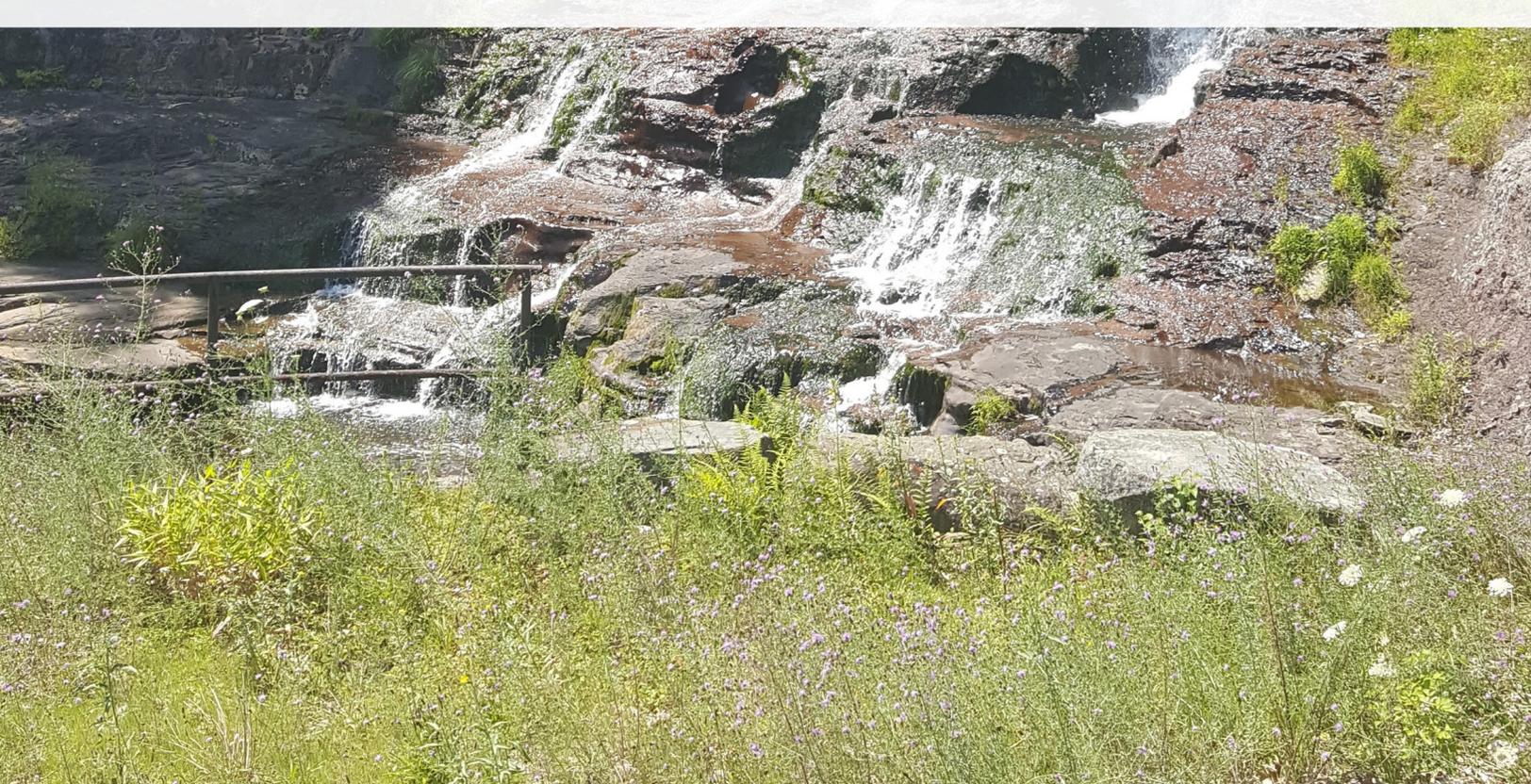




Engineering



ENGINEERING TASKS

As a part of this feasibility study, the project team analyzed and developed designs for areas of the trail that are considered “low-hanging fruit” for expanding and improving the trail. The trail elements that underwent design development were the Tomsco Falls Bridge, Fallsburg Tunnel, Neversink Bridge, and the Parksville-Livingston Manor Trail Segment. In addition to these specific trail needs, the project team also analyzed a gap in the trail in the Town of Rockland where the old rail alignment used to cross the Little Beaver Kill. The following information will include conceptual plans, illustrations, opinions of cost, and other details necessary to propel these projects towards construction.



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TOMSCO FALLS BRIDGE

THE PLAN

One large railroad bridge used to traverse the entire valley in the vicinity of Tomsco Falls. Instead of building another massive bridge, an alternative pathway with small bridges is proposed in its place. Tomsco Falls located just southeast of Mountindale exists on a 125.4-acre parcel with a grade change of approximately 170' from the top of the site behind the falls to the lower point of the Taylor Brook. The entire site has great potential to be utilized by future Sullivan O&W Rail Trail users because of the natural resources already in place. Cascading down the center of the site is the Tomsco Falls which empties into Taylor Brook that also traverses the site. Other natural features include forests, open spaces consisting of meadows and lawn, viewing areas, two buildings, and the former O&W rail alignment with remnants of the trestle bridge that used to cross overtop the site. Also on the other side of Spring Glen Road is the Sandburg Creek that is an excellent trout fishing stream. The 2016 New York State Open Space and Conservation Plan identified Tomsco Falls as a regional priority conservation project.

Tomsco Falls in the future could also serve as an ideal trailhead with amenities that may include restrooms, parking, picnic areas, interpretive signage, information kiosks, and viewing areas atop the falls and below the falls. For these reasons the proposed bridges seen in the plan are critical to the continuation of the Sullivan O&W Rail Trail from the southeast to the northwest of the site.

There are two bridges proposed in the plan shown on page 10-5. The first bridge to the south exists where there is a steep slope. This bridge would span a 24' gap and be 11' wide. For ADA accessibility, this bridge would not exceed a 5% slope. Another bridge is recommended to replace the existing bridge that is in disrepair. The next few pages of this document describe this proposed bridge in more detail.

From the southeast, the proposed trail alignment starts at elevation 918', turns west and climbs to as high as elevation 930' before going down to elevation 906' where the bridge connects with the original alignment across the falls at elevation 924'.



TOMSCO FALLS BRIDGE

CROSS SECTION

The following cross section illustrates the grade change between the north and south side of Taylor Brook, as well as and the location of the existing Tomsco Fall Bridge and two options for its replacement. The first proposed bridge option is approximately 36 feet long and 5 feet above the Taylor Brook below. The first bridge option utilizes the existing abutments. This option is only valid if the abutments prove to be stable and usable for the future bridge. The second proposed bridge option is approximately 48 feet long and 6 feet above Taylor Brook. This second option should be considered if the existing abutments prove to be unstable and unusable for a future bridge. Grading and a switchback trail design is necessary to meet ADA requirements (5% slope of less) on the north side of the bridge to ensure the path can succeed from the original O&W Rail Alignment to the proposed bridge over the Taylor Brook.

REGULATORY DESIGN AND APPROVAL REQUIREMENTS

- NYS ED-15-004
- NYSDOT Highway Design Manual Chapter 18 – Applies to work within DOT ROW and locally administered pedestrian Facilities
- US Access Board’s Accessibility Guidelines for work within the public ROW
- NYSDOT Regional director will designate staff for field review and technical assistance, “Regional ADA Specialists”
- No tolerance beyond ADA accepted values
- NYSDOT Bridge Inspection Manual (MARCH 2017), should be used as a guide for preliminary and final pedestrian Bridge design to ensure compliance with all applicable State and Federal regulations

RECOMMENDED TOPOGRAPHIC SURVEYS

- Recommend survey of corridor 100 feet in width – total acreage 3.3.

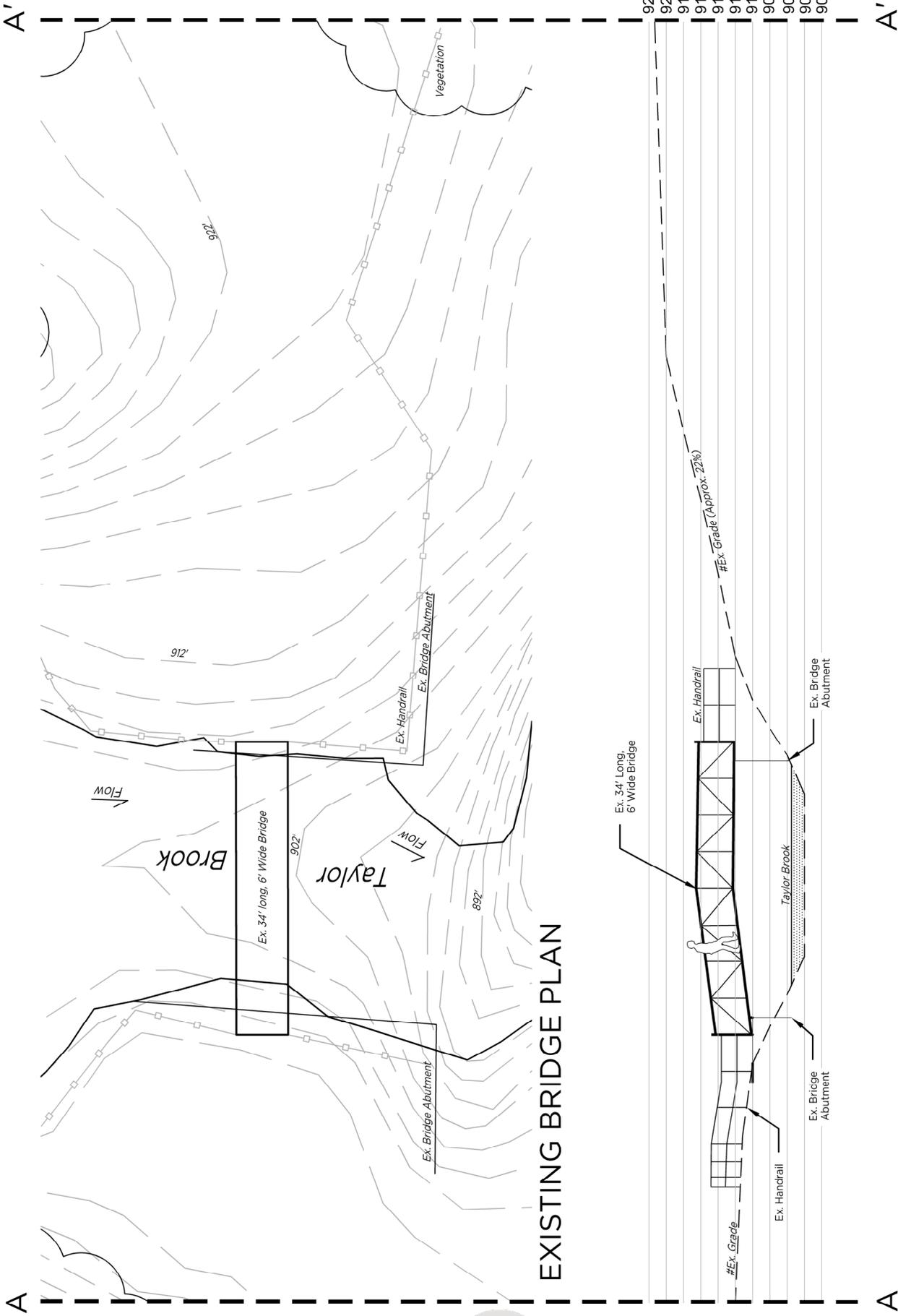
MATERIAL TESTING OF EXISTING ABUTMENTS

- Existing abutments should undergo final structural analysis and material testing prior to final design to ensure the qualities of the structures
- Subsurface (geotechnical investigation may be necessary in the event the existing structures are not suitable for reuse and are not repairable.

OPINION OF COST

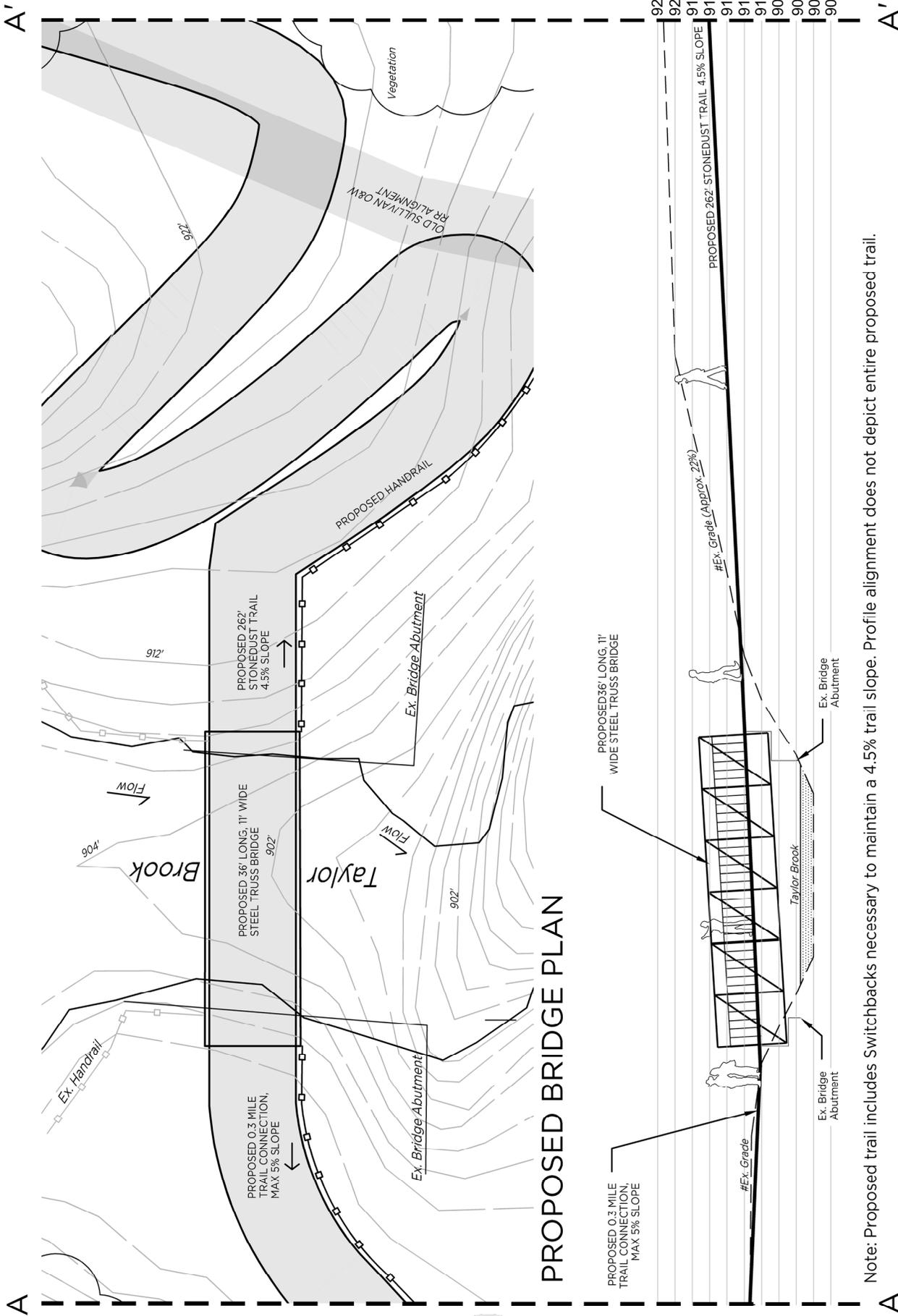
Costs for the proposed bridge structures varied depending upon the configuration of the options. Option A and option B ranged from \$89,000 and \$120,000. Additional fees are also associated with permitting, structural and civil engineering, construction and materials costs.





EXISTING BRIDGE
SECTION A-A'





PROPOSED BRIDGE PLAN

Note: Proposed trail includes Switchbacks necessary to maintain a 4.5% trail slope. Profile alignment does not depict entire proposed trail.

PROPOSED BRIDGE OPTION A: 36' LENGTH
SECTION A-A'



FALLSBURG TUNNEL

THE PLAN

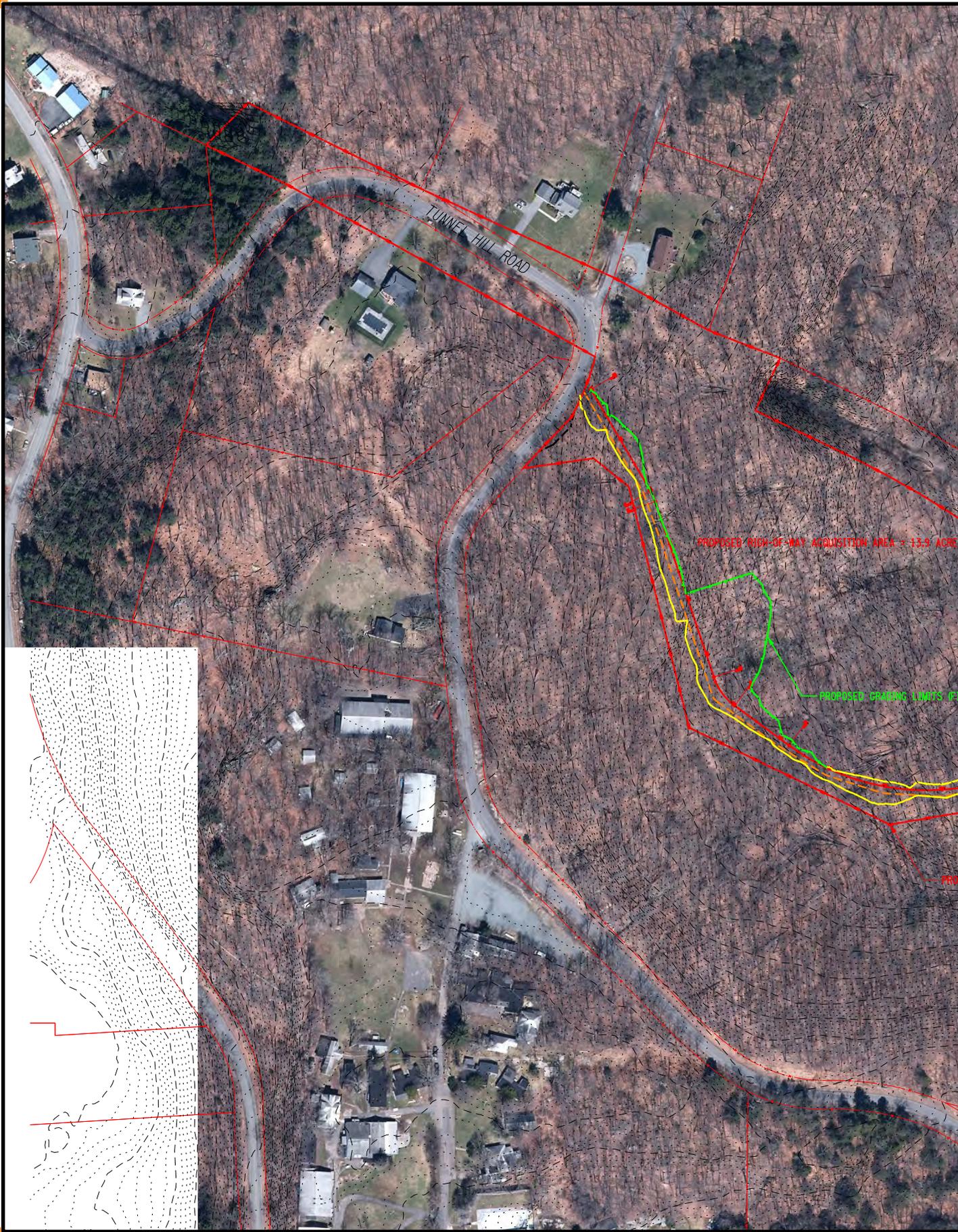
The Fallsburg Tunnel is located under Tunnel Hill Road and provides clear and level passage of the Sullivan O&W Rail Trail between the east and west sides of Tunnel Hill Road. Due to the poor existing condition of the structure and the estimated construction cost of approximately \$975,000 to repair the tunnel to a condition safe for passage, an alternative route plan was developed. This alternative will provide connectivity of the Sullivan O&W Rail Trail by bypassing the Fallsburg Tunnel before connecting to Tunnel Hill Road and the remaining on-road routes through Fallsburg.

The tunnel bypass consists of a one (1) mile section of trail will connect the existing on-road facilities in Fallsburg to the scenic Neversink River. This connection is the first phase of a two-phased approach to connect Fallsburg to the existing rail trail in Woodridge, NY. The second phase will include a bridge over the Neversink River (see p. 10-16) and will ultimately connect over 14 miles of connected trail in existence today. The 1-mile of trail will start on the east side of Tunnel Hill Road and wind it's way down the existing steep side slopes before reconnecting with the existing O&W rail alignment. Once the new trail has connected to the existing rail bed, it will continue east towards the Neversink River where a 90-foot long timber boardwalk and overlook area will provide views of the Neversink River corridor below. In addition to trail construction, tree clearing will be required as part of the project.



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Alta Planning + Design
 1801 6th Avenue
 Suite 204
 Troy, NY 12180

- Base map information was generated with publicly available aerial, topographic, and property line information.

NOT FOR CONSTRUCTION

Sullivan County

PROJECT OWNER

O&W Rail Trail

PROJECT

7/9/2019

DOCUMENT ISSUE

**Proposed O&W Rail Trail
 Neversink Connection
 Concept**

SHEET TITLE

GNP-1

SHEET NUMBER



FALLSBURG TUNNEL

CROSS SECTION

The following cross section illustrates the proposed timber boardwalk, overlook, and future connection to the Neversink River bridge. The 90-foot-long timber boardwalk will open to an overlook viewing area at the existing Neversink River bridge abutments. Leading up to the boardwalk, the proposed trail will include the construction of a 10-foot-wide stone-dust path with 2-foot-wide grass shoulders. The stone-dust path will be comprised of 6" of subbase and 2" of trail stone dust. The timber boardwalk will have a 12-foot-wide clear width and will be constructed of pressure treated timber supported on helical piles to minimize existing ground disturbance. For increased ease of use, a gravel parking area for two (2) vehicles will be provided for occasional visitors on the east side of Tunnel Hill Road.

REGULATORY DESIGN AND APPROVAL REQUIREMENTS

- NYSDEC Protection of Waters Program
- DEC Permit
- Possible U.S. Army Corps of engineers permits
- Joint Application Form
- SEQR – State Environmental Quality Review Act
- Environmental Assessment Form
- SAAF – Structural / Archaeological Assessment Form
- Cultural resource survey and field study might be necessary

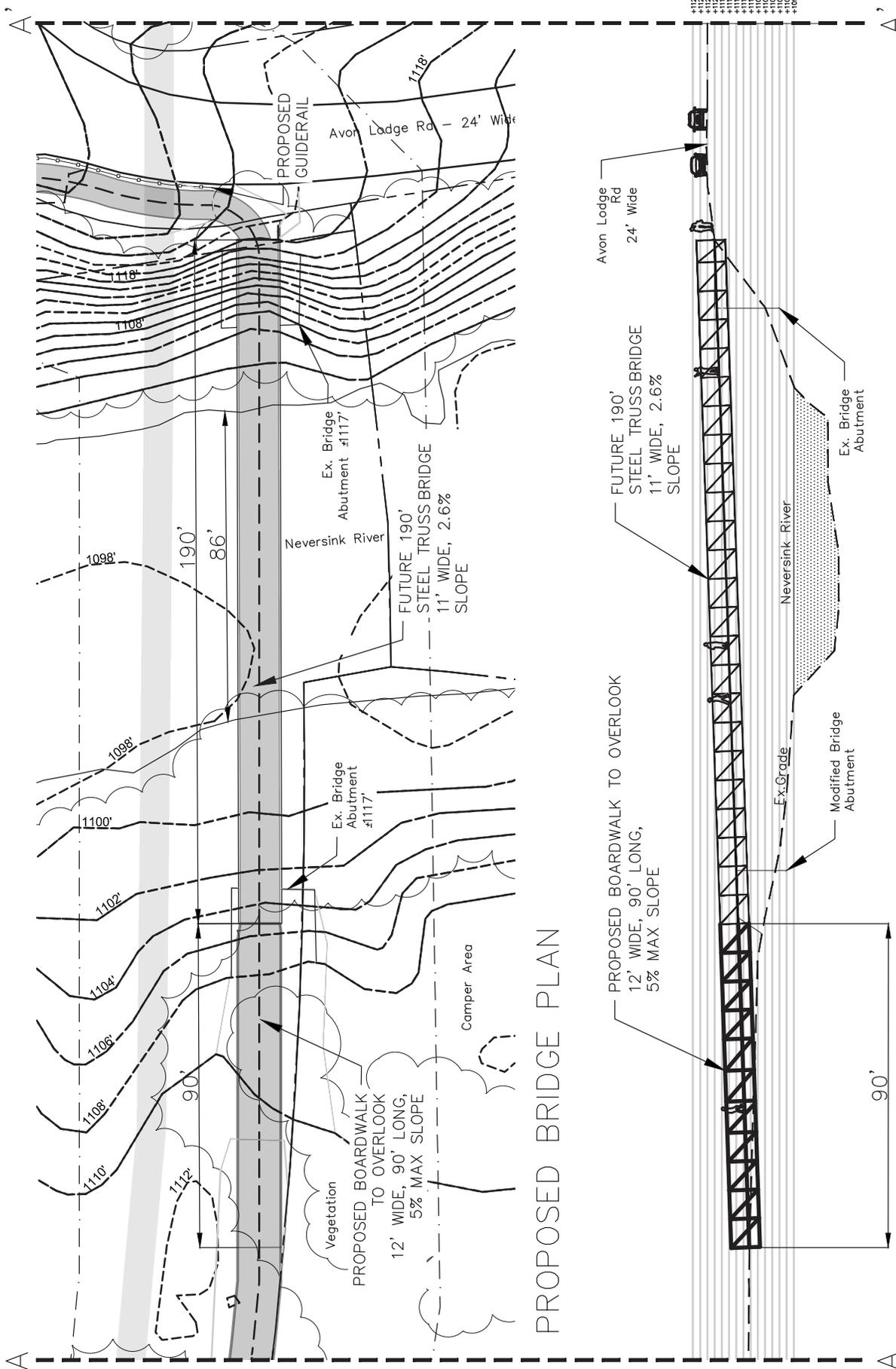
RECOMMENDED TOPOGRAPHIC SURVEYS

- Recommend survey of corridor 50 feet in width – total acreage 6.1.
- Include the length of the trail to the Fallsburg Tunnel, the tunnel bypass portion of trail, and the gravel parking area including some of Tunnel Hill Road.

OPINION OF COST

Costs for the construction of the entire project, including the boardwalk, overlook, and 1-mile of stone-dust trail are approximately \$365,000. These costs assume that the local municipality will be responsible for any required tree removals and the construction of the gravel parking area. Additional fees are also associated with permitting, structural and civil engineering, and right-of-way acquisition.





PROPOSED NEVERSINK BOARDWALK/OVERLOOK

SECTION A-A



NEVERSINK BRIDGE

THE PLAN

The Neversink crossing exists just southwest of the existing trailhead along the Sullivan O&W Rail Trail and adjacent to Joseph Road. The proposed route will need to cross Joseph Road, Panther Trail Road, and then run parallel with Avon Lodge Road before meeting up with the proposed bridge on the northeast side of the Neversink River. Some trees will need to be removed for the pathway along Avon Lodge Road and for the construction of the bridge. On the West side of the Neversink River the bridge will reconnect with the proposed 90-foot timber boardwalk that connects to the old O&W rail alignment just north of an existing trailer park. The overlook built as part of the tunnel bypass project (see pp. 10-10 to 10-15) will be removed and replaced with the new Neversink bridge. The proposed bridge will provide great views of the Neversink River corridor below.



NEVERSINK BRIDGE

CROSS SECTION

The following cross section illustrates the grade change between the north and south side of the river gap. In order to cross the Neversink River, and the associated floodplain to the west of the river a multi-spanned structure will need to be designed that utilizes the existing abutments on the eastern and western banks of the river. The 190' primary span will utilize the existing abutments. The proposed bridge is approximately 16' above the Neversink River.

REGULATORY DESIGN AND APPROVAL REQUIREMENTS

- NYSDEC Protection of Waters Program
- DEC Permit
- Possible U.S. Army Corps of engineers permits
- Joint Application Form
- Plans must be kept flexible to work with the governing agencies to provide highest and best stream crossing practices
- Stream Crossing Guidance and Best Practices - NYSDEC
- SEQR – State Environmental Quality Review Act
- Environmental Assessment Form
- SAAF – Structural / Archaeological Assessment Form
- Cultural resource survey and field study might be necessary

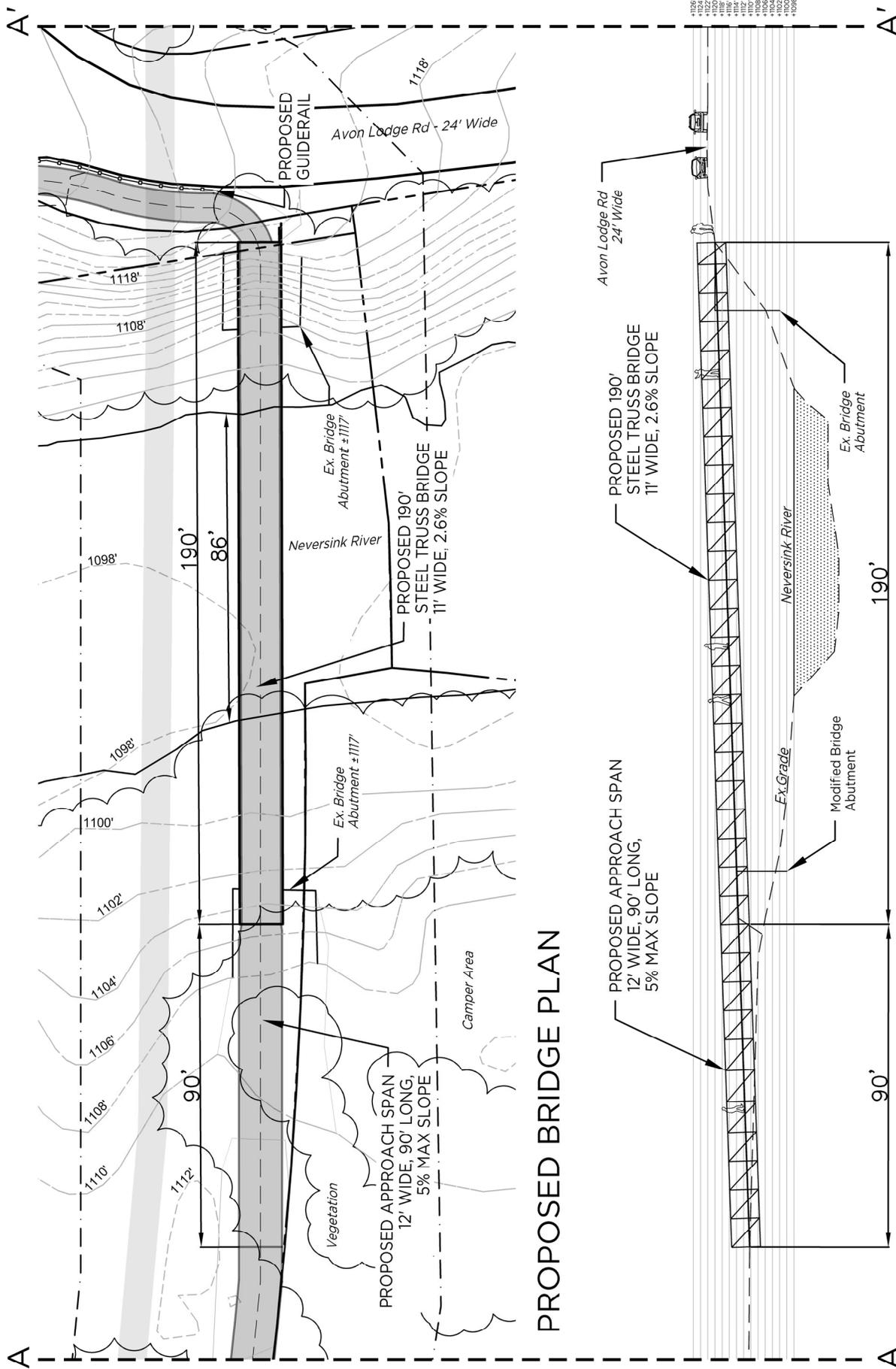
RECOMMENDED TOPOGRAPHIC SURVEYS

- Recommend survey of corridor 100 feet in width – total acreage 0.5.
- Include entire adjacent trailhead
- Include the boardwalk constructed as part of the Fallsburg Tunnel project (see p. 10-10)

OPINION OF COST

Multiple cost estimates were prepared by bridge manufacturers for the necessary structures. Costs for the proposed bridge structure averaged around \$750,000. Additional fees are also associated with permitting, structural and civil engineering, construction and materials costs.





PROPOSED BRIDGE PLAN

PROPOSED BRIDGE SECTION A-A'



LITTLE BEAVER KILL GAP

THE PLAN

In the town of Rockland there is a gap where the old Sullivan O&W Rail line used to cross the Little Beaver Kill twice before continuing northwest towards Livingston Manor. Continuing the rail trail across the old abutments and along the old rail corridor is not feasible since this connection would require two new very large bridges. Instead, the trail can continue on-road. From the east, the trail before reaching the stone bridge over Old Liberty Road would require a switchback from the old railbed elevation to Old Liberty Road. Then the trail would follow Old Liberty Road and Dahlia Road until it meets up with Old Route 17 towards Livingston Manor. This gap still provides an opportunity for lookout points on either side of the gap. The Little Beaver Kill is a natural resource that should be highlighted during the Sullivan O&W Rail Trail experience.





Existing lidar topographic data from FEMA 2007, obtained from NYS GIS clearing house.



LITTLE BEAVER GAP PLAN

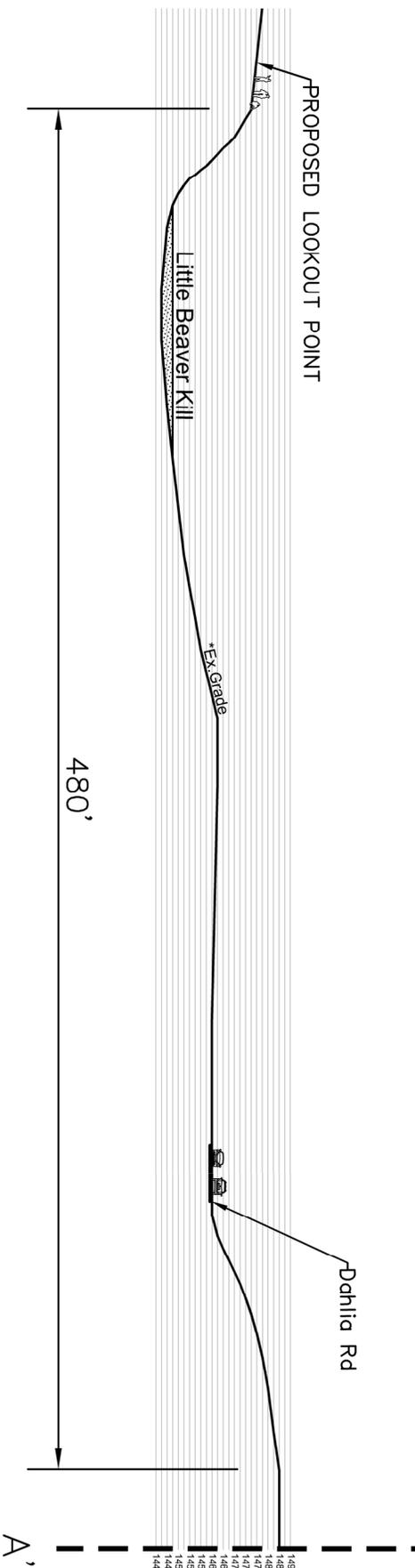
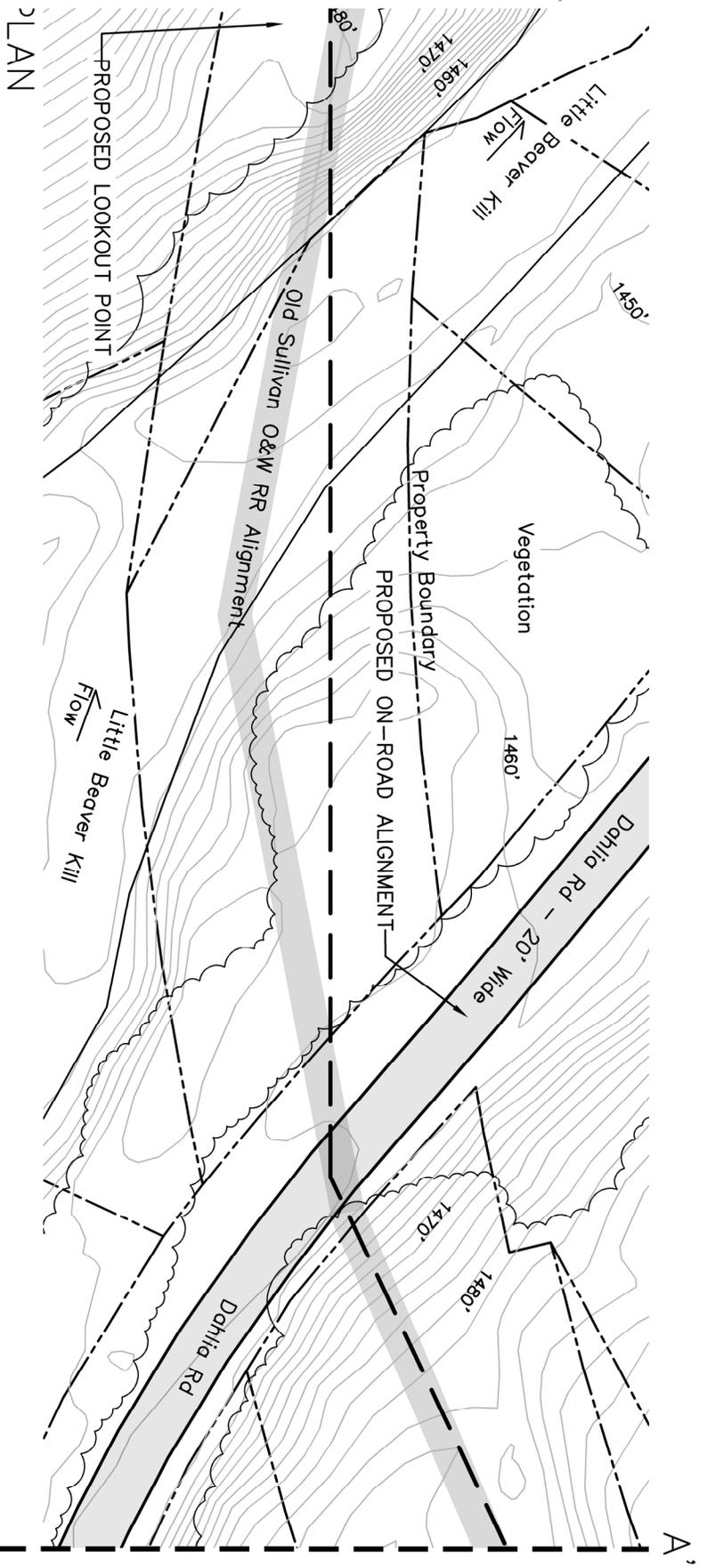


LITTLE BEAVER KILL GAP

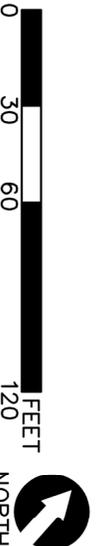
CROSS SECTION

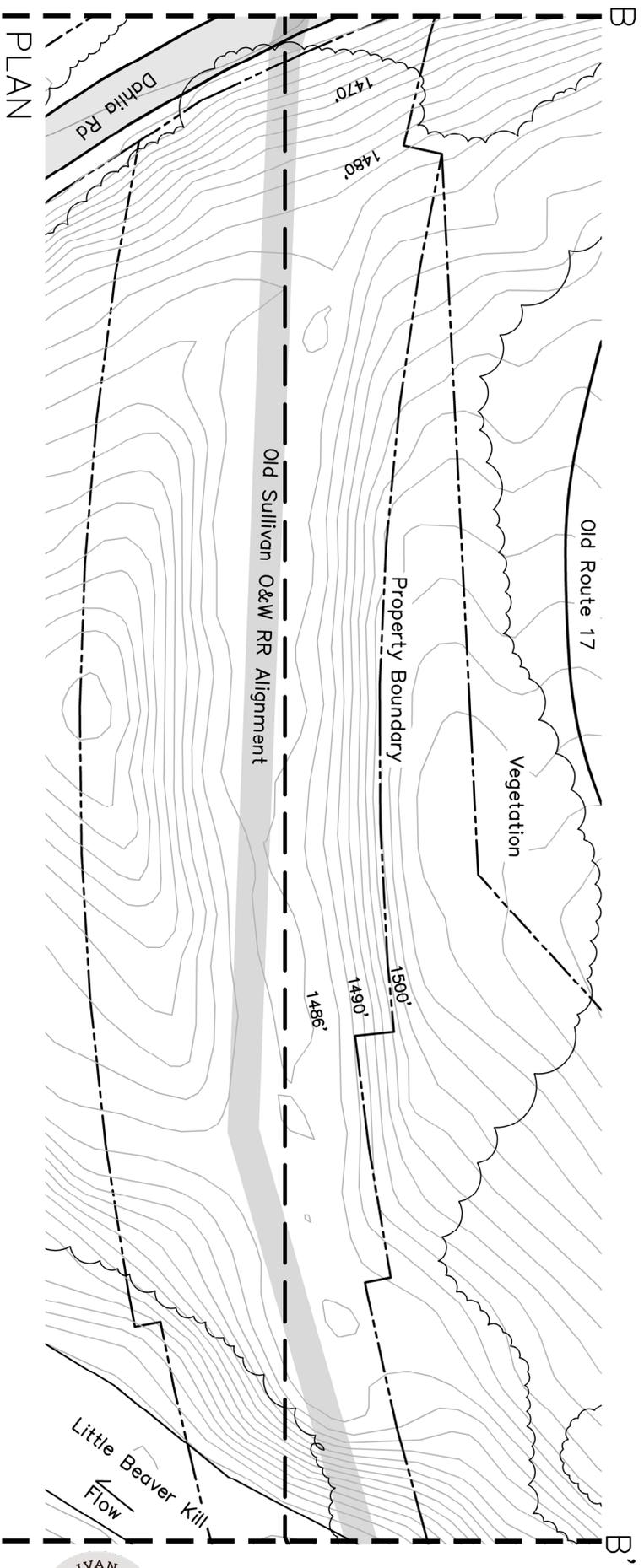
Two former abutments remain on each side of the Little Beaver Kill gap where the old railroad bridge used to exist. Both abutment edges on each side of the gap could serve as lookout spaces for trail users with various amenities. These spaces could include benches, picnic tables, interpretive signage, solar panel phone charging stations, and coin operated binoculars. Illustrated in section are both large gaps over the Little Beaver Kill where the old rail corridor used to exist. If bridges were to be installed, the first bridge would need to span approximately 480' and the other 207'. For these reasons it is more feasible to utilize the abutments as potential resting / viewing areas, and divert the trail on-road and through the gap utilizing the existing road bridge on Dahlia road.



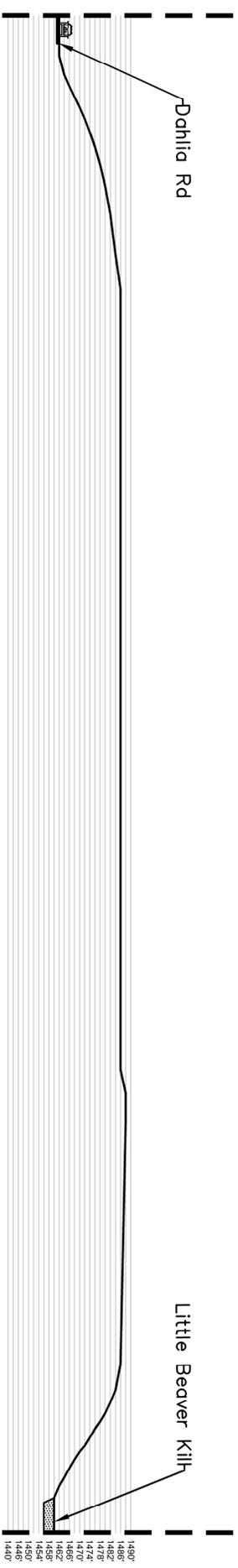


LITTLE BEAVER GAP
SECTION A-A'





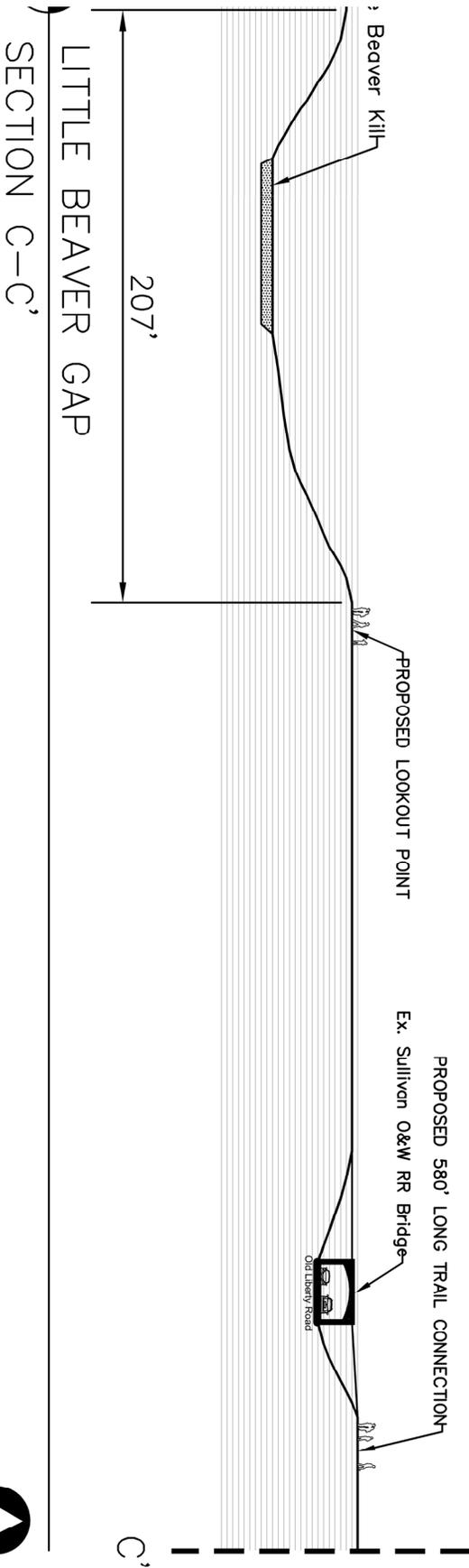
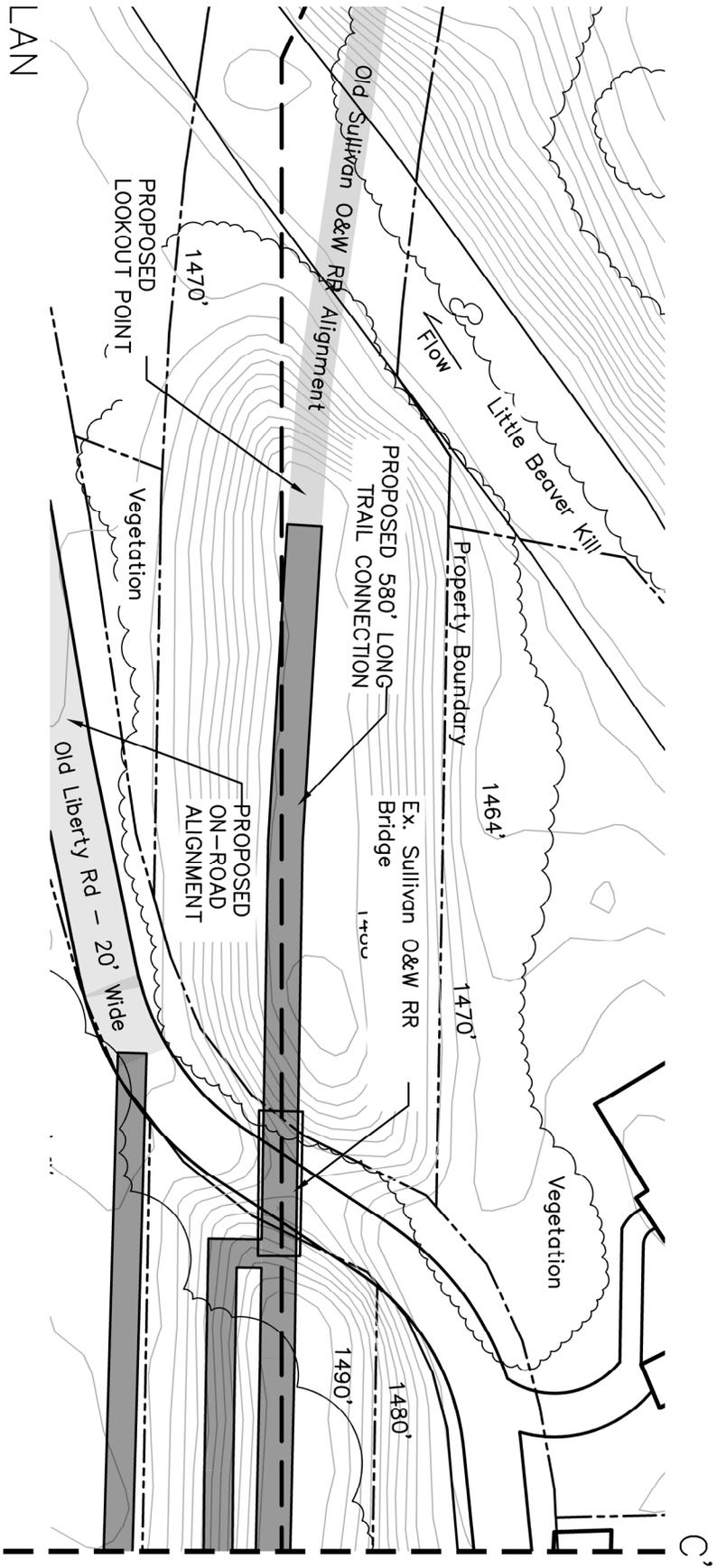
PLAN



LITTLE BEAVER GAP

SECTION B-B'





PARKSVILLE TO LIVINGSTON MANOR SEGMENT

The following conceptual plans describe in more detail the proposed segment of the Sullivan O&W Rail Trail between the hamlets of Parksville and Livingston Manor in the towns of Rockland and Liberty. Within this segment there are opportunities for open space rest areas, lookout points, new pedestrian crossings, new stone dust trails, improved stone dust trails, and on-road bike facilities. The subsequent maps will display the entire segment with details on trail improvements and additions, as well as the trail connection to Rotary Park, the local airport property, and to the proposed Riverwalk in downtown Livingston Manor.

1 In downtown Parksville, there is presently an access point that connects with Main Street. The access point has a small pull off area for cars and some signage. There is an opportunity here to design and create a more formal trailhead. The trailhead could include angled parking with handicap accessibility and bike amenities such as bike racks and a bike repair station. There is also ample room for benches and an informational kiosk. Just where the trail leaves the Main Street trailhead heading north, there have been complaints about dumpsters, debris and garbage conflicting with trail patrons. It is recommended that local businesses in this area find a new location for dumping or establish restrictions such as fence or a designated distance between dumpsters and the trail itself.

2 The portion of trail between Parksville and Fox Mountain Road is in relatively good condition but will need minor upgrades to adhere to the Sullivan O&W Rail Trail Standards. This segment also has a resting point for viewing a natural waterfall. It is recommended that a bench is added along the trail that faces the waterfall for trail users.

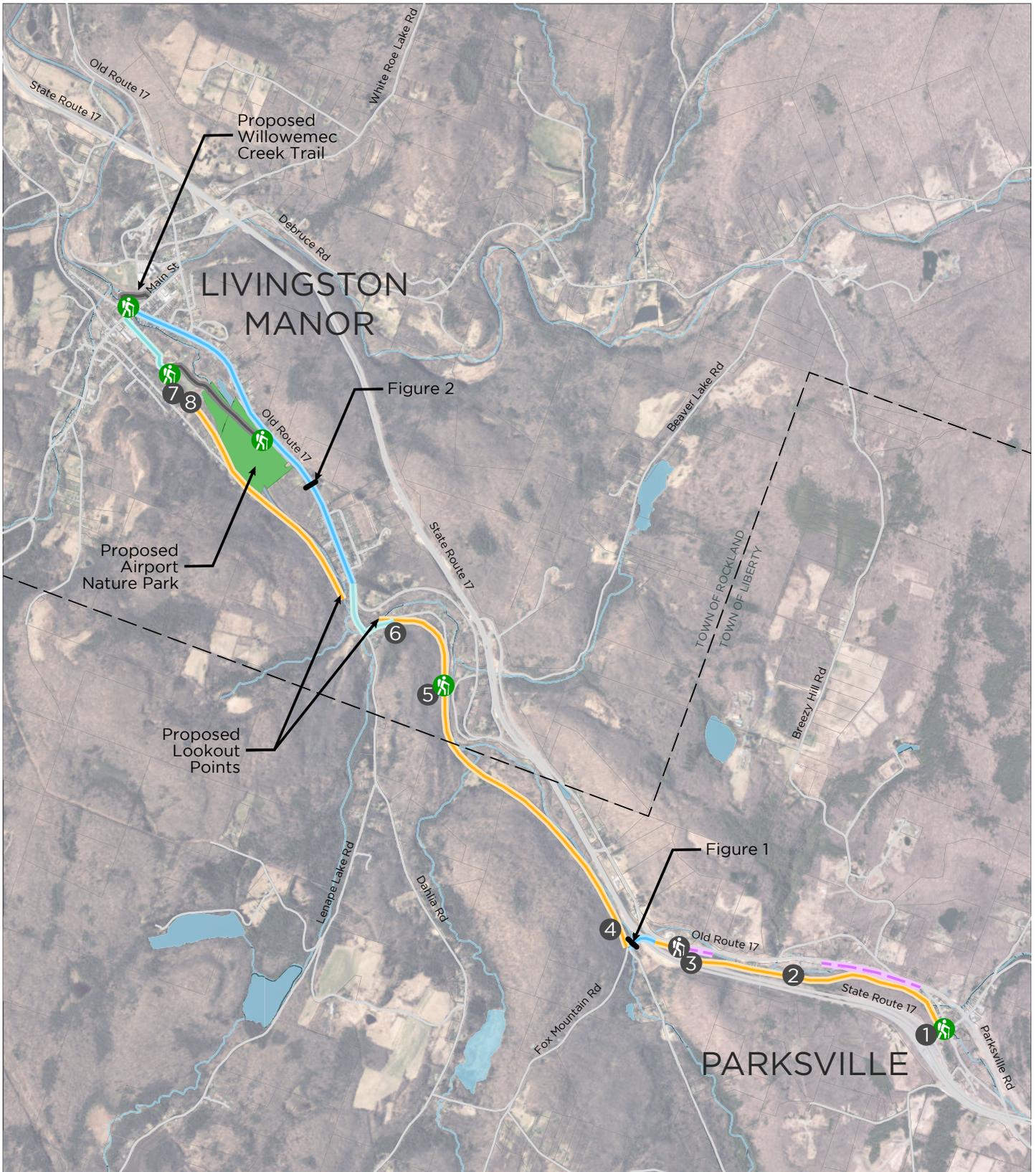
3 The existing Parksville Rail Trail trailhead off of Old Route 17 is new and in excellent condition. Typical trailhead amenities should eventually be added to ensure continuity among trailheads along the entire Sullivan O&W Rail Trail. These amenities could include an informational kiosk, bike racks, bike repair station, and benches.

There is a pinch point here where the trail is briefly on-road as a paved shoulder. Figure 1 on page 10-36 shows the recommended strategy for dealing with a one lane bridge as long as the results of a future traffic study allow for this condition. Along roadways with low motor vehicle volumes and adequate sight distance, configuring the structure as a one-lane bridge can provide an exclusive separated space for pedestrians and bicyclists. Refer to the FHWA MUTCD section 2C.21.

4 A significant amount of fill and grading will be required to construct the necessary ramp to reach grade at the existing railbed. If necessary, a switchback path configuration can alleviate some grading by condensing the path up the slope.

5 The large gravel entry could easily be improved to serve as a trailhead. This location also has room for some designated parking spots. Additional recommended trailhead amenities include an informational kiosk and a few benches for resting. The trail should continue off road until the bridge over Old Liberty Road.





PARKSVILLE TO LIVINGSTON MANOR

- PAVED SHOULDER
- SHARED LANE
- STONE DUST
- ASPHALT
- DEVELOPED TRAIL
- PROPOSED TRAILHEAD
- EXISTING TRAILHEAD



NORTH



6 After crossing the bridge over Old Liberty Road, the trail ends abruptly at the former bridge that spanned the winding Little Beaver Kill below. Topography, ownership and multiple stream crossings make the connection back to railbed across the Little Beaver Kill challenging. A lengthy switchback ramp must be created on the south side of the rail corridor to reach grade at old Liberty Road. Old Liberty Road is a low volume residential roadway that can easily be treated as a shared lane bike facility, while providing an appropriate level of comfort for trail users. At Dahlia Road, the route turns north and crosses the Little Beaver Kill by bridge. It is recommended that this length of trail is also a shared lane bicycle condition due to low volume and narrow roadway.

PROPOSED LOOKOUT POINTS

Where there used to be a large bridge spanning the Little Beaver Kill there exists two abutments that provide an opportunity for lookout points on either side of the valley for trail users. What is left of the existing bridge and abutment will require safety railing to prevent trail users from falling or venturing into dangerous overlook areas. A metal fence cemented in concrete is recommended in these types of locations. At both of these lookout points there is an opportunity for two resting areas with benches, picnic seating, and interpretive signage describing the condition of the railbed when the rail line was in use.

FIGURE 2 (PAGE 10-37)

When the trail emerges from Dahlia Road and meets with Old Route 17, it is recommended that the on-road trail switch from a shared lane bicycle facility to a protected paved shoulder condition. The condition is recommended for the entire length of Old Route 17 and Pearl Street until it terminates at the intersection of Pearl Street and Main Street in downtown Livingston Manor. The section on page 10-37 describes the protected lane condition along Old Route 17.

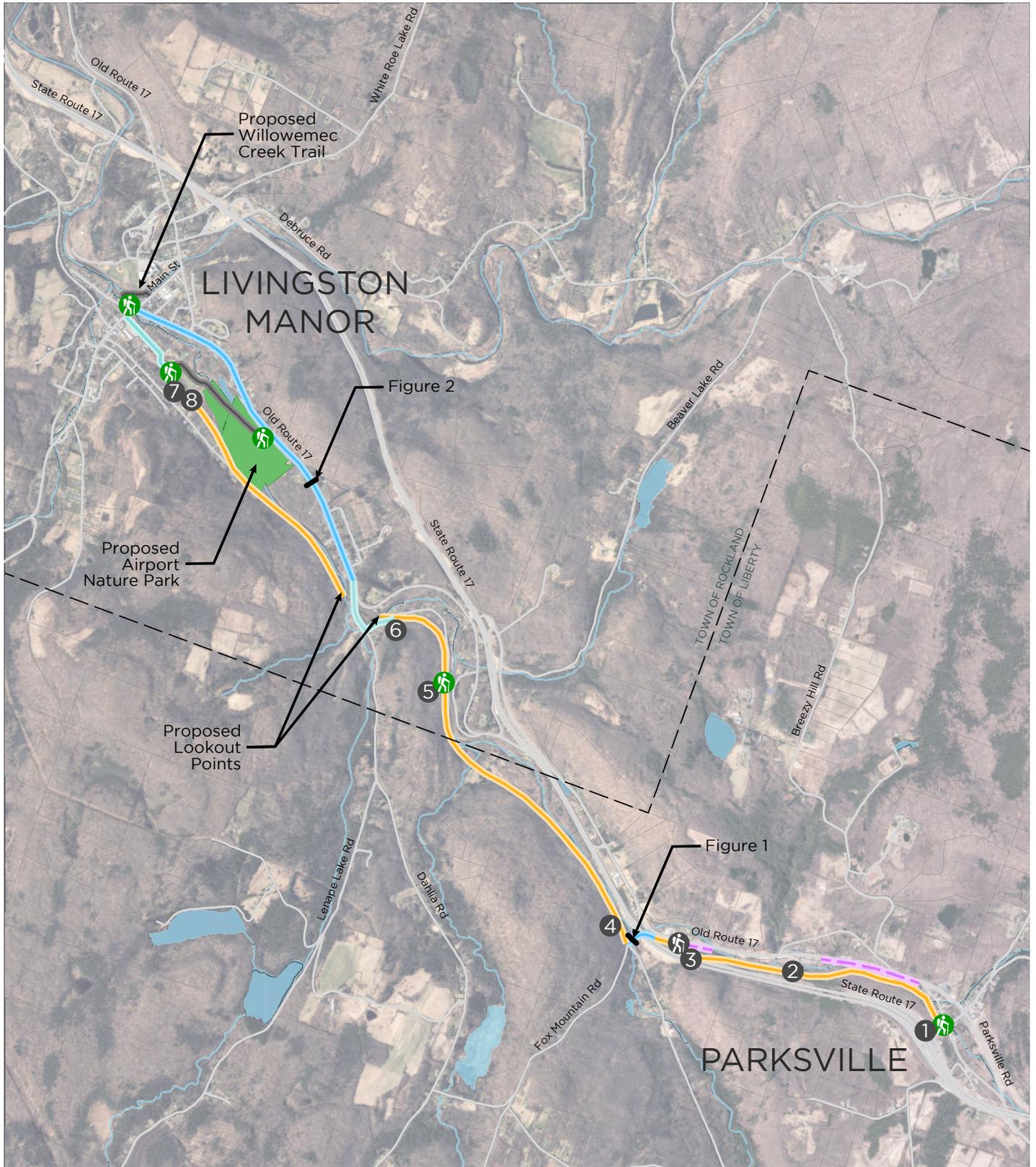
PROPOSED AIRPORT NATURE PARK

As part of this feasibility study a proposed conceptual plan for a nature park in the location of the old Livingston Manor Airport has been prepared. The park will include nature trails, wetland restoration and excavation (to assist with flooding), a welcome center, accessible parking, trailhead amenities, and an asphalt trail connection to Rotary Park. The proposed park is further explained in the following pages.

7 Where the trail meets Rotary Park, there is an opportunity to implement a more formalized trailhead with accessible parking, amenities, and wayfinding signage. More descriptions on recommended improvements can be found on page 10-32.

8 From Rotary Park, there is an opportunity to activate the old railbed and implement a stone dust path that leads from Rotary Park to the abutment and proposed lookout area over the Little Beaver Kill. This segment of trail is in good condition except for drainage issues where the trail starts at Rotary Park. It is recommended that culverts and grading are implemented to bring the trail out of the current wet conditions.





PARKSVILLE TO LIVINGSTON MANOR

- PAVED SHOULDER
- SHARED LANE
- STONE DUST
- ASPHALT
- DEVELOPED TRAIL
- PROPOSED TRAILHEAD
- EXISTING TRAILHEAD



AIRPORT NATURE PARK

Adjacent to Old Route 17 is the site of the old Livingston Manor Airport. The site of the former airport is currently abandoned with one old existing structure and foundation from another previously existing structure. Debris and garbage are suspected to exist just beneath the soil in some areas. The site was previously filled to create a landing strip.

FLOODPLAIN AND ASPHALT PATHWAY

As the concept illustrates, a majority of the site exists within the floodplain and the floodway. For this reason, an asphalt trail is recommended between the proposed parking lot and Rotary Park. This paved surface will prove to be more stable during flooding and will connect the on-road portion of trail from Old Route 17 to the proposed trailhead at Rotary Park.

ASSIST WITH FLOODING

The site was included in the U.S. Army Corps of Engineers Flood Risk Management and Ecosystem Restoration Feasibility Report for Livingston Manor in March of 2016. The report identified flood problem areas and recommended alterations to the Little Beaver Kill channel. If these alterations are not implemented, the new park could assist with flooding mitigation by lowering part of the site and installing wetland plants, restoring part of the site to the original habitat that existed before the airport was built. These additions would allow for water to partially flood the site during flooding events. Wetland plants would act as a sponge and slow the flow of water towards Livingston Manor. As the Army Corps of Engineers Report mentioned, the nature of the fill material used to create the airport may reduce the suitability of the airport site for wetland creation. The park design includes a diverse pallet of native wetland plant species to attract native wildlife to the park. A variety of wetland elevation levels will accommodate different flood events and assist with the ecological diversity of the new riparian buffer in that area of the site.

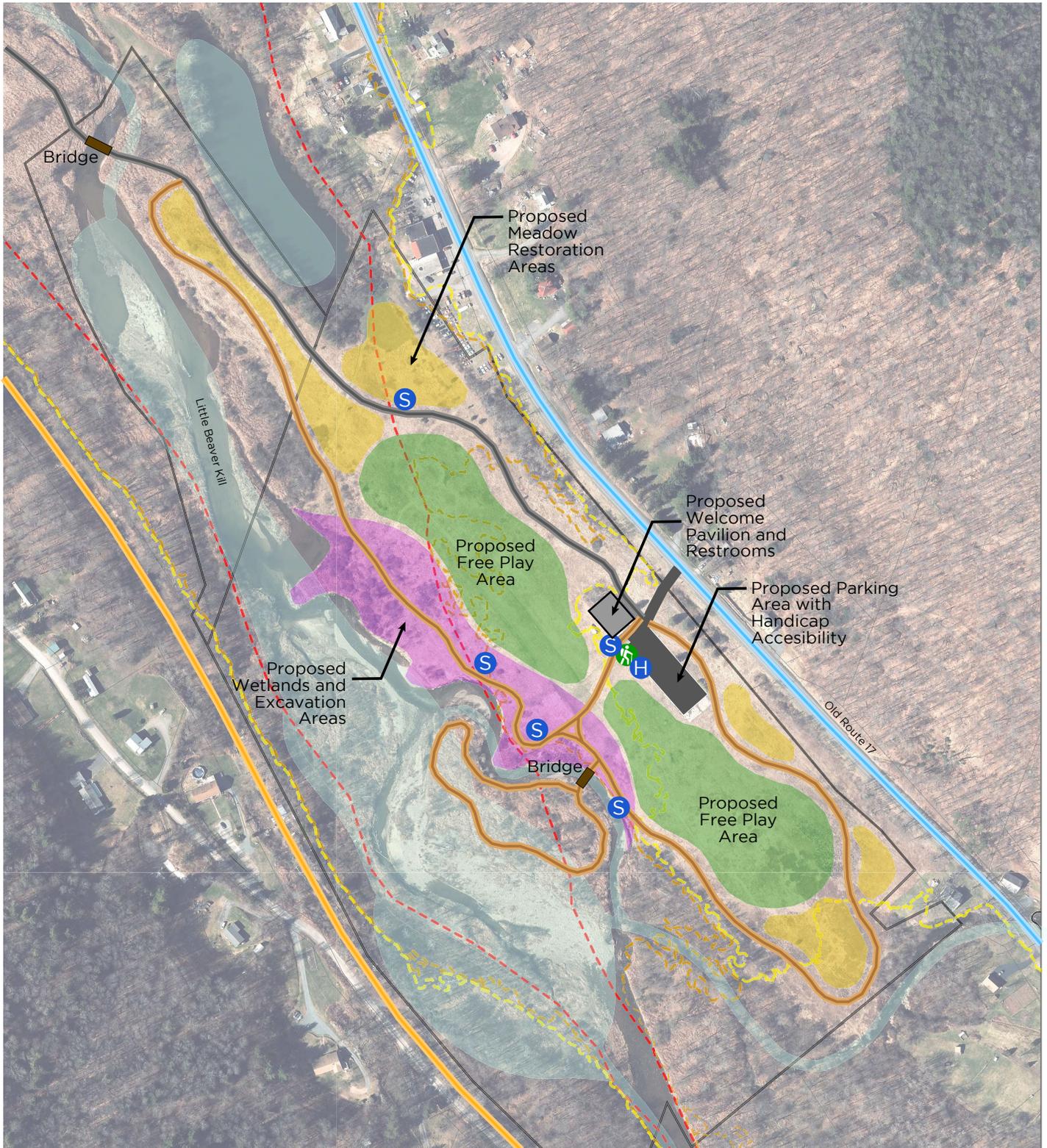
FREE PLAY AREAS AND NATURE TRAILS

The site should also include mowed lawn areas (open space) for free play and programmed events. This could include kite flying, star gazing, large family gatherings, picnics, and outdoor movies or concerts. In addition to the asphalt pathway leading to Rotary park, there should be natural trails constructed with interpretive stations. These stations should describe the native ecology on the site as well as the improvements made to the local environment that assist with flooding and revitalizing the native habitat along the water. There should also be an interpretive station showing visitors images of the old airport which used to occupy the space.

WELCOME PAVILION AND PARKING

The park should include accessible parking with trailhead amenities matching those along the Sullivan O&W Rail Trail which should include an informational kiosk, benches, bike racks, and bike repair station. The new parking area should be paved asphalt due to the consistent flooding in the area. The existing old building foundation would be a suitable location for the new parking lot since the subgrade is already prepared for the newly paved condition. Proposed next to the parking area is a welcome pavilion that should be an open shelter with enclosed bathrooms. Running water is accessible via the existing utilities running along Old Route 17. Bathrooms should be locked from dusk until dawn to prevent vandalism.





AIRPORT NATURE PARK

- PAVED SHOULDER
- NATURAL TRAIL
- ASPHALT
- STONE DUST
- EXISTING WETLAND
- PROPOSED TRAILHEAD
- S INTERPRETIVE STATION
- - - FLOODWAY
- - - BASE FLOOD ELEVATION
- - - 0.2%-1% ANNUAL CHANCE FLOOD HAZARD
- H HANDICAP PARKING



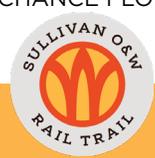
NORTH



alta
PLANNING + DESIGN



0 150 300 600 FEET



DOWNTOWN LIVINGSTON MANOR AND ROTARY PARK

The trail has a couple opportunities to connect with downtown Livingston Manor. The first is via Pearl Street on the proposed paved shoulder until it reaches Main St. Once the on-road trail meets Main Street, trail users can direct themselves to amenities downtown such as shops, the public parking area, the proposed trailhead, or towards Rotary Park.

A sidewalk connection exists between Pearl Street and Pleasant Street. Pleasant Street is a low volume road and more of vehicular driveway for Rotary Park. A shared lane facility is recommended for this span as it continues to the parking lot at Rotary park.

If trail users enter the Airport Nature Park from Old Route 17, they have the opportunity to use the proposed asphalt pathway there and continue along the path until it reaches Rotary Park. The asphalt multi-use trail should be at least 10' wide to accommodate service and maintenance vehicles. In Rotary Park, wayfinding signage will direct users to the stone dust portion of the trail that leads to the lookout area, downtown Livingston Manor, and the trailhead and proposed parking area within Rotary Park.

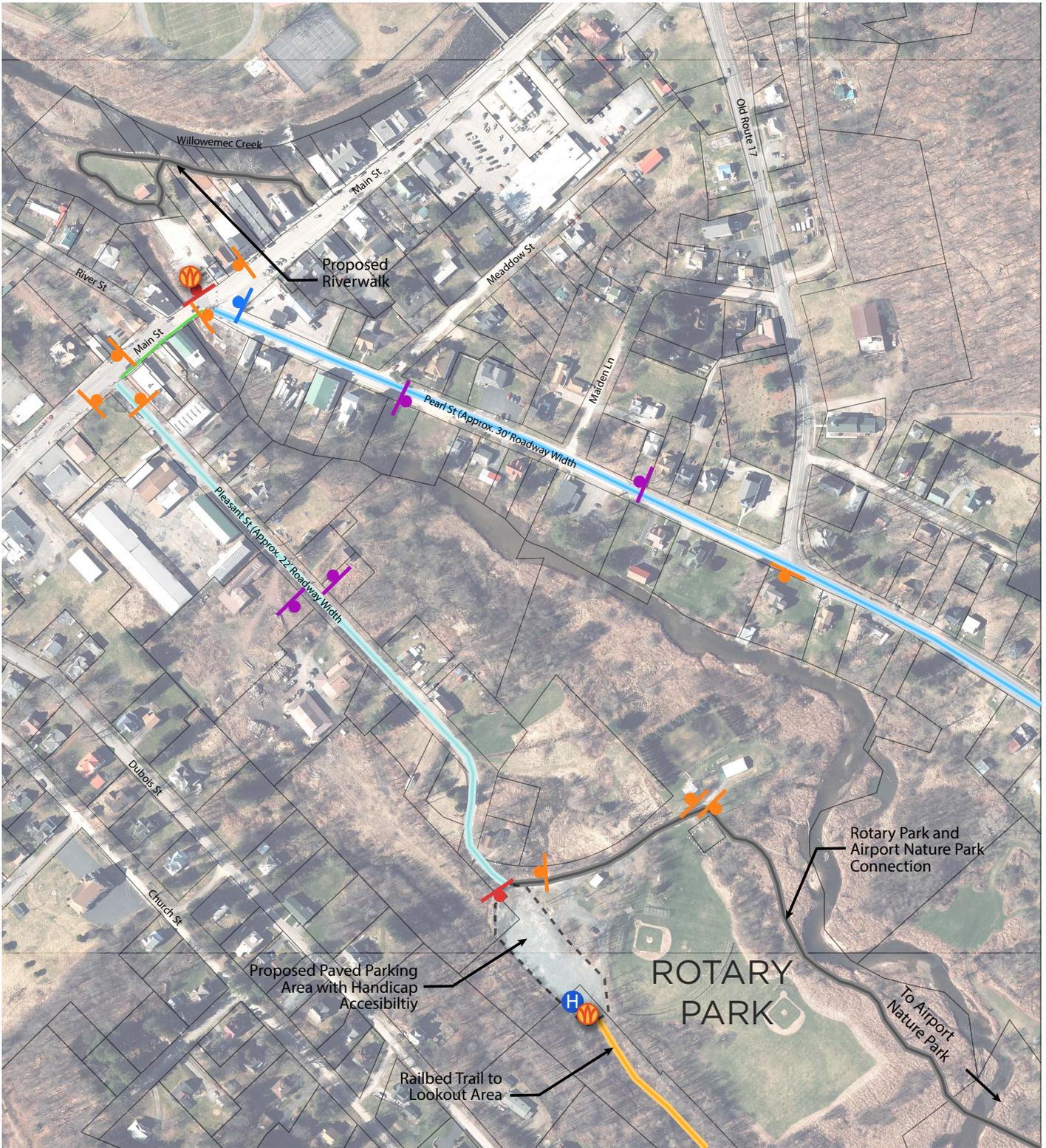
ROTARY PARK AMENITIES

Rotary Park currently has a gravel parking lot adjacent to the two existing ball fields. It is recommended that the parking lot be paved to prevent future washouts during flooding events. Handicap parking implemented near the trail entrance heading south towards the lookout area will enable those with limited mobility the ability to access this unique portion of the trail. Trailhead amenities should also be added next to the handicap loading zone. Amenities should include an informational kiosk, benches, bike repair station, and bike racks.

WAYFINDING

Strategically positioned wayfinding signage will reassure trail users that they are on the trail route and will direct users towards other parts of the trail and other amenities in Livingston Manor. More information on how the trail terminates in the downtown can be found on page 10-35.





DOWNTOWN LIVINGSTON MANOR AND ROTARY PARK

- PAVED SHOULDER
- SHARED LANE
- STONE DUST
- ASPHALT
- SIDEWALK
- PROPOSED TRAILHEAD
- ROUTE SIGN ASSEMBLY
- CONFIRMING/REASSURANCE ASSEMBLY
- DESTINATION SIGN
- VEHICULAR ENTRY SIGN
- HANDICAP PARKING



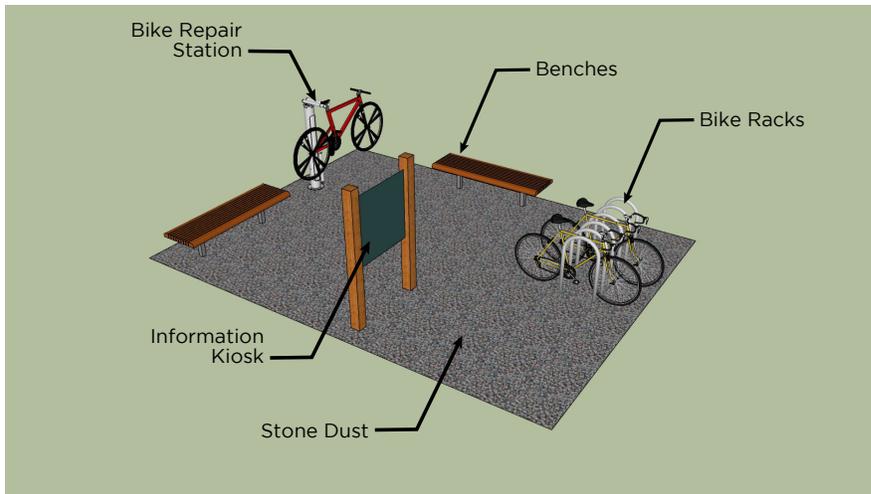
DOWNTOWN LIVINGSTON MANOR

As the on-road part of the trail enters downtown Livingston Manor, there is an opportunity for wayfinding that will lead users through town and between Pearl St. and Pleasant St. The downtown public parking lot is a great location for a future trailhead with trailhead amenities, such as an information kiosk, bike racks, and a bike fixit station. A vehicular entry sign is also recommended for this location so visitors understand where it is preferable to park their vehicle when using the trail.

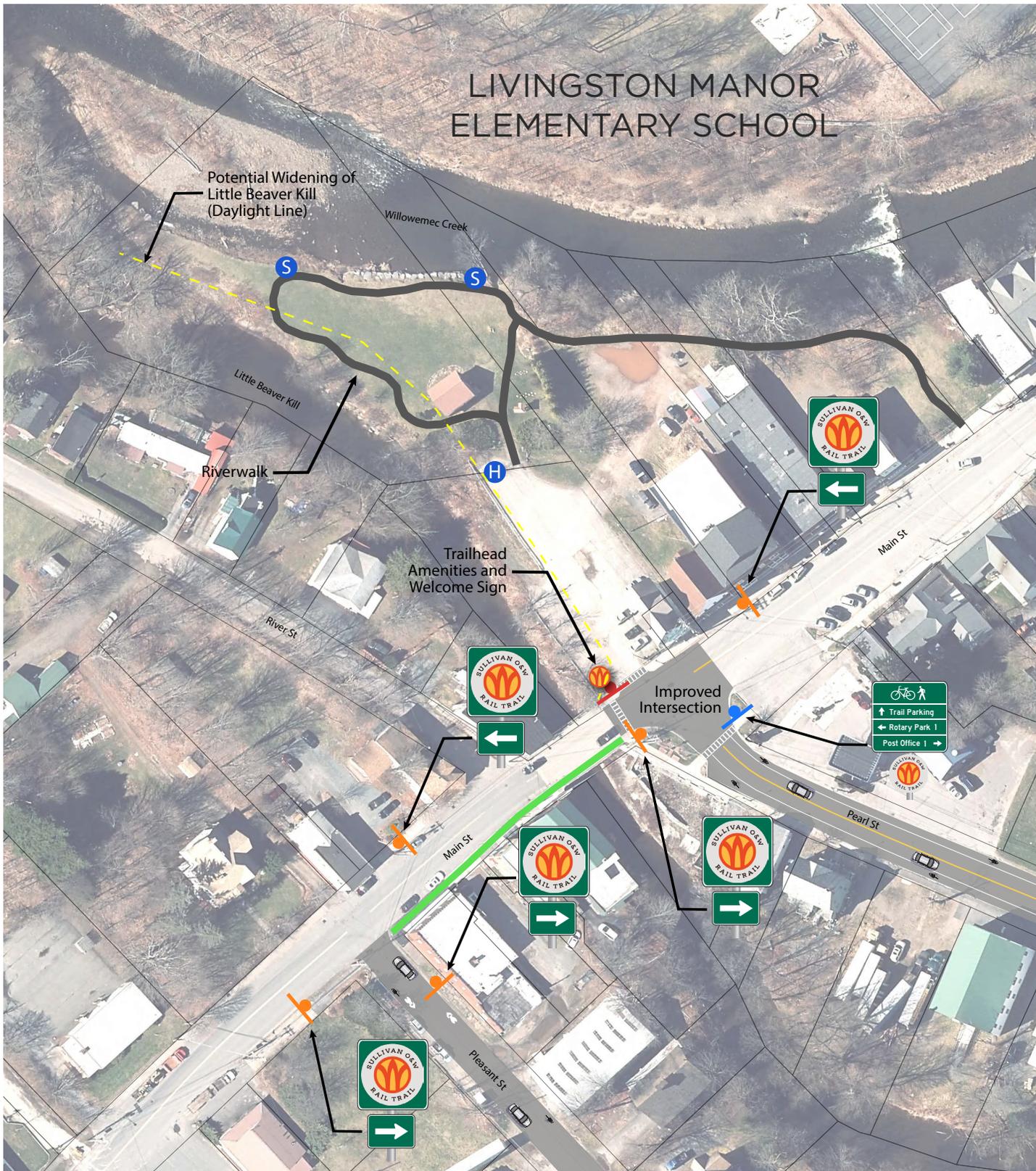
The Army Corps of Engineers Feasibility Study outlines a recommended widening of Little Beaver Kill where the existing public parking area and public park is located. Trailhead additions will depend on this implementation and if it scheduled to take place in the future.

The proposed riverwalk will also make a connection between the existing green space behind the public parking area and the greenspace. Interpretive stations and wayfinding are recommended on Main St. along this short trail route to ensure that it conforms with the rest of the Sullivan O&W Rail Trail.

TYPICAL TRAILHEAD WITH AMENITIES



LIVINGSTON MANOR ELEMENTARY SCHOOL



DOWNTOWN LIVINGSTON MANOR

-  ASPHALT TRAIL
-  SIDEWALK
-  INTERPRETIVE SIGN
-  HANDICAP PARKING
-  PROPOSED TRAILHEAD
-  ROUTE SIGN ASSEMBLY
-  DESTINATION SIGN
-  VEHICULAR ENTRY SIGN



NORTH

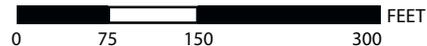


FIGURE 1

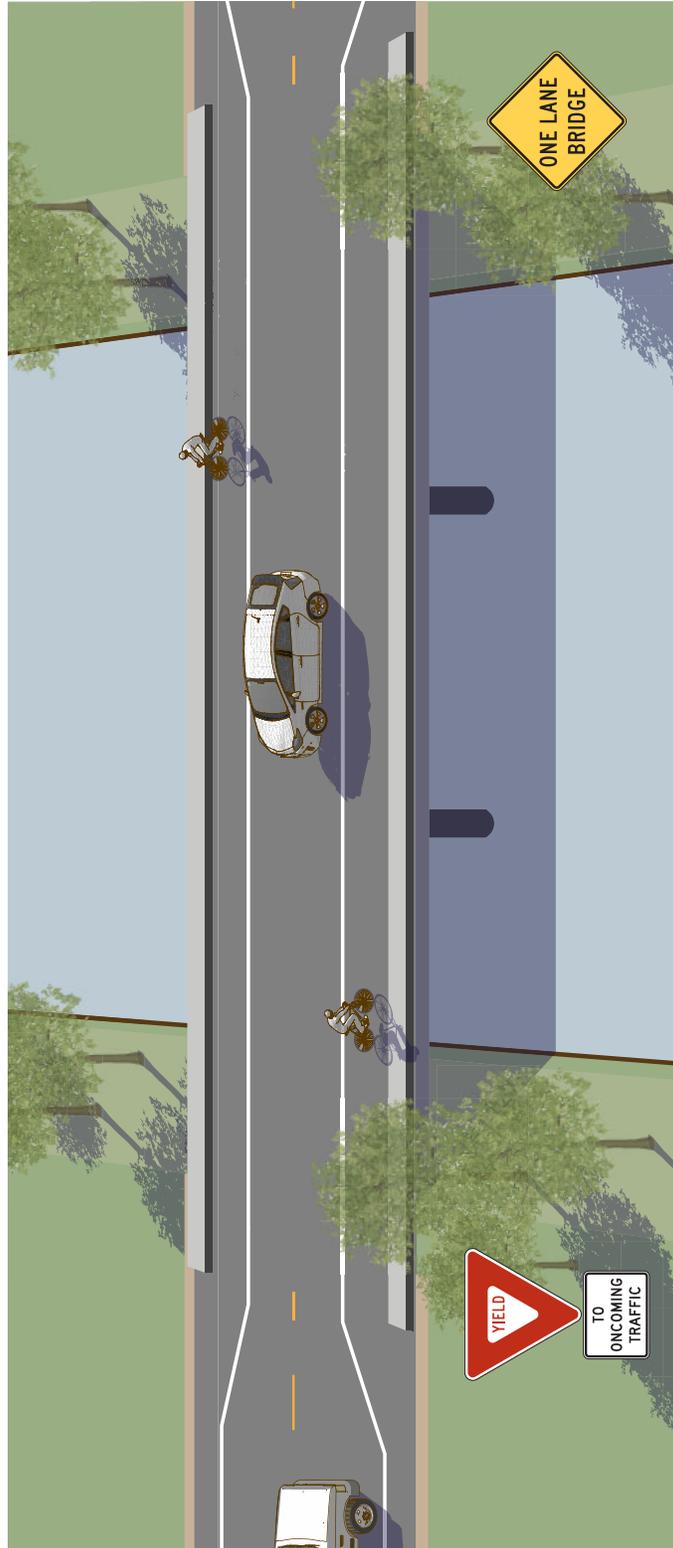


FIGURE 2

