



# CAMP SEVEN HILLS TRAILS MASTER PLAN

2021/11/19







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# BACKGROUND

## INTRODUCTION

The Girl Scouts are a national organization with the mission to “ build girls of courage, confidence, and character, who make the world a better place”. From the organization’s inception in 1912 the Girl Scouts achieve their mission by getting girls out in nature and teaching them a range of skills to build courage, confidence, and character. The organization believes in teaching its members to not only see the world around them but how to experience the world. With this strong foundation in outdoors experiences the camp properties used by the Girl Scouts are an important cornerstone to the program. The camping areas, activities, features, and trails of each camp property provide opportunities for learning and gaining experiences to the scouts.

The Girl Scouts of Western New York (GSWNY) is one regional branch of the national organization that services nine counties on the western side of New York state. The GSWNY would like to improve and expand the existing trail system at Camp Seven Hills to increase the opportunities for learning and experiences available to the scouts that visit the site. For these improvements Pashek + MTR was hired to develop a trail master plan for the property, build phase one of the plan, and help train staff and volunteers on trail building to implement future phases of the plan.

To assist in the development of the trail master plan the GSWNY prepared a study committee to oversee the project. The committee included the Senior Vice President of Asset Management, the Director of Camp Administration, the Seven Hills Property Manager, a Natural Resource Specialist, and a member of the Seven Hills Property Management staff.

## GOALS

The study committee and the GSWNY community defined nine goals to guide the development of the trail plan.

### GOALS

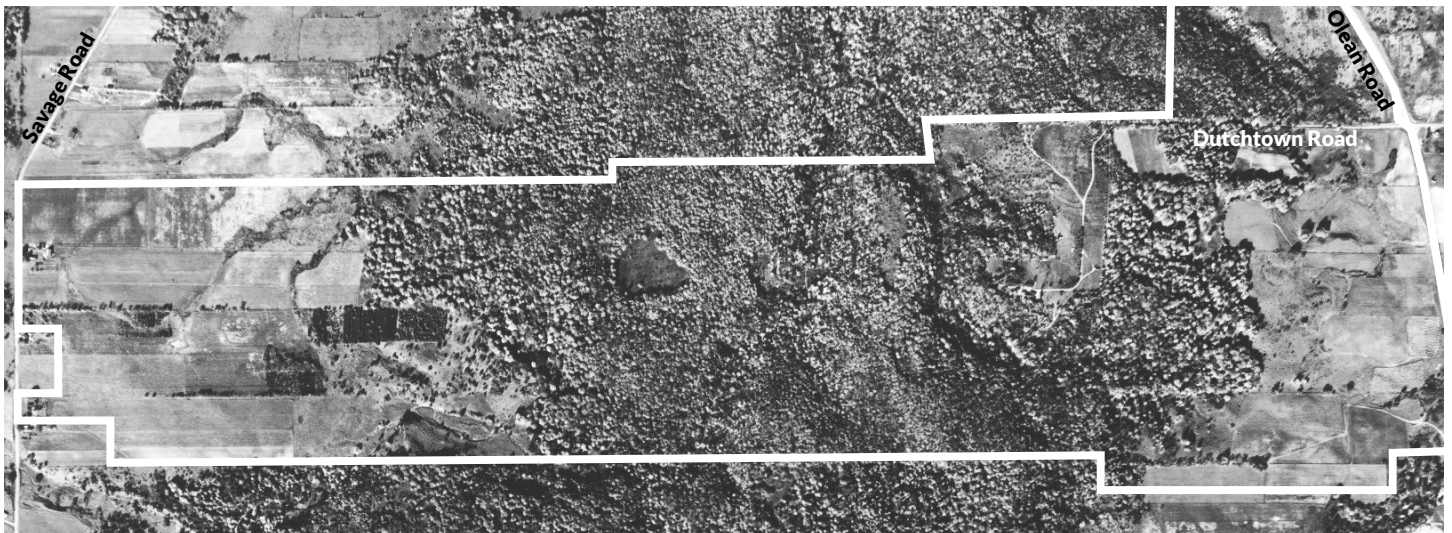
1. **UTILIZATION.** Get more people out on the trails.
2. **SUSTAINABLE** trail maintenance.
3. **ECOLOGICAL** sustainability and **ENVIRONMENTAL** education.
4. Create a **COMPREHENSIVE MAP** of the trail system.
5. Provide opportunities for additional **PROGRAMMING**.
6. Provide **CONNECTIONS** between the Goodyear and the Lakeside Camps.
7. **REDUCE BARRIERS** for users of the trails.
8. Provide trails that can be used by a **RANGE** of **AGES** and **SKILL** levels.
9. **IMPROVE SIGNAGE** and markers along the trails. Provide signs for wayfinding, mile markers, difficulty level, interpretation, and education.

## HISTORY

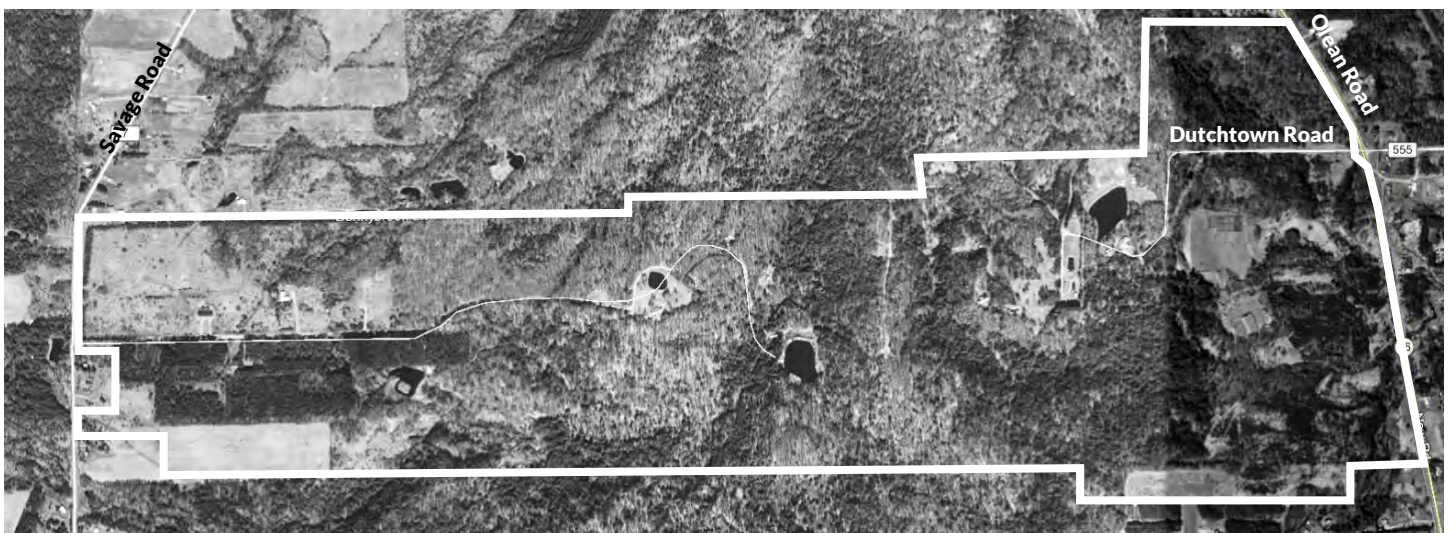
Camp Seven Hills is nestled in the Allegheny Plateau region of New York, known for its rugged hills and valleys with winding streams, lakes, and ponds.

The Seneca tribe originally lived in the area of western New York where Camp Seven Hills is located. After the Revolutionary War, the Seneca were forced to cede the majority of their land to the United States. A portion of these lands were acquired by the Holland Land Company in the 1790s, in a purchase from Massachusetts. The adjacent towns of Holland and Sardinia were both settled in the first decade of the 1800s. The area was mostly agricultural, with some light industrial and trade in the towns. The region is still predominately rural with a mixture of residences and farmland.

The Girl Scouts have used at least a portion of the property as a camp since the 1930s. Prior to the 1930s the property was farmland. The Wetlaufer family owned the farm and built the first camp building on the site. County public property records only go back to the 1960s, but these records show that the main camp parcels were already owned by the Girl Scouts at that time. Smaller adjacent parcels were acquired over the years as the camp and facilities expanded. The parcels to the north of Dutchtown Road, referred to the Wilhelm Acres, are set aside as natural areas, only allowing trail use and no other development.



**1951 Aerial**



**1995 Aerial**

# TRAIL MASTER PLANNING PROCESS

## Inventory & Analysis

## Vision for the Future

## Plan to Achieve Vision



The trails master plan for Camp Seven Hills was developed using a consensus building process, with feedback loops to incorporate input from key stakeholders at project milestones. The first step in this process is to collect and analyze data on the existing trail system and site features. The next step is to form the vision for the trail system by talking to as many stakeholders as possible to get input on what is lacking in the existing trail system as well as new features to incorporate into the new trail system. The final steps are to prepare a plan and recommendations on how to achieve the vision that was set forth for the project, to gather feedback from stakeholders, and to refine the plan to reflect the input received.

This chapter, Background, provides general background information on the site and trails. The Inventory and Analysis chapter of this report details the existing conditions of the site and trails systems, analyses the environmental conditions of the property and trails, and summarizes the input provided by the study committee and stakeholders which developed the vision and goals for the trail master plan. The remaining chapters of this document discuss the methods to achieve the goals set out by the study committee. These methods are broken down into generalized information for trail planning provided in the Design Considerations chapter, specific trail recommendations for the property in the Recommendations chapter, and how to turn the recommendations into actual trails in the Trail Implementation chapter.



# INVENTORY & ANALYSIS

## EXISTING SITE CONDITIONS

Camp Seven Hills is 620 acres, split into two sides by a ridge running north-south near the center of the property. The western portion of the site is referred to as the Lakeside Camp and the eastern portion of the site is known as the Goodyear Camp. The Goodyear Camp can be accessed off Olean Road and is mostly used for summer camp programs and is only open spring through fall. The Lakeside Camp can be accessed off Savage Road and offers both seasonal and year-round facilities. The property includes several ponds, and numerous streams. Due to the undulating hills and numerous water sources the site provides a diverse range of habitats and natural features.

## EXISTING FACILITIES

### ACCESS & CIRCULATION

There are two vehicular entrances to Camp Seven Hills, one located on Olean Road leading to the Goodyear side of the camp, and another off Savage Road leading to the Lakeside Camp. The entrance at Olean Road, is an extension of Dutchtown Road. It enters the site near the northeast corner of the property and winds into the center of the Goodyear Camp facilities. The entrance off Savage Road goes through the Lakeside Camp allowing access to all the lodges and terminates at the eastern most campsites. A maintenance road connects the Goodyear Camp and the Lakeside Camp, meeting up with the two main roads on each site and winding around the pond in the center of the property. Additional maintenance roads allow access to facilities such as the sport complex, the barn, archery areas, and other camp units.

The existing trail system is composed of three main trails, the Orange Trail, the Blue Trail, and the Yellow Trail. There is also a small trail at the Goodyear Camp that connects Wetlaufer Lodge to the ropes course and barn. The Orange Trail is a loop trail on the Goodyear Camp that uses the maintenance road in some locations as a portion of the trail. The Blue Trail connects the Goodyear Camp to the Lakeside Camp through the center of the property. The Yellow Trail is a large partial loop trail at the Lakeside Camp that encompasses all the lodges and camp units.

### BUILDINGS & STRUCTURES

There are a large variety of buildings, structures, and facilities scattered throughout Camp Seven Hills. On the Goodyear Camp side there is a sport complex with athletic fields, tennis courts, and a pool. There is the Program Center and Wetlaufer Lodge for indoor activities and meeting. The site also features an infirmary, dining hall, shower house, and a latrine. The Goodyear Camp has six camp units, of various styles, from tent cabin units to platform tents and wooden cabins. There is a bunkhouse, chalet, Riding Director's Cabin, and a Brownie Lodge among other facility buildings. Goodyear also features an archery range, ropes course, and a barn with pastureland and paddocks for horses.

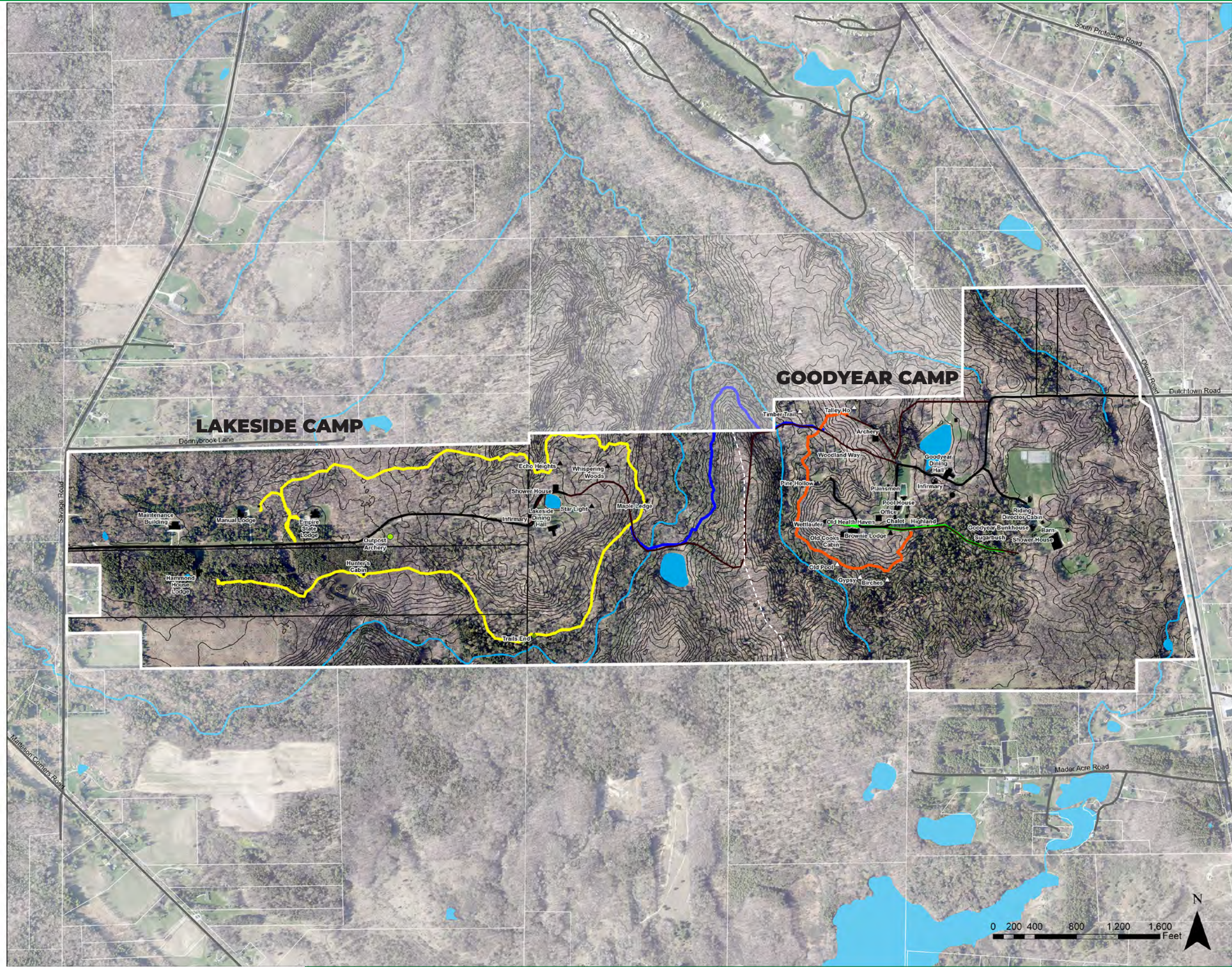
At the Lakeside Camp there are four lodges with sleeping quarters and meeting spaces, four tent cabin camp units, and two primitive camping sites. Near the tent cabin camp units there is an infirmary, shower house, and dining hall around the pond. Lakeside has an archery range located between the lodges and the camp units. Near the entrance of the Lakeside Camp is the maintenance building that services the entire property.



Existing Conditions  
Date: 10/22/2020

Legend

- Girl Scout Buildings
- Camp Seven Hills Features**
- Class
- Buildings
- ▲ Campsite
- Feature
- Latrine
- △ Lost Unit
- ▲ Tent Camp
- Roads
- Maintenance Roads
- Girl Scout Parcels
- Yellow Trail
- Orange Trail
- Blue Trail
- Wettlelafer Trail
- Water Bodies
- Streams
- Contour 10'





## HISTORIC & NATURAL FEATURES

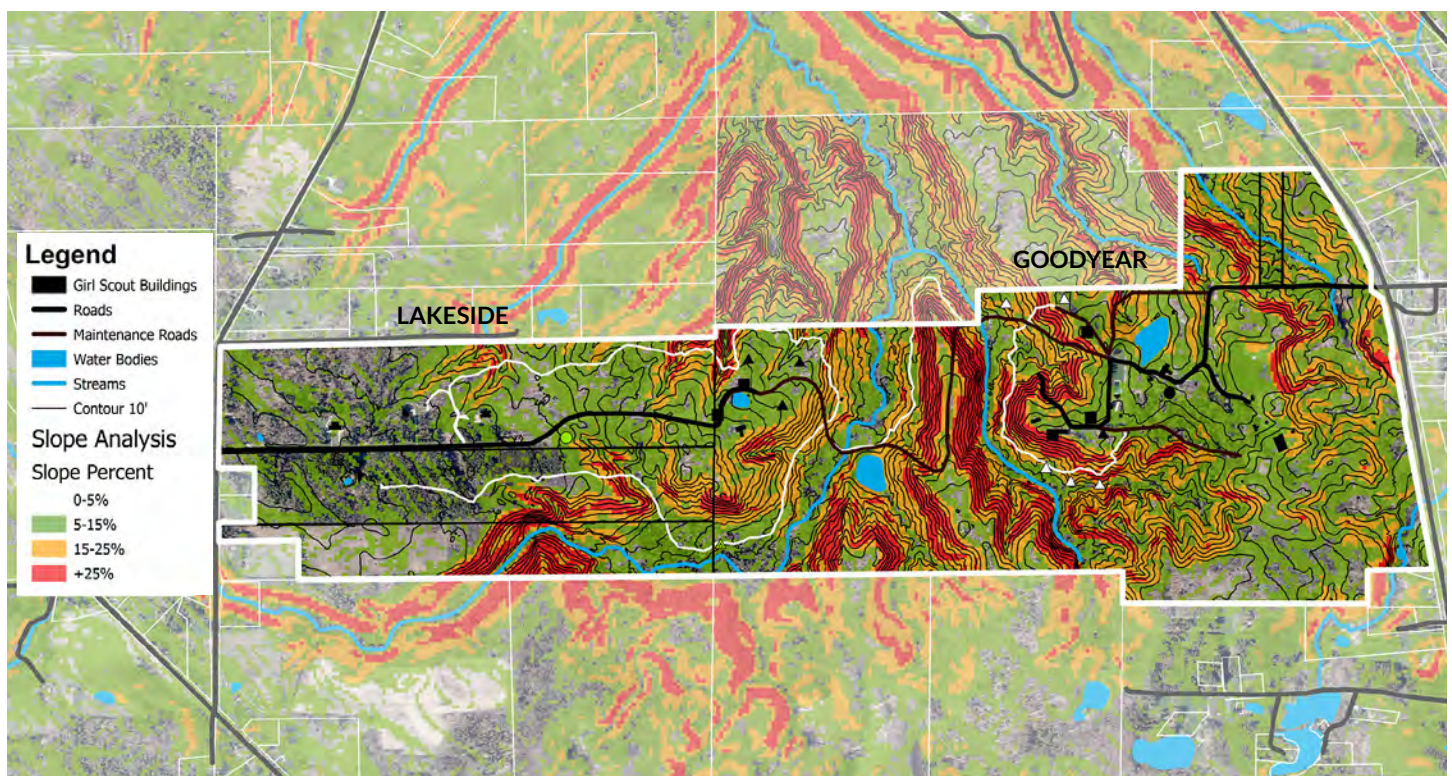
Goodyear Camp has a few unique historical features that could be featured along new trails. There are four abandoned camp units on the Goodyear site that still have the remains of the unit structures. Near the abandoned camp units there is also the remains of the old pool for the camp. In a section of the woods just south of the existing Dutchtown Road driveway there are the remnants of the original carriage road that existed before the present Dutchtown Road.

Camp Seven Hills features pockets of unique ecological features that can provide valuable educational opportunities to the scouts. Scouts can learn about the various plant communities such as the yellow birch-hemlock forest, the maple-beech forest, the spruce-pine plantations, and meadows. The numerous waterways, ponds, and wetlands also offer a variety of environmental education opportunities. Near the Hunter's Cabin there is a nice viewshed over Cazenovia Creek that could be a feature along a trail and an opportunity to learn about topography and watershed patterns. Lastly, between the sport fields and Dutchtown Road there is an area of blueberry bushes offering opportunities for learning about plant-food connections and foraging.

## SITE ANALYSIS

### TOPOGRAPHY

Camp Seven Hills lives up to its name, with a landscape composed of long narrow ridges and linear valleys. The steepest hillsides are in the middle of the property and along the southwest edge, bordering the two largest streams. The land around the entrance of the Lakeside Camp is the flattest area on the site. The slopes on the property range from nearly flat, to hillsides at over 25% slope. This variability in topography offers diversity in the plant and animal communities in the site, as well as a variety of experiences for trail users. There is one ridge, along the back side of the pond at Hunter's Cabin, that offers a beautiful overlook to Cazenovia Creek. Where possible trails should avoid the areas with the steepest slopes. Should a trail need to cross some of these steep ridges, the trail should gradually slope along the edge of the ridge and may require switchbacks to accommodate a more gradual elevation change.



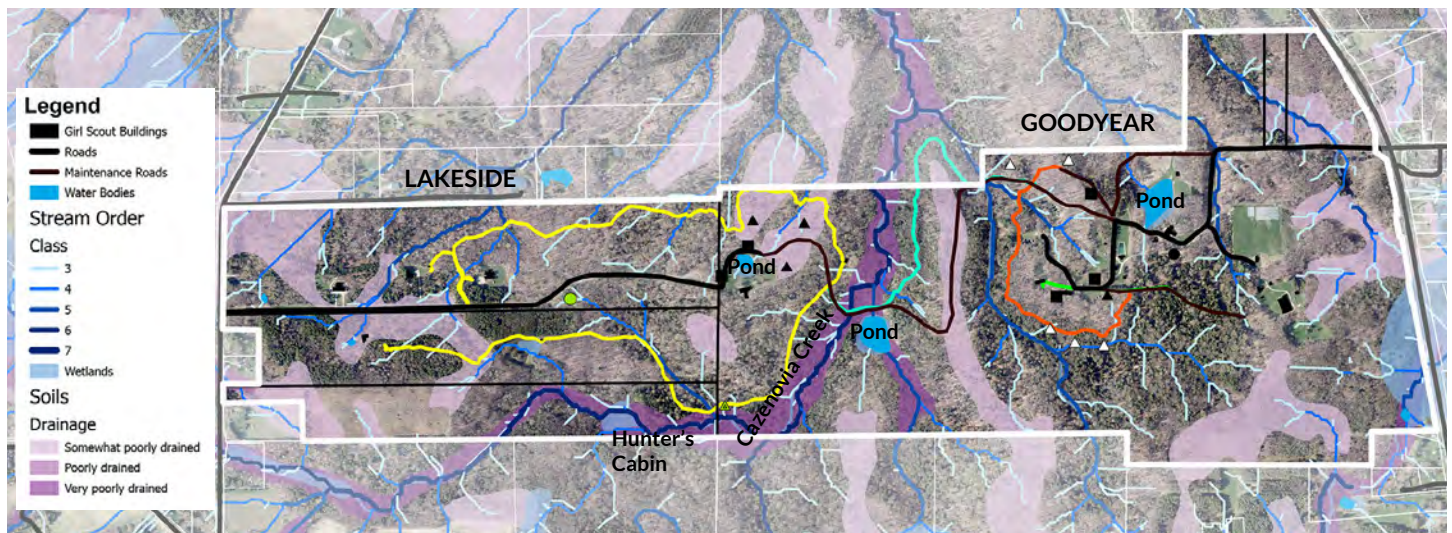


## HYDROLOGY

Cazenovia Creek, which runs through the center and along the southwest edge of the property, is the largest stream on the property. Due to the poorly drained soils the site has streams and wetlands throughout, not just in the valleys and low areas. Wetlands on the site are frequently located in the low areas adjacent to streams. The site has a large pond on the Goodyear Camp side and another large pond that is in the center of the property between the Goodyear and Lakeside Camps. Smaller ponds are scattered around the site; one pond near the Hunter's Cabin includes a small island. In planning trails on the site, knowing where potential waterways and wet areas are allows for the plan to include recommendations on crossings such as stepping stones, puncheons, bridges, or boardwalks.

## SOIL CONDITIONS

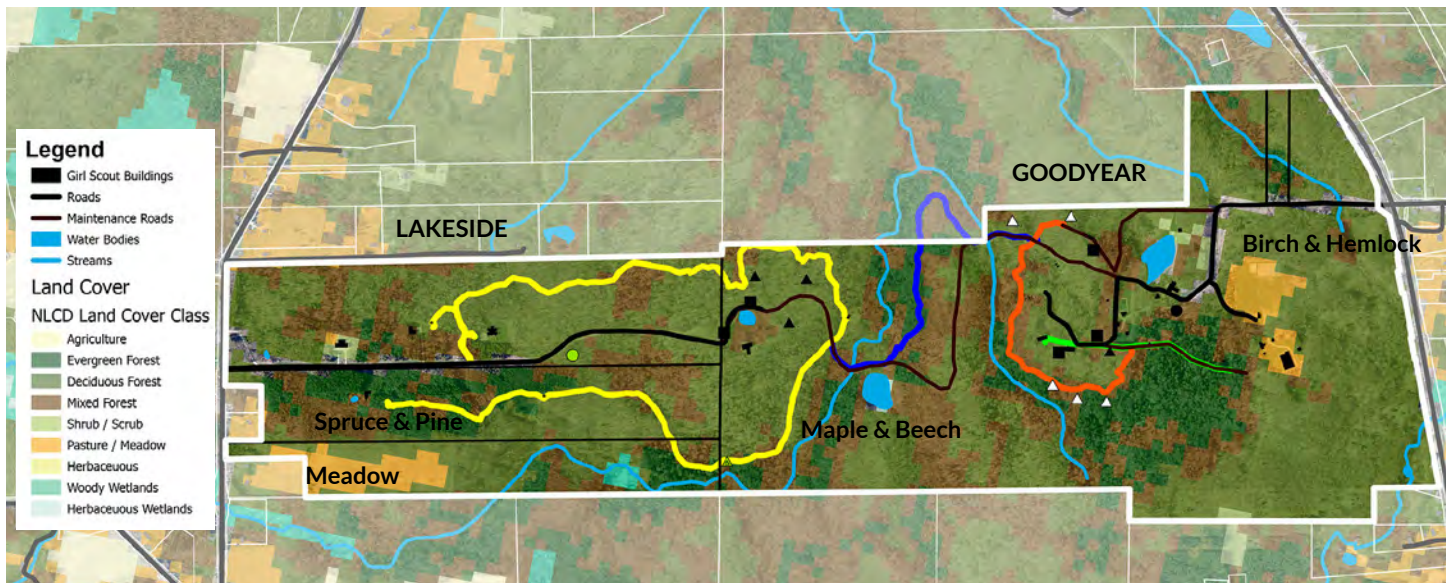
Due to the topography and geology of the site a large portion of the soils do not drain well, creating wet areas all over the property. The soils in the low valleys, especially along Cazenovia Creek are very poorly drained. Camp Seven Hills also has poor draining soils along the top of the ridges around the site, meaning even these high areas can have standing water. The wet soils and labyrinth of waterways pose a challenge to constructing trails due to potential issues of erosion and standing water on the trail surfaces. Knowing the drainage of the soil helps to inform areas to try to avoid with trails or areas that may need to have some sort of crossing system to keep trail users above any water during wet conditions.



## LAND COVER & VEGETATION

The majority of the undeveloped areas at Camp Seven Hills are wooded. The east side of the property, around the Goodyear Camp, is forest primarily composed of yellow birch and hemlock. A maple-beech plant community is typical of the woodlands at the center of the property. On the west side of the property near Hammond House and the Hunter's Cabin the woods are spruce and pine, likely originally planted for timber. The southwest corner of the site has a meadow that was historically agricultural fields. On the Goodyear Camp side of the property there are some athletic fields and a pasture by the barn. The land cover analysis provides information on the different habitats that are on the site and potential areas that the trail system may want to connect to for environmental educational opportunities and varied trail experiences.

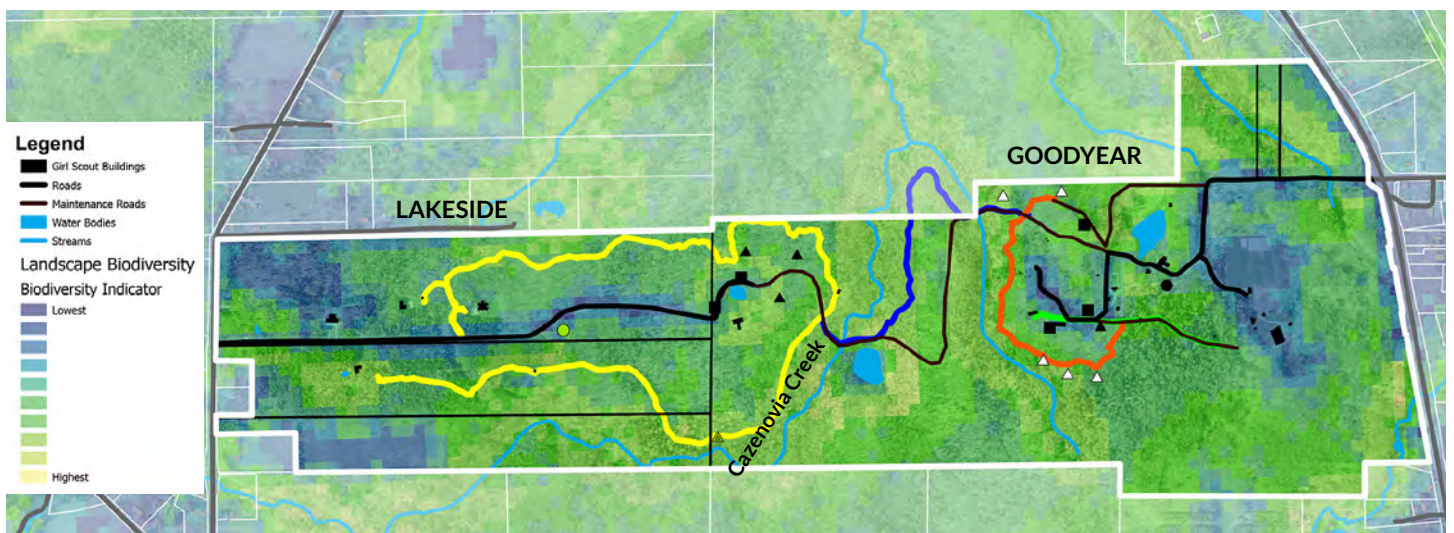




## BIODIVERSITY

The New York Office of Parks, Recreation, and Historic Preservation developed a biodiversity indicator tool for GIS which models the potential biodiversity of a location. The areas with the highest diversity potential are along the large streams running through the site and the areas with the lowest diversity potential are the areas most influenced by human activity such as the roadways and main camp buildings. For the trail master plan this analysis allows Pashek + MTR to connect trails to biodiverse areas of the site to provide for more environmental educational opportunities.

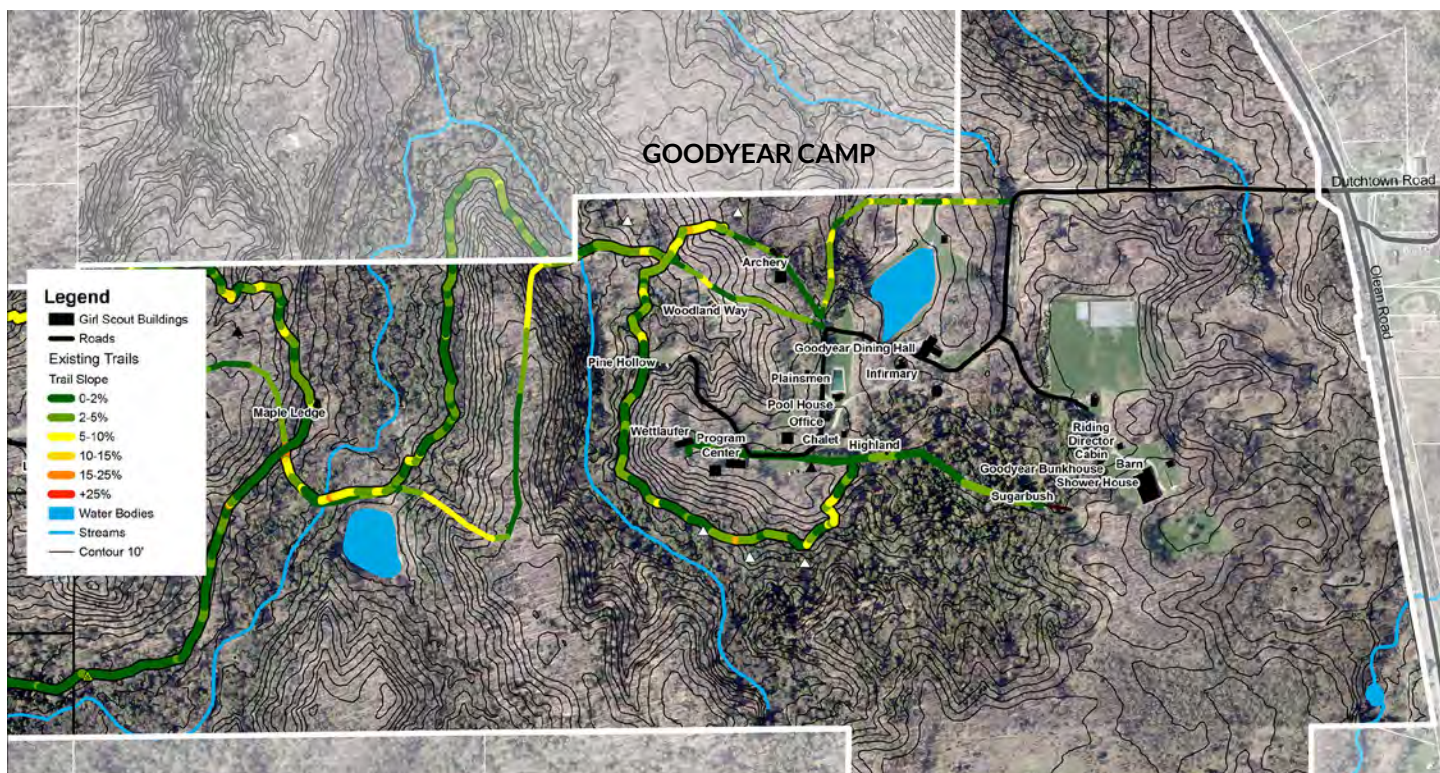
Pashek + MTR utilized the New York Environmental Assessment Form Mapper Tool from the New York Department of Environmental Conservation. For the Seven Hills property the map tool indicates that the property falls near the West Erie Canal Corridor and the ErieC15 Agricultural District. Cazenovia Creek is classified as a stocked Brown Trout stream. The mapper tool shows that the property and surrounding area do not have any documented rare or threatened species.





## EXISTING TRAIL SUSTAINABILITY ANALYSIS

The features and guidelines for designing a sustainable trail are discussed in more detail later in this report, but a short summary is provided for this analysis. A large factor of sustainable trail design is focused on preventing erosion of the trail. Design and environmental factors that can contribute to water erosion include the slope of the trail, the length of the grade, and how the trail crosses the contours of the landscape. Sustainable trails are designed to avoid running straight down a slope (fall line trails) or over long distances (greater than 10') at the steepest grade (maximum 10%). A Geographic Information Systems (GIS) analysis was completed on the existing trail routes at Camp Seven Hills to determine where the existing trails may fail due to erosion. The slopes of the four existing trails and the existing maintenance road were calculated and overlaid with the topography for the site.



### WETLAUFER TRAIL

This trail connects the Wetlaufer building to the barn. A section of this trail is used as a maintenance road to access the camping units and ropes course. The trail slope ranges from 0-5%, well within the desirable range. A couple of sections of the trail do follow the fall lines of the contours, which can lead to potential areas of erosion especially since these areas are also used for maintenance vehicles. Some erosion issues were noticed during the initial site visit.

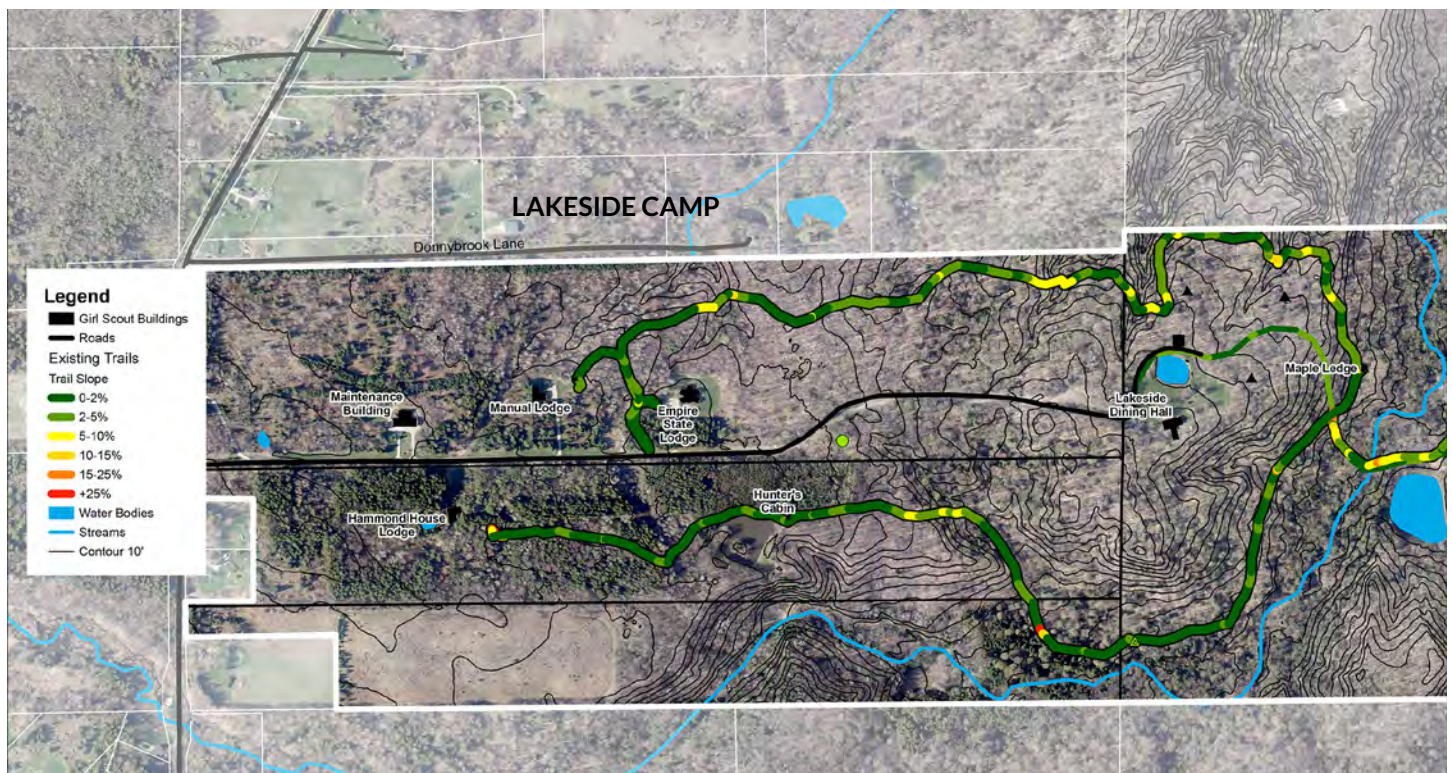
### ORANGE TRAIL

The Orange Trail is a loop trail that goes around the Goodyear Camp sites. The Orange Trail slope ranges between 0-10% with a couple of short segments that are more than 10%. Though a length of the trail follows along the contours of the hillside there are several areas that are along fall lines, these are mostly in section going up or down the hillsides. These sections have some of the higher slopes (10% or more), with distances longer than the recommended ten feet, which all will lead to frequent issues of trail erosion. Simply rerouting these sections of the trail could correct the issue.



## BLUE TRAIL

The Blue Trail connects the Goodyear Camp to the Lakeside Camp. This trail has a slope ranging from 0-10%, and like the Orange Trail has a couple small segments that are above 10%. The majority of the trail is in the 0-5% slope range. The section of the trail that has the steepest slopes is where the trail follows the maintenance road to connect with the Yellow Trail. The Blue Trail that is not on the maintenance road follows the curves of the contours well, and only has a couple of locations that cross the contours at an angle that could cause erosion. Minor rerouting of the portion of the trail that is not along the maintenance road can alleviate some of the erosion. Consideration should be given to creating a new sustainable route for the steep section of trail off the maintenance road. If a new route is preferred, then a stream crossing over Cazenovia Creek would be needed.



## YELLOW TRAIL

The Yellow Trail is the longest trail on the site, looping around the lodges and camp sites of the Lakeside Camp and connecting to the Blue Trail at the maintenance road. The majority of the trail route for the Yellow Trail has a slope of 0-5%, with a few sections up to 10% and two short sections over 10%. The trail, like the Orange Trail, has some sections that curve with the contours of the landscape and other sections that cut down the fall lines of the contours. All the segments of the trail that are above 5% slope are fall line trails, but even some of the lower sloped trail segments follow fall lines. These factors indicate that there are segments of this trail that likely have little to no erosion issues while other segments could be heavily eroded. These fall line segments should be rerouted to reduce erosion issues.

## 1989 LONG RANGE PLANS

A master plan was completed for the Camp Seven Hills site in 1989. Though this plan was for the entire site and not focused on trails, trails are mentioned in several sections. In this master plan document the plans recommend a trail system “threaded” through the site connecting features and facilities. The plan mentioned trails for a wide range of uses like hiking, horses, and even winter activities. The plan also impressed the need to include some trails that would be accessible to users in wheelchairs. Though the plan does not get specific on the trail routes, it suggests that special consideration should be taken when planning the trail routes to not adversely affect the environmental features of the site.

## STAKEHOLDER PARTICIPATION

Several stakeholder and committee meetings helped guide the trail planning process. The following is a brief summary of those meetings

### STUDY COMMITTEE MEETING ONE

The project kicked off in October of 2019 with a virtual committee meeting to discuss the project vision and goals. It is during this meeting that a draft of the project goals was compiled. The meeting discussed the existing trail systems, their limitations, as well as the committee's vision for the new trails. The committee included the Senior Vice President of Asset Management, the Director of Camp Administration, the Seven Hills Property Manager, a Natural Resource Specialist, and a member of the Seven Hills Property Management staff.

#### GOALS

- Utilization
- Sustainable maintenance
- Ecological sustainability and education
- Map of the trail system
- Connect Goodyear and Lakeside sites
- Reduce barriers to trail use
- Trails for a range of ages and skills

#### TOPICS

- Loop trails with varying lengths and bypass routes
- Connections to primitive camping areas
- More trail connections to Girl Scout badges
- Increased programming: environmental education, camping, foraging, cross county skiing, snowshoeing, horseback riding, mountain biking
- Potential connections: hilltops, historic features, foraging areas, Wilhelm acres

### STAKEHOLDER MEETING ONE

The first stakeholder meeting was held at the GSWNY offices in Depew, NY in December 2019. The meeting included all the committee members along with various members of the organization that are involved in the programs at Camp Seven Hills, including one of the current Girl Scouts that attends activities at Seven Hills. The meeting discussed the initial goals defined during the committee kick off meeting, adding to and refining the goals. After discussing the goals and site conditions the group filled out a questionnaire for the project. The questionnaire asked about the current uses for the existing trails, desires for future uses and programming for the new trail system, features desired for the new trails, and recommended features for trail connections. The meeting then broke into two groups to mark up site maps and further discuss the questions from the questionnaire. A summary of the questionnaire responses is provided below along with common discussion points from the group discussions.

EXISTING USE	NEW USE	AMENITIES	CONNECTIONS
<ul style="list-style-type: none"> <li>• Hiking / Walking</li> <li>• Exercise</li> <li>• History</li> <li>• Overnight camping</li> <li>• Backpacking</li> <li>• Horses</li> <li>• Facility connections</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental education</li> <li>• More tent camping</li> <li>• More backpacking</li> <li>• Interpretive</li> <li>• Adaptive</li> <li>• Variety of difficulty</li> <li>• Winter activities</li> </ul>	<ul style="list-style-type: none"> <li>• Signage</li> <li>• Seating</li> <li>• Classrooms</li> <li>• Primitive camping</li> <li>• Bird blinds</li> <li>• Shelters</li> <li>• Bridges and boardwalks</li> <li>• Animal houses</li> <li>• Maple sugaring</li> <li>• Hammocks</li> </ul>	<ul style="list-style-type: none"> <li>• Numerous streams on the site</li> <li>• Ponds and Lakes</li> <li>• Views / vistas</li> <li>• Lost units and historic areas</li> </ul>

**SITE VISIT ONE**

The first site visit was conducted in December 2019 during the same trip for the stakeholder meeting. This visit was for Pashek + MTR to explore the existing trails and features of the site in person to better understand opportunities and limitations for the existing and the new expanded trail system. During the site visit data was collected on the plant communities, features and views, sustainability and usability issues with the trails, and camp facilities.

**STUDY COMMITTEE MEETING TWO**

The second committee meeting was conducted virtually to review a draft of the new trail plan with the committee members. The plan showed various options for main trail routes, secondary routes, and primitive camp sites for review by the committee to provide feedback and preferences. The committee’s input from this meeting was used to refine the draft plan into the final trail plan.

**SITE VISIT TWO**

A second site visit was conducted in August 2020. This site visit provided an opportunity to explore and flag the trail route for the segment of trail to be constructed with the Girl Scouts volunteer group. Pashek + MTR provided hands on instruction for Seven Hills staff on sustainable trail layout. The trail route was mapped using GPS in order to update the final trail route master plan.

**STAKEHOLDER MEETING TWO**

The second stakeholder meeting was held virtually in October 2020. This meeting provided an opportunity for stakeholders to review the progress on the trail plan design and provide feedback. Amenities and features of the trail such as signage, seating, and structures were also discussed. The group provided positive feedback on the variety and levels of trails, voiced continued concerns about encroachment issues with neighbors, and excitement over the different programming and activities that can be incorporated with the trail system. The group closed out the discussion talking about priorities for trail development and next steps in the process.



## DRAFT TRAIL PLAN

After gathering information on the existing site conditions and the vision and goals for the future trail system, Pashek + MTR developed a draft trail plan for review by the study committee. This plan included modifications and expansion of the Yellow Trail, Blue Trail, and Orange Trail. It also proposed routes for three new trails, one around the Goodyear pond, one that loops through the Wilhelm Acres to the barn, and one that connects the Goodyear Camp side with the Lakeside Camps through the southern part of the property.

Along with the proposed trail routes the draft included optional secondary routes and connections. The draft plan noted locations for potential trail signage, trail side primitive camp sites, and trailheads.

Once the draft plan was completed the study committee reviewed it and provided comments and direction to refine the plans to best suit the needs for the Seven Hills camp.

## STAKEHOLDER FEEDBACK ON DRAFT TRAIL MASTER PLAN

<b>ORANGE TRAIL</b> <ul style="list-style-type: none"><li>• Like minor reroutes for improved sustainability</li><li>• Want to improve access to the lost units to teach about camp history</li></ul>	<b>PURPLE POND LOOP</b> <ul style="list-style-type: none"><li>• Like the accessible loop especially for younger campers</li><li>• Would like an accessible trail for Lakeside as well</li></ul>	<b>PINK TRAIL</b> <ul style="list-style-type: none"><li>• Reroute section of trail by the barn to not run through the pasture</li><li>• Like the inner loop segment</li><li>• Would like to use as a horse trail</li></ul>
<b>WHITE TRAIL</b> <ul style="list-style-type: none"><li>• Like the connections to other trails (yellow, blue, and orange)</li><li>• Like the increased difficulty level for campers</li><li>• Would like to use as an overnight horse trail</li></ul>	<b>BLUE TRAIL</b> <ul style="list-style-type: none"><li>• Keep trail connection to the vernal pool feature</li><li>• Keep trail connection to maintenance road and pond</li><li>• Could be included as a part of a larger horse trail loop</li></ul>	<b>YELLOW TRAIL</b> <ul style="list-style-type: none"><li>• Prefer alternate route further from archery</li><li>• Some of the proposed connections not needed</li><li>• Like connection segments that create loops</li><li>• Meadow area offers new experience</li></ul>



Site Photos from December 2019



Site Photos from August 2020





Site Photos from December 2019



Site Photos from August 2020



# DESIGN CONSIDERATIONS

## TRAIL SUSTAINABILITY

When planning for sustainable trails, minimizing impacts on natural and cultural resources is critical. Trail layout and design must consider these resources of the site. The highest quality habitats and sensitive cultural sites should be avoided. Sustainable trail planning objectives include:

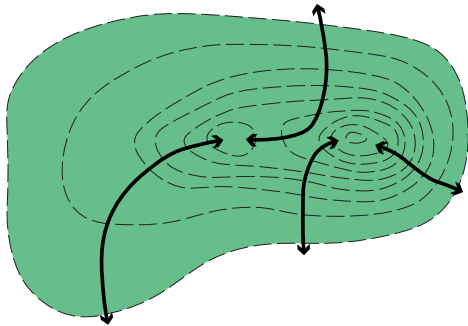
- **Physical Sustainability:** Designing trails to retain their structure and form over years of use and under forces of humans and nature is a key factor in sustainability. Trail use promotes change, so trails must be designed in anticipation of change to ensure that they remain physically stable with appropriate maintenance and management.
- **Ecological Sustainability:** Minimizing the ecological impacts of trails and protecting sensitive natural and cultural resources is fundamental in sustainable trail design and development.
- **Economic Sustainability:** For any trail to be sustainable, the implementing agency or advocacy group must have the capacity to economically support it over its life cycle. Developing and committing to a long-term maintenance strategy is a critical aspect of a successful trail program.

## SUSTAINABLE TRAIL OBJECTIVES

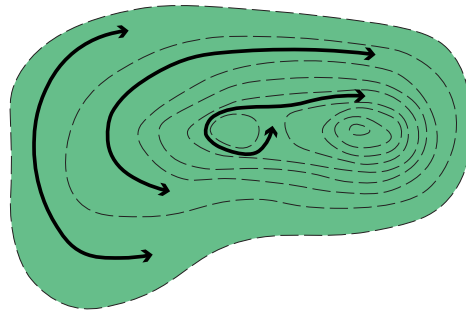
- ✓ **Connect positive, and avoid negative, control points.**
  - Sustainable trails lead users to desired destinations such as water features, historic sites, vistas, interesting landforms, and user facilities; while avoiding wet areas, steep slopes, critical habitats, and other culturally or environmentally sensitive areas.
- ✓ **Keep water off the trail.**
  - Erosion is the number one problem for sustainable trails. It damages trails, is expensive to repair and diminishes the users' experiences. Water is the primary erosive force. Trails that collect water or channel water will be both environmentally and economically unsustainable.
- ✓ **Follow natural contours. Trails lie on the land in three ways:**
  - Fall Line Trail - along a fall-line, perpendicular with the direction of the contours
  - Flat Trail - on flat ground with little slope or cross slope
  - Contour Trail - along the contour with subtle elevation changes. Of these types of trails, only the contour trail easily sheds water and is thus sustainable.
- ✓ **Keep users on the trail**
  - When users leave the trail tread, they widen it, create braided trails, and create social trails. These can cause environmental damage and raise maintenance costs. Users leave the trail when it becomes eroded or wet, or when the trail does not meet their needs or expectations.



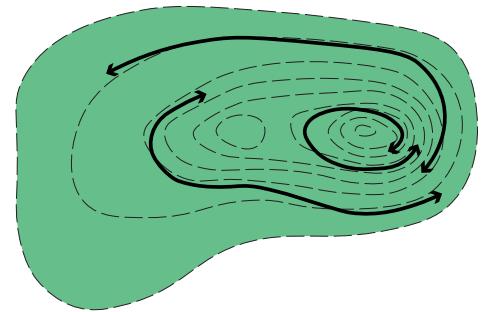
## FALL LINE TRAIL



## FLAT TRAIL



## CONTOUR TRAIL



## SUSTAINABLE TRAIL DESIGN CONSIDERATIONS

Ultimately, a sustainable trail design will most often be a contour trail that connects desired control points by contouring along the sides of slopes while making subtle changes in grade.

Important considerations in sustainable trail design include:

- Trail corridor
- Tread design
- Tread drainage
- Changes in trail grade
- Drainage solutions
- Tread reinforcement & trail structures
- Trailhead design
- Signage and markings
- Trail gates and barriers
- Bridges
- Landscaping with native plants

## FIVE ESSENTIAL ELEMENTS OF SUSTAINABLE TRAILS

1. **The Half Rule:** A trail's grade should not exceed half the grade of the hillside or side-slope that the trail traverses. If the grade does exceed half the side-slope, it is considered a fall-line trail. Water will flow down a fall-line trail rather than run across it.
2. **The 10 Percent Average Guideline:** Generally, an average trail grade of 10 percent or less is most sustainable because this aids planning, applies to most soil types, minimizes user-caused erosion, allows design flexibility, helps future reroutes, and accommodates undulations.
3. **Maximum Sustainable Grade:** The maximum grade for a trail length of longer than 10 feet should be identified and calculated early in the planning process. Planning for these very steep segments should consider soil type, presence of rock, annual rainfall amount, grade reversals (dips and rises), types of users, number of users and difficulty targets.
4. **Grade Reversals:** Dips and rises should be included because they force water to exit the trail at the low point of the grade reversal before it can gain more volume, momentum, and erosive power.
5. **Outslope:** As a trail contours across a hillside, the downhill or outer edge of the pathway should tilt slightly down and away from the high side. This tilt, called an outslope, encourages water to sheet across and off the trail instead of funneling down its center.

## GENERAL USE CONSIDERATIONS

While developing the master trail plan for the Camp Seven Hills property the stakeholders and committee discussed a range of trail uses that could be provided on the site. These uses focus predominately on hiking, but also included beginner mountain biking, horseback riding, beginner cross country skiing, and beginner snowshoeing.

### HIKING

Hiking trails can greatly vary depending on location and user groups, but in general a hiking trail is a natural surface route for pedestrian use. Hikers seek out trails for their personal desired experience. Often hikers prefer loop trails over out and back trails for more convenience and like to have trails with varying difficulty to add variety to the experience.

Hikers enjoy having places along the trail routes to rest, observe, or socialize. General hiking trails provide a natural surface route that allows for opportunities to observe wildlife and interact with nature. Interpretive nature trails also include ways to learn about the wildlife and nature during the hiking experience. Trail surface conditions, grades, tread width, and clearance all vary depending on desired use of the trail. Best practices for hiking trail design follows the sustainable trail guidelines.



### EQUESTRIAN

Camp Seven Hills hosts the English horseback riding program for the GSWNY. Since this program is hosted on the site the study committee desired some trails for equestrian use to be incorporated. Most equestrian trails are done as a walking pace and prefer to have a variety of features like water crossings, grade changes, open spaces, and wooded areas. Equestrian trails are often a multiple looping system that allows riders to vary the length of the ride by choosing the loops they take.



Safety considerations include minimizing anything that could spook the horses (noise, animals, unstable terrain, etc.), stable tread, good clear sight lines, and proper clearing widths and heights to accommodate the horse and the rider. Single file trails can be two feet wide with a clearing area of 5-8 feet, and a clearing height of at least 9 feet. Equestrian trails should be less than 10% grade, with a maximum of 25% grade for up to 200 feet. Surfaces should be stable and well compacted to provide solid footing for the horses. Turning radii on the trails should not be less than 30 inches so that the horses can easily make the turns. Horses on trails travel at about 3 to 5 miles per hour, so a 3 to 5 mile loop trail would take about an hour to complete.

### CROSS COUNTRY SKIING

Cross country ski trails are natural surface trails that can be either groomed or not and tend to be designed for a range of skills and abilities. These trails are typically in a natural setting and consist of looping systems with individual loops ranging from half a mile to 3 miles in length with larger loops 5 to 10 miles. The trail should be well marked for beginners, have a clearance height of at least 8 feet, trail tread of 1 to 4 feet in width and for beginners' grades no more than 8%. For skiing it is best to have at least a 6 inch base of snow on the trail, and the surface below the ski route should be stable, smooth, and well maintained with proper drainage to prevent erosion issues.



### SNOWSHOEING AND WINTER HIKING

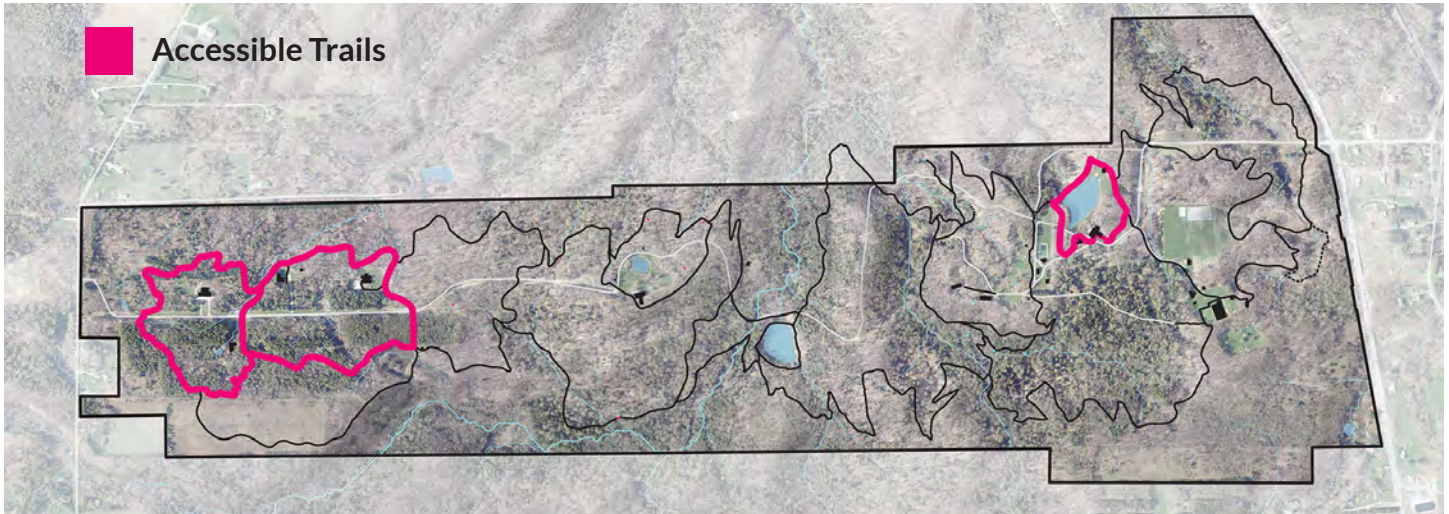
Snowshoeing and winter hiking trails are often designed similar to cross country skiing trails. These trails are for people wanting to enjoy nature in the winter months. Use of these winter trails tends to vary depending on the depth of snow. If the snow is about one foot or less in depth users tend to prefer to hike the trail, with snow depths over one foot snowshoeing is used more. Users of these trails like loops systems with areas to stop and rest, and observation/overlook spaces. When in natural, ungroomed settings the trail width is typically 18 inches.





## ACCESSIBILITY

One of the first goals discussed by the study committee for the trails master plan was to incorporate trails that are accessible to users of all ages, skill levels, and abilities. With that guiding goal in mind the proposed trail master plan includes three trails that are accessible, and should be constructed as such. These trails are the Grace Loegler Trail, the Lakeside Lodge Trail, and the Goodyear Pond Loop. These trails provide access to multiple different areas on the site for learning and exploring, allowing Girl Scouts of all abilities to have the same experiences.



Accessibility, in design terms, is described by the Americans with Disabilities Act (ADA), which guarantees equal opportunity for individuals with disabilities to participate in the mainstream of public life. To do so, the ADA sets requirements for facilities to prevent physical barriers that keep people with disabilities from participating. When recreational facilities are built or altered, they must comply with the ADA standards by providing an accessible route to the area of use and spectator areas. With regards to complying with ADA, the following standards and guidelines must be taken into consideration:

- Access Board: [www.access-board.gov](http://www.access-board.gov)
- Access Board guides on Recreation Facilities: [www.access-board.gov/guidelines-and-standards/recreation-facilities/guides](http://www.access-board.gov/guidelines-and-standards/recreation-facilities/guides)
- 2010 ADA Standards for Accessible Design: [www.ada.gov/regs2010/2010ADASTandards/2010ADAstandards.htm](http://www.ada.gov/regs2010/2010ADASTandards/2010ADAstandards.htm)
- Access Board guide on Outdoor Development Areas: <https://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas/final-guidelines-for-outdoor-developed-areas>
- Forest Service Accessibility Guidebook for Outdoor Recreation and Trails: [www.fs.fed.us/recreation/programs/accessibility/htmlpubs/hm06232801/toc.htm](http://www.fs.fed.us/recreation/programs/accessibility/htmlpubs/hm06232801/toc.htm)
- Penn State Center for Dirt and Gravel Studies: [www.dirtandgravel.psu.edu/trails/trails.html](http://www.dirtandgravel.psu.edu/trails/trails.html)

### ACCESSIBILITY GUIDELINES FOR OUTDOOR DEVELOPED AREAS

Where the 2010 ADA Standards are not applicable, the Outdoor Guidelines provides guidance on achieving accessibility

- Outdoor Recreation Access Route (Section 1016)
- Outdoor Constructed Features (Section 1011)
- Viewing Areas (Section F246 and 1015)
- Trails (Section F247 and 1017)

#### Outdoor Recreation Access Route vs Accessible Routes

- Accessible routes apply to facilities covered by the 2010 ADA Standards.
- Outdoor recreation access routes apply to facilities covered by the Outdoor Guidelines.
- Running slope grades may be as steep as 10% for short segments.

- Surfaces must be “firm and stable” but are not required to be “slip-resistant”
- Obstacles may be higher than ¼”, although stairs are still not compliant.

**Outdoor constructed features consist of picnic tables, fire rings, grills, receptacles, hydrants, benches, telescopes, etc.**

How many of each type of feature must be accessible?

- All features that are located in an accessible camping unit or picnic unit.
- For common-use features, the required number of accessible unites will depend on the total features provided.

Constructed features must have clear ground space:

- Space for wheelchair users to approach and use accessible features.
- Must be level, firm, and stable.
- Must provide adequate clearance.
- Specific guidelines located in Section 305 and 306

### **Viewing Area Guidelines**

- Clear ground space on outdoor recreation access route.
- Unobstructed view between 32 and 48 inches above clear ground space.
- Slope no steeper than 1:33 or 1:48 for asphalt, concrete, and boards.
- Firm and stable surface.
- Turning space.

### **Trail Accessibility**

Distinction between trails, outdoor recreation routes, and accessible routes:

- A trail is used primarily for recreational purposes.
- Accessible routes and outdoor recreation access routes are used primarily to connect elements, spaces, or facilities within a site.
- Trails are held to less stringent standards that accessible routes.

#### **Surfaces of Trails**

- Trail surfaces must be stable and firm.
- A firm surface resists deformation by indentations.
- A stable surface is not permanently affected by normal weather conditions and is able to sustain wear and tear from normal usage between maintenance cycles.

#### **Clear Tread Width of Trails**

- Provide at least 36 inches of clear tread width.

#### **Trail Slopes**

- Allowable Running Slopes
  - Steeper than 1:20 (5%) but not steeper than 1:12 (8.33%) maximum length of 200 feet
  - Steeper than 1:12 (8.33%) but not steeper than 1:10 (10%) maximum length of 30 feet
  - Steeper than 1:10 (10%) but not steeper than 1:8 (12.5%) maximum length of 10 feet.
- Provide a resting interval between each steeper slope segment.

#### **Resting Intervals on Trails**

- Provide resting intervals between each trail segment that the running slope exceeds 1:20 (5%).
- Resting interval space should be at least 60 inches long and as wide as the widest segment of trail.
- If the resting interval is adjacent to the trail it should be at least 60 inches long and 36 inches wide.
- The resting interval could serve as a turning or passing space.
- The slopes for the resting interval must not exceed 1:20 (5%) in any direction.

#### **Passing Spaces on Trails**

- A 60 inch clear tread wisth is needed for two wheelchairs to pass on a trail.
- Where the clear width of the trail is less than 60 inches, provide pacing spaces at least every 1000 feet.
- Passing spaces must be at least 60 inches wide and 60 inches long



## Trail Signs

- Trail name
- Length of trail or trail segment
- Surface type
- Typical minimum tread width
- Typical maximum running slope
- Typical maximum cross slope

## Conditions and Exceptions

Four conditions that permit departures from specific technical provisions include:

1. Where compliance would cause substantial harm to cultural, historic, religious, or significant natural features or characteristics.
2. Where compliance would substantially alter the nature of the setting, the purpose of the facility, or portion of the facility.
3. Where compliance would require construction methods or materials that are prohibited by federal, state, or local regulations or statutes.
4. Where compliance would not be feasible due to the terrain or prevailing construction practices.

# DRAINAGE

Drainage is the most important aspect of trail design, regardless of the trail material. If the trail is not designed with sufficient drainage it will require high levels of maintenance and will ultimately fail. Water sources that can cause erosion on the trail include rain, snowfall, seeps, springs, streams, ephemeral drainages, water tables, or floodplains. There are numerous other factors that contribute to trail erosion issues such as vegetation around the trail and user impacts on the trail.

## DRAINAGE SOLUTIONS

Even perfectly constructed trails with proper excavation, outslopping/insloping, and stabilization cannot completely neutralize water damage to the trail surface. A well-constructed trail will incorporate features to direct water away from and off the trail surface. Consider installing more drainage features than necessary to ensure continued water flow off the trail in the event that one or more drainage methods fail.

## GRADE REVERSALS AND DIPS

A grade reversal is a reverse in the trail grade, usually a short dip followed by a rise, that forces water off the trail. Grade reversals are also referred to as grade dips, drainage dips, and/or rolling grade dips. Frequent grade reversals are a critical element of sustainable trail design. Most trails will benefit from grade reversals every 20 to 50 feet, depending on soil type and rainfall.

## KNICKS

Knicks are tapered, semi-circular sections of a trail that measure approximately 10 feet in diameter. Knicks are usually built on gentle, smooth sections of a trail tread where water tends to puddle. For the knick to be effective, its center must be outslopped at least 15 percent towards an area lower in elevation so that the water will have a place to drain.

## BLEEDERS

Bleeders are constructed swales angled to drain water off and away from the treadway. Built by digging a shallow dip in the tread at a slant towards the outside edge of the treadway. Bleeders work best on sidehills, especially in spots where topography, roots, and rocks naturally facilitate drainage. Bleeders often work as effective backups where drainage dips will not fit. They also work well at the apex of turns and switchback corners. However, they work poorly along straight, unobstructed graded trails where they may clog with silt.

# RECOMMENDATIONS

## TRAIL MASTER PLAN DESCRIPTION

The master trail plan expands on the existing trail system to provide a greater variety of outdoor recreation experiences and environmental education for users. The master trail plan incorporates a wide range of trail experiences, lengths, and difficulty levels that can interest users of all ages and skills. The proposed path network includes accessible trails for people of all abilities.

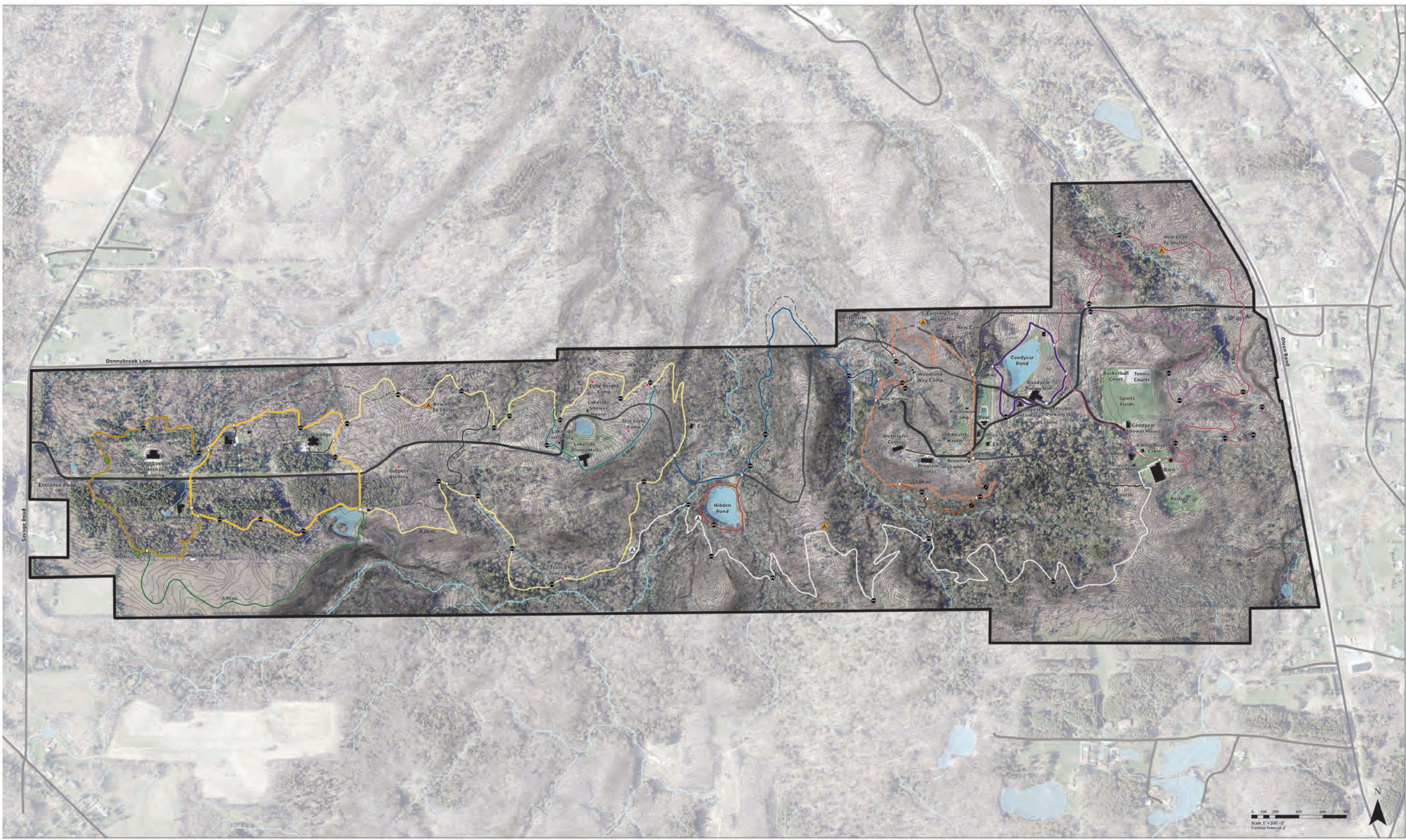
The trails on the Lakeside half of the property consist of multiple connected loops allowing for different lengths and difficulty for a variety of users. The trails in the center of the property connect the Goodyear Camp with the Lakeside Camp, one a more moderate, short trail, the other a longer more rigorous trail. The trails on the Goodyear half of the property provide a few separate loops of varying length, difficulty levels, and experiences. The trail routes took into consideration desired programming beyond hiking and backpacking such as education, horseback riding, primitive camping, nature discovery, winter activities, connections to facilities, and unique ecological features. The following sections describe the proposed trail plan in greater detail starting at the western edge of the site moving east. Information about trail construction and materials can be found in the Implementation Chapter. Trail construction details are located in the Appendix.

## GOALS

1. **UTILIZATION.** Get more people out on the trails.
2. **SUSTAINABLE** trail maintenance.
3. **ECOLOGICAL** sustainability and **ENVIRONMENTAL** education.
4. Create a **COMPREHENSIVE MAP** of the trail system.
5. Provide opportunities for additional **PROGRAMMING**.
6. Provide **CONNECTIONS** between the Goodyear and the Lakeside Camps.
7. **REDUCE BARRIERS** for users of the trails.
8. Provide trails that can be used by a **RANGE** of **AGES** and **SKILL** levels.
9. **IMPROVE SIGNAGE** and markers along the trails. Provide signs for wayfinding, mile markers, difficulty level, interpretation, and education.



# Trail Master Plan



### LEGEND

- Project Boundary
- Buildings
- Roads
- Maintenance Roads
- Existing Trails
- Yellow Trail - 2.27 mi.  
Slope range: 0-300%  
Av. Slope: 14.17%
- Blue Trail - 0.68 mi.  
Slope range: 0-44%  
Av. Slope: 4.64%
- Orange Trail - 0.58 mi.  
Slope range: 0-11%  
Av. Slope: 3.17%
- Additional - 0.34 mi.  
Slope range: 0-4%  
Av. Slope: 1.25%
- Proposed Trails
- Grace Loewler Trail - 0.67 mi.  
Slope range: 0-4%  
Av. Slope: 0.7%
- Mustard Yellow
- Lakeside Lodge Trail - 0.87 mi.  
Slope range: 0-4%  
Av. Slope: 1.11%  
Difficulty: Easiest
- Yellow
- Maple Ledge Trail - 2.01 mi.  
Slope range: 0-8%  
Av. Slope: 1.49%  
Difficulty: More Difficult
- Pale Yellow
- Meadow Trail - 0.50 mi.  
Slope range: 0-6%  
Av. Slope: 1.23%  
Difficulty: Easy
- Green
- Lakeside Camp Trail - 0.34 mi.  
Slope range: 0-5%  
Av. Slope: 1.7%
- Teal
- Cazenovia Trail - 0.69 mi.  
Slope range: 0-7%  
Av. Slope: 2.36%  
Difficulty: More Difficult
- Blue
- Hidden Lake Loop - 0.28 mi.  
Slope range: 0-7%  
Av. Slope: 10.0%
- Red
- Beech Maple Trail - 2.02 mi.  
Slope range: 0-11%  
Av. Slope: 2.15%  
Difficulty: Most Difficult
- White
- Goodyear Camp Trail - 1.04 mi.  
Slope range: 0-9%  
Av. Slope: 2.0%
- Orange
- Lost Unit Trail - 0.16 mi.  
Slope range: 0-6%  
Av. Slope: 3.12%  
Difficulty: More Difficult
- Red Orange
- Goodyear Lake Loop - 0.44 mi.  
Slope range: 0-4%  
Av. Slope: 1.52%  
Difficulty: Easiest
- Purple
- Dutchtown Trail - 1.53 mi.  
Slope range: 0-13%  
Av. Slope: 2.27%  
Difficulty: Most Difficult
- Pink
- Blueberry Trail - 0.51 mi.  
Slope range: 0-7%  
Av. Slope: 2.29%  
Difficulty: More Difficult
- Lavender
- Connectors - 0.57 mi.  
Slope range: 0-8%  
Av. Slope: 2.61%
- Secondary Trail Routes
- Dutchtown Alternate - 0.19 mi.  
Slope range: 0-5%  
Av. Slope: 1.75%
- ★ Proposed Trailhead
- ◇ Proposed Trail Markers
- Proposed Steps
- Water Crossings
- △ Proposed Primitive Camp Sites
- ▲ Primitive Sites with Shelters
- Sensory Nodes

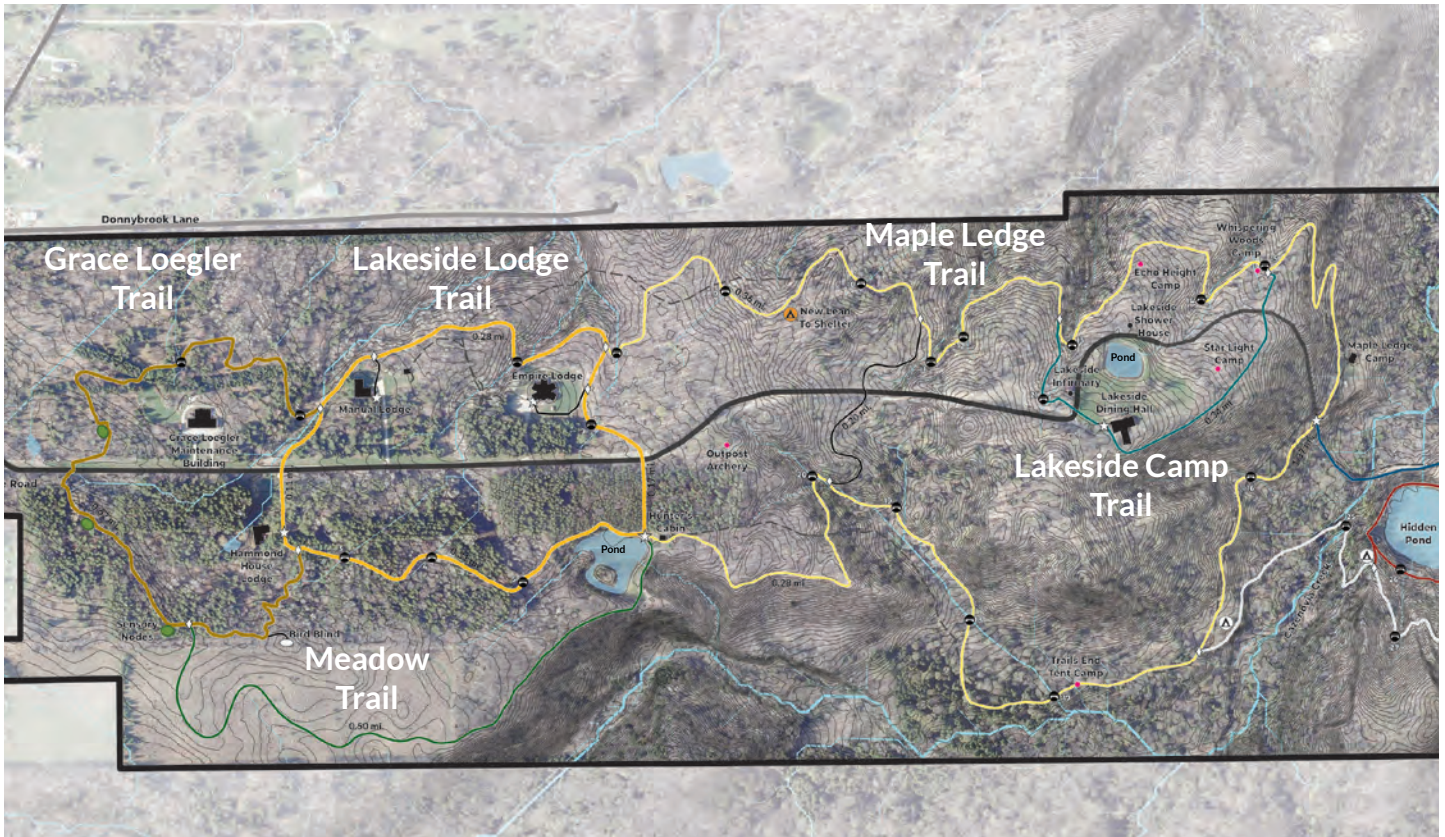
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## YELLOW TRAIL SYSTEM

The master trail plan proposes expanding and rerouting the existing Yellow Trail system, as well as breaking the trail into three connected loops: Grace Loegler Trail, Lakeside Lodge Trail, and Maple Ledge Trail. As one large loop the new Yellow Trail system is about 3.27 miles long and would take approximately 90 minutes of hiking to complete. The purpose of the Yellow Trail system is to connect all of the major facilities on the Lakeside portion of the camp, provide accessible trail opportunities, provide varying degrees of entry level hiking, and allow for a variety of looping distance options. The following pages describe the Yellow Trail system in more detail.





## GRACE LOEGLER TRAIL

ACCESSIBLE	Yes	RATING	Easiest
LENGTH	0.67 miles	WIDTH	5'
SLOPE RANGE	0-4%	CROSS SLOPE	3-5%
AVERAGE SLOPE	0.67%	SURFACE	T.S.A.

### TRAIL DESCRIPTION

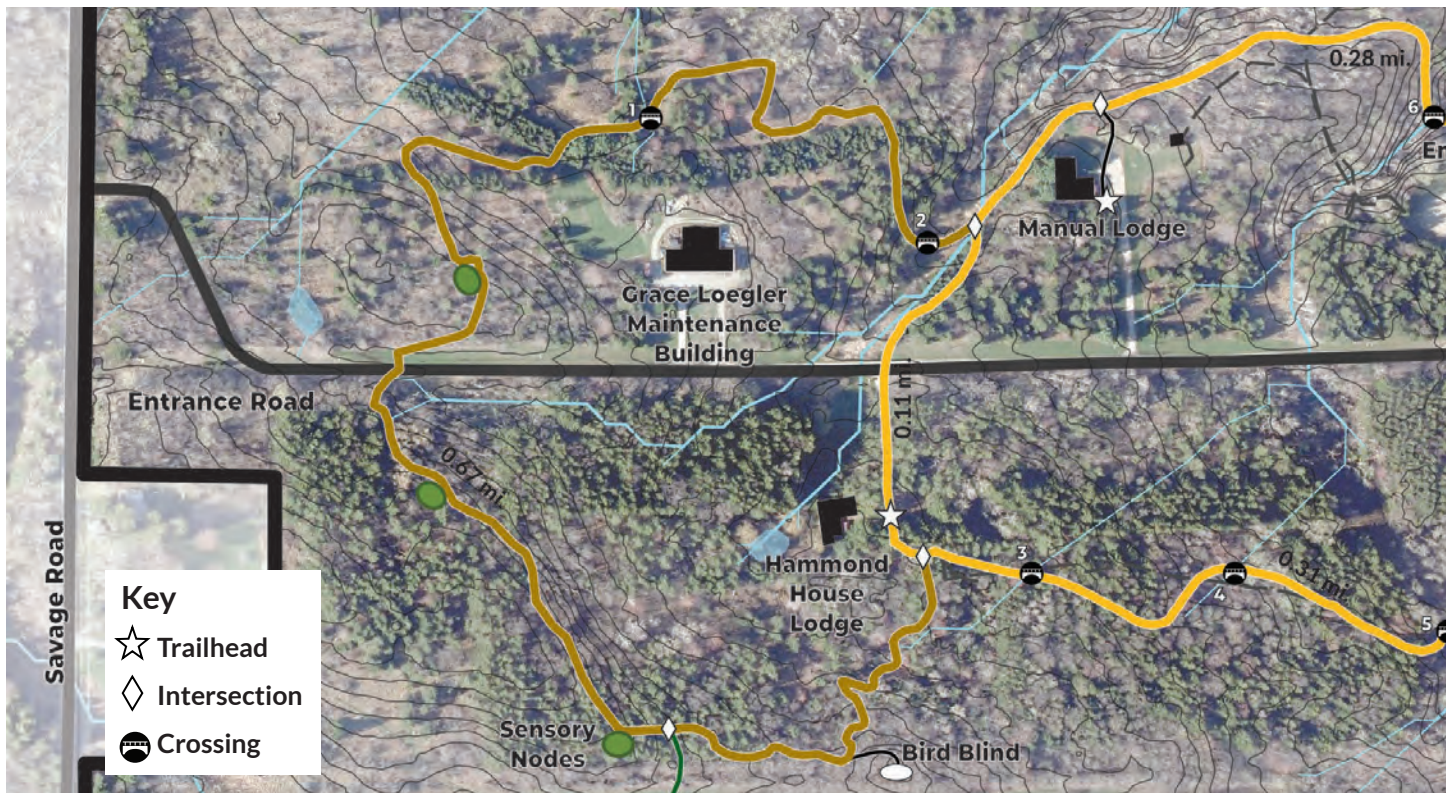
The Grace Loegler Trail segment completes the Yellow Trail loop by connecting into the ends of the Yellow Trail at two of the lodges. The trail intersects with the Lakeside Lodge Trail near Manual Lodge, winds behind the maintenance building, crosses the main entrance road, and loops over to connect with the Lakeside Lodge Trail by Hammond House. This section of the trail is under one mile in length and would take about 20 minutes to hike. The trail is designated as accessible, using a wider trail path and maintaining slopes under 5%. The Grace Loegler Trail intersects with one of the ends of the Meadow Trail near Hammond House.

### TRAIL USES

This segment of trail can be complete as an individual loop or combined with the connected trails to create longer hiking experiences. Due to the location, slope, and width of the trail, it would be ideal for winter activities such as snowshoeing and cross country skiing, especially for beginners.

### TRAIL FEATURES

The route weaves through a variety of ecological features including a spruce tree plantation, old apple orchard, shrublands, an emerging maple grove, and large specimen trees near the Meadow Trail connection. The trail includes trail head signs, intersection markers, interpretive signs, and benches made from felled trees. A bird blind is proposed on the south edge of the trail that will face the meadow. Due to the topography and hydrology of the site this segment of trail would likely require two water crossings. This trail also includes three sensory pods. They include: a music garden with outdoor musical instruments made from items such as metal dust pans, buckets, and sticks; a life sized bird's nest made from sticks and wood to create a small gathering space; and a garden pod planted with natives species that have interesting textures, smells, edible fruit, and seed pods.





## LAKESIDE LODGE TRAIL

ACCESSIBLE	Yes	RATING	Easiest
LENGTH	0.87 miles	WIDTH	5'
SLOPE RANGE	0-4%	CROSS SLOPE	3-5%
AVERAGE SLOPE	1.11%	SURFACE	T.S.A.

### TRAIL DESCRIPTION

The Lakeside Lodge Trail creates a loop trail that connects all three of the existing lodges at Lakeside. The loop connects to Empire Lodge, Manual Lodge, crossing the main road to connect with the Hammond House Lodge then loops around to the Hunter's Cabin and back across the road to connect with Empire Lodge. The trail intersects with the Grace Loegler Trail by Manual Lodge and Hammond House. The Maple Ledge Trail meets up with the Lodge Trail at Empire Lodge and Hunter's Cabin. The trail includes two small connector trails, one connecting to the entrance of Manual Lodge and one connecting to the entrance at Empire Lodge. The Lakeside Lodge Trail is just under a mile long and would take about 25 minutes of hiking to complete the entire loop. The slope for the trail is under 5% allowing for accessibility to all users.

### TRAIL USES

The trail loop could be combined with the adjacent Yellow Trail loops or the Meadow Trail to expand the hiking experience. Similar to the Grace Loegler Trail the Lodge Trail provides an opportunity for winter activities like snowshoeing and cross country skiing.

### TRAIL FEATURES

The loop wanders through shrublands, young forests, and a pine tree plantation. The primary point of interest for the trail is the beautiful pond at Hunter's Cabin. This trail is estimated to require five stream or wetland crossings, these crossings should be small trail bridges or boardwalks to comply with accessibility.





## MAPLE LEDGE TRAIL

<b>ACCESSIBLE</b>	No	<b>RATING</b>	More difficult
<b>LENGTH</b>	2.01 miles	<b>WIDTH</b>	18-24"
<b>SLOPE RANGE</b>	0-8%	<b>CROSS SLOPE</b>	3-5%
<b>AVERAGE SLOPE</b>	1.69%	<b>SURFACE</b>	Natural

### TRAIL DESCRIPTION

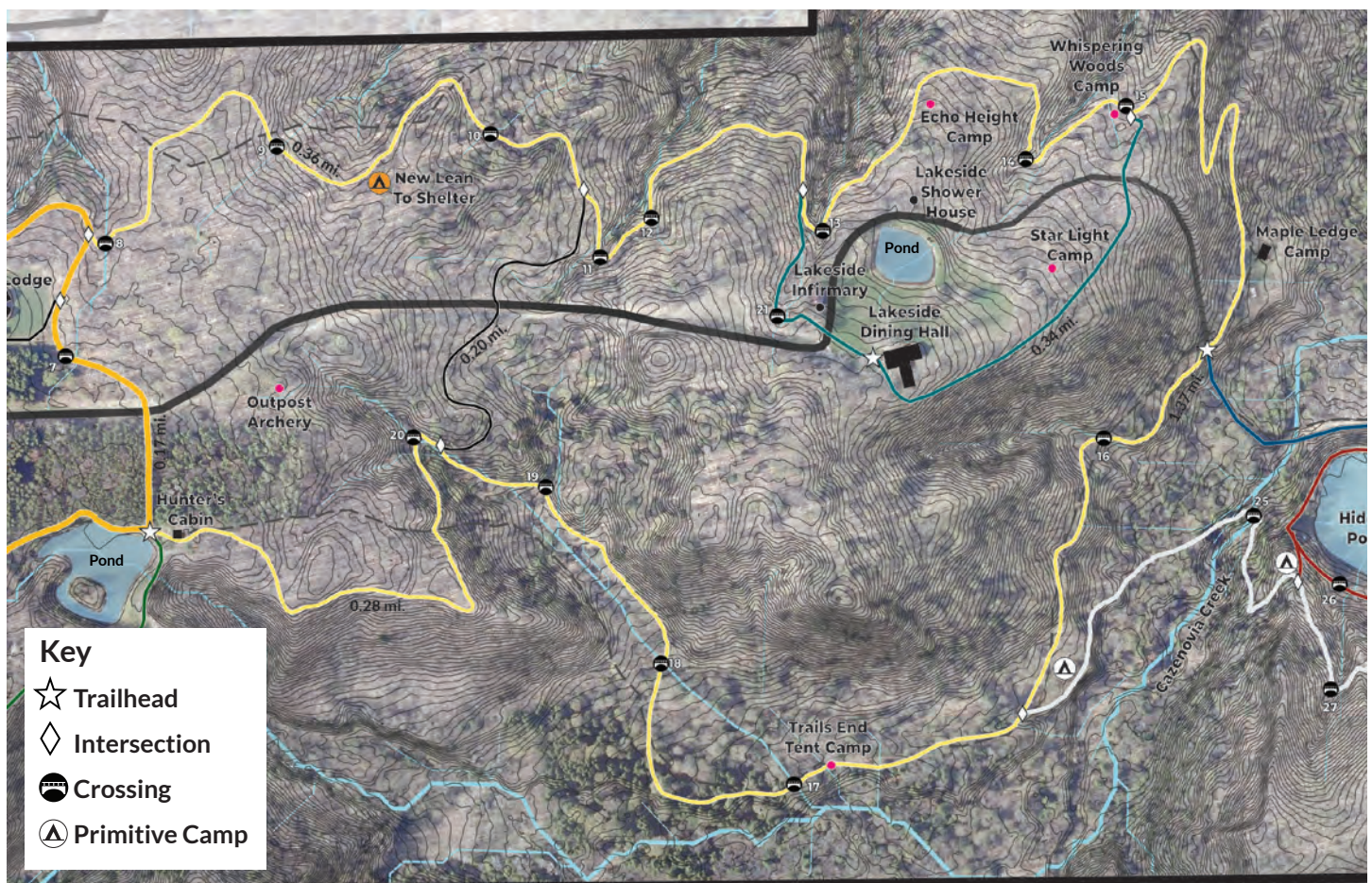
The Maple Ledge Trail is the last segment of the Yellow Trail system. This segment is the longest, looping from Empire Lodge, behind two of the camp units, out to the Maple Ledge unit, then across the maintenance road, down to the Trails End campsite, and over to Hunter's Cabin. The trail features a small connector between the Lodge Trail and the Lakeside campsites that allows the Maple Ledge Trail to be completed in shorter loops if desired. The entire segment is just over two miles with sections of slightly steeper slopes than the Grace Loegler Trail and the Lodge Trail. Hikes along this portion of the trail would take approximately 60 minutes to complete. The Maple Ledge Trail intersects with the Lodge Trail, the Meadow Trail, the Lakeside Camp Trail, the Cazenovia Trail, and the Beech Maple Trail.

### TRAIL USES

The trail provides the Lakeside Camp with a more challenging trail loop that winds along the numerous ridges and valleys in this area of the property. This loop can be completed with the other Yellow Trail system segments to create a longer hiking experience. It also offers access to multiple areas that could be used for primitive camping.

### TRAIL FEATURES

The trail crosses several perennial and ephemeral streams providing opportunities for environmental exploration. These crossings would require approximately 14 structures ranging from stepping stones, puncheon bridges, and timber trail bridges.





## MEADOW TRAIL

ACCESSIBLE	No	RATING	Easy
LENGTH	0.5 miles	WIDTH	3'
SLOPE RANGE	0-6%	CROSS SLOPE	3-5%
AVERAGE SLOPE	1.25%	SURFACE	Natural

### TRAIL DESCRIPTION

The Meadow Trail is a short half mile trail that connects the Grace Loegler Trail to Hunter's Cabin by going through the meadow area south of Hammond House.

### TRAIL USES

This small trail segment would take less than 15 minutes to hike and could be combined with sections of the Yellow Trail system to create a longer hiking experience.

### TRAIL FEATURES

The trail, after leaving the meadow goes through a mixed forest at the top of a ridge overlooking Cazenovia Creek. The trail offers an opportunity to explore a meadow habitat on the site. Meadows are a great area to learn about birds and herbaceous native plants with the addition of a bird blind trail users can spend time observing the animals in the meadow. A highlight of the trail is the pond at Hunter's Cabin and the overlook to Cazenovia Creek from the top of the ridge by the pond.

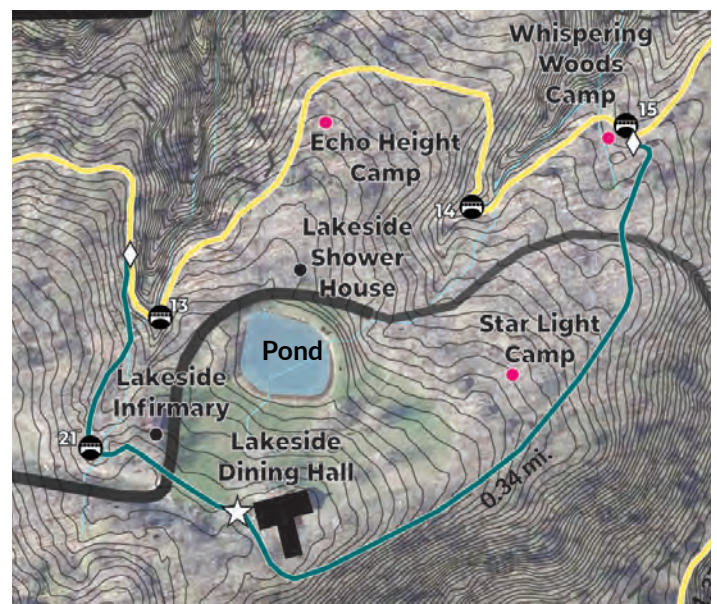


## LAKESIDE CAMP TRAIL

ACCESSIBLE	No
LENGTH	0.34 miles
SLOPE RANGE	0-5%
AVERAGE SLOPE	1.73%
RATING	Easy
WIDTH	3'
CROSS SLOPE	3-5%
SURFACE	Natural

### TRAIL DESCRIPTION

The Lakeside Camp Trail combined with a section of the Maple Ledge Trail creates a loop connecting the three cabin camp units, the dining hall, and the infirmary. The trail is primarily for facilities access for campers staying at the Lakeside campsites. This trail would require one small bridge or puncheon to cross the stream area behind the infirmary.





## CAZENOVIA TRAIL

ACCESSIBLE	No	RATING	More difficult
LENGTH	0.69 miles	WIDTH	18-36"
SLOPE RANGE	0-7%	CROSS SLOPE	3-5%
AVERAGE SLOPE	2.36%	SURFACE	Natural

### TRAIL DESCRIPTION

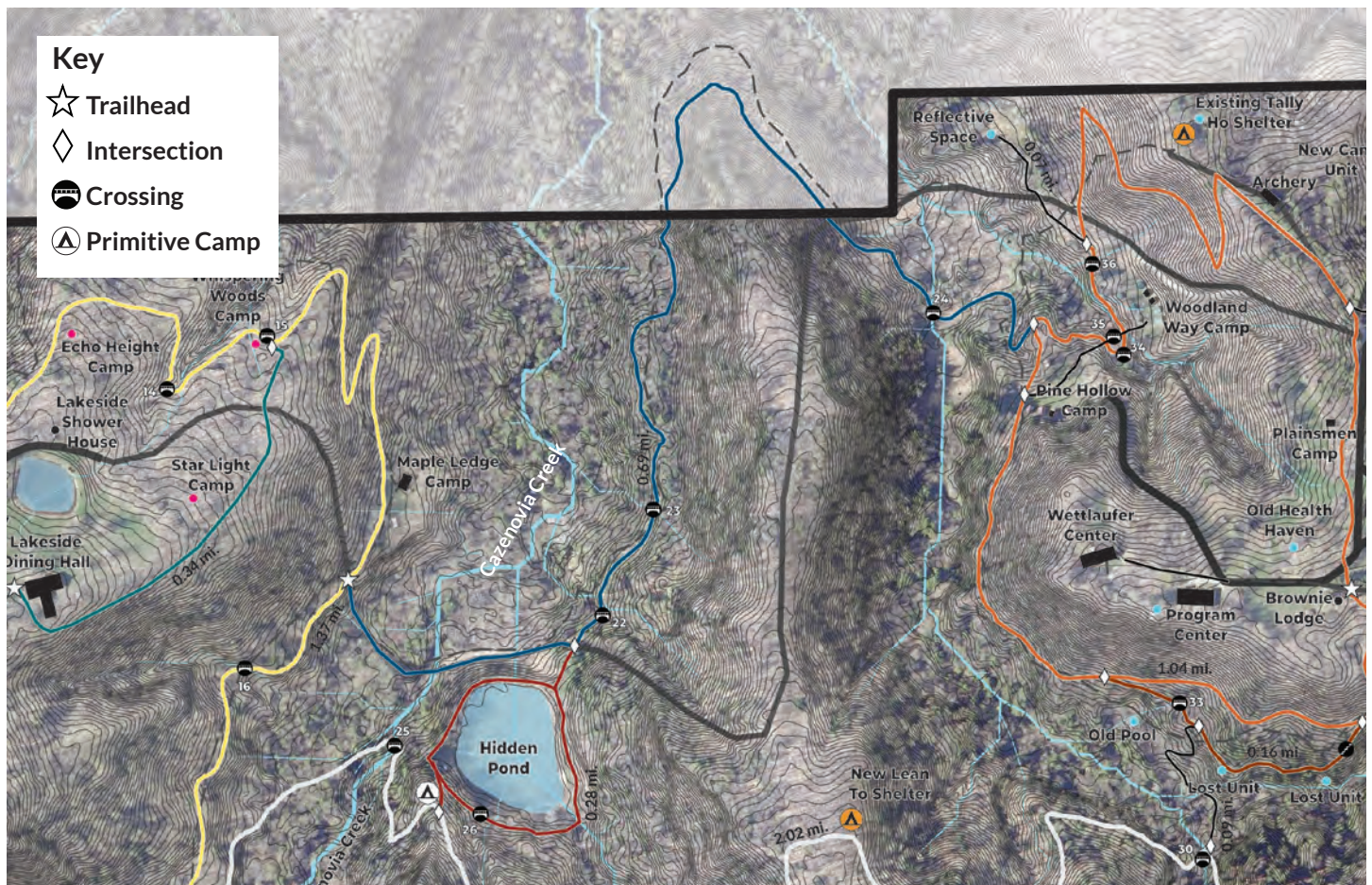
The Cazenovia Trail, or blue trail, follows a similar route as the existing Blue Trail. The proposed trail connects the Yellow Trail system at the Lakeside Camp to the Goodyear Camp Trail. One of the steepest sections of the trail is the section leading from Maple Ledge down the maintenance road to the bridge crossing at Cazenovia Creek. The trail is under a mile long and would take around 25 minutes to hike the full length.

### TRAIL USE

Due to the location this trail would be a perfect opportunity to teach campers about hydrological systems and various different water ecologies. The trail could be built to accommodate horseback riding should the Girl Scouts want to expand horseback riding trails through the property.

### TRAIL FEATURES

The trail is near Cazenovia Creek, and crosses numerous springs and ephemeral streams, as well as running adjacent to a small vernal pool. This trail would need numerous wet soil crossing and stream crossings to ease access, it is estimated that there would be three crossings with the largest across the stream below the Goodyear Camp sites.





## HIDDEN POND LOOP

### TRAIL DESCRIPTION

This is a short quarter mile trail that loops around the pond at the center of the property. This trail allows for access along the edge of the pond and connects to both the Cazenovia Trail and the Beech Maple Trail.

## BEECH MAPLE TRAIL

<b>ACCESSIBLE</b>	<b>No</b>	<b>RATING</b>	<b>Most difficult</b>
<b>LENGTH</b>	<b>2.02 miles</b>	<b>WIDTH</b>	<b>18-36"</b>
<b>SLOPE RANGE</b>	<b>0-11%</b>	<b>CROSS SLOPE</b>	<b>3-5%</b>
<b>AVERAGE SLOPE</b>	<b>2.15%</b>	<b>SURFACE</b>	<b>Natural</b>

### TRAIL DESCRIPTION

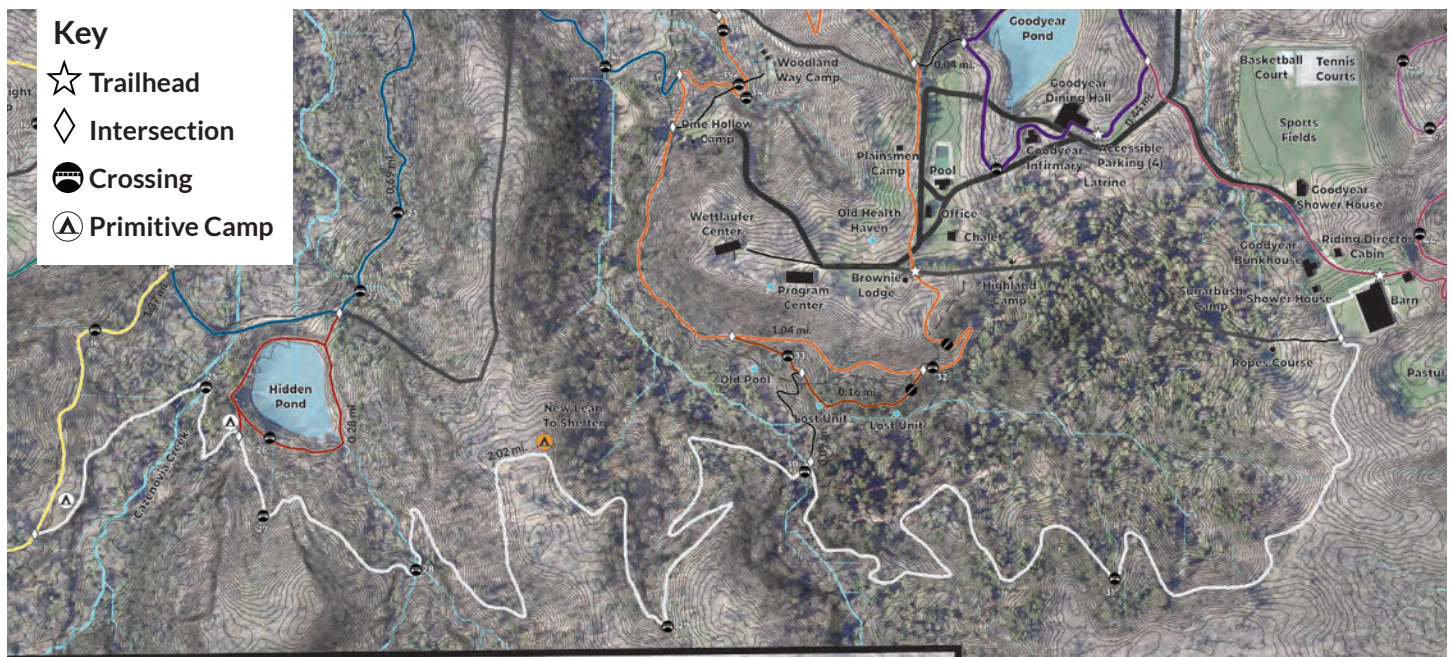
The Beech Maple Trail (white trail) winds from the Yellow Trail system at Lakeside to the horse barn at Goodyear. This trail is one of the most difficult and rigorous trails on the site with sections of steeper slopes and stretching just over two mile long. The trail ambling over the hills of the property would take approximately 75 minutes to hike from one end to the other. The Beech Maple Trail intersects with the Maple Ledge Trail near Trails End, connects to the Hidden Pond Trail, and ends at an intersection with the Dutchtown Trail (pink trail) at the horse barn. The trail also meets up with a connector trail that leads to the Lost Unit Trail portion of the Goodyear Camp Trail.

### TRAIL USES

The Beech Maple Trail provides access to multiple sites for primitive camping along the series of ridges. There is potential that the trail, combined with the Cazenovia Trail and a segment of the Maple Ledge Trail, could create a large horseback riding loop. This trail would also offer the opportunities for girls to learn beginning backpacking skills hiking to and from a camp site.

### TRAIL FEATURES

This winding trail crosses multiple streams and runs along the side of several steep ridges. It is estimated the trail would require seven stream crossings. The woods surrounding the trail are predominately composed of beech and maple trees, with unique ecological areas of elevated wet soils.





## GOODYEAR CAMP TRAIL

ACCESSIBLE	No	RATING	More difficult
LENGTH	1.04 miles	WIDTH	18-36"
SLOPE RANGE	0-9%	CROSS SLOPE	3-5%
AVERAGE SLOPE	2.20%	SURFACE	Natural

### TRAIL DESCRIPTION

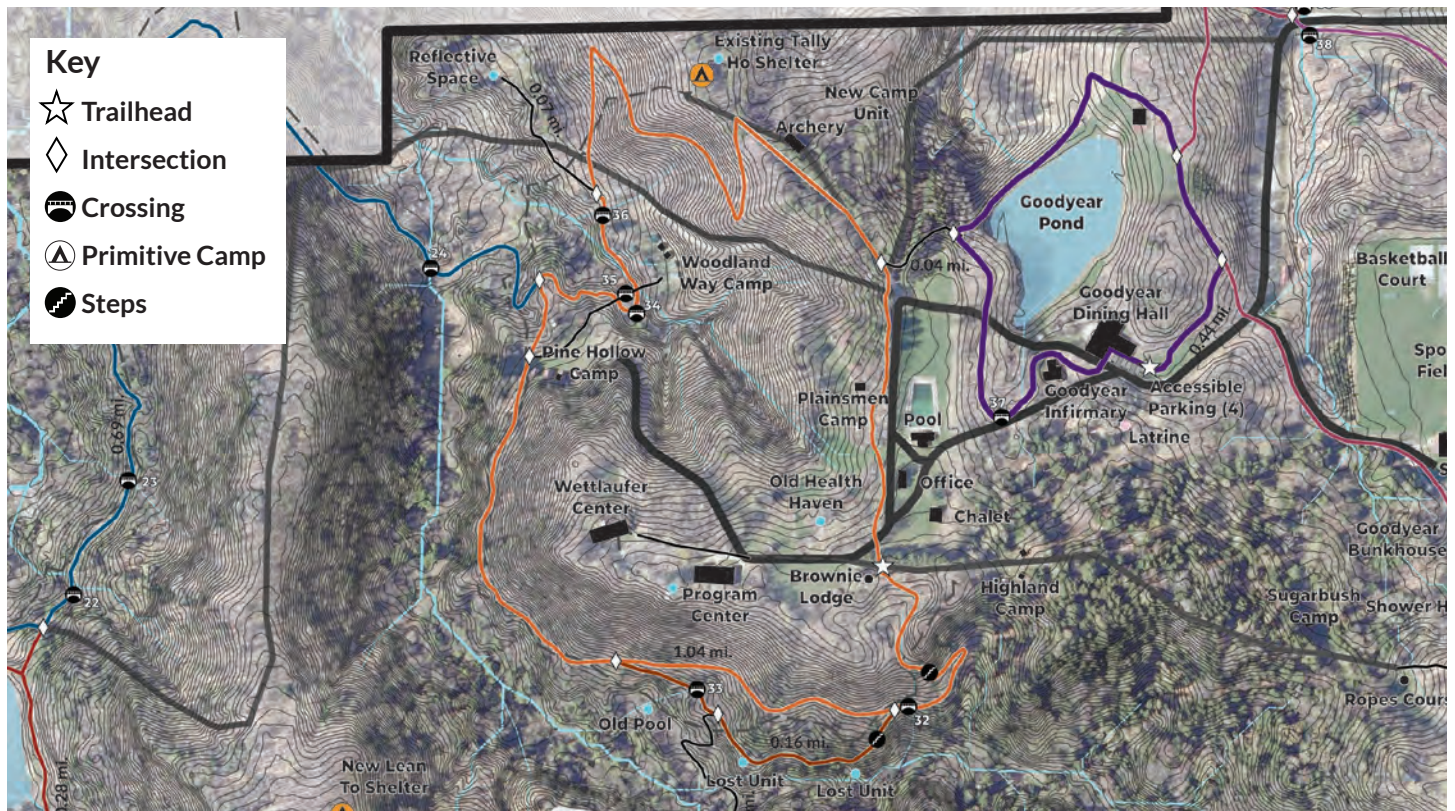
The Goodyear Camp Trail is a modified route of the existing Orange Trail. The trail connects several of the campsites on the Goodyear half of the property, including the Brownie Lodge, Pine Hollow, Woodland Way, the new unit by archery, Plainsmen, and the central area of the Goodyear Camp. The trail, along with a couple of spur trails, provides access to many of the historical camp features such as the lost units and the old pool area. The trail connects to the Cazenovia Trail between the Pine Hollow and Woodland Way campsites. The trail also features a small path that connects to the Goodyear Pond Loop and has a small connection trail to the Beech Maple Trail by the lost units. The one mile trail would take about 35 to 40 minutes to complete depending on the route taken.

### TRAIL USES

This trail loop provides a good general purpose hiking loop near many of the Goodyear Camp facilities. The Goodyear Camp Trail would be perfect for historical educational opportunities and aid in transitioning girls to more secluded and longer trails on the site.

### TRAIL FEATURES

Due to the topography around the campsites the trail has several areas that steps are recommended to accommodate the steep elevation change along the route. The committee also discussed the possibility of doing a suspension bridge to connect the Pine Hollow campsite to the Woodland Way campsite steps to connect the sites. Along with the suspension bridge the trail would require four additional stream crossings.



## GOODYEAR POND LOOP TRAIL

ACCESSIBLE	Yes
LENGTH	0.44 miles
SLOPE RANGE	0-4%
AVERAGE SLOPE	1.52%
RATING	Easiest
WIDTH	5'
CROSS SLOPE	3-5%
SURFACE	T.S.A.

### TRAIL DESCRIPTION

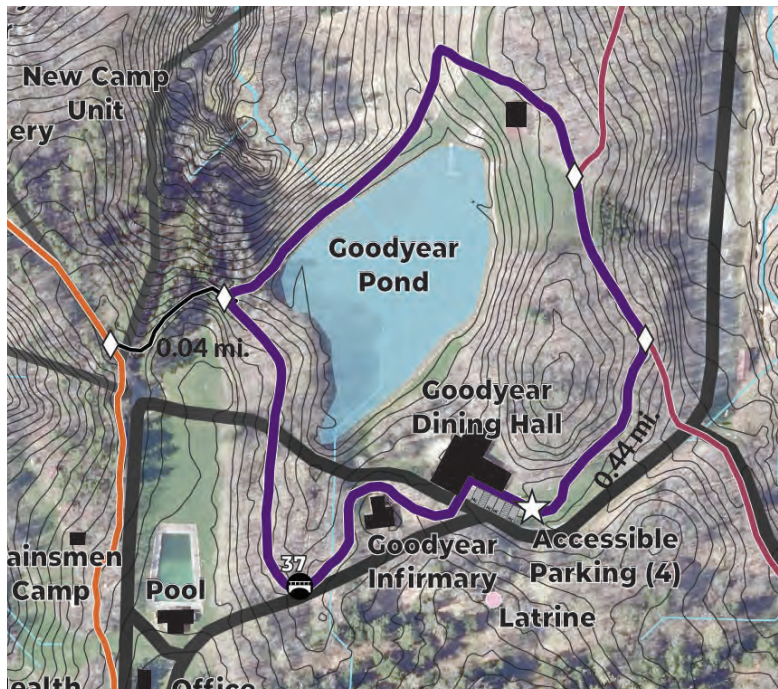
The half mile Pond Loop Trail is designed to be an easy, accessible trail loop that would be a great starter trail for the youngest scouts. The trail makes a complete loop around the Goodyear Pond connecting to the dining hall, infirmary, and the boat house. A connection trail leads to the Goodyear Camp Trail and the Dutchtown Trail overlaps with one segment of the Pond Loop.

### TRAIL USES

This trail provides the Goodyear facilities with a short, easy beginner trail to start campers on. Should the Goodyear side of camp be winterized at some point the Pond Loop would be a good trail for winter activities.

### TRAIL FEATURES

The loop allows easy access to the pond edges, facilitating aquatic educational activities. This short loop would take about 15 minutes to complete and would require a small trail bridge to cross the stream section behind the infirmary. The trail loops through wooded areas as well as meadows near the pond.



## DUTCHTOWN TRAIL

ACCESSIBLE	No	RATING	Most difficult
LENGTH	1.53 miles	WIDTH	18-36"
SLOPE RANGE	0-13%	CROSS SLOPE	3-5%
AVERAGE SLOPE	2.27%	SURFACE	Natural

### TRAIL DESCRIPTION

The Dutchtown Trail is a one and a half mile loop trail that goes from the horse barn around to the Pond Loop, out to the Wilhelm Acres, across Dutchtown Road, and back around to the horse barn. The trail overlaps with a section of the Pond Loop Trail and intersects with the Beech Maple Trail at the horse barn. It also connects to the Blueberry Trail, which runs halfway between the Dutchtown Trail loop. Hiking the Dutchtown Trail would take about 50 minutes to complete.

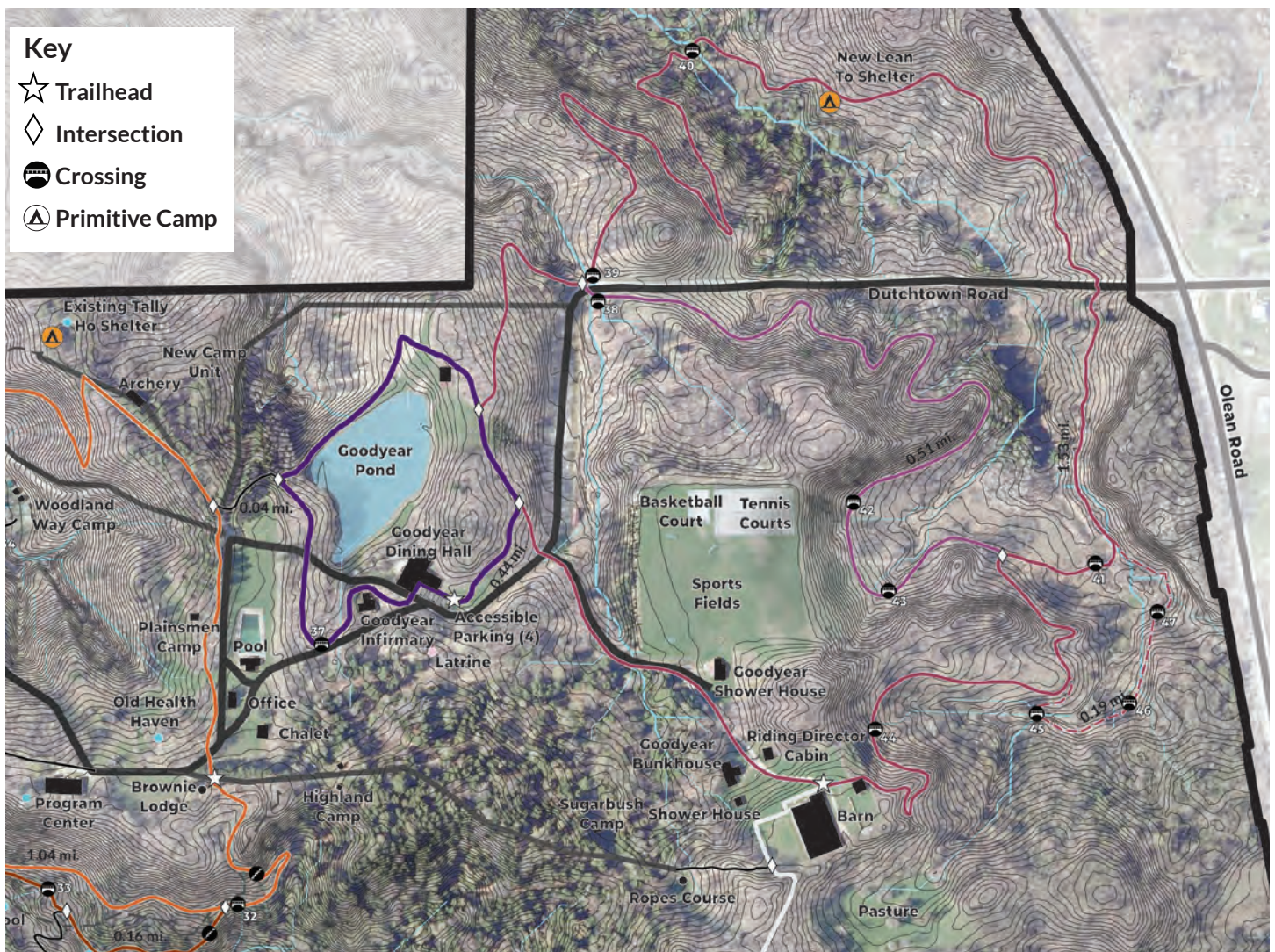
### TRAIL USES

The proposed trail would be designated for both hiking and horseback riding with the potential to create a primitive camping site in the Wilhelm Acres. This trail provides a larger loop trail dedicated for the Goodyear Camp and the horseback riding program.

### TRAIL FEATURES

The forests surrounding the trail range from birch and hemlock to maple and beech. The Dutchtown Trail meanders through numerous ridges, crossing over streams and wetlands. The trail would need at least three stream crossings, and one area of boardwalk going over the large wetland area and stream. This trail shows a dashed secondary route segment that could be used for horseback riders. The secondary route would require three small stream crossings designed for horses.





## BLUEBERRY TRAIL

ACCESSIBLE	No	RATING	More difficult
LENGTH	0.51 miles	WIDTH	18-36"
SLOPE RANGE	0-7%	CROSS SLOPE	3-5%
AVERAGE SLOPE	2.29%	SURFACE	Natural

### TRAIL DESCRIPTION

The Blueberry Trail segment breaks the Dutchtown Trail loop in half, creating two smaller loops, or an additional trail route. The trail would take about 20 minutes to complete on its own.

### TRAIL USES

Similar to the Dutchtown Trail the Blueberry Trail would be used for hiking and horseback riding.

### TRAIL FEATURES

The trail runs along a ridge below a known blueberry patch, which is where the name for the trail comes from. Another feature of the trail is that it runs adjacent to the historic Dutchtown Road location, providing an opportunity for historical education. This route also moves through multiple micro-habitats with streams, wetlands, and steep sloped forests, and would need at least three stream crossings along the route.

## TRAIL DIFFICULTY RATING

The trail ratings for the proposed trail routes on the Camp Seven Hills trails master plan are based off the National Forest Service standards. There are numerous trail rating systems dependent on the trail use, but the ratings used for the master plan are focused on hiking difficulty ratings, since that will be the most common use of the trails at Camp Seven Hills.

### NATIONAL FOREST SERVICES HIKING TRAIL RATINGS

TRAIL RATING	CLASS 5	CLASS 4	CLASS 3	CLASS 2	CLASS 1
TREAD WIDTH	N/A	18-24 inches; 36-48 inches on steep side slope	12-24 inches; 36-48 inches on steep side slope	6-18 inches	0-12 inches
SURFACE TYPE	Likely imported material, routine grading; uniform, firm, stable	Native with improved sections, routine grading; minor roughness	Native with some imported material; intermittently rough	Native, limited grading; may be continuously rough	Native, ungraded; may be continuously rough
SURFACE PROTRUSIONS	No protrusions	Less than 3 inches; uncommon and not continuous	Less than 3 inches; may be common and continuous	Less than 6 inches; may be common and continuous	Less than 24 inches; common and continuous
OBSTACLES MAX. HEIGHT	No obstacles	8 inches	10 inches	14 inches	24 inches
TARGET GRADE	2-5%	2-10%	3-12%	5-18%	5-25%
GRADE MAX	5%	15%	25%	35%	40%
TARGET CROSS SLOPE	2-3%	3-7%	5-10%	5-20%	Natural
CLEAR HEIGHT	8-10 ft	8-10 ft	7-8 ft	6-7 ft	6 ft
CLEAR WIDTH	60-72 inches	48-72 inches	36-60 inches	24-48 inches	Less than 24 inches
SHOULDER CLEARING	12-24 inches	12-18 inches	12-18 inches	6-12 inches	3-6 inches
TURNING RADIUS	6-8 ft	4-8 ft	3-6 ft	2-3 ft	No Minimum



## ASSIGNING PROPOSED TRAIL RATINGS

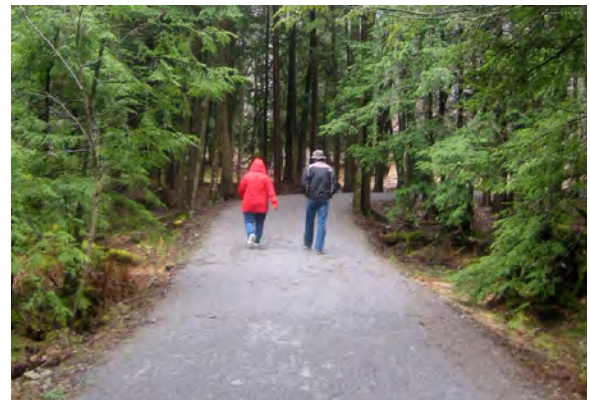
TRAIL	SLOPE RANGE	AVERAGE SLOPE	PRIMARY USE	NFS RATING	GSWNY RATING
GRACE LOEGLER	0-4%	0.67%	Accessible	Class 5	Easiest
LAKESIDE LODGE	0-4%	1.11%	Accessible	Class 5	Easiest
MAPLE LEDGE	0-8%	1.69%	Hiking	Class 4	More difficult
MEADOW	0-6%	1.25%	Hiking	Class 4	Easy
LAKESIDE CAMP	0-5%	1.73%	Access	Class 5	Easy
CAZENOVIA	0-7%	2.36%	Hiking	Class 4	More difficult
HIDDEN POND	0-7%	3.05%	Hiking	Class 4	More difficult
BEECH MAPLE	0-11%	2.15%	Hiking	Class 3	Most difficult
GOODYEAR CAMP	0-9%	2.20%	Hiking	Class 4	More difficult
LOST UNITS	0-6%	3.12%	Hiking	Class 4	More difficult
GOODYEAR POND	0-4%	1.52%	Accessible	Class 5	Easiest
DUTCHTOWN	0-13%	2.27%	Horses	Class 3	Most difficult
BLUEBERRY	0-7%	2.29%	Horses	Class 4	More difficult

## TRAIL TYPES

The Master Plan proposes three types of trails; accessible trails, woodland trails, and meadow trails.

### ACCESSIBLE TRAILS

Accessible trails are trails that meet accessibility guidelines as described for Outdoor Developed Areas. In general these trails aim to have slopes of 5% or less, uses a stable, firm surface, a vertical clearance of at least 10 feet, and a clearing width of 3 to 5 feet. Steeper trails up to 12.5% can be made accessible using the Trail Accessibility standards described under Design Considerations in the previous chapter.



### WOODLAND TRAILS

The woodland trails are natural surface trails that pass through forest areas. These are typically single track trails that are 18 to 36 inches in width. The surface of the trail is cleared of the loose topsoil to expose the more stable soil underneath and provide a solid tread surface. In wooded areas the trail will need a clearing width of about 3 feet and a vertical clearance of 8 feet.



## MEADOW TRAILS

The meadow trails are another natural surface trail, but they run through meadows. These trails are typically mowed through the meadow, and are 10 feet wide to prevent tall meadow plants from flopping into the trail and to reduce tick exposure. The trails will need to be cut about once a month throughout the growing season to maintain the route and not allow the meadow to take over the trail.



## DRAINAGE CROSSINGS

To determine if a crossing or bridge is necessary for the trail involves assessing likely users of the trail, its location, and alternative routes. It is important to base a bridge design on its aesthetic value, size, and the intended user experience proposed for the trail. Recommended deck widths for bridges are minimum 36 inches for hikers, 60 inches for cross country skiers, and 48 inches for equestrian.



Several of the proposed trail routes cross streams and other drainage ways. Narrow streams and ephemeral waterways can be crossed in several ways depending on the size and the type of the stream. Appropriate crossings can include placement of stepping stones along a narrow streambed or the use of culverts to divert water under the trail. For larger perennial streams, bridges provide the user with the necessary means to cross the stream. Some important aspects to consider include: stable banks, banks close together, a sunny location, acceptable approach trails, and a bridge's potential environmental impact.

## STEPPING STONES

Stepping stones are rocks placed in the stream or waterway at intervals to allow users to cross without stepping in the water. Stepping stones are best used in areas where the water level is typically low, or for small spring seeps and ephemeral waterways. Stepping stones provide a way to cross the water while keeping the aesthetic natural. Stepping stones are proposed for most of the small stream crossings.

## BOARDWALK

Boardwalks are often used in areas where the soil is frequently wet, such as wetlands, marshes, and bogs. Boardwalks provide a way to elevate the trail above the wet soils. Boardwalks are the most expensive and maintenance intensive drainage crossing. However, they do provide the best access to wetland habitat. A boardwalk is proposed to cross the wet along the proposed Dutchtown trail.

## CULVERT

Culverts are pipes that run under the trail surface to allow water to pass through instead of on the trail surface. Culverts can be used for small drainage ways.



## PUNCHEON BRIDGE

Puncheon bridges are narrow, rustic, wooden walkways over small streams or wetlands. Puncheons can be used in areas similar to boardwalks, stepping stones, or culverts, and simply offer a different user experience. Puncheons are proposed to cross small streams in hard to access areas where stepping stones are not feasible.

## SUSPENSION BRIDGE

A suspension bridge uses two main steel cables for support, anchored into the stream bank of towers for support. The deck of the bridge is usually some sort of planks that are hung from suspended cables or steel rods. A suspension bridge is proposed to connect the Pine Hollow camp unit and the Woodland Way camp unit.

## TRAIL SIGNAGE

### TRAILHEAD KIOSKS



Kiosks introduce the trail user to the trail system. These typically contain signs and maps as well as safety concerns, and other information of import to communicate to the users. Kiosks needs to be manufactured from weatherproof materials, and often have a covered area for users to stand under and easily view the posted information.

Kiosks can range from simple single panel signs containing limited information, or larger multi-panel units. The size of the kiosk is based on the amount of information that is needed to be conveyed to the trail users. Simple trail kiosks are best for less used, or more simple trail systems, while larger more complex kiosks are for prominent trailhead locations and for trails that wish to convey a large amount of information to trail user.

The design and material used in the kiosk is often based on the character of the site the trail is on. More remote trails tend to be more rustic in design, with wood and simple structures.

In general, a kiosk should have the following information:

- Trail name and logo
- Map showing the location of the trail and amenities
- Trail distance in time and mileage
- Trail level of difficulty
- Rules of the trails
- Warnings of danger, safety messages, and trail closures
- Contact phone number for manager and emergency services

Kiosks might also include information on:

- Carry in/out, leave no trace principles
- Hours the trail is open

- Trail map handouts
- Information on trail partners and care crews
- Information about how to get involved
- Interpretive information
- Types of trail uses allowed
- Recognition of organizations providing volunteer services

## TRAIL SIGNS

Trail signs assist in managing trail use, warning trail users of trail conditions or characteristics, locating the trail route, and providing information to trail users. Standardizing sign appearance and applications improves recognition and safety through trail user familiarity. Typically trail signs fall into three categories: regulatory and warning signs, trail markers, and interpretive signs.

### REGULATORY & WARNING SIGNS

Used to promote safety of users and the property. These signs communicate specific actions or provide warnings to trail users when necessary. It is best to place these signs only where potential conflicts are unclear, or to emphasize a significant conflict. Regulatory signs proposed for Seven Hills include private property signs where the trails come within 50-100 feet of private property, and road crossing signs for both vehicles and pedestrians.

### TRAIL MARKERS

Trail markers are signs along the trail that are used to indicate the trail route, type of trail, and level of difficulty. These signs reassure trail users they are following the correct path and are provided as a point of reference along the trail.



### TRAIL MARKER MATERIALS

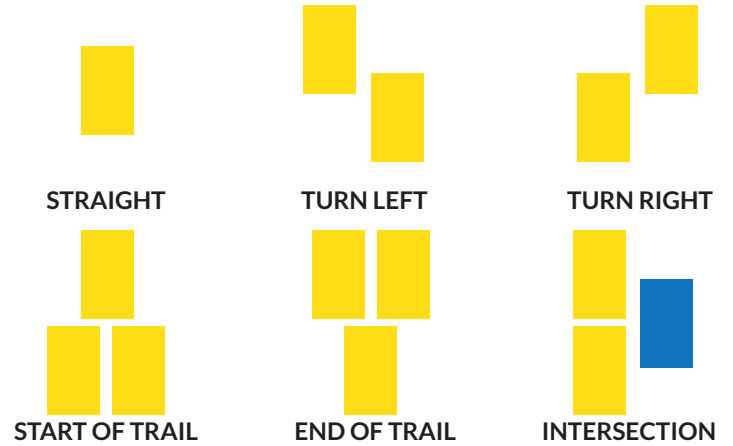
- Wood posts
- High-density overlay plywood
- Medium-density overlay plywood
- Medium-density fiberboard
- Plastics
  - Acrylic
  - Polycarbonate
  - Polyethylene
  - Polypropylene
- Aluminum
- Aluminum clad plastic
- Aluminum clad plywood
- High-density foam board
- Reinforced fiberglass

### TRAIL INTERSECTION MARKERS

Trail intersection markers are placed at trail entrances and intersections. These signs provide the name of the trail and include simple information such as trail difficulty and trail uses. Examples include carsonite composite dual sided trails posts. Custom decals can be used for displaying trail information.



## BLAZES



Blazes are used to indicate the trail route, so that users can easily find and stay on the designated trail. Blazing is most frequently done with paint on tree trunks but can also be small markers attached to tree trunks. Painted blazes are typically 6" x 2" rectangles, and when properly done are easy to be seen at a distance. Blazes are usually located at eye height and marked to face both directions.

Certain vegetation and topographic changes may require more frequent blazing, while flat more open spaces may not need blazes as often. A good rule of thumb is to only see one blaze, in each direction, at a time. If multiple blazes are seen from one location, it can create confusion on the trail route location. The color of the blazes used should be contrasting to the vegetation surrounding the trail. For this reason, colors like red, orange, yellow, blue, and white are often used. For painted blazes high quality latex paint is recommended. Turns, and trail junctions each get specific blazing to indicate changes to the trail users. See the graphic above for blazing patterns and their descriptions.

## INTERPRETIVE SIGNS

Camp Seven Hills has a wide range of interpretive opportunities along the trail systems, from historic features like the old Dutchtown Road to the abandoned units, to ecological features like vernal pools, wetlands, and streams. With the way the site is used it is recommended that any interpretive signs be used sparingly and in areas where they can easily be maintained. Some good location for interpretive signage include the accessible trails, Grace Loegler, Lakeside Lodge, and Goodyear Pond, as well as the Goodyear Camp trail.



## TRAIL AMENITIES

### SEATING

Benches are the most common seating option and can be simple rustic wood. Seating along the accessible trails should have proper surfacing and a space for companion seating. More rustic seating could include using stumps and logs to create benches or seating groups. Lastly there are Adirondack and other similar style chairs that can be placed in pairs or groups along the trail. With all the seating the material and style should be inspired by the property, camp, and the desired character of the trail system.

### SENSORY NODES

The sensory nodes allow users to explore activities centered around stimulating one or more senses. One of the nodes will include outdoor musical instruments made from simple everyday objects like metal pans, buckets, sticks, etc. A second node will feature a human-sized birds nest. The last node will be a native plant garden featuring plants that have unique textures, smells, seed pods, or edible fruit.

## EARNING BADGES ON TRAILS

The proposed trail system throughout the property at Camp Seven Hills provides the structure to facilitate numerous badge earning activities for the Girl Scouts visiting the site. Some badges could be completely earned on the route of the trails, while others could simply provide a support system to earning the badges.

### POTENTIAL BADGES TO EARN ON THE TRAILS

<b>DAISY BADGES</b> <ul style="list-style-type: none"><li>• Buddy Camper</li><li>• Daisy Snow Adventure</li><li>• Daisy Trail Adventure</li><li>• Eco Learner</li><li>• Outdoor Art Maker</li><li>• Between Earth and Sky</li></ul>	<b>BROWNIE BADGES</b> <ul style="list-style-type: none"><li>• Brownie First Aid</li><li>• Brownie Snow Adventure</li><li>• Brownie Trail Adventure</li><li>• Bugs</li><li>• Cabin Camper</li><li>• Eco Friend</li><li>• Hiker</li><li>• Outdoor Adventurer</li><li>• Wonders of Water</li></ul>	<b>JUNIOR BADGES</b> <ul style="list-style-type: none"><li>• Animal Habitats</li><li>• Camper</li><li>• Digital Photography</li><li>• Drawing</li><li>• Eco Camper</li><li>• Flowers</li><li>• Geocacher</li><li>• Horseback Riding</li><li>• Junior First Aid</li><li>• Junior Snow Adventure</li><li>• Junior Trail Adventure</li><li>• Outdoor Art Explorer</li></ul>
<b>CADETTE BADGES</b> <ul style="list-style-type: none"><li>• Animal Helpers</li><li>• Cadette First Aid</li><li>• Cadette Snow Adventure</li><li>• Cadette Trail Adventure</li><li>• Eco Trekker</li><li>• Night Owl</li><li>• Primitive Camper</li><li>• Trail Blazing</li><li>• Trees</li></ul>	<b>SENIOR BADGES</b> <ul style="list-style-type: none"><li>• Adventure Camper</li><li>• Eco Explorer</li><li>• Locavore</li><li>• Senior First Aid</li><li>• Senior Snow Adventure</li><li>• Senior Trail Adventure</li><li>• Voice for Animals</li></ul>	<b>AMBASSADOR BADGES</b> <ul style="list-style-type: none"><li>• Ambassador First Aid</li><li>• Ambassador Snow Adventure</li><li>• Ambassador Trail Adventure</li><li>• Photographer</li><li>• Eco Advocate</li><li>• Survival Camper</li><li>• Water</li></ul>



## TRAIL ADVENTURE BADGES

The national organization for the Girl Scouts recently added a progression of trail adventure badges. The trail master plan at Camp Seven Hills took the requirements of these badges into mind during the design and planning process since they are a part of the site's programs that are most directly influenced by the trail system. Where the proposed trail system can't meet all the badge requirements for the trail adventure badges it can still serve as training ground to prepare the scouts for completing those higher level badges.

### DAISY

**How to earn the badge:** Trail jogging **OR** hiking games

The shorter, easiest level trails on the site, like the Goodyear Pond Loop or the Grace Loegler Trail loop are perfect starter trails for the youngest scouts to earn this badge. Since these trails are accessible, they provide a surface appropriate for beginner trail jogging. Also, since these trails are wider, they have more room for the scouts to stop and play trail games like "walk this way" and "senses walk".



### BROWNIE

**How to earn the badge:** Trail running, three trail runs each for 20 minutes. **OR** Roamer, take three different types of hikes. Hiking options: night hike, owl hike, woods hike, snow hike, rain hike, beach hike, heritage hike, urban hike, senses hike, penny hike, photo hike, color hike, or create your own.

The new trail system for Seven Hill has several easy options for beginning trail runners. The trails can be used in combinations or in repeating loops to meet the twenty minute running time. For the Roamer option the trail system at Seven Hills supports many of the different hiking options, all the ideas, except for the beach hike and urban hike, could be completed within the Camp Seven Hills trail system.



### JUNIOR

**How to earn the badge:** Trail running, one mile or more. **OR** Day hiker, three separate hikes of three to four miles each.

The trail system at Seven Hills has multiple options for running routes that are one mile or more in length to complete the trail running challenge to earn the badge. Should a scout prefer the day hiker option to earn the badge, some of the trails on the site could be combined with connecting trails to meet the hiking distance required for earning the badge. With the numerous routes and trail connections there are several hiking combinations to accommodate the three different day hikes needed for the badge.



### CADETTE

**How to earn the badge:** Long distance trail running, three mile run. **OR** Trail hiking challenge. Three parts, part one is a trail covering a minimum 2,000 foot elevation gain, part two hiking a minimum of 10 miles, part three is a six hour hike on terrain different from previous hiking experiences.

The trail system for Seven Hills easily supports the long distance trail running option for earning the badge. The trail hiking challenge requirements for the badge are more extensive, and more advanced than the trails at Seven Hills can offer. The trails at Seven Hills do not cover a 2,000 foot elevation change. The longest loop, joining numerous trails on the site is about 9 miles long, not quite meeting the part two hiking distance. The trail system could meet the requirements for part three of the hiking challenge depending on the individual scout's previous hiking experiences.



The **Senior and Ambassador** level trail adventure badges are far more advanced than the trail system at Seven Hills can support. Both involve multiple day backpacking and camping experiences. However, the trail system at Seven Hills, along with the primitive camping areas offer opportunities for scouts to learn beginner backpacking and primitive camping skills to help them be able to achieve these higher level trail adventure badges.



## OPINION OF PROBABLE COST

The opinion of probable construction costs for this project assume improvements are constructed by the property manager with the help of volunteers. GSWNY and their partners, if they think outside the box can determine how to construct and implement the recommendations of this plan in phases, and at the lowest rate, while maintaining a high level of quality in the construction.

The planning level opinion of probable costs were developed based on the consultant's experience with construction costs in 2021. To budget for inflation costs for improvements that will occur after 2021 we recommend a 4% annual cost inflation each year after 2021.

The following tables summarize our opinion of probable construction costs for implementing the improvements described herein and shown in the trail master plan.



# Camp Seven Hills Trails Master Plan

Opinion of Probable Construction Costs

Prepared by Pashek + MTR

Item Description	Quantity	Unit	Unit Cost	Total Item Cost
<b>Grace Loegler Trail</b>				
<i>Site Improvements</i>				
Accessible Trail - 5' wide (Trail Surface Aggregate)	2,100	SY	\$7	\$ 14,700
TSA for Sensory Pods (3 @ 10'x10' each)	33	SY	\$7	\$ 231
Crossing #1 - Wood boardwalk (5' wide x 10' long)	50	SF	\$6	\$ 300
Crossing #1 - Wood boardwalk Toe Kick	20	LF	\$2	\$ 40
Crossing #1 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #2 - Wood boardwalk (5' wide x 90' long)	450	SF	\$6	\$ 2,700
Crossing #2 - Wood boardwalk Toe Kick	180	LF	\$2	\$ 360
Crossing #2 - Footers	14	EA	\$75	\$ 1,050
Crossing #2 - Concrete Headwalls	2	EA	\$300	\$ 600
Misc Equipment and Rentals	1	LS	\$2,500	\$ 2,500
Sensory Pod items (plants, wood, musical items)	1	LS	\$2,000	\$ 2,000
Material Delivery	1	LS	\$500	\$ 500
Interpretive Signs	2	EA	\$2,000	\$ 4,000
Trail Blazing	1	LS	\$20	\$ 20
<i>Subtotal Site Improvements</i>				\$29,601
Contingency			15%	\$4,440
<b>TOTAL GRACE LOEGLER</b>				<b>\$34,041</b>
<b>Lakeside Lodge Trail</b>				
<i>Site Improvements</i>				
Accessible Trail - 5' wide (Trail Surface Aggregate)	2,690	SY	\$7	\$ 18,830
Crossing #3 - Wood Boardwalk (5' wide x 10' long)	50	SF	\$6	\$ 300
Crossing #3 - Wood boardwalk Toe Kick	20	LF	\$2	\$ 40
Crossing #3 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #4 - Wood boardwalk (5' wide x 10' long)	50	SF	\$6	\$ 300
Crossing #4 - Wood boardwalk Toe Kick	20	LF	\$2	\$ 40
Crossing #4 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #5 - Trail Bridge (5' wide x 15' long)	75	SF	\$6	\$ 450
Crossing #5 - Trail Bridge Railings	30	LF	\$9	\$ 270
Crossing #5 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #5 - Footers	2	EA	\$75	\$ 150
Crossing #6 - Trail Bridge (5' wide x 20' long)	100	SF	\$6	\$ 600
Crossing #6 - Trail Bridge Railings	40	LF	\$9	\$ 360
Crossing #6 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #6 - Footers	2	EA	\$75	\$ 150
Crossing #7 - Wood boardwalk (5' wide x 10' long)	50	SF	\$6	\$ 300
Crossing #7 - Wood boardwalk Toe Kick	20	LF	\$2	\$ 40
Crossing #7 - Concrete Headwalls	2	EA	\$300	\$ 600
Misc Equipment and Rentals	1	LS	\$2,500	\$ 2,500
Material Delivery	1	LS	\$500	\$ 500
Trailhead Sign	3	EA	\$500	\$ 1,500
Interpretive Signs	1	EA	\$2,000	\$ 2,000
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	4	EA	\$75	\$ 300
<i>Subtotal Site Improvements</i>				\$31,680
Contingency			15%	\$4,752
<b>TOTAL LAKESIDE LODGE</b>				<b>\$36,432</b>

## Maple Ledge and Lakeside Camp Trails

Site Improvements					
Crossing #8 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #9 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #10 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #11 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #12 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #13 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #14 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #15 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #16 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #17 - Puncheon (8x8 and 2x8 lumber)	30	LF	\$15	\$	450
Crossing #18 - Puncheon (8x8 and 2x8 lumber)	20	LF	\$15	\$	300
Crossing #19 - Puncheon (8x8 and 2x8 lumber)	10	LF	\$15	\$	150
Crossing #20 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #21 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Trailhead Sign	2	EA	\$500	\$	1,000
Trail Blazing	1	LS	\$50	\$	50
Trail Intersection Signs	5	EA	\$75	\$	375
<i>Subtotal Site Improvements</i>					\$2,325
Contingency			15%		\$349
<b>TOTAL MAPLE LEDGE &amp; LAKESIDE CAMP</b>					<b>\$2,674</b>

## Meadow Trail

Site Improvements					
Interpretive Signs	2	EA	\$2,000	\$	4,000
Trail Blazing	1	LS	\$50	\$	50
Trail Intersection Signs	1	EA	\$75	\$	75
<i>Subtotal Site Improvements</i>					\$4,125
Contingency			15%		\$619
<b>TOTAL MEADOW</b>					<b>\$4,744</b>

## Cazenovia and Hidden Pond Trail

Site Improvements					
Crossing #22 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #23 - Steppings Stones (materials on site)	1	LS	\$0	\$	-
Crossing #24 - Trail Bridge (5' wide x 20' long)	100	SF	\$6	\$	600
Crossing #24 - Trail Bridge Railings	40	LF	\$9	\$	360
Crossing #24 - Concrete Headwalls	2	EA	\$300	\$	600
Crossing #24 - Footers	2	EA	\$75	\$	150
Trailhead Sign	1	EA	\$500	\$	500
Interpretive Signs	3	EA	\$2,000	\$	6,000
Trail Blazing	1	LS	\$50	\$	50
Trail Intersection Signs	2	EA	\$75	\$	150
<i>Subtotal Site Improvements</i>					\$8,410
Contingency			15%		\$1,262
<b>TOTAL CAZENOVIA &amp; HIDDEN POND</b>					<b>\$9,672</b>



## Beech Maple Trail

Site Improvements				
Crossing #25 - Trail Bridge (5' wide x 30' long)	150	SF	\$6	\$ 900
Crossing #25 - Trail Bridge Railings	60	LF	\$9	\$ 540
Crossing #25 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #25 - Footers	2	EA	\$75	\$ 150
Crossing #26 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #27 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #28 - Puncheon (8x8 and 2x8 lumber)	10	LF	\$15	\$ 150
Crossing #29 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #30 - Trail Bridge (5' wide x 20' long)	100	SF	\$6	\$ 600
Crossing #30 - Trail Bridge Railings	40	LF	\$9	\$ 360
Crossing #30 - Concrete Headwalls	2	EA	\$300	\$ 600
Crossing #30 - Footers	2	EA	\$75	\$ 150
Crossing #31 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	2	EA	\$75	\$ 150
<i>Subtotal Site Improvements</i>				\$2,060
<i>Contingency</i>			15%	\$309
<b>TOTAL BEECH MAPLE</b>				<b>\$2,369</b>

## Goodyear Camp and Lost Unit Trails

Site Improvements				
Stairways	2	EA	\$1,000	\$ 2,000
Crossing #32 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #33 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #34 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #35 - Suspension Bridge (5' wide x 150' long), includes contingency and design fees	1	LS	\$400,000	\$ 400,000
Crossing #36 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Trailhead Sign	2	EA	\$500	\$ 1,000
Interpretive Signs	6	EA	\$2,000	\$ 12,000
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	8	EA	\$75	\$ 600
<i>Subtotal Site Improvements</i>				\$415,650
<i>Contingency</i>			15%	\$62,348
<b>TOTAL GOODYEAR CAMP &amp; LOST UNIT</b>				<b>\$477,998</b>

## Goodyear Pond Trail

Site Improvements				
ADA Parking (Goodyear Dining Hall)	150	SY	\$25	\$ 3,750
Accessible Trail - 5' wide (Trail Surface Aggregate)	1,500	SY	\$7	\$ 10,500
Crossing #37 - Wood boardwalk (5' wide x 10' long)	50	SF	\$6	\$ 300
Crossing #37 - Wood boardwalk Toe Kick	20	LF	\$2	\$ 40
Crossing #37 - Concrete Headwalls	2	EA	\$300	\$ 600
Misc Equipment and Rentals	1	LS	\$2,500	\$ 2,500
Material Delivery	1	LS	\$500	\$ 500
Trailhead Sign	1	EA	\$500	\$ 500
Interpretive Signs	1	EA	\$2,000	\$ 2,000
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	1	EA	\$75	\$ 75
<i>Subtotal Site Improvements</i>				\$20,815
<i>Contingency</i>			15%	\$3,122
<b>TOTAL GOODYEAR POND</b>				<b>\$23,937</b>

## Dutchtown Trail

Site Improvements				
Crossing #39 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #40 - Puncheon (8x8 and 2x8 lumber)	30	LF	\$15	\$ 450
Crossing #37 - Wood boardwalk (5' wide x 100' long)	500	SF	\$6	\$ 3,000
Crossing #37 - Wood boardwalk Toe Kick	200	LF	\$2	\$ 400
Crossing #37 - Concrete Headwalls	4	EA	\$300	\$ 1,200
Crossing #44 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #45 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #46 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #47 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Trailhead Sign	1	EA	\$500	\$ 500
Interpretive Signs	4	EA	\$2,000	\$ 8,000
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	2	EA	\$75	\$ 150
<i>Subtotal Site Improvements</i>				\$13,750
<i>Contingency</i>			15%	\$2,063
<b>TOTAL DUTCHTOWN</b>				<b>\$15,813</b>

## Blueberry Trail

Site Improvements				
Crossing #38 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #42 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Crossing #43 - Steppings Stones (materials on site)	1	LS	\$0	\$ -
Interpretive Signs	2	EA	\$2,000	\$ 4,000
Trail Blazing	1	LS	\$50	\$ 50
Trail Intersection Signs	2	EA	\$75	\$ 150
<i>Subtotal Site Improvements</i>				\$4,200
<i>Contingency</i>			15%	\$630
<b>TOTAL BLUEBERRY</b>				<b>\$4,830</b>
<b>GRAND TOTAL</b>				<b>\$612,508</b>

### Notes:

Opinion of Probable Construction Costs is made based on the experience and qualifications of Pashek + MTR, Ltd and represents reasonable judgment based on familiarity with the industry. Pashek + MTR, Ltd. has no control over the cost, or availability of labor, materials or equipment, or over market conditions or the provider's method of pricing. Pashek + MTR, Ltd cannot and does not guarantee that the opinion of probable cost provided the Owner will not vary from the actual cost experienced by the Owner.





# TRAIL IMPLEMENTATION

## FIELD LAYOUT

Field layout is an essential step in the trail planning and design process that is needed to assess safety, protect the environment, improve recreation, and minimize conflicts. Trail design aims to provide the most stable, sustainable, and attractive route for users to enjoy. This data can be assessed through mapping analysis, which provides a basis for designing the trail routes. However, there are always nuances in conditions that can only be assessed in the field. This includes small decisions and considerations to determine the final location of the trail corridor. Field layout happens in two stages, scouting and flagging.

### SCOUTING

Scouting is a field investigation of the potential trail routes. To best see the characteristics of the site, scouting in the spring or fall when there are no leaves on the trees and no snow on the ground allows for the best views of routes and topographic changes. With current technologies like GPS units and cell phone applications, the proposed route locations can guide users in their field investigations. Scouting is easiest with two or three people who can walk on and assess terrain in multiple areas. By analyzing various routes, as well as taking field notes, designers can discover a track that provides the best continuous route.

### FLAGGING

Flagging, the process of tying flagging tape around trees to indicate the trail route, is essential for accurate trail route construction. In places where there is not good vegetation for tying the flagging tape, marking flags on metal or wood can be used to mark the route. It is important to tie flags frequently to make the route clear, and to make sure the route remains clear even if some of the flags are lost due to weather. Clear and careful flagging should be done at turns, switchbacks, and intersections, to make the route clear for construction. Keep in mind as you flag to locate the trail line in locations requiring the least maintenance, meaning trying to avoid areas with erosion, that might need stairs or other structures. Sometimes there is no way to avoid areas like this so occasional steps, waterbars, puncheons, and cribs may be needed. Once flagging is finished, and the route approved by the property management, the trail work can move into the initial construction phase.

## CONSTRUCTION

### TRAIL CLEARING

The first steps in trail construction is clearing the flagged trail corridor. The goal should be to clear as little as necessary but still provided the necessary trail tread width and clearance buffers on each side of the tread. Prior to clearing erosion controls, both permanent and temporary, should be put in place. Clearing the trail route includes not just clearing the trail tread area, but the vertical clearance area for the trail so that users are not impeded by branches and vegetation blocking the walking space, this vertical clearance height differs depending on trail use as previously discussed.

### TREAD CONSTRUCTION

After clearing is completed constructing the trail tread can begin. The first step in this phase is to clear the ground of all organic material and loose topsoil, so that the more stable mineral soil can be shaped into the trail tread. In flat areas it may

### FIELD LAYOUT TOOLS

1. **Clinometer:** Used to measure slope.
2. **Clinometer cover:** Protects clinometer (optional).
3. **Flagging Tape:** Used for flagging in the woods to mark the trail route.
4. **Marking Flags:** Used for flagging in areas with no vegetation or for more detailed flagging.



be necessary to fill the void created by removing this surface material, in these cases follow the recommendations provided in the trail construction cross sections. To remove the organic materials, soil, roots, etc. along the trail tread area it is important to mark the sides of the treadways to ensure consistent width and use mattocks, fire rakes, or root axes to remove the materials. Organic materials and topsoil should be spread downhill of the trail so as not to cause erosion issues, if the trail is located next to a waterway, the material should be transported to another location, so the materials do not enter the waterway.

After removing the topsoil and organic materials follow the instructions provided by the specified trail cross sections. Shape the trail tread in the soil, pulling any excess material to the downhill side of the tread. Continue to work across the tread until the desired elevation and width are achieved, while ensuring the stability of both the upslope and downslope banks, if applicable. Sideslopes for the tread should be no steeper than 2:1. When constructing the sideslope carefully smooth and finish them fine tuning the shape to help reduce future maintenance. At this point the tread surface is ready to be finished with compaction, geotextiles, or tread hardening as specified in the trail cross section construction details.

It is best if natural surface trails are allowed to settle for a few months before regular use is allowable. This helps to improve long term stability of the trail tread surface.

## TRAIL CONSTRUCTION TOOLS

### Hand Tools

#### Trail Clearing

- **Swizzle Stick or Weed Whip:** Used in a swinging motion, to clear brush and low growth.
- **Lopping Sheer:** Essential for trail corridor brushing and clipping vegetation flush to the ground.
- **Machete:** Wielded with a vertical stroke to clear brush and vegetation.
- **Axe:** Effective for making deep cuts when felling trees and chopping through logs.
- **Brush and Bow Saw:** Suited for making vertical cuts involved in clearing modest-sized logs from trails.
- **Leaf Rake:** Used for clearing trail tread of leaves, needles, and other debris.

#### Trail Tread

- **Pulaski:** Preferred for loosening compacted soil, grubbing tread, chopping roots, and removing slough.
- **McLeod:** Useful for removing slough and berm from the trail, tamping or compacting tread, and shaping a trail's backslope.
- **Hoe:** Useful for breaking up sod or when leveling an existing trail tread.
- **Shovel:** A spade shovel is most effective for digging holes, moving loose dirt, and digging in tight spaces.
- **Mattock:** Versatile tool for digging, prying, and moving dirt.

### Rock

- **Rock Bar or Crow Bar:** Necessary in heavy trail work to obtain leverage to move and unearth rocks.
- **Hammer:** Hammers with a wedge-shaped peen needed to chip away parts of a rock.

### Hoisting

- **Grip Hoist:** A lightweight tool capable of dragging tremendous weights on wire rope in rigging systems.
- **Ratchet Winch:** Useful for moving rocks and logs, as well as pulling stumps.

### Power Tools

- **Chain Saw:** Effective for felling and bucking trees.
- **Gas Powered Brush Cutters:** Useful for extensive trail clearing through young/heavy growth.
- **Rock Drill:** Useful for drilling holes in rock for pinning rock, installing metal rungs, or splitting rock.

### Mechanized Equipment

- Excavators
- Dozers
- Loaders
- Haulers
- All-Terrain Vehicles
- Utility Task Vehicles

## TRAIL CLOSURE & RESTORATION

Existing trail routes that will no longer be a part of the new trail system should be closed and restored. This includes closing off human access by either disguising the corridor or blocking the corridor, breaking up the compaction of the old trail tread, planting of native vegetation, and incorporating temporary erosion controls if necessary. This process allows for the old trail routes to be integrated back into the surrounding vegetation and natural habitat.

## TRAIL TREADS

### DESIGN

After clearing the trail corridor, the treadway should be cleared of organic material and shaped into a slightly outsloped walking surface. Most cases the work will be on a slope, forming a more level, slightly outsloping bench or sidehill trail. This type of trail design often allows for construction without man made structures. There are 2 ways to construct a sidehill trail: a full bench or a partial bench.

#### FULL BENCH

A full bench tread has entire width excavated into a hillside. A full bench is preferred for sidehill trails, especially on steeper slopes or in areas with poor soils.

#### PARTIAL BENCH

Partial bench trail construction is when part of the tread is excavated, and the other part is filled. The filled portion of the tread should be less than half the tread width. It is best if a partial bench can be reinforced with a retaining wall on the downhill slope.



Full Bench



Partial Bench

### MATERIALS

Materials for the trail tread should be selected based on the user needs, maintenance needs, and construction costs. The tread should be constructed on stable, compacted soils for the most structural stability.

#### NATURAL SURFACE TRAILS

To design a natural surface trail, planners must understand:

- The characteristics of the soil where the trails will be constructed.
- The grades of the trail.
- The watershed above the trail and its impact on the trail.
- Trail users and how they will impact the trail tread.

Knowing the characteristics of the soils helps to understand the limitations of the soil along the trail. This will allow the trail planners to align the trail and features to respond to the soil limitations.

Desirable soil properties for trail base:

- Adequate strength
- Resistant to frost action



- Acceptable compression and expression
- Adequate drainage
- Good compaction

Construction methods and additional materials can be added to make the existing soils sustainable for natural trail surfaces.

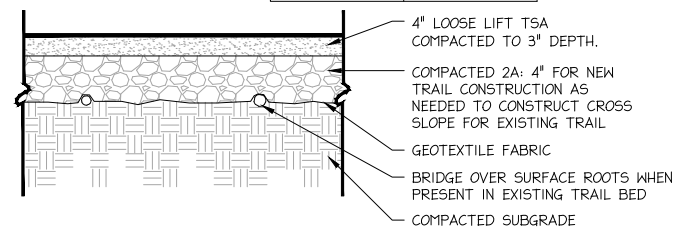
## COMPACTED AGGREGATE TRAILS

Compacted aggregate trails provides an option for paving the trail tread without being a solid pavement system like asphalt or concrete. Compacted aggregate trail surfaces provide a forgiving tread to users that is not as harsh as the solid pavement systems and is more cost effective than other paving options. Compacted aggregate trails are also preferred when the natural trail surface doesn't meet the needs of the trail tread, and the tread requires support for heavier loads.

Penn State Center for Dirt and Gravel Road Studies has developed a trail surface aggregate mixture ideally suited for trail surfaces. Properly installed trail surface aggregate will meet the American Disabilities Act requirements for a firm and stable trail surface. The formula allows for the trail surface to withstand traffic and erosion better than traditional aggregate mixes. The mixture of 3/8" to very fine aggregate sizes allows for excellent compaction reducing wear and erosion. See additional information on trail surface aggregate in the appendix.

NOTE:  
SEE SPECIFICATIONS FOR REQUIREMENTS FOR TRAIL SURFACE AGGREGATE (TSA) PLACEMENT, IN ACCORDANCE WITH PENN STATE CENTER FOR DIRT & GRAVEL ROAD STUDIES TECHNICAL BULLETIN.

SIEVE SIZE	TSH % PASSING
1/2"	100%
3/8"	96-100%
#4	75-90%
#8	55-75%
#16	35-50%
#200	12-20%



## TRAIL INSPECTION & MAINTENANCE

Trails should be maintained to be safe and usable at all times. Potential hazards should be clearly identified and marked to alert users until they can be repaired. Failure to properly manage and maintain a trail may result in an unsafe condition that may become a hazard to the trail users and a liability to those responsible for managing the trail.

The frequency of trail maintenance varies depending on the type of maintenance activity being undertaken, and potentially by the frequency of use.

Typical types of trail maintenance include:

- Scheduled maintenance
- Seasonal closure and opening
- Winter maintenance
- Periodic grooming
- Corrective maintenance
- Deferred maintenance

Trail maintenance tasks should be documented in the trail maintenance plan and should be adopted by the group responsible for the trail.

Maintenance requirements are dependent on the type of trail and amount of visitation it receives.

An excellent online reference resource for trail maintenance crews is the U.S. Forest Service's Trail Construction and Maintenance Notebook, available here: [www.fs.fed.us/t-d/pubs/htmlpubs/htm07232806/toc.htm](http://www.fs.fed.us/t-d/pubs/htmlpubs/htm07232806/toc.htm)

## SCHEDULED MAINTENANCE

Scheduled maintenance is the normal maintenance needed to restore a trail to its intended standard after prolonged wear and tear of normal use and exposure to the elements.

Develop an annual trail maintenance schedule using historical and known maintenance requirements from previous inspections or deferred maintenance. The living document should be adapted to the changing conditions of the trail.

Typical scheduled maintenance tasks are described below. The list can be altered as need to meet the needs of the trail, users, and GSWNY:

- Trimming or removing vegetation, dead limbs, or standing dead trees.
- Removing debris, dead falls, or loose impediments.
- Cleaning out ditches, swales, and culverts.
- Repairing and revegetating minor erosion on slopes or embankments.
- Grooming the tread surface.
- Mowing.
- Trash removal.
- Invasive plant removal.
- Signs inspect/repair/replace.
- Fencing inspect/repair/replace.
- Drainage structures inspect/repair/replace.
- Gates inspect/repair/replace.
- Bridges inspect/repair/replace.
- Maintain dips.
- Grade ditches.
- Storm damage.
- Vandalism removal/repairs.
- Repair washouts.
- Maintaining and completing preventative maintenance on support facilities.
- Inspecting trail related structures to endure they are in safe condition.
- Plowing trailhead parking lots in winter.

The following is a typical calendar for scheduled maintenance:



FREQUENCY OF SCHEDULED MAINTENANCE												
ACTIVITY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
MOWING ( <i>example</i> )			•	••••	••••	••••	••••	••••	••••	•••		
MOWING												
TRIMMING												
TRASH												
PRUNING												
WEEDING												
INVASIVE REMOVAL												
BRUSH HOG												
SIGNS												
FENCE												
CULVERTS												
STORM DRAINS												
GATES												
BRIDGES												
MAINTAIN DIPS												
GRADE DITCHES												
TRAIL GROOMING												
TRAIL SURFACING												
LANDSCAPING												
STORM DAMAGE												
VANDALISM												
REPAIR WASHOUT												

## SEASONAL OPENING & CLOSING

If seasonal closures occur along a trail, inspect and maintain portions of the trail that require maintenance. Sometimes this maintenance can be intensive, especially in areas prone to blow downs. For those trails with winter closures, the trail surface may need to be graded, compacted, and or groomed in preparation for increased use during wet conditions of the spring season. Fall maintenance should focus on clearing and trimming of vegetation sufficiently to account for the next growing season. Repair and stabilize eroded areas to prevent future erosion.

## CORRECTIVE MAINTENANCE

Corrective maintenance is necessary for the restoration of areas or structures severely damaged or destroyed by overuse, inadequate scheduled maintenance, vandalism, or unexpected natural events. Corrective maintenance is usually unexpected and may require more planning or design than scheduled maintenance. Corrective maintenance includes:

- Grooming and maintenance of trailhead surface
- Stabilization of erosion
- Reconstruction of grade dips, or other water control features
- Replacement or major repair of drainage structures or bridges

Regardless of the level of planning and effectiveness of the schedule maintenance, the unexpected will occur. Address unexpected emergencies by establishing a contingency line item in the annual maintenance budget. Ideally, a long-term capital improvement budget should be in place to repair/replace major structures.

## MAINTENANCE OF SIGNS

Incorporate a regular maintenance program for signs into your trail maintenance plan. Sign maintenance is important from a safety and liability perspective. Further, signs are highly visible, and their maintenance or lack of maintenance leaves the visitor with a positive or negative impression about the trail and the GSWNY. Well maintained signs convey a sense of pride and reduce vandalism, while poorly maintained signs may contribute to a diminished visitor experience, including disorientation of trail users.

The following guidelines are recommended:

- Maintain a record of all signage, including location, GPS coordinates, type of sign, and a photo.
- Inspect signs regularly, especially after each winter season, for weathering and visibility.
- Repair or replace damaged or missing signs as soon as possible.
- Secure loose or tilting signs in an upright position.
- Clear vegetation from around signs to maintain high visibility.
- For signs mounted on living trees, loosen fasteners as necessary to accommodate growth of the tree.
- Review signage content to ensure continued relevance and accuracy.

When signs have been weathered or otherwise damaged or destroyed, consider the reasons for the damage. If the sign was eaten by wildlife, consider less palatable materials. If weather or natural events damaged the sign, consider stronger material, a different location, or a different system for mounting the signs. If the sign is damaged by water or decay consider applying a sealer or preservative (ensuring compatibility with color, aesthetics, and environmentally sustainable practices) or replacing the sign with a more water resistant material. When signs are damaged due to vandalism, managers should consider a different location or temporary signage that is not expensive to replace.

Priorities for sign maintenance are:

- Signs required for user safety
- User restrictions and advisory signs
- Destination and identification signs, blazes, and trail logos
- Informative and interpretive signs

There is a fine balance between providing good information and diminishing the trail experience with too much signage. An abundance of signage can also be a burden on the trail managers and those responsible for maintaining the signs.

## SAFETY & SECURITY

The trails must be safe for visitors, provide for the preservation of life, protection on property, and allow emergency service responders to respond to incidents on the property as quickly as possible. Safety must be balanced with the opportunity to explore the trails, natural habitat and environs of Seven Hills. This section of the trail master plan suggests considerations that need to be evaluated and recommendations that should be implemented to assure a facility that provides a high level of safety within an appealing, challenging and adventuresome natural environment.

### SAFETY

#### SAFETY POLICY

A written safety policy is an effective tool to communicate to staff, volunteers, and to trail users the specific purposes of the safety program. It provides a general outline of what actions staff and volunteers must take to make the safety program successful.

The safety policy should include the following elements:

- A simple, clearly written description of the philosophies and objectives of the safety program.



- Adoption as official policy by the GSWNY organization.
- Strong support from the GSWNY staff.

## COMMUNICATION PROTOCOL

A communication protocol should be developed to provide for quick response to incidents on the property. If a report is made to local authorities, staff or volunteers, there needs to be a communication protocol to allow contact with the appropriate person to respond to the incident. Further, a phone number should be posted in a variety of locations including kiosks, signs, maps, brochures, and information guides telling visitors how to report an incident or accident.

## EMERGENCY SERVICES

Post the phone number(s) for the appropriate first responders at trailheads and trail access locations.

### Emergency Response

Trail managers should work with local law enforcement and emergency responders to develop appropriate policies and procedures; often these will vary from place to place. This includes providing the responders with keys to gates so they can access the trail corridor.

## SECURITY

There may be issues in protecting people, including staff, volunteers, visitors, and guests. Security concerns can include vandalism and theft of both property within Camp Seven Hills and adjacent private property. Such concerns include issues of disputes and disagreements, illegal activity, disobeying of property rules and regulations, vehicle, parking, and traffic issues, accidents and emergencies, and violence.

All staff and volunteers should be trained in matters related to security. This includes:

- An awareness of security issues.
- Learn understanding of property rules and regulations.
- An understanding of the differences between violating camp rules and breaking laws.
- Methods of dealing with difficult people.
- Ways to defuse difficult situations.
- Knowing when to call law enforcement officials.
- Knowing and understanding the safety and security plan.
- Knowing the consequences of violations.

### Preventing Undesired Access

The property has had some issues of encroachment and use of areas within the site against the owners wishes, these include hunting stands as well as off road motorized vehicles. Unfortunately, limited vehicular access on the property, the size and location on the property, and the limited staff on site inhibits successful enforcement of the property boundaries.

We recommend installing gates, fencing, and/or other barriers as necessary in key places that are known to be locations of access by unauthorized users. The fences will establish the fact that access is not permitted. In places where fencing is not installed, boundary markers should be placed along the property's boundaries as necessary to identify the boundary and indicate no trespassing. Posting these locations also aids law enforcement in enforcing and prosecuting those who trespass at these locations.

### Preventing Access to Adjacent Properties

In addition to fencing to prevent unlawful access into Camp Seven Hills, visitors should be deterred from intentionally or unintentionally traveling onto private property surrounding the site, unless there is a public access agreement in place with the adjacent landowner. Signs should be posted at the perimeter indicating that visitors are approaching private property and that trespassing onto the property is prohibited. Users should be encouraged to obey all posted signs and rules including perimeter signs posted as "No Trespassing".

## TRAIL ASSESSMENTS

Trail Assessment Forms (TAF) provide a means of recording basic information for current and future trail planning, design, construction, and maintenance. TAFs document current trail conditions and help identify subsequent work required to satisfy current trail standards. A sample TAF is provided in the appendix.

Trail managers should be responsible for reviewing TAFs and ensuring that any required maintenance on a trail or trailhead be addressed. A review of completed TAFs will help trail managers identify areas or sections of trails that require maintenance attention. In areas that require more maintenance than expected or are too costly to maintain, trail redesign or improvements may be considered.

### Assessment Information

#### Trail Information

- Official trail name
- Trail location on site
- Trail length in miles
- Trail segment beginning and end
- Name of person conducting assessment
- Date of assessment

#### Use Objectives

- Designed use of trail
- Season of trail use
- Level of difficulty
- Access Points
- Name of access point
- Location of access point

#### Tread

- Current condition of trail tread
- Type of material used for trail tread
- Average width of trail tread

#### Drainage

- Drainage conditions of trail, identify all issues
- Condition of bridges, culverts, and other drainage structures
- Condition of dips along trail corridor

#### Road Crossings

- Condition of road crossing intersection
- Condition of sight lines at crossings
- Specify if crossing is accessible

#### Stream Crossings

- Condition of bridges or other crossing structures

#### Adjacent Land Use

- Specify current land uses adjacent to trail
- Condition of structures along the trail

#### Signage

- Specify blaze or marking color and style
- Condition of blazes or markings



- Blazes or markings that need replacement
- Other signs that need repairs or replacements

### **Inspection Procedures**

A complete inspection of the trail should be a routine scheduled event, performed by trained personnel/volunteers familiar with the trail. Inspectors should review the trail management objectives for a section of trail before inspecting the trail. It is also helpful to review the previous inspection and maintenance records. The inspector should determine the current condition of the physical features of the trail and document deficiencies, change of conditions, and the need for corrective maintenance.

Trail inspectors should carry a trail map, inspection checklists, and tools for minor maintenance relating to safety. Photographing current trail conditions is an excellent way to document and monitor changes in conditions. Inspectors should identify deficiencies that create safety concerns and hazards to the trail users.

After identifying and repairing safety hazards, the second highest priority is repairing damage from improperly functioning drainage features. Correction of improperly functioning drainage may be a matter of maintenance or may require trail improvements or re-routing. Allowing a trail to continue to degrade from poor drainage quickly leads to costly corrective maintenance or trail closure.

The inspector should also be attentive to evidence of heavy use and trail tread condition requiring immediate maintenance. Record the general condition of the tread throughout various sections of the trail.

Inspections should be frequent enough to correct potential problems before they become a safety issue or lead to more costly corrective maintenance. An experienced and licensed professional engineer should be used to inspect structural facilities such as bridges and retaining walls. Schedule the frequency of structural inspections based on the age and condition of the structure.

### **Using Volunteers**

If using volunteers to assist in the trail assessment process, the volunteers should be trained by a designated GSWNY staff member before beginning assessment. This allows for the information to be gathered in a comprehensive and cohesive manner as well as addressing any questions or concerns of the volunteers.

# APPENDICES



## Camp Seven Hills Sustainable Trails Master Plan

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October 15, 2019 at 3:00pm, web conference

### Attendees

Karen Lundgard, Senior Vice President of Asset Management, Girl Scouts of Western New York

Allison Owczarczak, Property Manager, Girl Scouts of Western New York

Janet DePetrillo, Director of Camp Administration, Girl Scouts of Western New York

Lumberjack Lavin, Natural Resource Specialist, Girl Scouts of Western New York

Sara Thompson, Pashek + MTR, Ltd.

Keely McDonald, Pashek + MTR, Ltd.

### Meeting Minutes

#### Discussion Items

1. Introduction of committee. Camp Seven Hills is one of four Girl Scout camp grounds in western New York.
2. Sara T. reviewed the project scope, including meetings, projects phases, and implementation of phase 1 of the trail system.
3. Sara T. discussed what sustainable trails are and the types of trails that can be used. In short sustainable trails are less maintenance and reduce environmental impact. Trail types include natural surface trails, accessible trails, and a range of widths and difficulty levels.
  - a. Karen L. mentioned the desire to have some accessible trails in the master plan, just not in the phase one portion.
4. Sara T. reviewed the existing conditions map with the committee to confirm if the information is correct.
  - a. The blue trail is currently showing a portion going outside of the camp property lines. Allison O. will review this and confirm the trail location. Pashek + MTR will confirm that the layers are all correct in GIS.
  - b. Allison O. will gather additional GPS data on portions of the blue trail that were re-routed, the camp road, and additional buildings on site. This information will be updated in the existing conditions map.
  - c. Sara T. inquired about the difference in the two sides of the camp, Goodyear and Lakeside.
    - i. The Goodyear side is predominately used for Girl Scout resident summer camps, it is open seasonally from May to October, with no current winter use on the site.
    - ii. The Lakeside camp is used more for weekends with troops, and is available for rentals, half of the Lakeside camp is seasonal (like Goodyear) and half is available for use year-round.

5. Sara T. asked what some of the goals are for the trail master plan, the committee went around the room naming a couple of goals they would like for the trail plan.
  - a. Goals included:
    - i. Utilization, getting more girls/troops out on the trails
    - ii. Sustainability in maintaining the trails, since there are limited resources and time to maintain the trails
    - iii. Ecological sustainability and environmental education
    - iv. Create a map of the trail system to let people know the trails are there and where they go
    - v. Would like to see the ropes course go away (not sustainable and concerns about safety)
    - vi. Provide places for tent camping or lean-tos
    - vii. Ability to hike across the site, from one camp to the other, provide connection between the camps
    - viii. Reduce barriers for users of the trails
    - ix. Provide trails that can be used by a range of ages and skill levels
  - b. During the goals discussion the historic white trail was discussed. Historically it ran from Goodyear to Lakeside connecting the camps but was abandoned back in the 1990s. Remnants of the trail remain but some sections were damaged during logging operation and microbursts. It was also a very strenuous trail.
  
6. After discussing the goals Sara T. asked the group what types of trails, programing needs, and uses may want to be incorporated with the new trail master plan.
  - a. Committee discussed having trails that varied in length, from an hour or two with locations to bail out if the group needs to.
  - b. Need trails to lead to primitive camping areas.
  - c. There is a badge that is given for hiking length accomplishments, so trails that can help the girls build up to longer hiking distances would provide opportunity to build the skills to achieve the badge.
  - d. Some programing and uses discussed included: environmental education, camping, varying difficulty levels, foraging, cross-country skiing, snowshoeing, beginner mountain biking, and hiking.
  - e. It was mentioned that the use of loops instead of in and out trails is preferred.
  - f. Discussed having snowshoe or cross-country ski routes that are good for beginners and around 45 minutes to an hour long. Gives time in a two-hour session for instruction and gear along with trail time.
  - g. Sara T. asked if horses are ever used on the camp sites. The committee mentioned that horses were used in the past during summer camps but are no longer being used at Camp Seven Hills. Horse trails could be somethings on the site that could be marketed to outside groups to use (not just Girl Scouts).
  - h. Sections of the existing trails could be used for beginning mountain biking. Mountain bikes trails could be on the Lakeside year-round and on the Goodyear side in the off season (after summer camps).



7. The group then discussed opportunities and constraints.
  - a. The camp features include manmade ponds and pine plantations, with no overlooks or viewsheds within the site.
  - b. There are clay beds between the east end of the yellow trail and the nearby stream. These clay beds have posed a safety issue in the past but are also a unique ecological feature. Consideration should be given to if the trails should connect to or avoid the clay beds, the committee agreed that if there were not any detrimental ecological impacts, seasonal and supervised connection to the clay beds may be considered.
  - c. The property has had some encroachment issues with the neighbor to the southeast of the Goodyear camp using their ATV's and erecting hunting stands on the camp property. This issue may be more of an internal issue requiring some legal action to deter encroachment.
  - d. Allison O. mentioned that the orange trail is often referred to as the abandoned unit trail, since there are several abandoned units both on or near the trail including the Timber Trail unit which is in a wet area just off the orange trail.
  - e. Some of the desired connections that the committee mentioned for the trails include:
    - i. A hilltop prairie to the southeast of the pond in the center of the site
    - ii. The area north of the sports fields at Goodyear, it has an area with blueberries and some historical features. There used to be the Tulip trail, an old horse trail, that went through the area.
    - iii. The parcels that extend to the northeast of the Goodyear site is a forever wild area, with an easement in place. Trails are permitted with the easement.

## 8. Next Steps

- a. The committee and Pashek + MTR discussed the first site visit and in-person meeting.
  - i. The meeting date was set for November 7<sup>th</sup> from 5:30-7:00pm at the Depew offices. The GSWNY will provide food.
  - ii. Groups that will be invited to the meeting include: camp counselors, troop leaders, key summer camp staff, volunteer groups, some girls or groups from other departments.
  - iii. Pashek + MTR will arrive at Camp Seven Hills around 11am on November 7<sup>th</sup> and will spend the afternoon walking the site, including some time with some of the committee members. Additional site review will be completed on the morning of November 8<sup>th</sup> if needed.
  - iv. Pashek + MTR will put together information/introduction that the committee can include with the invitations for the meeting on November 7<sup>th</sup>.
  - v. Pashek + MTR will be staying on site at Camp Seven Hills on the night of November 7<sup>th</sup>. They will bring their own linens and toiletries.

The information contained in these minutes was recorded by Pashek + MTR and represents our interpretation and understanding of the discussions that occurred during the meeting. Please notify Pashek + MTR within one week of distribution for any changes. Otherwise, minutes will be distributed as final, and assumed accurate as written.

Prepared by: Keely McDonald

Date Prepared: 2019/10/16

Distributed to: Study Committee



## Camp Seven Hills Sustainable Trails Master Plan

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March 26, 2020 at 2:00pm, Zoom Meeting

### Attendees

Karen Lundgard, Senior Vice President of Asset Management, Girl Scouts of Western New York

Allison Owczarczak, Property Manager, Girl Scouts of Western New York

Janet DePetrillo, Director of Camp Administration, Girl Scouts of Western New York

Lumberjack Lavin, Natural Resource Specialist, Girl Scouts of Western New York

Sara Thompson, Pashek + MTR, Ltd.

Keely McDonald, Pashek + MTR, Ltd.

### Meeting Minutes

#### Discussion Items

1. Sara opened the meeting by reviewing the project goals and objectives with the committee.
  - a. Goals:
    - i. Utilization. Get more people on the trails.
    - ii. Sustainable trail maintenance.
    - iii. Ecological sustainability and environmental education.
    - iv. Create a comprehensive map of the trail system.
    - v. Provide opportunities for additional programming.
    - vi. Provide connection between Goodyear and Lakeside camps.
    - vii. Reduce barriers for users of the trails.
    - viii. Provide trails that can be used by a range of ages and skill levels.
    - ix. Improve signage and markers along the trails. Including: wayfinding, mile markers, difficulty level, and educational/interpretive signs.
  - b. Objectives
    - i. Outline the level of difficulty and time required to complete the trails.
    - ii. Large trailhead maps of trail system, and primitive signage along trails.
    - iii. Opportunities for programming a variety of experiences and difficulty levels.
    - iv. Identify points of interest.
    - v. Include more trails or loops on the Goodyear side of the site.
2. Sara reviewed the trail plan map with the committee. She started off by looking at all the information that is included in the map legend like trail length and slope data.
  - a. Overview
    - i. The existing trail routes were assessed for sustainability and plans were developed on how to alter the existing to make them more sustainable
    - ii. The plan gives an idea of the possible trail network and options for a variety of uses.
  - b. Individual trail review
    - i. Orange trail

1. Pashek + MTR assumes that the orange trail will be heavily used due to its centralized location at camp Goodyear.
  2. The trail is used to connect a variety of features on the Goodyear side of the camp and offer an easy trail loop for young girls new to hiking.
  3. Because of the heavy use, we think that parts of the trail should be re-routed to make it more sustainable. Steps might need to be installed where sections are too steep leading down to the lost units. We propose a separate lost unit loop off of the orange trail.
- ii. Purple lake loop
1. Accessible 0.5 mile loop
  2. Karen mentioned the location and size would be perfect as a starter trail especially for the youngest Girl Scouts.
  3. Allison brought up thinking about having parking access to any accessible trails.
  4. Currently the Lakeside lodges are used the most for accessibility so it would be important to have accessible trails on the Lakeside especially near the lodges so that they can be used year round.
  5. Allison likes the idea of two accessible trails, one on the Goodyear side and one on the Lakeside.
  6. Pashek + MTR will provide a few accessible trail options and cost estimates to allow for the committee to decide how much of the trails they want to be accessible.
  7. Allison will share information on the rock dirt used by the NPS at the Poconos Environmental Center with Pashek + MTR as a possible trail surface for the accessible trails.
- iii. Pink trail
1. More rigorous trail, with small sections of steeper slopes.
  2. Connects up to the parcels north of Dutchtown Road.
  3. The route connects to wetland areas, offering different learning opportunities, but would require puncheons or turnpikes. Note that horses can't use puncheons.
  4. The alternate route would be easier to cross the stream without the need for turnpikes or puncheons.
    - a. This is something Pashek +MTR would like to look at during the next site visit.
  5. The interior connector trail provides options for a shorter loop or extended hiking. It also connects to a part of the old carriage road offering a learning opportunity for the scouts.
  6. The pink trail could be a good horse trail since it connects to the barn.
  7. The segment of trail near the barn should be redirected to the



front of the barn and away from the storage area to the east of the barn

iv. White trail

1. A 2 mile rigorous trail that connects Lakeside and Goodyear.
2. Offers access to a variety of areas with different vegetation and different hiking experiences.
3. Possible primitive camp site at the top of one of the ridges.
4. Presents an option for longer, and more challenging loops with the other trails.
5. The start of the trail by the barn should be moved to the front of the barn instead of the back.
6. Karen likes that there are connecting trails from the white trail to the orange trail and the pond loop trail, offering hiking options and possible backpacking experiences.
7. White trail can be used for horseback riding to overnight camping.

v. Blue trail

1. Connects to the orange trail without needing to use the maintenance road.
2. The new route is mostly just minor adjustments in the existing route to make more sustainable and avoid wet areas.
3. Alternate route along side of slope would be drier route but would not connect with the small streams and vernal pools like the existing trail.
4. Allison expressed keeping the trail connection to the existing vernal pool since it is a unique learning opportunity for the scouts.
5. The proposed blue trail connects to the pond loop trail, which connects to the white trail. It also still connects to the yellow trail along the maintenance road.

vi. Yellow trail

1. More trail rerouting on the north part of the existing trail to improve sustainability and manage steep slope areas.
2. Completed the trail so that it is a full loop.
3. The shower house connector is not needed since campers can use the roadways to access it. The group likes the loop connecting the yellow trail with the infirmary, dining hall, and the Star Light camp.
4. The bail out segments of the yellow trail help to create a concentric loop system of trails offering flexibility in hiking options.
5. Trail loop to meadow offers a different/unique experience for the scouts.
6. The maintenance trail is not needed, and the group would prefer to keep the scouts away from the maintenance area for safety reasons.



## Camp Seven Hills Sustainable Trails Master Plan

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December 3, 2019 at 5:30pm, GSWNY Offices, Depew, NY

### Attendees

Karen Lundgard, Senior Vice President of Asset Management, Girl Scouts of Western New York  
Allison Owczarczak, Property Manager, Girl Scouts of Western New York  
Janet DePetrillo, Director of Camp Administration, Girl Scouts of Western New York  
Lumberjack Lavin, Natural Resource Specialist, Girl Scouts of Western New York  
Sandra Bennett, Girl Scouts of Western New York  
Kathy Weiss, Girl Scouts of Western New York  
Jennifer Fuer, Girl Scouts of Western New York  
Bethany Fuer, Girl Scout, Girl Scouts of Western New York  
Erin Dempsey, Girl Scouts of Western New York  
Carolyn Magner, Girl Scouts of Western New York  
Amy McSean, Girl Scouts of Western New York  
Bee Bauer, Girl Scouts of Western New York  
Sara Thompson, Pashek + MTR, Ltd.  
Keely McDonald, Pashek + MTR, Ltd.

### Meeting Minutes

#### Discussion Items

1. Sara T. provided an overview of the trail master plan project scope for the group.
2. Sara T. discussed what sustainable trails are and the types of trails that can be used. Sustainable trails strive to be easier to maintain and reduce their environmental impact.
3. Pashek + MTR briefly reviewed the site analysis maps with the group.
  - a. Slope analysis, soil drainage, biodiversity, and land use
4. Sara T. reviewed project goals set during the kick off meeting in October 2019 and requested group input on any additional goals to include.
  - a. Goals included:
    - i. Utilization. Get more people on the trails.
    - ii. Sustainable trail maintenance.
    - iii. Ecological sustainability and environmental education.
    - iv. Create a comprehensive map of the trail system.
    - v. Provide opportunities for additional programming.
    - vi. Provide connection between Goodyear and Lakeside camps.
    - vii. Reduce barriers for users of the trails.
    - viii. Provide trails that can be used by a range of ages and skill levels.
    - ix. **New:** Improve signage and markers along the trails. Including: wayfinding, mile markers, difficulty level, and educational/interpretive signs.
  - b. During the goals discussion several additional objectives were also identified by



- the group.
- i. Outline the level of difficulty and time required to complete the trails.
  - ii. Large trailhead maps of trail system, and primitive signage along trails.
  - iii. Opportunities for programming a variety of experiences and difficulty levels.
  - iv. Identify points of interest.
  - v. Include more trails or loops on the Goodyear side of the site.
5. After the large group discussion, the group spent time individually answering the questions provided on the back of the agenda.
- a. **Question 1.** How do you use the trail now? What programs and activities occur on or along the trails?
    - i. *Responses on trail use:* hiking, walking, workout, camp history, overnight hiking, backpacking, and horses.
    - ii. *Responses to programming/activities:* tent camping, lodge camping, large variety of small activities, overnight camping.
  - b. **Question 2.** What other uses, programs, and activities are missing that should occur along the trails? Why don't they occur (what are the barriers)?
    - i. *Responses for missing programs/activities:* environmental education, more tent camping, more backpacking, more use of trails, variety of difficulty levels, interpretive/history, running, horses, adaptive trails, nature feature trails, cross country skiing, sledding.
    - ii. *Responses to barriers:* lack of knowledge (both environmental and trail), convenience for tent camp locations, trails for backpacking specifically, fear of being lost (poor signage/markers), not well delineated, accessibility.
  - c. **Question 3.** What kind of amenities along the trail should be improved or added?
    - i. *Responses:* benches/seating, outdoor classrooms, primitive campsites, bird blinds, signage, project areas for campers, rest stop areas for groups, shelters (lean-to), self-guided nature trail, bridges/boardwalks in areas with water, outdoor amphitheater, meditative/reflective space, birdhouses, night hiking amenities and signage, nature play areas, guided discovery locations (fairyland), maple sugaring, hammock camping.
  - d. **Question 4.** Are there any natural features or built facilities that new trails should connect to?
    - i. *Responses:* along streams, lost units and camp history, just connecting to more natural features than now, ponds, clay beds, loop around pond with blinds.
6. The group split into two smaller groups with the existing conditions maps to discuss ideas and possibilities of trail improvements and add notations to the maps of locations for new trail features.
- a. Topics that were discussed in group 1:
    - i. Snowshoeing, tent camping/primitive camp sites, backpacking, horse trails, cross country ski trails, a sledding hill, outdoor amphitheater, smaller loop trails, more activities along the trails like play areas or ropes courses, Hammond House to Hunter's Cabin as accessible trail, trail bypass sections with varying difficulty, meeting the requirements of the adventure badges, more water related activities, connecting to the viewshed by the Hunter's Cabin.

- b. Topics that were discussed by group 2:
  - i. Primitive campsites, cross country skiing, snowshoeing, ADA, access to clay beds, trail around pond, upland meadow area, lost unit hike, hammock camp sites, horse trail area, outdoor classrooms and lean to, 5K trail with mile markers, maple sugaring, foraging, animal houses, using natural materials for constructed signs/features, backpacking trail, interpretive trails (nature and history), interactive map, phone app, nature play/discovery.

7. After the small group discussions Sara T. and Keely M. summarized the topics discussed in each group for the large group to hear.

- a. Attached is a composite map of all the mark ups from the small group discussions.

#### 8. Next Steps

- a. Sara T. closed out the meeting by discussing the next steps in the project.
  - i. Pashek + MTR would spend a ½ day exploring the Camp Seven Hills site and existing trails on 12/4.
  - ii. GSWNY will provide information on adventure badge requirements to Pashek + MTR to include as data for the trail master plan.
  - iii. Pashek + MTR will use the data collected from the meeting and the site visit to prepare preliminary trail designs.
  - iv. A secondary group meeting and site visit will be scheduled for late winter/ early spring 2020. Pashek + MTR and the GSWNY committee will coordinate the date for the second meeting.

The information contained in these minutes was recorded by Pashek + MTR and represents our interpretation and understanding of the discussions that occurred during the meeting. Please notify Pashek + MTR within one week of distribution for any changes. Otherwise, minutes will be distributed as final, and assumed accurate as written.

Prepared by: Keely McDonald

Date Prepared: 2019/12/09

Distributed to: Study Committee



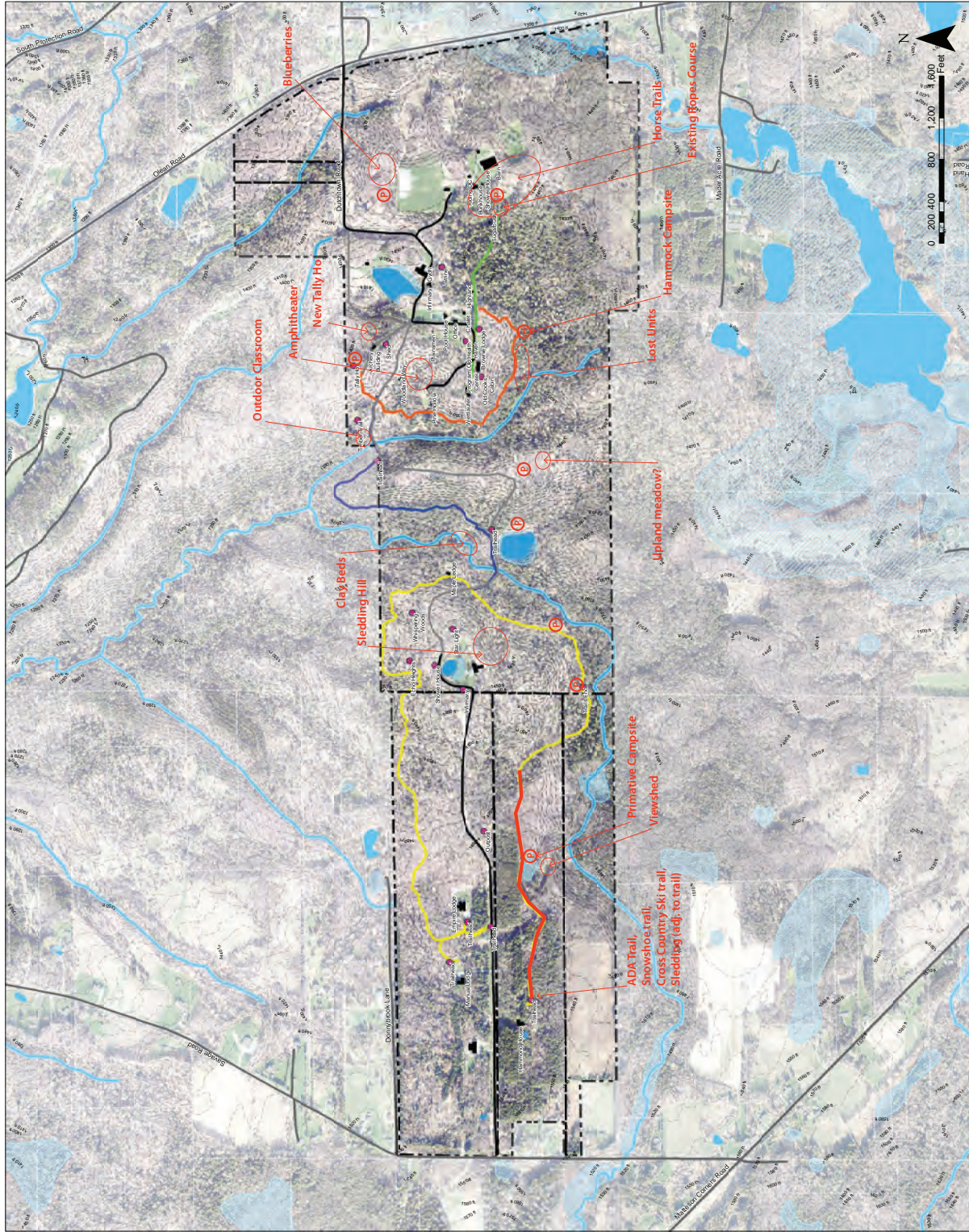
**Existing Conditions**

Date: 11/26/2019

**Site Conditions**

**Legend**

- Girl Scout Buildings
- Features
- Roads
- Maintenance Road
- Girl Scout Parcels
- Yellow Trail
- Orange Trail
- Blue Trail
- Wentlauler Trail
- Water bodies
- Streams
- Freshwater Wetlands
- Index Contour 10'





## Camp Seven Hills Sustainable Trails Master Plan

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October 27, 2020 at 5:00pm, ZOOM

### Attendees

Janet DePetrillo, Director of Camp Administration, Girl Scouts of Western New York  
Erin Johnson, Outdoor Program Lead, Girl Scouts of Western New York  
Allison Owczarczak, Property Manager, Girl Scouts of Western New York  
Jennifer Fuer, Girl Scouts of Western New York  
Bethany Fuer, Girl Scout, Girl Scouts of Western New York  
Erin Dempsey, Girl Scouts of Western New York  
Carolyn Magner, Girl Scouts of Western New York  
Amy McCabe, Girl Scouts of Western New York  
Nancy Grimes, Girl Scouts of Western New York  
Diane Powell, Girl Scouts of Western New York  
Sara Thompson, Pashek + MTR, Ltd.  
Keely McDonald, Pashek + MTR, Ltd.

### Meeting Minutes

#### Discussion Items

1. Sara began the meeting with introductions and reviewing the meeting agenda.
2. Sara reminded the group of the goals set forward back in December 2019 for the trail master plan project.
  - a. Goals included:
    - i. Utilization. Get more people on the trails.
    - ii. Sustainable trail maintenance.
    - iii. Ecological sustainability and environmental education.
    - iv. Create a comprehensive map of the trail system.
    - v. Provide opportunities for additional programming.
    - vi. Provide connection between Goodyear and Lakeside camps.
    - vii. Reduce barriers for users of the trails.
    - viii. Provide trails that can be used by a range of ages and skill levels.
    - ix. Improve signage and markers along the trails. Including: wayfinding, mile markers, difficulty level, and educational/interpretive signs.
3. Sara took some time to update the group on what has been completed so far in the project
  - a. December 2019 meeting
  - b. Inventory and analysis of the property and existing trails
  - c. Field work
    - i. December 2019
    - ii. August 2020
    - iii. November 2020 (future)
  - d. Flagged and completed one volunteer day for phase 1 of the trail implementation.

- i. Connecting a trail from Hammond House around the maintenance building to Manual Lodge, completing the Yellow Trail loop.
- 4. Next the group reviewed some precedent images for the trail and associated amenities.
  - a. Trail type: single track natural surface trail, ADA trail surface aggregate trails
  - b. Structures
    - i. Timber steps
    - ii. Amenities: bird blinds, primitive camps, hammock camps, lean to, seating and rest stops, picnic tables
    - iii. Stream crossings: steppingstones, puncheon, timber trail bridge, fiberglass trail bridge, suspension bridge
    - iv. Wetland trails: puncheons, boardwalks
  - c. Signage: trailhead kiosks, painted trail blazes, intersection markers, interpretive
  - d. Feedback
    - i. Allison confirmed that Seven Hills has a wood router and could create wood routed signage.
    - ii. The group agreed it is important to make sure the trails are clearly marked.
    - iii. Janet expressed a desire that whatever signage is used it has a consistent, complementary system of signs across all camps.
- 5. Sara introduced the group to the current draft of the trail master plan describing the trail routes, uses, difficulty, and lengths as well as some of the adjacent trail amenity recommendations.
  - a. Lakeside
    - i. Mustard yellow and bright yellow trail loops are recommended to be accessible loops, the rest of the trails on the Lakeside would be single track, natural surface trails.
    - ii. Plan denotes areas that might require some sort of stream crossing.
    - iii. Connector trails are used in the system to connect amenities as well as create smaller loops giving hikers more options to adjust the hiking route based on their skills and abilities.
    - iv. Some primitive camp site recommendations.
  - b. Lakeside to Goodyear
    - i. The blue trail and the white trail connect the Lakeside camp to the Goodyear camp.
    - ii. The blue trail is a modification of the existing blue trail route and provides an easy route from one camp to the other.
    - iii. The white trail would be a more difficult, and longer trail connecting the camps providing a route for more experienced hikers.
  - c. Goodyear
    - i. Orange trail is a modification of the existing trail featuring off road trail connections.
    - ii. Main feature of the orange trail would be a suspension bridge between Pine Hollow and Woodland Way.
    - iii. Goodyear Lake features a half mile accessible loop trail, perfect for trail running and beginners.
    - iv. Pink and lavender trails on the east end of Goodyear would be equestrian trails.
  - d. The current trail system at Seven Hills is around 4 miles of trails, this new

proposed system would be about 10 miles of trails. The plan tried to provide a range of options and uses, increasing use of the site.

6. After reviewing the trail plan with the group Sara opened the meeting up for discussion and questions about the plans.
  - a. Overall, the group was excited about the trail plan and all the possibilities the new system would offer for programming at Seven Hills.
  - b. Janet asked about trails in the plan that would be best for snowshoeing, cross country skiing, and trail running.
    - i. Snowshoeing: any of the yellow trails, any of the accessible trails
    - ii. Cross country skiing: the accessible trails are best
    - iii. Trail running: any of the yellow trails, accessible trails, the orange trail system
  - c. Erin expressed concern about white trail near Mater Acres.
    - i. Trail is down a steep slope from area that has seen encroaching activities in the past, about 16 feet lower, which would hinder encroachment.
    - ii. It will be important to post signage and continue to monitor encroachment issues.
  - d. Erin is excited about the primitive camping sites with shelters and potential hammock camp, likes that they will be destinations along the trail and not just former units.
    - i. The group discussed using old Tally Ho as a primitive camp site, since it is still so close to all the main camp amenities. It was determined that the site would be used for primitive camping with the youngest scouts, giving them some security by still being close to the main camp.
  - e. Allison is excited about the addition of the pink trail system at Goodyear because it will be a unique new addition to the trails, as well as the addition of the white trail to provide a more challenging hike for older girls.
  - f. Carolyn is also excited about the white trail's potential for backpacking experience with some of the older scouts, while the blue trail maintains a less difficult connection between the two sides of the camp.
  - g. Carolyn appreciated including the connecting trails to allow for groups to adjust the hiking experience to their skill levels as well as proving options for emergency access if needed.
  - h. Erin D. likes the potential for the suspension bridge, especially in conjunction with the Night Owl program at the camp.
  - i. Erin D. asked about potable water access to the primitive camp sites, Allison clarified that water lines could be run to some of the sites that are closer to the main camp areas.
  - j. Both Jennifer and Nancy brought up that signage and clearly marked trail systems are exciting so that groups won't get lost and can enjoy the hiking experience.
7. Once discussion was completed on the plan the group discussed what they viewed as priorities for developing the trail system.
  - a. Completing the phase 1 trail section, which is already underway, is the first priority.
  - b. Marking and blazing the existing trails to improve use is secondary.
    - i. Updating and rerouting of the existing trails, as well as installing permanent signage can be completed later.



8. Constructing the white trail and updating the blue trail to have the connecting trails from the two sides of the camp established as well as a more difficult trail for the older girls to be able to start using is third.
9. Next would be completing construction on the three accessible trail loops, two on Lakeside, and one on Goodyear.

#### 10. Next Steps

- a. Sara closed out the meeting by discussing the next steps in the project.
  - i. Pashek + MTR will continue to revise and add detail to the trail master plan.
  - ii. Pashek + MTR will develop a phasing plan for the project which will be shared with the GSWNY group to provide feedback.
  - iii. Pashek + MTR will develop cost estimates for the trail development with some guidance from Allison on in house costs.
  - iv. Pashek + MTR aims to have the trail master plan report completed by the end of 2020. Fundraising can then start to implement some of the structures.

The information contained in these minutes was recorded by Pashek + MTR and represents our interpretation and understanding of the discussions that occurred during the meeting. Please notify Pashek + MTR within one week of distribution for any changes. Otherwise, minutes will be distributed as final, and assumed accurate as written.

Prepared by: Keely McDonald

Date Prepared: 2020/10/28

Distributed to: Study Committee

Technical Bulletin

# Trail Surface Aggregate (TSA)

10/2013

**Trail Surface Aggregate (TSA):** A specific mixture of aggregate designed for surfacing trails that is designed to achieve very high densities to withstand traffic and erosion better than traditional aggregates.

*Note that this specification was updated in October 2013. TSA changes were made to reduce the amount of loose surface stone in TSA placements. A plasticity index limit was added and a certification form is available.*

**Background:**

Trail Surface Aggregate (TSA) is designed for use as a wearing surface for trails. It is different from traditional materials used to surface trails such as "number 10's". TSA is designed to have a uniform mixture of a range of rock sizes from 3/8-inch all the way down to fine material. This uniform mix allows excellent compaction to achieve a higher in-place aggregate density than commonly used aggregates to resist wear and erosion. The mix was designed by the PSU Center for Dirt and Gravel Road Studies, and is based on a "downsizing" of the successful and popular Driving Surface Aggregate (DSA) developed for use on roads.

**Specification:**

All TSA material is to be derived from natural stone formations. Stone is defined as rock that has been crushed; rock is defined as consolidated mineral matter. Both are restricted to that which has been mined or quarried from existing geologic bedrock formations.

All components of the aggregate mix, including fines passing the #200 sieve, are to be derived by crushing parent rock material that meets TSA purchasing specifications for abrasion resistance, pH, Plasticity, and freedom from contaminants. Determine the amount of particles less than #200 sieve size using the washing procedures PTM No. 100.



Close-up of worker's gloved hand in TSA pile.

TSA can be made using a traditional sieve gradations, or using a "recipe" approach that mixes existing aggregate gradations. The "recipe approach" may be more cost effective for ordering small amounts of TSA for smaller jobs.

**TSA RECIPE:**

Combine existing aggregates and water in the ratio:

- 1 part AASHTO # 8
- 4 parts unwashed AASHTO # 10 (or B3 sand)
- 1 part minus #200 fines (collector fines)

**TSA GRADATION:**

Sieve Size	TSA Percent Passing
1/2"	100%
3/8"	96-100
#4	75-90
#8	55-75
#16	35-50
#200	12-20

**Additional TSA Specifications:**

• **Aggregate Properties:**

- **Hardness:** The acceptable limit as measured by weight loss is "less than 40% loss". Los Angeles Abrasion test, AASHTO T-96 [ASTM C 131] shall be used to determine this property. Existing data obtained from tests made for and approved by PENNDOT will be accepted.
- **pH:** Aggregate must be in the range of pH 6 to pH 12.45 as measured by EPA 9045C.
- **Plasticity:** Material must not exceed Plasticity Index (PI) rating of 6 by ASTM D4318 Standard.
- **Parent Material:** TSA can be made from limestone, sandstone, or any other parent material that meets the hardness, pH, gradation, and other requirements as outlined in this document.

The publishers of this publication gratefully acknowledge the financial support of the PA State Conservation Commission and PA Bureau of Forestry. For additional copies, information, or assistance, contact: Center for Dirt & Gravel Roads Studies, Penn State University, 215 Transportation Research Building, University Park, PA 16802 (Toll-Free Phone: 1-866-668-6683, Fax: 814-863-6787, Email: [dirtandgravel@psu.edu](mailto:dirtandgravel@psu.edu)).



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Center for Dirt and Gravel Road Studies



## Additional TSA Specifications *(continued)*

- **Optimum Moisture:** Material is to be delivered and placed at optimum moisture content as determined for that particular source. The optimum percentage moisture is to be identified by the supplier in the bid/purchasing documents. The optimum percentage moisture is to be determined using Proctor Test ASTM D698, procedure C, Standard.
- **Transport:** Truck tarps must be used to cover 100% of the load's exposed surface from the time of loading until immediately before dumping, including standing time waiting to dump.
- **Placement:** TSA should be placed from the furthest point working back towards the source to avoid running equipment on the final trail.
  - **Paver:** When possible on large jobs, a small paver should be used to place TSA. This will reduce aggregate segregation by size that occurs when any aggregate is dumped and spread. It is recommended that the minimum depth of placement should be 4 inches loose, 3 inches compacted.
  - **"Dump and Spread":** On small trails, a paver may be cost-prohibitive. TSA can be placed using a "dump and spread" method on small trails. Be sure the aggregate is not "overworked" which may cause size segregation. TSA must be placed in one layer.
  - **Compaction:** A minimum 3 ton vibratory roller is to be used to compact the final surface. The initial pass of the roller should be in static mode. TSA must be compacted while it is at optimum moisture to achieve maximum density. If TSA sticks to the drum of the roller, stop and wait for the surface to dry further.



**Paver-placement of TSA is preferred for longer sections of trail as pictured above.**



**TSA can be successfully placed with small equipment for short sections of trail. Proper compaction at optimum moisture is crucial. Note the crown in the finished surface.**

## Other Important TSA Considerations:

- **Mixing fines:** When mixing aggregates to create TSA, take care not to pre-wet any "minus #200" fines before they are added to the mixture. Doing so may cause the fines to clump into balls that can be difficult to break apart by mixing. These "balls" of fines will appear in the final trail, and may cause the rest of the trail to have insufficient fine material.
- **Weather:** Since TSA is to be placed at optimum moisture, TSA placement is not recommended if the forecasted weather is too cold or wet to allow the material to dry for 1-2 days after placement.
- **Trail Closure:** Trail use should be prohibited or restricted for TSA placement and the following day.
- **Site Preparation:**
  - **Drainage:** All trail drainage concerns must be addressed before TSA placement.
  - **Crown:** If possible, TSA (like all trail surfaces) should be placed with a crown or cross-slope of not less than 1/4" per foot 3-4% for drainage. This same crown or cross-slope should be established in the trail base materials **before TSA placement**. Establish side-slope with your base, and reflect it in TSA.
  - **Base material:** On some existing compacted trails, no base modification is required. The ideal base course for TSA is a 2-6 inch thick layer of well graded compacted aggregate such as PennDOT's 2A. TSA placement directly over "open graded" stone (such as railroad ballast) is not recommended. When placing TSA **directly** on fabric, a minimum 6" uncompacted aggregate depth is recommended.
- **ADA accessibility:** Properly placed and compacted TSA will meet all Americans with Disabilities Act requirements for gravel surface on properly designed trails.

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# D: TRAIL MANAGEMENT OBJECTIVES

## Trail Management Objectives

Trail Name \_\_\_\_\_ Begin Segment \_\_\_\_\_ identified by mileposts   
 Location \_\_\_\_\_ End Segment \_\_\_\_\_ or coordinates   
 Total Trail Length \_\_\_\_\_ Segment Length \_\_\_\_\_

page 1 of 2

**Designed Use**  Hike / Pedestrian  Bike  Mountain Bike  Equestrian  
 Cross Country Ski  Snowshoe

**Season of Use**  Year Round  Winter  Spring  Summer  Fall

**Level of Difficulty**  Easiest \_\_\_\_\_%  More Difficult \_\_\_\_\_%  Most Difficult \_\_\_\_\_%

**System Layout**  Linear  Single Loop  Stacked Loop  Multiple Loop  
 Spoked Wheel  Primary & Secondary Loop  Maze

<b>Trail Specifications</b>		<b>Tread Specifications</b>	
Maximum Grade	Sustained ..... _____%	Tread Surface	<input type="checkbox"/> Stable <input type="checkbox"/> Firm
	Short ..... _____%	Tread Material	<input type="checkbox"/> Native In-Place <input type="checkbox"/> Native Borrow
Minimum Clearances	Width ..... _____feet	<input type="checkbox"/> Manufactured, _____	<input type="checkbox"/> Stabilized Soil
	Height ..... _____feet	<input type="checkbox"/> Stone	<input type="checkbox"/> Pavement
Design Requirements	Tread Width ..... _____feet	<b>Accessibility</b>	
	Target Cross Slope ..... _____%	<input type="checkbox"/> Complies with ADA – Draft final Accessibility Guidelines for Outdoor Developed Areas	
	Minimum Curve Radius .... _____feet		

**Managed Use**  Shared Use Path / Rail Trail  Multi-Use / Shared Use Trail  
 Hike / Pedestrian  Bicycle  Equestrian  
 Cross Country Ski  Snowshoe

**Prohibited Use**  All Motorized Use  ATV  Snowmobile  
 Hike / Pedestrian  Bike  Mountain Bike  Equestrian  
 Cross Country Ski  Snowshoe

**Sensitive Areas**  Wetlands  Seeps  Habitat  Species  
 Cultural / Historical  EV / HQ Streams  Adjacent Land Use  
 Other, describe: \_\_\_\_\_

**Destinations**  Parks  Connecting Trails  Wildlife Areas  Control Points  
 Stream Crossings  Trailheads  Vistas  Scenic Areas  
 Others, describe: \_\_\_\_\_

**Structures**  Culverts  Bridges  Rock Walls  
 Crib / Gabion Walls  Other Walls  
 Other Structures, describe: \_\_\_\_\_

**Notes**

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Prepared by \_\_\_\_\_ Date \_\_\_\_\_

## Trail Management Objectives

Trail Name \_\_\_\_\_ Begin Segment \_\_\_\_\_ identified by mileposts   
 Location \_\_\_\_\_ End Segment \_\_\_\_\_ or coordinates   
 Total Trail Length \_\_\_\_\_ Segment Length \_\_\_\_\_

page 2 of 2

Trailheads & Access Points Name \_\_\_\_\_ Location \_\_\_\_\_ identified by milepost   
 or coordinates

- Amenities**
- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Parking, no. of spaces _____ | <input type="checkbox"/> Restroom          | <input type="checkbox"/> Potable Water |
| <input type="checkbox"/> Trash / Recycling Containers | <input type="checkbox"/> Picnic Shelter    | <input type="checkbox"/> Kiosk         |
| <input type="checkbox"/> Message Board                | <input type="checkbox"/> Primitive Camping | <input type="checkbox"/> Warming Hut   |
| <input type="checkbox"/> Bike Rack                    | <input type="checkbox"/> Air Station       | <input type="checkbox"/> High Line     |
| <input type="checkbox"/> Hitch Rail                   | <input type="checkbox"/> Corral            | <input type="checkbox"/> Horse Stall   |
| <input type="checkbox"/> Watering Trough              | <input type="checkbox"/> Fire Ring         | <input type="checkbox"/> Picnic Table  |
| <input type="checkbox"/> Others, describe: _____      |  |  |

**Maintenance Requirements:** Identify the anticipated frequency for completing routine maintenance tasks

Routine Maintenance Schedule												
Maintenance Activity	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
EXAMPLE- Mowing	/	/	•	••••	••••	••••	••••	••••	••••	••••	•••	/
Mowing												
Trimming												
Trash												
Pruning												
Weeding												
Invasive Removal												
Brush Hog												
Signs - inspect/repair/replace												
Blazes - inspect/re-paint												
Fence - inspect/repair/replace												
Culverts - inspect/repair/replace												
Storm Drains - inspect/repair/replace												
Gates - inspect/repair/replace												
Bridge - inspect/repair/replace												
Maintain Dips												
Grade Ditches												
Trail Grooming												
Trail Surfacing												
Landscaping												
Storm Damage												
Vandalism												
Repair Washouts												

Special Considerations	Notes

Prepared by \_\_\_\_\_ Date \_\_\_\_\_

# E: TRAIL ASSESSMENT FORM

## Trail Assessment Form

**Trail Name** \_\_\_\_\_ *Begin Segment* \_\_\_\_\_ identified by mileposts   
*Location* \_\_\_\_\_ *End Segment* \_\_\_\_\_ or coordinates   
*County* \_\_\_\_\_ *Total Trail Length* \_\_\_\_\_ *Segment Length* \_\_\_\_\_  
*Conducted by* \_\_\_\_\_ *Date* \_\_\_\_\_

page 1 of 3

**Designed Use**  Hike / Pedestrian  Bike  Mountain Bike  Equestrian  
 Cross Country Ski  Snowshoe  ATV  Snowmobile  
 Others, \_\_\_\_\_

**Level of Difficulty**  Easiest  More Difficult  Most Difficult

**Trailheads & Access Points** *Name* \_\_\_\_\_ *Location* \_\_\_\_\_ identified by milepost   
*Latitude N* \_\_\_\_\_ or coordinates   
*Longitude W* \_\_\_\_\_

**Notes**

**Trail Tread / Surface** *Condition*  Good  Fair  Poor  Needs Improvement

*Materials* \_\_\_\_\_ *Average Width* \_\_\_\_\_, min. \_\_\_\_\_, max. \_\_\_\_\_

*Grade* \_\_\_\_\_% *Cross Slope* \_\_\_\_\_%

**Notes**

**Drainage**  Drains properly  Draining onto or across trail surface  
 Water staying on trail  Needs drainage structure

**Bridges and Culverts**  Good  Fair  Poor  Cleanout

**Dips**  Good  Fair  Poor  Cleanout

**Notes**

### Road / Railroad Crossings

*Condition*  Good  Fair  Poor  Needs improvement

*Sight Lines*  Good  Fair  Need to prune  Unsafe

*Accessible (Note Exceptions)* \_\_\_\_\_

**Notes**



## Trail Assessment Form

**Trail Name** \_\_\_\_\_ *Begin Segment* \_\_\_\_\_ identified by mileposts   
*Location* \_\_\_\_\_ *End Segment* \_\_\_\_\_ or coordinates   
*County* \_\_\_\_\_ *Total Trail Length* \_\_\_\_\_ *Segment Length* \_\_\_\_\_  
*Conducted by* \_\_\_\_\_ *Date* \_\_\_\_\_

page 2 of 3

**Adjacent Land Uses (Check all that apply)**

Forest      Farm      Residential  Commercial      Industrial      Encroachment

**Notes**

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**Historical and Other Structures**

*Condition*      Good      Fair      Poor      Needs Improvement  
 Needs to be replaced      Needs to be cleared out

**Notes**

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**Signage (includes trailhead and reassurance markings, blazes, etc.)**

*Blaze / Marking Color or Style* \_\_\_\_\_

<i>Overall Condition</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Regulatory</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Wayfinding</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Interpretive</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Wooden / Routed</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Reassurance Markings</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Intersections</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Pavement Markings</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance
<i>Others (fiberglass, etc.)</i>	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Lacking	<input type="checkbox"/> Needs Maintenance

*Replace Signs:*

**Notes**

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## Trail Assessment Form

**Trail Name** \_\_\_\_\_ *Begin Segment* \_\_\_\_\_ identified by mileposts   
*Location* \_\_\_\_\_ *End Segment* \_\_\_\_\_ or coordinates   
*County* \_\_\_\_\_ *Total Trail Length* \_\_\_\_\_ *Segment Length* \_\_\_\_\_  
*Conducted by* \_\_\_\_\_ *Date* \_\_\_\_\_

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page 3 of 3

**Other Notes and Summary**

Please return this form to

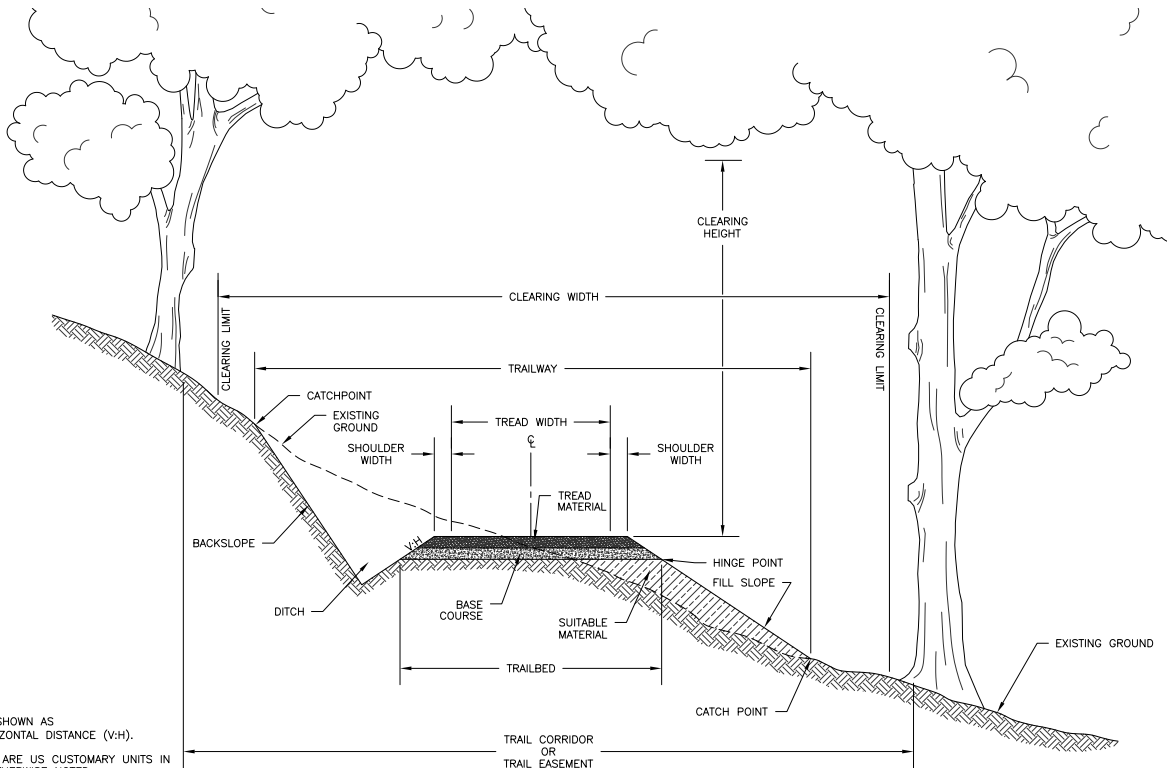
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# F: TYPICAL TRAIL DETAILS

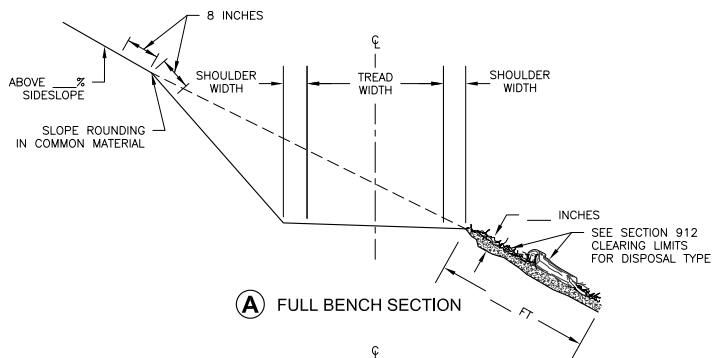
## TRAIL TERMS



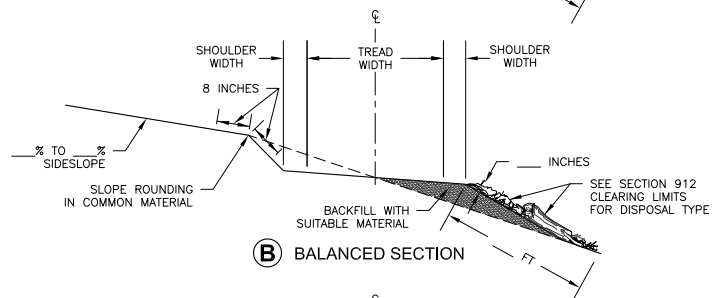
NOTES:  
 ALL SLOPES ARE SHOWN AS VERTICAL-TO-HORIZONTAL DISTANCE (V:H).  
 ALL UNITS SHOWN ARE US CUSTOMARY UNITS IN INCHES UNLESS OTHERWISE NOTED.

## TRAIL CROSS SECTIONS

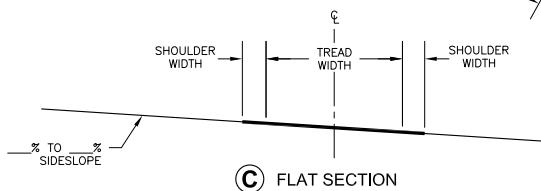
TYPICAL TRAIL CROSS SECTIONS



**(A) FULL BENCH SECTION**



**(B) BALANCED SECTION**



**(C) FLAT SECTION**

TYPICAL TRAIL TREAD AND SHOULDER WIDTH

TYPICAL ID	SECTION TYPE	TREAD FINISH	TREAD WIDTH	SHOULDER WIDTH		COMMENTS
				UPHILL	DOWNHILL	
TSF-1		T				

TREAD CROSS SLOPE

TYPICAL ID	OUTSLOPE	INSLOPE	CROWNED SECTION	COMMENTS
	%	%	%	

SLOPE AND TRAILBED FINISH

TREAD FINISH	ROOTS	LOOSE ROCK	EMBEDDED ROCK	COMMENTS
T1				
T2				
T3				
T4				
T5				
T6				

TRAILBED AND SLOPE FINISH

**SLOPE FINISH**  
 REMOVE ROOTS THAT PROTRUDE FROM THE BACKSLOPE WITH DIAMETERS GREATER THAN SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

**TRAILBED FINISH**  
 REMOVE LOOSE ROCK ON THE TRAILBED WITH A DIMENSION GREATER THAN SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

REMOVE OR REDUCE EMBEDDED ROCK THAT PROTRUDES MORE THAN THE DIMENSIONS SHOWN IN THE SLOPE AND TRAILBED FINISH TABLE.

NOTES:

- SLASH CONSISTS OF LOGS, LIMBS, BRUSH, AND ROCKS PLACED RANDOMLY IN A WAY TO CATCH SEDIMENT MOVEMENT.
- LIMB ALL TREES AND SHRUBS AND TAMP SLASH INTO GROUND SO THAT 80% OF SLASH IS IN CONTACT WITH THE GROUND.



# SWITCHBACK TYPE 1

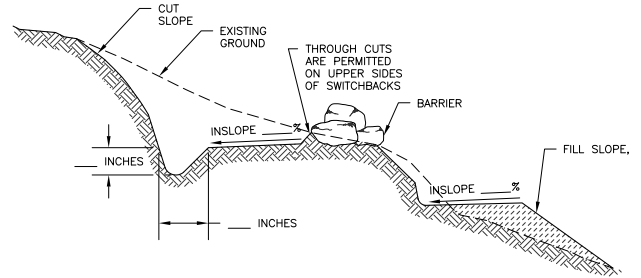
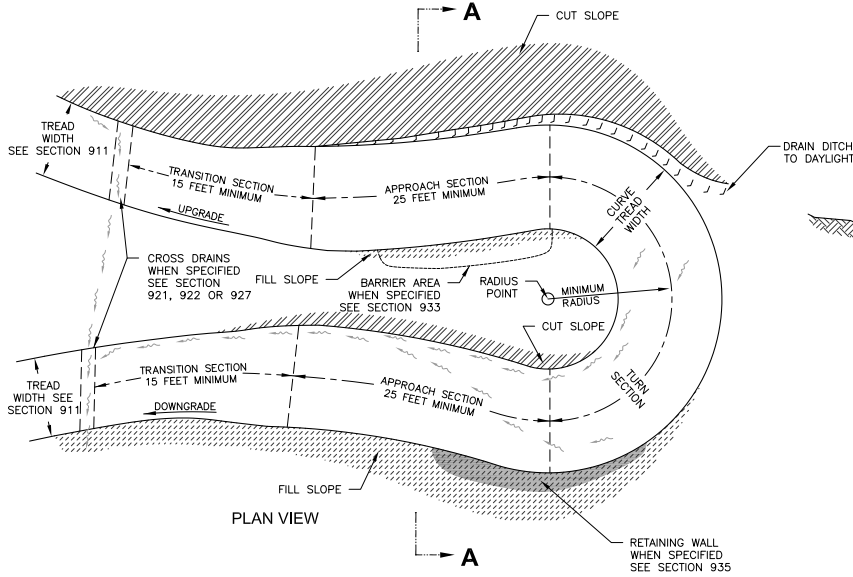
TYPE 1 RADIUS SWITCHBACK SECTIONS

TYPICAL ID	MINIMUM RADIUS	CURVE TREAD WIDTH	BARRIER TYPE	RETAINING WALL TYPE	CROSS DRAINS	COMMENTS
SW1-1						

N/A WHEN NOT APPLICABLE

NOTES:

1. CONSTRUCT CONSTANT GRADE THROUGH BOTH APPROACH SECTIONS AND TURN SECTION.
2. RADIUS POINT AND CENTERLINE OF SWITCHBACK AS STAKED ON THE GROUND.



SECTION A-A

# SWITCHBACK TYPE 1

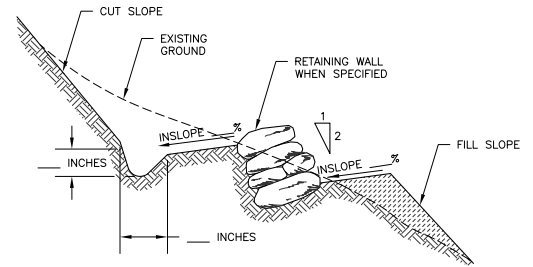
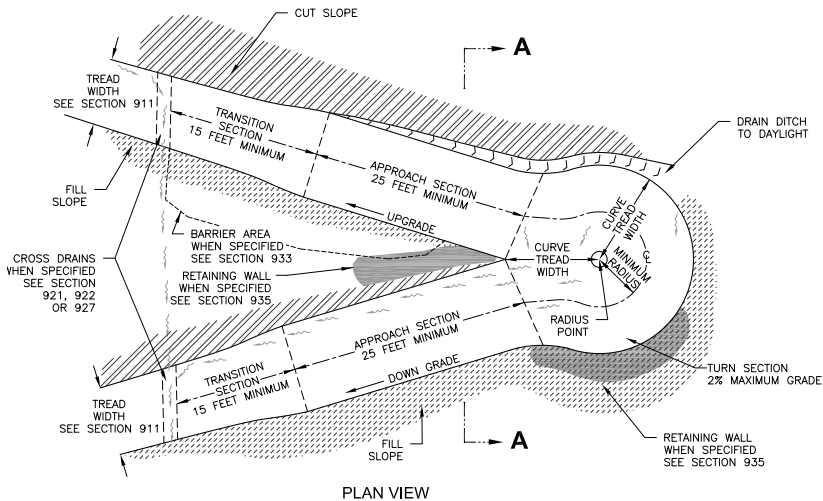
TYPE 2 CIRCULAR LANDING SWITCHBACK SECTIONS

TYPICAL ID	MINIMUM RADIUS	CURVE TREAD WIDTH	BARRIER TYPE	RETAINING WALL TYPE	CROSS DRAINS	COMMENTS
SW2-1						

N/A WHEN NOT SPECIFIED

NOTE:

1. RADIUS POINT AND CENTERLINE OF SWITCHBACK AS STAKED ON THE GROUND.



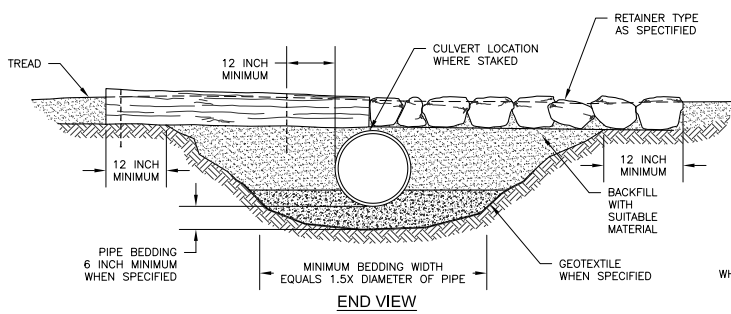
SECTION A-A

# CULVERTS

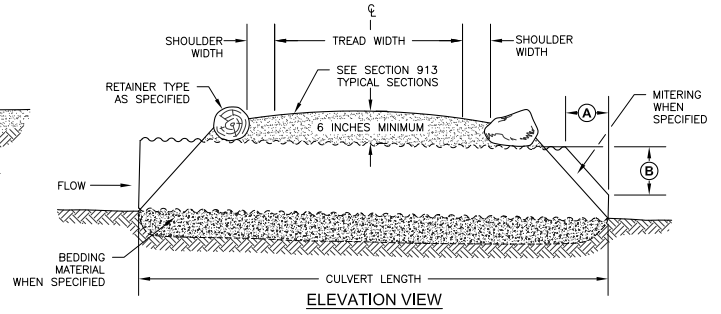
## STANDARD CULVERT

TYPICAL ID	GEOTEXTILE TYPE	BEDDING		CULVERT		RETAINER*	COMMENTS
		TYPE	TYPE	MITERING (A)	(B)	TYPE	
SCV-1		B	C			R	

N/A WHEN NOT APPLICABLE  
\*FOR TYPICAL RETAINERS SEE SHEET STD\_911-03



END VIEW



ELEVATION VIEW

### CULVERT TYPE

TYPE	MATERIAL	COMMENTS
C1	CMP - GALV	
C2	HDPE	
C3	PLASTIC	
C4	ALUMINUM	
C5	CONCRETE	
C6		

- NOTE:
1. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
  2. NO ROCKS LARGER THAN 1 1/2 INCHES WITHIN 12 INCHES OF PIPE.

### BEDDING MATERIAL TYPE

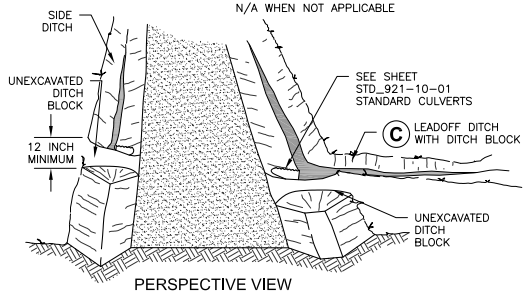
TYPE	MATERIAL	GRADATION	COMMENTS
B1	PITRUN		
B2	AGGREGATE		
B3			

# DITCH SECTIONS

## TYPICAL DITCH SECTIONS

TYPICAL ID	DITCH TYPE	GEOTEXTILE TYPE	DITCH DIMENSIONS (INCHES)					LINING MATERIAL		DITCH BLOCK		COMMENTS	
			(D)	(E)	(F)	(G)	(H)	(J)	TYPE	SPACING (FEET)	MATERIAL		DITCH BLOCK LT   RT
TDS-1											DL		

N/A WHEN NOT APPLICABLE



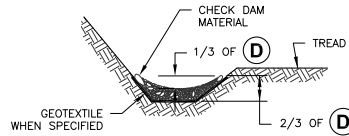
PERSPECTIVE VIEW

### DITCH LINING OR CHECK DAM MATERIAL

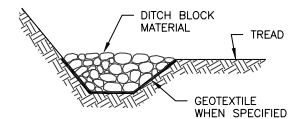
TYPE	MATERIAL	GRADATION	COMMENTS
DL1	GRAVEL		
DL2	ROCK		
DL3			

### LEAD OFF DITCH/ CHECK DAM SPACING

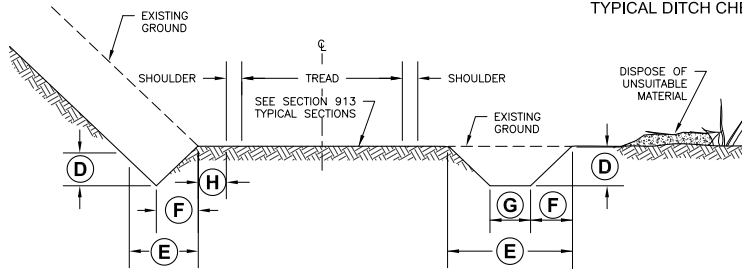
DRAINAGE GRADE	DRAINAGE SPACING (FEET)
<3	OCCASIONAL
3-7	60
8-12	30
>12	18



TYPICAL DITCH CHECK DAM SECTION

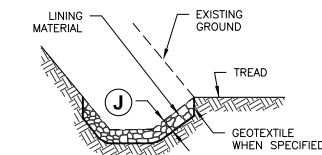


TYPICAL DITCH BLOCK SECTION



(A) "V" DITCH SECTION

(B) FLAT BOTTOM DITCH SECTION

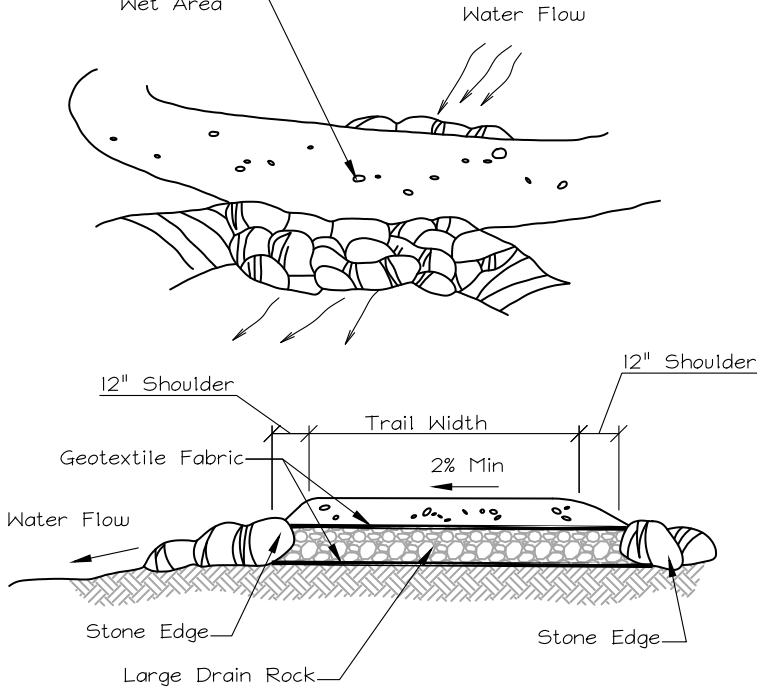


TYPICAL LINED DITCH SECTION

- NOTES:
1. LEAD-OFF DITCHES SHALL UTILIZE AS MUCH NATURAL DRAINAGE AS POSSIBLE.
  2. LEAD-OFF DITCH SHALL DRAIN TO DAYLIGHT.

# DRAINAGE LENS

Raise and Level Trail and Widen at Wet Area

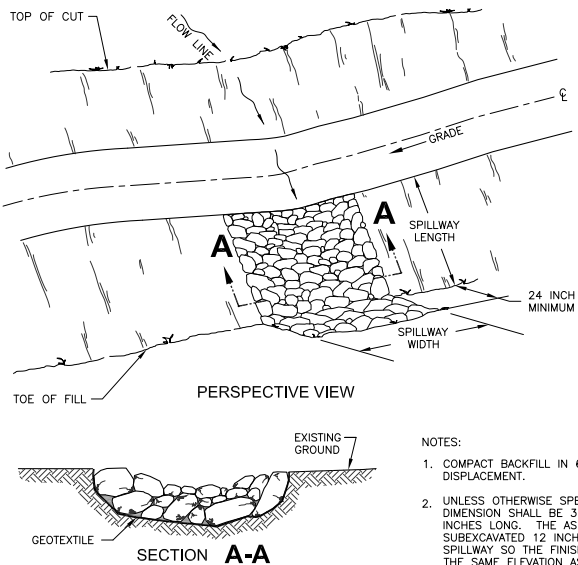


# SPILLWAY

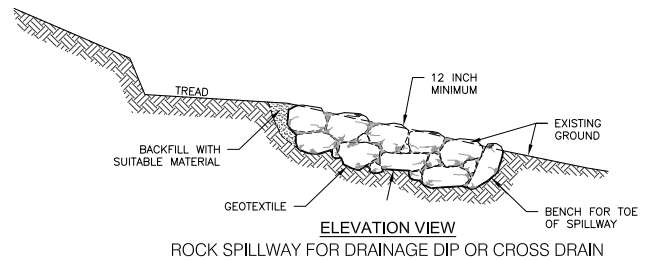
## ROCK SPILLWAY

TYPICAL ID	SPILLWAY WIDTH	SPILLWAY LENGTH	GEOTEXTILE TYPE	MINIMUM ROCK SIZE (LBS)	MAXIMUM ROCK SIZE (LBS)	RETAINER* TYPE	COMMENTS
RSP-1						R	

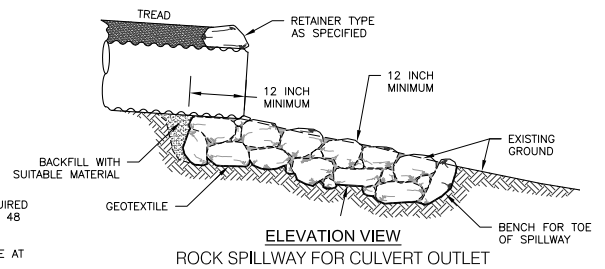
N/A WHEN NOT APPLICABLE  
\*FOR TYPICAL RETAINERS SEE SHEET STD\_911-03



- NOTES:
1. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
  2. UNLESS OTHERWISE SPECIFIED WHEN ROCK SPILLWAY IS REQUIRED DIMENSION SHALL BE 36 INCHES WIDE X 12 INCHES DEEP X 48 INCHES LONG. THE AS BUILT FILL SLOPE SHALL BE SUBEXCAVATED 12 INCHES PRIOR TO PLACEMENT OF THE SPILLWAY SO THE FINISHED SURFACE OF THE RIPRAP WILL BE AT THE SAME ELEVATION AS THE ADJACENT SLOPE.



ELEVATION VIEW  
ROCK SPILLWAY FOR DRAINAGE DIP OR CROSS DRAIN



ELEVATION VIEW  
ROCK SPILLWAY FOR CULVERT OUTLET



# TURNPIKE TYPE 1

## TYPE 1 - STANDARD TURNPIKE

TYPICAL ID	GEOTEXTILE TYPE	RETAINER*		DITCH				COMMENTS
		TYPE	TYPE	LOCATION		DIMENSIONS (INCHES)		
				LT	RT	D	E	
TPK-1	G	R						

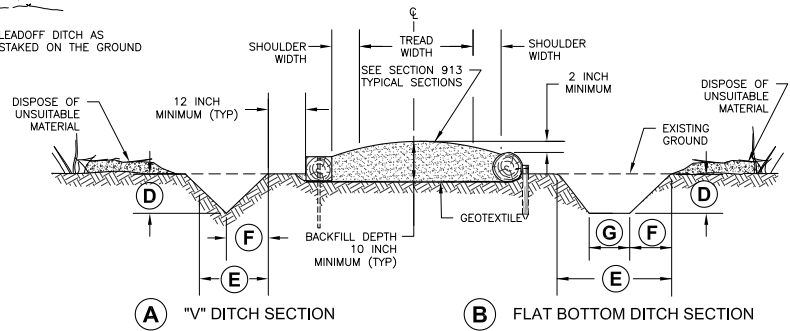
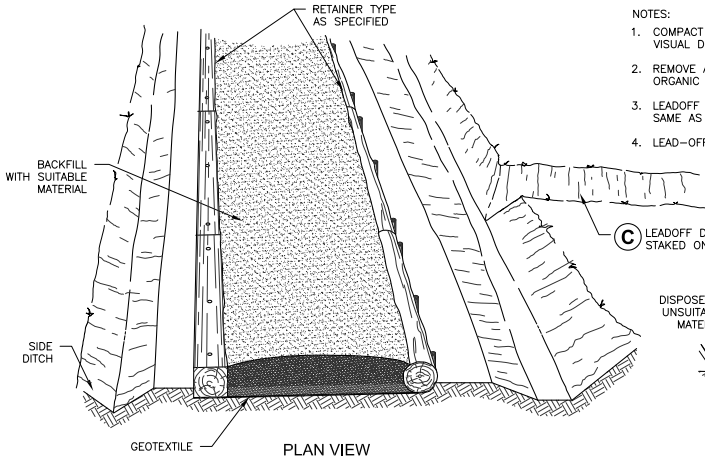
N/A WHEN NOT APPLICABLE  
\*FOR TYPICAL RETAINERS SEE SHEET STD\_911-03

### GEOTEXTILE TYPE

TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	
G3		

### NOTES:

1. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
2. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
3. LEADOFF DITCH TO BE CONSTRUCTED THE SAME AS SIDE DITCHES.
4. LEAD-OFF DITCH TO DRAIN TO DAYLIGHT.



TYPICAL CROSS SECTION

# TURNPIKE TYPE 2

## TYPE 2 - STANDARD TURNPIKE WITH FOUNDATION

TYPICAL ID	GEOTEXTILE			RETAINER*		DITCH				FOUNDATION**	COMMENTS
	TYPE	TOP	BTM	TYPE	TYPE	LOCATION		DIMENSIONS (INCHES)		TYPE	
						LT	RT	D	E		
TPF-1	G			R						FD	

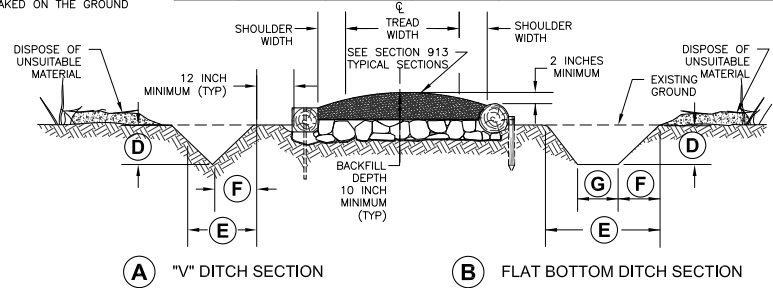
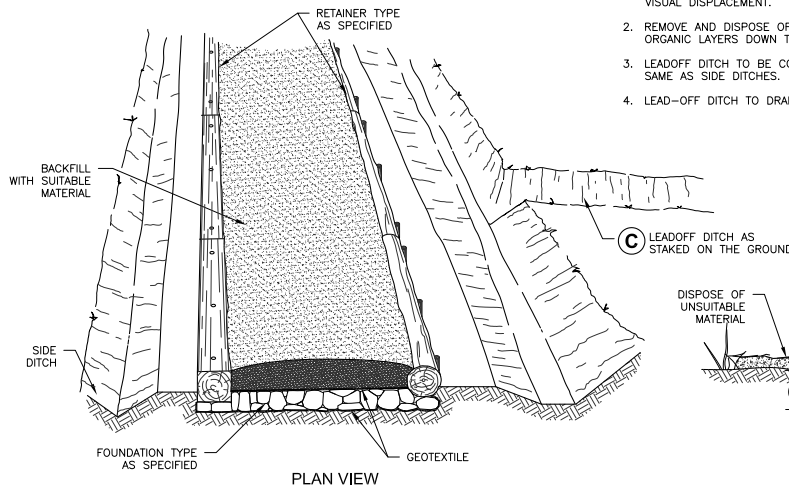
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\*FOR TYPICAL RETAINERS SEE SHEET STD\_911-03  
\*\*FOR FOUNDATIONS SEE SECTION STD\_918

### GEOTEXTILE TYPE

TYPE	MATERIAL	COMMENTS
G1	NON-WOVEN	
G2	WOVEN	
G3		

### NOTES:

1. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
2. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
3. LEADOFF DITCH TO BE CONSTRUCTED THE SAME AS SIDE DITCHES.
4. LEAD-OFF DITCH TO DRAIN TO DAYLIGHT.



TYPICAL CROSS SECTION

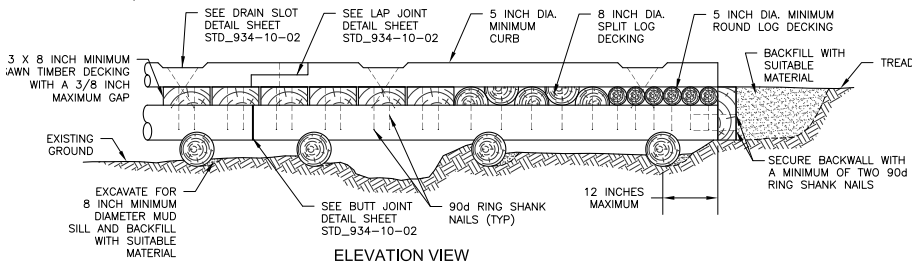
### IN-FILL MATERIAL TYPE

TYPE	MATERIAL	ROCK SIZE	GRADATION %	COMMENTS
FD1	AGGREGATE	1 INCH MINUS		
FD2	COARSE ROCK	4 TO 6 INCH		
FD3	HEAVY ROCK	8 INCH +		
FD4				

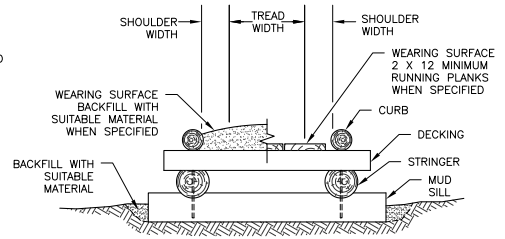
## STANDARD PUNCHEON

TYPICAL ID	STRINGER/MUD SILL				DECK/BACKWALL				CURB			WEARING SURFACE				COMMENTS
	SIZE	SPECIES	NUMBER	PRESERV. TYPE	TYPE	SIZE	SPECIES	PRESERV. TYPE	SIZE	SPECIES	PRESERV. TYPE	TYPE	SIZE	SPECIES	PRESERV. TYPE	
SP1-1				P				P			P					

N/A WHEN NOT APPLICABLE

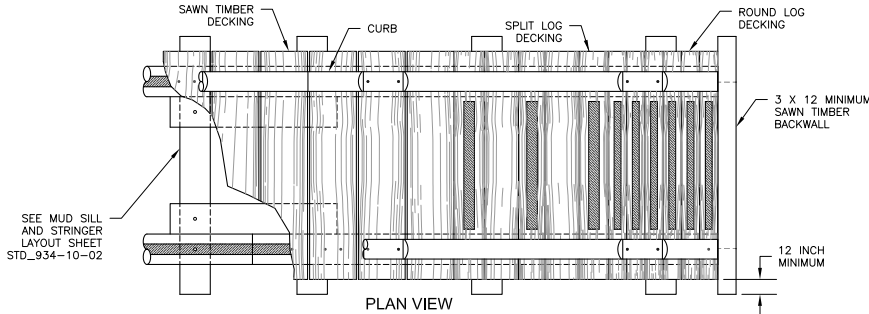


ELEVATION VIEW



TYPICAL SECTION

- NOTES:
- PRE-DRILL HOLES FOR FASTENERS TO PREVENT SPLITTING OF LOGS OR SAWN TIMBERS.
  - RECESS END OF REBAR 1/2 INCH BELOW TOP OF STRINGERS.
  - COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
  - ALL FIELD DRILLED HOLES AND CUTS SHALL BE FIELD TREATED.
  - FINAL DECK ELEVATION FOR RUNNING PLANKS OR DECKING SHALL BE NO MORE THAN 1/2 INCH DIFFERENCE IN ELEVATION.

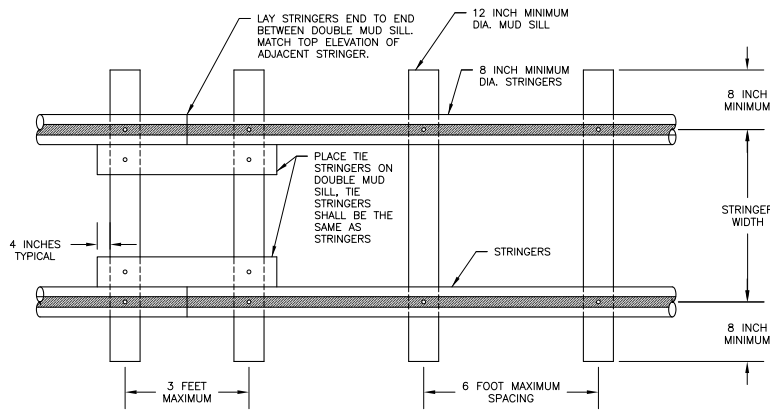


PLAN VIEW

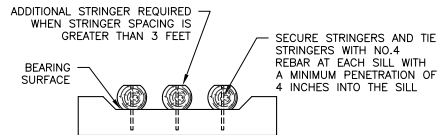
PRESERVATIVE TREATMENT - (REFER TO AWPA USE CATEGORY SYSTEM)			
PRESERVATIVE TYPE	TREATMENT TYPE	USE CATEGORY	COMMENTS
P1	WB	UC4A	
P2	WB	UC3B	
P3			

TREATMENT TYPE	USE CATEGORY
WB = WATERBORNE	UC3B = ABOVE GROUND - EXPOSED
OT = OIL-BORNE	UC4A = GROUND CONTACT - GENERAL USE
	UC4B = GROUND CONTACT - HEAVY DUTY

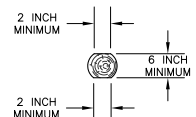
SHEET 1 OF 2



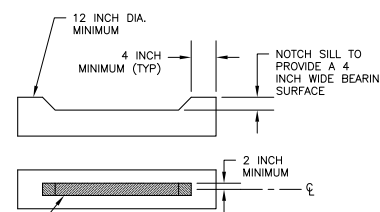
MUD SILL AND STRINGER LAYOUT



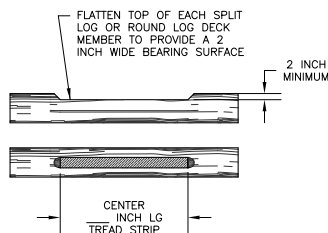
MUD SILL AND STRINGER LAYOUT



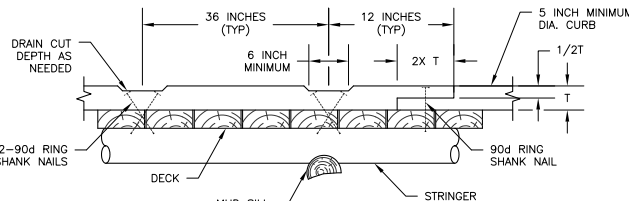
LOG STRINGER DETAIL



MUD SILL DETAIL



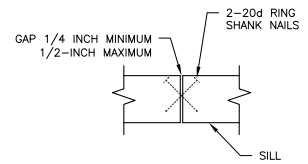
TREAD STRIP DETAIL



DRAIN SLOT DETAIL

TYPICAL LAP JOINT

T = THICKNESS OF RETAINER



TYPICAL BUTT JOINT

SHEET 2 OF 2

# PUNCHEON WITHOUT DECKING

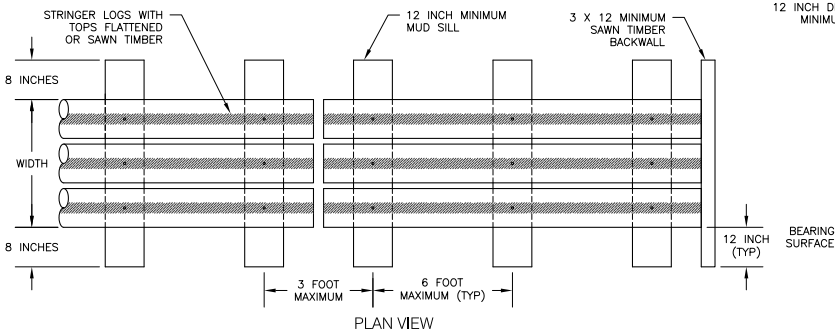
## PUNCHEON WITHOUT DECKING

TYPICAL ID	WIDTH	MUD SILL		STRINGER			BACKWALL		COMMENTS
		SPECIES	PRESERV. TYPE	TYPE	SIZE	PRESERV. TYPE	SIZE	PRESERV. TYPE	
NDP-1			P					P	

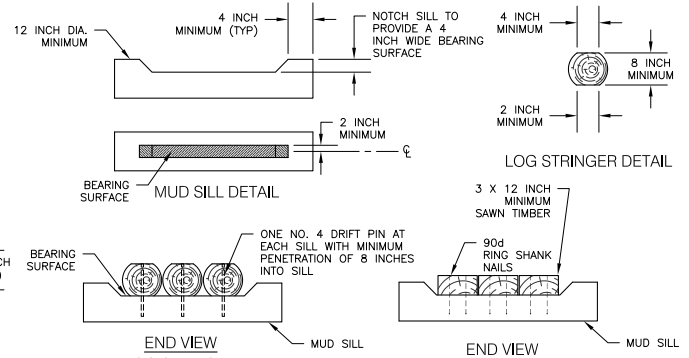
N/A WHEN NOT APPLICABLE

### NOTES:

1. PRE-DRILL HOLES FOR FASTENERS TO PREVENT SPLITTING OF LOGS OR SAWN TIMBERS.
2. RECESS END OF REBAR 1/2 INCH BELOW TOP OF STRINGERS.
3. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
4. ALL FIELD DRILLED HOLES AND CUTS SHALL BE FIELD TREATED.
5. FINAL DECK ELEVATION FOR RUNNING PLANKS OR DECKING SHALL BE NO MORE THAN 1/2 INCH DIFFERENCE IN ELEVATION.



PLAN VIEW

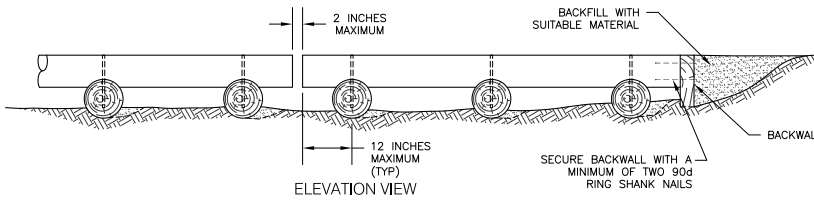


END VIEW LOG STRINGER

END VIEW SAWN TIMBER STRINGER

PLACE ROUND LOG STRINGERS AS CLOSE AS POSSIBLE WITH NO GAPS GREATER THAN 2 INCHES

PLACE SAWN TIMBER STRINGERS WITH A MAXIMUM GAP OF 3/8 INCH



ELEVATION VIEW

PRESERVATIVE TREATMENT - (REFER TO AWPA USE CATEGORY SYSTEM)			
PRESERVATIVE TYPE	TREATMENT TYPE	USE CATEGORY	COMMENTS
P1	WB	UC4A	
P2	WB	UC3B	
P3			

### TREATMENT TYPE

WB = WATERBORNE

OT = OIL-BORNE

### USE CATEGORY

UC3B = ABOVE GROUND - EXPOSED  
 UC4A = GROUND CONTACT - GENERAL USE  
 UC4B = GROUND CONTACT - HEAVY DUTY

# NATURAL FORD

## NATURAL FORD STRUCTURE

TYPICAL ID	FORD WIDTH	APPROACHES			SIDE RETAINERS*		MINIMUM ROCK SIZE			COMMENTS
		WIDTH	GRADE	SURFACE TYPE	SURFACE DEPTH	TYPE	SIZE	CHECK DAM*** TYPE	STEPPING ROCK (LBS)	
NFD-1				S		R				

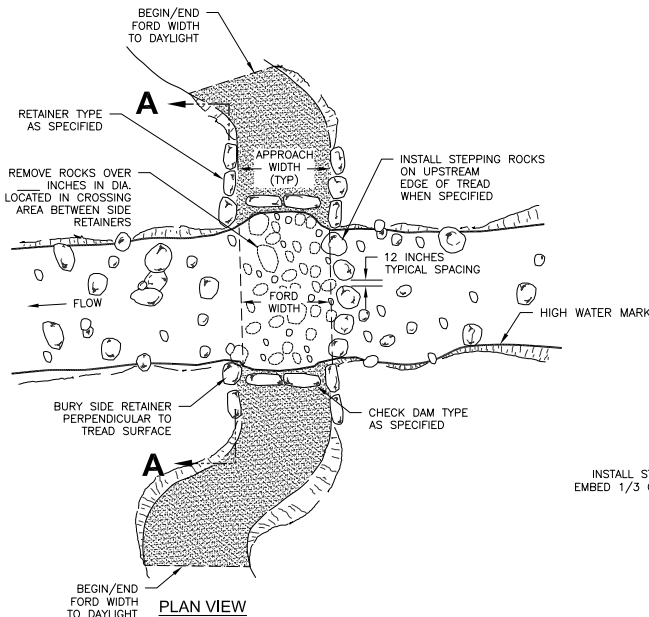
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\*FOR TYPICAL RETAINERS SEE SHEET STD\_911-03

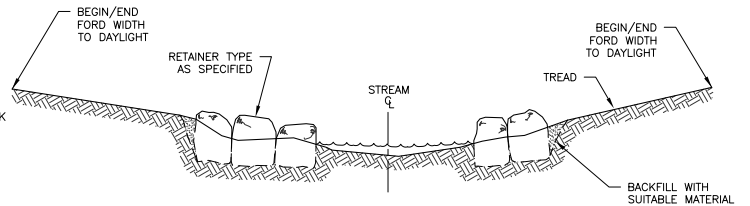
\*\*\*FOR CHECK DAM SEE SHEET STD\_928-01

### SURFACE COURSE MATERIAL TYPE

TYPE	MATERIAL	GRADATION	COMMENTS
S1	PITRUN		
S2	AGGREGATE		
S3	CLAY		
S4	WOODCHIPS		
S5			



PLAN VIEW



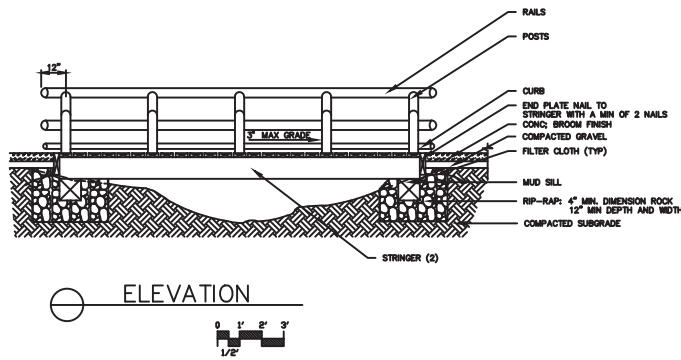
SECTION A-A



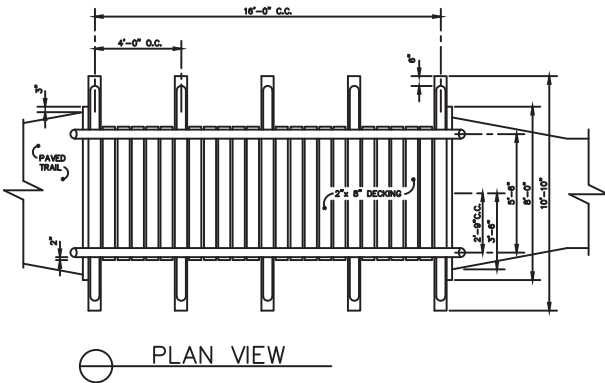
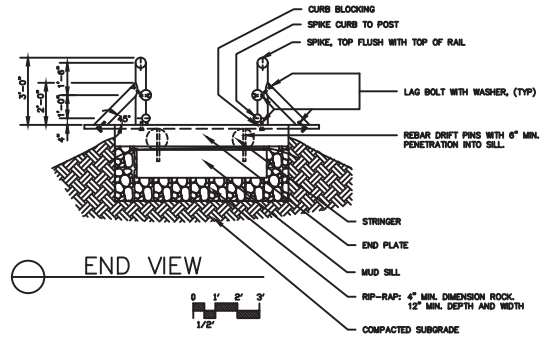
STEPPING ROCK DETAIL



# FOOT BRIDGE



INSERT FACTOR IS .04194 FOR ALL REBAR ON THIS DRAWING D-SIZE DRAWING WILL BE PLOTTED AT 1=1



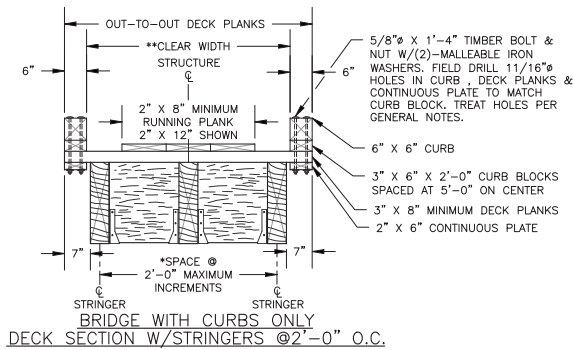
**GENERAL NOTES:**

1. ALL NATIVE MATERIAL SHALL BE SOUND AND FREE OF ROT AND OTHER DEFECT.
2. RAILINGS, POSTS, SUPPORTS AND CURBS SHALL BE CEDAR AND LEFT IN NATURAL COLOR.  
DECKING SHALL BE OF PRESSURE TREATED DOUG. FIR WITH OSMOSE-K-33, PRESERVATIVE TO 25 RETENTION. MUD SILLS & STRINGERS SHALL BE DOUG FIR PRESURE TREATED WITH OSMOSE K-33 PRESERVATIVE TO 25 RETENTION.
3. ALL HARDWARE TO BE HOT-DIPPED GALVANIZED AND WELL SEATED. HEADS OF NAILS, SPIKES AND LAG BOLTS SHALL BE RECESSED OR FLUSH WITH SURFACE OF WOOD.
4. EXPOSED ENDS OF ALL RUSTIC MATERIAL TO BE CHAMFERED FOR RUSTIC APPEARANCE.
5. FINISHED ELEVATION OF BRIDGE DECKING SHALL MATCH FINISHED ELEVATION OF PAVEMENT WITH MAX. SURFACE SLOPE OF 3%.

**\*\*IMPORTANT NOTE\*\***

THIS DRAWING IS ONLY AN IDEA CONSULT WITH ENGINEERS FOR SPECIFICATIONS.

# TIMBER STRINGER BRIDGE



**GENERAL NOTES:**

SPECIFICATIONS: MATERIALS AND CONSTRUCTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS (FP-03) AND STANDARD SPECIFICATIONS FOR CONSTRUCTION OF TRAILS AND TRAIL BRIDGES ON FEDERAL PROJECTS.

**TIMBER & LUMBER:** SOLID SAWN TIMBER MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF THE GRADING RULES AGENCY FOR THE SPECIES, TYPE, AND GRADE SPECIFIED BELOW.

- DECK PLANKS, CURBS, SILLS, & BACKING PLANKS
  - COASTAL REGION DOUGLAS FIR-LARCH ROUGH SAWN NO.1 GRADE, GRADING RULES AGENCY - WHPA, WCLB
- RUNNING PLANKS
  - COASTAL REGION DOUGLAS FIR-LARCH ROUGH SAWN NO.2 GRADE, GRADING RULES AGENCY - WHPA, WCLB
- RAILS & POSTS (SEE PROJECT CRITERIA)
  - UNTREATED
    - REDWOOD, S4S, NO.1 GRADE GRADING RULES AGENCY - RIS
    - WESTERN RED CEDAR, S4S, SELECT STRUCTURAL GRADE GRADING RULES AGENCY - WHPA, WCLB
  - TREATED
    - HEM-FIR/DOUGLAS FIR, S4S, NO.1 GRADE GRADING RULES AGENCY - WHPA, WCLB

**TREATMENT:** SEE PROJECT CRITERIA FOR MEMBERS IDENTIFIED TO BE TREATED AND FOR TREATMENT TYPE. PRESERVATIVE TREATMENT SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN WOOD PROTECTION ASSOCIATION (AWPA) SPECIFICATIONS USING THE TREATMENT MATERIALS LISTED BELOW. TREATMENT WILL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF WESTERN WOOD PRESERVERS INSTITUTE (WWPI) "BEST MANAGEMENT PRACTICES FOR THE USE OF TREATED WOOD IN AQUATIC ENVIRONMENTS".

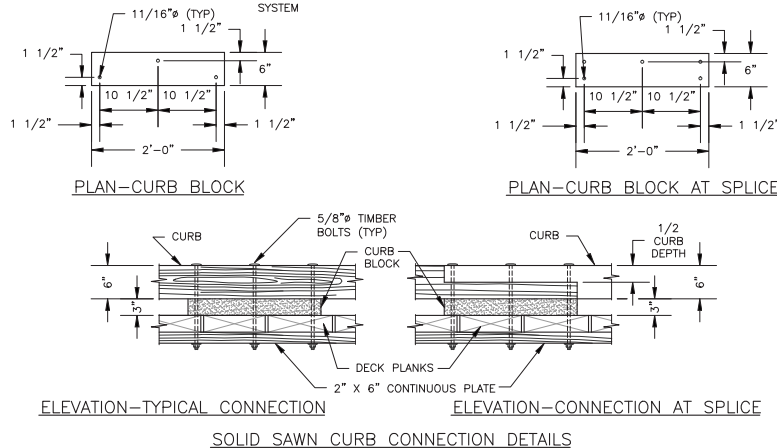
- STRINGERS, DECKING, RUNNING PLANKS, & RAILING SYSTEM, IF TREATED
  - AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 3B ABOVE GROUND-EXPOSED (UC3B)
  - PENTACHLOROPHENOL IN LIGHT OIL (TYPE C SOLVENT)
  - COPPER NAPHTHENATE (CuN) IN LIGHT OIL (TYPE C SOLVENT)
- SILLS, BACKING PLANKS, CRIBS, & TIMBER WALLS, IF TREATED
  - AWPA USE CATEGORY SYSTEM (U1) FOR USE CATEGORY 4B GROUND CONTACT-HEAVY DUTY (UC4B)
  - PENTACHLOROPHENOL IN HEAVY OIL (TYPE A SOLVENT)
  - COPPER NAPHTHENATE (CuN) IN HEAVY OIL (TYPE A SOLVENT)

**FIELD TREATMENT:** COPPER NAPHTHENATE (2% SOLUTION) SHALL BE FURNISHED FOR FIELD TREATING OF WOOD. ALL ABRASIONS AND FIELD CUTS -APPROVED BY THE C.O.R.- SHALL BE CAREFULLY TRIMMED AND GIVEN THREE BRUSH COATS OF THE FIELD TREATMENT SOLUTION. WHERE APPROVED FIELD DRILLING OF BOLT OR NAIL HOLES IS REQUIRED, THE HOLES SHALL BE FILLED WITH PRESERVATIVE PRIOR TO INSERTING THE FASTENERS.

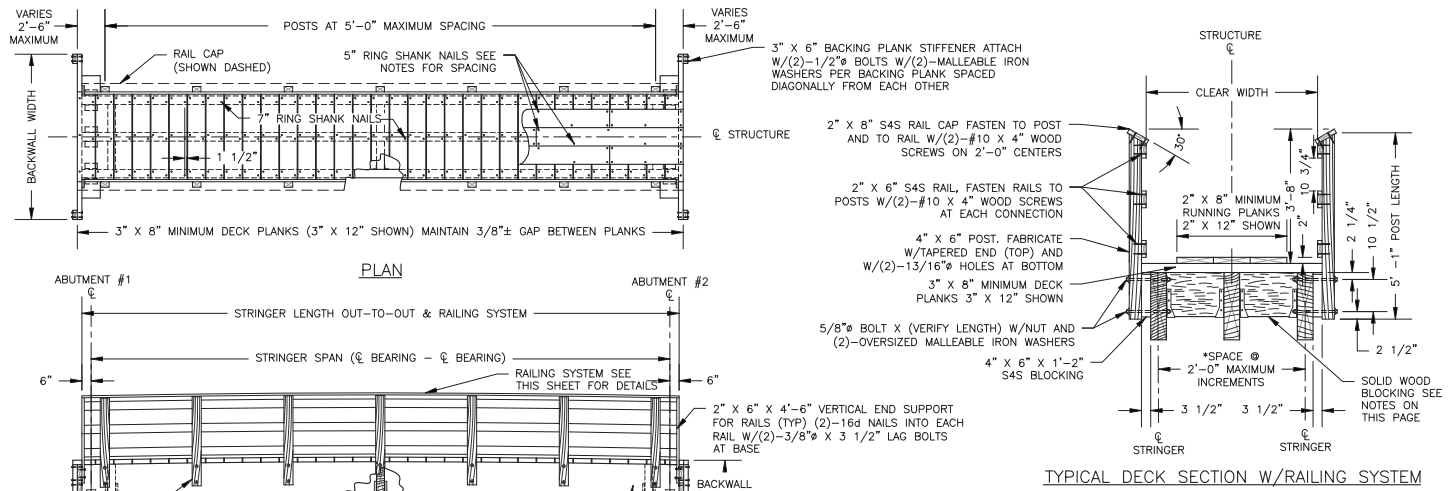
**HARDWARE AND STRUCTURAL STEEL:** SEE PROJECT DESIGN CRITERIA FOR STEEL HARDWARE FINISH. GALVANIZED OR UNFINISHED HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36, WITH NUTS AND BOLTS CONFORMING TO ASTM A307, GRADE A. WEATHERING STEEL AND HARDWARE SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 50W, WITH BOLTS AND NUTS CONFORMING TO ASTM A325, TYPE 3. USE MALLEABLE IRON WASHERS AGAINST WOOD UNLESS OTHERWISE NOTED.

WHEN STRUCTURAL STEEL IS TO BE WELDED, THE WELDING PROCEDURE SHALL BE IN ACCORDANCE WITH AWS D1.1 AND SHALL BE SUITABLE FOR THE GRADE OF STEEL AND INTENDED USE OR SERVICE.

**FABRICATION:** SUBMIT SHOP DRAWINGS FOR ALL BRIDGE COMPONENTS (EXCEPT TIMBER RUNNING PLANKS). SHOW ALL DIMENSIONS AND FABRICATION DETAILS FOR ALL CUT OR BORED TIMBER. FIELD DRILLING OF HOLES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED ON THE PLANS.



# TIMBER STRINGER BRIDGE DETAILS



### NOTES:

1. ALL DIMENSIONS IN TABLE-1 ARE NOMINAL (ROUGH SAWN). THE MINIMUM STRINGER DEPTH FOR BRIDGES WITH A PEDESTRIAN RAILING SYSTEM IS 15-INCHES. BRIDGES WITH STRINGER DEPTHS LESS THAN 15-INCHES SHALL HAVE CURBS ONLY. THE MINIMUM NUMBER OF STRINGERS IS THREE.
2. FASTEN DECK PLANKS TO STRINGERS WITH TWO ROWS 5/16-INCH DIAMETER X 7-INCH RING SHANK NAILS PER PLANK AT EACH STRINGER, ALTERNATE SIDES.
3. FASTEN RUNNING PLANKS TO DECK WITH 40d (5-INCH RING SHANK) NAILS AT 24-INCH SPACING, ALTERNATE SIDES WITH TWO AT EACH END.
4. PROVIDE A MINIMUM 1/2-INCH SPACE BETWEEN BLOCKING AND BACKWALL FOR AIR CIRCULATION.
5. SPLICE RAILS AT POSTS. RAILS SHALL BE CONTINUOUS FOR TWO POST SPACES. DO NOT LOCATE MORE THAN ONE RAIL SPLICE AT ANY ONE POST.
6. BRACING REQUIRED AT THE ENDS OF EACH MEMBER. THE BRACING SHALL BE THREE-QUARTERS TO FULL DEPTH AND PLACED WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING. BRACING REQUIRED AT MID-SPAN FOR SPANS OVER 20 FEET LONG.
7. WOOD BLOCKING SHALL BE BOLTED TO STRINGERS WITH STEEL ANGLES OR SUSPENDED IN STEEL HANGERS THAT ARE NAILED TO BLOCKS AND STRINGER SIDES

\*TABLE-1: SOLID SAWN STRINGER SIZE REQUIREMENTS - LRFD

**STRINGER SPAN (FEET)	TIMBER SPECIES - DOUGLAS FIR - LARCH GRADE - NO.1				
	DESIGN LOADING IN POUNDS PER SQUARE FOOT				
	PEDESTRIAN	LIVE LOAD	GROUND SNOW LOAD		
	***65	90	120	150	200
● 10	3" X 8"	3" X 10"	3" X 12"	4" X 10"	4" X 12"
● 15	4" X 10"	4" X 12"	4" X 14"	4" X 16"	5" X 12"
● 20	4" X 14"	6" X 12"	6" X 12"	6" X 14"	6" X 16"
● 25	6" X 14"	6" X 14"	6" X 16"	6" X 18"	6" X 20"
▲ 30	6" X 16"	6" X 18"	6" X 20"	6" X 20"	8" X 20"

- INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING
- ▲ INSTALL BRACING WITHIN A DISTANCE OF THE DEPTH OF THE BEAM FROM THE CENTERLINE OF BEARING & MID-SPAN
- \* STRINGER SIZE SHALL BE THE LARGER OF THE PEDESTRIAN OR GROUND SNOW LOAD SIZE REQUIRED FOR THE SITE CONDITIONS
- \*\* STRINGER LENGTH EQUAL TO STRINGER SPAN PLUS ONE FOOT
- \*\*\* REQUIRES REGIONAL BRIDGE ENGINEER APPROVAL

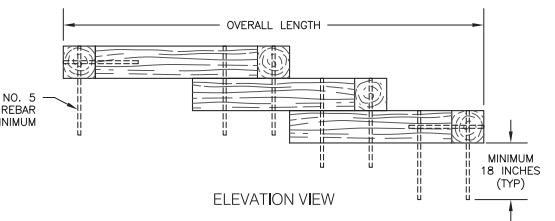
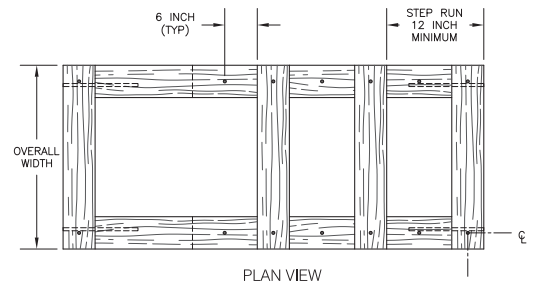
SHEET 2 OF 4

# TIMBER STEPS

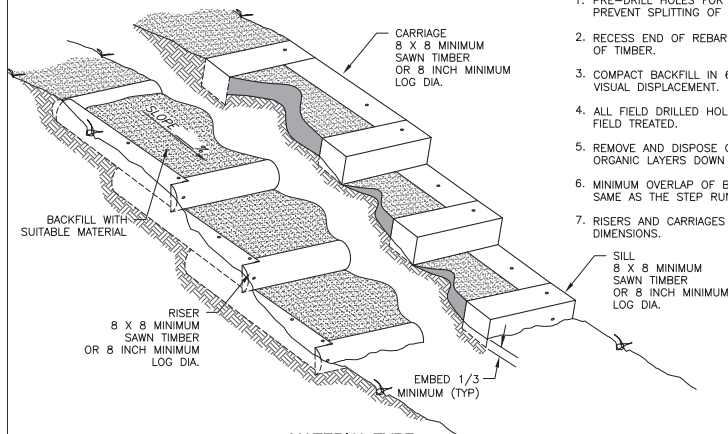
## OVERLAPPING TIMBER STEP

TYPICAL ID	MATERIAL TYPE	OVERALL LENGTH	OVERALL WIDTH	STEP RUN	COMMENTS
OTS-1	M				

N/A WHEN NOT APPLICABLE



- NOTES:
1. PRE-DRILL HOLES FOR REBAR AND PINS TO PREVENT SPLITTING OF LOGS OR SAWN TIMBERS.
  2. RECESS END OF REBAR 1/2 INCH BELOW TOP OF TIMBER.
  3. COMPACT BACKFILL IN 6 INCH LIFTS UNTIL NO VISUAL DISPLACEMENT.
  4. ALL FIELD DRILLED HOLES AND CUTS SHALL BE FIELD TREATED.
  5. REMOVE AND DISPOSE OF DUFF AND TOP ORGANIC LAYERS DOWN TO MINERAL SOIL.
  6. MINIMUM OVERLAP OF BOTTOM CARRIAGE IS THE SAME AS THE STEP RUN LENGTH.
  7. RISERS AND CARRIAGES SHALL BE THE SAME DIMENSIONS.



### MATERIAL TYPE

TYPE	MATERIAL	SIZE	SPECIES/GRADE	PRESERV. TYPE	COMMENTS
M1	LOG				
M2	SAWN TIMBER				
M3	RAIL ROAD TIES				
M4					

PRESERVATIVE TREATMENT - (REFER TO AWPA USE CATEGORY SYSTEM)			
PRESERVATIVE TYPE	TREATMENT TYPE	USE CATEGORY	COMMENTS
P1	WB	UC4A	
P2	WB	UC3B	
P3			

TREATMENT TYPE  
WB = WATERBORNE  
OT = OIL-BORNE

USE CATEGORY  
UC3B = ABOVE GROUND - EXPOSED  
UC4A = GROUND CONTACT - GENERAL USE  
UC4B = GROUND CONTACT - HEAVY DUTY

