Transportation Analysis

Report to Planning Commission
Tysons Committee

February 19, 2009

Presentation Outline

- Background on Analysis
- Model Results and Assessment
- Transportation Recommendations
- Next Steps

Background

- Two prior rounds of looking at alternatives
  - July 2007 Community Workshops (Round 1)
  - February 2008 Community Workshops (Round 2)

Background

July 2007 Community Workshops

- Land uses
  - Scenario A, “Pushing envelope” (92,000 pop, 246,000 jobs)
  - Scenario B, Jobs emphasis (62,000 pop, 191,000 jobs)
  - Scenario C, Housing emphasis (76,000 pop, 164,000 jobs)

- Transportation network
  - Metrorail
  - Additional transit
  - Grid of streets
  - HOT lanes connections and one additional DTR ramp
  - Beltway crossings

Background

- What was learned learn from this exercise
  - Grid of streets performed an important function
  - Access into and out of Tysons needed to be improved
  - Housing emphasis resulted in less increase in congestion than other scenarios
  - Pushing envelope had over 60% more congestion than Base Case (Comprehensive Plan)

Background

- February 2008 Community Workshops
  - Prototype A (72,000 pop; 159,000 jobs)
  - Prototype B (100,000 pop; 203,000 jobs)
- Analyzed against two networks
  - Both networks had extensive grid of streets, Beltway crossings and some additional ramps
  - Both included extensive transit and transportation demand management
  - Network 1 - Included more roadway elements (grade separations, more highway ramps)
  - Network 2 - Circulator in dedicated right-of-way

Background

- What was learned learn from this exercise
  - Residential component captured a substantial amount of trips, reducing trips from outside Tysons
  - Network 1 attracted more vehicle trips into Tysons
  - Prototypes resulted in a higher level of transit use than Comprehensive Plan

Background

Summary of Existing and Future Analyses

- Current Task
  - Evaluating seven combinations of land use and transportation

- Future Tasks
  - Prepare “Chapter 527 Report.”
  - Supplemental Neighborhood Traffic Impact Study
  - Phasing analysis and recommendations (2020)
  - Circulator Study

Scenarios Tested

Scenario	Land Use Within Tysons	Network
2005	2005	2005
Comprehensive Plan	Comprehensive Plan	Comprehensive Plan
2030 GMU High	2030 GMU High Forecast	Task Force Preferred
2030 GMU High (Modified)	2030 GMU High Forecast	Modified Task Force
2040 Prototype A	Prototype A (Similar to GMU 2040)	Modified Task Force
2050 Prototype B	Prototype B (Similar to GMU 2050)	Task Force Preferred
Task Force Preferred	Task Force Preferred (Beyond GMU 2050)	Task Force Preferred

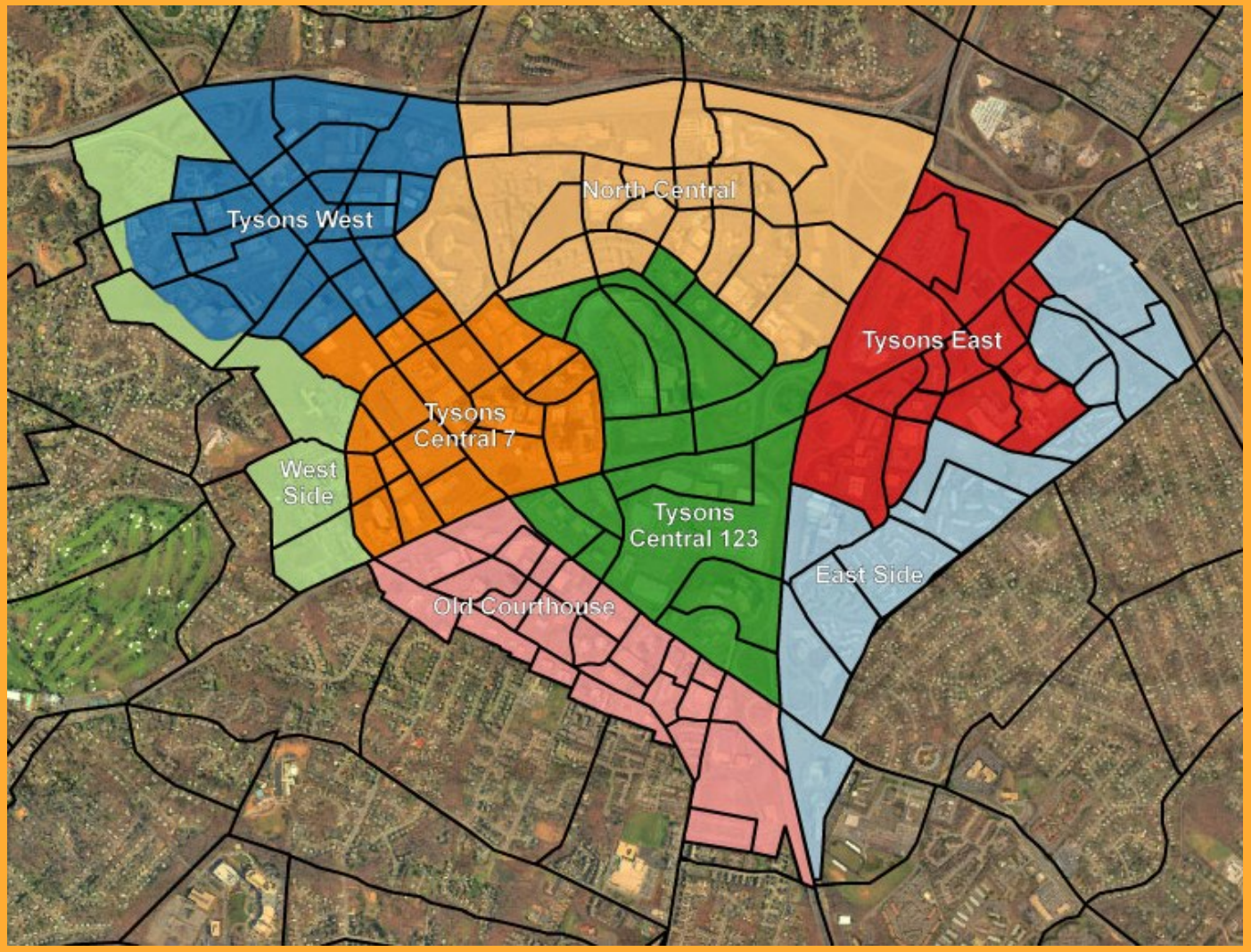
Reasons for Scenarios

- Reasons for model runs
  - Determine impacts of differing land use on transportation system performance
  - Determine impacts of differences in transportation networks
  - Gain insight into how development might occur over time (2030, 2040, 2050, etc.)

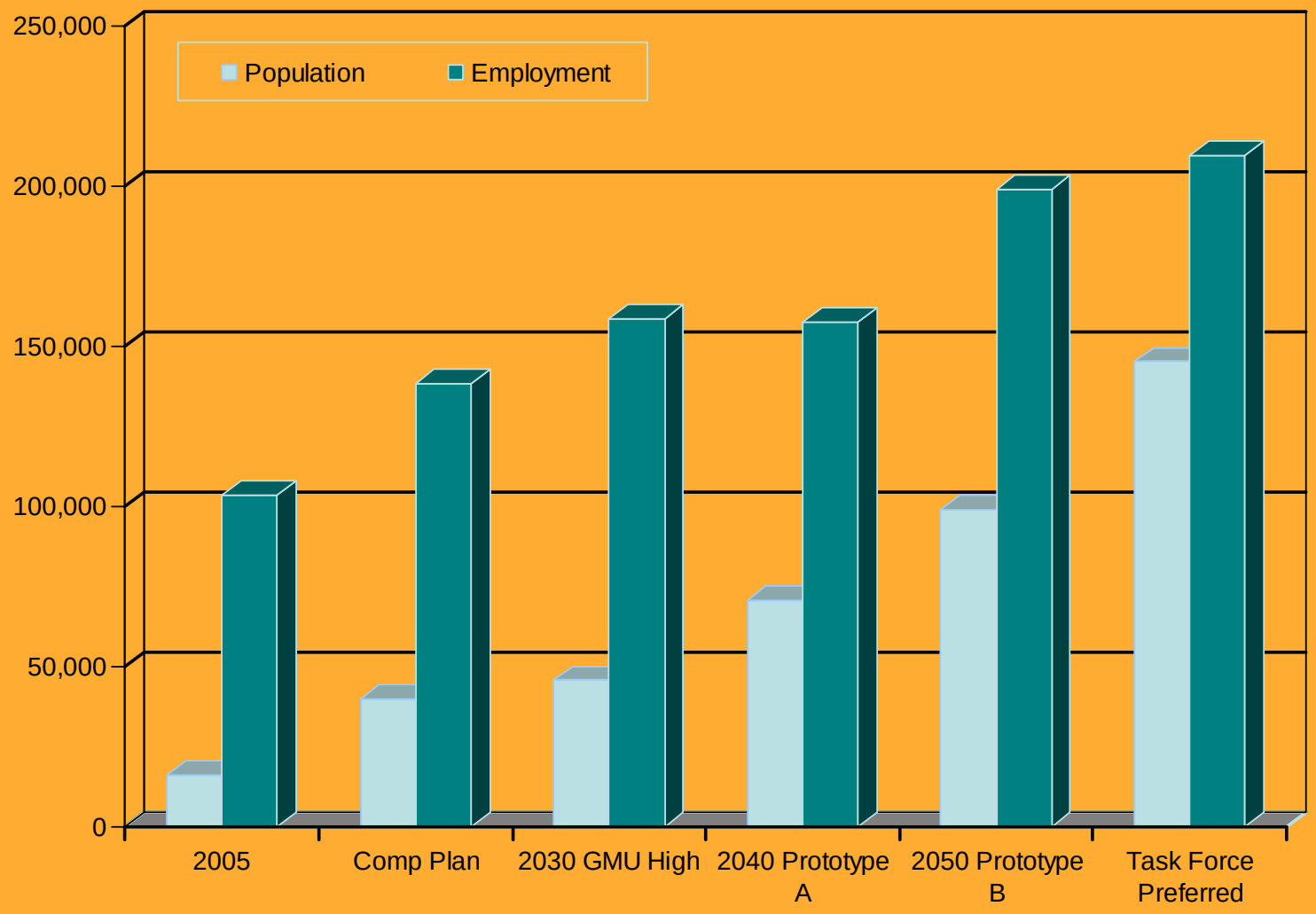
Reasons for Scenarios

- 2005
  - Validation run
- Comprehensive Plan
  - Provides base for analysis
- 2030 GMU High
  - 2030 growth with most aggressive transportation network
- 2030 GMU High (Modified Network)
  - 2030 growth with modified transportation network
- 2040 Prototype A
  - Shows possible evolution of Tysons 30 years into future
- 2050 Prototype B
  - Shows possible evolution of Tysons 40 years into future
- Task Force Preferred
  - Shows possible evolution of Tysons beyond 40 years into future

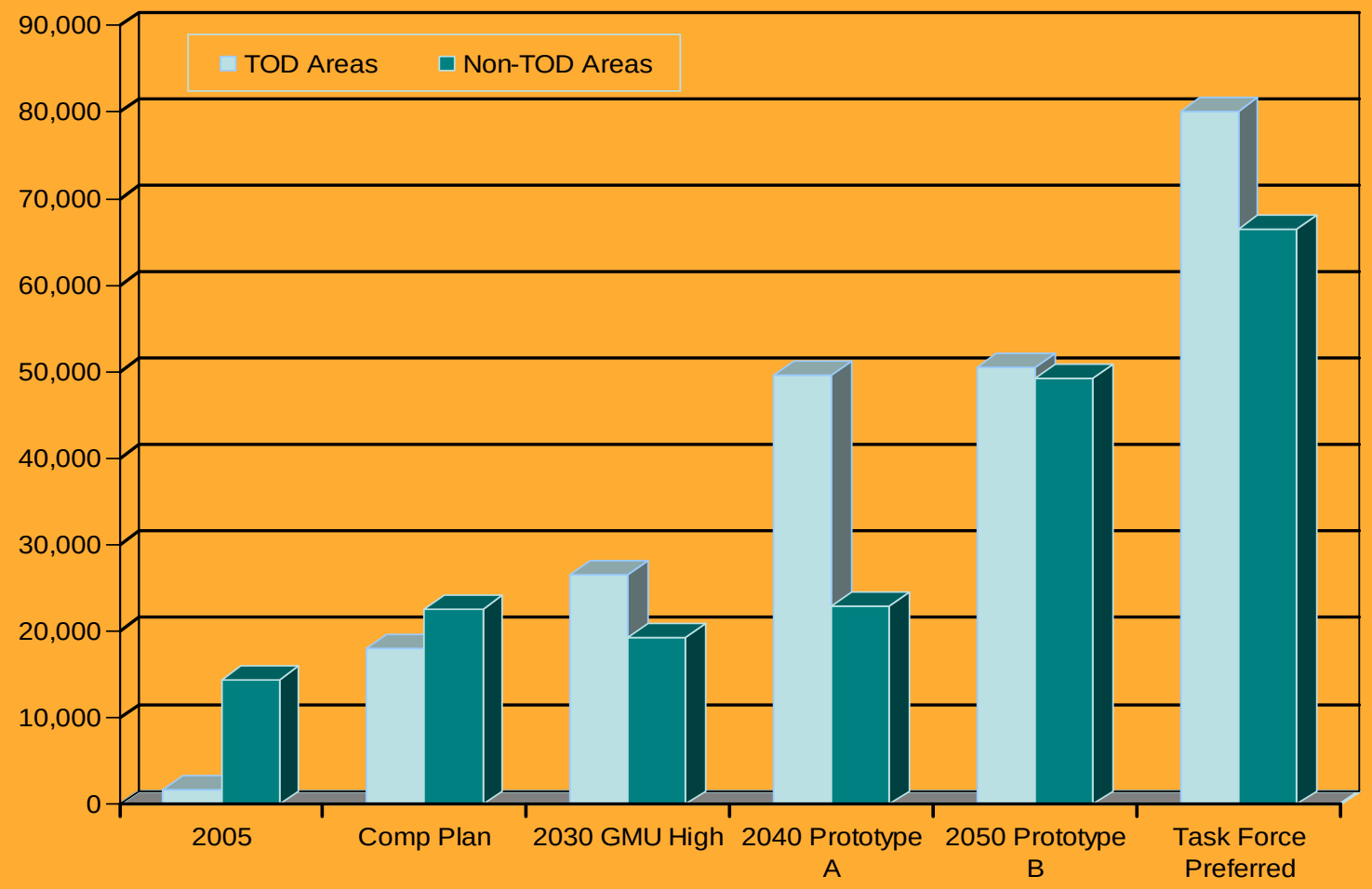
TOD and non-TOD Areas



Differences in Land Use – Tysons Corner Area

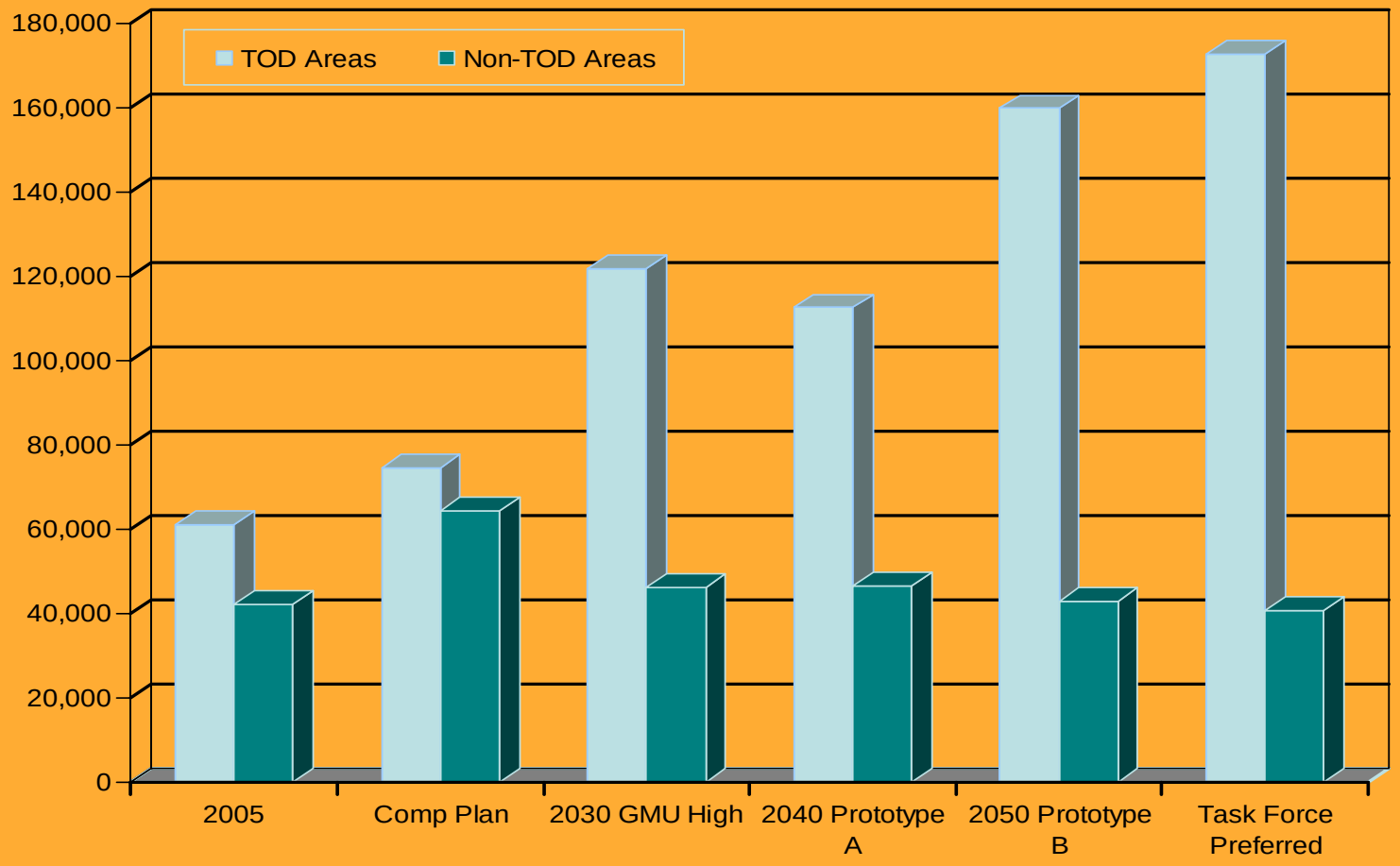


Differences in Population – TOD vs. Non-TOD Areas



All scenarios increase percentage of housing in the TOD areas.

Differences in Employment – TOD vs. Non-TOD Areas



All scenarios have a much higher concentration of employment in the TOD areas versus the Comprehensive Plan.

Road Networks

2005

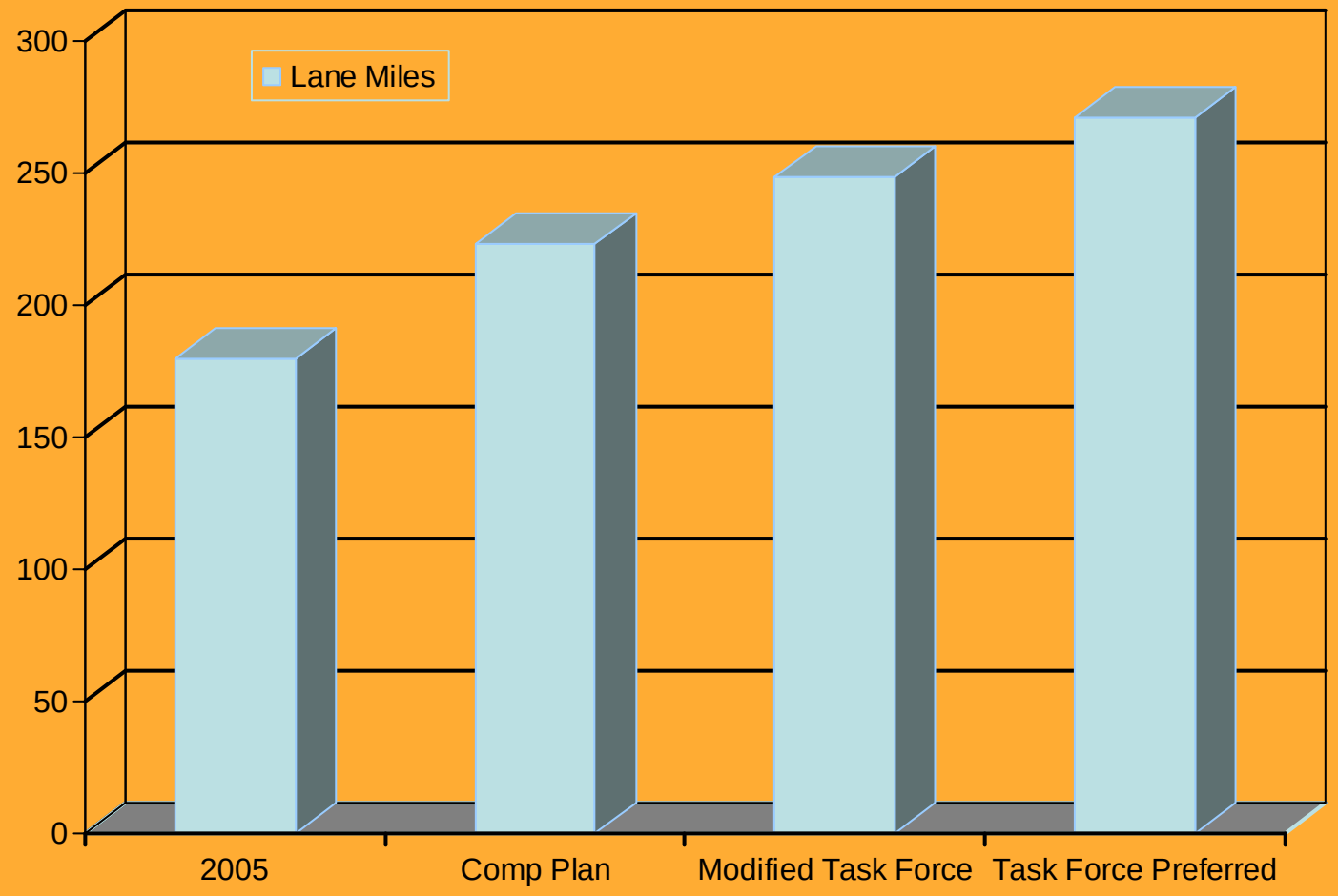
Comprehensive Plan

Modified Task Force

Task Force Preferred

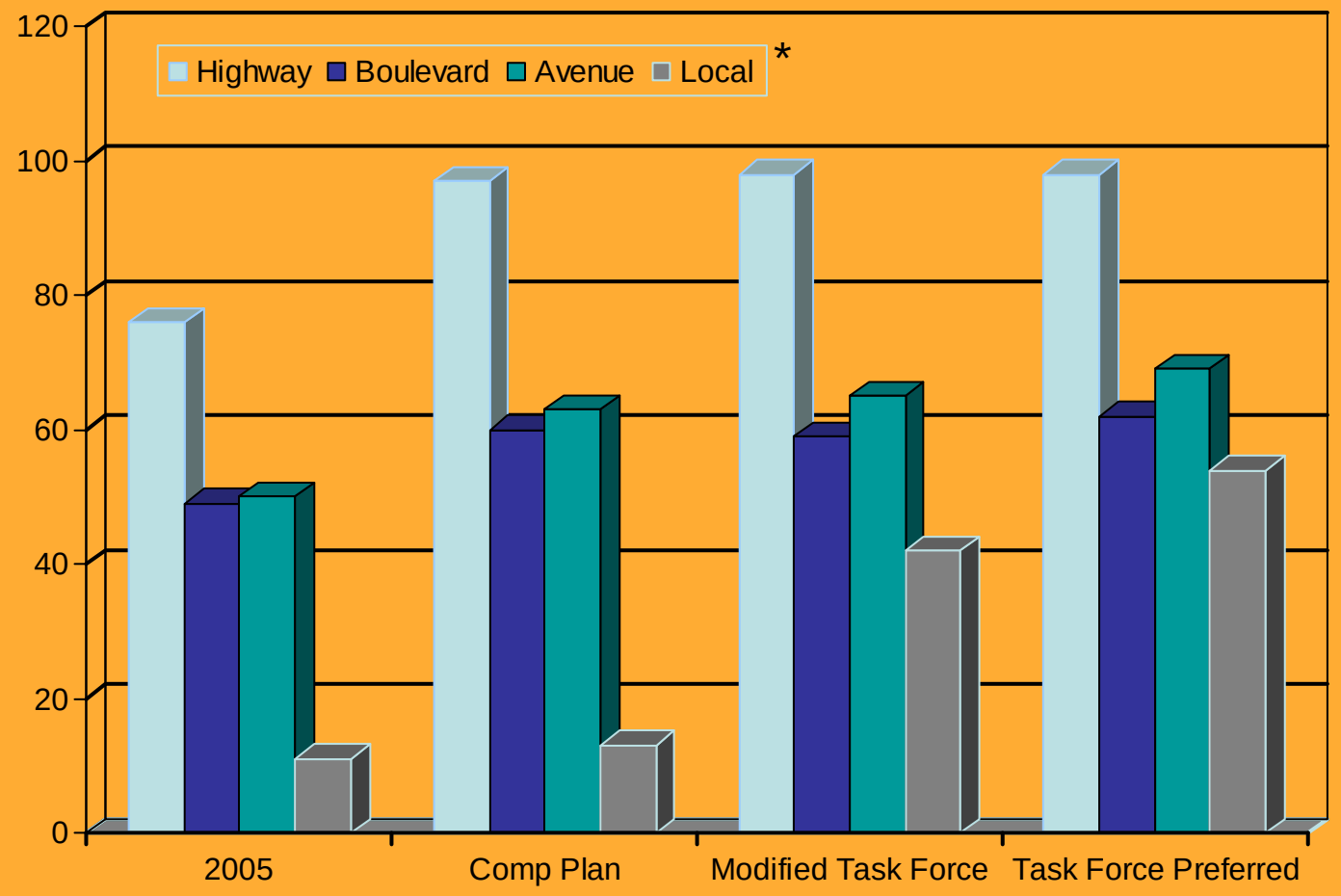
Road Network

Total Lane Miles



Road Network

Lane Miles by Facility Type



**Facility type names are from the urban design framework*

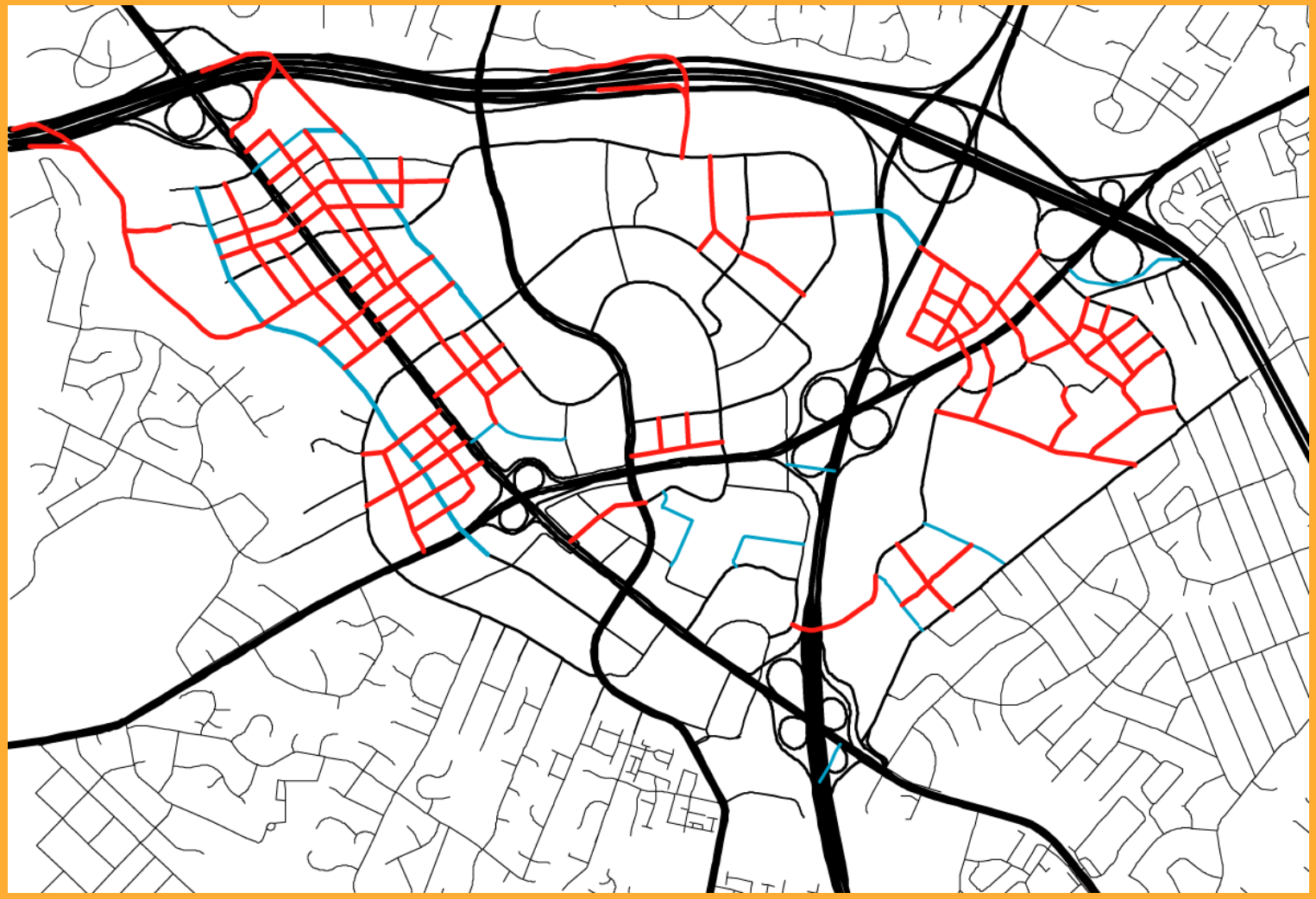
Road Network – 2005

Highway Network – Comprehensive Plan

- grade separations
- extensions of Boone Blvd. and Greensboro Drive

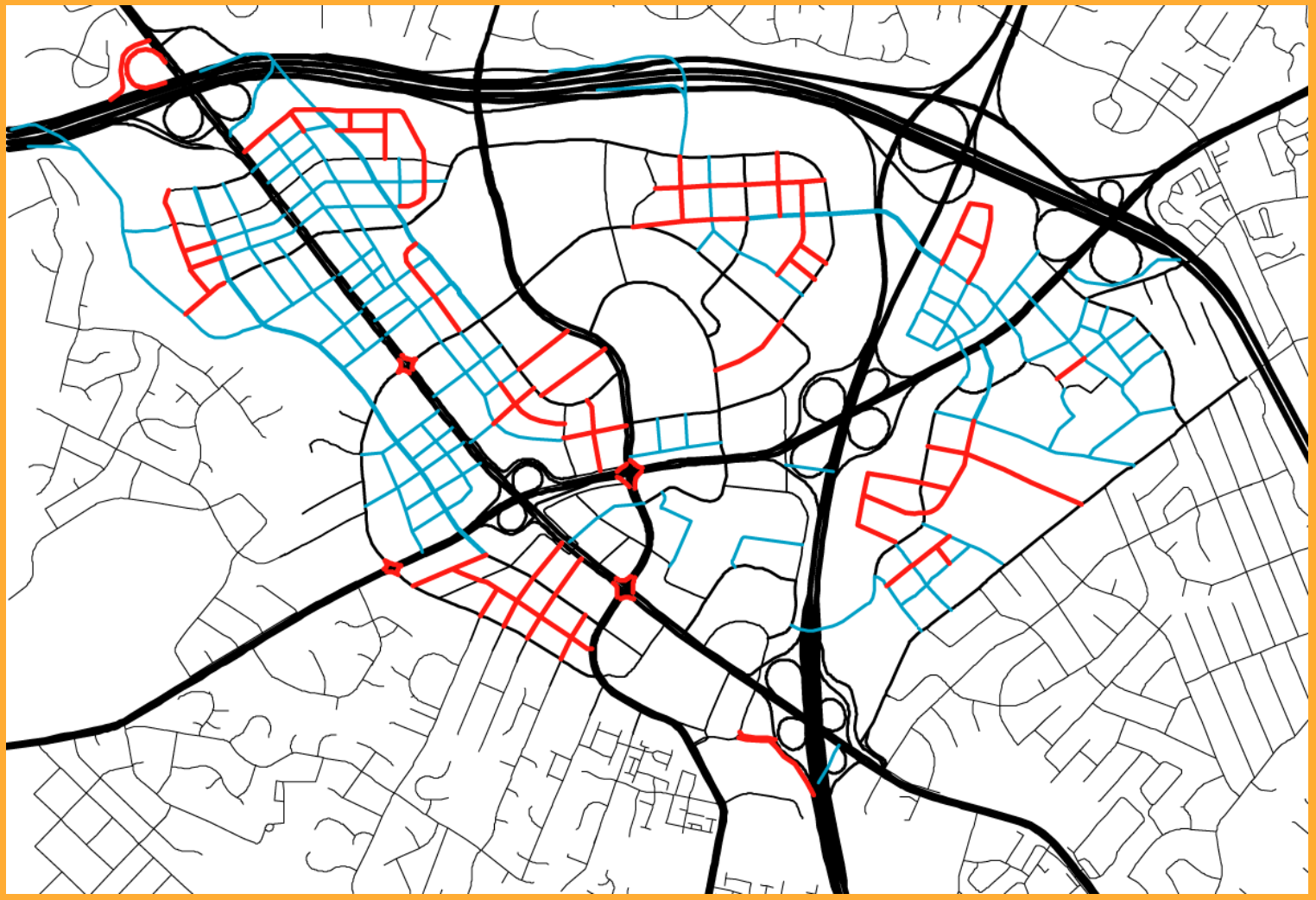
Highway Network – Modified Task Force

- DTR ramps
- grid of streets



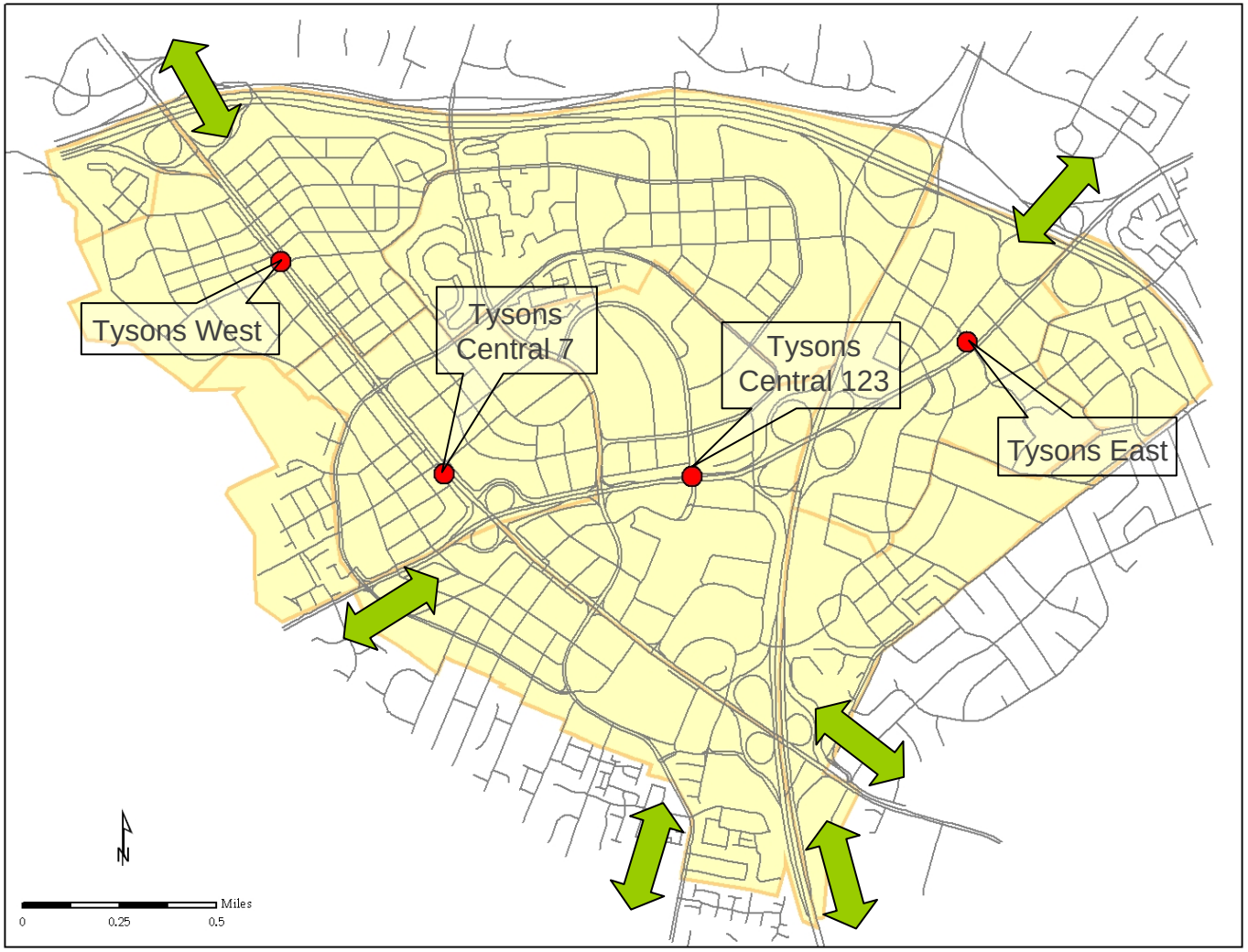
Highway Network – Task Force Preferred

- DTR and beltway ramps
- grid of streets
- grade separations

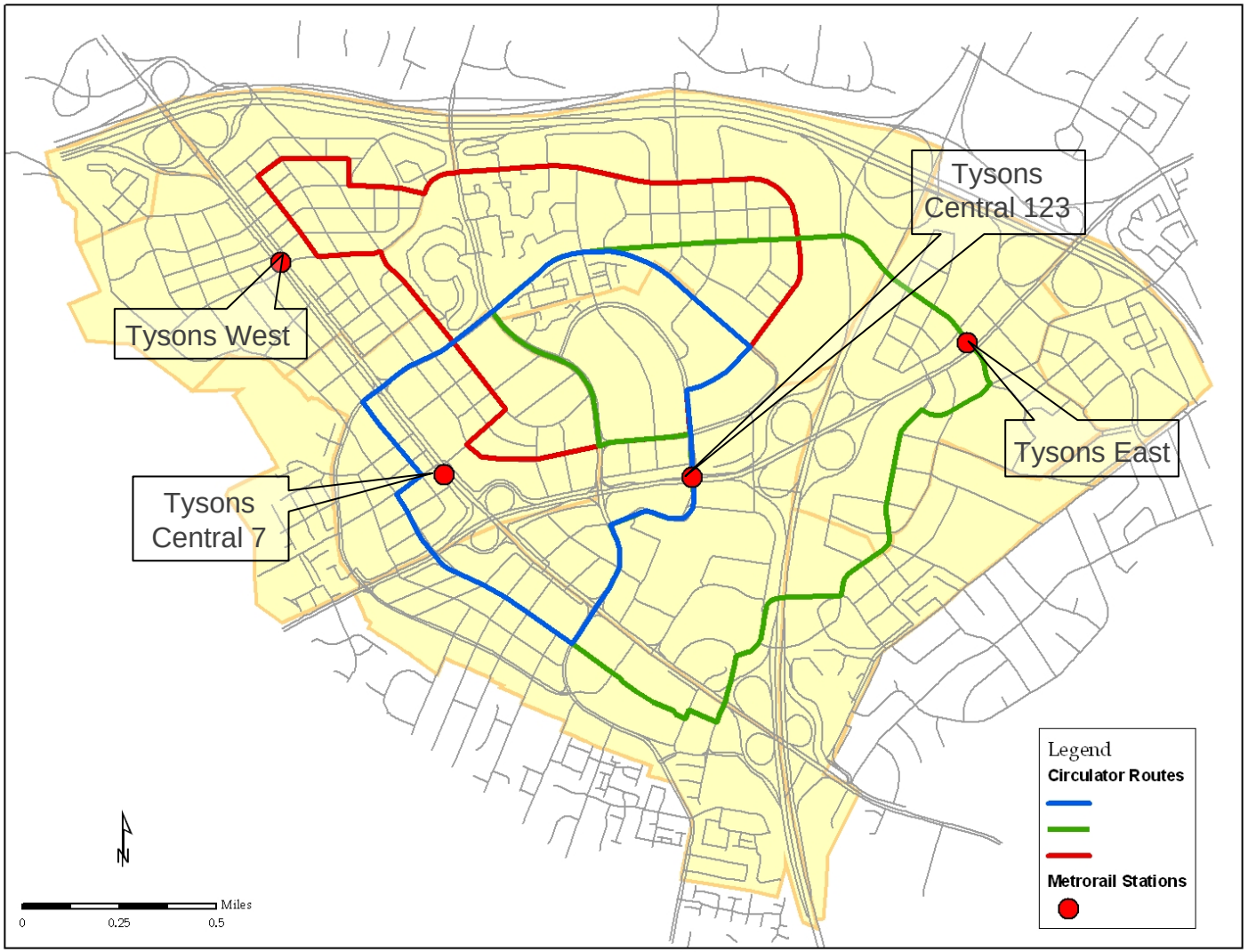


Transit Network – Future Bus Connectivity

Future bus networks include continued regional bus service to surrounding areas, supplementing the Metrorail extension.



Transit Network – Circulator Routes



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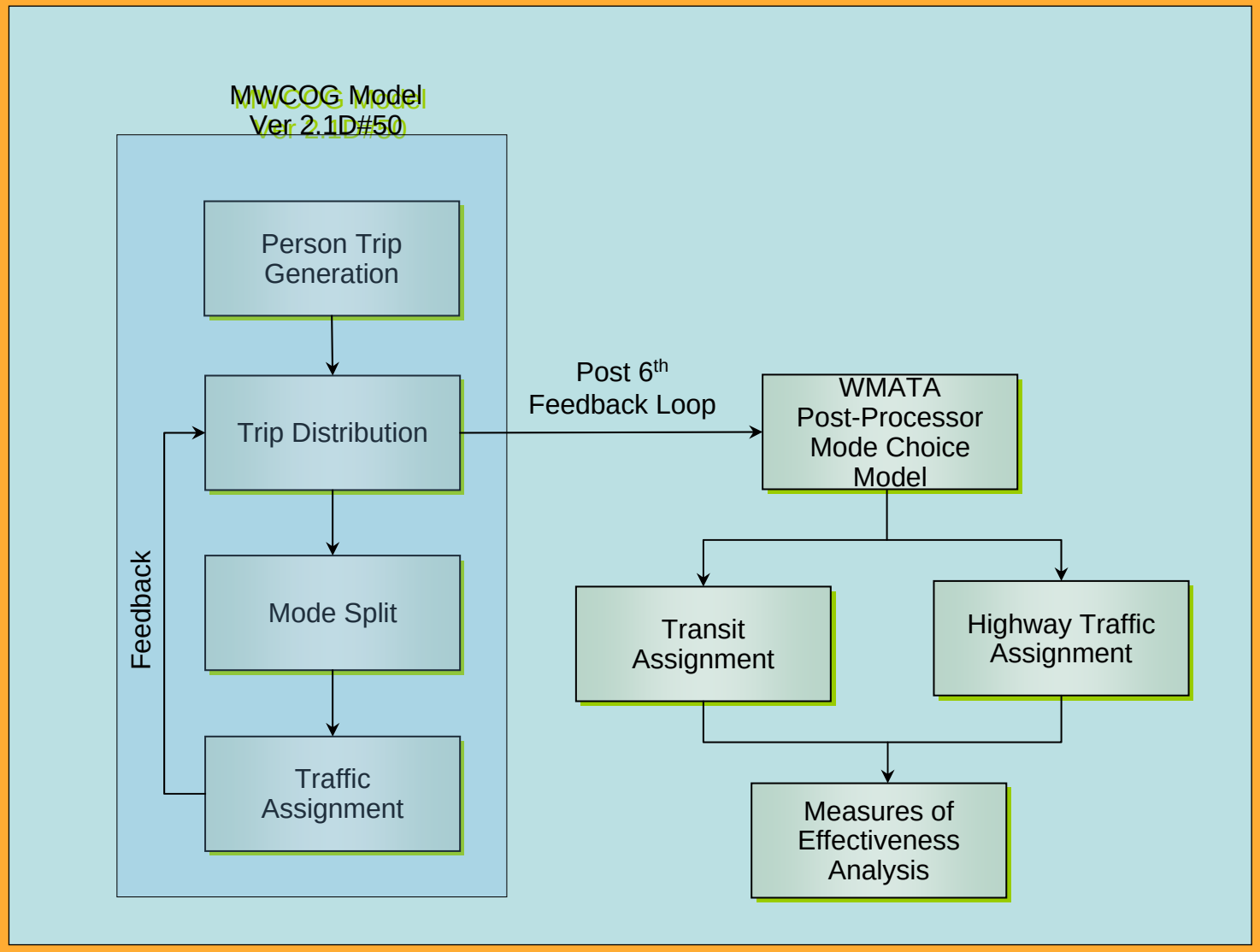
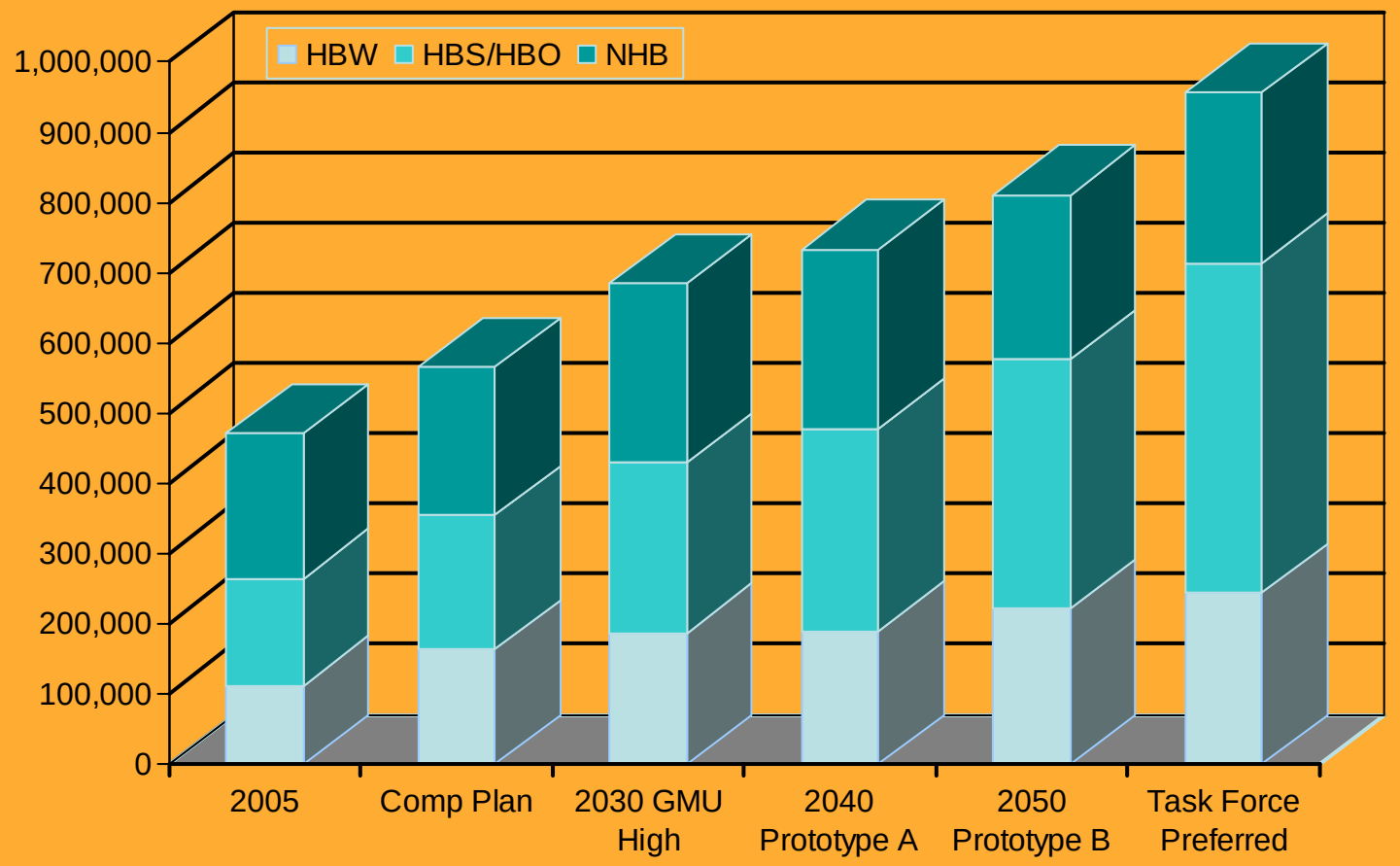
Analysis Process

WMATA Post-Processor provides enhanced transit forecasting capabilities.

Fairfax County submodel provides enhanced highway assignment capabilities.



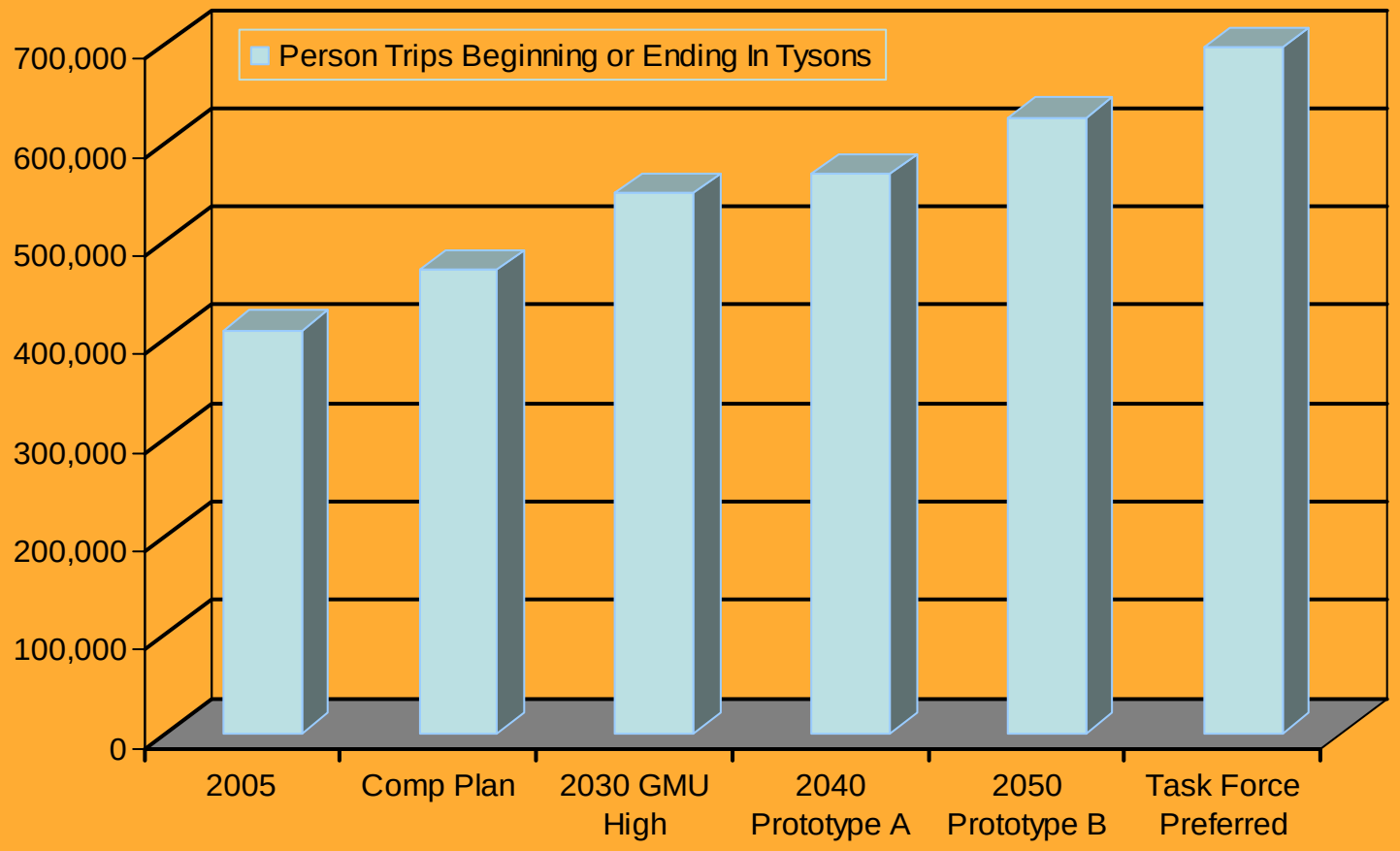
How Much Travel Occurs by Scenario



Total daily vehicle and transit person trips beginning and/or ending in Tysons Corner are 69% higher in Task Force Preferred versus the Comprehensive Plan scenario and 103% higher versus 2005.

Where Travel Occurs by Scenario

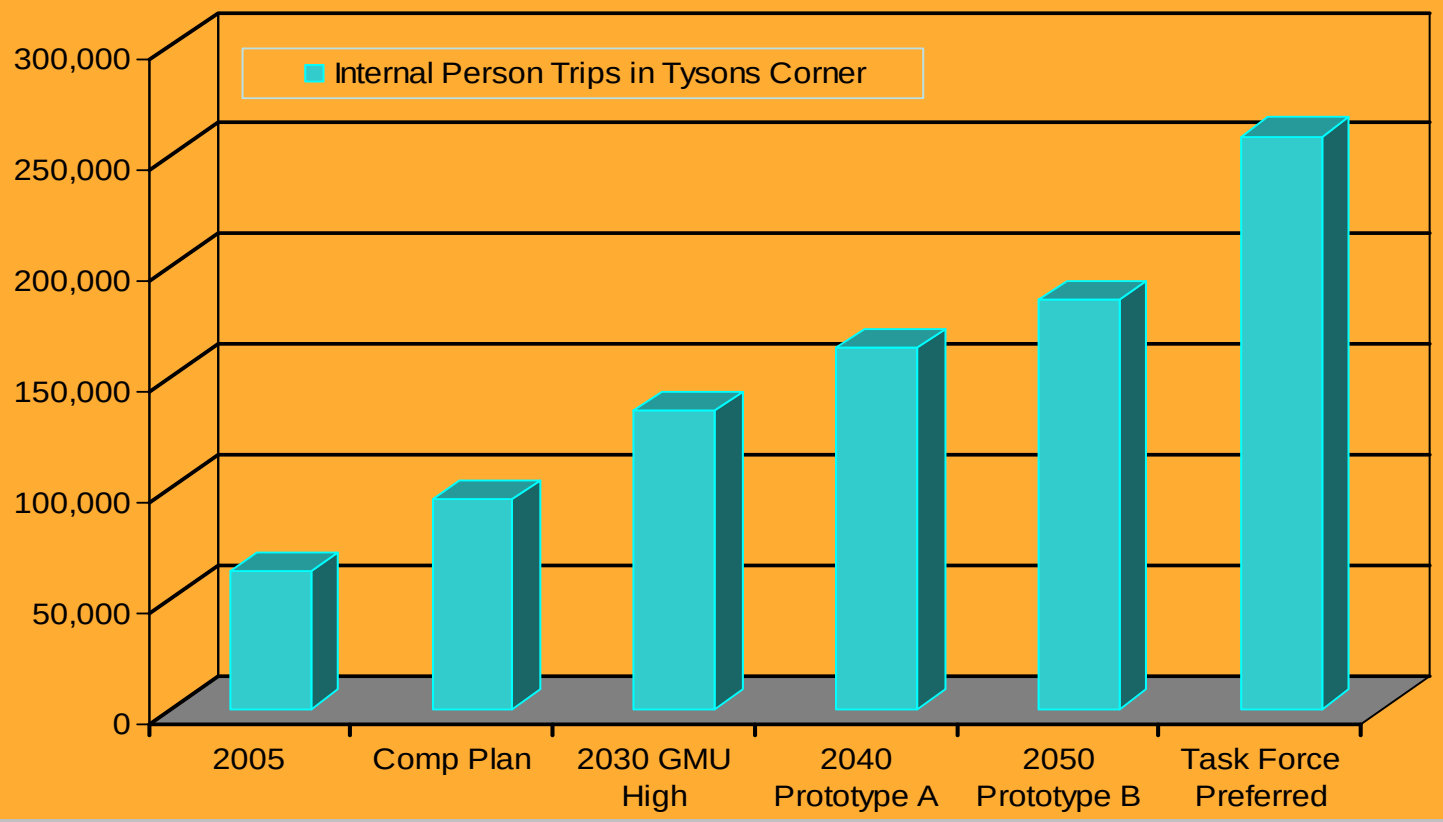
Person Trips With Origin or Destination Within Tysons



Person trips beginning or ending in Tysons Corner are 48% higher in Task Force Preferred versus the Comprehensive Plan scenario and 71% higher versus 2005.

Where Travel Occurs by Scenario

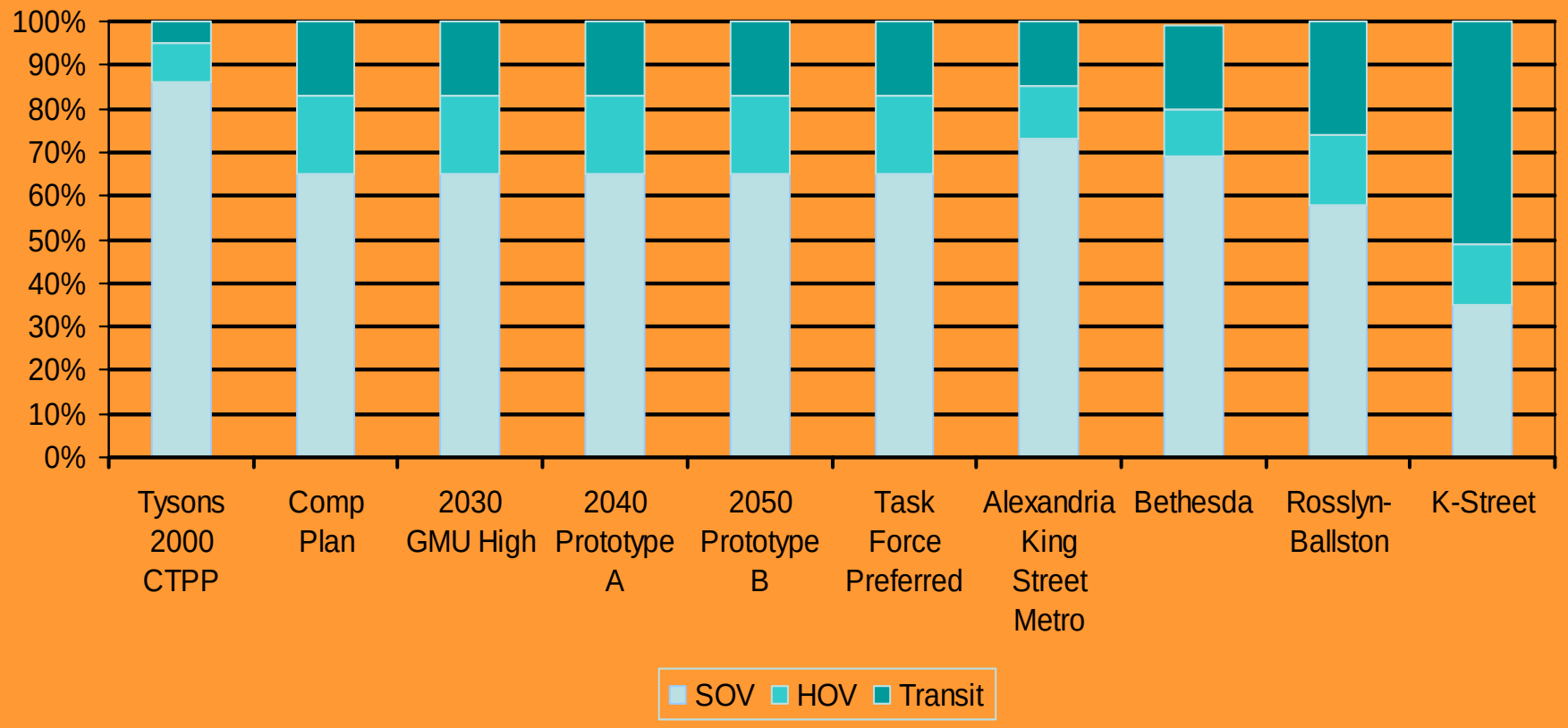
Person Trips With Origin and Destination Within Tysons



Lower job-to-housing ratios are present as development is intensified, leading to higher proportion of travel internal to Tysons Corner. Internal trips are 174% higher in Task Force Preferred versus the Comprehensive Plan scenario and 318% higher versus 2005.

Mode Used by Scenario for Work Trips

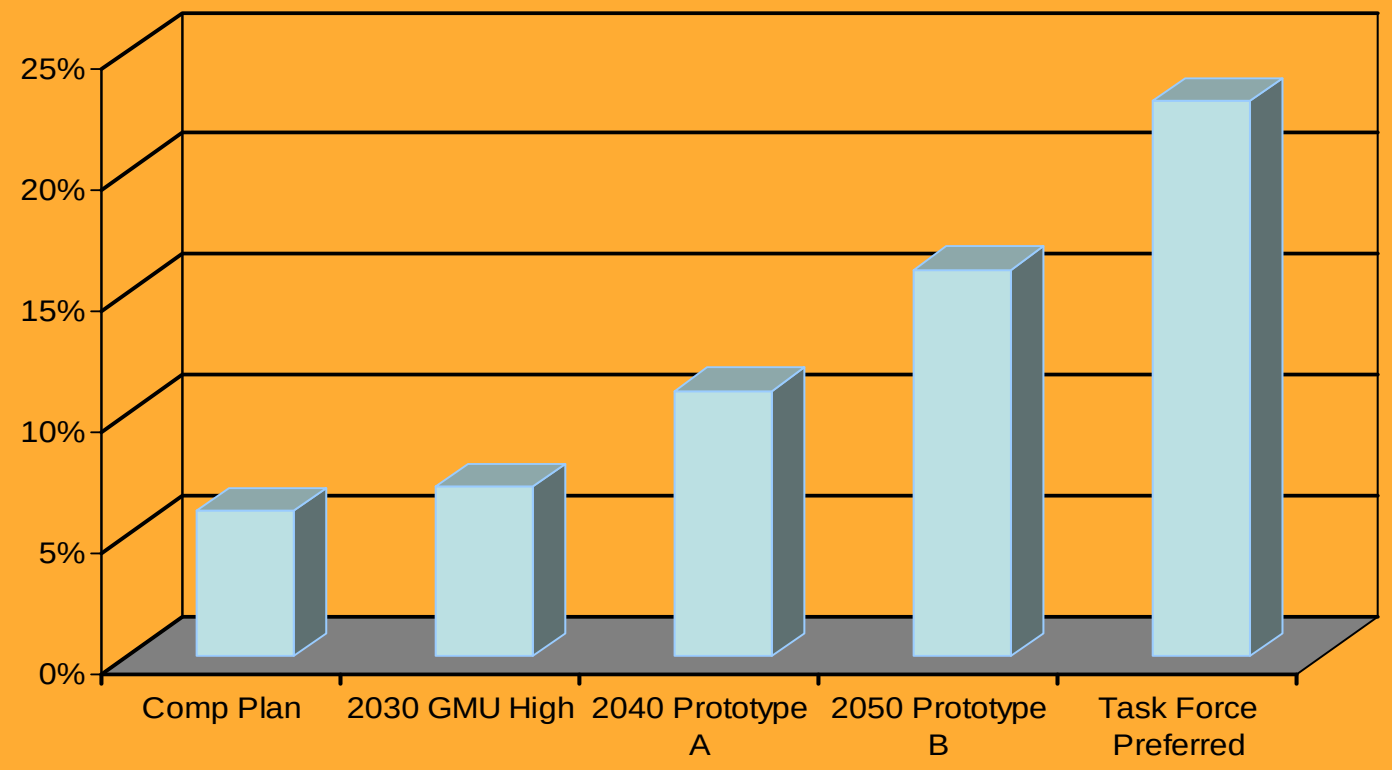
DC Metro Comparisons for People Working in These Areas



Forecasted transit mode share is similar to existing mode share in area transit-friendly development areas.

Mode Used by Scenario for Work Trips

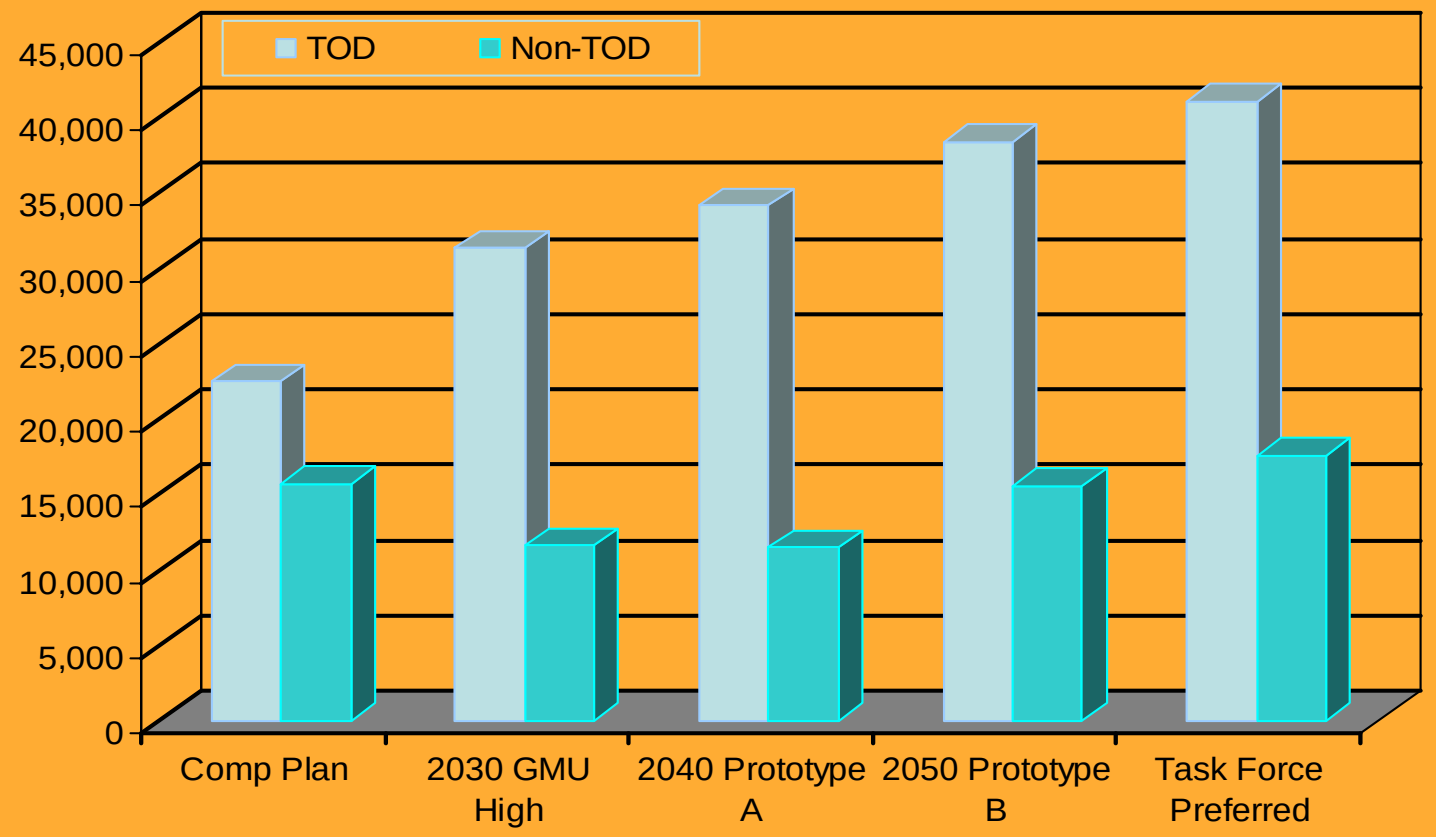
Non-Motorized (Walk and Bike) Percentage of Daily Work Trips in Tysons



Model reflects highest non-motorized share of work trips in highest density scenarios. The model shows that pedestrian needs are important in the future scenarios.

Transit System Performance

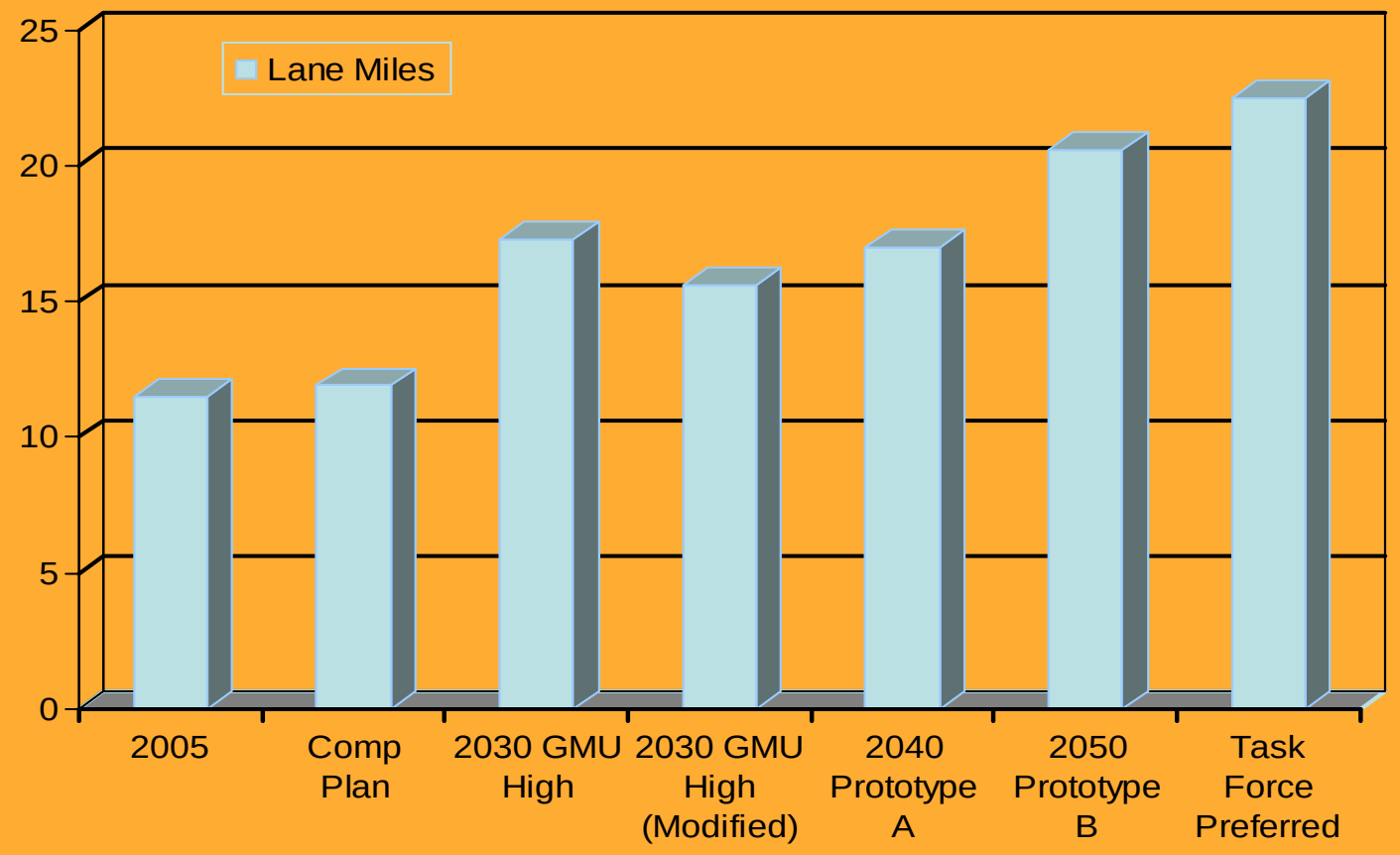
Tysons Corner Total Transit Trips



High transit ridership is observed in all of the scenarios, emphasizing the need for good pedestrian connectivity. The Comprehensive Plan does not have a clear distinction between TOD and non-TOD areas and so the transit use is higher for the non-TOD areas compared to the other scenarios.

Road System Performance by Scenario

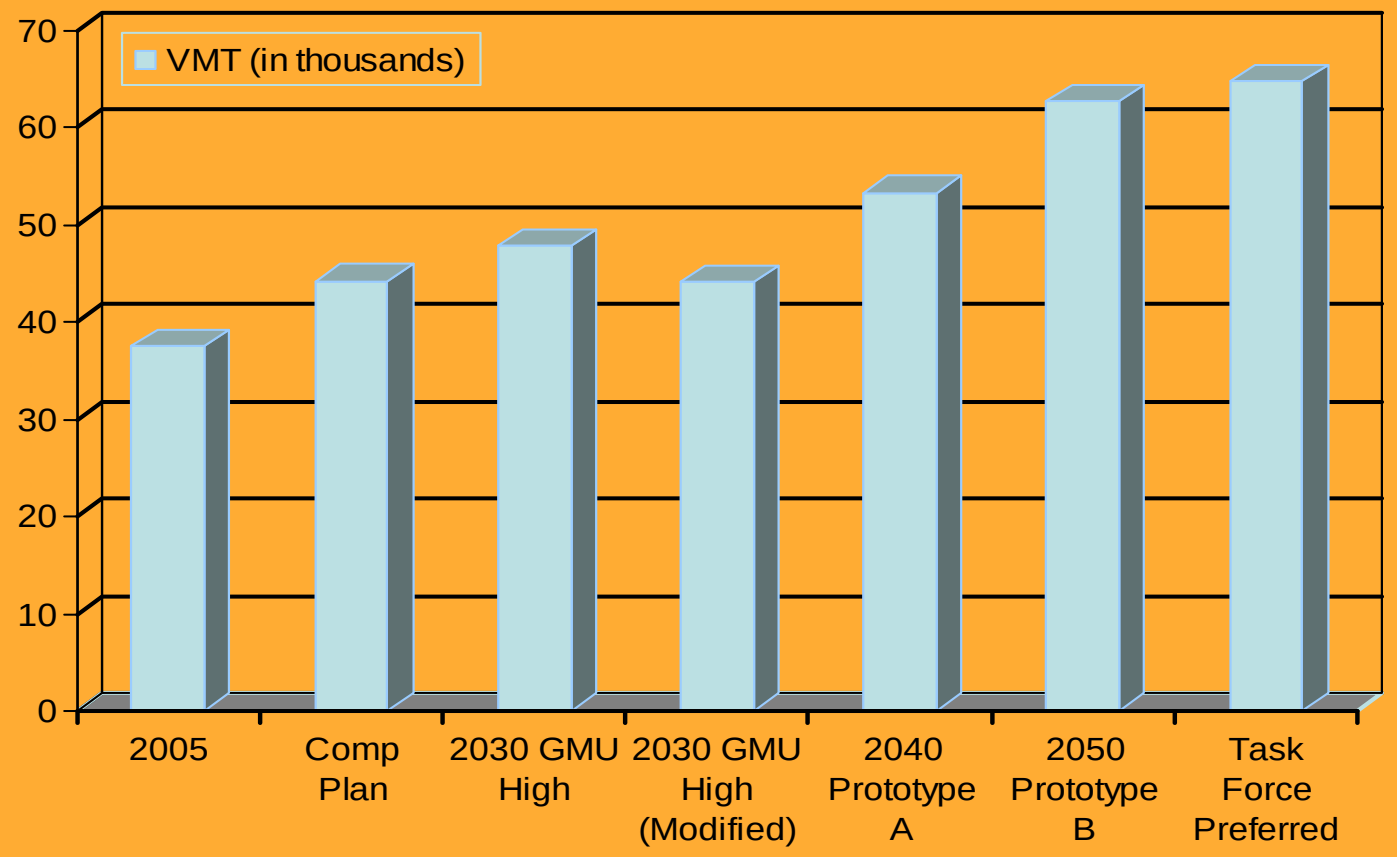
Congested Lane Miles (LOS F)



Task Force Preferred scenario results in approximately twice as many lane miles of congested roadways in Tysons Corner as the Comprehensive Plan and 2005.

Road System Performance by Scenario

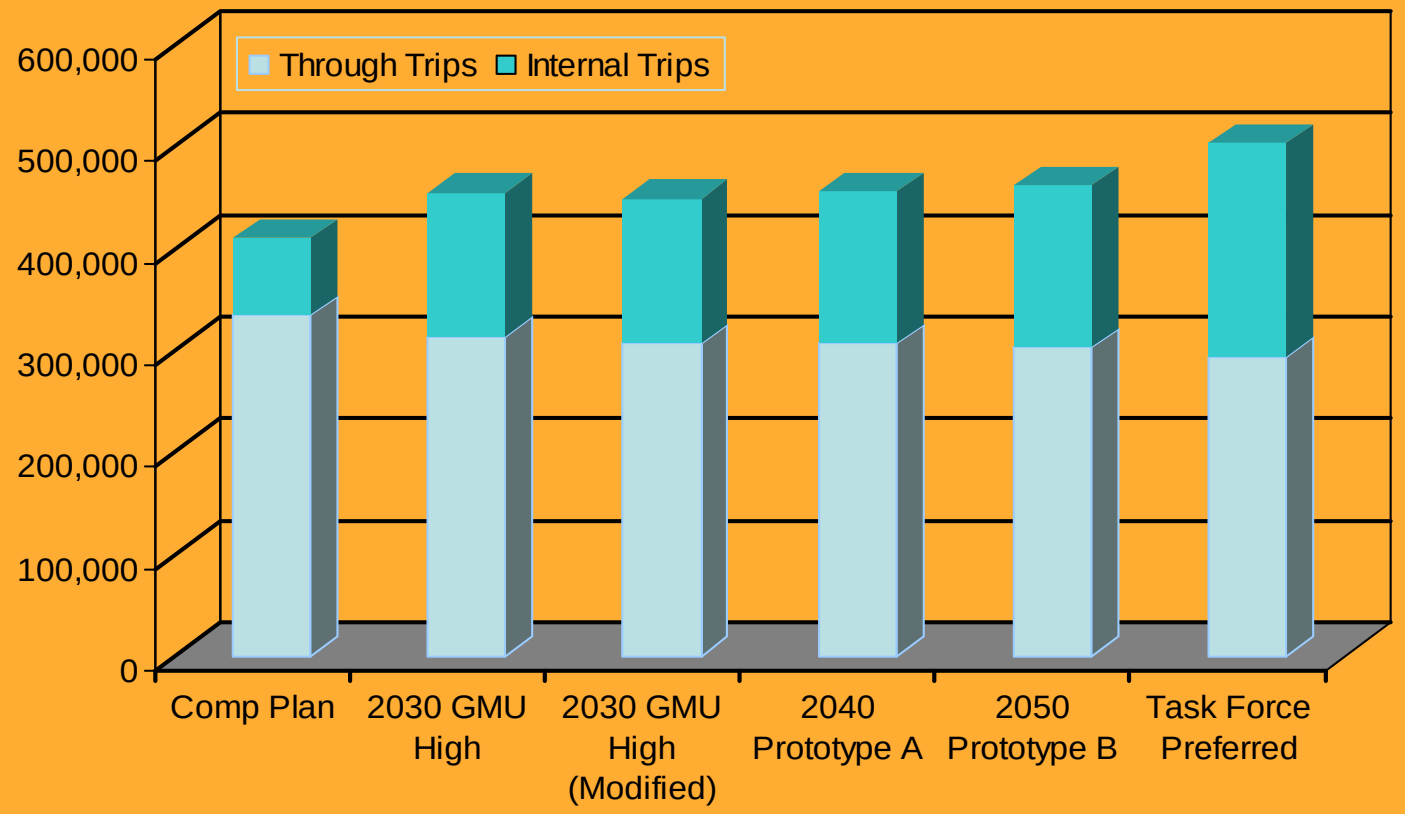
Congested Vehicle-Miles of Travel (LOS F)



Task Force Preferred scenario results in 45% more congested VMT in Tysons Corner than the Comprehensive Plan and 73% more versus 2005.

Road System Performance by Scenario

Through Vehicle Trips



Grade separations on the major arterials increase through trips. With higher internal trips, driving through Tysons becomes less attractive.

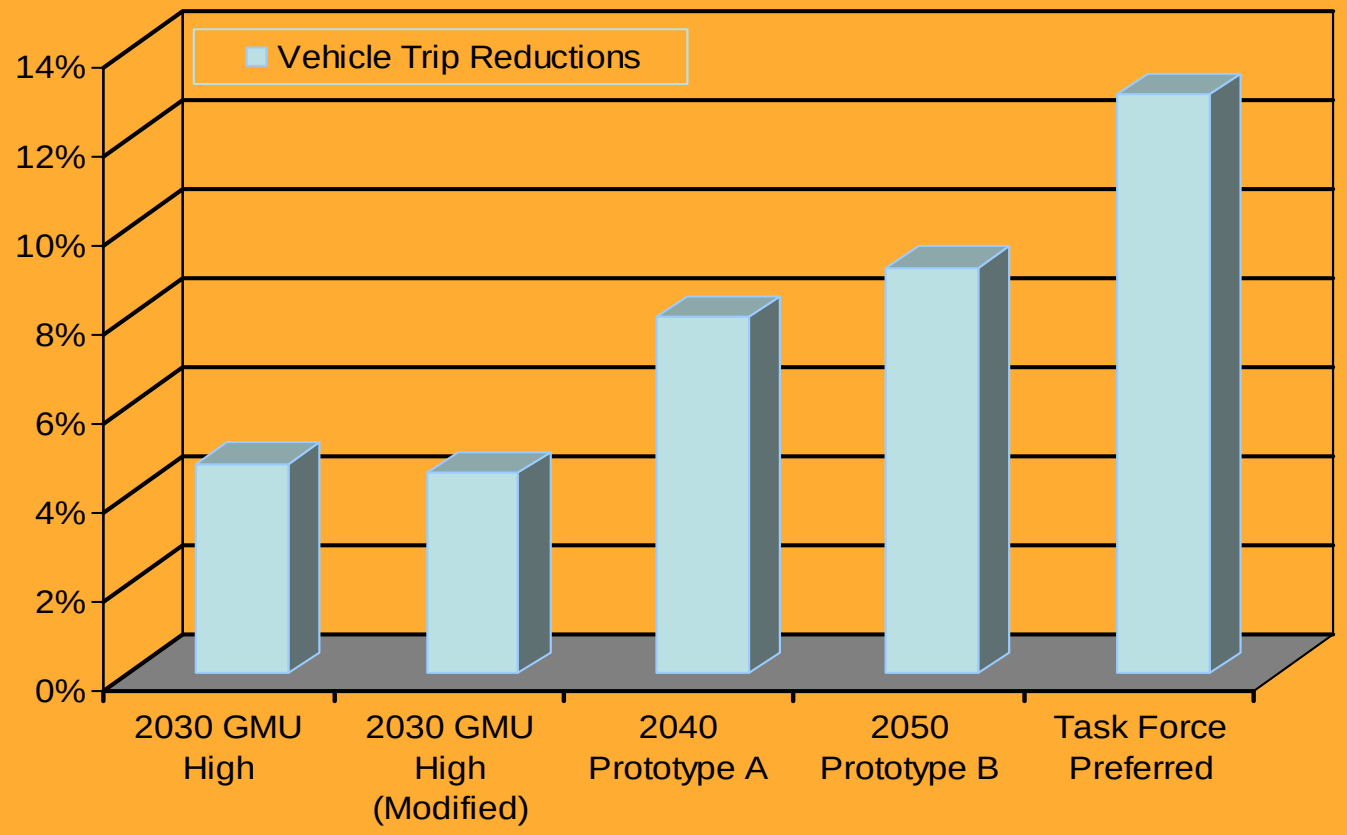
Enhanced Travel Demand Management (TDM)

- **Carpool Program**
  - Includes programs such as preferential parking for carpool, and increase to a ½ time transportation coordinator
- **Vanpool Program**
  - Includes programs such as financial assistance such as vanpool purchase loan guarantees, and increase to a ½ time transportation coordinator
- **Vanpool Preferential Parking**
  - One minute walk time reduction
- **Transit**
  - Includes programs such as on-site bus pass sales, and increase to a ½ time transportation coordinator
- **Telecommuting/Alternate Work Schedules**
  - Includes telecommuting, flex-time, and 9/80 work weeks
- **Employer Participation in Programs**
  - Mandatory for new development for station areas and the North Central and Old Courthouse districts, and voluntary for other districts

The reduction in vehicle trips due to additional TDM strategies was approximately the same for each scenario (~5%). A further reduction could occur with aggressive parking management.

Urban Design Benefits

Vehicle Trip Reductions



The 4D-tool shows relative benefits of one scenario versus another. Scenarios with higher density have the highest urban-design related trip reduction potential.

Analysis Summary

- The grid network seems essential to supporting internal mobility needs
- Pedestrian demand will be high, requiring investment in good facilities
- Transit system is important to supporting added future demand
- Single occupancy vehicles will still be the dominant mode of travel for work trips
- Carpooling is an important mode due to unique access to a high-quality HOV network (I-66, DTR, Beltway)
- Vehicle trips per resident and/or employee decrease with higher density

Presentation Outline

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- Transportation Recommendations
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Road System Performance: Freeway Ramps at DTR

Road System Performance: Freeway Ramps at DTR

Proposed Ramps to Connect Boone Blvd. Extension With Dulles Toll Rd.

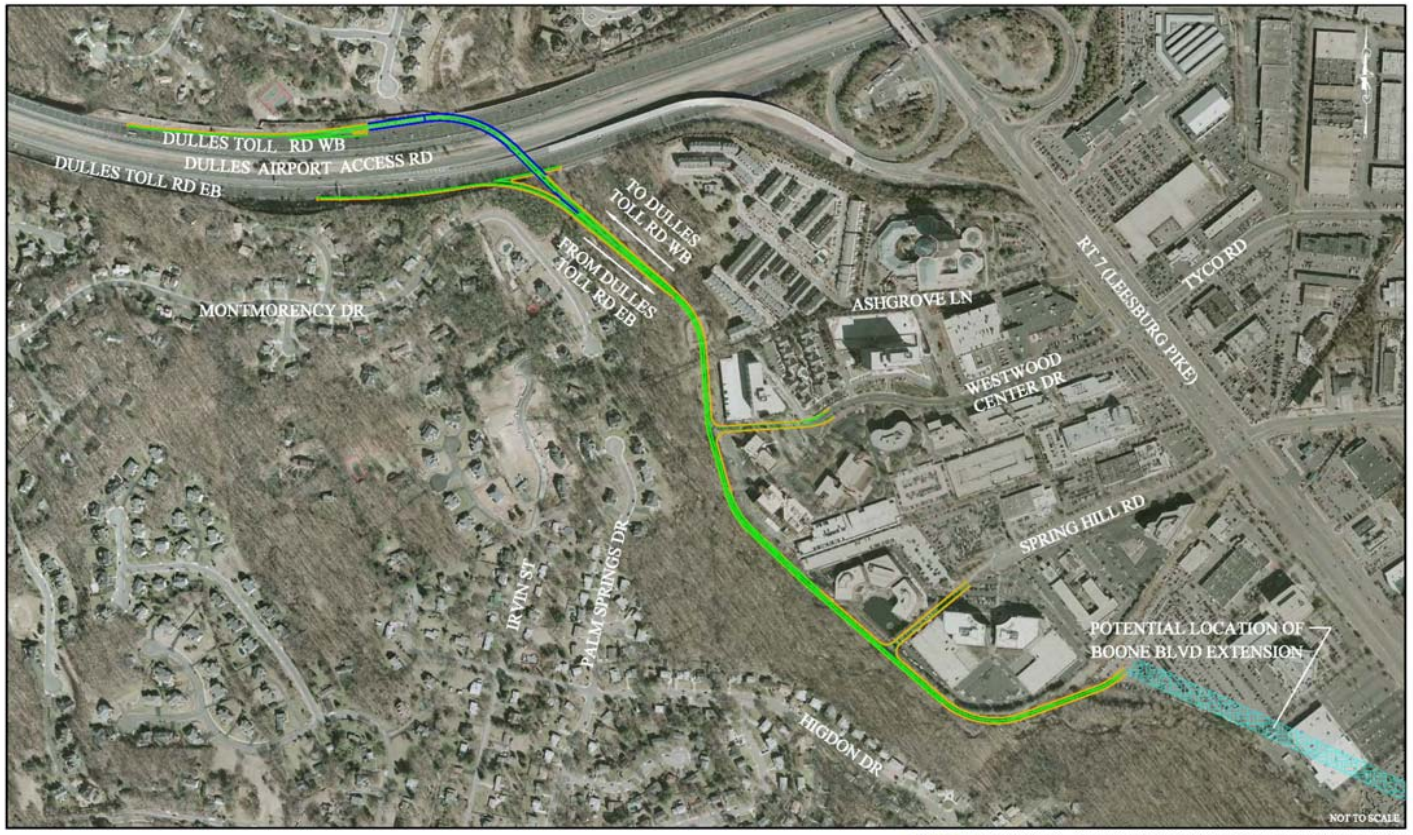

FIGURE 6: OPTION 1D - DULLES TOLL RD TO BOONE BLVD EXTENSION

PBSJ Tysons Corner Grid Connection Feasibility Study • Fairfax County, VA • January 2009 1-9

Road System Performance: Freeway Ramps at DTR

Proposed Ramps to Connect Greensboro Drive Extension With Dulles Toll Rd.

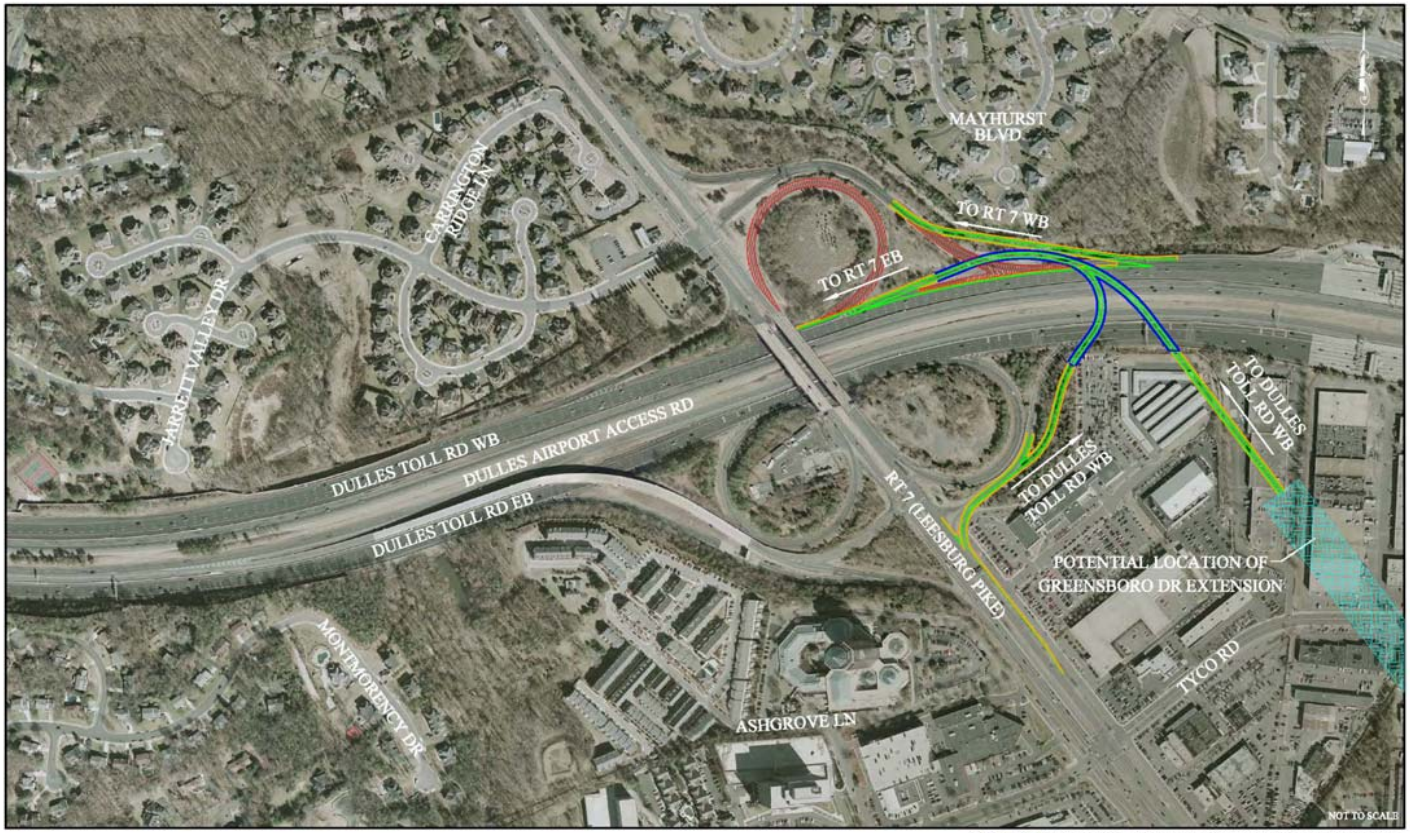

FIGURE 8: OPTION 2B - DULLES TOLL RD TO GREENSBORO DR

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Road System Performance: Freeway Ramps at DTR

Proposed Ramps to Connect Jones Branch Dr With Dulles Toll Rd.

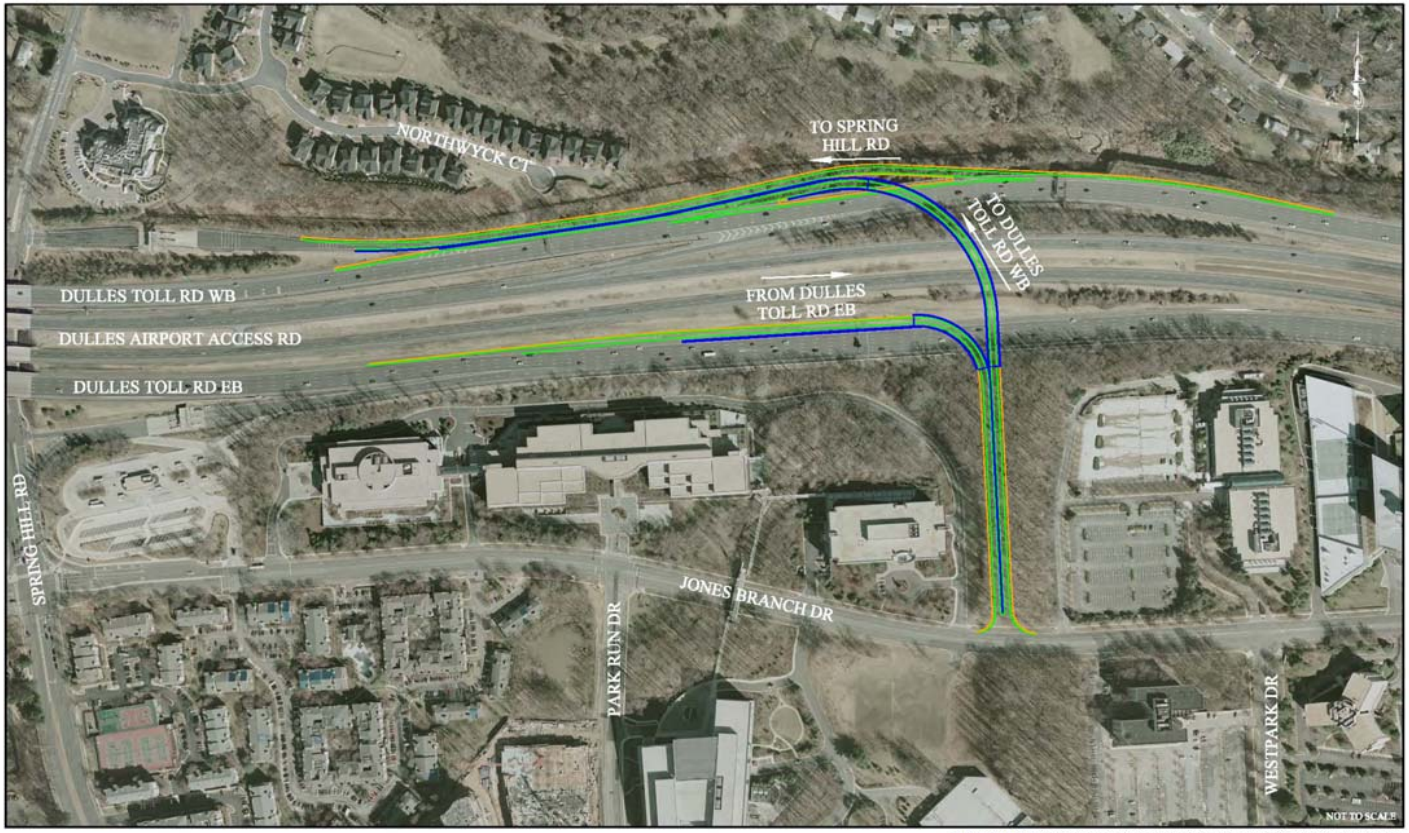

FIGURE 10: OPTION 3B - DULLES TOLL RD TO JONES BRANCH DR

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Road System Performance: Freeway Ramps at DTR

Engineering Analysis (Preliminary)

- Design concepts produced by PBSJ, best alternatives identified
- Initial comments by VDOT
  - Design challenges
  - Environmental challenges
  - Boone Blvd. Extension and Greensboro Dr. Extension ramps might be possible
  - Jones Branch connector ramps have challenges

Road System Performance: Freeway Ramps at DTR

Operational Analysis (Preliminary)

- Close spacing between on-ramps and off-ramps in vicinity of Leesburg Pike are problematic
- A preliminary assessment indicates that the merge of traffic in P.M. peak fails (2030 GMU High Modified analysis) in the vicinity of Boone Blvd. and Leesburg Pike on-ramps
- To overcome operational problems, two collector-distributor lanes on each side of the DTR will likely be required.
- An additional lane on DTR westbound will likely be necessary.
- The availability of right-of-way is a major concern

Road System Performance: Freeway Ramps at Beltway

Road System Performance: Freeway Ramps at Beltway

Operational Analysis (Preliminary)

- Preliminary assessment indicates that the traffic merge from westbound Leesburg Pike to the southbound Beltway will most likely fail (2030 GMU High Modified)
- An additional lane on the Beltway between Leesburg Pike and I-66 will likely be necessary

Road System Performance: DTR, Beltway Ramps

Assessment of Ramps: Implications (GMU High Land Use)

- With the proposed improvements to the DTR and the Beltway, the ramps should operate at an acceptable level of service
- It will most likely not be possible to increase the capacity of the DTR and the Beltway beyond the improvements identified in the prior slides
- Growth in Tysons beyond the GMU 2030 High land use alternative will have to take place with limited growth in Tysons traffic for the highway network to continue to operate at an acceptable LOS
- Approximately 50% of traffic on the DTR and Beltway at Tysons is regional (origins and destinations not located in Tysons)
- Additional high-quality regional transit connections, in addition to the Dulles Metrorail extension should be explored

Road System Performance: Interchanges

Road System Performance: Interchanges

Assessment of Interchanges:

Operational Assessment

- Compared the results from two networks: the Task Force Preferred (with proposed interchanges) and the Task Force Modified (without proposed interchanges)
- The interchanges resulted in approximately 7,000 additional through trips through Tysons per day
- The level of congestion within Tysons is approximately the same

Road System Performance: Interchanges

Assessment of Interchanges (cont.):

Physical Assessment

- Access to properties is reduced
- Structure extends for substantial distance along both roads
- Right-of-way required

Road System Performance: The Grid

Assessment of the Tysons Internal Grid:

Road System Performance: The Grid

Assessment of the Tysons Internal Grid:

- Boone Blvd. and Greensboro Drive divert a significant amount of traffic away from Leesburg Pike
- However, the traffic volume on Leesburg Pike remains very high near the Beltway
- The estimated traffic on Route 123 is very high most of its length through Tysons.
- Streets running parallel to Route 123 are limited
- The amount of traffic along the Leesburg Pike corridor is nearly double the traffic along the in the Route 123 corridor.

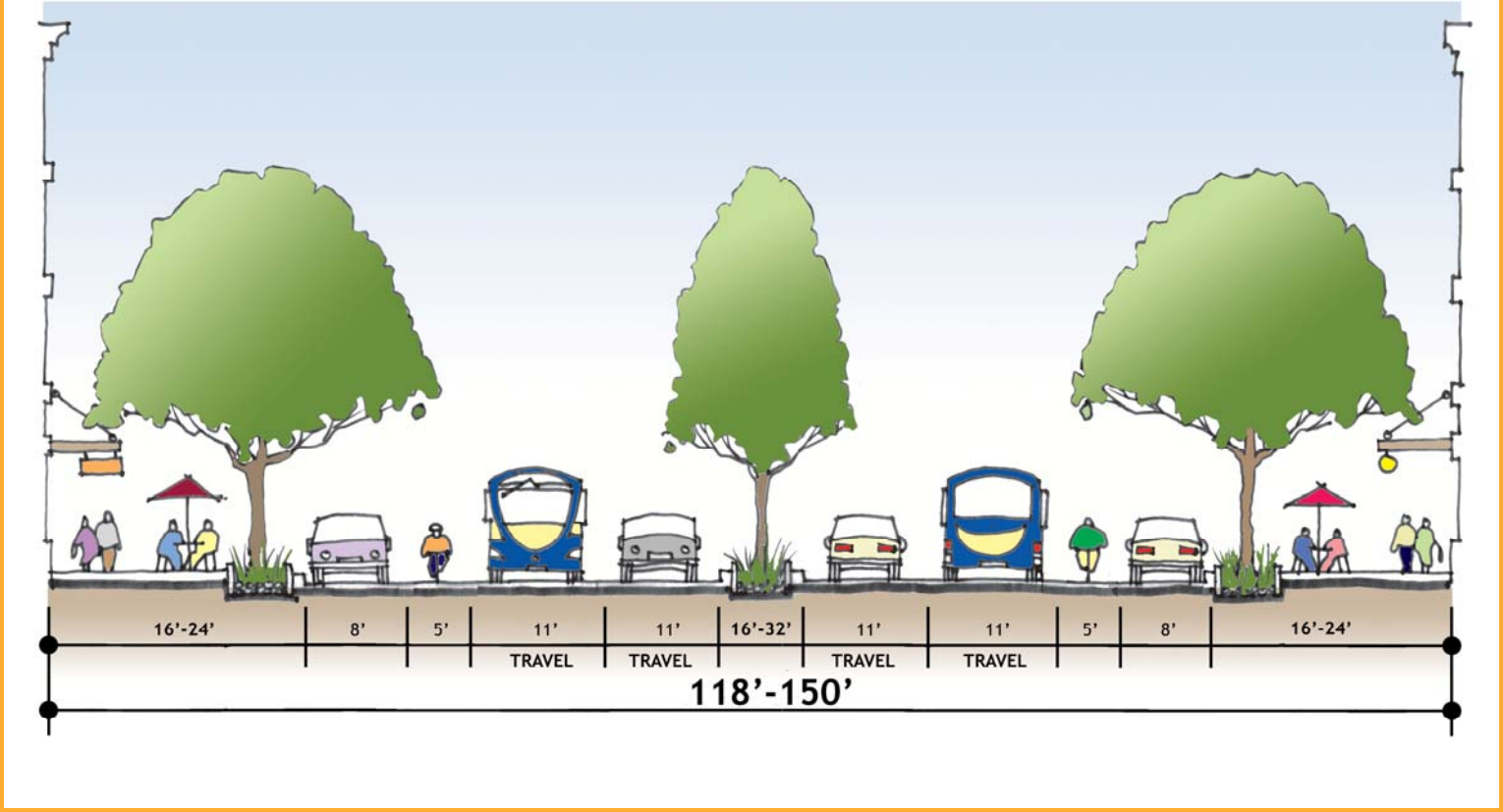
Road System Performance: The Grid

Assessment of the Tysons Internal Grid (cont.):

- The grid performed reasonably well operationally with relatively few problem locations
- The streets running parallel with Leesburg Pike function more like Avenues while most of those crossing Leesburg Pike are shorter and function more like local streets

Road System Performance: The Grid

Typical Cross Section of the Grid: Main Street



Road System Performance: Roads Outside Tysons

Assessment of Roads Outside Tysons:

P.M. Peak Hour Traffic Volumes	
2005	2030 GMU High (Modified)
Sum of Traffic on 7 Arterials (traffic direction: outbound)	
15,100	15,800 (+5%*)
Sum of Traffic on 5 Collectors (traffic direction: outbound)	
3,500	4,000 (+14%*)

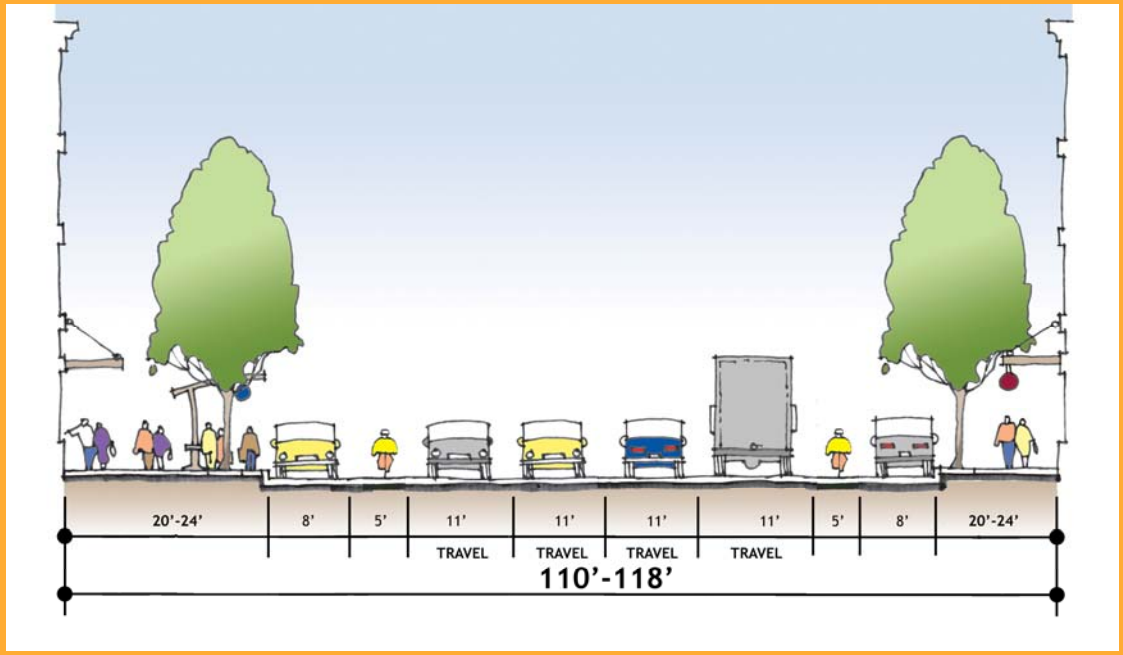
* Percentage increase over 2005 value

- The traffic volume on the roads outside Tysons is estimated to grow at a relatively slow rate

Assessment of Roads Outside Tysons: Implications

- Traffic on local roads is severely constrained by capacity limitations, so most of the growth in traffic occurs on freeways and freeway ramp connections
- To help maintain the viability of Tysons relative to other competing activity centers in terms of accessibility, it is desirable to maintain an acceptable LOS on the ramps and freeways at Tysons.
- An acceptable LOS on the ramps and freeways at Tysons will minimize cut-through traffic on local roads close to Tysons

Accommodating Bicycles and Pedestrians in Tysons



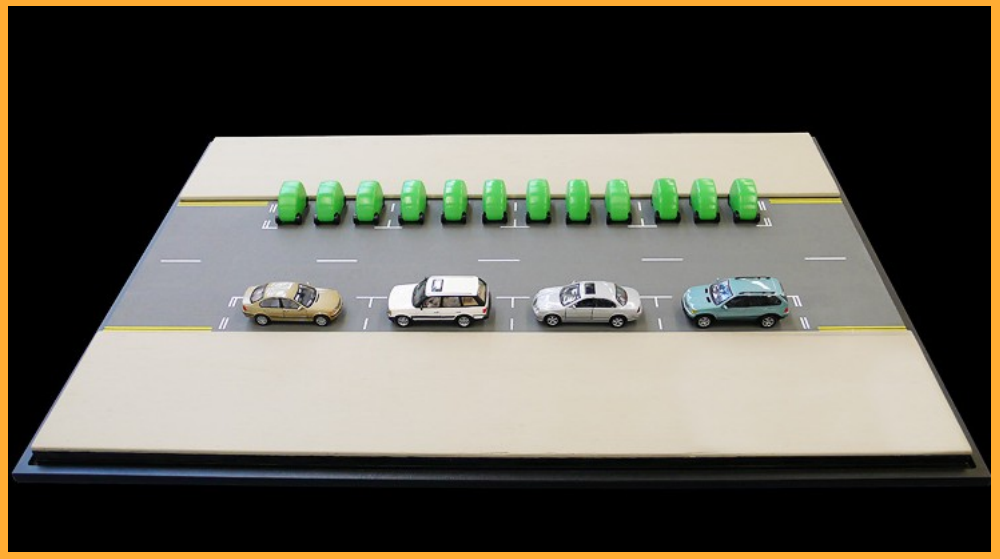
- All proposed cross sections for the Grid accommodates bicycles. Bicycle lanes on Boulevards will be provided where traffic operations permit. The above cross section is proposed for an Avenue without a median.

- The pedestrian walkway can accommodate the estimated pedestrian volume at Metrorail stations with room to spare based on a preliminary capacity analysis

Transportation Hubs in Tysons?

- Transportation Hubs allow the reservation and rental of bicycles and cars
- Destinations beyond walking distance to a rail station or bus stop can be reached.

Small Electric Station Cars in Tysons?



A Major Role for IT?

- An electronic information infrastructure to maximize efficiency and utility of transportation system
- Real-time information for operators and users of transportation system
- Facilities, technology and information to reduce energy consumption

Multimodal LOS?

- FCDOT is considering the application of Multimodal LOS (MMLOS) at activity centers in the County
- Four LOS specified for each street:
  - Auto LOS
  - Transit LOS
  - Bicycle LOS
  - Pedestrian LOS
- A different set of LOS can be specified for each type of street

Transportation Recommendations

- Preliminary assessment shows the likely need for additional capacity to the DTR and the Beltway to accommodate the GMU High 2030 Land Use
- To maintain a competitive level of accessibility for Tysons beyond a 2030 GMU High Land Use level, additional high-quality regional transit connections, in addition to the Dulles Metrorail extension, should be explored

Transportation Recommendations (cont.)

- Proposed interchanges on Rt. 123 and Leesburg Pike in Tysons do not provide significant enough operational advantages to justify their inclusion in the Grid. (This recommendation excludes the proposed grade separations on Rt. 123 in Tysons East, which need further analysis.)

- The application of new technology to promote telework, communications with travelers, the use of transit, and bicycles, can be very beneficial

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Next Steps

- Prepare “Chapter 527 Report.”
- Supplemental Neighborhood Traffic Impact Study
- Phasing Analysis and Recommendations (2020)
- Complete Plan Text
- Circulator Study