ANNE ARUNDEL COUNTY
MARYLAND

Riva Road Trail Corridor Study
Concept Design Report

Project No. H508425

May 2021

AECOM

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Executive Summary

The Anne Arundel County Department of Public Works (DPW) is conducting the Riva Road Trail Corridor Study to examine the feasibility, impacts, and costs of a trail (also referred to as a shared use path) on either side of Riva Road from Speicher Drive/Annapolis High School to Forest Drive, a distance of approximately 1.2 miles. Two alternatives will be evaluated for this study – 1) a trail on the east side and 2) a trail on the west side of Riva Road – with the understanding that the trail will cross Riva Road at a signalized intersection to connect to the existing trail/shared use paths at Parole Town Center. The primary goal of this study is to develop potential improvement concepts that the County can carry forward through final design in order to provide a more complete trail network in Anne Arundel County.

As shown on the concept plans in Appendix A, the two trail alignments show the feasibility of a trail on either the west side or east side of Riva Road and the proposed improvements include upgraded pedestrian signals, ADA-compliant ramps, and marked crosswalks. The overall construction cost estimate (including right-of-way, utilities, and engineering costs) is approximately $5.61M for a trail on the west side of Riva Road and $4.96M for a trail on the east side of Riva Road.

Potential trail crossing locations along Riva Road were evaluated at existing signalized intersections and narrowed down to the intersections of Harry S. Truman Parkway and the Board of Education.

As part of the Riva Road Trail Corridor Study, on-road bike lanes were considered at a high level, but are not recommended to be carried forward as an alternative due to feasibility, impacts, and costs. Without lane width reductions on Riva Road, there is not enough curb-to-curb width available for low stress on-road bike lanes without roadway widening.

Section 1: Introduction

The Anne Arundel County Department of Public Works (DPW) is conducting the Riva Road Trail Corridor Study to examine the feasibility, impacts, and costs of a trail (also referred to as a shared use path) on either side of Riva Road from Speicher Drive/Annapolis High School to Forest Drive, a distance of approximately 1.2 miles. Two alternatives will be evaluated for this study – 1) a trail on the east side and 2) a trail on the west side of Riva Road – with the understanding that the trail will cross Riva Road at a signalized intersection to connect to the existing trail/shared use paths at Parole Town Center. The primary goal of this study is to develop potential improvement concepts that the County can carry forward through final design in order to provide a more complete trail network in Anne Arundel County.

The *Parole Mobility Study* (2021) is a precursor for the Riva Road Trail Corridor Study and recommends a shared use path on Riva Road from Speicher Drive to Forest Drive, along the west side of Riva Road from Speicher Drive to Harry S. Truman Parkway and along the east side of Riva Road from Harry S. Truman Parkway to Forest Drive. Additionally, recent traffic improvements south of the study area on Riva Road (signage and pavement markings for bicyclists) led to this study. The County *Pedestrian and Bicycle Master Plan* calls for bicycle facilities on one side of the road for this portion of Riva Road.

The section of Riva Road in the study area (shown in Figure 1) has a posted speed limit of 40 mph and is a closed roadway section with curb and gutter and is lined with light/utility poles. Riva Road is a County Road and is functionally classified as a Minor Arterial under the County Functional Classification System.

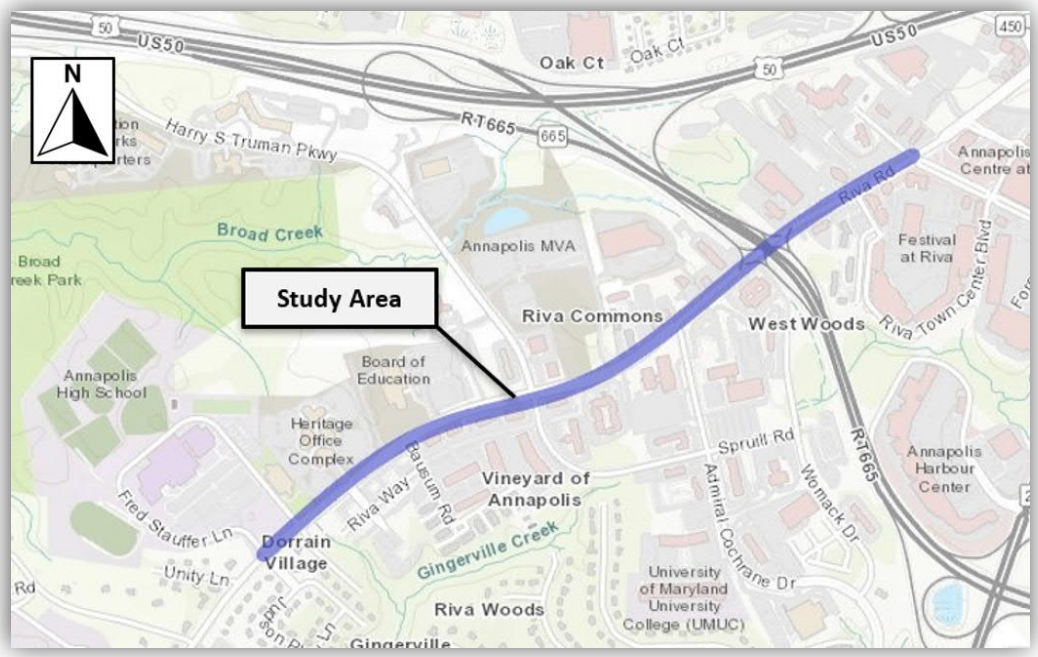

Figure 1: Study Area Map

Section 2: Existing Conditions

AECOM collected and reviewed readily available data from the County's Office of Information Technology (OIT) for the study area, including as-builts, aerial imagery, contours, parcel lines, planimetrics, and County utilities (water and sewer) to develop base mapping for the concept design phase of the project. Other roadside features such as utility poles, light poles, signposts, traffic signal poles, and pedestrian signal poles were added to the mapping based on a desktop inventory and field verification. Existing and planned bicycle facilities, sidewalks, and shared use paths were also reviewed, along with developer plans and other County studies, in the vicinity of the study area. A desktop survey was conducted using the Maryland Historical Trust's online database (Medusa) and no historic sites are present in the study area.

At both ends of the study area, Annapolis High School and the Parole Town Center are pedestrian and bicycle attractors. Additionally, the Farmers Market on Harry S. Truman Parkway is a key destination for pedestrians and bicyclists and the Truman Park and Ride (just west of the Farmers Market) could be considered a key destination to promote multimodal travel.

In terms of existing bicycle facilities, there are existing on-road bike lanes south of the study area on the shoulder of Riva Road, an existing shared use path on the east side of Harry S. Truman Parkway, and an existing shared use path at the northern end of the study area at the Parole Town Center. A mixed-use development is proposed along northbound Riva Road at Admiral Cochrane Drive (2555 Riva Road), with the developer proposing to construct a 10' wide trail along the parcel frontage. This section, along with a segment just north of MD 655 at the 2521 Riva Road shopping center, are the only existing sections of Riva Road in the study area that do not currently have sidewalk – the remaining portion of Riva Road from Speicher Drive to Forest Drive generally has 5' wide sidewalks on both sides of the roadway. Figure 2 shows a typical view of the existing sidewalk on Riva Road.

Figure 2: Typical Existing Sidewalk

Multiple transit routes operate on Riva Road and serve major generators such as retail, libraries, and hospitals. Bus stops (Yellow Route) in the study area were field-verified and are shown on the base map. Figure 3 shows a typical bus stop with shelter along Riva Road. County bus stop data showed a stop just north of the Dunkin' Donuts on the west side of Riva Road, across from Admiral Cochrane Drive; however, this stop does not currently exist. Per County feedback, this may have been a previous bus stop which may be reintroduced in the future. For the purpose of this study, the bus stop is included on the base map.

Figure 3: Typical Bus Stop with Shelter

The section of Riva Road in the study area has a posted speed limit of 40 mph and is a closed roadway section with curb and gutter and is lined with light/utility poles. A site visit was conducted on February 24, 2021 to verify the study data and identify potential issues and constraints in the corridor. General information obtained from the site visit is discussed below, followed by location-specific information presented from south to north in the study area:

- Both sides of Riva Road contain existing sidewalk (other than the parcel on the east side of Riva Road, south of Admiral Cochrane Drive) and provide safe walking areas for pedestrians; however, no bicycle facilities exist in the study area
- Pavement markings at crosswalks are generally in good condition
- Pedestrian signals are located at crosswalks within signalized intersections; however, not all pedestrian signals meet the latest accessibility standards, such as audible warnings, countdown signals, etc.
- There are no noticeable issues with the curb ramps along the corridor being Americans With Disabilities Act (ADA) compliant and detectable surfaces are in-place
- Street lighting is consistent along the corridor, with most lights attached to utility poles
- Existing ramps at some intersections are constrained with 8' or less width to the back of curb (Figure 4 shows a typical example of this scenario) – these intersection areas may require additional construction or traffic signal relocation to accommodate a wider trail cross section.

Figure 4: Typical Existing Curb Ramp Width Constraint

- The ramp at the northeast quadrant of the Riva Road/Speicher Drive intersection showed signs of a potential ponding/drainage issue following a recent snow event (Figure 5)

Figure 5: Potential Ponding/Drainage Issue at Riva Road/Speicher Drive, East Side of Riva Road Looking South

- Just north of Marquise Lane on the east side of Riva Road, there is an existing section of 3' wide sidewalk at a stream crossing, with only 3'6" of width from the back of curb to the existing guardrail. This area is shown in Figure 6 below.

Figure 6: Existing Sidewalk North of Marquise Lane, East Side of Riva Road Looking South

- The west side of Riva Road between Fred Stauffer Lane and the Board of Education has several drainage swales on County property (Figure 7) that may require adjustment and/or potential retaining walls for trail construction. Additionally, the west side of Riva Road contains numerous utility poles that are located approximately 8' from the back of curb.

Figure 7: Existing Drainage Swale and Utility Pole, West Side of Riva Road Looking North

- There is a large brick wall (and ramp access to the CVS) at the southeast quadrant of the Riva Road/Harry S. Truman Parkway intersection, as shown in Figure 8

Figure 8: Brick Wall at Riva Road/Harry S. Truman Parkway, Looking South

- Figure 9 shows the existing utility poles and topography constraints at the northwest quadrant of the Riva Road/Harry S. Truman Parkway intersection

Figure 9: Existing Poles and Topography – Riva Road/Harry S. Truman Parkway, West Side of Riva Road Looking South

- North of the ramp entrance to the Truman Park and Ride on the west side of Riva Road, there is a raised 3' x 5' utility vault (Figure 10) which may require adjustment – there is also another utility vault adjacent to a curb ramp at Hearne Road, at the northern end of the study area

Figure 10: Raised Utility Vault North of the Park and Ride Entrance, West Side of Riva Road Looking North

- On the east side of Riva Road approaching the MD 665 interchange, Figure 11 shows the 6'-6" of available width from existing back of curb to guardrail at the parking lot

Figure 11: Existing Sidewalk Width Constraint Approaching MD 665, East Side of Riva Road Looking North

- There are detectable surfaces on the curb ramps to cross all MD 665 ramps and some have marked crosswalks, but there are no pedestrian signals present (Figure 12)

Figure 12: MD 665 Ramp Crossings (Typical)

- As shown in Figure 13, there is a potential sight distance issue for vehicles exiting MD 665 to northbound Riva Road On the east side of Riva Road

Figure 13: Potential Sight Distance Issue for MD 665 Ramp, Looking East

- At the southeast quadrant of the Riva Road/Hearne Road intersection, Figure 14 shows a potential truck turning radii issue that exists from northbound Riva Road with larger vehicles traveling over the curb to navigate the turn

Figure 14: Potential Turning Radii Issue at Riva Road/Hearne Road, Looking West across Riva Road

- Two significant trees are located on the east side of Riva Road with the existing sidewalk alignment in between, just north of Hearne Road, as shown in Figure 15

Figure 15: Significant Trees North of Hearne Road, East Side of Riva Road Looking North

Section 3: Alternatives Analysis

Section 3.1: No-Build Scenario

As part of the Riva Road Trail Corridor Study Concept Design, a No-Build Scenario was considered. If the No-Build Scenario is pursued, undesirable and inadequate conditions for bicyclists will continue to exist along Riva Road in the study area due to the lack of bicycle infrastructure and no connection will be made to the existing trail/shared use paths at Parole Town Center to provide a more complete trail network in Anne Arundel County. Additionally, the issues presented in the Existing Conditions section would not be addressed – namely the lack of pedestrian signals at the MD 665 ramp crossings.

Section 3.2: Design Parameters and Criteria

Design parameters and criteria for the development of a potential trail along both sides of Riva Road were established using County requirements and project team feedback, along with design policies from the National Association of City Transportation Officials (NACTO), the American Association of State Highway and Transportation Officials (AASHTO), the Maryland Department of Transportation State Highway Administration (MDOT SHA), and the Federal Highway Administration (FHWA). It should also be noted that available GIS data collected as part of the base mapping process and spot field measurements were used as a concept-level screening tool and no detailed survey information was obtained for this study.

The following list summarizes the information used to guide the concept design for the two trail alternatives, one each on the east side and west side of Riva Road:

- Anne Arundel County preference for asphalt trail instead of concrete – for trail construction, the existing concrete sidewalk along Riva Road will be removed
- All curb ramps will be concrete and constructed to meet ADA standards, including detectable warning surfaces
- At this planning-level stage, assume utility poles will be impacted when designing the west side trail – once actual survey information is obtained, the alignment can be refined in a future design phase
- County prefers a 2’ grass buffer to be provided along the entire corridor to physically separate all trail users from Riva Road and reduce conflicts between non-motorized and motorized traffic while providing additional user safety and comfort
- NACTO and AASHTO guidelines (*AASHTO Bicycle Facilities Guide*) were consulted regarding width requirements for shared-use paths; 10' width is recommended and 8' width is acceptable for low usage and in areas where maintenance vehicles aren't anticipated. After discussion with the County, it was determined that an 8’ trail width would be proposed along the corridor along with the 2’ grass buffer to minimize impacts. In the vicinity of the MD 655 interchange, the island will remain concrete and a 10’ trail width will be proposed to promote easier passing and accommodate a greater volume of users in a high traffic area.

- Per NACTO and ADA shared use path guidelines, a maximum 2% cross slope is proposed for the trail
- 10' wide painted crosswalks will be proposed at all signed roadway crossings; per approved MDOT SHA standards, the continental crosswalk style will be used
- For areas along the trail where retaining walls are proposed, a 10' wide trail will be shown to provide extra space for trail users
- As pedestrian signals in the corridor are not consistent in type or function, it is assumed that all pedestrian signals will be upgraded with Accessible Pedestrian Signal (APS) units with audible signals and countdown displays at all crossing locations for consistency and safety along the corridor
- The trail will not preclude providing ADA connectivity to existing pedestrian/bicycle infrastructure or to side streets or specific properties along Riva Road
- For maintenance, including snow operations – the proposed trail concept is an off-road facility that is wide enough to be serviced by small equipment

Section 3.3: Concept Overview – West Side Trail

On the west side of Riva Road, existing 5' sidewalk is present in the entire study area from Speicher Drive to Forest Drive and the proposed trail will replace the existing sidewalk. The exact terminus for the west side trail at the southern end of the study area will be refined in future stages of design, but at this phase, the concept shows accommodations for bicycles by tying into the existing marked bicycle lane located on the southbound shoulder of Riva Road, south of Speicher Drive. The west side trail concept plan for Riva Road is shown in Appendix A.

The proposed typical section used to design the trail along the west side of Riva Road (as discussed in the *Design Parameters and Criteria* section above) is shown in Figure 16. The pavement section is based on previous County trail projects. Shown on the concept plan, the proposed right-of-way line, shown where necessary, is one foot behind the new trail construction, with a 4' Limit of Disturbance (LOD) during construction. Refer to *Section 6 - Right-of-Way and Property Impacts* for more detail.

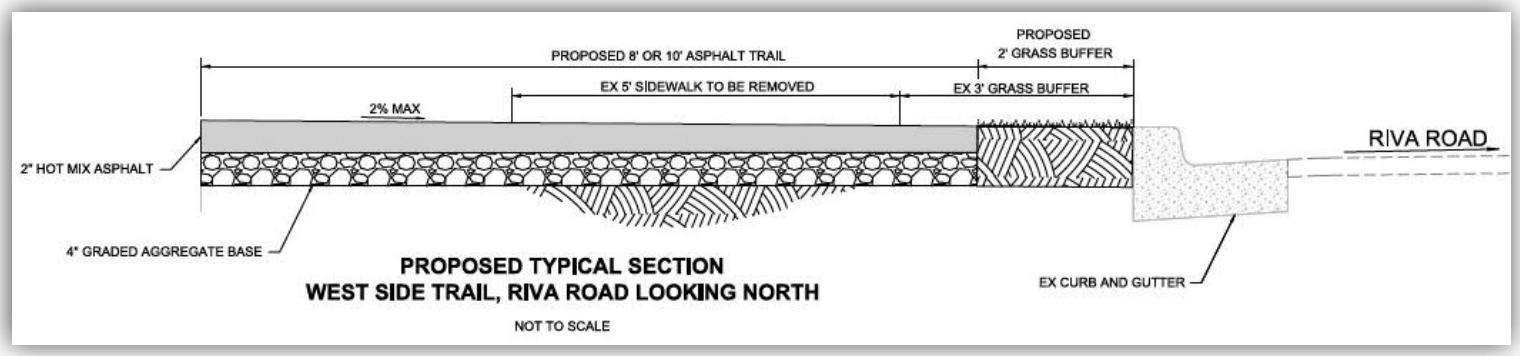

Figure 16: Proposed Typical Section – West Side Trail

As shown on the concept plan, ADA-compliant ramps (including detectable warning surfaces) are proposed at all commercial and signed street crossings along the west side of Riva Road. Marked

10' wide crosswalks are proposed at all signed street crossings to coincide with the new proposed trail in order to provide a safe, continuously marked path along Riva Road to/from Speicher Drive and Forest Drive.

As mentioned in the *Existing Conditions* section, the west side of Riva Road between Fred Stauffer Lane and the Board of Education (approximately Station 111+00 to Station 126+00) has several drainage swales on County property that may require adjustments and/or potential retaining walls that are shown on the concept plan. Additionally, the west side of Riva Road contains numerous utility poles that are located approximately 8' from the back of curb, which will be impacted by the proposed trail alignment. In general, the availability of County property on the west side of Riva Road, south of Harry S. Truman Parkway, would reduce the right-of-way costs associated with constructing a trail and relocating utility poles in this area (compared to the east side trail option).

A trail is feasible on the west side of Riva Road through the vicinity of the MD 665 overpass (approximately Station 150+50 to Station 153+50), but there is less available width (pinch point) under the overpass compared to the east side of Riva Road and the bridge abutment restricts sight lines. On all crossings of the MD 665 ramps, warrants for pedestrian signals should be investigated.

Access management improvements (such as driveway consolidation or relocation) on the west side of Riva Road could potentially be implemented by the County to enhance the comfort and safety of trail users if deemed beneficial and accepted by adjacent property owners. In future stages of design, this can be re-examined should funds be available, if specific community or traffic-related concerns are present, or as properties are redeveloped.

Section 3.4: Concept Overview – East Side Trail

On the east side of Riva Road, existing 5' sidewalk is present in the entire study area from Speicher Drive to Forest Drive, except for a segment south of Admiral Cochrane Drive (located at the 2555 Riva Road parcel) and a segment just north of MD 655 at the 2521 Riva Road shopping center, and the proposed trail will replace the existing sidewalk. The exact terminus for the east side trail at the southern end of the study area will be refined in future stages of design, but at this phase, the concept shows accommodations for bicycles by tying into the northbound shoulder of Riva Road, south of Speicher Drive, where an existing marked bicycle lane is present.

A future County sidewalk project is planned to construct sidewalk on the east side of Riva Road up to Speicher Drive – the proposed trail could tie into this sidewalk when constructed, but the concept plan currently shows a tie-in to the existing shoulder of Riva Road. The east side trail concept plan for Riva Road is shown in Appendix A.

The proposed typical section used to design the trail along the east side of Riva Road (as discussed in the *Design Parameters and Criteria* section above) is shown in Figure 17. The pavement section is based on previous County trail projects. Shown on the concept plan, the proposed right-of-way line, shown where necessary, is one foot behind the new trail, with a 4' Limit of Disturbance (LOD) for construction. Refer to *Section 6 - Right-of-Way and Property Impacts* for more detail.

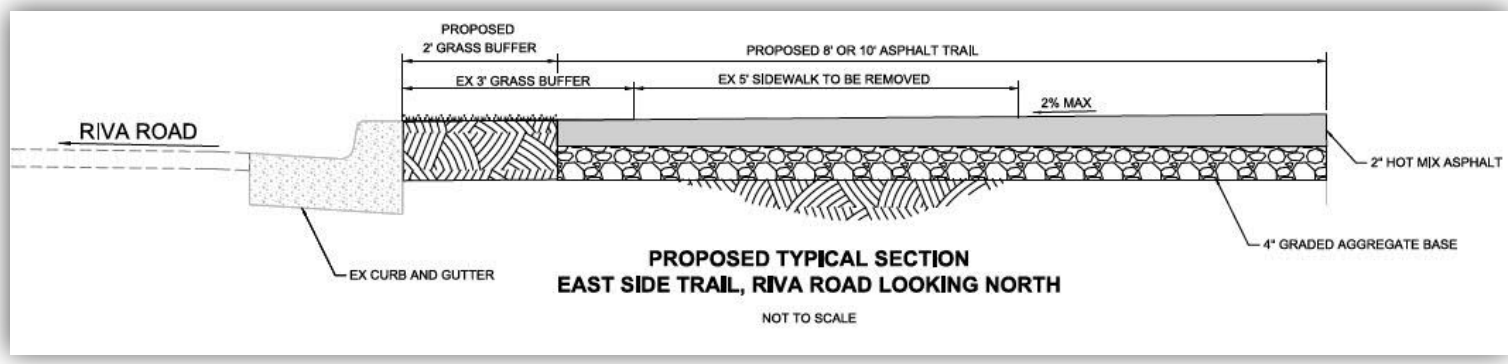

Figure 17: Proposed Typical Section – East Side Trail

As shown on the concept plan, ADA-compliant ramps (including detectable warning surfaces) are proposed at all commercial and signed street crossings along the east side of Riva Road. Marked 10' wide crosswalks are proposed at all signed street crossings to coincide with the new proposed trail in order to provide a safe, continuously marked path along Riva Road to/from Speicher Drive and Forest Drive.

As mentioned in the *Existing Conditions* section, there is a stream crossing just north of Marquise Lane (approximately Station 109+75 to 110+75) that has an existing 3' wide sidewalk. For this trail concept, a bridge structure is shown adjacent to the existing guardrail that provides a wider crossing at this location. Per County structures standards, the bridge structure is 12' wide, with 2' wide parapets on either side of the bridge (total of 16' wide). Where necessary due to site topography, potential retaining walls are shown on the concept plan, along with associated right-of-way impacts.

The segment on the east side of the Riva Road, south of Admiral Cochrane Drive, that is planned for a future 10' wide developer-constructed trail along the parcel frontage (approximately Station 138+00 to 142+50) is noted on the concept plan. The proposed trail would tie into this project at both ends.

The commercial center located at 2525 Riva Road (approximately Station 148+00 to 151+00), just south of the MD 665 interchange, may require a potential parking lot configuration (i.e. angled spaces or one-way traffic flow) due to constrained right-of-way for the trail alignment at this location.

In the vicinity of the MD 665 overpass (approximately Station 151+50 to Station 154+50), a trail on the east side of Riva Road is feasible and preferred to an alignment in this area on the west side of Riva Road. On all crossings of the MD 665 ramps, warrants for pedestrian signals should be investigated. At approximately Station 154+25, a potential sight distance issue exists for vehicles exiting MD 665 to northbound Riva Road. To help mitigate the potential sight distance issue, the proposed crossings are aligned to be adjacent to Riva Road – additional measures such as advance warning signs or other traffic control can be considered during future stages of design.
North of MD 655 at the 2521 Riva Road shopping center (approximately Station 156+50 to Station 158+50), the trail will be constructed in an area that does not currently have sidewalk. Removal of existing parallel parking spaces at the shopping center will likely be necessary.

There are two significant trees present on the east side of Riva Road, north of Hearne Road (approximately Station 162+00). The concept is shown with the trail alignment angled between the two trees to follow the existing sidewalk alignment. More detailed design and potential construction methods to preserve them (such as use of an air spade), will be necessary in future stages once detailed survey information is obtained.

Access management improvements (such as driveway consolidation or relocation) on the east side of Riva Road could potentially be implemented by the County to enhance the comfort and safety of trail users if deemed beneficial and accepted by adjacent property owners. In future stages of design, this can be re-examined should funds be available, if specific community or traffic-related concerns are present, or as properties are redeveloped.

Section 3.5: Potential Crossing Locations of Riva Road

Although two alternative concept plans were developed for this study on each side of Riva Road, the trail must cross Riva Road at a signalized intersection to connect to the existing trail/shared use paths at Parole Town Center. While it is outside of the scope of this study to develop an end-to-end trail alignment on varying sides of Riva Road that includes a crossing location, the potential crossing locations of Riva Road were evaluated.

AECOM coordinated with the County and MDOT SHA to obtain peak traffic volumes and the most recent three years of available crash data (2017-2019) at intersections in the study area. Table 1 presents the crash data and traffic volume analysis for Riva Road intersections in the study area.

Table 1: Crash Data (2017-2019) and Traffic Volume Analysis

	Riva Road Intersections										
	Speicher Dr	Marquise Ln	Heritage Entrance	Bausum Rd	Board of Education	Harry S Truman Pkwy	Park and Ride Entrance	Admiral Cochrane Dr	MD 655	Hearne Rd	Forest Dr
Fatal Crashes	0	0	0	0	0	0	0	0	0	0	0
Injury Crashes	4	1	3	0	0	8	1	5	19	0	6
Property Damage Only Crashes	6	3	5	2	1	13	3	11	19	5	8
Total Crashes	10	4	8	2	1	21	4	16	38	5	14
Pedestrian Involved Crashes	0	0	0	0	0	1	0	0	0	0	3
Peak Volume (all PM)	1,859	2,049	2,276	No Count	3,423	3,737	No Count	3,635	4,041	2,543	2,749
% Turns	6.13%	11.71%	13.66%	No Count	7.10%	42.23%	No Count	19.86%	74.93%	33.46%	38.49%

Three signalized crossings on Riva Road were initially discussed with the County as having the most desirable characteristics for a crossing – Admiral Cochrane Drive, Harry S. Truman Parkway, and the Board of Education entrance. The Admiral Cochrane Drive intersection has potential for a pedestrian refuge island on the south side of the intersection, but was removed from consideration due to the fact that the Dunkin' Donuts site presents vehicular access challenges during peak hours and that the location may not generally by the best location to encourage significant trail crossings due to those challenges.

The following summary includes general observations and information presented in Table 1 for the remaining two signalized intersections deemed desirable. It should be noted that traffic volumes and percent turns were considered as part of this evaluation due to conflicts between pedestrians and bicyclists and turning vehicles.

Riva Road at Harry S. Truman Parkway

- The Harry S. Truman Parkway intersection was identified in the *Parole Mobility Study* as the recommended crossing location, with a shared-use path continuing on the east side of Harry S. Truman Parkway to the Truman Park and Ride; this is also consistent with the discussion included in the County *Pedestrian and Bicycle Master Plan*
- This location provides a crossing at the Farmer's Market site, which is a key origin/destination in the study area
- Added level of pedestrian and bicyclist safety while crossing due to the split phase signal for Harry S. Truman Parkway
- Existing crosswalk lengths on either side of the intersection are approximately 85' and 90'
- 3,737 vehicles at the intersection in the PM peak with 42% turns
- 21 total crashes reported from 2017-2019, including one pedestrian-involved crash

Riva Road at Board of Education

- Not an origin/destination in the study area
- Existing crosswalk length at the intersection is approximately 70'
- 3,423 vehicles at the intersection in the PM peak, with 7% turns
- Overall, there are a lower number of operational conflicts, slightly lower traffic volumes, and less historical crashes associated with a crossing at this location; however, this intersection crossing location does not provide the access benefits that a crossing at Harry S. Truman Parkway provides

In future stages of design, potential consideration could be given to raise awareness for both bicyclists and motorists at the chosen crossing location of Riva Road with enhancements such as wider/high visibility pavement markings, colored pavement markings, faux stamped concrete, or other enhancements as deemed appropriate by the County's Traffic Engineering Division.

Section 3.6: Feasibility of On-Road Bike Lanes

As part of the Riva Road Trail Corridor Study, on-road bike lanes were considered at a high level, but the primary focus is on the west and east side trail alignments due to feasibility, impacts, and costs. The *Parole Mobility Study* determined that Riva Road is at or over capacity, so a trail/shared-use path was recommended rather than on-road bike lanes. There is not enough curb-to-curb width available on Riva Road for low stress on-road bike lanes without roadway widening.

On-road bike lanes would be required in each direction of Riva Road, as bikes travel in the same direction of traffic while riding in the roadway with vehicles. The AASHTO *Guide for the Development of Bicycle Facilities* states that a shoulder width of at least 5' is recommended from the face of curb and for the purpose of this conceptual study, 6' wide bike lanes were evaluated on both sides of Riva Road to meet MDOT SHA standards. No available shoulder space exists along on Riva Road in the study area.

Based on the 2017 *MDOT SHA Cost Estimating Manual*, a high range cost per mile estimate of roadway widening for two 6' bike lanes on a minor arterial is $7.4 million per mile, along with $100,000 per mile for roadway milling and resurfacing. No planning level contingency is included in the cost per mile estimate and a 40% contingency is recommended. As such, the resulting estimated cost of two 6' on-road bike lanes for the approximately 1.2-mile long Riva Road Trail Corridor Study is $12.6 million ($9 million + $3.6 million contingency). It should be noted that impacts related to parcel right-of-way, utilities, and probable on-site/off-site stormwater management/drainage are not included in this estimate. These elements, along with other potential considerations, would add substantial costs to the project and would be determined in later stages of design if on-road bike lanes were to be considered. However, at this time, on-road bike lanes are not recommended to be carried forward as an alternative.

Section 4: Drainage and Stormwater Management

AECOM developed a storm drain and stormwater management (SWM) concept plan associated with the proposed trail improvements shown on the concept plans in Appendix A for the purposes of identifying potential impacts and developing construction cost estimates. For this concept study, the SWM facilities could be interchangeably included with the trail alignment on the west side or east side of Riva Road.

Section 4.1: Existing Conditions and Methodology

The existing storm drain systems along Riva Road, between Speicher Drive and Forest Drive, consist of mostly grate inlets and a few curb inlets near intersections and at low points along the roadway. Stormwater runoff collected by these systems is conveyed south, toward the South River. The storm drain concept study was conducted per the *Anne Arundel County Design Manual, Chapter V – Storm Drains*.

There are various existing grass lined swales along the west (southbound traffic) side of Riva Road. A stormwater management concept study was conducted as per the Anne Arundel County Stormwater Management Practices and Procedures Manual, in accordance with Maryland Stormwater Management Regulations, COMAR 26.17.02, Stormwater Management Act of 2007, to determine how Environmental Site Design (ESD) can be implemented to the Maximum Extent Practicable (MEP).

Section 4.2: Proposed Storm Drain System

The removal of the 5' existing sidewalk and addition of 8'-10' trail will result in only a small amount of additional curb and gutter at the southern end of the project site. It is assumed that the existing storm drain system is adequately sized to handle the flow from the new trail. It is not anticipated that any new inlets will be needed along the roadway. Spread calculations will be performed at a future stage in the design process to confirm this. Standard Yard inlets will need to be added at the locations of proposed SWM facilities. The new inlets will connect directly to existing storm drain systems.

Further analysis is required to ensure correct placement of the proposed inlets and that the existing pipe sizes are adequate to convey the additional stormwater runoff from the trail. The trail adds a relatively small amount of impervious area to the site and the runoff volume increases should be manageable.

On the east (northbound traffic) side of Riva Road, there is a localized ponding area at the Riva Road/Speicher Drive northeast quadrant curb ramp (noted on the concept plan). This can be addressed with regrading/reconstruction of the concrete gutter and wedge and level pavement resurfacing to provide positive drainage. Further study will also identify any additional existing "problem" areas along Riva Road where water ponding exists. Grading and pavement reconstruction will be used to eliminate these ponding areas.

Section 4.3: Proposed Stormwater Management

The construction of the trail along Riva Road and removal of existing sidewalk between Speicher Drive and Forest Drive would result in approximately 0.5 acres of new impervious area and one acre of redeveloped area. For concept design, approximate drainage areas were mapped and the MDE stormwater management calculator, condensed spreadsheet, was used to calculate the amount of water quality treatment required. Nine areas along Riva Road (predominately on the west side) were identified as potential ESD facility locations, shown cumulatively below in Figure 18.

Figure 18: Potential ESD Facility Locations

After some study, it was determined that Areas 3 and 4 were most desirable. The advantages of these location are:

- Located within County owned right-of-way (ROW), so additional ROW acquisition would not be required
- One bio-swale at either of these locations would provide approximately one-third of the water quality requirements for the project
- Located within an area where construction will already be occurring
- Proximity to the proposed storm drain system, making outfall tie-in easier
- Proximity to Riva Road for maintenance

Areas 1 and 7 were the second most desirable. The advantages of these locations are:

- Provides a reasonable amount of water quality treatment
- Located within an area where construction will already be occurring
- Proximity to Riva Road for maintenance

The disadvantages of these location are:

- Area 1 and Area 7 are located within privately-owned land
- Area 7 would require a fair amount of tree removal and regrading

During final design, other potential stormwater management options may be considered, such as water quality inlets (i.e., Filterra), and permeable concrete pavement sidewalk (as a last resort).

To meet quality requirements, the Impervious Area Requiring Treatment (IART) for the entire site must be met. The goal of the project is to treat a minimum of 90% of the required Environmental Site Design Volume (ESDv) to the MEP. Each sub-watershed within the project area will provide treatment of the first inch of rainfall in order to satisfy the water quality requirements. Quality requirements for the site can be met with the installation of two or three bio-swales. Due to limited right-of-way, it would be impractical to construct an ESD facility in each drainage area; therefore, variances will need to be applied for during final design.

According to the *Anne Arundel County Stormwater Management Practices and Procedures Manual*, overbank flood protection may be required, depending on whether the site discharges to a location that is deemed to have an inadequate outfall. We anticipate there to be a slight increase in runoff volumes, but less than 10% of the existing. In this case, under Section 7.2.2 C-h, downstream analysis would not be required, and the outfall is deemed to be adequate. Due to limited right-of-way, it may be impractical to construct quantity control facilities in each drainage area, though this may be addressed further in later phases of design.

Section 5: Utilities

Section 5.1: Existing Utilities

The following utilities were identified along Riva Road through County GIS mapping and/or site visits and included on the concept plans:

- BGE Poles with aerial electric and telecommunications
  - Most poles are located on the west side of Riva Road
  - Most poles also have lighting
  - Some poles have guy wires
- Fire hydrants
- Water mains
- Sanitary sewer lines
- Storm drainage systems

Gas and County fiber facilities were seen during the site visit but were not available through County GIS mapping and are not shown on the concept plans.

Section 5.2: Potential Utility Impacts

As mentioned in *Section 3.3*, the west side of Riva Road contains numerous utility poles that are located approximately 8' from the back of curb, which will be impacted by the proposed trail alignment on that side of the roadway. There will also be numerous fire hydrant relocations necessary to accommodate the proposed trail alignments on either side of Riva Road.

No roadway widening is recommended as part of this study, so major impacts to the storm drain system are not anticipated. Proposed ESD facilities will outfall into a storm drain inlet, which will tie into the existing or proposed storm drain system. This storm drain pipe will be adjusted to avoid conflict with any existing utilities to the extent possible. The ESD facility itself will not be placed over any utilities.

Specific utility impacts will be determined in future stages of design when detailed survey data is available.

Section 6: Right-of-Way and Property Impacts

Existing right-of-way and parcel lines shown on the concept plans are based on County GIS mapping; therefore, impacts identified in this study are approximate and subject to change during plat development. For both trail concepts, the proposed right-of-way line is set one foot behind the proposed trail and is shown (in red) on the concept plans in Appendix A, in areas where right-of-way impacts are anticipated. An approximate Limit of Disturbance (LOD) line (in purple) is shown five-feet beyond the proposed sidewalk to indicate areas of potential property impacts to allow a work zone, grading, and driveway tie-ins. The construction grading area beyond the proposed (or existing) right-of-way out to the LOD would be in a Temporary Construction Easement (TCE) which is not shown. Specific, quantified impacts to fences, trees, driveways, and other property features within the proposed LOD will be determined after topographic surveys and final design is complete.

The following is a summary of property right-of-way impacts based on the two concept plans – these properties would also require a TCE. These impacts do not account for right-of-way impacts associated with the SWM concept described in *Section 4.3* or easements for utility relocations.

West side trail:

- County impacts: 5,858 square feet (5 parcels)
- MDOT SHA impacts: 456 square feet (1 parcel)
- Private property impacts: none
- Commercial impacts: 2,279 square feet (9 parcels)

East side trail:

- County impacts: none
- MDOT SHA impacts: 108 square feet (1 parcel)
- Private property impacts: none
- Commercial impacts: 16,497 square feet (11 parcels)

The information below summarizes the additional right-of-way impacts associated with the proposed SWM facilities (located predominately on the west side of Riva Road), which are interchangeable between the two trail concepts:

- County impacts: 19,667 square feet (2 parcels)
- MDOT SHA impacts: 1,210 square feet (1 parcel)
- Private property impacts: 2,104 square feet (3 parcels)
- Commercial impacts: 9,816 square feet (4 parcels)

It should be noted that, for cost estimating purposes in the next section, only right-of-way impacts to private and commercial property will be included.

Section 7: Cost Estimating

Section 7.1: Methodology and Assumptions

The construction cost estimates were developed using the "major quantity" method of estimating as outlined in the *Maryland Department of Transportation State Highway Administration Highway (MDOT SHA) Construction Cost Estimating Manual*. The costs for Category 1 (Preliminary) and Category 7 (Landscaping) were generated by calculating 50% and 12%, respectively, of the costs of Categories 2 (Grading), 5 (Paving), and 6 (Shoulders). Unit costs for individual line items were determined using *AASHTOWare Project Estimator* software and the *MDOT SHA Price Index*. The cost for traffic signals and pedestrian signals were determined using the *MDOT SHA Construction Cost Estimating Manual*. It was assumed that all traffic signals would be considered "half intersection" reconstructions due to the trail construction impacts and that Accessible Pedestrian Signal (APS) units at each crosswalk would be included in the cost of the traffic signal reconstruction, where applicable. Bus shelters within 10' of the existing curb are assumed to be relocated due to the trail construction. All curb ramps, including detectable warning surfaces, within the project limits are assumed to be reconstructed. An overall contingency of 40% has been added to the construction cost for the total, combined project based on the concept-level of design and size of the project. Right-of-way costs have been added to the construction cost estimates, based on a unit price of $20 per square foot (per County guidance). For cost estimating purposes, only right-of-way costs associated with impacts to private and commercial property are included in the costs – County and State property impacts are not included. Right-of-way impacts associated with SWM improvements are also included in the estimates. An additional 10% was added for Temporary Construction Easement costs.

Section 7.2: Cost Estimates

The estimated total construction cost for the trail on the west side of Riva Road as shown on the concept plan is $5,613,911. The estimated total construction cost for the trail on the east side of Riva Road as shown on the concept plan is $4,958,190. These estimates include right-of-way costs (for trail construction and associated stormwater management), estimated utility impact/relocation costs, and engineering costs.

For comparison purposes, the summary information for the two cost estimates is shown below, based on the category headings from the *MDOT SHA Construction Cost Estimating Manual*, and includes the additional costs noted above.

Cost Estimate Summary – West Side Trail:

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$256,221
2	GRADING	$173,922
3	DRAINAGE	$1,042,160
4	STRUCTURES	$44,882
5	PAVING	$155,400
6	SHOULDERS	$183,120
7	LANDSCAPING	$61,496
8	TRAFFIC	$607,600
9	UTILITIES	$1,547,700
	TOTAL CONSTRUCTION PROJECT COST	$4,072,501
	RIGHT OF WAY - 10 PARCELS IMPACTED. APPROX. 2,607 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$57,354
	SWM RIGHT OF WAY - 7 PARCELS IMPACTED. APPROX. 11,920 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$262,306
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$1,221,750
	TOTAL COST	$5,613,911

Cost Estimate Summary – East Side Trail:

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$218,152
2	GRADING	$98,168
3	DRAINAGE	$1,042,160
4	STRUCTURES	$342,524
5	PAVING	$157,805
6	SHOULDERS	$178,080
7	LANDSCAPING	$52,360
8	TRAFFIC	$1,030,400
9	UTILITIES	$247,100
	TOTAL CONSTRUCTION PROJECT COST	$3,366,749
	RIGHT OF WAY - 11 PARCELS IMPACTED. APPROX. 14,505 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$319,110
	SWM RIGHT OF WAY - 7 PARCELS IMPACTED. APPROX. 11,920 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$262,306
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$1,010,025
	TOTAL COST	$4,958,190

Additionally, breakout segments were determined based on the location of significant intersections along Riva Road in the study area. Each of the segments could be a stand-alone project which would not preclude any future improvements to adjacent sections of Riva Road. Each breakout cost estimate is shown below, along with the total cost.

West Side Trail (Riva Road Southbound Traffic)

- Riva Road – Speicher Drive to Fred Stauffer Lane: $547,455
- Riva Road – Fred Stauffer Lane to Harry S. Truman Parkway: $2,124,703
- Riva Road – Harry S. Truman Parkway to Admiral Cochrane Drive: $1,186,603
- Riva Road – Admiral Cochrane Drive to MD 665: $610,018
- Riva Road – MD 665 to Hearne Road: $591,933
- Riva Road – Hearne Road to Holiday Court/Forest Drive: $553,199
- TOTAL – WEST SIDE TRAIL: $5,613,911

East Side Trail (Riva Road Northbound Traffic)

- Riva Road – Speicher Drive to Marquise Lane $619,339
- Riva Road – Marquise Lane to Bausum Road $1,076,628
- Riva Road – Bausum Road to Harry S. Truman Parkway: $1,027,754
- Riva Road – Harry S. Truman Parkway to Admiral Cochrane Drive: $1,169,087
- Riva Road – Admiral Cochrane Drive to MD 665: $558,434
- Riva Road – MD 665 to Hearne Road: $321,746
- Riva Road – Hearne Road to Forest Drive: $185,202
- TOTAL – EAST SIDE TRAIL: $4,958,190

The construction cost estimates for the west side trail segments are included in Appendix B and the construction cost estimates for the east side trail segments are included in Appendix C.

Section 8: Summary and Moving Forward

The primary goal of the Riva Road Trail Corridor Study is to develop potential improvement concepts and cost estimates of a trail on either side of Riva Road from Speicher Drive/Annapolis High School to Forest Drive that the County can carry forward through final design in order to provide a more complete trail network in Anne Arundel County.

The concept plans show the feasibility of a trail on either the west side or east side of Riva Road and the proposed improvements include upgraded pedestrian signals, ADA-compliant ramps, and marked crosswalks. Potential trail crossing locations along Riva Road were evaluated at existing signalized intersections and narrowed down to the intersections of Harry S. Truman Parkway and the Board of Education. A drainage and stormwater management concept plan associated with the proposed trail improvements on Riva Road was developed and potential right-of-way and property impacts were examined.

The overall construction cost estimate (including right-of-way, utilities, and engineering costs) is approximately $5.61M for a trail on the west side of Riva Road and $4.96M for a trail on the east side of Riva Road.

Following County review of this report, there will be public outreach efforts to present the findings to the public and obtain their input.

Moving forward to final design, the following is a non-exhaustive list of items that will require consideration:

- Survey data required; GIS data used for the conceptual study in this report
- Limits of impacts (i.e. utility relocations, fence relocations, tree removal, etc.) associated with a new trail along Riva Road to be determined
- Utility mapping and designations should be performed and then during design, test pits may be recommended; later stages of design will include a thorough review of utility documents to confirm where manholes, utilities, etc. are located
- Regarding a 10’ wide versus an 8’ wide trail, obtaining a MDOT SHA waiver may be necessary if Federal funding is being used for construction – this is beyond the scope of the concept study
- Although County preference is for an asphalt trail, potential for using concrete instead can be considered during a future design phase, along with widening existing sidewalk instead of removal
- The exact terminus at the southern end of the study area to be refined in future stages; current concept shows accommodations for bicycles, tying into existing marked bicycle lanes on the shoulder of Riva Road south of the study area
- Potential consideration for roadside sign placement to be determined in future design phases, in coordination with the County Traffic Engineering Division – may include a 4' wide minimum grass buffer for signage, potential bump-outs to increase grass buffer

width in areas where signs are located, or relocating signs to the far side of the trail (approximately 12' from the existing Riva Road curb)

- It may be possible to use an elevated boardwalk or other structure at some of the most extremely constrained locations in the corridor, if related to grade issues (i.e. the stream crossing identified at the southern end of the study area for the east side trail concept)
- Future consideration for utility pole impacts may include relocating the poles (as assumed in this study) or leaving the poles in place within the trail, wrapping in cushioned reflective decals, and requesting an exception
- Driveway ramp reconstruction and grading/drainage tie-in aspects to be determined in the next phase of design
- Potential for additional/enhanced crosswalk treatments such as stamped brick, etc. to enhance visibility at key locations (i.e. through the MD 655 interchange)
- Future stages of design could consider extending other spur connections to generators of potential trail users, such as the high school, government complex, and multi-use "live/work" developments
- Future stages of design could consider implementing potential commercial property access management measures on the west or east side of Riva Road, depending on the trail alignment, based on any specific public or traffic-related concerns
- Permits
  - MDOT SHA Access Management Permit for work at MD 665
  - Forest Conservation Act requirements – As a linear project for a County road, an exemption may be possible for Riva Road since the trail improvements will not result in the cumulative cutting, clearing, or grading of more than 20,000 square feet of forest. Any individual trees that are impacted may need to be mitigated with new tree plantings within the corridor.
  - Grading
  - Soil Conservation District for erosion and sediment control
  - Stormwater Management
  - Maryland Department of the Environment (MDE) – Notice of Intent

ANNE ARUNDEL COUNTY
MARYLAND

Appendix A:
Concept Plans

DRAFT

LEGEND

- PROPOSED TRAIL
- PROPOSED GRASS BUFFER
- PROPOSED ADA COMPATIBLE RAMP
- PROPOSED TRAIL ROW
- ASSUMED TRAIL LOD
- POTENTIAL RETAINING WALL
- PARCEL LINES
- WATER LINE
- SEWER LINE
- STORM WATER LINE
- OPEN WATER
- INLET
- SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- FENCE
- YELLOW ROUTE BUS STOP
- LIGHT POLE
- SIGN POST
- UTILITY POLE
- SIGNALIZED INTERSECTION
- PED SIGNAL
- SIGNAL POLE
- SIGNAL CONTROL CABINET
- TRAFFIC BARRIER
- WOOD FENCE

SCALE: 1"=40'

ANNE ARUNDEL COUNTY MARYLAND

AECOM

Riva Road Trail Corridor Study
Concept Plan - West Side Trail

Project No: H508425

May 2021

DRAFT

LEGEND

- PROPOSED TRAIL
- PROPOSED GRASS BUFFER
- PROPOSED ADA COMPATIBLE RAMP
- PROPOSED TRAIL ROW
- ASSUMED TRAIL LOD
- POTENTIAL RETAINING WALL
- PARCEL LINES
- WATER LINE
- SEWER LINE
- STORM WATER LINE
- OPEN WATER
- INLET
- SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- FENCE
- YELLOW ROUTE BUS STOP
- LIGHT POLE
- SIGN POST
- UTILITY POLE
- SIGNALIZED INTERSECTION
- PED SIGNAL
- SIGNAL POLE
- SIGNAL CONTROL CABINET
- TRAFFIC BARRIER
- WOOD FENCE

SCALE: 1"=40'

ANNE ARUNDEL COUNTY MARYLAND

AECOM

Riva Road Trail Corridor Study
Concept Plan - East Side Trail

Project No: H508425

May 2021

ANNE ARUNDEL COUNTY
MARYLAND

Appendix B:
Cost Estimates – West Side Trail

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - SPEICHER DR TO FRED STAUFFER LN**	**PRJ LENGTH:**	**0.07 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 10,047.50	$10,048
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,019
SUBTOTAL CATEGORY 1 COST					$14,067

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	120	CY	$ 75.00	$9,000
2002	COMMON BORROW	3	CY	$ 40.00	$120
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,648
SUBTOTAL CATEGORY 2 COST					$12,768

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	385	LF	$ 200.00	$77,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	149	LF	$ 200.00	$29,800
3003	STANDARD YARD INLET - MINMUM DEPTH	2	EA	$ 10,000.00	$20,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$58,720
SUBTOTAL CATEGORY 3 COST					$205,520

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	35	TON	$ 125.00	$4,375
5002	4 INCH GRADED AGGREGATE BASE COURSE	300	SY	$ 10.00	$3,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$2,950
SUBTOTAL CATEGORY 5 COST					$10,325

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	2	EA	$ 1,800.00	$3,600
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$1,440
SUBTOTAL CATEGORY 6 COST					$5,040

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 2,411.40	$2,411
CONTINGENCY			40%		$965
SUBTOTAL CATEGORY 7 COST					$3,376

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	PED POLE RELOCATION	3	EA	$ 2,000.00	$6,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$2,400
SUBTOTAL CATEGORY 8 COST					$8,400

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	UTILITY POLE RELOCATION	3	EA	$ 30,000.00	$90,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$36,000
SUBTOTAL CATEGORY 9 COST					$126,000

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$14,067
2	GRADING	$12,768
3	DRAINAGE	$205,520
4	STRUCTURES	$0
5	PAVING	$10,325
6	SHOULDERS	$5,040
7	LANDSCAPING	$3,376
8	TRAFFIC	$8,400
9	UTILITIES	$126,000
	TOTAL CONSTRUCTION PROJECT COST	**$385,496**
	RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	SWM RIGHT OF WAY - 3 PARCEL IMPACTED. APPROX. 2105 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$46,310
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$115,649
	TOTAL COST	**$547,455**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - FRED STAUFFER LN TO HARRY S. TRUMAN PKWY**	**PRJ LENGTH:**	**0.41 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 64,032.50	$64,033
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$25,613
SUBTOTAL CATEGORY 1 COST					$89,646

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	689	CY	$ 75.00	$51,675
2002	COMMON BORROW	99	CY	$ 40.00	$3,960
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$22,254
SUBTOTAL CATEGORY 2 COST					$77,889

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	1,080	LF	$ 200.00	$216,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	238	LF	$ 200.00	$47,600
3003	STANDARD YARD INLET - MINMUM DEPTH	2	EA	$ 10,000.00	$20,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	5	EA	$ 10,000.00	$50,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$133,440
SUBTOTAL CATEGORY 3 COST					$467,040

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4001	MSE RETAINING WALL	2,181	SF	$ 13.00	$28,353
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$11,342
SUBTOTAL CATEGORY 4 COST					$39,695

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	172	EA	$ 125.00	$21,500
5002	4 INCH GRADED AGGREGATE BASE COURSE	1,933	SY	$ 10.00	$19,330
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$16,332
SUBTOTAL CATEGORY 5 COST					$57,162

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	12	TON	$ 1,800.00	$21,600
6002	BUS SHELTER RELOCATION	1	SY	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,640
SUBTOTAL CATEGORY 6 COST					$44,240

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 15,367.80	$15,368
CONTINGENCY			40%		$6,148
SUBTOTAL CATEGORY 7 COST					$21,516

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	3	EA	$ 65,000.00	$195,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$78,000
SUBTOTAL CATEGORY 8 COST					$273,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	FIRE HYDRANT RELOCATION	2	EA	$ 6,500.00	$13,000
9002	UTILITY POLE RELOCATION	13	EA	$ 30,000.00	$390,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$161,200
SUBTOTAL CATEGORY 9 COST					$564,200

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$89,646
2	GRADING	$77,889
3	DRAINAGE	$467,040
4	STRUCTURES	$39,695
5	PAVING	$57,162
6	SHOULDERS	$44,240
7	LANDSCAPING	$21,516
8	TRAFFIC	$273,000
9	UTILITIES	$564,200
	TOTAL CONSTRUCTION PROJECT COST	**$1,634,387**
	RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$490,316
	TOTAL COST	**$2,124,703**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - HARRY S. TRUMAN PKWY TO ADMIRAL COCHRANE DR**	**PRJ LENGTH:**	**0.25 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2 5, and 6	1	LS	$ 43,985.00	$43,985
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$17,594
SUBTOTAL CATEGORY 1 COST					$61,579

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	432	CY	$ 75.00	$32,400
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,960
SUBTOTAL CATEGORY 2 COST					$45,360

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	825	LF	$ 200.00	$165,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	50	LF	$ 200.00	$10,000
3003	STANDARD YARD INLET - MINMUM DEPTH	1	EA	$ 10,000.00	$10,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$82,000
SUBTOTAL CATEGORY 3 COST					$287,000

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4001	MSE RETAINING WALL	160	SF	$ 13.00	$2,080
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$832
SUBTOTAL CATEGORY 4 COST					$2,912

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	110	TON	$ 125.00	$13,750
5002	4 INCH GRADED AGGREGATE BASE COURSE	942	SY	$ 10.00	$9,420
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$9,268
SUBTOTAL CATEGORY 5 COST					$32,438

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	18	EA	$ 1,800.00	$32,400
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,960
SUBTOTAL CATEGORY 6 COST					$45,360

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 10,556.40	$10,556
CONTINGENCY			40%		$4,223
SUBTOTAL CATEGORY 7 COST					$14,779

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	1	EA	$ 65,000.00	$65,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$26,000
SUBTOTAL CATEGORY 8 COST					$91,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	FIRE HYDRANT RELOCATION	1	EA	$ 6,500.00	$6,500
9002	UTILITY POLE RELOCATION	2	EA	$ 30,000.00	$60,000
9003	LIGHT POLE RELOCATION	4	EA	$ 10,000.00	$40,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$42,600
SUBTOTAL CATEGORY 9 COST					$149,100

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$61,579
2	GRADING	$45,360
3	DRAINAGE	$287,000
4	STRUCTURES	$2,912
5	PAVING	$32,438
6	SHOULDERS	$45,360
7	LANDSCAPING	$14,779
8	TRAFFIC	$91,000
9	UTILITIES	$149,100
	TOTAL CONSTRUCTION PROJECT COST	**$729,528**
	RIGHT OF WAY - 4 PARCELS IMPACTED. APPROX. 1060 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$23,320
	SWM RIGHT OF WAY - 3 PARCELS IMPACTED. APPROX. 9768 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$214,896
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$218,859
	TOTAL COST	**$1,186,603**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - ADMIRAL COCHRANE DR TO MD 665**	**PRJ LENGTH:**	**0.18 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 28,920.00	$28,920
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$11,568
SUBTOTAL CATEGORY 1 COST					$40,488

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	130	CY	$ 75.00	$9,750
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,900
SUBTOTAL CATEGORY 2 COST					$13,650

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 3 COSTS				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 3 COST					$0

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4001	MSE RETAINING WALL	125	SF	$ 13.00	$1,625
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$650
SUBTOTAL CATEGORY 4 COST					$2,275

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	70	TON	$ 125.00	$8,750
5002	4 INCH GRADED AGGREGATE BASE COURSE	594	SY	$ 10.00	$5,940
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$5,876
SUBTOTAL CATEGORY 5 COST					$20,566

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	13	EA	$ 1,800.00	$23,400
6002	BUS SHELTER RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$13,360
SUBTOTAL CATEGORY 6 COST					$46,760

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 6,940.80	$6,941
CONTINGENCY			40%		$2,777
SUBTOTAL CATEGORY 7 COST					$9,718

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	PED POLE	5	EA	$ 2,000.00	$10,000
8002	ADVANCE WARNING BEACON	1	EA	$ 20,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,000
SUBTOTAL CATEGORY 8 COST					$42,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	FIRE HYDRANT RELOCATION	1	EA	$ 6,500.00	$6,500
9002	UTILITY POLE RELOCATION	6	EA	$ 30,000.00	$180,000
9003	LIGHT POLE RELOCATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$82,600
SUBTOTAL CATEGORY 9 COST					$289,100

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$40,488
2	GRADING	$13,650
3	DRAINAGE	$0
4	STRUCTURES	$2,275
5	PAVING	$20,566
6	SHOULDERS	$46,760
7	LANDSCAPING	$9,718
8	TRAFFIC	$42,000
9	UTILITIES	$289,100
	TOTAL CONSTRUCTION PROJECT COST	**$464,557**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 277 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$6,094
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$139,367
	TOTAL COST	**$610,018**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - MD 665 TO HEARNE RD**	**PRJ LENGTH:**	**0.16 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 20,947.50	$20,948
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$8,379
SUBTOTAL CATEGORY 1 COST					$29,327

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	141	CY	$ 75.00	$10,575
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,230
SUBTOTAL CATEGORY 2 COST					$14,805

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	130	LF	$ 200.00	$26,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	65	LF	$ 200.00	$13,000
3003	STANDARD YARD INLET - MINIMUM DEPTH	1	EA	$ 10,000.00	$10,000
3004	SWM FACILITY AS-BUILT CERTIFICAITON	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$23,600
SUBTOTAL CATEGORY 3 COST					$82,600

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
					$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	72	TON	$ 125.00	$9,000
5002	4 INCH GRADED AGGREGATE BASE COURSE	612	SY	$ 10.00	$6,120
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$6,048
SUBTOTAL CATEGORY 5 COST					$21,168

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	9	EA	$ 1,800.00	$16,200
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$6,480
SUBTOTAL CATEGORY 6 COST					$22,680

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 5,027.40	$5,027
CONTINGENCY			40%		$2,011
SUBTOTAL CATEGORY 7 COST					$7,038

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	PED POLE	4	EA	$ 2,000.00	$8,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,200
SUBTOTAL CATEGORY 8 COST					$11,200

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	FIRE HYDRANT RELOCATION	1	EA	$ 6,500.00	$6,500
9002	UTILITY POLE RELOCATION	6	EA	$ 30,000.00	$180,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$74,600
SUBTOTAL CATEGORY 9 COST					$261,100

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$29,327
2	GRADING	$14,805
3	DRAINAGE	$82,600
4	STRUCTURES	$0
5	PAVING	$21,168
6	SHOULDERS	$22,680
7	LANDSCAPING	$7,038
8	TRAFFIC	$11,200
9	UTILITIES	$261,100
	TOTAL CONSTRUCTION PROJECT COST	**$449,918**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 270 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$5,940
	SWM RIGHT OF WAY - 1 PARCEL IMPACTED. APPROX. 50 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$1,100
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$134,975
	TOTAL COST	**$591,933**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD WEST SIDE - HEARNE RD TO HOLIDAY CT**	**PRJ LENGTH:**	**0.11 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 15,082.50	$15,083
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$6,033
SUBTOTAL CATEGORY 1 COST					$21,116
ITEM NO.	**CAT. 2 (GRADING) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
2001	CLASS II EXCAVATION	90	CY	$ 75.00	$6,750
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$2,700
SUBTOTAL CATEGORY 2 COST					$9,450
ITEM NO.	**CAT. 3 (DRAINAGE) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
	NO CATEGORY 3 COSTS				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 3 COST					$0
ITEM NO.	**CAT. 4 (STRUCTURES) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0
ITEM NO.	**CAT. 5 (PAVING) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	47	TON	$ 125.00	$5,875
5002	4 INCH GRADED AGGREGATE BASE COURSE	394	SY	$ 10.00	$3,940
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,926
SUBTOTAL CATEGORY 5 COST					$13,741
ITEM NO.	**CAT. 6 (SHOULDERS) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
6001	CONCRETE RAMP WITH DETECTABLE WARNING	2	EA	$ 1,800.00	$3,600
6002	BUS SHELTER RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$5,440
SUBTOTAL CATEGORY 6 COST					$19,040
ITEM NO.	**CAT. 7 (LANDSCAPING) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
	12% Categories 2, 5, and 6	1	LS	$ 3,619.80	$3,620
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$1,448
SUBTOTAL CATEGORY 7 COST					$5,068
ITEM NO.	**CAT. 8 (TRAFFIC) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	2	EA	$ 65,000.00	$130,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$52,000
SUBTOTAL CATEGORY 8 COST					$182,000
ITEM NO.	**CAT. 9 (UTILITIES) - DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
9001	FIRE HYDRANT RELOCATION	2	EA	$ 6,500.00	$13,000
9002	UTILITY POLE RELOCATION	3	EA	$ 30,000.00	$90,000
9003	LIGHT POLE RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$45,200
SUBTOTAL CATEGORY 9 COST					$158,200

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$21,116
2	GRADING	$9,450
3	DRAINAGE	$0
4	STRUCTURES	$0
5	PAVING	$13,741
6	SHOULDERS	$19,040
7	LANDSCAPING	$5,068
8	TRAFFIC	$182,000
8	UTILITIES	$158,200
	TOTAL CONSTRUCTION PROJECT COST	**$408,614**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 1,000 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$22,000
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$122,584
	TOTAL COST	**$553,199**

ANNE ARUNDEL COUNTY
MARYLAND

Appendix C:
Cost Estimates – East Side Trail

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - SPEICHER DRIVE TO MARQUISE LANE**	**PRJ LENGTH:**	**0.07 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
1001	50% Categories 2, 5, and 6	1	LS	$ 12,240.00	$12,240
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,896
SUBTOTAL CATEGORY 1 COST					$17,136

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	107	CY	$ 75.00	$8,025
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,210
SUBTOTAL CATEGORY 2 COST					$11,235

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAEGMENT FACILITY	385	LF	$ 200.00	$77,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	149	LF	$ 200.00	$29,800
3003	STANDARD YARD INLET - MINMUM DEPTH	2	EA	$ 10,000.00	$20,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$58,720
SUBTOTAL CATEGORY 3 COST					$205,520

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
					$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	45	TON	$ 125.00	$5,625
5002	4 INCH GRADED AGGREGATE BASE COURSE	363	SY	$ 10.00	$3,630
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$1,452
SUBTOTAL CATEGORY 5 COST					$10,707

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	4	EA	$ 1,800.00	$7,200
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$2,880
SUBTOTAL CATEGORY 6 COST					$10,080

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 2,937.60	$2,938
CONTINGENCY			40%		$1,176
SUBTOTAL CATEGORY 7 COST					$4,114

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	2	EA	$ 65,000.00	$130,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$52,000
SUBTOTAL CATEGORY 8 COST					$182,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 9 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 9 COST					$0

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$17,136
2	GRADING	$11,235
3	DRAINAGE	$205,520
4	STRUCTURES	$0
5	PAVING	$10,707
6	SHOULDERS	$10,080
7	LANDSCAPING	$4,114
8	TRAFFIC	$182,000
9	UTILITIES	$0
	TOTAL CONSTRUCTION PROJECT COST	**$440,792**
	RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	SWM RIGHT OF WAY - 3 PARCELS IMPACTED. APPROX. 2105 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$46,310
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$132,237
	TOTAL COST	**$619,339**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - MARQUISE LANE TO BAUSUM RD**	**PRJ LENGTH:**	**0.21 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 33,732.50	$33,733
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$13,493
SUBTOTAL CATEGORY 1 COST					$47,226

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	163	CY	$ 75.00	$12,225
2002	COMMON BORROW	167	CY	$ 40.00	$6,680
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$7,562
SUBTOTAL CATEGORY 2 COST					$26,467

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	438	LF	$ 200.00	$87,600
3002	SWM FACILITY AS-BUILT CERTIFICATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$43,040
SUBTOTAL CATEGORY 3 COST					$150,640

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4001	BRIDGE	920	SF	$ 260.00	$239,200
4002	MSE RETAINING WALL	420	SF	$ 13.00	$5,460
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$97,864
SUBTOTAL CATEGORY 4 COST					$342,524

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	182	TON	$ 125.00	$22,750
5002	4 INCH GRADED AGGREGATE BASE COURSE	781	SY	$ 10.00	$7,810
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,224
SUBTOTAL CATEGORY 5 COST					$42,784

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	CONCRETE RAMP WITH DETECTABLE WARNING	10	EA	$ 1,800.00	$18,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$7,200
SUBTOTAL CATEGORY 6 COST					$25,200

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 8,095.80	$8,096
CONTINGENCY			40%		$3,239
SUBTOTAL CATEGORY 7 COST					$11,335

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	2	EA	$ 65,000.00	$130,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$52,000
SUBTOTAL CATEGORY 8 COST					$182,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 9 UTILITY COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 9 COST					$0

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$47,226
2	GRADING	$26,467
3	DRAINAGE	$150,640
4	STRUCTURES	$342,524
5	PAVING	$42,784
6	SHOULDERS	$25,200
7	LANDSCAPING	$11,335
8	TRAFFIC	$182,000
9	UTILITIES	$0
	TOTAL CONSTRUCTION PROJECT COST	**$828,175**
	RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$248,453
	TOTAL COST	**$1,076,628**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - BAUSUM RD TO HARRY S. TRUMAN PKWY**	**PRJ LENGTH:**	**0.20 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 25,840.00	$25,840
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$10,336
SUBTOTAL CATEGORY 1 COST					$36,176

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	110	CY	$ 75.00	$8,250
2002	COMMON BORROW	17	CY	$ 40.00	$680
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,572
SUBTOTAL CATEGORY 2 COST					$12,502

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	642	LF	$ 200.00	$128,400
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	238	LF	$ 200.00	$47,600
3003	STANDARD YARD INLET - MINMUM DEPTH	2	EA	$ 10,000.00	$20,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	3	EA	$ 10,000.00	$30,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$90,400
SUBTOTAL CATEGORY 3 COST					$316,400

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	94	TON	$ 125.00	$11,750
5002	4 INCH GRADED AGGREGATE BASE COURSE	660	SY	$ 10.00	$6,600
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$7,340
SUBTOTAL CATEGORY 5 COST					$25,690

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	8	EA	$ 1,800.00	$14,400
6002	BUS SHELTER RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$9,760
SUBTOTAL CATEGORY 6 COST					$34,160

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 6,201.60	$6,202
CONTINGENCY			40%		$2,481
SUBTOTAL CATEGORY 7 COST					$8,683

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	3	EA	$ 65,000.00	$195,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$78,000
SUBTOTAL CATEGORY 8 COST					$273,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	LIGHT POLE RELOCATION	3	EA	$ 10,000.00	$30,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,000
SUBTOTAL CATEGORY 9 COST					$42,000

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$36,176
2	GRADING	$12,502
3	DRAINAGE	$316,400
4	STRUCTURES	$0
5	PAVING	$25,690
6	SHOULDERS	$34,160
7	LANDSCAPING	$8,683
8	TRAFFIC	$273,000
9	UTILITIES	$42,000
	TOTAL CONSTRUCTION PROJECT COST	**$748,611**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 2,480 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$54,560
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$224,583
	TOTAL COST	**$1,027,754**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - HARRY S. TRUMAN PKWY TO ADMIRAL COCHRANE DR**	**PRJ LENGTH:**	**0.25 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 23,982.50	$23,983
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$9,593
SUBTOTAL CATEGORY 1 COST					$33,576

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	117	CY	$ 75.00	$8,775
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,510
SUBTOTAL CATEGORY 2 COST					$12,285

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	825	LF	$ 200.00	$165,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	50	LF	$ 200.00	$10,000
3003	STANDARD YARD INLET - MINMUM DEPTH	1	EA	$ 10,000.00	$10,000
3004	SWM FACILITY AS-BUILT CERTIFICATION	2	EA	$ 10,000.00	$20,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$82,000
SUBTOTAL CATEGORY 3 COST					$287,000

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	62	TON	$ 125.00	$7,750
5002	4 INCH GRADED AGGREGATE BASE COURSE	524	SY	$ 10.00	$5,240
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$5,196
SUBTOTAL CATEGORY 5 COST					$18,186

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	9	EA	$ 1,800.00	$16,200
6002	BUS SHELTER RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$10,480
SUBTOTAL CATEGORY 6 COST					$36,680

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 5,755.80	$5,756
CONTINGENCY			40%		$2,303
SUBTOTAL CATEGORY 7 COST					$8,059

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	2	EA	$ 65,000.00	$130,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$52,000
SUBTOTAL CATEGORY 8 COST					$182,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	FIRE HYDRANT RELOCATION	1	EA	$ 6,500.00	$6,500
9002	UTILITY POLE RELOCATION	2	EA	$ 30,000.00	$60,000
9003	LIGHT POLE RELOCATION	4	EA	$ 10,000.00	$40,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$42,600
SUBTOTAL CATEGORY 9 COST					$149,100

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$33,576
2	GRADING	$12,285
3	DRAINAGE	$287,000
4	STRUCTURES	$0
5	PAVING	$18,186
6	SHOULDERS	$36,680
7	LANDSCAPING	$8,059
8	TRAFFIC	$182,000
9	UTILITIES	$149,100
	TOTAL CONSTRUCTION PROJECT COST	**$726,885**
	RIGHT OF WAY - 1 PARCEL IMPACTED. APPROX. 420 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$9,240
	SWM RIGHT OF WAY - 3 PARCELS IMPACTED. APPROX. 9768 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$214,896
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$218,066
	TOTAL COST	**$1,169,087**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - ADMIRAL COCHRANE DR TO MD 665**	**PRJ LENGTH:**	**0.18 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 22,882.50	$22,883
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$9,153
SUBTOTAL CATEGORY 1 COST					$32,036

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	121	CY	$ 75.00	$9,075
2002	COMMON BORROW	24	CY	$ 40.00	$960
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,014
SUBTOTAL CATEGORY 2 COST					$14,049

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 3 COSTS				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 3 COST					$0

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	84	TON	$ 125.00	$10,500
5002	4 INCH GRADED AGGREGATE BASE COURSE	723	SY	$ 10.00	$7,230
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$7,092
SUBTOTAL CATEGORY 5 COST					$24,822

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	10	EA	$ 1,800.00	$18,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$7,200
SUBTOTAL CATEGORY 6 COST					$25,200

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 5,491.80	$5,492
CONTINGENCY			40%		$2,197
SUBTOTAL CATEGORY 7 COST					$7,689

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	TRAFFIC SIGNAL RELOCATION (QUARTER INTERSECTION)	2	EA	$ 65,000.00	$130,000
8002	CONTROLLER AND CABINET - BSE MOUNT	1	EA	$ 5,000.00	$5,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$54,000
SUBTOTAL CATEGORY 8 COST					$189,000

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	LIGHT POLE RELOCATION	3	EA	$ 10,000.00	$30,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$12,000
SUBTOTAL CATEGORY 9 COST					$42,000

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$32,036
2	GRADING	$14,049
3	DRAINAGE	$0
4	STRUCTURES	$0
5	PAVING	$24,822
6	SHOULDERS	$25,200
7	LANDSCAPING	$7,689
8	TRAFFIC	$189,000
9	UTILITIES	$42,000
	TOTAL CONSTRUCTION PROJECT COST	**$334,795**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 5600 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$123,200
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$100,439
	TOTAL COST	**$558,434**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - MD 665 TO HEARNE RD**	**PRJ LENGTH:**	**0.16 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 25,962.50	$25,963
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$10,385
SUBTOTAL CATEGORY 1 COST					$36,348

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	108	CY	$ 75.00	$8,100
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$3,240
SUBTOTAL CATEGORY 2 COST					$11,340

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
3001	STORMWATER MANAGEMENT FACILITY	130	LF	$ 200.00	$26,000
3002	24 INCH REINFORCED CONCRETE PIPE, CLASS IV	65	LF	$ 200.00	$13,000
3003	STANDARD YARD INLET - MINIMUM DEPTH	1	EA	$ 10,000.00	$10,000
3004	SWM FACILITY AS-BUILT CERTIFICAITON	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$23,600
SUBTOTAL CATEGORY 3 COST					$82,600

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	67	TON	$ 125.00	$8,375
5002	4 INCH GRADED AGGREGATE BASE COURSE	565	SY	$ 10.00	$5,650
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$5,610
SUBTOTAL CATEGORY 5 COST					$19,635

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	11	EA	$ 1,800.00	$19,800
6002	BUS SHELTER RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$11,920
SUBTOTAL CATEGORY 6 COST					$41,720

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 6,231.00	$6,231
CONTINGENCY			40%		$2,493
SUBTOTAL CATEGORY 7 COST					$8,724

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	PED POLE RELOCATION	6	EA	$ 2,000.00	$12,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,800
SUBTOTAL CATEGORY 8 COST					$16,800

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
9001	LIGHT POLE RELOCATION	1	EA	$ 10,000.00	$10,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,000
SUBTOTAL CATEGORY 9 COST					$14,000

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$36,348
2	GRADING	$11,340
3	DRAINAGE	$82,600
4	STRUCTURES	$0
5	PAVING	$19,635
6	SHOULDERS	$41,720
7	LANDSCAPING	$8,724
8	TRAFFIC	$16,800
9	UTILITIES	$14,000
	TOTAL CONSTRUCTION PROJECT COST	**$231,167**
	RIGHT OF WAY - 2 PARCELS IMPACTED. APPROX. 915 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$20,130
	SWM RIGHT OF WAY - 1 PARCELS IMPACTED. APPROX. 50 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$1,100
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$69,350
	TOTAL COST	**$321,746**

DATE:	**May 2021**	**PREPARED BY:**	**AECOM**
PROJECT LIMITS	**RIVA ROAD EAST SIDE - HEARNE RD TO FOREST DR**	**PRJ LENGTH:**	**0.11 mi.**
JOB DESCRP:	**RIVA ROAD TRAIL CORRIDOR STUDY**	**DPW PROJECT NO.:**	**H508425**

ITEM NO.	CAT. 1 (PRELIMINARY) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	50% Categories 2, 5, and 6	1	LS	$ 11,182.50	$11,183
	INCLUDES MAINTENANCE OF TRAFFIC, MOBILIZATION, ETC.				
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,473
SUBTOTAL CATEGORY 1 COST					$15,656

ITEM NO.	CAT. 2 (GRADING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
2001	CLASS II EXCAVATION	98	CY	$ 75.00	$7,350
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$2,940
SUBTOTAL CATEGORY 2 COST					$10,290

ITEM NO.	CAT. 3 (DRAINAGE) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 3 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 3 COST					$0

ITEM NO.	CAT. 4 (STRUCTURES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 4 COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 4 COST					$0

ITEM NO.	CAT. 5 (PAVING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
5001	SUPERPAVE ASPHALT MIX 9.5MM FOR SURFACE, PG 64S-22, LEVEL 2	57	TON	$ 125.00	$7,125
5002	4 INCH GRADED AGGREGATE BASE COURSE	429	SY	$ 10.00	$4,290
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$4,566
SUBTOTAL CATEGORY 5 COST					$15,981

ITEM NO.	CAT. 6 (SHOULDERS) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6001	CONCRETE RAMP WITH DETECTABLE WARNING	2	EA	$ 1,800.00	$3,600
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$1,440
SUBTOTAL CATEGORY 6 COST					$5,040

ITEM NO.	CAT. 7 (LANDSCAPING) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	12% Categories 2, 5, and 6	1	LS	$ 2,683.80	$2,684
CONTINGENCY			40%		$1,074
SUBTOTAL CATEGORY 7 COST					$3,758

ITEM NO.	CAT. 8 (TRAFFIC) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
8001	PED POLE	2	EA	$ 2,000.00	$4,000
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$1,600
SUBTOTAL CATEGORY 8 COST					$5,600

ITEM NO.	CAT. 9 (UTILITIES) - DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
	NO CATEGORY 9 UTILITY COSTS				$0
CONTINGENCY at 40% BASED ON CONCEPT-LEVEL DESIGN PHASE & SIZE OF PROJECT			40%		$0
SUBTOTAL CATEGORY 9 COST					$0

CATEGORY	DESCRIPTION	TOTAL
1	PRELIMINARY	$15,656
2	GRADING	$10,290
3	DRAINAGE	$0
4	STRUCTURES	$0
5	PAVING	$15,981
6	SHOULDERS	$5,040
7	LANDSCAPING	$3,758
8	TRAFFIC	$5,600
9	UTILITIES	$0
	TOTAL CONSTRUCTION PROJECT COST	**$56,324**
	RIGHT OF WAY - 4 PARCELS IMPACTED. APPROX. 5090 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$111,980
	SWM RIGHT OF WAY - 0 PARCELS IMPACTED. APPROX. 0 SF FEE SIMPLE AREA @ $20/SF + 10% FOR TEMP. EASEMENTS	$0
	ENGINEERING COST (SURVEYING, RIGHT-OF-WAY PLATS, DESIGN, AND CONSTRUCTION PHASE SERVICES) 30% OF CONST. COST	$16,897
	TOTAL COST	**$185,202**