Development of a High Capacity Transit Plan for Managed Lanes Using Demand Forecasting

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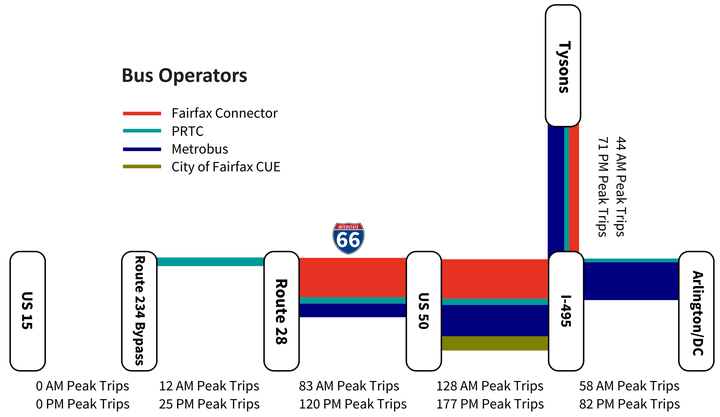
Topic

High capacity transit planning was incorporated into the plans for the proposed I-66 Managed Lanes in Northern Virginia in order to maximize the use of the managed lanes and to decrease vehicle miles traveled to achieve regional sustainability goals. Planning relied on an innovative transit demand forecasting methodology that utilized scenario comparisons to inform the development of the preferred transit service plan for the corridor in 2025 and 2040. The data-driven transit plan was critical in justifying its inclusion within the project's financial plan and toll revenue sharing to fund the enhanced bus service. Results will be used to develop future enhanced bus performance standards.

Methodology

1. Used the Regional Travel Demand Model to assess the baseline and future travel flows associated with the I-66 corridor, where the traffic analysis zone data from the model were aggregated into “districts” to represent corridor origin-destination travel sheds.
2. Compared the baseline travel flows against existing commuter services and derived thresholds from existing transit services. These were then applied to origin-destination pairs to determine the number of buses that would be required to service that pair; service was recommended for pairs that warranted one or more buses per hour.

Existing Conditions: Peak Period Bus Trip Volumes on the I-66 Corridor



Results: Preferred Transit Service Phasing Summary

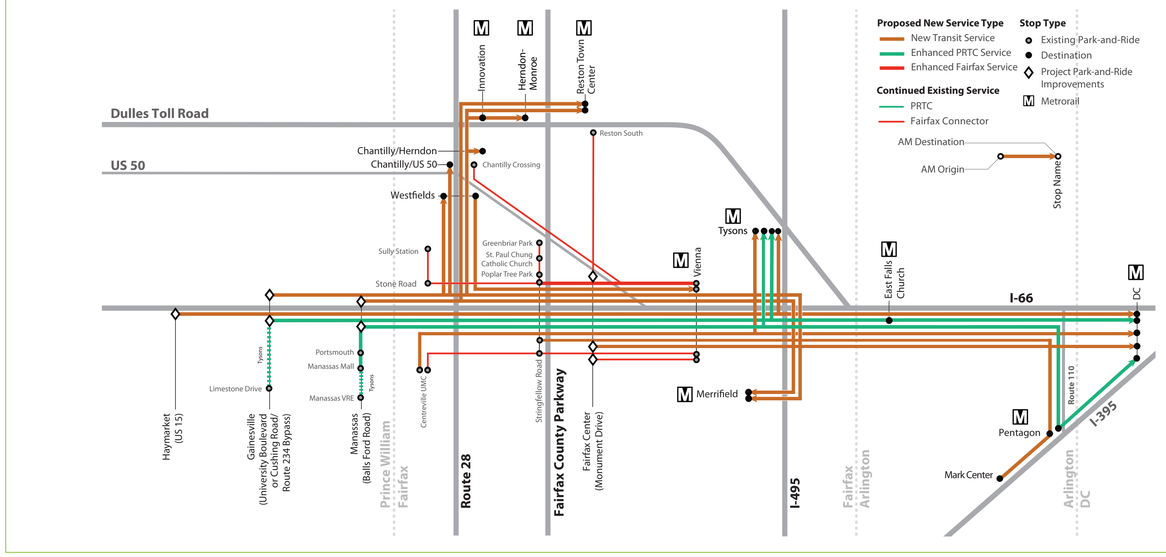
Route	Interim Stops	Similar Existing/Programmed Commuter Bus Route	Proposed Headways (Minutes)					
			Opening Year (2021)	2023	2025	2030	2035	2040
Haymarket to Tysons	None						60	45
Haymarket to Washington, DC	None		60	60	60	45	45	45
Gainesville to Westfields	None			60	45	45	25	25
Gainesville to Chantilly/US 50	None						60	45
Gainesville to Reston	None		25	25	25	25	25	25
Gainesville to Herndon	Innovation (Fairfax County)			60	45	45	30	25
Gainesville to Chantilly/Herndon	None						60	45
Gainesville to Tysons	None	PRTC Gainesville Metro Direct	30	30	20	15	15	15
Gainesville to Washington, DC	East Falls Church Metrorail	PRTC Gainesville OmniRide (Modified)	20	20	15	15	15	15
Gainesville to Merrifield	None				35	35	35	35
Manassas to Reston	None					60	60	45
Manassas to Tysons	None	PRTC Manassas Metro Direct	30	30	30	30	25	25
Manassas to Washington, DC	Pentagon	PRTC Manassas OmniRide	20	20	20	15	15	15
Manassas to Merrifield	None		60	60	60	60	60	60
Centreville to Tysons	None						60	45
Centreville to Washington, DC	None			25	25	25	25	25
Fairfax Center to Washington, DC	None		35	35	35	35	35	35
Westfields to Vienna	None		60	60	60	60	60	60
Stringfellow to Vienna[1]	None	Fairfax Connector 600 Series (631,632,624,634)					7.5[1]	7.5[1]
Stringfellow to Mark Center	Pentagon						60	60
Total Buses Required (Commuter Bus Type)			**48**	**59**	**71**	**81**	**97**	**102**
Total Annual Billable Hours			**38,310**	**46,600**	**55,790**	**63,350**	**77,410**	**82,580**

Key
New Transit Service
Enhancement to Existing/Programmed Routes

Notes

1. Stringfellow to Vienna service represents increase of service levels from existing/programmed Fairfax Connector Service. Increase in headway subject to route performance
2. Potential vehicle savings if a lesser number of vehicles are needed due to coordination with TMP, PRTC, or Fairfax Connector
3. 'Billable hours' for Prince William-originating service are revenue hours; Hours are inclusive of PRTC's OmniRide and Metro Direct service operating in the I-66 corridor
4. 'Billable hours' for Fairfax-originating routes include revenue hours and non-revenue billable reverse flow (exclusive of deadhead); Hours reflect new I-66 service only
5. Total Buses include spares (assumed 20% ratio)
6. Assumed AM & PM Peak Periods: 4 hours each
7. East Falls Church stop dependent on available bus bay capacity

Results: Preferred Transit Service Plan



Conclusions

A data-driven process was integral to creating a plan that could be fully accepted by all parties, stakeholders, and the public alike. It allowed the I-66 team to:

- Focus on designing a transit service that connected people in more exurban/suburban areas to major activity centers or transit hubs.
- Employ demand forecasting to substantiate future investment in proposed services.
- Utilize a capacity analysis to further develop performance standards that will define future proposed services as well.

Acknowledgements

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Reference

Kimley-Horn and Associates, Inc., and CH2M HILL, Inc. *Transform 66 Outside The Beltway: Multimodal Solutions 495 - Haymarket: I-66 Corridor Improvements Project: Tier 2 Environmental Assessment Transit And Transportation Demand Management (TDM) Technical Report.* Draft. Virginia Department of Transportation; Virginia Department of Rail and Public Transportation; FHWA, U.S. Deparmtent of Transportation, 2015.