

## Duke Street FAQs - Table of Contents

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## Background

### **Why is the City focusing on transit on Duke Street?**

City Council has prioritized a transitway along the Duke Street starting in the 2008 [Transportation Master Plan](#). Numerous City Councils have shown continued support over the past 15 years to meet the following priorities:

- **Improve access to jobs and opportunities** - especially important for minority populations
- **Manage traffic congestion**
- **Reduce air pollution and carbon emissions**
- **Meet the needs of development**
- **Increase safety**
- **Improve quality of life**

Right now, taking the bus on Duke Street is slower and less reliable than driving, but the corridor still has the highest ridership in the City. A more efficient, reliable and comfortable bus service – with safe connections -- will make it a more attractive option. Otherwise congestion will continue to get worse.

### **Will this project address cut-through traffic?**

Cut-through traffic is a major concern in this area, and making Duke Street work better will likely help to keep drivers on major roadways and off neighborhood residential streets. As part of this project and others on Duke Street, signal timing, new Smart Signals, transit signal priority, and other improvements will help make Duke Street flow and could reduce cut-through traffic.

- [Smart Mobility](#)
- [Duke Street at West Taylor Run](#)
- [Central Alexandria Traffic Study](#)
- [Alexandria Mobility Plan](#)

### **What are the typical elements or goals of Bus Rapid Transit projects?**

Bus Rapid Transit (or BRT) systems aims to make bus transit more efficient, reliable, and comfortable. In general, BRT is a flexible system of facilities, equipment, services, and amenities that improve the speed, reliability, and identity of the bus. Specific BRT elements vary but may include:

- Upgraded bus stations with enhanced passenger amenities
- Faster and easier boarding
- Transit signal priority enabling buses to stop less often at red lights. (You can see a video about this technology [here](#).)
- Dedicated bus lanes that can function similar to a railway
- Queue jump lanes to allow buses to bypass traffic when they don't have their own lane
- More frequent service

Dedicated lanes are not a required element of BRT, but they help make other elements like transit signal priority more effective, getting buses out of traffic and increasing reliability.

## Understanding project benefits

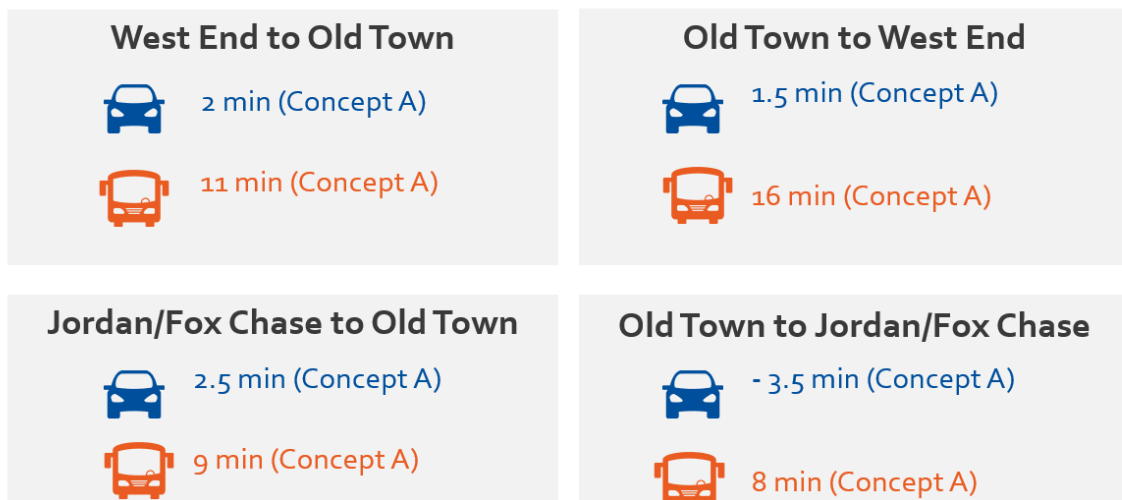
### How will travel times for buses and vehicles change on the corridor?

The PM peak is the most congested period of the day. End-to-End corridor travel time savings in the eastbound is estimated at 9.5 minutes for buses (From 25 minutes to 15.5 minutes) and 5 minutes for other vehicles (from 19.5 minutes to 14.5 minutes).

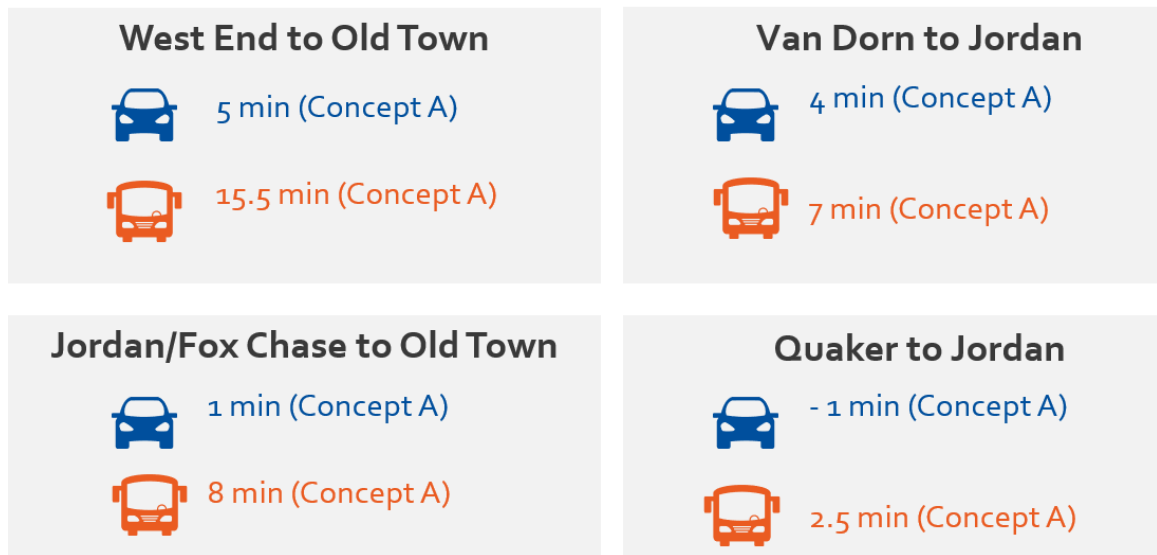
The Westbound AM is only direction seeing a net increase in vehicle travel times from 11 minutes to 13.5 minutes.

Because the increases in vehicle travel times vary by segment and direction, most roundtrips on the corridor will result in a net savings in vehicle travel time.

If you **commute during the AM peak and return during the PM peak, you save..**



## If you make a round trip during the PM peak, you save...



### How can you say that travel times will decrease?

Travel times on Duke Street may decrease related to transit signal priority and traffic signal modifications to provide more green time for Duke Street.

While side street delay may increase, cut-through traffic may elect to take other routes, so it is difficult to say the net impact to side streets.

### What are the major safety benefits?

Duke Street is one of the city's high crash corridors. There were 632 total reported crashes between 2016 and 2020, including:

- 74 left turn angle crashes
- 27 ped involved crashes
- 3 fatalities
- 16 incapacitating injuries
- 168 non-incapacitating injuries
- 22 potential injuries

Busway Concept A would result in the following safety benefits:

- Reduce left turn angle crashes by 70%, which would lead to a 15% reduction in total crashes.
- Reduce ped crashes by 50% at the 29 intersections on the corridor by adding ped refuges where they do not exist today.
- Other intersection safety treatments will be incorporated such as leading pedestrian intervals and no turn on reds.

## How will this project affect various users of Duke Street?

- **Transit riders:** Nicer bus stations that are safer and easier to access, and the bus will be faster and more reliable. Some riders may have to walk a little farther to their stop.
- **Drivers:** Safer because of fewer left turn crashes and from separating buses from traffic. Travel times for most segments of the corridor will likely be shorter. Some left turns will need to make u-turns at a signal, but the turn will be protected.
- **Walkers:** Wider sidewalks, separate paths from bikes where there is space. Safer intersections, and overall a more pleasant experience.
- **Cyclists/Scooter Riders:** Separated (where feasible), connected and wider paths for a safer and more pleasant experience.
- **School buses:** The project team is working with ACPS to identify stops and potential alternative stop locations if the new design impacts existing stop locations.
- **Emergency vehicles:** Response times will improve by using bus only lanes to get around traffic.
- **Businesses:** Access to businesses will remain, but it might look different. More people walking, biking and taking transit on a nicer looking corridor is good for business. Construction will likely be a short-term burden.
- **Service roads:** Access to driveways and parking remains. Some service roads might look different or be converted to one-way for safety and to reduce congestion.
- **People with disabilities:** Upgraded intersections for safer crossings with new technology. Slightly longer distances between stations might mean farther walks for some people, but others might be closer to new stations.

## Impacts

### Will you need private right-of-way?

Any right-of-way needed for this phase would be acquired via **voluntary agreements and not through use of eminent domain. The City does not want to use eminent domain and does not envision utilizing that tool in future phases.** During this phase, the Advisory Group recommended priorities in cases of trade-offs. Some options could include shifting station location, decreasing widths for shared use paths, or reducing buffers or green space.

### How will the plan impact the service roads?

Based on community feedback, **the residential service roads remain in place for the entire corridor.** Some mostly commercial service roads in Segment 1 would be removed to separate buses, bicycles, pedestrians and general traffic. **Access to all businesses would remain** but would look different than today.

To achieve a Duke Street that is better for all users, there are proposals to convert the service road from Cambridge to Telegraph to one way westbound to separate bicycle and scooter traffic from pedestrians and drivers. Overall travel times will likely stay the same since the Duke Street corridor and neighboring intersections will function more efficiently. Any service road conversion would be included in the design

phase, and there would be a **future public hearing at the Traffic and Parking Board and City Council** prior to final approval.

### **How does the proposed slip lane as part of the West Taylor Run Project relate to the Duke Street transitway?**

The slip lane, or right turn into the service road prior to the intersection, is part of the Duke and West Taylor Run project, which is separate but related to the Duke Street in Motion project. The transitway has no impact on the slip lane's location, which is still being determined. The slip lane will help make the intersection at WTR safer and more efficient. Staff will engage with that community later this summer or early fall on the right-turn location and the curb features and if and how they relate, as data and survey are finalized.

### **How are left turns impacted by the current proposal?**

There are some changes to left turn access as a result of Busway Concept A. Because vehicles will not be able to cross the busway at non-signalized intersections, vehicles wishing to access a destination on the other side of the street between intersections will need to make a U-turn to access those locations. This feature is mainly an issue in Segment 2B. To access businesses on the south side between Roth and the western entrance to Alexandria Commons, for vehicles going westbound, drivers would need to make a U-Turn at the western entrance to Alexandria Commons. To access businesses between Witter and Roth, drivers going westbound could make a U-turn at Witter. These changes have safety benefits for drivers who no longer have to wait for a gap in traffic to turn across vehicle lanes, but it may result in slightly longer travel times.

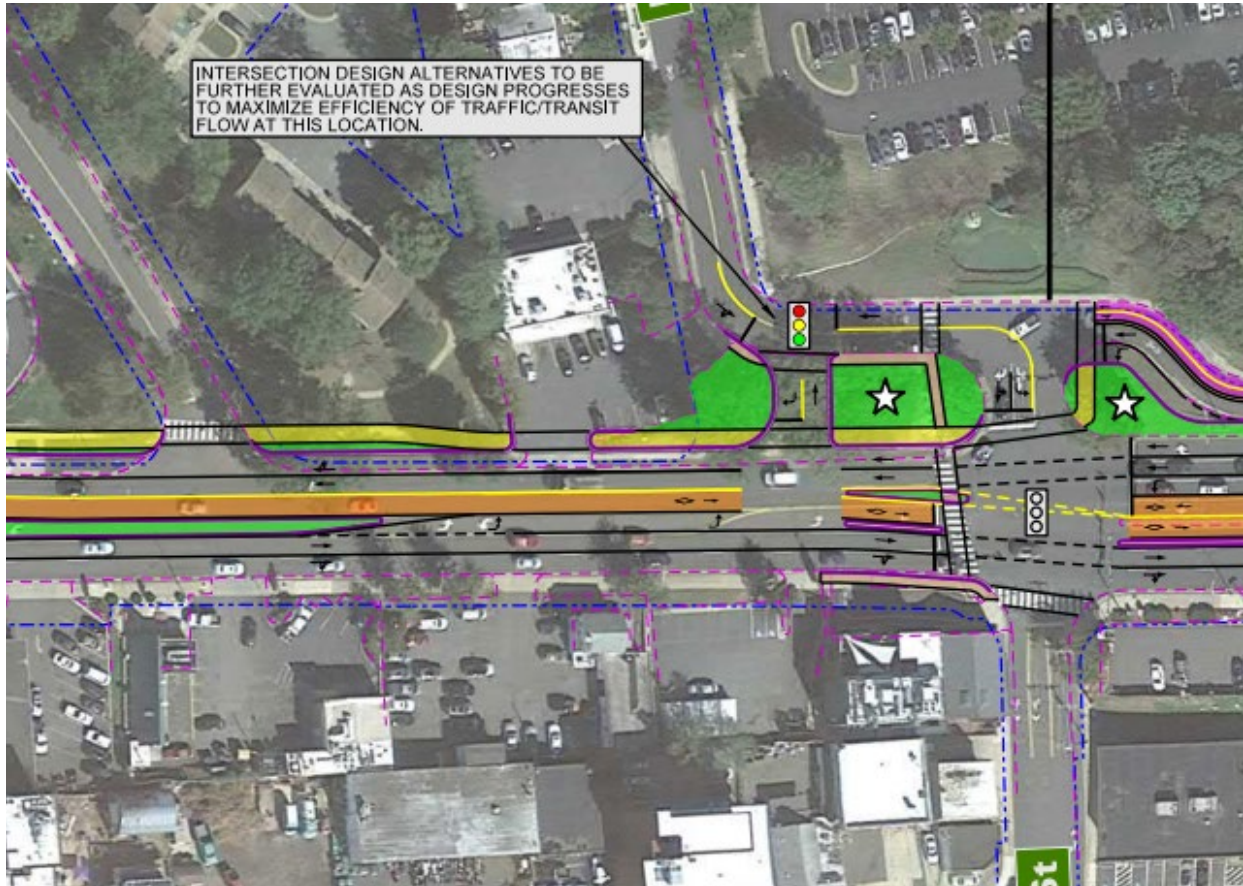
### **How are Yale Drive and Cambridge Road impacted with the proposal?**

During outreach for this project and others, the project team has heard a lot of concerns about issues with traffic, safety and access at the Cambridge Road intersection. To address these concerns, the proposed design reduces conflict points at the intersection for both pedestrian and drivers and creates a more efficient traffic patterns aimed at reducing congested and confusing conditions with stop signs and signals. The new design separates turn movements to provide conflict free pedestrian crossings at the intersection and provides new signals to better manage traffic flow. The traffic model showed that the intersection operates around the same level of service, but you also get dedicated bus lanes and a much safer intersection.

At Yale Drive, the left turn into Yale from eastbound Duke Street would be removed since there is a dedicated bus lane proposed in segment 2B. Wherever there is a dedicated center lane, drivers must go to the next intersection and make a U-turn, like they do on Route 1. Rather than waiting for a gap in traffic to make the turn, they would have a protected turn at a signalized intersection, which is a major safety benefit for drivers and pedestrians crossing Yale and other streets. Specifically, for turns onto Yale Drive, drivers would have to go an additional 80 feet to turn at the signal. Left turns are already prohibited from turning out of Yale onto Duke Street. Traffic counts show that that 40 and 27 vehicles turn left onto Yale Drive in the AM and PM peaks, respectively. The community has expressed concern

that these cars will now use Cambridge instead of Yale. While some people making this turn onto Yale now might shift to Cambridge, it is unlikely that the impact would be noticeable.

Additionally, the 10% design calls out “Intersection design alternatives to be further evaluated as design progresses to maximize efficiency of traffic/transit flow at this location”



### **What will happen to existing bus service and stops on the corridor?**

Currently DASH and Metrobus run buses on Duke Street, and these will continue. With regards to stops, Metrobus stops are currently about a half mile apart and DASH bus stops are about every block. Once this project is completed, all buses will stop at all proposed stations on the corridor, meaning that a passenger going towards the King Street Metro can simply take the first bus that arrives, making the wait times shorter and more convenient. All stops will be on average .4 miles apart or a maximum of a 4 minute walk (for an average person) once on Duke Street.

### **What are the impacts to trees and green space on the corridor?**

A guiding principle of DSIM is sustainability, and an overall goal of this project is to increase greenspace and tree canopy. Some trees will need to be removed with construction, and this will be mitigated with new tree plantings or other features. Trees would need to be removed because of median changes, and shared use path widening. During the design phase, an arborist will examine existing trees to help inform preservation and mitigation strategies.

## What will the construction impacts be?

With any project of this size, construction will be disruptive, but the detailed schedule for construction and **specific impacts will not be known until the project is more fully designed**. The **City will keep the community informed** and will seek to minimize impacts as much as possible. During the design phase, the project team will create a transportation maintenance plan and schedule. Direct access may be changed but temporary routes or detours will be made available when necessary.

## Process

### Has the City worked with Fire and Police on this project?

Yes. This project will likely improve emergency vehicle response time by using dedicated lanes and signal priority to bypass traffic. The Project Team has been working with representatives from Fire and Police and will continue to do so as design advances. The Alexandria Fire Department has indicated a preference for Concept A.

### How does the traffic model work?

Traffic models are tools that can help us understand and predict traffic behavior such as changes to the transportation system (new roads, new transit lines, or changes to traffic signals). Traffic models can also be used to plan for future transportation needs.

This study's traffic model used Vissim, a traffic simulation software, with vehicle data from May 2022. Looking at both morning and afternoon peak times, the team developed a **2030 Business as Usual scenario** using projected traffic growth in the corridor and planned transportation investments. Twelve model runs were conducted for Corridor Concept A, B, and Business as Usual to understand potential travel times for drivers and bus riders as well as bus reliability. These travel runs represent a typical day along the corridor.

The following assumptions were included in the traffic model:

- The bus lanes are only used by those authorized (buses, emergency vehicles)
- Projected growth in demand for the corridor will be realized.
- Planned transportation investments will be completed as scheduled.
- Traffic behavior will remain constant.

It is important to view traffic models as a tool, not as a perfect representation of reality. Traffic models are based on a number of assumptions based on historical data and planned growth, and these assumptions can introduce some uncertainty into the results. The accuracy of the model's predictions will depend on how well these assumptions hold true in the future.



## What is the project schedule?

Once the final concept plan is approved, staff will move forward with procurement of a design consultant. Community engagement will continue. The schedule will be developed as part of this process and will depend on the procurement method, but the high-level project schedule is as follows:

**Spring 2021-Summer 2023:** Community Visioning and Concept Development

**2024 & 2025:** Detailed Design & Environmental work

**2026 & 2027:** Construction

## What are the grant requirements?

Per NVTA, grantees are required to demonstrate substantial progress within 18 months of a grant agreement. The initial agreement for the first \$12 million began in April 2019. Funds for construction will be available in FY24. The City applied for funding based on the analysis of the 2012 plan, which included TSP and dedicated bus lanes. A major change in the anticipated benefits would require review by NVTA and a potential rescoring of the project.

## Why should Council act now?

The City has spent **more than two years** with the community revisioning this project and getting to the point of presenting a preferred alternative to City Council with a transparent and open process.

- Public engagement and visioning began in June, 2021
- With this feedback, the Advisory Group (AG) approved the Vision and Guiding Principles
- The project team presented numerous options for the corridor to the AG, including:
  - Dedicated center bus lanes, curbside lanes, single direction lanes, bi-directional travel lanes and mixed traffic lanes, and all were evaluated for some portions of the corridor.
  - Transit Signal Priority and smart traffic signals were assumed
- The second phase of outreach helped inform which concepts to advance for further design and analysis. These were assembled into Busway Concepts A and B and Curb Concepts Y and Z and underwent rigorous analysis to measure against the Vision and Guiding Principles
- The third phase of outreach, focused on sharing the results of the analysis, and input from all earlier phases helped inform the Advisory Group's approval of a recommendation to Council to proceed into design with Concepts A and Y.
- Additional engagement will occur into the next phase of Design, particularly around service road design.

Because of the extensive public engagement and analysis, there is little value in deferring a decision. In fact, delaying a decision would likely increase the cost of the project because of inflation.

Moreover, the Duke Street Transitway is intended to help manage transportation demand for projects already planned on the corridor. Delaying the project until other projects are completed will leave the corridor ill prepared to handle growth, resulting in more congestion.

## Why not just consolidate the bus stops to get improved travel times?

The model is estimating about 3.5 minutes saved from stop consolidation alone. Bus travel time savings during peak periods range from 4 minutes to as much as 9.5 minutes. The estimated savings from stop consolidation is a conservative estimate because the model used 2018 boarding/alighting data, before fares were free, which has since sped up boarding. **Stop consolidation alone does not reduce congestion on the street or help keep Duke Street moving**, but it does, along with other design features, play a part in the travel time savings and increased reliability the model shows for buses. Ridership gains from BRT are related to both the travel time savings and the higher quality of service that BRT provides – not from stop consolidation alone. Dedicated bus lanes also have a benefit for cars by eliminating the need to weave around buses.

## Ridership questions

### Existing Ridership

Overall corridor ridership has grown steadily since the pandemic. DASH is working to validate its Automated Passenger Count (APC) ridership data for use by the FTA but has provided conservative estimates of ridership using a combination of existing methods and APC data.

Route	2018	Fall 2022	Spring 2023	% pre-covid
30	1,948	1,503	1819	93%
28A		637	693	NA
29K/N	666	619	590	89%
Total	2,614	2,759	3,102	119%

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30	1,948	1,503	1819	93%
28A		637	693	NA
29K/N	666	619	590	89%
Total	2,614	2,759	3,102	119%

### Ridership Projections

The model projected about a **doubling of ridership** with the introduction of the new infrastructure. The Project Team used an FTA model to project ridership for 2030. The main inputs in the model are existing transit service provided, bus and vehicle travel times, bus ridership and land use data as well as projected transit service provided, land use data and bus and vehicle travel times. BRT is assumed to be a more desirable option than a local bus.

The Pulse, a BRT example in Richmond, experienced ridership twice as high as service goals within the first year of service.

## Cost

### **What is the projected cost of the project and how will the Project Team ensure that City funds are not at risk?**

The City currently has \$87 million in non-City grant funding to plan, design and construct this project. A cost estimate was developed at this 10% level of design based on current FTA guidance for contingency and inflation. For most components, a contingency percentage of 35-40% was applied. Annual escalation of 4% was applied based on FTA guidance on similar projects for FY24 and beyond. Escalation was based on construction starting in 2027, which is a conservative estimate of schedule and resulted in a total escalation of 17% being applied to construction items. Based on the recommendation as laid out in the preferred concept roll plot, the current cost estimate is as follows:

Total Project Cost (including Escalation and Contingency) = \$97 million

Escalation Amount = \$10 million

Contingency Amount = \$27 million

Estimated Cost in today's dollars without contingency = \$60 million

Design Cost (including Escalation and Contingency) = \$6.5 million

ROW/Utilities (including Escalation and Contingency) = \$14 million

Construction (including Escalation and Contingency) = \$77 million

As the selected concept advances through the design phase, the accuracy of the estimate will increase project elements can be scaled up or down accordingly. The Advisory Group specifically prioritized converting Segment 2B from Wheeler to Roth from a single direction center running bus lane to mixed traffic as a cost saving measure. This change alone would save about \$8 million (including contingency and escalation) and another \$2-3 million could be saved by deferring changes to curb features until redevelopment occurs.

If needed and directed by Council, staff can seek additional grant opportunities funding for future project phases. There are many sources of funding for BRT, particularly in this region, including:

- The Northern Virginia Transportation Authority (NVTA) is actively seeking to increase funding for BRT projects
- State funding (i.e. SMART SCALE)
- Federal funding could be available sooner since there are more grants available as part of the Bipartisan Infrastructure Law.