

# NCPTA & NCDOT-IMD PRESENT

## “Planning for Freight (Are you?)”

- Presented by: **Dana A. Magliola** - Logistics + Freight – NCDOT
- Please make sure you sign-in with your name and organization.
- Please use the Chat option to let us know how many people are at your location.
- Please use the Chat option for any questions for the presenters, we will address them at the end of the presentations.

## Question & Answer Session:

Please use the Chat option on the right to ask your questions.

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Please visit our website for this presentation, previous presentations and our schedule of future Webinars on exciting topics in today's Mobility solutions and related subjects.

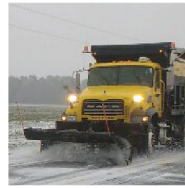
<https://connect.ncdot.gov/business/Transit/Pages/Transit-Lunch-Learn-Series.aspx>

Thank you and please join us for our next Webinar in January where we will have a presentation on Data & Route Design and the Census. More details to come.



# NORTH CAROLINA

Department of Transportation



## Planning for Freight (*Are you?*)

Dana Magliola  
Office of Logistics + Freight, NCDOT  
12 November 2019





"Those DOTs that focus on older models will be unprepared to serve new kinds of demand."

McKinsey & Company - October 2017

"Data is the new oil."

**The Economist** - May 2017

# Agenda



- Introduction
- Defining Logistics + Freight
- Considering + Understanding Freight
- Rural + Urban
- Freight Behavior
- What's Next
- Resources

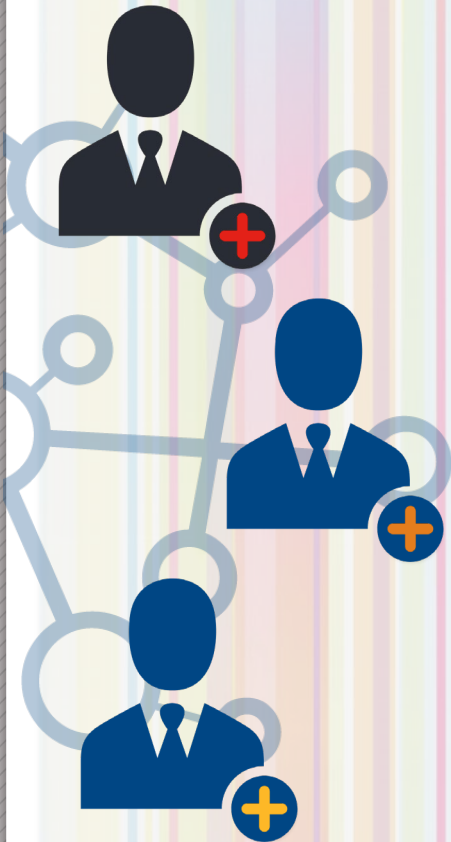
## Dana Magliola

- Charleston, South Carolina
  - B.A. - University of Virginia, 2001
  - M.B.A. - NC State University, 2016
- 
- NC Department of Transportation  
Office of Logistics + Freight
  - NC State University  
Industry Expansion Solutions  
Supply Chain Resource Cooperative
  - AP Moller-Maersk, Maersk Line  
Corporate Communications/Media Relations  
Labor Relations, Corporate Social Responsibility
  - UPS Supply Chain Solutions/Logistics  
Business Development + Solutions Team Leader
- 
- Caterpillar SCRC Supply Chain Scholar
  - MacLauchlan Leadership Fellow
  - NC Supply Chain economic impact report
  - Material Handling + Logistics U.S. Roadmap 2.0
  - NC Manufacturing Extension Partnership Subject  
Matter Expert: Supply Chain Management
  - Head Coach, NC State Sailing

## About Me



# Organization: Who Are We?



**Charles Edwards, Director**  
BA, University of Reading  
MBA, University of Virginia\*



**Dana Magliola, Sr. Supply Chain Analyst**  
BA, University of Virginia\*  
MBA, NC State University

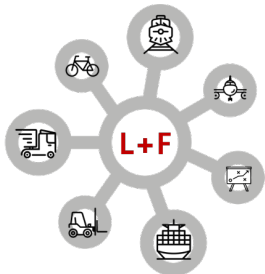


**NC STATE UNIVERSITY**

**Ahmed Zahrani, HBCU Fellow**  
Georgetown University  
BS, MS, North Carolina A+T State University



- Drive North Carolina's development as the preeminent environment for freight transport + logistics services
- Promote understanding and facilitate freight + logistics activities throughout the state
- Resource project delivery from planning to construction, ensuring infrastructure investment is connected to industry + commerce
- Support the economic + social well-being of all North Carolinians







ECONOMIC DEVELOPMENT  
PARTNERSHIP OF NORTH CAROLINA



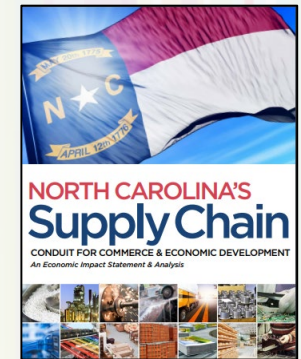
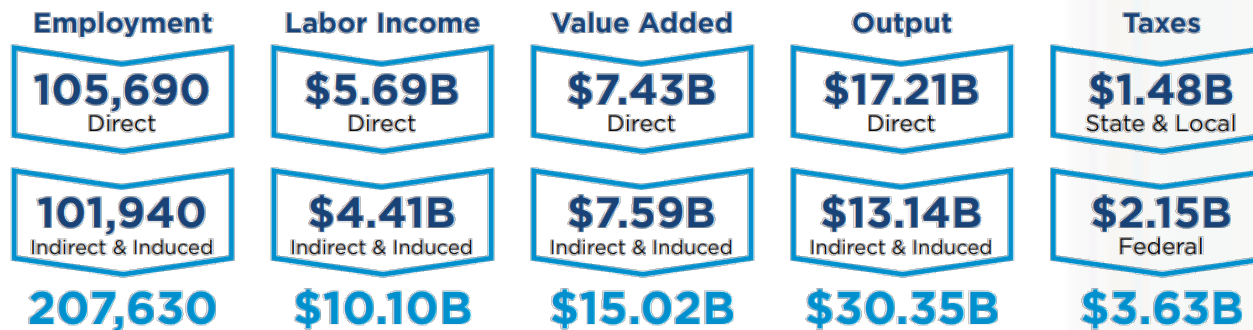
# All the Stakeholders!

- Logistics + freight professionals in NC
- Supply chain, transportation, trade organizations in NC
- NCDOT leadership + colleagues
- Planners (MPO, RPO, Tribal, Municipal)
- Manufacturers + supply chain management organizations
- Economic development organizations + Chambers of Commerce
- Community, equity, sustainability + environmental advocates
- Dept. of Defense + emergency response organizations
- Other state government agencies
- Neighboring states' DOTs
- and YOU



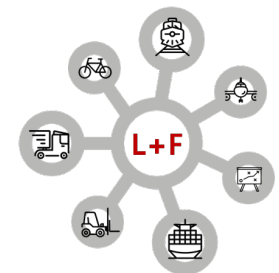
- Logistics + freight is an important part of the North Carolina's economy:

### TOTAL ECONOMIC IMPACT OF THE SECTOR



- Recognizing freight + logistics planning and transportation investment requires a nuanced and informed approach
- Leverages a network of logistics + freight *liaisons* from across the NCDOT organization to amplify impact and multiply capabilities
- Core group of full-time logistics + freight professionals as dedicated resource to NCDOT and NCDOT stakeholders

# DEFINING LOGISTICS + FREIGHT





**YOU KEEP USING THAT  
WORD**

**I DON'T THINK YOU KNOW WHAT  
IT MEANS**

*(freight)*

# Freight: Definition + Context

- Freight is the physical manifestation of the economy
- Freight can be everything from intermodal containers full of merchandise to the smallest e-Commerce package, and everything in-between
- USDOT estimates that the transportation system moves over 54 million tons of goods, worth nearly \$48 billion daily
- Freight tonnage is forecasted to increase 45 percent by 2040



# Logistics: Definition + Context

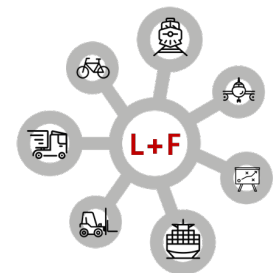
- Logistics management activities include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, sourcing and procurement, production planning and scheduling, packaging and assembly, and customer service.
- It is involved in all levels of planning and execution, strategic, operational + tactical.



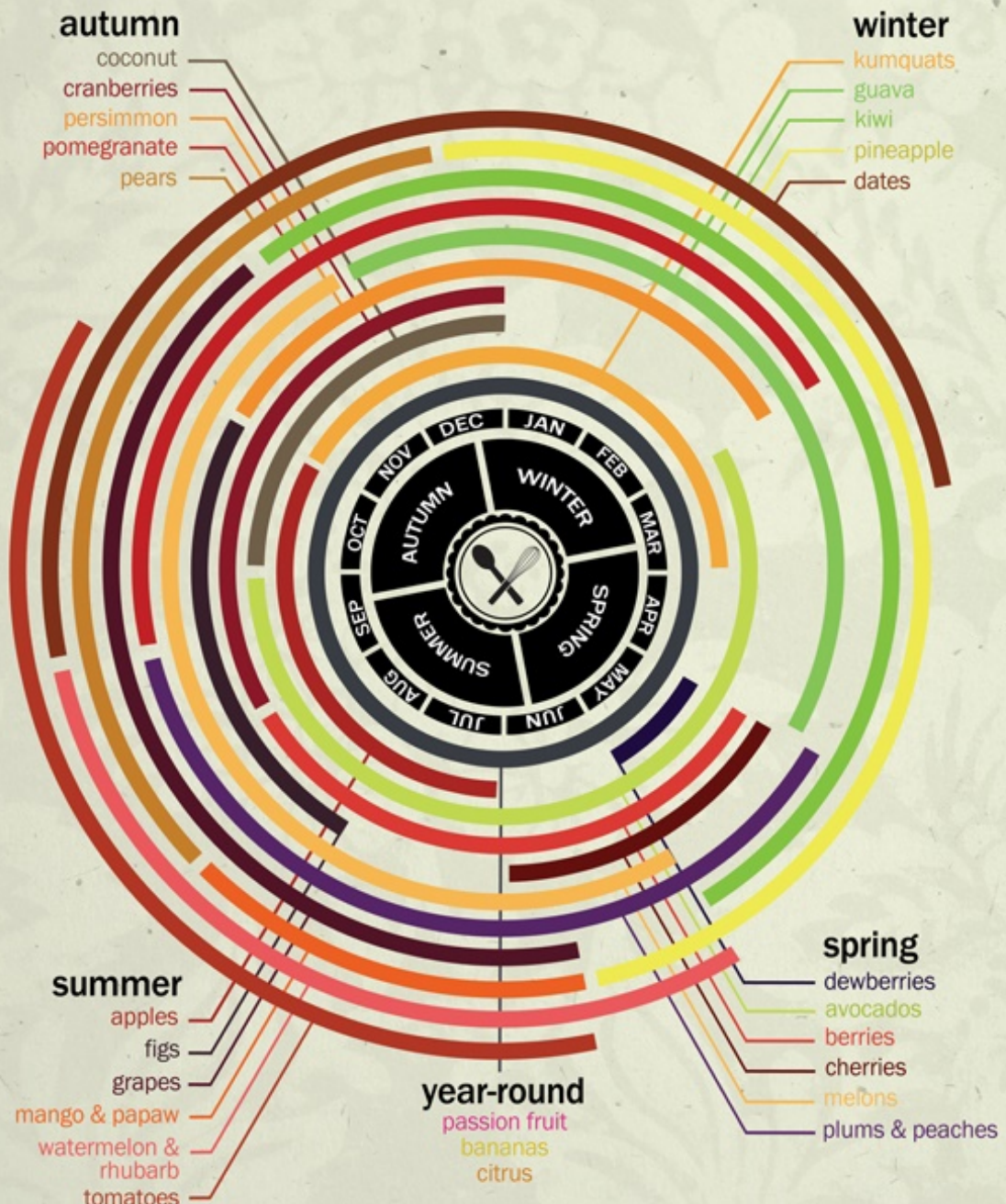
Supply chain management is the coach.  
Logistics is the quarterback.  
Freight is the football.

GO PACK!

# CONSIDERING + UNDERSTANDING FREIGHT







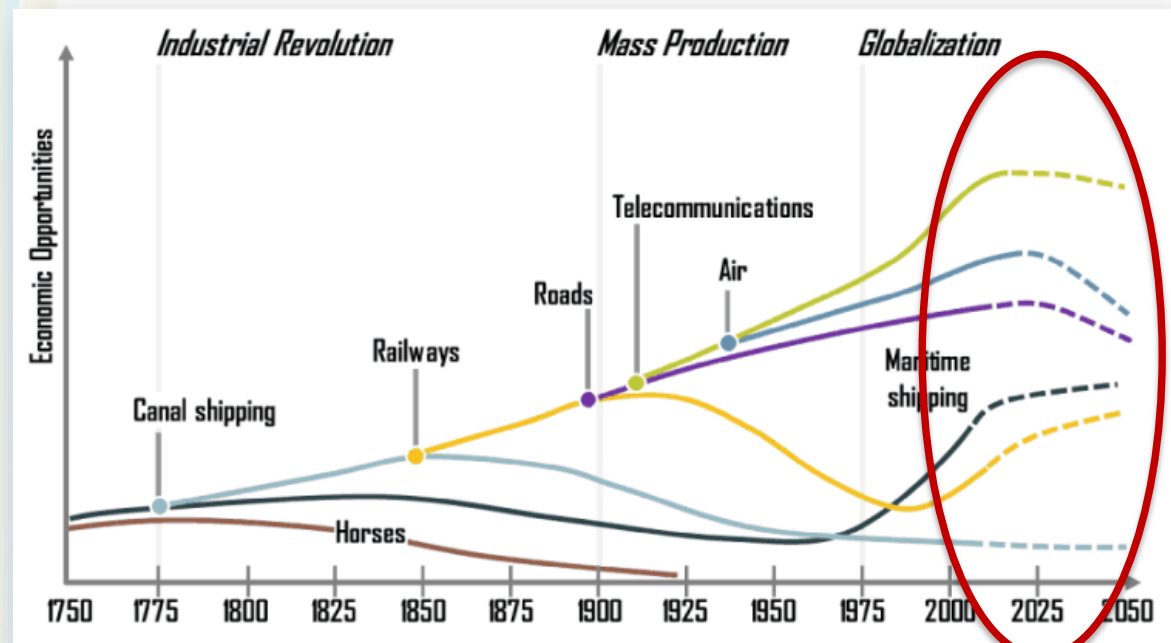
# MARKETS + COMMODITY ACCESS

- GLOBAL
- NATIONAL
- REGIONAL
- LOCAL

*"You're welcome."  
- Transportation*

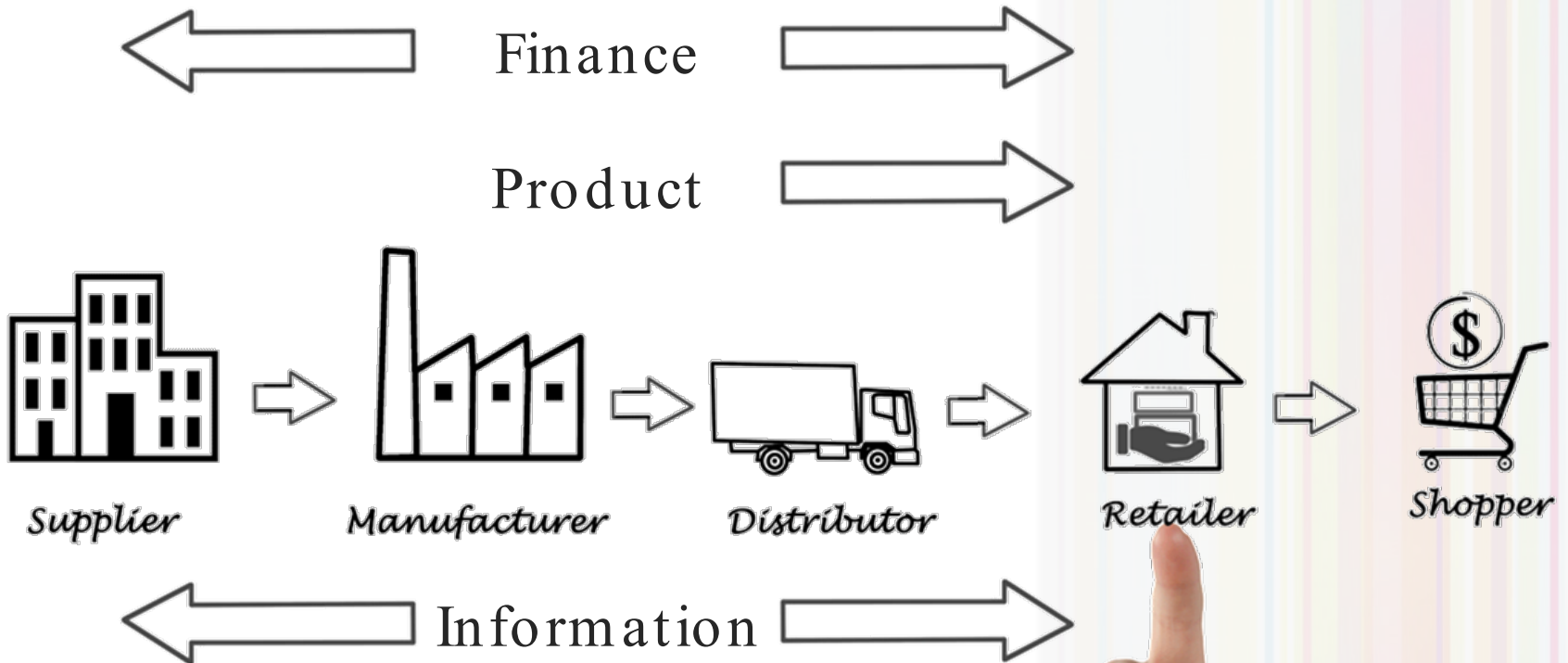
# Transportation: Ticket to Economic Opportunity

- Freight transit influences the economic opportunities of production and consumption



Today we enjoy the benefits of a diversified, multimodal supply chain.

# a Supply Chain perspective is a holistic viewpoint

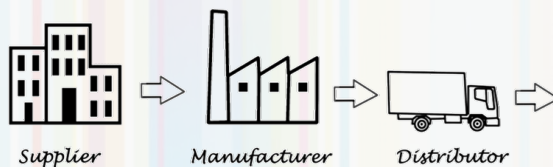


# Know Your Industry - Know Your Area

- Can you name the top 5 industrial sectors in your planning area by GDP contribution?
- What are the top 5 most active manufacturing sectors in your area?
- Are there important industrial sector concentrations or corridors to consider?
- What is the total square footage of warehouse space in your area?
- Are there major freight handling assets or facilities in your area?
- Are there active industry or supply chain management organizations in your area?



There are many resources to better understand the economic environment in your planning area



## Beyond The Plan: Other Levers

**HAVE YOU CONSIDERED  
LOGISTICS + FREIGHT IN  
YOUR CTP/MTP?**

Yes. Best decision *EVER*.

I *TOTALLY* will next time. For reals.

- 
- Support policy that enables efficient freight transportation + commerce
  - Coordinate land use planning or zoning decisions with industry and commercial stakeholders
  - Consider municipal, county, or other governmental code requirements to protect freight access
  - Strengthen coordination between regional agencies **INCLUDING** those with a primary economic development or industry focus

# Are You Planning for THIS?

- Technology is changing transportation (and our economy) by the minute
- Artificial Intelligence, advanced analytics, Internet of Things (IoT), and other disruptors drive us towards a more connected world
- Demographic changes will impact the workforce, as well as commercial behaviors
- National migration patterns: the southeast is the fastest growing region of the US
- Political uncertainty (including ill-advised tariff policies) will change macroeconomic patterns

millennial

Born from 1980-2000  
Total in US: 72 Million  
Social Networking: 75%  
35% Liberal  
Most Diverse



BOOMER

Born from 1935-1955  
Total in US: 82 Million  
Social Networking: 35%  
40% Conservative  
Most Wealthy





RURAL  
+  
URBAN



# Freight + The Aging Population

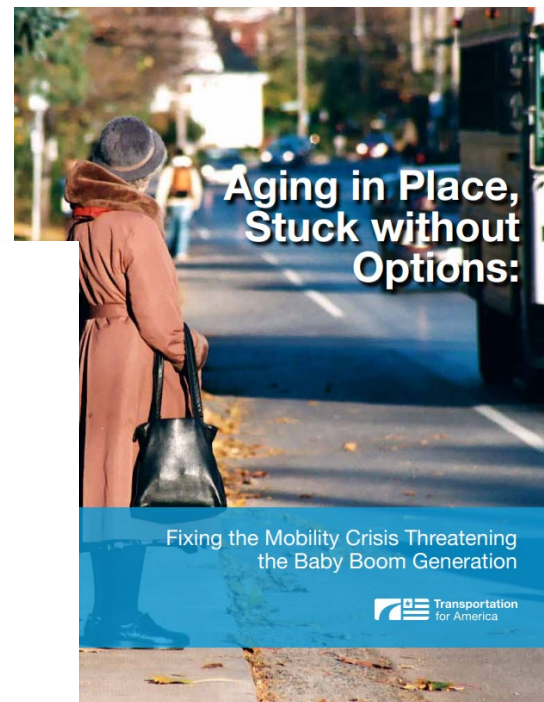


Widespread adoption of ride-sharing usage by aging Americans will keep seniors on the road (and potentially increase highway utilization/degradation, CO2 emissions, and other externalities...)



# Freight + The Aging Population

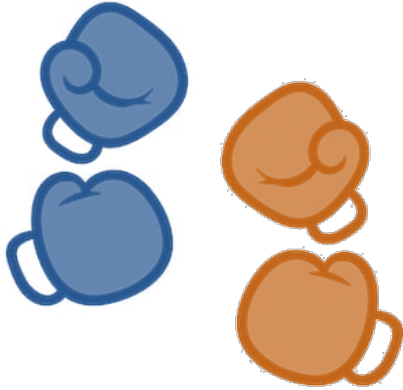
appointments. These membership organizations underscore the importance of transportation options and help to ensure that older adults do not become isolated and unable to access critical services. Public officials and transportation planners must begin to think creatively about how to combine standard fixed-route service with these alternative programs.



*The same can be said for Freight.*

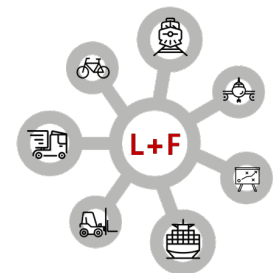
For an aging population, how can the transportation activities of our multimodal network support the needs (product all the way to the door) of this growing demand?

## From a Rural Perspective



- Closer connection to industry and manufacturing
  - Agriculture as a key freight product with a complex, global supply chain
  - Demographic changes are a key driver in freight demand, characteristics and behavior
- 
- Limited resources reinforces regional cooperation, collaboration
  - Recognize the primary (urban) market orientation of a rural region and how transportation plays a part in the connection to commerce
  - Consider how freight behaves in the rural network – and where rural communities can develop/grow/protect competitive routings
  - Modernization category in products strengthens rural project scoring
  - Other funding sources may be relevant (ADHS, Kellogg Foundation)
  - As B2C commerce grows, freight transport must find ways to harness **the activity networks** of rural communities

# FREIGHT and the CITY

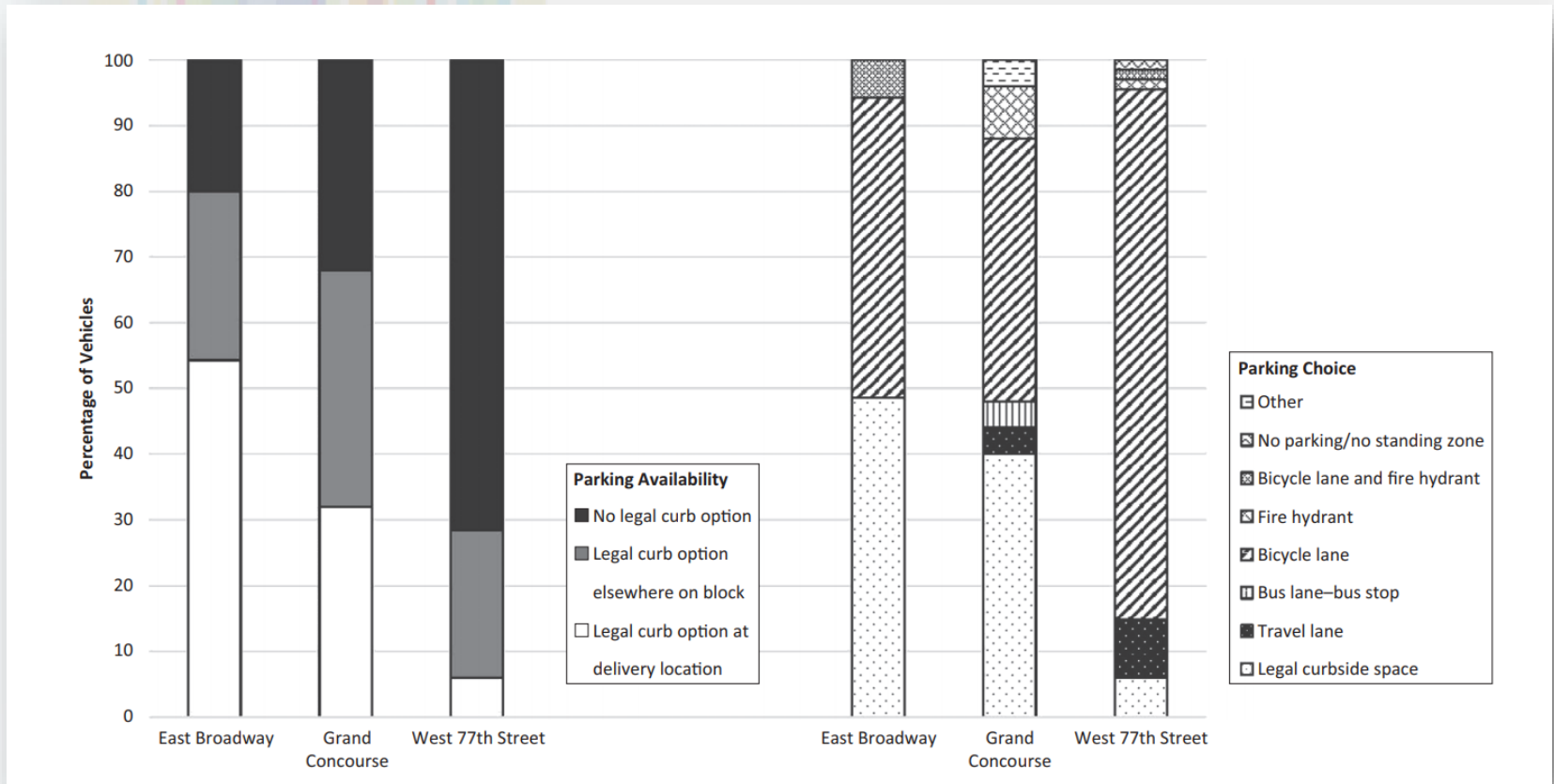


# Urban Logistics: Patterns



Are there ways in which the current activities and patterns within a city offer opportunity for improved freight access?

# No Other Choice



Services such as FedEx or UPS consider parking tickets to be a cost of doing business and budget accordingly.



# Amazon gets patent to convert public buses into mobile pickup lockers

BY MYNORTHWEST STAFF  
FEBRUARY 3, 2019 AT 8:53 PM

Share ↗



(Sounder Bruce, Flickr Creative Commons)

Amazon seems constantly in search of new ways to deliver a package. They've used designated lockers, [accessed homes](#) or even cars, and recently began [testing robot delivery](#) in Snohomish County.

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## Freight on Transit (FOT)

- How might public transit vehicles or infrastructure be used to move freight (think small packages)
- Or how might actual transportation assets be integrated into the supply chain?
  - Cargo trailers on transit vehicles
  - Freight vehicles between trains on subway lines
- Other ideas?

## Expand Your Mind

The multimodal freight system is owned and operated by the public and private sectors.

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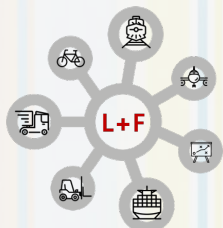
The effective and efficient movement of goods supports vibrant communities and millions of jobs.

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While freight growth is an indicator of a strong economy, care must be taken to mitigate negative externalities on our communities.

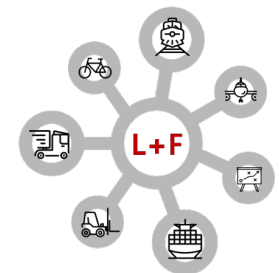
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**Often freight problems do not have perfect answers.  
Planners must understand the complexities and trade-offs involved.**



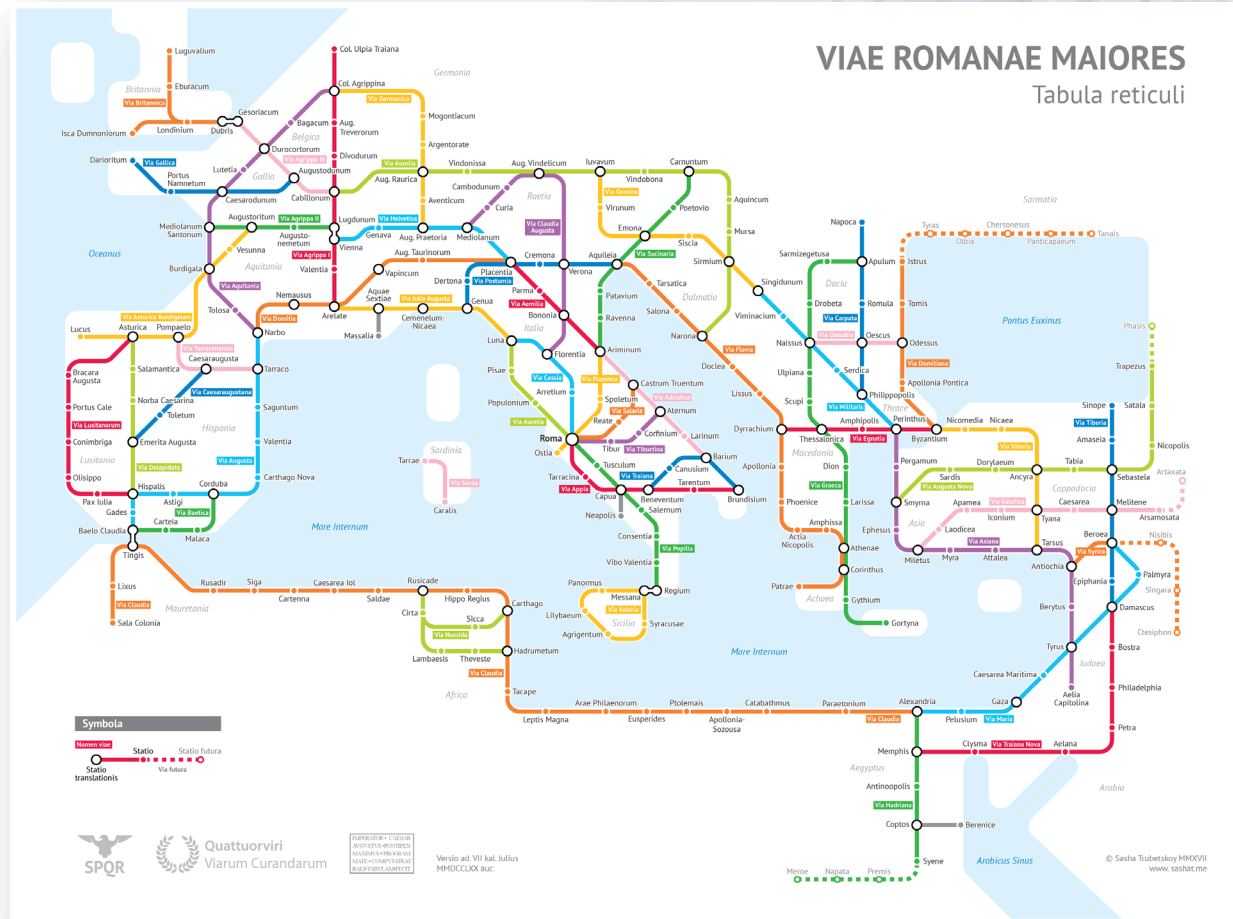


# FREIGHT BEHAVIOR



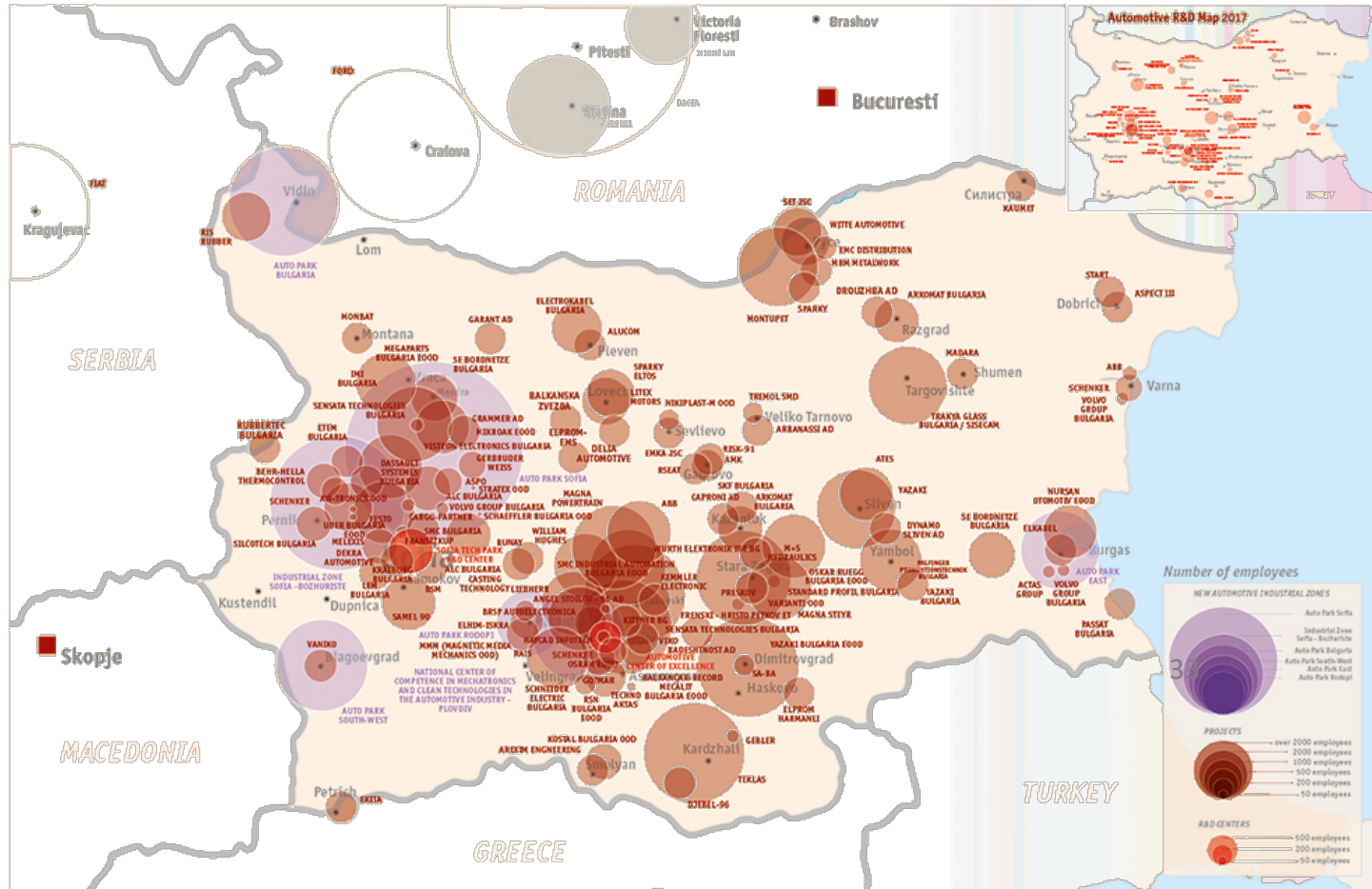
# Historical Considerations

- Movement of goods
- Control of information
- Collection of taxes
- Access to resources



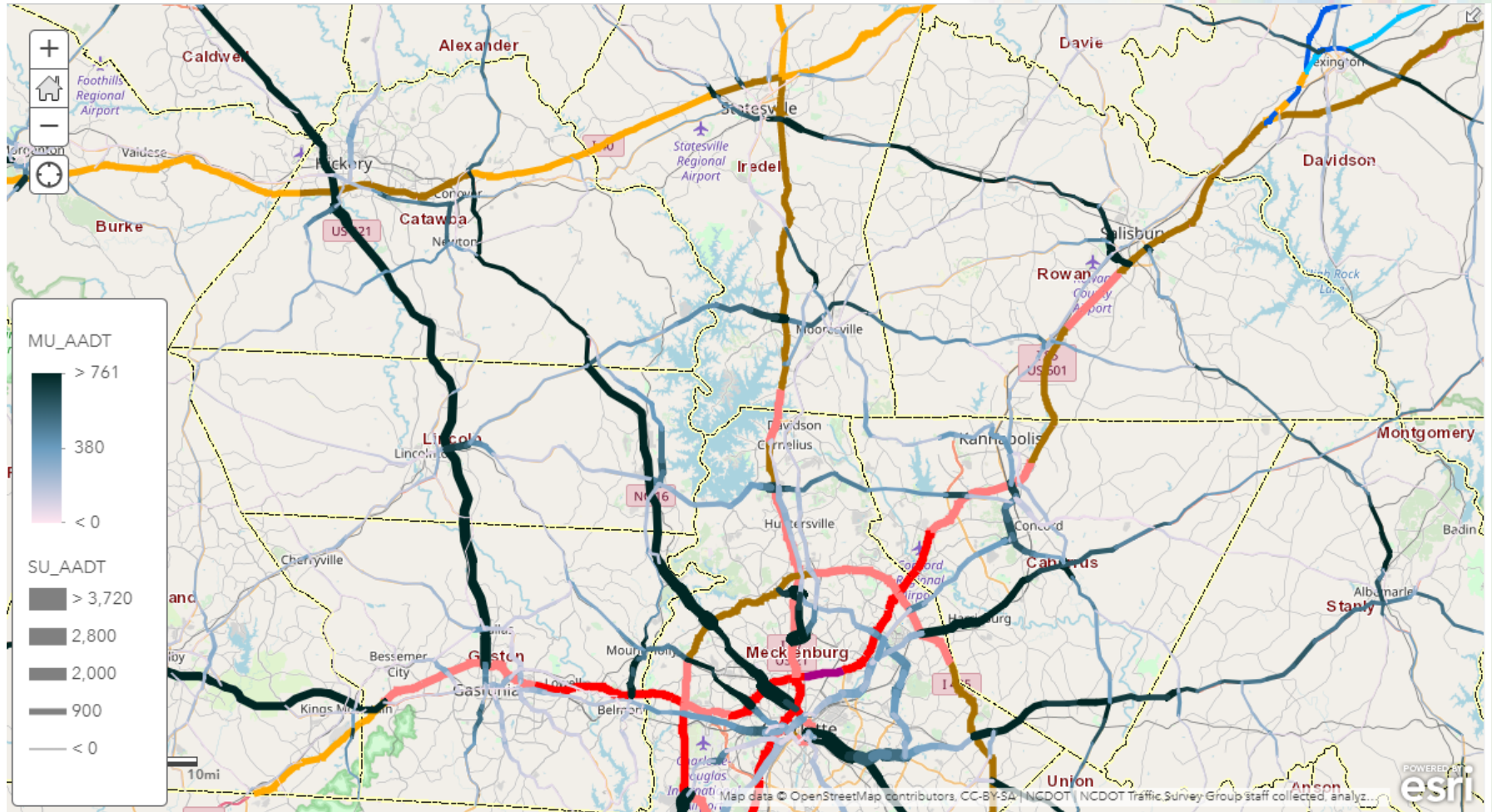
# Practical Considerations

## Automotive Map of Bulgaria 2017-2020



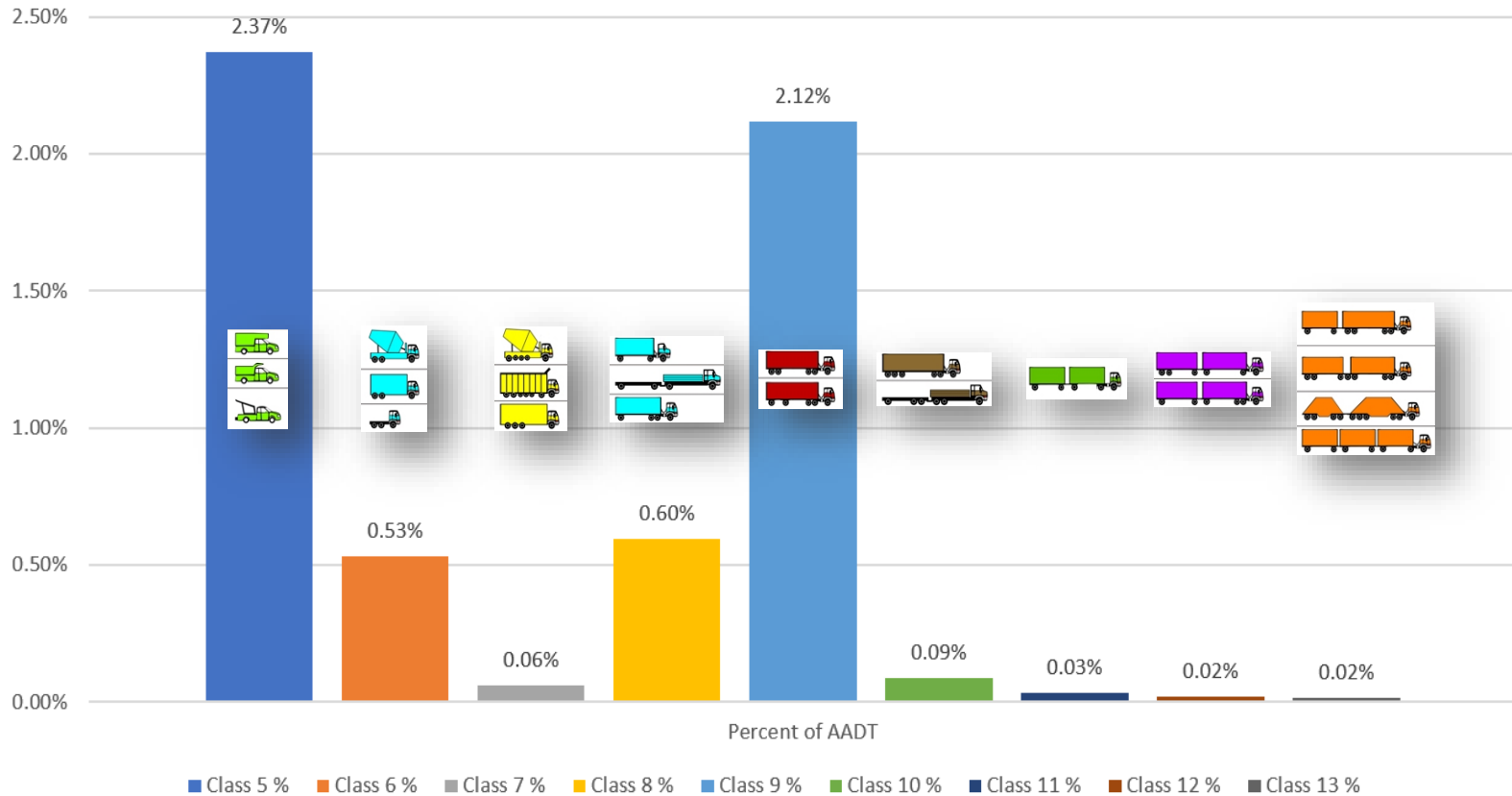
Note to planners: recognize your area's niche(s) in the system



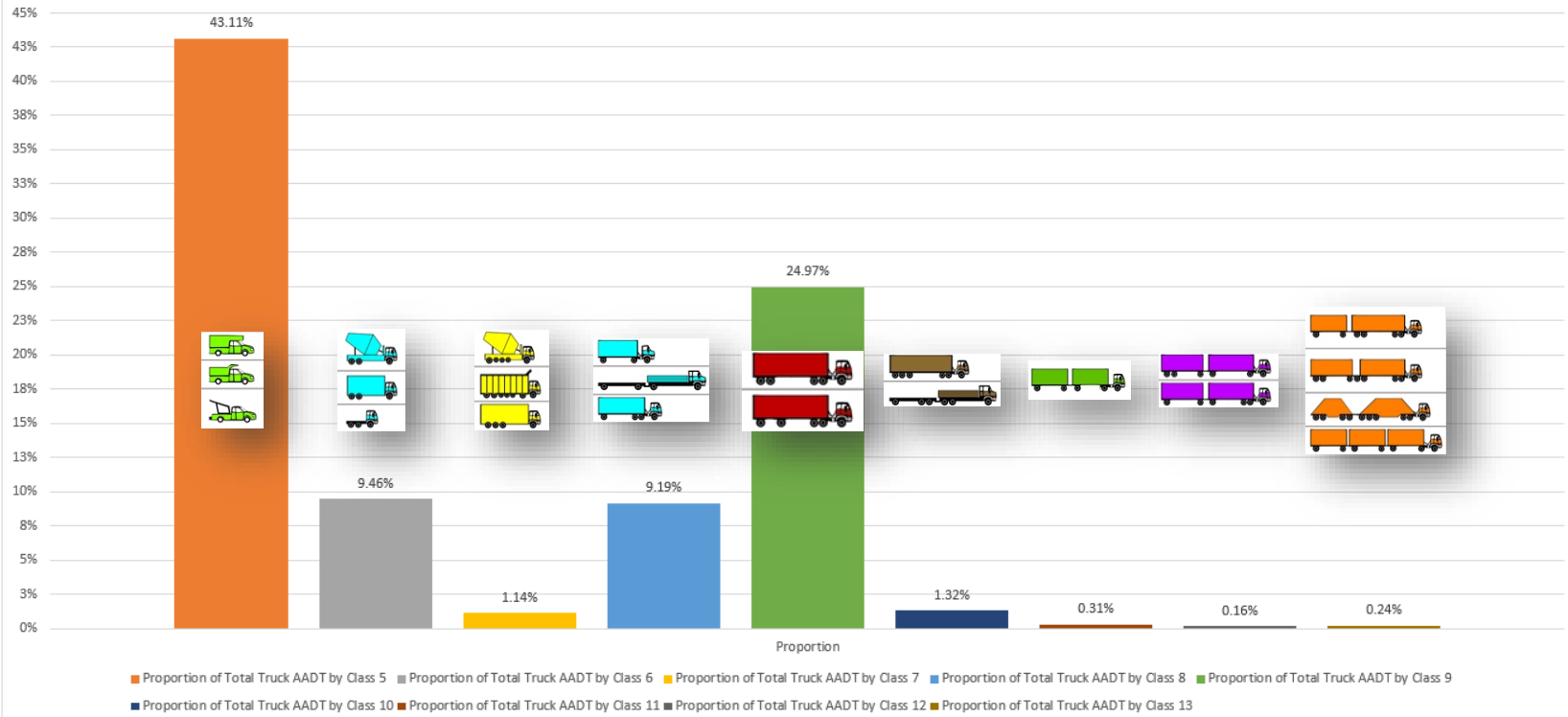


NCDOT GIS AADT Single Unit/Multi-Unit Trucks 2016

Percentage of Total AADT by Vehicle Class (Trucks Edition)

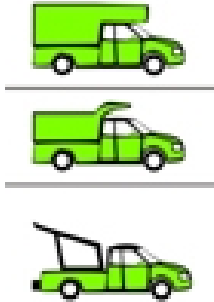


Proportion of Total Truck AADT by Vehicle Class (Classes 5-13)

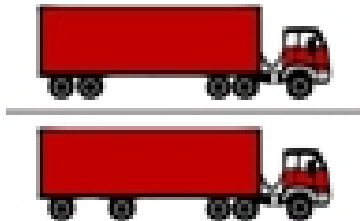


# Know Your FHWA Classes

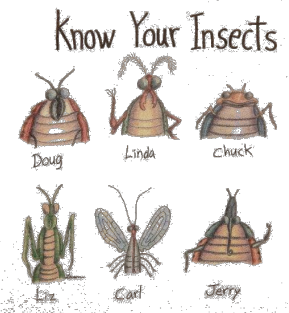
*the important ones at least...*



**Class 5:** Two-Axle, Six-Tire, Single-Unit Trucks – All vehicles on a single frame including trucks, camping and recreational vehicles, motor homes, etc., with two axles and dual rear wheels.



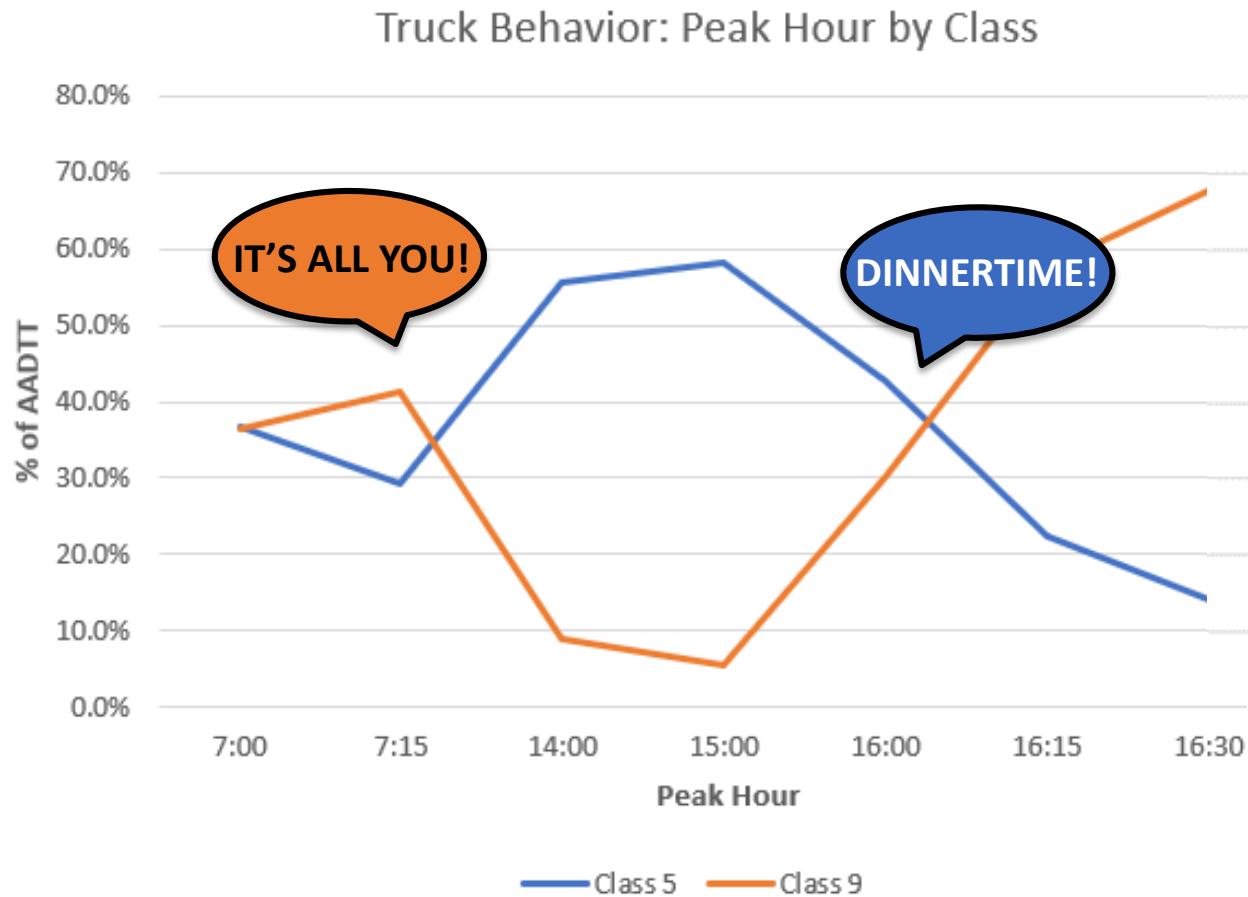
**Class 9:** Two-axle tractors pulling three-axle trailers; three-axle tractors pulling two-axle trailers; three-axle trucks pulling two-axle trailers



also, know your insects →



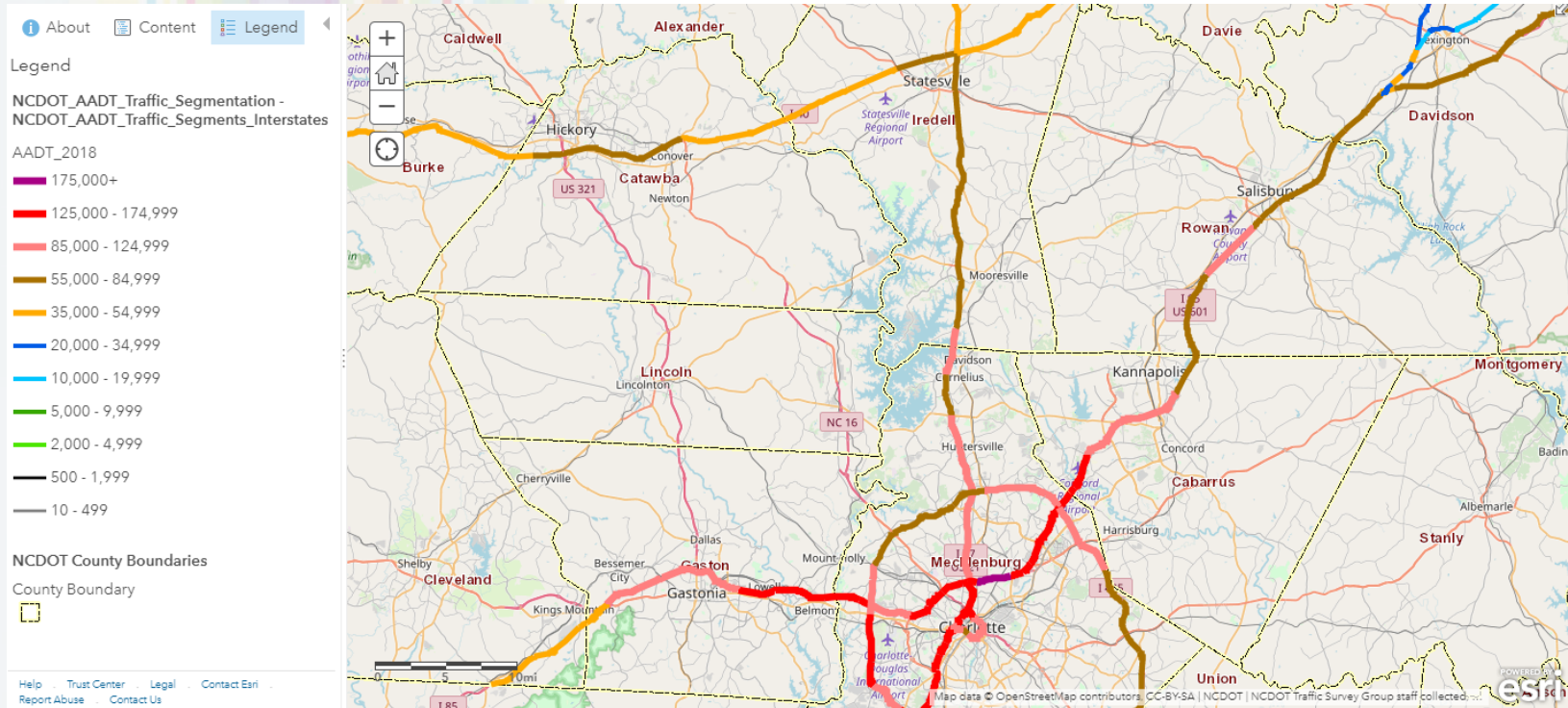
# Box Trucks vs. Tractor Trailers

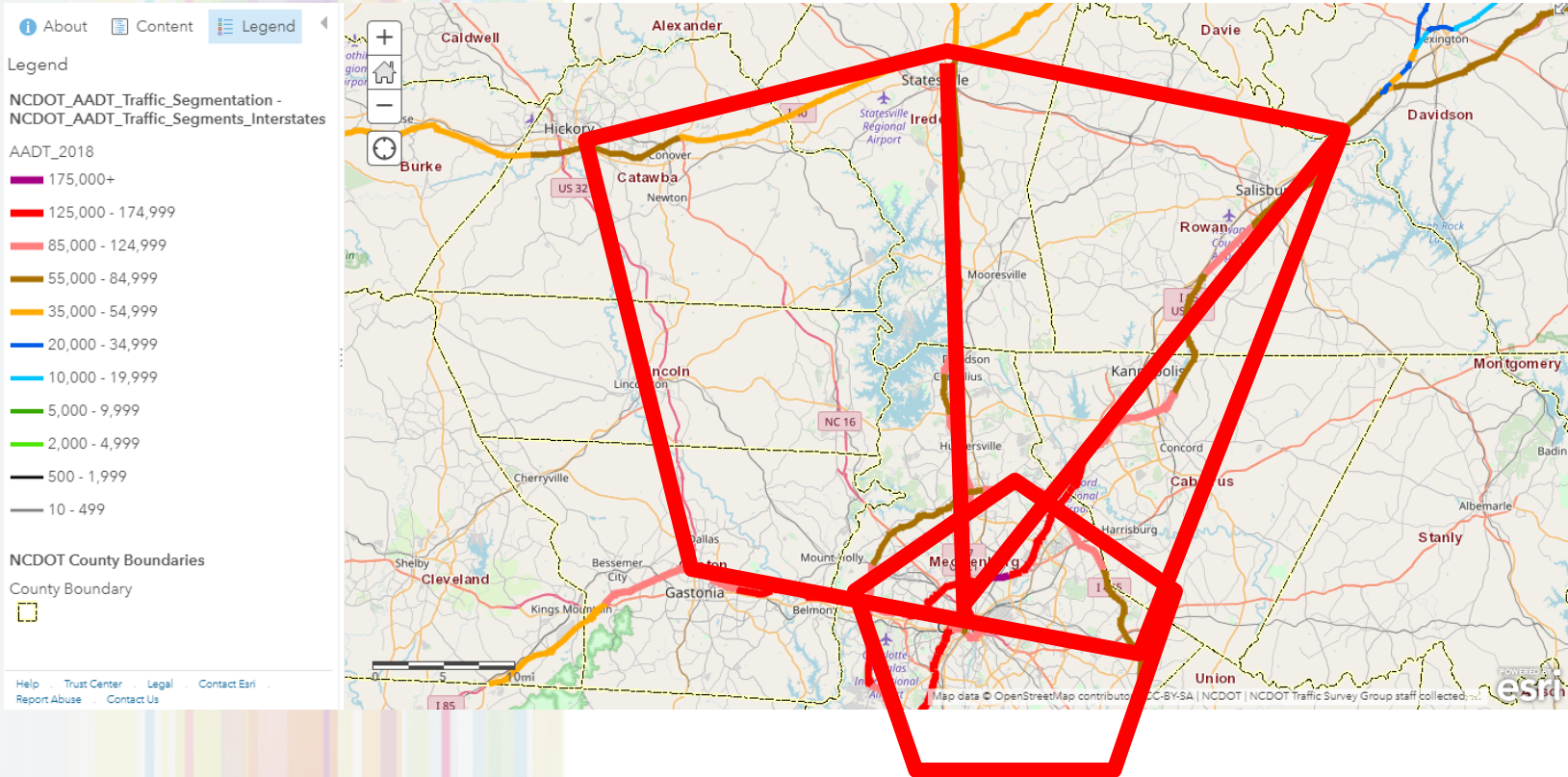


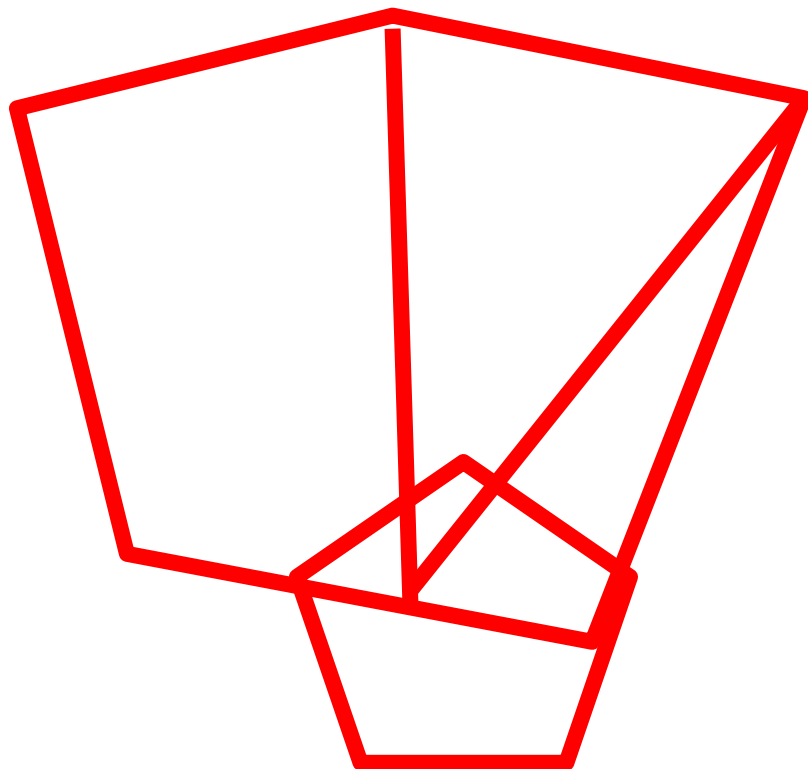
## Freight Finds A Way: A Network View



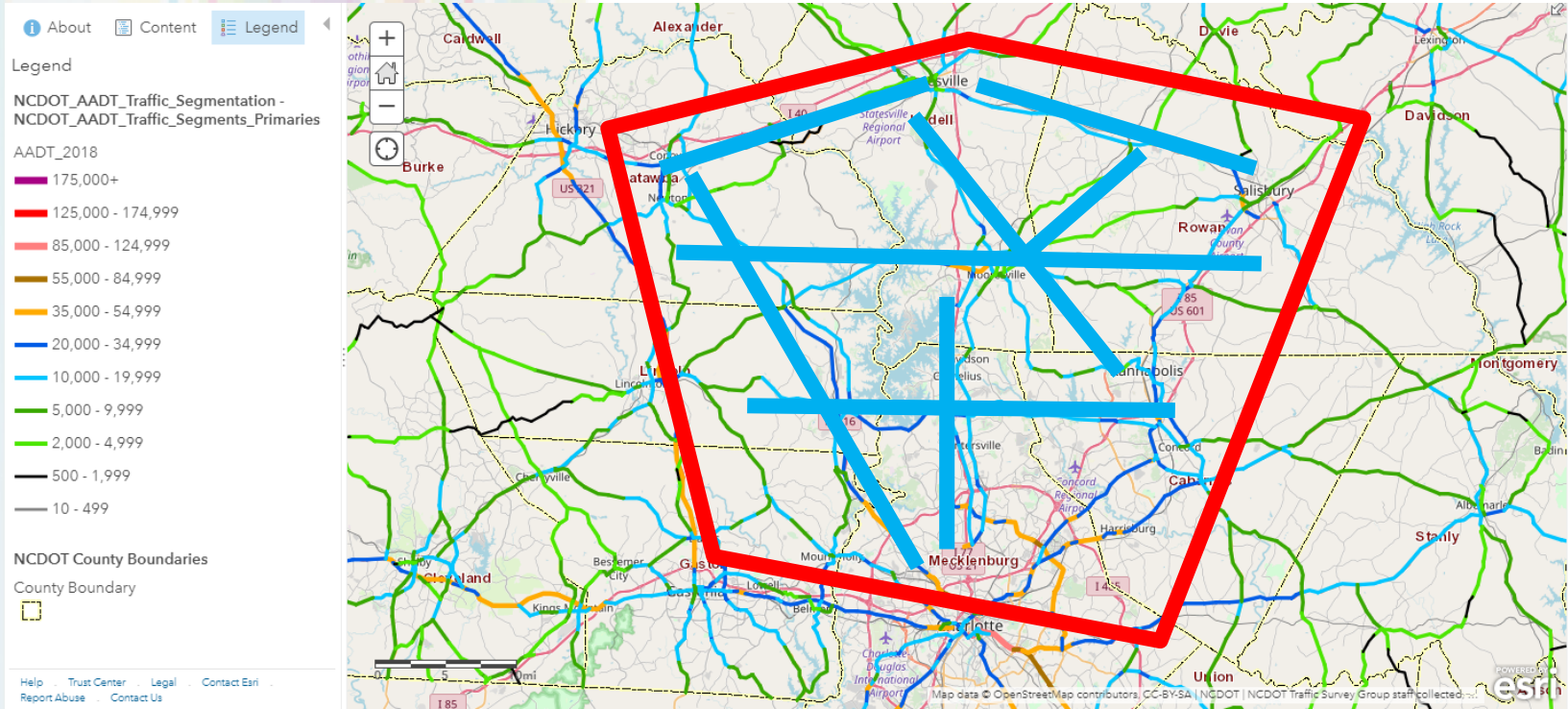
# Freight distribution trends shift the paradigm from B2B/Nodes to B2C/Network

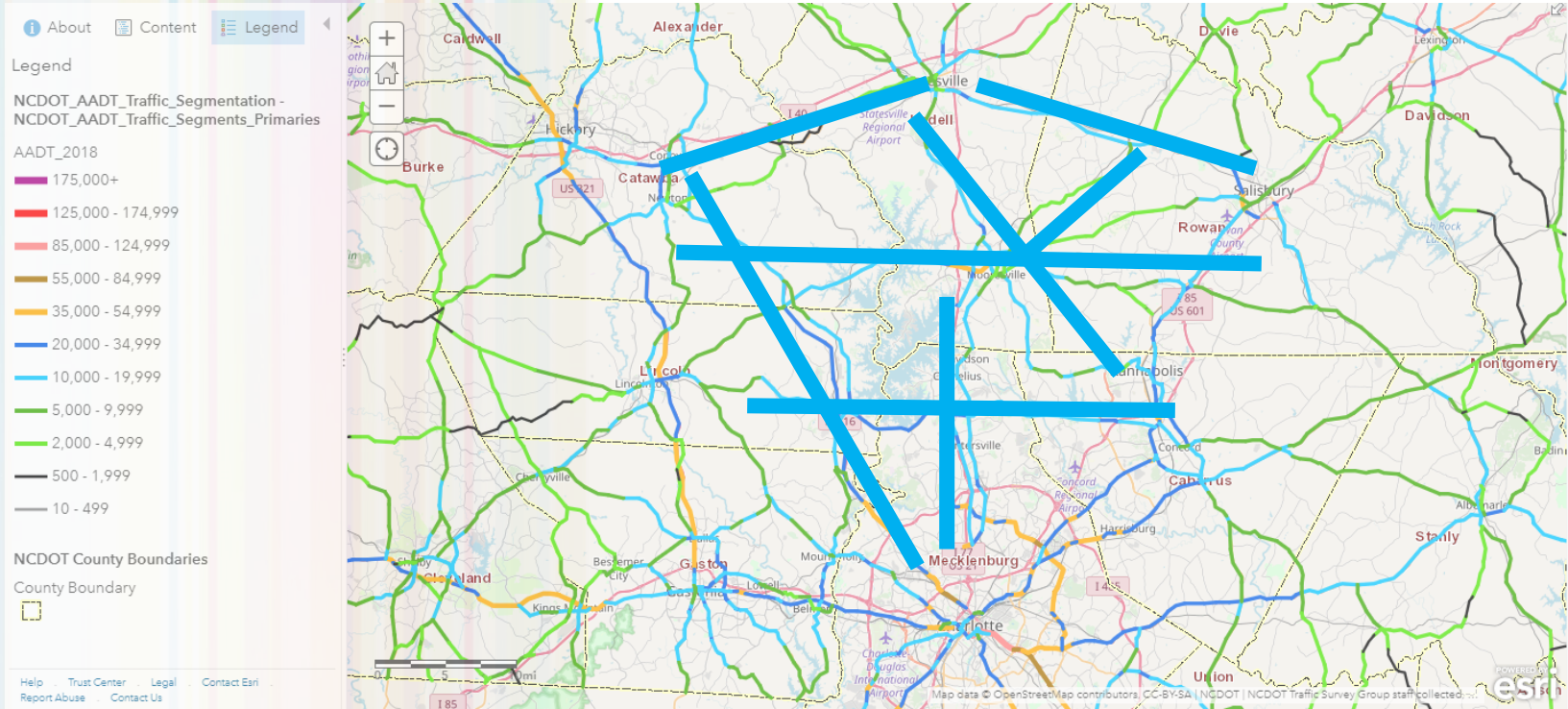


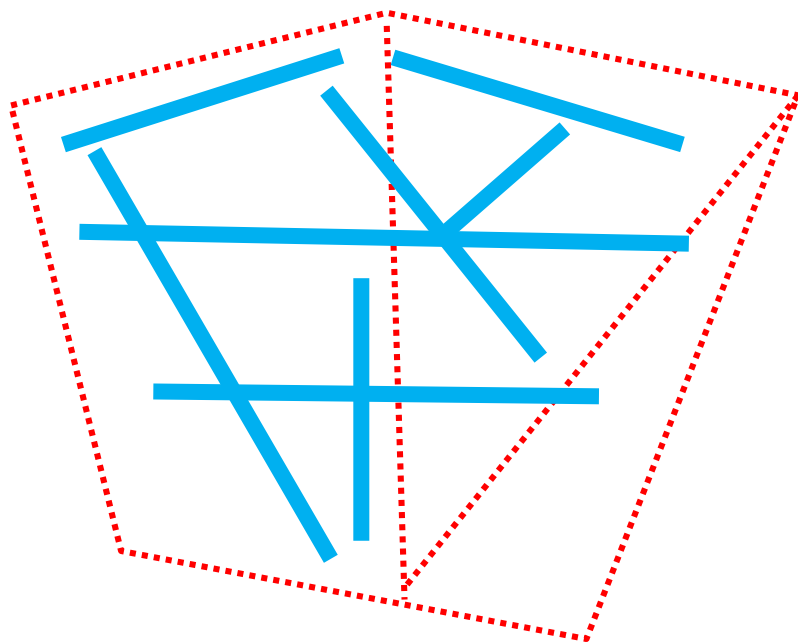




- Beltline style urban structure
- Node-based
- Ex-urban distribution patterns
- Downsize of freight from distribution centers into city center
- B2B



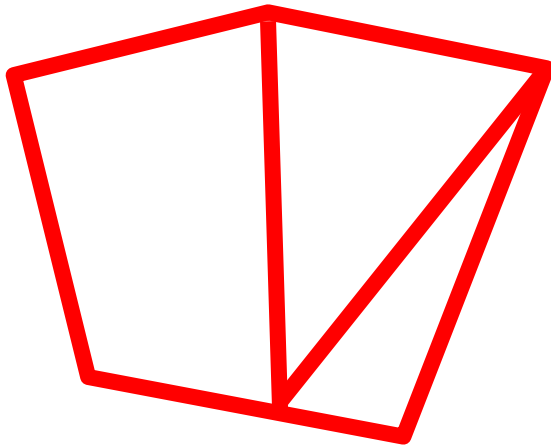




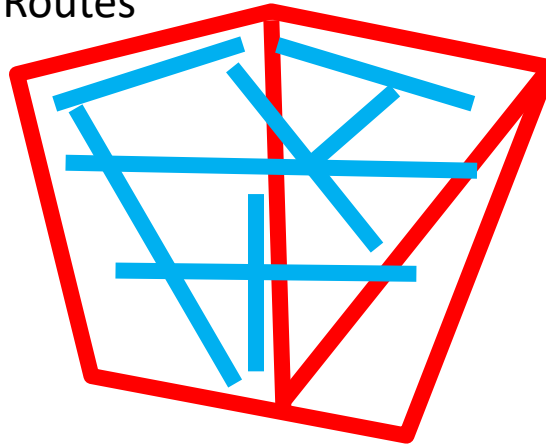
- Network of routes provide access
- Grid patterns
- Freight density reduced
- Distribution closer to consumer
- More resilient to disruption
- B2C



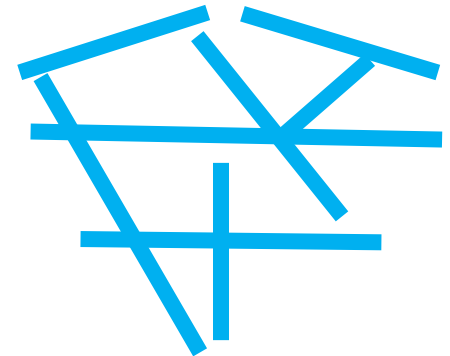
Interstates



Interstates & Primary Routes



Primary Routes



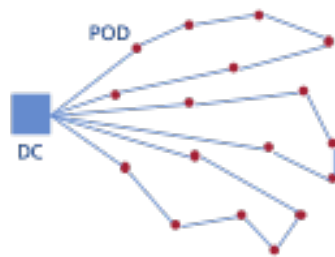
Beltline → Ecosystem

Decentralized distribution and freight close to market trends will strengthen the use of the non-interstate network

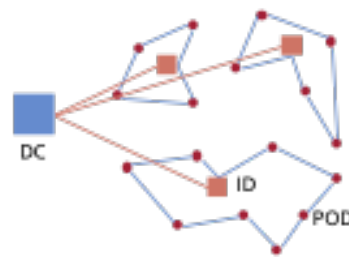
# Enter the City: Urban Logistics

Most existing approaches

Single-tier system

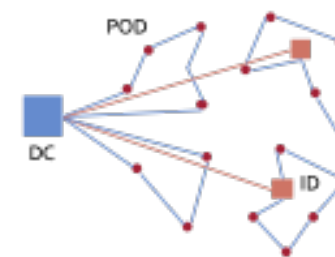


Two-tier system



More realistic approach

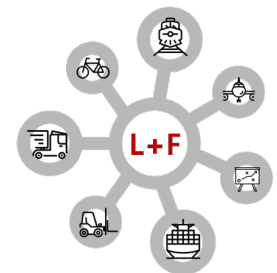
Mixed multi-tier system with multiple DCs



DC: Distribution Center  
ID: Intermediate Depot  
POD: Point of Demand



# WHAT'S NEXT?





THE FUTURE IS HERE.



This is the stuff of nightmares.



~~This is the stuff of nightmares.~~

...there, fixed it



Let's be honest. This is the future we want.



# RESOURCES





## Office of Logistics + Freight Resources

- Project specific analysis and support from planning through construction
- On-demand subject matter expertise, data + analytical support/guidance
- Maps, freight-relevant GIS resources developed + maintained
- Economic/industry research + information for planning
- Industry engagement through Regional Freight Councils
- Partners in collaboration; pilot programs or initiatives
- Guidance to better consider freight into their CTP/MTP/long-range planning



**BUT WAIT THERE'S MORE**

# North Carolina Statewide Multimodal Freight Plan



- Common freight and logistics planning-related acronyms (NCSWMMFP)
- Data sources which may be of interest
- Freight transportation assets, operational stats, commodities and trade information
- Freight and supply chain sector data
- Performance, key metrics, safety information, trends and issues, asset management, and more...

→ [bit.ly/NCDOTfreightplan](http://bit.ly/NCDOTfreightplan)

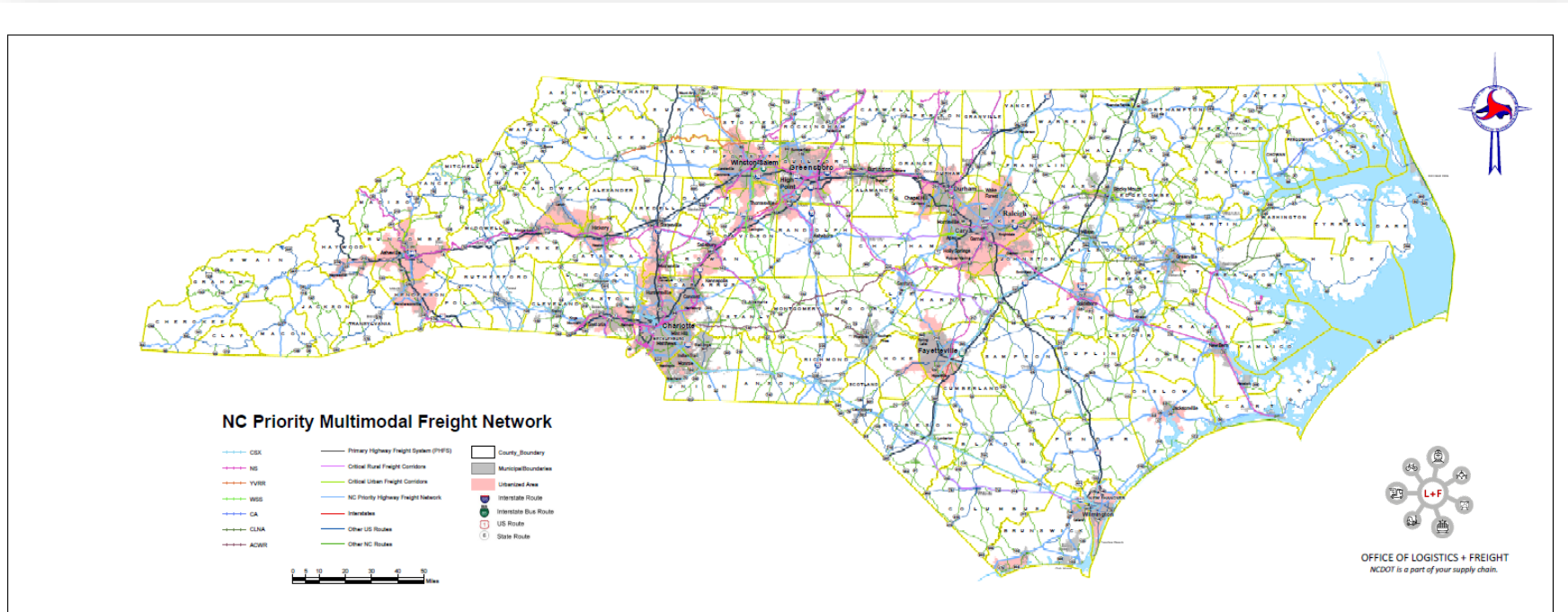
# Supply Chain + Logistics Profiles

Gotta catch 'em all!™

- Commodity Flow
  - Air Cargo
  - Military Cargo
  - Rail
  - Maritime
- Pipeline/Hazardous

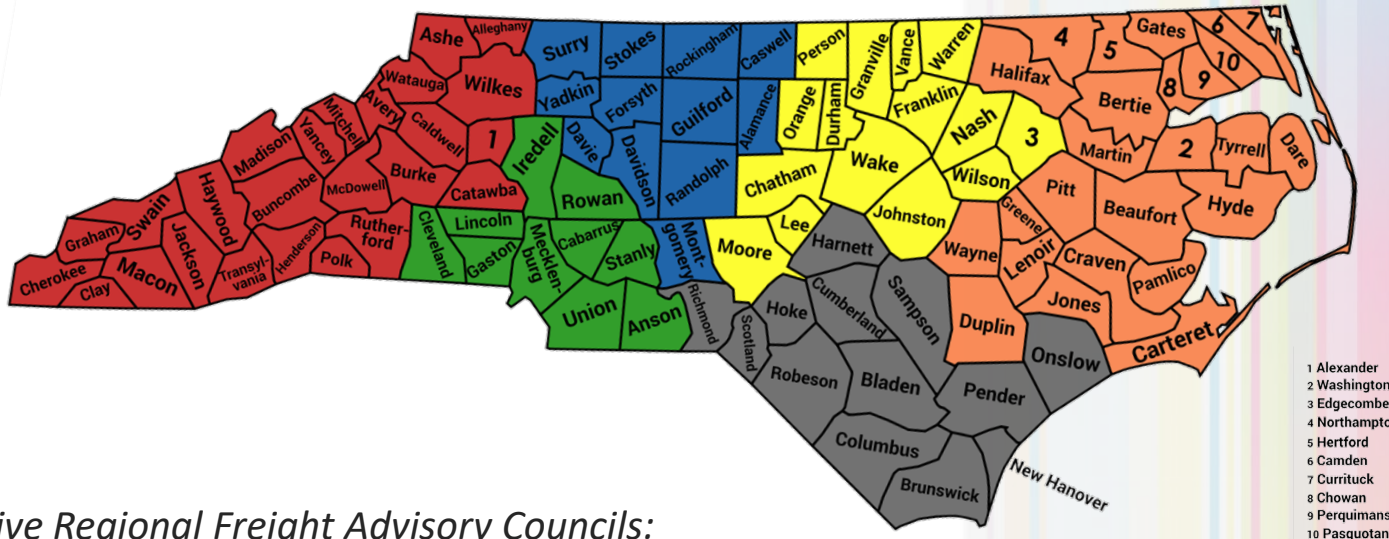


# North Carolina Priority Multimodal Freight Network



GIS Shapefiles + Data resources available through Office of Logistics + Freight

# Regional Freight Advisory Councils



### Active Regional Freight Advisory Councils:

- Centralina
- North/Northeast
- Piedmont-Triad

### RFAC meetings scheduled soon:

- West
- North Central
- Southeast

### Regional Freight Advisory Councils

- Northwest/West
- Centralina
- Piedmont-Triad
- North Central
- North/Northeast
- Southeast

## Resources for Planners (Links to Connect)

### State Freight Plan

### Research + Development Opportunities

- Learn about Logistics + Freight (+ Supply Chain Management)
- Industry Engagement
- Connect with our partners and important state freight assets

**NORTH CAROLINA**  
Department of Transportation

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## Logistics and Freight

**North Carolina: Freight Moves**

From produce to clothing to furniture, every person in North Carolina is affected by freight. In addition to the positive impact it has on quality of life, freight transportation and logistics connect local and regional industries to the national and global marketplace.

[Learn More](#)

### Programs & Initiatives

- [Statewide Multimodal Freight Plan](#)
- [Learn about Logistics & Freight](#)
- [Freight Resources for Planners](#)
- [Industry & Economic Engagement](#)
- [Logistics & Freight Research Opportunities](#)
- [NC Logistics & Freight Partners](#)

## Additional Resources in Development

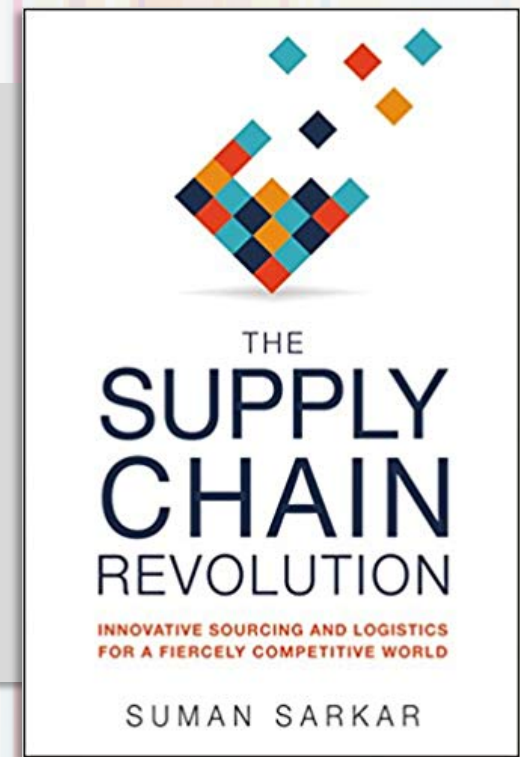
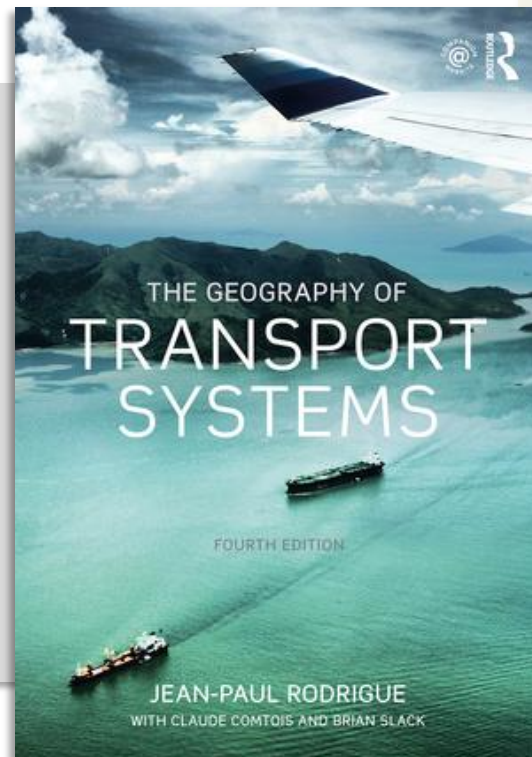
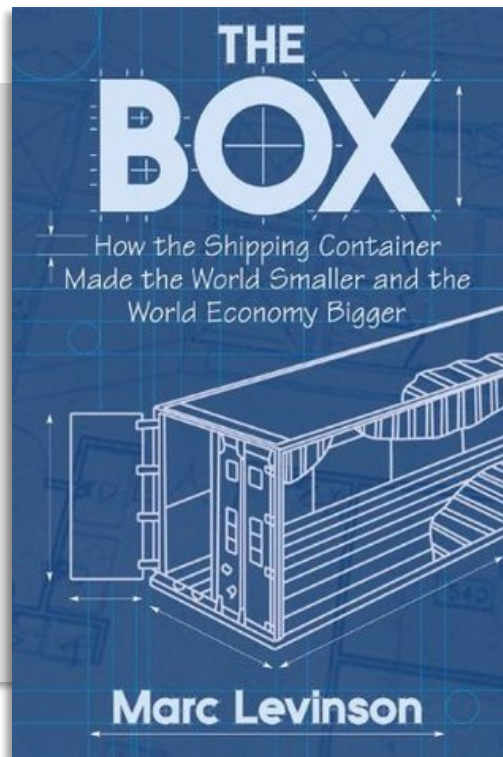
**JUST GOT BACK FROM 2040**



**I-26 IS STILL UNDER CONSTRUCTION**

- *Freight Services Index* at state and county level
- *Freight Price Index* based on NC “Basket of Goods/Services”
- Top 10 Logistics + Freight Bottlenecks Report (monthly)
- Statewide multimodal freight network signage
- Key freight corridor metrics dashboard, and freight data including volume, class, TTR
- GIS-based operational freight data and analysis resources for planners
- **APA Continuing Education Credits focused on freight and logistics planning**

# Recommended Reading





If you're talking about Transportation  
and you're not using these awesome graphics,  
**you're doing it wrong.**



Dana A. Magliola  
*Sr. Supply Chain Analyst*  
Office of Logistics + Freight  
North Carolina Department of Transportation

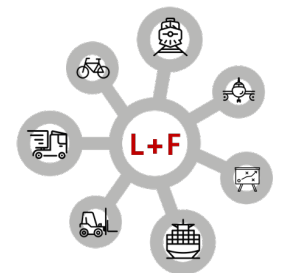
919.707.0909 office  
919.617.6247 cell  
[damagliola@ncdot.gov](mailto:damagliola@ncdot.gov)  
Tw: @danamagliola

1 South Wilmington Street  
1554 Mail Service Center  
Raleigh, NC 27699-1554



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# Appendix



# Paradigm Shifts in Industry

Dana's Conspiracy Theory #1:  
Grocery stores (as we know them) are on their way out...

- Grocery e-commerce growth from 2017 to 2018 was nearly 35% YoY
- Major retailers invested over \$28 billion in grocery e-commerce in the 18 months prior to 2019
- On average, consumers prefer home delivery 3:1 over curbside pickup
- **How will changes in this sector impact transportation planning?**
  - \* Consider both consumer behavior + the dynamics of freight supply.

