National Capital Region Transportation Planning Board

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MEMORANDUM

TO: TPB Scenario Study Task Force

FROM: Robert E. Griffiths,
Technical Services Director,
Department of Transportation Planning

SUBJECT: Scenario Study - Analysis of Local Level Impacts

DATE: January 16, 2007

The purpose of this memorandum is to provide an illustrative analysis of some of the local level impacts identified for one of the scenarios examined in the Regional Mobility and Accessibility Study. This analysis examines the localized travel impacts of "shifting" some of the future household growth forecast for the Gainesville and Haymarket area in western Prince William County to the Tysons Corner regional activity center and the U Street/Shaw area in the District of Columbia.

"Households In" Scenario

The "Households In" Scenario assumed more of the region's forecast household growth located closer to major concentrations of employment in the District of Columbia, Arlington County, Alexandria, and Fairfax County. The intent of this scenario was to examine the transportation impacts of providing more housing close to and within the major regional employment areas by shifting some of the forecast household growth in lower density areas to these high employment areas having low amounts of nearby housing. A shift of approximately 84,000 households from areas outside of regional activity clusters to regional employment centers in the District of Columbia, Arlington County, Alexandria, and Fairfax County was assumed for this scenario.

Gainesville/Haymarket Area

The fast growing Gainesville/Haymarket area in western Prince William County was one of the lower density residential areas identified in the "Households In" Scenario as an area outside of a major regional activity cluster that had a sizeable excess of household growth relative to its forecast employment growth. In the Round 6.4 Cooperative Forecasts this area is forecast to add 11,000 households between 2000 and 2010 and another 5,200 households between 2010 and 2030, while employment growth for this area is 2,600 jobs in the 2000 to 2010 period and 2,900 jobs in the 2010 to 2030 period. Shifting the entire forecast household growth for this area in the 2010 to 2030 period to major regional employment areas projected to have shortages of new housing relative to their forecast employment growth would improve the jobs/housing ratio in both areas. This assumed shift in household growth would significantly reduce the projected 2030 imbalance between jobs and housing in the Gainesville/Haymarket area and Prince William County as a whole.

The travel impacts of this assumed shift in household growth were modeled in the Regional Mobility and Accessibility Study using the TPB Version 2.1D travel demand forecasting model. As shown in Table 1, the primary impact of the shift of 5,200 households out of the Gainesville/Haymarket area is a 26% reduction in 2030 household-related vehicle miles of travel (VMT). The modal shares for commuting travel by households in the Gainesville/Haymarket did not change appreciably between the Baseline Regional Congestion Management Scenario (CLRP+) Scenario and the "Households In" Scenario, although a slight shift from carpool (HOV2+) to the drive alone, single occupancy (SOV) mode was indicated.

Table 1
Travel Impacts of the "Household In" Scenario for Households Living in the Gainesville/Haymarket Area

Gainesville / Haymarket Area (24 Sq Miles)	2030 CLRP+ Base	Change for Households In Scenario	Percent Change
Input:			
Households	19,900	-5,200	-26%
Population	57,700	-14,300	-25%
Employment	6,300	No Change	No Change
Output:			
% SOV	85%	86%	0%
% HOV2+	7%	6%	-14%
% Transit	5%	5%	0%
% Walk/Bike	3%	3%	0%
Household VMT	1,114,300	-289,900	-26%
VMT/HH	56.0	0.0	0%
VMT/POP	19.3	0.0	0%

Tysons Corner Regional Activity Center

Complementing the shift of 5,200 households out the Gainesville/Haymarket area in the "Households In" Scenario was a shift into the Tysons Corner regional activity center. Tysons Corners is one of the region's largest employment centers. In 2000, 100,000 jobs were concentrated in the Tysons area. This area is projected to add another 9,000 jobs between 2000 and 2010 and another 15,000 jobs between 2010 and 2030. For a regional employment center of this size, Tysons has very few households located in immediate proximity to these jobs. In 2000, only about 4,500 households lived in the heart of this center and a total of about only 100 additional households were forecast to be added to the Tysons Center between 2000 and 2030 in the Round 6.4 COG Cooperative Forecasts.

The assumed addition of 5,200 households to the Tysons Corner Center in the "Households In" Scenario had a dramatic impact on the travel mode shares in this center. As shown in Table 2, the primary 2030 travel impacts of adding 5,200 households to the Tysons Corner activity center is to double the

percentage of workers living in the Tysons Center who walked or biked to work and to reduce the percentage of commuters living in the Tysons Center who drive alone to work. The transit modal share for workers living in the Tysons activity center did not change at all because the future Silver Line Metrorail line running through Tysons to Dulles Airport was in both the 2030 CLRP+ baseline and the "Households In" Scenario. If the Metrorail line extension to Dulles Airport had not been included in the CLRP+ baseline the travel impacts seen for the "Household In" Scenario in the Tysons area would have been even greater.

Table 2
Travel Impacts of the "Household In" Scenario for Household Living in the Tysons Corner Activity Center

Tysons Corner Center (3 Sq Miles)	2030 CLRP+ Base	Change for Households In Scenario	Percent Change
Input:			
Households	4,600	+5,200	112%
Population	9,400	+10,800	115%
Employment	123,000	No Change	No Change
Output:			
% SOV	66%	57%	-13%
% HOV2+	2%	1%	-50%
% Transit	21%	21%	0%
% Walk/Bike	11%	21%	84%
Household VMT	90,600	118,200	131%
VMT/HH	19.5	1.7	9%
VMT/POP	9.7	0.7	7%

U Street/ Shaw Area

The U Street / Shaw area in the District of Columbia was another area in the "Households In" Scenario for which additional household growth was assumed. In this scenario, the U Street/Shaw area received an additional 3,600 households and 8,000 people. In this area of the District of Columbia, the proportion of daily travel by walk and bike is already high so the additional increment of household growth had little effect on increasing this walk/bike percentage. The share of travel by transit in this area is also already high. Nonetheless, this share increases from 45% to 46% in the "Households In" scenario, but the main reason for this increase was the extensive light-rail system assumed for the District in this scenario rather than the land use change. The travel characteristics of households living in the U Street/Shaw area are shown in Table 3.

Table 3
Travel Impacts of the "Household In" Scenario for Household Living in the U Street/Shaw Area

U Street / Shaw Area (1.2 Sq Miles)	2030 CLRP+ Base	Change for Households In Scenario	Percent Change
Input:			
Households	19,500	3,500	18%
Population	42,400	8,000	19%
Employment	27,800	No Change	No Change
Output:			
% SOV	21%	-1%	-5%
% HOV2+	0%	0%	0%
% Transit	45%	1%	2%
% Walk/Bike	34%	0%	0%
Household VMT	168,500	44,400	26%
VMT/HH	8.7	0.5	6%
VMT/POP	4.0	0.2	5%

Change in Household Travel for "Shifted" Households

If the simplifying assumption is made that the 5,200 households shifted out of the Gainesville/Haymarket area are the same one that are shifted into the Tysons Corner activity center or the U Street Shaw area, we can get some indication of the effects on household travel behavior. As shown in Tables 4 and 5, daily household-related VMT is reduced by 62% for households "shifted" from the Gainesville/Haymarket area to Tyson and by 84% if these households are shifted to the U Street/Shaw area. These areas are depicted graphically in Figures 1 and 2.

Table 4

"Shift" of 5,200 Households From Gainesville/Haymarket Area to Tysons Corner	Change in Travel by "Shifted" Households	Total Percent Change
Travel Mode:		
SOV Trips	-2,400	-34%
HOV2+ Trips	-800	-89%
Transit Trips	1,600	533%
Walk/Bike Trips	2,400	1200%
Household VMT	-180,500	-62%

Table 5

"Shift" of 5,200 Households From Gainesville to U Street / Shaw Area	Change in Travel by "Shifted" Households	Total Percent Change
Travel Mode:		
SOV Trips	-5,500	-79%
HOV2+ Trips	-900	-100%
Transit Trips	4,000	1333%
Walk/Bike Trips	2,500	1250%
Household VMT	-223,900	-84%

Why Scenario Travel Changes are Smaller at the Regional Level

While the localized area impacts of the scenarios are very significant, the effects of these changes at the regional level are much smaller as shown in Table 6. The reason for this is that the opportunity to shift growth from potential sending areas to potential receiving areas is fairly limited in the 2010 to 2030 time period. The amount of household growth outside of regional activity centers that could be shifted was only about 84,000 household or about 4% of total number of households expected to be in the region by 2030. About 85% of the 2030 household are already in place or will be in place by 2010. The remaining 11% of the 2030 households are already being forecast to be located in regional activity centers or other areas of concentrated growth.

Table 6

	All Sending Areas	All Receiving Areas	No Change Areas	Total Region
2030 CLRP+ Base				
Land Area (Sq. Mi.)	2,120	83	1,763	3,966
Households	608,500	381,500	2,022,400	3,012,400
Household VMT	28,811,000	6,456,700	52,301,600	87,569,300
Households In Scenario				
Households	524,200	465,800	2,022,400	3,012,400
Household VMT	24,561,200	8,392,600	52,878,200	85,832,000
Change from 2030 CLRP+ Base				
Households	-84,300	+84,300	0	0
Household VMT	-4,249,800	+1,935,900	+576,600	-1,737,300
% Change from 2030 CLRP+ Base				
Households	-14%	+22%	0%	0%
Household VMT	-15%	+30%	+1%	-2%

Figure 1: Tysons Corner and Gainesville / Haymarket Study Areas

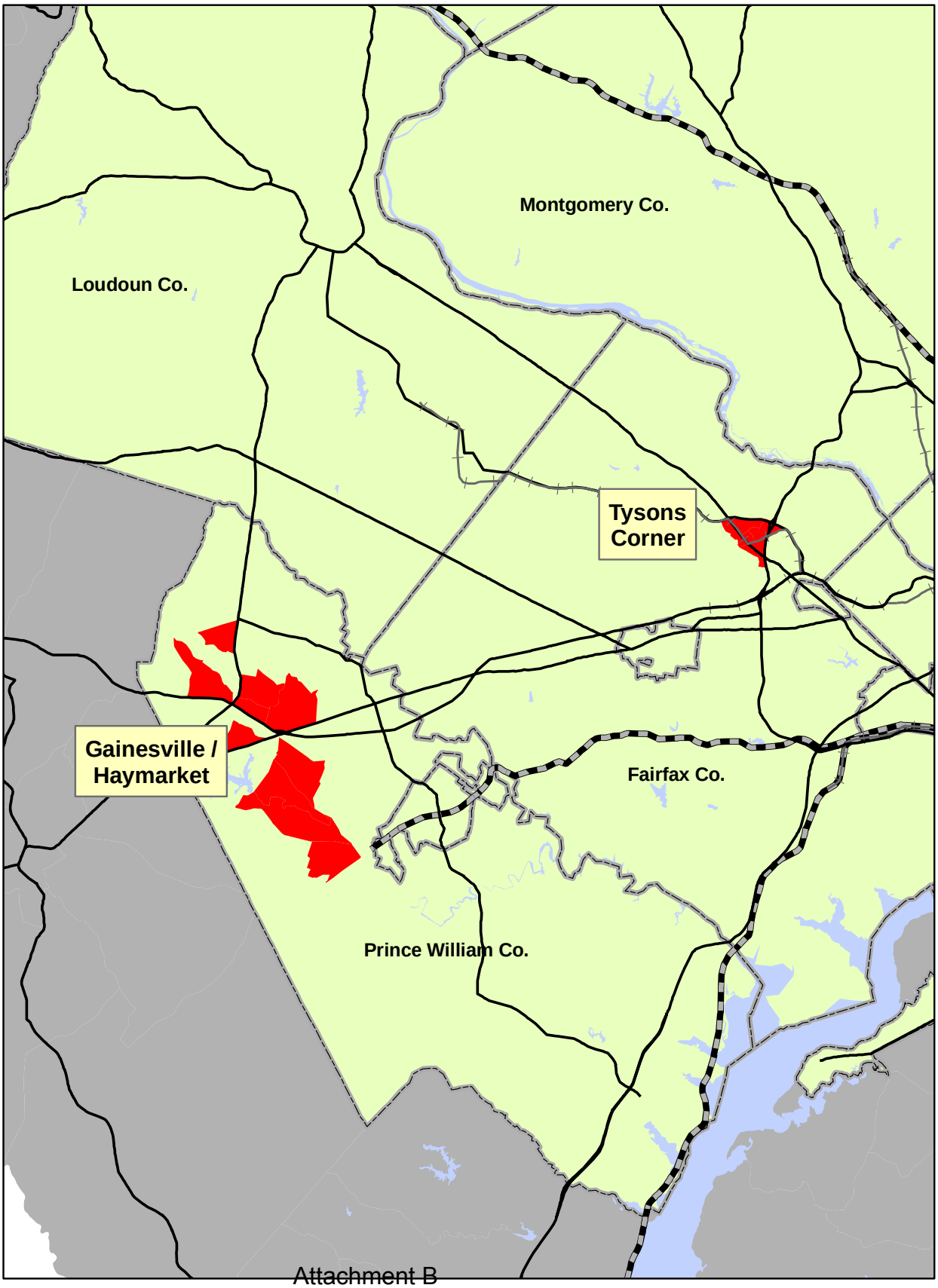
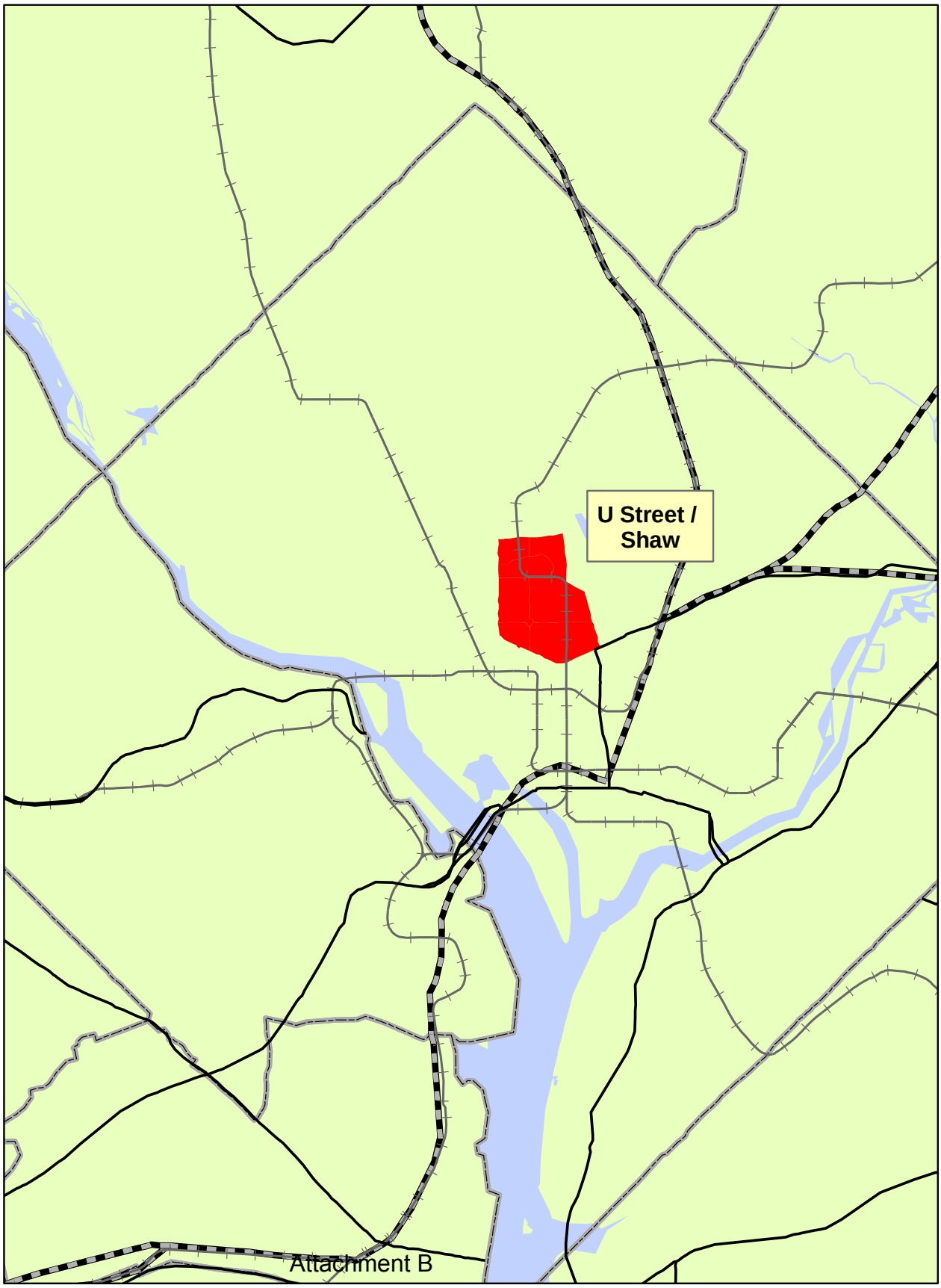


Figure 2: U Street / Shaw Study Area



Conclusion

The purpose of this memorandum was to provide an illustrative case study for some of the local level impacts identified for one of the scenarios examined in the Regional Mobility and Accessibility Study. This type of analysis can be used to identify high impact travel changes resulting from assumed shifts in future growth that can be used to better communicate travel impacts resulting from the scenarios that have already been analyzed and could prove useful in the development of new or composite scenarios for further analysis.