

Grey Trail Design and Construction Report

Delaney Woods Town Forest

Wells, VT



Completed September 17, 2020 at the request of Slate Valley Trails

Delaney Grey Trail Design Report

Project Introduction

NOTE: This document was completed by a professional trail designer and SVT has added some comments and edits shown as “SVT:” in RED.

Grey Trail Design Project

This trail design is a new trail addition to the existing multi-use trail network in the Delaney Woods Town Forest in Well, VT. The conceptual design of the trail was completed by Slate Valley Trails. The following report is accompanied by a survey tape flag line in the field, as well as supporting gpx tracks of each section of trail included in the trail design.

As part of the conceptual design and bid proposal process Slate Valley Trails divided the Grey Trail Design into 5 sections. Sections 2-4 were requested for this project, with sections 1 and 5 reserved for completion by Slate Valley Trails.

Grey Trail Design

Trail Management Objectives

The Trail Management Objectives for the trail design listed below were identified by Slate Valley Trails and are derived from IMBA’s Guidelines for Quality Trail Experiences. (See references.)

Trail Objectives	Range
Setting	Relatively primitive
Technical Challenge	Intermediate
Trail Flow	Bike-optimized, but less predictable
Nature	Immersed in nature
Playfulness	Moderate
Exposure	Relatively low exposure

Grey Trail Description (Sections 2-4)

Grey Trail Section 2 (GT2) is a loop extension off of the end of East Trail, beginning near the Grey Trail Section 1 (GT 1) onto East Trail. It begins just north of GT 1's northernmost junction with East Trail, and peels off to the east to traverse over technical sections of surface level rock and natural undulations. At the northernmost end of East Trail, GT 2 co-aligns with East Trail for a brief distance to avoid new trail construction within 200' of the wetland to the west of this section. Once clear of this zone, the trail continues off on the west side of East Trail through brief technical rock sections before rejoining East Trail just south of GT 1.

GT2 Length and Average Slope: ~ 0.2 miles, 8.5%

Grey Trail Section 3 (GT3) runs generally parallel to East Trail. As East Trail is an old forest road, this parallel option will naturally provide for more technical options in the form of rock outcrops near the quarry, and the nature of more natural, narrow trail construction. A short co-location of GT 3 and East Trail will allow for a greatly reduced length of boardwalk needed through a poorly draining, low lying area. GT 3 ends on the west side of East Trail, near the southernmost junction with GT1. **SVT: There is the possibility to move the trail north at POI #7 for final 50'ish on higher ground avoiding the low area that might require bridging. Due to the runoff on East Trail the builder should include improving the portion of ET used as part of GT3 to divert runoff and make ET more sustainable (ie. two water bars). Also, in this section ET is down hill going north and designer blaze may give rider chance to build up speed and wider puncheon may be required. The alternative higher path may be designed for a slower speed entrance.**

GT 3 Length and Average Slope: ~0.16 miles, 9.7%

Grey Trail Section 4 (GT4) begins just south of where GT 1 and GT 3 meet with East Trail. GT 4 co-aligns with an existing old trail that climbs from East Trail to the first prominent switchback on Buck Snort. Just past the first rise, GT 4 branches off to the north traversing through a steeper, cross-sloped section of seasonal drainages before wrapping around to a flatter grassy area interspersed with rock outcrops. From here GT 4 continues to traverse and wrap around to cut across another steep cross-slope on the northernmost edge of the hill, which Hoot's Loop circumnavigates.

From here GT 4 continues to wrap around, traversing on side-slope, over a band of exposed rock before meeting with an old logging road for a brief length, then dropping down to cross the outflow of a drainage and avoid construction within 200' of two wetlands directly to the south. Continuing to traverse cross slope across a couple more seasonal outflows, the trail then takes a sharper turn to the south and climbs steadily through a mature hardwood stand before a long gentle turn to connect to a short, steep section of old logging road. At the top of this hill, GT 4 follows an existing logging road for approximately 670' before continuing

off to the east, up and over a small rise, descending just north of the wetland in a short junction with Delaney Cross Road.

Choosing to co-align with Delaney Cross Road for this short section negates any additional impacts to wetlands in this area, and provides an easy, already constructed wet area crossing in this generally sensitive and already impacted area.

GT4 Length and Average Slope: 0.54 miles, 10%

PLANNING FOR CONSTRUCTION

General Construction Recommendations

In order to create the trail experience laid out in the Trail Management Objectives, translated into the trail design, the following trail construction methods and standards are recommended, in addition to those for sustainability and safety intrinsic to all high-quality trail construction. Please see attached resources to address standard sustainability guidance.

It is recommended that trail construction for all sections of GT2-4 be minimal, hand-built techniques. Tread width should be 12-18” with trail structures no greater than 24”, with corridor clearing of 36- 48” (with additional consideration for safety on corners for dual-directional trail use). In addition, only corridor clearing and debris clearing/tread definition are necessary in any area that does not exceed a 10% cross slope. Areas that exceed a 10% cross slope (mostly only in GT 4) will need light tread construction to create enough of a benched tread to ride. Other areas where tread benching and more definitions are recommended are junctions with existing trails and forest/logging roads. **SVT: builders can recommend alternative construction techniques but must be noted in their quote with specific locations noted clearly.**

These techniques and guidance will provide for a more natural, challenging and technical experience as possible for sections of new trail construction. Additionally, simply clearing corridor and minor surface debris where the tread is on less of a side slope will more likely ensure that the finished trail will age to be more technical and natural feeling, and avoid the possibility of “over construction” that can occur during bench tread construction when roots and rocks are sometimes removed in order to complete the construction.

The few sections where it is recommended to armor around roots, the purpose is for the longevity of the tree and to reduce wear and damage to roots, not for the ease of the riders. All aspects of typical sustainable trail construction should be taken into consider, in addition to the guidance provided above.

GT 2-4 Recommended Structures and Locations



Note: The Grey Trail Design Project was confined to a period of approximately 6 weeks, in a time with very little precipitation, compared to annual amounts. Drainage areas crossed by the new trail may be slightly longer or more frequent than indicated in this report. Spring-time review under normal moisture conditions is highly recommended.

Site Number	Trail Section	Need and Recommended Structure	Length
0	GT 4	Wet Area, Install Single Stringer Puncheon	12'
1	GT 4	Wet Area, Install Single Stringer Puncheon SVT: By routing trail 20' higher avoids lower possible wet section and need for puncheon, or reduce the length required. Blue pin flags on site show possible option.	45'
2	GT 4	Trail traverses rock band, break rock and retain	15'
3	GT 4	Edge of bedrock outcrop, set rock to create transition	7'
4	GT 4	Abrupt hole, set rock to create transition SVT: Possibility to avoid by trail moving 5-10'?	10'
5	GT 4	Steep side slope with seasonal drainage, install puncheon SVT: Should be reviewed in Spring 2021 to confirm this is needed or just grade reversals and armoring required.	25'
6	GT 4	Steep side slope with seasonal drainage, install puncheon SVT: Should be reviewed in Spring 2021 to confirm this is needed or just grade reversals and armoring required. It is likely that <i>some</i> bridging will be required for sites #5 and/or #6.	10'
7	GT 3	Low, wet area, install bridging SVT: By routing trail 20' north and about 2-3' elevated connecting with East Trail it <i>may</i> be possible to avoid lower possible wet section where GT 3 would exit East Trail and need for bridging. Reason this was labeled bridging designer felt the rate of speed possible at this spot, so bridging wider than puncheon. The angle of entry can be made so as the need to slow when entering GT3 and not the wider "bridging" required. Also include improving East Trail for section used by GT3 by adding 2-3 water bars or other drainage improvements on East Trail section now part of GT2.	20'
8	GT 3	Abrupt transition onto tree roots, install rock transition	7'
9	GT 2	Roots exposed to damage, retain with rock and fill	15'

Grey Trail Section 2

Brief description of construction: Mostly trail clearing and removal of light debris is needed for this section of trail, as well as some possible short sections of light tread construction that may be needed to create transitions between natural forest swales in this area. Other areas of more intensive tread construction will be at the junctions of East Trail in order to define the treadway and make it visible. **SVT: Likely an 'easier' rated loop that riders could access via East Trail.**

Scope of Work for Construction (Lengths in Feet)

New Hand built Tread Construction	1,056'
Existing Tread (East Trail)	229'
Switchbacks	0
Stone Work	15'
Armoring	0
Bridging or Puncheons	0
Purchased Materials:	0

Grey Trail Section 3

Brief description of construction: Similar to GT 2, GT 3 will only require minimal construction in order to maintain a natural and technical feel over time. Keeping the trail corridor narrow and only doing full tread construction at the trail junctions will contribute to this, (however, ensure safety of dual direction travel by avoiding blind corners.)

New Hand built Tread Construction	886'
Existing Tread	~70'
Switchbacks	0
Stone Work	7'
Armoring	0
Bridging/Boardwalk	20'
Purchased Materials: Lumber and Fasteners	See Below

Structure Type: Boardwalk/bridging

Materials and Cost

Material	Quantity	Cost
4x6x16 (PT)	1	\$50
2x6x10 (PT)	5	\$60
2x6x12 (PT or rough-cut lumber)	14	\$266
Fasteners- 3" Deck Screws	1 box - 5#	\$35

Grey Trail Section 4

This section will require some light bench construction in order to provide adequate trail tread in areas where side slopes exceed 10%. Natural cross slope and natural features should provide for both drainage and fun, provided that these are also taken into account during construction. Single stringer puncheon will not only provide for more challenge, but also will decrease both labor and cost, especially for the construction sites further away from the accessible areas.

New Hand built Tread Construction	2,869'
Existing Tread	679'
Switchbacks	0
Stone Work	32'
Armoring	0
Puncheon	92'
Purchased Materials: Lumber and Fasteners	See Below

Structure Type: Single Stringer Puncheon

Materials and Cost

Material	Quantity	Cost
2x12x8 (PT or rough-cut lumber)	13	\$299
4x6x12 (PT)	12	\$384
Fasteners- 3" Deck Screws	1 box - 5#	\$35

*Rebar may be necessary on some sections of puncheon to anchor in place at sites 5 and 6.

Notes on Existing 'Roads' vs. Completely New Build

SVT: In some areas of the design, trail building efforts will be eased a bit by the use of some existing older log roads that are grassy and not eroded. In order to provide as much information as possible in terms of construction time, Table 1 provides some details about the length of trail that will be a brand new tread and areas that will utilize older, existing forest path/roads. About 21% of the proposed GT consists of some form of existing path or logging road.

Table 1. New vs. existing comparison

estimated build vs existing		
	GT length (ft)	Existing road (ft)
GT2	1056	165
GT3	845	143
GT4	2851	670
Total feet	4752	978
New build feet	3774	

Notes on Materials, Length and Costs

On average, the total length of constructed trail tends to be 5-10% deviated from the professional grade GPS track of the designed flag line, so it is advised to include this amount of contingency in the construction cost.

Additionally, material costs are based on the general market price at the time of the creation of this report and do not include sales tax.

Wood Type:

Pressure treated is important for ground contact and will be most durable in the long run, though rough sawn, rot resistant lumber is recommended for any tread surface, as PT surfaces can get slippery and the practices of covering with chicken wire or other metal are not recommended as they can lead to punctured tires and do not meet many aesthetic standards.

References:

Guidelines for Quality Trail Experiences, IMBA/BLM, 2017

<https://www.blm.gov/sites/blm.gov/files/Guidelines-for-a-Quality-Trail-Experience-2017.pdf>

This original design was conducted by Sinuosity, LLC of Morrisville , VT (www.Sinuosity.net)