

ROYAL SHENANDOAH GREENWAY CONCEPTUAL MASTER PLAN

PREPARED FOR THE FRONT ROYAL TREE STEWARDS, THE
TOWN OF FRONT ROYAL, AND WARREN COUNTY
MAY 2009

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College of Architecture and Urban Studies
Virginia Polytechnic Institute and State University

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Darryl Merchant, GIS Coordinator

Front Royal Tree Stewards

Joan Brubaker, Member, Royal Shenandoah Greenway Committee
Jim Huttar, Co-Chair, Royal Shenandoah Greenway Committee
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Project Team

Eliza Furedy, Undergraduate Student, Department of Landscape Architecture
Yining Xu, Graduate Student, Department of Landscape Architecture

Kim Steika, CDAC Landscape Architecture Project Coordinator



Eliza Furedy describes Zones 1-3 of the Royal Shenandoah Greenway.



Yining Xu describes Zones 4-6 of the Royal Shenandoah Greenway.

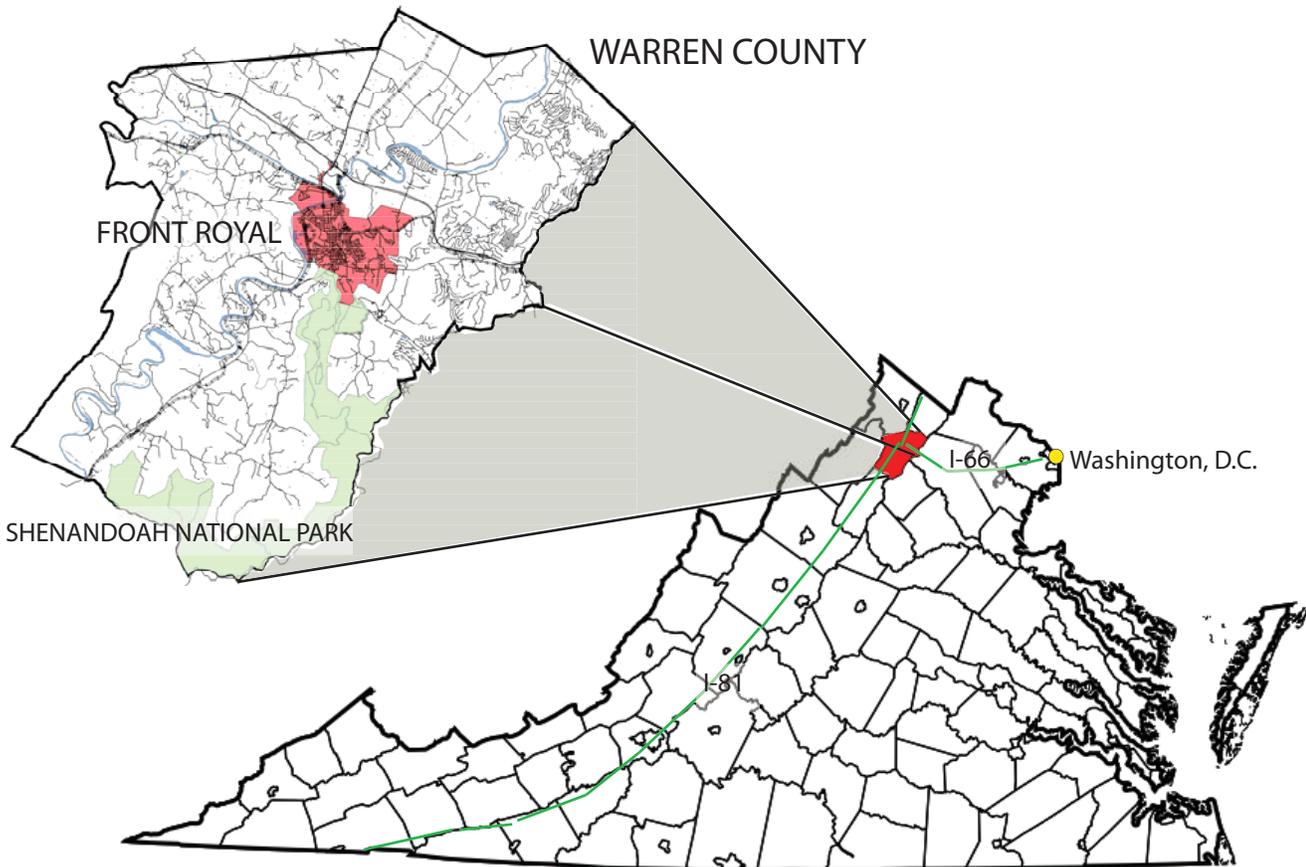
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Project Description

The Community Design Assistance Center (CDAC) was asked by the Front Royal Tree Stewards, in conjunction with the Town of Front Royal, to develop a conceptual master plan for a greenway. The Royal Shenandoah Greenway, that would utilize the constructed portion of Happy Creek Trail and create a loop connecting Burrell Brooks Jr. Community Park, Samuels Public Library, Ressie Jeffries Elementary School, Skyline High School, and the proposed Eastham Park along the South Fork of the Shenandoah.

The project study area is within the Town of Front Royal. Front Royal is located in Warren County, 70 miles west of Washington, D.C., near the junction of I-66 and I-81. The North and South Forks of the Shenandoah River join here to form the main stem of the Shenandoah River. The Town is bounded by the Blue Ridge Mountains on the east and the Massanutten Mountains on the west. Elevations in the area range from 566 feet in downtown to over 3,300 feet in the



surrounding mountains. The mountain ridges visually dominate the landscape, looming 1,000 to 2,900 feet over the central lowland. Topography in these mountainous parts includes steep-walled valleys with fast flowing streams and wooded slopes.

With the help of Town and County staff, and the Tree Stewards, the CDAC team developed conceptual design recommendations for the Royal Shenandoah Greenway. The project team also received feedback, guidance, and support from National Park Service staff related to trail connections to and through the Shenandoah National Forest and from the Virginia Department of Transportation related to road crossings.

The conceptual design provides multiple access points throughout the Town that allow residents and visitors to enjoy the variety of the Royal Shenandoah Greenway. Six greenway zones join to result in a complete looped trail system which has unique qualities and experiences along its entirety. A smaller loop within the larger greenway loop allows for increased user choices and opportunities.

The final report includes descriptions of the conceptual master plan, illustrative sketches, and documentation of the entire design process.

Design Process

The design process began in early September 2008, with the collection of data from town and county resources, including geographic information system data, aerial photography, and literature on previous greenway plans for the area. Following the creation of a study area base map, the CDAC design team made arrangements for a site visit to Front Royal.

The first field visit was used to familiarize the design team with the project study area, as well as to begin the analysis process. With the aid of the Front Royal Tree Stewards, the design team explored the existing Happy Creek Trail, as well as the destination points desired to be linked by the proposed Royal Shenandoah Greenway.

Initial analysis maps were developed to indicate the potential opportunities and issues related to the proposed greenway system. Another site visit was made to verify information, as well as to answer additional questions regarding the existing conditions of the study area. A visit was made to the Luray Hawksbill Greenway to experience an example of a successful greenway system located in a similar setting to the Royal Shenandoah Greenway.

On November 13, the CDAC design team, along with Susan Musante, Bruce Drummon, Sandy Willson, and Jim Huttar, met with the Shenandoah National Parks (SNP) team led by Steve Bair. After meeting at the Skyline Drive entry, the team was led along the proposed greenway trail through the Shenandoah National Park forest. Using former road beds, which are generally well graded and cleared, the scouting team developed an approximate route through the SNP forest. The aid of a GIS tracking device provided an accurate record of the path taken through the park to reach Brown-town Road.

Through the review of map and digital resources, field visits, and meetings with community and town government members, the CDAC design team was able to develop a site analysis map highlighting the issues and potentials for the proposed Royal Shenandoah Greenway.



Sandy Wilson of the Tree Stewards (c) leads the way for Eliza Furedy, CDAC Team Member, (l) and Andy Conlon, Town Planning Director (r), as they explore the existing Happy Creek Trail.



CDAC Team Members Yining Xu (l) and Eliza Furedy (r) walk a former road bed, and proposed trail route, in Shenandoah National Park.

On December 12, Kim Steika and Yining Xu made a formal presentation of the proposed conceptual master plan to town and county staff members and Tree Steward representatives. This was an opportunity for additional critique and questioning, as well as to clarify issues and concerns.

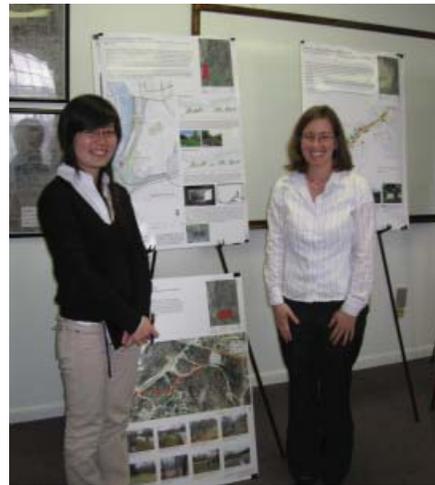
Following the December meeting, the CDAC design team responded to the suggested adjustments and information requested. Additionally, signage proposals for the Royal Shenandoah Greenway (RSG) were created, giving examples of existing trail signage, as well as examples of potential RSG entry markers.

The CDAC team presented the revised concepts at a joint meeting of the Town and County Planning Commissions on February 11, 2009. Town and County staff, the Tree Stewards and interested area residents were also present. A summary of feedback received from the Virginia Department of Transportation was also shared at this meeting.

A final report was prepared to document the design process and concepts.



Eliza Furedy provides a scale to the culvert under the railroad tracks.



Yining Xu and Kim Steika show the proposed master plan for the Royal Shenandoah Greenway.



Yining Xu presents the final master plan for the Royal Shenandoah Greenway.

Connecting Points of Interest

One of the primary goals of the Royal Shenandoah Greenway is to create a connected loop that links points of interest within Front Royal. By creating a system that strengthens the relationships between destinations, the trail user is able to access a wide range of public services and attractions. The greenway allows for increased usage of alternative transportation as a means of visiting sites within the Town of Front Royal. Additionally, the Royal Shenandoah Greenway promotes routes for children to travel to school and recreational facilities safely, supplying infrastructure to support active and healthy living for area residents of all ages. The greenway offers users a variety of environmental experiences and choices in surface type. An 11x17 pullout on the following page highlights the many destinations that this greenway loop will connect.

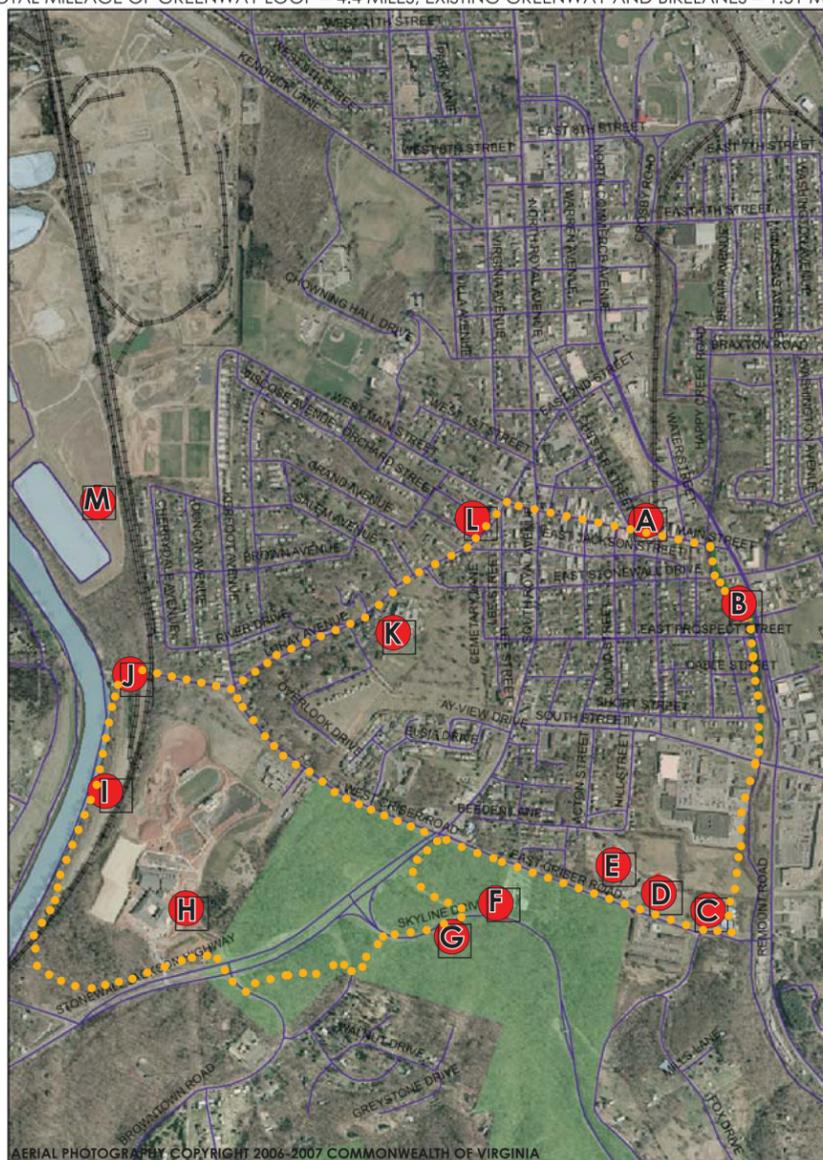
ROYAL SHENANDOAH GREENWAY: PHASE ONE

PROPOSED SITES OF INTEREST ALONG THE GREENWAY

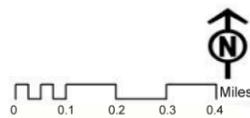
Front Royal is located in Warren County, 70 miles west of Washington, D.C., near the junction of I-66 and I-81. The North and South Forks of the Shenandoah River join here to form the main stem of the Shenandoah River. The Town is bounded by the Blue Ridge Mountains on the east and the Massanutten Mountains on the west. Elevations in the area range from 566 feet in downtown to over 3,300 feet in the surrounding mountains. The mountain ridges visually dominate the landscape, looming 1,000 to 2,900 feet over the central lowland. Topography in these mountainous parts includes steep-walled valleys with fast flowing streams and wooded slopes.

A plan for parks, trails, bike paths, and greenways for the Town, entitled "Where the Mountains Meet the River: Front Royal's Plan for Parks, Trails, Bike Paths, and Greenways", was developed in 1993. The goal of the trails and sidewalk path system in this plan are: "to provide accessible recreation for all, to provide unification of the Town's features such as schools, parks, commercial centers, historic districts and neighborhoods."

TOTAL MILEAGE OF GREENWAY LOOP = 4.4 MILES; EXISTING GREENWAY AND BIKELANES = 1.51 MILES.



- Legend**
- ROADS
 - RAILROAD
 - EXISTING GREENWAY
 - SHENANDOAH RIVER
 - SHENANDOAH NATIONAL PARK
 - POINTS OF INTEREST
 - PROPOSED ROYAL SHENANDOAH GREENWAY



The Community Design Assistance Center (CDAC) was asked by the Front Royal Tree Stewards, in conjunction with the Town of Front Royal, to develop a conceptual master plan for a greenway, the Royal Shenandoah Greenway, that would utilize the constructed portion of Happy Creek Trail and create a loop connecting Burrell Brooks Jr. Community Park, the library, Ressie Jeffries Elementary School, Skyline High School, a proposed park along the South Fork of the Shenandoah, and the Conservancy Park.

FORMER AVTEX SITE **M**



BOWMAN PARK **L**



FUTURE MIDDLE SCHOOL **K**



SOUTH LANDING BOAT LAUNCH **J**



PROPOSED PARK **I**



SKYLINE HIGH SCHOOL **H**



DICKEY RIDGE TRAIL HEAD **G**

This drawing is conceptual and was prepared to show approximate location and arrangement of site features. It is subject to change and is not intended to replace the use of construction documents. The client should consult appropriate professionals before any construction or site work is undertaken. The Community Design Assistance Center is not responsible for the inappropriate use of this drawing.



A FRONT ROYAL VISITORS CENTER



B HAPPY CREEK ARBORETUM



C BURRELL BROOKS PARK



D SAMUELS PUBLIC LIBRARY



E RESSIE JEFFRIES ELEMENTARY



F SHENANDOAH NATIONAL PARK

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Site Inventory & Analysis

Inventory data collection began with a review of pertinent Town and County information, including existing trails and bike routes, local geological features, key points of interest, and previous greenway proposals.

The study area was divided into six zones, allowing for a more detailed analysis and inventory of existing conditions and issues. The findings and potentials of the six zones are described on the following pages.



Zone One: Existing Happy Creek Trail

Zone One consists of the study area from Main Street, south along the existing Happy Creek Greenway, down to South Street and includes both existing and proposed trail segments. The existing Happy Creek Greenway is a wide, asphalt trail in excellent condition. It parallels its namesake, Happy Creek, and links the end of Main Street to the Happy Creek Arboretum and Miss Florence Smith's Park. However, Happy Creek Greenway is rather short, as only a segment of the planned trail has been constructed. The proposed Royal Shenandoah Greenway aims to connect this segment of trail to other destinations in Town.

The primary issues of Zone One revolve around safety and connectivity. The existing section of the trail can only become more popular as it becomes part of the greater trail system.

Currently the entry of Happy Creek Greenway intersects with Main Street immediately after a narrow bridge. This creates a dangerous overlap of pedestrian and automobile traffic. It is advised to add a crosswalk, as well as signage, to alert both drivers and trail users.

Happy Creek Arboretum is located at the center of the existing trail, providing a beautiful place for pause along the route.

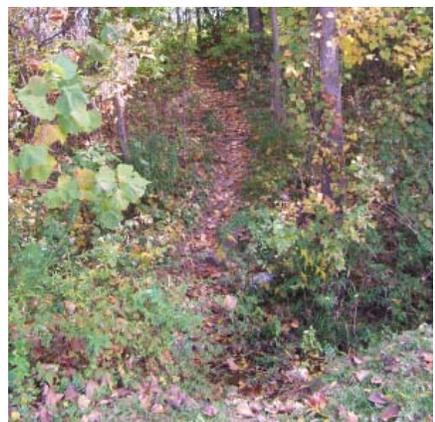
The existing trail ends at Short Street, however, a small dirt pathway has been established by users as a continuation of the trail to South Street. Continuation of the trail under South Street will create a desired link between the existing trail and Burrell Brooks Community Park, Samuels Public Library, and Ressie Jeffries Elementary School. Two options for addressing the South Street intersection include routing trail users along South Street to the intersection of South Street and Commerce Avenue to cross at the light or crossing under the low bridge on South Street, adjacent to Happy Creek. Both options have pluses and minuses which are described in the Zone 2 analysis and inventory.



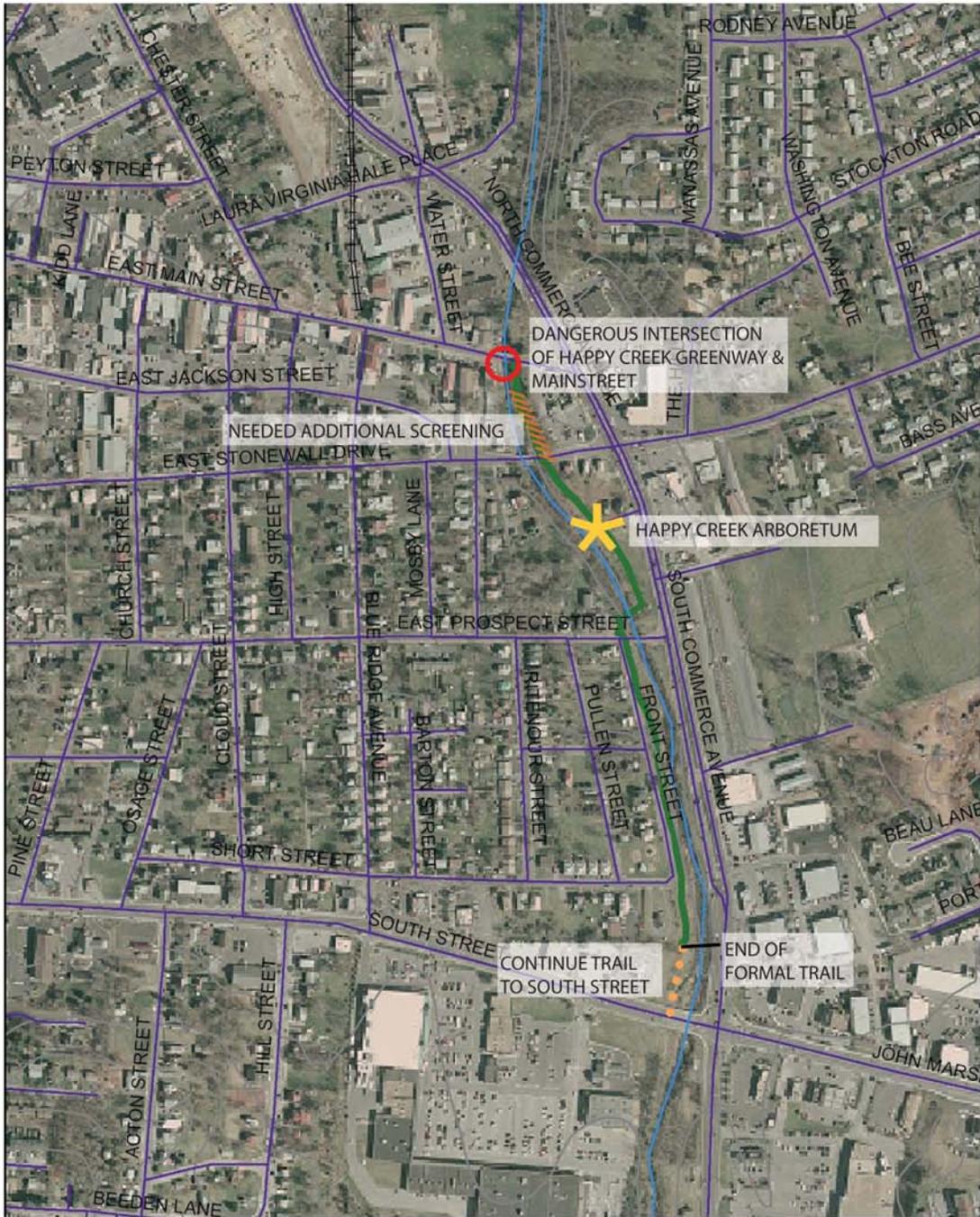
Happy Creek Entry at Main Street



Happy Creek Arboretum



Trail Leading from Short Street to South Street



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Legend

- Roads
- Railroad
- Happy Creek
- Existing Trail
- 10ft Contours
- Shenandoah National Park
- Point of Interest
- Noted Intersection
- Screening



Zone Two: South Street to Criser Road

Zone Two consists of the study area from South Street, along Happy Creek to Burrell Brooks Community Park and Samuels Public Library on East Criser Road.

One option for connecting Zone One to Zone Two is to construct the trail underneath the South Street bridge. The primary issue that would need to be addressed with this option is that of safety. Lighting would need to be provided in order for this segment of the trail to be usable, as it is a low bridge which allows little natural light into the space. Additionally, efforts must be made to provide for safe passage/egress in the event of flash-flooding. Extra care would also need to be taken in the design to ensure the trail did not have a negative environmental impact to the riparian corridor as well. However, the positive aspects of using the area underneath the bridge to connect the greenway include the separation of pedestrian and automobile traffic, avoiding a busy intersection, and providing opportunity for continuous, non-interrupted travel along the trail.

An alternative connection could be made at street level, by routing users to the sidewalk on the north side of South Street, directing them to the intersection of Commerce and South Street, providing for pedestrian crossing buttons/signage at the traffic light, and then linking back along Happy Creek towards the park.

Current site conditions along Happy Creek result in limited usable area that will accommodate the greenway extension. Steep topography is present on both sides of the creek, making access difficult. However, the relatively flat grassy area just east of the shopping center could accommodate the trail in most places. Currently the vegetation is overgrown, resulting in limited visual access to Happy Creek.



South Street Bridge



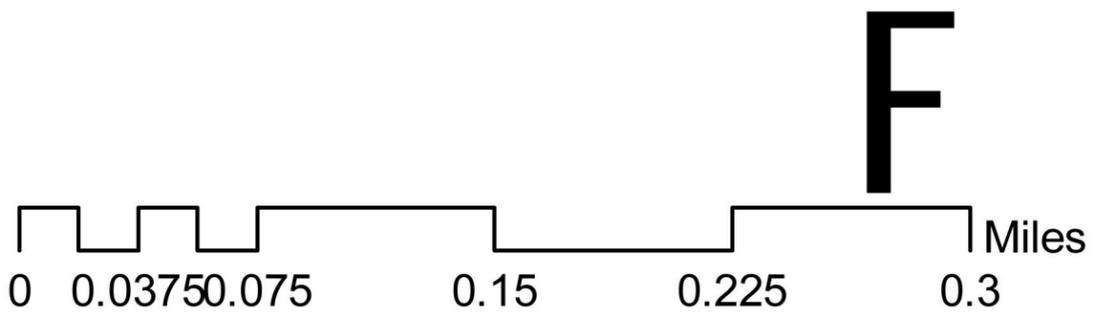
Flat area as possibility for accommodating the trail.



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Legend

- Roads
- Railroad
- Happy Creek
- 10ft Contours
- Shenandoah National Park
- Existing Trail
- Flat Area
- Steep Slope



ZONE TWO: INVENTORY & ANALYSIS

Zone Three: Criser Road Through Shenandoah National Park

Zone Three consists of crossing Criser Road to enter the Shenandoah National Park, and continuing to the Browntown Road and US-340 intersection.

Selective clearing of undergrowth is recommended along Criser Road to allow for the implementation of the link to the Dickey Ridge Trail.

The area around the current School Board Bus Facility is one of the few known locations in the Shenandoah National Park where there was an African-American community that emerged after the Civil War. The 'colored' school, which is no longer standing, was a centerpiece of that community. Care should be taken with site evaluation and design implementation to maintain the historical significance of artifacts found, and highlight the area's historical and community significance. Opportunities for interpretation through signage and other design interventions should be considered along the proposed trail route in this section.

The existing Dickey Ridge Trail will be widened and used to connect Criser Road to Skyline Drive. Trail users will cross Skyline Drive to continue on the trail at the established crosswalk.

The current site conditions to the south of Skyline Drive includes a former road bed, which will be utilized by the trail. Tall grasses vegetate an otherwise clear route linking Skyline Drive to Browntown Road. Sections of the proposed trail are in low-lying, wet areas resulting in the need for a boardwalk.

Topography between the former road bed and the Browntown Road/US-340 intersection increases in slope. The steep slope runs down into Browntown Road, which is the most heavily used secondary road in Warren County. The importance of a safe crossing point is emphasized by the roads curvature, resulting in the limited visibility of oncoming vehicular traffic.



Undergrowth along Criser Road



Former road bed to the south of Skyline Drive.

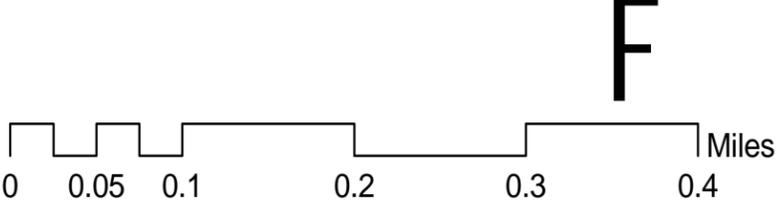


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ZONE THREE: INVENTORY & ANALYSIS

Legend

- Roads
- Railroad
- 10ft Contours
- South Fork of Shenandoah River
- Shenandoah National Park
- Point of Interest
- Heavy Traffic
- Former Road Bed
- Steep Slope



Zone Four: Shenandoah National Park to Luray Avenue Boat Landing

Zone Four consists of the study area from the Browntown Road/US-340 intersection through Skyline High School property, and along the South Fork of the Shenandoah River to the Luray Avenue boat launch.

Route 340 and Skyline Vista Drive create an extremely busy and dangerous intersection. There must be a pedestrian and trail user safety system implemented to ensure safe crossing.

The land bordering Skyline High School is heavily wooded and has steep topography running down to the South Fork of the Shenandoah River.

An existing culvert can serve as a link between the trail on the Skyline High School property and the trail along the Shenandoah River. Currently the culvert is used to allow a wet-weather stream to run down the slope into the river. Primarily dry, the stream bed occasionally becomes flooded from up-slope drainage. The culvert is visually open, with the railroad tracks high overhead, creating an interesting and unique space. A raised boardwalk type trail will be used to enable safe usage as well as allow for the natural processes to continue.

The flood plain along the South Fork of the Shenandoah River is primarily flat, with a large stretch of open, grassy field bordered by the railroad tracks on the uphill side.

An existing boat ramp is located at the end of Luray Avenue. The area currently has limited parking and facilities, however, a plan for the new Eastham Park has been approved. The road leading to the boat launch is relatively narrow and traffic is light, but with increased amenities the traffic will increase resulting in the need for additional pedestrian safety measures. A train trestle narrows the road to become one lane for a short period.



Intersection of Route 340 & Skyline Vista Drive



Existing Culvert



Flood Plain along the River.



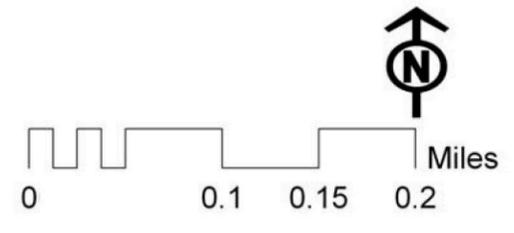
Train Trestle on Luray Avenue.



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Legend

- Roads
- Railroad
- 10ft Contours
- South Fork of Shenandoah River
- Shenandoah National Park
- Point of Interest
- Noted Intersection
- Culvert
- Railroad Trestle
- Steep Slope



ZONE FOUR: INVENTORY & ANALYSIS

Zone Five: Luray Avenue to Main Street

Zone Five consists of the study area along Luray Avenue to its intersection with Main Street.

Luray Avenue and Criser Road intersect resulting in a large intersection requiring pedestrian safety measures. The implementation of a crosswalk and appropriate signage would increase the safety and functionality of the trail.

Along Luray Avenue exists a biking lane that runs nearly the full length of the road, linking Criser Road to Main Street. There is a need for the separation of vehicular and bicycle traffic, as none currently exists. This added safety precaution will make the trail more user friendly.

The Blue Ridge Technical Center and the Middle School are on the south edge of Luray Avenue, and are connected to Main Street by existing sidewalks. The Middle School property offers desirable open space along the trail route.

Bowman Park is located on the northeast end of Luray Avenue, near the entry point to Main Street. The park is a shady retreat along the trail, offering a place for pause.

The intersection of Luray Avenue and Main Street requires a crosswalk to enable trail users to safely move from one trail section to the next.



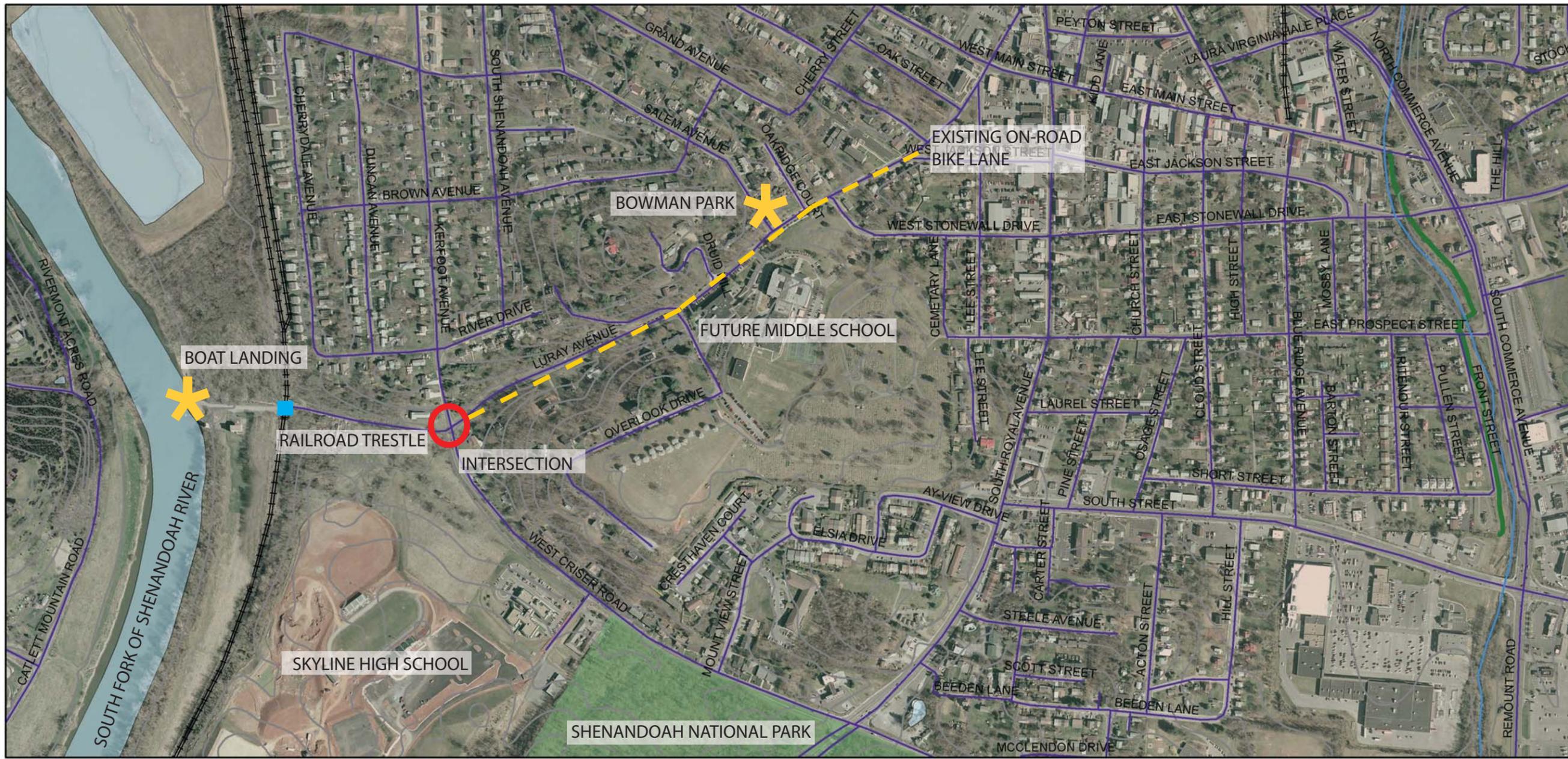
Bike Lane on Luray Avenue



Middle School



Bowman Park

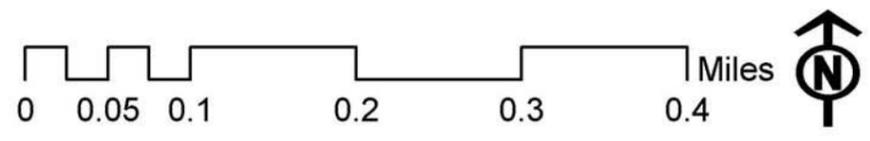


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ZONE FIVE: INVENTORY & ANALYSIS

Legend

-  Roads
-  Railroad
-  Happy Creek
-  10ft Contours
-  South Fork of Shenandoah River
-  Shenandoah National Park
-  Point of Interest
-  Noted Intersection
-  On-road Bike Lane
-  Railroad Trestle



Zone Six: Main Street

Zone Six consists of the study area that runs along Main Street to its intersection with Happy Creek.

Generous sidewalks currently guide pedestrians into the heart of Front Royal creating a pleasant experience. A shady park surrounds the Gazebo and Visitors Center, allowing for a place for pause along this route. Within the Visitors Center are a variety of amenities for those exploring downtown Front Royal.

The safety precautions implemented by the Town are manifested in the placement of crosswalks at intervals along Main Street.



Park near the Visitors Center on Main Street.

Conceptual Master Plan

Multiple draft conceptual plans were created and adjusted as a result of a series of progress meetings with Town and County staff, and local interest groups.

The final conceptual master plan was divided into six zones to better explore the design solutions for each section of the Royal Shenandoah Greenway.

The description of the final conceptual master plan follows the previous sectional format of the site analysis and inventory.

Zone One: Existing Happy Creek Trail

The conceptual master plan for Zone One of the Royal Shenandoah Greenway primarily deals with the issue of connectivity, namely how does the existing Happy Creek Trail connect to the larger trail system?

The existing twelve foot wide asphalt trail establishes the experiential quality of the trail in Zone One and Two. The trail will continue from its ending at Short Street along Happy Creek to the opposite side of South Street.

Increasing the vegetative screening between businesses and the trail will allow for a greater sense of immersion in nature, and result in a more satisfying experience.

There are two viable options for the linkage of the trail past South Street. Both have positives and negatives to consider.

The first option is to run the trail beneath the South Street bridge. This creates a trail that is user friendly, as it avoids interaction with automobiles on the heavily traveled South Street. The result would be a unique experience that contributes to the interest of the trail. There are safety concerns to consider, as the space beneath that bridge is dark and isolated. Proper lighting and visibility measures would need to be implemented to ensure user safety while passing under South Street. Another concern is the occurrence of flash-flooding. Measures to allow for the continued usage of the trail would need to be considered. Engineering drawings have already been prepared for this solution.

The second option is to have the trail users cross at the South Street intersection. There is an increased potential for automobile-pedestrian conflict with this solution. The addition of a push-button crosswalk monitor would allow for increased safety of the trail user. A benefit of crossing at street level is the increased visibility of the user at all times.



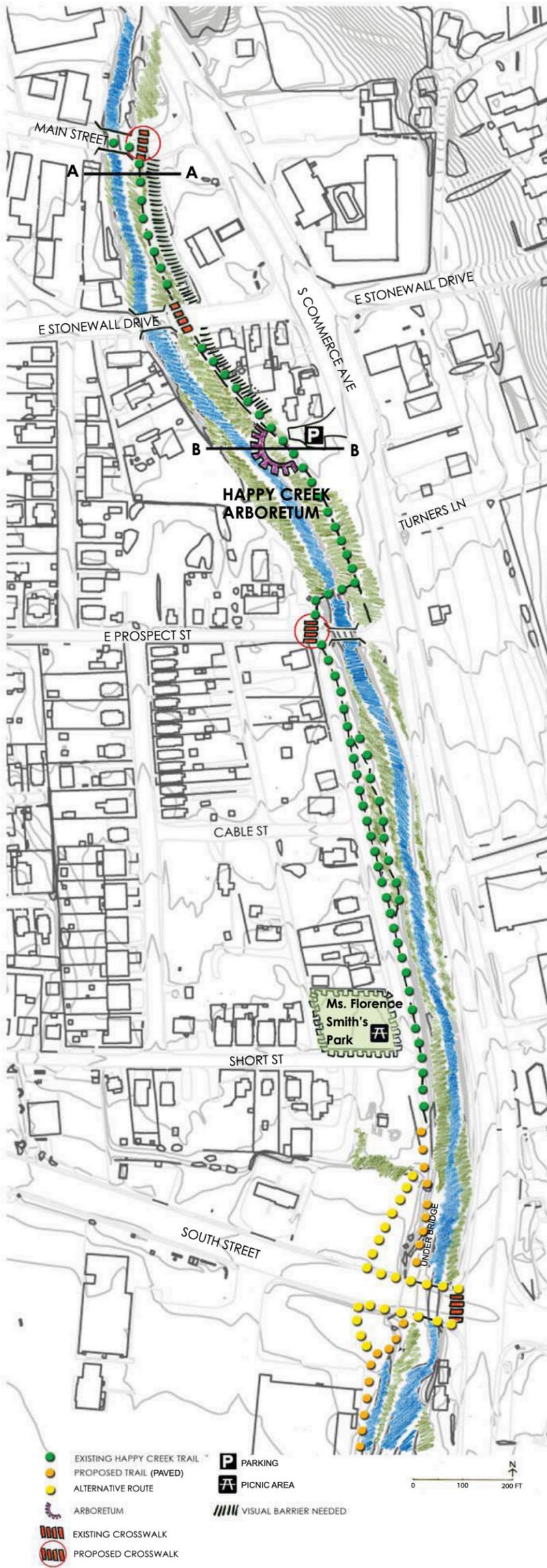
Area beneath the South Street Bridge.



Pedestrians Walk across the South Street Bridge.

ROYAL SHENANDOAH GREENWAY

Zone One Conceptual Master Plan: From Main Street to South Street, 0.47 miles



ZONE ONE IS COMPOSED OF BOTH EXISTING AND PROPOSED TRAIL SEGMENTS.

THE EXISTING TRAIL:

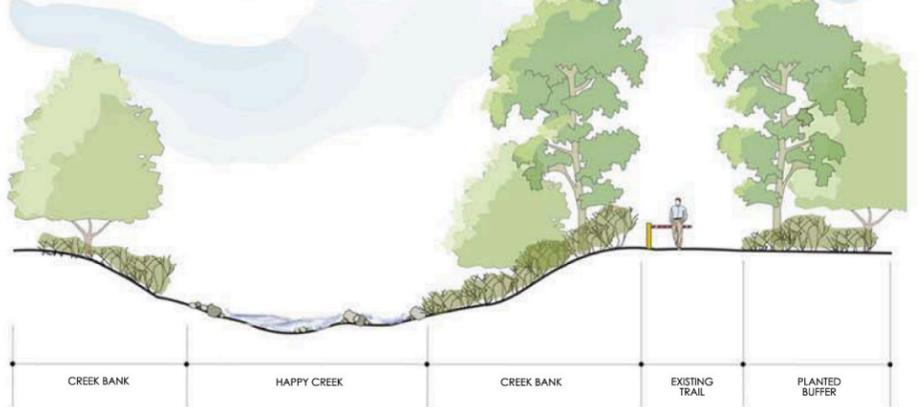
- IN EXCELLENT CONDITION
- NEEDS TO BE LINKED TO THE PROPOSED ROYAL SHENANDOAH GREENWAY SYSTEM.

RECOMMENDATIONS FOR ZONE ONE INCLUDE:

- WAYS TO INCREASE THE SAFETY OF TRAIL USERS.
- SUGGESTIONS FOR THE EXTENSION OF THE EXISTING TRAIL ACROSS OR UNDER SOUTH STREET.



SECTION A-A: Existing Condition



SECTION B-B: Existing Condition



ISSUES AND SUGGESTIONS FOR ZONE ONE:

- THE ENTRY TO HAPPY CREEK TRAIL INTERSECTS WITH MAIN STREET IMMEDIATELY AFTER A NARROW BRIDGE (FIGURE 1), CREATING A DANGEROUS INTERSECTION. IT IS ADVISED TO ADD A CROSS-WALK AND SIGNAGE TO ALERT BOTH DRIVERS AND TRAIL USERS.
- INCREASE THE VISUAL SCREENING ALONG PORTIONS OF THE EXISTING TRAIL TO PROVIDE A MORE PLEASING EXPERIENCE FOR USERS (FIGURE 2).
- HAPPY CREEK ARBORETUM IS AT THE CENTER OF THE EXISTING TRAIL, PROVIDING A PLACE FOR PAUSE ALONG THE ROUTE (FIGURE 3).
- THE EXISTING TRAIL ENDS AT SHORT STREET. A SMALL DIRT PATHWAY HAS BEEN ESTABLISHED BY USERS AS A CONTINUATION OF THE TRAIL TO SOUTH STREET (FIGURE 4).
- CONTINUE THE TRAIL ACROSS/UNDER SOUTH STREET TO CREATE A LINK TO BURRELL BROOKS COMMUNITY PARK AND SAMUELS PUBLIC LIBRARY, AS WELL AS DESTINATIONS BEYOND.



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

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Zone Two: South Street to Criser Road

The conceptual master plan for Zone Two creates a unique creek side experience that connects the trail to civic locations.

The greenspace running behind the shopping center is rather narrow, bounded by steep topography on the creek side, and a parking lot opposite. One design solution is to cut into the existing scrubby vegetation creating a wider pathway as well as increased viewpoints into Happy Creek. This allows for a more visually stimulating experience, as well as an increased buffer between the trail and the parking lot. An alternative solution would be to site the trail on the edge of the asphalt parking lot, stripping the asphalt to indicate the trail.

A smaller, secondary path is proposed to allow trail users to gain closer access to Happy Creek via steps down to the waters edge. Steps are needed to deal with the steeper topography that borders Happy Creek.

The Royal Shenandoah Greenway will then continue through the open grassy field behind Burrel Brooks Park to Criser Road. Pedestrians will utilize the sidewalk in front of the Samuels Public Library, while cyclists will ride on Criser Road, sharing the lane with vehicles up to Ressie Jeffries Elementary.



Narrow Greenspace behind shopping center.



Grassy field behind Burrel Brooks Park.

ROYAL SHENANDOAH GREENWAY

Zone Two Conceptual Master Plan: Between South Street and East Criser Road, 0.53 miles



Context Map



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

ZONE TWO CONNECTS THE EXISTING HAPPY CREEK TRAIL TO BURRELL BROOKS COMMUNITY PARK AND SAMUELS PUBLIC LIBRARY ON EAST CRISER ROAD.

ISSUES AND RECOMMENDATIONS FOR ZONE TWO:

- SAFETY (AND LIGHTING ISSUES NEED TO BE ADDRESSED (FIGURE 1) FOR THE TRAIL CONTINUATION UNDER THE BRIDGE.
- AN ALTERNATIVE CONNECTION WOULD BE TO CROSS AT THE STOP LIGHT AT SOUTH STREET AND CONTINUE ALONG HAPPY CREEK TOWARD THE PARK.
- THERE IS LIMITED AREA WITH TOPOGRAPHY TO ACCOMMODATE A TRAIL SOUTH OF SOUTH STREET.
- THE PROPOSED TRAIL IS SITED ALONG THE FLAT, GRASSED AREA BEHIND THE SHOPPING CENTER (FIGURES 2 & 3)
- CLEAR AWAY SOME SCRUB PLANTINGS AND ADDING SMALL SITING AREAS WITH OPEN VIEWS TO HAPPY CREEK (FIGURE 4).
- A SECONDARY PATH COULD GIVE USERS LIMITED ACCESS TO HAPPY CREEK (SECTION C-C).
- DUE TO SLOPE, STEPS MAY BE NEEDED TO ACCESS THE CREEK BANK (SECTION D-D).

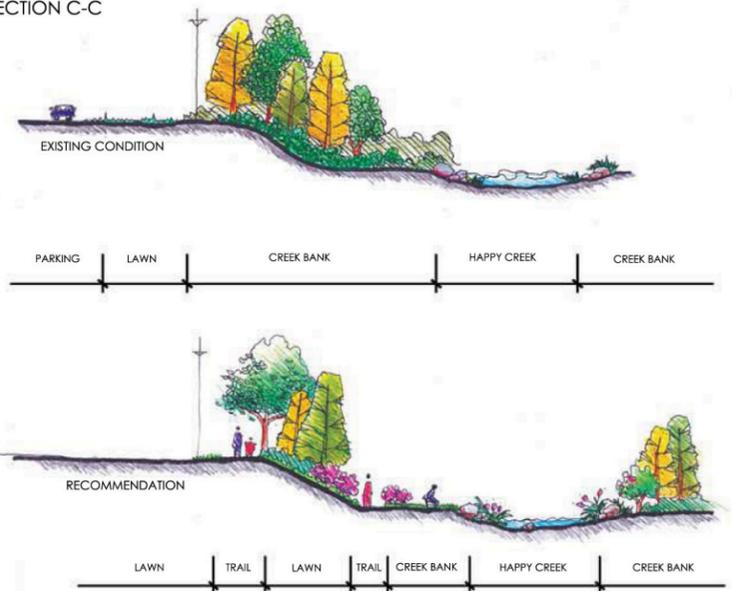


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- EXISTING SIDEWALK
- CROSSWALK
- FITNESS TRAIL
- BRIDGE
- RESTROOM
- BICYCLE SHARED USE RIGHT OF WAY
- PROPOSED GREENWAY- (PAVED)
- ALTERNATIVE ROUTE
- PARKING
- PICNIC AREA

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SECTION C-C

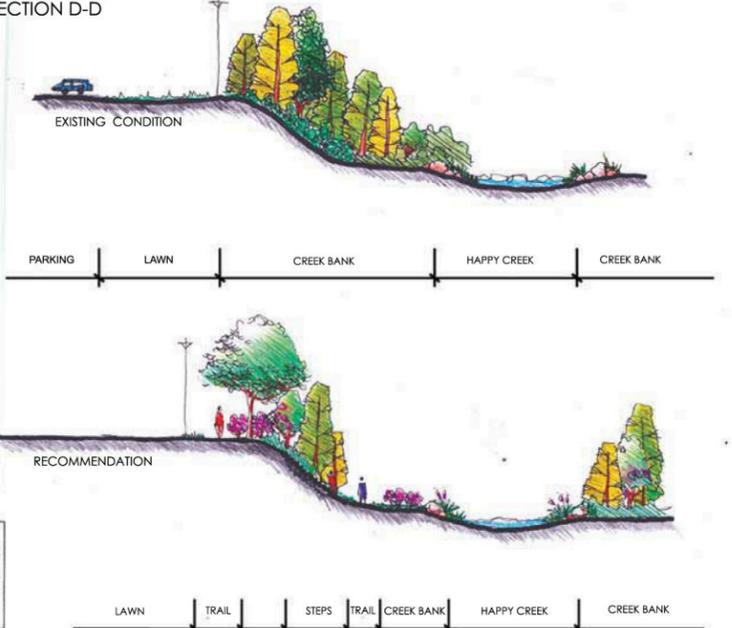


FITNESS TRAIL AT BURRELL BROOKS PARK



Burrell Brooks Park and Fitness Trail

SECTION D-D



ZONE TWO: DESIGN

Zone Three: Criser Road through Shenandoah National Park

The conceptual master plan for Zone Three offers the trail user a unique experience as they travel through Shenandoah National Park. This portion of the trail will be utilizing the existing Dickey Ridge Trail from US Route 340/Criser Road to Skyline Drive.

The natural character of the trail surroundings will be reflected in its paving material by utilizing crushed stone. Able to be used by bikers and walkers alike, the crushed stone emphasizes the unique experience within the Shenandoah National Park. Additionally, this trail should be widened to eight feet to accommodate multiple users. It will be important to clearly alert trail-goers of the shared usage for the Dickey Ridge trail that will only occur in this section.

An historic African-American community, established in the early 1900s, is located alongside the trail and provides an opportunity for interpretive signage and increased awareness of the site's past. This cultural site creates another point of interest along the trail, making each section unique from one another.

The trail will utilize the former Old Browntown Road bed as a connection from Skyline Drive to Brownton Road. Portions of the trail will need to be boardwalk, as the ecology varies throughout SNP and some areas are low-lying and wet. Boardwalks promote an environmentally friendly route through the forest, as well as ensuring a stable tread surface.

The trail users arrive at Browntown Road through the SNP, next crossing US-340 to continue onwards. This heavily traveled road requires the implementation of proper signage and crosswalks to ensure safety.



Low-lying and wet area.

ROYAL SHENANDOAH GREENWAY

Zone Three Conceptual Master Plan: Shenandoah National Park Connection, 1.05 miles

WITHIN ZONE THREE TRAIL USERS WILL PASS THROUGH SHENANDOAH NATIONAL PARK.

- ZONE THREE CONNECTS THE ROYAL SHENANDOAH GREENWAY FROM SAMUELS PUBLIC LIBRARY TO SKYLINE HIGH SCHOOL.
- IT OFFERS AN ESCAPE INTO THE QUIET SOLITUDE OF NATURE IN SHENANDOAH NATIONAL PARK.
- A SEGMENT OF THE TRAIL WILL UTILIZE THE EXISTING DICKEY RIDGE TRAIL ALIGNMENT FROM US 340 TO SKYLINE DRIVE.
- PORTIONS OF THIS TRAIL MAY NEED TO BE CONSTRUCTED AS A BOARDWALK TO PROVIDE AN ENVIRONMENTALLY FRIENDLY AND STABLE SURFACE.
- INTERPRETIVE HISTORICAL SIGNAGE IS PROPOSED TO HIGHLIGHT THE FORMER AFRICAN-AMERICAN COMMUNITY IN THIS AREA. EXACT LOCATION SHOULD BE DETERMINED AFTER THE ARCHEOLOGICAL STUDY IS COMPLETE.
- THE CROSSING OF BROWNTOWN ROAD AND US 340 NEED FURTHER INVESTIGATION. EXACT TRAIL AND CROSSING LOCATIONS NEED TO BE APPROVED BY NATIONAL PARK SERVICE AND VIRGINIA DEPARTMENT OF TRANSPORTATION STAFF AND MAY DIFFER SLIGHTLY FROM THE PROPOSED CONCEPT.



1 THE PROPOSED TRAIL WILL CROSS SKYLINE DRIVE



2 A PORTION OF THE TRAIL WILL RUN PARALLEL TO SKYLINE DRIVE



3 SECTION OF THE TRAIL THAT MAY REQUIRE BOARDWALK



4 UTILIZING AN OLD ROAD BED FOR A PORTION OF THE TRAIL



5 POTENTIAL NEIGHBORHOOD ACCESS POINT FOR THE TRAIL



6 WOODED SECTION OF THE TRAIL WITH GENTLE SLOPES



7 THE TRAIL WILL CROSS BROWNTOWN ROAD AS IT MOVES TOWARD SKYLINE HIGH SCHOOL



8 THE TRAIL WILL CROSS US 340 AT THE INTERSECTION WITH BROWNTOWN RD.

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Zone Four: Shenandoah National Park to Luray Avenue Boat Landing

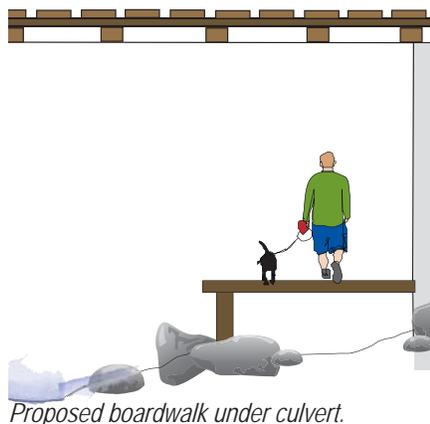
The conceptual master plan for Zone Four connects the Skyline High School property to the Luray Avenue Boat Launch. The forested property of this next trail segment allows for the continuation of the natural experience from Zone Three. Crushed stone is recommended as the paving material for the trail.

The trail crosses US-340 at the intersection of US-340 and Browntown Road. Further study will need to be made to identify the most appropriate location for a safe and approved crossing. A push-button crosswalk light should be installed.

After crossing US-340, the trail will continue along the western side of Skyline Vista Drive into the forested edge of the Skyline High School property. Following the ridge line where the topography is the gentlest, the trail will continue to the culvert beneath the railroad tracks. The culvert should be fitted with a boardwalk structure to allow for safe usage even when the wet-weather stream is active. Boardwalking the culvert allows for uninterrupted water flow as well as pedestrian safety and environmental preservation.

The trail emerges on the flat and grassy flood plain adjacent to the South Fork of the Shenandoah River. The majority of Eastham Park is located in the flood plain between the train tracks and the South Fork of the Shenandoah River. Soccer fields, exercise paths, and parking amenities will be implemented to make this an excellent destination, as well as a great trail head and access point for trail users. The amenities located at the trailhead include parking, restrooms, and picnic areas.

The trail will run along the South Fork of the Shenandoah River, allowing for beautiful vistas to the water and places for pause along the way. The trail will then run on Luray Avenue for a short time, until it goes under the trestle, at which point a bike lane will be implemented. At the trestle the road narrows, resulting in the need for signage to make motorists aware of trail users.



ROYAL SHENANDOAH GREENWAY

Zone Four Conceptual Master Plan: Between Skyline High School and the Luray Avenue Boat Launch, 1.28 miles

ZONE FOUR OF THE ROYAL SHENANDOAH GREENWAY OFFERS USERS A UNIQUE TRAIL EXPERIENCE, OFFERING PASSAGE THROUGH A FORESTED HILLSIDE AND REVEALING VIEWS OF THE SOUTH FORK OF THE SHENANDOAH RIVER. ZONE FOUR PROVIDES CONNECTIONS TO:

- SKYLINE HIGH SCHOOL
- THE SOUTH FORK OF THE SHENANDOAH RIVER
- LURAY AVENUE BOAT LAUNCH
- EASTHAM PARK

ZONE FOUR ISSUES AND RECOMMENDATIONS:

- UTILIZE AN EXISTING CULVERT BENEATH THE RAILROAD TRACKS TO CONNECT THE UPPER PORTION OF THE TRAIL TO EASTHAM PARK.
- THE CULVERT ALLOWS A WET WEATHER STREAM (IMAGE 3) AND UPSLOPE DRAINAGE TO PASS UNDER THE RAILROAD TRACKS TO THE RIVER.
- CONSTRUCT A SHORT, BOARDWALK SEGMENT THAT ALLOWS THE USER TO MOVE THROUGH THE CULVERT, WHILE ALLOWING RUNOFF TO FLOW UNDERNEATH.



- EXISTING BIKELANE
- PROPOSED GREENWAY (GRAVEL)
- SHARED ROAD RIGHT OF WAY
- ▬▬▬ EXISTING CROSSWALK
- PROPOSED SIDEWALK
- P** PARKING
- ⛶** PICNIC AREA
- ♿** RESTROOM
- ▬▬▬ PROPOSED CROSSWALK

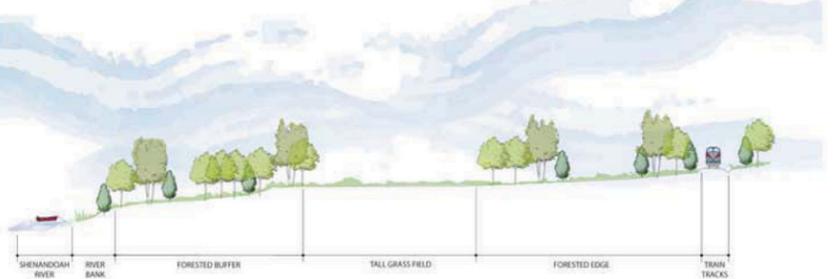
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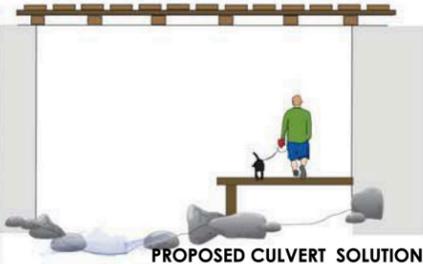
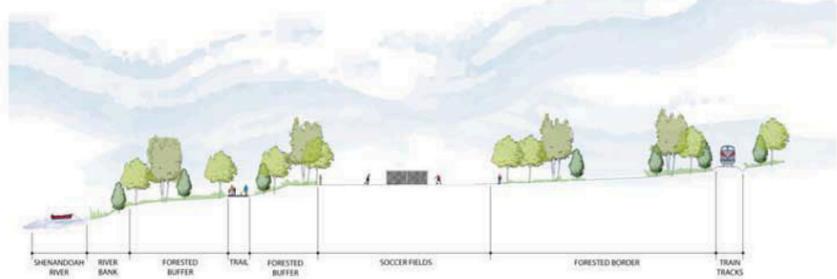
THE EXISTING SITE FOR THE EASTHAM PARK:

- IS COMPOSED OF A LARGE OPEN FIELD (IMAGE 1) BORDERED BY DENSE VEGETATION.
- TRAIN TRACKS (IMAGE 2) BORDER THE SPACE ON THE UPPER EDGE, SEPARATING THE FIELD FROM A STEEP AND FORESTED INCLINE.
- CURRENTLY THERE ARE LIMITED VIEWS TO THE WATERFRONT ASIDE FROM THE BOAT LAUNCH.

EXISTING SECTION A-A



PROPOSED SECTION A-A



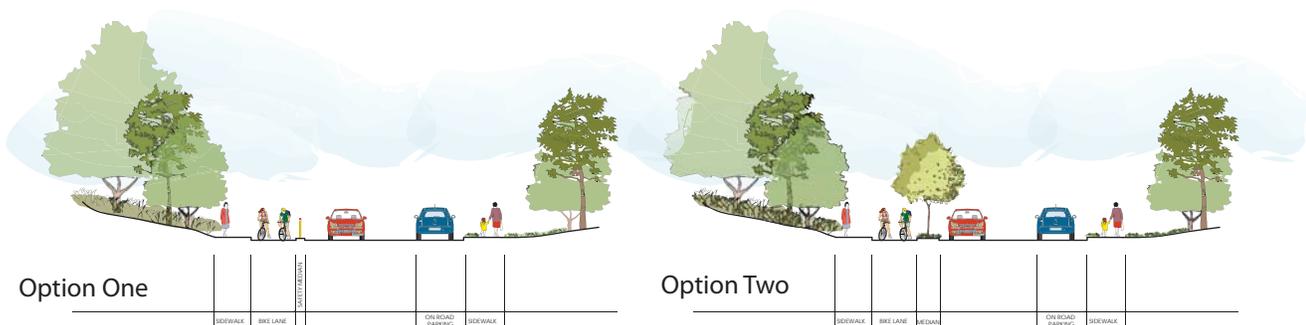
Zone Five: Luray Avenue to Main Street

The conceptual master plan for Zone Five emphasizes the existing shared bike lane and sidewalks as a means of connecting the trail to Main Street.

The existing on-road bike lane runs halfway up Luray Avenue, ending at Oakridge Drive. This on-road trail should be extended up Luray Avenue as road widths permit. Sidewalks currently run along Luray from Overlook Road to Main Street. It is proposed that the sidewalk be extended along Luray from Criser Road to Overlook Road. This will provide pedestrians with a continual sidewalk up to Main Street. After Luray Avenue the cyclist will utilize a shared roadway to Main Street.

For increased safety, the bike lanes on Luray Avenue need to be defined with painted stripes. Also, the addition of a physical element to separate the cyclists from automobile traffic would enhance the users safety and experience. There are two options for the physical separation of the bike lane and the automobile traffic. One is a simple design intervention of adding a safety reflective median. This uses reflective barriers that alert both the trail user and the driver of the presence of a bike lane, decreasing automobiles likelihood of entering the trail way. A second option is to add a planted median which would create a stronger separation between cars and cyclists. A planted median is a more intensive intervention, however it is both visually pleasing and safe.

Finally, Bowman Park is a successful and beautiful green-space that allows a place to pause along the railway. The CDAC team proposes the addition of picnic facilities will make it more usable by trail users and residents alike.



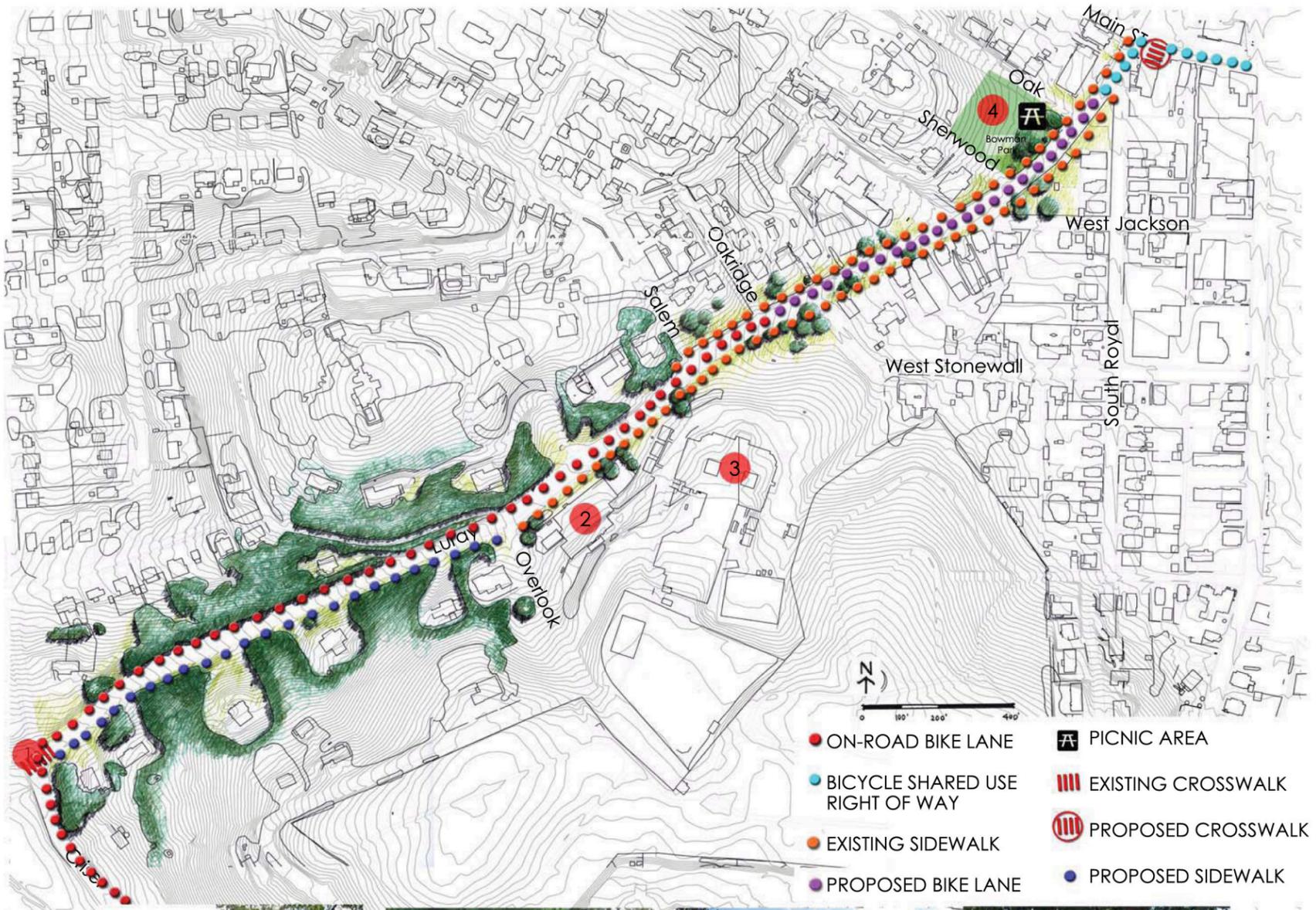
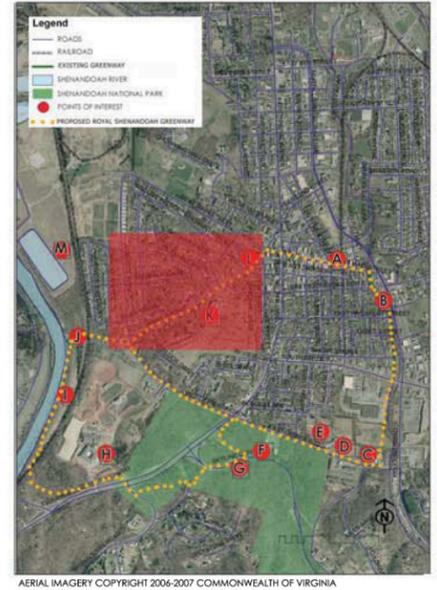
ROYAL SHENANDOAH GREENWAY

Zone Five Conceptual Master Plan: From Luray Avenue to Main Street, 0.66 miles

**ZONE FIVE OF THE ROYAL SHENANDOAH GREENWAY CONTINUES
ALONG LURAY AVENUE TOWARD THE CENTER OF TOWN.**

ISSUES AND SUGGESTIONS FOR ZONE FIVE:

- THE TRAIL UTILIZES EXISTING SIDEWALKS AND BIKE LANE FOR A PORTION OF ZONE FIVE.
- DESIGN INTERVENTIONS TO CREATE VISUAL OR PHYSICAL SEPARATION FROM VEHICLES ARE RECOMMENDED.
- DRIVING LANES ON LURAY AVENUE SHOULD BE MORE CLEARLY DEFINED WITH PAINTED STRIPS DOWN THE CENTER OF THE ROAD IN PLACES WHERE IT IS NOT CURRENTLY MARKED.



1
INTERSECTION OF LURAY AVENUE
AND KERFOOT ROAD



2
ZONE 5 CONNECTS TO BLUE RIDGE
TECHNICAL SCHOOL AND THE
FUTURE MIDDLE SCHOOL



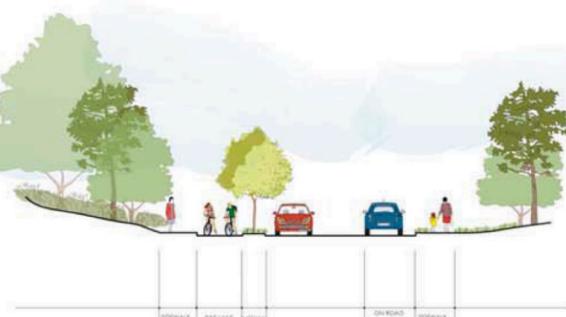
3
THE FUTURE MIDDLE SCHOOL OFFERS
DESIRABLE OPEN SPACE ALONG THIS
SECTION OF TRAIL.



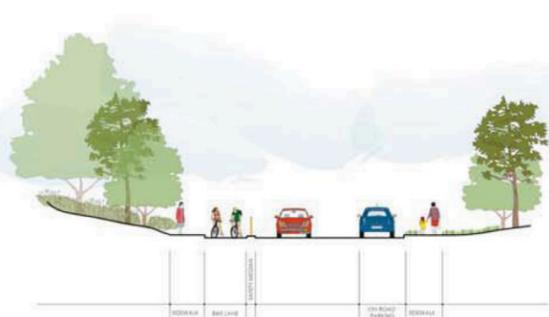
4
TRAIL USERS CAN ENJOY A SHADY
BENCH IN BOWMAN PARK.

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LURAY AVENUE OPTION ONE:
IMPLEMENTING A PLANTED MEDIAN TO SEPARATE THE
BICYCLE LANE AND AUTOMOBILE TRAFFIC.



LURAY AVENUE OPTION TWO:
IMPLEMENTING A REFLECTIVE SAFETY MEDIAN TO SEPARATE
THE BICYCLE LANE FROM AUTOMOBILE TRAFFIC.

ZONE FIVE: DESIGN

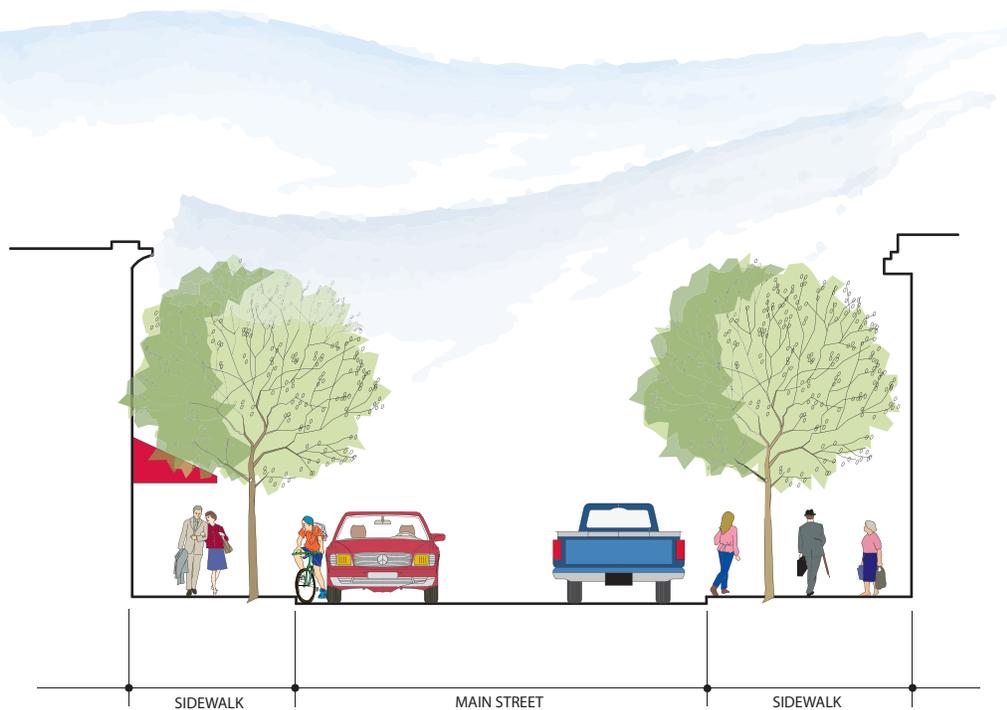
Zone Six: Main Street

The conceptual master plan for Zone Six enhances the already successful downtown streetscape of Front Royal.

Generous sidewalks allow for pedestrians to experience Main Street, while bikers are able to share the road with vehicular traffic. Bicycle racks should be placed along Main Street to invite trail users to pause and explore what downtown Front Royal has to offer.

The Gazebo Park and Visitors Center provide a place for pause as well as a range of amenities such as restrooms and water fountains, for the trail users during business hours.

The design interventions along Zone Six allow for the increased accessibility of trail users to the downtown streetscape of Front Royal.



ROYAL SHENANDOAH GREENWAY

Zone Six Conceptual Master Plan: From Main Street to Happy Creek, 0.42 miles



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ZONE SIX OF THE ROYAL SHENANDOAH GREENWAY COMPLETES THE LOOP AND BRINGS USERS INTO THE HEART OF DOWNTOWN.

- WALKERS CAN MOVE ALONG THE TOWN'S GENEROUS SIDEWALKS, WHILE BIKERS WILL RIDE ON THE ROAD, SHARING THE LANE WITH VEHICLES.
- BIKE RACKS WILL HELP INVITE TRAIL USERS TO STOP AND EXPLORE DOWNTOWN.
- THE VISITOR'S CENTER CAN PROVIDE WALKERS AND BIKERS WITH WATER FOUNTAIN AND RESTROOM OPPORTUNITIES DURING BUSINESS HOURS.



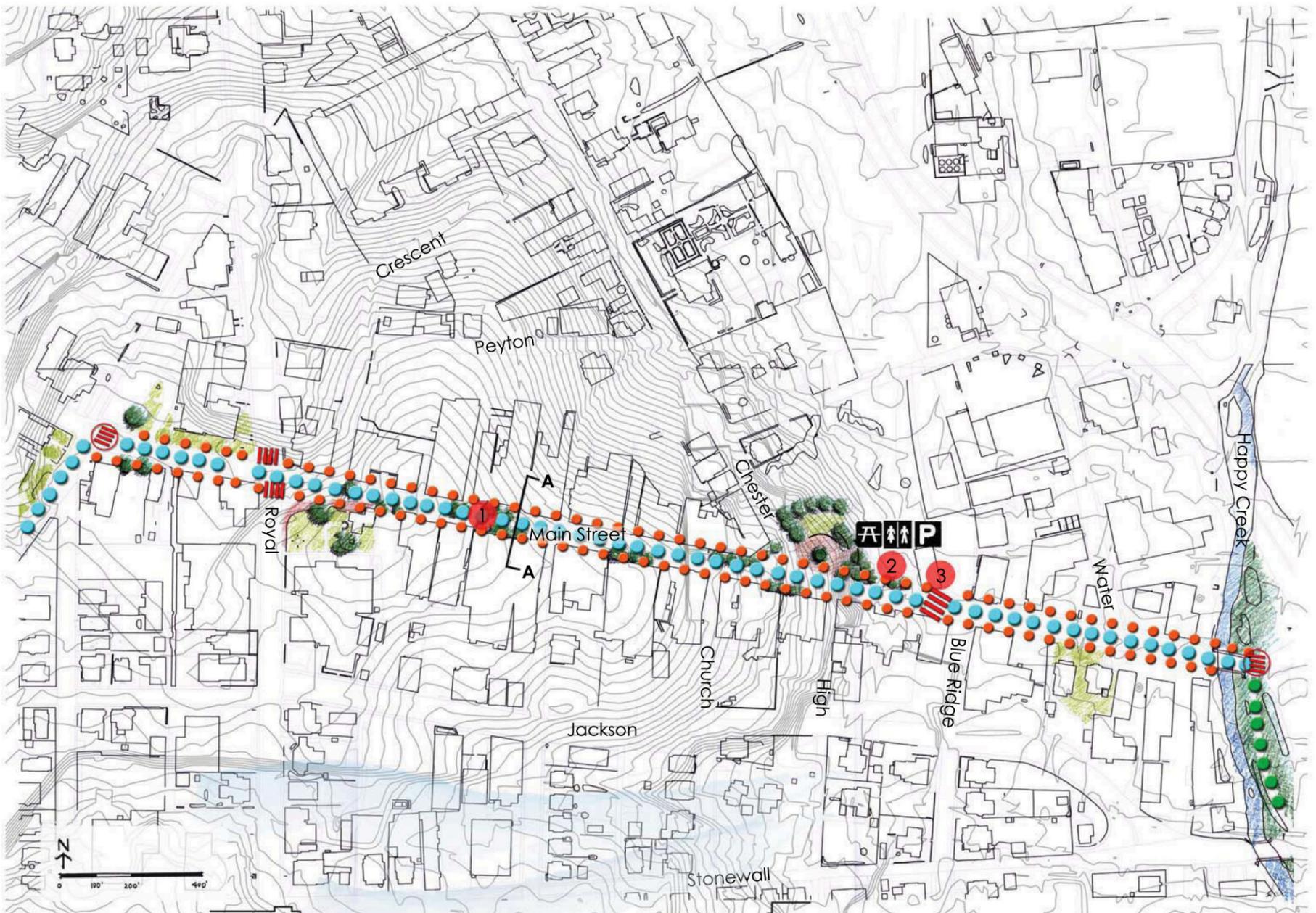
1 CROSS SECTION LOOKING WEST ON MAIN STREET



2 DOWNTOWN PARK OFFERING SHADE AND SEATING

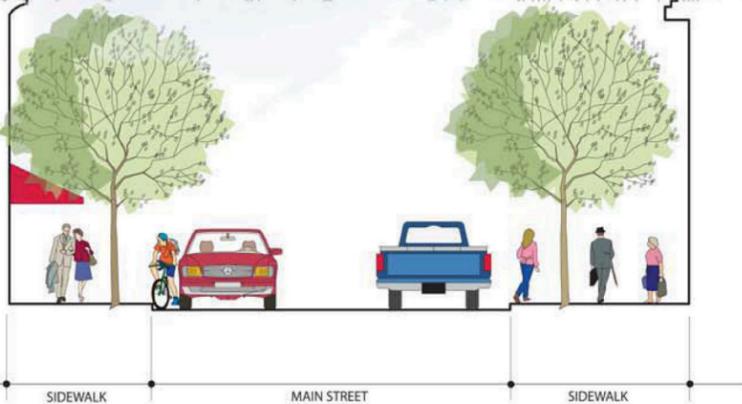


3 VISITOR'S CENTER



SECTION A-A:

TYPICAL SECTION OF MAIN STREET: CARS AND BIKERS SHARE THE ROAD; PEDESTRIANS ON SIDEWALK.



- EXISTING SIDEWALK
- EXISTING GREENWAY
- BICYCLE SHARED USE RIGHT OF WAY
- ▬ EXISTING CROSSWALK
- ⊘ PROPOSED CROSSWALK
- P PARKING
- ⌘ PICNIC AREA
- ♿ RESTROOM
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Appendices:

Appendix A: Trail Design Guidelines

Appendix B: Additional Suggestions for Trail Design

Appendix A: Trail Design Guidelines

Serving as part of a transportation circulation system, the Royal Shenandoah Greenway will be a shared use path and will support multiple recreation opportunities, including walking, bicycling, and running. A portion of the trail will be paved and a portion will be crushed gravel. Signage, in the forms of brochures and trail head maps, should clearly indicate which areas are paved or gravel so user expectations can be clear.

Major access points (trail heads) should provide parking and signage that articulates rules for trail use and gives an overview of the trail loop (map). Restroom opportunities should also be clearly identified in the mapping. Consistent maintenance over the entire length of the greenway is very important both to reduce the damage caused over time by the effects of weather and use, as well as to provide a uniform and predictable experience for trail users over the course of a year and its varying seasons.

As much as possible, the trail should maintain continuity in terms of the trail width and design of supporting facilities, such as signage, seating, trail heads, and mile markers. In general, the ideal width of the greenway is 10 feet wide with 2 foot wide graded shoulders on either side. Proposed trail width for Zone 3 through Shenandoah National Park is 8 feet with two foot wide graded shoulders. The specific design of Royal Shenandoah Greenway may have additional variations per zone based on physical constraints and guidelines of the managing organization. Some potential exceptions are mentioned below.

EXCEPTIONS TO THE ABOVE STATED GUIDELINES:

Zone One: The existing Happy Creek Greenway is a 12-foot wide, asphalt trail in excellent condition. As Zone One is extended the greenway width will need to shift to 10-feet wide, due to the need to fit the trail in narrower locations. It is recommended that the surfacing material will remain as asphalt. One area of exception is the crossing of South Street. The trail will either need to be routed under the South Street bridge, skirting Happy Creek or the trail could be routed along the existing sidewalk on South Street to the traffic light. Site specific design considerations will need to be made for either option. Parking, picnicking, and trail head signage are also offered in Zone One near the Happy Creek Arboretum.

Zone Two: It is recommended that the proposed greenway in Zone Two continue to be a paved, 10-foot wide trail. Trail width may vary behind the shopping center depending on trail placement. A second variation in width and use may need to occur in front of Samuel Jeffries Library. For a short portion of the greenway pedestrians will utilize the sidewalk in front of the library, and bicyclists will either share the road with vehicles or dismount their bikes and walk on the sidewalk. Parking, restroom opportunities, picnic areas, and trail head signage are offered via Burrell Brooks Park in Zone Two.

Zone Three: The proposed route for Zone Three is sited within Shenandoah National Park. As the trail enters the park, it is recommended that surfacing material transition to crushed stone, consistent with existing Dickey Ridge Trail surfacing, and the width will shift to 8-feet wide, with two foot shoulders. The use of crushed greenstone has been successfully used on other trails within the Shenandoah National Park, and may be considered for the Zone Three trail. Trail construction standards will be set by the park and trail construction assistance may come from the Potomac Appalachian Trail Club. A small portion of the trail may need to be constructed as a boardwalk, to minimize impact on the existing habitat and to provide a suitable surface for the trail. Parking opportunities for trail access exist at the current Dickey Ridge Trail parking lot.

Zone Four: It is recommended that the trail surfacing for

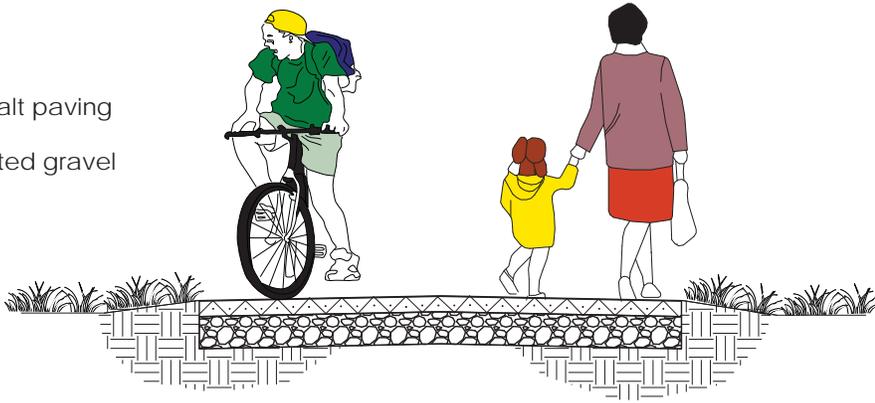
Zone Four will also be primarily crushed stone. The portion of the trail that continues along Criser Road on Shenandoah National Park land will be constructed to the same standards as the trail in Zone Three (8 foot wide with 2 foot shoulders). It is recommended that the portion of trail that passes down the wooded hillside and parallels the South Fork of the Shenandoah River be 10 feet wide and will also be a crushed stone surface. A change in trail width and surfacing is recommended as the trail passes through a large box culvert. In order to allow runoff to flow in the culvert, it is recommended that a short boardwalk segment be constructed that allows greenway users to move through the culvert. Another trail surfacing and width exception in Zone Four is on Luray Avenue. A short segment of the trail will need to be routed onto the road to allow for passage under the railroad trestle. Parking, restroom opportunities (port-a-jons), picnic areas, and trail head signage are offered via Eastham Park in Zone Four.

Zone Five: The trail experience for Zones Five and Six will vary from Zones One to Four. As the trail passes through neighborhoods and into downtown Front Royal, it utilizes existing sidewalk and bike lane infrastructure. Recommendations are made for Zone Five to extend the bike lane on Luray Avenue and to construct a sidewalk to create a continuous pedestrian experience along Luray Avenue. As the trail moves toward Main Street, walkers/hikers are routed along existing sidewalks; cyclists will finish the loop sharing the road with vehicles. Picnicking opportunities are offered at Bowman Park in Zone Five.

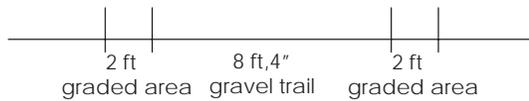
Zone Six: Zone Six provides connection to downtown Front Royal and the existing Happy Creek Greenway, completing the Royal Shenandoah Greenway loop. Trail walkers are routed along the ample sidewalks on Main Street. Cyclists will share the road with vehicles for this last portion. Parking, restroom opportunities, and seating are offered via the existing town square and visitors center. Trail signage should also be added.

Design Guidelines for Standard Asphalt Trail

2" asphalt paving
4" compacted gravel



Design Guidelines for Gravel Trail

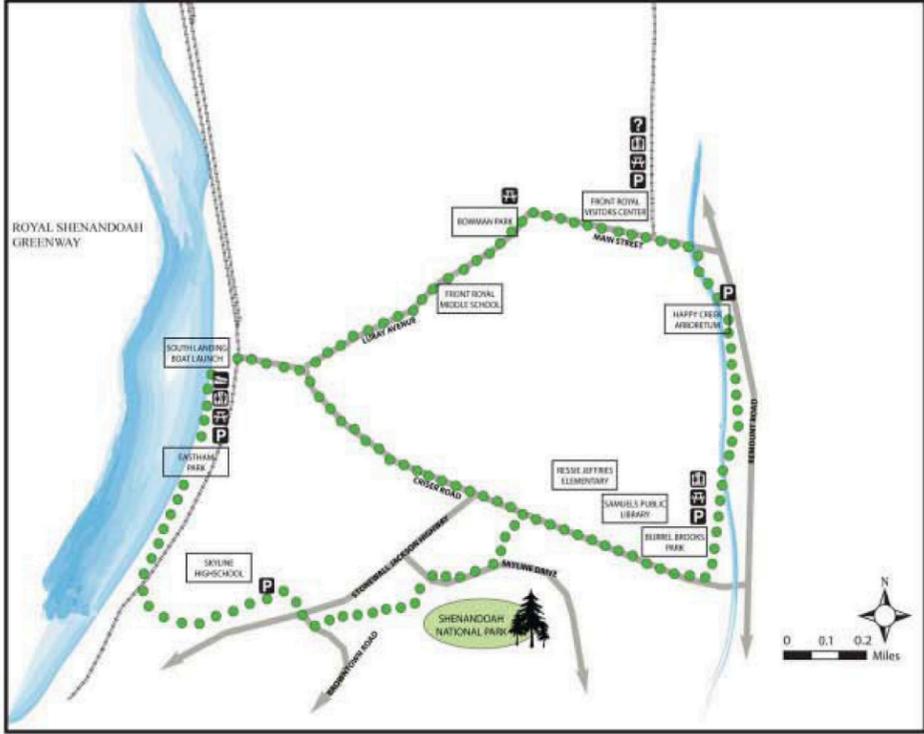


ROYAL SHENANDOAH GREENWAY

GREENWAY SIGNAGE SUGGESTIONS

POTENTIAL TRAIL HEAD SIGNAGE BOARD

THE ROYAL SHENANDOAH GREENWAY





ROYAL SHENANDOAH GREENWAY RULES

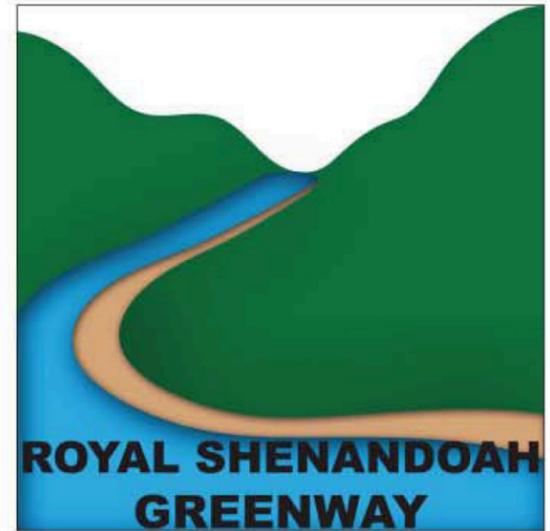
- CONSUMPTION OF ALCOHOLIC BEVERAGES PROHIBITED
- IT IS UNLAWFUL TO CARRY FIREARMS OR WEAPONS ON THE TRAIL
- MOTORIZED VEHICLES ARE NOT PERMITTED ON THE TRAIL
- PETS MUST BE ON A LEASH AT ALL TIMES.

TRAIL OPEN FROM SUNRISE TO SUNSET

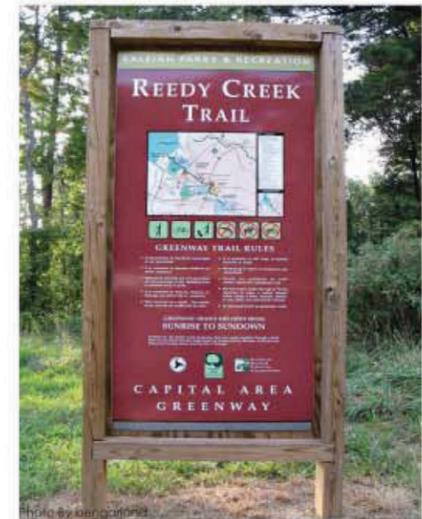



A FRONT ROYAL AND WARREN COUNTY COLLABORATION

POTENTIAL TRAIL LOGO



SIGNAGE BOARD EXAMPLE



SMALL KIOSK EXAMPLE



STREETScape SIGNAGE



SIGNAGE ALONE THE GREENWAY



SIGNAGE IN THE NATIONAL PARK



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Appendix B: Additional Suggestions

The following information was taken from the Federal Highway Administration's Shared Use Path Design and Recreational Trail Design recommendations. It provides general suggestions related to addressing user conflicts, trail surfacing, and signage design that will be helpful in the consideration of specific designs for the Royal Shenandoah Greenway

Addressing User Conflicts

Greenways attract a variety of user groups who may have conflicting needs. All pedestrians are affected by sudden changes in the environment and by other trail users, such as bicyclists, who travel at high speeds. To improve the greenway experience for all users, including people with disabilities, designers and planners should be aware of potential conflicts and employ innovative solutions whenever possible. Basic conflicts can be reduced by:

- Providing information, including signage, in multiple formats that clearly indicates permitted users and rules of conduct;
- Ensuring that the greenway provides sufficient width and an appropriate surface for everyone, or providing alternate paths for different types of users;
- Providing the necessary amenities for all users. For example, bike racks downtown and at trail head/restroom areas;
- Considering the needs of people with disabilities within all of the user groups permitted on the path. For example, many individuals with disabilities may use a longer hand cycle or wider tricycle design that may not be compatible with bike racks. Longer and wider equipment may need additional maneuvering space in restrooms and when transferring from the chair to benches.

Surfaces

There are various surface materials that can be used in outdoor environments. Greenways are generally paved with asphalt or concrete, but may also use prepared surfaces such as crushed stone or soil stabilizing agents mixed with native soils or aggregates. High use trails passing through developed areas or fragile environments are commonly surfaced with asphalt or concrete to maximize the longevity of the trail surface and promote use. The surfacing material on the trail significantly affects which user groups will be capable of negotiating the terrain. Trails that have been built using crushed aggregate generally slow down the speed of bicyclists. Paved surfaces should be provided in areas that are subject to flooding or drainage problems, in areas with steep terrain, and in areas where bicyclists are the primary users.

The firmness, stability, and slip resistance of the greenway surface affects all users but is particularly important for people using mobility devices such as canes, crutches, wheelchairs, or walkers.

The greenway should have a firm and stable surface. When a person walks or wheels across a surface that is not firm and stable, energy that would otherwise cause forward motion instead deforms or displaces the surface or is lost through slipping. Asphalt and concrete are firm and stable in all conditions. Other materials, such as crushed limestone, are also firm and stable under most conditions. If a more natural surface is desired, synthetic bonding materials should be considered.

The condition of the surface is a significant factor in determining how easily a person with a disability can travel along the trail. The accessibility of the greenway surface is determined by a variety of factors including:

- Surface material;
- Surface firmness and stability;
- Slip-resistance;
- Changes in level; and
- Size and design of surface openings

Signage

Signs that clearly describe the greenway conditions are an essential component to enhance users' experience of the trail. Signs should be provided in an easy to understand format with limited text, and graphics that are understood by all users. Providing accurate, objective information about actual greenway conditions will allow people to assess their own interests, experience, and skills in order to determine whether a particular greenway is appropriate for them. Providing information about the condition of the greenway to users is strongly recommended for the following reasons:

- Users are less likely to find themselves in unsafe situations if they understand the demands of the greenway before beginning;
- Frustration is reduced and people are less likely to have to turn around on the trail because they can identify impassible situations, such as steep grades, before they begin;
- Users can select greenway that meet their skill level and desired experience;
- The level of satisfaction increases because the user is able to select a trail that meets his or her expectations;
- If more difficult conditions will be encountered, users can prepare for the skill level and equipment required.

Objective information about the greenway conditions (e.g., grade, cross slope, surface, width, obstacles) is preferable to subjective difficulty ratings (e.g., easier, most difficult). Because subjective ratings of difficulty typically represent the perceptions of the person making the assessment, the ratings cannot be accurate or appropriate for the range of greenway users.

A variety of information formats may be used to convey objective greenway information. The type of format should conform to the policy of the management agency. Written information should also be provided in alternative formats, such as Braille, large print, or an audible format. In addition, simplified text and reliance on universal graphic symbols will provide information to individuals with limited reading abilities.

The type and extent of the information provided will vary depending on the greenway, environmental conditions, and

expected users. It is recommended that the following information be objectively measured and conveyed to the user through appropriate information formats:

- Greenway name;
- Permitted users;
- Greenway length;
- Change in elevation over the total length and maximum elevation obtained;
- Average running grade and maximum grades that will be encountered;
- Average and maximum cross slopes;
- Average tread width and minimum clear width;
- Type of surface; and
- Firmness, stability, and slip resistance of surface.

Concepts taken from the Federal Highway Administration Shared Use Path Design/Recreation Trail Design:
<http://www.fhwa.dot.gov/environment/sidewalk2/sidewalks214.htm>
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