



Oakwood Road Transportation Analysis SSPA Nominations PC19-LE-006 & 009

Presentation to Lee District SSPA Task Force
February 7, 2022

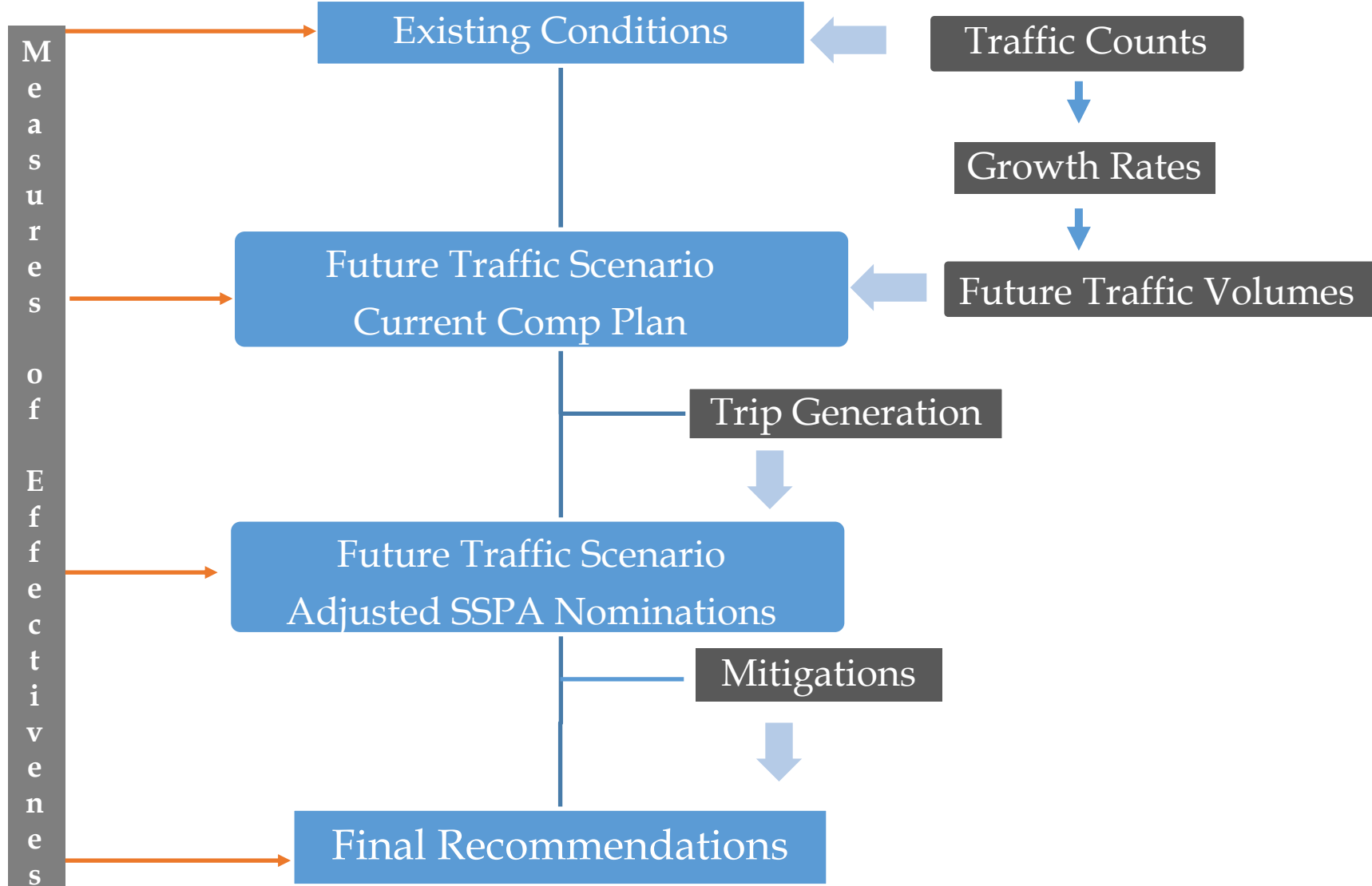
Arpita Chatterjee & Thomas Burke
Fairfax County Department of Transportation



- Transportation Analysis Process Overview
- Study Area and Traffic Data
- Existing Conditions
- Growth Rates & Trip Generation
- Future Comprehensive Plan Conditions
- Adjusted SSPA Nomination Trip Generation
- Future Conditions Based on Adjusted SSPA Nominations
- Comparison of All Future Scenarios
- Conclusions & Recommendations
- Projects and Improvements in the Study Area



Transportation Analysis Process





Quantitative Performance - Level of Service (LOS)

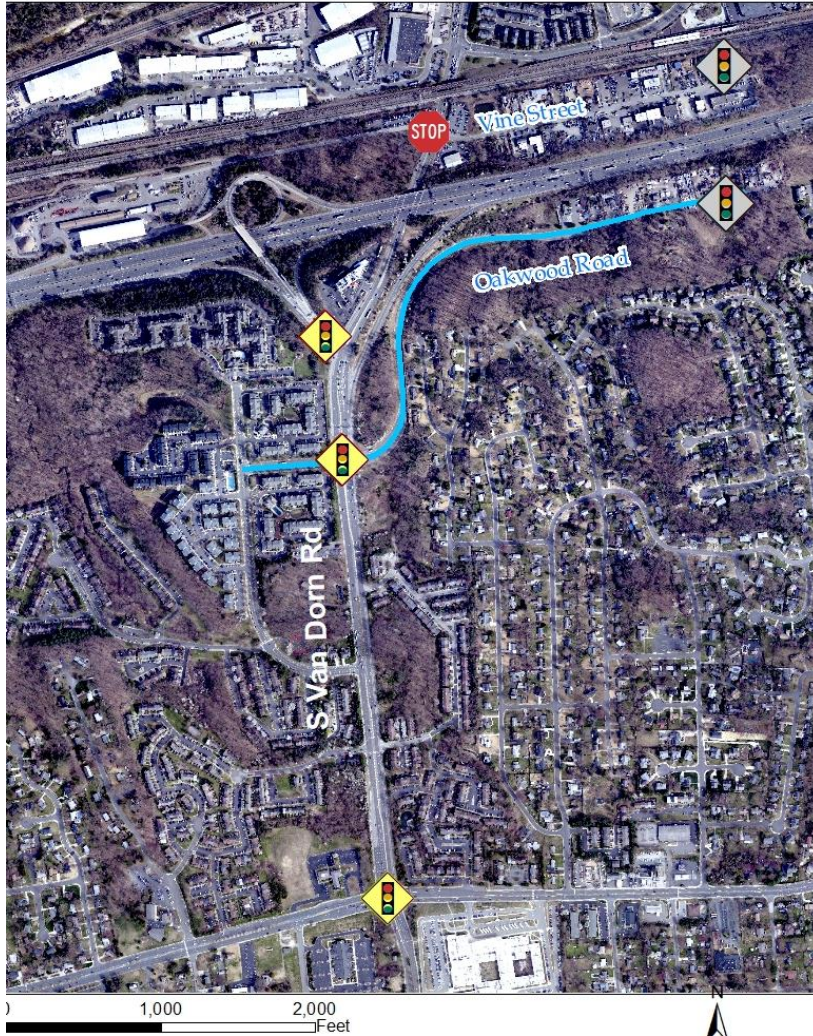
- LOS measures how well traffic flows along a roadway or how long vehicles wait at intersections (delay)
- LOS D is the default countywide acceptable standard in the Comprehensive Plan
- LOS E is identified as an acceptable standard, specific to the Van Dorn Transit Station Area (TSA)

| LOS | Delay (sec/veh) | |
|----------|--------------------------|----------------------------|
| | Signalized Intersections | Unsignalized Intersections |
| A | ≤ 10 | 0-10 |
| B | > 10-20 | > 10-15 |
| C | >20-35 | >15-25 |
| D | > 30-55 | > 25-35 |
| E | > 55-80 | > 30-50 |
| F | > 80 | > 50 |





Study Area & Traffic Data



Intersection Turning Movement Counts collected at:

- South Van Dorn Street at
 - Franconia Road
 - Oakwood Road
 - I-95/495 (Capital Beltway)
 - Vine Street



Existing Conditions

Based on current traffic counts taken at each intersection and current VDOT signal timings and phasing

Vine Street / McGuin Drive

Mainline operates efficiently
Side streets operate with high approach delays

Oakwood Road & I-495

Overall efficient operations
Side streets and mainline lefts, in general, incur longer delays and lengthier queues

Franconia Road

Most approaches incur long delays and lengthy queues

Planned for an interchange

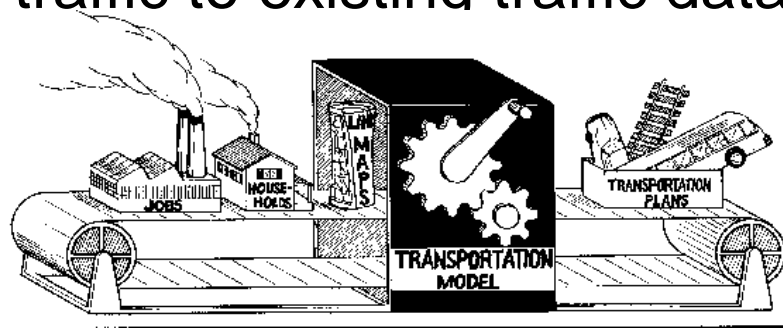
| Intersections | Existing Conditions | | | |
|---|---------------------|-----------|--------------|-----------|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay (s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | N/A | | | |
| 2. South Van Dorn Street / I-495 Ramps | D | 40.6 | E | 57.3 |
| 3. South Van Dorn Street / Oakwood Rd | C | 22.6 | B | 11.5 |
| 4. South Van Dorn Street / Franconia Rd | F | 116.8 | F | 87.5 |

High % of green signal time allocated to South Van Dorn Street approaches due to higher traffic demand



Estimating / Forecasting Traffic Growth

- Future traffic is forecasted using a travel demand model based on projected land uses throughout the region, including population and employment
- Factors also include socioeconomic data, transportation network characteristics, area types, and traveler behaviors
- Travel models are calibrated and validated based on current traffic data
- Growth rates used to grow traffic to 2045 levels are ultimately derived by comparing the forecasted traffic to existing traffic data





Land Use Input

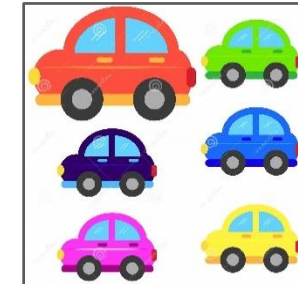


Equation/Rate

ITE Code: 230
Directional Distribution:
67% entering, 33% exiting
Average Rate: 0.52
Standard Deviation: 0.75
Fitted Curve Equation:
 $\ln(T) = 0.80 \ln(X) + 0.32$
 $R^2 = 0.80$



Output



Additional Considerations:

- Neighboring land uses
- Proximity to transit
- Transportation demand management



Current Plan Trip Generation

Potential Trip Generation of Combined Oakwood Road Sites – Currently Adopted Land Uses

| Land Use (ITE Code) | Quantities | Daily Trips | AM | | | PM | | |
|--------------------------------|------------|---------------|------------|------------|------------|------------|------------|--------------|
| | | | In | Out | Total | In | Out | Total |
| Current Plan-TOTAL | | | | | | | | |
| Multi Family Residential (221) | 467 DU | 2,543 | 44 | 124 | 168 | 125 | 80 | 205 |
| Hotel (310) | 313 RMs | 3,107 | 89 | 62 | 151 | 106 | 103 | 209 |
| Office (710) | 533 KSF | 5,379 | 454 | 74 | 528 | 89 | 469 | 558 |
| Retail (820) | 66 KSF | 4,532 | 38 | 24 | 62 | 192 | 208 | 400 |
| Total Trips Generated | | 15,561 | 625 | 284 | 909 | 512 | 860 | 1,372 |



Current Plan Conditions

Based on 2045 traffic forecasts, assuming the current Comprehensive Plan, and current VDOT signal timings and phasing



Vine Street / McGuin Drive

Operates efficiently overall.
Side streets and mainline lefts, in general, incur longer delays and lengthier queues



I-495

Significant increases in delay (PM)
Side streets and mainline lefts incur longer delays and queues



Oakwood Road

Significant increases in delay (AM, PM)
Side streets and mainline lefts incur longer delays and queues



Franconia Road

Deficient operations continue

| Intersections | Baseline Conditions | | | |
|--|---------------------|-----------|--------------|-----------|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay (s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | B | 17.9 | D | 39.9 |
| 2. South Van Dorn Street / I-495 Ramps | D | 45 | F | 108.2 |
| 3. South Van Dorn Street / Oakwood Rd Rd | F | 103.1 | F | 94.5 |
| 4. South Van Dorn Street / Franconia Rd | F | 113.9 | F | 96.2 |

This represents what traffic could look like if land uses in the current Comprehensive Plan develop as planned



Existing vs. Current Plan Comparison

Land uses currently approved in the Comprehensive Plan for Oakwood Road are projected to generally cause additional congestion along Oakwood Road as we move toward 2045

| Intersections | Existing Conditions | | | | Current Plan Conditions | | | |
|---|---------------------|-----------|--------------|-----------|-------------------------|-----------|--------------|-----------|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street / McGuin Drive | N/A | | | | B | 17.9 | D | 39.9 |
| 2. South Van Dorn Street / I-495 Ramps | D | 40.6 | E | 57.3 | D | 45 | F | 108.2 |
| 3. South Van Dorn Street / Oakwood Road | C | 22.6 | B | 11.5 | F | 103.1 | F | 94.5 |
| 4. South Van Dorn Street / Franconia Road | F | 116.8 | F | 87.5 | F | 113.9 | F | 96.2 |



Adjusted SSPA Nomination Trip Generation

Currently proposed land uses on Oakwood Road are less than the original nominations

| 5605 Oakwood Road PC19-LE-006 | Quantity | Daily | AM IN | AM OUT | TOTAL | PM IN | PM OUT | TOTAL |
|--|-----------------|--------------|--------------|---------------|--------------|--------------|---------------|--------------|
| Multi Family Residential (221) | 100 DU | 543 | 9 | 27 | 36 | 27 | 17 | 44 |
| Day Care Center (565) | 10 KSF | 476 | 58 | 52 | 110 | 52 | 59 | 111 |
| Total Trips Generated | | 1,019 | 67 | 79 | 146 | 79 | 76 | 155 |


| 5400-5604 Oakwood Road PC19-LE-009 | Quantity | Daily | AM IN | AM OUT | AM TOTAL | PM IN | PM OUT | PM TOTAL |
|---|-----------------|--------------|--------------|---------------|-----------------|--------------|---------------|-----------------|
| Multi Family Residential (221) | 276 DU | 1,502 | 25 | 74 | 99 | 74 | 47 | 121 |
| Office (710) | 50 KSF | 542 | 63 | 10 | 73 | 9 | 50 | 59 |
| General Retail (820) | 4.4 KSF | 724 | 2 | 2 | 4 | 26 | 28 | 54 |
| Total Trips Generated | | 2,768 | 90 | 86 | 176 | 109 | 125 | 234 |


75-85% reduction in anticipated trips with proposed nominations, as compared to the Comp Plan




Total Future Conditions (Adjusted SSPA Nominations)

Based on 2045 traffic forecasts, assuming the adjusted SSPA nominations and current VDOT signal timings and phasing

 **Vine Street / McGuin Drive**
Continues to operate efficiently overall
Side streets and mainline lefts still incur longer delays and queues

 **I-495**
Operations improve in the PM
Side streets and mainline lefts incur longer delays and queues

 **Oakwood Road**
Operations improve in the AM & PM
Side streets and mainline lefts incur longer delays and queues

 **Franconia Road**
Although slightly improved, deficient operations continue

| Intersections | Total Future Conditions (Combined) | | | |
|---|------------------------------------|--------------|--------------|-------------|
| | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay(s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | B | 17 | C | 30.2 |
| 2. South Van Dorn Street / I-495 Ramps | D | 40.6 | E | 75.6 |
| 3. South Van Dorn Street / Oakwood Rd | C | 32.5 | B | 17.9 |
| 4. South Van Dorn Street / Franconia Rd | F | 111.2 | F | 92.1 |

Proposed nominations are projected to result in improved operations compared to the current plan

** A less congested future during AM and PM peaks **



Analysis Comparison

The adjusted SSPA nominations, if approved and developed, would improve upon current plan conditions in the AM and PM peaks and lead to operations at or near existing levels

| Intersections | Existing Conditions | | | | Baseline Conditions | | | | Total Future Conditions (Combined) | | | |
|--|---------------------|--------------|--------------|-------------|---------------------|--------------|--------------|-------------|------------------------------------|--------------|--------------|-------------|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay(s) | LOS | Delay(s) | LOS | Delay(s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | N/A | | | | B | 17.9 | D | 39.9 | B | 17 | C | 30.2 |
| 2. South Van Dorn Street / I-495 | D | 40.6 | E | 57.3 | D | 45 | F | 108.2 | D | 40.6 | E | 75.6 |
| 3. South Van Dorn Street / Oakwood | C | 22.6 | B | 11.5 | F | 103.1 | F | 94.5 | C | 32.5 | B | 17.9 |
| 4. South Van Dorn Street / Franconia | F | 116.8 | F | 87.5 | F | 113.9 | F | 96.2 | F | 111.2 | F | 92.1 |



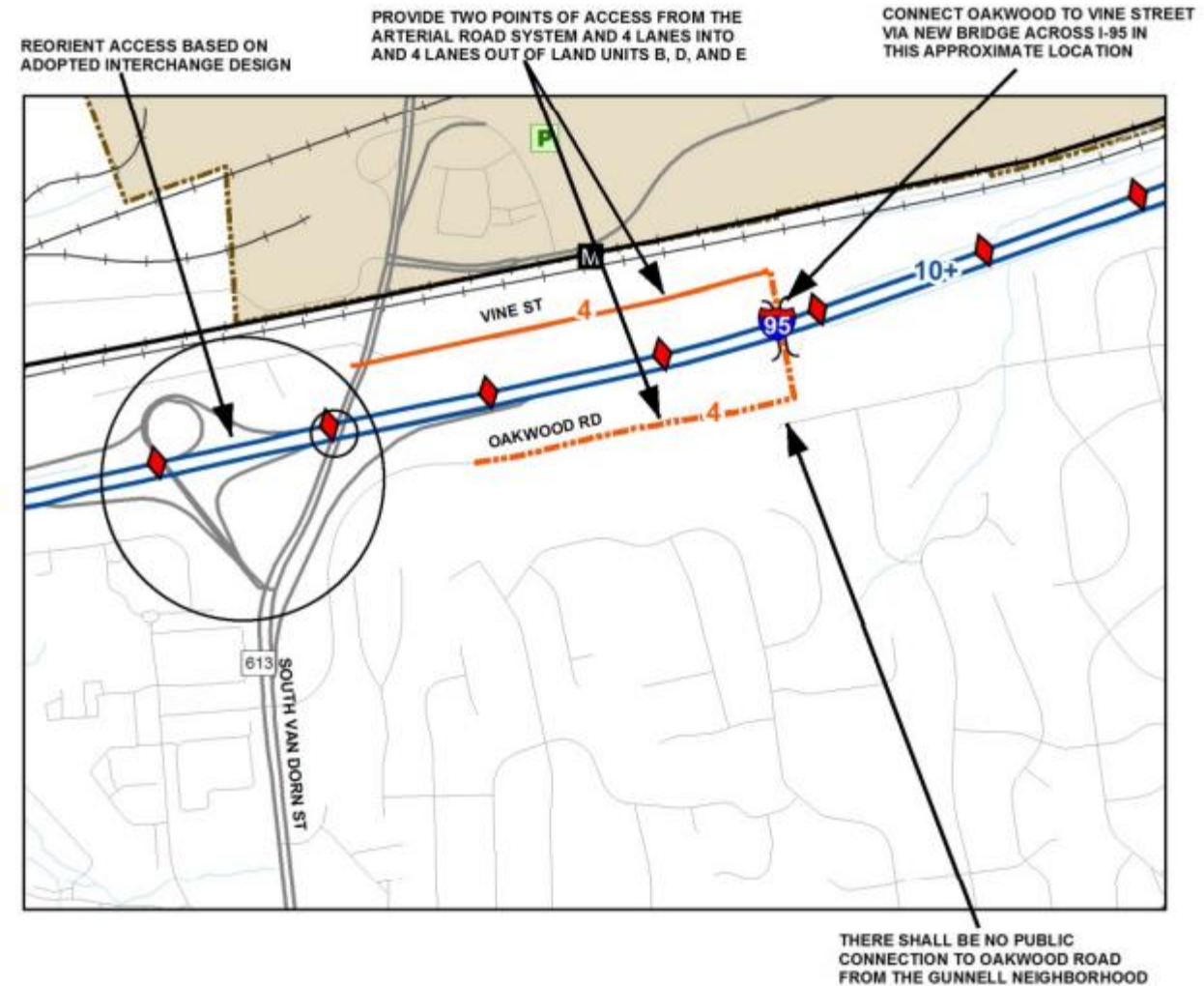
Conclusions and Recommendations

- The adjusted SSPA nominations would improve traffic conditions on the adjacent street network, as compared to the current plan potential
- Currently, each of the signalized study intersections operate at an overall acceptable LOS “E” or better, with the exception of the intersection of South Van Dorn Street/Franconia Road
 - Ultimately planned to be converted to a grade-separated interchange
- In the future, with the adjusted nominations, operations would generally improve compared to conditions during the AM and PM peak hours and return to at or near existing conditions
- The South Van Dorn Street/Oakwood Road intersection would improve with the proposed nominations



Oakwood-Vine Connection

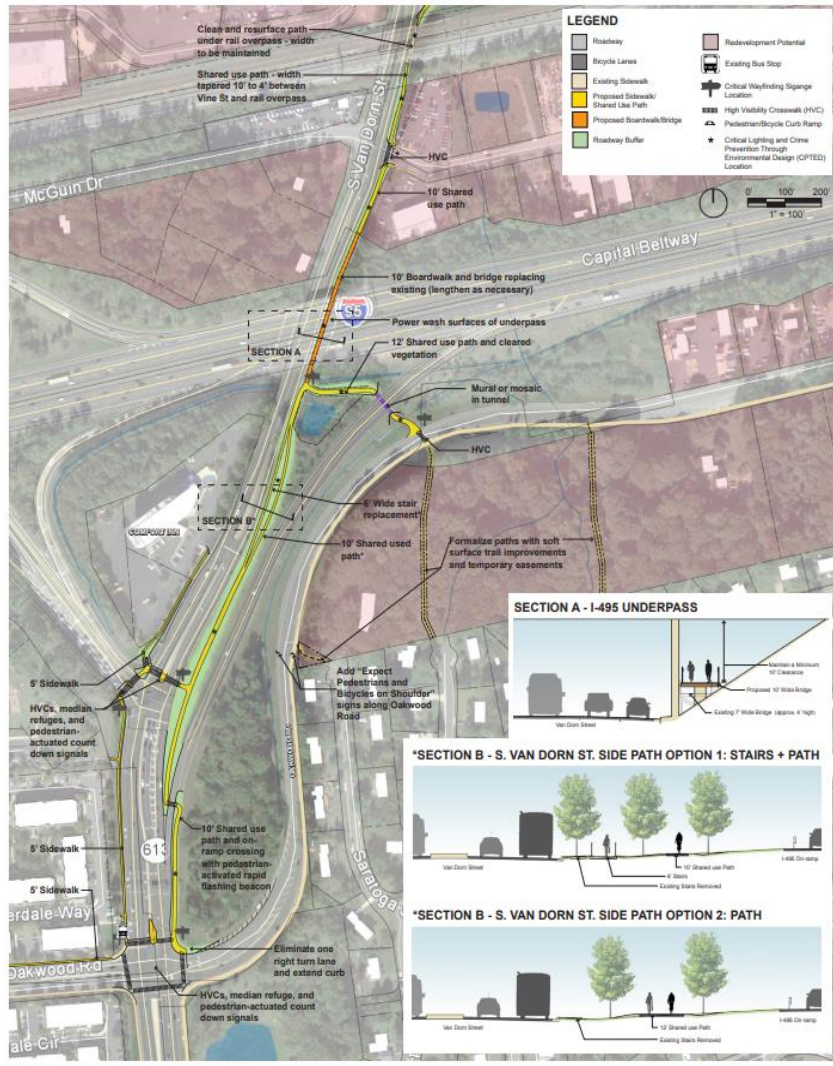
- Analysis finds bridge not needed with adjusted Oakwood Road nominations
- Bridge does need to remain in Plan to accommodate planned development on Vine Street
- Site development on both sides needs to accommodate the bridge
- The bridge connection would have multimodal benefits for both Oakwood Road and Vine Street
- The bridge would prove effective in supporting a multimodal infrastructure within the TSA





Van Dorn Street Metro Area Bike and Ped Access Improvements Study

Figure 6 Preferred Conceptual Alternative for Fairfax County



- Study conducted by WMATA to provide safe, convenient, and functional bicycle and pedestrian connections (2015)
- Assessed and analyzed the feasibility of different ped and bike improvement alternatives
- Aims to provide improved ped and bike access to and from Van Dorn Metro and adjacent neighborhoods
- Developed a preferred alternative for Fairfax County and another for the City of Alexandria
- Link to the Report:

https://www.wmata.com/initiatives/plans/upload/Van_Dorn_Final_Report_012016.pdf



Trail to Van Dorn Metrorail Station Spot Improvements



Plans will move to implementation upon prioritization and funding

- Study by Fairfax County and Metropolitan Washington Council of Governments (2020)
- Recommendations for pedestrian and bicyclist connectivity improvements to the shared use path to the Van Dorn Metrorail Station.
- Focused on 5 “spots”
- Enhanced neighborhood connections, path widenings, accessibility, safety, and placemaking as identified in the Fairfax County Bicycle Masterplan.
- Multimodal travel enhanced with more continuous and viable network of bicycle and pedestrian facilities and facilitating access to high-capacity transit.



South Van Dorn Street Shared Use Path



- Implementation of a 10-foot shared use path, from Oakwood Road to the Capital Beltway
- Includes modifications at Oakwood Road to help to realign the northbound I-95/495 on-ramp entrance.
- Provides a signalized pedestrian crossing of the I-495 on-ramp at South Van Dorn Street.
- Study Link: <https://www.fairfaxcounty.gov/transportation/projects/south-van-dorn-path>

Currently scheduled for construction in 2023



Questions



APPENDIX



Total Future Conditions –Vine Street

| Intersections | Total Future Conditions (Combined with Vine Street) | | | | Total Future Conditions with Optimized Signal Timings (Combined with Vine Street) | | | |
|---|---|-----------|--------------|-----------|---|-----------|--------------|-----------|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | F | 158.7 | F | 354 | F | 81.1 | F | 150.7 |
| 2. South Van Dorn Street / I-495 Ramps | D | 52.5 | F | 105.5 | D | 41.1 | E | 76.4 |
| 3. South Van Dorn Street / Oakwood Road | D | 42.8 | D | 43.3 | C | 34.1 | C | 32.6 |
| 4. South Van Dorn Street / Franconia Road | F | 120.7 | F | 103 | F | 82.5 | F | 103 |



Comparison of All Future Scenarios

| Intersections | Baseline Conditions | | | | Total Future Conditions (Combined) | | | | Total Future Conditions (Combined with Vine Street) | | | | Total Future Conditions with Optimized Signal Timings (Combined with Vine Street) | | | |
|---|---------------------|----------|--------------|----------|------------------------------------|----------|--------------|-----------|---|----------|--------------|-----------|---|-----------|--------------|-----------|
| | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | | AM Peak Hour | | PM Peak Hour | |
| | LOS | Delay(s) | LOS | Delay(s) | LOS | Delay(s) | LOS | Delay (s) | LOS | Delay(s) | LOS | Delay (s) | LOS | Delay (s) | LOS | Delay (s) |
| 1. South Van Dorn Street / Vine Street | B | 17.9 | D | 39.9 | B | 17 | C | 30.2 | F | 158.7 | F | 354 | F | 81.1 | F | 150.7 |
| 2. South Van Dorn Street / I-495 Ramps | D | 45 | F | 108.2 | D | 40.6 | E | 75.6 | D | 52.5 | F | 105.5 | D | 41.1 | E | 76.4 |
| 3. South Van Dorn Street / Oakwood Rd | F | 103.1 | F | 94.5 | C | 32.5 | B | 17.9 | D | 42.8 | D | 43.3 | C | 34.1 | C | 32.6 |
| 4. South Van Dorn Street / Franconia Rd | F | 113.9 | F | 96.2 | F | 111.2 | F | 92.1 | F | 120.7 | F | 103 | F | 82.5 | F | 103 |