

Date: March 31, 2009

To: Luke Vinciguerra  
James City County

From: Bill Cashman

Subject: **Build Out Analysis**  
**Travel Demand Model Results**

*Forecasts Modifications*

Over the past two months, we have worked with you and other County staff to further refine the travel demand model and to address specific concerns expressed by members of the Steering Committee. To date in the process, four alternatives based on the assumption of full build out have been analyzed:

1. Zoning – Full development according to current zoning;
2. Comprehensive Plan – Full development according to policies in current Comprehensive Plan;
3. Comprehensive Plan with Land Use Applications: Commerce Park - Full development according to policies in current Comprehensive Plan with modifications to reflect a series of development applications as provided by staff. The largest modification involved the proposed Hill Pleasant Farms development. The projected Commerce Park development levels have been based on current densities exhibited by the Stonehouse Commerce Park (excluding Lumber Liquidators), which indicates a Floor Area Ratio (FAR – building floor area to lot area ratio) of 0.179. Based on an estimated developable area of 400 acres, a total floor area of 3,118,896 square feet was computed. A development of this size would accommodate approximately 6,238 employees.
4. Comprehensive Plan with Land Use Applications: Transit Oriented - Full development according to policies in current Comprehensive Plan with modifications to reflect a series of development applications as provided by staff. The largest modification involved the proposed Hill Pleasant Farms development, which was set up in the model to reflect dense, mixed-use development focused near the CSX rail line and Route 199. Labeled “Transit Oriented” to reflect a mix and density of uses that would be supportive of eventual transit service, the development reflects the types of densities found in the City Center in the Oyster Point area of Newport News. This mixed-use development anticipates a population of 8,400, and employment of 11,420, of which 1,037 are in retail trade.

The total countywide forecasted build out population, retail employment and total employment projections used to develop the forecasted volumes are shown in Table 1. For comparison purposes, estimates of year 2000 and 2007 population and employment levels are included, as are year 2030 forecasts from the Hampton Roads Planning District Commission (HRPDC). The 2030 HRPDC forecasts were developed in cooperation with local jurisdictions.

**TABLE 1  
SUMMARY OF FORECASTS: BUILD OUT ANALYSIS  
JAMES CITY COUNTY**

ALTERNATIVE	POPULATION	TOTAL EMPLOYMENT	RETAIL EMPLOYMENT
2000	48,102	25,517	4,757
2007	61,739	30,078	N/A
2030 HRPDC (not Build Out)	95,300	47,400	7,600
1. Build Out - Zoning	118,482	56,009	15,723
2. Build Out - Comp Plan	176,721	50,140	13,451
3. Build Out - Commerce Park	178,828	57,358	13,941
4. Build Out - Transit Oriented	187,228	62,450	14,977

The data in Table 1 for Alternatives 1 and 2 has been modified from those previously presented to the Steering Committee. These revised forecasts are the product of a re-examination applying more conservative forecasts of retail employment. The previous and current employment and population forecasts are summarized in Table 2 below:

**TABLE 2  
MODIFICATIONS TO FORECASTS: BUILD OUT ANALYSIS  
JAMES CITY COUNTY**

ALTERNATIVE	POPULATION	TOTAL EMPLOYMENT	RETAIL EMPLOYMENT
<i>Previous Build Out - Zoning</i>	<i>114,207</i>	<i>67,626</i>	<i>37,491</i>
Build Out Zoning - Zoning	118,482	56,009	15,723
<i>Previous Build Out - Comp Plan</i>	<i>176,721</i>	<i>57,098</i>	<i>31,104</i>
Build Out - Comp Plan	176,721	50,140	13,451

As the table indicates, the forecasted County population does not substantially change from the previously presented forecasts (in italics) with the revisions to the Build Out by Zoning and by Comprehensive Plan alternatives. In contrast, employment – particularly retail employment – is reduced substantially.

### *Model Modification*

The model was run under two network configurations. The first included those improvements anticipated by the year 2030, as listed by HRPDC and VDOT. The results of the “Without Improvements” assignment alternative indicated that forecasted congestion – especially along I-64 and Richmond Road – would encourage motorists to use other local streets. The results indicate an unusual mix of improvement needs. For example, Cranston’s Mill Pond Road (Little Creek Dam – Jolly Pond) carries a current volume of approximately 1,700 vehicles, but under this assignment alternative, it would carry 11,000-15,000. These volumes are not from development in the vicinity but rather from the model assigning trips that avoid using Richmond Road and I-64.

To provide a more useful analysis by minimizing diversions from overly congested roadways, we have assumed that the following major roadway improvements will have been completed by the time of buildout:

- I-64 – 6 lanes (Newport News to Barhamsville Road - Exit 227)
- Richmond Road – 6 Lanes (Croaker Road to Williamsburg City Limits)
- Pocahontas Trail – 4 Lanes (Grove to Yorktown Road in Newport News)

The cost of widening I-64 has not been included. The cost of widening Richmond Road and Pocahontas Trail has been included in the summary table at a combined \$116.7 million in 2009 dollars. The volumes from the assignment using the network with these improvements are summarized on the “With Improvement” table.

To provide the Steering Committee with a more realistic picture of traffic impacts, the roadway network for both the Without Improvements and the With Improvements assignment alternatives were modified in several areas.

1. The Stonehouse proffered Bridge Road (connecting Stonehouse north of I-64) to Rochambeau Road (approximately 0.7 miles west of Croaker Road) was added as a 4-lane collector roadway;
2. The Stonehouse proffered widening of the 2-lane segment Rochambeau Road from Croaker Road west to the 4-lanes section of Rochambeau Road was improved to a 4-lane collector roadway;
3. Rochambeau Road between Croaker Road east to Mooretown Road at Route 199 was added as a 2-lane collector road;
4. Mooretown Road Extension was added between Croaker Road and Route 199 in York County (for the Comprehensive Plan with Land Use Applications Commerce Park and Transit Oriented Alternatives – Alternatives 3 & 4 - only);
5. Neck-O-Land Road and Lake Powell Road have been added to the network and to the Build Out Analysis summary table. Treyburn Drive has been added to the Build Out Analysis summary table;
6. Although requested, the following roadways could not be added to the network due to limitations in the size of the model: Riverview Road, Sandy Bay Road, Bush Springs Road, Newman Road and Ware Creek Road;

7. As requested, several Transportation Analysis Zones (TAZ's) in adjacent jurisdictions were revised to reflect development that had not been considered in the year 2030 forecasts. The following TAZ's were revised by using the draft year 2034 forecasts:

1259 & 1260 – City of Williamsburg opposite Route 199 from the County Complex. Development includes Quarterpath Trace;

1391 – York County in the northeast quadrant of the I-64 interchange with Route 199. Includes commercial development adjacent to Water Country USA

1398 – York County east of Route 199 in the area of Mooretown Road. Includes additional retail commercial development.

#### *Additional Modifications Considered*

We have also reviewed extending existing roads and connecting existing parallel roads with new roads. While a policy of providing for an interconnected street system offers many benefits and should be pursued, the level of detail in the model does not lend itself to providing valid evaluations of such extensions at the local street classification level. Furthermore, it may or may not provide valid evaluation of the collector road classification level provided the network and TAZ's are appropriately sized.

#### *Interpretation of Results and Consistency with Other Studies*

Prior to discussing findings, we want to reiterate that using the model for this type of analysis is valid only from a general perspective of the entire system. The findings are useful for policy level analysis and are best used as a starting point for generating more detailed analysis.

In addition, for consistency, we have defined a deficiency as a roadway that exhibits a service level of E or F. In some cases, the difference between a service level of D (no improvement) and E (improvement) can be only a few hundred vehicles a day. Using Croaker Road between I-64 and Fenton Mill Road as an example, Alternative #3, Comprehensive Plan with Land Use Applications – Transit Oriented forecast is 33,827 vehicles for a service level of E. For Alternative #3, Commerce Park, the forecast is 33,323 vehicles (504 fewer vehicles) for a service level of D. While the 1.5% difference in the forecast would not be sufficient to make a final decision on the future of widening either roadway, we have shown the difference to present a consistent analysis results. We trust that you will consider the results in their proper context.

There also are roadways in the model output for which the need for improvements has been indicated where more detailed studies – traffic impact analyses, for example - have not developed an improvement need. Reconciling the two will not be possible because of the different set of development assumptions used in each.

For example, in the Stonehouse Traffic Impact Analysis, Stonehouse was assumed to be fully developed in approximately 15 years, and the analysis included off-site traffic volume growth through the 15 year period. In contrast, all four alternative in the Build Out analysis includes off-site traffic forecast to be generated by full development of the County according to the respective alternative – a much higher level of development than considered in the Stonehouse analysis. The Stonehouse TIA did not indicate the need to widen Croaker Road to Richmond Road but Alternatives 2-4 of the Build Out analysis show the need to widen Croaker Road.

The point to emphasize here is that reconciling the findings of the Build Out analysis to more detailed traffic studies can only be done on a limited basis because the Build Out analysis includes a set of development assumptions that are not incorporated into traffic impact studies.

*Findings*

Based on the results of the With Improvement assignment alternative, the results show that the amount of growth (as documented in the forecasted socioeconomic data) is commensurate with the cost and extent of roadway improvements.

- Alternative #1 - Build Out by Zoning - forecasts substantially lower population and employment than forecast the other alternatives, and the cost of improvements is estimated in current dollars at \$313.7 million.
- Alternative #2 - Build Out by the Current Comprehensive Plan – forecasts much higher population and employment than the Build Out by Zoning alternative (offset somewhat by a lower employment forecast) and the cost of improvements are estimated at \$399.5 million. Improvements that account for much of the increase over Build Out by Zoning include:
  - Centerville Road (Longhill –News)
  - Croaker Road (Rochambeau – I-64)
  - Monticello Avenue (Ironbound – Route 199)
  - News Road (Centerville – Monticello)
  - Richmond Road (Rochambeau - Croaker)
  - Rochambeau Road (Bridge – Croaker)
  - Neck-O-Land (Gatehouse – Jamestown)
- Alternative #3 - Build Out by Comprehensive Plan with Land Use Applications: Commerce Park - increases both population and employment (when compared with the current Comprehensive Plan alternative). The cost of improvements – at \$366.8 million – is \$32.7 million less. The following roads are removed from those listed in the Comprehensive Plan alternative:
  - Centerville Road (Longhill –News)
  - John Tyler Highway (Greensprings – Ironbound)
  - News Road (Centerville – Monticello)

The following road is added:

- Mooretown Road Extended (Croaker – York County Line)

If 2 lanes of Mooretown Road Extended is part of the Hill Pleasant Farm development proposal, the cost of adding 2 lanes is estimated at \$8.9 million, \$6.9 million less than the cost for the 4-lane facility. It has not been included in Alternatives #1 and #2.

- Alternative #4 - Build Out by Comprehensive Plan with Land Use Applications: Transit Oriented - uses a more compact land use pattern(focused closer to Route 199) for the Hill Pleasant Farm development than used in the Commerce Park alternative, and when compared with the Commerce Park version, the following road is added to the improvement list, which is estimated to cost \$369.5 million:
  - Croaker Road (I-64 – Fenton Mill)

### *Interpretations*

For the most part, the difference between the Alternative #1 – Zoning and the three Comprehensive Plan alternatives can be explained by the level of forecasted development with the former. Lower population and employment levels result in fewer trips being added to the network in the County. In general, we interpret the improvements listed in the model output for Alternative #1 – Zoning to be a reasonable representation of facilities that will need improvements.

In reviewing the list of improvements in the model output for Alternatives #2 - #4, Comprehensive Plans, we suggest the following improvements are a product of the limitation of the model and should not be included in final analysis or recommendations:

- Neck-O-Land Road: The higher volumes are a product of the added development from full build out of one TAZ. Considering the amount of existing development in the TAZ and the opportunities for additional connections to Jamestown Road, widening Neck-O-Land Road should not be considered as a likely needed improvement;
- Croaker Road (I-64 – Fenton Mill): Alternative #4 (Transit Oriented), the forecasted volume is modestly higher than that Alternative #2 and is a product of the added attraction of the commercial development in the Hill Pleasant Farm development. To balance volumes among competing commercial areas, we conclude the model is overstating the volumes on this link.

Focusing on the differences in Alternatives #2 - #4, understanding the differences among the results involves the effects of the gravity model for distributing trips to commercial areas and the impact of the growth in TAZ's in neighboring jurisdictions discussed above and the employment forecast for Hill Pleasant Farms.

In Alternative #2 – Comprehensive Plan without Hill Pleasant Farms – the largest areas of forecasted increases in commercial employment are in the Route 199/Mooretown Road vicinity, the Richmond Road corridor, the Monticello Avenue at Route 199 vicinity and Quarterpath Trace. As the model results show, improvements for this alternative only (purple in the improvement table) are oriented to these areas. The improvement to Jamestown Road west of Route 199 is a product of residential trips from the Jamestown Road corridor being attracted to the Quarterpath Trace commercial center.

In Alternatives #4 – Transit Oriented – the addition of over 13,000 forecasted employees reoriented the distribution to all commercial centers in the area. For example, the volumes on Route 199 east of Jamestown Road are lower than in Alternative #2 as more trips are attracted to the north and west. The same occurs on News Road and on Centerville Road (Longhill Road –News Road).

An impact of Hill Pleasant Farms that is not shown on this table is forecast to occur on Route 199 north of Route 60 in York County. The forecast volumes for Alternative #4 are approximately 11,000 vehicles higher than those forecast in Alternative #2. Using the volume and service level criteria, this segment of Route 199 would need to be widened based on Alternative #4.

### *System Efficiency*

As you requested, we have also evaluated the amount of and efficiency of travel within James City County under the four alternatives, and we have shown the year 2000 data for comparison

purposes. The results are presented in Table 3. The data shown provides an indication of how efficiently the trips are assigned between TAZ's across the network. The fewer the vehicle miles of travel (VMT) the more direct the available routes between TAZ's. Indicators of congestion are shown in vehicle hours of travel under congested conditions (VHTCC) and the average speed of vehicle under congested conditions (CON SP). Under free flow conditions, vehicles are assumed to be traveling at or near the free flow speed.

The added lane miles from the 2000 model include improvements that have been added since then, such as Treyburn Drive and the widening of Route 199, as well as improvements assumed to be completed by the time of build out, such as the widening of I-64, Richmond Road and Pocahontas Trail. The added lane miles incorporated into the Land Use with Applications alternatives are comprised of the two lanes of Mooretown Road Extended to Croaker Road.

**TABLE 3  
COMPARISON OF SYSTEM EFFICIENCY: BUILD OUT ANALYSIS  
JAMES CITY COUNTY**

<b>ALTERNATIVE</b>	<b>VMT</b>	<b>VHT FF (% Total VHT)</b>	<b>VHT CC (% Total VHT)</b>	<b>AVERAGE CONGESTED SPEED</b>	<b>TOTAL LANE MILES</b>
2000	1,651,845	36,440 (45%)	44,932 (55%)	36.8	484
1. Zoning	3,382,225	78,554 (41%)	113,254 (59%)	29.9	552
2. Comprehensive Plan	4,412,874	105,046 (36%)	187,604 (64%)	23.5	552
3. Comprehensive Plan with LU: Commerce Park	3,895,930	91,635 (39%)	142,458 (61%)	27.4	558
4. Comprehensive Plan with LU Applications – Transit Oriented	3,999,982	94,223 (38%)	151,676 (62%)	26.4	558

VMT = Total Number of Miles Traveled by Vehicles (24-Hour)  
 VHTFF = Vehicle Hours of Travel under Free Flow Conditions  
 VHTCS = Vehicle Hours of Travel under Congested Conditions  
 AVERAGE CONGESTED SPEED (MPH) = Average Vehicle Speed Under Congested Conditions in mph  
 TOTAL LANE MILES = Lane miles in James City County on network analyzed.

The results of the system efficiency analysis indicate that while adding both population and employment over the forecasts in Alternative #2, Alternatives #3 & #4 will result in a more efficient assignment of traffic over the network. The results show more development with lower VMT and a higher average congested speed.

This conclusion is a result of the impact of the forecasted build out employment levels at Hill Pleasant Farms. We anticipate that as more time sensitive growth levels are developed and analyzed, the advantage of Alternatives #3 & #4 over Alternative #2 will be somewhat reduced.