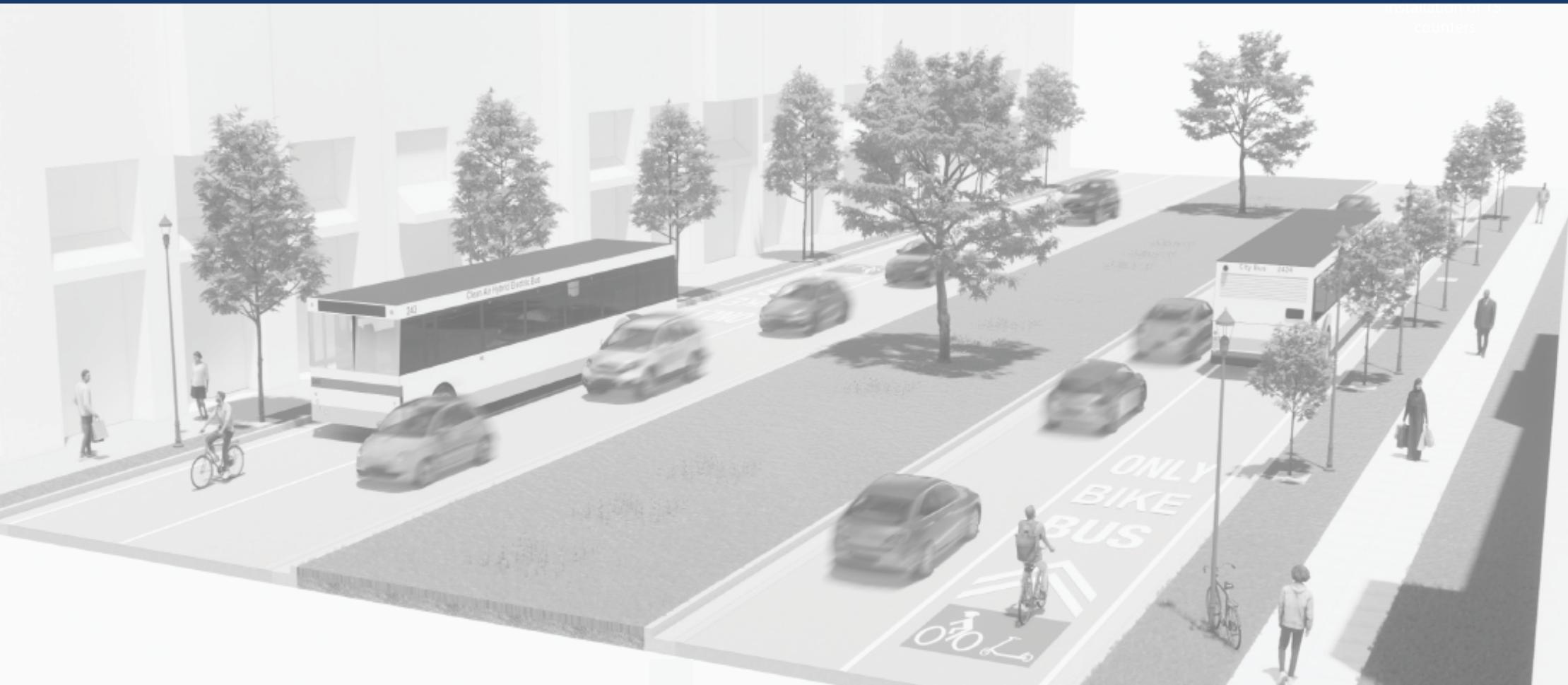


BOUSH STREET BUS/BIKE/SCOOTER LANE DEMONSTRATION



Executive Summary

In an ongoing effort to make bike and scooter riding safe and convenient, the City of Norfolk tested dedicated bus/bike/scooter lanes along a section of Boush Street from City Hall Avenue to Brambleton Avenue during the first weekend in May 2021. The purpose of the demonstration is to help the Department of Transit determine which travel concept for Boush Street is preferred for the future configuration of the street – one vehicular travel with a shared bus/bike/scooter lane or one vehicular travel lane and a parking lane.

An online survey conducted by the Department of Transit allowed respondents to provide feedback on how they currently use Boush Street and their preferences for the future configuration of the street. The survey was open for three weeks and received over 300 responses. HRT drivers were able to provide feedback on their experience using the dedicated lane as well. In addition, data collected during the demonstration included speed and vehicle counts as well as bike and scooter counts in both the northbound and southbound directions.

The following points summarize the results from the test days: Friday, May 7 (8AM – 3PM) and Saturday, May 8 (10AM – 2PM).



Data results:

- During the test hours, **72.1%** of vehicles and **69.2%** of vehicles travelled 25 mph or less on Friday and Saturday, respectively, compared to **63.2%** of vehicles travelling 25 mph or less over the 7-day period speed data was collected. The posted speed limit is 25 mph.
- During the test hours, the average speeds recorded were **23.7 mph** and **22.5 mph** on Friday and Saturday, respectively. The average max speeds recorded were **27.1 mph** and **26 mph**, respectively.
- On Thursday, May 6 (day before demonstration), the average speed range was **24-27 mph** with parked cars present. Without the parked cars, the average speed range was **27-32 mph** with several recorded speeds at **40-42 mph**.
- Speeds when the bus was traveling adjacent to traffic were approximately **18-22 mph**.
- During the test hours on Friday, a total of **81 bikes** and **94 scooters** were counted.
- During the test hours on Saturday, a total of **99 bikes** and **50 scooters** were counted.



Survey results:

- **23.2%** of respondents rode a bike or a scooter on the test days.
- **64.8%** of respondents felt "Very comfortable" or "Somewhat comfortable" riding a bike or scooter in the dedicated lane.
- **19.1%** of respondents use a bicycle as their primary mode of transportation to/from Downtown.
- **55.6%** of respondents would prefer the bus/bike/scooter lane if they lived or owned a business near Boush Street compared to **44.4%** for on-street parking.
- **43.5%** of respondents would prefer the bus/bike/scooter lane if they rode bikes or scooter to/from Downtown compared to **14.8%** for on-street parking.
- **57.1%** of respondents would prefer the bus/bike/scooter lane if they were crossing Boush Street on foot to get to work/shopping/dining compared to **42.9%** for on-street parking.
- **33.3%** of respondents live in Downtown Norfolk and **42.8%** work in Downtown Norfolk.
- The most common response to "What prevents you from biking or scootering to/from Downtown Norfolk" was a fear of vehicle collisions or riding in traffic with **45.6%** of responses.



General observations:

- Frequent blockage of the bus/bike/scooter lane as delivery vehicles pulled into the dedicated lane to unload.
- Any vehicle stopped (including the bus) in the bus/bike/scooter lane creates a condition where the cyclists or scooters would have to wait to move again or enter the vehicular travel lane to go around the stopped vehicle.
- Inhaling vehicle exhaust is a concern if cyclists or scooters cannot pass the bus.

After analyzing the data, it was clear that vehicle speeds slowed significantly with the presence of the bus/bike/scooter lane, even more than with the presence of on-street parking. The survey results indicate that there is support for the dedicated bus/bike/scooter lane with a majority favoring the dedicated lane if they live or own a business near Boush Street and/or travel Boush Street by bike, scooter, or on foot. Even with support for the dedicated lane, there were several respondents who prefer keeping on-street parking as it is a convenient option for those driving to/from Downtown.

Introduction

In an ongoing effort to make bike and scooter riding safe and convenient, the City of Norfolk tested dedicated bus/bike/scooter lanes along a section of Boush Street from City Hall Avenue to Brambleton Avenue Friday, May 7, 2021 and Saturday, May 8, 2021. The purpose of the demonstration is to help the Department of Transit determine which travel concept for Boush Street is preferred for the future configuration of the street – one vehicular travel lane with a shared bus/bike/scooter lane (top image) or one vehicular travel lane and a parking lane (bottom image).

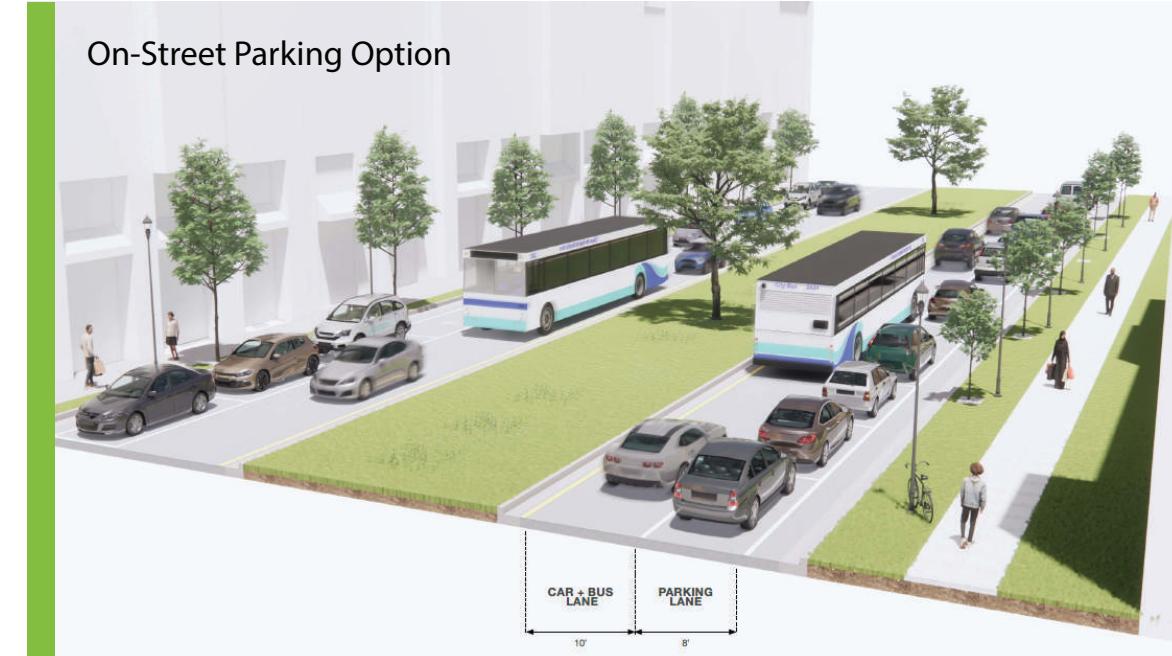
Although there is currently no regular bus service on Boush Street, only one infrequent route, the City's draft Multimodal Transportation Master Plan identifies a new bus route to run 15-minute regular service along a section of the street. This new route would travel from the Downtown Norfolk Transfer Center (DNTC) along City Hall Avenue, turn onto Boush Street, continue to Olney Road, and head west to EVMS and Ghent. In the Multimodal Plan, Boush Street is identified as a street with pedestrian, bicycle, and transit modal emphasis meaning that the street serves as a critical connection for all three modes and should emphasize the use of these modes in the design of the corridor. Boush Street is also identified as an "Avenue" meaning it should be designed with slower speeds to allow pedestrians and bicyclists to feel safe and comfortable.

Boush Street should serve all modes in a safe and convenient way, however, there is not sufficient right-of-way to accommodate both a dedicated bus lane and a dedicated bike lane. Therefore, it was decided to test a dedicated bus/bike/scooter lane to determine the feasibility of using such a multimodal lane in downtown Norfolk. A shared bus/bike/scooter lane is a single lane that is dedicated to only buses, bikes, and scooters. Private vehicle like cars and trucks and commercial vehicles such as delivery trucks are not permitted to use this lane. A shared bus/bike/scooter lane provides an improvement in bus travel time and separates bicycle and scooter riders from general traffic, providing better reliability for bus riders and safety for those who ride a bike or a scooter to their destination. For this demonstration, the temporary street configuration included one vehicular travel lane with the bus/bike/scooter lane along the outside lane, with no parking lane.

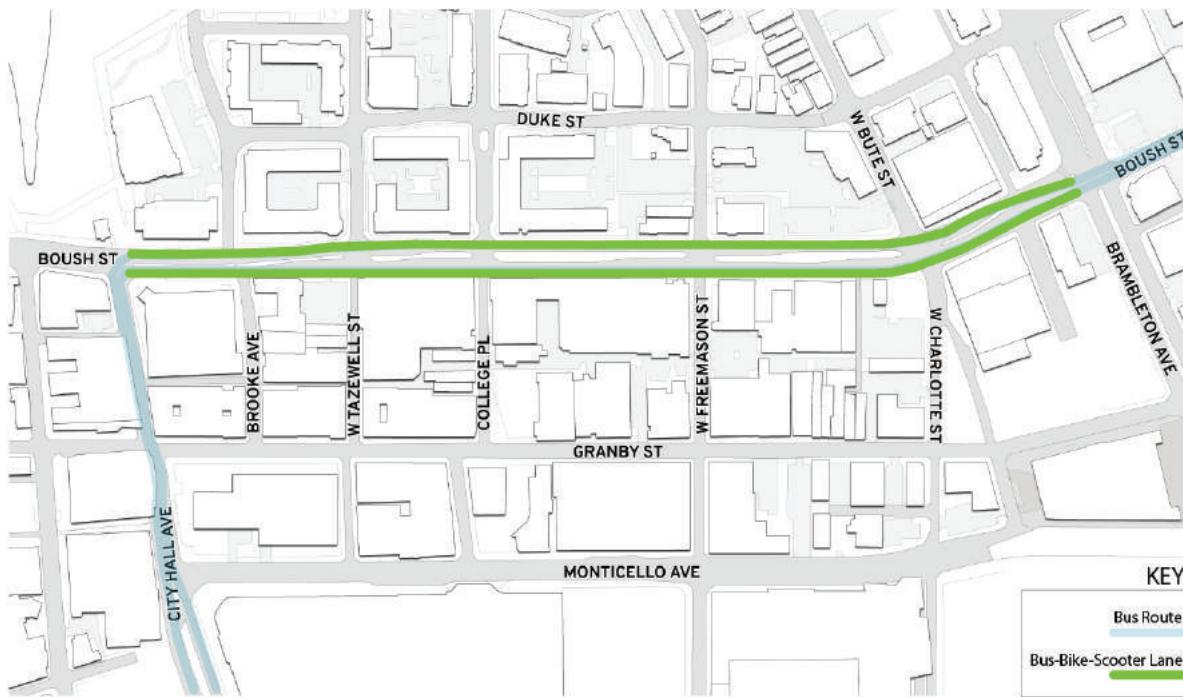
Bus/Bike/Scooter Lane Option



On-Street Parking Option



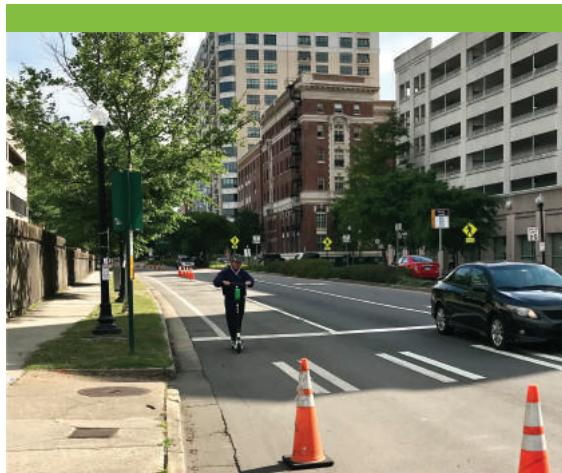
Public Input & Data Collection



Public input and data collected during the demonstration will be used to determine if the City will move forward with implementing a permanent bus/bike/scooter lane. If the City chooses to move forward with the dedicated lane, a design and community involvement process will be needed before a permanent installation of a bus/bike/scooter lane can be completed.

An online survey conducted by the Department of Transit was open from May 3, 2021 to May 26, 2021 and allowed respondents to answer 19 questions on how they currently use Boush Street and what are their preferences: a dedicated bus/bike/scooter lane or a parking lane. In addition to the online survey, paper copies of the survey were available during the test days for attendees to provide their feedback on site. The goal of the survey is to get feedback from those who bike or scooter, to understand if people are comfortable using a bus/bike/scooter lane, and to hear from nearby residents about their preferences for how Boush Street gets used. In total, the survey received 332 responses – 317 online responses and 15 paper responses.

Data collection during the test days included southbound speed data and vehicle counts using NPD's Blackcat, northbound speed data using a radar gun, and bike and scooter counts in both the northbound and southbound directions. General observations were also recorded during and after the demonstration.



Results & Analysis

Blackcat Data

The Norfolk Police Department posted a Blackcat unit in the southbound direction at 200 Boush Street near Brooke Avenue to track vehicle counts and speeds before, during, and after the bus/bike/scooter lane demonstration. The unit was posted from Wednesday, May 5 at 1pm to Tuesday, May 11 at 10am.

During this time, 70,100 vehicles were recorded in the southbound direction with the 85th percentile speed (the speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions past a monitored point) being 29 mph. The posted speed limit is 25 mph. Over the 7-day period, 63.2% of all vehicles travelled 25 mph or less.

Table 1 details the number of vehicles, the number of vehicles traveling 25 mph or less and the percentage of vehicles traveling 25 mph or less in the Southbound direction for each day the Blackcat was posted. More detailed data is provided in the Appendix.

On Friday, May 7 (first demonstration day), 14,868 southbound vehicles were recorded with 6,043 vehicles during the test hours, 8am to 3pm. During the test hours, 72.1% of vehicles travelled 25 mph or less. Reference **TABLE A.1** in the Appendix for further information. Outside of the test hours, the percentage of vehicles travelling at 25 mph or less dropped to 67.5%.

On Saturday, May 8 (second demonstration day), 9,381 southbound vehicles were recorded with 2,724 vehicles during the test hours, 10am to 2pm. During the test hours, 69.2% of vehicles travelled 25 mph or less. Reference **TABLE A.2** in the Appendix for further information. Outside of the test hours, the percentage of vehicles travelling at 25 mph or less dropped to 63.8%.

The data from both Friday and Saturday indicates that vehicle speeds slowed down to the posted speed of 25 mph or lower due to the presence of buses, bikes, and scooters in the dedicated lane and the presence of only one vehicular travel lane.

TABLE 1 – Southbound Vehicle Counts & Speeds

| DATE | NUMBER OF VEHICLES | # 25 MPH OR LESS | % 25 MPH OR LESS |
|------------------|--------------------|------------------|------------------|
| Wednesday, May 5 | 7,645 | 5,031 | 65.8% |
| Thursday, May 6 | 13,663 | 9,126 | 66.8% |
| Friday, May 7 | 14,868 | 10,319 | 69.4% |
| Saturday, May 8 | 9,381 | 6,139 | 65.4% |
| Sunday, May 9 | 8,688 | 5,556 | 63.9% |
| Monday, May 10 | 12,083 | 6,363 | 52.6% |
| Tuesday, May 11 | 3,772 | 1,796 | 47.6% |
| TOTAL | 70,100 | 44,330 | 63.2% |

Results & Analysis

Radar Gun Data

Volunteers from WPA used their radar gun to record vehicle speeds in the northbound direction of Boush Street before and during the test days. Speeds were recorded on May 6, May 7, and May 8.

On Thursday, May 6, the average speed range for northbound was 24-27 mph, and parked cars were still present in the northbound parking lanes. The average speed range for southbound was 27-32 mph with several recorded at 40-42 mph. During this time, there were no cars parked in the southbound parking lanes. This data highlights the impact parked cars (or the use of the outside lane) have on reducing the speed of traveling vehicles.

Table 2 presents the average speed and the average max speed of vehicles traveling in the Northbound direction for each of the demonstration days during the test hours. More detailed data from the radar gun is provided in the Appendix.

On Friday, May 7, speeds were recorded at 10 different times and locations along the northbound section Boush Street during the test hours, 8am and 3pm. The average speed recorded on Friday was 23.7 mph while the average max speed was 27.1 mph. The highest speed recorded on Friday was 36 mph. Reference [TABLE A.3](#) in the Appendix for further information.

On Saturday, May 8, speeds were recorded at 9 different times and locations along the northbound section of Boush Street during the test hours, 10am and 2pm. The average speed recorded on Saturday was 22.5 mph while the average max speed was 26 mph. The highest speed recorded on Saturday was 36 mph. Reference [TABLE A.4](#) in the Appendix for further information.

Similar speeds were recorded for both Friday and Saturday with Saturday's speeds being slightly slower. Additionally, the average speeds on Friday and Saturday were lower than the average speed range recorded for Thursday indicating the influence the bus/bike/scooter lane had on lowering vehicular speeds.

TABLE 2 – Northbound Vehicle Speeds (during test hours)

| DATE | AVERAGE SPEED | AVERAGE MAX SPEED |
|-----------------|-----------------|-------------------|
| Friday, May 7 | 23.7 mph | 27.1 mph |
| Saturday, May 8 | 22.5 mph | 26 mph |
| TOTAL | 23.1 mph | 26.5 mph |

Results & Analysis

Bike & Scooter Counts

Volunteers assisted with counting bikes and scooters in the northbound and southbound directions while the buses ran every 15 minutes.

Table 3 lists the number of bikes and scooters traveling in both the Northbound and Southbound directions for each of the demonstration days during the test hours. More detailed count data is provided in the Appendix.

On Friday, 38 bikes and 45 scooters were recorded going northbound and 43 bikes and 49 scooters going southbound with a total of 81 bikes and 94 scooters during the test hours, 8am and 3pm. Reference **TABLE A.5** in the Appendix for further information.

On Saturday, 55 bikes and 28 scooters were recorded going northbound and 44 bikes and 22 scooters going southbound with a total of 99 bikes and 50 scooters during the test hours, 10am and 2pm. Reference **TABLE A.6** in the Appendix for further information.

TABLE 3 – Bike and Scooter Counts (during test hours)

| DATE | DIRECTION | BIKES | SCOOTERS |
|--------------------|------------|------------|------------|
| Friday, May 7 | Northbound | 38 | 45 |
| Friday, May 7 | Southbound | 43 | 49 |
| TOTAL | – | 81 | 94 |
| Saturday, May 8 | Northbound | 55 | 28 |
| Saturday, May 8 | Southbound | 44 | 22 |
| TOTAL | – | 99 | 50 |
| GRAND TOTAL | – | 180 | 144 |

General Observations

- Southbound speeds appeared to be faster than northbound.
- Overall, there was frequent blockage of the bus/bike/scooter lane as delivery drivers pulled over to unload.
- Any vehicle stopped (including the bus) in the bus/bike/scooter lane creates a condition where the cyclists or scooters would have to wait to move again or enter the vehicular travel lane to go around the stopped vehicle.
- The northbound bus/bike/scooter lane had significant overhang from street trees which seemed to reduce the speed the buses were able to travel. Buses are allowed to travel at 20 mph.
- If bus/bike/scooter lane were implemented, the transition from side streets will need to be designed.
- The traffic light timing may need to be modified if the bus/bike/scooter lane is to be implemented to support slower speeds.
- If the parking lane remains, curb extensions should be considered at all crosswalks.

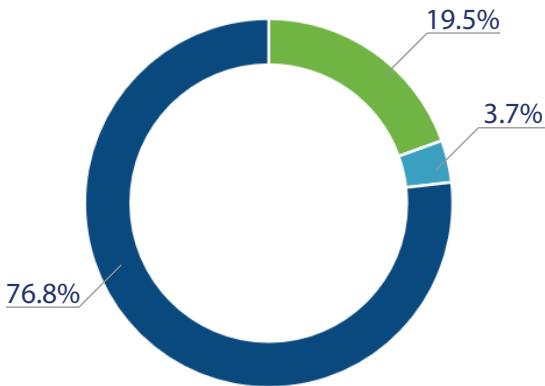
Results & Analysis

Survey Responses

As noted above, over 300 respondents answered the survey questions between May 3, 2021 to May 26, 2021. Responses to each question are provided in the Appendix. Below are some key observations followed by highlights from the open comments section of the survey:

76.8% of respondents did NOT ride a bike or scooter in the bus/bike/scooter lane on the test days

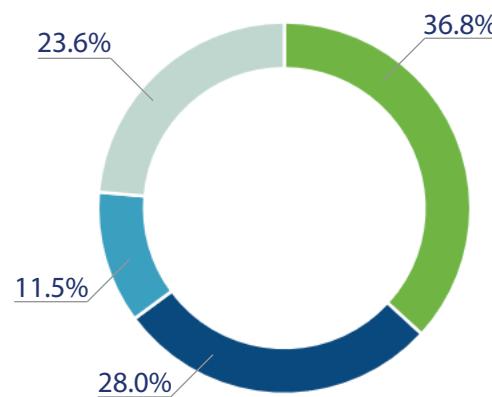
Did you ride a bike or scooter in the dedicated bus/bike/scooter lane on the test day?



- Yes, I rode a bike
- Yes, I rode a scooter
- No

64.8% of respondents who did bike or scooter on the test days felt "Very comfortable" or "Somewhat comfortable" in the dedicated lane

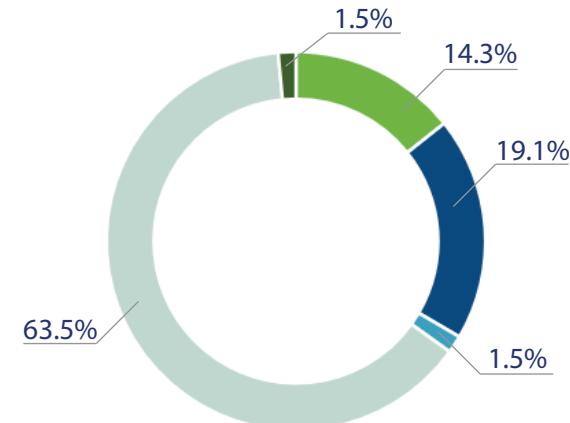
How comfortable did you feel while riding in the bus/bike/scooter lane?



- Very comfortable
- Somewhat comfortable
- Somewhat uncomfortable
- Very uncomfortable

19.1% of respondents use a bicycle as their primary mode of transportation to/from Downtown (50% of those trips are 2 miles or less)

What is your primary mode of transportation to/from Downtown Norfolk?



- Walk
- Car or motorcycle
- Bike
- The Tide
- Scooter

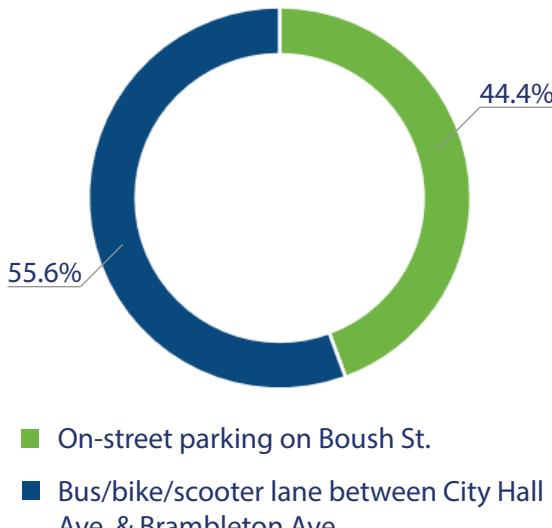
Results & Analysis

Survey Responses

55.6% of respondents would prefer the bus/bike/scooter lane if they lived or owned a business near Boush St.

44.4% of respondents would prefer on-street parking along Boush St. if they lived or owned a business near Boush St.

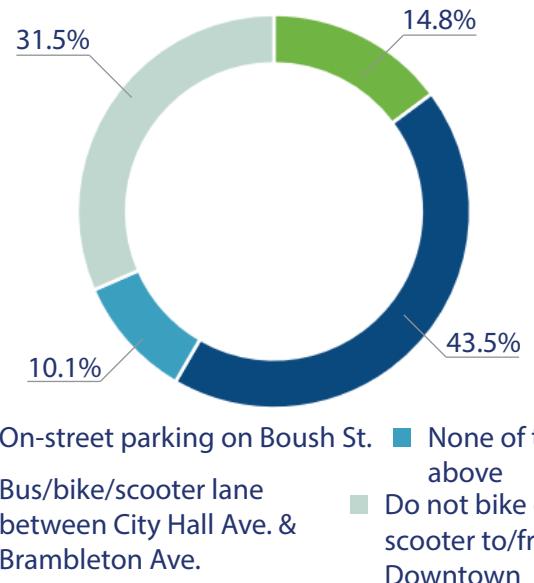
Which street configuration would you prefer if you lived or owned a business near Boush St?



43.5% of respondents would prefer the bus/bike/scooter lane if they rode bikes or scooters to/from Downtown

14.8% of respondents would prefer on-street parking if they rode bikes or scooters to/from Downtown

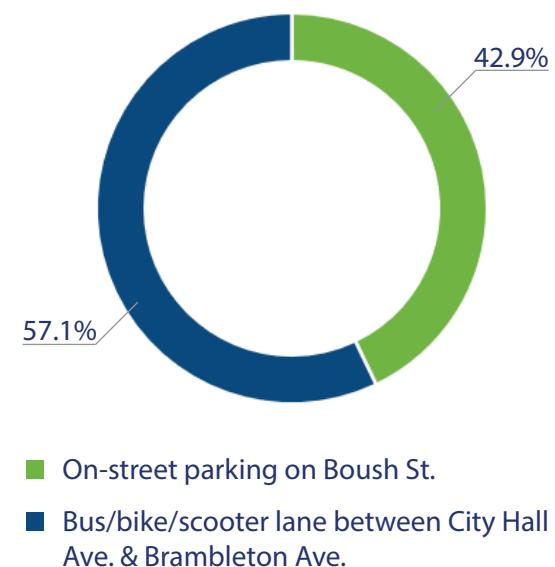
Which street configuration would you prefer as someone who rides bicycles or scooters to/from Downtown?



57.1% of respondents would prefer the bus/bike/scooter lane if they were crossing Boush St. to get to work/shopping/dining.

42.9% of respondents would prefer on-street parking if they were crossing Boush St. to get to work/shopping/dining.

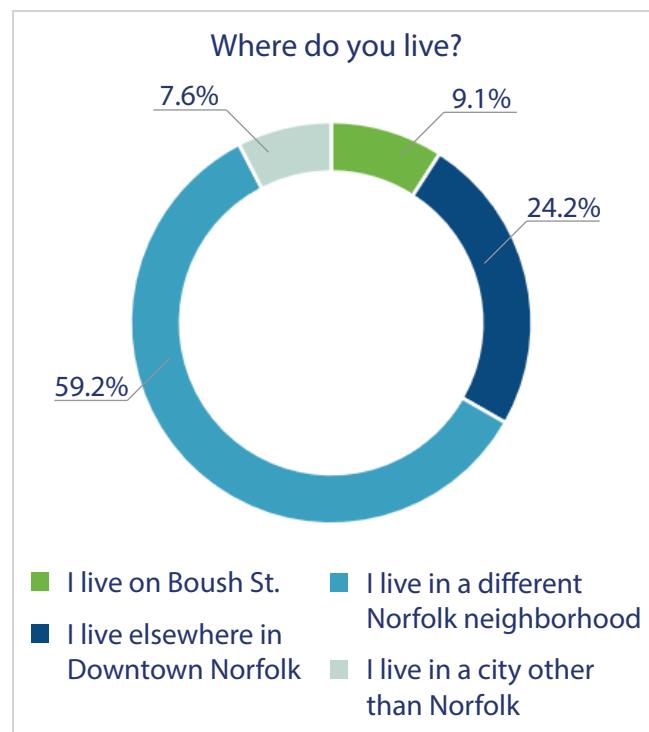
Which street configuration would you prefer if you were to cross Boush St. on foot to get to work, shopping, or dining?



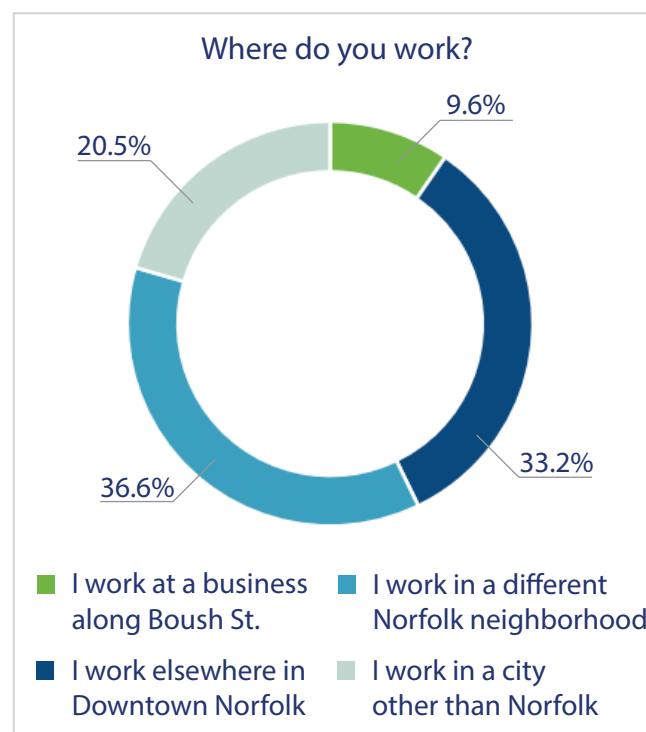
Results & Analysis

Survey Responses

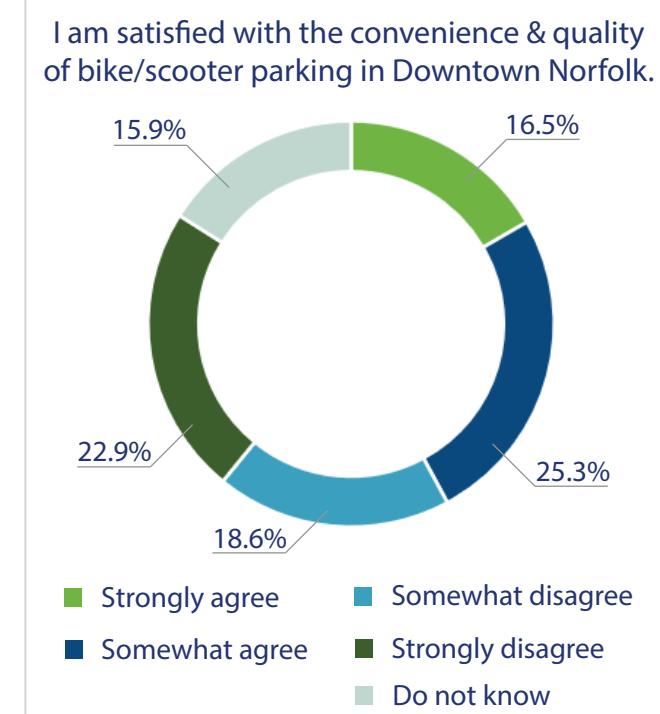
33.3% of respondents live in Downtown Norfolk
(**9.1%** live along Boush St.)



42.8% of respondents work in Downtown Norfolk
(**9.6%** work along Boush St.)



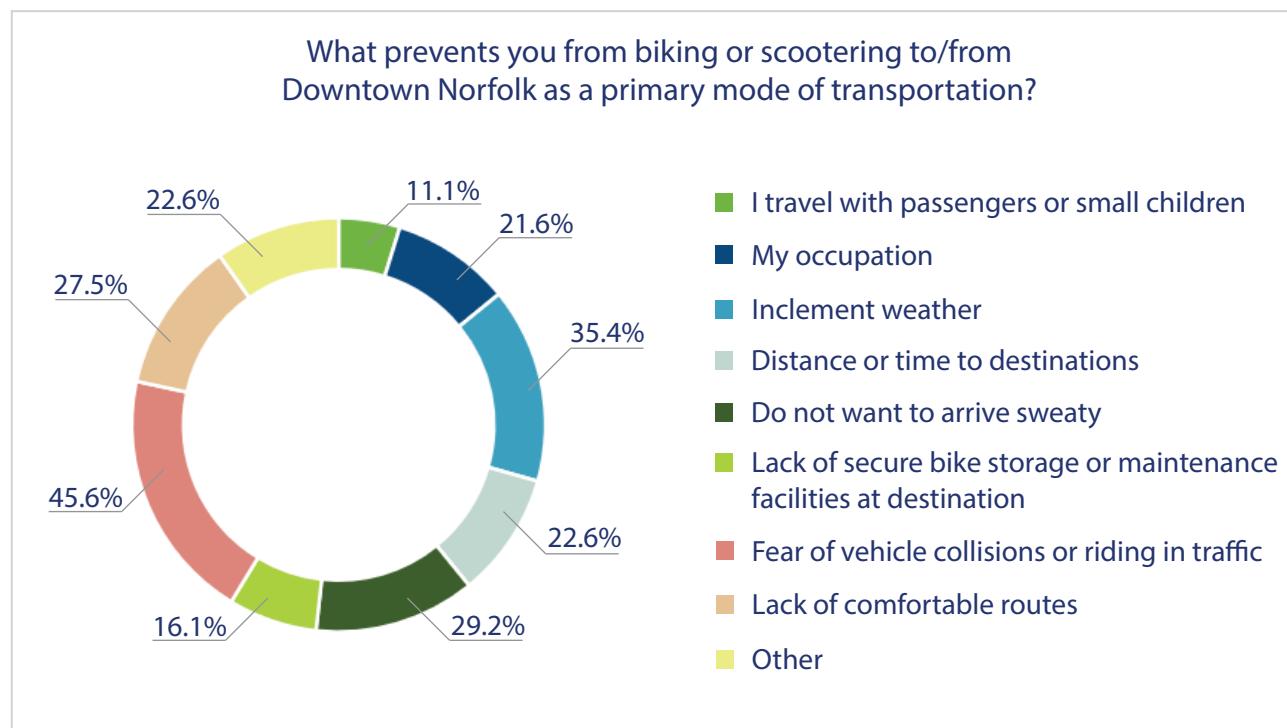
41.5% of respondents "Somewhat disagree" or "Strongly disagree" with the convenience & quality of on-street bike/scooter parking Downtown



Results & Analysis

Survey Responses

45.6% of respondents said a fear of vehicle collisions or riding in traffic prevents them from biking or scootering to/from Downtown



Highlights from the "Open Comments" section:

- The most common response indicated from many respondents was wanting Boush Street to revert to its original design pre-Covid, with four travel lanes. Many said biking facilities should be on Granby or Monticello but not on a main thoroughfare like Boush Street.
- Several comments about when cruise ships return to Downtown and the massive congestion they bring, especially with only one travel lane in each direction on Boush Street.
- Multiple comments discussing the mess of scooters Downtown (all over sidewalks, making it difficult to walk, etc).
- Multiple comments about how on-street parking makes it difficult to cross Boush Street on foot or in a vehicle.
- Several comments complaining about the City spending tax dollars on bike lanes (which they said are seldomly used), on installing new parking meters that may be taken out, and on other unnecessary things when recreation centers and libraries are still closed.
- Several comments about the bus/bike/scooter lane not being connected to other bike facilities in the area.
- A few comments asking if Boush Street needs bike facilities especially with the ERT and Granby Street in close proximity.
- Many comments about how on-street parking slows down traffic on Boush Street and is better for Downtown businesses.

HRT Driver Survey Responses

In addition to the general survey, a different survey was conducted for the HRT bus driver who drove in the bus/bike/scooter lane during the demonstration. The goal of this survey was to ask for the bus driver's feedback to understand the experience of the driver during the test and his/her preference. Below are the driver's responses to the survey.

The full HRT Driver survey is provided in the [Appendix](#).

- The driver has been an HRT bus driver for 5+ years.
- The driver drives an HRT bus in or near Downtown Norfolk an average of 5+ days per week.
- The driver has been given training in bus and bike/scooter road rules and safety.
- The driver felt very comfortable while driving in the bus/bike/scooter lane.
- The driver sometimes experienced delays due to the presence of cyclists and scooter riders. The average amount of delay was less than 1 minute.
- If this driver were a regular bus driver along Boush Street, he/she would prefer the bus/bike/scooter lane configuration between City Hall Avenue and Brambleton Avenue (no on-street parking).
- If this driver were to cross Boush Street as a pedestrian to get to work, shopping, or dining, he/she would prefer the on-street parking configuration on Boush Street.

After analyzing the data, it was clear that vehicle speeds slowed significantly with the presence of the bus/bike/scooter lane, even more than with the presence of on-street parking. The survey results indicate that there is support for the dedicated bus/bike/scooter lane with a majority favoring the dedicated lane if they live or own a business near Boush Street and/or travel Boush Street by bike, scooter, or on foot. The HRT bus driver felt comfortable using the lane and, for the most part, bikers and scooter users felt comfortable being separated from traffic. Even with support for the dedicated lane, there were several respondents who prefer keeping on-street parking as it is a convenient option for those driving to/from Downtown.

One frequent comment stated in the survey was about the interaction between the bus and the bikes/scooters. Participants became impatient when having to wait behind the bus and rather than waiting for the bus to proceed, entered the vehicular travel lane to pass the bus. This passing activity can be dangerous if there is a high volume of cars or if the bus driver does not realize the bikes/scooters are passing.

Other comments in the survey expressed concern about crossing Boush Street with parked cars present. Pedestrians cannot always see oncoming traffic well with the on-street parking. Many survey respondents said they prefer crossing Boush Street on foot with the bus/bike/scooter lane option.

If the bus/bike/scooter lane option is selected, the plan should mention that connections across Brambleton Ave. to the existing bike network as well as connections southward towards Town Point Park and the Elizabeth River Trail will be considered in the development of the dedicated lane on Boush St. There were several comments in the survey about connecting Boush St. to the existing bike network.

Plans will also need to include ideas for how delivery vehicles will interact with the bus/bike/scooter lane as they should not be able to park/drop off packages in the dedicated lane. There should be an alternative location for this activity. Similarly, there would need to be ideas of how to keep regular traffic out of the dedicated lane for stopping, parking and/or turning.

Appendix

Blackcat Data - 200 Boush Street near Brooke Avenue (Southbound) Speed Limit: 25mph

Wednesday, May 5 at 1pm to Tuesday, May 11 at 10am

- 70,100 southbound vehicles
- 85 percentile speed: 29 mph (the speed at or below which 85 percent of all vehicles are observed to travel under free-flowing conditions past a monitored point.)
- 63.24% of all vehicles travelled 25 mph or less over the 7-day period

Friday, May 7

- 14,868 southbound vehicles
- 6,043 southbound vehicles during test hours, 8am to 3pm
- 69.4% of all vehicles travelled 25 mph or less
- 72.2% of vehicles between 8am to 3pm travelled 25 mph or less when buses, bikes, and scooters were present
- 67.5% of vehicles outside of the 8am to 3pm times travelled 25mph or less

TABLE A.1 – Southbound Vehicle Counts & Speeds for Friday, May 7 (8 AM - 3 PM)

| TIME | NUMBER OF VEHICLES | # 25 MPH OR LESS | % 25 MPH OR LESS |
|--------------|--------------------|------------------|------------------|
| 8:00 AM | 912 | 633 | 69.4% |
| 9:00 AM | 806 | 629 | 78.0% |
| 10:00 AM | 673 | 496 | 73.7% |
| 11:00 AM | 773 | 524 | 67.8% |
| 12:00 PM | 981 | 727 | 74.1% |
| 1:00 PM | 916 | 665 | 72.6% |
| 2:00 PM | 982 | 689 | 70.2% |
| TOTAL | 6,043 | 4,363 | 72.2% |

Saturday, May 8

- 9,381 southbound vehicles
- 2,724 southbound vehicles during test hours, 10am to 2pm
- 65.4% of all vehicles travelled 25 mph or less
- 69.2% of vehicles between 10am to 2pm travelled 25 mph or less when buses, bikes, and scooters were present
- 63.8% of vehicles outside of the 10am to 2pm times travelled 25mph or less

TABLE A.2 – Southbound Vehicle Counts & Speeds for Saturday, May 8 (10 AM - 2 PM)

| TIME | NUMBER OF VEHICLES | # 25 MPH OR LESS | % 25 MPH OR LESS |
|--------------|--------------------|------------------|------------------|
| 10:00 AM | 537 | 358 | 66.7% |
| 11:00 AM | 713 | 506 | 70.9% |
| 12:00 PM | 724 | 501 | 69.2% |
| 1:00 PM | 750 | 521 | 69.5% |
| TOTAL | 2,724 | 1,886 | 69.2% |

Appendix

Radar Gun Data - Boush Street (Northbound)

Speed Limit: 25mph

Thursday, May 6

- "No Parking" signs installed along test route
- Average speed range for northbound of 24-27 mph with no outliers observed
 - Parked cars were still present in the northbound parking lanes
- Average speed range for southbound was 27-32 mph with several at 40-42 mph
 - There were no cars parked in the southbound parking lanes

Friday, May 7

- Average speed for Friday = **23.7 mph**
- Average max speed for Friday = **27.1 mph**
- Highest speed recorded on Friday = **36 mph**

TABLE A.3 – Northbound Vehicle Speeds for Friday, May 7 (8 AM - 3 PM)

| TIME | LOCATION | AVERAGE SPEED | AVERAGE MAX SPEED | HIGHEST SPEED |
|--------------|-------------------------|-----------------|-------------------|---------------|
| 8:45 AM | City Hall - Tazewell | 26 mph | 30 mph | 34 mph |
| 9:00 AM | College - Tazewell | 23 mph | 27 mph | 36 mph |
| 9:30 AM | College Pl. - Freemason | 23 mph | 27 mph | 36 mph |
| 9:45 AM | Freemason - Bute | 24 mph | 26 mph | 29 mph |
| 10:00 AM | College Pl. - Freemason | 24 mph | 27 mph | 35 mph |
| 1:30 PM | Brooke - Tazewell | 24 mph | 27 mph | 35 mph |
| 2:00 PM | Tazewell - College | 23 mph | 26 mph | 29 mph |
| 2:15 PM | College - Freemason | 21 mph | 27 mph | 29 mph |
| 2:40 PM | Freemason - Bute | 25 mph | 27 mph | 36 mph |
| 3:00 PM | Bute - Brambleton | 24 mph | 27 mph | 36 mph |
| TOTAL | – | 23.7 mph | 27.1 mph | 36 mph |

Saturday, May 8

- Average speed for Saturday = **22.5 mph**
- Average max speed for Saturday = **26 mph**
- Highest speed recorded on Saturday = **36 mph**

TABLE A.4 – Northbound Vehicle Speeds for Saturday, May 8 (10 AM - 2 PM)

| TIME | LOCATION | AVERAGE SPEED | AVERAGE MAX SPEED | HIGHEST SPEED |
|--------------|---------------------|-----------------|-------------------|---------------|
| 10:45 AM | Brooke - Tazewell | 25 mph | 27 mph | 36 mph |
| 11:00 AM | Tazewell - College | 25 mph | 28 mph | 36 mph |
| 11:25 AM | College - Freemason | 24 mph | 26 mph | 30 mph |
| 11:35 AM | Freemason - Bute | 26 mph | 27 mph | 36 mph |
| 11:50 AM | Bute - Brambleton | 22 mph | 25 mph | 27 mph |
| 12:50 PM | City Hall - Brooke | 19 mph | 28 mph* | 29 mph |
| 1:00 PM | Brooke - Tazewell | 20 mph | 23 mph | 32 mph |
| 1:10 PM | Tazewell - College | 21 mph | 27 mph | 32 mph |
| 1:15 PM | College - Bute | 21 mph | 23 mph | 32 mph |
| TOTAL | – | 22.5 mph | 26 mph | 36 mph |

* Maximum speed of 25 mph when a bus was present in bus-bike-scooter lane

Appendix

Bike & Scooter Counts

Friday, May 7 - Northbound

- Total bikes = **38**
- Total scooters = **45**

Friday, May 7 - Southbound

- Total bikes = **43**
- Total scooters = **49**

TABLE A.5 – Bike and Scooter Counts for Friday, May 7 (8 AM - 3 PM)

| TIME | DIRECTION | BIKES | SCOOTERS |
|--------------------|------------|-----------|-----------|
| 8:00 AM | Northbound | 6 | 1 |
| 9:00 AM | Northbound | 5 | 5 |
| 10:00 AM | Northbound | 7 | 9 |
| 11:00 AM | Northbound | 7 | 11 |
| 12:00 PM | Northbound | 5 | 8 |
| 1:00 PM | Northbound | 5 | 7 |
| 2:00 PM | Northbound | 3 | 4 |
| TOTAL | – | 38 | 45 |
| 8:00 AM | Southbound | 16 | 3 |
| 9:00 AM | Southbound | 5 | 10 |
| 10:00 AM | Southbound | 6 | 15 |
| 11:00 AM | Southbound | 8 | 16 |
| 12:00 PM | Southbound | 3 | 0 |
| 1:00 PM | Southbound | 2 | 4 |
| 2:00 PM | Southbound | 3 | 1 |
| TOTAL | – | 43 | 49 |
| GRAND TOTAL | – | 81 | 94 |

Saturday, May 8 - Northbound

- Total bikes = **55**
- Total scooters = **28**

Saturday, May 8 - Southbound

- Total bikes = **44**
- Total scooters = **22**

TABLE A.6 – Bike and Scooter Counts for Saturday, May 8 (10 AM - 2 PM)

| TIME | DIRECTION | BIKES | SCOOTERS |
|--------------------|------------|-----------|-----------|
| 10:00 AM | Northbound | 33 | 19 |
| 11:00 AM | Northbound | 2 | 0 |
| 12:00 PM | Northbound | 11 | 5 |
| 1:00 PM | Northbound | 9 | 4 |
| TOTAL | – | 55 | 28 |
| 10:00 AM | Southbound | 17 | 10 |
| 11:00 AM | Southbound | 1 | 3 |
| 12:00 PM | Southbound | 22 | 3 |
| 1:00 PM | Southbound | 4 | 6 |
| TOTAL | – | 44 | 22 |
| GRAND TOTAL | – | 99 | 50 |

Appendix

Test Day Observations (WPA)

1) Southbound speeds appeared to be faster than northbound.

- One measurement showed a difference of more than 10 mph.
- Northbound speeds were above the speed limit by 1-5 mph.
- Only when the bus was present, did we notice speeds significantly below 25 mph. Speeds when the bus was traveling adjacent to traffic were approximately 18-22 mph.
- A physical object, adjacent to traffic, slowed speeds more than an empty lane as observed with the presence of cones.

2) Overall, there was frequent blockage of the bus/bike/scooter lane as delivery drivers pulled over to unload.

- The bus/bike/scooter lane was occasionally blocked by:
 - Delivery vehicles
 - Turning vehicles
- Several of the delivery vehicles that were parked were unattended, and the bus driver needed to wait for the delivery driver to come back to remove the vehicle.

3) Any vehicle stopped (including the bus) in the bus/bike/scooter lane creates a condition where the cyclists or scooters would have to wait to move again or enter the vehicular travel lane to go around the stopped vehicle.

- With the length of time the buses were stopping, we observed cyclists going around them into the vehicular lane to pass regularly.
- Inhaling vehicle exhaust is a concern if cyclists/scooters cannot pass the bus.

4) The northbound bus/bike/scooter lane had significant overhang from street trees which seemed to reduce the speed the buses were able to travel. Buses are allowed to travel at 20 mph.

- Trimming trees to accommodate the buses will remove significant numbers of branches and foliage.

5) If bus/bike/scooter lane were implemented, the transition from side streets will need to be designed.

- We noticed several scooter users riding along the sidewalk as they transitioned from the neighborhood or Downtown to Boush St.

6) The traffic light timing may need to be modified if the bus/bike/scooter lane is to be implemented to support slower speeds.

- All platoons were observed emptying out the block before a red light
- The lights at Brambleton, Bute, and Freemason seemed to stop nearly every platoon every cycle
- Observationally, in the field, it appeared that traffic was most calm with green lights ahead. Speeds and aggressiveness seemed to increase with red lights ahead.

7) If the parking lane remains, curb extensions should be considered at all crosswalks.

- These would provide a place for pedestrians to safely observe oncoming traffic around the parked cars.
- They would take full advantage of the reduction in the number of lanes to cross and help to reduce needed time of the pedestrian crossing signal, which could increase the pace of the signal changes helping traffic to move more freely.

Appendix

Survey Responses

Reference the FOLLOWING PAGES to see the summary of responses to each of the survey questions.

HRT Driver Survey Responses

QUESTION #1: How long have you been an HRT bus driver?

- Less than 1 year
- 1-2 years
- 3-5 years
- **5+ years**

QUESTION #2: What are the average number of days per week you drive an HRT bus in or near Downtown Norfolk?

- 0
- 1-2
- 3-4
- **5+**

QUESTION #3: Have you been given training in bus and bike/scooter road rules and safety?

- Yes
- No

QUESTION #4: How comfortable did you feel while driving in the bus/bike/scooter lane?

- **Very comfortable**
- Somewhat comfortable
- Somewhat uncomfortable
- Very uncomfortable

QUESTION #5: If you answered "Somewhat uncomfortable" or "Very uncomfortable" to Question 4, what made driving in the bus/bike/scooter lane uncomfortable? If possible, please provide suggestions for improvement.

QUESTION #6: While driving in the bus/bike/scooter lane, did you experience delays due to the presence of cyclists or scooter riders?

- Frequently
- **Sometimes**
- Never

QUESTION #7: If you answered "Frequently" or "Sometimes" to Question 6, what was the average amount of delay?

- **Less than 1 minute**
- 1-2 minutes
- 3-4 minutes
- 5+ minutes
- No delay

QUESTION #8: Which of the street configurations would you prefer if you were a regular bus driver along Boush Street?

- On-street parking on Boush St.
- **Bus/bike/scooter lane between City Hall Ave. and Brambleton Ave. (no on-street parking)**

QUESTION #9: Which of the street configurations would you prefer if you were to cross Boush Street as a pedestrian to get to work, shopping, or dining?

- **On-street parking on Boush St.**
- Bus/bike/scooter lane between City Hall Ave. and Brambleton Ave. (no on-street parking)



Boush Street Survey

May 27, 2021, 9:22 AM

Contents

| | | |
|------|----------------------|----|
| i. | Summary of responses | 2 |
| ii. | Survey questions | 12 |
| iii. | Individual responses | 15 |

Boush Street Survey

Please give us your input.

Summary Of Responses

As of May 27, 2021, 9:22 AM, this forum had:

| | |
|--------------------------|------|
| Attendees: | 420 |
| Responses: | 332 |
| Hours of Public Comment: | 16.6 |

Topic Start

April 28, 2021, 8:18 AM

Topic End

May 27, 2021, 9:21 AM

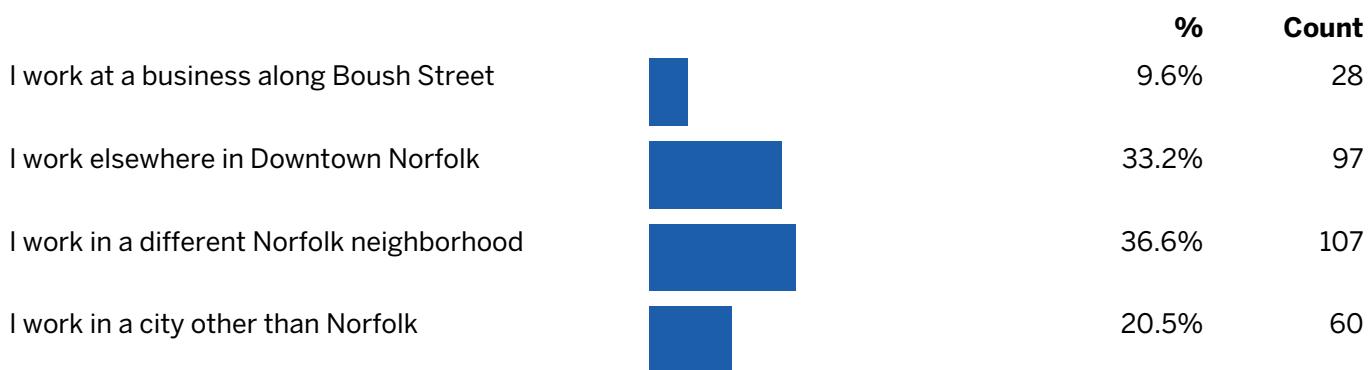
QUESTION 1

Where do you live?



QUESTION 2

Where do you work?

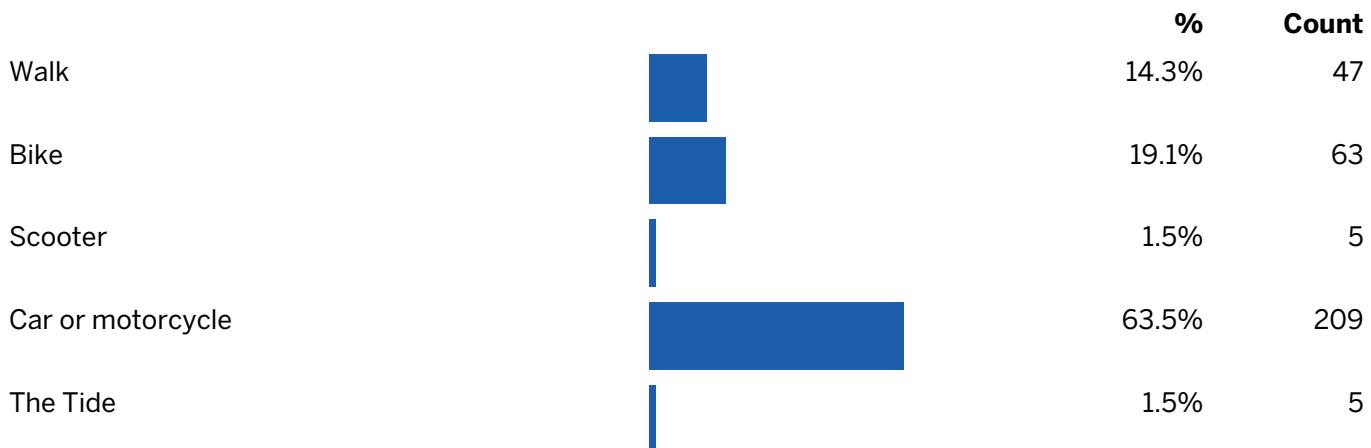


Boush Street Survey

Please give us your input.

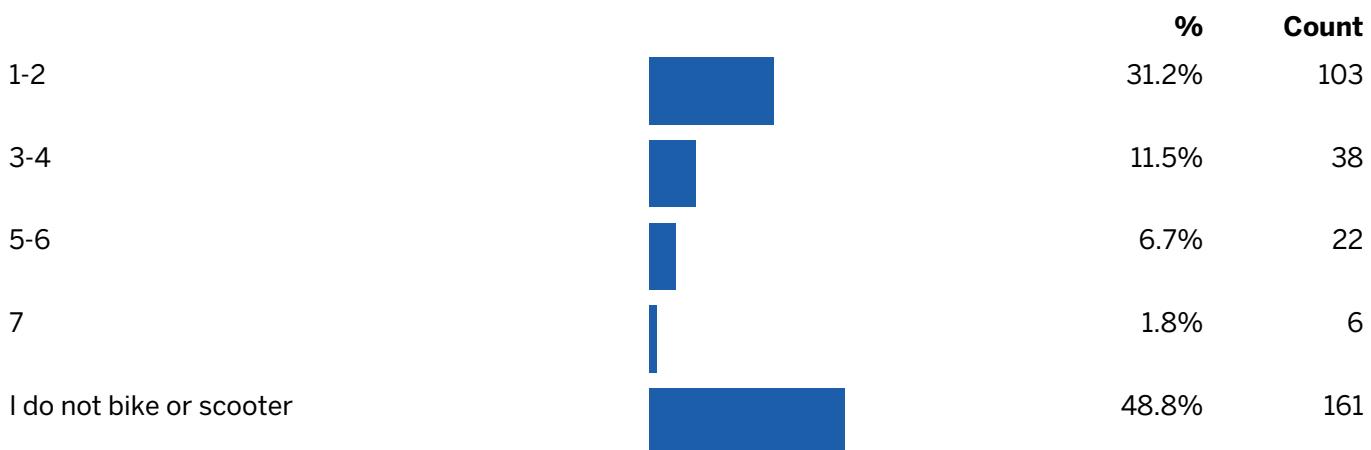
QUESTION 3

What is your primary mode of transportation to/from Downtown Norfolk?



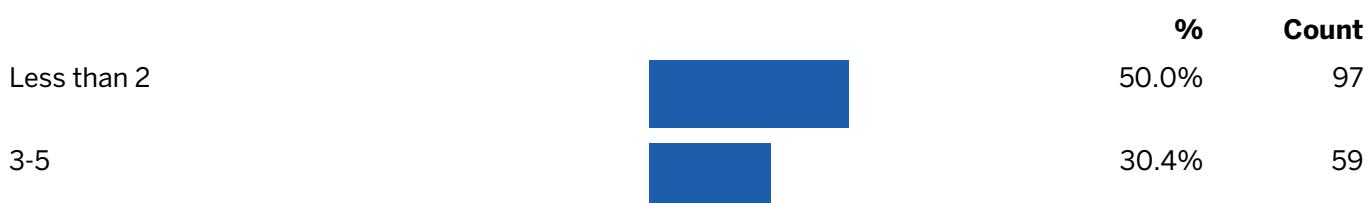
QUESTION 4

What are the average number of days per week that you bike or scooter to/from Downtown Norfolk?



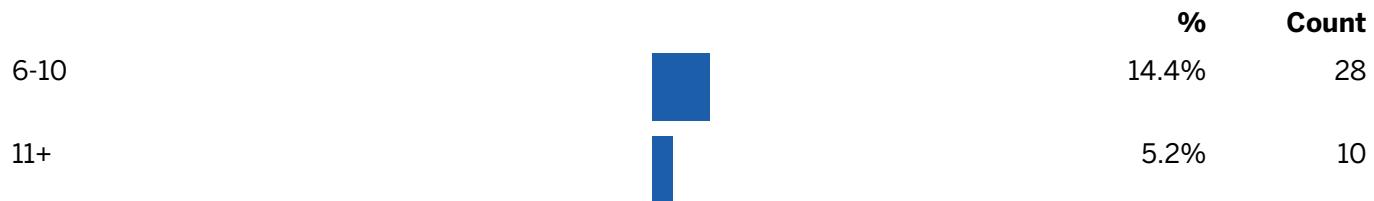
QUESTION 5

If you bike, what is the average distance (in miles) of your bike rides to Downtown Norfolk (one way)?



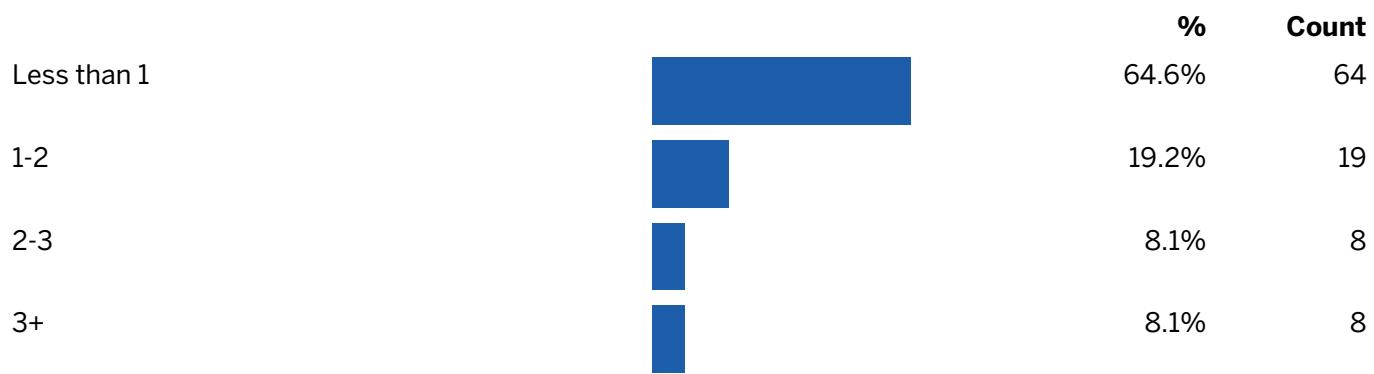
Boush Street Survey

Please give us your input.



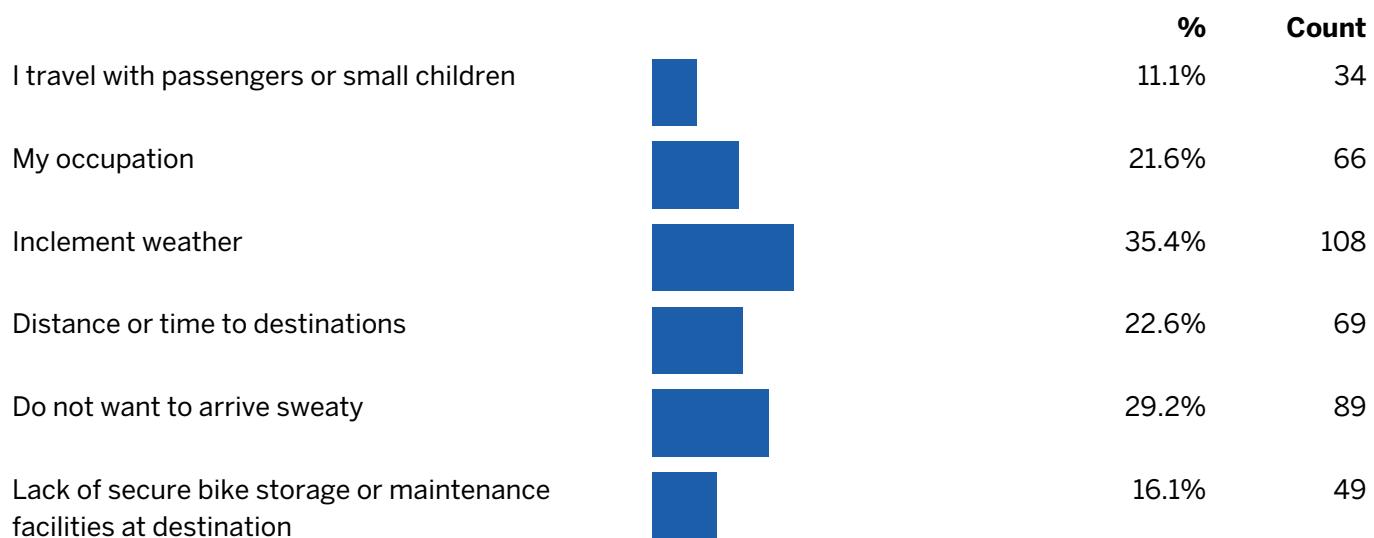
QUESTION 6

If you scooter, what is the average distance (in miles) of your scooter rides to Downtown Norfolk (one way)?



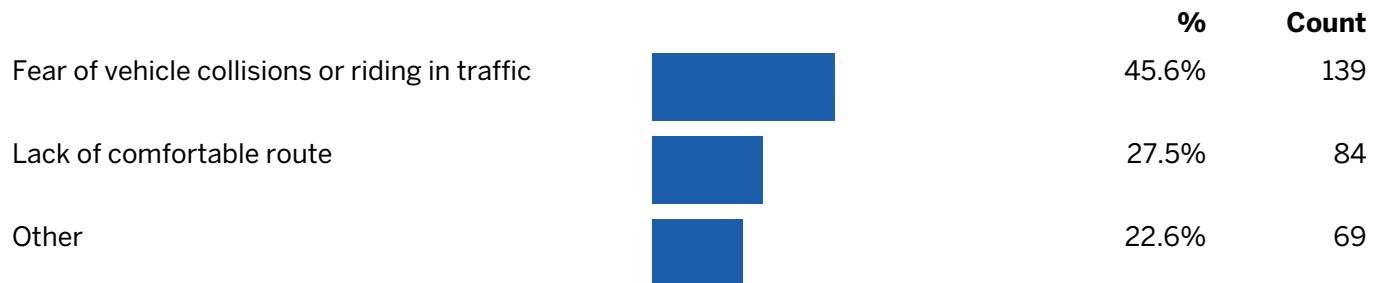
QUESTION 7

**What prevents you from biking or scootering to/from Downtown Norfolk as a primary mode of transportation?
(Check all that apply)**



Boush Street Survey

Please give us your input.



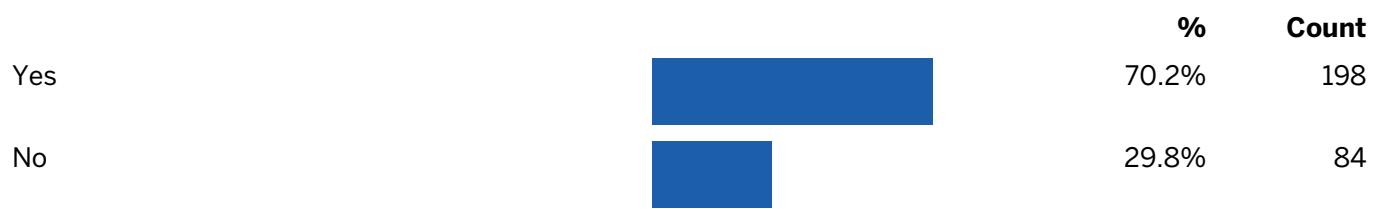
QUESTION 8

Do you currently:



QUESTION 9

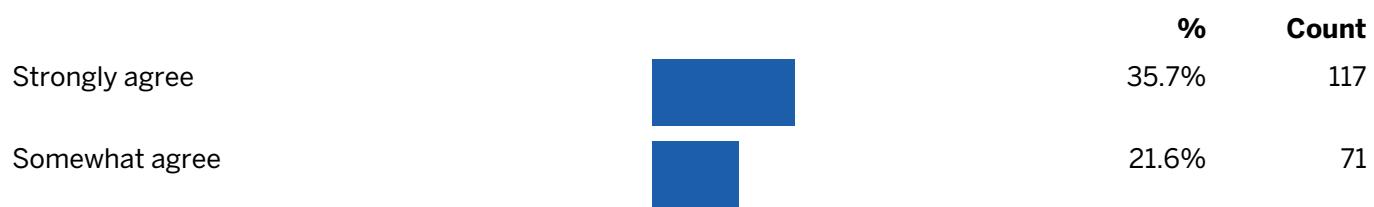
Would you prefer to have a more direct route to Downtown if it felt comfortable/safe?



QUESTION 10

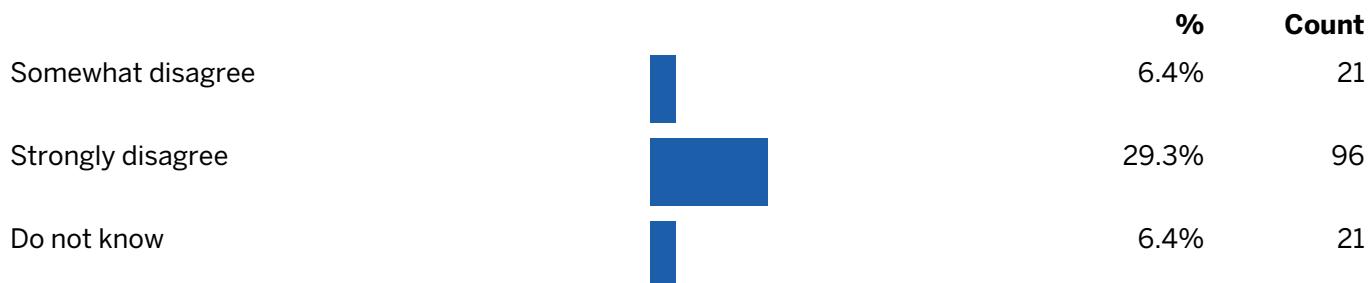
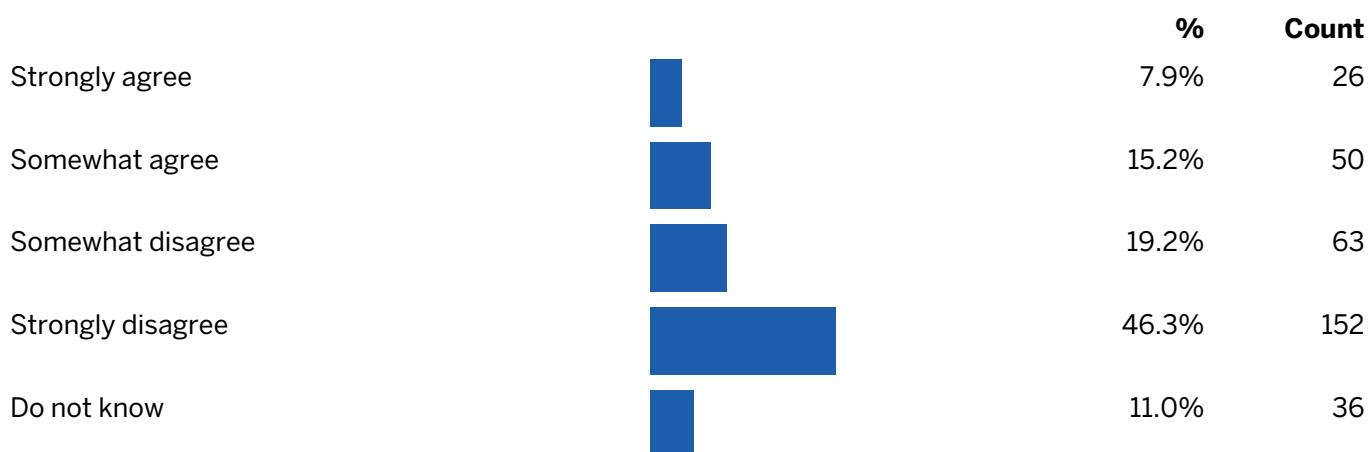
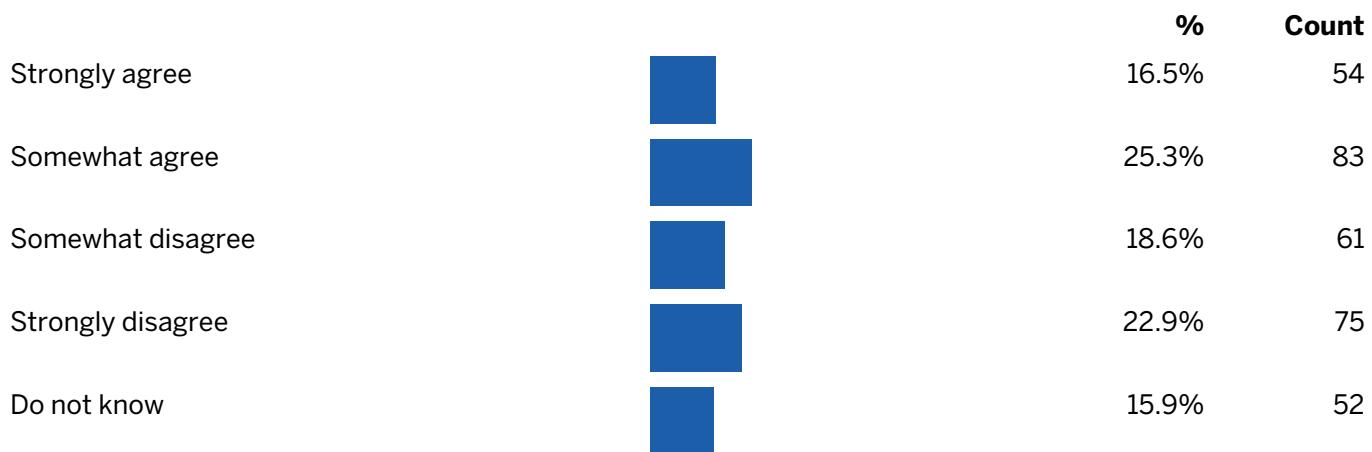
Rate these questions:

I would ride a bike or scooter to/from Downtown more often if it felt safe & comfortable.



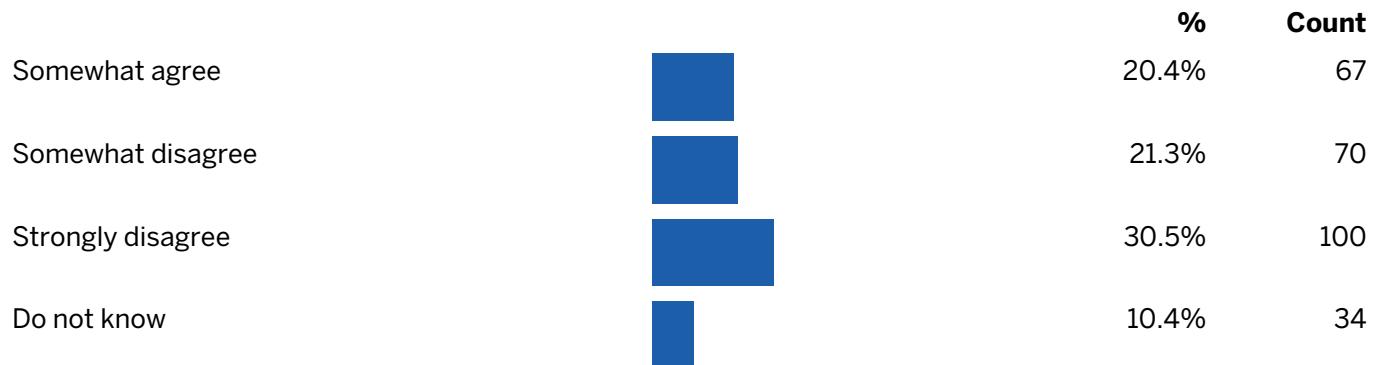
Boush Street Survey

Please give us your input.

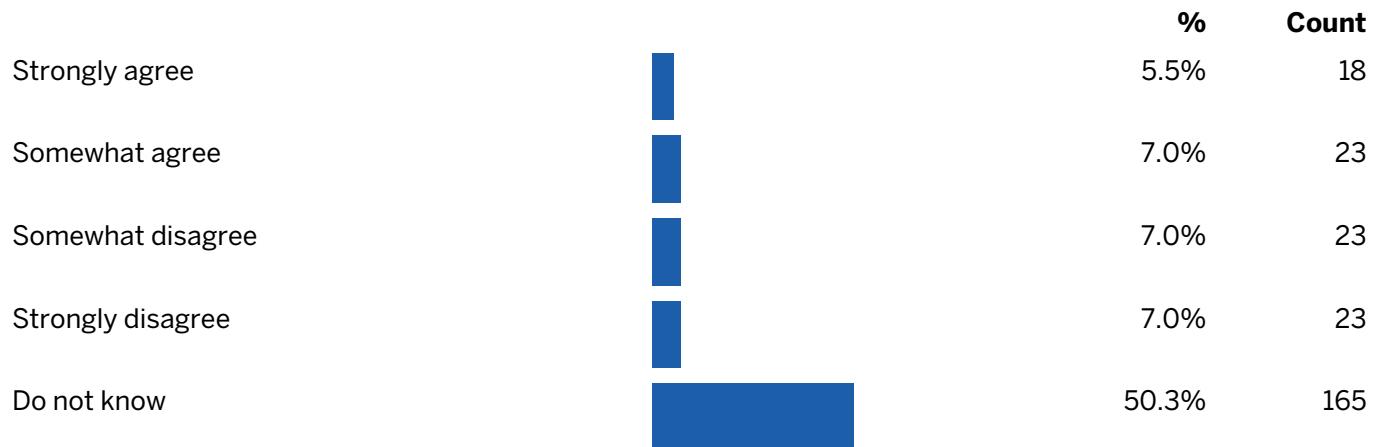
**Downtown Norfolk is a good place to bicycle with children.****I am satisfied with the convenience & quality of bike/scooter parking in Downtown Norfolk****I am satisfied with the convenience & quality of on-street bicycle/scooter lanes in Downtown Norfolk.**

Boush Street Survey

Please give us your input.



If you commute by a bus-bike combination, are you satisfied with the current feasibility of commuting with a combination of bicycling and public transportation?



QUESTION 11

Did you ride a bike or scooter in the dedicated bike-bus-scooter lane on the test day?

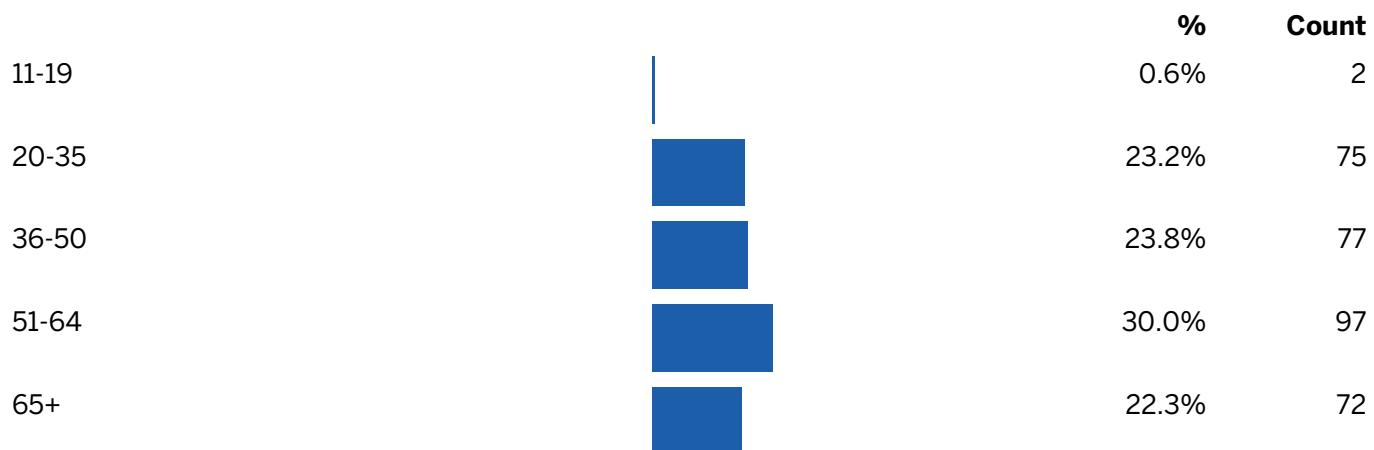


QUESTION 12

Boush Street Survey

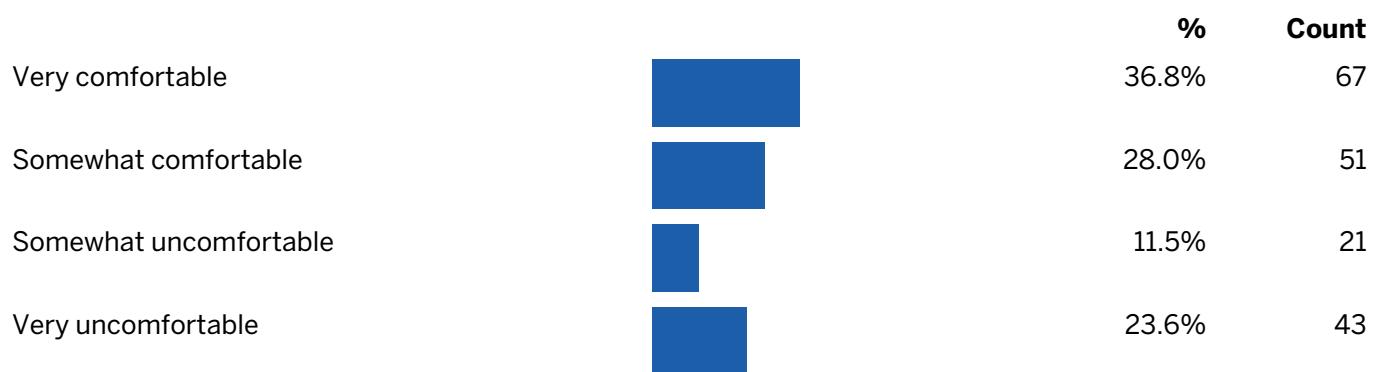
Please give us your input.

Age Range



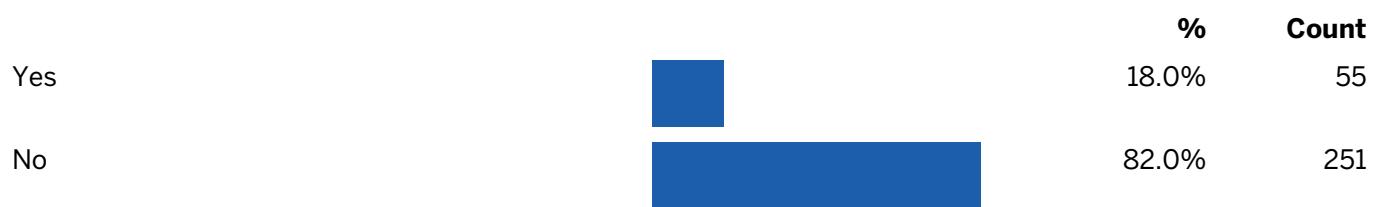
QUESTION 13

How comfortable did you feel while riding in the bus-bike-scooter lane?



QUESTION 14

Do you ride your bike to work?

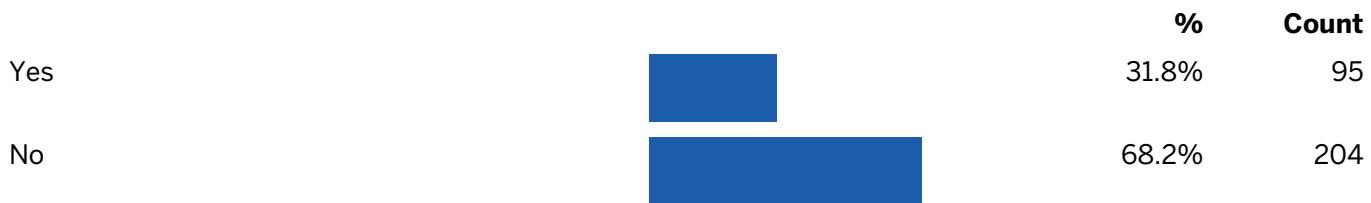


Boush Street Survey

Please give us your input.

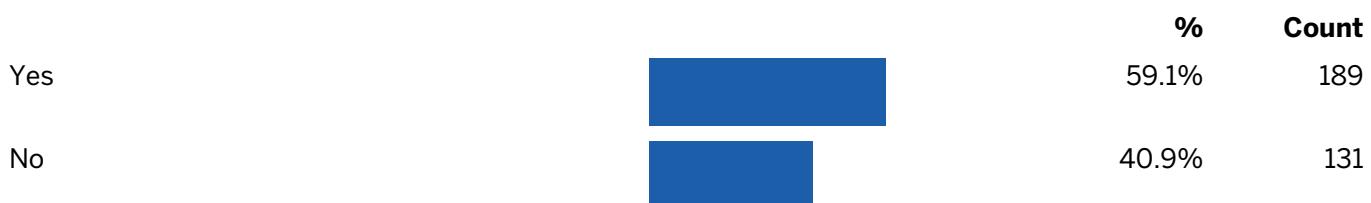
QUESTION 15

Would you ride to work if this bus-bike-scooter lane were in place?



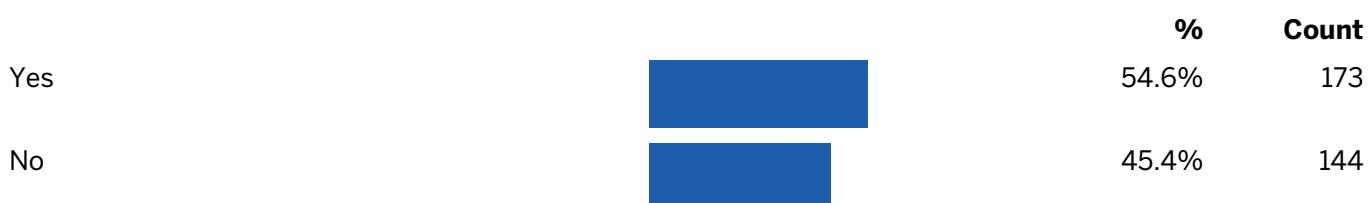
QUESTION 16

Do you ride Downtown for fun?



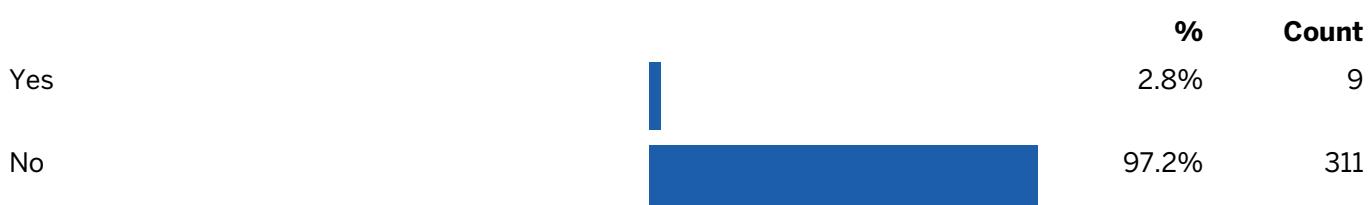
QUESTION 17

Would you ride Downtown for fun if this bus-bike-scooter lane were in place?



QUESTION 18

Do you ride the bus to get to Downtown?

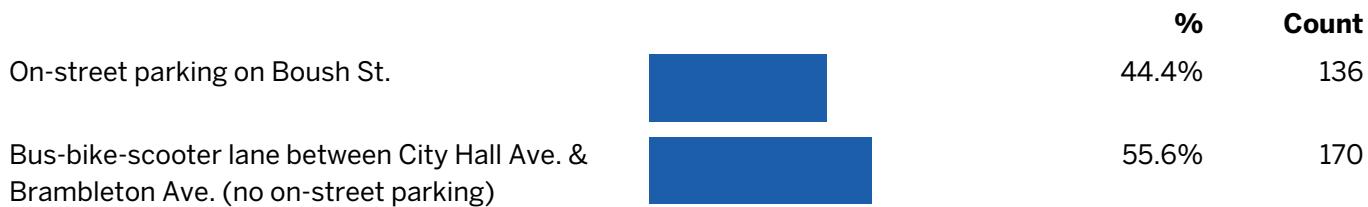


Boush Street Survey

Please give us your input.

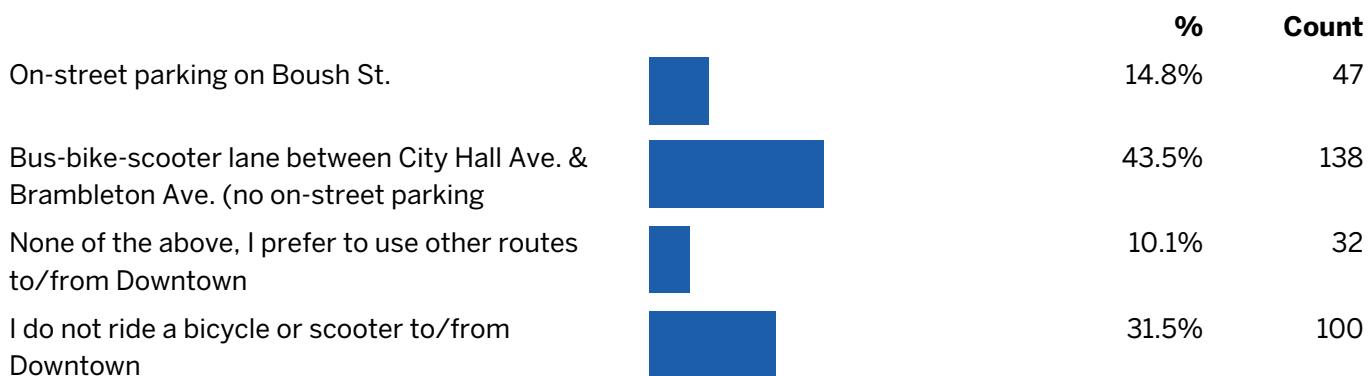
QUESTION 19

Which of the above street configurations would you prefer if you lived or owned a business near Boush Street?



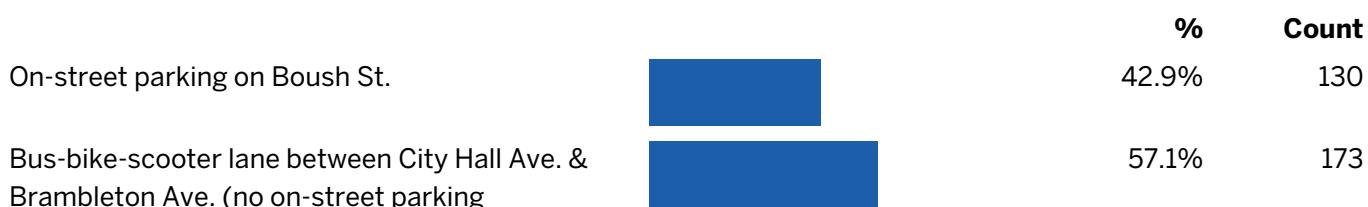
QUESTION 20

Which of the above street configurations would you prefer as someone who rides bicycles or scooters to/from Downtown Norfolk?



QUESTION 21

Which of the above street configurations would you prefer if you were to cross Boush Street on foot to get to work, shopping, or dining?



QUESTION 22

Please provide any comments you would like us to know.