The Value of Metrorail and Virginia Railway Express to the Commonwealth of Virginia

Overview and Findings
January 23, 2018

NORTHERN VIRGINIA TRANSPORTATION COMMISSION

The Commission

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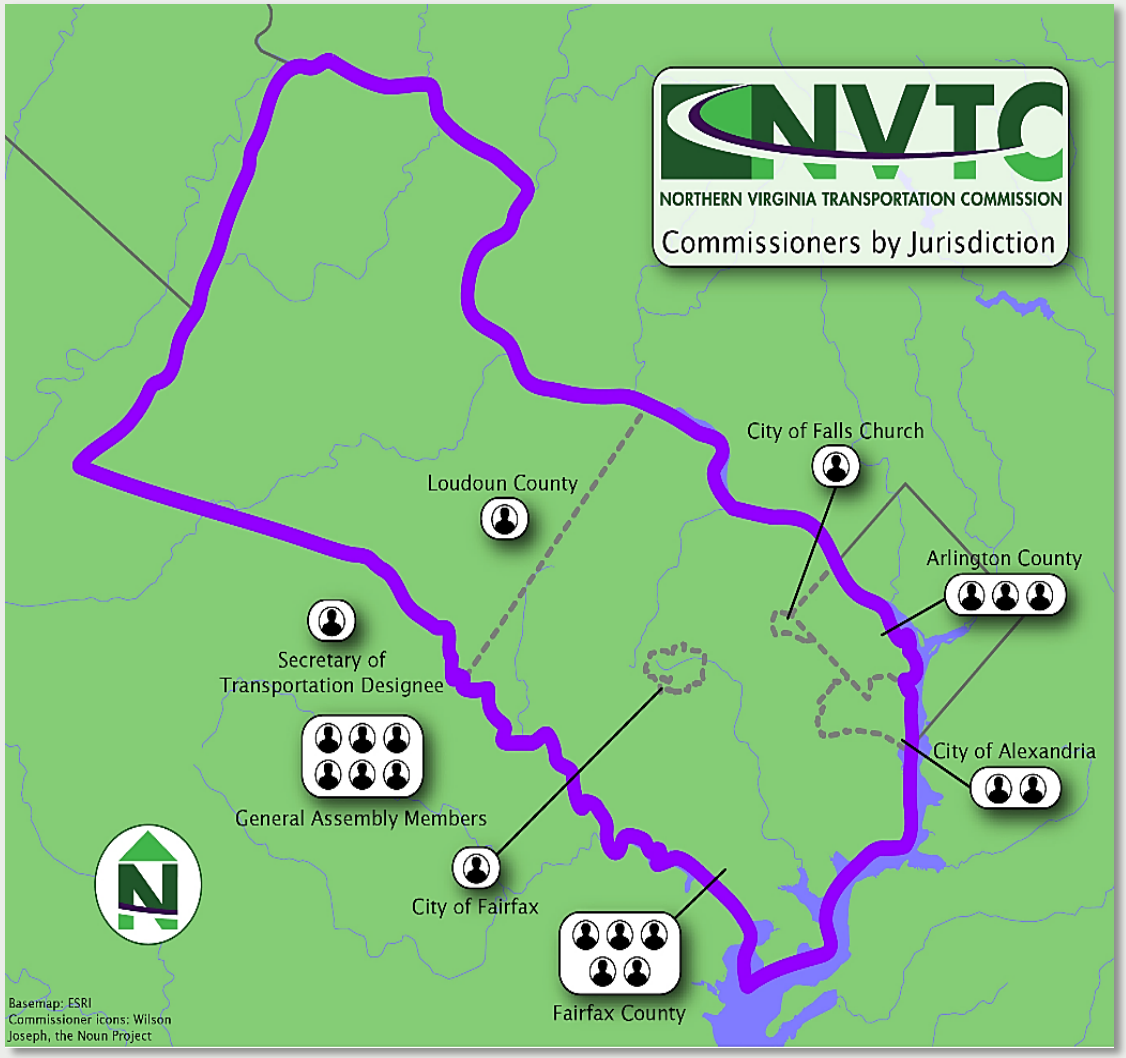

NVTC Jurisdictions:

- Loudoun County
- Arlington County
- Fairfax County
- City of Alexandria
- City of Fairfax
- City of Falls Church

All of NVTC's jurisdictions are members of the Washington Metropolitan Area Transit Zone established by the WMATA Compact.

The Commission

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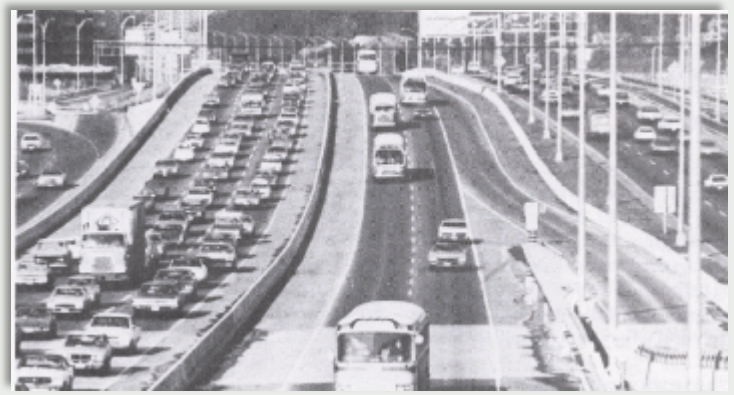

Why is Rail Transit Important to Virginia?

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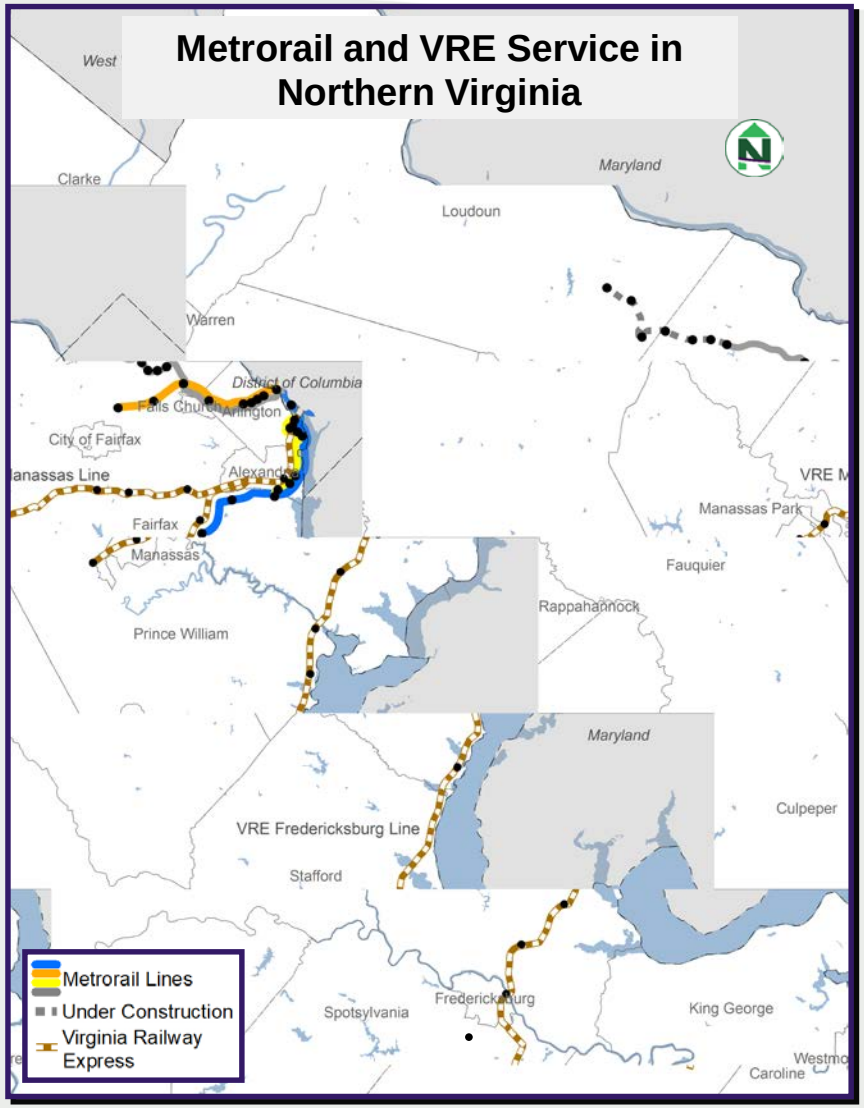

- ✓ Metrorail and VRE move 290,000 people per average weekday
- ✓ Approximately 80 directional miles of Metrorail and 25 stations in Virginia
- ✓ VRE has approximately 160 directional track miles and 17 stations in Virginia
- ✓ Regional Benefits - NVTC, WMATA, and MWCOG studies
  - $235B in property value within ½ mile
  - $3.1B/year in property tax revenues

But how does rail transit in Northern Virginia benefit the Commonwealth as a whole?

Study Objectives and Methodology

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Study Objective

- The goal of this effort was to evaluate the of Metrorail and VRE at the state level.

Technical Review Team

WMATA, TPB, FTA, GMU, and other nationally recognized transit experts.

How is this different than other studies?

- What distinguishes this study from earlier ones is that it is dynamic. Our approach focused on the level of activity that the regional transportation network could support.
- Looked beyond impacts on local generated revenues and focuses on state revenues.

Study Approach

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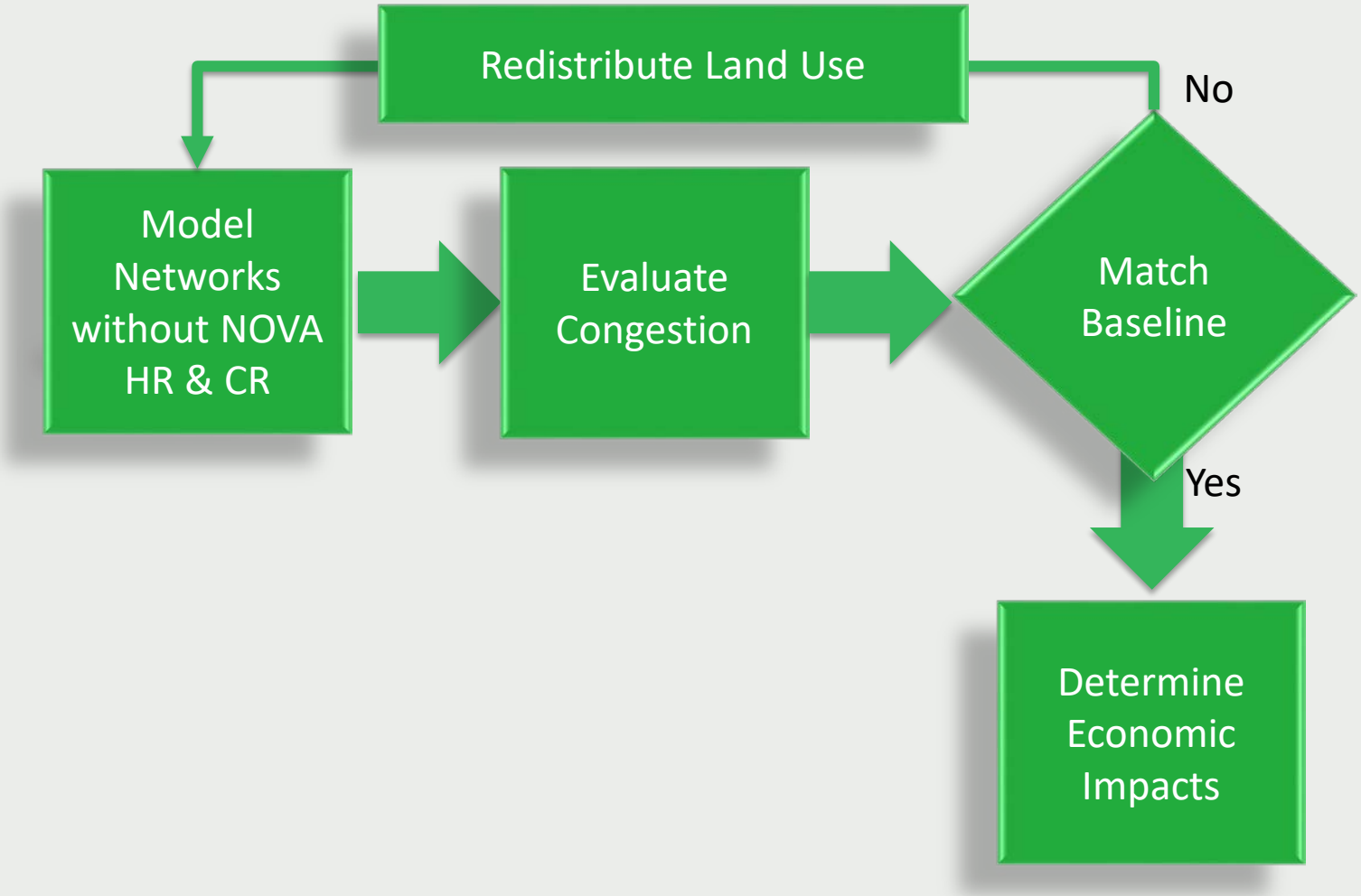
(1) Determine the Existing Level of Roadway Congestion

(2) Remove Metro & VRE from the Transportation Network in Virginia

(3) Redistribute Land Use Until Network Reaches Existing Roadway Congestion

(4) Estimate State Revenue Loses from Land Use Redistribution

Modeling Application



Existing Level of Roadway Congestion

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Measures of Effectiveness (MOEs)

Measure	Primary	Secondary
Service Supplied (Mobility)	HBW Average Trip Length	Job Accessibility
Service Consumed	Peak Period Congested Lane Miles	HBW Mode Share

Percent of Lane Miles by Level of Service

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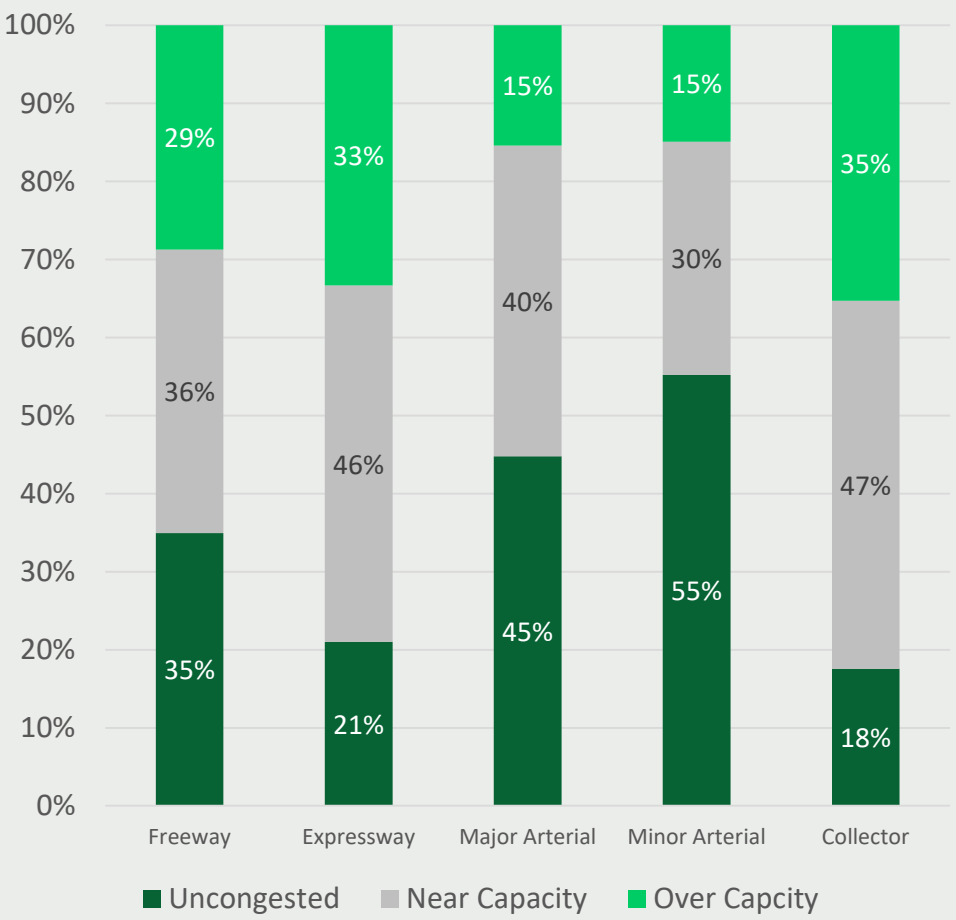
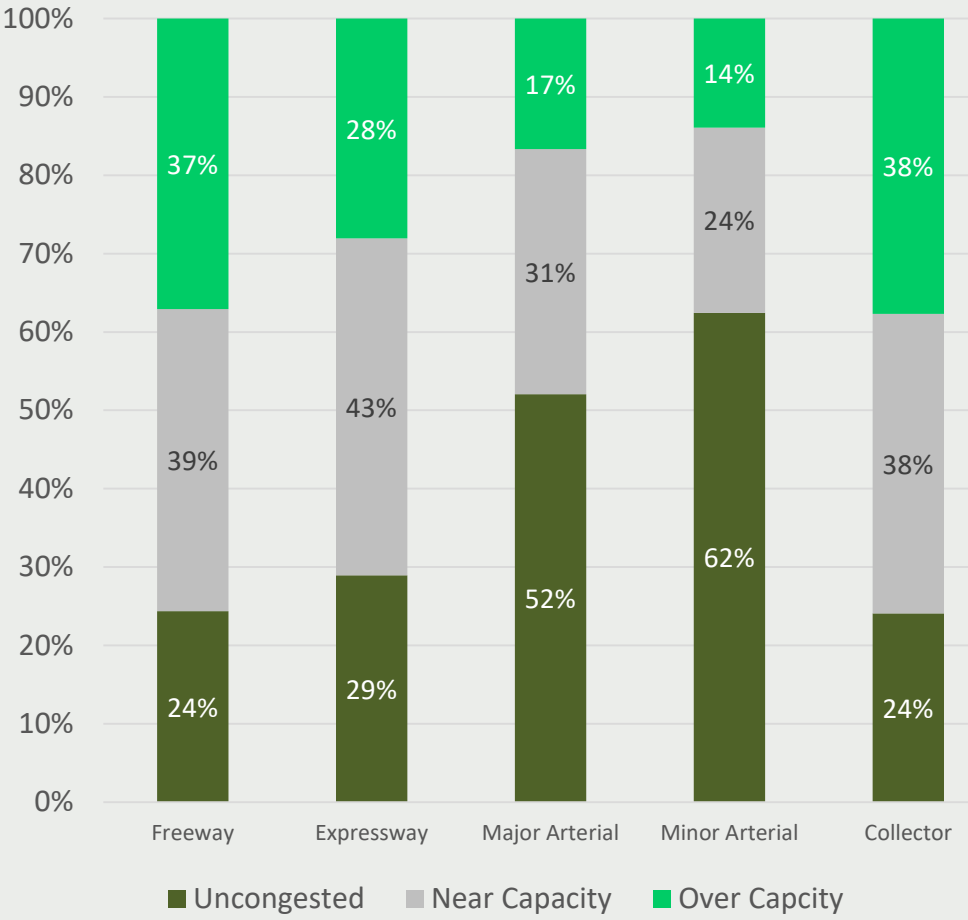
Northern Virginia Morning Peak Period Lane Miles of Congestion



Metropolitian Area Morning Peak Period Lane Miles of Congestion



Percent of Lane Miles by Level of Service

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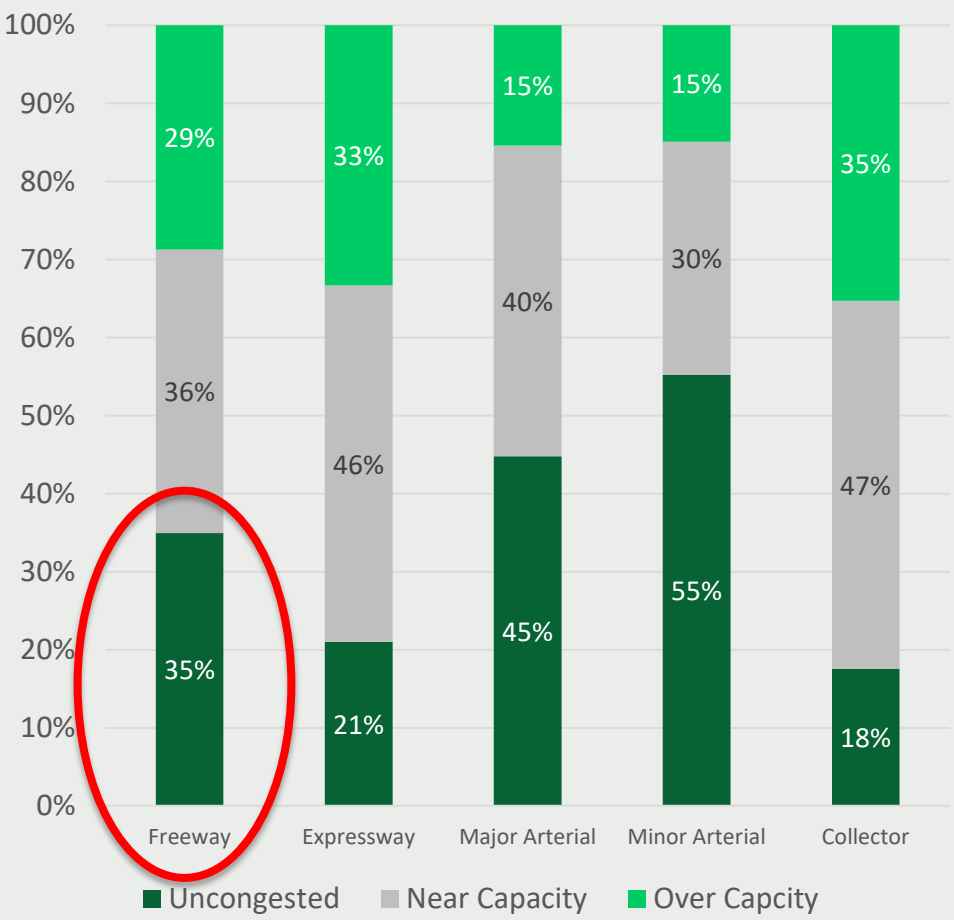
Northern Virginia Morning Peak Period Lane Miles of Congestion



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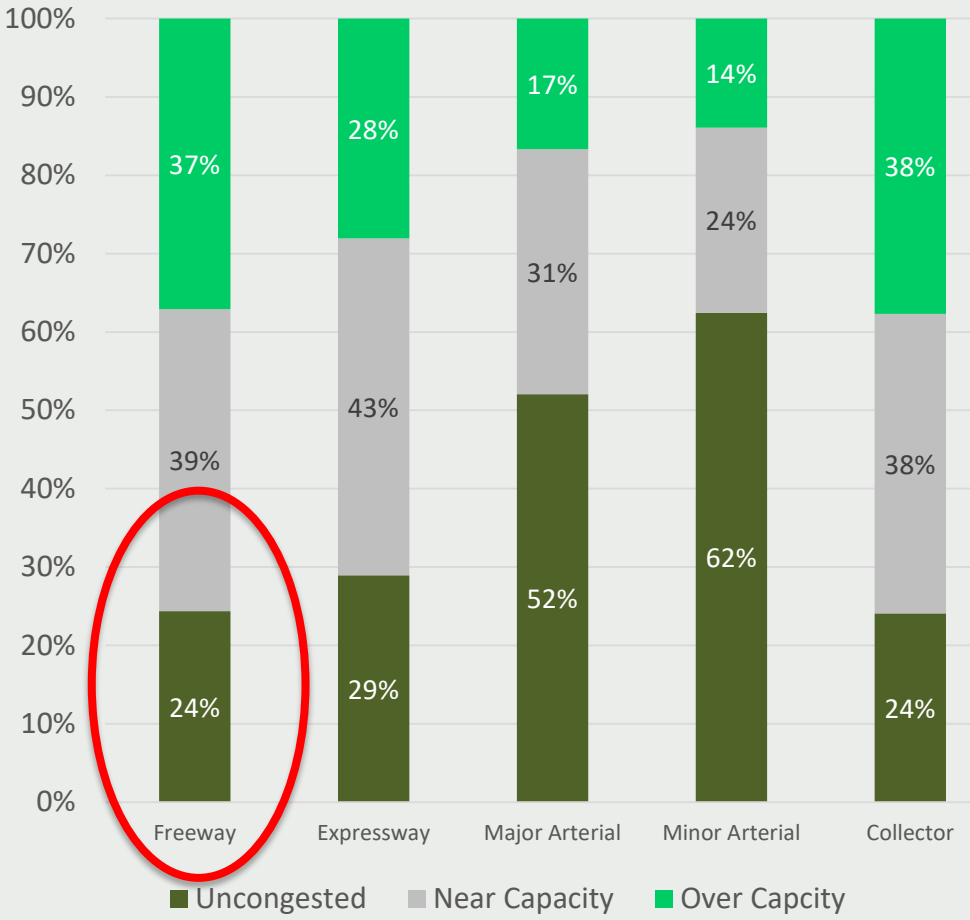

Mobility Measure

- Gravity Model
- Travel time budget
- Average HBW trip time 30 minutes
- Time constant
- Length changes
- Measures impact from congestion

$$Trips_{ij} = P_i \times \frac{A_j \times FF_{ij} \times K_{ij}}{\Sigma(A_j \times FF_{ij} \times K_{ij})}$$

Existing Trip Length

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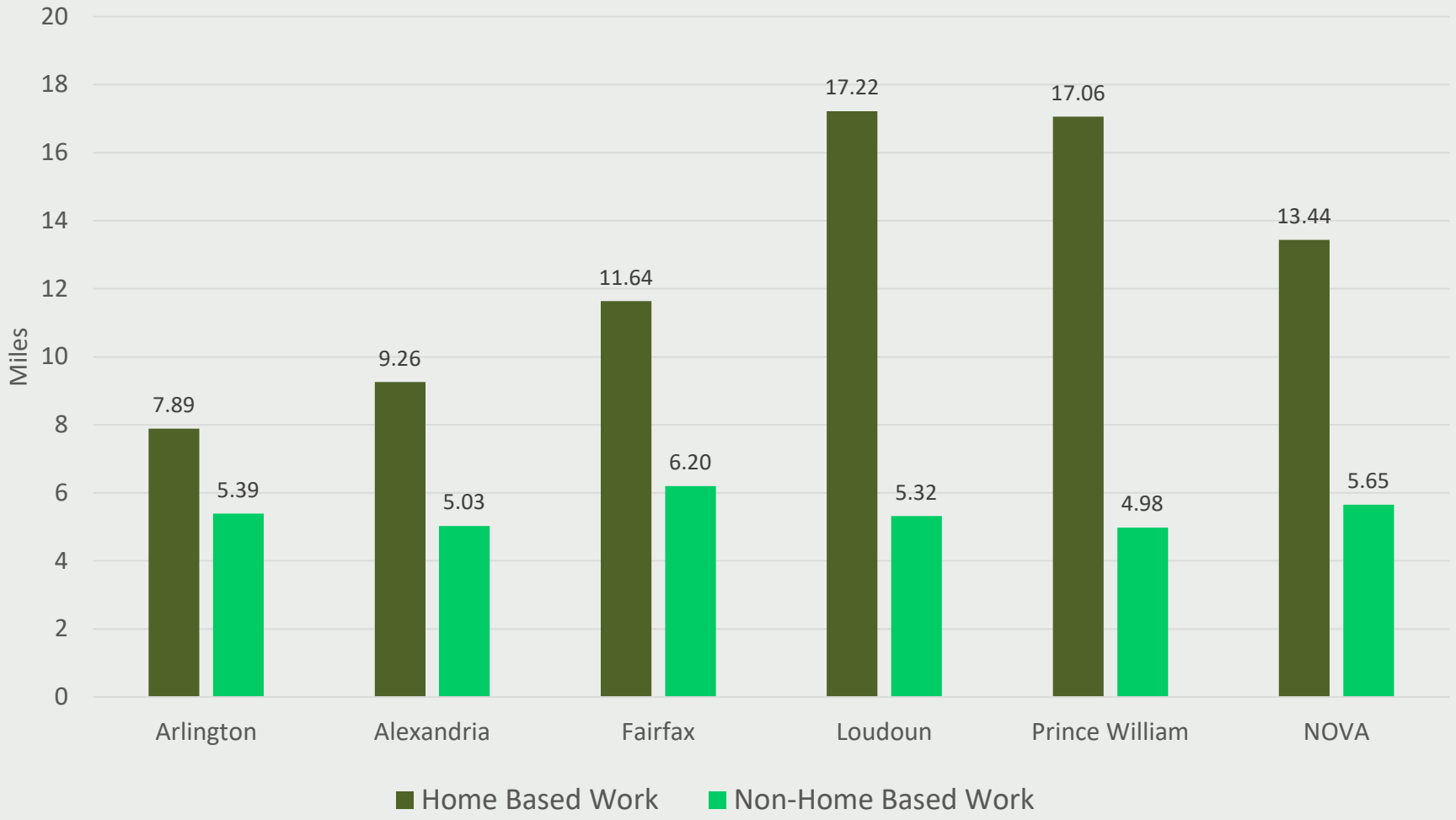

Existing HBW Mode Share

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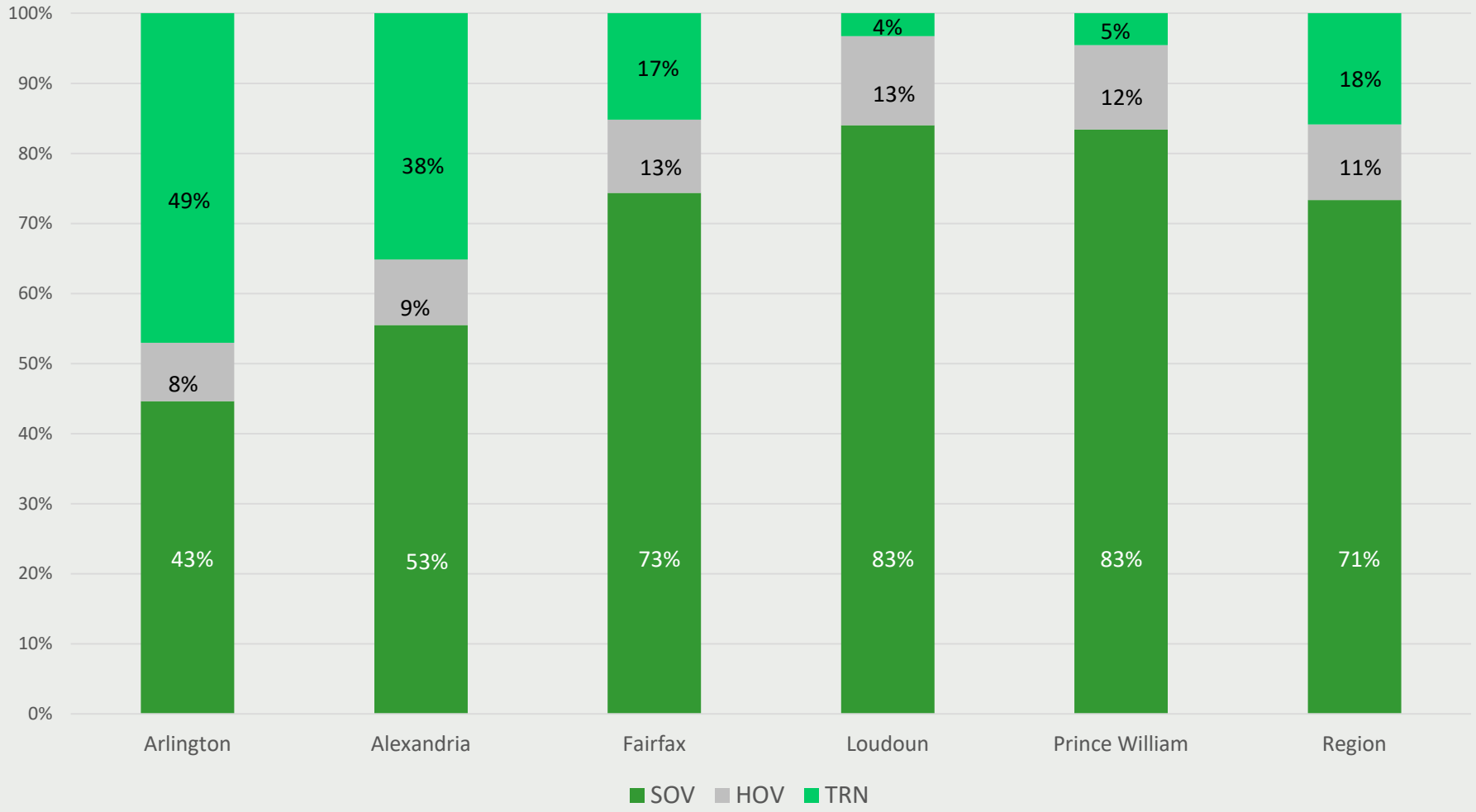

Existing HBW Transit Mode Share

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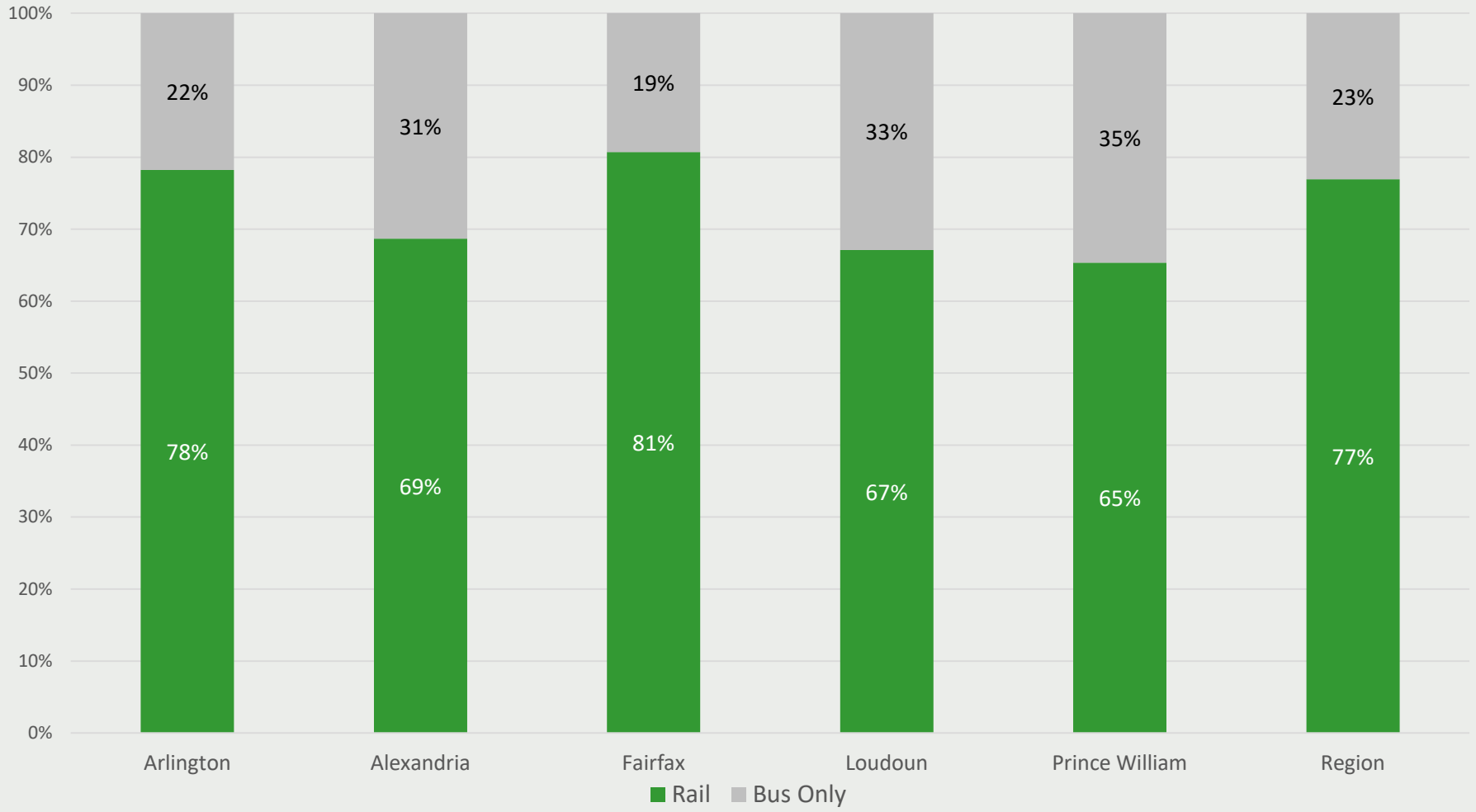

Land Use Reductions

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- TAZ level
- Proportionally reduced based on the WMATA passenger survey
- Attractions (jobs) balanced to productions (households)

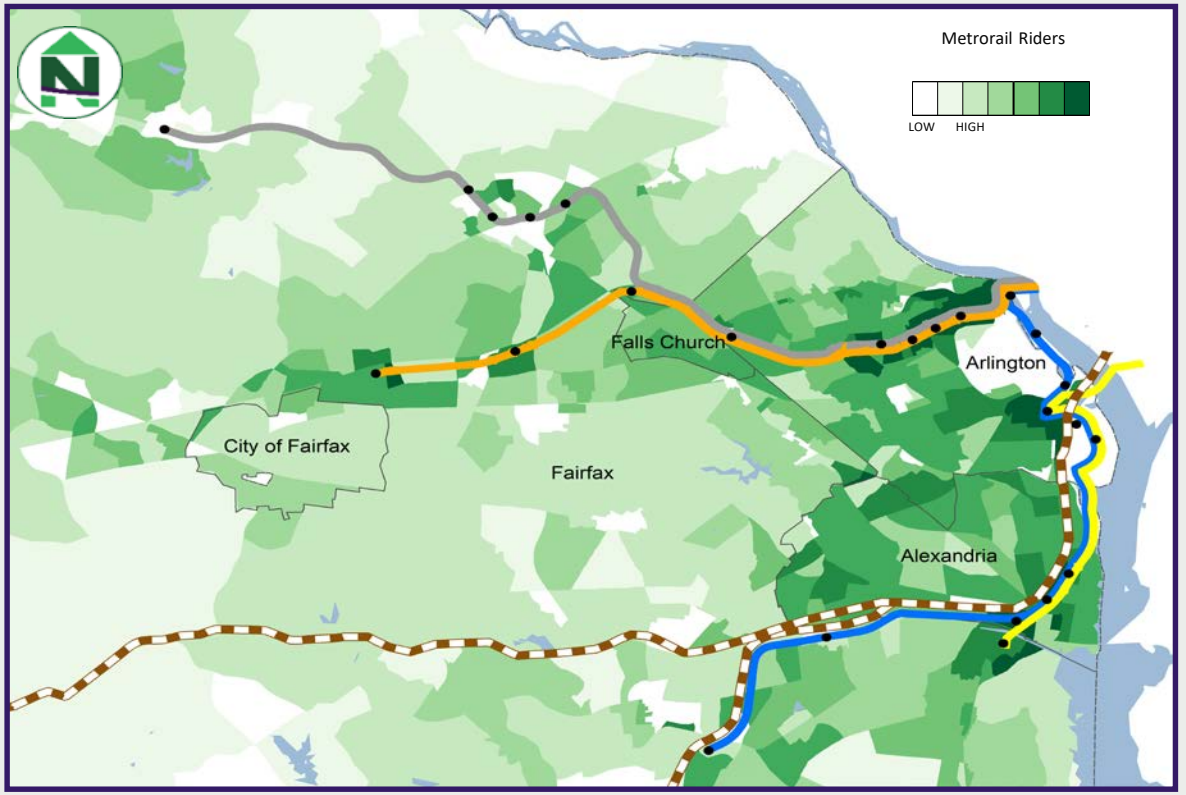

Figure 3 Source: NVTC and WMATA 2016 Metrorail Survey
Ridership weighted by population per traffic analysis zone

Economic Impacts

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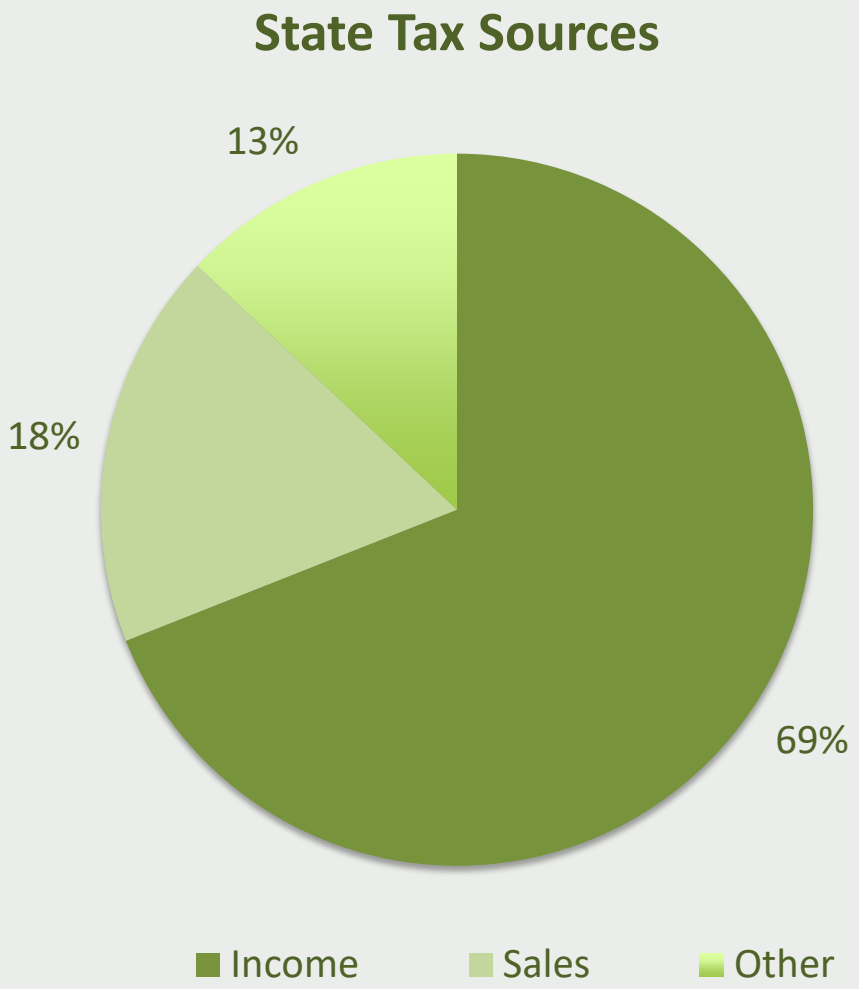
- Focus was impacts to the Commonwealth
- Approximately 90% of the revenue is income and sales taxes
- Calculated the loss in income and sales taxes from redistribution of households and jobs
- Calculations were at the TAZ level



Income Tax Calculations

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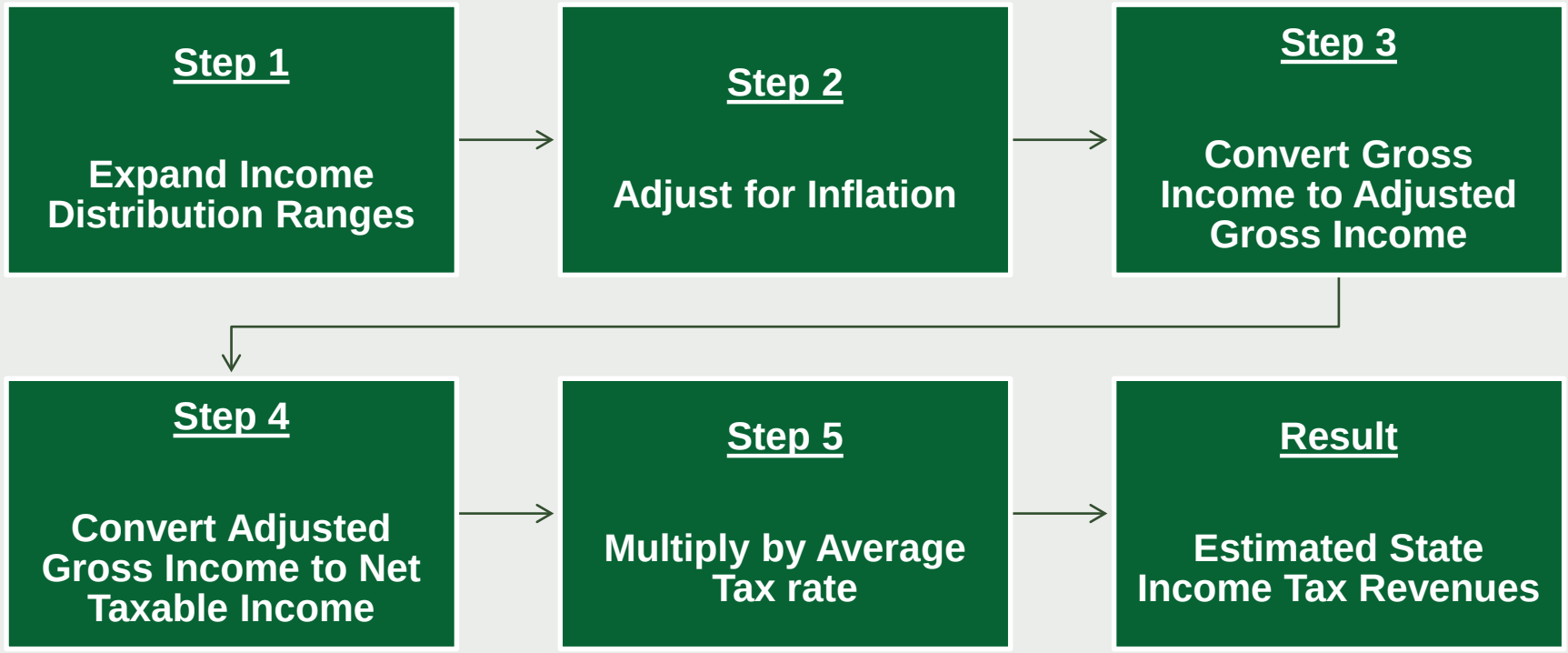

Income Tax Calculations

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Household Income provided by the 2009 5-Year American Community Survey

Model Income Quartiles ($2007)	ACS Income Ranges ($2009)	Midpoint
< $50,000	Less than $10,000	$5,000
	$10,000 to $14,999	$12,500
	$15,000 to $24,999	$20,000
	$25,000 to $34,999	$30,000
	$35,000 to $49,999	$42,500
$50,000 - $99,999	$50,000 to $74,999	$62,500
	$75,000 to $99,999	$87,500
$100,000 - $149,000	$100,000 to $149,999	$125,000
> $150,000	$150,000 to $199,999	$175,000
	$200,000 or more	$400,000

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	$15,000 to $24,999	$20,000
	$25,000 to $34,999	$30,000
	$35,000 to $49,999	$42,500
$50,000 - $99,999	$50,000 to $74,999	$62,500
	$75,000 to $99,999	$87,500
$100,000 - $149,000	$100,000 to $149,999	$125,000
> $150,000	$150,000 to $199,999	$175,000
	$200,000 or more	**$400,000**

Income Tax Calculations

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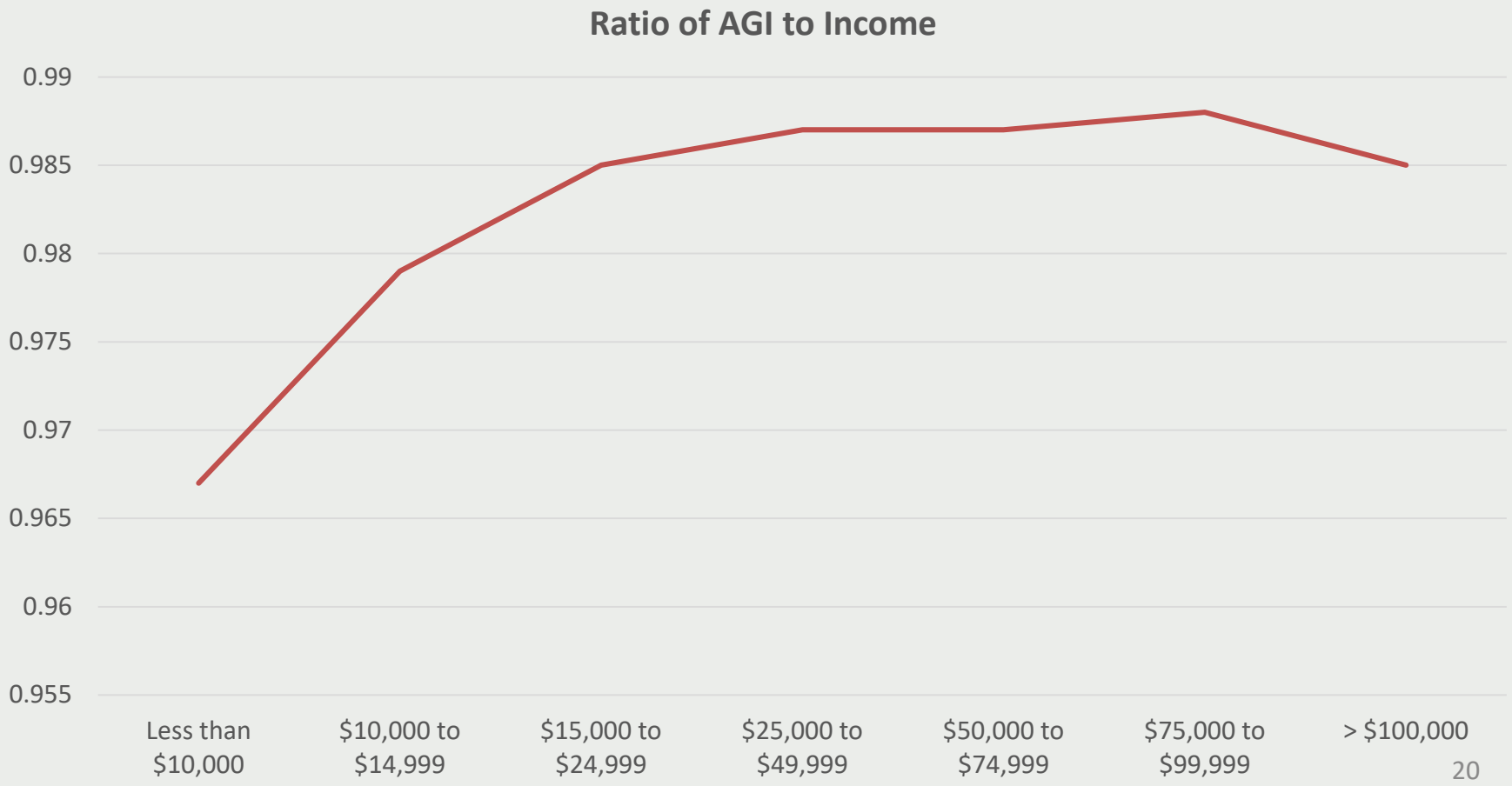
Gross Income compared to Adjusted Gross Income



Income Tax Calculations

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Adjusted Gross Income, Taxable Income, and Total Tax Liability by Income Class.

Sales Tax Calculations

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Step 1

Calculate Retail Jobs by Jursidiction

Step 2

Estimate Sales Tax Yield by Jurisdiction

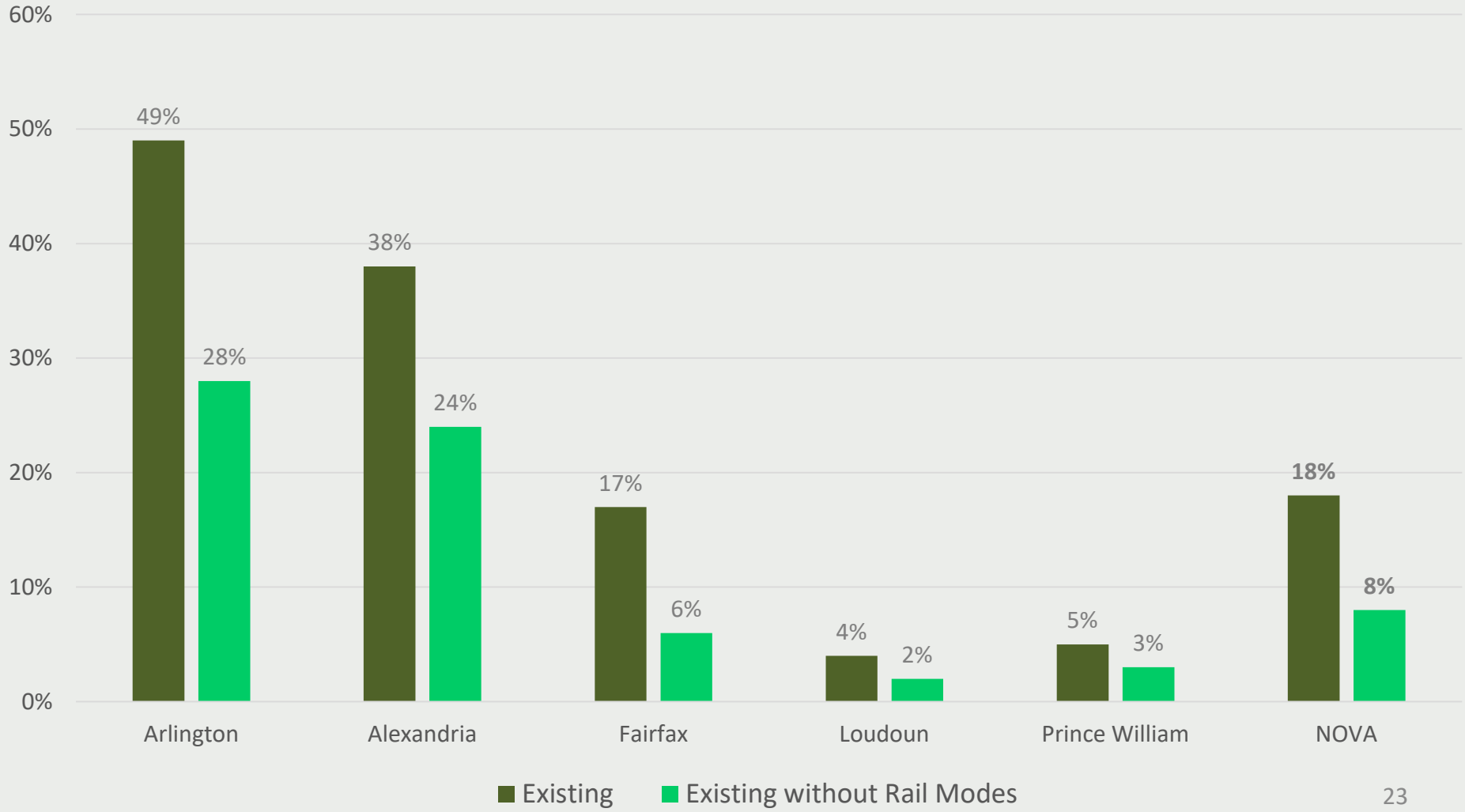
Step 3

Establish Ratios of Retail Jobs to Sales Tax Yield

Step 4

Estimate State Sales Tax (General Fund) Revenues

Findings HBW Mode Share Impacts



Redistributing Land Use

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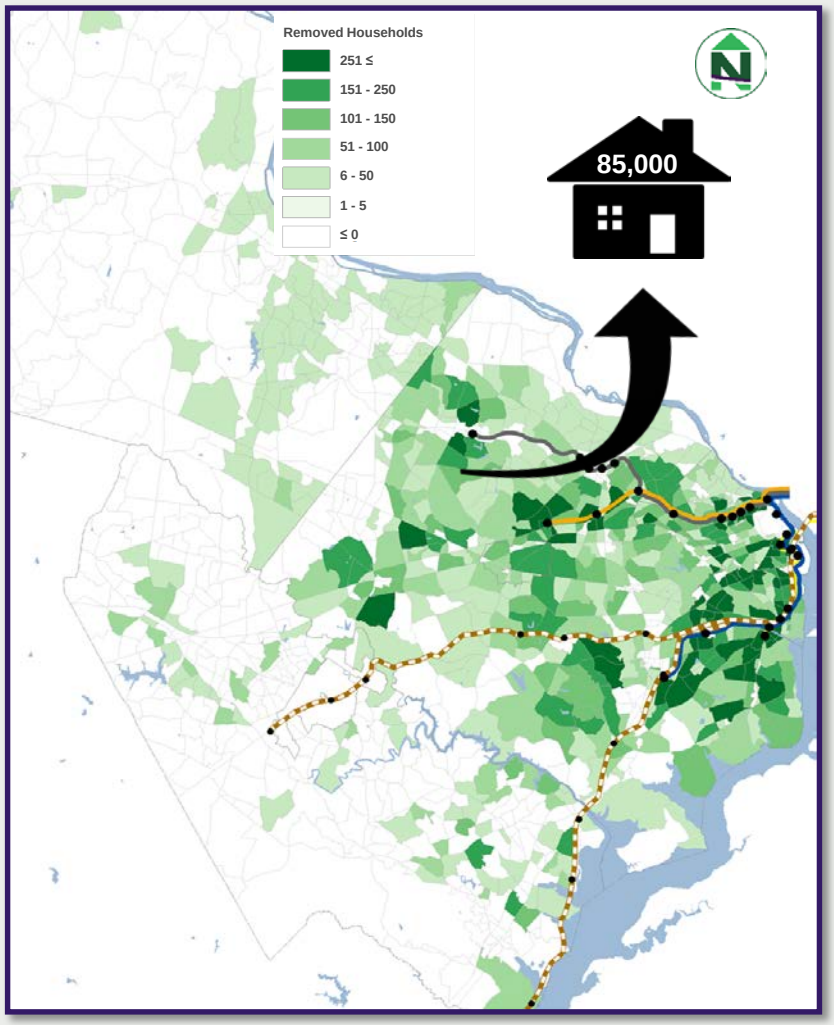
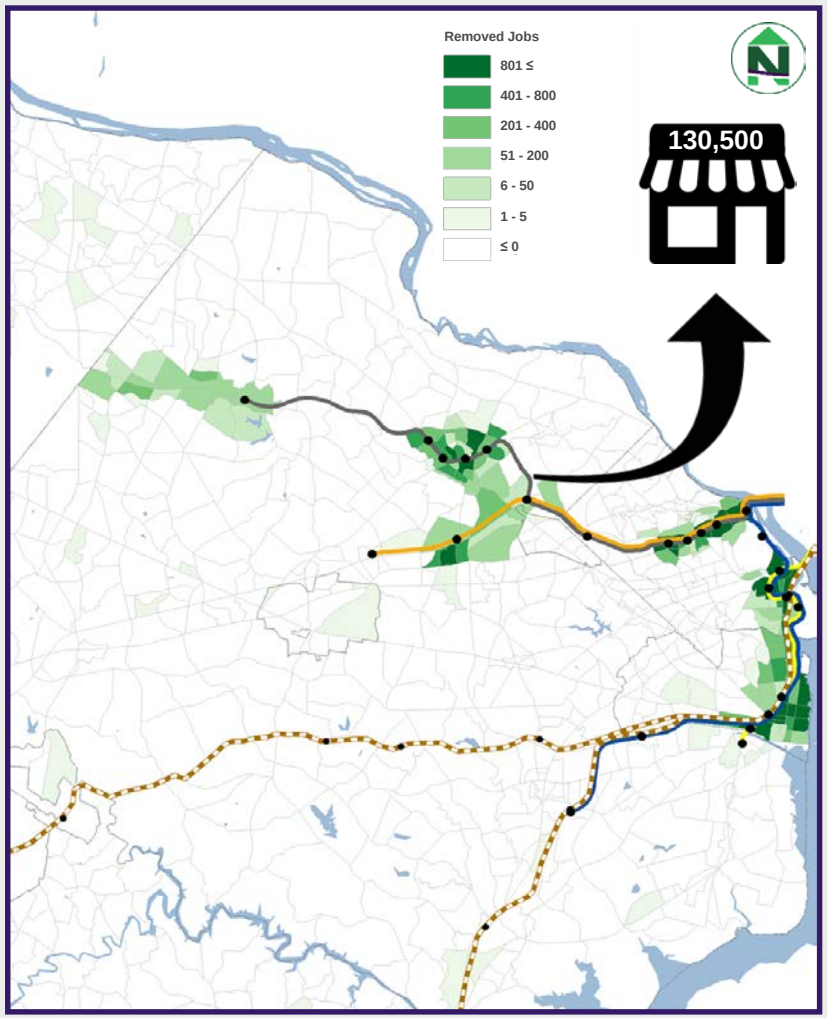
Households Redistributed



Jobs Redistributed



Household Reductions

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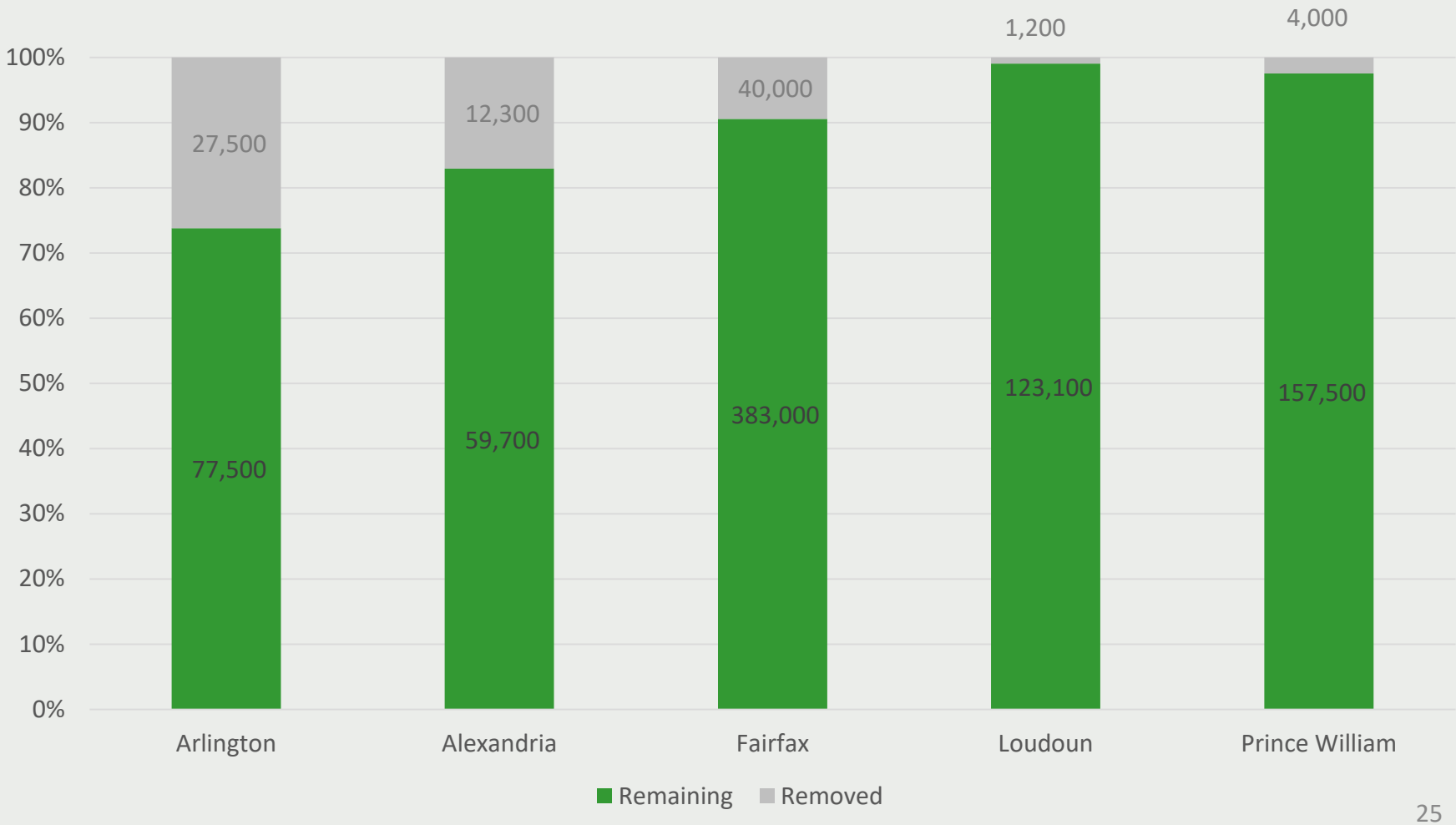

Job Reductions

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Report Findings: Revenues, Riders, and Cost Savings

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More than

$600M

in sales and income tax revenue sent to the state's general fund generated by the additional households and jobs that rail supports

250% ROI

received by the Commonwealth from the $170 million it provided to Metro and VRE

130K

additional daily transit trips in Northern Virginia

56,500

lane miles of congestion saved

Value of Metrorail and VRE to the Commonwealth of Virginia

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This report can be found at

www.novatransit.org

Northern Virginia Transportation Commission

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