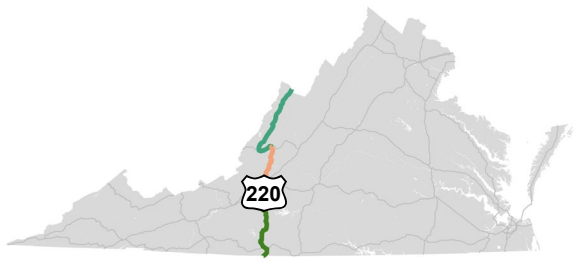
VTrans2040 Multimodal Transportation Plan

Corridors of Statewide Significance Needs Assessment

North Carolina to West Virginia Corridor (F)



Office of INTERMODAL Planning and Investment

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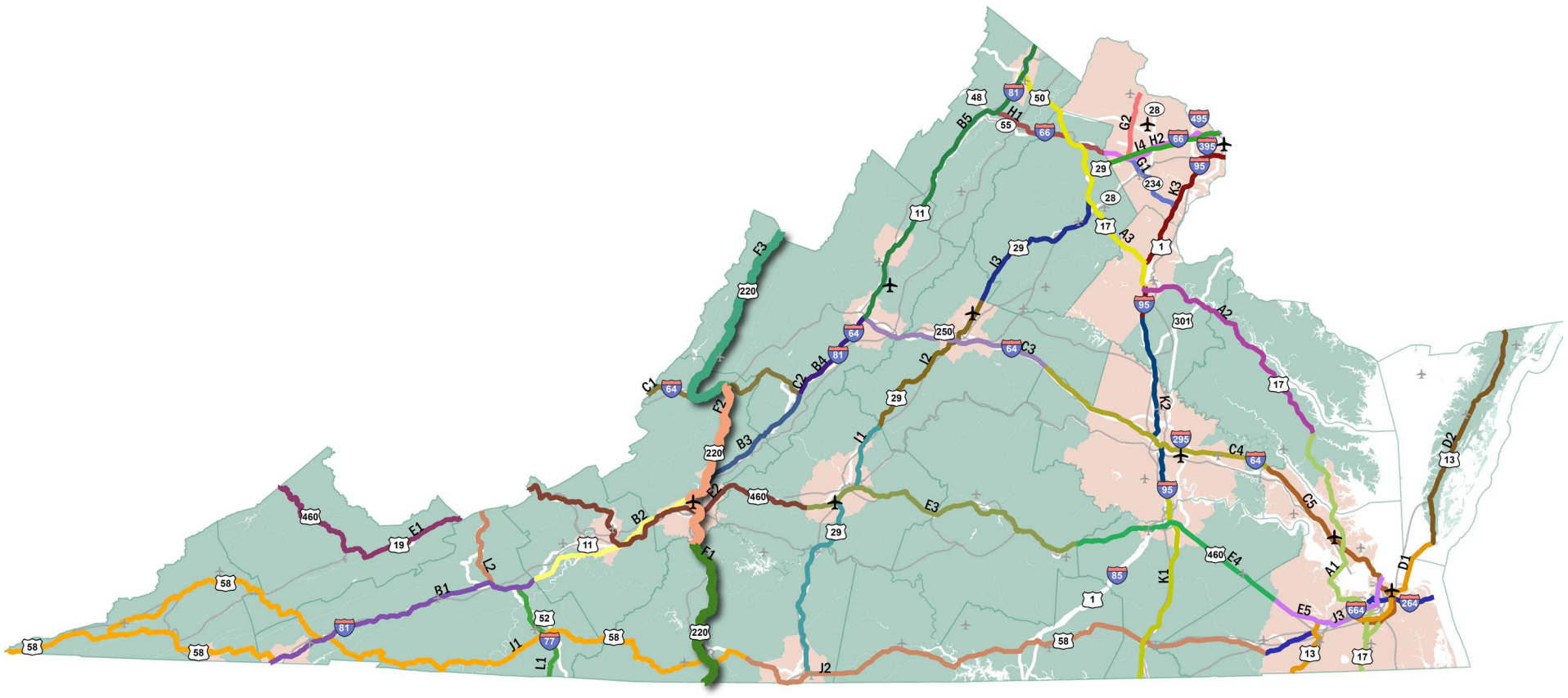
See *Corridors of Statewide Significance, Needs Assessment: Executive Summary and Methodology Report* for details on the overall assessment approach, data sources, and performance measures used throughout this report.

I. Corridor Overview



Corridor of Statewide Significance
(color varies by segment)

Railroad

Airport Facility
(grey denotes not a commercial service airport)

Metropolitan Planning Organization Area

The North Carolina to West Virginia Corridor (Corridor F) is defined primarily by US 220, which runs north to south in the eastern United States between Waverly, New York, and Rockingham, North Carolina. I-73 is a planned interstate that will run from Myrtle Beach, South Carolina, to Sault Sainte Marie, Michigan, and would run parallel to US 220 for much of its length through Virginia, from the North Carolina border to Roanoke. In Virginia, US 220 travels for approximately 183 miles between the North Carolina state line, just south of Martinsville, and the West Virginia state line north of Monterey in Highland County.

US 220 traverses mountainous terrain for much of its run through the Commonwealth, leading to relatively slow vehicle speeds. It is primarily a four-lane roadway between the North Carolina state line and Roanoke, where it overlaps with I-581 and then I-81, between Exit 143 and Exit 150. US 220 continues as a four-lane highway for approximately 20 miles north of Roanoke before switching to a two-lane rural facility, except for where it runs concurrently with I-64 between Clifton Forge and Covington. US 220 serves as both a local-access road through southwestern Virginia and as a throughway between North Carolina and West Virginia. Business spurs of US 460 run through Martinsville, Rocky Mount, and south of the City of Roanoke, while US 460 Alternate connects I-81/US 220 and US 221 in southern Botetourt County.

Passenger travel along Corridor F is accomplished primarily via the highway facilities. Other travel options include:

- The Alleghany Highlands Mountain Express (operated by RADAR), which provides an express bus service between Iron Gate and Covington in Alleghany County;
- Greyhound bus service, available in Roanoke;
- Six Park-and-Ride lots, available in the corridor, mostly near the Roanoke Valley Area;
- An Amtrak station in Clifton Forge, which provides passenger rail service east and west of the corridor along the Cardinal Route, which runs between New York City and Chicago; and
- Roanoke-Blacksburg Regional Airport, which provides commercial air service to a dozen major cities and connecting service to the hubs of four major airlines. The airport also provides general aviation service.

Norfolk Southern rail lines run within the corridor between Martinsville and Roanoke. These rail lines connect to the Crescent Corridor and Heartland Corridor in Roanoke and provide freight rail access in this region. The Norfolk Southern lines then run between Roanoke and Clifton Forge, connecting with multiple lines along CSX's Coal Corridor. The Buckingham Branch, which runs between Clifton Forge and Richmond, connects within the corridor and runs parallel to US 220 for a short stretch before connecting to CSX lines in Clifton Forge.

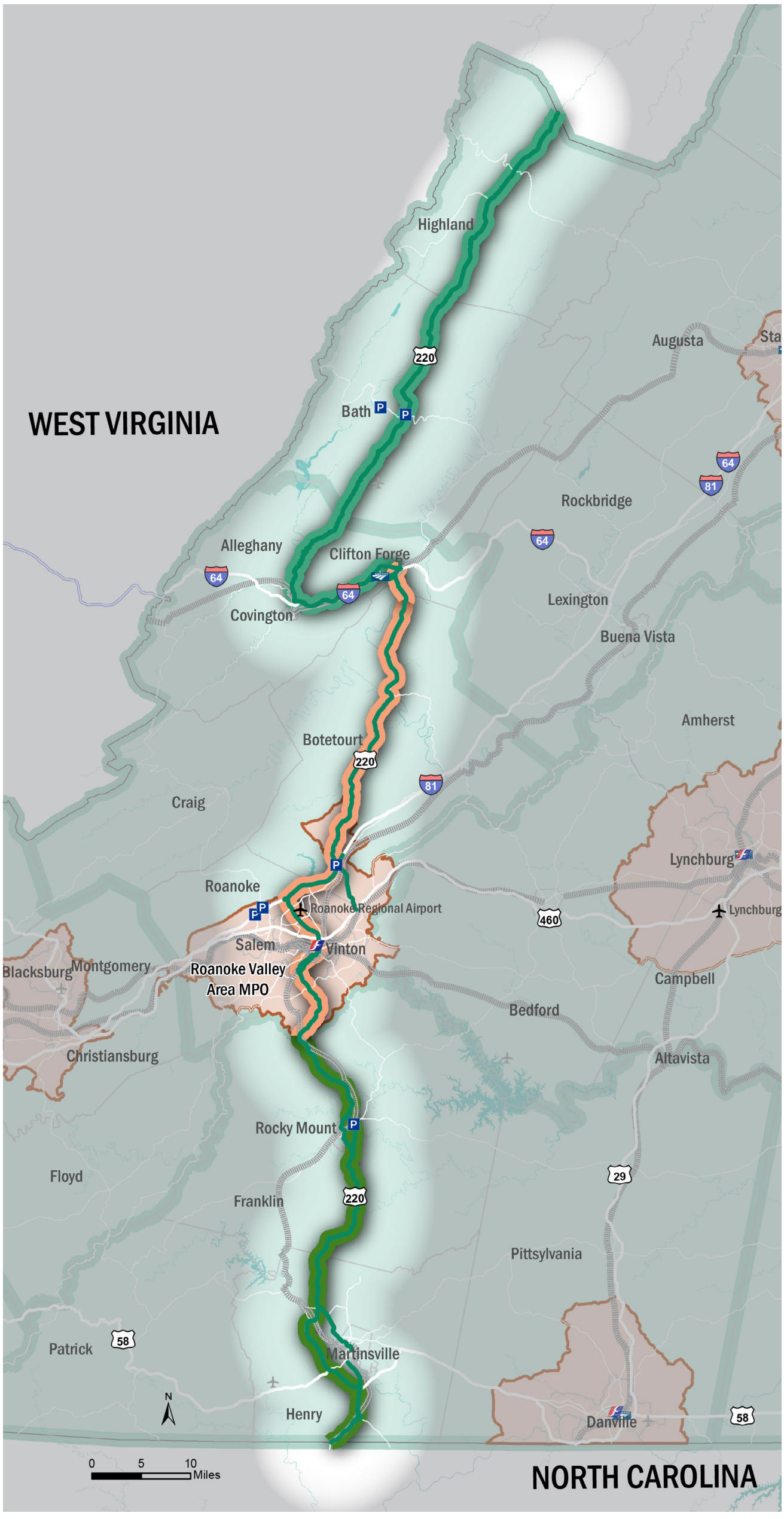
There are no direct connections to any port facilities along US 220, though there is a connection to I-81 in Roanoke, which leads to the Virginia Inland Port. The section of US 220 between I-81 and I-64 (between Roanoke and Clifton Forge) is frequently used as a connection between the two interstate highways. This connection is used mostly for freight movement between southern Virginia and points west, although passenger travel also occurs along this route.

Corridors of Statewide Significance

A	Coastal Corridor (US 17)
B	Crescent Corridor (I-81)
C	East-West Corridor (I-64)
D	Eastern Shore Corridor (US 13)
E	Heartland Corridor (US 460)
F	North Carolina to West Virginia Corridor (US 220)
G	North-South Corridor (Route 234)
H	Northern Virginia Corridor (I-66)
I	Seminole Corridor (US 29)
J	Southside Corridor (US 58)
K	Washington to North Carolina Corridor (I-95)
L	Western Mountain Corridor (I-77)

Corridor Components

Highway Facilities	
Primary Facility	• US 220
Other Highway Facilities	• US 220 Business • US 220 Alt
Transit Services	
	• Amtrak • Intercity bus service
Rail Facilities	
	• Norfolk Southern
Airport Facilities	
	• Roanoke-Blacksburg Regional Airport



Demographics and Economic Trends

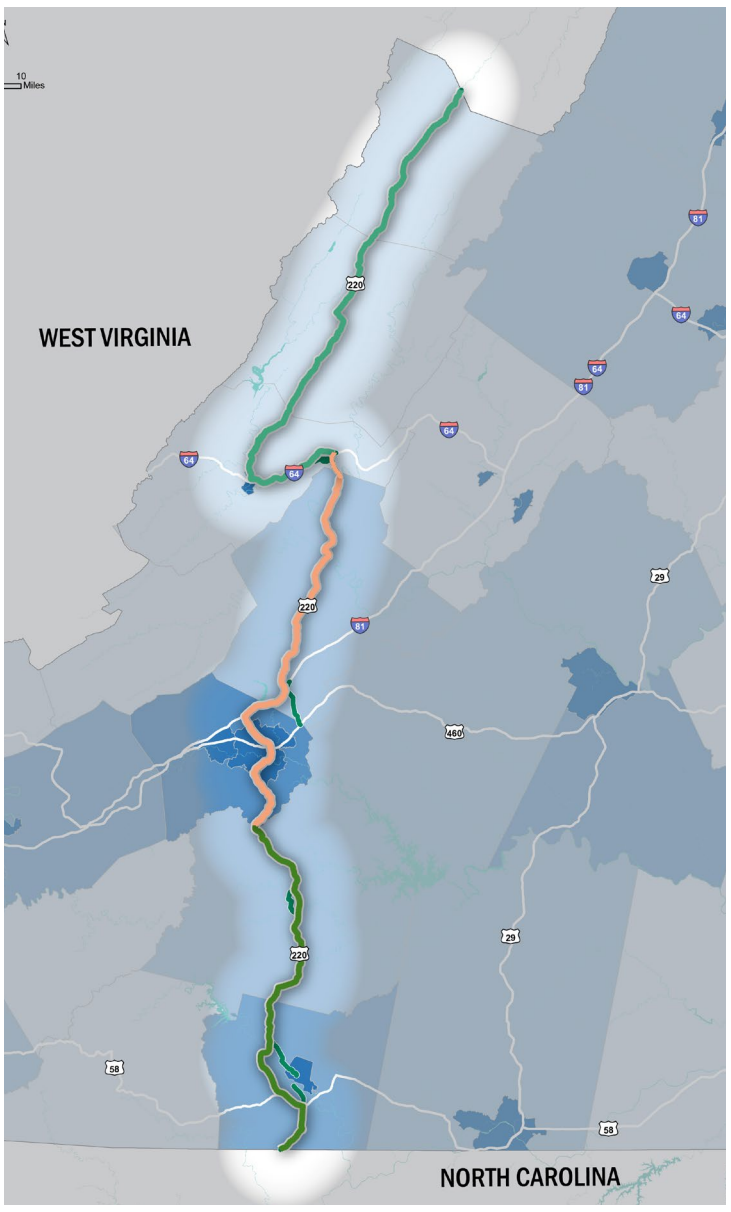
The primary population centers with greater than 500 persons per square mile along Corridor F are currently found in Martinsville, Salem, Roanoke, and Covington. Alleghany, Bath, and Highland Counties, in the northwest, have the lowest density along the corridor with less than 50 persons per square mile. The most densely-populated segment along the corridor is Segment F2 in its path through Roanoke County.

Between 2012 and 2025, Franklin County is anticipated to see the largest population growth (between 11 and 25 percent) among counties along the corridor. The population of Alleghany County is expected to shrink; however, population along the corridor overall is expected to grow moderately.

Current employment centers follow a pattern similar to the population centers, with jobs clustered in the Cities. However, employment growth is anticipated to be the highest in Highland County (higher than 25 percent), and is also expected to grow in the other counties in the northern half of the corridor. Corridor F passes through the Roanoke Valley Area where the three largest industry sectors by GDP include public administration, retail trade, and manufacturing.

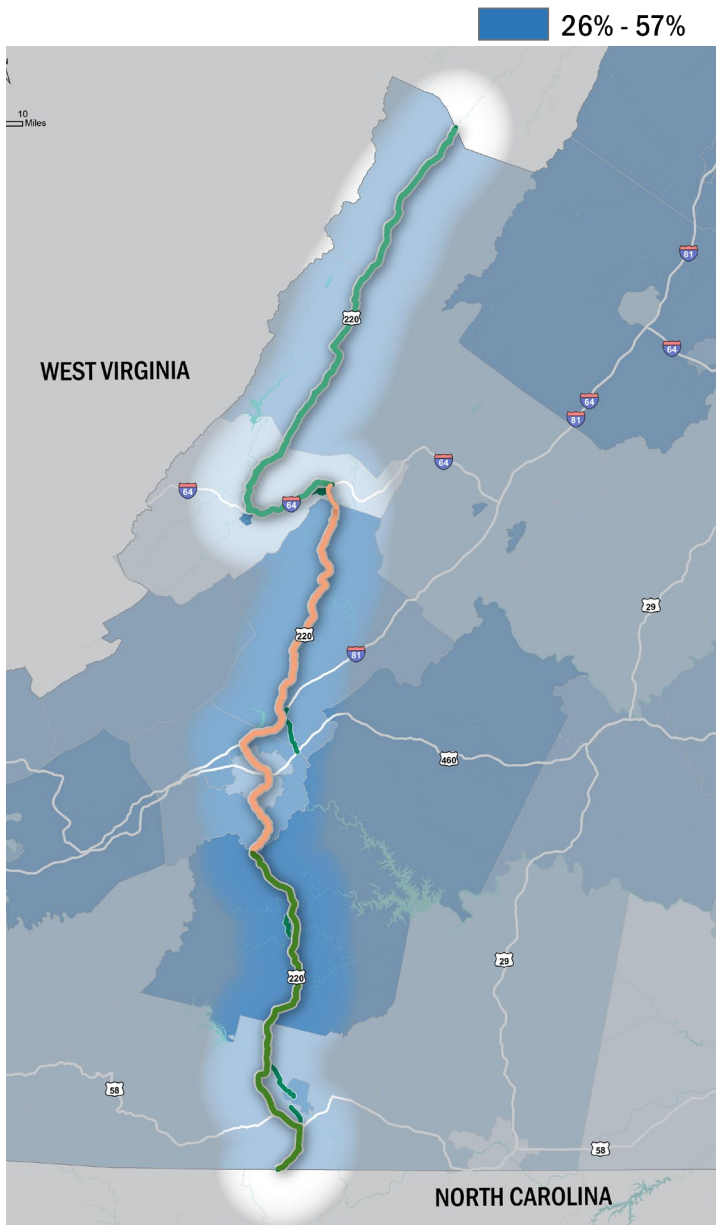
2012 Population Density Persons / Square Mile

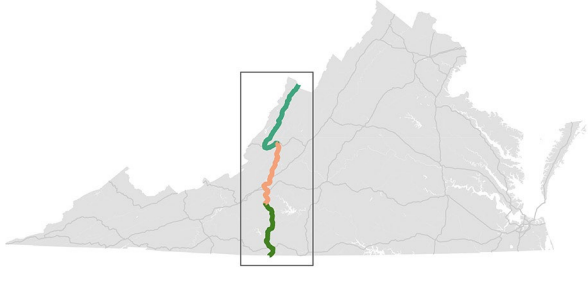
- 0 - 50
- 50 - 100
- 100 - 250
- 250 - 500
- 500 +



Population Growth (2012-2025 Percent Change)

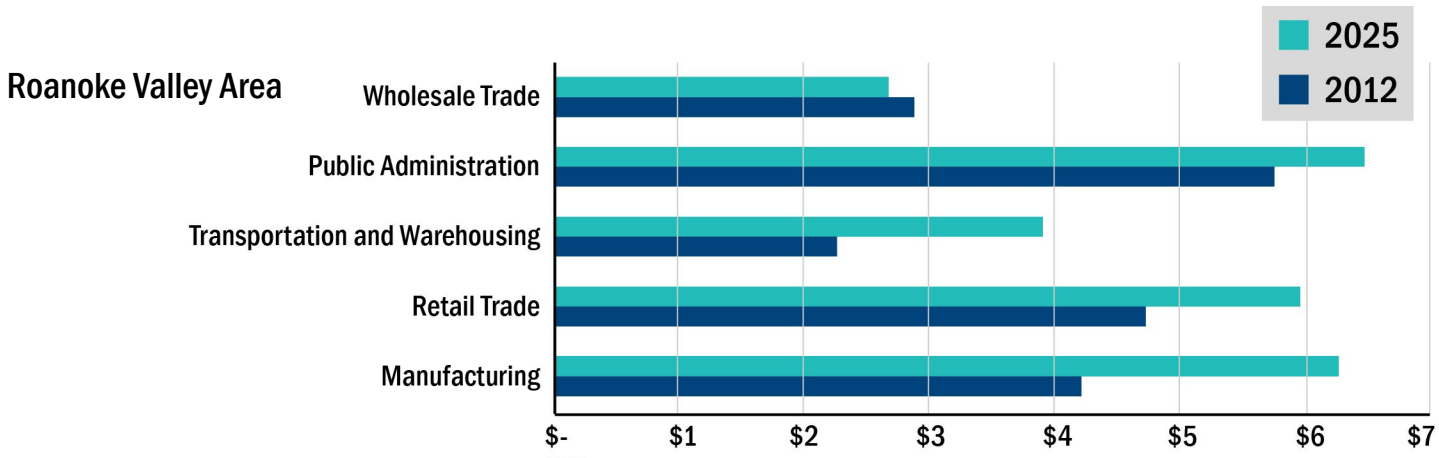
- -8% - 0%
- 1% - 5%
- 6% - 10%
- 11% - 25%
- 26% - 57%





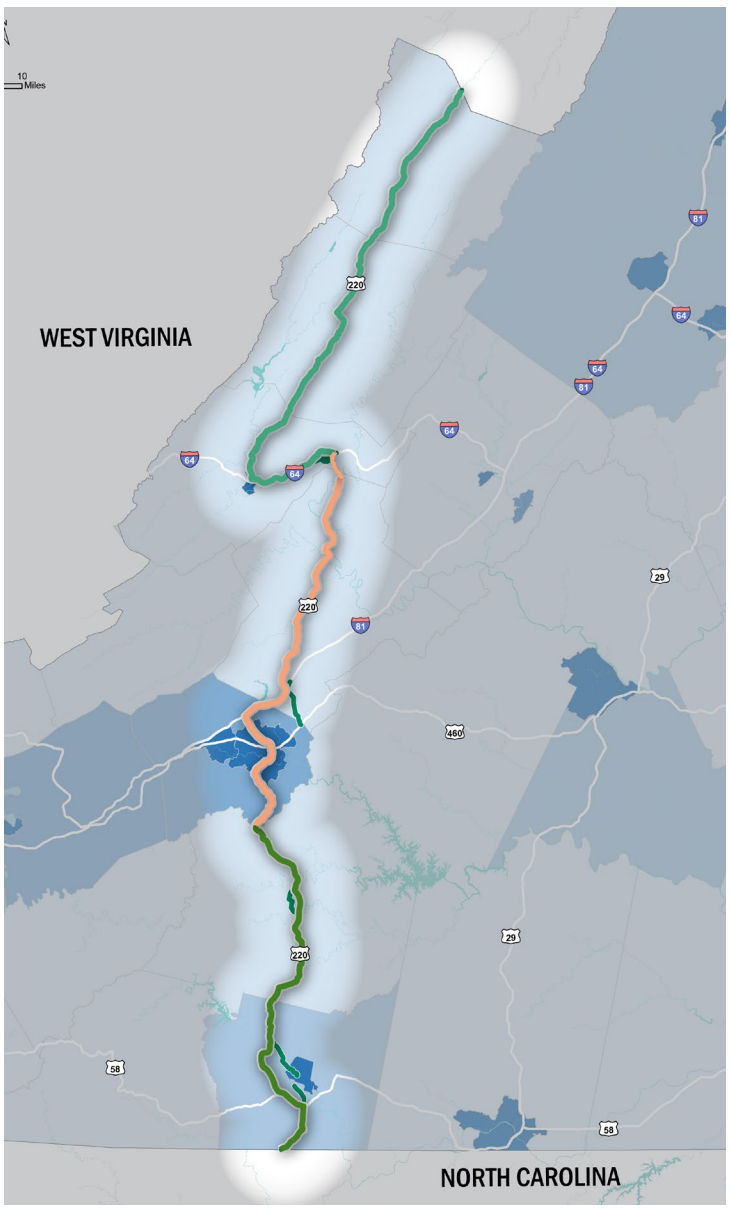
CORRIDOR F OVERVIEW

Top Industries (GDP)



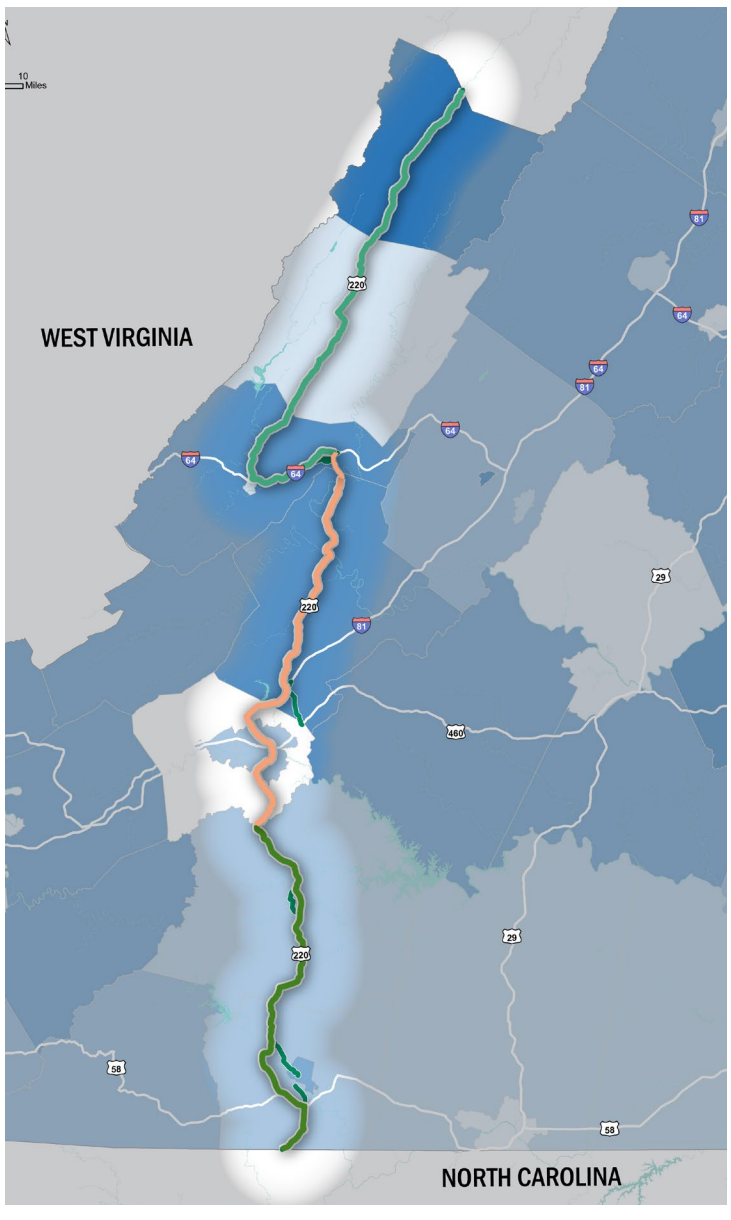
2012 Employment Density Jobs / Square Mile

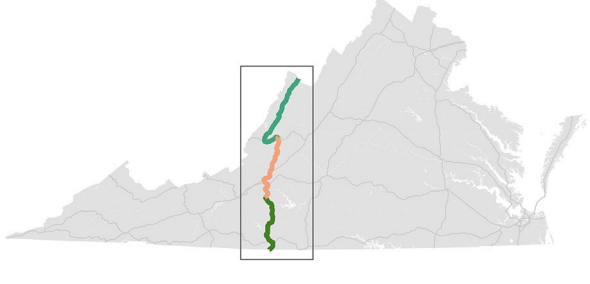
< 25
25 - 100
100 - 250
250 - 500
> 500



Employment Growth (2012-2025 Percent Change)

-7% - 0%
1% - 5%
6% - 10%
11% - 25%
26% - 69%



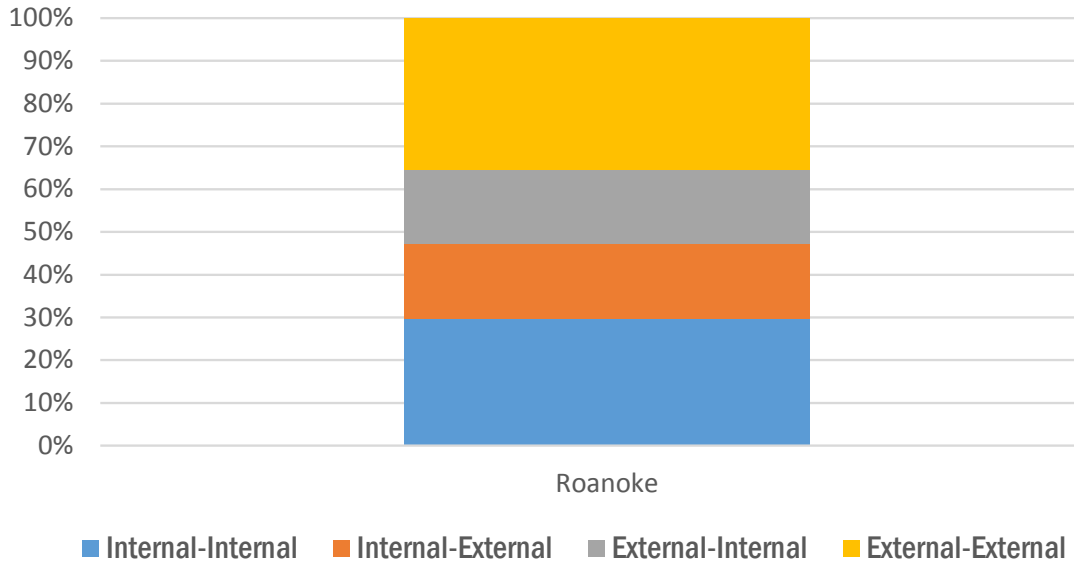


Corridor Travel Patterns

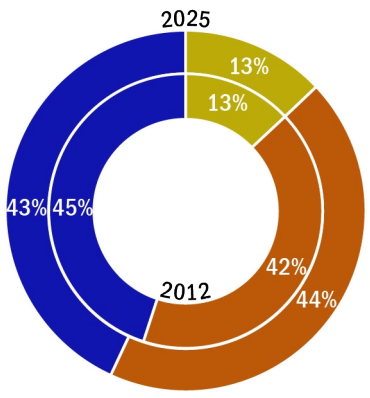
Passenger

Corridor F connects North Carolina and West Virginia, and passes through the Roanoke Valley Area. Within the Roanoke Valley Area, traffic along the corridor is fairly well distributed between internal and external trips. The largest portion of traffic (35 percent) is related to pass-through trips, while just less than 30 percent is related to local internal traffic. The primary facility in the corridor (US 220) carries the majority of the pass-through traffic, while the parallel facility (US 220 Business) carries almost exclusively local internal traffic.

Distribution of Internal and External Travel



Roanoke Valley Area



GDP by Sector, 2012 and 2025

- Freight Dependent
- Local Serving
- Knowledge-based

Freight

By truck, Corridor F carried 851 million tons of freight worth $163 billion in 2012, and is estimated to carry 113 million tons of freight worth $262 billion in 2025. The major truck freight patterns on this corridor are interstate through movements, accounting for approximately 55 percent of the total truck tonnage and more than 64 percent of the total corridor truck freight value. There are significant flows on Corridor F between the Southeastern and Middle Atlantic regions. North Carolina, Pennsylvania, and Tennessee are major truck freight generators on this corridor, accounting for more than 20 percent of truck tonnage on Corridor F. North Carolina, New York, and Pennsylvania are major truck freight attractors on Corridor F, accounting for 24 percent of truck tonnage. Truck freight originating from or destined for non-US locations in North America account for approximately five percent of total truck freight on Corridor F.

By rail, Corridor F carried three million tons of freight worth $1 billion in 2012, and neither tonnage nor value is expected to increase by 2025. In terms of tonnage, the largest rail flow on Corridor F is from West Virginia to North Carolina, accounting for more than 44 percent of the total rail tonnage in the corridor. Another significant rail freight movement on Corridor F is from West Virginia to South Carolina, accounting for more than 14 percent of the total rail tonnage on the corridor. In terms of value, the largest rail freight movements on Corridor F are between Ohio and the Carolinas, accounting for more than 26 percent of the total rail value.

Truck Freight

2012	2025
Truck Freight Value	
$163 Billion	$262 Billion
Truck Freight Tonnage	
85 Million Tons	113 Million Tons
Freight Value per Ton	
$1914	$2324
Corridor Tonnage Passing Through	
54%	55%

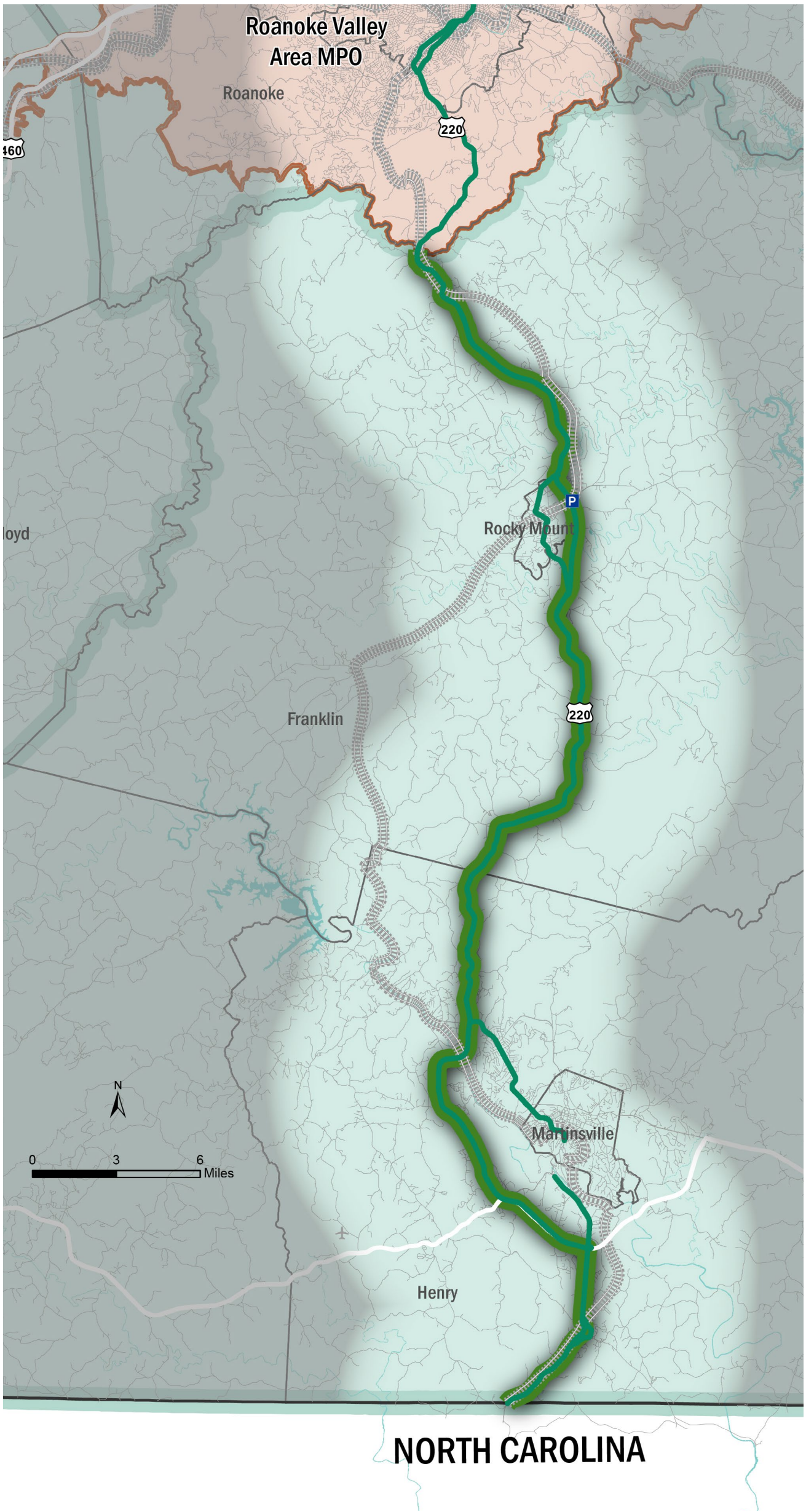
Rail Freight

2012	2025
Rail Freight Value	
$1 Billion	$1 Billion
Rail Freight Tonnage	
3 Million Tons	3 Million Tons
Freight Value per Ton	
$361	$428
Corridor Tonnage Passing Through	
80%	75%

II. Segment F1

Corridor Segment F1 Components

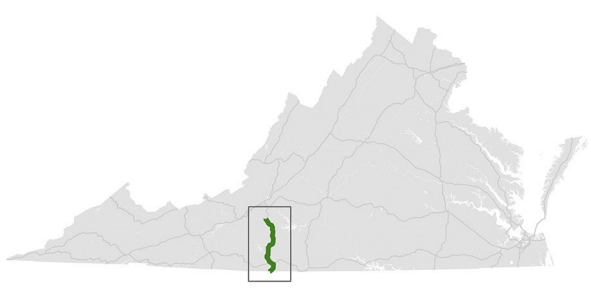
- US 220
- US 220 Business
- Norfolk Southern



Segment F1

Corridor Component Road
Railroad
Airport Facility
Amtrak Facility
Greyhound Facility
VRE Facility
Metrorail Facility
Port Facility
Park & Ride Facility

MPO Area
Planning District Area



F1 SEGMENT PROFILE

Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility

Segment F1 runs from the North Carolina border to Roanoke County, serving Henry and Franklin Counties and the City of Martinsville. The primary facility is US 220, which functions as both a local access road through southwestern Virginia and as a throughway between North Carolina and West Virginia.

Highway Facilities: Route 220 is a four-lane roadway in this segment. US 220 Business Routes provide local access in the City of Martinsville and the Town of Rocky Mount.

Transit Services: There is no intercity transit service available on Segment F1.

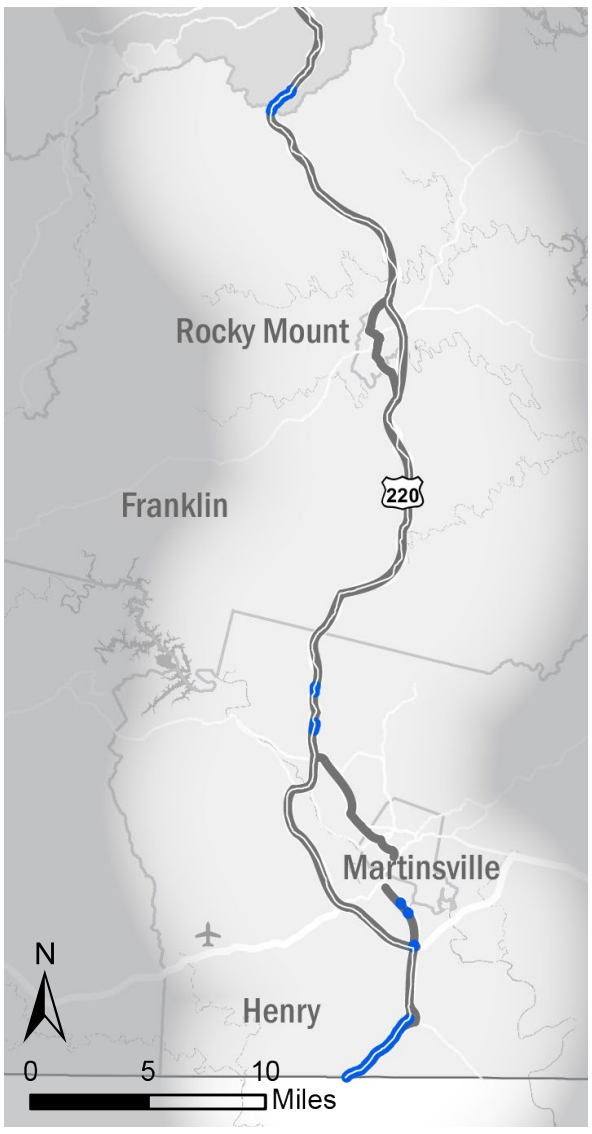
Rail Facilities: Norfolk Southern rail lines provide freight rail access in this region by operating within the North Carolina to West Virginia Corridor between Martinsville and Roanoke, connecting to the Crescent Corridor and Heartland Corridor in Roanoke.

Port Facilities: No port facilities are directly accessible from Segment F1.

Airport Facilities: Commercial air service is provided by the nearby Roanoke Regional Airport. One additional general aviation facility is present along Segment F1.

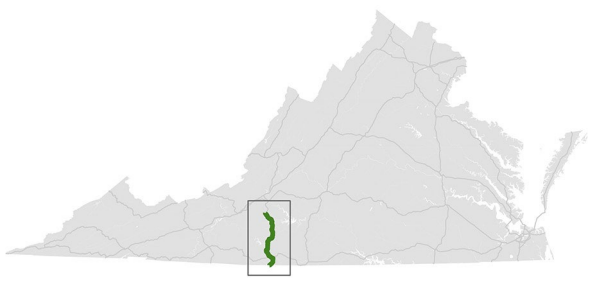
Major planned and future projects include:

- Safety improvements to include shoulder paving, guardrail, rumble strips all within existing right-of-way on Greensboro Road (US 220) near the North Carolina border.



Future Projects

- Reconstruction with added capacity
- Safety improvements
- Primary facility

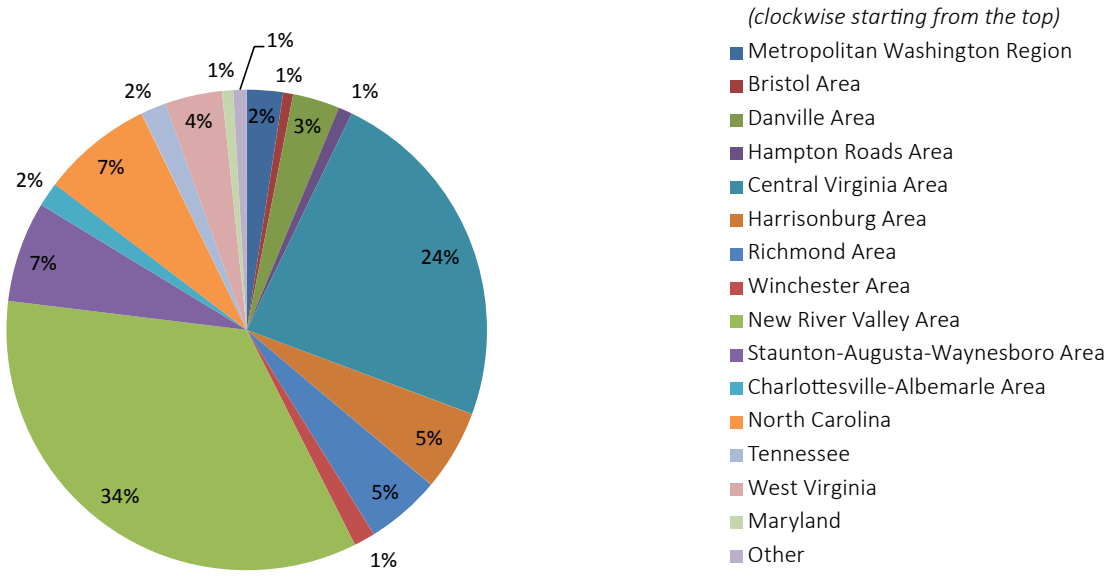


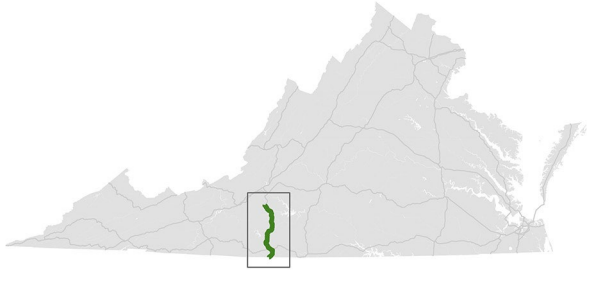
Travel Demand

Passenger Demand

The southernmost segment in Corridor F connects the Roanoke Valley Area to North Carolina, although it does not connect any major cities within Virginia. Of the intercity passenger travel originating in the Roanoke Valley Area, seven percent is destined for locations in North Carolina, although not all of those travelers may use Corridor F as several alternative routes are possible depending on the final destination. An additional three percent of intercity travel from the Roanoke Valley Area is destined for the Danville Area using Segment F1.

Travel from Roanoke Valley Area to...





F1 SEGMENT PROFILE

Freight Demand

By truck, Segment F1 carried 11 million tons of freight worth $13 billion in 2012, and is estimated to carry 13 million tons of freight worth $15 billion in 2025. The major truck freight patterns on this corridor are interstate through movements, accounting for approximately 55 percent of the total truck tonnage and more than 64 percent of the total corridor truck freight value. There are significant flows on Corridor F between the Southeastern and Middle Atlantic regions. North Carolina, Pennsylvania, and Tennessee are major truck freight generators on this corridor, accounting for more than 20 percent of truck tonnage on Corridor F. North Carolina, New York, and Pennsylvania are major truck freight attractors on Corridor F, accounting for 24 percent of truck tonnage. Truck freight originating from or destined for non-US locations in North America account for approximately five percent of total truck freight on Corridor F. Within the jurisdictions adjacent to Segment F1, Franklin County is the largest generator of freight on the corridor, with between one and two percent of the total freight tonnage originating there.

By rail, Segment F1 carried three million tons of freight worth $710 million in 2012, and is estimated to carry three million tons of freight worth $920 million in 2025. The largest rail flow on Corridor F is from West Virginia to North Carolina, accounting for more than 44 percent of the total rail tonnage in the corridor. Another significant rail freight movement is from West Virginia to South Carolina, accounting for more than 14 percent of the total rail tonnage on the corridor. In terms of value, the largest rail freight movements on Corridor F are between Ohio and the Carolinas, accounting for more than 26 percent of the total rail value. Although the amount of rail freight originating in jurisdictions adjacent to Segment F1 is negligible, the segment is a significant attractor of rail freight, accounting for between 16 and 18 percent of the total rail freight value on Corridor F. Approximately six percent of the total rail freight value on the corridor flows between Louisiana and Franklin County, adjacent to Segment F1. Rail freight flows from Henry and Franklin Counties, located adjacent to Segment F1, account for only around 0.5 percent of the total rail freight tonnage on the corridor.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (26% / 27%)
2. North Carolina (10% / 9%)
3. Tennessee (7% / 7%)
4. Pennsylania (7% / 7%)
5. New Jersey (5% / 5%)

Corridor Tonnage Originating in Segment F1: 4% / 3%

Major Origin-Destination Pairs for Freight
North Carolina and Pennsylvania
North Carolina and New York
New York and Georgia
New York and Tennessee
New Jersey and Texas

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (27% / 27%)
2. North Carolina (8% / 8%)
3. New York (8% / 8%)
4. Pennsylvania (8% / 8%)
5. New Jersey (5% / 5%)

Corridor Tonnage Destined for Segment F1: 2% / 2%

Rail Freight

Major Origins (by Tonnage)
1. West Virginia (70% / 62%)
2. Virginia (13% / 17%)
3. City of Roanoke (11% / 13%)
4. South Carolina (6% / 7%)
5. North Carolina (5% / 6%)

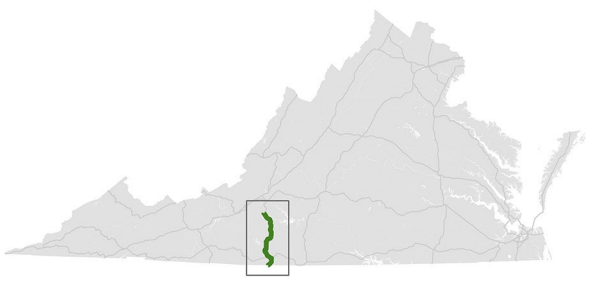
Corridor Tonnage Originating in Segment F1: <1% / <1%

Major Origin-Destination Pairs for Freight
City of Norfolk* and West Virginia
Wise County and City of Norfolk*
Buchanan County and City of Norfolk*
Wise County and Georgia
City of Norfolk* and Kentucky

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. North Carolina (51% / 46%)
2. South Carolina (17% / 15%)
3. Virginia (10% / 12%)
4. Ohio (7% / 8%)
5. West Virginia (4% / 5%)

Corridor Tonnage Destined for Segment F1: 5% / 6%



Traffic Conditions

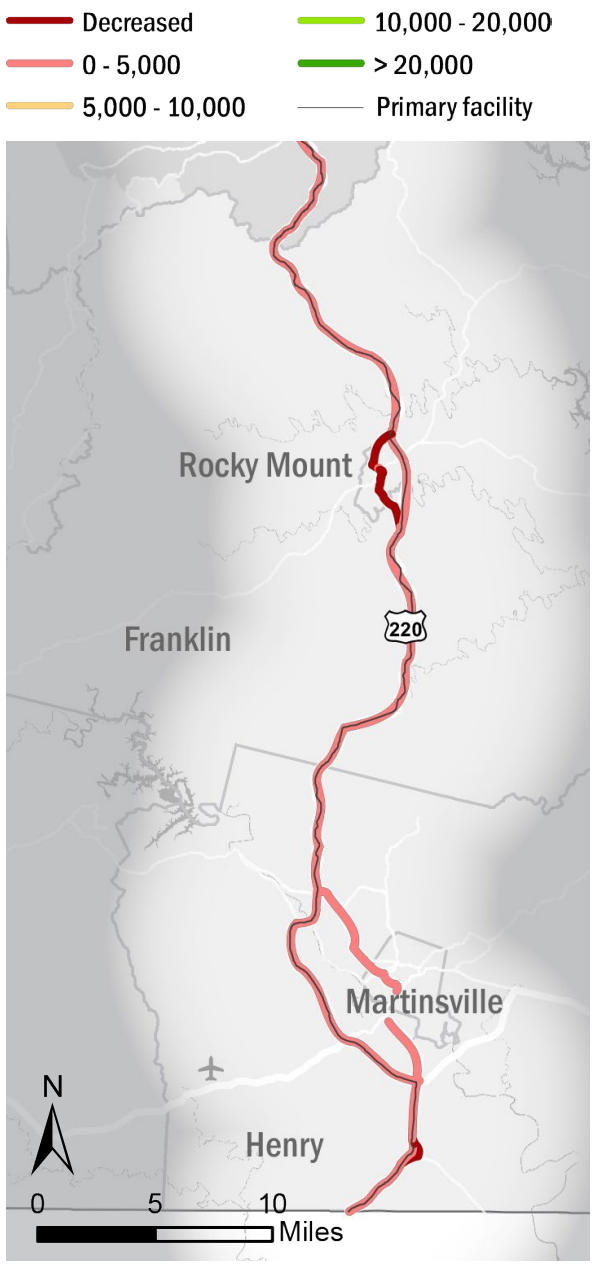
Traffic Volume

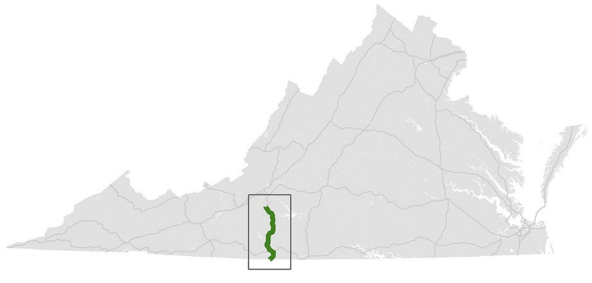
Traffic volume on Segment F1 is moderate compared to traffic volumes throughout the rest of Corridor F. Along US 220, average daily traffic volumes range from 10,000 to 25,000 vehicles, with the highest traffic volumes along US 220 in Segment F1 occurring north of Rocky Mount. Traffic volumes on US 220 throughout Segment F1 are projected to increase by fewer than 3,000 vehicles per day by 2025, with the highest growth projected near Ridgeway in Henry County. Traffic volumes on US 220 Business in Segment F1 are less than 10,000 vehicles per day, and are not projected to increase by 2025.

Traffic Volume 2014 (AADT)

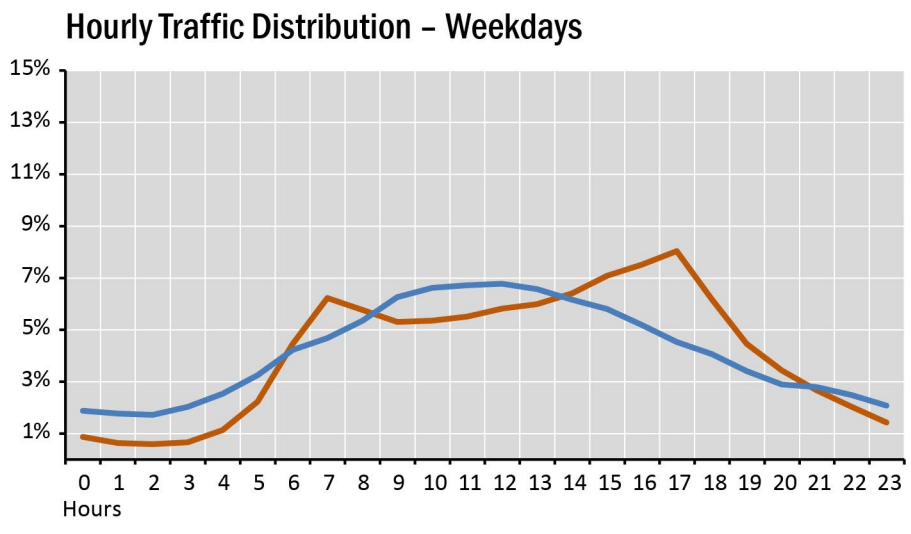
Traffic Volume 2025 (AADT)

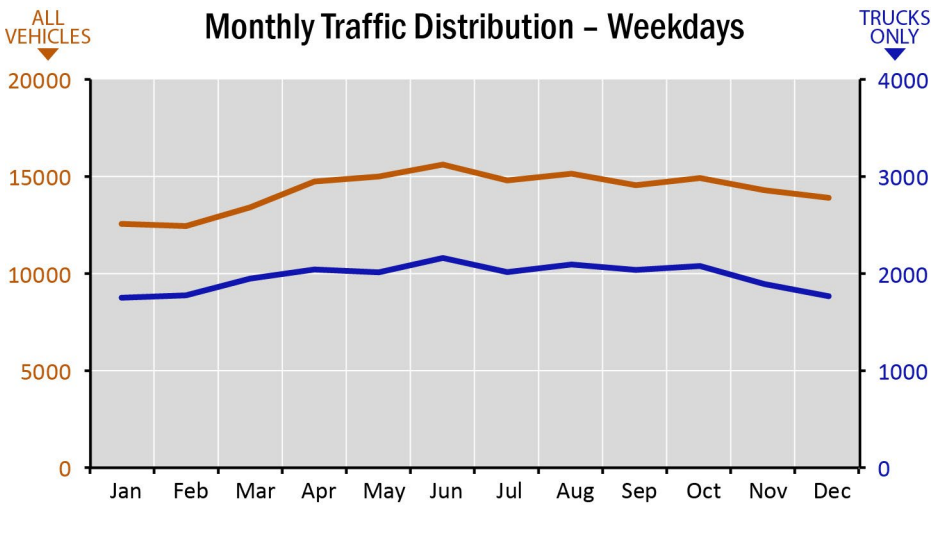
Change in Traffic Volume 2014- 2025 (AADT)

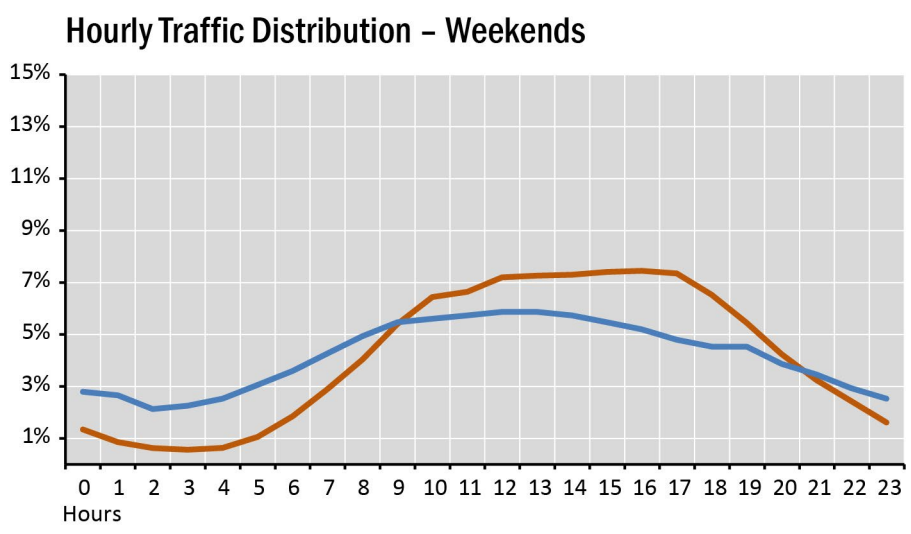


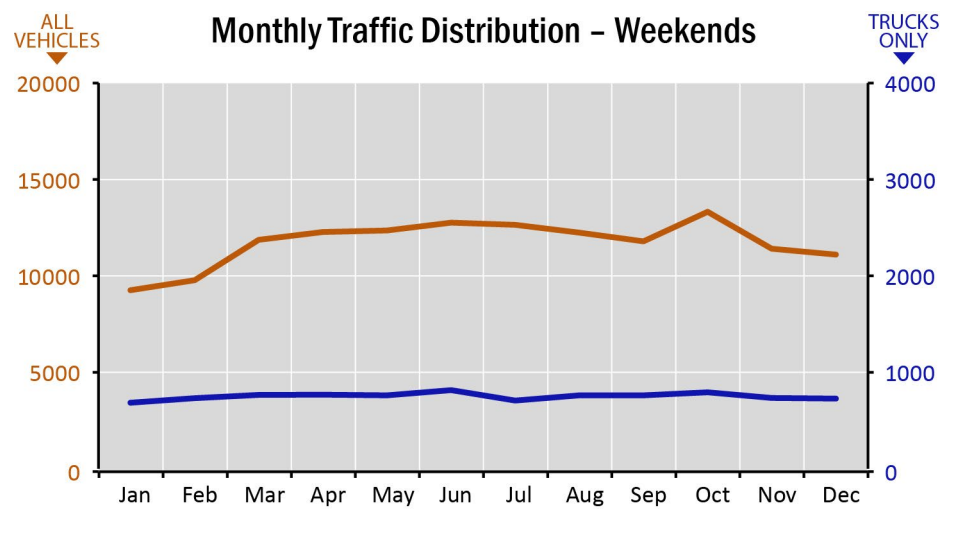


F1 SEGMENT PROFILE









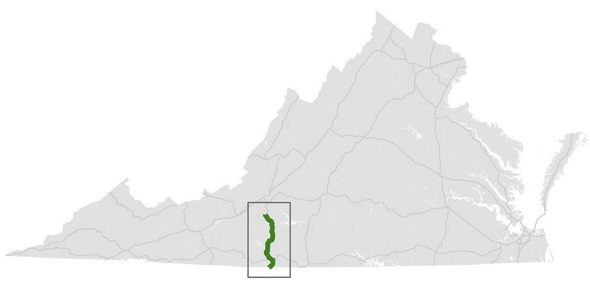
Traffic Distribution

On average, traffic on Segment F1 is distributed throughout the day as shown in the graphs below. Weekday traffic shows two peak periods over the course of the day, with the highest hourly traffic occurring between 5 and 6 p.m. which accounts for eight percent of daily traffic and a less busy morning peak between 7 and 8 a.m. accounting for 6.2 percent of daily traffic. The combined weekday traffic in the two peak periods (from 6 to 10 a.m. and from 3 to 7 p.m.) accounts for 51 percent of total daily traffic. Peaking patterns for truck traffic are different from commuter traffic with a single peak period during the midday, showing a peak hourly flow of 6.8 percent of daily traffic between 1 and 2 p.m. Weekend traffic patterns are also different from the typical commute patterns, showing an even distribution of traffic during the middle of the day with the peak hour flow between 4 and 5 p.m. (7.5 percent of daily traffic) for all traffic, and noon to 1 p.m. (5.9 percent of daily traffic) for truck traffic.

Weekday traffic volumes on Segment F1 vary by as much as 25 percent throughout the year, with the highpoint in June (around 16,000 vehicles per day) and the low point in February (around 12,000 vehicles per day). Truck volumes also vary throughout the year, with the June high (around 2,000 vehicles per day) 23 percent higher than the January low (around 1,700 vehicles per day). The highest levels of weekend traffic (October, around 13,000 vehicles per day) are 44 percent higher than January levels (around 9,000 vehicles per day). Weekend truck traffic is steadier than all vehicle traffic, with the June high 19 percent higher than the January low.

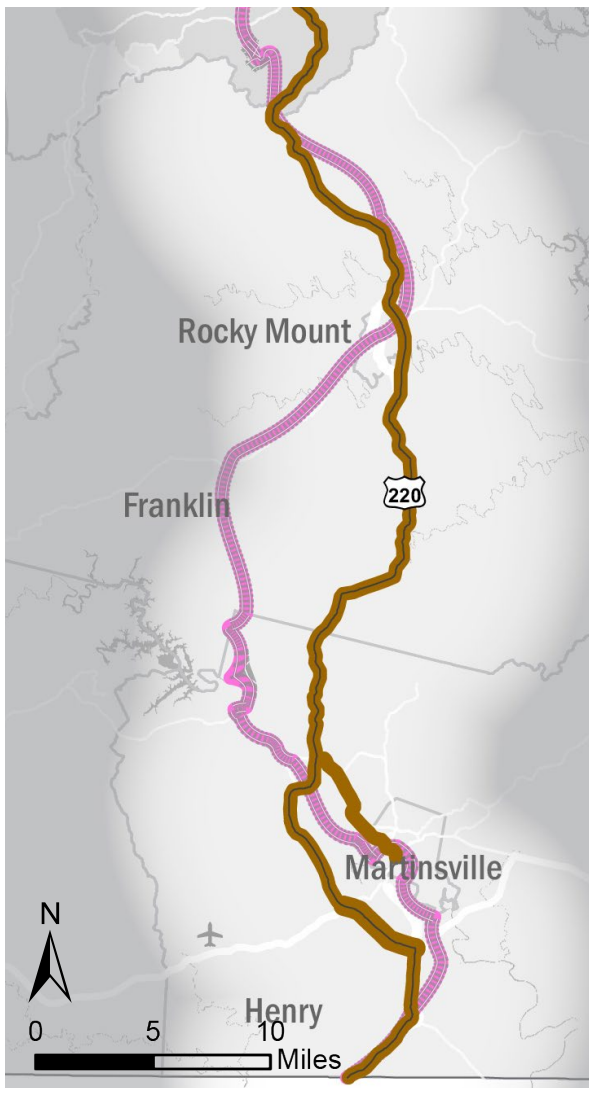
Truck Volumes

The percent of daily traffic comprised of heavy trucks on Segment F1 is moderate compared to the other segments in Corridor F. On US 220 in Segment F1, heavy trucks comprise six to seven percent of total traffic. On US 220 Business, heavy trucks comprise less than five percent of daily traffic.



F1 SEGMENT PROFILE

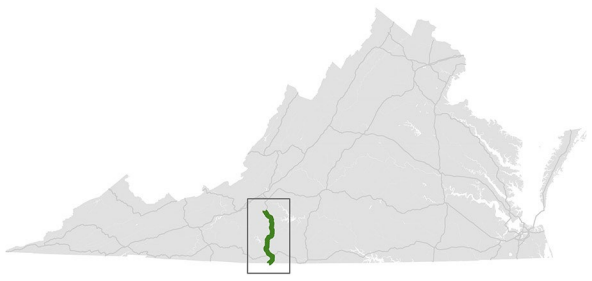
Annual Freight by Tonnage, 2012



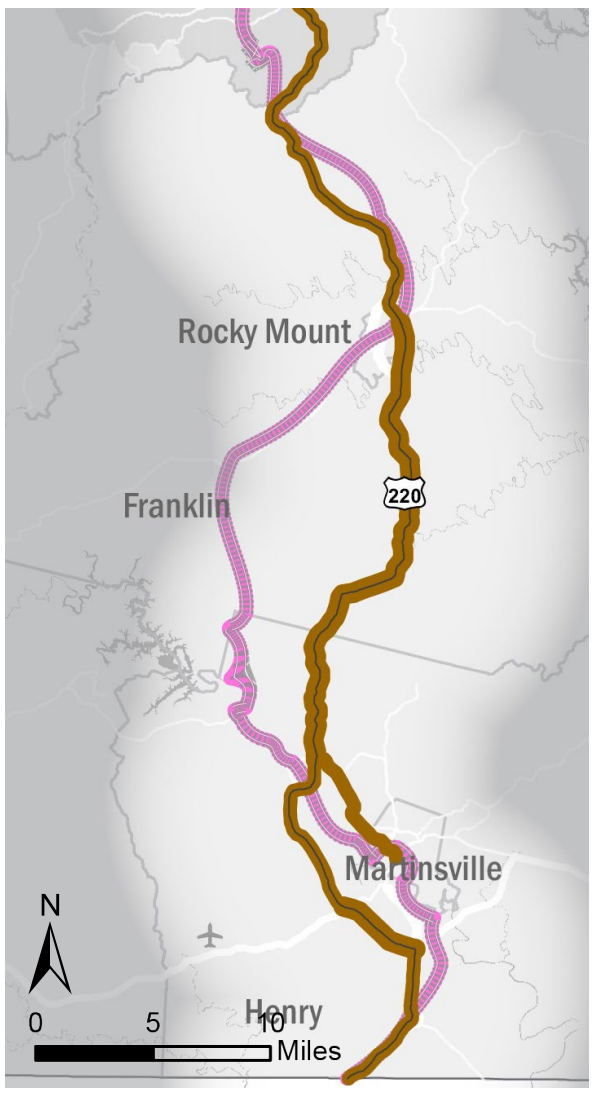
Freight Flows

On Segment F1 near Martinsville, freight is moved primarily by truck in relation to both tonnage and value. In total, 10.5 million tons (80 percent) of freight is moved through this section of Segment F1 by truck, compared to three million tons (20 percent) by rail. With respect to value, $12.5 billion (95 percent) of freight travels by truck, compared to $621 million (five percent) by rail. On average, a ton of freight traveling through this section of Segment F1 by truck is worth $1,189 while a ton of freight traveling by rail is worth $243. In 2025, both rail and truck freight tonnages and values in this area of Segment F1 are expected to increase. The percentage of freight traveling by truck is expected to increase by both tonnage and value to 83 percent and 95 percent, respectively. Freight value per ton on trucks and rail is expected to increase to $1,191 and $294, respectively.

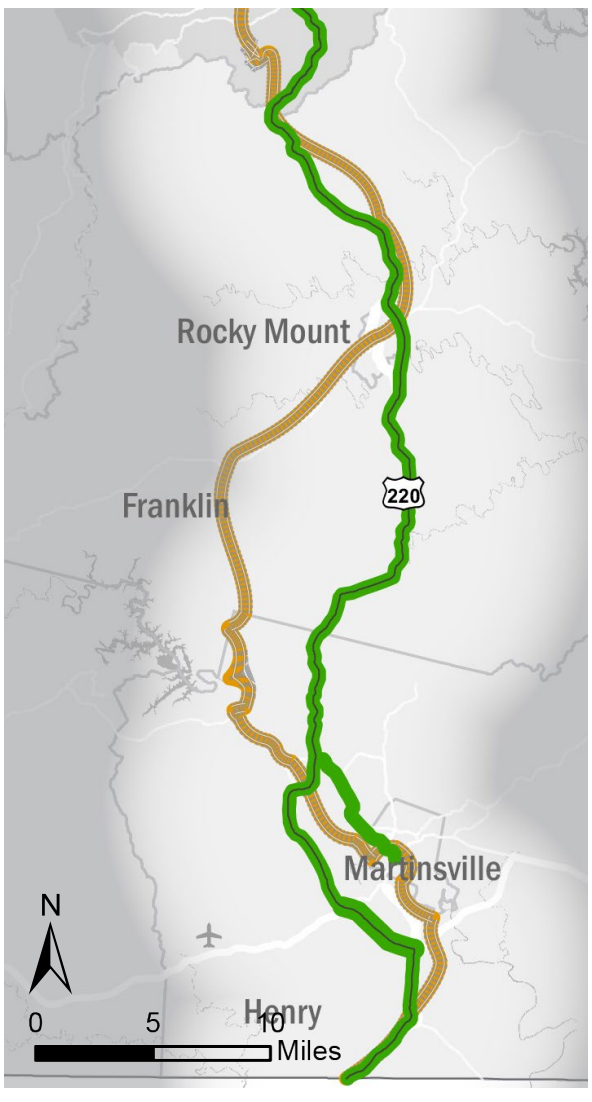
North of Rocky Mount, the majority of freight moves by truck, in terms of both tonnage and value. In total, eight million tons (75 percent) of freight travels through this section of Segment F1 by truck, compared to only three million tons by rail. With respect to value, $10 billion (93 percent) of freight travels by truck, compared to $711 million by rail. On average, a ton of freight traveling through this section of Segment F1 by truck is worth $1,233 while a ton of freight traveling by rail is worth $275. In 2025, both rail and truck freight tonnages and total values in Segment F1 are expected to increase. The percentage of freight traveling by truck is anticipated to increase by both tonnage and value to 78 percent and 93 percent, respectively. Freight value per ton on trucks and rail is expected to increase to $1,219 and $337, respectively.



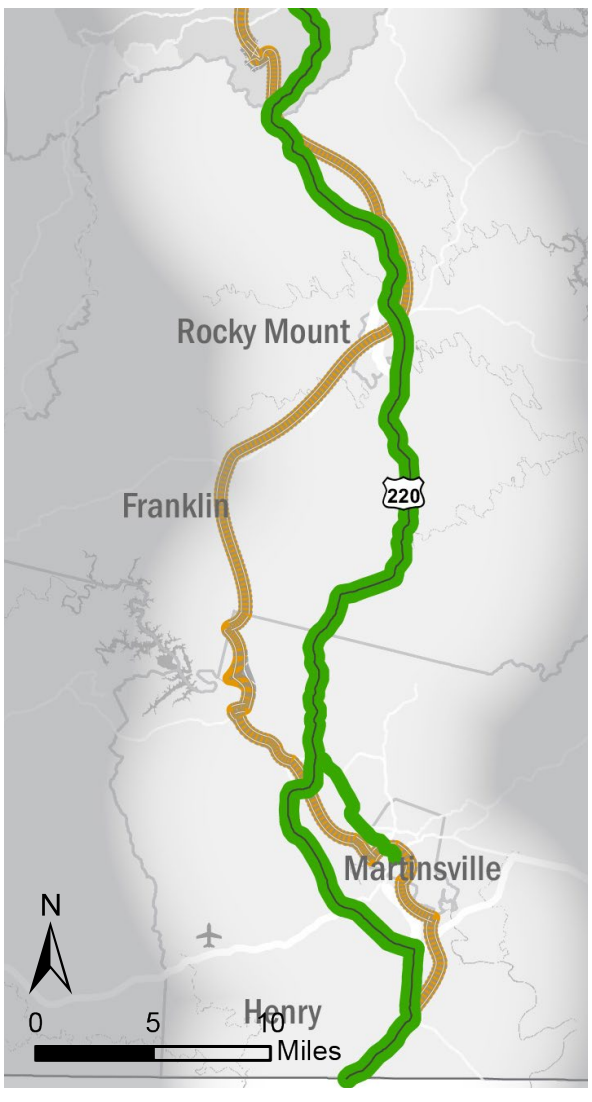
Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025



Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Redundancy and Mode Choice

Comparable Travel Options

Roanoke to Martinsville

Inter-City Bus
0 Trips per Day
0:00 Travel Time
$0 Est. Cost

Train
0 Trips per Day
0:00 Travel Time
$0 Est. Cost

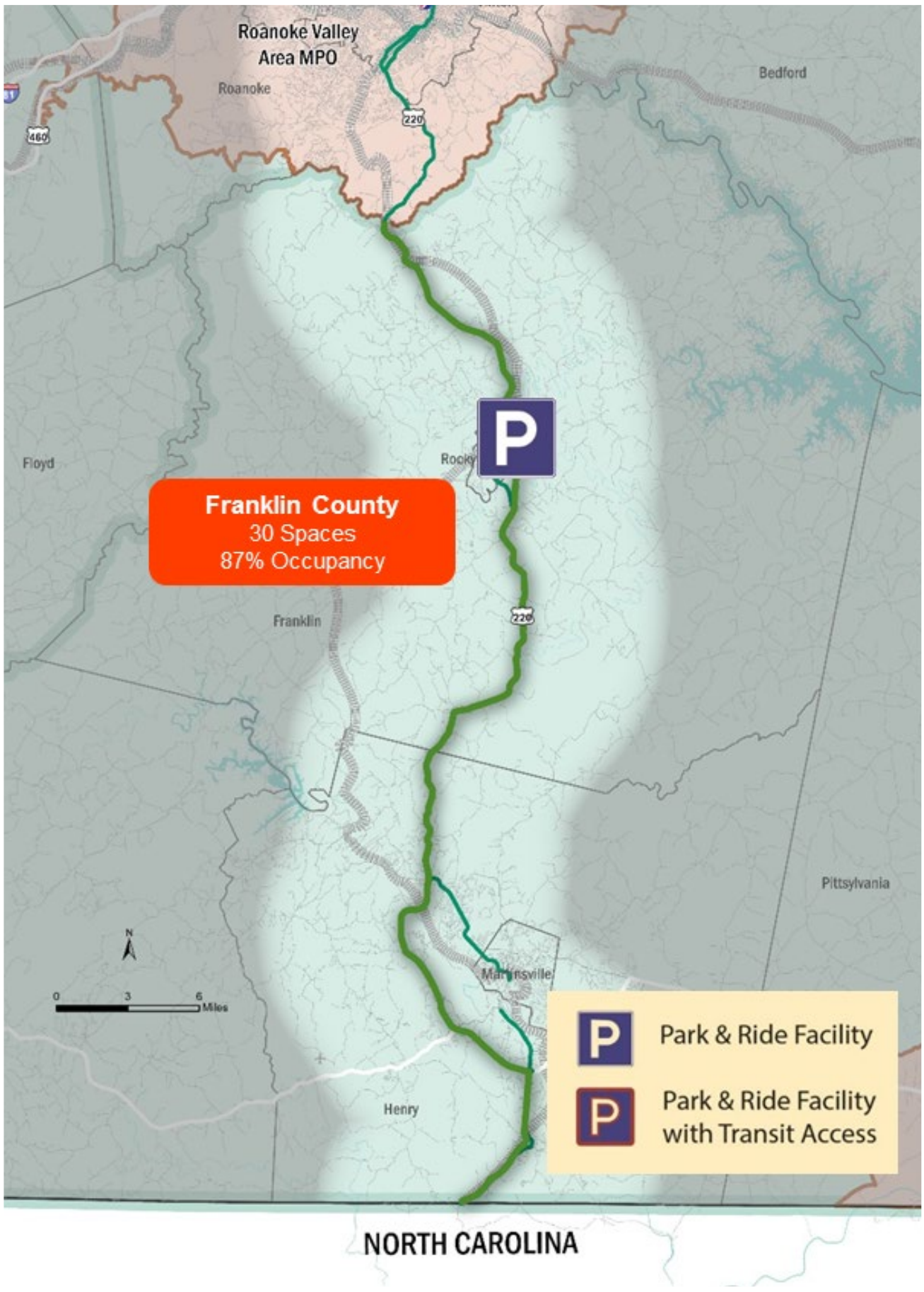
Auto
Via Rt. 220: 1:05 Travel Time $28 Est. Cost

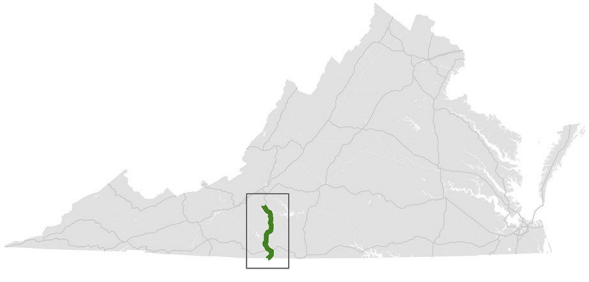
Passenger trips on Segment F1 have few travel options, both in terms of travel path and mode choice. There are no parallel facilities to US 220 in Segment F1 that accommodate inter-city travel. No alternate modes are available to passengers traveling on Segment F1. Roanoke Regional Airport does provide service to the area, but it does not facilitate travel within the corridor.

Park and Ride Facitilities

Park-and-Ride

Within Segment F1, commuters can utilize one Park-and-Ride facility located in Franklin County, while Henry County has no Park-and-Ride locations. This Park-and-Ride facility in Rocky Mount has 30 spaces and its utilization rate of 87 percent is higher than the statewide average of 76 percent for Park-and-Ride utilization.





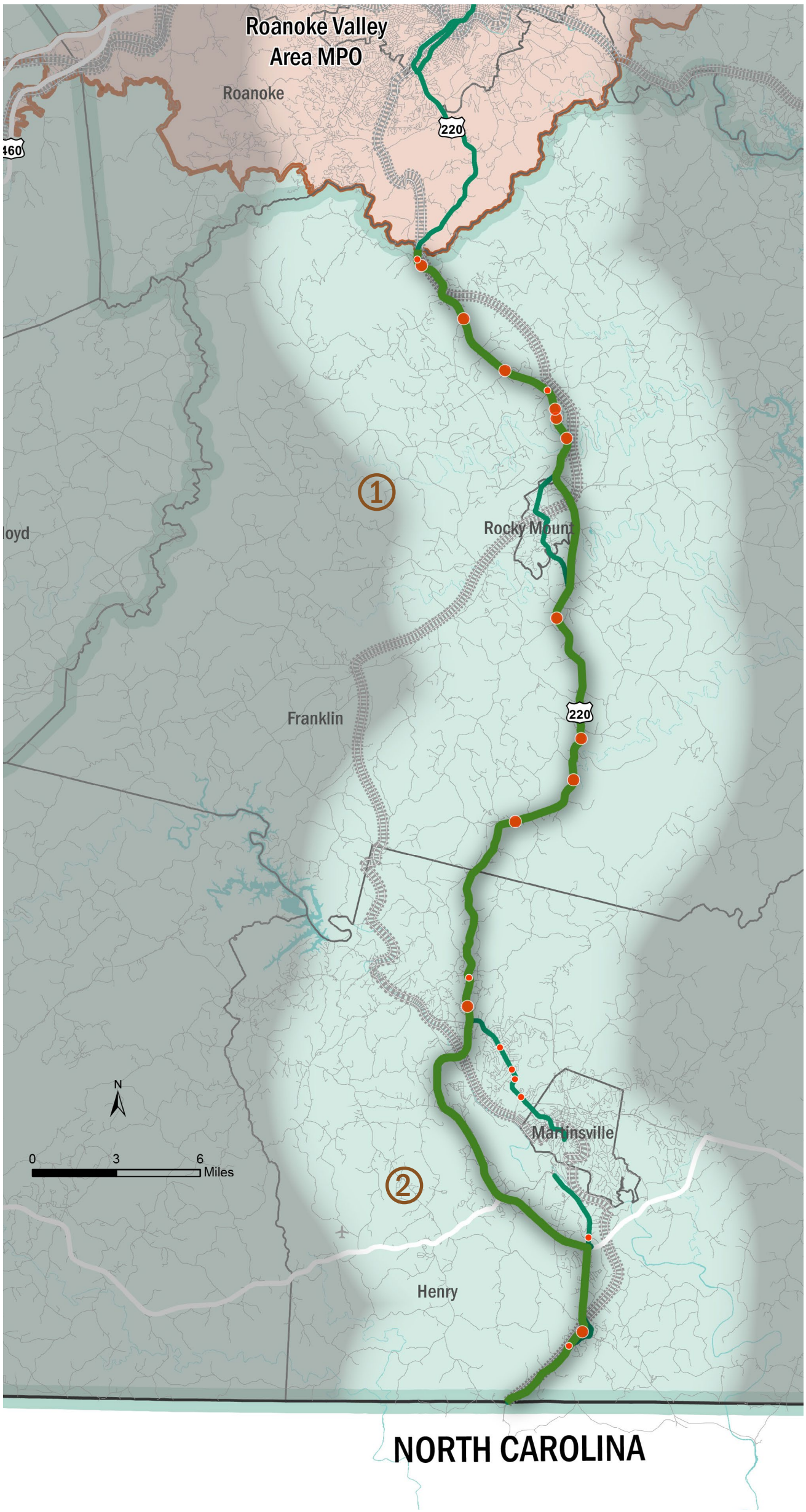
F1 SEGMENT NEEDS

Safety

Performance Metrics

Number of Severe Crashes	125
Severe Crashes/Million VMT	2.3
Number of Railroad Crashes	3

Between 2010 and 2012, 125 severe crashes occurred on Segment F1, resulting in the highest crash rate on the North Carolina to West Virginia Corridor. There are several locations along Segment F1 where high concentrations of severe crashes took place. In Ridgeway, south of Martinsville in Henry County, along US 220 (Greensboro Road), 15 collisions occurred within one mile at the intersections with Church Street (five crashes) and Morehead Avenue (ten crashes). In Collinsville, there were 12 incidents along 2.2 miles of US 220 Business (Virginia Avenue) between Eliza Reamy Avenue and Lafayette Avenue. On US 220 (Virgil H. Goode Highway) in Franklin County south of Rocky Mount, 20 crashes occurred over a 5.3-mile distance between Goose Dam Road and Henry Road. Also, on US 220 (Virgil H. Goode Highway) in Franklin County, there were 30 crashes over approximately 2.4 miles between Iron Ridge Road and Wooddale Drive.

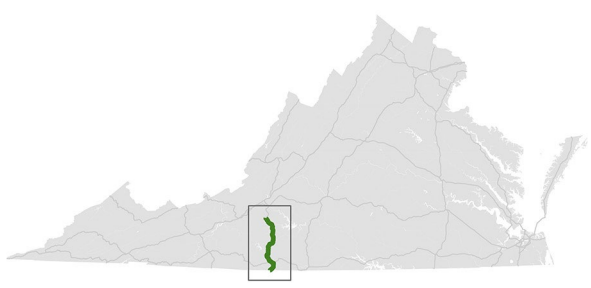


Fatality and Injury Crashes (2010 - 2012)

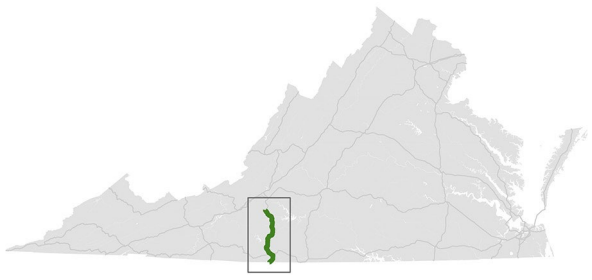
- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/Accidents per County (2011-2014)

#



Congestion



Performance Metrics

Person Hours of Delay per Mile	8
Freight Ton Hours of Delay per Mile	6.7K

Passenger Delays

Passenger traffic congestion along Segment F1 is minimal in most locations, with slightly over 1,000 person-hours delay across the corridor segment. The only location where passenger traffic experiences delays in excess of 100 person-hours per mile is on US 220 near Ridgeway in Henry County. Peak-period passenger delays account for 47 percent of daily congestion, slightly above average for the peak-period share of congestion along CoSS segments.

Freight Delays

Freight congestion along Segment F1 is minimal, with less than 850,000 ton-hours of delay daily. As such, there are no locations of significant freight delay on Segment F1. Peak-period freight delays account for about 40 percent of daily congestion, which is average for the peak-period share of congestion along CoSS segments.

Daily Person Hours of Delay Per Mile

Daily Freight Ton Hours of Delay Per Mile

Reliability

Weekday Peak

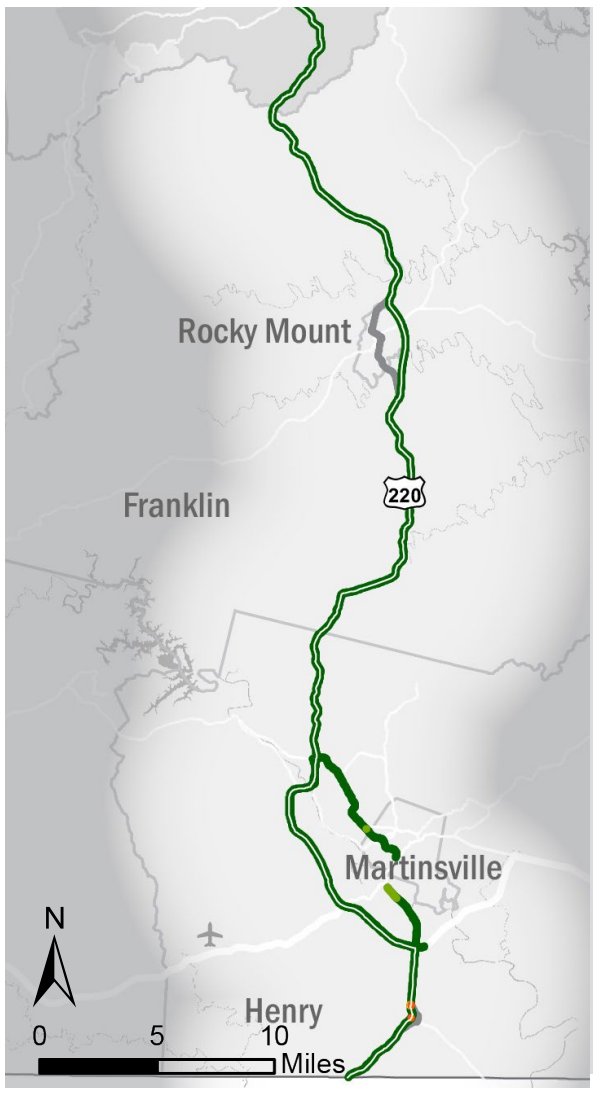
Reliability of travel during the peak period on a typical weekday on Segment F1 ranges from 0.00 to 0.70 in terms of reliability index, with an average value of 0.09. None of the locations along Segment F1 have reliability index values exceeding the statewide threshold.

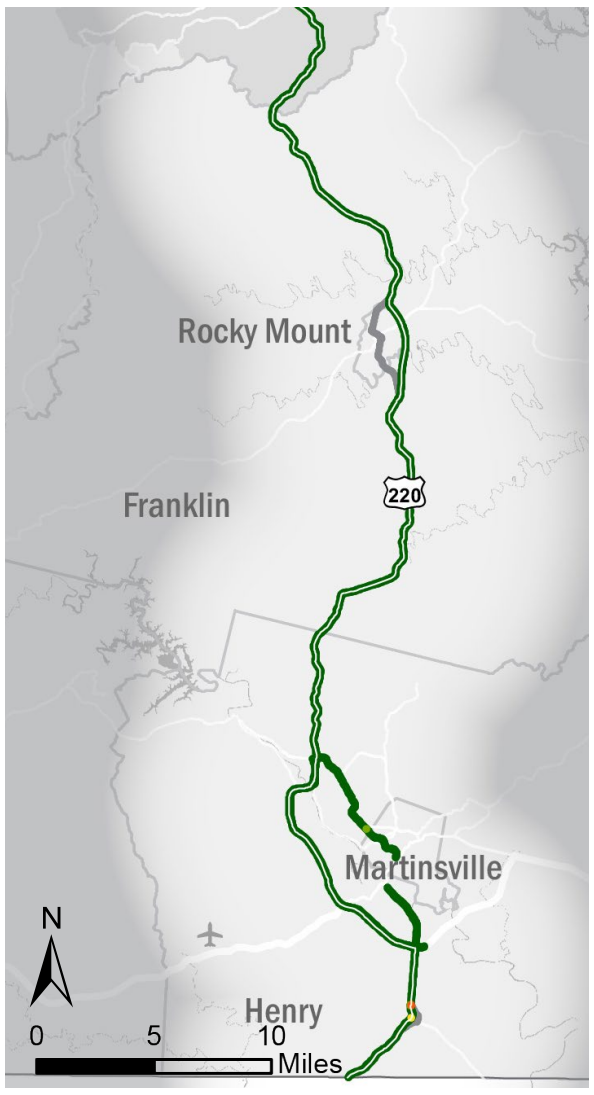
Weekday

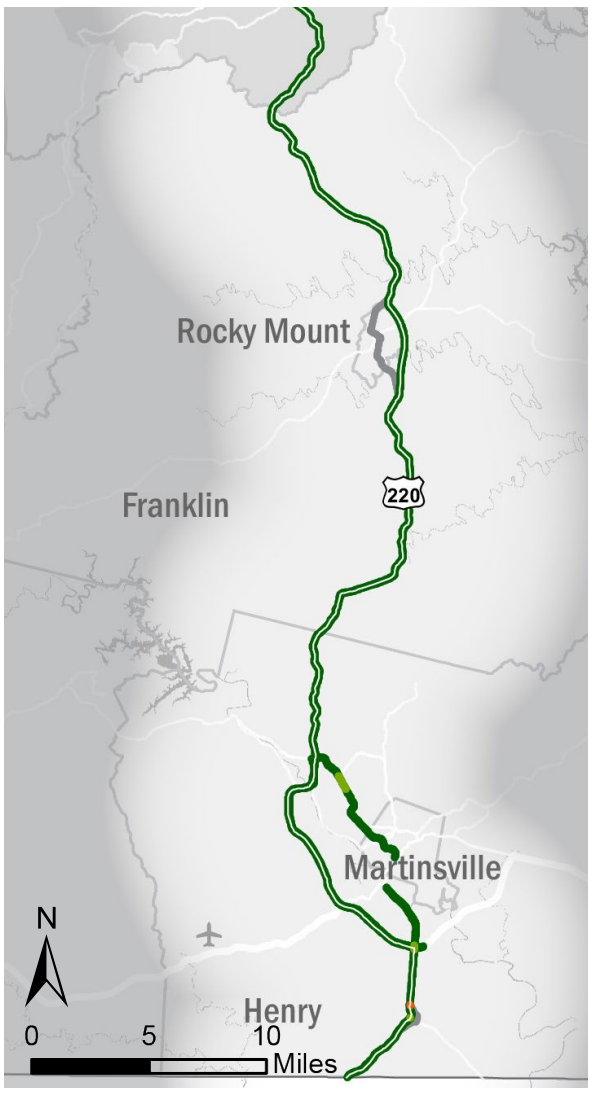
Reliability of travel during a typical weekday ranges from 0.01 to 0.67 in terms of reliability index, with an average value of 0.08. While Segment F1 has a lower weekday reliability index than average for the CoSS segments statewide, two locations on US 220 near Ridgeway in Henry County have reliability index values exceeding the statewide threshold.

Weekend

Reliability of travel during a typical weekend ranges from 0.00 to 0.71 in terms of reliability index, with an average value of 0.07. While Segment F1 has a lower weekend reliability index than average for the CoSS segments statewide, a short segment of US 220 near Ridgeway in Henry County has a reliability index value exceeding the statewide threshold.





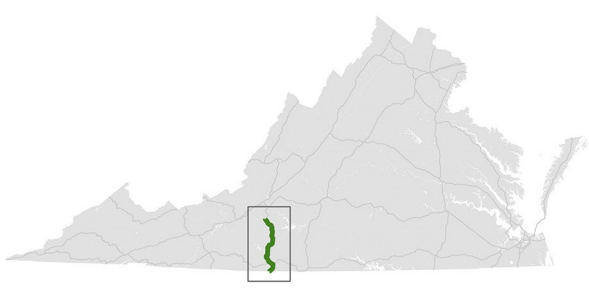


Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

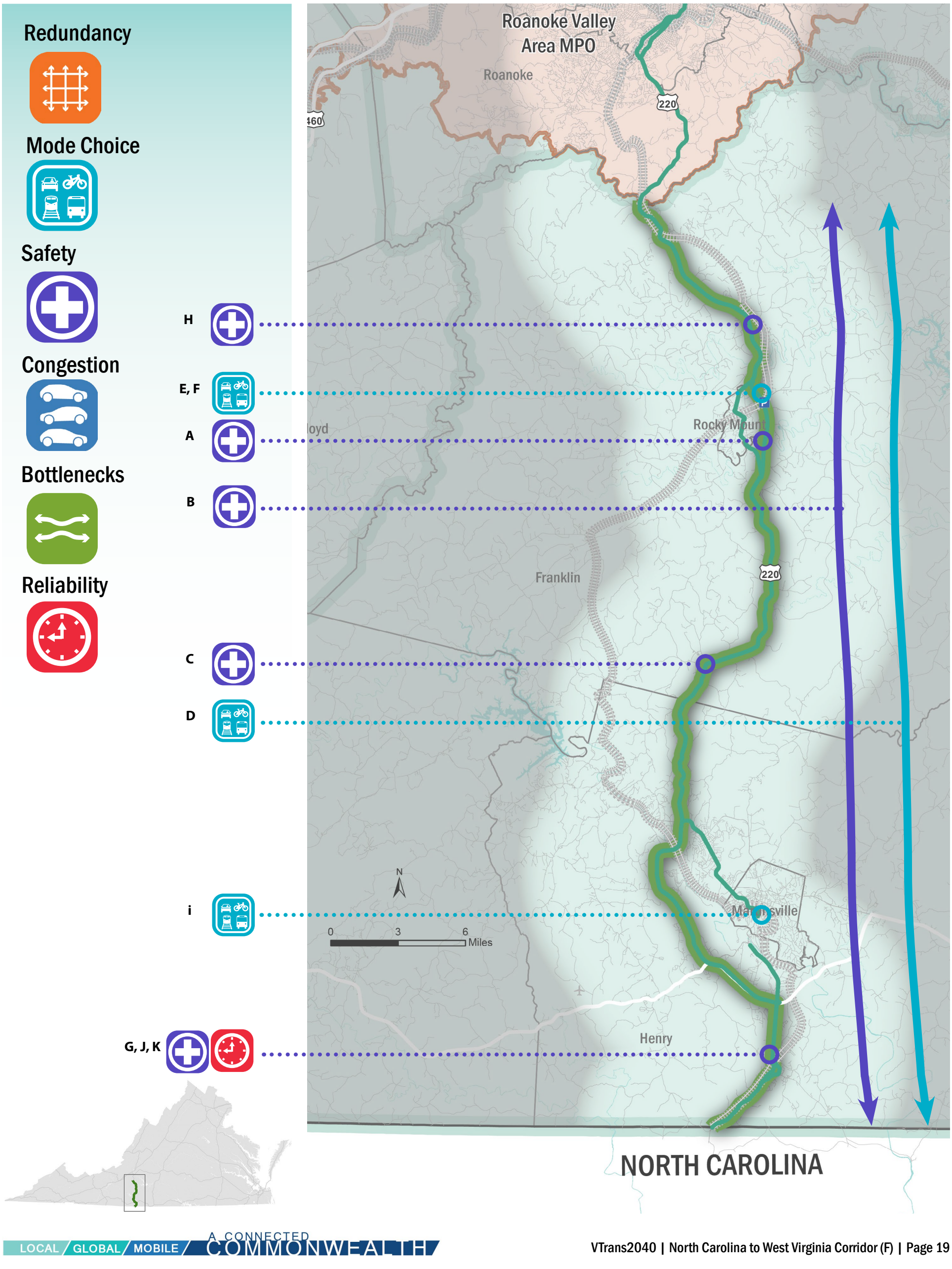
Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60



Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.



F1 SEGMENT NEEDS

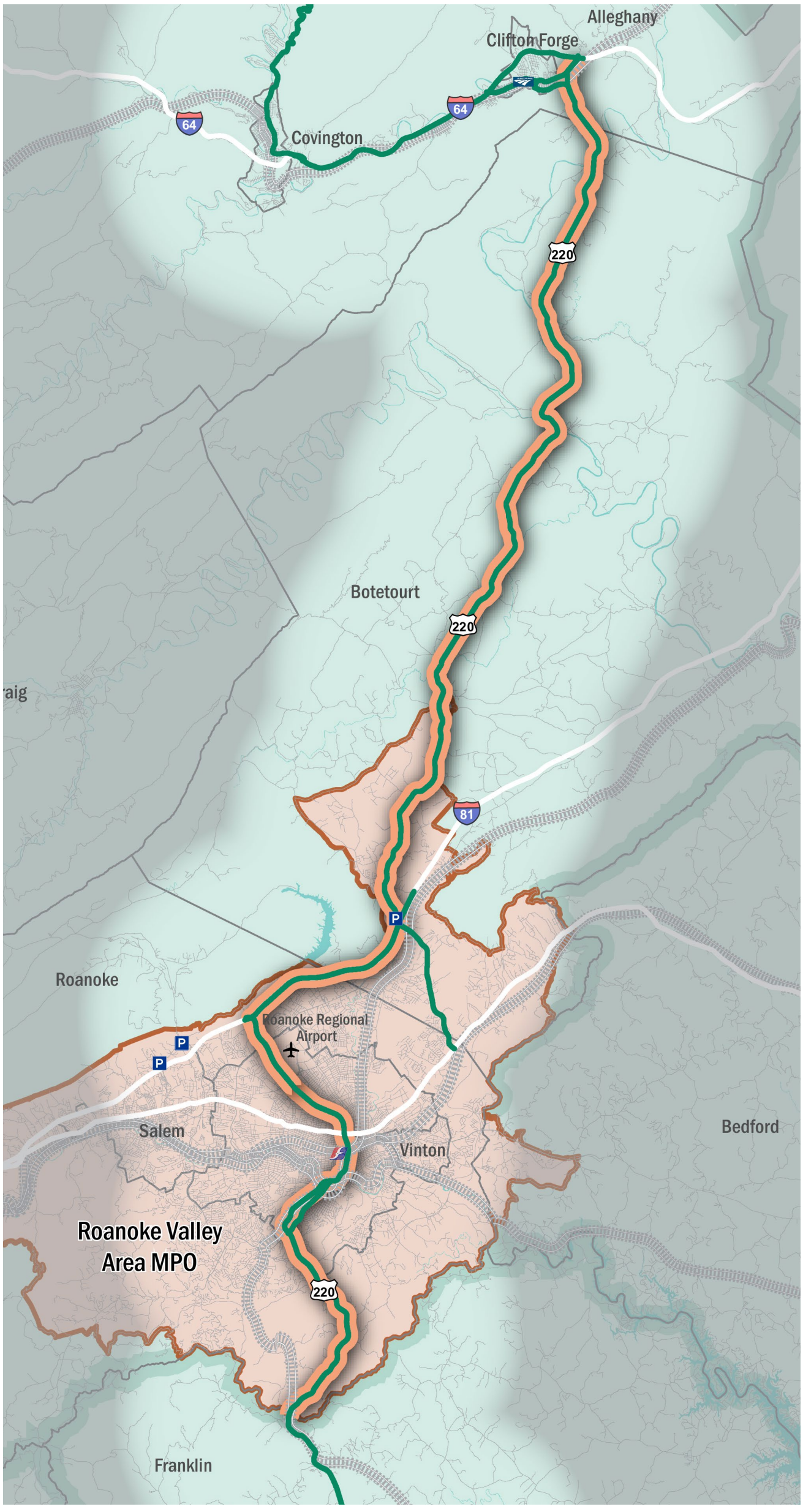
Summary of Needs - F1 Segment

A.		Safety issues caused by intersection geometry at US 220-Business at VA 40 in Rocky Mount
B.		US 220 in Franklin & Henry Counties: roadway geometry including sweeping turns and narrow shoulders not conducive to significant levels of truck traffic.
C.		US 220 between Goose Dam Road and Henry Rd in Franklin County: 20 severe crashes. Sharp horizontal curve at Henry Rd a safety concern for trucks.
D.		No bus or passenger rail service from Martinsville to other cities and towns in the corridor
E.		No bus or passenger rail service from Rocky Mount to other cities and towns in the corridor
F.		Park and Ride lot in Rocky Mount has a higher utilization rate than statewide average
G.		US 220 between Church St and Morehead Ave in Ridgeway: 15 severe crashes
H.		US 220 between Iron Ridge Rd and Wooddale Dr in Franklin County: 30 severe crashes
I.		Congestion issue at US 220 and Main Street in Ridgeway
J.		Reliability issue at US 220 and VA Route 87 (Morehead Avenue) in Ridgeway
K.		Reliability issue at US 220 and Main Street in Ridgeway

III. Segment F2

Corridor Segment F2 Components

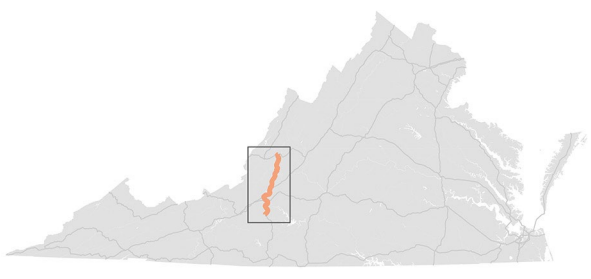
- US 220
- US 220 Business
- US 220 Alt
- Norfolk Southern
- Roanoke Regional Airport



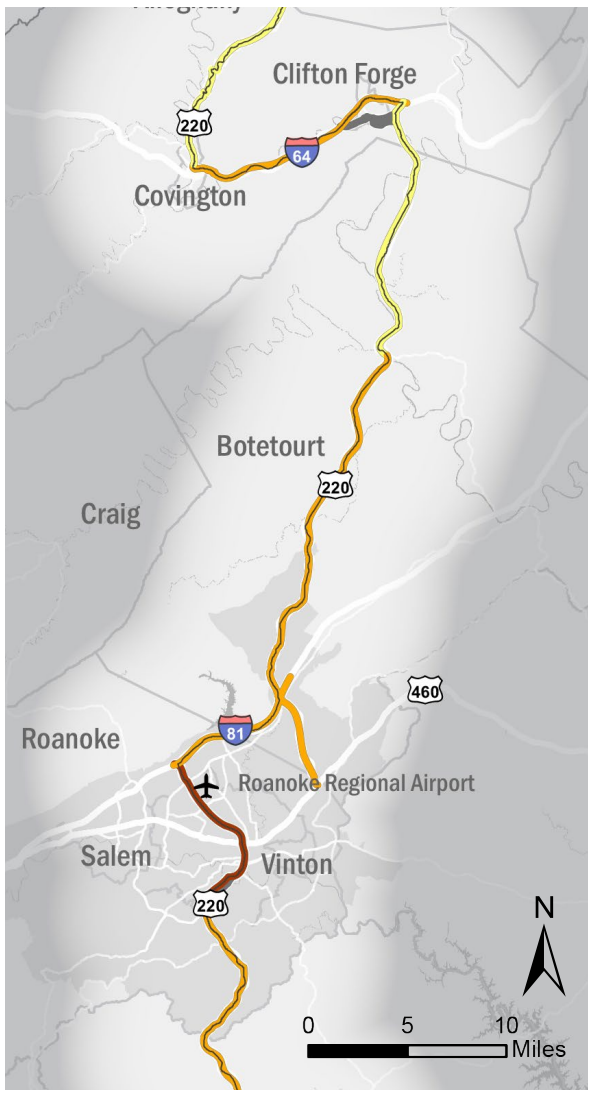
Segment F2

Corridor Component Road
Railroad
Airport Facility
Amtrak Facility
Greyhound Facility
VRE Facility
Metrorail Facility
Port Facility
Park & Ride Facility

MPO Area
Planning District Area

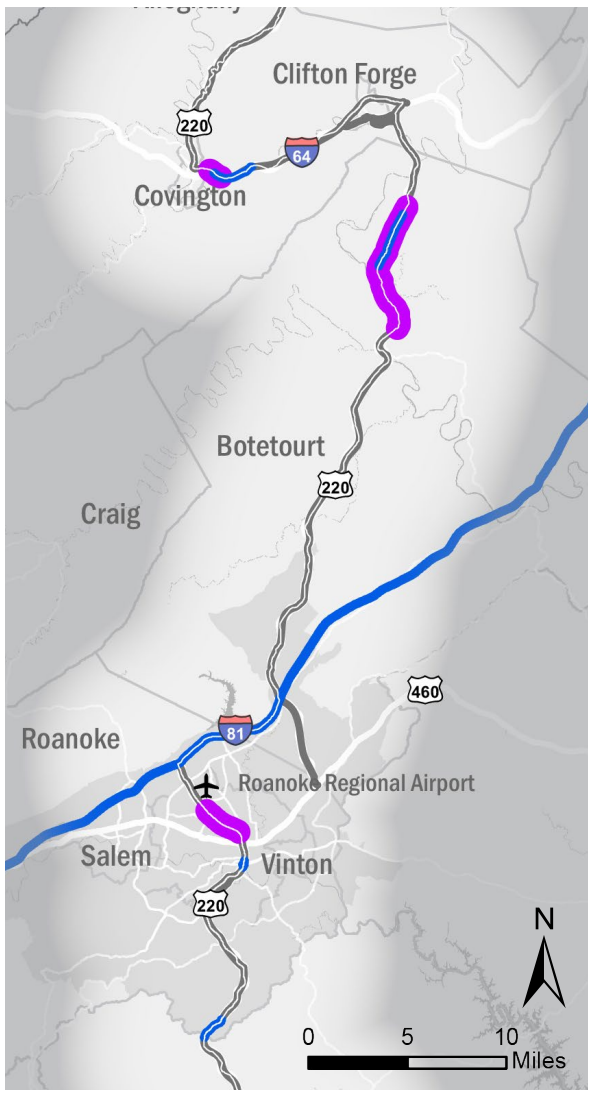


F2 SEGMENT PROFILE



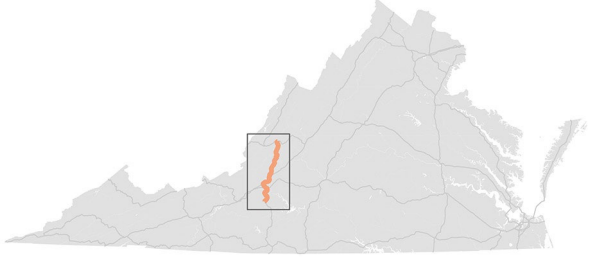
Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility



Future Projects

- Reconstruction with added capacity
- Safety improvements
- Primary facility



Segment F2 traverses the area covered by the Roanoke Valley Area, serving Roanoke and Botetourt Counties, and a portion of Alleghany County, in addition to the City of Roanoke, and terminating at the junction with I-64 near Clifton Forge. The primary facility is US 220, which serves as both a local access road through southwestern Virginia and as a throughway between North Carolina and West Virginia. In Roanoke, as the segment overlaps with I-81 and I-581, it serves as the main through corridor. North of Roanoke, the segment provides access to small communities and rural areas.

The section of US 220 between I-81 and I-64 (between Roanoke and Clifton Forge) is frequently used as a connection between the two interstates instead of the longer route through Lexington to the north and east. This connection is primarily used for freight travel between southern Virginia and areas west, though passenger travel also utilizes this route.

Highway Facilities: In this segment, US 220 is primarily a four-lane roadway. Through Roanoke, it runs concurrently with I-581 (six lanes) and I-81 between Exit 143 and Exit 150 where it is a six-lane facility. North of I-81, US 220 continues as a four-lane facility until approximately 20 miles north of Roanoke before transitioning to a two-lane rural facility. Segment F2 also includes US 220 Business in the southern portion of the City of Roanoke and US 220 Alternate connection US 220 and US 221 in Botetourt County.

Transit Services: Roanoke Area Dial-a-Ride (RADAR) provides an express bus service between Iron Gate and Covington in Alleghany County, called the Alleghany Highlands Mountain Express, a portion of which operates on Segment F2. In addition, Greyhound service is available in Roanoke, and six Park-and-Ride locations are located in the corridor.

Rail Facilities: Norfolk Southern rail lines, which provide freight rail access in this region, run within the North Carolina to West Virginia Corridor between Martinsville and Roanoke, connecting to the Crescent Corridor and Heartland Corridor in Roanoke.

Port Facilities: No port facilities are directly accessible from Segment F1.

Airport Facilities: The Roanoke Regional Airport provides commercial air service to several major cities and connecting service to the hubs of four major airlines. This airport also provides general aviation service.

Major planned and future projects include:

City of Roanoke:

- Complete the interchange at Valley View Boulevard and construct auxiliary lanes west of Valley View Boulevard ramps connecting to the Hershberger Road ramps.

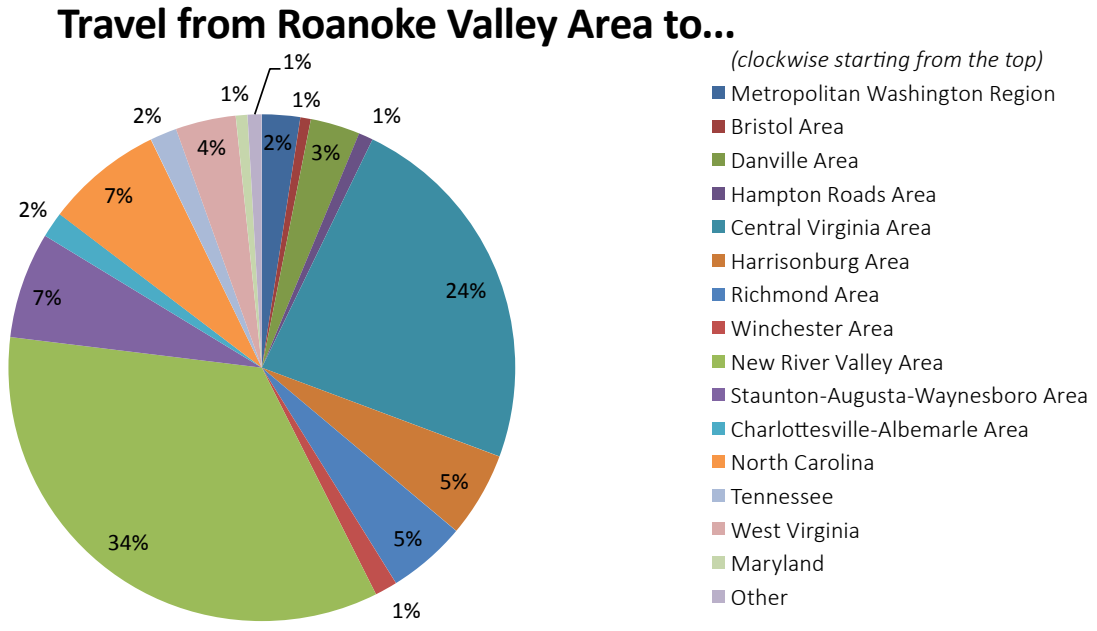
Botetourt County:

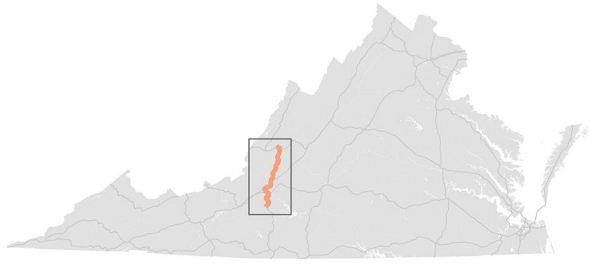
- Reconstruction with added lanes from just south of Route 43 to about a half-mile north of Route 696 to include roadway striping, raised pavement markers, regrading existing shoulders, upgrading or installing guard rail, replacing narrow bridges, and turn lane improvement;
- Widen US 220 from two to four lanes just south of Route 722; and
- Access management project for US 220 and US 220 Alternate near I-81 Exit 150.

Travel Demand

Passenger Demand

Segment F2 traverses the Roanoke Valley Area, and provides connections between I-64 in the north (Corridor C) and I-81 (Corridor B) and US 460 (Corridor E) in the south. Of the intercity passenger travel originating in the Roanoke Valley Area, seven percent is destined for North Carolina and four percent is destined for West Virginia. Depending on the ultimate destination within those states, these travelers may use Segment F2 for their trips. In addition, three percent of intercity travel from the Roanoke Valley Area is destined for the Danville area using Segment F1.





F2 SEGMENT PROFILE

Freight Demand

By truck, Segment F2 carried six million tons of freight worth $9 billion in 2012, and is estimated to carry eight million tons of freight worth $11 billion in 2025. The major truck freight patterns on this corridor are interstate through movements, accounting for approximately 55 percent of the total truck tonnage and more than 64 percent of the total corridor truck freight value. There are significant flows on Corridor F between the Southeastern and Middle Atlantic regions. North Carolina, Pennsylvania, and Tennessee are major truck freight generators on this corridor, accounting for more than 20 percent of truck tonnage on Corridor F. North Carolina, New York, and Pennsylvania are major truck freight attractors on Corridor F, accounting for 24 percent of truck tonnage. Within Segment F2, Botetourt County and the City of Roanoke have significant truck freight flow movements to and from North Carolina and Pennsylvania, accounting for between one and three percent of the total truck freight corridor tonnage.

By rail, Segment F2 carried six million tons of freight worth $710 million in 2012, and is estimated to carry six million tons of freight worth $920 million in 2025. In terms of tonnage, the largest rail flow on Corridor F is from West Virginia to North Carolina, accounting for more than 44 percent of the total rail tonnage in the corridor. Another significant rail freight movement on Corridor F is from West Virginia to South Carolina, accounting for more than 14 percent of the total rail tonnage on the corridor. In terms of value, the largest rail freight movements on Corridor F are between Ohio and the Carolinas, accounting for more than 26 percent of the total rail value. The jurisdictions adjacent to Segment F2 are major generators and attractors of rail freight on Corridor F. In terms of value, 29 percent of the rail freight is generated along this segment and approximately 20 percent of the rail freight is destined for the area jurisdictions along Segment F2. There is a major rail freight movement from the City of Roanoke to West Virginia, accounting for about ten percent of the total rail freight value on the corridor.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (26% / 27%)
2. North Carolina (10% / 9%)
3. Tennessee (7% / 7%)
4. Pennsylania (7% / 7%)
5. New Jersey (5% / 5%)

Corridor Tonnage Originating in Segment F2: 7% / 7%

Major Origin-Destination Pairs for Freight
North Carolina and Pennsylvania
North Carolina and New York
New York and Georgia
New York and Tennessee
New Jersey and Texas

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (27% / 27%)
2. North Carolina (8% / 8%)
3. New York (8% / 8%)
4. Pennsylvania (8% / 8%)
5. New Jersey (5% / 5%)

Corridor Tonnage Destined for Segment F2: 8% / 7%

Rail Freight

Major Origins (by Tonnage)
1. West Virginia (70% / 62%)
2. Virginia (13% / 17%)
3. City of Roanoke (11% / 13%)
4. South Carolina (6% / 7%)
5. North Carolina (5% / 6%)

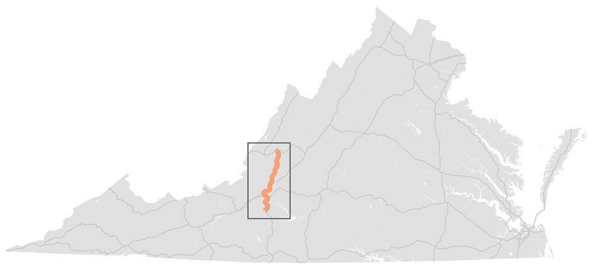
Corridor Tonnage Originating in Segment F2: 12% / 14%

Major Origin-Destination Pairs for Freight
City of Norfolk* and West Virginia
Wise County and City of Norfolk*
Buchanan County and City of Norfolk*
Wise County and Georgia
City of Norfolk* and Kentucky

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. North Carolina (51% / 46%)
2. South Carolina (17% / 15%)
3. Virginia (10% / 12%)
4. Ohio (7% / 8%)
5. West Virginia (4% / 5%)

Corridor Tonnage Destined for Segment F2: 7% / 9%

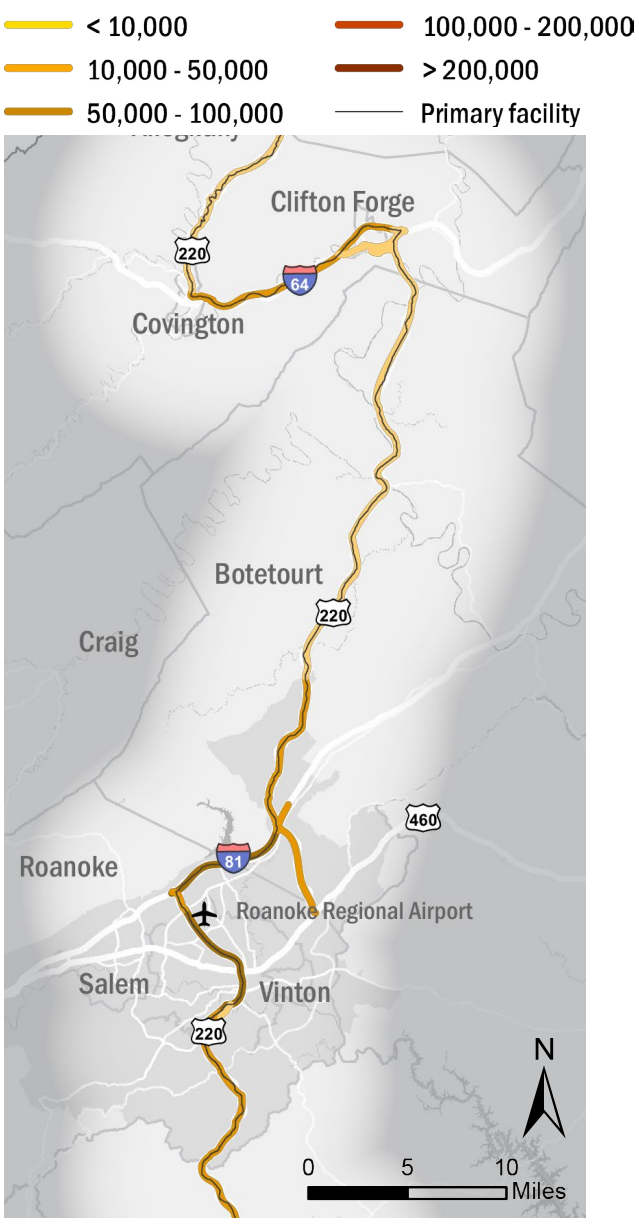


Traffic Conditions

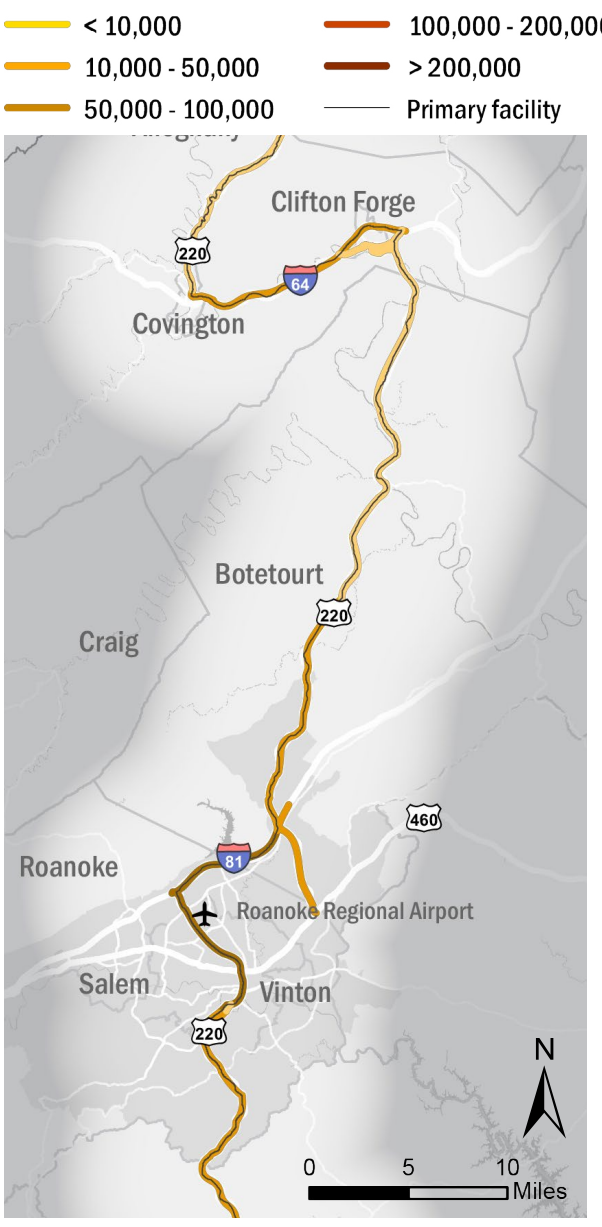
Traffic Volume

Traffic volume on Segment F2 is high compared to traffic volumes throughout the rest of Corridor F and varies considerably based on location. Volumes on the segment are highest where US 220 runs concurrently with I-81 and I-581, where they can reach more than 76,000 vehicles per day. South of US 220 Business in Roanoke County average daily traffic volumes range from 29,000 to 37,000 vehicles. Along US 220 north of the area covered by the Roanoke Valley Area, traffic volumes are less than 9,000 vehicles per day. By 2025, traffic growth is expected throughout the corridor, with the highest growth forecasted where US 220 runs concurrently with I-81 and I-581.

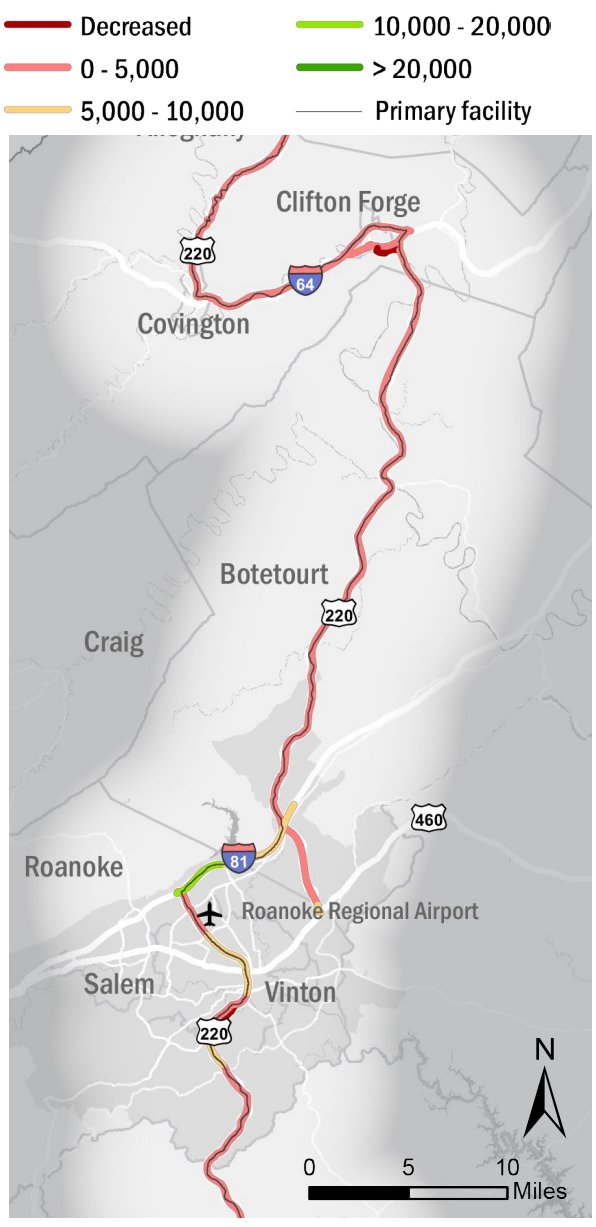
Traffic Volume 2014 (AADT)

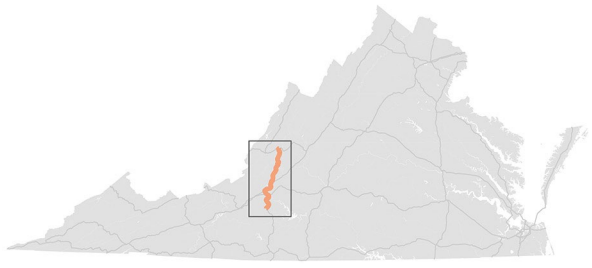


Traffic Volume 2025 (AADT)

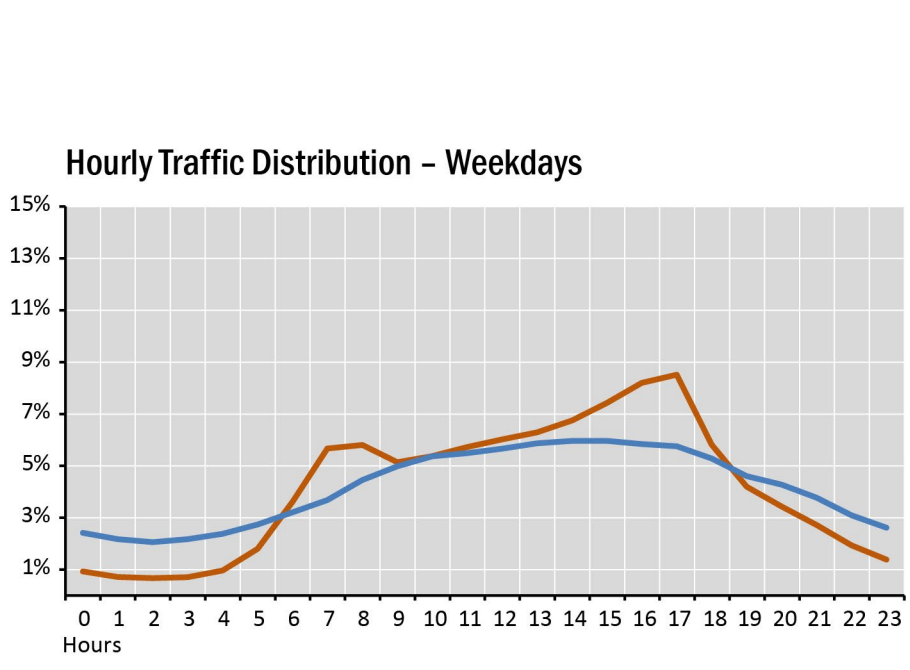


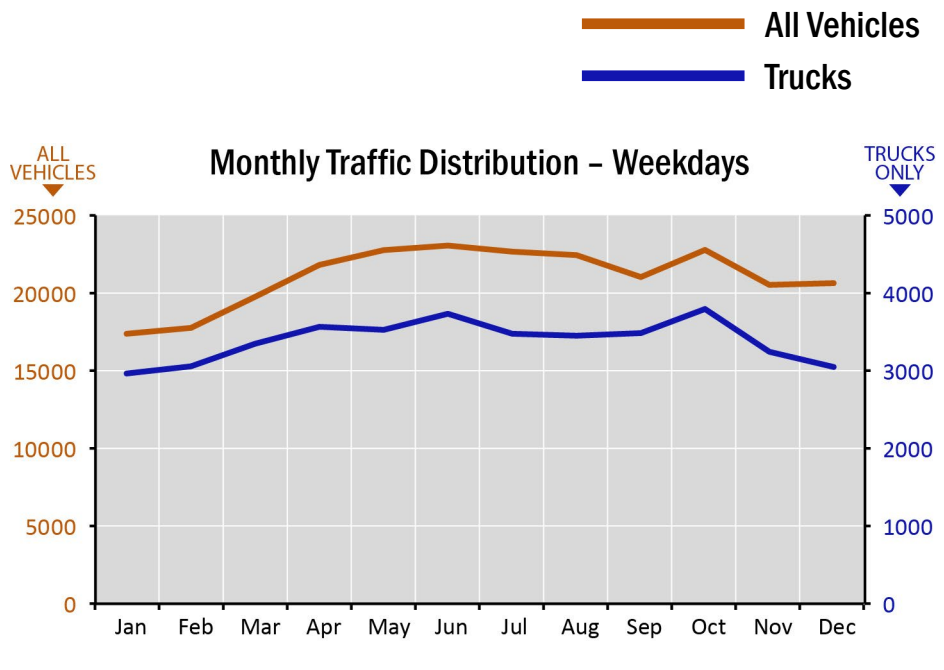
Change in Traffic Volume 2014- 2025 (AADT)

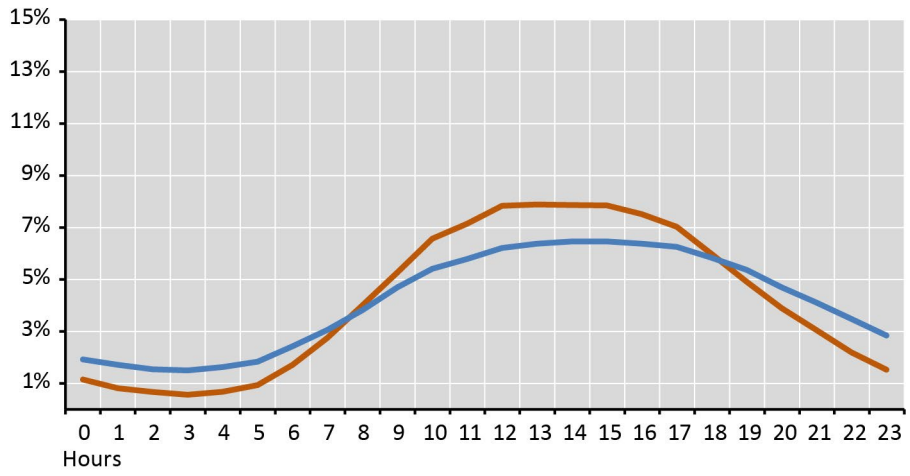


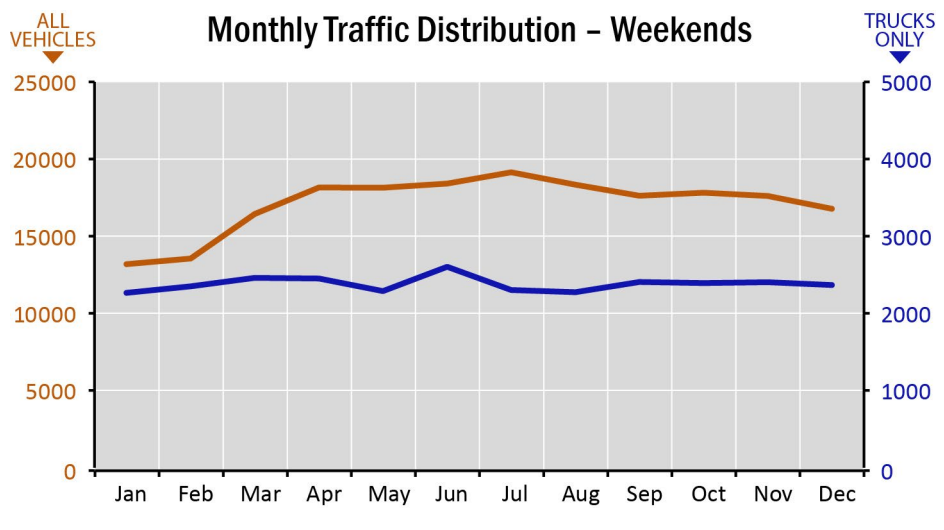


F2 SEGMENT PROFILE





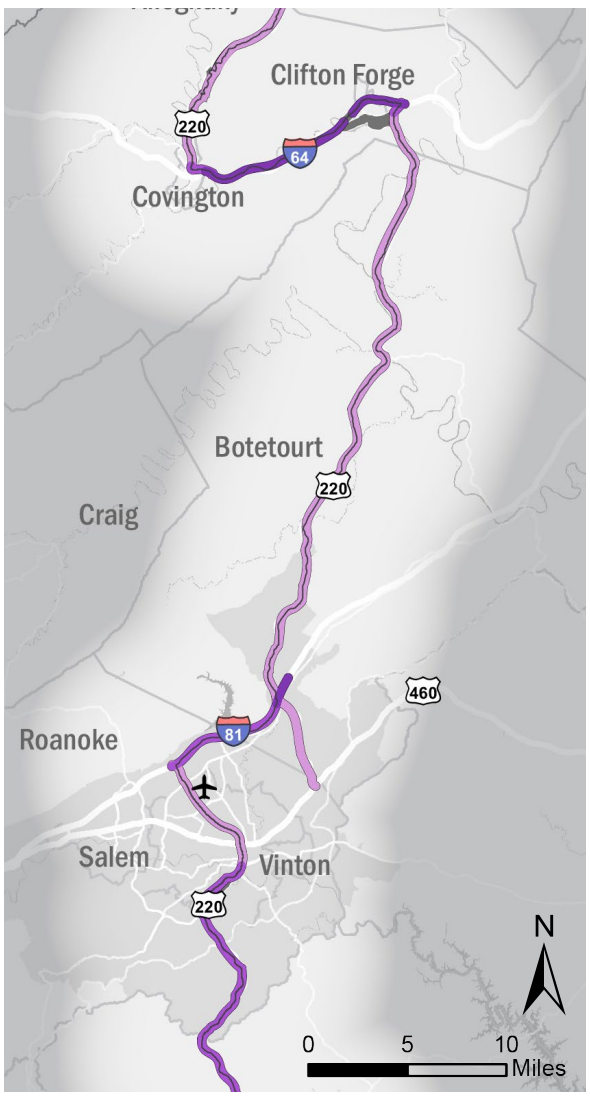




Traffic Distribution

On average, traffic on Segment F2 is distributed throughout the day as shown in the graphs below. Weekday traffic shows two peak periods over the course of the day. The evening peak hour is between 5 and 6 p.m. (8.5 percent of daily traffic) and a less busy morning peak between 8 and 9 a.m. accounting for 5.8 percent of daily traffic. The combined weekday traffic from 7 a.m. to 7 p.m. period accounts for 77 percent of total daily traffic. Peaking patterns for truck traffic are different from other traffic with a single peak during the midday period with a peak hourly flow of six percent of daily traffic between 3 and 4 p.m. Weekend traffic shows a single midday peak for between 1 and 2 p.m. (7.9 percent of daily traffic) for all traffic, and 2 to 3 p.m. (6.5 percent of daily traffic) for truck traffic.

Weekday traffic volumes on Segment F2 vary by as much as 33 percent throughout the year, with the highpoint in June (around 23,000 vehicles per day) and the low point in January (around 17,000 vehicles per day). Truck volumes also vary throughout the year, with the October high (around 4,000 vehicles per day) 28 percent higher than the January low (around 3,000 vehicles per day). Weekend traffic levels also vary over the course of the year, and the highest levels of weekend traffic (July, around 19,000 vehicles per day) are 45 percent higher than January levels (around 13,000 vehicles per day). Weekend truck traffic is steadier than all vehicle traffic, with the June high 15 percent higher than the January low. Truck volumes account for a significant portion of traffic on Segment F2 (16 percent of overall daily traffic for weekdays and 14 percent of overall daily traffic for weekends); as a result truck traffic has an impact on overall traffic conditions.

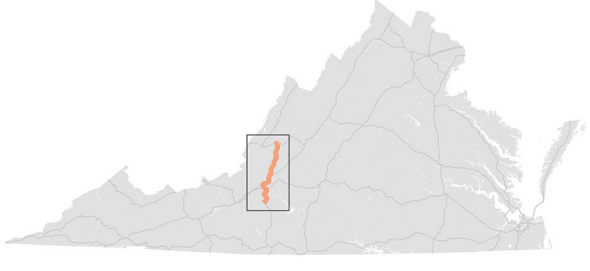


Truck Volumes

The percent of average daily traffic comprised of heavy trucks on Segment F2 varies considerably based on location. Trucks comprise three percent of daily traffic on US 460 in Botetourt County and in the City of Roanoke where US 460 runs concurrently with I-581. On the portion of US 460 that runs concurrently with I-81, heavy trucks comprise between ten and fifteen percent of daily traffic. Elsewhere is Segment F2, heavy trucks comprise five to six percent of daily traffic.

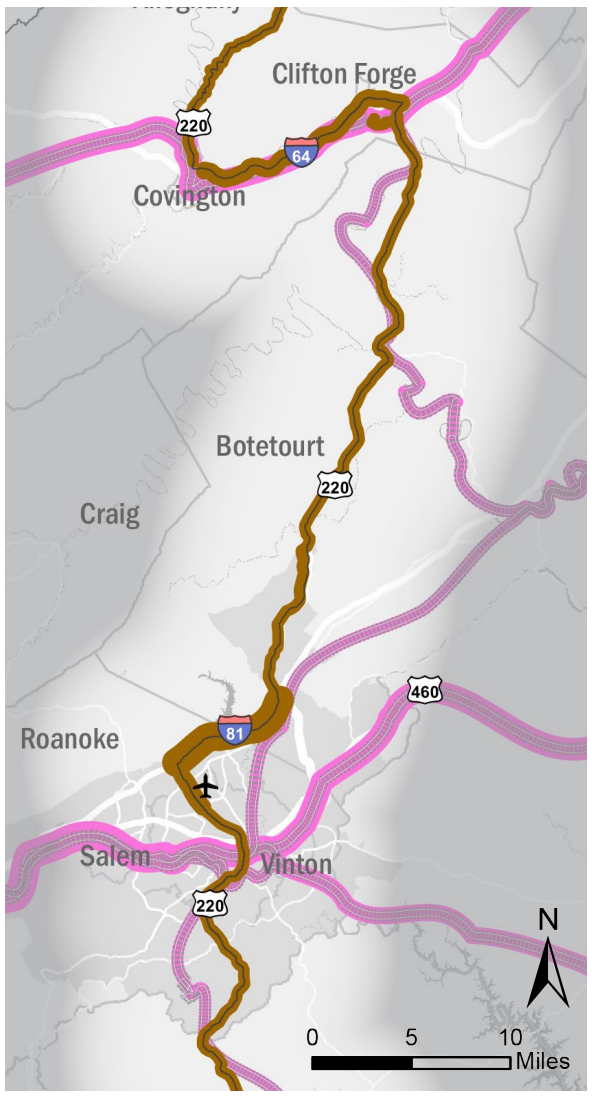
Percent Heavy Trucks

- < 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- > 20%
- Primary facility



F2 SEGMENT PROFILE

Annual Freight by Tonnage, 2012

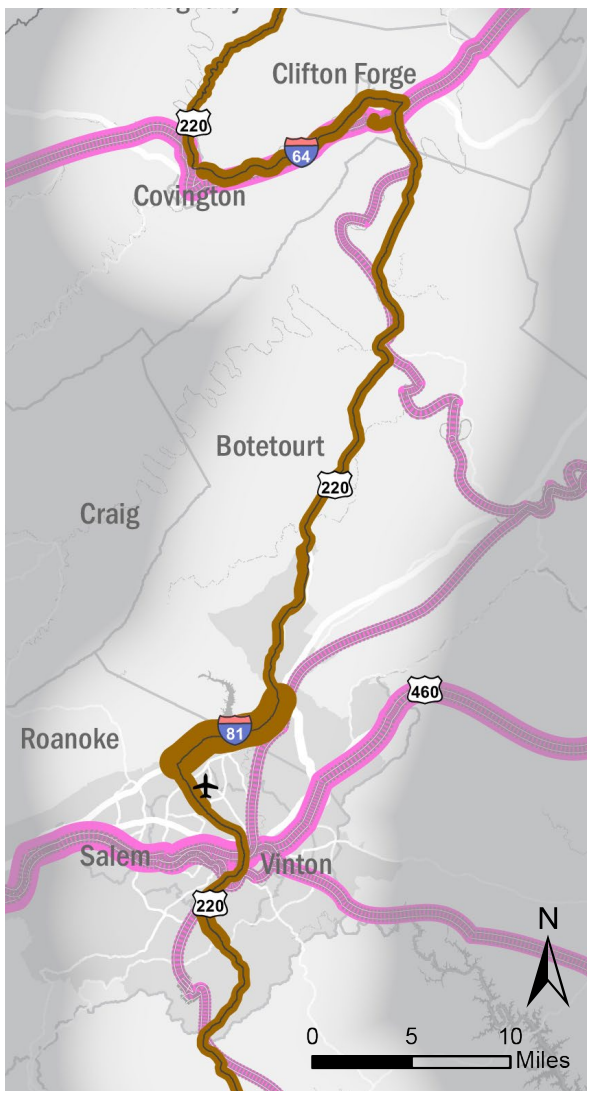


Freight Flows

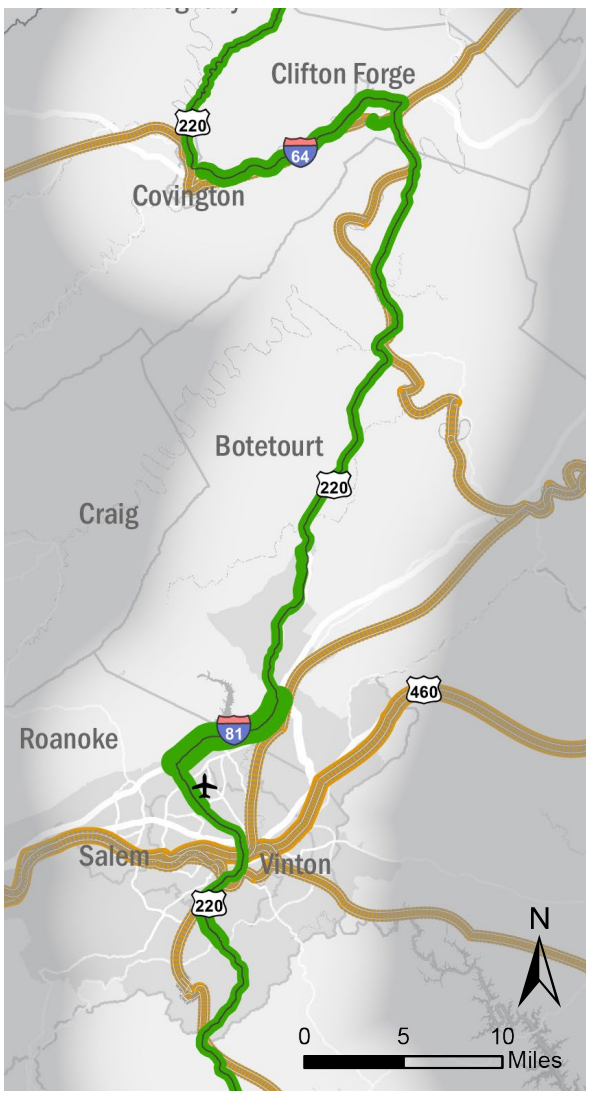
South of the City of Roanoke freight on Segment F2 is moved primarily by truck in relation to both tonnage and value. In total, more than six million tons (71 percent) of freight is moved through this section of Segment F2 by truck, compared to less than three million tons (29 percent) by rail. By value, $8.5 billion (92 percent) of freight value travels by truck, compared to $711 million (eight percent) by rail. On average, a ton of freight traveling through this section of Segment F2 by truck is worth $1,352 while a ton of freight traveling by rail is worth $275. In 2025, both rail and truck freight tonnages and total values in this area of Segment F2 are expected to increase. The percentage of freight traveling by truck is expected to increase by both tonnage and value to 74 percent and 92 percent, respectively. It is anticipated that freight value per ton on trucks and rail will increase to $1,383 and $337, respectively.

In the northern portion of Segment F2 in Botetourt County, freight is moved primarily by rail in relation to tonnage and by truck in relation to value. In total, just over one million tons (17 percent) of freight is moved through this section of Segment F2 by truck, compared to almost six million tons (83 percent) by rail. By value, $645 million (52 percent) of freight value travels by truck, compared to $584 million (48 percent) by rail. On average, a ton of freight traveling through this section of Segment F2 by truck is worth $547 while a ton of freight traveling by rail is worth $104. In 2025, both rail and truck freight tonnages and total values in this area of Segment F2 are expected to increase. The percentage of freight traveling by truck is expected to increase by both tonnage and value to 23 percent and 52 percent, respectively. It is anticipated that freight value per ton on trucks and rail will increase to $562 and $157, respectively.

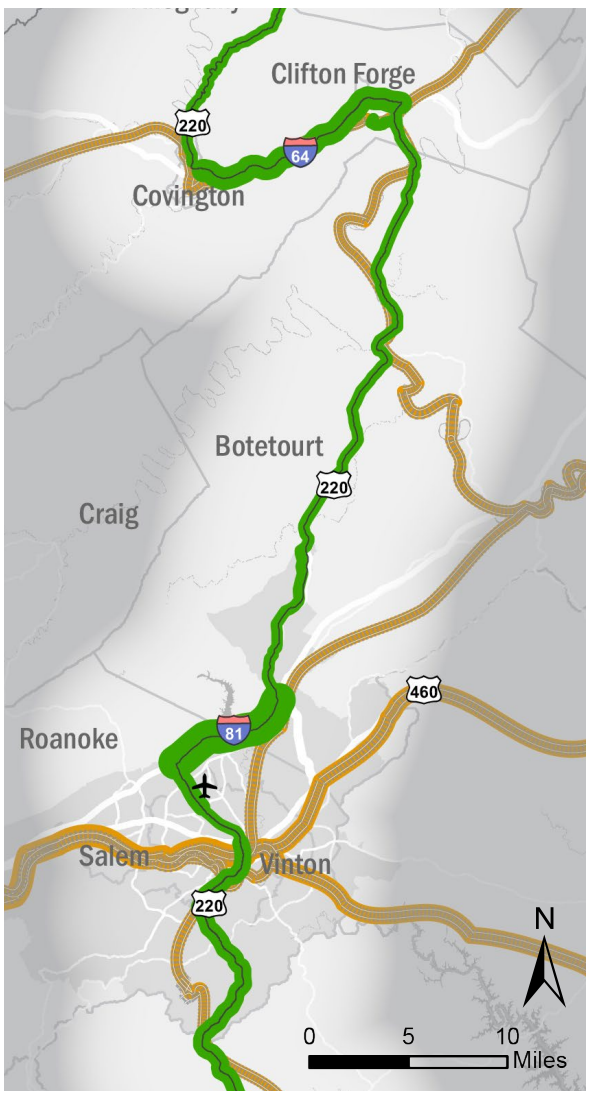
Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025



Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

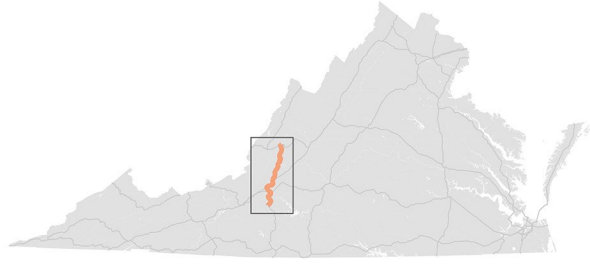
- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility



Redundancy and Mode Choice

Comparable Travel Options

Clifton Forge to Roanoke

Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $00 Est. Cost

Auto

Via Rt. 220: 0:55 Travel Time $27 Est. Cost

Roanoke to Martinsville

Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

Auto

Via Rt. 220: 1:05 Travel Time $28 Est. Cost

Roanoke to Franklin, WV

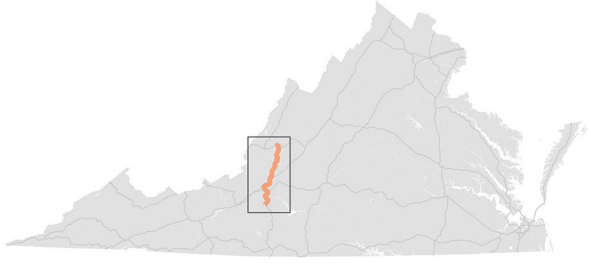
Inter-City Bus	*Train*
0 Trips per Day 0:00 Travel Time $0 Est. Cost	0 Trips per Day 0:00 Travel Time $0 Est. Cost

Auto

Via Rt. 220: 2:49 Travel Time $78 Est. Cost

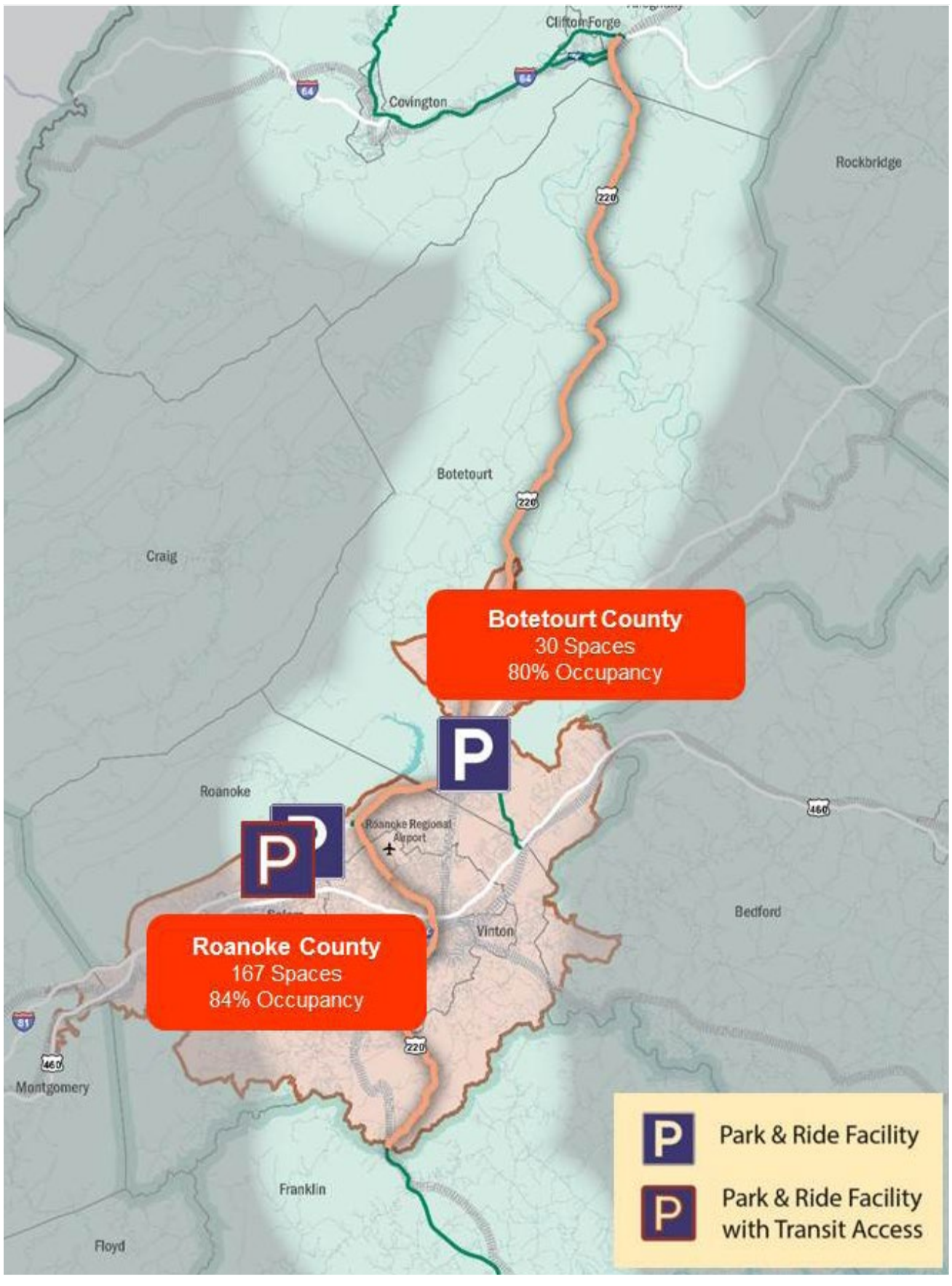
Park-and-Ride

Within Segment F2, commuters can utilize several Park-and-Ride facilities, all of which are located in Roanoke County. Roanoke County has six Park-and-Ride locations and a total of 167 spaces. The Park-and-Ride locations in Roanoke County are heavily used, at a rate of 84 percent, which is higher than the statewide average of 76 percent for Park-and-Ride utilization.



Passenger trips on Segment F2 have limited travel options, both in terms of travel path and mode choice. Aside from the portion within the Roanoke Valley Area, there are no parallel facilities to US 220 in Segment F2. Where US 220 runs concurrently with I-81 and I-581, parallel facilities including US 11 are available. Bus service for inter-city travel is extremely limited with service Thursday to Sunday only between Ferrum College and downtown Roanoke, and the Alleghany Highlands Mountain Express, which connects Iron Gate and Covington. Greyhound offers service from Roanoke, but its routes do not facilitate travel along the corridor.

Park and Ride Facitilities



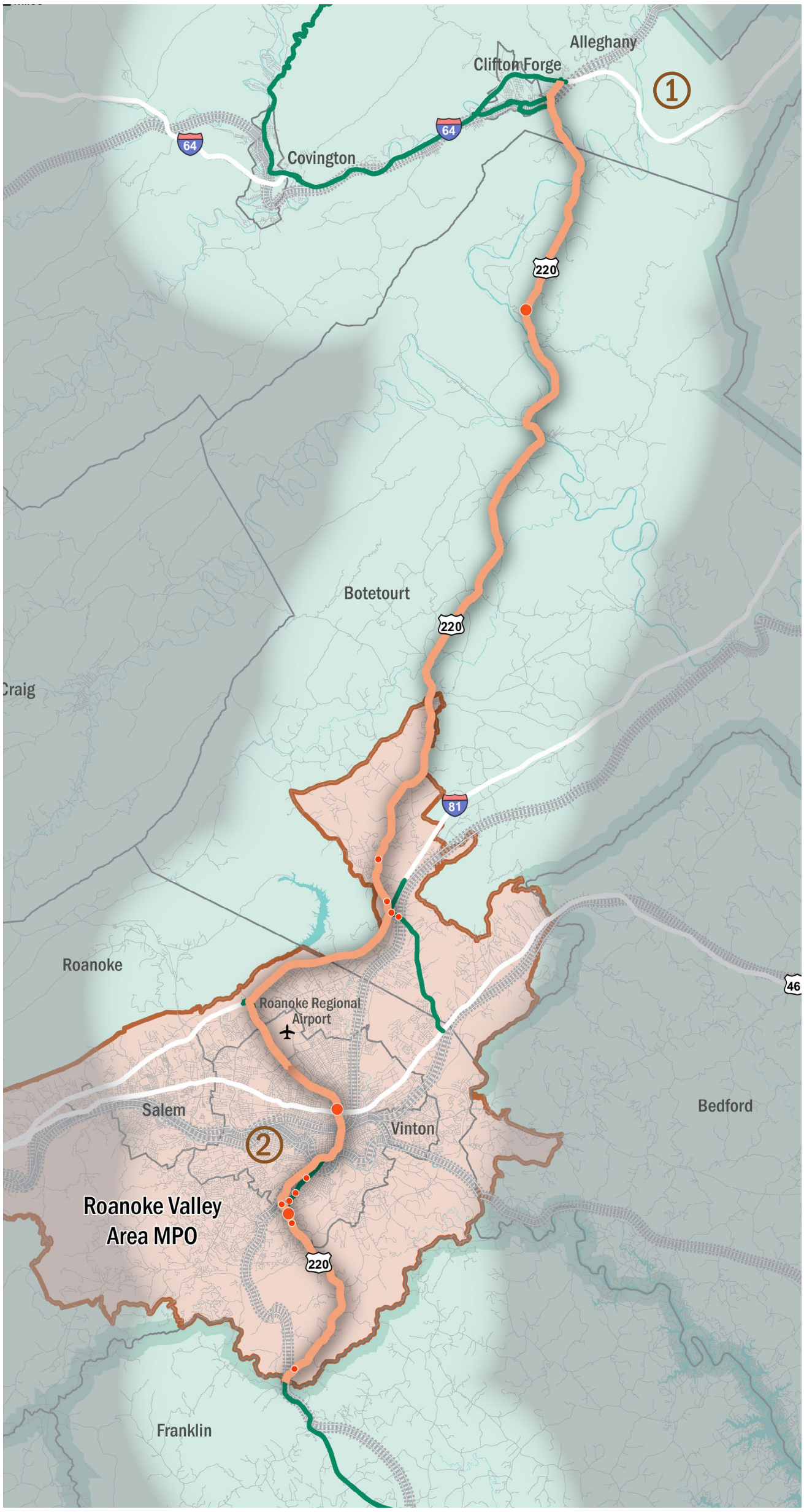
F2 SEGMENT NEEDS

Safety

Performance Metrics

Number of Severe Crashes	50
Severe Crashes/Million VMT	0.5
Number of Railroad Crashes	3

Between 2010 and 2012, 50 severe crashes occurred on Segment F2, clustered in a few locations. On US 220 (Franklin Road) in Roanoke, 12 crashes took place over a distance of 0.9 miles between the exit to Route 419 (Electric Road) and Pheasant Ridge Road SW; of these 12 crashes, seven occurred at the intersection with Southern Hills Drive SW. On US 220 Business in Roanoke, eight incidents occurred over 1.3 miles between Broadway Avenue SW and Penarth Road SW. On US 220 in Roanoke, there were seven collisions at the ramps just north of the interchange with US 460. In Botetourt County, on US 220 between Daleville and the US 220 Alternate (Cloverdale Road) just south of I-81, there were 13 incidents over approximately three miles from Glebe Road to Autumnwood Lane.

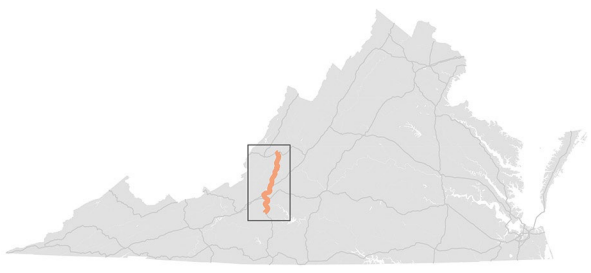


Fatality and Injury Crashes (2010 - 2012)

- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/Accidents per County (2011-2014)

#

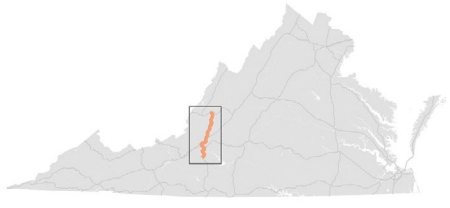


F2 SEGMENT NEEDS

Congestion

Performance Metrics

Person Hours of Delay per Mile	9
Freight Ton Hours of Delay per Mile	29.9K



Passenger Delays

Passenger congestion along Segment F2 is the highest among the three segments of the North Carolina to West Virginia Corridor (Corridor F), with around 1,200 person-hours of delay. Locations where delays exceed 250 person-hours per mile include:

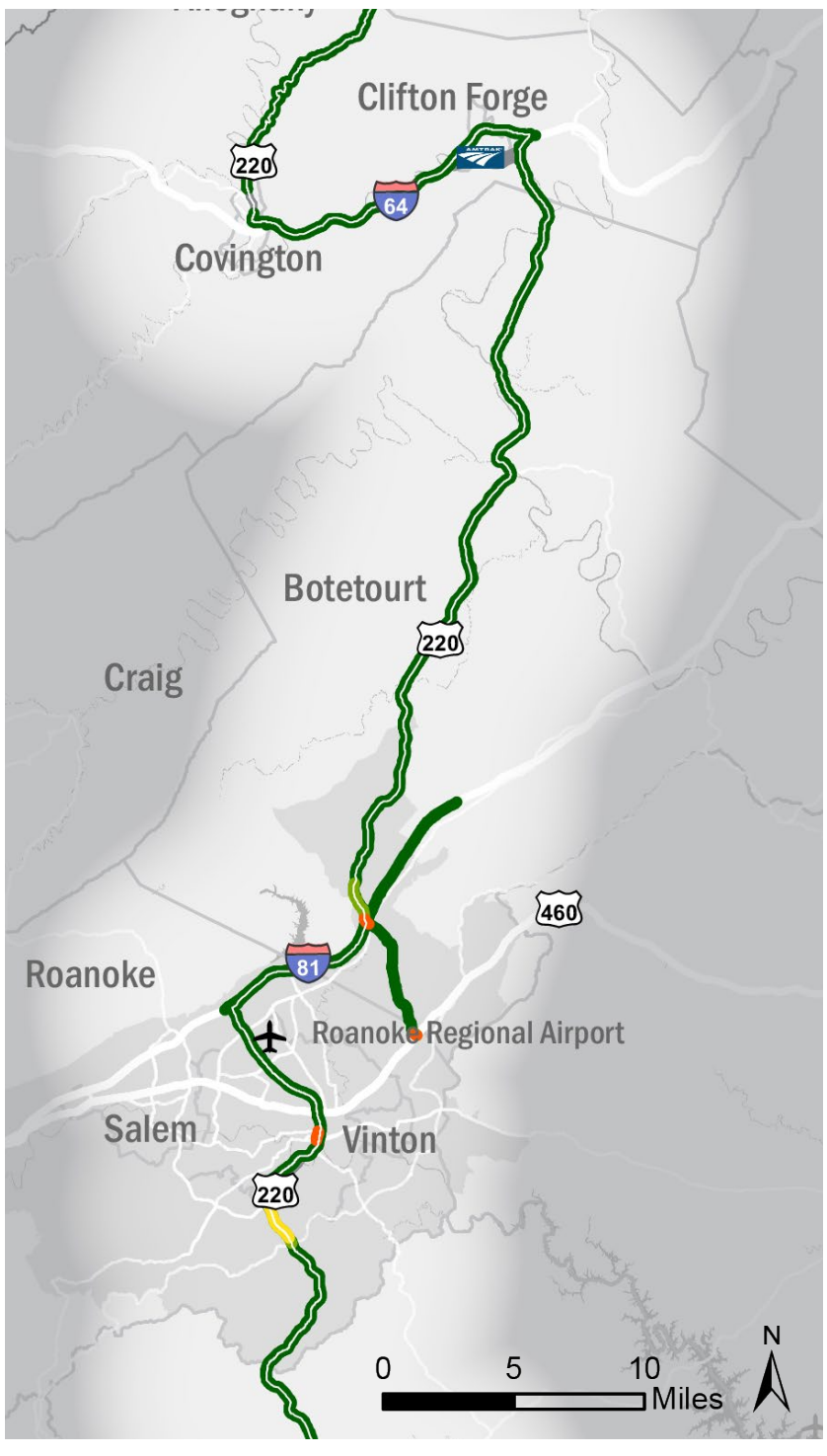
- US 220 south of US 220 Business within the City of Roanoke;
- Route 116 just south of US 11 in downtown Roanoke;
- US 220 Alternate at the interchange with I-81 in Botetourt County; and
- US 220 Alternate at the intersection with US 221/460 in Roanoke County.

Peak-period passenger delays account for around 30 percent of daily congestion, considerably below average for the peak-period share of congestion along CoSS segments.

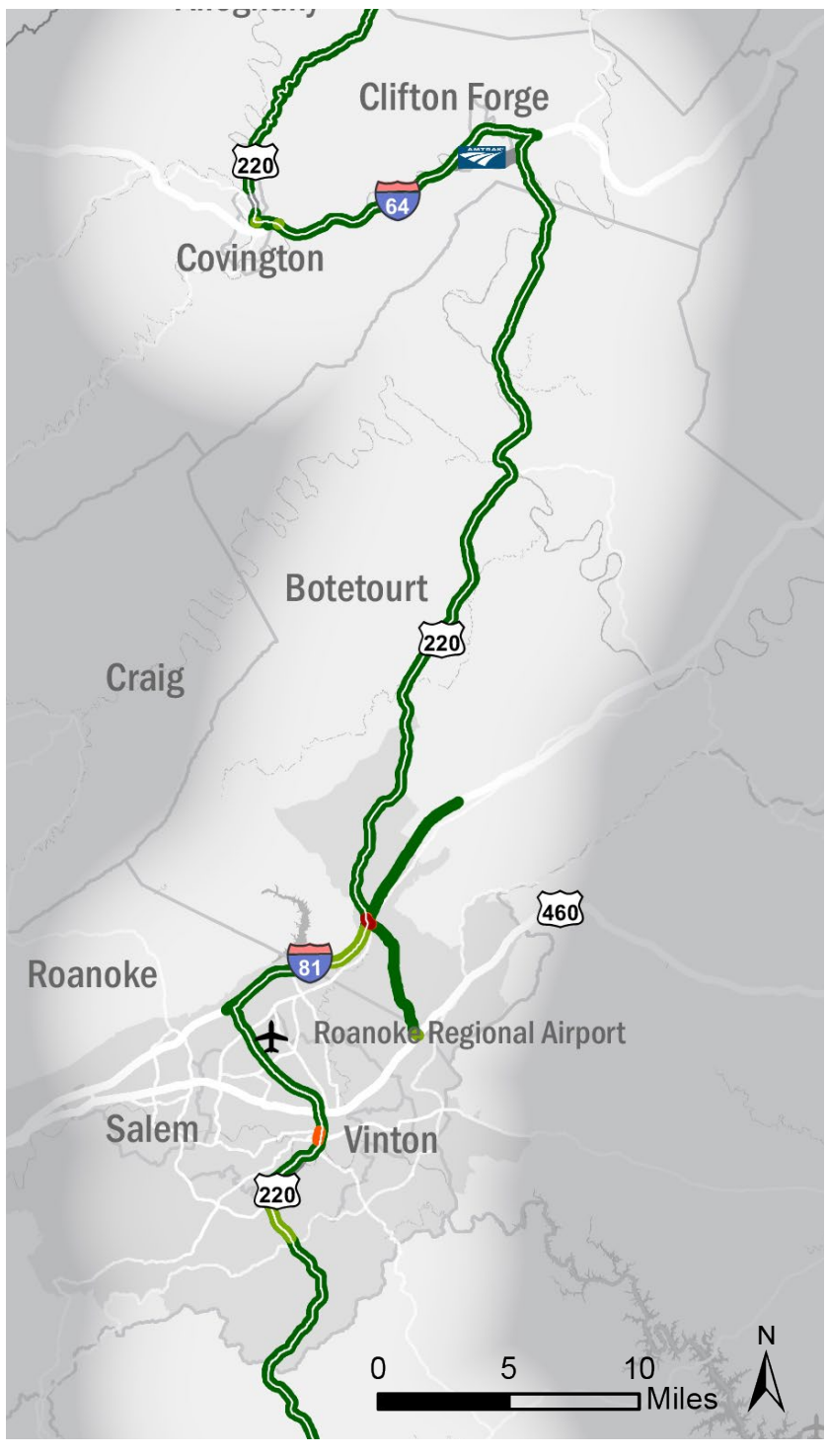
Freight Delays

Freight congestion along Segment F2 is the highest on the corridor, with over 3.8 million ton-hours of delay daily. On a per-mile basis, freight traffic experiences nearly 30,000 ton-hours per mile of delay on this segment. Freight delays follow similar pattern to passenger delay, and significant delays occur on Route 116 just south of US 11 in downtown Roanoke and on US 220 Alternate at the interchange with I-81 in Botetourt County. Peak-period freight delays along Segment F2 account for about 31 percent of daily congestion, which is slightly lower than average for the peak-period share of congestion along CoSS segments.

Daily Person Hours of Delay Per Mile



Daily Freight Ton Hours of Delay Per Mile



F2 SEGMENT NEEDS

Reliability

Weekday Peak

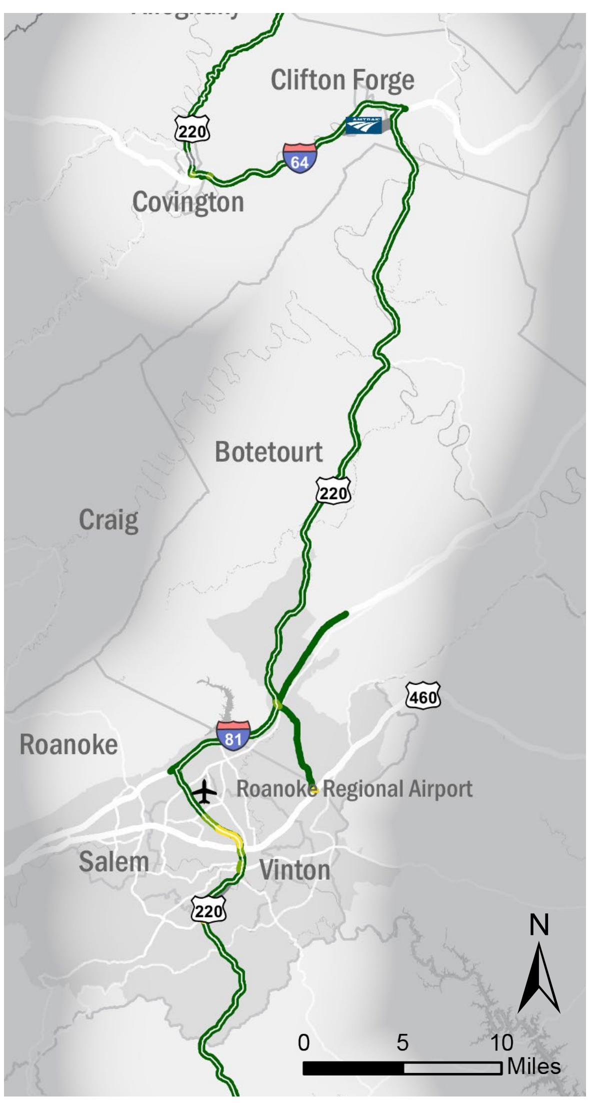
Reliability of travel during the peak period on a typical weekday on Segment F2 ranges from 0.02 to 0.56 in terms of reliability index, with an average value of 0.08. None of the locations along Segment F2 have reliability index values exceeding the statewide threshold.

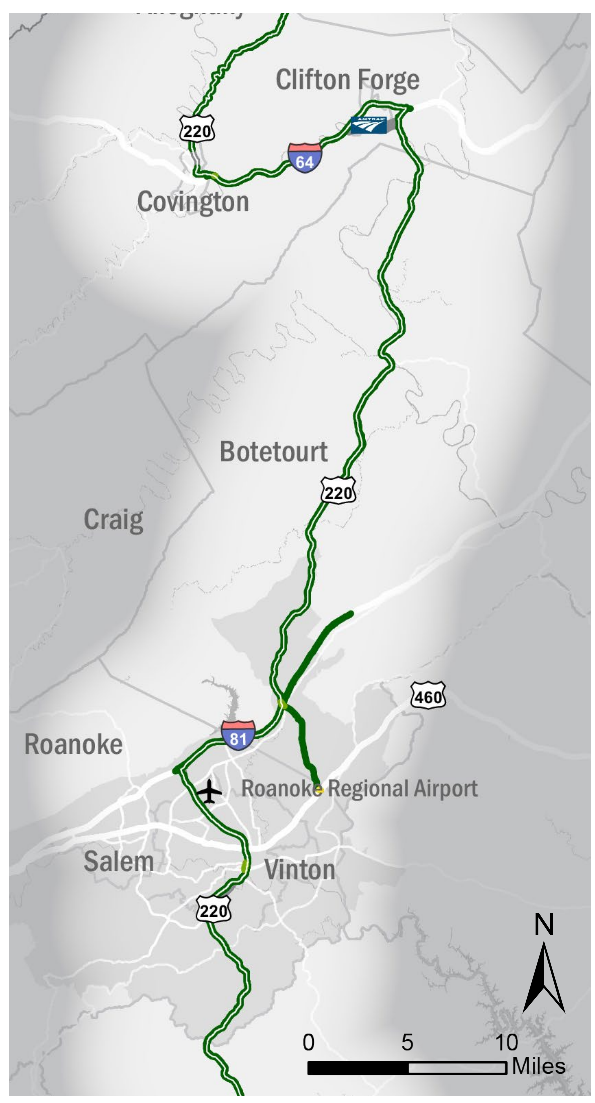
Weekday

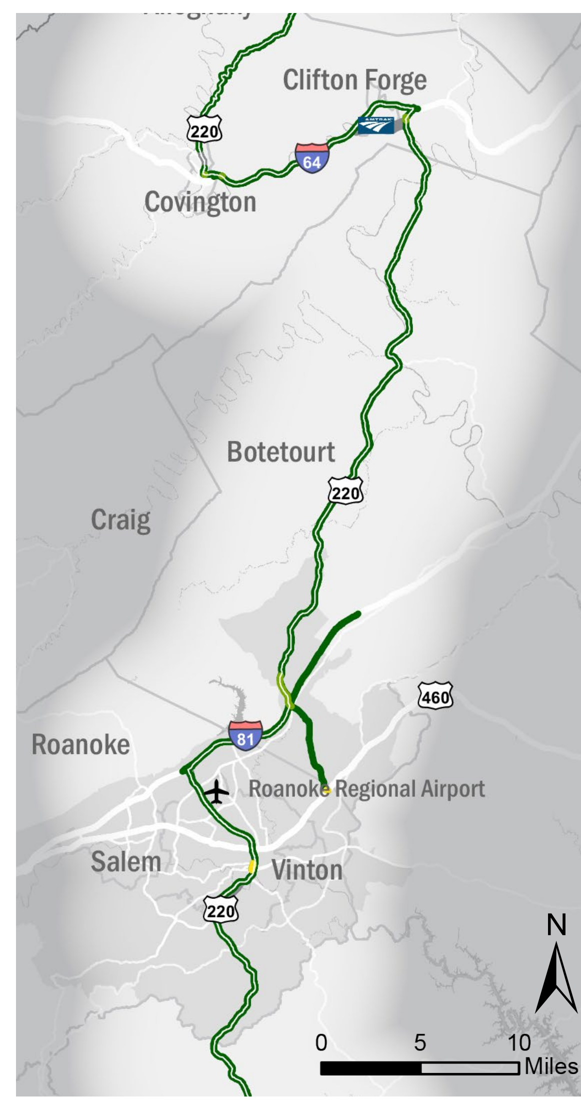
Reliability of travel during a typical weekday ranges from 0.02 to 0.49 in terms of reliability index, with an average value of 0.07. Only a short portion of US 220 Alternate at the intersection with US 221/US 460 in Roanoke County has a weekday reliability index value exceeding the statewide threshold.

Weekend

Reliability of travel during a typical weekend ranges from 0.02 to 0.59 in terms of reliability index, with an average value of 0.07. None of the locations along Segment F2 have reliability index values exceeding the statewide threshold.





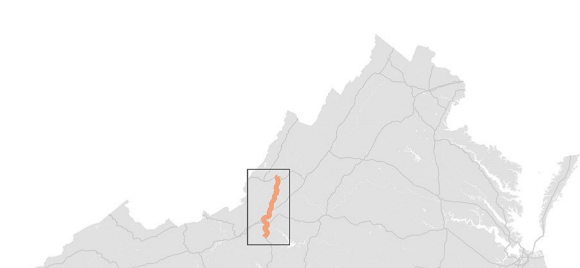


Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60



F2 SEGMENT NEEDS

Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.

Redundancy

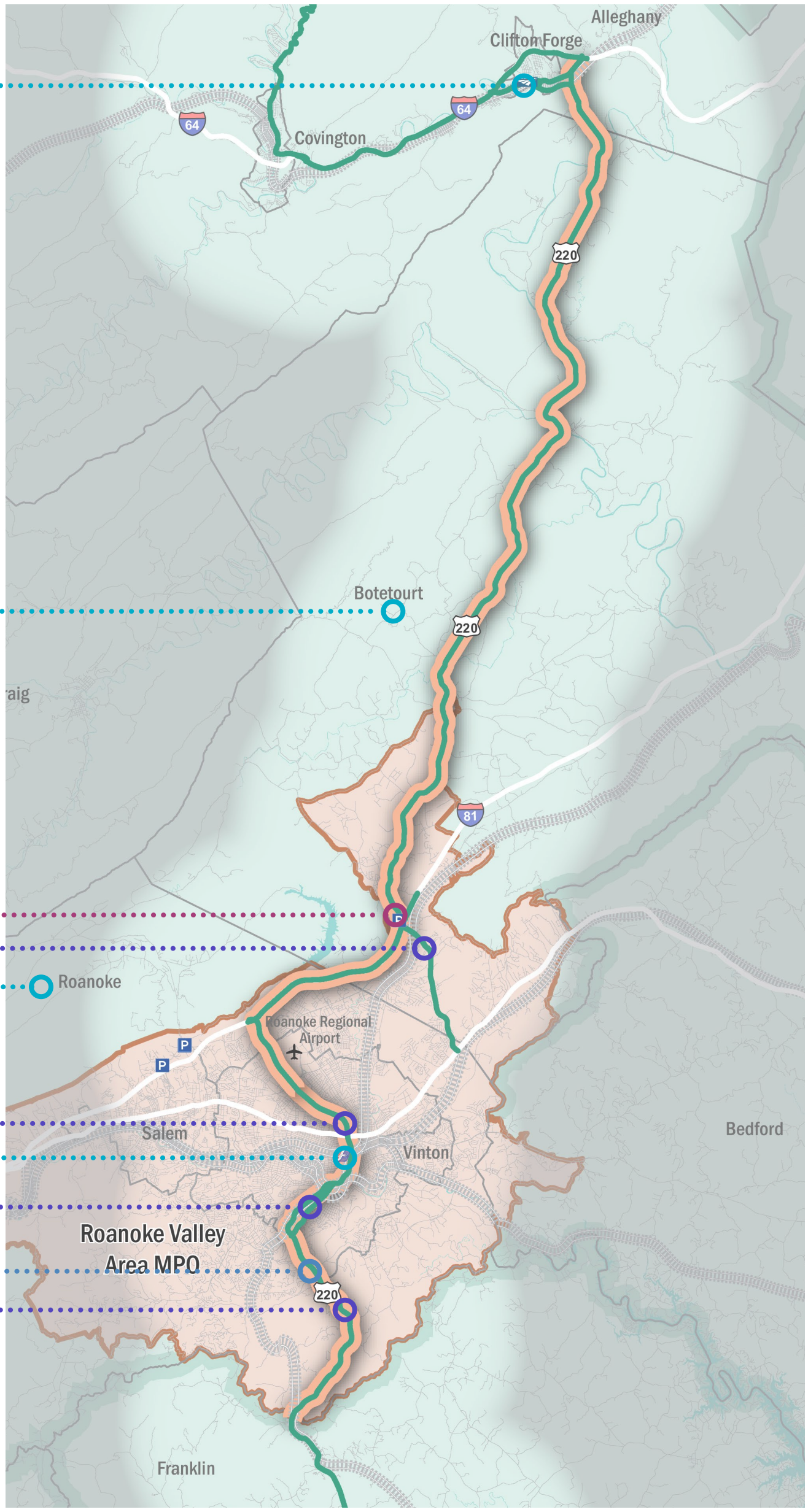
Mode Choice

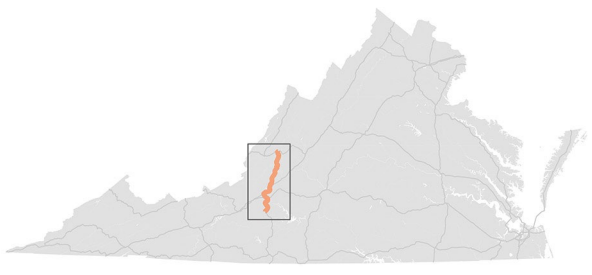
Safety

Congestion

Bottlenecks

Reliability





F2 SEGMENT NEEDS

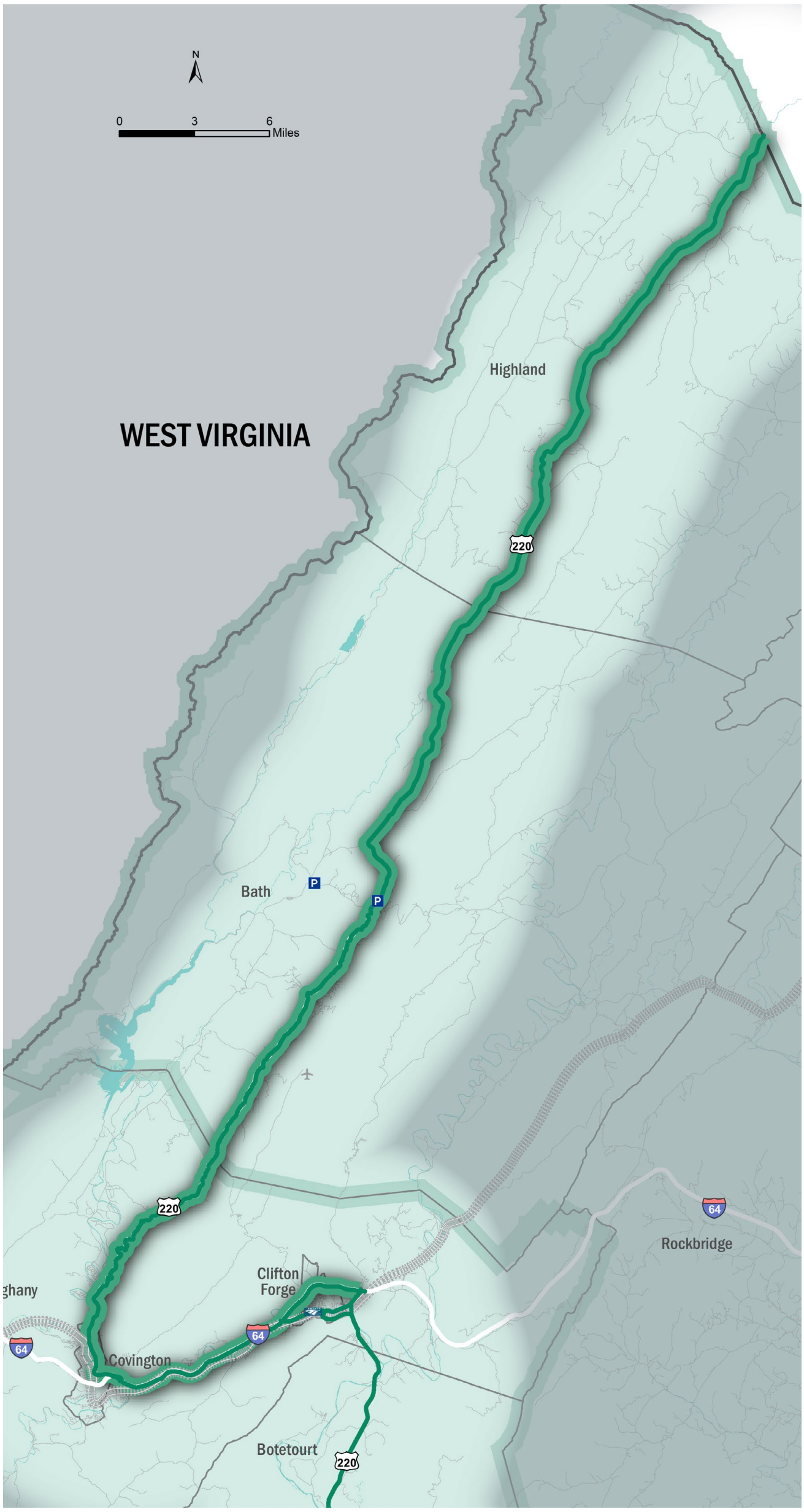
Summary of Needs - F2 Segment

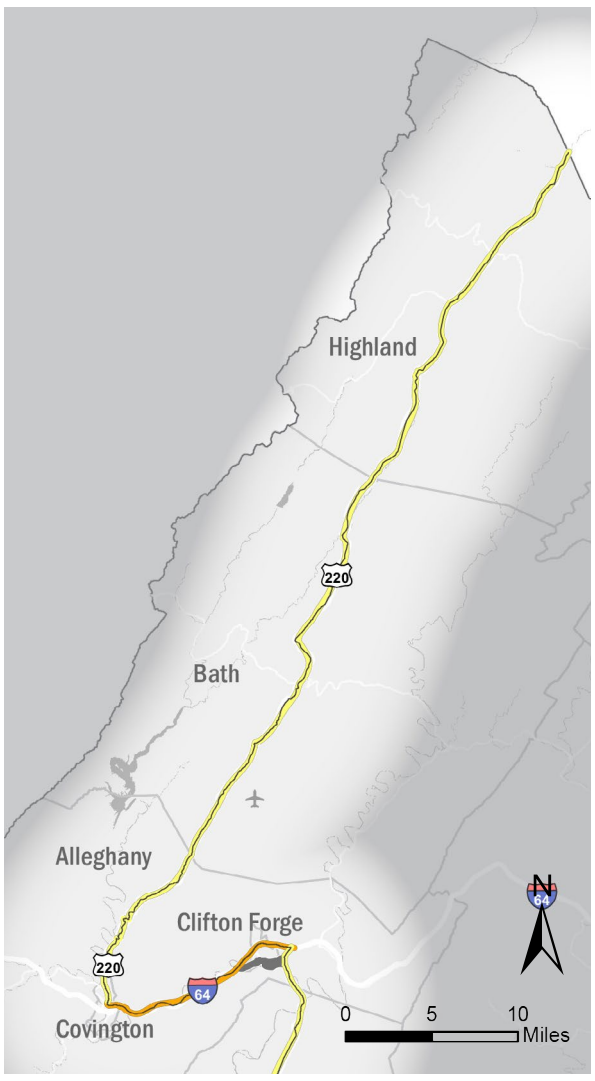
A.	Safety issues caused by geometric design on US 220 south of Roanoke
B.	Park and Ride lots in Roanoke County have higher utilization rates than statewide average
C.	Park and Ride lots in Botetourt County have higher utilization rates than statewide average
D.	No passenger rail or bus service from Roanoke to other cities in the corridor
E.	No passenger rail service from Clifton Forge to other cities in the corridor, bus service between cities in corridor is limited to Covington
F.	US 220 between Electric Rd and Pheasant Ridge Rd SW in Roanoke: 12 severe crashes
G.	US 220 at interchange with US 460 in Roanoke: 7 severe crashes
H.	US 220-Alt between Glebe Rd and Autumnwood Ln north of Roanoke: 13 severe crashes
I.	Congestion issue on US 220 between Electric Road (VA Route 419) and Blue Ridge Parkway in Roanoke
J.	Congestion issue at US 220/I-81 and US 220-Alt/US 220 junction north of Roanoke
K.	Congestion issue on US 220/I-581 at Exit 6 (US 221/VA Route 24) in Roanoke

IV. Segment F3

Corridor Segment F3 Components

- US 220
- US 60 Business





Segment F3 runs from the junction of US 220 and I-64 just east of the Town of Clifton Forge, through the City of Covington, Alleghany County, Bath County, and Highland County, to the West Virginia border. The primary facility is US 220, which serves as both a local access road through southwestern Virginia and as throughway between North Carolina and West Virginia. US 220 runs concurrently with I-64 between the Town of Clifton Forge and the City of Covington in Alleghany County; Segment F2 overlaps with Segment C1 in this area.

Highway Facilities: In this segment, US 220 is primarily a two-lane rural roadway, although it is four lanes where it runs concurrently with I-64 between Clifton Forge and Covington. In addition to US 220, Segment F3 also includes a portion of US 60 Business in the Town of Clifton Forge.

Transit Services: RADAR provides an express bus service between Iron Gate and Covington in Alleghany County, called the Alleghany Highlands Mountain Express, which runs on the southernmost portion of Segment F2. An Amtrak station is located in Clifton Forge and provides passenger rail service east and west of the corridor along the Cardinal Route running between New York City and Chicago. There are Park-and-Ride locations throughout this segment as well.

Rail Facilities: Norfolk Southern rail lines, which provide freight rail access in this region, run between Roanoke and Clifton Forge, connecting with multiple lines along CSX's Coal Corridor. The Buckingham Branch, which runs between Clifton Forge and Richmond, connects within the corridor and runs parallel to US 220 for a short stretch before connecting to CSX coal lines in Clifton Forge.

Port Facilities: No port facilities are directly accessible from Segment F3.

Airport Facilities: One general aviation facility is located near Segment F3.

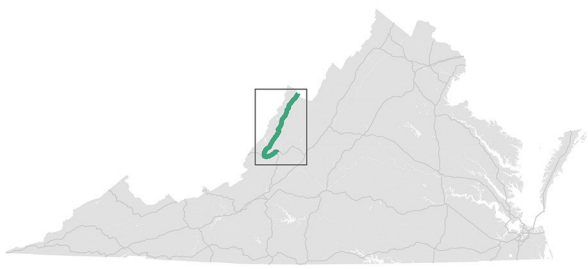
Major planned and future projects include: There are no major planned projects to improve safety or increase capacity at this time.

Number of Lanes (both directions)

- 2
- 3 - 4
- 5 - 6
- 7 - 8
- 9 - 12
- Primary facility

Future Projects

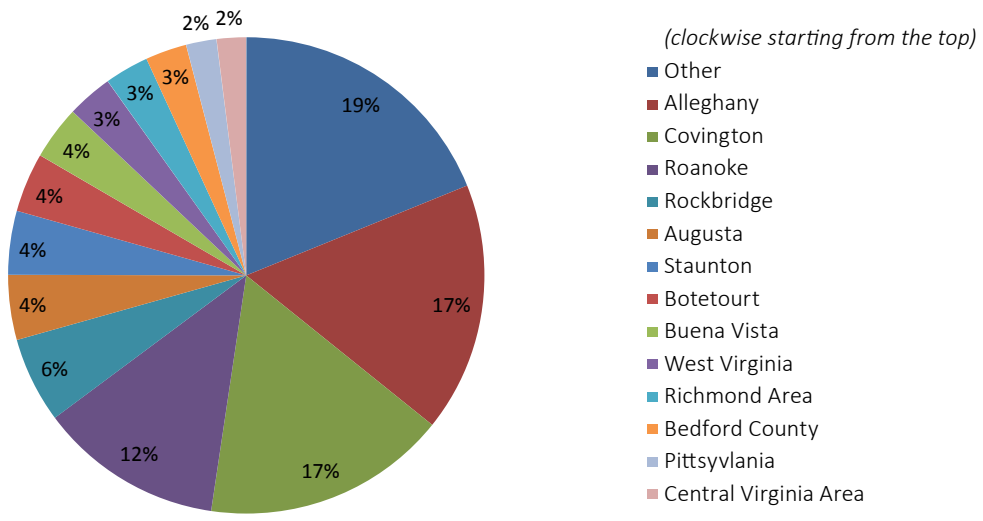
- Reconstruction with added capacity
- Safety improvements
- Primary facility



Travel Demand

Passenger Demand

Segment F3, the northernmost segment of Corridor F, does not provide direct access to any of the Commonwealth's MPO Areas, but does provide access to the City of Covington and communities in Alleghany, Bath, and Highland Counties. Intercity travel in these jurisdictions accounts for a very small percentage of intercity travel in the Commonwealth (less than 0.5 percent), but major destinations for travel from these jurisdictions include Botetourt County, Covington (17 percent each), the Roanoke Valley Area (12 percent), and Rockbridge County (six percent).



F3 SEGMENT PROFILE

Freight Demand

By truck, Segment F3 carried 440,000 tons of freight worth $160 million in 2012, and is estimated to carry 620,000 tons of freight worth $200 million in 2025. The major truck freight patterns on this corridor are interstate through-movements, accounting for approximately 55 percent of the total truck tonnage and more than 64 percent of the total corridor truck freight value. There are significant flows on Corridor F between the Southeast and Middle Atlantic regions. North Carolina, Pennsylvania, and Tennessee are major truck freight generators on this corridor, accounting for more than 20 percent of truck tonnage on Corridor F. North Carolina, New York, and Pennsylvania are major truck freight attractors on Corridor F, accounting for 24 percent of truck tonnage. The majority of truck freight movement on this segment is through-traffic and there are no major generators or attractors of truck freight along Segment F3.

By rail, Segment F3 carried 33 million tons of freight worth $3 billion in 2012, and is estimated to carry 34 million tons of freight worth $4 billion in 2025. In terms of tonnage, the largest rail flow on Corridor F is from West Virginia to North Carolina, accounting for more than 44 percent of the total rail tonnage in the corridor. Another significant rail freight movement on Corridor F is from West Virginia to South Carolina, accounting for more than 14 percent of the total rail tonnage on the corridor. In terms of value, the largest rail freight movements on Corridor F are between Ohio and the Carolinas, accounting for more than 26 percent of the total rail value. For jurisdictions adjacent to Segment F3, there are only negligible rail freight flows of less than one percent of the total corridor tonnage and value.

Truck Freight

Major Origins (by Tonnage)
1. Virginia (26% / 27%)
2. North Carolina (10% / 9%)
3. Tennessee (7% / 7%)
4. Pennsylania (7% / 7%)
5. New Jersey (5% / 5%)

Corridor Tonnage Originating in Segment F3: 3% / 3%

Major Origin-Destination Pairs for Freight
North Carolina and Pennsylvania
North Carolina and New York
New York and Georgia
New York and Tennessee
New Jersey and Texas

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. Virginia (27% / 27%)
2. North Carolina (8% / 8%)
3. New York (8% / 8%)
4. Pennsylvania (8% / 8%)
5. New Jersey (5% / 5%)

Corridor Tonnage Destined for Segment F3: 2% / 2%

Rail Freight

Major Origins (by Tonnage)
1. West Virginia (70% / 62%)
2. Virginia (13% / 17%)
3. City of Roanoke (11% / 13%)
4. South Carolina (6% / 7%)
5. North Carolina (5% / 6%)

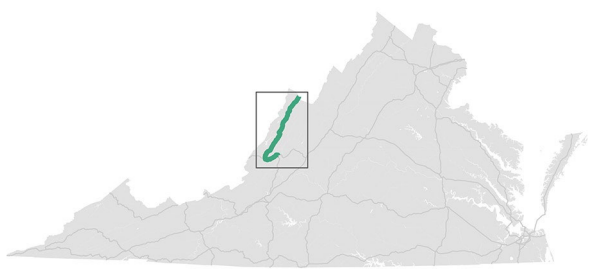
Corridor Tonnage Originating in Segment F3: <1% / 1%

Major Origin-Destination Pairs for Freight
City of Norfolk* and West Virginia
Wise County and City of Norfolk*
Buchanan County and City of Norfolk*
Wise County and Georgia
City of Norfolk* and Kentucky

Percentages represent 2012 / 2025 values.
*Includes freight passing through the Port of Virginia.

Major Destinations (by Tonnage)
1. North Carolina (51% / 46%)
2. South Carolina (17% / 15%)
3. Virginia (10% / 12%)
4. Ohio (7% / 8%)
5. West Virginia (4% / 5%)

Corridor Tonnage Destined for Segment F3: <1% / <1%



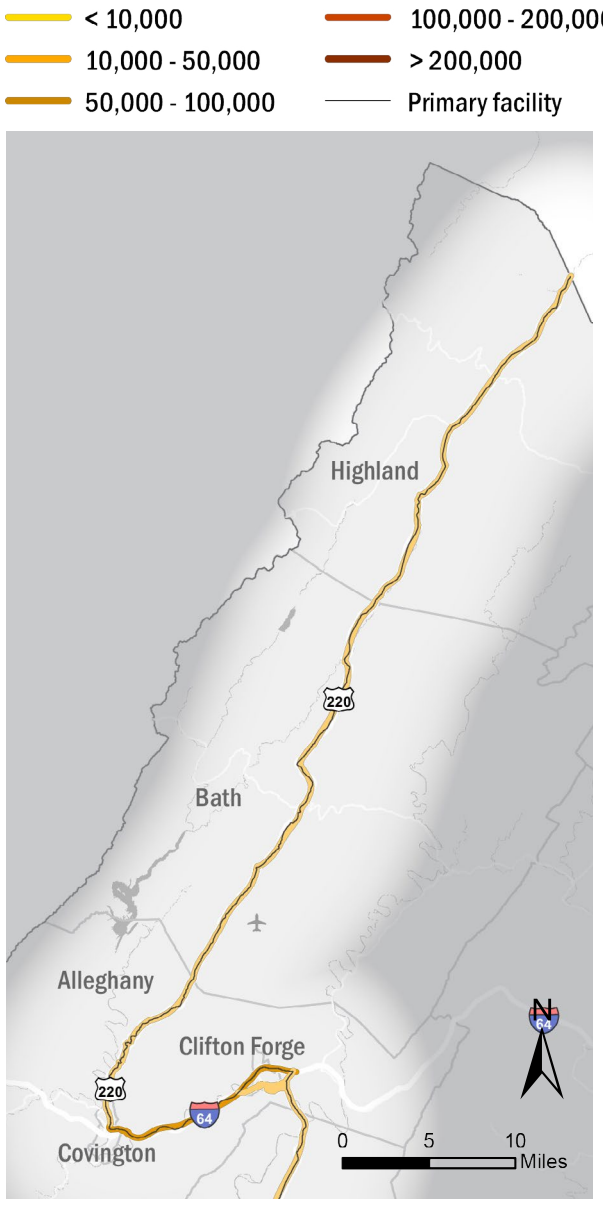
Traffic Conditions

Traffic Volume and AADT

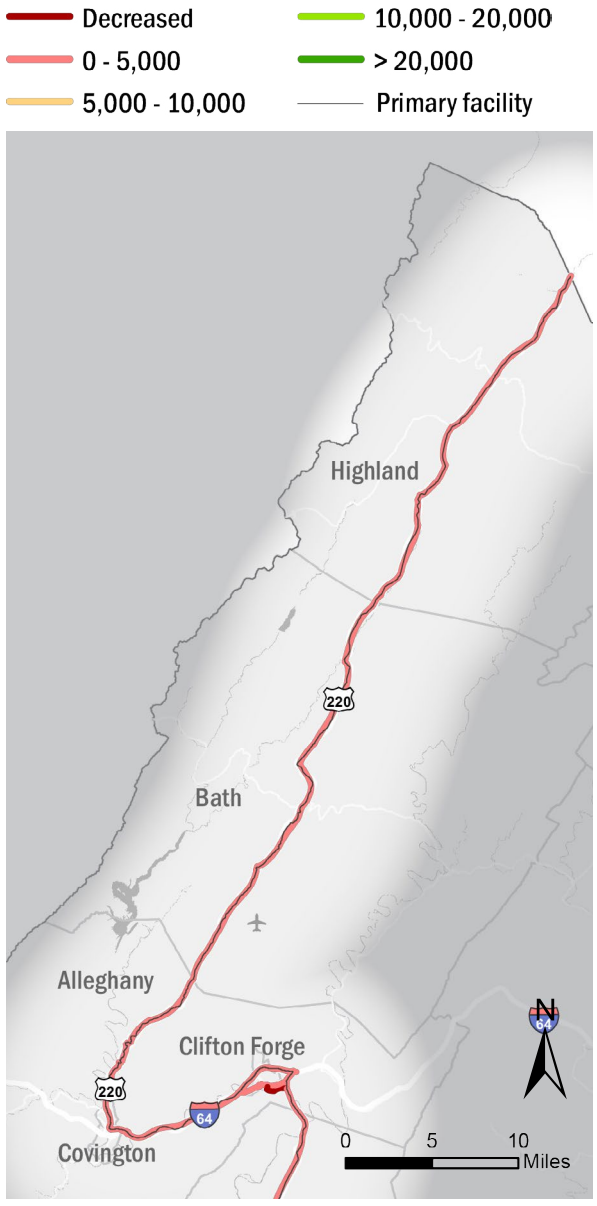
Traffic volumes on Segment F3 are generally lower than elsewhere on the North Carolina to West Virginia Corridor. The portion of US 220 that runs concurrently with I-64 has the highest daily traffic volume at 10,000 to 18,000 vehicles per day. Elsewhere on Segment F3, traffic volumes are less than 9,000 vehicles per day. A small amount of traffic growth is projected throughout the segment by 2025. Traffic growth where US 220 runs concurrently with I-64 is projected to be the highest in the segment, with between 1,000 and 2,000 vehicles per day by 2025.

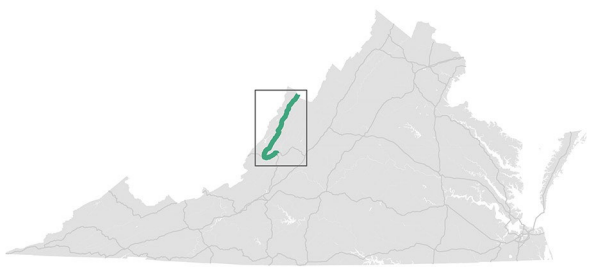
Traffic Volume 2014 (AADT)

Traffic Volume 2025 (AADT)

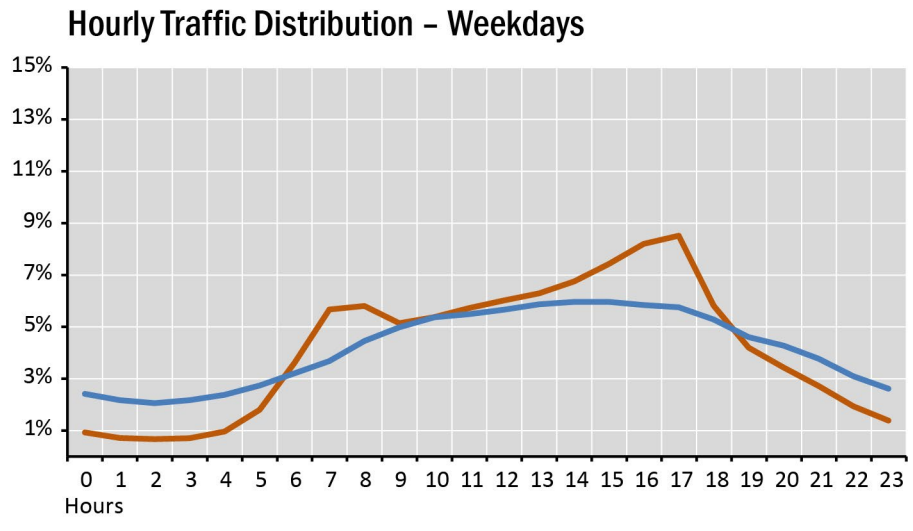


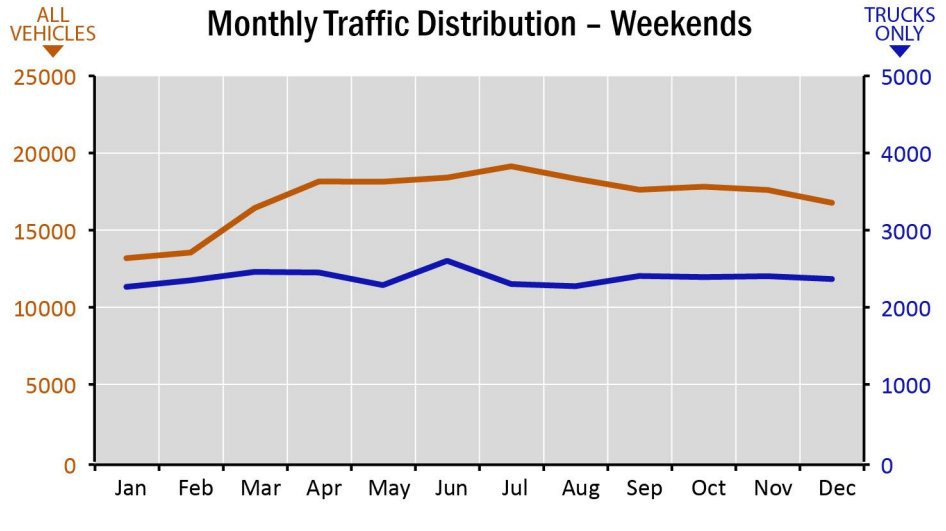
Change in Traffic Volume 2014- 2025 (AADT)

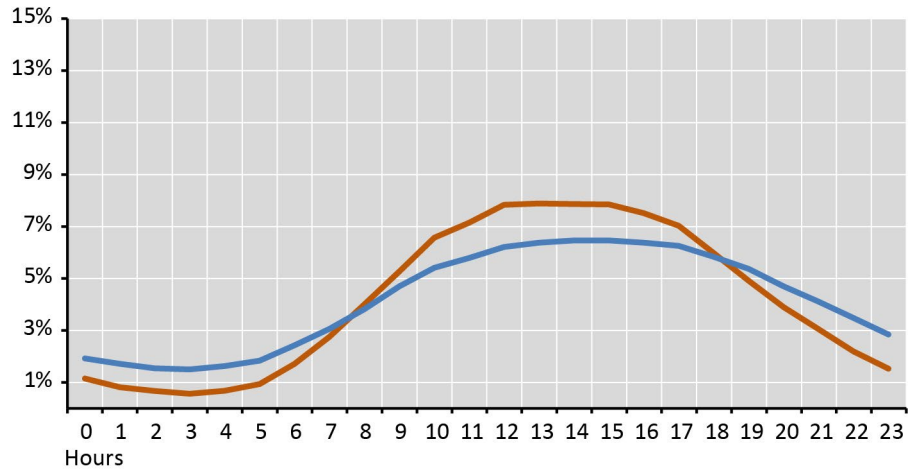


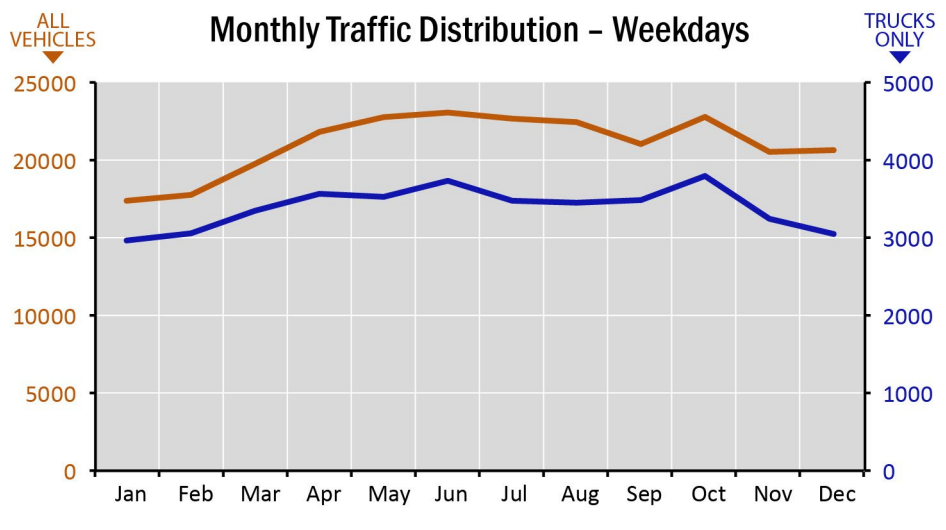


F3 SEGMENT PROFILE









Traffic Distribution

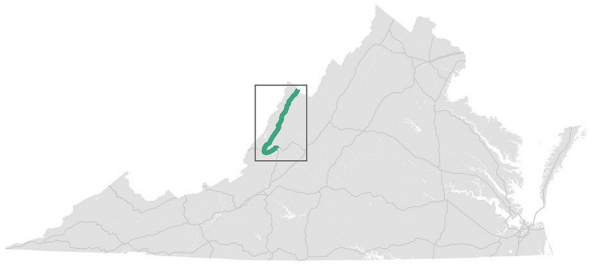
Traffic distribution counts were not available on Segment F3. Therefore, analysis assumed the same time of day and annual distributions for this segment as were observed on Segment F2, even though these may not capture traffic patterns on Segment F3 with complete accuracy.

Truck Volumes

The percent of daily traffic comprised of heavy trucks on Segment F3 varies based on location. Where US 220 runs concurrently with I-64 in Segment F3, heavy trucks comprise 11 percent of total traffic. Along US 220, heavy trucks comprise less than five percent of total traffic from Covington to central Bath County and between six and eight percent of total traffic from central Bath County to the West Virginia border.

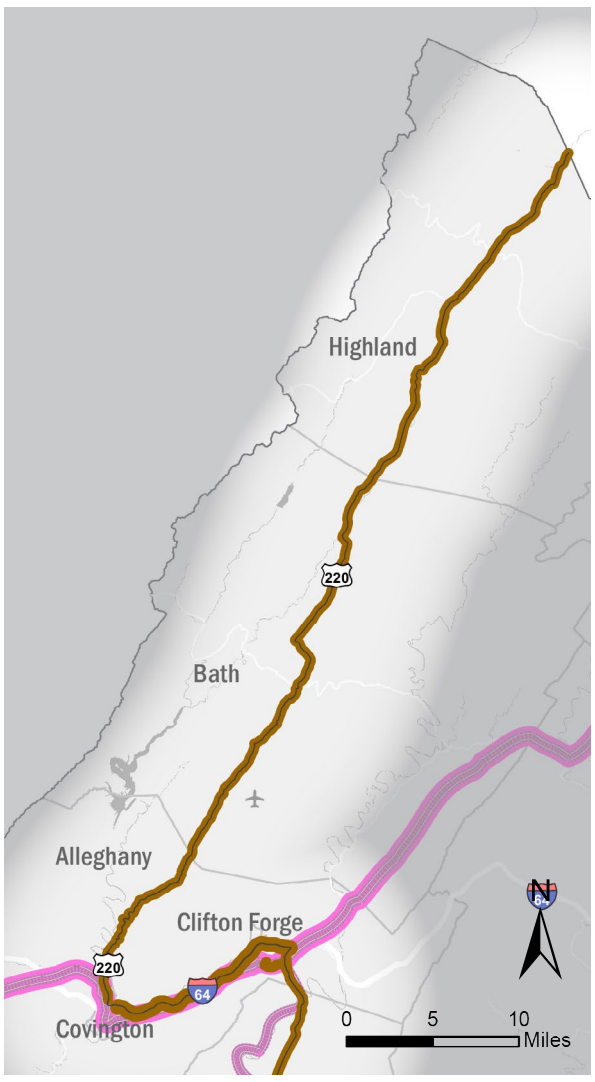
Percent Heavy Trucks

- < 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- > 20%
- Primary facility



F3 SEGMENT PROFILE

Annual Freight by Tonnage, 2012

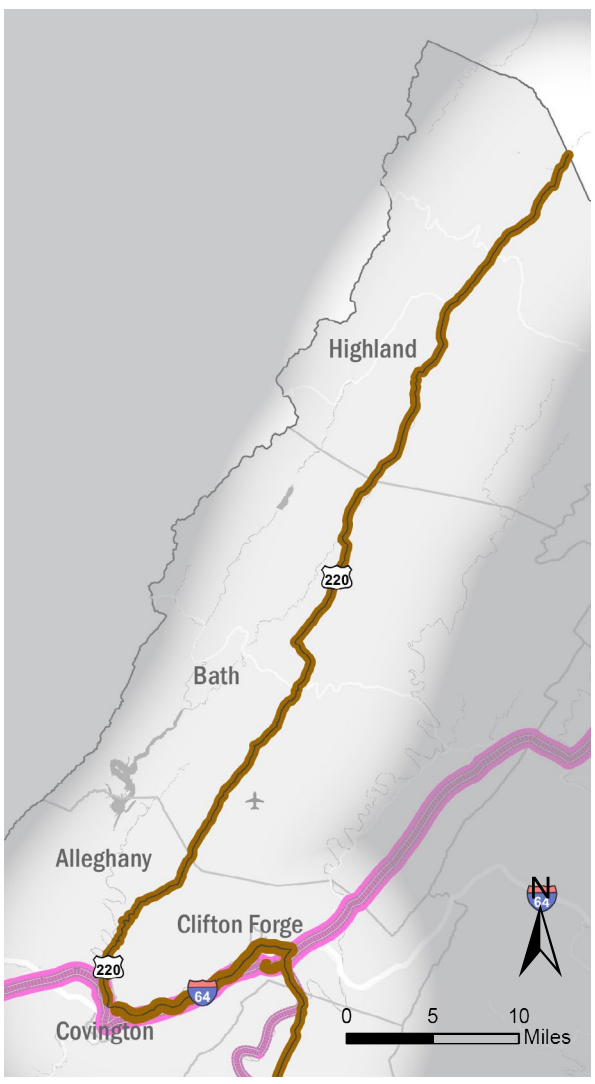


Freight Flows

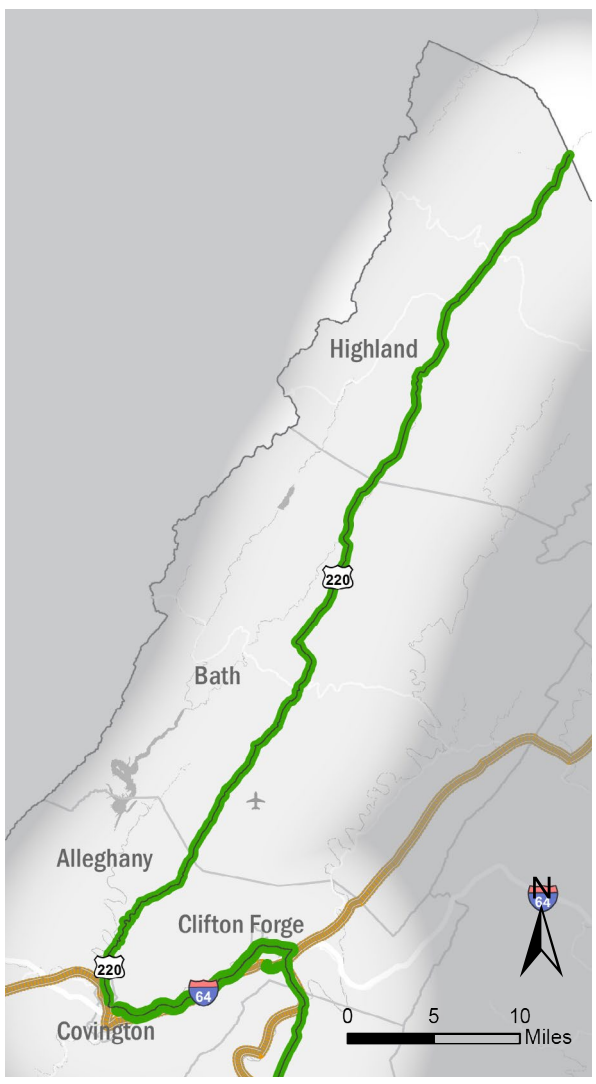
On Segment F3 just north of Covington freight is moved primarily by rail in relation to both tonnage and value. In total, 168,000 tons (one percent) of freight is moved through this section of Segment F3 by truck, compared to 33 million tons (99 percent) by rail. By value, $63 million (two percent) of freight value travels by truck, compared to $3 billion (98 percent) by rail. On average, a ton of freight traveling through this section of Segment F3 by truck is worth $372 while a ton of freight traveling by rail is worth $97. In 2025, both rail and truck freight tonnages and total values in this area of Segment F3 are expected to increase. The percentage of freight traveling by truck by tonnage and value is expected to remain the same. It is anticipated that freight value per ton on trucks and rail will increase to $292 and $109, respectively.

Further north along Segment F3 in Highland County, freight is also moved primarily by rail in relation to both tonnage and value. In total, 438,000 tons (one percent) of freight is moved through this section of Segment F3 by truck, compared to 33 million tons (99 percent) by rail. By value, $162.5 million (five percent) of freight value travels by truck, compared to $3 billion (95 percent) by rail. On average, a ton of freight traveling through this section of Segment F3 by truck is worth $371 while a ton of freight traveling by rail is worth $97. In 2025, both rail and truck freight tonnages and total values in this area of Segment F3 are expected to increase. The percentage of freight traveling by truck by tonnage and value is expected to remain the same. It is anticipated that freight value per ton on trucks and rail will increase to $318 and $109, respectively.

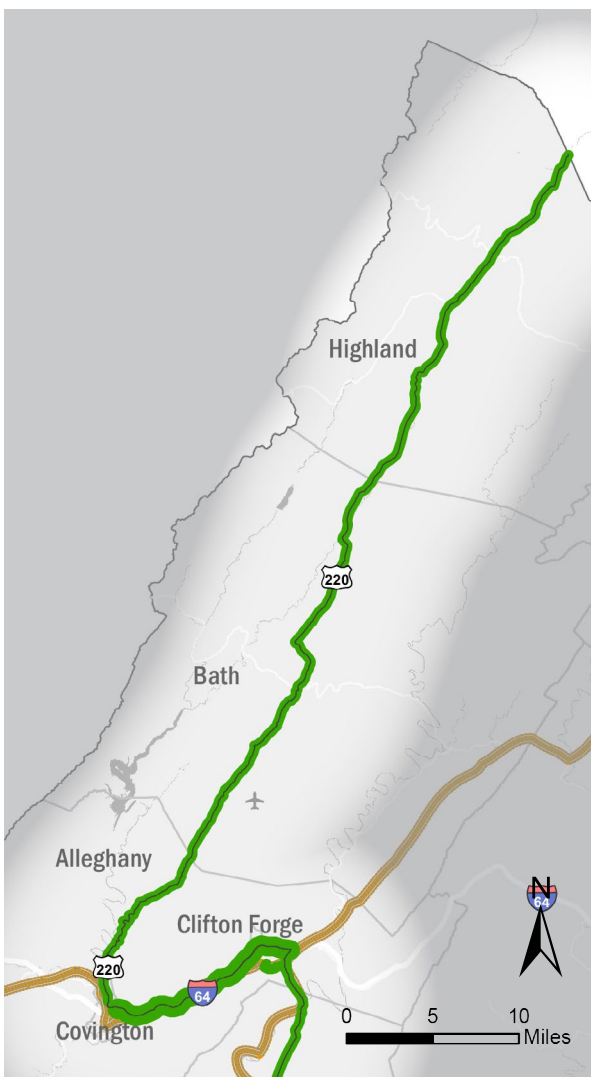
Annual Freight by Tonnage, 2025



Annual Freight by Value, 2012



Annual Freight by Value, 2025



Truck Freight (in tons)

- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Rail Freight (in tons)

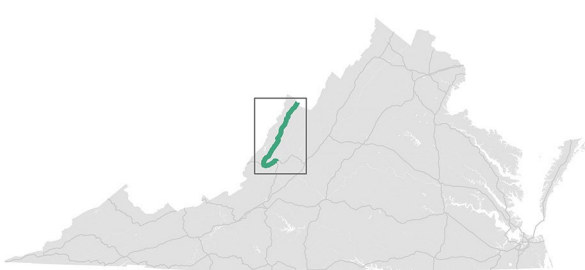
- < 10M
- 10M - 25M
- 25M - 50M
- 50M - 100M
- > 100M
- Primary facility

Truck Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility

Rail Freight

- < $10B
- $10B - $50B
- $50B - $100B
- $100B - $200B
- > $200B
- Primary facility



Redundancy and Mode Choice

Comparable Travel Options

Clifton Forge to Roanoke

Inter-City Bus
0 Trips per Day
0:00 Travel Time
$0 Est. Cost

Train
0 Trips per Day
0:00 Travel Time
$00 Est. Cost

Auto
Via Rt. 220: 0:55 Travel Time $27 Est. Cost

Roanoke to Franklin, WV

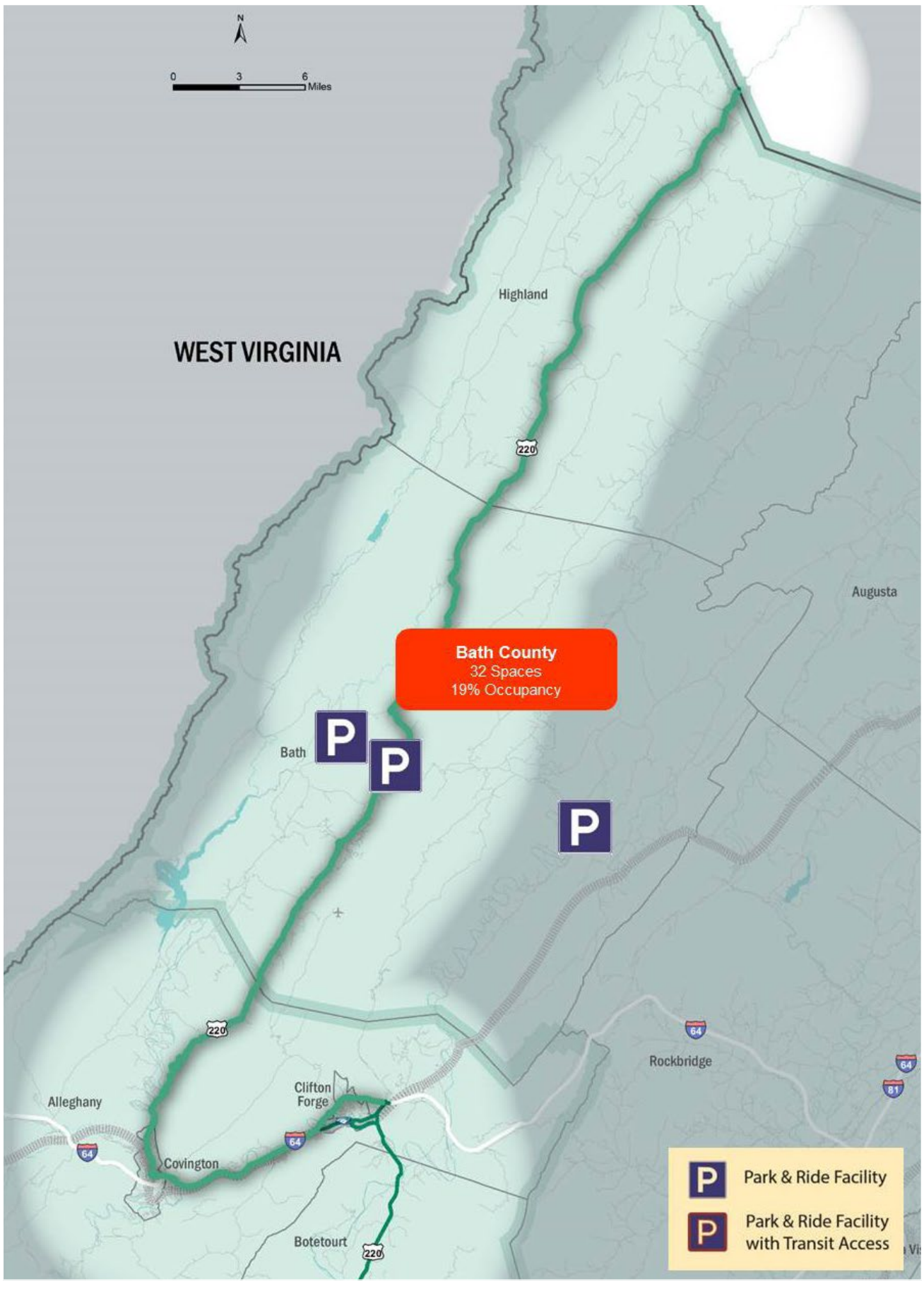
Inter-City Bus
0 Trips per Day
0:00 Travel Time
$0 Est. Cost

Train
0 Trips per Day
0:00 Travel Time
$0 Est. Cost

Auto
Via Rt. 220: 2:49 Travel Time $78 Est. Cost

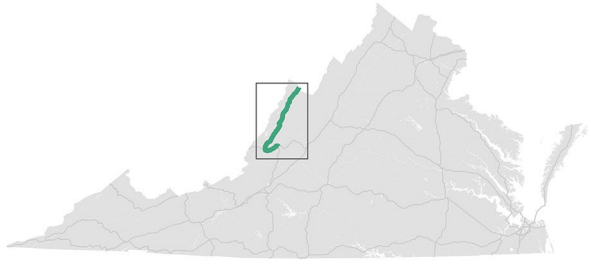
Passenger trips on Segment F3 have limited travel options, both in terms of travel path and mode choice. There are no parallel facilities to US 220 in Segment F3, though it does overlap with interstate I-64. Bus service in the segment includes the Alleghany Highlands Mountain Express, which connects Iron Gate and Covington. Amtrak offers service from Clifton Forge, but its routes do not facilitate travel along the corridor.

Park and Ride Facitilities



Park-and-Ride

Within Segment F3, commuters can utilize three Park-and-Ride facilities, all of which are located in Bath County. Bath County's Park-and-Ride locations have a total of 32 spaces. The Park-and-Ride locations in Bath County are not heavily used, with a utilization rate of only 19 percent, which is much lower than the statewide average of 76 percent for Park-and-Ride utilization.

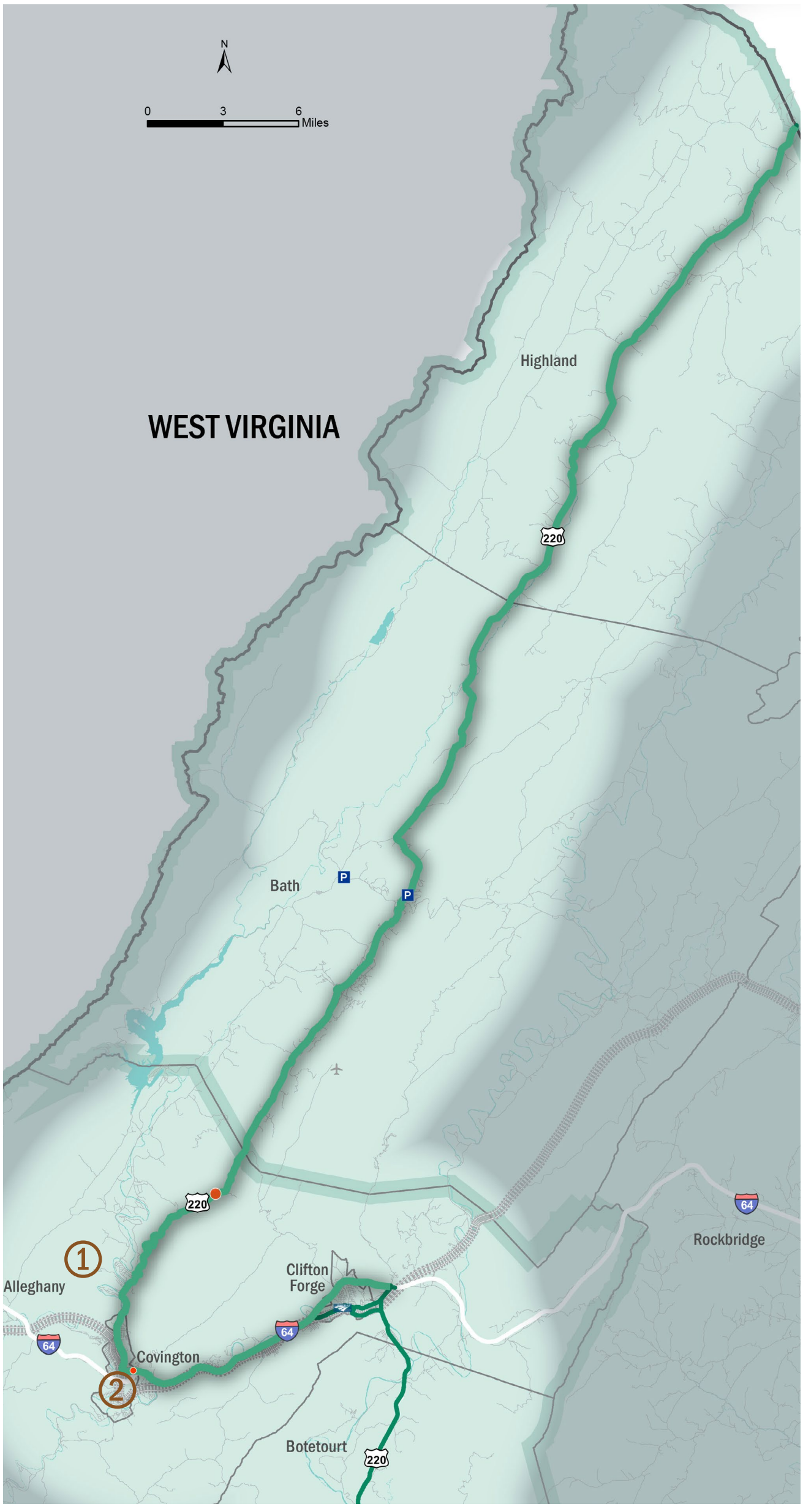


Safety

Performance Metrics:

Number of Severe Crashes	10
Severe Crashes/ Million VMT	0.4
Number of Railroad Crashes	3

Between 2010 and 2012, only 21 severe crashes were recorded in Segment F3, one of the lowest totals for any CoSS segment. These crashes are in two locations along Segment F3. On US 220 (East Madison Street) in Covington, four collisions occurred over 0.16 miles between East Dolly Ann Drive and the on-ramp to I-64 W. On US 220 (Hot Springs Road) in Alleghany County, there were six incidents that took place over a distance of 3.4 miles between McGraw Gap Road and Route 640 (Falls Road).

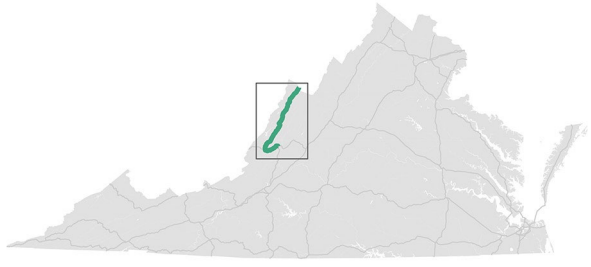


Fatality and Injury Crashes (2010 - 2012)

- < 5
- 5 - 10
- 11 - 15
- 16 - 20
- > 20

Railroad Incidents/Accidents per County (2011-2014)

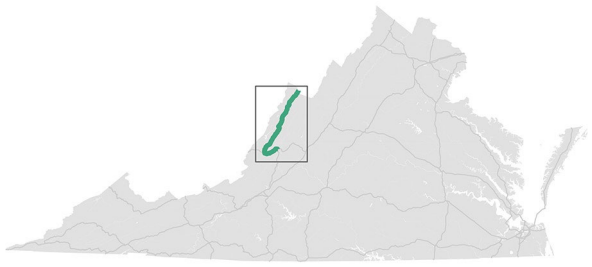
#



Congestion

Performance Metrics

Person Hours of Delay per Mile	1
Freight Ton Hours of Delay per Mile	982



Passenger Delays

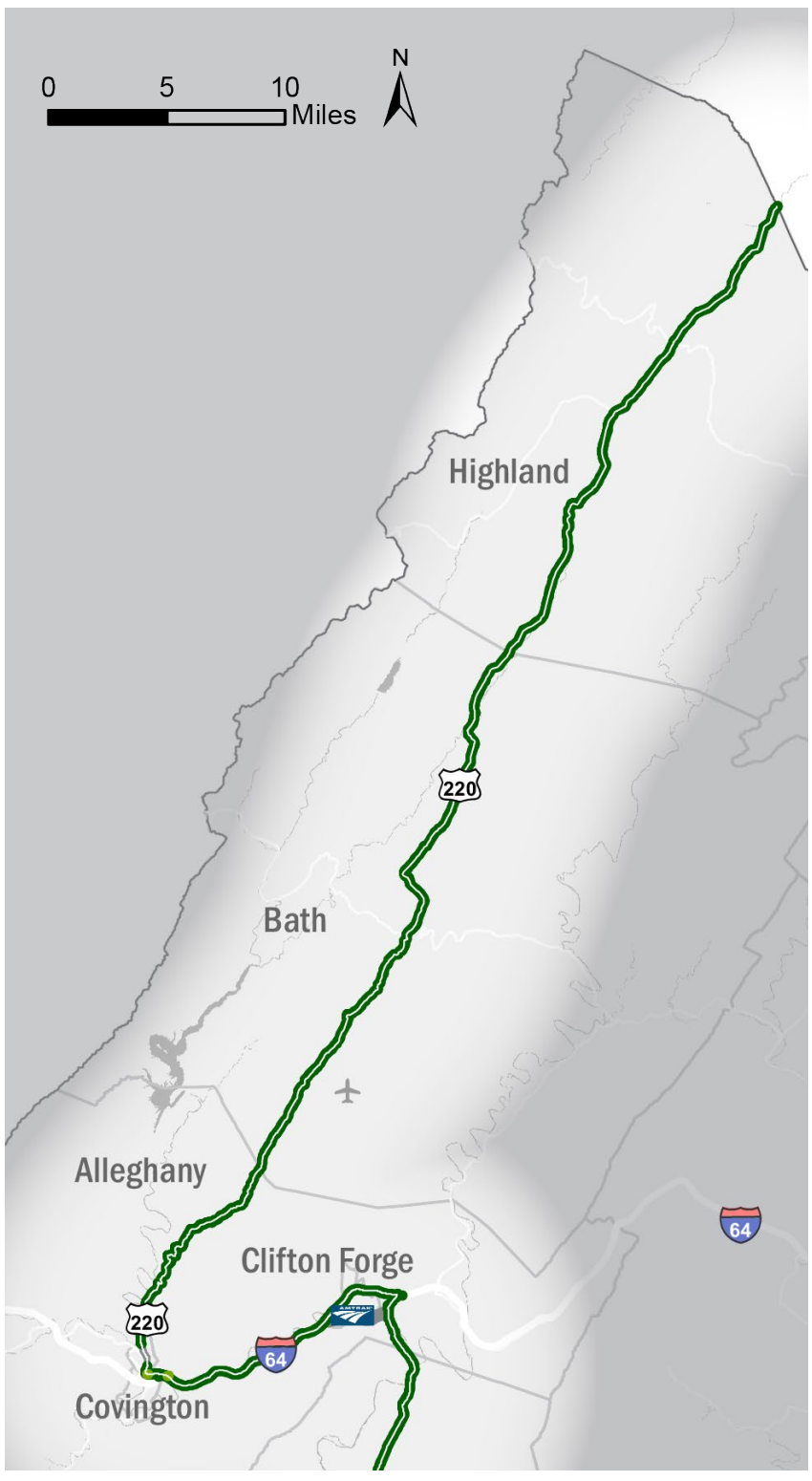
Segment F3 has substantially lower levels of passenger congestion than other Corridor F segments. Passenger traffic on this segment only experience 200 person-hours of delay daily, ranking it as one of the least congested CoSS segments in the Commonwealth. As such, there are no locations along the segment where delays exceed 100 person-hours per mile. Peak-period passenger delays along Segment F3 account less than 15 percent of daily congestion, far lower than the peak-period share of congestion along CoSS segments.

Freight Delays

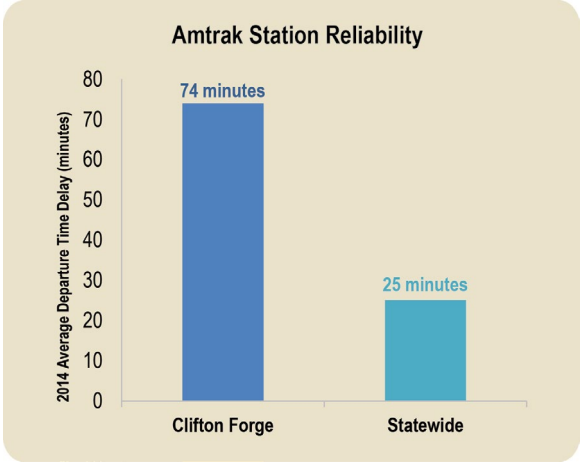
Segment F3 has substantially lower levels of freight congestion than other Corridor F segments. Traffic on this segment only experiences around 140,000 ton-hours of delay daily, ranking it as one of the least congested CoSS segments. As such, there are no locations along the segment where freight delays exceed 250,000 ton-hours per mile. Peak period freight delays along Segment F3 account for less than one percent of daily congestion, but the total freight delay is minimal.

Daily Person Hours of Delay Per Mile

Daily Freight Ton Hours of Delay Per Mile



Reliability



Weekday Peak

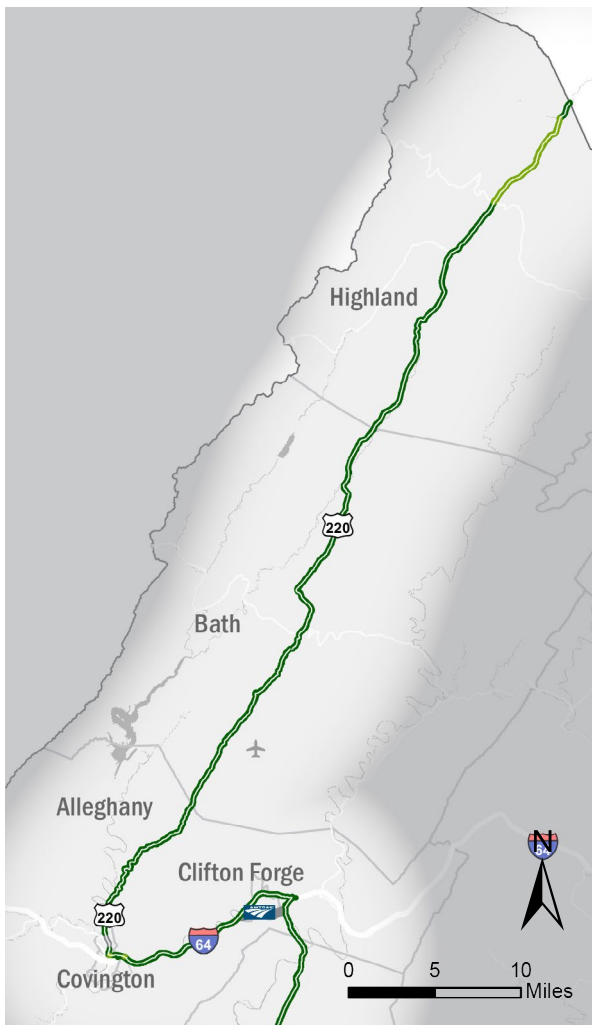
Reliability of travel during the peak period on a typical weekday on Segment F3 ranges from 0.00 to 0.27 in terms of reliability index, with an average value of 0.07. This segment has a peak period reliability index much lower than average for the CoSS segments statewide, and none of the locations along Segment F3 have reliability index values exceeding the statewide threshold.

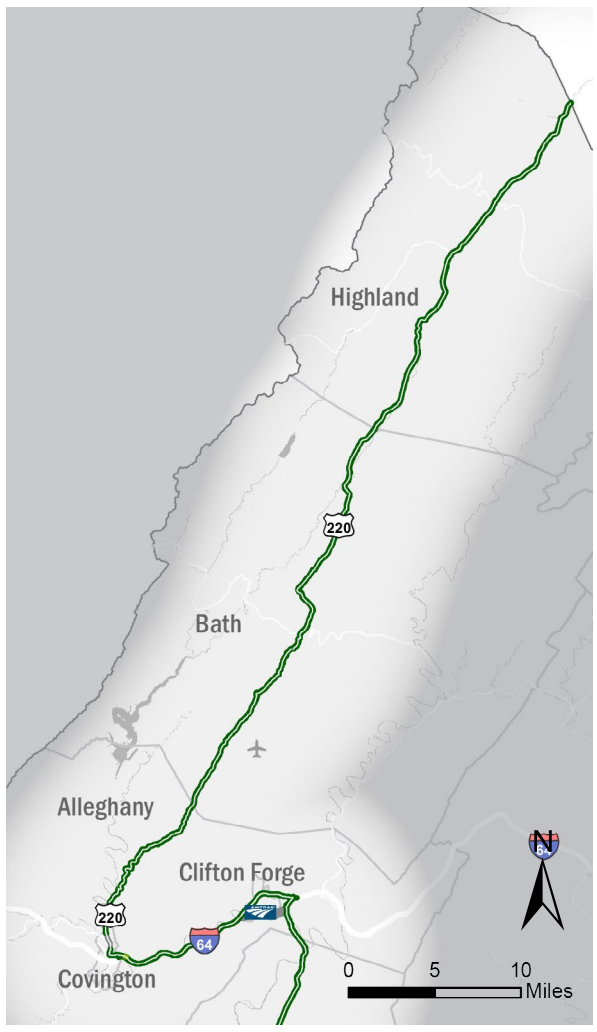
Weekday

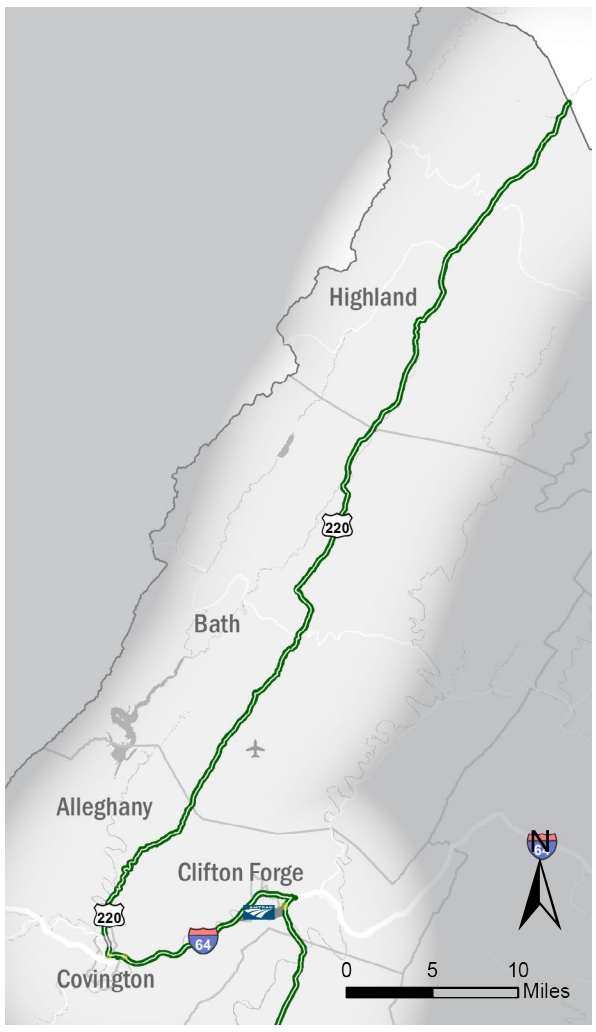
Reliability of travel during a typical weekday ranges from 0.01 to 0.26 in terms of reliability index, with an average value of 0.07. This segment has a weekday reliability index much lower than average for the CoSS segments statewide, and none of the locations along Segment F3 have reliability index values exceeding the statewide threshold.

Weekend

Reliability of travel during a typical weekend ranges from 0.00 to 0.25 in terms of reliability index, with an average value of 0.04. This segment has a weekend reliability index much lower than average for the CoSS segments statewide, and none of the locations along Segment F3 have reliability index values exceeding the statewide threshold.





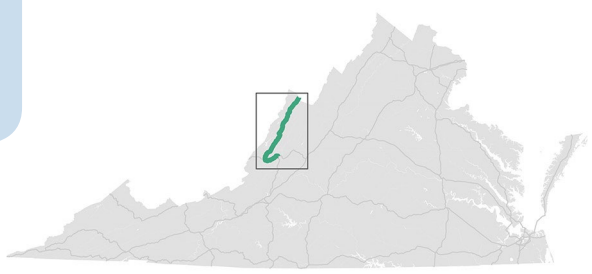


Reliability Index

- < 0.2
- 0.2 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- > 0.8
- Primary facility (in white)

Statewide reliability index thresholds have been set for weekday peak, weekday and weekend travel to assess the reliability of travel on each segment on all corridors of statewide significance. A higher reliability index indicates that travel times are more unreliable. The following are the reliability index thresholds:

- Weekday Peak - 0.80
- Weekday - 0.40
- Weekend - 0.60



F3 SEGMENT NEEDS

Summary of Needs

Identified locations are approximate. See "Summary of Needs" table on the following page for details.

Redundancy

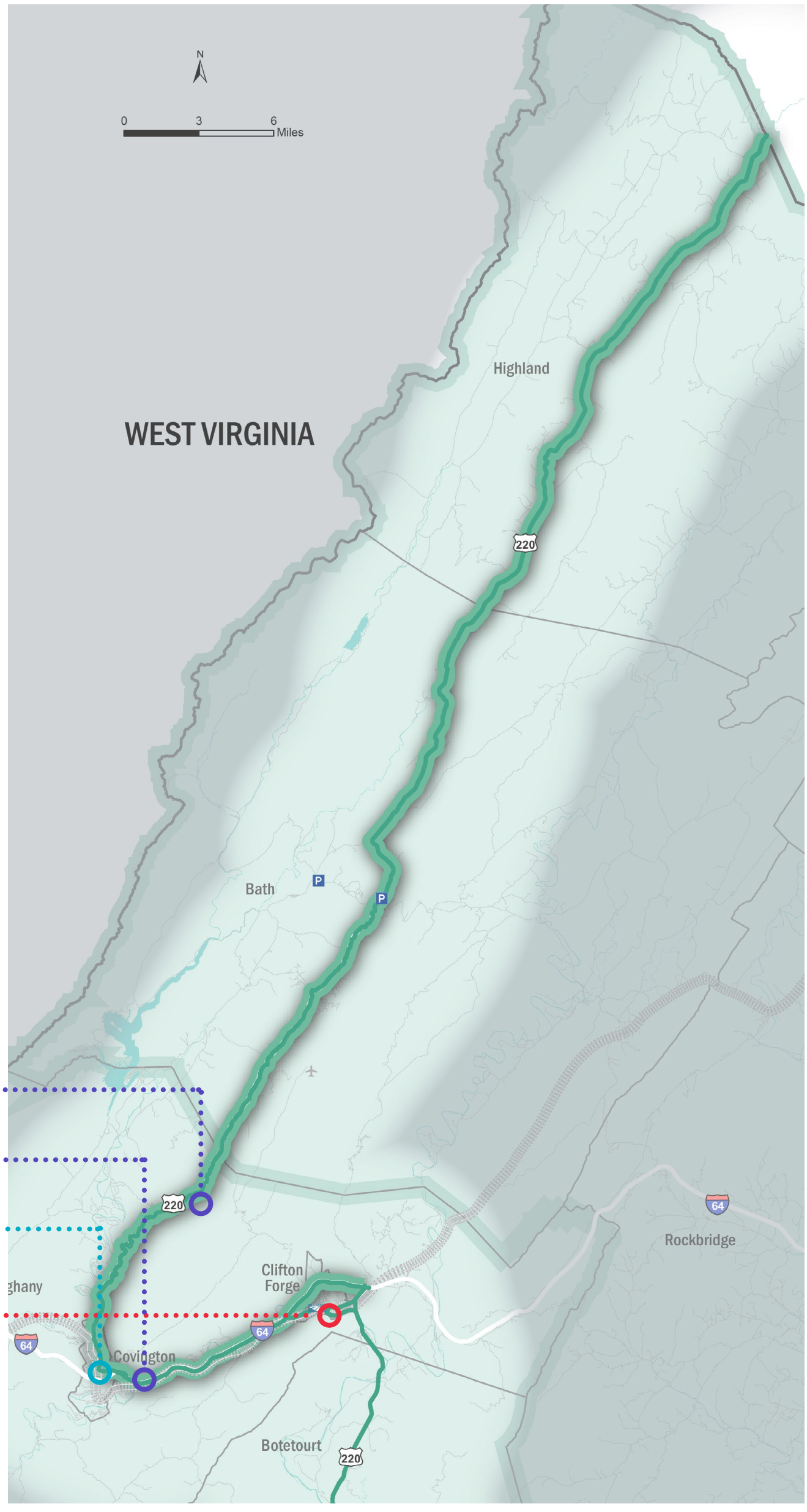
Mode Choice

Safety

Congestion

Bottlenecks

Reliability



F3 SEGMENT NEEDS

Summary of Needs - F3 Segment

A.		**No passenger rail service from Clifton Forge to other cities in the corridor, bus service between cities in corridor is limited to Covington**
B.		**No passenger rail service from Covington to other cities in the corridor, bus service between cities in corridor is limited to Clifton Forge**
C.		**US 220 near I-64 interchange in Covington: four severe crashes**
D.		**US 220 between Route 640 and McGraw Gap Rd in Alleghany County: 6 severe crashes**
E.		**Unreliable Amtrak service from Clifton Forge station. Average departure delay is 74 minutes (highest in the State) totaling almost 1,500 person-hours of delay from this segment.**