December 5, 2022

Dan Reinhard
Senior Project Manager, Location and Design
Virginia Department of Transportation

Dear Mr. Reinhard:

Enclosed please find Arlington County staff comments on the VDOT Route 1 Multimodal Improvements Study Phase 2 details presented to date. We appreciate the opportunity to provide a thorough review of how the VDOT Route 1 Concept Plan and streetscape alternatives align with the Crystal City Sector Plan (CCSP), other Board-adopted plans and policies, and ongoing projects and private development nearby.

The redesign of Route 1 creates a once-in-a-generation opportunity to achieve the unified vision for premium multimodal safety and access discussed in the Arlington County Master Transportation Plan, Vision Zero Action Plan, and Crystal City Sector Plan. In proposing to bring Route 1 to grade, VDOT took a visionary step toward alignment with the goals of these plans. Building on that step forward, it is essential to use a robust combination of street design elements supportive of an urban mixed-use corridor to achieve the multimodal urban boulevard envisioned for Route 1. Unlike many places where transformative change happens through small, incremental shifts over several decades, Crystal City is experiencing numerous large-scale changes that may accelerate the achievement of Arlington's adopted guidance. By integrating the changes outlined in this memo, VDOT's Concept Design Plans can deliver on the County's vision and make Route 1 a safe, multimodal corridor.

Our comments identify opportunities for improved alignment between VDOT's Route 1 concepts and Arlington County's plans, policies, and goals for the corridor. The comment topics and key recommendations are summarized as follows:

Section	**Key Recommendations**
1. Cross Section and Right-of-Way (ROW)	- Follow the ROW recommendations outlined in the CCSP: o 140' from 23rd Street to 18th Street and o Up to 160' north of 18th Street, to accomplish minimum recommendations below. - Maintain a consistent curb-to-curb width of 87 feet from 12th Street to 23rd Street, as shown in Figures 1 and 2.
2. Design Speed	- Advance a design speed of 25 MPH, consistent with the goals and policies of the CCSP, MTP, and VZ Action Plan. - Align all elements of the street design to reinforce the target speed of 25 MPH.
3. Travel Lane Widths	- Minimize travel lane widths to align to Arlington County Pavement Marking Specifications: o 10 feet for inside lanes o 11 feet for outside lanes and turn lanes, inclusive of a 1.5-foot-wide gutter pan
4. Pedestrian Realm	- Between 18th Street and 23rd Street: At a minimum, design sidewalks to be 10 feet wide (8-foot sidewalk clear zone + 2-foot shy zone). Once the minimum recommended widths of

	all street elements are accounted for, any additional width available within the 140' should be allocated to the sidewalk. - North of 18th Street: At a minimum, design sidewalks to be 14 feet wide (12-foot clear zone + 2-foot shy zone) to allow people walking in pairs to pass one another without yielding. - Include additional pedestrian-scale lighting on both sides of Route 1 at the transition zone between 12th Street and 15th Street. - Approaching 15th Street in the southbound direction, change the outside lane to a right turn only to allow this phase to be protected and separated from pedestrians crossing the street. - Design existing driveways with a continuous, flat sidewalk across the driveway to visually communicate to motorists that pedestrians have priority. - Reduce corner radii at intersections to the minimum practical dimension and consider safety treatments such as truck aprons to accommodate large vehicles. - Widen crosswalks to match the sidewalk approach width. - Provide rounded median noses at intersections. Do not narrow the median nose width.
5. Landscape Zone and Street Trees	- Medians: Design medians to be continuous planting strips a minimum of 12 feet wide planting space (excluding curbs) to allow a planting space wide enough to enable an alternating double row of trees throughout the corridor. - Provide a continuous landscape zone where feasible between travel lanes and pedestrian/bicycle facilities. Provide continuous under-pavement soil volume where not feasible. - Landscape zone north of 18th Street: Design landscape zones to be a minimum of 12 feet wide planting space (excluding the 6" curb and 1-foot step-out zone) to support large canopy trees and enable an alternating double row of trees. - Landscape zone between 18th Street and 23rd Street: Design landscape zones behind the curb to have a minimum of 8 feet wide planting space (excluding the 6" curb and 1-foot step-out zone) to support large canopy trees. - Apply a minimum lateral offset between the travel lanes and roadside elements behind the curb like trees that is appropriate for a 25-mph design speed: 1.5' per AASHTO and VDOT Roadway Design Manual or 2' per Arlington County Standards).
6. Bicycle and Scooter Safety and Access	- Provide a minimum 6-foot cycle track on both sides of Route 1 between the landscape zone and sidewalk clear zone. Provide a 1' buffer between cycle track and sidewalk. - Modify the VDOT Concept Design Plans to show a protected bike lane on 23rd Street west of Route 1. This is a continuation of the facility on 23rd Street east of Route 1, as envisioned in the CCBN. - Apply protected intersection treatments at the intersections of Route 1 and 23rd, 18th, and 15th Streets.

	- Provide separate green hatched bike markings through intersections, across driveways, and at any other conflict points. - Eliminate VDOT's Streetscape Option 2 from consideration. The two-way cycle track design is not consistent with national best practices and would create challenging conflicts at intersections that would be difficult to mitigate at these locations.
7. Transit	- Convene the County's staff team and regional transit providers for a targeted discussion of alternative locations for the 18th Street bus bays. Include right-of-way impacts, modeling of existing and future planned service impacts, and emergency planning in VDOT's design analysis. - Consider appropriate spaces for hotel and private shuttles which currently stop and layover on 18th Street and S Bell near the Crystal City Metrorail Station entrance. - Consider appropriate spaces for pickup and drop off near the Metro entrance(s). - Consider the natural desire lines between different transit uses and the nearby destinations, and provide direct, conflict-free connections where possible.
8. Gateway between 12th and 15th Street	- Between 12th Street and 15th Street, use a robust set of design features to create a gateway with distinct visual cues intended to change driver expectations and behavior. - Use less gradual horizontal curves between 15th and 12th Street to encourage slower driving speeds. Reduce the radius of the horizontal curve to create more pronounced curves that reinforce the speed transition zone.
9. Alignment of Route 1	- Advance the alignment of Route 1 presented by VDOT, with the noted changes to the ROW width and curvature geometry recommended in Topics 1 and 8.
10. Curbside Uses and Curb Management	- Allow for on-street, off-peak pick-up/drop-off and short-term parking in the outermost lane of Route 1 in both directions. Provide a 1' step out zone adjacent to the off-peak parking lane. - As Route 1 is brought to grade and TDM strategies are implemented, monitor traffic volumes and seek opportunities to permanently convert the outermost lanes of Route 1 from travel lanes to flexible curbside uses (pickup/drop-off, short-term parking, bikeshare, parklets, etc.).
11. Grades and Building Facades	- In coordination with adjacent properties, consider opportunities for public art, plantings, biophilic design, and other changes to activate building facades and address non-contributing uses along the Route 1 frontage. - The roadway profile appears to involve a significant change in grade (approximately 3 feet) on the South side of 15th Street. Address and coordinate this with the adjacent landowners.

The long-term success of bringing Route 1 to grade will rely on the implementation of a diverse set of aggressive TDM strategies. VDOT's Phase 2 analysis shows that 2022 traffic volumes remain substantially lower than pre-pandemic volumes, making an at-grade option feasible based on current conditions, but these reductions are not guaranteed to last indefinitely without intervention. To maintain the trend of lighter traffic volumes and achieve further reductions in car travel as regional population increases over the next several decades, multimodal travel options need to be developed and promoted to residents, employees, employers, and visitors traveling in this corridor. For Route 1 to successfully function as an at-grade urban boulevard, it is essential that VDOT develop TDM strategies with Arlington County, surrounding jurisdictions, and TDM providers that reach beyond the borders of Arlington County and modify the regional travel distribution for this portion for the corridor. County staff welcome the ongoing coordination and commitment of VDOT and the state to transform how people travel to and along Route 1.

Thank you for the opportunity to comment on this transformative study. We look forward to our continued dialogue with VDOT to develop an improved Route 1 that facilitates safe and accessible transportation for all users.

Sincerely,

Dennis M. Leach

Dennis M. Leach
Director of Transportation
Arlington County Department of Environmental Services

Arlington County Comments on VDOT Route 1 Multimodal Improvements Study Phase 2

Opportunities for Improved Alignment between VDOT Concepts and County Plans

The Crystal City Sector Plan (CCSP) describes the existing Route 1 as an "edge barrier that separates the east and west sides" of the community. The CCSP also envisions the "calming and humanizing (of Route 1) with expansive landscaping and attractive building frontages along its edge." Furthermore, Route 1 is described as an "asset of the overall multimodal transportation network," that requires design changes that "reduce the barrier effect" that exists today. Most specifically the CCSP reads:

> "The plan maintains the capacity of this major transportation corridor yet unites the two sides of Crystal City by creating a central boulevard lined with wide sidewalks with large street trees, active building entrances, and amenities one would expect on a major urban street."

County staff have discussed and reaffirmed the vision depicted in the CCSP. However, the CCSP did not envision the conversion of Route 1 to an at-grade roadway, so the cross sections included in the plan are not directly applicable to the assessment of VDOT's current concepts.

The densities envisioned in the CCSP and the recently adopted Pentagon City Sector Plan will result in thousands of people walking, biking, and accessing transit along and across Route 1. For this reason, the road needs to serve both as a critical transportation spine and as a welcoming, walkable place. County staff discussed Park Avenue in New York City as an aspirational and relevant precedent. County staff agreed that, like Park Avenue, Route 1 is *not* envisioned as the primary retail/commercial center of the Crystal City neighborhood. This means that, although small pockets of retail or café seating could be included in spot locations, continuous café zones are not expected as part of the streetscape throughout the corridor. Therefore, the priority design objectives, explored in more detail below, are pedestrian-friendliness for people walking along and crossing Route 1, large shade trees, and calm traffic that reinforces safety and comfort for everyone. VDOT's current design concept is aligned with some aspects of the CCSP vision, but it does not accomplish other aspects of this vision as described below.

1. Cross Section and Right-of-Way

Because the Sector Plan expected Route 1 to remain a partially elevated roadway, it envisioned the corridor would generally have 140 to 160 feet between building faces. The Plan recommended a cross-section of 140 feet between 23rd Street to 18th Street. North of that point, the Sector Plan envisioned a wider right-of-way of 160' to accommodate the inboard on- and off-ramps connecting Route 1 to local cross-streets below. With an at-grade configuration, the typology of the arterial changes and the mobility and safety needs of the corridor take precedence. Inboard ramps will no longer be needed, and sufficient space to safely accommodate multimodal travel emerge as a new need. The cross-section and right-of-way should be sufficiently wide to meet these needs and future anticipated demand, as well as fulfill the overarching Sector Plan vision of Route 1 as a tree-lined, pedestrian friendly urban boulevard. The VDOT Concept Design Plans currently show a consistent 140-foot-wide cross section along the entirety of the study area.

Recommendations:

a. Follow the right-of-way recommendations outlined in the CCSP, which account for right-of-way constraints and development patterns south of 18th Street and wider available right-of-way north of 18th Street:

    a. 140’ from 23rd Street to 18th Street and
    b. Up to 160’ north of 18th Street, to accomplish minimum recommendations described in the following sections.

b. Maintain a consistent curb-to-curb width of 87 feet from 12th Street to 23rd Street, as shown in Figures 1 and 2, with the remaining width dedicated to streetscape elements behind the curb. North of 18th Street, use the additional width to provide the wider cross-section shown in Figure 2. This is feasible without impacting the land development potential to the east and northwest of Route 1 at 15th Street, as envisioned in the Sector Plan.

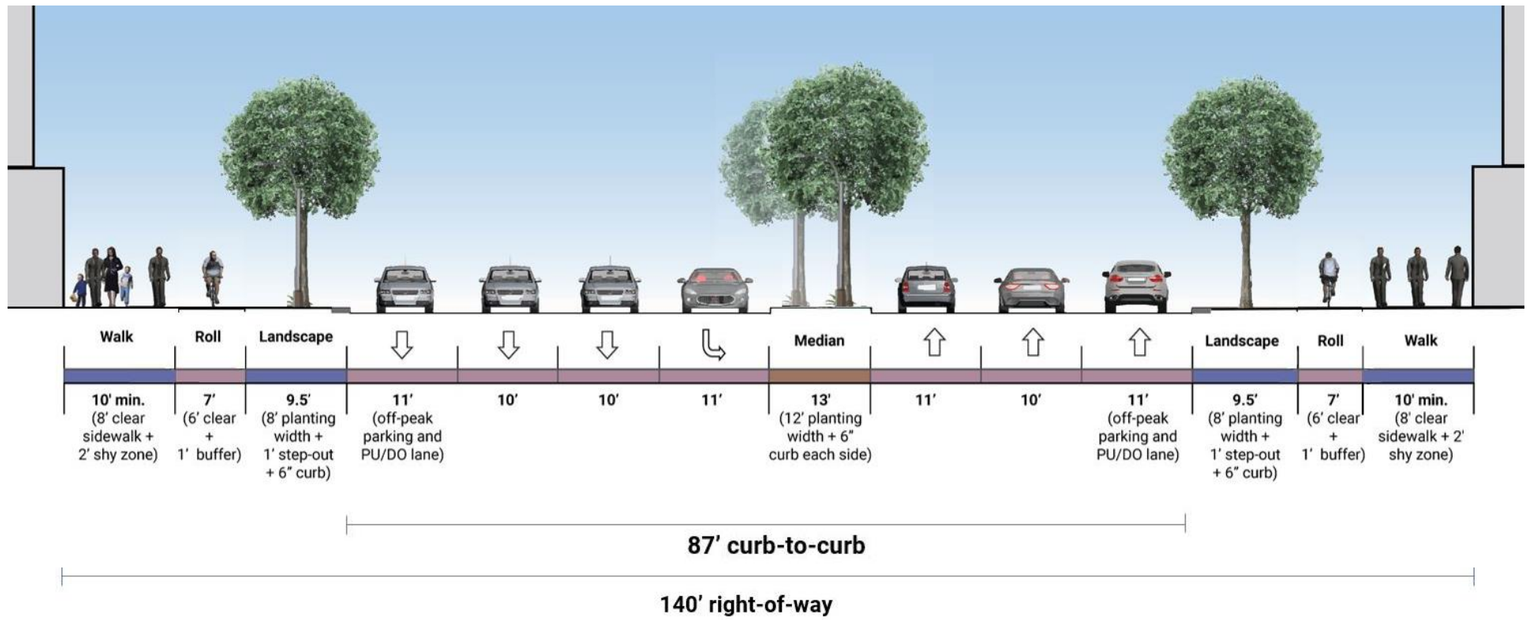

Figure 1. Recommended cross-section from 23rd Street to 18th Street.

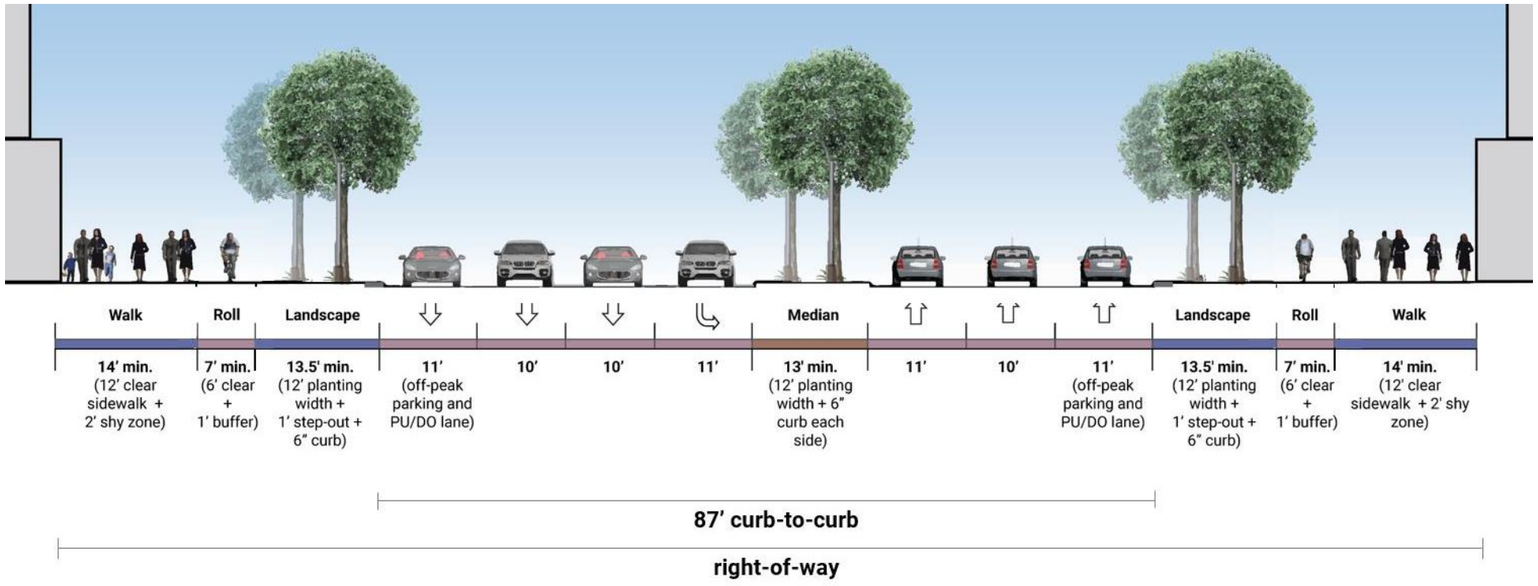

Figure 2. Recommended cross section from 18th Street to the north.

2. Design Speed

Converting an auto-oriented principal arterial highway into a walkable urban street requires the application of Complete Streets design principles. The design requires an intensive layering of treatments that collectively send clear signals to people using the street. Every aspect of the street design must communicate to drivers that they're in a dynamic place where they should slow down and be alert for people walking, biking, and rolling. For drivers, it should feel intuitively uncomfortable to drive too fast. To everyone who lives, works, or visits the corridor, the design should be immediately recognizable as a comfortable and inviting place to walk, bike, or roll (including walking to transit).

The posted speed along Route 1 between 12th Street and 23rd Street is currently 35 MPH, but it drops to 25 MPH in Alexandria. County staff support VDOT's proposal to apply a design speed of 25 MPH to the study area and to develop design elements that reinforce that speed limit. This approach aligns with the vision for a walkable urban boulevard articulated in the CCSP. It is also consistent with the County's Vision Zero goals and the speed limit reductions that the County Board recently approved on other arterials in Arlington. However, many of the design elements currently in VDOT's Concept Plan neither fully reflect nor reinforce a 25 MPH design speed. We recommend further changes to meet this target.

Recommendations:

a. Advance a design speed of 25 MPH. The existing posted speed of 35 MPH is not aligned with the goals of the Sector Plan, and actual driving speeds of 20-25 MPH are most compatible with the Sector Plan vision. The Federal Highway Administration (FHWA) encourages the use of a Safe Systems approach for establishing speeds, where the speed is set based on the desired safety outcomes of the street.
b. Align all elements of the roadway design to reinforce the target speeds that are desired, most critically including lane widths, horizontal curves, signal progression, and lateral clearances for vertical objects along the road edge. These topics are discussed in more detail below.
c. Vision Zero is a guiding principle for Route 1, which means that the design speed should reflect research about how speed relates to the risk of serious or fatal injury crashes occurring.

3. Travel Lane Widths

The VDOT Concept Plan includes 11-foot travel lanes with an additional 1 ½-foot wide gutter pan on the outside travel lanes. Travel lane width directly influences crossing distances for pedestrians (and thus exposure) and can also influence driving speeds. On retrofit projects in urban areas, lane widths also influence how much space is available for streetscape/pedestrian elements located outside of the curbs. The AASHTO Green Book specifies that lane widths on urban arterial roadways can vary from 10 to 12 feet. AASHTO does not have requirements for the gutter pan. Some state Departments of Transportation do not use gutter pans while others permit them within the outer lane dimension. Arlington County's practice is to use gutter pans but include it as part of the outside lane width.

Recommendations:

a. Minimize travel lane widths to align with the Crystal City Multimodal Transportation Study and the Arlington County Pavement Marking Specifications:
    - 10 feet for inside lanes
    - 11 feet for outside lanes and turn lanes, inclusive of a 1.5-foot-wide gutter pan

4. Pedestrian Realm

The VDOT Concept Plan includes a 23.5-foot space behind the curb where the sidewalk, landscaping, and any streetscape elements would be provided. The design of this space was the focus of the Phase 2 Public Meeting in June 2022, where VDOT presented four alternatives. The sidewalk width (clear width plus building shy zone) varied in the alternatives, with 14.5 feet in Option 1, 10 feet in Option 3, 7.5 feet in Option 4, and 7 feet in Option 2.

Recommendations:

a. Size sidewalks in the corridor to be generous enough to support the increased density and pedestrian activity as recommended for an Urban Mixed-Use Street. This is consistent with the Street Typology guidelines in Arlington's Master Transportation Plan, which recommend pedestrian clear zones of up to 12 feet for Urban Mixed-Use streets, the typology within which a Route 1 urban boulevard would fit.
    a. From 23rd Street to 18th Street, sidewalks should have a minimum width of 10 feet (8-ft min. clear walking zone plus 2-ft min. shy zone).
    b. North of 18th Street, sidewalks should have a minimum width of 14 feet (12-ft min. clear walking zone plus 2-ft min. shy zone) to allow people walking in pairs to pass one another without yielding. A target clear width of 12 feet would allow people walking in pairs to pass one another without yielding and would also align with the scale of the buildings and width of the roadway on Route 1. As a point of reference, Alexandria, VA and Montgomery County, MD consider 12 to 15 feet to be the default along similar urban boulevards.
b. The VDOT Concept Design Plan envisions that Route 1 is elevated over 12th Street and transitions to at-grade at the intersection with 15th Street. The transition zone between 12th Street and 15th Street will require retaining walls between the sidewalk (which will remain at grade) and the roadway as it elevates. Special attention is appropriate in this portion of the corridor to ensure the comfort and personal safety of people walking along these sidewalks. On both sides of Route 1, additional pedestrian-scale lighting is recommended. On the east side of Route 1, a wider landscaped space between the retaining wall and the sidewalk would create a more comfortable experience for people walking. This could be achieved by shifting the alignment of the east-side sidewalk to adjoin Clark Street, as shown in Figure 3. One key design consideration is that the County's 15th Street South / S Clark Street Realignment Project will start construction in 2023 and is expected to be complete prior to Route 1 implementation. The sidewalk alignment along Route 1 should tie into the County's project as an existing condition.

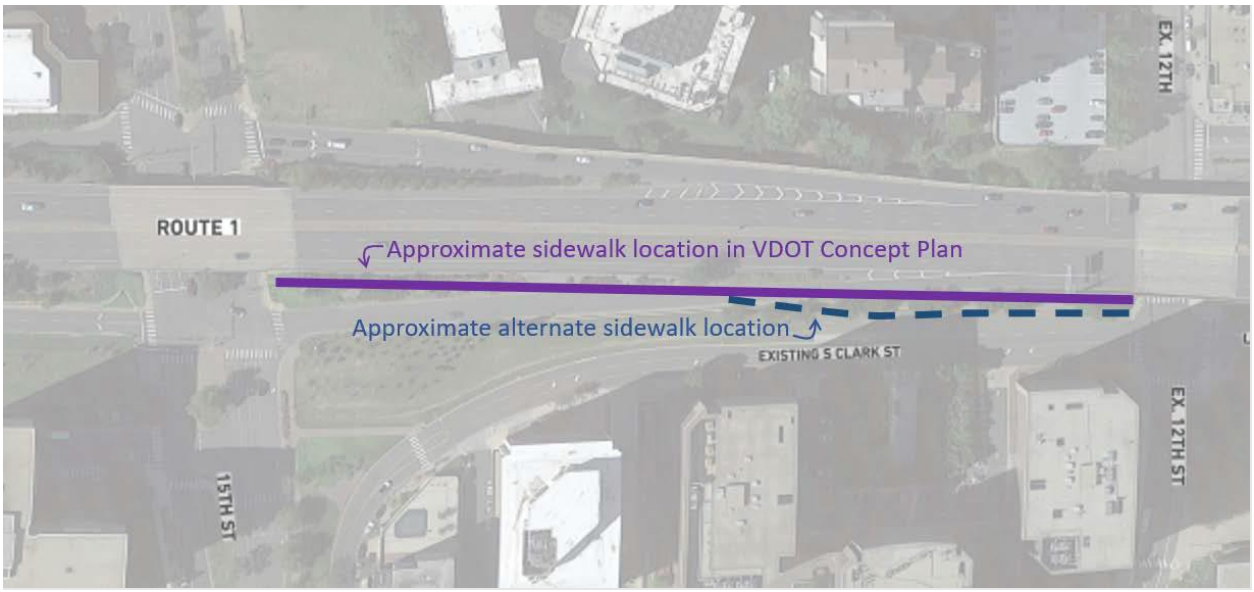

Figure 3. Relocating the sidewalk creates opportunity for improved pedestrian comfort approaching 12th Street

c. Modify the designs for existing driveways shown in the VDOT Concept Design Plan. Some of the VDOT driveway designs show continuous driveways across the sidewalk, which create a grade change and a visual break in the concrete sidewalk (e.g., immediately south of 23rd Street at the existing Exxon driveway). Design existing driveways with a continuous, flat sidewalk across the driveway to visually communicate to motorists that pedestrians have priority while also being preferable for people using wheelchairs. No new driveways should be recommended.

d. Reduce the corner radius at intersections to the minimum practical dimension. The current design shows 25-foot corner radii at most intersections. Smaller corner radii can encourage slower turning speeds and position vehicles at a 90-degree angle (or thereabouts) as they approach the crosswalk, creating more direct lines-of-sight to pedestrians in the crosswalk. Since all intersecting roadways in the Route 1 study area have more than one lane in each direction, it may be feasible to reduce corner radii while still facilitating vehicle turns. The application of truck aprons with protected intersections (described in section 6 below) should be considered where additional accommodations are needed for large vehicles (see Figure 4).

Figure 4. Truck apron and protected intersection in Montgomery County, MD

e. Use wider crosswalks where sidewalk width exceeds 10 feet. The VDOT Concept Design includes 10-foot-wide crosswalks throughout the plan, but 10 feet should be considered a minimum. As the vision for development and walkability in the Sector Plan is implemented, the number of people walking along and across Route 1 will increase, particularly near the Metro Station entrance at 18th Street. Expand the crosswalk widths and median refuge areas to match the width of the approaching sidewalk (e.g., use a 14-foot-wide crosswalk where the sidewalk has 12 feet of clear width and a 2-foot shy zone). Use wider curb ramps to correspond to those dimensions to accommodate more people and create a more visible pedestrian realm. Bike crossing markings should be treated separately from pedestrian crosswalks. Provide separate green hatched bike markings through intersections and any other conflict points.

f. Include rounded median noses at all intersections. The current VDOT Concept Design Plan shows narrowed median noses at the intersections of Route 1 and 20th Street as well as at 15th Street. The design should use Arlington County's Guidelines for the Design and Treatment of Median Noses (Version 1, 2019). With three receiving lanes for turning vehicles, narrowed medians are not necessary to accommodate turning vehicles. As described in the County's guidelines, wider median noses (as shown in Figure 5) provide a better sense of enclosure for pedestrians crossing the street and help to position turning vehicles at closer to a 90-degree angle to the crosswalk, which gives the drivers a better view of the crosswalk.

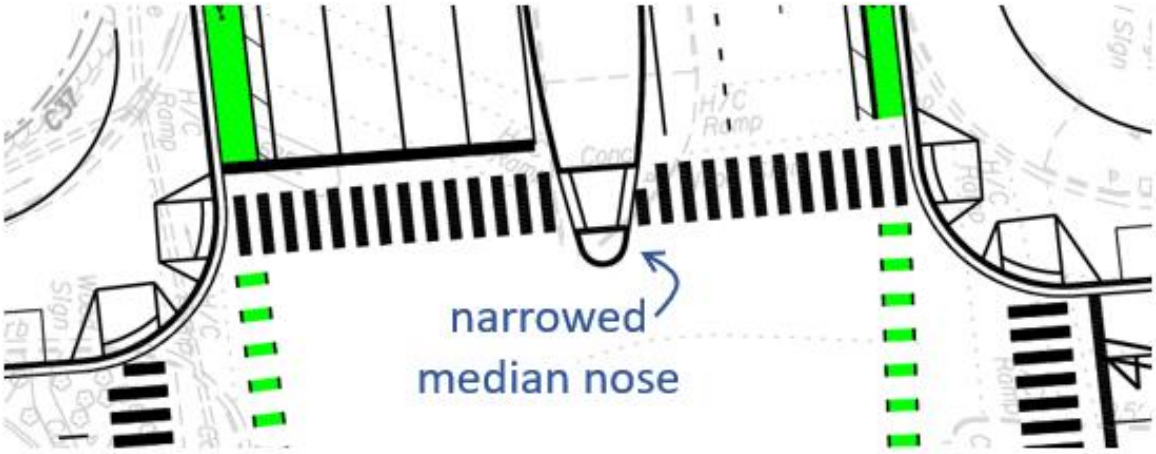

Figure 5a. VDOT's median cap design at the intersections of Route 1 and 20th and 15th Streets.

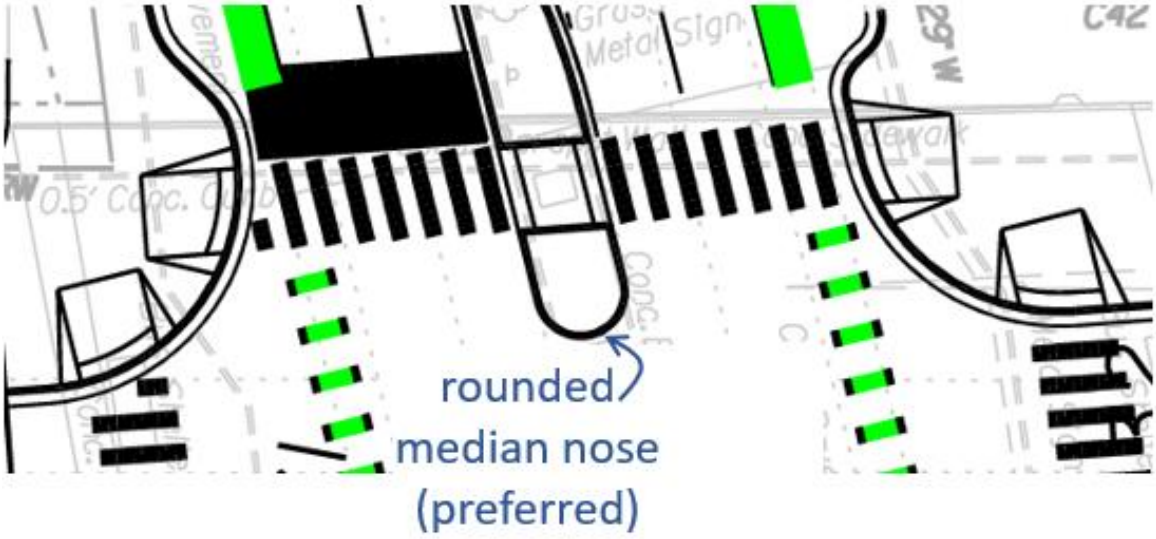

Figure 5b: Preferred design for all intersections.

5. Landscape Zone and Street Trees

The VDOT Concept Design alternatives presented at the Phase 2 public meeting in June showed options for a continuous landscape zone with trees between the travel lanes and the sidewalk. The width of the landscape zone ranged from 6 feet (Option 2 and 3) to 9.5 feet (Options 1 and 4). The Crystal City Sector Plan identified tree canopy coverage at 17.6% which "will be the baseline for the planning area with the long-term goal of increasing this percentage by maximizing tree planting along streets" and "by strategically installing street trees, where feasible, in areas where redevelopment is projected for later phases."

Recommendations:

a. The width of the landscape zone should be maximized to support large canopy trees. This recommendation will allow this project to meet County soil volume requirements set out in Administrative Regulation 4.3 for tree planting on public land and meet the goal to have large street trees along this corridor. These trees will help meet the design goals outlined in section 2, as one of the speed reduction mechanisms recommended by NACTO.
b. Medians: Design medians to be continuous planting strips with a minimum of 12 feet wide planting space (exclusive of curbs) to allow an alternating double row of trees throughout the corridor.
c. Provide a continuous landscape zone where feasible between travel lanes and pedestrian/bicycle facilities. Provide continuous under-pavement soil volume where not feasible.
d. Landscape zone north of 18th Street: Design landscape zones to have a minimum of 12 feet wide planting space (exclusive of the 6" curb and 1-foot step-out zone) to support large canopy trees and enable an alternating double row of trees.
e. Landscape zone between 18th Street and 23rd Street: Design landscape zones behind the curb to have a minimum of 8 feet wide planting space (exclusive of the 6" curb and 1-foot step-out zone) to support large canopy trees.
f. Apply a minimum lateral offset between the travel lanes and roadside elements behind the curb like trees that is appropriate for a 25-mph design speed: 1.5' per AASHTO and VDOT Roadway Design Manual or 2' per Arlington County Standards). The VDOT Concept Design options presented at the Phase 2 public meeting in June show a minimum lateral offset of 6 feet between the face of curb and any vertical streetscape elements (e.g., trees, signposts, light poles). While a 6-foot offset is appropriate in high-speed contexts, these significant offsets are unnecessary on lower-speed urban streets.

6. Bicycle and Scooter Safety and Access

The VDOT Concept Design options presented at the Phase 2 public meeting in June showed one option for the streetscape that does not include a bikeway and three alternatives that include a bikeway along Route 1. The Sector Plan did not envision a bikeway along Route 1, nor did the Crystal City Bike Network or the County's Master Transportation Plan, Bicycle Element (MTP-BE). However, it is important to note that these three plans were all developed with the assumption that Route 1 would remain an elevated roadway through Crystal City. The at-grade concept and the proposal to reduce the speed limit along Route 1 to 25 MPH, changing the typology of the arterial, present new opportunities for bicycle and micromobility access and safety that were not part of the discussion at the time of these past planning efforts.

Providing a bike facility on Route 1 is consistent with multiple policies of the MTP:

- MTP Goals & Policies, Complete Streets Policy: "Design and operate a comprehensive network of Arlington's local and arterial streets to enable safe access by all user groups including pedestrians, bicyclists, transit vehicles and users, and motorists of all ages and abilities, allowing these users to access a full range of daily activities."
- MTP Streets Element, Policy 4: "Include the appropriate facilities to meet the needs of bicyclists, pedestrians, transit riders, motorists and freight movements as part of all County street and

facility improvement projects. Operate arterial and local streets in a manner that balances the needs of pedestrians, bicyclists, transit users and motorists in the right-of-way."

- The MTP-BE, Policy 5: "Accommodate bicycle infrastructure as part of all street improvement projects and provide the highest-quality on-street bikeway possible, as referred in Appendix C."
    - Appendix C notes that the County utilizes leading national design guidance, in particular the National Association of City Transportation Officials (NACTO) guidance for bicycle facilities in urban settings. This guidance indicates that a protected bike lane or path is the appropriate bike facility for a multi-lane, high volume roadway like Route 1.

Consistent with this guidance, County staff recommend a cycle track similar to VDOT's Streetscape Option 3, with the cycle track placed between the landscape zone and sidewalk clear zone similar to VDOT's Streetscape Option 4 (see Figures 1 and 2). A 1-foot buffer should be provided between cycle track and sidewalk. Combined with the other recommendations in this memo, it is feasible to provide a bicycle facility along Route 1 while still meeting or exceeding the minimum recommended widths of other streetscape elements.

Three factors support this recommendation:

- the policies for Complete Streets, bicycle access, and safety listed above;
- the density of destinations and increased walking and rolling demand that will be created through redevelopment along Route 1; and
- the increasing use of micromobility devices (e.g., scooters) particularly for last-mile trips to and from the Metro Station.

Recommendations:

a. Provide a minimum 6-foot cycle track on both sides of Route 1 between the landscape zone and sidewalk clear zone. Provide a 1' buffer between cycle track and sidewalk.
b. Modify the VDOT Concept Design Plans to show a protected bike lane on 23rd Street west of Route 1. This is a continuation of the facility on 23rd Street east of Route 1, as envisioned in the Crystal City Bike Network.
c. Apply protected intersection treatments at the intersections of Route 1 and 23rd, 18th, and 15th Streets. Protected intersections improve safety, comfort, and the legibility of the bike network, while at the same time providing pedestrian safety benefits. Where conventional or buffered bike lanes are proposed on these intersecting streets, they would transition to a protected bike lane at the intersection to provide the noted benefits.
d. Provide separate green hatched bike markings through intersections, across driveways, and at any other conflict points.
e. Eliminate VDOT's Streetscape Option 2 from consideration. The two-way cycle track design is not consistent with national best practices and would create challenging conflicts at intersections that would be difficult to mitigate at these locations.

7. Transit

As envisioned in the Sector Plan, the signature components of the transit network in Crystal City are:

- the existing Metro Station at 18th Street;

- a multimodal transfer area (bus bays) in the short-term on 18th Street under Route 1, while working to integrate long-term future development adjacent to the existing Metro Station entrance with an enhanced multi-modal transfer facility situated at the ground floor;
- the new Metro Entrance at 18th Street and Crystal Drive;
- VRE Crystal City Station improvements; and,
- the Crystal City Potomac Yard Transitway.

Much of the vision for the Transitway has been implemented, with additional phases of build-out in progress. The most critical component of the VDOT Concept Design Plan related to transit is the relocation of the bus bays that currently exist on 18th Street under the Route 1 overpass. To date, County staff have not been adequately included in coordination meetings on the 18th St bus bay relocation proposals. Separate meetings were held earlier in the year between VDOT and regional transit providers to identify and evaluate proposed alternatives, but because any relocation option will have impacts to County right-of-way and the curbside needs of other modes (shuttles, pickup/drop-off, etc.), it is important that County staff be fully included in these conversations.

Recommendations:

a. Convene the County's staff team and regional transit providers for a targeted discussion of alternative locations for the 18th Street bus bays. Include right-of-way impacts, modeling of existing and future planned service impacts, and emergency planning in VDOT's design analysis.
b. Consider appropriate spaces for hotel and private shuttles which currently stop and layover on 18th Street and S Bell near the Crystal City Metrorail Station entrance.
c. Consider appropriate spaces for pickup and drop off near the Metro entrance(s).
d. Consider the natural desire lines between different transit uses and the nearby destinations, and provide direct, conflict-free connections where possible.

8. Gateway between 12th and 15th Street

Southbound drivers entering the Route 1 corridor are coming from the higher-speed environments of I-395 (55 MPH) or US 110 (45 MPH). Neither of these limited-access roadways feature pedestrian and bicycle facilities, signalized intersections, or crossings. VDOT's concept to signalize the I-395 interchange to Route 1 would be a positive step toward slowing driver speeds and shifting behavior from highway driving to operating in a mixed urban setting. The design of the block between 12th Street and 15th Street is equally critical for changing driver expectations and behavior as Route 1 transitions from an elevated highway to an at-grade urban boulevard which continues southward into Alexandria. The design of this block must serve as a gateway, which the AASHTO Roadside Design Guide defines as "combinations of localized features intended to produce a traffic-calming effect by emphasizing to motorists that a change in the character of the roadside and possibly the roadway uses has occurred, such that slower and more cautious operation of their vehicle is appropriate."

Recommendations:

a. Between 12th Street and 15th Street, use a robust set of design features to create a gateway with distinct visual cues intended to change driver expectations and behavior. Consider a wider

median, more intensive plantings and streetscape features, compact geometric design, and more pronounced horizontal curvature. Other treatments and visual cues should be considered, including textured pavement, supplemental edge line markings, public art, and unique landscape design. These changes can support traffic calming and send a strong signal to drivers that they are entering an urban context and must shift their driving behavior accordingly. Many of these treatments will be similarly important at the southern project limit approaching 23rd Street northbound. These treatments are more commonly used by VDOT along arterial roadways that are transitioning into a small town or approaching midblock trail crossings, but they would similarly be appropriate as this highway transitions into an urban, mixed-use environment. Without an intensive layering of design treatments, slower driving speeds will not be achieved in this critical block.

b. Use less gradual horizontal curves between 15th and 12th Street to encourage slower driving speeds. The VDOT Concept Design Plan shows curvature in this area, but uses a 800-foot radius horizonal curve. The AASHTO Green Book notes that this curvature design is appropriate for a 40 MPH design speed, which would communicate to motorists that this is still a place to drive fast. Reduce the radius of the horizontal curve to create more pronounced curves that reinforce the speed transition zone.

9. Alignment of Route 1

The Sector Plan envisioned relocating the Route 1 access ramps to a center-running location, which would create new development opportunities in some locations but would maintain the overall alignment of Route 1 where it is today. By converting Route 1 to an at-grade roadway, the VDOT Concept Design Plan still creates new development opportunities but follows a different alignment than was envisioned in the Sector Plan. There are advantages to the alignment shown in the VDOT Concept Plan which County staff support, but also acknowledge the following discrepancies with the Sector Plan:

- It eliminates the new development opportunity identified in the Sector Plan on the southwest corner of the intersection of 15th Street and Route 1.
- It narrows the new development opportunity at the northwest corner of the intersection of 15th Street and Route 1.
- It increases the space that can be repurposed or developed on the east side of Route 1 between 18th Street and 12th Street.

Recommendation:

a. Advance the alignment of Route 1 presented by VDOT instead of the Sector plan alignment with the noted changes to the right-of-way width and curvature geometry recommended in Topics 1 and 8.

10. Curbside Uses and Curb Management

The Sector Plan envisioned that curbside loading and services would be concentrated on side streets (mostly on Clark-Bell Street, Eads Street, and 20th Street), rather than on Route 1. However, the Sector Plan did not envision an at-grade configuration of Route 1. Also, since the Sector Plan's adoption in 2010, the volume of deliveries and curbside pick-ups and drop-offs has dramatically increased. Ridesharing services (e.g., Uber and Lyft), online shopping, and food/grocery deliveries have become the norm, leading to demands on curbside space that were not anticipated in the Sector Plan. Pre-pandemic research from New York City found that about 15 percent of NYC households received a package every day, which means that a building with 800 apartments would get roughly 120 packages daily.[1]

Given the residential, hotel, and office land uses envisioned along Route 1 per the Sector Plan, pressure for delivery and pick-up/drop-off space may increase as developments on Route 1 build out. Most of these activities are expected to occur in designated loading bays and on the side streets, particularly S. Eads Street and Clark-Bell Street, which are anticipated to provide loading, service, and garage entrances in the Crystal City Sector Plan for developments fronting Route 1. However, those side streets are also envisioned to be transit priority and bicycle priority streets per more recent planning efforts, so the provision of these curbside spaces may not always be viable. Particularly for buildings fronting Route 1, there will be some curbside demand along Route 1 itself for pickup/drop-off and short-term parking and loading.

The Phase 2 traffic analysis that VDOT presented in PIM #3 indicates that 3 travel lanes are necessary to accommodate current peak-hour volumes, but lower volumes off-peak may make 2 travel lanes feasible during off-peak hours. This presents an opportunity to use the outermost lane in each direction as on-street pickup/drop-off and short-term parking during the off-peak hours, which would have multiple benefits. It would help to prepare the corridor for the increased curbside activity expected when Route 1 is brought to grade and particularly for the future increased density planned through redevelopment. On-street parking also provides a traffic calming effect by creating "friction" with the adjacent travel lanes, thereby serving as an additional street design element that reinforces a 25 MPH speed limit. Lastly, on-street parking provides an additional physical buffer between moving vehicles and pedestrians/bicyclists and shortens the number of moving vehicle lanes that they must cross at intersections, increasing pedestrian/bicyclist safety and comfort.

With the implementation of an aggressive set of regional TDM strategies that minimize car-centric travel, future peak-hour traffic volumes along Route 1 could be further reduced. This reduction may reach a point at which it is feasible for Route 1 to operate with two travel lanes in each direction, in which case VDOT should consider permanently converting the outermost lanes to other curbside uses. Not only could these lanes then be used throughout the day as pickup/drop-off and short-term parking, but they could also create opportunities for flexible uses to further activate the street and encourage multimodal travel options, such as bike share stations, parklets, bike and micro-mobility parking, seating, and additional plantings.

Recommendations:

[1] New York Times, "1.5 Million Packages a Day: The Internet Brings Chaos to N.Y.C.," (October, 2019), based on research by the *Sustainable Urban Freight Systems Center at Rensselaer*

a. Allow for on-street, off-peak pick-up/drop-off and short-term parking in the outermost lane of Route 1 in both directions and provide a 1' step out zone adjacent to the off-peak parking lane.
b. As Route 1 is brought to grade and TDM strategies are implemented, monitor traffic volumes and seek opportunities to permanently convert the outermost lanes of Route 1 from travel lanes to flexible curbside uses.

11. Grades and Building Facades

The Sector Plan envisioned changes to Route 1 that would create "active building frontages" along Route 1. As the development and redevelopment vision for Crystal City is implemented (i.e., during the build-out phase of Route 1 changes, which could occur over a decade or more), there are challenges related to the grades of existing buildings compared to the future elevation of Route 1. Lowering the elevation of Route 1 exposes inactive sides of many existing buildings throughout the study area, most of which were never oriented to an elevated Route 1 and therefore may not contribute toward the Sector Plan vision for a walkable boulevard with activated frontages absent of redevelopment.

Recommendations:

a. In coordination with adjacent properties, consider opportunities for public art, plantings, biophilic design, and other changes to activate building facades and address non-contributing uses along the Route 1 frontage. In the Phase 2 Public Meeting in June 2022, VDOT identified public art and similar treatments as "Elements to be considered in a partnership between VDOT and adjacent development." Such collaboration would help to create a more active and welcoming streetscape along Route 1, particularly where redevelopment is not planned in the near-term. This includes locations that are not currently at-grade that will be exposed by the new elevation of Route 1, as well as existing buildings that treat Route 1 as the rear/service entry, parking garages, emergency exits, and blank facades with no windows, doors, or pedestrian interest.
b. The roadway profile appears to involve a significant change in grade (approximately 3 feet) on the South side of 15th Street. This will need to be addressed and coordinated with the adjacent landowners.