

Commercial Loading Zone Analysis

Presentation to MWCOG TPB Freight Subcommittee

U.S. DOT Volpe Center

On behalf of FHWA Office of Freight Management and Operations (HOFM)

November 12, 2026

U.S. Department of Transportation
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Introductions

What is the Volpe Center?

- Fee-for-service agency housed within U.S. DOT under the Office for Research and Technology (OST-R)
- Conducts work across U.S. DOT's operating administrations, other Federal agencies, State and local governments, industry, and academia
- Volpe's primary office is located in Cambridge, MA
- About 25 Volpe staff are based in Washington, D.C.

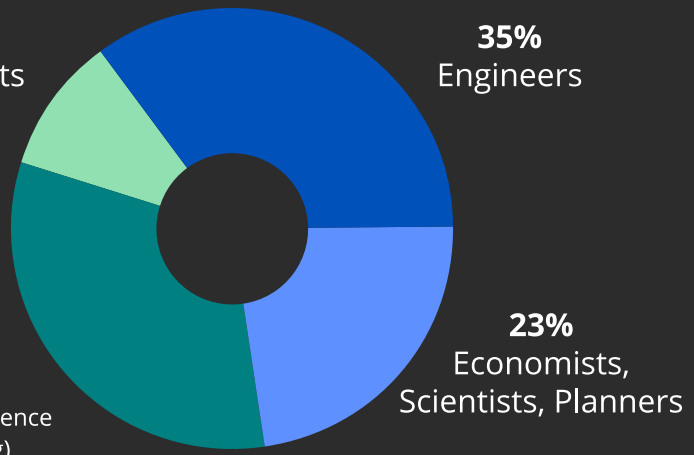


*Dave Burk Photography for Skidmore, Owings, & Merrill Architects – do not use without permission

Volpe's Workforce

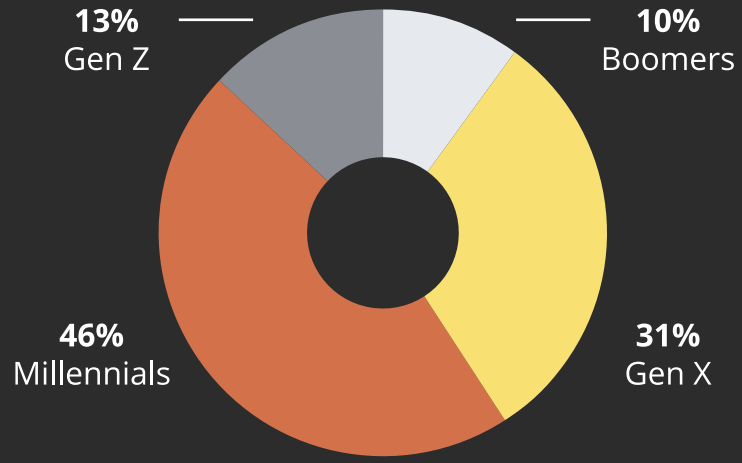
Volpe is home to a Federal, multimodal, and multidisciplinary workforce with diverse skillsets.

Disciplines of Technical Center Staff



Staff with Advanced Degrees
42% Masters | **10%** Doctorates and Equivalent

Generations of Technical Staff



U.S. DOT Volpe Center Federal Staff

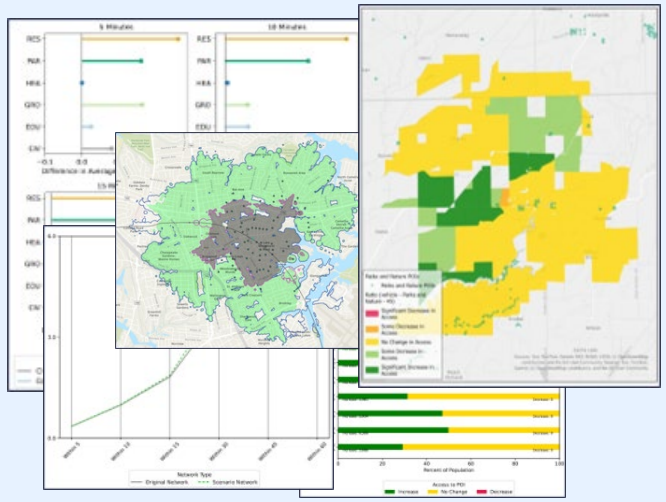
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Volpe Project Examples

TRACKIT

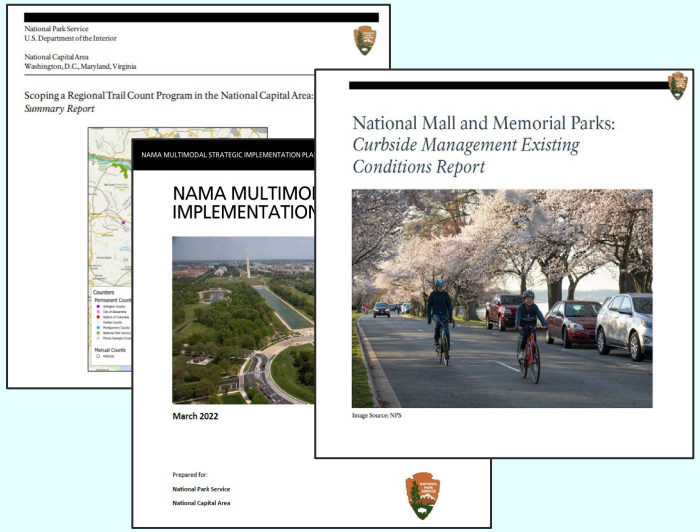
The Transportation Access and Connectivity Key Insights Tool (TrACKIT) is a free scenario testing toolbox built for ArcGIS Pro that quantifies how transportation infrastructure changes affect people's ability to reach key destinations. Learn more here.

Sponsored by FHWA Office of Planning.



Transportation Planning for the National Capital Region

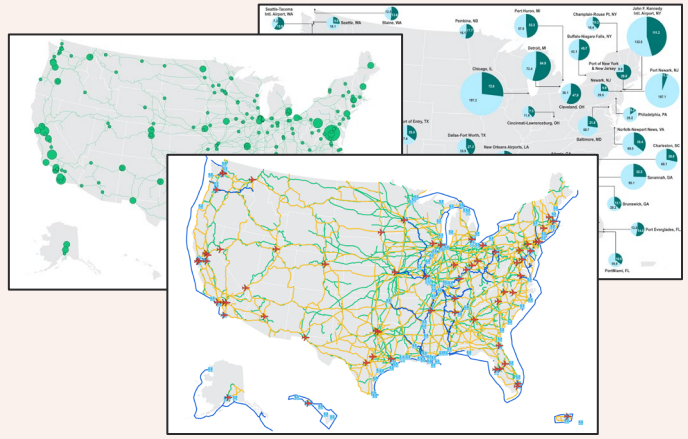
The Volpe Center provides expert transportation planning, environmental compliance, and engineering management to modernize the National Park Service's National Capital Region infrastructure, ensuring a resilient network for 50 million annual visitors.



National Freight Strategic Plan

The NFSP is the guiding framework for the nation's multimodal freight systems. It sets the goals and long-term strategy for Federal freight policy, investment, and partnership, while supporting State, local, Tribal, and private-sector efforts to improve freight movement across the country. Find it here.

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Volpe Project Examples

Freight Solutions Program

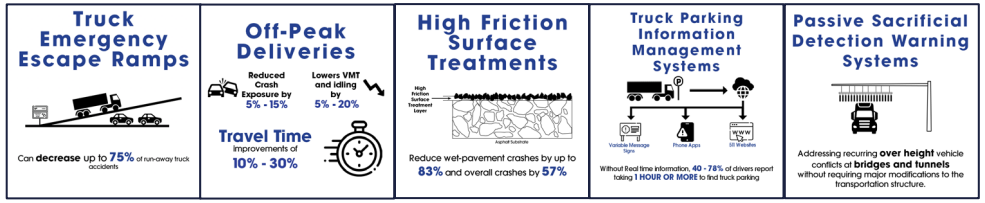
Provides public agencies with practical information about freight-related operational, technical, or infrastructure interventions that can be used to address a range of safety and reliability issues.

This includes documenting Proven Solutions and providing resources on Developing Solutions.

Sponsored by FHWA Office of Freight Management and Operations (HOFM).

1) Proven Solutions

- Those that are already widely deployed and well established, or have rigorous, quantitative research that demonstrates their effectiveness



2) Developing Solutions

- Those where *additional research is needed* to understand their effectiveness
- These include active height warning systems, curve warning systems, and Commercial Loading Zones (CLZs)
- The Program has focused on CLZs as a high-priority area where Federal guidance would be beneficial

Commercial Loading Zone Analysis

Washington, D.C.

Background

- **Overarching research question:** How does the introduction of a CLZ impact whether commercial vehicles are able to find a safe and legal place to park?
- **"Legal place to park"** can be measured by analyzing **parking violations**
- **Locations:** Volpe analyzed CLZ and parking violation data in New York City and then Washington, D.C.

Required Data

Variable	Topic	Required Attributes	Level of Data Availability
Independent	CLZs	• Locations • Installation dates	**Very Low:** Many cities have the locations of CLZs, but often no information on installation date
Dependent	Violations	• Locations • Dates • Vehicle type • Parking-related factors	**Medium:** Often available but quality varies

Washington, D.C. Violations Analysis

What is the impact of new CLZs on the number of nearby trucking-related parking violations in D.C.?

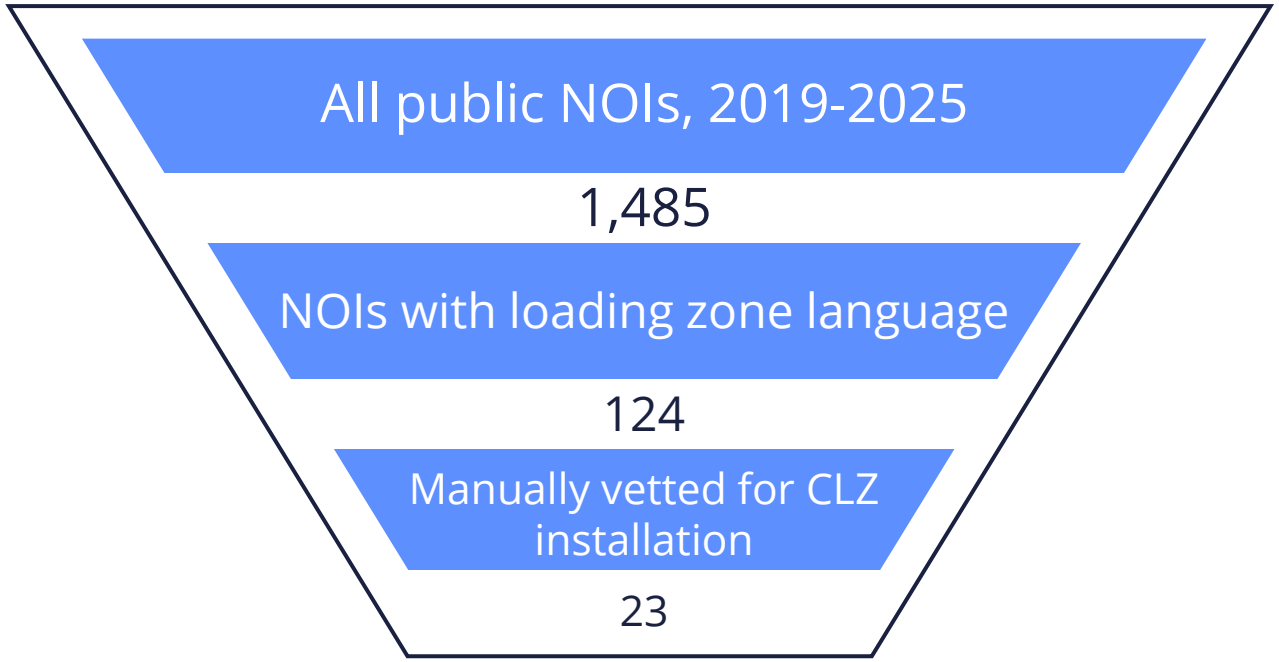
1. Define Treatment Sites
   - New CLZ installations identified from DDOT Notice of Intents (NOIs) from 2019 to 2025 and then a comparison with Google Street View
2. Build Comparison Areas
   - Treatment area: near each CLZ (<150 ft)
   - Spillover area: adjacent area used to test displacement (150-500 ft)
   - Control area: local area outside any treatment zone (1,500-3,500 ft)
3. Collect Violation Data
   - D.C. parking violations, 2018-2026
   - Trucking-related violation codes used
4. Estimate Effect of CLZs on Violations
   - Poisson Difference-in-Differences regression used
   - Controls for zone size, calendar-month trends, violation volume, and more

Analysis support from Gemini and Codex.

CLZ Identification

Public NOIs identified from DDOT database, 2019-2025

1. Script written to identify every NOI related to loading zones installations (e.g., keywords: "loading zone" and "commercial loading," then "install," "establish," "add")
2. NOIs manually reviewed and verified against Google Street View
3. Date ranges identified, where start is NOI date and end is earliest Google Street View appearance



Source: District Department of Transportation (DDOT) Wiki. "Notices of Intent." https://ddotwiki.atlassian.net/wiki/spaces/NI/overview

Installation Date Range

- Limited data available about CLZ installation dates (both at DDOT and more broadly in curb data standard best practice)
- NOI dates and Google Street View used to frame the possible installation date range

NOI-22-136-TOA

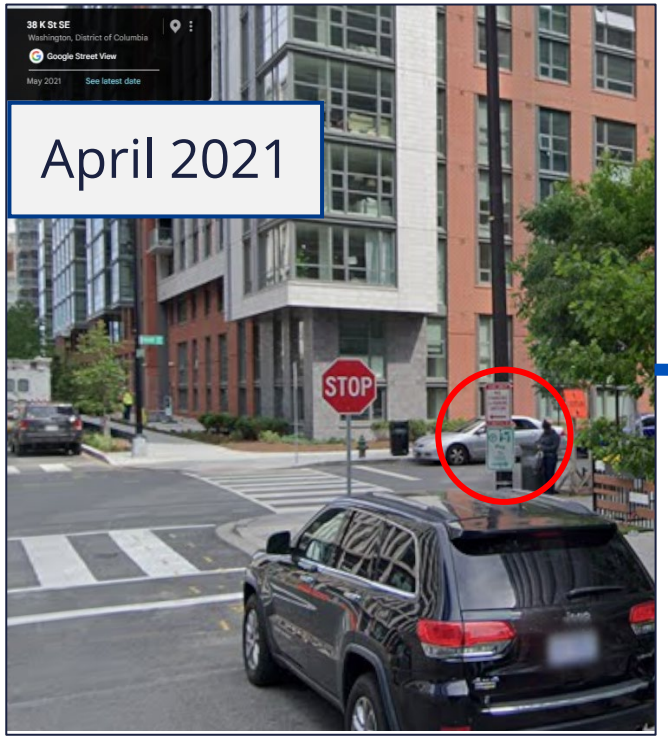
By DDOT Webmaster Add a reaction

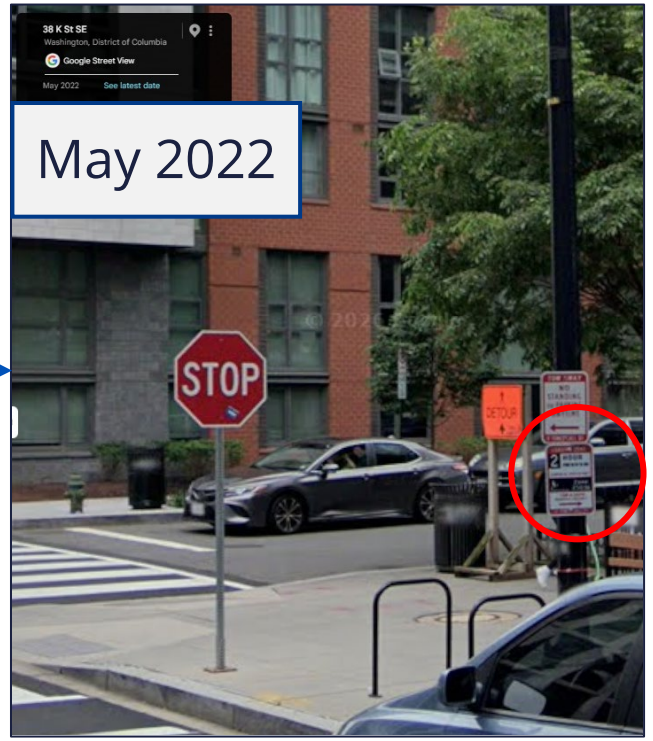
Government of the District of Columbia
Department of Transportation

April 6, 2022

Chair Edward Daniels
Advisory Neighborhood Commission 6D
Email: 6D07@anc.dc.gov

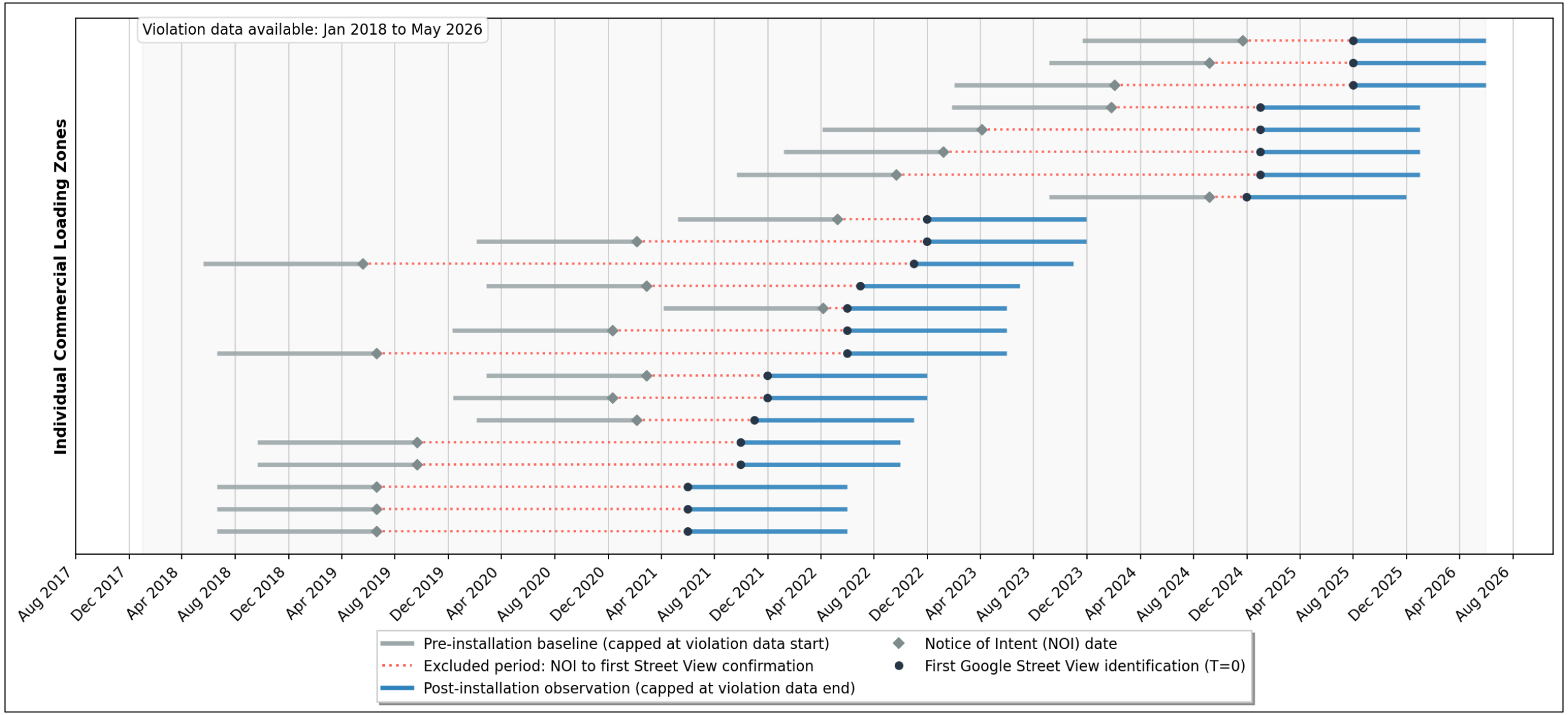
NOI# 22-136-TOA





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Treatment Period Start/End Timeline



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Violation Code Filtering

Violations filtered into two categories:

1) Parking type violations related to trucks used to measure effect of treatment area

Examples:
- Parking abreast (double parked)
- Obstructing crosswalk
- No standing prohibited
- Parking in excess of time zone restricted by posted sign
- Parking within 5 ft. of driveway or alley
- Unauthorized parking in an official parking permit space

2) Other violations used as a control for enforcement trends over time

Examples:
- No front tag
- Obstructed reciprocity sticker
- Fail to display current ID tags
- Fail to secure DC tags
- Failure to properly affix validation sticker to tags
- Improper display of tags

Source: Metropolitan Police Department (MPDC). "2020 Collateral List for Moving Violations and Parking Violations." https://mpdc.dc.gov/sites/default/files/dc/sites/mpdc/publication/attachments/2020_Collateral_List_for_Moving_Violations_and_Parking_Violations.pdf

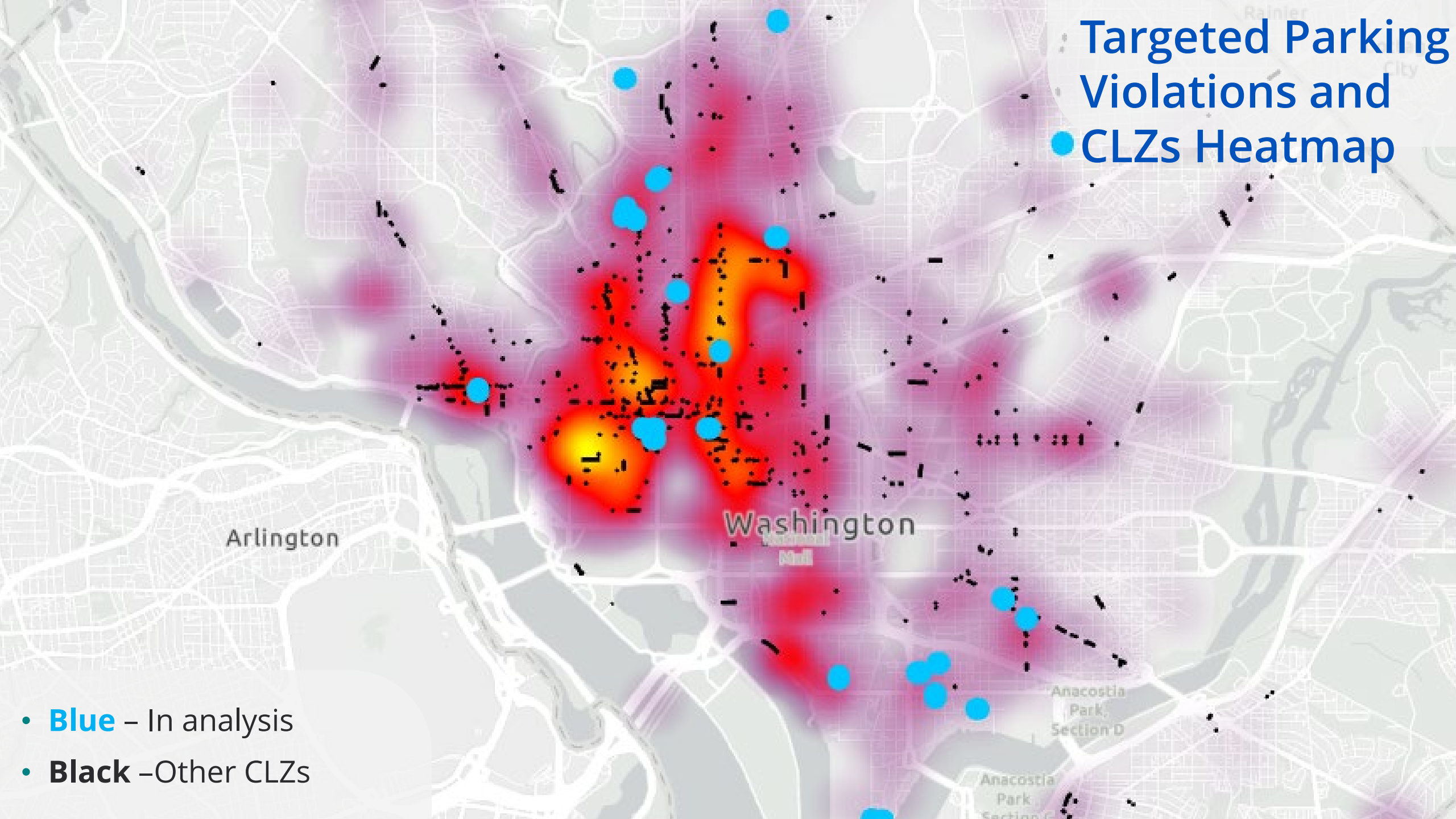
Yearly Filtered Violation Count



Source: District Department of Transportation. (2025). Parking Violations Issued in All Months 2018-2026 [Data set]. Open Data DC. https://opendata.dc.gov/datasets/parking-violations-issued-in-march-2025/about
Note: Data through May 2026.

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Targeted Parking Violations and CLZs Heatmap

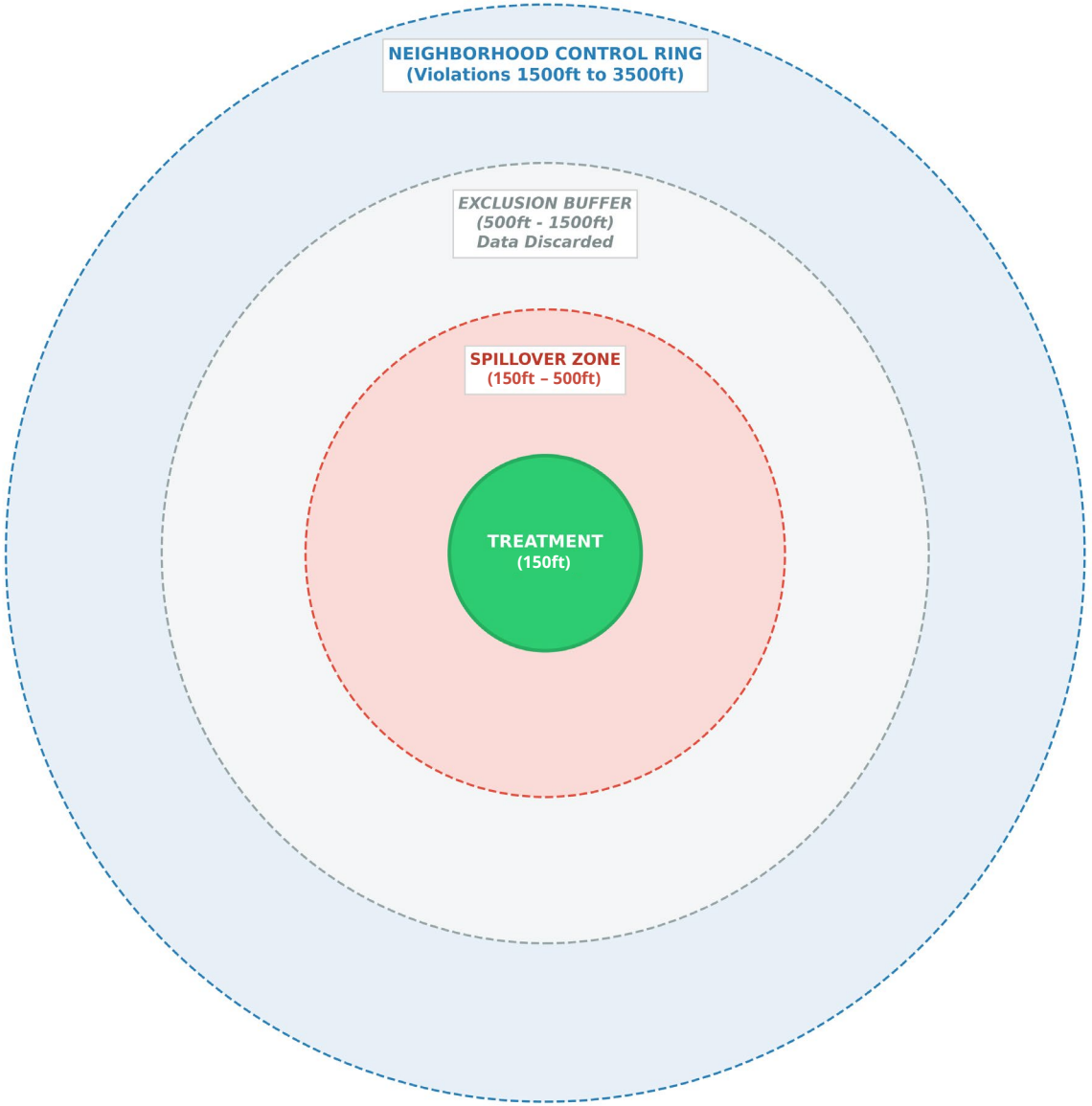


- **Blue** – In analysis
- **Black** –Other CLZs

Analysis Specifications

- Sensitivity tests varied size of treatment, spillover and control areas as well as the length of the violation window
- 18 sensitivity tests conducted
- Results were directionally consistent across specifications
- Final selected model represents the strongest specification among the sensitivity tests

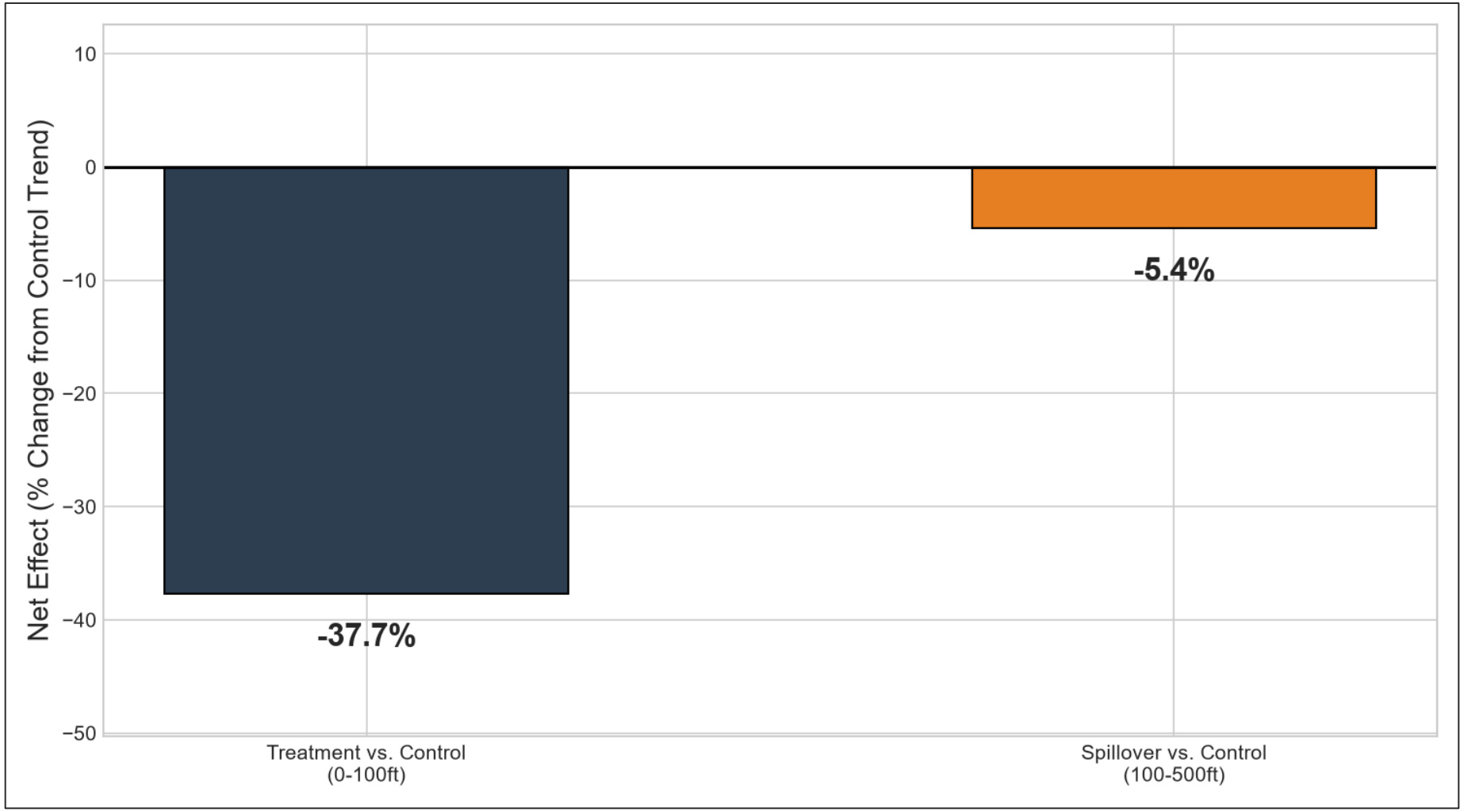
Parameter	Final Specification
Treatment area	0-150 ft from CLZ
Spillover area	150-500 ft from CLZ
Control area	1,500-3,500 ft from CLZ, excluding other treatment areas
Violation window	12 months before and after exclusion period, where available
Enforcement Control	Local non-parking violation rate used as a proxy for enforcement intensity



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Our analysis estimates a statistically significant **37.7% reduction** in nearby trucking-related parking violations after new commercial loading zones were installed.

Analysis Results (Summary)



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Analysis Results (Details)

Variable Description	Analysis	Result
Did the treated area improve more than the control area? Our main takeaway	Measured the number of parking violations in treatment zones to those in the control zones over a set period to determine the effect of CLZs.	**37.7% drop** in violations (coefficient of -0.474)
How confident are we?	P-value test is performed on data to determine likelihood of results occurring on their own (i.e., with CLZs not having effect)	**Highly confident.** Results are statistically significant (p=0.0046)
Did violations just shift elsewhere nearby?	Testing to see if the area adjacent to the treatment zones received a significant increase in violations, which would indicate a spillover effect.	**No significant shift.** Violations actually decreased by about 5.4%, but results were not statistically significant (coefficient of -0.056, p=0.501)
Did the areas have similar violation patterns *before* the installation? (Parallel trends)	Testing to see whether the city control group slopes match that of our treatment before installation to assess how strong the controls are.	**Yes.** The control groups provided a fair baseline comparison (0.742, a high value means better controls)

Note: Result percentages are converted from the log-scale coefficients of the Poisson regression model.

Key Takeaways

- **Statistically significant result**
  - New CLZs are associated with fewer nearby truck-related parking violations
- **Observed effect was directionally consistent**
  - Relationship between CLZs and truck parking held across sensitivity tests, which provides confidence in the overall results
- **Limitations of the analysis:**
  - Small number of treatment areas (23)
  - Imprecise installation dates drawn from combined NOI issue dates and Google Maps Street View data
  - Potential confounding effects that are unaccounted for in the controls, such as other curb or street treatments
  - Parking violations do not record vehicle type in D.C., so violation codes used as a rough proxy for trucking-related citations

Next Steps: CLZ Toolkit

- FHWA HOFM is funding Volpe to develop a CLZ Toolkit as the next step of this work
- Under the current scope of work, we plan to:
  - Conduct a comprehensive **state-of-the-practice review of CLZ programs across up to 15 U.S. cities** to establish a baseline of national CLZ practices
  - Develop a **model set of definitions or typologies** of commercial vehicles, loading zones, and characteristics of neighborhoods that benefit from CLZs
  - Build on existing mobility data standards to establish a **baseline set of curb data best practices** for jurisdictions planning, mapping, and analyzing CLZs
  - Develop a **foundational model equation** to recommend CLZ needs at the block level based on local data, such as road characteristics, land use, and more
- Volpe and FHWA will engage with local stakeholders throughout development of the Toolkit to validate the work

Questions

Thank You!

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