countywide totals for single-family residential units, multi-family residential units, office jobs, retail jobs, industrial jobs, and other jobs. This approach was developed in the interest of isolating the jobs/housing balance from other independent variables (such as total development levels in each TAZ) to the extent possible, rather than shifting assumed development capacity from one part of the County to another.

Table 1 shows the jobs and housing estimates for 2009, the Round 7.2 Cooperative Forecast for 2030, and the CLRP Aspirations Scenario for 2030. In general, most Policy Areas have J/HH balances that are slightly closer to 1.6 in the CLRP Aspirations Scenario than in the Round 7.2 Cooperative Forecast. The number of logical and mathematical constraints in the exercise, however, preclude all Policy Areas from moving meaningfully toward 1.6. For example, Aspen Hill has limited opportunities for commercial development, so the J/HH ratio moves only from 0.25 in the Round 7.2 forecast to 0.28 in the CLRP Aspirations scenario.

In general, the effect of the CLRP Aspirations scenario is to "shift" about 5,000 dwelling units from the rural areas and eastern parts of the County into the I-270 corridor and the urban ring and shift about 10,000 jobs in the reverse direction.

Transportation Effects

The Policy Area Mobility Review (PAMR) test has been adopted as a long-range planning tool to assess the long-range balance between land use and transportation in master plans. Table 2 presents the PAMR-related data for the scenario that assumes the 2030 Round 7.2 demographic forecast in combination with the 2030 CLRP network (including the Purple Line between Silver Spring and New Carrolton). Table 3 presents comparable data for the scenario that assumes the 2030 Round 7.2 "balanced J/H" scenario in combination with the same 2030 CLRP network.

VMT is a key component of the PAMR analysis. As can be observed, Countywide VMT (for local roadways) is only marginally reduced (by less than 1%) under the 2030 CLRP Aspirations scenario as compared to the 2030 Round 7.2 forecast. As shown in Figures 2 and 3, the CLRP Aspirations scenario reduces PM peak period VMT by about 16,000 vehicles on a typical weekday. Before proceeding further with a determination of the PAMR implications of these alternative demographic forecasts, the VMT results developed thus far warrant additional review by staff. Our preliminary findings are generally consistent with the results of the MWCOG RMAS study, but neither study has found the level of reduction solely attributed to jobs/housing balance that might be desired.

Several considerations affecting VMT reductions associated with land use changes warrant further examination. Perhaps the most significant consideration is the degree to which future jobs/housing balance examinations should consider transit-orientation along our line-haul transit systems, including Metrorail, MARC, and the CCT and Purple Line. For instance, the CLRP Aspirations scenario results in a much better J/HH balance for the Shady Grove Policy Area (the 0.98 J/HH ratio in Round 7.2 is further from the 1.6 ideal than the 1.88 J/HH ratio in the CLRP Aspirations Scenario). However, in keeping development totals constant, the CLRP Aspirations scenario resulted in a reduction of total residential units at Shady Grove (from 5,564 to 3,792), which, as an isolated example, is not an effective tool to shift transit ridership by residences.

The complexity of independent variables can complicate the interpretation of results. For instance, if households are "moved" from an area that has a lower auto ownership level (say, Aspen Hill at 1.7 cars per household) to an area with a higher auto ownership level (say, Gaithersburg and Vicinity at 1.8 cars per household), the trip generation rates per household may be adversely affected. Finally, an increased proximity of jobs and housing may shorten some trips, but the resultant roadway capacity generated may be filled by other travelers.

Table 2: 2030 Round 7.2 Forecast PAMR Table

Derivation of Year 2030 Rnd 7.2 PAMR Results by Policy Area

			Relative Arterial Mobility				Relative Transit Mobility		
Policy Area	VMT	VHT (free-flow)	VHT (congested)	Free-Flow Speeds	Congested Speeds	Relative Arterial Mobility	Average Arterial Travel Time	Average Transit Travel Time	Relative Transit Mobility
Aspen Hill	192,139	5,839	12,513	32.9	15.4	47%	40.4	52.0	78%
Bethesda/Chevy Chase	396,059	15,559	38,733	25.5	10.2	40%	31.4	39.2	80%
Clarksburg	108,435	3,509	5,916	30.9	18.3	59%	38.0	65.6	58%
Cloverly	95,485	2,391	3,541	39.9	27.0	68%	43.8	55.8	78%
Damascus	88,466	2,190	3,750	40.4	23.6	58%	48.0	87.4	55%
Derwood/Shady Grove	145,531	4,997	11,346	29.1	12.8	44%	36.7	47.6	77%
Fairland/White Oak	383,224	10,108	27,422	37.9	14.0	37%	40.0	57.8	69%
Gaithersburg City	254,930	9,226	23,068	27.6	11.1	40%	33.4	53.5	62%
Germantown East	115,126	3,886	5,941	29.6	19.4	65%	35.7	58.7	61%
Germantown West	159,260	5,288	7,936	30.1	20.1	67%	35.9	60.3	60%
Kensington/Wheaton	472,655	14,874	33,502	31.8	14.1	44%	37.2	44.0	85%
Montgomery Village/Airpark	160,668	5,365	9,071	29.9	17.7	59%	39.9	56.8	70%
North Bethesda	243,100	10,494	26,088	23.2	9.3	40%	25.9	40.2	64%
North Potomac	66,808	2,484	4,173	26.9	16.0	60%	39.8	59.9	66%
Olney	165,409	4,659	9,474	35.5	17.5	49%	46.2	60.6	76%
Potomac	199,655	5,955	15,250	33.5	13.1	39%	38.4	56.7	68%
R & D Village	70,508	3,130	6,780	22.5	10.4	46%	29.0	49.6	58%
Rockville City	277,028	11,652	29,402	23.8	9.4	40%	32.3	45.9	70%
Silver Spring/Takoma Park	275,029	10,435	24,039	26.4	11.4	43%	33.6	38.8	87%
Rural East	601,615	15,316	32,335	39.3	18.6	47%	46.0	64.2	72%
Rural West	238,539	6,489	9,449	36.8	25.2	69%	46.6	70.2	66%
Montgomery County Total	4,709,669	153,846	339,729	30.6	13.9	45%	37.0	47.9	77%

Relative Arterial Mobility measures total PM Peak Period vehicular travel on arterial roadways within each policy area
Relative Transit Mobility measures AM Peak Period travel times for journey-to-work trips originating within each policy area
VMT = Vehicle Miles of Travel
VHT = Vehicle Hours of Travel

Table 3: 2030 Round 7.2 "Balanced" Forecast PAMR Table

Derivation of Year 2030 "Balanced J/H Ratio" PAMR Results by Policy Area

			Relative Arterial Mobility				Relative Transit Mobility		
Policy Area	VMT	VHT (free-flow)	VHT (congested)	Free-Flow Speeds	Congested Speeds	Relative Arterial Mobility	Average Arterial Travel Time	Average Transit Travel Time	Relative Transit Mobility
Aspen Hill	190,180	5,776	12,106	32.9	15.7	48%	39.4	52.0	76%
Bethesda/Chevy Chase	401,272	15,486	38,822	25.9	10.3	40%	31.6	39.0	81%
Clarksburg	106,417	3,460	5,706	30.8	18.7	61%	33.2	63.7	52%
Cloverly	95,028	2,379	3,488	39.9	27.2	68%	42.6	55.2	77%
Damascus	89,434	2,214	3,841	40.4	23.3	58%	42.9	89.2	48%
Derwood/Shady Grove	143,130	4,896	10,602	29.2	13.5	46%	35.1	48.1	73%
Fairland/White Oak	382,466	10,090	27,086	37.9	14.1	37%	39.1	57.6	68%
Gaithersburg City	249,526	9,324	22,571	26.8	11.1	41%	31.4	52.8	59%
Germantown East	112,375	3,868	5,724	29.1	19.6	68%	32.0	57.7	55%
Germantown West	156,968	5,313	8,006	29.5	19.6	66%	32.4	58.5	55%
Kensington/Wheaton	470,635	14,790	33,052	31.8	14.2	45%	36.8	44.3	83%
Montgomery Village/Airpark	158,918	5,307	8,917	29.9	17.8	60%	37.4	56.4	66%
North Bethesda	240,233	10,279	24,743	23.4	9.7	42%	28.1	41.0	69%
North Potomac	63,267	2,406	3,713	26.3	17.0	65%	38.3	59.7	64%
Olney	168,249	4,594	9,081	36.6	18.5	51%	43.8	60.7	72%
Potomac	196,972	5,803	14,346	33.9	13.7	40%	37.9	56.5	67%
R & D Village	70,888	3,144	6,514	22.5	10.9	48%	28.0	51.3	55%
Rockville City	288,821	11,385	28,679	25.4	10.1	40%	31.6	46.2	68%
Silver Spring/Takoma Park	273,913	10,388	23,795	26.4	11.5	44%	34.0	39.1	87%
Rural East	600,329	15,313	31,971	39.2	18.8	48%	43.5	63.4	69%
Rural West	234,831	6,379	9,087	36.8	25.8	70%	44.4	70.1	63%
Montgomery County Total	4,693,852	152,594	331,850	30.8	14.1	46%	35.6	47.4	75%

Relative Arterial Mobility measures total PM Peak Period vehicular travel on arterial roadways within each policy area
Relative Transit Mobility measures AM Peak Period travel times for journey-to-work trips originating within each policy area
VMT = Vehicle Miles of Travel
VHT = Vehicle Hours of Travel

The CLRP Aspirations scenario results in shifting assumed year 2030 jobs and housing to provide better localized balances between jobs and housing, with a general shift of housing from the eastern part of the County into the I-270 corridor. Shifting housing from areas where housing is generally more affordable to areas where prices are higher might be assumed to increase average housing costs.

The net effect of the CLRP Aspirations scenario might be expected to increase average housing prices slightly, although our analysis indicates the increase might be less than 1%. Table 4 shows an analysis of the weighted average housing prices (in 2008 dollars) for the County, using housing sales for fiscal year 2008 as a base.

The FY 2008 median sales prices (combined single-family detached, single-family attached, and condo units) vary by policy area from $302,700 in Germantown West to $1.3 million in Darnestown/Travilah. An estimated typical sales price for the County was obtained for each of the scenarios by weighting the FY 2008 sales price for each policy area by the number of households assumed in the three scenarios.

This process yields an estimated typical sales price of $481,800 for 2009 households. The 2030 Round 7.2 forecast average is a bit lower, at $474,034, based primarily on the fact that future housing will have a higher mix of smaller units than the current housing stock has. The CLRP Aspirations scenario has a typical sales price of $474,980, a very minor increase of less than one percent above the Round 7.2 scenario.

Growth Policy Study: Appendix M –Potential Changes to the APF Tests for Transportation and School Adequacy

Lead Staff: Shahriar Etemadi and Pam Dunn

Summary:

Changes to the APF tests for transportation adequacy should include a revision to PAMR Arterial LOS standards, establishment of new trip generation rates and transportation impact taxes for urban residential uses, and the development of an Alternative Review Procedure for PAMR that will allow satisfaction of PAMR requirements through arterial-specific mobility improvements. Special procedures in White Flint will replace PAMR and LATR with taxes/assessments and a cap on long-term parking spaces. Changes to the APF test for schools will adjust the threshold for school facilities payments.

The retention of the Adequate Public Facilities review for transportation and school facilities remains an important element of the development approval process. Staff analyzed alternatives to LATR and PAMR in both the 2007 Growth Policy and the 2008 subsequent studies and did not find a better framework on which to build the APF process. Therefore, staff recommends the retention of the basic Local Area Transportation Review (LATR) and Policy Area Mobility Review (PAMR) tests as well as the school test.

However, staff did evaluate revisions to the currents tests such as threshold changes for both transportation congestion and school capacity, development of a cordon-line method exemption and a parking cap method exemption from PAMR and LATR, and review of adequacy tests for other public facilities. In addition, impact tax calculations were analyzed with respect to changing the transportation impact tax calculation based on trips to one based on VMT.

Staff believes that the LATR and PAMR processes can be improved through several policy-related changes that could incentivize high-quality, transit-oriented growth and streamline development review processes where appropriate. Staff has started to pursue some of these recommendations as part of the White Flint and Gaithersburg West master planning processes.

1. Definition of Adequacy

Transportation:

Policy Area Mobility Review establishes criteria for Relative Transit Mobility and Relative Arterial Mobility that are based on Level of Service (LOS) criteria published by the Transportation Research Board in the *Highway Capacity Manual* (2000) and the *Transportation Capacity and Quality of Service Manual* (2003). The details of the PAMR process are contained in the Planning Board's LATR/PAMR Guidelines.

As PAMR was developed in the 2007, both staff and the Planning Board recommended in 2007 that the relationship between Transit LOS and Arterial LOS in the PAMR process be "symmetrical" as shown in Table 1.

Table 1. PAMR "Symmetrical" LOS Standards

If Transit LOS is	Then Arterial LOS Must Be
F	A
E	B
D	C
C	D
B	E
A	F

Staff retains the position stated in 2007 that the application of symmetrical LOS supports the argument that the provision of multimodal transportation service is applied equitably throughout the County. Of course, the County Council has the prerogative to establish adequacy thresholds, and jurisdictions nationwide use alternative LOS criteria, including both LOS E (as the Council established as the minimum acceptable PAMR Transit LOS) and LOS D (as the Council established as the minimum acceptable PAMR Arterial LOS).

From a more practical perspective, staff recognizes that on an areawide basis, it is extremely unlikely that any policy area will experience LOS A or LOS F conditions for either Arterial LOS or Transit LOS. The pragmatic question is therefore whether or not LOS E arterial conditions should be appropriate for areas with LOS B transit service. Staff finds that LOS E conditions are appropriate for two reasons.

First, from a technical perspective, **LOS E is the condition at which the throughput of a roadway facility is maximized**. This is somewhat counterintuitive simply due to the fact that the LOS grading system is oriented toward the customer. For the customer, LOS A represents the least delay, and therefore the best level of service. Provision of LOS A service to all customers, however, is not practical from either fiscal or community-building perspectives. Most jurisdictions across the country require conditions ranging from LOS C to LOS E.

Second, from a community-building perspective, the establishment of more stringent LOS requirements in urban areas can create pressures to widen roadways to provide auto capacity, an action which not only uses valuable property but also tends to reduce pedestrian comfort and accessibility. In the White Flint Sector Plan, staff has recommended that the end-state conditions, which would result in Transit LOS B and Arterial LOS E conditions, should reflect an appropriate balance between land use and transportation.

Adopting symmetrical LOS standards would reduce the amount of anticipated PAMR mitigation by removing five policy areas (Bethesda/Chevy Chase, Derwood, Kensington/Wheaton, Olney, and Silver Spring/Takoma Park) from the "partial mitigation" category and reducing the percent mitigation requirements in three others (Aspen Hill, Rockville City, and North Bethesda).

Figure 1 shows the current PAMR "chart" identifying Policy Areas requiring both full mitigation and partial mitigation and Figure 2 shows the same chart with the "Symmetrical LOS" standards.

Both Figures 1 and 2 show the forecasted conditions for each policy area under the FY 10 conditions approved by the Planning Board in May 2009. In other words, the policy area "dots" on the chart are the same in both Figures 1 and 2, but the lines representing the boundaries between "acceptable", "acceptable with partial mitigation", and "acceptable with full mitigation" are different.

Figures 3 and 4 provide a graphic comparison of the approved FY 10 mitigation requirements by policy area and those that would apply under the staff proposal for symmetrical LOS standards.

Figure 1. Current PAMR Chart for FY 10

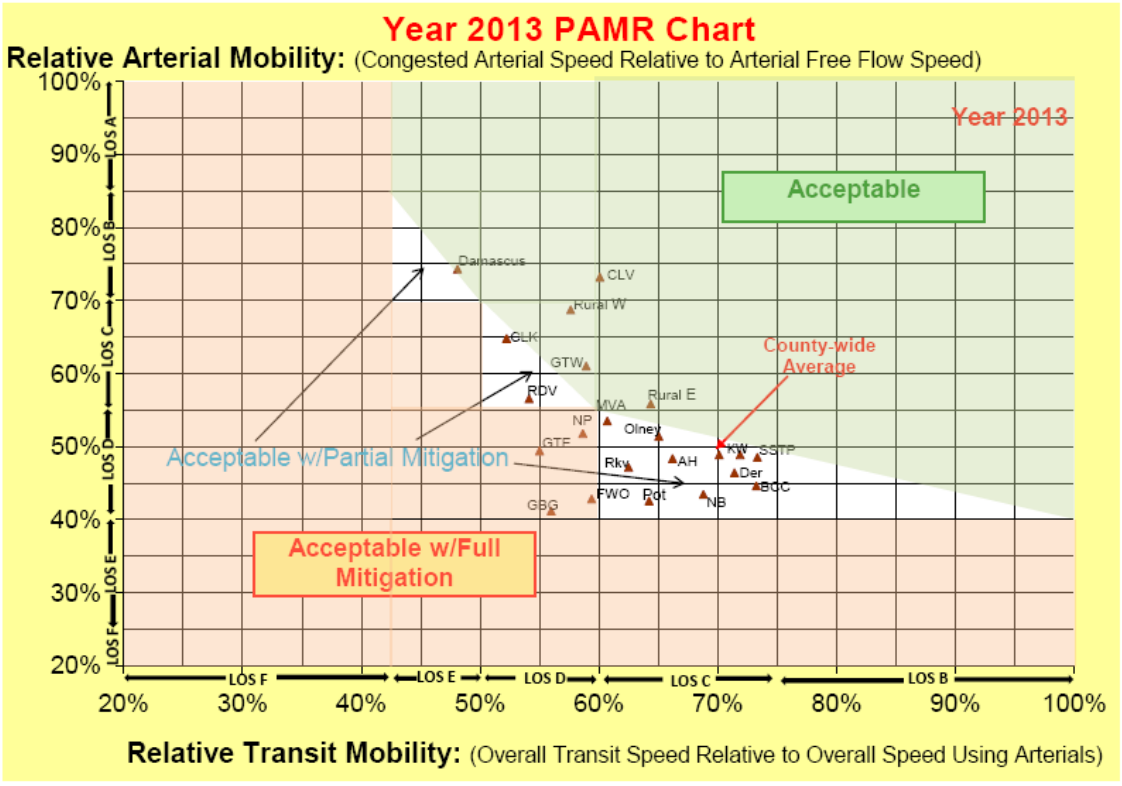


Figure 2. PAMR Chart for FY 10 with Proposed "Symmetrical LOS"

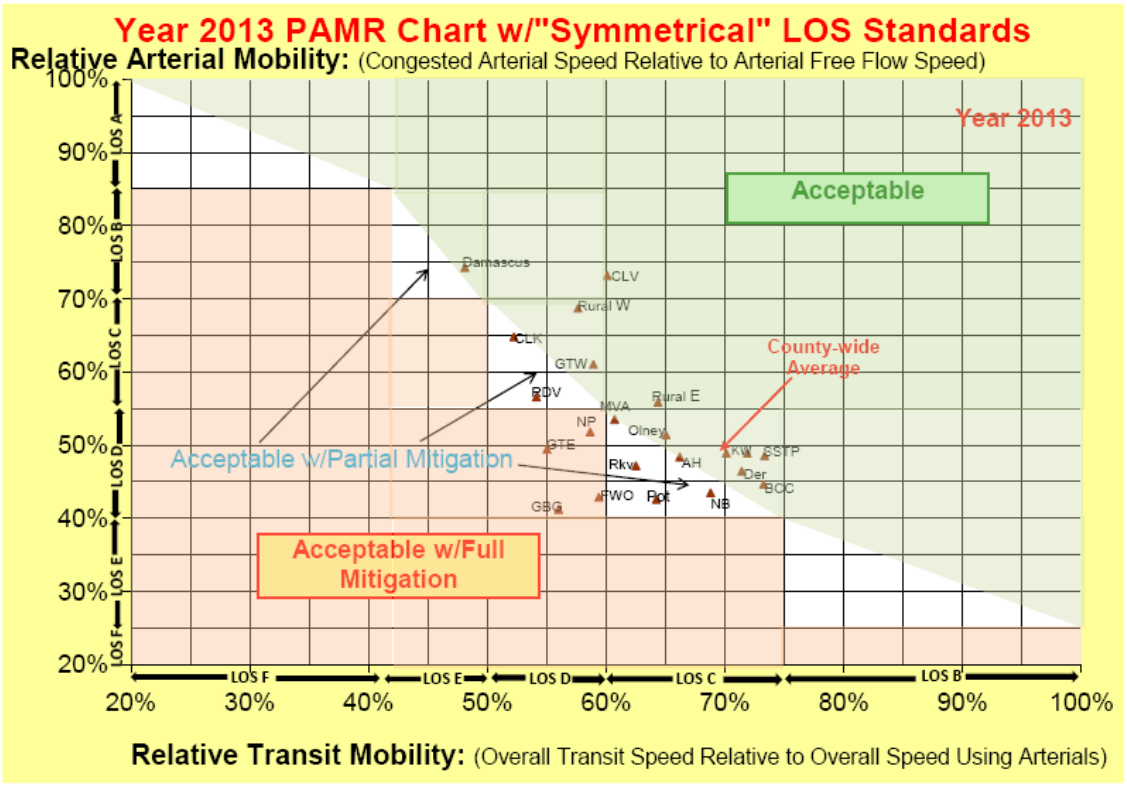


Figure 3. Current PAMR Mitigation Requirements for FY 10

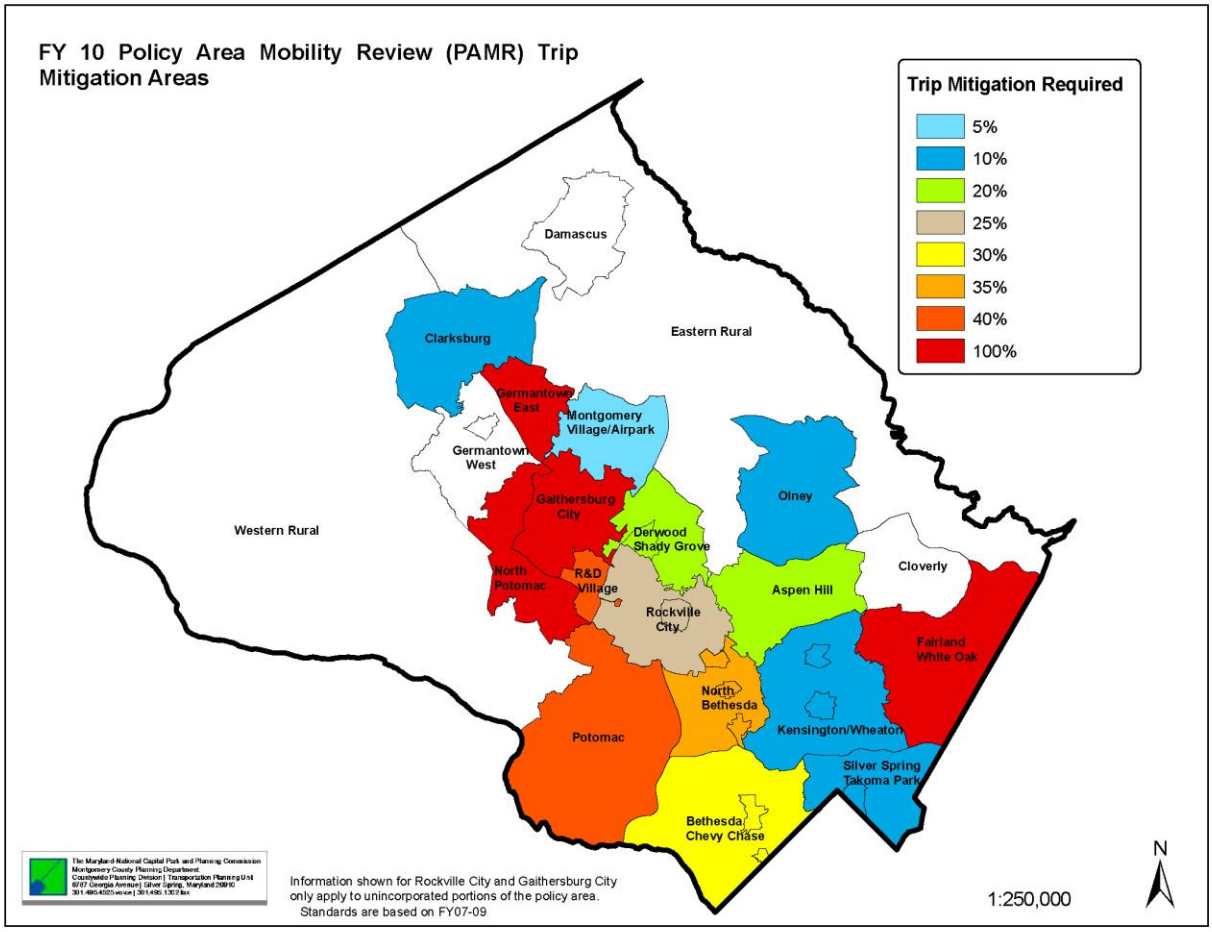
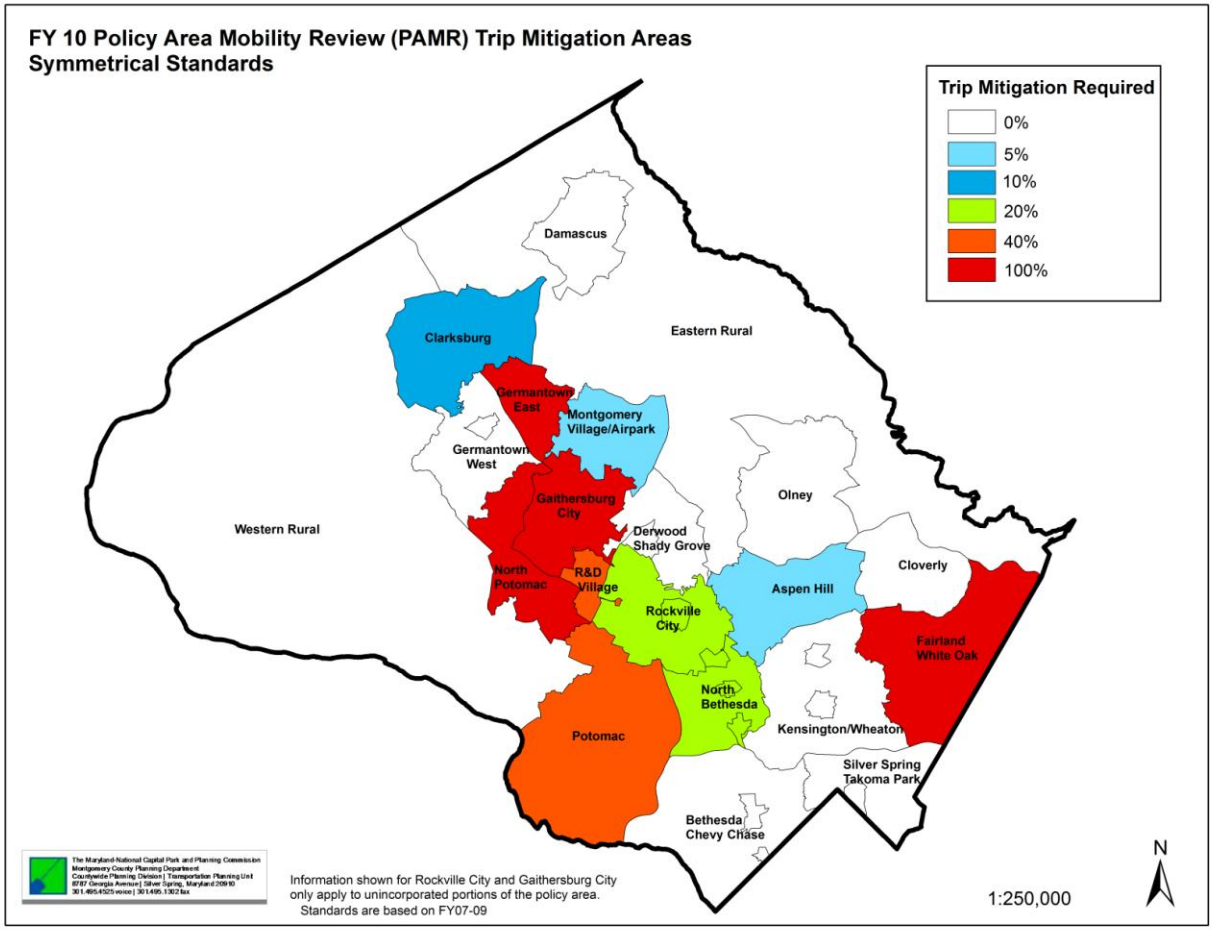


Figure 4. PAMR Mitigation Requirements for FY 10 with Proposed "Symmetrical LOS"



Changes to certain Policy Area boundaries to better define transit station services areas are recommended in the draft White Flint, Germantown, and Gaithersburg West master plans as described in Appendix H. These changes would revise LATR congestion standards at intersections within the expanded boundaries.

Schools:

The 2007-2009 Growth Policy established the definition of capacity as the MCPS program capacity in a high school cluster at each level: elementary, middle, and high. The practice of 'borrowing' excess capacity from adjacent clusters at the high school level was eliminated. Borrowing at the middle and elementary school levels was eliminated in the 2003-2005 Growth Policy. In addition, currently, a cluster goes into a residential moratorium if its enrollment 5 years from now would exceed 120 percent of cluster-wide program capacity at any level. For

FY2010, residential development in the B-CC, Clarksburg and Seneca Valley clusters will be in moratorium.

A residential subdivision is required to make a School Facilities Payment if its enrollment 5 years from now would exceed 105 percent of cluster-wide program capacity at any level but would be less than 120 percent. In FY2010, residential development in 9 clusters will require a School Facilities Payment to proceed: Walter Johnson, Richard Montgomery, Northwest, Northwood, Paint Branch, Quince Orchard, Rockville, Wheaton and Whitman.

Staff recommends that the test for the adequacy of public school facilities be revised so that the threshold that triggers a School Facilities Payment is 110 percent of MCPS program capacity. Capacity deficits of 5 percent are typically just below the amount that would prompt an MCPS facility adjustment, such as an addition. At 110 percent, the School Facility Payment threshold more closely relates to facility programming in the CIP.

Staff does not recommend any changes to School Facility Payment rate. For FY2010, the costs per unit type are shown in Table 2:

Table 2. School Facility Payment Rates for FY 2010

Cost per unit by housing type	Elementary	Middle	High
Single-family detached	$6,245	$3,659	$3,734
Single-family attached	$4,118	$3,100	$3,050
Multi-family garden apt.	$2,986	$1,423	$2,081
High-rise; low-rise w/structured parking	$820	$991	$941

The Planning Board and the Montgomery County School Board recommended a 110 percent School Facility Payment threshold during the 2007-2009 Growth Policy deliberations. Both Boards also proposed a 135 percent capacity ceiling. Staff does not recommend changing the threshold for moratorium at this time.

In addition, staff does not recommend changing the De Minimis, senior housing or enterprise zone exemptions. Currently, subdivisions of three units or fewer are exempt from the school adequacy test, as is senior housing. The School Facilities Payment is waived in an enterprise zone (Wheaton CBD and Long Branch) or an area that was formerly an enterprise zone (Silver Spring CBD). Staff does not recommend changing these parameters.

2. **Definition of De-Minimis Thresholds**

Transportation

The 2007 Growth Policy established a de-minimis threshold of 3 vehicle trips to trigger PAMR mitigation. The staff and private sector efforts required to define mitigation measures for small (< 30 vehicle trip) applications was not practical, with public sector review costs often exceeding the value of the mitigating action. The Planning Board determined in July 2008 that payment-in-lieu of $11,000 per vehicle trips for applicants generating between 3 and fewer than 30 vehicle trips is an appropriate solution.

Staff proposes at this time that no change be made to the De-Minimis PAMR threshold, as:

- The Planning Board's 2008 approach to accept payment-in-lieu for applications generating less than 30 peak hour trips improves predictability and efficiency for smaller applications
- Staff proposes to expand the Alternative Review Procedure options to mitigate PAMR requirements, including those described elsewhere in Appendix M and in the smart growth criteria in Appendix N.

Schools

The 2007 Growth Policy established a De Minimis threshold of greater than three units to apply the cluster capacity test.

Staff does not recommend changing the De Minimis provision at this time.

3. **Adjustments to Acceptable Peak Hour Vehicle Trip Rates**

Staff recommends the development of a new peak hour vehicle trip generation rate for residential developments in urban areas as defined by Section 49 of the County Code. These urban areas are locations in the County where street and highway designs are particularly tailored to a pedestrian environment, including wider sidewalks and slower targeted travel speeds. This environment must be created in part by the promotion of urban land uses, development designs, and pedestrian activity levels. Each of the urban areas already has a base of commercial development that provides some basic services and a level of transit service higher than the surrounding suburban development. These urban areas are also locations where appropriately scaled transportation improvements should be based on best available estimates of forecast traffic demand to avoid implementing more capacity for auto travel than will be needed as development comes online.

The LATR/PAMR Guidelines contain vehicle trip generation rates appropriate for developments in Montgomery County. The LATR/PAMR trip generation rates were developed based on data collection efforts conducted for developments countywide, primarily during the 1980s. Separate trip generation rates were developed for the Silver Spring, Bethesda, and

Friendship Heights CBDs as sector plans for those areas were adopted in the 1990s. A discounting factor is available for offices near Metrorail stations to reflect the higher transit mode share at those locations.

The LATR/PAMR Guidelines contain county-specific trip generation rates for 12 land uses:

- General office
- General retail
- Fast food restaurants
- Single-family detached residential
- Townhouses
- Garden and mid-rise apartments
- High rise apartments
- Private schools
- Automobile filling stations
- Independent and assisted living facilities
- Mini-warehouse
- Child day-care center

For other land uses, applicants are directed to data in the report *Trip Generation*, published by the Institute of Transportation Engineers (the 8th edition was published in fall 2008). The ITE *Trip Generation* rates are based on data collected in studies nationwide, and reflect a wide range of socioeconomic environments. The separate rates in the LATR/PAMR Guidelines reflect the fact that conditions in Montgomery County are different from conditions in many areas of the country, particularly considering that Montgomery County's household income, education, and available transit services are above nationwide averages. The LATR/PAMR Guidelines also note that staff may consider case-by-case adjustments from the approved trip generation rates if the adjustment can be documented from reliable sources that reflect the type of use and environmental conditions that are comparable to the proposed development.

During the last two years, there has been interest in developing special trip generation rates that could be applied to other areas such as White Flint or Wheaton. In particular, the dynamics of internal trip capture for mixed-use developments creates potential for reducing vehicle-miles of travel in a suburban activity center. The LATR/PAMR Guidelines support the use of internal capture methodology in the ITE *Trip Generation: A Recommended Practice*, in which the synergy between office, retail, and residential development in a development is reflected by subtracting vehicle trips based on the relative amounts of each type of development. This methodology is based in large part on research conducted as part of NCHRP Report 323, *Travel Characteristics at Large-Scale Suburban Activity Centers*, completed in 1989.

Substantial literature suggests that a diversity of uses is a trip-reducing variable with a stronger relationship for reducing trip generation than is reflected in current NCHRP or ITE documents,

but that further study would be needed to develop a significant relationship appropriate for development review purposes.

This need for more comprehensive and current information on mixed use development is the basis for NCHRP Study 08-51, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments. This study will present a classification system for mixed-use developments to enhance the internal capture estimation process and is scheduled to be completed during the summer of 2009.

Staff has evaluated available data resources on trip generation rates and recommends:

- establishing a new **LATR/PAMR Guidelines peak hour trip generation rate for all residential development in the County's urban areas that is 18% lower than that for countywide rates**, based on information obtained by the Metropolitan Washington Council Governments (MWCOG) 2008 Household Travel Survey and supported by guidance documents for the use of California Environmental Quality Act environmental assessments.
- conducting **further study for the 2011-2013 Growth Policy on additional changes to trip generation rates for commercial and mixed-use development**, including
    - review and incorporation of NCHRP Project 08-51 findings,
    - collection of selected local trip generation data based on gaps anticipated in NCHRP Project 08-51, particularly relating to differences between community-serving retail and regional destination retail uses.

<u>Comparison of Local Trip Generation Guidelines with TCRP Report 128</u>

Staff also reviewed Transit Cooperative Research Project (TRCP) Report 128, *Effects of TOD on Housing, Parking, and Travel*. This research report, released by the Transportation Research Board in fall 2008, contains data collected at 17 transit-oriented developments nationwide, including two sites in Montgomery County (the Avalon at Grovesnor Station and the Lenox Apartments in the Silver Spring CBD), and derives certain trip generation relationships that are similar to those already incorporated in our LATR/PAMR Guidelines.

Staff concurs with the basic findings of TCRP Report 128:

- Vehicle trip generation rates for transit-oriented development are substantially lower than those in the ITE *Trip Generation*
- A positive relationship should be expected between lowered trip generation rates and each of the following independent variables: accessibility to high-quality transit, restricted on-site parking, and proximity to the regional center.
- A reduction in parking requirements for TOD can improve development efficiency by reallocating scarce resources (both in terms of physical space and

construction/maintenance costs) from parking to either additional smart growth development or other on-site amenities.

Staff has drawn three additional conclusions that are not included in TCRP Report 128:

- For the most urban densities, the LATR/PAMR Guidelines already have trip generation rates substantially lower than the ITE *Trip Generation* rates, and our current rates remain appropriate.
- For TOD in more suburban locations, the LATR/PAMR Guidelines rates are lower than ITE rates, but slightly higher than the average rates found in TCRP 128.
- TCRP Report 128 concludes that the lower vehicle trip generation rates for TOD should result in a lowering of traffic-related impact fees or exactions. Staff finds that because TOD generate a higher amount of transit ridership, the prudent course of action may be not to lower transportation fees, but rather to **shift both the fee assessment basis and the application of fee and exaction revenue for TOD toward transit service improvements**, particularly in considering funding for capital expansion projects such as the Corridor Cities Transitway and BRT improvements that are planned along Veirs Mill Road and Georgia Avenue and being studied on other corridors throughout the county.

For comparison purposes, consider the relationship between the two sites observed in Montgomery County.

Table 3. Montgomery County Sites in TCRP Report 128

	Avalon (Grosvenor)	Lenox Apartments (Silver Spring CBD)	Average of TCRP Report Sites
Number of units	497	406	288 (median)
Height (floors)	4	16	4 (median)
Distance to rail transit	1,000’	400’	920’ (median)
AM Peak Hour Trip Generation Rate (vehicle trips per unit)			
TCRP Report Observed	0.44	0.18	0.28
ITE Trip Generation Rate	0.55	0.55	0.54
LATR/PAMR Trip Generation Rate	0.41	0.30	0.36
PM Peak Hour Trip Generation Rate (vehicle trips per unit)			
TCRP Report Observed	0.37	0.22	0.39
ITE Trip Generation Rate	0.67	0.67	0.66
LATR/PAMR Trip Generation Rate	0.47	0.30	0.39

Table 3 indicates that the LATR Trip Generation Rates are appropriate for high rise residential units (which are almost by definition located in areas well served by transit) and the Bethesda,

Silver Spring, and Friendship Heights CBDs. The average results from the two sites in Montgomery County have exactly the same observed peak hour trip generation rate (0.39 for the PM peak period) as the LATR/PAMR Guidelines would yield. The Lenox Apartments have a lower observed trip generation rate than the LATR/PAMR Guidelines would yield, but are located only 420' from the Silver Spring Metrorail station and have only one on-site parking space per unit, both characteristics that would be expected to lower trip generation rates even below the average TOD trip generation rate.

The LATR/PAMR Guidelines PM peak period trip generation rate outside of Bethesda, Silver Spring, or Friendship Heights are 0.48 trips per unit for apartments and 0.83 trips per unit for townhouse developments, higher than the TCRP Report averages but lower than the ITE *Trip Generation* rates.

TCRP 128 contains suggested adjustments to ITE trip generation rates for TOD that would appear to be promising in reflecting independent variables such as the walking distance to transit and the number of parking spaces per unit. Unfortunately, the regression formulae developed have very limited application to Montgomery County development. The most promising trendline linked trip rates to density and walking distance to transit, but would result in a negative trip generation rate for communities with a density of more than 25 units per acre (such as Bethesda and Silver Spring). The conclusions regarding walking distance to transit, parking ratios, and distance to the regional core appear somewhat supported by anecdotal evidence, although none of the regression analyses cited have an R-squared value of more than 0.21 for both AM and PM peak hours. Staff therefore does not recommend directly adopting any of the trip generation rates for wholesale use in development review.

Review of URBEMIS Application

URBEMIS (short for Urban Emissions) is an air quality application tool developed in 2005 by the California Air Resources Board for use in the evaluation of California Environmental Quality Act (CEQA) environmental analysis of land use projects. The tool allows users to adjust ITE trip generation rates to reflect the effect of local environmental variables such as density, diversity, and design elements as well as other travel demand mitigation proposals. The URBEMIS model itself is very complex, applying hundreds of input variables (including development construction phases in addition to end-state conditions) calibrated for use in California jurisdictions.

The URBEMIS model does provide insight as to the state-of-the-practice for CEQA applications. Figure 5 shows a summary of trip reduction potential credits for different physical and operating measures excerpted from an URBEMIS user's guidebook, "Crediting Low Traffic Developments", published by Nelson-Nygaard Consultants in 2005.

Figure 5. Summary of URBEMIS Trip Reduction Potential

	Residential (1)	Non-Residential
Physical Measures		
Net Residential Density	Up to 55%	N/A
Mix of Uses	Up to 9%	Up to 9%
Local-Serving Retail	2%	2%
Transit Service	Up to 15%	Up to 15%
Pedestrian/Bicycle Friendliness	Up to 9%	Up to 9%
Physical Measures subtotal	*Up to 90%*	*Up to 35%*
Demand Management and Similar Measures		
Affordable Housing	Up to 4%	N/A
Parking Supply (2)	N/A	No limit
Parking Pricing/Cash Out	N/A	Up to 25%
Free Transit Passes	25% * reduction for transit service	25% * reduction for transit service
Telecommuting (3)	N/A	No limit
Other TDM Programs	N/A	Up to 2%, plus 10% of the credit for transit and ped/bike friendliness
Demand Management subtotal (4)	*Up to 7.75%*	*Up to 31.65%*

Notes:
(1) For residential uses, the percentage reductions shown apply to the ITE average trip generation rate for single-family detached housing. For other residential land use types, some level of these mitigation measures is implicit in ITE average trip generation rates, and the percentage reduction will be lower.
(2) Only if greater than sum of other trip reduction measures.
(3) Not additive with other trip reduction measures.
(4) Excluding credits for parking supply and telecommuting, which have no limit.

The LATR/PAMR Guidelines rates already account for the residential density credits (as noted in the footnote, the 55% percentage reduction is taken from a single-family detached housing rate). Figure 5 does indicate the potential for trip generation reductions for mix of uses (up to 9%), local serving retail (2%) and pedestrian/bicycle friendliness (up to 9%), elements that are not explicit in the LATR/PAMR Guidelines rates. This information supports the staff recommendation that standard trip generation rates in the County's urban areas be reduced by 18% from the general Countywide rates.

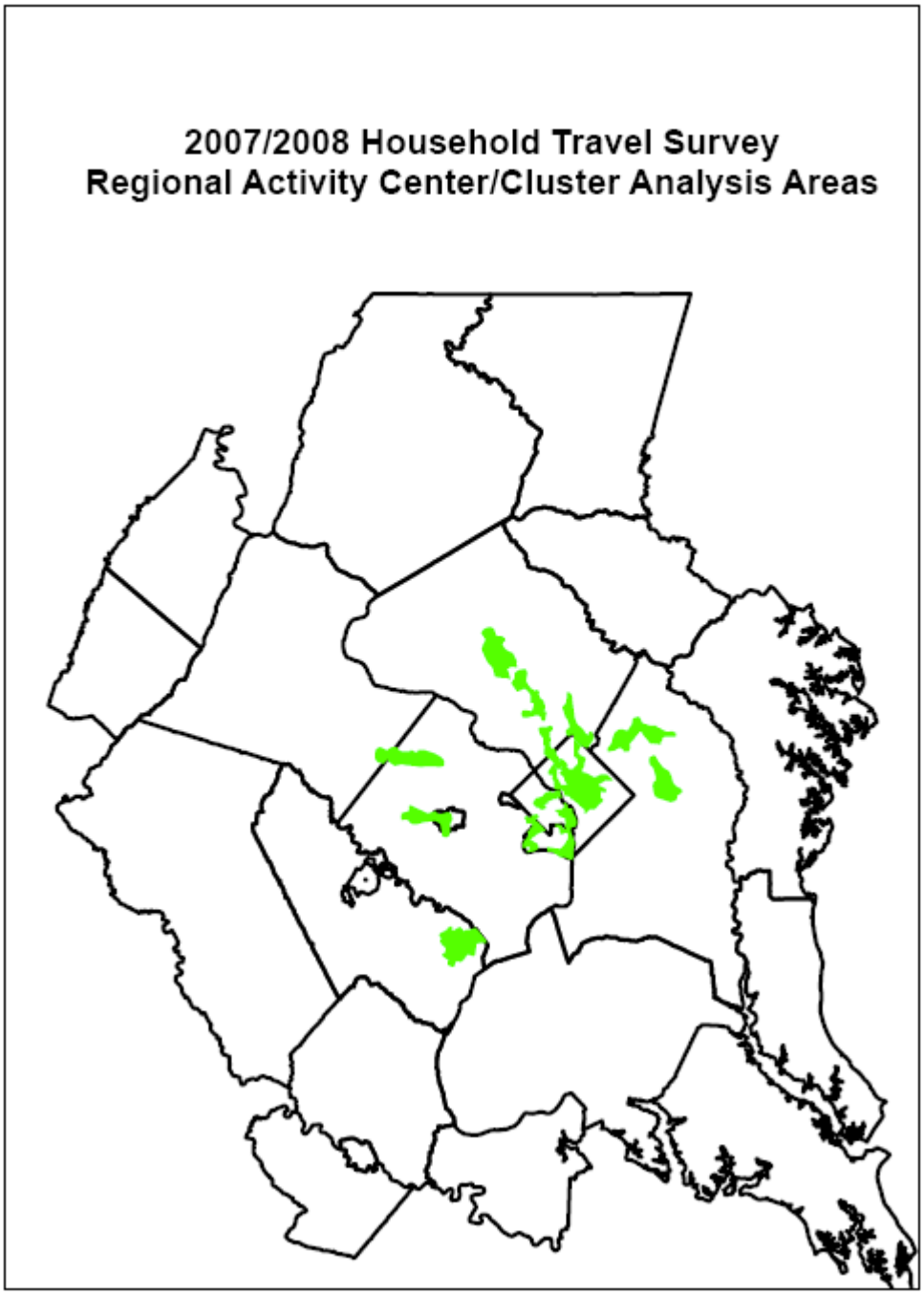
MWCOG Household Travel Survey

The Metropolitan Washington Council of Governments (MWCOG) conducted a survey of 11,000 households between February 2007 and March 2008 to identify areawide travel patterns. Preliminary reports from the survey effort are being released during spring and summer 2009. One of the initial results is the report on daily vehicle trip generation and VMT comparisons between residents in the region's Regional Activity Centers and Clusters compared to those who reside outside of the activity center areas.

Figure 6 shows the areas in the MWCOG region identified as Regional Activity Centers and Clusters. In Montgomery County, these areas include:

- Most of the Silver Spring/Takoma Park policy area west of Sligo Creek
- The Georgia Avenue corridor from Forest Glen to Glenmont
- The MD 355 corridor from Friendship Heights through Rockville Town Center, including Rock Spring Park
- Much of the City of Gaithersburg and the Life Sciences Center
- Most of the Germantown Sector Plan area and the Clarksburg Town Center.

Figure 6. MWCOG Regional Activity Centers and Clusters



Residents in Regional Activity Centers and Clusters are found to generate:

- About 18% fewer auto trips (4.6 per day as compared to 5.6 per day), and
- About 33% less VMT (19.6 per day as compared to 29.3 per day).

A substantial portion of this difference in trip-making is due to demographic differences. Residents in Regional Activity Centers and Clusters typically have:

- Fewer persons per household (24% of center/cluster households have three or more residents compared to 45% of households outside these areas)
- Fewer workers per household (37% of center/cluster households have two or more workers compared to 51% of households outside these areas)
- Fewer autos per household (18% of center/cluster households do not own a vehicle, compared to 3% of households outside these areas)

Information to normalize the trip generation and VMT findings to account for variables such as household size are not yet available. Some of the differences in the survey results could be due to the fact that multifamily dwelling units, with lower trip generation rates, are slightly over-represented in the activity centers. Nonetheless, staff recommends that the MWCOG household survey information, combined with the URBEMIS information, support the reduction of expected residential trip generation rates in the County's urban areas.

4. **Value of Trip Mitigation Actions**

Transportation:

The value of providing transit services needs to be reviewed. The PAMR process introduced the concept of buying a transit vehicle for Ride-On to operate as a mitigating measure. The value (one vehicle plus 12 years of operating costs equals 30 peak hour vehicle trips) reflected our estimates of costs and benefits but was not found to be a practical option by any applicants.

Table 5 in the LATR Guidelines for Non-Automobile Transportation Facilities is shown in Figure 7.

Figure 7. Current Value of Non-Auto Facilities

Non-Automobile Transportation Facility	Trip Credit vs Congestion Standard		
	1350-1500	1550-1600	1800
100 linear feet of five-foot wide sidewalk	0.5	0.75	1.0
100 linear feet of eight-foot wide bike path	0.5	0.75	1.0
Curb Extension/Pedestrian Refuge Island/Handicap Ramp	2.0	3.0	4.0
Accessible or Countdown Pedestrian Signals/ Intersection	1.0	2.0	3.0
Bus Shelter	5.0	7.5	10.0
"Super" Bus Shelter	10.0	15.0	20.0
Bus Bench with Pad	0.5	0.75	1.0
Information Kiosk	1.5	3.0	4.5
Bike Locker (set of eight)	2.0	3.0	4.0
Real-Time Transit Information Sign	10.0	15.0	20.0
Static Transit Information Sign	0.25	0.4	0.5
Maximum Trip Credits	60	90	120

Staff recommends the following changes:

- Elimination of all measures in above table except the provisions of sidewalks and bikeways. Any applicant wishing or unable to provide sidewalks and bikeways must develop a mitigation proposal based on an $11,000 per vehicle trip value as established by the Planning Board.

- Establishment of a formal system of collecting and spending the revenue generated from the $11,000 per trip payment-in-lieu fees. Staff is currently working with the Montgomery County Department of Transportation to resolve the difficulties of applicants choosing non-auto transportation amenities including payment-in-lieu fees for applications mitigation fewer than 30 trips to satisfy PAMR requirements.

- The staff intent in summer 2008 was to update the $11,000 per vehicle trip value annually based on the Construction Cost Index. While the Engineering News Record CCI rose 5.1% from April 2008 to April 2009 (higher than the general rate of inflation), staff recommends no increase to the $11,000 value at this time based on our observation of County efforts to avoid actions that might dampen economic stimulus activities.

5. Alternative Review Procedures for Urban Areas

Transportation:

This Growth Policy should examine additional methods to incentivize development in our urban areas, where our transit investment and potential for non-auto commuting is greatest. Allocating development capacity to Metro Station Policy Areas (MSPAs) has been a part of the Growth Policy in Montgomery County for more than a decade. Over the years, the Planning Board has evaluated different ways to optimize the balance between the allocated development and adequacy of transportation capacity to accommodate that land use.

Currently, the LATR/PAMR Guidelines contain one Alternative Review Procedure. It allows development to satisfy both LATR and PAMR requirements by paying additional impact taxes and committing through a binding Traffic Mitigation Agreement to reduce 50% of their vehicle trips. The Alternative Review Procedure has been in place for over eight years and has not yet been tested (only the LCOR North Bethesda Project has entered into an agreement). Our understanding is that the risk of non-performance in the Traffic Mitigation Agreement process creates a level of risk that reduces the attractiveness of this Alternative Review Procedure.

Other Alternative Review Procedures could allow development to satisfy the adequacy of transportation facility tests without taking action under PAMR. The options listed below would create incentives to channel development into urban areas.

- **Replace the LATR / PAMR tests in urban areas with replacement adequacy definitions per concepts outlined in the following bullets**

Some have suggested that there be no mobility adequacy requirement for development in MSPAs. However, even if traffic congestion in the MSPAs is determined to be not a concern from a policy perspective, development within the MSPAs also increases traffic on major highways, arterials and primary residential streets connecting to the MSPAs. Therefore, staff finds that Alternative Review Procedures for PAMR in urban areas

- **Establish congested operating speed requirements for arterials serving urban areas**

Staff recommends that PAMR could be satisfied for development in urban areas if arterials affected by site traffic can be shown to maintain an adequate Arterial LOS as defined by PAMR

standards. Staff proposes to pursue the following elements for this Alternative Review Procedure:

- The Arterial LOS standard appropriate for each policy area would be applied to any arterial examined under this Alternative Review Procedure.
- An arterial will require analysis if the application will add more than 5 peak hour trips per lane at the MSPA boundary (mirroring the 5 CLV de-minimis policy already in the Growth Policy) in the peak direction.
- Both the peak hour in the AM and PM peak periods and in both directions will be analyzed (with removal of off-peak direction analysis considered at discretion of staff).
- A minimum of three runs must be made between 9 PM and midnight to establish the free flow speed.
- Sufficient runs need to be made during the peak hour to establish a 95% confidence level within +/- 3 MPH.
- SYNCHRO analysis software must be used to forecast the future volume and speed on the arterial with background traffic and site trip generation added to the existing traffic as an input into SYNCHRO to determine the arterial mobility under total future traffic conditions and any proposed mitigation actions needed to achieve an acceptable Arterial LOS.

    - **Establish cordon line caps (vehicles or seats) and/or long-term parking space caps to limit in-commuting to MSPAs to a maximum amount supported by the adjacent network**

A cordon line limit of traffic volume for all major highways, arterials and primary residential streets at the boundary of the MSPAs was considered. In theory, as long as observed counts remained below the cordon line capacity, development can continue in the MSPAs. The limit could be set by allowing adjacent policy areas to "sink" to the lowest allowable levels of mobility as defined by PAMR.

The current Growth Policy has such a cordon line capacity for the Silver Spring CBD; development is ultimately capped by a PM peak hour outbound cap of 17,500 vehicles. This limit was established in conjunction with the master planning process. However, there are no interim staging requirements that phase development toward the ultimate cordon line cap, and all LATR and PAMR requirements still apply to Silver Spring CBD development. This cap provides a set of "suspenders" in addition to the LATR/PAMR "belt".

A future growth policy could examine combining the capacity of transit and highway systems to arrive at a "seats per hour" capacity ceiling for development within the MSPA. This could be accomplished by establishing a multi modal cordon line limit of transportation capacity around the MSPAs or urban area. For example, suppose the average traffic volume to capacity ratio of all roadways leaving an MSPA is 95%. A parallel measure of the volume to capacity ratio of all

transit modes could be calculated by counting the ratio of occupied seats in each transit mode to the total number of available seats. Suppose in the same MSPA, this ratio is 75%. The average transportation capacity of all modes in this area could be estimated to be 85% (the average of the two). With this policy, development can occur until the established limit of combined transportation capacity for the area is reached even if one of the two systems is operating above its congestion standard. Cordon line capacity could also then be increased by adding transit service.

Limit the number of parking spaces in the MSPAs to limit traffic increase in the MSPAs. A periodical inventory of long-term parking space capacity and utilization would be necessary to ensure that the demand does not exceed supply.

The Growth Policy should incorporate a parking cap in the White Flint Sector Plan area, per the recommendations of the White Flint Sector Plan:

- Establish an end-state long-term parking cap of 0.61 spaces (public and private) per employee
- Conduct an initial inventory of long-term parking spaces to establish a current baseline
- Establish interim parking cap ratios that interpolate between the baseline rate and the end-state ratio to use during transportation analysis needed to support moving from Stage 1 to Stage 2 and from Stage 2 to Stage 3.

The Growth Policy should also incorporate the White Flint Sector Plan proposal to replace LATR and PAMR with an implementation district that would assess transportation impact fees on a pro-rata trip generation basis to implement transportation system improvements recommended in the Plan.

In White Flint, therefore, the Growth Policy parking cap would have a staged implementation level (to be determined in Stage 1 of the Plan) and would replace the LATR/PAMR "belt" with the parking cap "suspenders".

6. Expansion of MSPA Alternative Review Procedures to additional urban areas

The entire North Bethesda Transportation Management District could be allowed to use Alternative Review Procedure (ARP) as a permitted procedure for APF testing. This area contains three MSPAs with permitted ARP testing for APF and the remaining area of North Bethesda surrounding these MSPAs could be permitted for use of ARP under the umbrella of the TMD to monitor traffic mitigation.

Staff recommends allowing all Urban Areas of the county as defined by the County Council in 2007 as part of the Road Code to be able to be tested for APF by the Alternative Review Procedure.

7. Proposed Revision to the Transportation and School Impact Tax

Transportation:

In the 2007 Growth Policy the Planning Board recommended structuring the transportation impact tax by land use and geographic location in the County, with lower rates for uses or locations that generated fewer vehicle trips and lower vehicle miles traveled (VMT). Examples of lower vehicle demand land uses are senior and high rise residential housing, where general retail generates considerably higher demand. The rates recommended by the Board also reflected an updated total cost of County portion of the Constrained Long Range Plan, effectively "what the transportation system would cost." The intent was to portion the tax to match the land use's average impact to the transportation system, so that new development would be levied a tax proportionate to that need. The rates were in some cases significantly higher than prior tax rates, and so the Council chose to not implement the higher VMT based rates as proposed, but did modify the rates to reflect a proportion of impact, if not the total amount.

Staff proposes to further refine the transportation impact tax rate to reflect geographic location in the county, and nest with other policies that reflect a proportionate benefit to locating closer to transit, based on the literature reviewed in considering changes to the LATR/PAMR trip generation rates. The housing schedule for the transportation impact tax should include a new category for housing in urban areas (other than Metro Station Policy Areas).

As described above, the MWCOG Travel Survey conducted in 2007 and 2008 found that housing proximate to regional activity centers generated both fewer trips-per-household and shorter vehicle-miles-traveled, reflecting higher non-automobile use and the proximity of jobs and services prevalent in land use clusters. An equitable approach to taxing the households in these areas would reduce the per capita tax for new dwellings appropriately, similar to the lower rates available in Metro Station Policy Areas. We therefore recommend a new category for these residences to coincide with Urban Areas classified in Chapter 49 of the County Code that are not in MSPAs.

Data from the 2008 MWCOG household survey shows a VMT rate of approximately two-thirds that of a residence located outside of an activity cluster. Households in MWCOG activity centers generated 19.6 VMT per day, compared to 29.3 VMT per day generated by households outside of the activity centers. Therefore, rates proposed are calculated as two-thirds that of the 2007-2009 adopted rate for general residential. These rates are shown in the table below, with the prior rates for MSPA and non-MSPA shown for context.

Figure 8. Proposed Transportation Impact Tax rates per Dwelling Unit for New Residential Development (FY 2010)
(proposed changes highlighted in *italic* text)

Building Type	Metro Station	Clarksburg	*Other Urban Area*	General
Single-family detached residential	$5,325	$15,973	*$7,135*	$10,649
Single-family attached residential	$4,357	$13,070	*$5,809*	$8,713
Multifamily residential (garden apartments)	$3,338	$10,164	*$4,517*	$6,776
High-rise residential	$2,420	$7,261	*$3,226*	$4,840
Multifamily-senior residential	$968	$2,904	*$1,291*	$1,936

Schools:

Several jurisdictions nationwide have used square footage of new construction as the basis for assessing impact fees. Staff investigated the calculation of school impact taxes on dwelling unit size rather than type.

GIS was used to link parcel file data (which contains housing unit size) with data on household demographic characteristics. Student generation rates were calculated for single-family dwelling units by size and type. These student generation rates were multiplied by the per seat cost of school construction in order to calculate school construction cost impact by unit size and type.

Data limitations did not allow for a calculation of the school construction cost per square foot for multi-family dwelling units. In addition, linking the parcel file and demographic data yielded results that encouraged further investigation of the process.

Staff found that, although a shift to administration of the tax on a square foot basis could provide a more fine-grained methodology, preliminary analysis indicates that for all but the smallest single-family units this would result in an increase in the school impact tax. Current economic conditions reflect poor timing to recommend higher tax rates, even if the calculation is equitably proposed. This shift in methodology could be revisited again in the next Growth Policy.

Growth Policy Study: Appendix N – Smart Growth Criteria and Exemption

Lead Staff: Pam Dunn, Mark Pfefferle, and Cathy Conlon

Summary:

- The Smart Growth Criteria establishes an Alternative Review Procedure for Policy Area Mobility Review (PAMR) such that PAMR obligations can be offset for smart growth mixed-use projects near transit or basic services that exceed otherwise required energy efficiency and affordable housing criteria.

- In addition, the Smart Growth Criteria proposes an expansion of the Alternative Review Procedures into (Road Code) urban areas thereby encouraging mixed-use development and placemaking through the fulfillment of already planned density in areas with basic services designated as urban (town) centers.

The current adequate public facilities ordinance focuses on transportation tests, school tests and impact taxes that are designed to ensure that necessary facilities are provided as development occurs. This approach limits the locations where development can occur and in doing so, potentially limits the ability to create the types of sustainable, well-designed and strategic development that is desired.

Based on a review of best practices in the area of Smart Growth, great potential exists for development of an exemption process similar to California's SB375 legislation. In addition, LEED ND and LEED for New Construction and Major Renovation are well-known certification programs designed to encourage Smart Growth. Elements of these programs provide reliable standards for the assessment of sustainable development.

Under the realm of Growth Policy an exemption from an APFO finding (for transportation) should be based on design elements that improve transportation efficiency. Staff believes these elements should include the following prerequisites that lead to reduced auto travel:

- *Connectivity* – Projects located in areas with the highest transit service or near several, other basic services

- *Diversity* – Projects that provide a mix of residential and commercial uses as well as a mix of housing types

- *Design* – Projects built with compact design, taking advantage of the maximum zoning density

To achieve a better balance between capacity and more sustainable development, smart growth criteria are proposed to incentivize this goal. The proposed Smart Growth approach is divided into two categories – transit and basic services proximity; and urban area boundaries.

Transit & Basic Services Proximity

The Growth Policy must evolve into more than just a capacity measure. It should promote sustainability through design and infrastructure. If a project is designed to encourage walking to jobs or transit, and if it produces less carbon, these factors should be considered concurrently with traffic and school capacity.

Studies have shown that people living within a half mile of transit are more likely to commute via transit than car. California has recently led the nation in mandating higher densities near transit, citing the positive benefits of more compact growth.

This growth policy includes recommendations for incentives to be provided for smart growth development. A revised Alternative Review Procedure is proposed that would allow for projects meeting certain criteria to benefit from either a 100 percent or 50 percent PAMR offset. The amount would depend upon proximity to either transit, or basic services such as grocery stores, dry cleaners, community facilities, restaurants, etc.

Below is the *Smart Growth Criteria* whereby projects meeting the criteria are eligible for an offset in PAMR mitigation. The framework is designed to encourage development in areas that are well-served by transit or areas that are well-served by other services. In addition, these projects must provide a mix of residential and commercial uses; they must contribute to diversity in housing affordability; and they must make efficient use of resources through compact design and increased energy efficiency or production.

Montgomery County - Smart Growth Criteria

All projects must meet the following criteria to be considered

for an Alternative PAMR Review:

- Project must be mixed-use with a minimum 50% residential use and
- Project must seek to achieve the maximum density of the site using 75% or more of the maximum density allowed in the zone (including all applicable bonuses) subject to the limits specified in the master/sector plan and
- Building(s) exceeds energy efficiency standards by 17.5% for new buildings or by 10.5% for existing building renovation. Or, building(s) has on-site energy production such that 2.5% of the annual building energy cost is off-set by the renewable production system *(LEED New Construction/Major Renovation)*
- And, the project must provide either one of the following above and beyond that required for plan approval:
    - 1 workforce housing unit (whu) or 1 moderately-priced dwelling unit (mpdu) for *x* trips – where x equals one half the number of trips requiring mitigation times the relative cost of mitigating one trip to the cost of providing one affordable unit.

Mixed-Use Transit Proximity Projects that meet the following criteria are eligible for 100% PAMR offset:	Mixed-Use Urban with Proximity to Basic Services Projects that meet the following criteria are eligible for 50% PAMR offset:
• Project must be located within ½ mile of an existing or planned major transit stop or high-quality transit corridor. A high-quality transit corridor means a corridor with fixed route bus service where service intervals are no longer than 15 minute during peak commute hours. A project shall be considered to be within one-half mile of a major transit stop if all parcels within the project have no more than 25% of their area farther than one-half mile from a transit stop or corridor and if not more than 10% of the residential units in the project are father than one-half mile from the stop or corridor. A planned transit stop or corridor is one that is funded for construction within the first four years of the Consolidated Transportation Program and/or the Capital Improvement Program	• Project must be located within a *Road Code Urban Area* and be located within ½ mile of at least 10 *Basic Services* ; *Basic Services* include but are not limited to: bank, place of worship, convenience grocery, day care, cleaners, fire station, beauty, hardware, laundry, library, medical/dental, senior care facility, park, pharmacy, post office, restaurant, school, supermarket, theater, community center, fitness center or museum, *(based on LEED for New Construction/Major Renovation)*

In other words, projects that are mixed use with 50 percent residential uses, that propose to build to a minimum of 75 percent of the allowable density of the zone, that meet minimum specific energy efficiency standards, and that provide additional mpdus or workforce housing at rates based on trip mitigation requirements of the overall project would then be assessed under one of the two following scenarios.

Transit proximity:

Developments within ½ mile of an existing or planned major transit stop or high quality transit corridor, including Metro, MARC, or a major bus station, would be eligible for a 100 percent PAMR offset. A planned transit stop or corridor must be funded for construction in the first four years of the Consolidation Transportation Program or the Capital Improvement Program.

Proximity to basic services:

This category recognizes that not all development in the County will be near a major transit corridor. Many of the 106 strip malls in the County do not qualify. However, they should be redeveloped in a more sustainable manner.

A strip mall on Route 29 could offer amenities that would reduce vehicle trips through mixed uses and a minimum of stores that provide services and products that residents and workers use on a daily basis, or what LEED for New Construction and Major Renovation defines as "basic services".

Basic services include grocery stores, dry cleaners, fire stations, medical office, fitness center, etc. People who live near these services frequently walk to them, reducing car trips. For projects that qualify, the PAMR requirement would be offset by 50 percent.

At the end to this appendix is an example of a project that could qualify for the PAMR offset under each of the above scenarios.

Urban area boundaries

Currently, an Alternative Review Procedure for PAMR is offered to projects in Metro Station Policy Areas. This Growth Policy proposes expanding the Alternative Review Procedures into all urban areas.

These changes are intended to encourage mixed use development in areas that are well-served by transit or by basic services. Moving capacity from commercial to residential development contributes to housing affordability, and energy efficiency.

The smart growth approach to growth policy combines several positive elements of important initiatives that are surfacing across the country.

- transit proximity
- green building technology
- retail and service diversity
- compact development

Encouraging mixed-use projects close to transit and basic services will help reduce vehicle trips and promotes County's Climate Protection Plan goals. This is a first step to further work and research into how this approach can evolve with the next growth policy two years from now.

Case Study #1. Metro Station Policy Area (Such as Twinbrook) With 35% PAMR Mitigation Requirement

	Sample Proposal Without Smart Growth Criteria	Alternative Review Proposal #1 - Mixed Use Transit Proximity	Alternative Review Proposal #2 - Proximity to Basic Services	Comparison: Increased FAR Without Residential
IMPACT TAX COSTS				
Transportation Impact Tax Office				
GSF	82500	75000	75000	165000
Rate	$ 4.85	$ 4.85	$ 4.85	$ 4.85
Extension	$ 400,125	$ 363,750	$ 363,750	$ 800,250
Transportation Impact Tax Retail				
GSF	67500	60000	60000	135000
Rate	$ 4.34	$ 4.34	$ 4.34	$ 4.34
Extension	$ 292,950	$ 260,400	$ 260,400	$ 585,900
Transportation Impact Tax - High Rise Residential				
DU (subject to impact taxes)	0	129	136	0
Rate	$ 2,420.00	$ 2,420.00	$ 2,420.00	$ 2,420.00
Extension	$ -	$ 312,180	$ 329,120	$ -
School Impact Tax - High Rise Residential				
DU (subject to impact taxes)	0	129	136	0
Rate	$ 4,127.00	$ 4,127.00	$ 4,127.00	$ 4,127.00
Extension	$ -	$ 532,383	$ 561,272	$ -
TOTAL IMPACT TAX	$ 693,075	$ 1,468,713	$ 1,514,542	$ 1,386,150
PAMR COSTS				
Applied toward MPDUs	$ -	$ 731,500	$ 376,750	$ -
Applied toward transportation projects	$ 1,342,000	$ -	$ 753,500	$ 2,662,000
TOTAL PAMR COST	$ 1,342,000	$ 731,500	$ 1,130,250	$ 2,662,000
TOTAL PAMR COST PLUS IMPACT TAX	$ 2,035,075	$ 2,200,213	$ 2,644,792	$ 4,048,150
Total Development GSF	150000	300000	300000	300000
TOTAL PAMR COST PLUS IMPACT TAX / GSF	$ 13.57	$ 7.33	$ 8.82	$ 13.49

Case Study #2. Suburban Area (Such as Germantown East) With 100% PAMR Mitigation Requirement

	Sample Proposal Without Smart Growth Criteria	Alternative Review Proposal #1 - Mixed Use Transit Proximity	Alternative Review Proposal #2 - Proximity to Basic Services	Comparison: Increased FAR Without Residential
IMPACT TAX COSTS				
Transportation Impact Tax Office				
GSF	45000	38250	38250	76500
Rate	$ 9.69	$ 9.69	$ 9.69	$ 9.69
Extension	$ 436,050	$ 370,643	$ 370,643	$ 741,285
Transportation Impact Tax Retail				
GSF	5000	4250	4250	8500
Rate	$ 8.67	$ 8.67	$ 8.67	$ 8.67
Extension	$ 43,350	$ 36,848	$ 36,848	$ 73,695
Transportation Impact Tax - Multifamily (Garden)				
DU (subject to impact taxes)	0	22	27	0
Rate	$ 6,776.00	$ 6,776.00	$ 6,776.00	$ 6,776.00
Extension	$ -	$ 149,072	$ 182,952	$ -
School Impact Tax - Multifamily (Non High Rise)				
DU (subject to impact taxes)	0	22	27	0
Rate	$ 9,734.00	$ 9,734.00	$ 9,734.00	$ 9,734.00
Extension	$ -	$ 214,148	$ 262,818	$ -
TOTAL IMPACT TAX	$ 479,400	$ 770,710	$ 853,260	$ 814,980
PAMR COSTS				
Applied toward MPDUs	$ -	$ 258,500	$ 129,250	$ -
Applied toward transportation projects	$ 440,000	$ -	$ 258,500	$ 605,000
TOTAL PAMR COST	$ 440,000	$ 258,500	$ 387,750	$ 605,000
TOTAL PAMR COST PLUS IMPACT TAX	$ 919,400	$ 1,029,210	$ 1,241,010	$ 1,419,980
Total Development GSF	50000	85000	85000	85000
TOTAL PAMR COST PLUS IMPACT TAX / GSF	$ 18.39	$ 12.11	$ 14.60	$ 16.71

How would the Smart Growth Criteria work in practice? Consider a hypothetical project in an area with partial PAMR mitigation (such as the Twinbrook Sector Plan area) with a 35% requirement (for FY 10). The affordable housing and PAMR requirements would be assessed as follows. First, the application must meet the following criteria:

- Within ½ mile of the Metrorail station (or other transit route with 15 minute frequency transit service during peak periods)
- Using at least 75% of the allowable density

- Minimum 50% residential use
- Meet specified energy efficiency requirements

Suppose the application had the following parameters:

- A 100,000 square foot site with a 3.0 FAR resulting in 300,000 square feet of building footprint,
- A 55% residential component, resulting in 165,000 square feet of residential space,
- A commercial component split between office (25% of the total building space) and retail (20% of the total building space)
- An average gross DU size of 1,000 square feet, resulting in 165 residential dwelling units, of which 12.5% (20 units) must be affordable and 10% (16 units) must be workforce.

This application:

- Would generate 379 peak hour trips,
- With 35% mitigation, 133 peak hour trips would require PAMR mitigation,
- At $11,000 a trip, the PAMR mitigation would have an expected value of $1,463,000

Under the Smart Growth Criteria, the applicant could be relieved of PAMR mitigation requirements if 50% of the PAMR savings, or $731,500, were applied toward providing additional affordable housing.

If the applicant could be expected to take a $50,000 loss on each affordable housing unit (the difference between the cost to build and the sales cost). The $731,500 would cover approximately 15 units at $50,000 each. Therefore, to meet the smart growth criteria, the number of affordable units would need to be increased from 21 units to 36 units (while retaining the 165-unit total).

The combination of PAMR and development impact taxes provides a financial incentive when considered on a per-square foot basis. This application would pay:

- $937,000 in transportation impact taxes and
- $532,000 in school impact taxes, for a total of
- $1,469,000 in development impact taxes, plus
- $731,500 in PAMR requirements redirected toward affordable housing, resulting in a total of
- $2,220,500 in tax/PAMR payments, or about $7.30 per square foot.

Without the Smart Growth Criteria, a similarly sized development of 300,000 GSF without a residential component:

- Would generate 690 peak hour vehicle trips
- With 35% mitigation, 242 peak hour trips would require PAMR mitigation,
- At $11,000 a trip, the PAMR mitigation would have an expected value of $2,662,000

The application without Smart Growth Criteria would pay:

- $1,386,000 in transportation impact taxes and
- $0 in school impact taxes, for a total of
- $1,386,000 in development impact taxes, plus
- $2,662,000 in PAMR requirements, resulting in a total of
- $4,048,000 in tax/PAMR payments, or about $13.49 per square foot.

Growth Policy Study: Appendix O – Carbon Trading/Offsets at the Local Level

Lead Staff: Mark Pfefferle

Summary:

The appendix demonstrates that further evaluations are necessary to identify a means to encourage reductions in future carbon emissions that are generated by growth.

In January 2009, Planning Department staff began working with a group of George Washington University Master of Public Policy studies to explore different methods of reducing greenhouse gases. Specifically, staff directed the students to research and explore various approaches to reduce greenhouse gases applicable to new development and redevelopment plans. The students found programs that address greenhouse gas emissions at the state and local levels to be in their infancy. Since the programs are new, there is little data available indicating the success of the programs in reducing greenhouse gas emissions.

The students identified three approaches to reduce greenhouse gas emission generated by development and redevelopment: direct regulation, offset the existing AFPO fees, or initiate new impact fees. The direct regulation approach would mandate developers implement greenhouse gas reduction actions during the development process. The approach to either offset the existing AFPO fee or new impact fees would provide incentives to induce developers to reduce greenhouse gas emissions by reducing existing or pre-requisites for fees so that the greater the greenhouse gas emissions the greater the fee reduction.

Staff is recommending a continued analysis of the various techniques to reduce greenhouse gases generated by new development. In particular, further analysis is needed to determine which of the approaches mentioned above are most appropriate for Montgomery County. All of the approaches would require developers employ and implement technologies that are not used elsewhere in the Washington Metropolitan area. Care would need to be taken to ensure that an approach does not become a disincentive for development and yield little of few results. Any program, such as the new fee program, must be used for the intended purpose, that is to reduce greenhouse gas emissions and not as an attempt to slow growth or raise revenue for the County. Furthermore, the students recommend and staff concurs that a full cost-benefit analysis be undertaken to determine the greenhouse gas reduction impact, cost savings to businesses, changes in desirability of developing in Montgomery County, historic

development rates, and transaction costs before implementing a greenhouse gas emissions program.

A copy of the Capstone report: “Strategies for Reducing Greenhouse Gas Emissions During Development and Redevelopment in Montgomery County, Maryland” and the accompanying appendices to that report can be found on the GrowingSmarterMontgomery webpage:

http://www.montgomeryplanning.org/research/growth_policy/growth_policy09/agp_growing_smarter.shtm

Growth Policy Study: Appendix P – Literature Review: Costs of Growth

Lead Staff: Krishna Akundi

Summary: Sprawl is a consequence of the market's failure to efficiently allocate resources. This market inefficiency manifests itself as a scattered or discontinuous or low-density development pattern. Low-density development patterns increase costs for all (businesses, residents, and governments) in the region. Thus, it is in everyone's interests to correct for those inefficiencies— for the costs of growth.

Local governments across the country have considered a range of remedies. These solutions include the application of an adequate public facilities ordinance, charging development impact fees, preserving open space and rural lands, creating transit-oriented developments and mixed-use centers. Guiding growth towards a compact form of development is a continuing effort and requires experimentation with new and innovative tools such as eminent domain, congestion pricing, land banking, and infrastructure funds; tradable development rights, mechanisms to offset developer's upfront costs, and varying exactions by distance from an urban core.

In this review staff surveys some of the academic research on the costs of low-density development— especially from journey-to-work travel patterns and public health; the provision of public services and infrastructure; land prices and housing affordability.

In this essay staff surveys some of the current research and analysis. The essay is organized into five sections: growth and density; sprawl as market failure; the physical, fiscal, and socio-economic costs; summary of potential remedies; and bibliography. Much of the work on the costs of growth/costs of sprawl is anecdotal, case-specific, contested, or lacks a causal link. More robust analytical studies are required. Only two of the articles we came across show a significant relationship between increasing density and lower per capita costs.

1. Growth and Density

A cornucopia of journal articles, literature reviews, working papers, and books have defined, described, or characterized sprawl (Wagner, et.al 2005; Khe and Grammy 2002). Common to all this established research: the density of development. Research shows that in a multi-nucleated region or polycentric city, the density gradient falls with distance from the central business district and from inner ring suburbs to developments (i.e. sub-centers) further out because of the large tracts of undeveloped land between them. Miezkowski and Smith (1991) find that as sub-centers relocate to the edge of established settlements they promote scattered development patterns resulting in heavy economic and social costs— the unintended consequences of growth.

1.1 Unintended consequences of rapid growth:

Robert Freilich in his 1999 text, From Sprawl to Smart Growth, discusses the battle that local governments are waging against unbridled growth, against low-density development. He describes these costs of sprawl in terms of its socio-economic impacts, i.e., on the community, housing, and jobs; its fiscal impacts, i.e., the costs to local governments of expanding road service, installing sewer and water lines to developments beyond the urbanized area, locating police stations and fire stations, and building new schools; and its physical costs as experienced by residents through traffic congestion, slow decline in environmental quality, and chronic illnesses.

Loudoun County, in this region, illustrates the unintended consequences of rapid growth. County supervisor Jim Burton in a series of presentations across Virginia reported that due to an unprecedented burst of population growth—a 50 percent increase between 2000 and 2007, and an additional 14 percent expected increase between 2007 and 2010— Loudoun County faced the following:

- A sharp but sudden increase in debt.
- Sixty-six percent increase in school enrollments: from 30,000 in 2000 to 50,000 in 2007.
- Unprecedented school construction activity. The County spent $839 million on nearly 40 schools between 1993 and 2007. The County has budgeted $1.38 billion in school construction for the 2007-2010 cycle: 27 new schools.
- An increase in property taxes: 200 percent increase between 1994 and 2007.
- Traffic congestion.
- Decline in air and water quality.
- Demand for higher levels of service.

Sprawl is not only a function of rapid population growth. Data show a number of urban areas, especially in the Northeast and Midwest, where population declined but land consumption increased: undeveloped and/or agricultural lands were converted to urban uses (Kolankiewicz and Beck 2001). This outcome is explained, in part, by push factors; factors such as crime, poor quality schools, and unresponsive public services that push residents from the urban core and inner suburbs to the periphery. There are also cases where population has increased but the amount of land consumed per capita has declined. This outcome may be explained by economic conditions, physical and political barriers to expansion, or land use controls.

Although the rate of per capita land conversion may have slowed or even reversed in some jurisdictions, in absolute terms open space, wetlands, and agricultural lands are still being lost to urban uses. Consequences include (Heimlich 2001; Sierra Club 1998):

- Between 1982 and 1992, according to the USDA's National Resources Inventory, 89,000 wetlands were lost. Wetlands serve as "natural sponges that soak up and store rain and run-off." With fewer wetlands, floods, flood deaths, and property damages caused by flooding would increase. Floods caused $4.3 billion in damage each year from 1988 to 1997.

- In the state of Maine, unfettered development activity has harmed 200 of the state's 2700 lakes and placed another 300 at risk.

- Low-density development patterns impact water quality. Groundwater recharge diminishes because of paved surfaces. Underground water supplies decline because of increased demand. McAllen Texas, for example, experienced a 40 percent increase in population between 1990 and 1996, thus exerting pressure on its already scarce water resources.

- Water quality in rural areas suffers from the development of residential subdivisions. In many cases, public sewer service is not available in rural areas, prompting private developers to provide septic systems which soon become inadequate to meet demands. Development activity—that is neither managed nor controlled— could generate bacteria, suspended solids, nitrogen and phosphorous run-off, and sediment in nearby lakes, rivers, streams, or aquifers.

- An even more tangible consequence for local governments is the impact on the tax base. The cost to government from expanding roads, laying water and sewer lines, building schools, and providing police and fire protection and emergency medical services for people who live far way from existing infrastructure is far greater than the taxes, fees, and surcharges it collects. New developments at the urban periphery do not pay for themselves.

How do jurisdictions manage land conversions and their resulting consequences? Jim Burton, the Loudoun County supervisor, explains that in their case, state courts and the Virginia legislature rejected nearly all of the planning department's proposals to control unbridled growth: No to a building moratorium, an adequate public facilities ordinance, developer impact fees, and to using an affordability index. The Board of Supervisors was directed to apply tools already available in the zoning toolbox.

Ewing, Pendall and Chen (2005) in their article for Smart Growth America, and the Sierra Club (1998) in *Sprawl: the Dark Side of the American Dream* call for an array of measures including:

- Agricultural Zoning
- Conservation Easements
- Clustering
- Tax-base sharing
- Transit-Oriented Development
- Infill Redevelopment
- Rehabilitate abandoned or obsolete properties
- Create Mixed-Use Activity Centers

The difference between the options Loudoun initially considered and those recommended by the Sierra Club and Smart Growth America is the difference between growth control and growth management. Vicki Been (2005), in her review of the literature on impact fees and housing affordability, describes the difference:

> Growth control refers to efforts to stop or limit growth through traditional regulatory tools such as growth caps or indefinite moratoria not tied to a particular goal, such as completing a comprehensive plan. Growth management means efforts to channel (but not stop or limit) growth into particular areas. Growth management may also take the form of concurrency requirements that seek to direct growth to areas in which infrastructure is already made available or planned, rather than allowing it to occur without regard to the availability of infrastructure (page 154).

The distinction between control and management is important because it influences how business, the development community, government, and residents perceive sprawl: "low-density, automobile-dependent development beyond the edge of service and employment areas [sprawl] is ubiquitous and its effects are impacting the quality of life in every region of America, in our large cities and small towns" (Sierra Club 1998).

1.2 Sprawl: for it or against it?

Among the first set of studies to make a case against low density development was a 1974 report by the Chicago-based Real Estate Research Corporation (RERC). Their report was commissioned by the U.S. Department of Housing and Urban Development and the Environmental Protection Agency. The authors of the study considered the typical costs involved in developing a 1,000 unit residential subdivision. The RERC team measured the costs of development, operation and maintenance under three scenarios (traditional low-density subdivision, combination, and dense

development). Each scenario is based on a mix of housing unit types—single family, townhomes, and multi-family (walk-up or high-rise apartments). They defined costs as land and capital, streets and roads, utilities (sewer, stormwater, gas, electric, telephone), public services (police, fire, sanitation), public facilities (library, health care, churches, government), environmental effects (air pollution, water pollution), and personal costs (travel time, traffic accidents, and crime). The RERC study concludes that costs are 44 percent lower at higher densities. Under all three scenarios, land costs are constant and there is no significant change in the cost of building public facilities and schools. However, construction costs and infrastructure costs are highest for the traditional development pattern and lowest under the high-density pattern.

The RERC study has been criticized on three issues: first, it is a conceptual model and thus one cannot generalize from it and apply the findings to real world conditions; second, the assumptions about construction standards are wrong; and lastly it makes statements on socioeconomic status that are unfounded (Najafi and Mohamed 2006). What is important about the RERC study, however, is that thirty years later researchers continue to measure the association between low-density development and costs using almost the same set of variables.

There are an increasing number of case studies—Khe's analysis of Bakersfield (2002) and Coyne's of the Denver-Boulder region (2003)— that show the cost savings from implementing growth management measures or conversely cost burdens from maintaining conventional growth patterns. Using larger data sets to make cross-sectional comparisons allow researchers to make broad statements about sprawling metros and compact metros (Burchell 1998; Snyder and Bird 1998; McCann and Ewing 2003). Far too few analyses demonstrate an explanatory relationship between urban form and the cost of public services (Carruthers and Ulfarrson 2003).

The Transportation Research Board commissioned a study group to revisit the costs of sprawl. Burchell (1998) and his team measured the per-unit costs of conventional (sprawl) versus managed development patterns on (1) the conversion of land to residential and non-residential uses, (2) providing infrastructure, (3) providing public services and facilities (police, fire, emergency medical services, and schools), and (4) the journey-to-work. The *Costs of Sprawl, Revisited* differs from all other works in its scale: 742 counties across all four regions of the nation. Data indicate that these 742 would experience significant sprawl in the next 25 years; so what costs would accrue under a managed growth scenario and what costs would accrue under the conventional (sprawl) scenario. Some findings from the study group are listed below:

- Building a non-residential project in managed or compact setting results in a one percent cost-saving. (This finding applied in all four regions except the Northeast where it was 2 percent).

- Building residential where growth is managed could result in a savings of $13,000 per unit.

- Adopting managed growth policies could save the nation nearly $110 billion in road expansion and ten percent in road –lane miles over the next 25 years.

- Managed growth scenario could bring $12.6 billion in infrastructure (water and sewer) savings. Regionally, the West would experience the largest savings-- $5.5 billion; the Northeast only $1.3 billion.

- Assuming local governments adopt a managed growth scenario, after 2025, municipal budgets could see a ten percent increase in annual savings (Burchell and Mukheriji 2003).

The numbers are quite large. Critics of the study claim that these large savings, which come after a 25-year period, are reported for impact. If the savings were reported on an annual basis, critics claim, the savings would be negligible. Cox and Utt (2004) hold that the assumptions and remedies laid out in *Costs of Sprawl* are wrong with respect to higher densities: higher densities do not result in lower per capita service costs.

Myers and Kitsuse (2001) writing for the Lincoln Land Policy Institute, review two sets of arguments: Ewing's support of compact development against Gordon and Richardson's implicit support of scattered development, and the views of the Bank of America against Wells Fargo. Their review of the competing bank reports is notable because the development community, in general, has stood against most land use and regulatory controls.

The reviewers find that the Bank of America report, *Beyond Sprawl: New Patterns of Growth to Fit the New California*, reviews development patterns in California. The document acknowledges the loss of wetlands and the impact of pollution on California's farms and agriculture. The report, however, is bereft of any analysis or specific prescriptions. Although, Bank of America should be credited for recognizing the impact "low-density single-use development that is removed from the central city and inner suburbs" has on economic growth and quality of life. As a rebuttal to the Bank of America document, Wells Fargo prepared the report, *Preserving the American Dream*. In its report, the Wells Fargo team contends that mass transit is inefficient and that leapfrog development will eventually lead to higher infill densities. Wells Fargo views development activity that stretches linear miles on end as acceptable because the development is dense. It is unclear what that study's standard is for dense development. It is clear that The Wells Fargo study falls on the side against compact development. Myers and Kitsuse fault the Wells Fargo study for not taking into account all the negative externalities of sprawl—specifically, its social and environmental costs.

2. Sprawl as Market Failure

Dense development— represented by a multinucleated or polycentric urban form— is more the rule than the exception in an efficient market economy. This is so because developers are more likely to economize on the use of land at expensive locations. They do so by substituting townhomes and multi-family units for single-family homes, and by constructing office buildings with higher floor area ratios (Bertaud and Malpezzi 2009). Market-oriented approaches to growth, however, are not always optimal. Sub-optimal choices include 'satisficing' by developers and hold-outs by land owners (Miceli and Sirmans 2004; Mohamed 2009).

2.1 Inefficient Allocation of Resources

Poor and inefficient allocation of resources occur, for example, when (1) residents do not account for all the costs associated with the journey-to-work choosing to drive and at peak times although other cost-saving commuter options are available; (2) local government must bear the costs for the public services and infrastructure required by new developments located far from established centers, and (3) the intangible benefits of open spaces are lost (Ewing 1995; Brueckner 2000; Ciscel 2001; Hernandez-Murillo 2001).

Bertaud and Malpezzi (2009) measured the relationship between urban form and population density for 48 large cities in twenty countries— eight are American cities. These researchers found that in market-oriented economies, density gradients flatten with income, population, and falling transportation costs. In other words, as people gain the ability to move away from the urban core they do so thus creating a low-density development pattern. However, low-density development patterns, "from an economic point of view, [are] deficient." Bertaud and Malpezzi would argue, based on a review of the literature, that the density gradient and price gradient follow one another up to a point. After that critical value, the price gradient begins climbing. A deficient spatial structure fragments labor and consumer markets; as the distance between people and places increases, the length of city infrastructure must increase which in turn increases capital and operating costs.

Even if we accept that the 'market' makes sub-optimal choices in urban development, Staley (2001) cautions against a top-down approach. An approach where local government does not take into account consumer preferences could lead to a situation where a jurisdiction's tools to manage sprawl inadvertently cause consumers to "vote with their feet" and exacerbate the very problem they were trying to solve. This is an example of regulatory failure— the public equivalent of market failure. Bertaud and Malpezzi find that regulatory failure is the reason for sprawl in centrally-planned economies.

Some of these sub-optimal market choices include satisficing by real estate developers and hold-outs by land-owners for more money. Mohamed (2009) in a narrowly crafted analysis addresses the question: Why do residential developers prefer large exurban lots? Because of poor market information and the desire to reduce costs and increase profits, small-scale developers will satisfice. This behavior, Mohamed contends, results in metro area's having low-density and leap-frog development patterns. While land use and zoning reduce the risk of uncertainty, they do nothing to reduce the upfront costs that a developer would have to spend when building in dense areas. Mohamed (2009) suggests that municipalities bear the burden of upfront costs "for certain on-site infrastructures and be reimbursed by developers for these capital and interest costs when the lots are sold."

Miceli and Sirmans (2004) contend that, because of the hold-out problem, large-scale projects such as housing developments and shopping centers will be under-produced in the urban core and inner suburbs. In the urbanized parts of metro areas, especially, land assembly requires negotiations with owners of multiple parcels. If any one of those small landowners should hold-out, the entire deal may fail. In contrast, developments at the urban fringe, more often than not, require negotiating with one large landowner. Miceli and Sirmans list a number of remedies—all of them well-known and used— to solve the hold-out problem but the most interesting of these is their call for the government to use its power of eminent domain to facilitate efficient development through urban renewal.

Despite evidence showing sprawl as a failure of the market and the positive effect that land use and zoning have in curbing negative externalities, there remains a chorus who defend low-density development: sprawl is a symptom of consumer preference and any attempt to manage or control "sprawl" would result in a decline in American's standard of living (O'Toole 2007; Gordon & Richardson 2000; Brueckner 2000).

Gordon and Richardson (2000) dismiss the premise—sprawl as market failure—entirely. These authors review each of the arguments for smart growth and offer a counter-argument. They conclude: "smart-growth prescriptions weaken property rights and limit the power of markets to deliver growth." Yet, perhaps, it is the advocates of sprawl who miss the mark. Growth for the sake of growth is not a good thing. If bad decisions result in a landscape of isolated and abandoned structures and those structures remain empty for years, then is it not a burden on the tax base and on adjacent owners whose property values decline?

Cox and Utt (2004) analyzed the statistical relationship between expenditures and growth across 700 municipalities. Expenditures were restricted to total municipal spending, water and wastewater utility charges. Growth was measured in terms of 12

variables including population density. Model results showed that 71 percent of the variation in total municipal expenditures could not be explained by growth.

3. Physical, Fiscal, and Socio-Economic Costs

3.1 Traffic Congestion

Ewing, Pendall, and Chen (2005) compared travel times between most sprawling metros and least sprawling metros. Residential density strongly influences the amount of driving per person. For example, workers in Atlanta, which has a high sprawl index, travel 34 miles daily per capita compared to New Orleans which has a low sprawl index and workers travel 15 miles daily per capita. Reid and others also found that in the most sprawling metros

- People drive more and own more cars
- Fewer people get to work by taking public transit and walking
- Increased incidence of accidents and fatal crashes

The Surface Transportation Policy project analyzed congestion in 70 metropolitan areas over a fifteen year period. They concluded that areas investing heavily in road capacity fared no better than those that did not in easing congestion (Cervero 2001). Cervero in a 2001 study had two objectives:

- To dissuade environmentalists and other critics of road investments from making the dubious claim that there is some cause – effect rationale between highways and sprawl: congestion is a negative externality from the use of roads not from the road itself.
- Call for more research on road expansion, urban growth and induced travel using a path model.

Cervero's long-term path model acknowledges that the benefits of supplying a road lane are an increase in roadway speed and development activity. These benefits create a demand-- more vehicle miles travelled (VMT). His study found that, at least in California, it takes between 2 and 3 years for development activity to respond to road expansion and another three years for VMT to respond to development activity. Growth

in VMT, of course, feeds back into freeway investment several years later. His model explains 55 percent of the relationship between road expansion and VMT.

While a road building program is unlikely to erase traffic congestion, Cervero discovered that Houston has come closer to that goal than other jurisdictions – fifteen years and billions of dollars later. Cervero concedes that investment in roads will invariably create land use shifts and increased VMT, so the question is how to minimize negative externalities from land use decisions and maximize scarce transportation resources. He suggests that we should consider building more bus rapid transit systems, applying 'value-pricing' on current carpool lanes, and account for the social costs and benefits of the transportation-land use nexus.

William Coyne (2003), in his case study of Colorado and the Denver metro area, finds that building local roads costs 25 percent less in compact cities than in low-density communities. Following a smart growth strategy could save the metro area $4.0 billion in road and highway construction over 25 years.

3.2 Public Health Impacts of Urban Sprawl

Staff at the USDA's Economic Research Service, writing on *Development at the Urban Fringe and Beyond,* cites that one impact of traffic congestion is air pollution. Air pollution in turn increases smog and other pollutants which translate into respiratory problems such as asthma for some. Frumpkin (2002) argues that there is a relationship between sprawl and public health. Low residential density, low employment density, low connectivity, is associated with less walking and bicycling and with more automobile travel. Twenty-five percent of all trips in the U.S. are shorter than one mile; however 75 percent of us make that trip by car. A sedentary lifestyle is responsible for obesity and other vascular problems.

McCann and Ewing summarize the findings from a 2003 national study of 83 metro areas and their counties. Based on their review of the literature on the health effects of sprawl, McCann and Ewing conclude that community design influences how people travel and how physically active they are in the course of a day. In the 2003 national study, researchers measure urban form in terms of residential density and street connectivity. Physical activity is measured in terms of hypertension rates, obesity, and body-mass-index. To increase physical activity, McCann and Ewing recommend that jurisdictions narrow streets at intersections, create raised crosswalks, install traffic circles, and lay bicycle and pedestrian infrastructure.

Some of the findings:

- Hypertension rates are 3.3 points lower in compact counties than in sprawling counties.
- 71 percent of the parents of school age children walked or biked to school when they were young but only 18 percent of their children walk or bike to school
- 19 percent of adults in a sample of compact counties were obese compared to 22 percent of adults in sprawling counties
- A state-by-state analysis, conducted in 2001, showed that Colorado has fewer obese adults: 10-14 percent. In nearly a fifth of the states (including Maryland and Virginia) 15-19 percent of the adult population is obese. In the vast majority of states, 20-24 percent obese. Mississippi's adult obesity rate is over 24 percent.
- In the state of Maryland, Montgomery County, Prince George's County, and Baltimore City are compact.
- In a sample of 83 metro areas, 2 percent of the population in sprawling metro areas chose to commute by transit compared to 7 percent in compact metro areas.

3.3 Infrastructure Costs and Public Services Provision

It is the fiscal argument that perhaps provides the best support for growth management measures. Cox and Utt (2004) tried but, according to Litman (2004), fail to prove that developments at the fringe of urban settlements do not have a negative impact on local budgets. Litman focused in on their claim that the savings from smart growth are trivial. Cox and Utt only looked at water and wastewater charges when they should have examined the full range of public services: including the costs of providing electricity, sanitation, schools, and roads. In the second place, their unit of analysis was not properly specified. Cox and Utt measured municipal expenditures. Most "sprawl" occurs outside of existing municipal boundaries.

Coyne (2003), in his case study of the Denver metro area, examined the potential net cost savings, over a five year period (2000-2005), from providing services to new subdivisions under four development patterns.

Development Pattern	Cost Savings
Sprawl	$0
Rural Clusters	$22,000,000
Land Protection	$17,000,000
Urban Growth	$81,000,000

Heimlich and Anderson (2001) reviewed five case studies of managed growth in New Jersey, Michigan, South Carolina, Kentucky and Delaware. In all instances, low-density development generally resulted in greater public capital and operating costs for infrastructure:

- 25 percent higher for local roads than in planned developments
- 20 percent higher for utilities than in planned communities
- 5 percent higher for schools than in planned communities

Synder and Baird (1998) in their report to the U.S. Department of Energy contend that sprawl is subsidized. There are hidden charges that are not taken into account when evaluating the costs of development. They call for using a fair-share costing method. Usually when comparing costs under a high-density scenario and a low-density development scenario, only the hard and soft costs of construction are considered. High density development is more expensive. However, when VMT and driving subsidies are taken into account, the balance changes in favor of higher densities.

According to Snyder and Baird, developer impact fees are one form of fair-share costing. They also reviewed costing strategies applied in Lancaster California, Boulder Colorado. In Lancaster, the city instituted an Urban Structure Program (USP) where surcharges for the provision of infrastructure are levied by distance from the urban core. Since the USP went into effect, the city has experienced growth but all of it within the urban core not at the edges of the city. Boulder instituted a development excise tax to vary by residential development type.

Several case studies have shown that per unit costs of providing public services (particularly infrastructure) decreases with higher densities. However studies by Ladd and Yinger (1991) and Ladd (1994) turned that argument up-side down. They found that the relationship between density and cost may in fact be U-shaped. In other words, at some tipping point, higher densities lead to the diseconomies of scale—with infrastructure costs 43 percent higher in increasingly dense counties.

Carruthers and Ulfarrson (2003) were skeptical of those results. They developed an ordinary least squares regression model to examine the influence that alternative development patterns have on twelve measures of public expenditure: direct spending, capital facilities, roads, other transportation, sewerage, trash collection, housing and community development, police, fire, parks, schools and libraries, across 283 metropolitan counties. For many services, the cost per unit of development rises as densities decrease. In other words, low-density, spatially

expansive development patterns lead to greater costs because of the large investments required to extend roads and other types of infrastructure that transmit water, sewage, electricity and other services long distances to reach relatively fewer numbers of people. The curve identified by Ladd and Yinger does occur but it appears to be restricted to those metro areas with a wide geographic spread and the relative strength of the property tax base.

3.4 Socio-Economic Costs of Low Density Development

Been (2005) reviewed the literature on the cost of smart growth-- specifically the influence of impact fees on housing affordability. It is her assessment, and one echoed by others, that impact fees have a negligible impact on housing affordability and that more importantly they are an effective growth management tool. Fees are predictable and more likely to be accepted by the development community. Perhaps for this reason, development fees have little effect on the rate of new construction.

Impact fees certainly increase the price of housing. Waddell and Blanco (2004) conducted a least-squares regression analysis measuring the influence of impact fees on the sales price of new single family homes in King County, Washington. They found that a $1 increase in impact fees is correlated with a $1.66 increase in house price. With respect to high quality housing, a $1 increase in fees leads to a $3.58 increase in house price.

Been also reviewed work by Ihlandfeldt and Shaughnessy (2004) showing that impact fees reduced the property tax rate after a 3-year lag. They analyzed the impact fee home sales relationship in Miami-Dade County Florida. Land prices also declined by eight percent due to the use of impact fees.

One critique of impact fees is that they are regressive. Been cites work showing that basing impact fees on housing type and unit size reduces the regressive character of the fee.

As a counterpoint to Been’s 2005 piece, is a 1982 article by Dowall and Landis "Land-Use Controls and Housing Costs: An examination of San Francisco Bay Area Communities". Dowell and Landis find that land use controls particularly those that encourage higher densities have an inflationary effect on land values, and restrict new development. Dowall and Landis urge local governments that are committed to reducing housing costs to loosen density restrictions and/or other controls that inhibit the flow of new housing on the market. In their analysis they appear not to take into account the cost of infrastructure or the cost of providing other public services.

4. Remedies

How can jurisdictions minimize or reduce the costs of low-density development? Research presented in the published articles we reviewed offer solutions that are similar to those already pursued in Montgomery County: the application of an adequate public facilities ordinance, charging development impact fees, preserving open space and rural lands, creating transit-oriented developments and mixed-use centers. Tools that the County has not used include urban growth boundaries, varying fees by distance, and eminent domain, congestion pricing, land banking, infrastructure funds, and mechanisms to assume or offset a developer's upfront costs.

- The Urban Growth Boundary (UGB), first used in Portland Oregon, has emerged in other jurisdictions: Boulder Colorado, Minneapolis-St. Paul, Virginia Beach, Lexington Kentucky, San Jose California, and Miami-Dade Florida. Growth boundaries, however, have not proven effective in all settings. Knox County Tennessee instituted a UGB but a recent evaluation by researchers at the University of Minnesota found that Knox County's UGB was unable to effectively prevent sprawl. There are no examples of a UGB or USB (urban service boundary) t in the Washington DC region. It may not even be necessary for Montgomery County where its agricultural reserve serves as a boundary. Moreover, it has other tools directing growth and density to its CBD's and activity centers.

- Varying exactions by distance and development type. In Lancaster, California, the impact fee charged a developer varies based on distance from the urban core. So you could have a situation where the fee is low within a 2-mile radius of a CBD, but increases by some increment as distance increases. Boulder also has experimented with varying charges but based not on distance but development type. Developers building single-family pay a higher fee compared to those building townhomes or multi-family.

- Applying the power of eminent domain to direct development activity to already dense centers. Although the method is controversial, the courts have weighed in favor—see *Kelo v. City of New London, Housing Authority of Hawaii v. Midkiff, and Poletown Neighborhood Council v. City of Detroit*.

- Congestion Pricing. If roads are not being used efficiently then congestion pricing or congestion tolls could correct for this problem (Bogart 1998). The theory is that congestion pricing gives consumers the true cost of the journey-to-work and thus allows them to consider alternative modes of travel: bicycle, bus, rail, foot. The Montgomery County *Businesses Gazette* in a May 21, 2008 issue, noted that although its use was rejected in New York, other cities have

adopted this technique: London, Singapore, San Diego, Orange County California and Lee County Florida.

- Congestion tolls could be used on those roads with heavy traffic or during peak hours of the day. Bogart (1998) suggests that implementing congestion tolls is made easier by technology: GPS systems, satellites, traffic cameras, and automatic vehicle identification tags.

- Infrastructure Fund.

- Land Banks

5. Bibiliography

Unintended Consequences of Rapid Growth

Brueckner, J. 2000. "Urban Sprawl: Diagnosis and Remedies." International Regional Science Review 23: 160-71.
http://www.igpa.uillinois.edu/library/urban-sprawl-diagnosis-and-remedies

Burton, J. 2007. Loudoun County: A Case Study in Unbridled Growth.
Leesburg, VA: Loudoun County Board of Supervisors.
http://www.loudoun.gov/Default.aspx?tabid=1005

Ewing, R., R. Pendall, and D. Chen. Measuring Sprawl and Its Impact. Washington, DC: Smart Growth America. http://www.smartgrowthamerica.org

Gordon, P. and H. Richardson. 2000. Critiquing Sprawl's Critics. Policy Analysis, no. 365: 1-18. http://www.cato.org/pubs/pas/html/pa365/pa365index.html

Khe, S. and A. Grammy. 2002. Cost of Residential Development: A case study of Bakersfield, California. Bakersfield: California State University.
http://www.kernsmartgrowth.com/

Kolankiewicz, L. and R. Beck. 2001. Weighing Sprawl Factors in Large U.S. Cities. Arlington, VA: Sprawl City. http://www.sprawlcity.org/studyUSA/USAsprawlz.pdf

Miezkowski, P. and B. Smith. 1991. "Analyzing Urban Decentralization: The Case of Houston." Regional Science and Urban Economics 21, no 2: 183-99.

O'Neill, D. 2002. *Environment and Development: Myth and Fact*. Washington, DC: Urban Land Institute.
http://www.uli.org/ResearchAndPublications/Reports/Smart%20Growth.aspx

Sierra Club. 1998. *Sprawl: the Dark Side of the American Dream*. Washington, DC.
http://www.sierraclub.org/sprawl/report98/

Wagner, F., T. Joder, A. Mumphrey et.al. 2005. *Revitalizing the City: Strategies to Contain Sprawl and Revive the Core*. Armonk, NY: M.E. Sharpe.

Sprawl as Market Failure

Bertaud, A. and S. Malpezzi. (2009). "The Spatial Distribution of Population in 48 World Cities: Implications for Economies in Transition." Washington DC: World Bank
http://alain-bertaud.com/AB_Files/Spatia_%20Distribution_of_Pop_%2050_%20Cities.pdf

Burchell R. et al. 1998. "The Costs of Sprawl, Revisited." Transportation Research Board, Washington, DC: National Research Council.
http://onlinepubs.trb.org/Onlinepubs/tcrp/tcrp_rpt_74-a.pdf

Burchell, R. and S. Mukherji. 2003. "Conventional Development versus Managed Growth: The Costs of Sprawl." American Journal of Public Health 93, no. 9: 1534-40
http://www.ajph.org/cgi/content/full/93/9/1534

Ciscel, D. 2001. "The Economics of Urban Sprawl: Inefficiency as a Core Feature of Metropolitan Growth." Journal of Economic Issues 35, no. 2: 405-14.
http://www.accessmylibrary.com/coms2/summary_0286-27063384_ITM

Cox, W. and J. Utt. 2004. "The Costs of Sprawl Reconsidered: What the data really show." Washington, DC: The Heritage Foundation
http://www.heritage.org/research/smartgrowth/

Frelich, R. 1999. *From Sprawl to Smart Growth: Successful Legal, Planning and Environmental Systems.* Chicago: American Bar Association.

Hernandez-Murillo, R. 2001. "Suburban Expansion," Regional Economist, St. Louis: Federal Reserve Bank of St. Louis.
http://research.stlouisfed.org/publications/regional/01/10/SuburbanExpansion.pdf

Mohamed, R. 2009. "Why do residential developers prefer large exurban lots? Infrastructure costs and exurban development" Environment and Planning B: Planning and Design. 36: 12-29.
http://www.envplan.com/abstract.cgi?id=b33120

Miceli, T. and C. Sirmans. 2004. "The Holdout Problem and Urban Sprawl." Economics Working Papers. Storrs, Connecticut: University of Connecticut, Department of Economics.
http://digitalcommons.uconn.edu/econ_wpapers/200438/

Myers, D. and A. Kitsuse. 2001. "The Debate over the Future Density of Development: An Interpretive Review." Boston, MA: Lincoln Land Policy Institute.
http://www.lincolninst.edu/pubs/PubDetail.aspx?pubid=63

Najafi, M., R. Mohamed, Tayebi, A. et.al. 2006. "The Fiscal Impacts of Alternative Single Family Housing Densities: Infrastructure Costs." Working Paper. 2006-2. Lansing, MI: Land Policy Institute, Michigan State University.
http://landpolicy.msu.edu

O'Toole, R. 2007. "The Planning Tax: The Case against Regional Growth-Management Planning. *Policy Analysis*. 606: 1-19.
http://www.cato.org/pub_display.php?pub_id=8811

Real Estate Research Corporation. 1974. Costs of Urban Sprawl: Executive Summary. Washington, DC: U.S. Government Printing Office.
http://www.smartgrowth.org/pdf/costs_of_sprawl.pdf

Staley, S. 2001. Market-Oriented Approaches to Growth: Outsmarting Sprawl's Impacts. Los Angeles: Reason Public Policy Institute.
http://www.southbaypartnership.com/Publications/Outsmarting_Sprawls_Impacts.pdf

Traffic Congestion

Cervero, R. 2001. Road Expansion, Urban Growth, and Induced Travel: A Path Analysis. Berkeley, CA: University of Berkeley
http://www.uctc.net/papers/520.pdf

Heimlich, R. and W. Anderson. 2001. "The Costs of Growth." In Agriculture Economic Research report 803, *Development at the Urban Fringe and Beyond: Impacts on Agriculture and Rural Land.* Washington DC: USDA, Economic Research Service.
http://www.ers.usda.gov/Publications/AER803/

Public Health Impacts

McCann, S. and R. Ewing. 2003. Measuring the Health Effects of Sprawl: A National Analysis of Physical Activity, Obesity, and Chronic Disease. Washington, DC: Smart Growth America.
http://www.smartgrowthamerica.org/report/HealthSprawl8.03.pdf

Frumpkin, H. 2003. Public Health and Urban Sprawl. Public Health Reports vol. 117
http://www.cdc.gov/healthyplaces/articles/Urban%20Sprawl%20and%20Public%20Health%20-%20PHR.pdf

Fiscal Costs

Coyne,W. 2003. The Fiscal Cost of Sprawl: How Sprawl Contributes to Local Governments' Budget Woes. Denver CO: Environment Colorado ResearchPolicy Center.
http://www.impactfees.com/publications%20pdf/fiscalcostofsprawl12_03.pdf

Litman, T. 2004. Understanding Smart Growth Savings: What we know about public infrastructure and service cost savings. Victoria, Canada: Victoria Transport Policy Institute.
http://www.vtpi.org/sg_save.pdf

Snyder, K. and L. Bird. 1998. "Paying the Costs of Sprawl: Using Fair-Share Costing to Control Sprawl. Washington DC: U.S. Department of Energy.
http://www.smartcommunities.ncat.org/articles/sprawl.shtml

Frank, J. 1989. "The Costs of Alternative Development Patterns: A review of the literature." Urban Land Institute.

Olle, A. and M. Hortas-Rico. 2008. Does Urban Sprawl increase the costs of providing local public services? Evidence from Spanish municipalities. Working Paper 2008/6. Barcelona: Universitat de Barcelona, Institut de Economia.
http://ideas.repec.org/p/ieb/wpaper/2009-3-doc2008-6.html

Provision of Infrastructure and Public Services

J. Carruthers and G. Ulfarsson. 2003. "Urban Sprawl and the Cost of Public Services." Environment and Planning B: Planning and Design. 30: 503-522.
http://www.envplan.com/epb/fulltext/b30/b12847.pdf

C. Speir and K. Stevenson. 2002. "Does Sprawl Cost us All? Isolating the effects of housing patterns on public water and sewer costs." Journal of the American Planning Association.

Housing Affordability

Been, V. 2005. "Impact Fees and Housing Affordability." Cityscape. 8, no. 1: 139-185.
http://www.huduser.org/periodicals/cityscpe/vol8num1/ch4.html

Dowall, D. and J. Landis. 1982. "Land-Use Controls and Housing Costs: An Examination of San Francisco Bay Area Communities." Journal of the American Real Estate and Urban Economics Association. 10: 67-94.

Nelson, A., R. Pendall, C. Dawkins, and G. Knaap. "The Link between Growth Management and Housing Affordability: The Academic Evidence. Washington, DC: Brookings Institution.
http://www.brookings.edu/es/urban/publications/growthmanagexsum.htm