PROJECT PIPELINE

Cascades Parkway

W. Church Road to Victoria Station & Nokes Blvd to Bartholomew Fair Drive

Final Report

DRPT Office of INTERMODAL Planning and Investment VDOT

PLANNING FOR PERFORMANCE

Table of Contents

Project Introduction

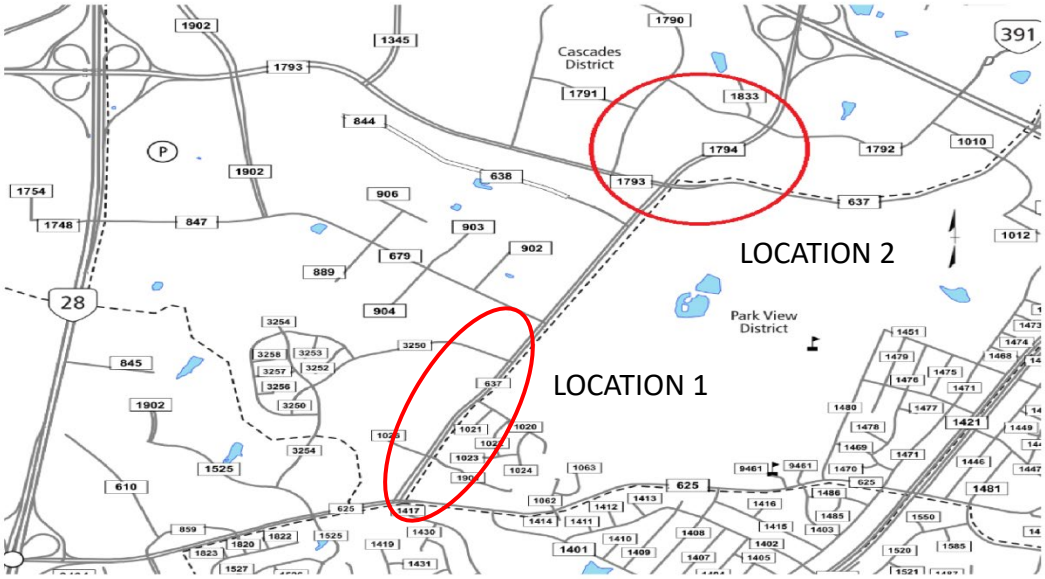
In collaboration with Loudoun County and VDOT, ATCS is preparing a Project Pipeline Phase 1 Study for the bike and pedestrian projects along Route 637 (Cascades Pkwy) in Loudoun County, VA. The original bike and pedestrian projects comprised three distinct 2022 SMART Scale applications, namely Application #8984 (Nokes Blvd./Potomac View Road to Victoria Station Drive/Loudoun Park Lane), #8985 (Church Road to Victoria Station Drive/Loudoun Park Lane), and #8986 (Nokes Blvd./Potomac View Road to Woodshire Drive/Bartholomew Fair Drive). Among these applications, only Application #8984 (Nokes to Victoria Station Drive) received funding in the 2022 SMART Scale process, while Applications #8985 (Church Road to Victoria Station Drive/Loudoun Park Lane) and #8986 (Nokes Blvd./Potomac View Road to Woodshire Drive/Bartholomew Fair Drive) were not selected due to their relatively high costs. ATCS understands that Application #8984 is moving forward with design through Loudoun County.

The primary objective of this study is to investigate potential alternative options for both Application #8985 (Church Road to Victoria Station Drive/Loudoun Park Lane) and Application #8986 (Nokes Blvd./Potomac View Road to Woodshire Drive/Bartholomew Fair Drive), with the intention of potentially streamlining and enhancing the projects and SMART Scale applications.

The alternative design solutions outlined in this memorandum have the potential to offer various courses of action to curtail project expenditures, while concurrently streamlining and enhancing the project's advantages. This endeavor involves a comprehensive review of past SMART Scale applications and concept designs, along with the execution of field investigations and additional research to potentially recalibrate the project scope. This realignment could potentially lead to reduced construction costs, minimized environmental impacts, decreased right-of-way requirements, managed utility ramifications, and augmented benefits. ATCS is also identifying higher-cost design elements from previous applications that could be modified or eliminated. Additionally, ATCS is scrutinizing locations where design waivers were sought (mainly related to shared use path and sidewalk buffers) to uncover additional grounds for waiver justifications. Moreover, ATCS is identifying design waivers that might have a lower probability of approval from VDOT's Location and Design Department. Waiver locations with a diminished likelihood of approval might necessitate more standardized designs, consequently contributing to increased project costs. The overarching aim is to propose potential solutions that are potentially more cost-effective, more amenable to approval, and that uphold the project's fundamental objectives.

Project Description

- Location 1: Cascades Parkway (Route 637) - Loudoun Co.
  - Limits – Church Road to Victoria Station Drive
- Location 2: Cascades Parkway (Route 637) - Loudoun Co.
  - Limits – Nokes Boulevard to Woodshire Drive/Bartholomew Fair Drive
- Locality – Loudoun County



The project consists of evaluating potential for bike and pedestrian projects on Cascades Parkway between Church Road and Victoria Station Drive/Loudoun Park Lane and between Nokes Boulevard and Woodshire Drive/Bartholomew Fair Drive. On June 30th, 2023, ATCS hosted a field/technical meeting with the participation of VDOT and Loudoun DTCI. The primary focus of the meeting was to explore various alternative options and solutions related to the project. The outcomes of that meeting will be documented in this memorandum for Phase 1, which will also support Phases 2 and 3 of the Project Pipeline process.

It is important to note that as of the writing of this memorandum, certain key activities such as field surveys, utility designation, environmental analysis, and geotechnical investigations have not been conducted. Therefore, the potential solutions presented here are solely based on available aerial imagery, GIS information, and field observations. Further data gathering and analysis will be necessary to analyze and advance these potential solutions in the subsequent stages of the project.

Existing Conditions

Existing conditions on the corridor are as follows:

Rte. 637 (Cascades Parkway) Location 1 & 2	
Functional Classification	Minor Arterial*
Average Annual Daily Traffic (AADT)	Church Road to Potomac View Road 13,000 (WCOG Clearinghouse, 2018)** Potomac View Road to Route 7 (Leesburg Pike) 25,000 (VDOT Traffic Count Data, 2018)** 26,000 (VDOT Traffic Count Data, 2019)**
Posted Speed Limit	45 MPH***
Lane Width	12 Feet
Existing Sidewalk	5-foot sidewalk along NB Cascades Pkwy between Church Road and Loudoun Park Lane

*Minor Arterial designation is consistent with Loudoun County's 2019 Countywide Transportation Plan. This classification was obtained from the LRS 23.1 Feature Service.
**The large drop in AADT between the two locations is due to a large volume of traffic coming from Route 7 down Cascades Pkwy to commute to the shopping plaza located along this stretch of road. The segment of Cascades Pkwy after the intersection with Potomac View Rd to Church Rd is mostly residential, which is likely why the traffic volume decreases in this section.
***Source: Google Maps and site visit.

Potential Solutions Summary

Potential Solution Types

During the field/technical meeting June 30, 2023, attended by ATCS, VDOT, and Loudoun DTCI, the team discussed potential design solutions that could help overcome project challenges, reduce costs, and assist with project approvals. The following potential types of solutions were identified:

Existing Right-of-Way Constraints: Identify areas where the project is limited by existing right-of-way and explore design modifications or negotiation options to optimize space usage and minimize right-of-way acquisition costs.

Steep Terrain Challenges: Develop engineering solutions, such as retaining walls or graded pathways, to accommodate the project's alignment on steep terrain while ensuring a safe and comfortable facility and minimizing environmental impacts.

Utility Conflicts: Conduct further utility analysis to precisely map and address conflicts, seeking potential utility relocations or alternative design approaches to avoid costly utility impacts.

Cost-Effective Design Alternatives: Propose alternative design options that reduce project costs without compromising functionality, safety, and project objectives. These alternatives may include innovative materials, construction methods, or revised layouts.

Optimizing Buffer Space Width: Evaluate buffer space requirements and consider design waivers or adjustments in areas where reduced buffer widths can be justified without compromising functionality and safety.

Incorporating Value-Added Features: Explore opportunities to include value-added features or elements that enhance the overall project benefits without significantly increasing costs.

Streamlining Approval Processes: Identify design/project approvals from the original concept that have a lower likelihood of acceptance and suggest alternative solutions.

By identifying these potential solutions in specific locations, the project teams aim to refine the concept designs and ultimate SMART Scale applications to make the project more competitive.

Potential Solution Table Summary

Location	Potenial Solution
West Church Road to Oakbrook Court Sta. 100+00.00 to 109+00.00	•Cost-Effective Design Alternatives: Perhaps replace the originally proposed shared use path with a 6-foot sidewalk with 4-foot buffer space between W. Church Road and MDI Properties LLC entrance to avoid impacts to existing utilities and MDI property. •Streamlining Approval Processes: Given the sufficient right of way available, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between MDI Properties LLC entrance and Oakbrook Court.
Oakbrook Court to Victoria Station Drive Sta. 107+00.00 to 114+50.00	•Incorporating Value-Added Feature: Adding a crosswalk across Cascades Pkwy connecting Oakbrook Ct to Cascades Plaza could potentially increase the SMART Scale score. (See "Field Photo 6") •Streamlining Approval Processes: Given the sufficient right of way available, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Sta. 109+00 to 113+50. •Utility Conflict: The utility pole at Sta. 114+50 and utilities at Sta. 113+50 may need to be relocated and warrants further investigation.
Oakbrook Court to Victoria Station Drive Sta. 114+50.00 to 121+00.00	•Streamlining Approval Processes: To avoid the need for a design waiver approval, it may be necessary to implement a standard 10-foot shared use path with an 8-foot buffer space between Sta. 114+50 to 121+00 which will require additional right of way. •Cost-Effective Design Alternatives: Eliminate existing concrete ditches with storm drainpipes to allow more flexibility with the proposed path location. Shared use path alignment to go between existing utility poles at Sta.121+00.00
Oakbrook Court to Victoria Station Drive Sta. 121+00.00 to 127+91.00	•Streamlining Approval Processes: Given the sufficient right of way available at some points, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Sta. 121+00 to Victoria Station Drive. •Optimizing Buffer Space Width: 5-foot shared use path buffer space design waiver may be warranted at Sta. 123+50.00 to avoid utility pole relocation. The utility pole at Sta. 125+00 which was mislabeled as utility hand hole in the original concept may need to be relocated.
Victoria Station Drive Sta. 00+00.00 to 16+00.00	•Cost-effective Design Alternative: The proposed 5-foot sidewalk on the north side of Victoria Station Drive from the original concept could be removed from the project. This sidewalk is not as critical to the pedestrian network due to the presence of the existing asphalt path along the south side of Victoria Station Drive. Removing the proposed sidewalk would reduce project costs.
Nokes Blvd. to Woodshire Drive Sta. 100+00.00 to 116+00.00	•Cost-Effective Design Alternative: Consider reducing the length of the proposed retaining wall in the original concept and pulling it back from Sta. 107+50 to 106+25.00 •Streamlining Approval Processes: Given the sufficient right of way available in some areas, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Nokes Blvd to Woodshire Drive. Other Potential Solutions: •Incorporating Value-Added Features: Adding bus stops/shelters and bus route along Cascades Pkwy particularly near Bartholomew Fair Drive. This would significantly improve SMART Scale scores.
Woodshire Drive/Bartholomew Fair Drive Sta. 100+00.00 to Sta. 108+00.00	Cost-Effective Design Alternative: Eliminate the sidewalk along the south side of Bartholomew Fair Drive and associate retaining wall between the intersection to Costco entrance due to existing steep terrain to reduce overall project cost. The originally proposed sidewalk did not connect to the Costco site sidewalk system, and therefore provided limited pedestrian benefit in this area. •Incorporating Value-Added Features: Connect the existing pedestrian path along Price Cascades Plaza to the proposed shared use path along Cascades Pkwy at the Price Cascades Plaza entrance. This would require negotiation with the property owner and may require relocation of existing traffic control cabinets at the southeast corner of Cascades Pkwy and Price Cascades Plaza entrance. (See Photo Below). However, this would create a pedestrian connection to the Costco site uses. Adding a mid-block/uncontrolled crossing connecting Potomac Run Plaza to Costco driveway, and a potential pedestrian connection into the Costco site. An engineering study would be required for the mid-block crossing per VDOT IIM-TE-384.0. This would benefit pedestrians by connecting the Target site to the Costco site as well as the to the sidewalk on the north side of Bartholomew Fair Drive proposed in the original concept.

Potential Solutions

Cascades Parkway: West Church Road to Oakbrook Court/Sterling Bridge Place Sta. 100+00 to Sta. 109+00

The following sections provide more details on the originally proposed concepts, challenges, field observations, and potential solutions.

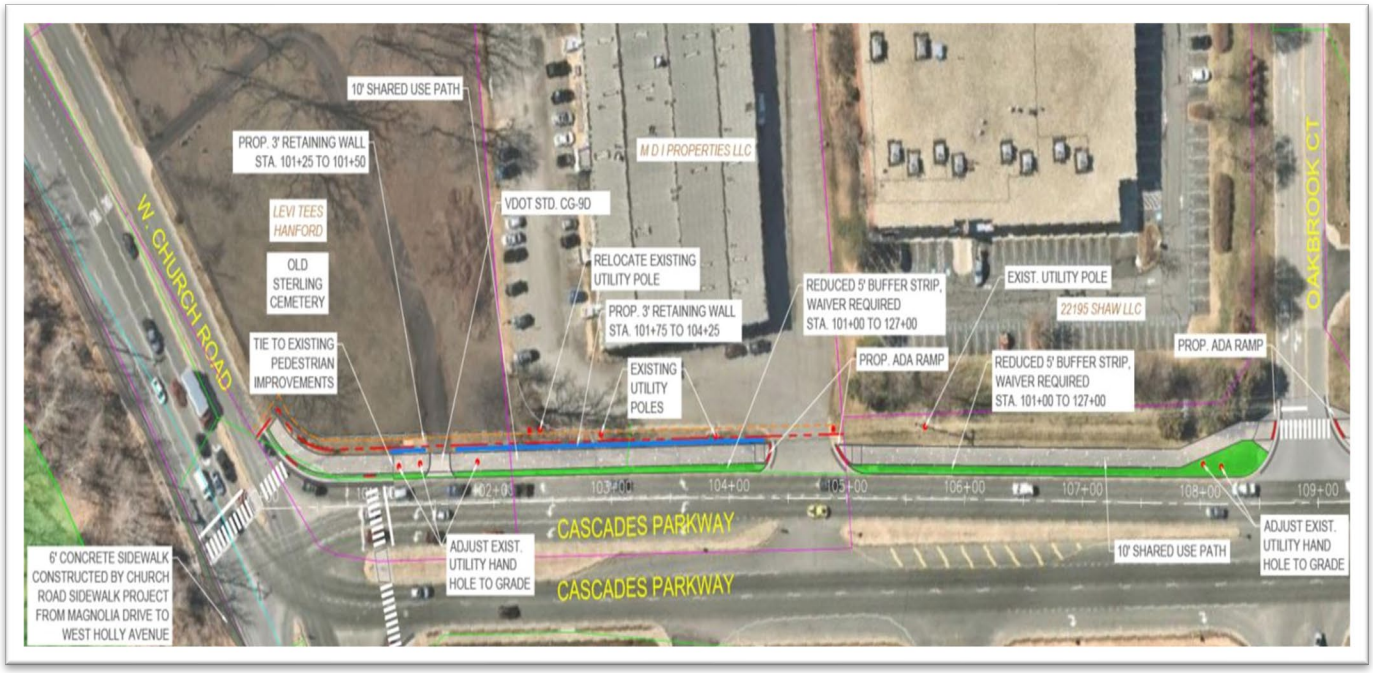


Figure 1: Graphic from original concept Exhibit A between Sta. 100+00 to Sta. 109+00

Original Concept:

- Proposed 10-foot shared use path with reduced 5-foot buffer space between W. Church Road and Oakbrook Court.
- Proposed 3-foot Retaining wall between W. Church Road and MDI Properties LLC entrance.

Existing Challenges:

- Existing right-of-way constraints.
- Steep terrain.
- Limited pedestrian access across Cascades Pkwy.
- Utility conflicts.
- Horizontal criteria constraints where the proposed path will need to navigate horizontally around existing utilities.

Field Observations:

Field Photo 1: MDI Entrance looking south towards W. Church Road.

- Steep terrain between W. Church Road and MDI Properties LLC entrance.
- Existing utility conflicts.
- Limited right of way available.

Potential Solutions:

- Cost-Effective Design Alternatives:
    - Perhaps replace the originally proposed shared use path with a 6-foot sidewalk with 4-foot buffer space between W. Church Road and MDI Properties LLC entrance to avoid impacts to existing utilities and MDI property.

- Streamlining Approval Processes:
    - If the existing right of way is sufficient, or minimal proposed right of way is needed, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between MDI Properties LLC entrance and Oakbrook Court.

Cascades Parkway: Oakbrook Court/Sterling Bridge Place to Victoria Station Drive/Loudoun Park Lane Sta. 107+00 to Sta. 114+50.

Figure 2: Graphic from original concept Exhibit A between Sta. 107+00 to Sta. 114+50

Original Concept:

- Proposed 10-foot shared use path with reduced 5-foot buffer space width.
- ADA curb ramps.

Existing Challenges:

- Utility conflicts.

Field Observations:

Field Photo 2: Oakbrook Ct looking north towards Victoria Station Drive. Sta. 108+00

- Utility conflicts with existing vaults at the southwest corner of Oakbrook Court and Cascades Pkwy intersection.

Field Photo 3: SB Cascades Parkway looking north at Sta. 112+25.

Field Photo 4: Cascades Parkway SB looking north at potential utility conflicts at Sta. 113+50.

- Potential utility conflicts with existing poles along SB Cascades Pkwy.

Potential Solutions:

- Incorporating Value-Added Feature:
    - Adding a marked crosswalk across Cascades Pkwy connecting Oakbrook Ct to Cascades Plaza could potentially increase the SMART Scale score. (See "Field Photo 5")
- Streamlining Approval Processes:
    - If the existing right of way is sufficient, or minimal proposed right of way is needed, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Sta. 109+00 to 113+50.
- Utility Conflict:
    - The utility pole at Sta. 114+50 and utilities at Sta. 113+50 may need to be relocated and warrants further investigation.

Field Photo 5: Potential marked crosswalk looking south on Cascades Pkwy between Oakbrook Ct to Cascades Plaza

Cascades Parkway: Oakbrook Court/Sterling Bridge Place to Victoria Station Drive/Loudoun Park Lane Sta. 114+50 to Sta. 121+00

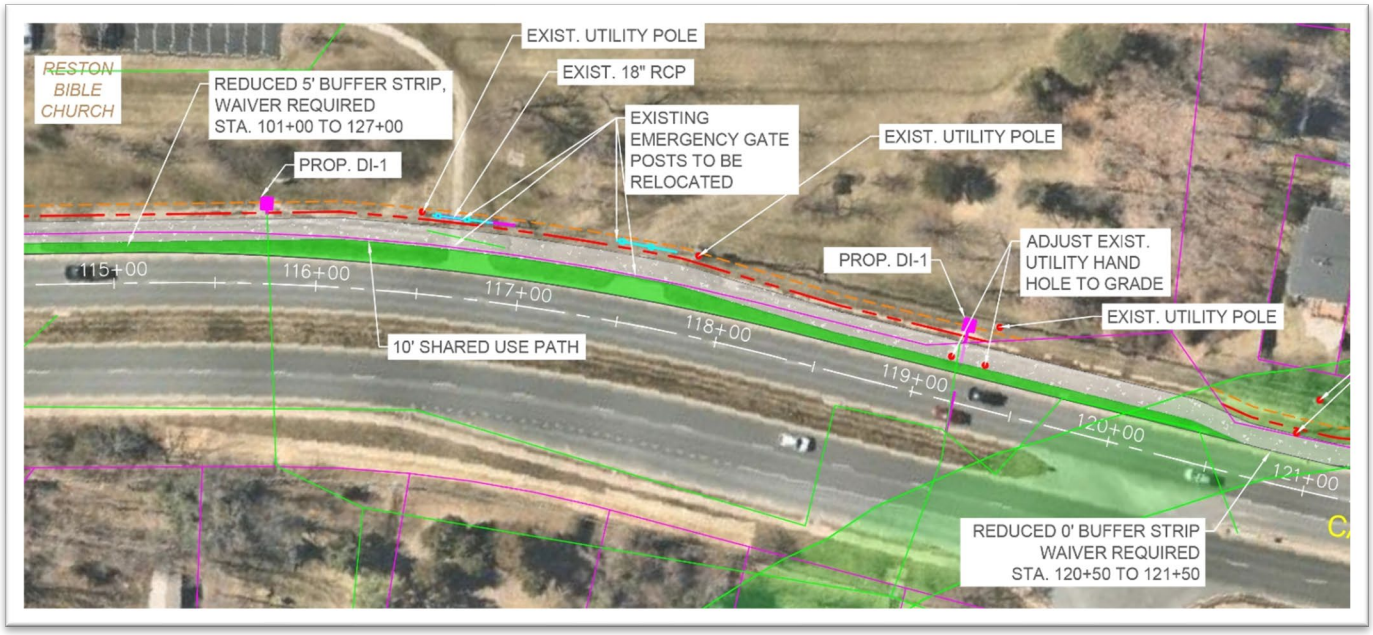


Figure 3: Graphic from original concept Exhibit A between Sta. 114+50 to Sta. 121+00.

Original Concept:

- 10-foot shared use path with 5-foot to 9-foot variable buffer space width.

Existing Challenges:

- Utility conflicts.
- Existing drainage conflicts.

Field Observations:

Field Photo 6: SB Cascades Pkwy looking south towards Oakbrook Court. Concrete ditch between Sta. 115+00 to 116+50.

Field Photo 7: SB Cascades Pkwy looking south towards Oakbrook Court. Concrete ditch between Sta. 118+00 to Sta. 121+00.

Field Photo 8: SB Cascades Pkwy looking south towards Oakbrook Ct. potential utility pole conflict at Sta. 121+00.00.

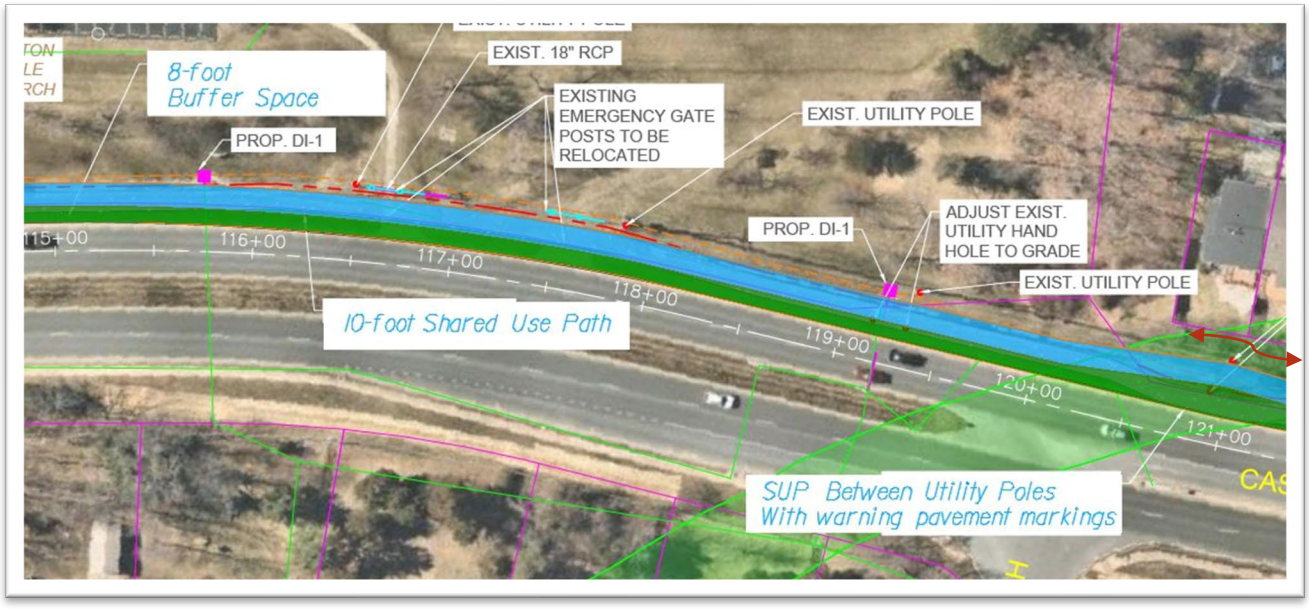


Figure 4: Base from original concept Exhibit A between Sta. 115+00 to Sta. 121+00 showing potential alignment solution (in blue).

Potential Solutions:

- Streamlining Approval Processes:
    - To avoid the need for a design waiver approval, it may be necessary to implement a standard 10-foot shared use path with an 8-foot buffer space between Sta. 114+50 to 121+00 which will require additional right of way.
- Cost-Effective Design Alternatives:
    - Eliminate existing concrete ditches with storm drain pipes to allow more flexibility with the proposed path location.
    - Shared use path alignment to go between existing utility poles at Sta.121+00.00.

Cascades Parkway: Oakbrook Court/Sterling Bridge Place to Victoria Station Drive/Loudoun Park Lane Sta. 121+00 to 127+91.

Figure 5:Graphic from original concept Exhibit A between Sta. 121+00 to Sta. 127+91.

Original Concept:

- 10-foot shared use path with 5-foot to 9-foot variable buffer space width.
- ADA curb ramps.

Existing Challenges:

- Utility conflicts.
- Limited right of way.
- Steep terrain.

Field Observations:

Field Photo 9: SB Cascades Pkwy looking north towards Victoria Station Drive at Sta. 121+50.00.

- Potential grading issues due to steep terrain and existing landscaping.

Field Photo 10: SB Cascades Pkwy looking south towards Oakbrook Court at Sta. 123+50.00.

Potential Solutions:

- Streamlining Approval Processes:
    - If the existing right of way is sufficient, or minimal proposed right of way is needed, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Sta. 121+00 to Victoria Station Drive.
- Optimizing Buffer Space Width:
    - 5-foot shared use path buffer space design waiver may be warranted at Sta. 123+50.00 to avoid utility pole relocation.
    - The utility pole at Sta. 125+00 which was mislabeled as utility hand hole in the original concept may need to be relocated.

Victoria Station Drive Sta. 0+00 to Sta. 16+00.

Figure 6:Graphic from original concept Exhibit D Victoria Station Drive Sidewalk.

Original Concept:

- Standard 5-foot sidewalk with 4-foot buffer space width.
- ADA curb ramps.

Existing Challenges:

- No foreseeable challenges.

Field Observation:

Field Photo 11: Cascades Pkwy looking west along Victoria Station Drive.

- Existing 7-foot asphalt path with no buffer space along south side of Victoria Station Drive.

Potential Solutions:

- Cost-effective Design Alternative:
    - The proposed 5-foot sidewalk on the north side of Victoria Station Drive from the original concept could be removed from the project. This sidewalk is not as critical to the pedestrian network due to the presence of the existing asphalt path along the south side of Victoria Station Drive. Removing the proposed sidewalk would reduce project costs.

Cascades Parkway: Nokes Blvd/Potomac View Road to Woodshire Drive Sta. 100+00 to Sta. 116+00.

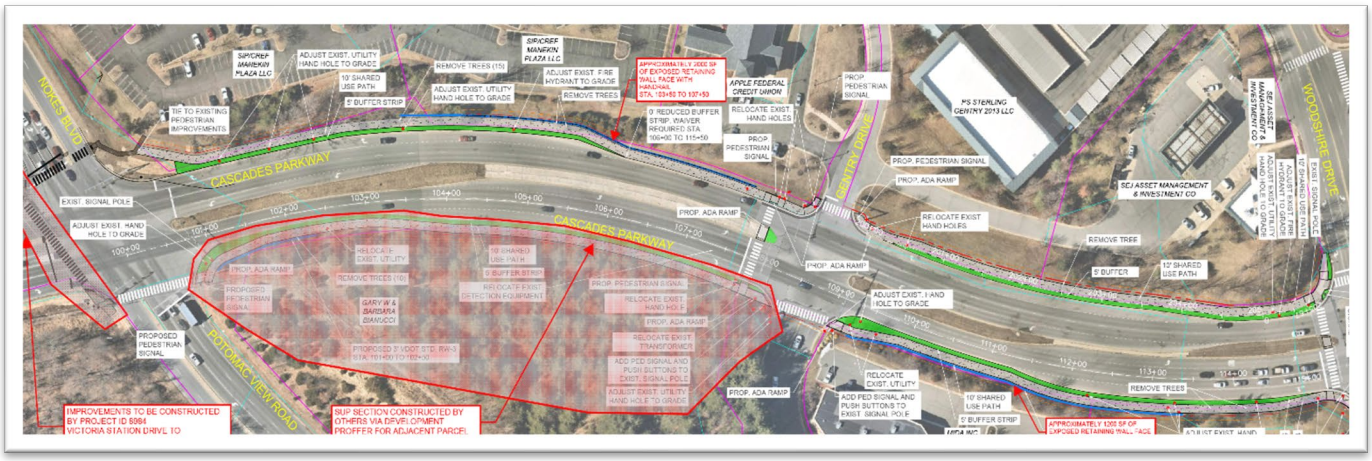


Figure 7: Graphic from original concept Exhibit B Nokes Blvd/Potomac View Road to Woodshire Drive/Bartholomew Fair Drive.

Original Concept:

- 10-foot shared use path with variable buffer space width from 0-foot to 5-foot along SB Cascades Pkwy from Nokes Blvd to Woodshire Drive.
- Retaining wall along SB Cascades Pkwy between Sta. 103+50 to Sta. 107+75.00.
- 10-foot shared use path with 5-foot buffer space width along NB Cascades Pkwy from Price Cascades Plaza to Bartholomew Fair Drive.
- The solutions are now looking at Location 2.

Existing Challenges:

- Steep terrain.
- Limited right of way.
- Utility conflicts.

Field Observations:

Field Photo 12:Gentry Drive looking south towards Nokes Blvd.

- Existing utility handholes at the south corner of Gentry Drive and Cascades Pkwy.

Field Photo 13:Gentry Drive looking north towards Woodshire Drive.

- Existing utility handholes at the north corner of Gentry Drive and Cascades Pkwy.

Field Photo 14: SB Cascades Pkwy looking south towards Nokes Blvd at Sta. 102+00.

- Existing SIP/CREF Manekin Plaza asphalt path.

Field Photo 15: Cascades Pkwy looking towards Gentry Drive at Sta. 106+00.

- Steep terrain at SIP/CREF Manekin Plaza near Gentry Drive.

Potential Solutions:

- Cost-Effective Design Alternative:
  - Consider reducing the length of the proposed retaining wall in the original concept and pulling it back from Sta. 107+50 to 106+25.00
- Streamlining Approval Processes:
  - If the existing right of way is sufficient, or minimal proposed right of way is needed, a design waiver for shared use path buffer reduction as indicated in the original concept may not be approved. Therefore, it may be necessary to implement a standard 10-foot shared-use path with an 8-foot buffer space between Nokes Blvd to Woodshire Drive.

Other Potential Solutions:

- Incorporating Value-Added Features:
  - Adding bus stops/shelters and bus route along Cascades Pkwy particularly near Bartholomew Fair Drive. This would significantly improve SMART Scale scores.

Woodshire Drive/Bartholomew Fair Drive Sta. 100+00 to Sta.108+00

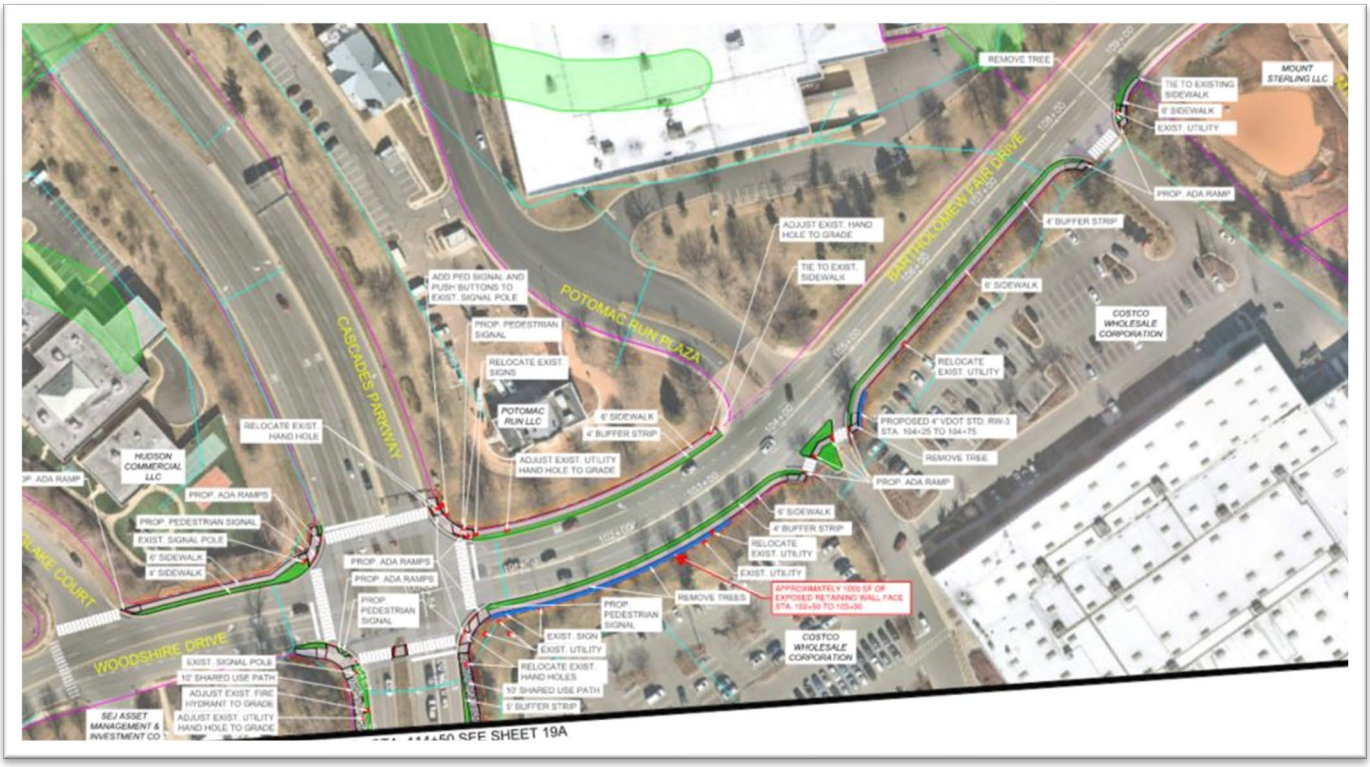


Figure 8: Graphic from original concept Exhibit E between Sta. 100+00 to Sta. 105+00

Original Concept:

- 6-foot sidewalk with 4-foot buffer space along Woodshire Drive and Bartholomew Fair Drive.
- Retaining wall along south side of Bartholomew Fair Drive from the intersection to the Costco entrance.
- Upgrading pedestrian ramps and signals to comply with ADA guidance.

Existing Challenges:

- Existing right-of-way constraints.
- Steep terrain along the south side of Bartholomew Fair Drive.
- Limited pedestrian crossing from Costco to Target.
- Utility conflicts.

Field Observations:

Field Photo 16: Costco Entrance looking west towards Cascades Pkwy and Bartholomew Fair Drive Intersection.

- Existing steep terrain could present grading challenges with the proposed retaining wall.

Field Photo 17: Price Cascades Plaza looking west towards Cascades Pkwy.

- Existing pedestrian path within Costco parking lot.

Potential Solutions:

- Cost-Effective Design Alternative:
  - Eliminate the sidewalk along the south side of Bartholomew Fair Drive and associate retaining wall between the intersection to Costco entrance due to existing steep terrain to reduce overall project cost. The originally proposed sidewalk did not connect to the Costco site sidewalk system, and therefore provided limited pedestrian benefit in this area. The proposed sidewalk, however, will provide connection to the sidewalk recently installed due to a new townhome residential development, Loudoun View Senior Living, and up to Cascades Overlook. It will also provide a connection to NOVA Community College and will increase access to the Eastern Loudoun Service Center.

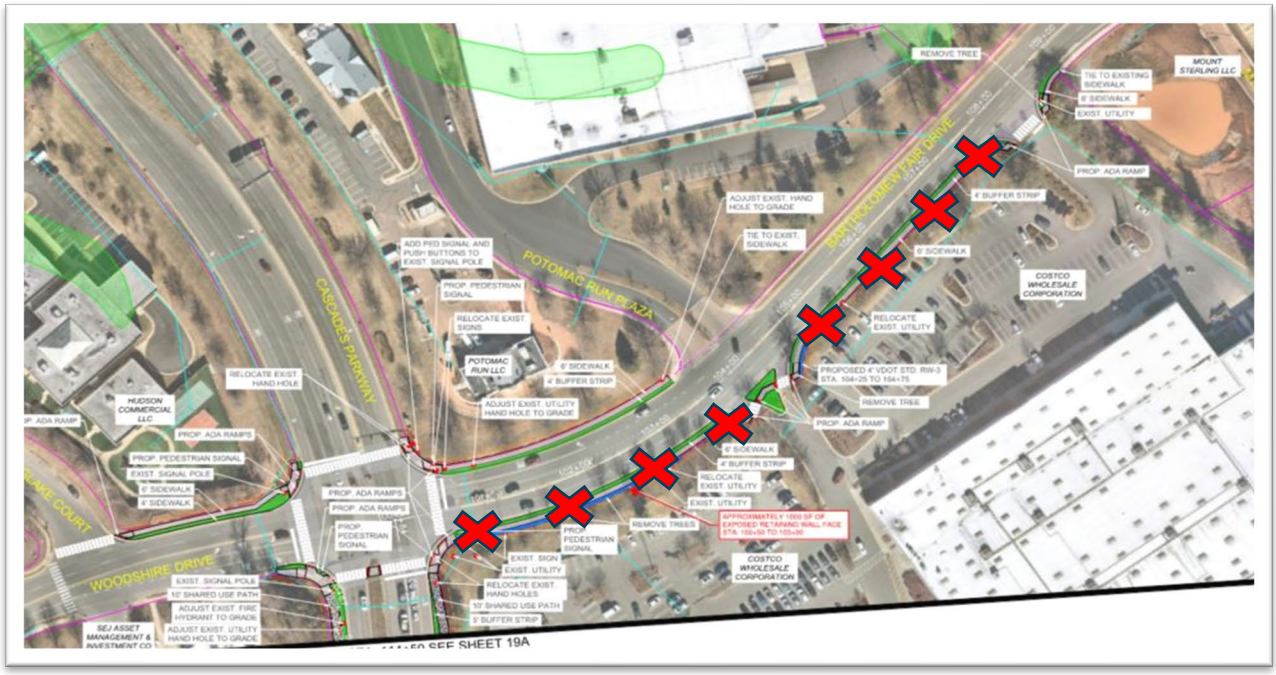


Figure 9: Graphic from original concept Exhibit E between Sta. 100+00 to Sta. 105+00 showing potential solution

Potential solution to eliminate proposed sidewalk and retaining wall along Bartholomew Fair Drive.

Google Earth Image 1: Potential Solution for Internal Pedestrian Path Connections

- Incorporating Value-Added Features:
  - As part of ZMAP-2019-0013, the applicant has proffered a signalized pedestrian crossing across Cascades Parkway to connect the existing pedestrian path along Price Cascades Plaza to the proposed shared use path along SB Cascades Pkwy at the Price Cascades Plaza entrance. This would require negotiation with the property owner and may require relocation of existing traffic control cabinets at the southeast corner of Cascades Pkwy and Price Cascades Plaza entrance. (See Photo Below). However, this would create a pedestrian connection to the Costco site uses.
  - Adding a mid-block/uncontrolled crossing connecting Potomac Run Plaza to Costco driveway, and a potential pedestrian connection into the Costco site. An engineering study would be required for the mid-block crossing per VDOT IIM-TE-384.0. This would benefit pedestrians by connecting the Target site to the Costco site as well as to the sidewalk on the north side of Bartholomew Fair Drive proposed in the original concept.

Field Photo 18: Traffic control cabinets at the southeast corner of Price Cascades Plaza.

2022 SMART Scale Application Concepts and Proposed Site Plan:

The concepts submitted for the 2022 SMART Scale applications were to create a connected pedestrian facility along Cascades Pkwy in two separate sections. These sections would include a 10-foot shared-use path and a 5-foot sidewalk, forming a connected bicycle and pedestrian route along the corridor.

The first section of the shared use path is planned to be situated along SB Cascades Pkwy, extending from Church Road to Victoria Station Drive/Loudoun Park Lane. This segment will incorporate a retaining wall and, in certain areas, a reduced buffer space width to accommodate the path's alignment. **(See Exhibit A)**

The second section of the shared-use path is intended to be located on NB Cascades Pkwy, spanning from Nokes Blvd/Potomac View Road to Woodshire Drive/Bartholomew Fair Drive. Similar to the first section, this segment will feature a retaining wall and, in specific areas, a reduced buffer space width to accommodate the path's alignment. **(See Exhibit B)**

The two sections of the shared use path will be linked by a 10-foot shared use path, which will be constructed as part of the Cascades Parkway Subdivision. This connecting path will be situated on NB Cascades Pkwy, extending from Potomac View Road to the entrance of Costco. This linkage will ensure a continuous bicycle and pedestrian route along Cascades Pkwy, benefiting the community and enhancing connectivity of active transportation users. **(See Exhibit C)**

In addition to the shared use path sections, the concept also includes a 5-foot sidewalk along the north side of Victoria Station Dr, featuring a standard 4-foot buffer space as depicted in **Exhibit D**. Along Woodshire Drive/Bartholomew Fair Drive, the proposal involves the construction of a 5-foot sidewalk with retaining walls, as shown in **Exhibit E**. These sidewalk additions aim to further improve pedestrian accessibility and safety in the respective areas.

The proposed concepts faced significant challenges due to existing right-of-way constraints, relatively steep terrain, and the presence of utilities along the project corridor. In an effort to overcome these obstacles and make the project more feasible, the SMART Scale application design team suggested using reduced shared use path and sidewalk buffer space width design waivers and incorporating retaining walls at various locations. These measures were intended to minimize the overall impact of the project on the surrounding environment and infrastructure.

Major Design Features

Major design features associated with this project include:

- Add shared use path with buffer along west side of Cascade Boulevard from W. Church Street to Victoria Station Dr.
- Add retaining wall along cemetery property and commercial property from STA. 100+50 to 106+00, LT.
- Add pedestrian ramps at business entrances.
- Update ramps and crossings at intersection of Victoria Station Drive and Cascade Parkway. Relocate/replace pedestrian signals and equipment.
- Remove existing concrete swales and install grass swales with inlets and pipe connections to existing inlets from STA 115+00 to 120+50, LT.
- Add retaining wall along townhouses from STA. 122+00 to 123+50, LT.
- Add and update pedestrian crossings at two intersections along Victoria Station Drive: Shortleaf Terrace/Shagbark Terrace and Redmon Terrace/Curving Creek Way.
- Add shared use path with buffer along west side of Cascade Boulevard from Nokes Boulevard to Gentry Drive.
- Add retaining wall along parking lot from STA. 303+75 to 306+00, LT.
- Add pedestrian ramp on north side of Nokes Boulevard and on three corners of Gentry Drive intersection. Add crossings at Gentry Drive.
- Add retaining wall from Prince Cascade Plaza entrance/Cascade Boulevard to Bartholomew Fair Drive from STA. 309+25 to 315+00, RT.
- Add retaining wall along commercial properties from STA. 311+50 to 313+50, LT.
- Add shared use path with buffer along both sides of Cascade Boulevard from Gentry Drive to Bartholomew Fair Drive/Woodshire Drive.
- Add/update pedestrian ramps and crossings at all four corners of Bartholomew Fair Drive/Woodshire Drive.
- Add pedestrian ramps at all four corners of Spring Lake Court intersection on Woodshire Drive.
- Add sidewalk with buffer on north side of Woodshire Drive from Spring Lake Court to Cascade Boulevard.
- Add sidewalk with buffer on both sides of Bartholomew Fair Drive from Cascade Boulevard to Prince Cascades Plaza main entrance.
- Add retaining wall along Prince Cascade Plaza from STA. 400+50 to 404+00, RT.
- Add pedestrian ramps on three corners at the intersection of the main Prince Cascades Plaza entrance and pedestrian crossings across Bartholomew Fair Drive on the east side of the Prince Cascades Plaza main entrance with ramp connections across entrance.
- Add sidewalk with buffer and retaining wall from STA. 404+50 to 407+75, RT. between Prince Cascades Plaza entrances along Bartholomew Fair Drive.
- Add pedestrian ramps and crossing at the secondary Prince Cascades Plaza entrance.

Background

The following studies, efforts and analyses have been conducted to develop design alternatives, select a preferred alternative, refine concept designs and develop cost estimates:

- Field visits – Teams of traffic engineers, roadway engineers and hydraulic engineers conducted site visits to better ascertain existing conditions.
- Stakeholder coordination – Multiple stakeholder coordination meetings were held during the project development process to gain input/feedback, validate designs, and identify issues/risks.
- Concept development Pipeline Process – Initially, the concept was developed with high-level options to improve performance. The next step in the process narrowed down options and more detailed concepts by conceptual analysis, stakeholder engagement, planning level estimates to identify the preferred conceptual approaches. Lastly, the focus shifted to concept refinement, consider current engineering standards, identify risks and contingencies, and a more detailed cost estimation.
- Public Involvement, Traffic Operational Analysis, and Safety Analysis was performed prior to this phase during the application submission for Round 5.

Design Information

Design Criteria

The following is the main design criteria and basic project information. Please see Appendix A for a more detailed list of design criteria:

- Functional Classification – Urban Principal Arterial (GS-05)
- Average Annual Daily Traffic (AADT) –
    - W. Church Road to Nokes Boulevard/Potomac View Road
        - 22,000 (VDOT Traffic Count Data, 2022)
    - Nokes Boulevard/Potomac View Road to Bartholomew Fair Drive/Woodshire Drive
        - 23,000 (VDOT Traffic Count Data, 2022)
- Posted Speed Limit and Design Speed – 35 MPH
- Lane Width – 12 Feet
- Existing Sidewalk –
    - 5-foot sidewalk along NB Cascades Pkwy between W. Church Road and Loudoun Park Lane
    - 5-foot sidewalk along EB Victoria Station Drive

*Minor Arterial designation is consistent with Loudoun County's 2019 Countywide Transportation Plan. This classification was obtained from the LRS 23.1 Feature Service.

**The large drop in AADT between the two locations is due to a large volume of traffic coming from Route 7 down Cascades Pkwy to commute to the shopping plaza located along this stretch of road. The segment of Cascades Pkwy after the intersection with Nokes Boulevard/Potomac View Rd to W. Church Rd is mostly residential, which is likely why the traffic volume decreases in this section.

***Source: Google Maps and site visit.

Data Sources

Information was received from the prior studies for this project and various additional resources. Below is a list of data sources collected and reviewed for this concept development phase:

- Existing GIS data inclusive of right-of-way, parcel lines, some utility information, and aerial imagery.
- CADD files from the previous study.
- Planning studies and development plans as available.
- Utilities and drainage facilities were obtained from data sources stated herein as well as various field visits.

Site visits were conducted on June 30, 2023, and December 5, 2023. Visits included traffic engineers, roadway engineers and hydraulic engineers. Staff focused on key aspects of the proposed project and potential impacts and risks:

- Shared use path geometry was evaluated including how to minimize construction and utility impacts.
- Grading was evaluated to identify locations of potential retaining walls along Cascades Boulevard and Bartholomew Fair Drive.
- Potential utility impacts were evaluated particularly the area of existing utility poles on the west side of the corridor between West Church Road and Victoria Station Drive.
- Pedestrian crosswalks were evaluated at signalized intersections, along Victoria Station Drive, and Bartholomew Fair Drive/Woodshire Drive.
- Hydraulics and stormwater management were evaluated to reduce impacts to existing drainage systems and right-of-way impacts for permanent stormwater management facilities.

The design concept was developed in accordance with the requirements of the following references:

- AASHTO “A Policy on Geometric Design of Highway and Streets”, 2018, 7th Edition
- AASHTO “Roadside Design Guide”, 2011, 4th Edition
- 2009 MUTCD with Revision Numbers 1 & 2 Incorporated
- VDOT Road and Design Manual, Rev. July 2021
- VDOT Instructional and Information Memorandum for all VDOT Divisions
- VDOT Road and Bridge Standards, 2016
- VDOT Cost Estimating Manual Version 2.0
- VDOT Right of Way Cost Estimate Guide
- SMART SCALE Technical Guide for Round 5

- Design Waiver/Exception Policy for SMART SCALE Applications
- IIM-LD-255 - Practical Design Flexibility in the Project Development Process

Assumptions

Following are key design assumptions that informed the concept development and cost estimate preparation:

- Geometry – Shared use paths were designed with a speed of 18 mph within the right-of-way footprint. Sidewalks used a standard VADOT design (6' width with 4' buffer).
- Structures – Retaining walls were assumed to be a modular block with concrete spread footings. Heights and lengths vary by location. There are several proposed locations throughout the corridor which are listed under the Major Design Features section of this report and on the concept design exhibits. The retaining walls are proposed to reduce significant impacts to the adjacent properties and to avoid utility relocations.
- Hydraulics and stormwater management – The additional impervious from the new shared use paths and sidewalk will require stormwater mitigation. Size and location will need to be further evaluated in a future phase. Additionally, the drainage swale and pipe(s) between Oakbrook Drive and Gentry Drive will be impacted and revised due to avoid additional right-of-way impacts. Pedestrian ramps will be designed to avoid low point/sumps within the apron areas.
- Utility impacts – The shared use paths and sidewalks will be designed to minimize impact to aerial and underground utilities to an extent that is feasible. However, in some areas, avoiding utility impacts will be unavoidable.
- Right of Way – The proposed improvements will involve acquiring right of way and easements on several parcels. This is primarily due to the proposed shared use path pushing outside of the existing right of way on some parcels or acquiring temporary construction easements to gain space for construction. Refer to the concept design exhibits and Right of Way Data Sheet for more details.

Schedule – Following is the anticipated project development schedule:

PE	1/2031 Start	6/2033 End
RW/Utility	6/2033 Start	6/2035 End
CN	6/2035 Start	6/2037 End

Environmental Considerations

A preliminary environmental review was conducted as part of this study including the following elements:

- Wetland/streams
- Hazardous Materials

- Cultural Resources
- Threatened/Endangered Species
- Floodplains
- Parks and recreational facilities

Based on the review, the potential environmental issues anticipated would be related to unknown hazardous materials or unknown archeological and architectural resources. The level of environmental document anticipated is a Categorical Exclusion, either a PCE or a CE depending on final project impacts/scope.

Constructability and Maintenance of Traffic Assessment

It is anticipated that construction will follow the following general phases:

- Phase 1 – Clear and grub the impacted areas. Relocate impacted utilities.
- Phase 2 – Allow 10' or up to one lane closures along the work zone area(s). At each location, build retaining walls and shared use paths/sidewalks in sections. Paths/sidewalks located on both sides of the roadway will be built one side at a time. Relocate required traffic signal equipment prior to building paths.

Driveway/entrance access would be maintained to all private properties throughout construction.

Pedestrian access along the corridor would be maintained throughout construction. Temporary sidewalk and pedestrian ramp closures or detours may be needed.

Risk Plan/Contingency

The project is considered Non-Complex and at a Pre-Scoping Phase. The Most Likely Estimate (MLE) contingency is considered in the 35% range. Project specific risks were identified and assessed based on field visits, stakeholder input and concept design development. However, quantitative analysis was not performed in this phase. Typical project risks are assessed per broad categories including Maintenance of Traffic, Roadway, Right of Way, In-plan Utilities, Mobilization/Construction Survey, Hydraulics, Traffic, Structures/Bridge, Geotechnical, and Environmental/Soundwalls. See the attached Cost Estimates and Cost Estimate Workbooks for the specific contingencies and allowances used for this project. Each individual risk was "scored" based on probability, cost impact and time impact. Scoring was used to assign contingencies per risk line item. These line-item risk contingencies were then aggregated to determine a **contingency amount per category:**

- Maintenance of Traffic = 35%
- Roadway = 25%
- Right of Way = 40%
- In-plan Utilities = 40%
- Mobilization/Construction Survey = 40%
- Hydraulics = 30%
- Traffic = 30%

- Structures/Bridge = 35%
- Earthwork/Geotechnical = 0%
- Environmental/Soundwalls = 0%

Unsignalized Pedestrian Crossings (SS02)

Unsignalized pedestrian crossings are proposed at three locations. The SS02 forms were completed and can be found in the attachments. The three locations are as follows:

- Victoria Station Drive and Redmon Terrace / Curving Creek Way
- Victoria Station Drive and Shortleaf Terrace / Shagbark Terrace
- Bartholomew Fair Drive and Potomac Run Plaza

Cost Estimate

Methodology

Cost estimates were prepared for two separate sections of the project area: from West Church Road to Victoria Station Drive and from Nokes Boulevard to Woodshire Drive / Bartholomew Fair Drive. The project cost estimates were developed using the following methodology:

- Understanding the goals of the project and scope of improvements to be implemented
- Gathering and reviewing as much information about the project as possible including site visits and stakeholder input
- Establishing design criteria and developing a detailed design concept
- Performing quantity take offs and identifying unit prices based on Bid Express to develop "defined costs".
- Developing "allowance costs" for some elements based on potential impacts and complexity. Allowances add costs for elements based on percentage of the base construction cost.
    - Roadway 20% Allowance
    - Hydraulics 15% Allowance
    - In-plan Utilities 10% Allowance
    - Traffic 10% Allowance
    - Structures/Bridges 6% Allowance
    - Materials/Geotech 3% Allowance
    - Survey/SUE 3% Allowance
    - Environmental 1% Allowance
    - Right-of-Way 1% Allowance
    - VDOT Project PE Oversight 20% Allowance
- Identifying proposed property impacts, developing a Right of Way Data Sheet and coordinating with VDOT to develop Right-of-Way costs. Note for the total project, 21 parcels are anticipated to be impacted (15 with Fee Taking and easements, and an additional 6 with just easements)

- Performing a risk assessment as outlined above and identifying appropriate contingency percentages by category.
- Developing Preliminary Engineering costs by category based on a percentage of the Construction cost (See the Cost Estimate for more details)

Cost Estimate Breakdown

The total 2024 project costs were estimated per Phase/Major area as follows:

- W. Church Road to Victoria Station Drive - $10,260,851
    - Preliminary Engineering Phase $1,069,250
    - Right of Way and Utilities Phase $3,381,658
    - Construction Phase $4,769,356
    - CEI $1,040,587
- Nokes Boulevard to Bartholomew Fair Drive/Woodshire Drive - $17,336,927
    - Preliminary Engineering Phase $1,678,250
    - Right of Way and Utilities Phase $4,781,371
    - Construction Phase $8,929,132
    - CEI $1,948,174

See the attached Cost Estimate and Cost Estimate Workbook for documentation of calculations, assumptions, and justifications.

Additional Study/Analysis Needs

Unresolved/Outstanding Items

Future work should include a detailed topographic survey, and utility designation (Level B) with test pits (Level A) at potential utility conflict locations. Future work would also include design development phases such as:

- Scoping Phase – Preliminary Field Inspection (PFI) Plans
- Preliminary Design Phase – Public Hearing (PH) Plans, design waiver requests,
- Detailed Design Phase – Field Inspection (FI) Plans, utility field inspection, final environmental documentation
- Final Design Phase – Right of Way (RW) Plans and acquisition, Pre-Advertisement Conference (PAC) Plans

- Advertisement Phase – Advertisement Plans, permitting

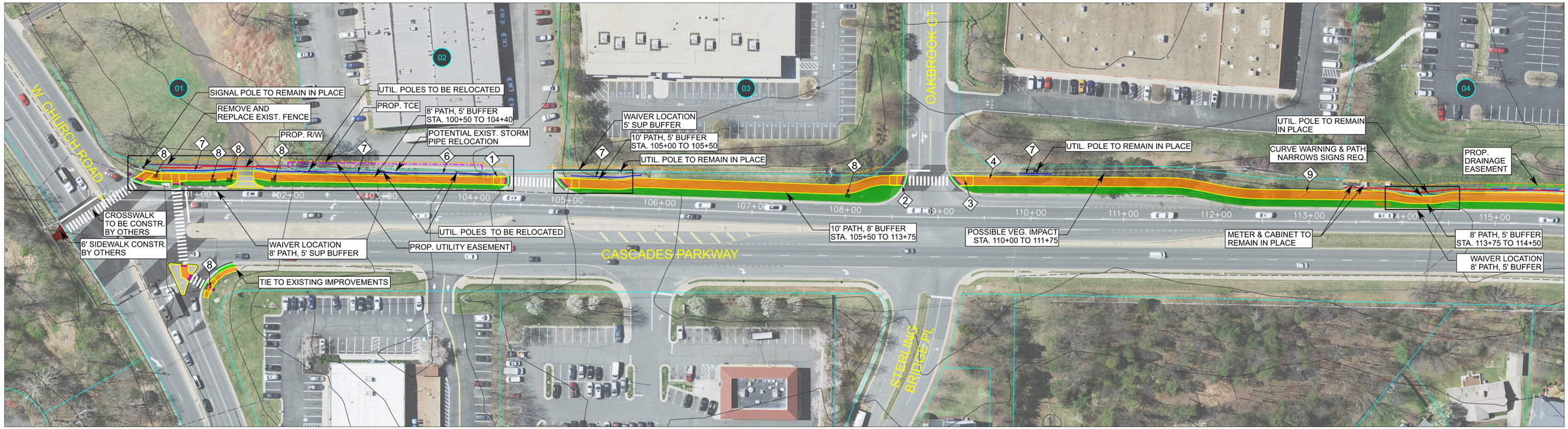
Design Criteria Summary

Cascade Boulevard Shared Use Path / Sidewalk – Design Criteria	
Functional Classification	Urban Principal Arterial (GS-5)
Posted & Design Speed – Cascades Parkway Blvd	35 MPH
Posted & Design Speed – Victoria Station Dr	35 MPH
Posted & Design Speed – Bartholomew Fair Dr / Woodshire Dr	35 MPH
Shared Use Path Design Vehicle	Bicycle / Pedestrian
Shared Use Design Speed	18 MPH
Cross Slope	0%
Minimum Sidewalk Width	6’
Minimum Sidewalk Buffer	4’
Pedestrian Crossings	High visibility marking, detectable surface
Curb Ramp Standard	CG-12
Minimum Shared Use Path Width	*10’
Minimum Shared Use Path Buffer Width	*8’
Roadway Lighting	Intersection and Interchange Locations
Entrance Standard	CG-11

*Design waiver will be required in specific locations where path / buffer will be reduced.

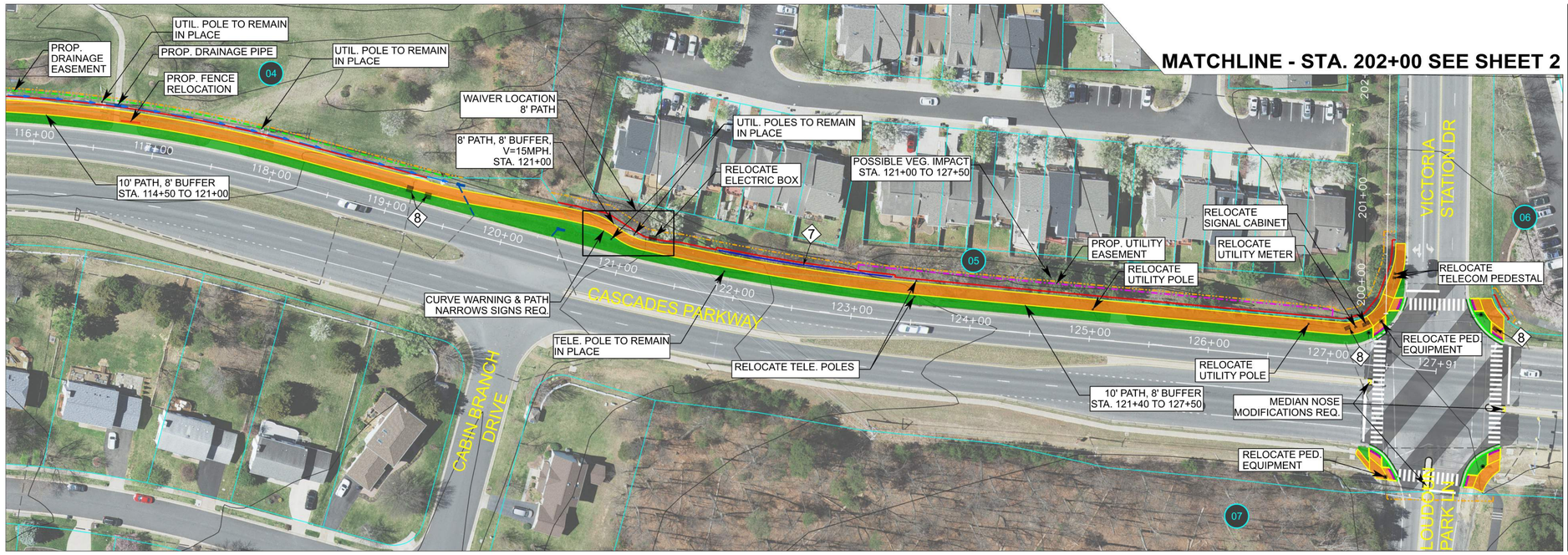
CASCADES PARKWAY BETWEEN W. CHURCH RD AND VICTORIA STATION DR

JUNE 2024



MATCHLINE - STA. 115+75 SEE BELOW

MATCHLINE - STA. 115+75 SEE ABOVE



MATCHLINE - STA. 115+75 SEE ABOVE

LEGEND

- PROP. FULL DEPTH PAVEMENT
- PROP. MILL AND OVERLAY
- PROP. SHARED USE PATH/ SIDEWALK
- PROP. GRASS AREA
- PROP. CONCRETE MEDIAN
- PROP. RIGHT OF WAY
- PROP. TEMPORARY CONSTRUCTION EASEMENT
- PROP. DRAINAGE EASEMENT
- PROP. UTILITY EASEMENT
- PROP. RETAINING WALL
- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CONTOURS AT 4' INTERVAL
- PROP. FENCE
- EXISTING STORMWATER PIPE
- PROP. DROP INLET
- PROP. DITCH
- PROP. PIPE CONNECTION
- PROP. SIGNAL POLE
- PROP. PED. SIGNAL POLE
- EXIST. SIGNAL POLE
- 01 IMPACTED PARCELS
- 1 PROP. CG-2
- 2 PROP. CG-6
- 3 PROP. CG-12
- 4 PROP. SHARED USE PATH
- 5 PROP. SIDEWALK
- 6 PROP. RET. WALL
- 7 PROP. ST'D HR-1
- 8 UTILITY HAND HOLE ADJUSTMENT REQ.

IMPACTED PARCELS

01 - HANFORD, LEVI ET AL TEES
02 - MDI PROPERTIES LLC
03 - 22195 SHAW LLC
04 - RESTON BIBLE CHURCH
05 - CASCADES PARK HOMEOWNERS ASSOCIATION
06 - CASCADES PARK HOMEOWNERS ASSOCIATION
07 - LOUDOUN COUNTY BOARD OF SUPERVISORS

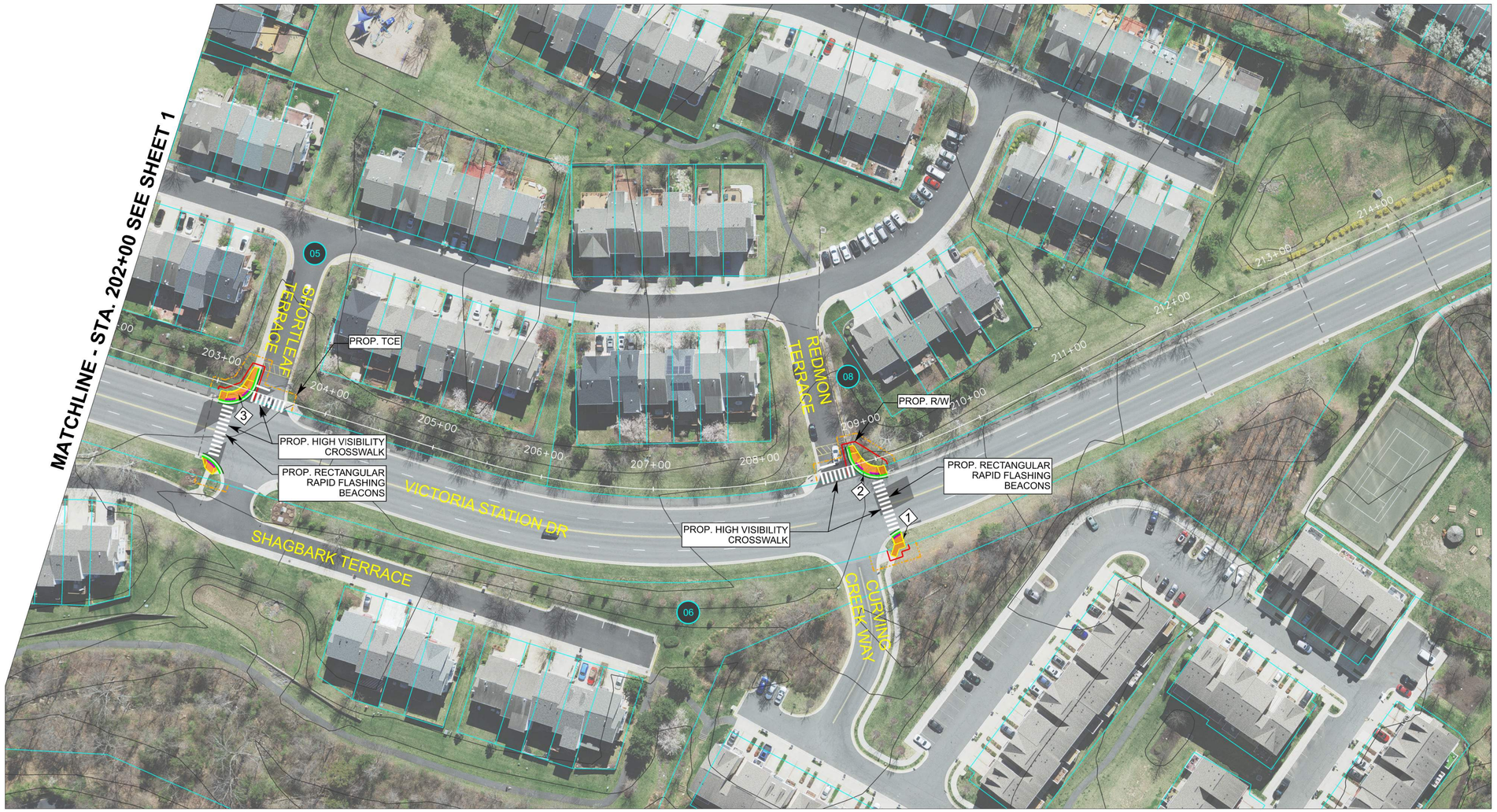
SCALE 0 50' 100'

N

SHEET NO. 1

VICTORIA STATION DR BETWEEN CASCADES PKWY AND REDMON TERRACE

JUNE 2024



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N

SCALE 0 50' 100'

IMPACTED PARCELS

05 - CASCADES PARK HOMEOWNERS ASSOCIATION
06 - CASCADES PARK HOMEOWNERS ASSOCIATION
08 - CASCADES PARK HOMEOWNERS ASSOCIATION

SHEET NO. 2

CASCADES PARKWAY BETWEEN NOKES BLVD AND BARTHOLOMEW FAIR DR

JUNE 2024

LEGEND

- PROP. FULL DEPTH PAVEMENT
- PROP. MILL AND OVERLAY
- PROP. SHARED USE PATH/ SIDEWALK
- PROP. GRASS AREA
- PROP. CONCRETE MEDIAN
- PROP. RIGHT OF WAY
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- 7 → PROP. ST'D HR-1
- 8 → UTILITY HAND HOLE ADJUSTMENT REQ.

N

SCALE 0 50' 100'

IMPACTED PARCELS

09 - AMAZON DATA SERVICES LLC
10 - AMAZON DATA SERVICES LLC
11 - APPLE FEDERAL CREDIT UNION
12 - HAYES VENTURE LLC
13 - PS STERLING GENTRY 2013 LLC
14 - SEJ ASSET MANAGEMENT & INVESTMENT CO
15 - COSTCO WHOLESALE CORPORATION
16 - MIDA INC

SHEET NO. 1

ATCS DRPT Virginia Department of Rail and Public Transportation Office of INTERMODAL Planning and Investment VDOT Virginia Department of Transportation

BARTHOLOMEW FAIR DRIVE / WOODSHIRE DRIVE

JUNE 2024

LEGEND

- PROP. FULL DEPTH PAVEMENT
- PROP. MILL AND OVERLAY
- PROP. SHARED USE PATH/ SIDEWALK
- PROP. GRASS AREA
- PROP. CONCRETE MEDIAN
- PROP. RIGHT OF WAY
- PROP. TEMPORARY CONSTRUCTION EASEMENT
- PROP. RETAINING WALL
- EXISTING RIGHT OF WAY/PROPERTY LINE
- EXISTING CONTOURS AT 4' INTERVAL
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- 6 → PROP. RET. WALL
- 7 → PROP. ST'D HR-1
- 8 → UTILITY HAND HOLE ADJUSTMENT REQ.

N

SCALE 0 50' 100'

IMPACTED PARCELS

14 - SEJ ASSET MANAGEMENT & INVESTMENT CO
15 - COSTCO WHOLESALE CORPORATION
17 - SARGE LC
18 - HUDSON COMMERICAL LLC
19 - POTOMAC RUN LLC
20 - TARGET CORPORATION T-1009
21 - MOUNT STERLING LLC

SHEET NO. 2