

# SUNSET PARK TRAILS MASTER PLAN

WAYNESBORO, VA

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## ACKNOWLEDGMENTS

**PREPARED FOR:**

CITY OF WAYNESBORO, VIRGINIA  
DEPARTMENT OF PARKS AND RECREATION



SHENANDOAH VALLEY BICYCLE COALITION  
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# TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	1
ABOUT IMBA TRAIL SOLUTIONS .....	2
PROJECT BACKGROUND .....	3
PROJECT GOALS .....	5
PROJECT SITE & EXISTING CONDITIONS .....	7
BIKE FACILITIES & TRAILS .....	9
EXPERIENCE ZONES & PREFERRED-USE TRAILS .....	14
CONCEPT PLAN .....	15
PHASING & COST OPINION .....	22
IMPLEMENTATION & NEXT STEPS .....	24
CONCLUSION .....	26
APPENDIX A: GENERAL TRAILS PLANNING & DESIGN GUIDELINES .....	27
APPENDIX B: BENEFITS OF MOUNTAIN BICYCLING TRAILS .....	33
APPENDIX C: FIGURES .....	36
APPENDIX D: TRAIL SPECIFICATIONS .....	40
APPENDIX E: PRE-FAB FEATURES .....	42



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# EXECUTIVE SUMMARY

This plan outlines a recreational vision for the future Sunset Park in Waynesboro, VA. Waynesboro is a recreational outpost in the Shenandoah Valley, with abundant public lands, trails, and rivers close by. The Shenandoah Valley Bicycle Coalition is a local organization that has been helping increase walking and biking opportunities for over two decades, their commitment to this project creates a strong partnership with Waynesboro Parks and Recreation. Sunset Park will provide meaningful close-to-home recreation for residents and visitors. Situated on wooded slopes above the City, this park will provide a range of passive recreational opportunities, from site seeing and picnicking to hiking and mountain biking. This plan outlines the conceptual design of over four miles of natural surface trails. When implemented, beginner-friendly trails that appeal to new users and offer accessible recreation for adaptive bicyclists will set the stage for future generations to grow up recreating outside. Intermediate level trails allow local residents to progress in their skills over time, growing individually and as a community. Sunset Park and its accompanying trail network will provide an important asset to the City; free and accessible nature-based recreation for everybody. Continuing to help Waynesboro set itself apart as a wonderful place to live and work.



## ABOUT IMBA TRAIL SOLUTIONS

IMBA Trail Solutions (TS) is the international leader in developing trails, with experience in over 750 projects in North America, Europe, and Asia. Our staff excels at planning, design, and construction of trail systems that provide high-quality experiences for local riders and destination visitors while simultaneously minimizing environmental impacts.

Trail Solutions is a fee-for-service based arm of the International Mountain Bicycling Association (IMBA), a 501(c)(3) nonprofit organization. IMBA's mission is to create, enhance, and protect great places to ride mountain bikes. Based in Boulder, Colorado, and with staff distributed across the country and the world, IMBA meets its goal to create great mountain bike experiences through its Trail Solutions program. Trail Solutions employs approximately twenty professional trail planners and builders. In addition to being industry professionals and exceptional mountain bike riders, Trail Solutions staff hold a broad base of applicable skills and knowledge from planning, landscape architecture, and environmental sciences to GIS systems, CAD, and graphic design.

Our wealth of experience has allowed us to develop the gold standard guidelines for the creation of both sustainable and enjoyable singletrack trails. These guidelines have influenced all major federal land management agencies and a large number of state and local parks departments. We pride ourselves on the positive experiences Trail Solutions has provided to the millions of active trail users around the world and on the economic independence that communities have achieved through the development of destination trail systems.





# PROJECT BACKGROUND

The Shenandoah Valley Bicycle Coalition (SVBC) was awarded a Trail Accelerator Grant (TAG) to assist in planning efforts of natural surface trails in the Shenandoah Valley and provide communities there with more trails close to home. TS and SVBC partnered with City of Waynesboro Parks and Recreation Department officials to develop a trail concept and design for Sunset Park that aligns with exiting planning efforts to create a new recreation area on a 100-acre former landfill property.

TS conducted a site visit in April 2022 and met with SVBC and city parks officials to get an understanding of site conditions, community goals, and create a field design. A community meeting was held during this time to inform the public about the planning process and gather input on their needs, interests, and goals.

This report outlines the planning and design work for Sunset Park. This document covers opportunities and constraints, site visit findings, conceptual plan with field flagged corridors, and implementation recommendations. This plan will help ensure close to home recreation opportunities and support fun healthy activities for residents of all ages and ability levels. It introduces a variety trail experiences for riders, hikers, and runners and creates new opportunities for area youth to engage in trail based activities.

## Trail Accelerator Grants (TAG)

To grow the quantity and quality of mountain bike trail communities, IMBA has identified the need to accelerate the process from trail planning to trail building. Trail Accelerator Grants (TAG) provide a jump-start for communities that have the interest and political support to develop trail systems, but need assistance to get projects up and running. A TAG award provides professional trail planning and consultation services to launch a community's trail development efforts, which can often leverage additional investment from local, regional, and national partners.

In late 2021, the Shenandoah Valley Bicycle Coalition was awarded TAG matching funds to engage IMBA TS to create this plan.

## SVBC

The Shenandoah Valley Bicycle Coalition is a membership-based organization with a mission to Build Better Communities in the Shenandoah Valley. Their mission is to enhance the places they live and help foster healthier, freer, more connected, stronger, vibrant communities. They have been involved in the area for over 35 years. Their history of stewardship involves all things bike and walk related. They are working to share these values and expand biking opportunities within their communities while promoting a spirit of playfulness and the joy of riding.



## Waynesboro, VA

Waynesboro, VA, in Augusta County, is nestled in the Shenandoah Valley along the South River. The City is growing (5.7%) annually with a population of 22,196 according to the 2020 census. This former industrial city is rich in history, with a renovated downtown full of shops and restaurants. Surrounded by the Blue Ridge Mountains the City provides a convenient stopping point for visitors along the Blue Ridge Parkway, Skyline Drive, and Appalachian Trail (AT).

## Regional Trails

Many recreational opportunities exist around the Shenandoah Valley for hiking and bicycling with the Appalachian Trail (AT) being the most well known destination. The Shenandoah Valley has some great mountain biking, but the majority of trails are found further north and west in the George Washington National Forest and along the Western Slope of Massanutten near Harrisonburg. Much of the area riding is geared toward intermediate and advanced riders. Montgomery Hall Park in Staunton and Hillendale Park in Harrisonburg are the closest trail systems for beginners or young riders in the area. Waynesboro is lacking in easily accessible

natural surface trails, the majority of trails in the area are either paved or gravel pathways or rugged hiking trails along the Blue Ridge.

The main trail in town is the South River Greenway, this 2-mile asphalt shared use path is near the Main Street business district along the South River. The historic Crozet Tunnel & Greenway is 4,700-foot train tunnel that passes under the mountains at Rockfish Gap. A 0.8 mile crushed stone path leads to the tunnel from a trailhead off Route 250. The path is steep in sections and not ideal for bike access. Additional recreational facilities within Waynesboro include a 6.5 mile water trail, Fox Disc Golf Course, Basic Park, Constitution Park, Coyner Springs Park, North Park, Ridgeview Park, and Rife Park. Ridgeview Park is the only facility within the City that includes some natural surface trails along the river.

### Sunset Park Planning

Sunset Park will be the newest addition to the City's parks and recreation facilities. The 107-acre property is the site of the former city landfill and includes a 17 acre cap and monitoring wells over the dump site. The City has engaged Landscape Architecture and Engineering firms to develop the plan and construction documents for the new park at the top of the hill.





# PROJECT GOALS

## 1 Develop trails and bike facilities that deliver high-quality experiences to the community

Waynesboro sits in the heart of the Shenandoah Valley where a variety of recreational opportunities exist, but the city is lacking in easily accessible natural surface trails close to home. Access and transportation are issues for some community members with more opportunities needed for area youth that are within walking or biking distance. SVBC runs the Staunton-Augusta-Waynesboro (SAW) mountain bike team for area youth but there are no trails within Waynesboro for kids to ride, Staunton provides the closest location. Sunset Park with its proximity to area schools, downtown, and residential areas offers a unique opportunity within the community to provide a range of trail experiences for biking, walking, and running. The trail network design considers the needs and desired experiences of a range of user groups and looks to compliment and enhance the cities plan for developing the park. This trail system will be a first for the community and will help foster healthy lifestyles and provide access to fun and engaging activities for people of all ages and ability levels.



## 2 Introduce progressive mountain bike experiences, skills development, and bike amenities with a focus on beginner trail experiences

An important factor for a successful community trail system is its capacity to support a range of ability levels and provide opportunities for progressive skills advancement. Today's mountain biker is looking for purpose built trails that optimize the riding experience. Bike optimized trails are constructed with features to enhance that experience. Features may include rock gardens, berms, grade reversals, cambered turns, and modest jumps. They should be designed for a range of users from beginner to advanced skill levels. In order to progressively build skills necessary for more difficult trails, cyclists are looking for features to increase bike handling and balancing skills. Technical trail features (TTFs), such as wooden rollers, bridges, log skinnies, etc. provide the challenge and skill-building opportunities that cyclists are seeking. These features can be located on a designated skills trail or can be provided on the side of trails as optional features. Adequate space must be provided to allow riders to exit the feature and gradually merge with the main trail and other riders. Many of the planned traditional cross country style trails will have the required space and ideal grades to locate optional technical trail features.

The focus of this design is to create a system that allows beginners to learn and advance their bike handling skills while also providing intermediate and advanced riders an engaging riding experience that they will enjoy riding repeatedly.





### 3 Provide healthy recreational activities for residents with a focus on opportunities for area youth

Numerous studies on physical activity have indicated that proximity to outdoor recreational facilities, such as trails and bike amenities, is a predictor for physical activity level. If there are walking and biking trails nearby, then residents are more likely to use them and therefore be healthier. Physical health and access to nature also benefit mental health, reducing stress and increasing happiness. Connection to nature is paramount to maintaining the health of the environment and making the outdoors relevant and accessible to all. In addition, individual and community health translate to economic benefits by decreasing healthcare costs. Public trails and bike facilities also provide outdoor community spaces that encourage public engagement. Bike facilities serve a diverse population and cultivate unity and stewardship in the community. By incorporating bike-specific amenities into parks, Waynesboro can help promote active and healthy lifestyles and promote social integration.

With today's distractions and the increasing amount of time indoors and in front of screens, children are spending less time outside. Many times, programmed play equipment doesn't provide the challenge and reward that children are seeking. By incorporating a range of bike-specific play features, the parks can provide engaging activities that will encourage kids to get outdoors, increase socialization, and build confidence.



### 4 Enhance connectivity to regional recreational offerings

Connectivity to the regional recreational landscape is important for this growing community. Residents and visitors would both benefit from increased access. Waynesboro's proximity to the Blue Ridge Mountains and all the recreational activities there is an asset for the community, but access is limited for some residents. Some of the area parks and trails are inaccessible to children on foot or bike due to distance or safe routes to parks and trails. The natural surface trails planned for Sunset Park will provide easily accessible facilities that are within walking or biking distance. Additional opportunities exist to expand natural surface trails and bike optimized singletrack around the city with some sites identified in this plan.

The City has worked on numerous studies looking at connectivity within Waynesboro with a focus on expanding the South River Greenway Trail. The goal is to connect Basic and Ridgeview Parks and make a connection between downtown and the Crozet Tunnel. Multiple projects are in the works to reach these goals. Improved connectivity will provide visitors and residents with convenient access to natural surface trails, strengthen their connection with nature, improve quality of life, enhance health and well-being, and increase visitation to local businesses.





# PROJECT SITE & EXISTING CONDITIONS

## Sunset Park

Sunset Park will be the newest recreational facility for the City of Waynesboro. Located at the top of a hill overlooking downtown and the Shenandoah Valley, this former landfill site will be a destination for both active and passive recreation. Development of the park is underway with plans being created to put out to bid this summer for construction of park roads and facilities. Planned amenities at the park will include parking, open lawn space, multiple overlooks, walking paths, pavilion, restrooms, and trailhead access. Improvements to the park entrance, access road, and stormwater infrastructure will also be made.

The project parcel is over 100 acres, including approximately 17 acres of capped landfill which is unusable for park or trail development. North Winchester Ave. is the only access road into the park. Access is limited by a gate at the base of the property next to the sanitation facility. The gravel road is steep and eroded in places and will be improved as part of the park development. A CSX Rail line runs along the western edge of the property cutting off access along the lower edge of the slope. The landfill cap is open grassland, the area includes stormwater catch basins and monitoring wells. The southern portion of the property remains undeveloped and is comprised of about 45 acres of beautiful open hardwood forest intersected by a few small creeks. The site is hilly with distinct zones created by the small creeks running westward through the valleys, Sunset Park will sit on the highest point at about 1,600' with open views of the surrounding area. Around 180' of usable elevation change is available for trail development. Slopes within the wooded portion of the site are gentle with grades under 50% and ideal for trail development. Steeper sections are found on terraced fill slopes below the cap along the western side of the property and include stormwater drainage catchment basins limiting trail opportunities there. There are no recreational trails on the property, but multiple forest roads exist which are used to access monitoring wells that are found throughout. A transmission line corridor runs along the southeastern side of the parcel bisecting portions of the furthest hillside.





## Bike Facilities Suitability Assessment

The methodology for this project included mapping data collection, desktop based GIS analysis, stakeholder and land manager discussions, public engagement, field observations and field design and flagging.

The following elements are identified as key opportunities and constrains when considering the suitability of the site for bike facilities development. Overall, the site was found to provide highly suitable conditions for bike focused infrastructure with progressive options for beginner and intermediate riders. The park facilities being developed by the City will support trailhead infrastructure needs and provide access for the community. Gentle slopes and open hardwood forest offer ample opportunities for locating natural surface trails serving a variety of user types and ability levels.

### Key Opportunities

- 45 acres of intact woodland area
- Close to 200' of elevation gain
- Gentle slopes for beginner terrain
- Park facilities to complement the trail system
- Multiple trailhead access points
- Close to the community

### Key Constraints

- Landfill cap
- Steep fill slopes
- Stormwater structures
- Monitoring wells
- Stream crossings
- Railroad limits connectivity





# BIKE FACILITIES & TRAILS

The types of mountain bike trails and facilities considered in this feasibility study are explained below. These narratives are meant to provide a brief description of the envisioned experience, intended user, construction considerations, and approximate ranges of construction costs. The construction costs reflect the cost of retaining a professional trail contractor and are provided for financial planning purposes only. The cost ranges do not include planning, design, and permitting needed to develop the facilities, typically estimated at 10-20% of construction costs. It is important to consider ongoing maintenance costs of trails and bike facilities; these can range from 5-25% of the installation cost.

## Trail Types

Modern trail systems use specific trail types as a way of managing users and providing them with the best possible visitor experience. Extensive planning and design should be dedicated to the goal of maximizing a visitor's trail experience while simultaneously balancing the demands of physical, environmental, and social sustainability. This list is not exhaustive.

### ***Traditional Shared-Use Singletrack***

These trails can serve walkers, hikers, runners, cyclists, and equestrians. Trails should be constructed and maintained according to sustainable trail construction practices and employ techniques that minimize user conflict. Multiple user types travel these routes; therefore, care should be taken to avoid obstacles such as jumps or water bars which may lead to undesirable trail experiences for some. Turns are constructed sustainably, but are generally not cambered like bike-optimized turns that improve cornering traction. Keeping trail grades within certain ranges ensures both a positive trail experience for users and enables proper stormwater drainage with minimized erosion. Depending on soil conditions, these trails may need surface hardening techniques to provide a durable four-season trail.

Approximate Construction Costs: \$40,000-\$70,000 per mile





### **Mountain Bike-Optimized Singletrack**

These trails are purpose-built to optimize the experience of riding a mountain bike. The trails can either be unidirectional or bidirectional depending on the type of trail, preferred circulation of users, and management decisions. This type of trail is constructed with features such as rock gardens, berms, grade reversals, cambered turns (typically wider than turns on traditional singletrack trails), and modest jumps. These trails should make use of gravitational forces and, where possible, be managed to enhance trail flow for descending riders. These trails may need surface hardening to provide a durable four-season trail. They should be designed for a range of users from beginner to advanced skill levels. Optional advanced features can be located along the side of the trail to provide challenges for intermediate and advanced riders. This allows many skill levels to experience the full trail mileage, while providing for skill progression within a smaller trail footprint.

- Approximate Construction Costs: \$50,000-\$100,000 per mile





### **Tot Track and Bicycle Playground**

A tot track is designed for smaller bicycles and beginner ability level users. The track is comprised of reduced-sized rollers as well as low-angle bermed turns that can accommodate balance bicycles as well as regular bikes with short wheelbases. These are essentially small versions of pump tracks, both of which can be constructed with dirt or hardened surfaces. Asphalt is the recommended surface material for tot tracks. Asphalt is more expensive to install, but greatly reduces maintenance costs. Most importantly, asphalt provides a consistent high-quality experience for the users.

Bicycle playgrounds incorporate play features such as prefabricated structures, rocks, berms, tunnels and other challenges to create a fun loop for children to practice skills and improve bike handling. The bicycle playground can range in size and configuration to best fit the site and desired features.

Approximate Construction Costs:

- \$10-\$30 per square foot (tot track)
- \$9-\$13/linear foot for trail surface (bicycle playground)
- \$1,000 - \$5,000 for prefabricated features (bicycle playground)





### **Mountain Bike Skills Trail**

These are trails that have been specially designed for mountain bikers to develop the skills necessary for enjoying more challenging trails. This type of trail is built with different routes and features for a range of skill levels, allowing users to progress their skills with repetition and experience over time. Beginner riders and kids are especially fond of this type of purpose-built bike facility. They are typically constructed on nearly flat or gently sloping terrain and take up relatively little space. Features may include rocks, bridges, drops, rollers, and more. Typically, installed features include a mix of prefabricated structures and those built on-site with locally sourced materials.

Approximate Construction Costs:

- \$9-\$13/linear foot for trail surface
- \$1,500 - \$10,000 for prefabricated features





## **NICA Training and Racing Facilities**

NICA, the National Interscholastic Cycling Association, develops mountain biking programs for student-athletes and coaches across the United States. Over 19,000 student-athletes in junior high and high-school participate in 31 state and regional leagues supported by over 9,000 volunteer coaches and 10,000 additional volunteers. Participant numbers continue to grow. In the last ten years, student-athlete participation has averaged 48% annual growth, and coach participation has averaged 75% annual growth.

The league's mission is to build strong minds, bodies, character, and communities through cycling with the values of fun, inclusivity, equity, respect, and community. Unlike some youth programs, there are no bench warmers. Every athlete participates, and the league offers a multitude of benefits: getting kids outside; promoting healthy lifestyles; exposing kids to cycling and outdoor advocacy; and providing social interaction, leadership opportunities, and life lessons such as self-awareness, discipline, success, failure, empathy, humility, and sportsmanship. In 2018, NICA launched GRIT (Girls Riding Together), a program focused on engaging more girls and women as student-athletes, volunteers and coaches. They also updated their Teen Trail Corps advocacy program to promote stewardship of the

trails. Some leagues include Elevate programs for student-athletes with mental and physical challenges, making the sport more inclusive and integrated than many other high school activities. NICA is also helping to fuel more collegiate varsity cycling programs and clubs.

Beyond the many benefits for student-athletes, NICA leagues provide significant economic stimulus to their communities. As participation grows, so does the demand for trails and bike amenities. Teams need trails for training and racing. NICA racecourses require 4- to 6-mile loops of combined singletrack and double track with 300–600 feet of climbing per lap. Throughout the country, communities are building NICA racecourses from scratch or modifying existing trails. Along with the trails, the racecourses require venues that can accommodate, in some cases, thousands of spectators and participants who generate business in lodging, travel, restaurants, bikes stores, and other retail sales and services. This economic activity can support jobs, provide sustainable growth in rural communities, and produce tax revenue. The bottom line: Growth in NICA leagues doesn't seem to show any signs of slowing down, and that means an abundance of benefits for individuals and communities.





## EXPERIENCE ZONES & PREFERRED-USE TRAILS

Experience zones and preferred-use trails are showing up in trail systems around the world. Experience zones divide management areas into special-use zones designed around specific activities: one zone may be preferred for mountain biking and another for accessible, interpretive trails. Implementation of such zones can provide a variety of visitor experiences and recreational opportunities that reduce conflict between differing user groups while providing sustainable, long-lasting trails.

Single use challenges the notion that all trails must be all things to all people. In this case, land managers designate certain trails as “preferred” for certain activities. For example, a trail that is single use for mountain bikers might be designed to be fast and flowing through open terrain, with swooping turns and dips. Hiking-preferred trails, meanwhile, may be more about travel efficiency with stairs, tight switchbacks, short distances, or other qualities that would be less attractive to bikers and equestrians. Visitors will be drawn to routes that match their desired experience.

Each trail system should, of course, include a variety of trails. One way to include numerous types of trails is to have shared-use trails at the beginning of the network near parking lots, with preferred-use trails branching off farther along. The number of trails designated for each mode of travel should be based on the habits and needs of the user groups being managed.

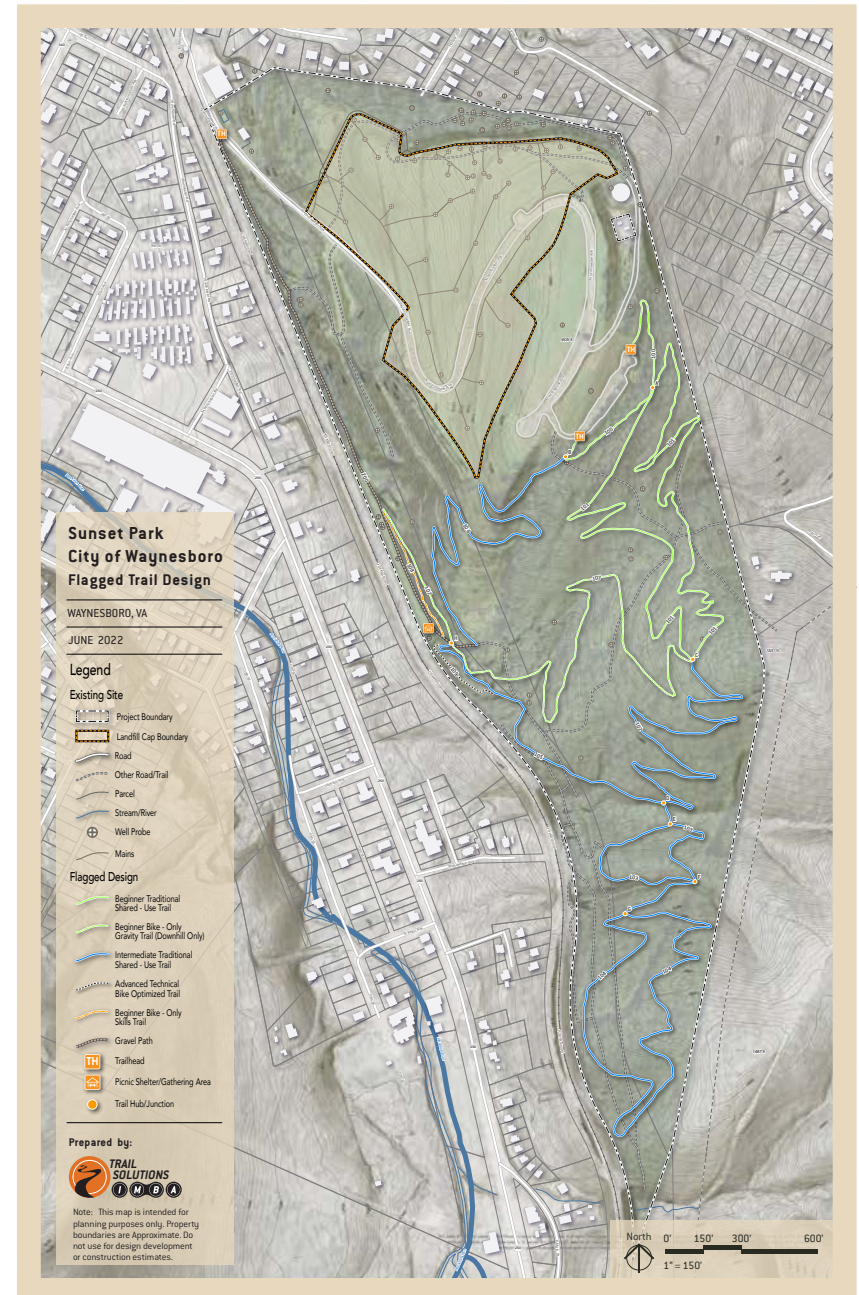
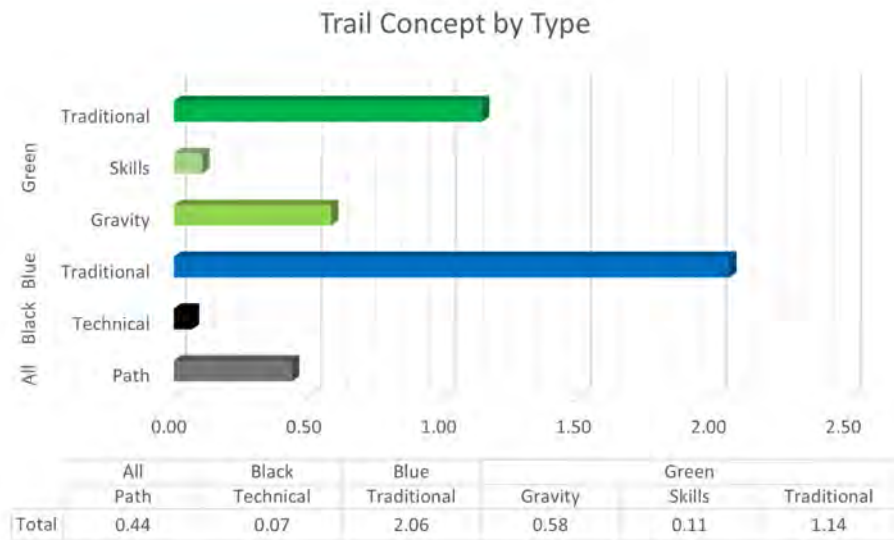




# CONCEPT PLAN

This concept plan seeks to provide engaging activities for park visitors of all ages and ability levels. An initial site assessment was conducted on property with TS joining Waynesboro Parks and Recreation Department Staff to field verify key opportunities and constraints to gain an understanding of how the trail system will integrate with existing and planned park facilities.

During the spring, just over 4 miles of trail corridor was designed and flagged at Sunset Park. The trails types are a mix of gravel path, traditional cross country, bike optimized gravity, and skills trails. The following plan illustrates the planned trail design with a short narrative to describe each segment. Trail corridors were marked with blue, orange, or pink flagging. Intersections were marked with small, corrugated plastic signs that indicate the trail number and flagging color.





## Flagged Design

**Segment 100** (0.21 miles, easiest cross country (XC), flagged in orange) This is a short shared use loop that offers a quick introduction to natural surface singletrack right out of the parking lot. This trail is designed with gentle grades at 5% or less. This is a bi-directional traditional cross country style trails suitable for all trail users. Segments 100, 10,1 and 107 are all suitable to accommodate adaptive riders. The tread surface will need to be 48 inches to 60 inches wide to allow for wider bikes such as hand cycles.

**Segment 101** (0.93 miles, easiest/XC, flagged in orange) descending from the trailhead this bi-directional loop continues in the same vein as trail 100 to create a longer easy loop that climbs to the top of a small knoll and returns back to the parking lot. Segment 101 connects to trails 102 and 107 offering some options for progression or return leg back to the parking lot. This trail crosses existing forest roads in multiple spots, signage will be needed in key places to keep users on the trail and avoid crossing onto neighboring properties. The upper section of Segment 101, and possibly 100, that connect to Hub A may need to be relocated depending on where the septic system drain field is constructed. An alternative plan is included in Appendix C that shows options for this relocation.



**Segment 102** (0.48 miles, intermediate/XC flagged in pink) this traditional cross country segment is designed to be a little more challenging than Segments 100 and 101, with average grades in the 7% - 8% range. The upper section crosses an existing access forest road in several places. The upper turns just after Hub C are located on the inside of an access road and provide a buffer along the property boundary. The trail is bi-directional, combined with Segment 105 it creates an outer loop to the lower skills area or can be utilized as a climbing trail to session segment 107.

**Segment 103** (0.15 miles, intermediate/XC, flagged in blue) a short bridge or rock armoring will be needed at the stream crossing between Hubs D and E. An additional 45' of rock armoring should extend to the toe of the slope to prevent this area from becoming muddy. The bank at Hub E should be dug out to create a landing for the bridge and trail junction. This segment creates a short loop between the two stream corridors and connects to Segment 104. Hub F is located along the transmission line corridor and uses an existing culvert to cross the second drainage.

**Segment 104** (0.75 miles, intermediate/XC, flagged in blue) this intermediate shared use trail traverses the slopes along the southern point of the property. It offers a more remote experience as it climbs and descends +80' of topographic relief along the outer edges of the park. This segment crosses the two parallel





access roads in multiple spots where there are steep banks that could be incorporated into optional trail features. There is also a small drainage that will need rock armoring or a short bridge.

**Segment 105** (0.24 miles, intermediate/XC, flagged in pink) this segment provides connectivity along the lower edge of the property and offers a more sustainable alignment as it bypasses some of the steepest road alignments going down to the stream. Sections that follow along the existing roads were wet in the spring and will likely need some rock armoring.

**Segment 106** (0.44 miles, intermediate/XC, flagged in pink) this segment weaves in and out of the trees offering up incredible views along the way. It traverses some of the steeper grassy slopes below the viewing deck creating a unique experience for trail users. It plays with the feeling of exposure creating a more advanced option for riders. The open slopes offer great sightlines, but signage should be installed informing users this is a shared use bi-directional trail and care should be taken when descending.

**Segment 107** (0.58 miles, easiest/bike optimized gravity, flagged in blue) this segment will create a fun flowy bike optimized gravity decent that is easily sessionable. The trail averages 5% and should be smooth and flowing include features such as berms and rollers suitable for the beginner rider, introducing

them to gravity assisted riding. While geared toward the beginner rider, optional advanced features can be built that will make this trail engaging for riders of all ability levels and keep people coming back.

**Segment 108** (0.11 miles, easiest/skills, pink pin flags) located in the grassy meadow at the base of the park an easily accessible skills trail follows the toe of the slope where riders can practice their bike handling skills before moving on to more advanced trails. This trail should include 5-7 prefabricated features that offer a variety of options for progression with a focus on the beginner and intermediate rider.

**Segment 109** (0.07 miles, advanced/technical, not flagged) this short trail takes advantage of the rocky debris along the edge of a small ridge to provide an introduction to the more advanced rocky technical type trails found in the area.

**Segment 200** (0.44 miles, easiest/gravel access path) this segment follows the existing access road to the lower meadow and skills area. It creates an additional access route to the trail system from the base of the park letting users avoid the climb back to the top of the hill. Improvements are needed to make this route more accessible including grading out some of the steeper sections, improving drainage in low laying wet areas, and adding gravel to create a consistent surface up to the junction with Segment 106.





## Trailheads and Amenities

The new parking area at the summit will provide the main access point to the trail system with stacked loops coming off the lower parking lot. In addition to parking areas, restrooms, water fountains, changing stations, bike repair stations, informational signage, seating areas, and other trailhead amenities welcome visitors while enhancing the park and trail experience. Many of these amenities will become available as Sunset Park is developed. Trailhead kiosks should be located at each end of the parking lot where Segment 100 makes a loop. Interpretive kiosk with trail map should be provided and include route finding information, necessary safety information, user etiquette, and park rules. Wayfinding signage is recommended to guide users along the trails and include information on the different trail types, ability levels, directionality, and allowed user groups. It is also recommended that technical Trail Features be marked with warning signs. Please see the "Signage" section included in the Appendix for more information on recommended sign types. In addition, we recommend a bike workstation to provide riders with a place to inflate tires and perform minor repairs. This is especially important for users who may not have the resources to make personal investments on tools or maintenance for their bikes.

A small secondary trailhead should be created near the park entrance. This will allow trail users the option of starting and ending at the bottom of the hill. This location provides direct access to the skills area and the wide gravel path will be a popular destination for families with young kids and strollers, along with dog walkers. A picnic pavilion or shade structure with benches within the meadow area is recommended. This would provide a place for families to gather and watch children using the skills features. Any structures and trail features in this area should not restrict access to the monitoring wells. An interpretive kiosk and signage should be provided as well.





## Pre-fabricated Features

Manufactured features are an excellent option for Segment 108, the beginner skills trail. These features are pre-fabricated to exacting standards and provide a known and approved option for providing unique riding experiences.

Advantages of pre-fabricated features include precise measurements which are conducive to a variety of trail needs and provide an easily constructed feature without need for second guessing. Stainless steel fasteners and powder coated steel frames are durable and long-lasting, meaning the structure itself requires little maintenance over its lifespan. Pre-fabricated trail features often are approved by engineers or other professionals and meet the criteria of a variety of land management and governmental agencies.

In the case of Sunset Park pre-fabricated features should be selected that are appropriate for a beginner skill level rider. Appendix E provides additional information on feature types and general installation guidelines.

Pre-fabricated features should be acquired from reputable vendors who provide quality control, construction instructions, and maintenance requirements in a written format.





## Additional Opportunities & Connectivity

The City is currently working on extending the South River Greenway to North Park. Additional extensions are in various phases of development that would connect the existing trail west to Ridgeview Park and north to Basic City Park. Connectivity to Sunset Park has been explored, with an option to connect to the trail system along the northeast side of the park. Right of way access extends along Reservoir Street and Jackson Avenue that is feasible to use as a connection to trail Segment 100. Existing City plans show this extending to the East Greenway Trail and Steel Run Greenway Trail creating a pedestrian walk/bike corridor within the core of the community. A second option being explored is creating a connection to the future Jones Hollow Greenway Trail that would extend up to the Crozet Tunnel. Options to connect directly into the planned trail system at Sunset Park along the southeastern side of the property are limited by the CSX Railroad. The rail line is built up within the hollows at Sunset creating an earthen barrier that would need a tunnel to provide access to the site. The connection is needed and will serve as a critical long term connection to increase access to Sunset Park. Improvements to pedestrian access to the main park entrance at Winchester Avenue should be a higher priority. Highway 340 – North Delphine Avenue is currently the biggest barrier to connectivity with safe pedestrian crossings very limited.



Sunset Park is a great place to begin building natural surface trails within the City and will help fill a need for residents but more trail miles with a wider variety of trail types are needed if Waynesboro wishes to increase visitation and become a destination for mountain biking. The region has a strong community of mountain bikers and Waynesboro sits in a great place in the valley to expand on regional offerings. Today's riders are seeking a variety of quality trail experiences, destinations need to offer a range of mountain bike focused trail experiences suitable for beginner to advanced level riders. A prime opportunity exists within Waynesboro to expand their natural surface trail network just a short distance from Sunset Park. The City owns a 250 acre parcel along North Delphine Avenue. This large wooded parcel is mostly undeveloped other than the power line corridor crossing the upper portion of the property. The property line runs along the ridgeline with gentle northwest facing slopes that provide ample opportunity for trail development. With over 400 ft of vertical elevation change, long bike optimized descents are possible. This large parcel could accommodate 15-25 miles of trail all within the city limits. Adjacent to the City property on the other side of the ridge is an additional 750 acre parcel that the City has an opportunity to acquire. Together these parcels if used for recreational purposes would allow for the creation of a truly destination worthy system. At over 1,000 acres this area could support a wide range of recreational activities easily accessible to residents and visitors.




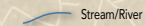
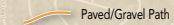



# Sunset Park City of Waynesboro Trail Concept Overview

WAYNESBORO, VA  
JUNE 2022

## Legend

### Existing Site

-  Road
-  Stream/River
-  Paved/Gravel Path
-  Trail

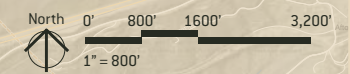
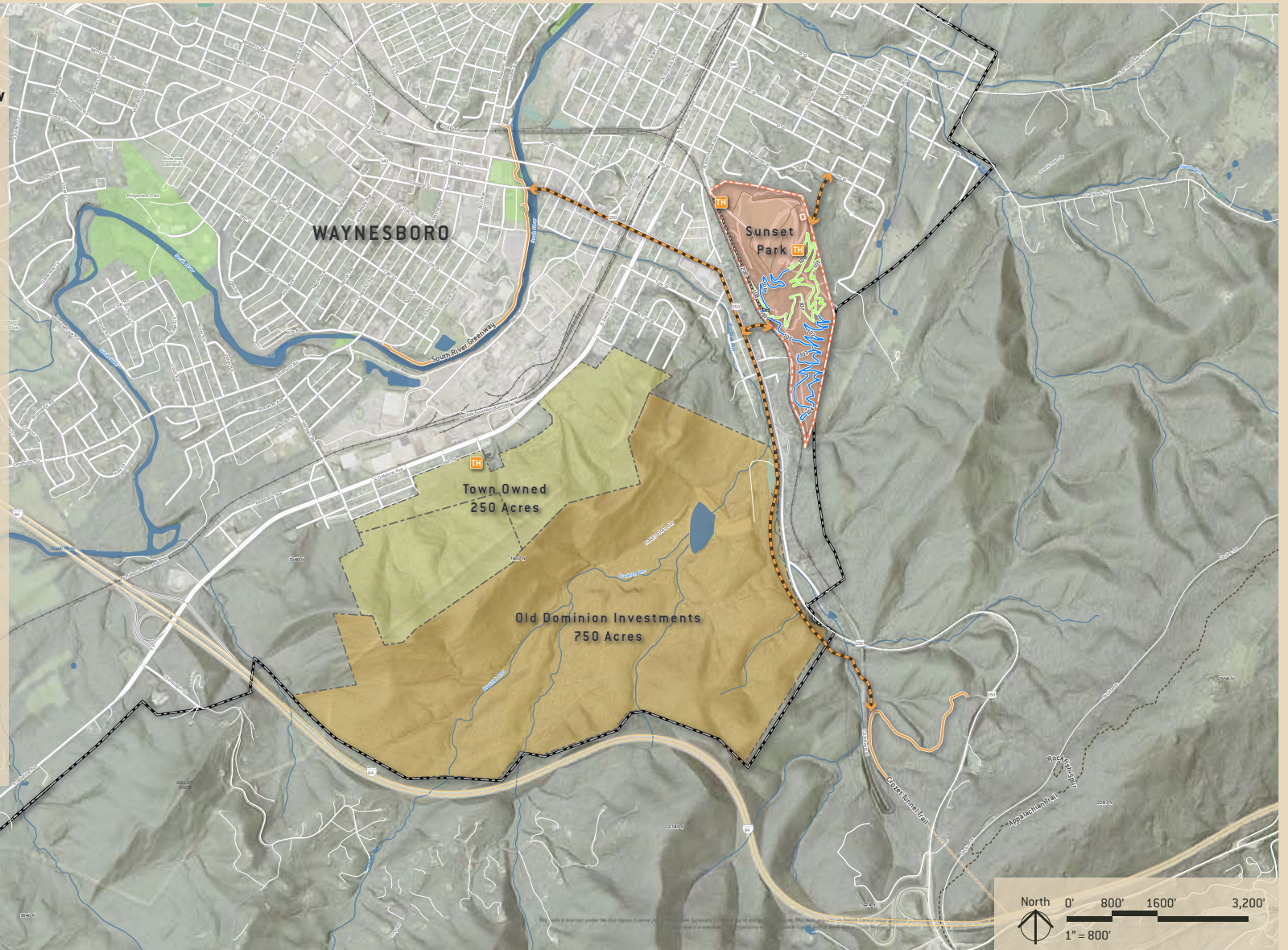
### Concept

-  Beginner Shared - Use Trail
-  Beginner Bike Optimized Trail
-  Intermediate Shared - Use Trail
-  Beginner Skills Trail
-  Gravel Path
-  Trail Connection
-  Trailhead

### Prepared by:



Note: This map is intended for planning purposes only. Property boundaries are Approximate. Do not use for design development or construction estimates.





## PHASING & COST OPINION

The following phasing is a recommended prioritization of next steps in the trail development process. These are provided to help the City of Waynesboro and their stakeholders understand the future and what it takes to get there.

Phasing is important for many reasons and typically chief among those is available funding. By stretching implementation out over time, stakeholders and community members have better opportunities to raise funds for construction. Phasing also creates the chance for new trails to be added over time, enticing locals and visitors to continue to come back for new experiences while the project progresses.

Phasing and priorities can change over time, this is intended as a guide to be revisited and edited as the project progresses. In general, the first few priorities are crucial, and the timing of the latter phases are more likely to blend, mix, or change. Some of these steps are iterative, and will progress with the rest of the project as it moves forward.

1. **Construct segments 100 and 101 (2023):** these will provide immediate beginner trail loops from the scenic view and future park location. This will allow residents and tourists to visit the future main trailhead and explore the property. By introducing the most accessible trails first the City provides great opportunities for everyone.
2. **Construct segments 102, 105, 107, and 108 (2024):** these segments extend the trail system deeper into the woods, providing more traditional intermediate experiences. This will allow visitors to explore and disperse throughout the property. Segment 107 is the easiest gravity trail, this unique trail experience will quickly create new riders and build their bike handling skills, enticing both young and old to ride mountain bikes in a new enjoyable way. Segment 108 provides a fun skills development area in the lower meadow which will activate this space with a fun new opportunity for youth.

3. **Improve segment 200 (2024):** improving the gravel access road from the lower trailhead is a key task and should occur in conjunction or shortly after segments 107 and 108 are built.
4. **Construct segments 103 and 104:** these trails extend the experience of the 103-105 loop, and significantly increase the available trail mileage at Sunset Park. This phase could occur earlier if funding is available.
5. **Construct segments 106 and 109:** these trails offer a few exciting opportunities that could be leveraged for fundraising and volunteerism. Segment 106 will provide the most expansive views, as well as a thrilling sense of rising above the city below. Segment 109 is ideal for a local volunteer design and build. Segment 109 is recommended as a hand built trail to craft the technically challenging experience the landscape offers.





## Sunset Park Trail Design Cost Opinion

Trail ID	Skill	Style	Route Type	User	Direction	Status	Flag Color	Tread		Length		Estimated Cost		
								Width	Average Grade	(Mile)	Unit Cost Low	Unit Cost High	Cost Low	Cost High
100	Green	Traditional	Singletrack	Hike, Bike	BI	Flagged	ORANGE	48" - 60"	5% and under	0.21	\$55,000.00	\$65,000.00	\$11,783.64	\$13,926.12
101	Green	Traditional	Singletrack	Hike, Bike	BI	Flagged	ORANGE	48" - 60"	5% and under	0.93	\$55,000.00	\$65,000.00	\$51,032.03	\$60,310.58
102	Blue	Traditional	Singletrack	Hike, Bike	BI	Flagged	PINK	24" - 36"	7%, Max 10%	0.48	\$55,000.00	\$65,000.00	\$26,150.74	\$30,905.42
103	Blue	Traditional	Singletrack	Hike, Bike	BI	Flagged	BLUE	24" - 36"	7%, Max 10%	0.15	\$55,000.00	\$65,000.00	\$8,154.58	\$9,637.23
106	Blue	Traditional	Singletrack	Hike, Bike	BI	Flagged	PINK	24" - 36"	7%, Max 10%	0.44	\$55,000.00	\$65,000.00	\$24,300.10	\$28,718.30
105	Blue	Traditional	Singletrack	Hike, Bike	BI	Flagged	PINK	24" - 36"	7%, Max 10%	0.24	\$55,000.00	\$65,000.00	\$13,263.58	\$15,675.14
104	Blue	Traditional	Singletrack	Hike, Bike	BI	Flagged	BLUE	24" - 36"	7%, Max 10%	0.75	\$55,000.00	\$65,000.00	\$41,333.87	\$48,849.12
107	Green	Gravity	Singletrack	Bike	Down	Flagged	BLUE	48" - 60"	5% and under	0.58	\$65,000.00	\$85,000.00	\$37,909.75	\$49,574.29
108	Green	Skills	SLG	Bike	BI	Flagged	PINK	36" - 48"	5% and under	0.11	\$65,000.00	\$85,000.00	\$6,850.61	\$8,958.49
200	All	Path	Gravel	Hike, Bike	BI	Existing Road	NONE	60" - 96"	5% and under	0.44	\$55,000.00	\$65,000.00	\$24,121.13	\$28,506.79
109	Black	Technical	Singletrack	Bike	BI	Flagged		12" - 24"	Under 10%	0.07	\$55,000.00	\$65,000.00	\$3,723.71	\$4,400.75
Total										4.40			\$248,623.74	\$299,462.23

Notes: Cost opinions are for planning purposes only. This conceptual cost opinion provides ranges for the cost of construction and serves as a tool for planning purposes only. The cost opinion does not serve as a bid and does not include cost of permitting, construction documents, and contractor mobilization or contingency.





# IMPLEMENTATION & NEXT STEPS

## Permitting

Trail development may require permits and permitting plan sets for grading and stormwater management. Additionally, good housekeeping and compliance regarding applicable laws and permissions should be performed. Anticipated permits and compliance include:

- National Pollutant Discharge Elimination System (NPDES)
- Construction General Permit (CGP)
- Clean Water Act 404
- Clean Water Act 401
- Utility Locate

## Construction

For the development of all trails and bike facilities in this plan, Trail Solutions recommends that a trail industry professional (with an excellent portfolio of construction projects) field flag specific trail features, construct the trails and bike-optimized facilities, and provide training for city staff and volunteers. When retaining a professional trail building firm, we recommend engaging a qualified construction manager experienced with mountain bike trail development as a “client rep” to provide oversight during the construction progress, perform inspections, and provide quality assurance services. Virginia requires all contractors to hold a Virginia State Contractors License.

## Risk Management

As the bike facilities would introduce a new type of recreation with unknown liability concerns, an assessment and clear understanding of recreation protections, laws, and precedents is necessary to ease concerns and create a plan to mitigate risk. Professional legal advice is recommended to ensure all liability concerns are understood and create a plan to mitigate risk. Warnings of the inherit risk of mountain biking should be clearly provided on park signage and should be reviewed by a legal professional.



## Maintenance

Trails should be managed according to recommended difficulty guidelines, trail type guidelines, and respective trail narratives. Maintenance is an ongoing cost and should be planned for. Typical annual maintenance budgets for traditional and mountain bike-optimized trails are 5%-10% of the installation cost, and gravity trails can be closer to 20%-25% of the construction cost. Some of the annual maintenance for all trails can be performed by adequately managed and trained volunteers. These tasks will include corridor trimming, downed tree removal, general clean up (branches, leaf litter, etc.), and minor drainage work.

Professional assistance will occasionally be required. The frequency will depend upon ongoing maintenance as well as weather patterns and use. Typically for cross-country trails, professional maintenance will be required every 10-20 years and will involve small reroutes, major drainage work, or other large tasks. Gravity trails can be expected to need professional help every 5-10 years as trails wear through weather and use. This will typically come in the form of rebuilding large dirt features and upgrading trails to provide slightly new experiences that help continue to draw regional riders, give locals something new, and help all riders progress in their skills. Increasingly, destination mountain bike trail systems are funding and hiring part-time or full-time staff to provide maintenance to trail systems. Ensuring a quality, consistent riding experience is key to attracting visitors and keeping a local riding community satisfied and growing.

## Programming

To fully activate and create a community around outdoor recreation and mountain biking, certain programming is recommended. Mountain bike skills clinics and/or guided rides can be provided by area groups such as the Shenandoah Valley Bicycle Coalition (SVBC) to help introduce the sport to new riders and help them improve skills. The trail system provide the potential to host competitions. Having scheduled volunteer days keeps the community engaged, invested in their local trails, and helps improve the conditions of the trails while reducing the maintenance workload of land managers. Events and programming keep visitation numbers high throughout the year.





## CONCLUSION

Sunset Park has the potential to be a gem within the City of Waynesboro, the expansive views, proximity to downtown, planned park facilities, and natural surface trails will set this park apart from other recreational offerings in the City. The gentle terrain is conducive to beginner and intermediate traditional cross country and bike optimized trail facilities and will allow ample opportunity for skills progression. Pedestrian connectivity to the trail system is key to ensuring area youth have access to these new facilities. Area residents will benefit from access to these trails where they can enjoy this beautiful area within their city and pursue healthy, active lifestyles. The Shenandoah Valley and Blue Ridge Mountains are well known for their recreational offerings, the development of Sunset Park and other area trails systems will help Waynesboro become the gateway to adventure!





# APPENDIX A: GENERAL TRAILS PLANNING & DESIGN GUIDELINES

The following are guidelines for the construction and maintenance of trails. The natural environment is dynamic and unpredictable. The nature of recreational trails and roads, the desired user experience, and the constant forces acting on natural surface trails and roads make strict standards untenable and undesirable. As such, the guidelines below are simply that: best management practices that should be followed within environmental constraints.

## Trail System Design

### ***Mountain Bike-Optimized Trails and Preferred Direction Trails***

Mountain bike-optimized singletrack trails are designed and constructed to enhance trail experiences specifically for mountain bikers. Mountain bike-optimized trails might differ from traditional trails in several ways: enhanced tread shaping, directional or one-way travel, and the addition of man-made technical trail features (TTFs). Bicycles move differently along a trail than other modes of transportation. The movement of the wheel, the use of gravity and friction, the transfer of energy from the rider to the wheel – these offer both opportunities and constraints for trails and trail features that may differ from those of other users.

Mountain bike-optimized and one-way trails that harness gravity are a growing area of interest for mountain bikers. These trails can be designed and built at any level, from beginner friendly flow trails to extremely difficult race-oriented downhill trails. Riders cherish the feeling of flight that a bicycle provides while coasting through a succession of bike-optimized features from top to bottom. A consistent trail is not necessarily a boring or easy trail (though it can be), it's one that is designed such that a preceding section of trail prepares users for the subsequent sections. This is a hallmark of flow trails and can be particularly important for beginner trails, as well as for higher speed trails with gravity features, such as jumps and drops.

As trail systems grow and become congested, one-way trails help to take the pressure off popular shared-use trails. Riders looking for speed, thrill, and challenge will have their own designated areas, and users traveling at slower speeds will have their own trails. Well-designed mountain bike-optimized singletrack and gravity singletrack are exciting for mountain bikers but are also designed to help manage risk and minimize user conflict



### **Rolling Contour Design**

Providing consistent climbs and extended descents is a design priority. Trails may contour gently up or down for consistent lengths to maximize climbs and descents. This is known as rolling contour design. All shared-use trails should be of rolling contour design to minimize impact and sedimentation in the watershed.

### **Stacked Loops**

A stacked-loop system is a series of loops somewhat like links in a chain. The loops can vary in length and difficulty. In a stacked-loop system, the loops that are closest to the trailheads are more inviting to novice riders, and the loops further out cater to more advanced riders. This creates a progression of experiences and challenges as users explore the trails in more depth.

### **Progressive Hubs and Clusters**

A trail system of hubs and clusters looks more like spokes radiating out from a central junction and intersecting at various points. A trailhead or major intersection is a hub. A cluster is a concentration of trails radiating out from the hub. Like a stacked loop system, hubs and clusters are designed with skill level progression in

mind. Hubs and clusters give users more trail options for varying skill levels at each hub, allowing for skill level diversity. At many intersections, riders have the option to change trail difficulty or continue on the same difficulty level.

With progressive trail features, a mountain biker may become a better rider by gradually moving up in trail difficulty. This practice also spreads out visitors and helps reduce trail user conflict. This is also a proven risk management tool. Signage shows difficulty levels at every hub and wherever necessary in the trail system to help users choose trails based on their skill levels and desired experience. Giving riders the option to warm up before hitting more technical segments provides a level of safety in the system.

Loops and clusters are often favored over out-and-back routes because they offer variety. People love the adventure of starting down one path and returning to the same point by way of a different trail. With loops or clusters in a trail system, visitors can choose a short route, a combination of routes, or a long outer route.

Progressive design and construction also allow users of different levels to ride the trails in the same system, so families and groups can enjoy being together in one place and riders can find a trail that matches their skills and progress.





## Trail Difficulty Rating System

In order for a trail system to provide the varied riding experiences and skill progression which trail users seek, the trails must be built to provide relatively specific challenges and riding characteristics. For the purposes of this conceptual trail plan, the difficulty rating system has been simplified into three levels:

- Easiest Trails, Green Lines (green circle) – For beginners, these trails have a smoother and wider tread, lower trail grades, and less exposure.
- More Difficult, Blue Lines (blue square) – For intermediate riders, these trails can be steeper, more technically difficult, or longer.
- Very to Extremely Difficult Trails, Red Lines (black diamond or double black diamond) – For advanced riders, these trails offer a combination of difficult trail tread, technical features, and long distances for those looking for challenge and endurance-oriented experiences. Generally, they have significant exposure and have less predictable surfaces.

This system was adapted from the International Trail Marking System used at ski areas throughout the world. Many trail networks use this type of system, most notably resort-based mountain biking trail networks. The system applies well to mountain bikers and is also applicable to other visitors such as hikers and equestrians. These ratings should be posted on trail signage and in all maps and descriptions. Following is a summary of criteria to be considered when implementing a trail rating system.

### **Tread Width**

The average width of the active tread or beaten path of the trail.

### **Tread Surface**

The material and stability of the tread surface is a determining factor in the difficulty of travel on the trail. Some descriptive terms include hardened (paved or surfaced), firm, stable, variable, widely variable, loose, and unpredictable.

### **Trail Grade (maximum and average)**

Maximum grade is defined as the steepest section of trail that is more than approximately 10 feet in length and is measured in percent with a clinometer. Average grade is the steepness of the trail over its entire length. Average grade can be calculated by taking the total elevation gain of the trail, divided by the total distance, multiplied by 100 to equal a percent grade.






### **Natural Obstacles and Technical Trail Features**

Objects that add challenge by impeding travel. Examples of natural obstacles include rocks, roots, logs, holes, ledges, drop-offs. The height of each obstacle is measured from the tread surface to the top of the obstacle. If the obstacle is uneven in height, measure to the point over which it is most easily ridden. Technical trail features are objects that have been introduced to the trail to add technical challenge. Examples include rocks, logs, elevated bridges, teeter-totters, jumps, drop-offs. Both the height and the width of the technical trail feature are measured.



## IMBA Trail Difficulty Rating System



	 EASIEST WHITE CIRCLE	 EASY GREEN CIRCLE	 MORE DIFFICULT BLUE SQUARE	 VERY DIFFICULT BLACK DIAMOND	 EXTREMELY DIFFICULT DBL. BLACK DIAMOND
TRAIL WIDTH	72" (1,800 mm) or more	36" (900 mm) or more	24" (600 mm) or more	12" (300 mm) or more	6" (150 mm) or more
TREAD SURFACE	Hardened or surfaced	Firm and stable	Mostly stable with some variability	Widely variable	Widely variable and unpredictable
AVERAGE TRAIL GRADE	Less than 5%	5% or less	10% or less	15% or less	20% or more
MAXIMUM TRAIL GRADE	Max 10%	Max 15%	Max 15% or greater	Max 15% or greater	Max 15% or greater
NATURAL OBSTACLES AND TECHNICAL TRAIL FEATURES (TTF)	None	<p>Unavoidable obstacles 2" (50 mm) tall or less</p> <p>Avoidable obstacles may be present</p> <p>Unavoidable bridges 36" (900 mm) or wider</p>	<p>Unavoidable obstacles 8" (200 mm) tall or less</p> <p>Avoidable obstacles may be present</p> <p>Unavoidable bridges 24" (600 mm) or wider</p> <p>TTF's 24" (600 mm) high or less, width of deck is greater than 1/2 the height</p>	<p>Unavoidable obstacles 15" (380 mm) tall or less</p> <p>Avoidable obstacles may be present</p> <p>May include loose rocks</p> <p>Unavoidable bridges 24" (600 mm) or wider</p> <p>TTF's 48" (1,200 mm) high or less, width of deck is less than 1/2 the height</p> <p>Short sections may exceed criteria</p>	<p>Unavoidable obstacles 15" (380 mm) tall or less</p> <p>Avoidable obstacles may be present</p> <p>May include loose rocks</p> <p>Unavoidable bridges 24" (600 mm) or narrower</p> <p>TTF's 48" (1,200 mm) high or greater, width of deck is unpredictable</p> <p>Many sections may exceed criteria</p>



## Trailheads

Well-placed trailheads and parking lots contribute to a successful trail system. Trailheads should be located in areas of lower elevation, as most trail users prefer outbound climbs with inbound descents back to the parking area. This also helps mitigate risk by allowing fatigued riders an easier route back to their starting point. This is especially true for mountain bikers, and necessary for families and beginners. Trailheads should offer information useful for the trail users, including trail maps, location information, emergency contact details, and volunteer information.

## Sustainable Trails

A sustainable trail balances many elements and is designed to have little impact on the environment. Sustainable trails resist erosion through proper design, construction, and maintenance and blend with the surrounding area. A sustainable trail also appeals to and serves a variety of users over many years. It is designed to provide enjoyable and challenging experiences for visitors by managing their expectations effectively. Following sustainable trail design and construction guidelines allows for high-quality trail and education experiences for users while protecting the land's sensitive resources. For additional trail design, construction, and maintenance techniques, refer to Trail Solutions: IMBA's Guide to Building Sweet Singletrack. These guidelines are appropriate for any hike, bike, or equestrian trail.



## Signage

The development of a mountain bike trail network requires the development of a comprehensive system of signs. Signs are the most important communication tool between land managers and trail users. A well-implemented and maintained signage system enhances the user experience by helping visitors navigate the trail network and providing information about the area. Signage also plays a critical role in managing risk and deploying emergency services.

Recommended signage for the trails should be simple, uncluttered, and obvious with a sign at every major intersection to help users stay on track. Signs should meet the needs of all users, from the daily trail user to someone who is experiencing the trails for the first time. In order to serve the variety of visitors, sign placement should be strategic and frequent. Because signs can intrude on the natural outdoor experience, too much signage can be unsightly. Balancing competing interests is key to developing a successful signage program.

### Sign Types

A variety of signs can be created to help users identify trails and their location, select routes, remain confident in their trail choices, find destinations and key points of interest, and understand regulations and allowed uses. Signage can also be interpretive, helping visitors learn about responsible recreation, trail etiquette, and resource protection, as well as how to reduce risk and hazards.



### Informational signs

Usually positioned at the trailhead and major intersections, informational signs provide details such as trail length and difficulty. These include signs that identify a trailhead from a road, signs at a trailhead kiosk, trail intersection signs, waymarks, difficulty rating signs, and trail length or elevation gain and loss signs.

### Regulatory signs

These types of signs delineate rules, such as prohibited activities, direction of travel, or other restrictions.

### Directional signs

Directional signs provide navigational information.

### Warning signs

Often incorporating highly visible designs, these signs warn trail users of upcoming hazards or risks. These include visitor rules and regulations, allowed activities, road and trail intersections, and emergency signs.

### Educational signs

Educational signs can provide a variety of information for trail users, such as guidelines for responsible recreation, descriptions of natural or cultural resources, trail etiquette, and bike skills





## APPENDIX B: BENEFITS OF MOUNTAIN BICYCLING TRAILS

### Promoting Active and Healthy Lifestyles

The benefits of mountain biking may start on the trails, but they don't end there. Learning to ride a bike is a rite of passage. Bikes and the sport of mountain biking provide a multitude of opportunities to teach children valuable lessons that will carry into adulthood.

Obesity is at a high, while activity levels among Americans are plummeting. With its progressive nature and way of stimulating the senses, mountain biking is appealing, especially to youth, and provides an excellent form of recreation for reversing the trend toward poor health. Since riding a bike provides excellent cardio conditioning, improves strength and coordination, and burns several hundred calories an hour, it is an activity as appealing to parents as it is to kids.

The unstructured play that mountain biking provides inspires people to explore and appreciate the natural world, leading to positive associations with outdoor activities and exercise.

Mountain biking allows individuals to advance at their own pace, so kids looking for a challenge can have just as much fun as children who are more interested in exploring the scenery. Riding in nature provides an environment where children can work on their skills, have fun, and pedal their bikes without parents having to worry. Mountain biking is a cross-generational endeavor, accessible to all ages and levels of physical fitness. Going for a trail ride is an excellent way for parents to do more than support their children's activities, it's a way to share the experience. Every ride is an opportunity to create a healthy lifestyle and pass on lessons that are best learned through experience.

Several studies on physical activity have indicated that proximity to recreational facilities, such as trails, is a predictor for physical activity. Simply put, if there are walking and biking trails nearby, then residents are more likely to use them and

therefore be healthier. Physical health and exposure to nature also benefit mental health, reducing stress and increasing happiness. In addition, individual and community health translate to economic benefits by decreasing health care costs.



## Contributing to Economic Growth

A well-designed trail system can stimulate economic growth by increasing activity within the local population as well as attracting visitors from outside. Trails can generate business in retail sales and services, support jobs, provide sustainable growth in rural communities, and produce tax revenue. Access to trails also correlates to a higher quality of life, thus making the community more desirable and capable of attracting new businesses and workers to an area.

IMBA assists local communities in increasing mountain bicycling tourism as a sustainable, renewable source of economic development. A mountain biking destination is one that attracts tourists to an area for the benefits of the mountain biking experience; provides visitors with all of the amenities needed to compliment, ease, and enhance their visit; and in turn creates word of mouth about the community that will draw new and repeat visits.



According to the Outdoor Industry Alliance, mountain bicyclists represent approximately 3.4% of the U.S. population, or nearly 10.6 million participants. IMBA's own research indicates that enthusiasts, who represent a portion of this overall number, travel extensively within a four-hour range and will typically devote one week per year specifically to travel to reach mountain bicycling destinations. Same-day visitors spend approximately \$35 per day in local communities while destination visitors spend closer to \$193 per day (due in part to lodging and increased meal purchases).

While mountain bicyclists are certainly willing to travel to ride, they will only do so if their destination contains a key ingredient: high-quality trails. These trails must be of a sufficient length and contain a variety of experiences, such as traditional singletrack, bike-optimized singletrack, bike parks, and shuttle options. The competition for these destination-quality locations is slowly increasing over time

A case study in Cable, Wisconsin, clearly illustrates how a community can benefit from offering a world-class bicycling experience. Construction of new bicycle trails in Cable resulted in:

- Increased property values.
- Increased spending on bicycle related goods.
- 35 jobs created annually, adding \$523,000 to total employee compensation.
- Nearly \$1.3 million impact related to spending from mountain bicyclists.

## Fostering Community Pride and Identity

Involving community members in the planning, building, and maintaining of trails fosters community pride. In order to maintain sustainable trails, care of the trail system should be managed by local enthusiasts and rely on an organized membership base. Volunteering to help with trails provides an opportunity for area residents to connect with each other and with the terrain and land that surround them. IMBA members donate nearly one million volunteer hours to trails throughout North America every year, making volunteerism a large part of mountain bike culture.



Trails and parks also provide informal opportunities for people to meet and interact with others in a natural setting. Connection to nature is paramount to maintaining the health of the environment and making the outdoors relevant and accessible to all. Trails serve a diverse population and cultivate unity and stewardship in the community. Trails can even revitalize blighted areas, for example, turning landfills into bike parks or gravel pits into trailheads.

### Preserving Open Space

Trails make communities better places to live by preserving and creating open spaces for recreation. Greenways function as hands-on environmental classrooms for people of all ages, providing opportunities to enjoy nature close up. With its abundant plant life, open spaces can decrease pollution, protect water quality, and reduce soil erosion. Economic growth and property values are also tied to open space as buyers are generally willing to pay more for property located close to parks and open space. The recreation, health, economic, and environmental benefits of trails can contribute to an overall enhanced quality of life in nearby communities.

### Encouraging Positive Recreation Use to Displace Negative Use

Without a plan, undeveloped areas are often haphazardly transformed by users creating unauthorized sites to suit their personal wants. Purposefully designing trail systems can help create diverse recreational opportunities, encourage safe use, and meet the needs of the entire community. Unauthorized trail building and dumping or other unacceptable activities can damage ecology, cause safety hazards, and leave behind debris that is both unsightly and illegal. The best way to encourage positive use is to displace negative use. A well-planned trail system can discourage and displace destructive activities with healthy recreational use that attracts visitors of all ages.



## APPENDIX C: FIGURES

**Figure 1: Sunset Park Trails Concept Plan**

**Figure 2: Waynesboro Trail Concept Overview**

**Figure 3: Sunset Park Segment 100/101 Alternative**



# Sunset Park City of Waynesboro Flagged Trail Design

WAYNESBORO, VA

JUNE 2022

## Legend

### Existing Site

-  Project Boundary
-  Landfill Cap Boundary
-  Road
-  Other Road/Trail
-  Parcel
-  Stream/River
-  Well Probe
-  Mains

### Flagged Design

-  Beginner Traditional Shared - Use Trail
-  Beginner Bike - Only Gravity Trail (Downhill Only)
-  Intermediate Traditional Shared - Use Trail
-  Advanced Technical Bike Optimized Trail
-  Beginner Bike - Only Skills Trail
-  Gravel Path
-  Trailhead
-  Picnic Shelter/Gathering Area
-  Trail Hub/Junction

### Prepared by:



Note: This map is intended for planning purposes only. Property boundaries are Approximate. Do not use for design development or construction estimates.

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# Sunset Park City of Waynesboro Trail Concept Overview

WAYNESBORO, VA  
JUNE 2022

## Legend

### Existing Site

- Road
- Stream/River
- Paved/Gravel Path
- Trail

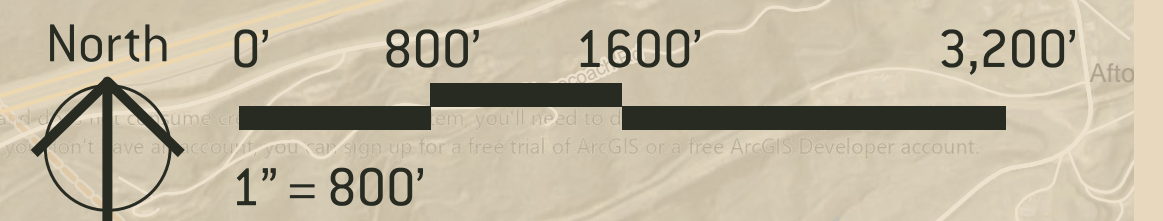
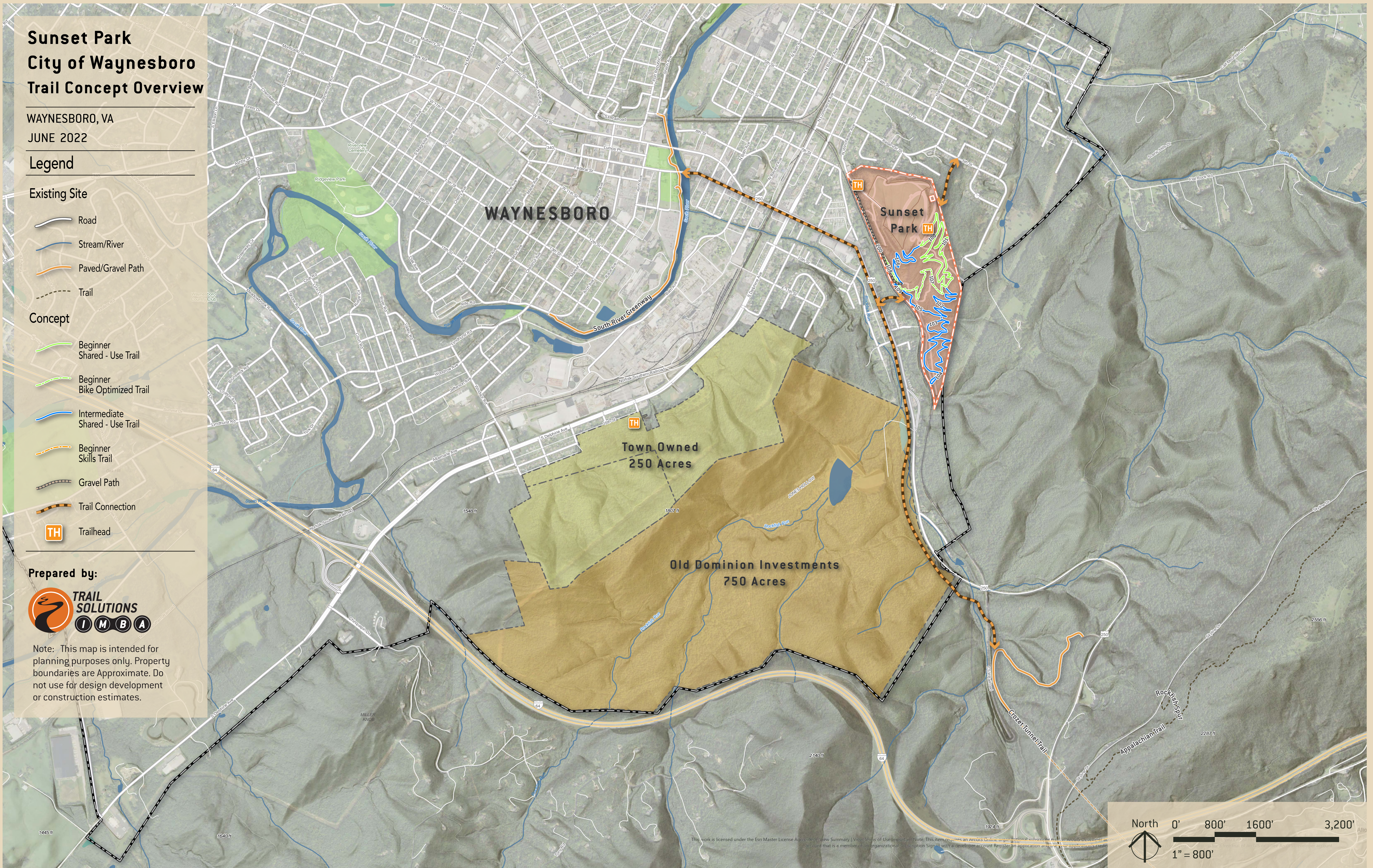
### Concept

- Beginner Shared - Use Trail
- Beginner Bike Optimized Trail
- Intermediate Shared - Use Trail
- Beginner Skills Trail
- Gravel Path
- Trail Connection
- Trailhead

Prepared by:



Note: This map is intended for planning purposes only. Property boundaries are Approximate. Do not use for design development or construction estimates.



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# Sunset Park City of Waynesboro Trail Design Segment 100 Alternative

WAYNESBORO, VA

JUNE 2022

## Legend

### Existing Site

- Project Boundary
- Landfill Cap Boundary
- Road
- Other Road/Trail
- Parcel
- Stream/River
- Well Probe
- Mains

### Flagged Design

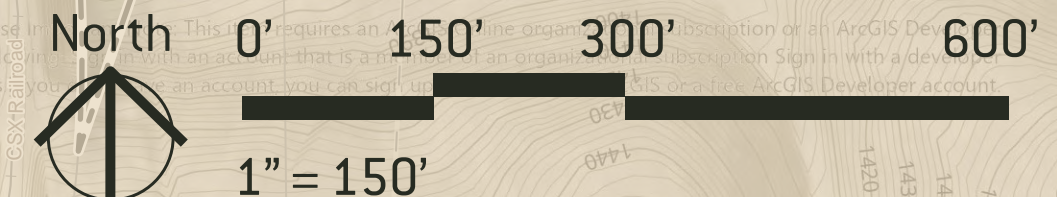
- Beginner Traditional Shared - Use Trail
- Beginner Bike - Only Gravity Trail (Downhill Only)
- Beginner Traditional Shared - Use Trail (Alternative Route)
- Intermediate Traditional Shared - Use Trail
- Advanced Technical Bike Optimized Trail
- Beginner Bike - Only Skills Trail
- Gravel Path
- Trailhead
- Picnic Shelter/Gathering Area
- Trail Hub/Junction

### Prepared by:



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## APPENDIX D: TRAIL SPECIFICATIONS



Appendix D: Sunset Park Trail Specifications Table

Skill Level	Trail Type	Visitor Types	Directional	Feature Frequency <sup>1</sup>	Constructed Tread Width <sup>2,3</sup>	Average Trail Grade per 1000'	Max Trail Grade: climbing <sup>4</sup>	Maximum Trail Grade: descending <sup>4</sup>	Minimum Turn Radius	Maximum Turn pad Grade <sup>5</sup>	Maximum Berm/Turn Camber <sup>6</sup>	Proposed Flagline Corridor Width	Corridor Width (4' above tread)	Ceiling Height Minimum <sup>7</sup>	Exposure (without railing)	Avoidable Obstacles (over 50% of tread or less)	Rollable Feature Height (jumps, berms, etc.)	Rugosity (surface texture) <sup>8</sup>	Tread Condition	Experience Notes
Green	Traditional (TRD)	Hike/bike	Two-way	Low	48" - 60"	5%	7%	7%	12'	5%	5%	50'	60-96"	8'	less than 24"	less than 2"	6-18"	Very Low	Firm, even, and predictable surface. May include gravel or crushed stone surfacing.	The most accessible trail within the project. Trail grades are gentle and set on shallow cross slopes with little to no exposure to trail side risks like steep slopes, cliffs, or external influences that require advanced bike handling moves to avoid. In general, the trail surface is smooth with no obstacles (rocks and roots). Crushed stone or gravel should be used to create a firm and predictable surface.
Blue	Traditional (TRD)	Hike/bike	Two-way	Medium-High	30"	7%	15%	15%	9'	10%	10%	50'	42"-58"	8'	less than 36"	less than 16"	12"-24"	Medium-High	Semi-firm trail surface. May include rock, gravel, or crushed stone surfacing. Rocks may be uneven.	This trail type looks and feels like traditional singletrack and hiking trails, narrower tread with the presence of rocks, roots, and other obstacles. Grades, alignments, and obstacles should be integrated in a natural fashion to provide shared-use accessibility. Trail should have less "flow" and provide a less "constructed" experience than mountain bike-optimized trails.
Green	Gravity (GRV)	Bike-only	One-way	Medium	60"	5%	8%	10%	11'	10%	20%	50'	72"-84"	12'	less than 24"	less than 8"	6"-18"	Low	Firm trail surface. May include rock surfacing.	The easiest bike-only gravity trails. This trail should provide an introduction to highly bike-optimized trail experiences. Trail grades are gentle and set on shallow cross slopes with little to no exposure to trail side risks like steep slopes, cliffs, or external influences that require advanced bike handling moves to avoid. In general, the trail surface is relatively smooth with little to no obstacles (rocks and roots). Feature frequency is low, but should provide ample rollers and berms to create a "roller coaster" experience for riders. No features should provide mandatory air time.
Black	Technical Bike Optimized (MBO)	Bike-only	Two-way	High	<18"	15%	30%	50%	N/A	N/A	N/A	50'	36"-48"	8'	less than 48"	No restrictions	No restrictions	Very High	Unpredictable trail surface. Will include rock surfacing. Rocks will be uneven.	This trail type looks and feels like traditional singletrack with narrow tread and the presence of rocks, roots, and other obstacles. Grades can be steeper for short segments are meant to provide a technical challenge for riders. Highly unpredictable trail surface with extreme rugosity is expected.
Green	Skills	Bike-only	One-way	Medium	48"	5%	8%	8%	N/A	N/A	N/A	50'	60-72"	10'	less than 24"	less than 8"	6"-18"	Low	Firm trail surface. May include rock surfacing. Optional lines include prefabricated Technical Trail Features.	The easiest beginner-friendly skills trail, these should include pre-fabricated features for bike handling skill development. Trail grades are gentle and set on shallow cross slopes with little to no exposure to trail side risks like steep slopes, cliffs, or external influences that require advanced bike handling moves to avoid. In general, the trail surface is relatively smooth with little to no obstacles (rocks and roots). Feature frequency is appropriate for engaging beginner riders looking to advance their skills. Appropriate clearance should be provided around all technical trail features.

Footnotes

1. Feature Frequency is averaged over long distances. Per 100': "low" = 2-3 features, "med" = 3-5 features, "high" = 5-10 features.
2. Constructed tread width may narrow over short distances to 50% of spec. Examples include rock or tree gateways.
3. Tread width also applies to bridges and boardwalks. Check with local regulations for overriding guidelines on width or any other requirements (height restrictions, railings, etc.).
4. Max grades climbing and descending refer to extremely short segments, 10 feet or less.
5. Turn pad grade measures the rise/fall across the turning surface at the base of any inslope.
6. Max camber is measured at the top of the inslope. Turns can not be outslped.
7. Ceiling height should be reduced in thick vegetation where appropriate to provide a more natural "tunnel experience".
8. Rugosity attempts to capture average tread coarseness. Tread area with obstacles: "low" = less than 5%, "med" = less than 20%, "high" = over 20%, "very high" = over 50%.

General Notes

Sustainable trails guidelines provide the foundation for all design + construction decisions ("half rule", frequent grade reversals, max grades function of soils + use, etc.). All trails should have a minimum grade and camber (in/outslope) of 3% to ensure a well-drained tread. Trail Specifications should adhere to Sunset Park Trails Master Plan dated July 2022.



# APPENDIX E: PRE-FAB FEATURES

## Supplemental Resources for Prefabricated Features

The vast majority of prefabricated features recommended for Sunset Park consist of varying sizes of Ladder Bridges. Below you will find supplemental resources that will assist the City in understanding, sourcing and installing these features. The information provided here is for Progressive Bike Ramps (PBR) engineered prefabricated features, there may be other suppliers capable of providing these features, but this is the supplier that we have used with great success on many projects.

In the following excerpt from PBR's Catalog on ladder bridges, it is important to note that nearly any situation can be accommodated by their ladder bridges.

Included in this appendix are installation instructions, Earth Anchor specifications, a framework submittal and a sample detail of a ladder bridge.

### Progressive Bike Ramps Contact:

P: 417-288-4466, E: [sales@progressivebikeramps.com](mailto:sales@progressivebikeramps.com), Regional Contact for Florida: Alec Beldin, Cole Beckham and Asa Beckham.

### LADDER BRIDGES/ SKILLS FEATURES

Ladder Bridges have become a staple for bike park skills areas. Originally created to bridge sensitive trail crossings, especially in marshy terrain, the popularity of ladder bridges for skill building and just plain fun has helped make these features a must have in any bike park master plan.

While standard widths and lengths are shown, Progressive Bike Ramps features can be modularly expanded to fit nearly any situation.







There are two different types of earth anchor plates that we use to attach to features in different locations. The “bat wing” type as shown here attach to the toes of the ramps (i.e. ladder bridges, Nessy, wedge table). They will also attach to wall rides in front and back and will accept one ground anchor each. This will eliminate the need for any concrete unless dense rock is found and you are unable to drive an anchor.



The upside down C-channel is able to attach to both the middle support posts and to the toes of features like ladder bridges. It is a good idea to either hammer down the piece to where it is solidly touching the ground, or to dig out a small area to make this happen (a small shovel or a claw hammer are completely acceptable tools for this task). Once in place you are ready for the ground anchors. This plate accepts two ground anchors. This distributes the load better and again eliminates the need for concrete (except in certain instances). A couple of things to note here: 1) If you are dealing with a very rocky soil, or in an area with a lot of roots it may be necessary for a pilot hole to be drilled prior to driving the ground anchor. This can be done with a hammer drill and masonry bit available at any hardware store. 2) If you are in looser soil and feel our standard 18” penetrator is not sufficient we can provide longer (or shorter) anchors depending on the soil needs.





When it comes to driving the earth anchors all that you need in "standard" soil is an 18v cordless impact with a 1/2" drive. Using this tool will eat through some batteries pretty quick so we recommend having several or using electric or pneumatic power if available. The ground anchor we use is an 18" Penetrator (yes that is the name we can't make this up). It is made of Aircraft-Quality cast aluminum 356 alloy; heat-treated to T6 Specification; has a length (depth) of 18" from flange to tip; has a flange diameter of 2"; flight diameter of 1 3/4"; and neck diameter of 1".



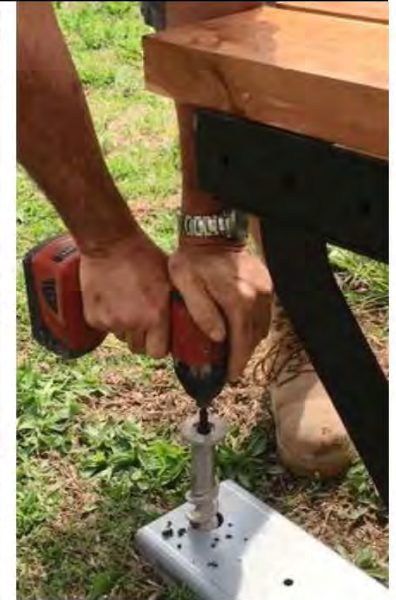
### LOAD CAPACITY

Pullout strength with flight fully embedded

Hardpan or asphalt	Soil Class 1 Dense sand or gravel	Soil Class 2 Medium sandy gravel	Soil Class 3 Loose medium-to-fine sand	Soil Class 4 Loose fine uncompacted sand
<b>2,500 lb</b> 11.1 kN	<b>1,700 lb</b> 7.56 kN	<b>600 lb</b> 2.67 kN	<b>350 lb</b> 1.56 kN	<b>200 lb</b> 0.89 kN



At this particular site pilot holes were not needed; however on the same site we ran into heavy rock and had to drill a pilot hole in order to properly drive the ground anchors. If you ever run into an area where you absolutely cannot get an anchor to drive to depth it is at that point another solution will need to be used. In this case we would recommend a small pad to whatever depth you can and utilizing J-bolts. The anchors can be driven into asphalt as well and it is recommended that a 1" pilot hole be drilled.







After parts are assembled and earth anchors are driven the product will be completed, and ready to ride.

The earth anchor supports are made of:

- 7 gauge (3/16") galvanized steel.
- Powder coated finish to protect against the elements further.
- Bolt patterns for "toes" and posts.

For permanent use we recommend that you cover the earth anchor supports with dirt, mulch, or other natural material. For temporary use leave uncovered for ease of removal.

If you need further assistance contact:

Don Wimer: Project/Install Manager  
1-855-727-7267 ext 150  
[don@progressivebikeramps.com](mailto:don@progressivebikeramps.com)

Robert Botts: PBR Product Engineer  
1-855-727-7267 ext 126  
[Robert@progressivebikeramps.com](mailto:Robert@progressivebikeramps.com)

Jason Stouder: PBR-VP  
1-855-727-7267 ext 123  
[jason@progressivebikeramps.com](mailto:jason@progressivebikeramps.com)







# American Earth Anchors

The best screw you will have in the dirt™

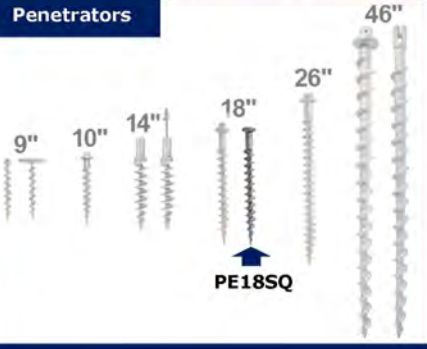
americanea.com

QUICK REFERENCE

## PE18SQ | Specifications

### 18" Penetrator™ with square-drive (flat) head

- Aircraft-quality cast aluminum 356 alloy
- Heat-treated to T6 specification
- Install with 1/2" square drive
- Removable



### LOAD CAPACITY

Pullout strength with flight fully embedded

Hardpan or asphalt	Soil Class 1 Dense sand or gravel	Soil Class 2 Medium sandy gravel	Soil Class 3 Loose medium-to-fine sand	Soil Class 4 Loose fine un-compacted sand
2,500 lb 11.1 kN	1,700 lb 7.56 kN	600 lb 2.67 kN	350 lb 1.56 kN	200 lb 0.89 kN

American Earth Anchors  
info@americanea.com  
americanea.com

Contact us for CUSTOM WORK  
Size, length, shape, material,  
prototypes, cable assemblies

866-520-8511  
+1 508-520-8511

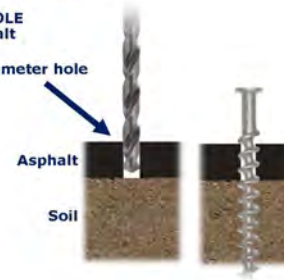
## PE18SQ | Installation

QUICK REFERENCE

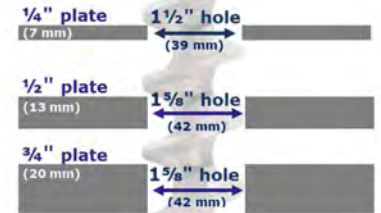
### Through asphalt

Drill PILOT HOLE through asphalt

1" (2.5 cm) diameter hole



### Through metal plate



### Installation methods



Impact wrench



### Attachment accessories

Contact us for custom bracket/sleeve sizes and designs



UNIVERSITY MICROFILMS

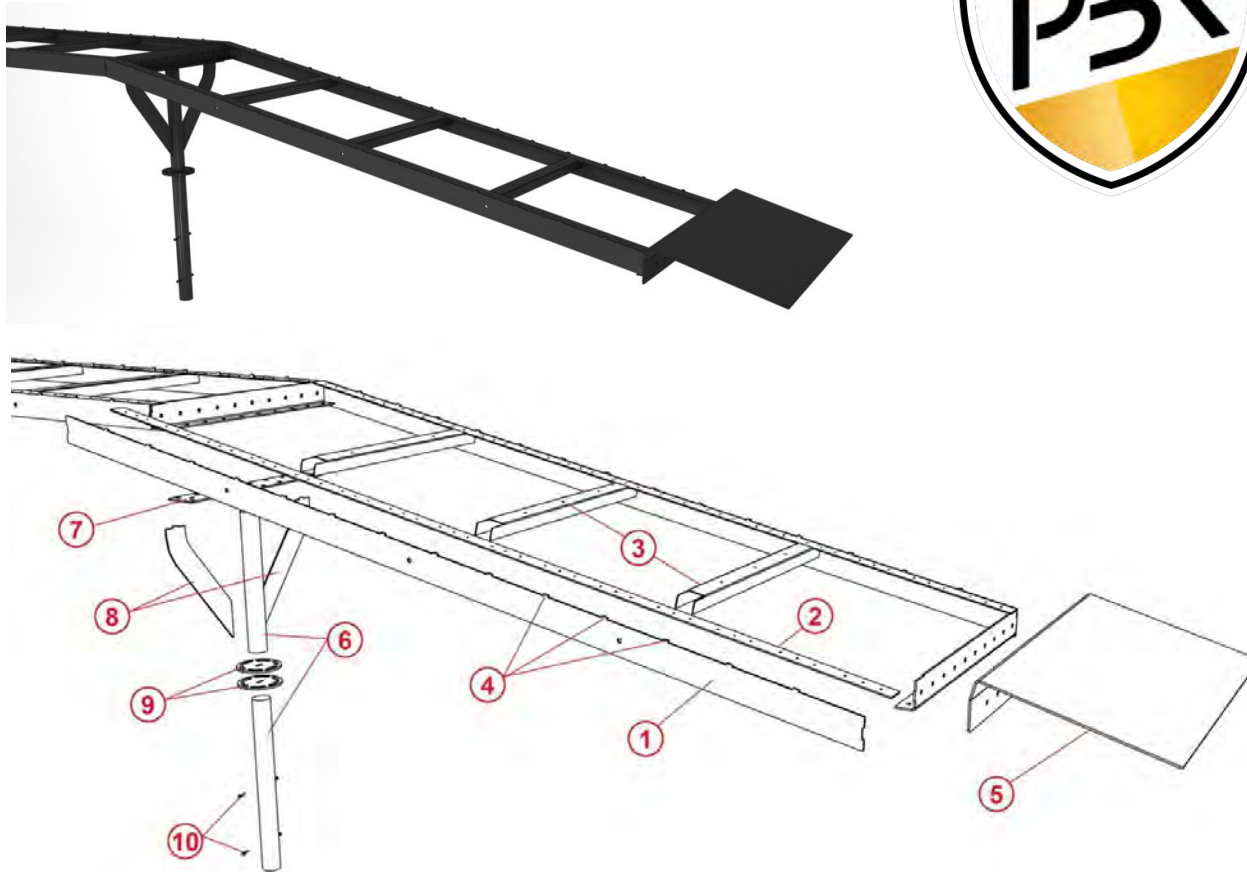
American Earth Anchors  
info@americanea.com  
americanea.com

Contact us for CUSTOM WORK  
Size, length, shape, material,  
prototypes, cable assemblies

866-520-8511  
+1 508-520-8511



## Progressive Bike Ramps- Framework Submittal

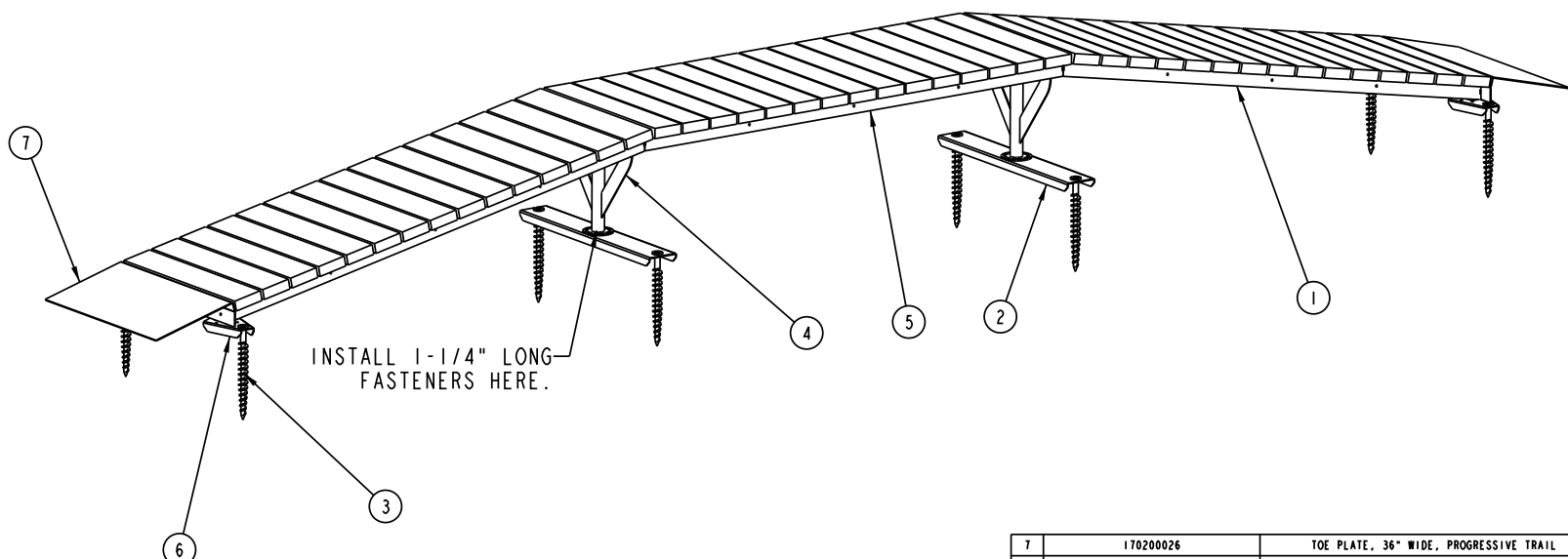


Progressive Bike Ramps  
 601 McKinley Ave  
 Joplin, MO 64801  
 1-855-727-7267  
[www.progressivebikeramps.com](http://www.progressivebikeramps.com)

- 1) **Side Support**- 7-gauge galvanized laser cut, powder-coat paint finish
- 2) **Top Support**- 10-gauge galvanized laser cut, laser cut hole pattern for riding surface, Powdercoat paint finish
- 3) **Lateral Support**- 13-gauge galvanized laser cut, CNC- formed metal support, powder-coat paint finish
- 4) **Locator Tabs**- laser cut, tabs for proper riding surface spacing
- 5) **Transition Plate**- 7-gauge galvanized laser cut, CNC-formed metal support, powder-coat paint finish, vertical support underneath
- 6) **Support & Anchor**- 2" schedule 40 pipe, powdercoat finish
- 7) **Support Plate**- 7-gauge galvanized laser cut, powder-coat paint finish
- 8) **Lateral Support**- 7-gauge galvanized laser cut, powder-coat paint finish
- 9) **Anchor Plate**- ¼" galvanized laser cut, powder-coat paint finish
- 10) **Nelson Studs**- welded 4" from the bottom & 8" between, powdercoat paint finish




REVISION HISTORY			
REV	DESCRIPTION	REVISED	DATE



INSTALL 1-1/4" LONG FASTENERS HERE.

ITEM	PART NUMBER	DESCRIPTION	QTY
7	170200026	TOE PLATE, 36" WIDE, PROGRESSIVE TRAIL	2
6	170510596	SCREW ANCHOR PLATE, SINGLE, PROGRESSIVE TRAIL	4
5	170110105W	FRAME W/LUMBER, 8' LONG, 3" WIDE, PROGRESSIVE TRAIL	1
4	170200069	FIXED LEG, 2' HIGH, 36" WIDE, PROGRESSIVE TRAIL	2
3	110460024	EARTH ANCHOR, 18" LONG, PROGRESSIVE TRAIL	8
2	170510592	ANCHOR CHANNEL, 42", PROGRESSIVE TRAIL	2
1	170110095W	8' RAMP, 2' HIGH, 36" WIDE, PROGRESSIVE TRAIL	2

<b>TOLERANCES</b> UNLESS OTHERWISE SPECIFIED (X.X) : ±0.125 (X.XX) : ±0.060 (X.XXX) : ±0.030 ANGULAR : ±1.0° <b>DIMENSIONS ARE IN INCHES</b> DRAWN BY : R. BOTTS P6-Mar-18 RELEASE LEVEL Concept	 <b>AMERICAN RAMP COMPANY</b> 601 MCKINLEY JOPLIN, MO. 64801 PHONE: (417) 206-6816 FAX: (417) 206-6888 www.americanrampcompany.com	PROPRIETARY THIS DOCUMENT CONTAINS PROPRIETARY DATA BELONGING TO AMERICAN RAMP COMPANY. IT IS NOT TO BE COPIED OR DISTRIBUTED TO ANYONE WITHOUT WRITTEN PERMISSION.	REVISION LEVEL -- MASS (POUNDS) 658.9 DRG NO. SL-11D-2-270-36-EA
		<b>STRAIGHT LADDER</b> 2' HIGH, 36" WIDE, PBR	