

Department of Planning and Zoning

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TO: Development Review Board
FROM: Scott Gustin *SG*
DATE: February 20, 2013
RE: 13-0701CA/CU; 85 Riverside Avenue

Note: These are staff comments only; decisions on projects are made by the Development Review Board, which may approve, deny, table or modify any project. THE APPLICANT OR REPRESENTATIVE MUST ATTEND THE MEETING.

Zone: RCO-C Ward: 1

Owner/Applicant: Winooski Valley Park District

Request: Trail improvements along Riverwalk Trail.

Applicable Regulations:

Article 3 (Applications and Reviews), Article 4 (Maps & Districts), Article 5 (Citywide General Regulations), Article 6 (Development Criteria & Guidelines)

Background Information:

The applicant is seeking approval to construct upgrades to the existing Riverwalk Trail along a portion of the Winooski River. Upgrades generally include some trail rerouting, new stairs/water bars, and replacement bridges. Due to this project's location within the river's riparian buffer zone, conditional use review is required; however, the project qualifies for exemption from major impact review per Sec. 3.5.3, *Exemptions*, of the CDO.

The Conservation Board reviewed this project at their February 4, 2013 meeting and recommended approval with the condition that the associated erosion prevention and sediment control plan be reviewed and approved by the Stormwater Administrator. This plan has been submitted and is pending review and approval.

Recommendation: Consent approval as per, and subject to, the following findings and conditions:

I. Findings

Article 3: Applications and Reviews

Part 5, Conditional Use & Major Impact Review:

Sec. 3.5.6, Review Criteria

(a) Conditional Use Review Standards

1. The capacity of existing or planned community facilities;

The trail improvements will have no impact on existing or planned community facilities.

(Affirmative finding)

2. The character of the area affected;

The trail is located down low within a wooded area following the banks of the river. The work will simply improve the existing trail and will have no adverse impact on the character of the area. **(Affirmative finding)**

3. Traffic on roads and highways in the vicinity;

The proposed work will have no impact on traffic. **(Affirmative finding)**

4. Bylaws then in effect;

The trial work complies with all applicable bylaws. **(Affirmative finding)**

5. Utilization of renewable energy resources;

The trail improvements will have no impact on alternative energy resources. **(Affirmative finding)**

6. Cumulative impacts of the proposed use;

There are no cumulative impacts associated with the proposed work. **(Affirmative finding)**

7. Functional family;

Not applicable.

8. Vehicular access points;

Vehicular access points to the trail will remain unchanged. **(Affirmative finding)**

9. Signs;

Not applicable.

10. Mitigation measures;

The proposed improvements will not generate offsite noise or glare substantial enough to require mitigation. **(Affirmative finding)**

11. Time limits for construction;

No time limits for construction have been specified in this application. Given the project scope, none are needed other than the standard 2-year time frame associated with all zoning permits. **(Affirmative finding)**

12. Hours of operation and construction;

There are no specific hours of operation for the trail, nor are hours of construction noted. Given the small scope and limited impact associated with the improvements, none are needed. **(Affirmative finding)**

13. Future enlargement or alterations;

In the event of future enlargement or alteration, permits would be required and reviewed under the regulations then in effect.

14. Performance standards;

Performance standards relating to outdoor lighting and erosion control are addressed under Article 5 of these findings.

15. Conditions and safeguards;

See recommended conditions of approval.

Article 4: Maps & Districts

Sec. 4.4.6, Recreation, Conservation, and Open Space Districts:

(a) Purpose

(3) RCO-Conservation (RCO-C)

The subject property is located in the RCO-C zone. This zone is primarily intended to preserve the city's significant natural communities in their natural state for scientific, ecological, wildlife, educational, or scenic purposes. Passive recreational opportunities, such as those afforded by primitive trails, are appropriate in this zone. The proposed work will make improvements to an existing primitive trail and will continue to provide passive recreational opportunities.

(Affirmative finding)

(b) Dimensional Standards & Density

The proposed trail improvements do not affect existing lot coverage, setbacks, or building height.

(Affirmative finding)

(c) Permitted & Conditional Uses

The existing trail use is allowable within this zone and will remain unchanged. **(Affirmative finding)**

(d) District Specific Regulations

Not applicable.

Sec. 4.5.4, Natural Resource Protection Overlay (NR) District

(c) District Specific Regulations: Riparian and Littoral Conservation Zone

The trail runs alongside the Winooski River and is almost entirely within the 250' wide riparian conservation zone. The Conservation Board reviewed this proposal at their February 4, 2013 meeting and recommended approval subject to review and approval of the erosion prevention and sediment control plan by the Stormwater Administrator. As noted previously, such plan has been submitted and is pending approval. **(Affirmative finding as conditioned)**

Article 5: Citywide General Regulations

Sec. 5.2.3, Lot Coverage Requirements

See Sec. 4.4.6 (b) above.

Sec. 5.2.4, Buildable Area Calculation

Not applicable.

Sec. 5.2.5, Setbacks

See Sec. 4.4.6 (b) above.

Sec. 5.2.7, Density and Intensity of Development Calculations

See Sec. 4.5.6 (b) above.

Sec. 5.5.1, Nuisance Regulations

Nothing in the proposal appears to constitute a nuisance under this criterion.

Sec. 5.5.2, Outdoor Lighting

Not applicable (none proposed).

Sec. 5.5.3, Stormwater and Erosion Control

No new stormwater outfalls or other stormwater infrastructure are included in this proposal. Associated earthwork is fairly minimal but is sufficient to warrant completion of a small project erosion prevention and sediment control plan. As noted above, such plan has been provided for review and approval by the Stormwater Administrator. **(Affirmative finding as conditioned)**

Article 6: Development Review Standards:

Part 1, Land Division Design Standards

Sec. 6.1.2, Review Standards

Not applicable.

Part 2, Site Plan Design Standards

Sec. 6.2.2, Review Standards

The proposed trail improvements involve some modest site work and are subject to review under this section; however, there is no significant impact related to any of the applicable criteria. The Conservation Board determined that there will be no adverse impact within the protected riparian buffer zone. Minimal grading and earth work is proposed. There are no impacts relative to the bulk of the criteria (i.e. street scape, building orientation, site infrastructure, etc.) under this section. **(Affirmative finding)**

Part 3, Architectural Design Standards

Sec. 6.3.2, Review Standards

Not applicable.

II. Conditions of Approval

1. Prior to release of the zoning permit, the applicant shall obtain written approval of the erosion prevention and sediment control plan from the Stormwater Administrator.
2. Standard permit conditions 1-15.

Riverwalk Trail Improvements- Transportation Enhancement and RTP 2013

Work will be done by: Winooski Valley Park District, Timber and Stone Construction, LLC,
and the Vermont Youth Conservation Corps.

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Bold #'s indicate worksite #/ location on map

#1 Check Steps/ Waterbars

- these are for erosion control measures where the trail repeatedly has been washed out. 2 additional 6"x6"x8' Waterbars will be added at an angle appropriate to the trail for shedding water. Check steps will be added every 10', or as necessary, these will help to slow water running down the trail and help to retain material.

#2 Re-route Trail ~65', Build (5) 8' sections of Puncheon

- trail here needs to be re-routed to avoid a major washout on bank. Brush and small trees will be removed from treadway and it will be raked free of organic materials. New puncheon will be built to keep hikers out of the water from discharge pipe. Puncheon will allow water to still flow freely. The old trail will be brushed in with nearby materials (leaves, branches, etc.) to encourage walking on new trail. New trees will also be planted along the edge of the river.

#3 Re-route trail ~80'

- trail here has either already fallen into the river or is very close. New trail will be approximately 10' from the river's edge. Old trail will be brushed in with native materials found on site to ensure hikers know which path to take. New trees will also be planted in old path. Old metal and trash will also be removed.

#4 Steps

- small slope. (2 or 3) 6"x6"x3' Pressure treated steps will be set into the slope. These will have (2) 3' lengths of rebar in them to secure them in the ground

#5 Check Steps/ Puncheon

- the original trail was washed away in this area. Now the trail goes over a small hill. There will be a set of steps on each side of the hill. We hope to reclaim materials from dismantling a bridge on site and use these to build the new steps. If this material is not useable, 6"x6" Pressure treated will be used. At the base of the North side of the hill approximately 40' of Puncheon will be constructed to keep hikers out of wet area as they approach the bridge

#6 Timber Bridge

- old bridge suffered damage during Tropical Storm Irene. It was displaced from its original location and the alignment of the trail was altered. We plan to remove this bridge, re-use as much of the material as possible in the construction of the puncheon and check steps previously mentioned, and build a new bridge in this location. Timber and Stone, LLC will be leading the construction portion of the bridge.

* The original plan was for the stringers of this bridge to be 40' steel I-beams, due to the location of the bridge, and the difficulty in getting the beams to the site, we are now

looking at building 40' stringers with multiple 2" x14" x 16' Pressure Treated Lumber, glued and lag bolted together. All other aspects of the bridge will remain the same.

#7 12' Bridge

- will be built by the VYCC. Small, seasonal stream crossing. See plans with photo of Worksite #7.

#8 Steps

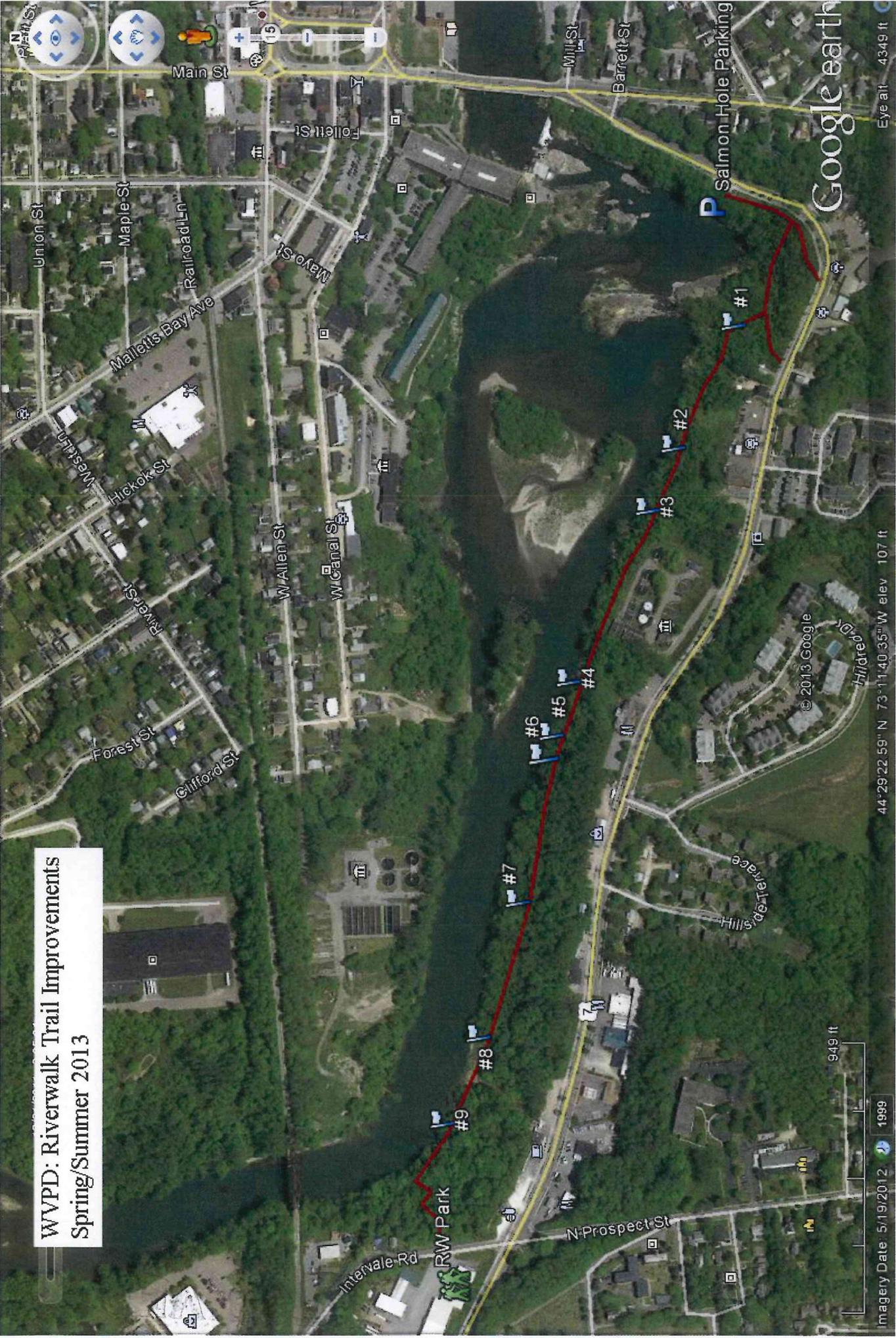
- (3) 3' 6"x6" steps will be dug into the slope and anchored with 3' sections of rebar

#9 12' Bridge

- will be same design as worksite #7

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WVPD: Riverwalk Trail Improvements
Spring/Summer 2013



Imagery Date: 5/19/2012 1999

44°29'22.59" N 73°11'40.35" W elev 107 ft

Eye alt: 4349 ft

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998 629

JUL 12 1994

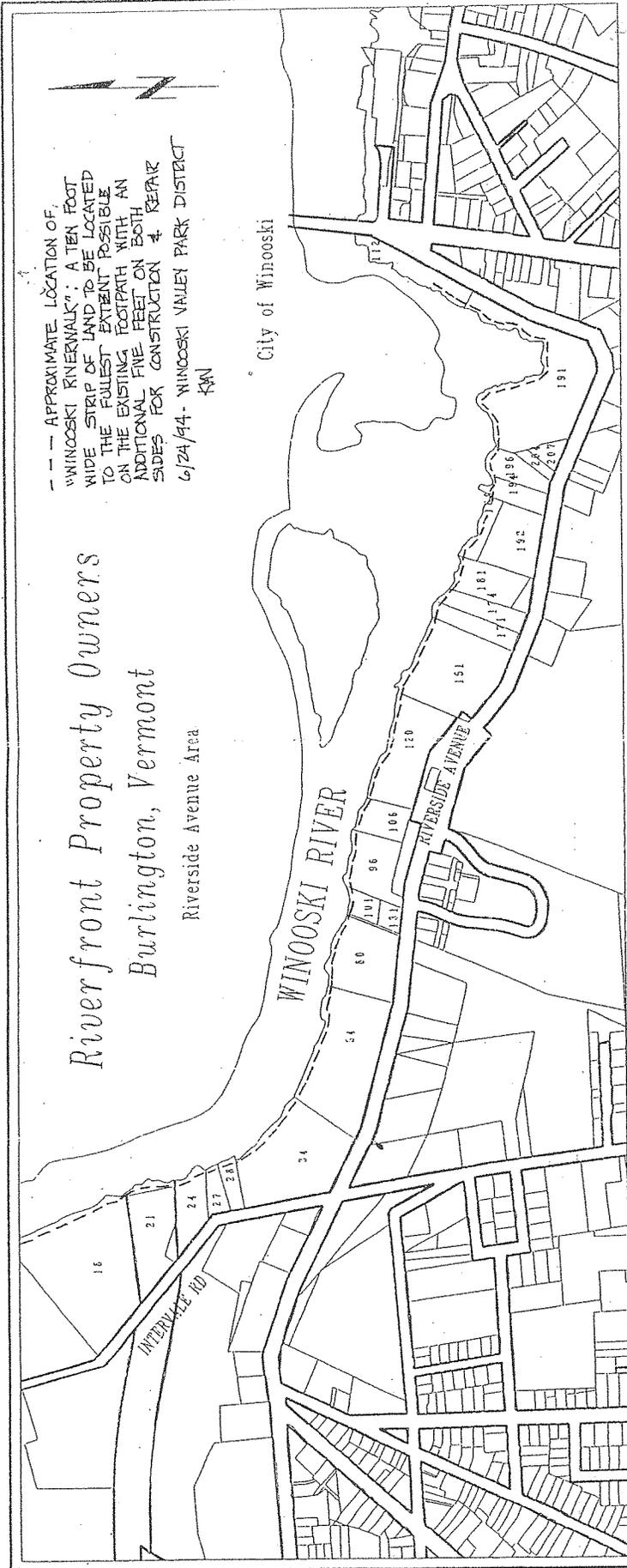
EXHIBIT A

Riverfront Property Owners
Burlington, Vermont

Riverside Avenue Area

--- APPROXIMATE LOCATION OF
WINOOSKI KNEEWALK: A TEN FOOT
WIDE STRIP OF LAND TO BE LOCATED
TO THE FULLEST EXTENT POSSIBLE
ON THE EXISTING FOOTPATH WITH AN
ADDITIONAL FIVE FEET ON BOTH
SIDES FOR CONSTRUCTION & REPAIR
6/24/94- WINOOSKI VALLEY PARK DISTRICT
KMN

City of Winooski



- 18 CALKINS REVA F
180 INTERVAL RD
BURLINGTON VT 05401
- 21 M. J. Olmstead, Mgr.
2 Federal St
St. Albans, VT 05478
- 24 RYAN MICHAEL L & THERESA P
147 NO PROSPECT ST
BURLINGTON VT 05401
- 27 BOYUN LAWRENCE F & RUTH A
44 INTERVAL RD
BURLINGTON VT 05401
- 28 BOYUN LAWRENCE F & RUTH A
44 INTERVAL RD
BURLINGTON VT 05401
- 34 CHAMPLAIN OIL CO INC
P O BOX 226
548 REMO DR
50 BURLINGTON VT 05403
- 34 RIES GORNBK L & FRANCES J
96 LOPES AVE
BURLINGTON VT 05406
- 50 WILLIAM Hunt
- 56 BURLINGTON CITY OF
STREET DEPT
- 103 BURLINGTON CITY OF
STREET DEPT
- 106 DESERHO LOUIS P & RIETA B
382 RIVERSIDE AVE
BURLINGTON VT 05401
- 112 BURLINGTON CITY OF
ELECTRIC DEPT
- 120 TOVELL DAVID N
37 RIVERSIDE AVE
BURLINGTON VT 05401
- 138 FURBER WILLIAM F & IRENE L
BOX 30 R D 12
WILLISTON VT 05495
- 153 BURLINGTON CITY OF
WATER RESOURCES DEPT
- 171 BURLINGTON CITY OF
WATER RESOURCES DEPT
- 174 L T H ASSOCIATES
400 SHELBRUNT RD
30 BURLINGTON VERMONT 05403
- 181 H & D REALTY CO
DAVID HOLMES ET AL
5 ELIZABETH ST
30 BURLINGTON VT 05403
- 188 NEWTON GEORGE & JOANNE
159 RIVERSIDE AVE
BURLINGTON VT 05401
- 191 BURLINGTON CITY OF
ELECTRIC DEPT
585 PINE ST
BURLINGTON VT 05401
- 192 NEWTON GEORGE & JOANNE
159 RIVERSIDE AVE
BURLINGTON VT 05401
- 194 RYAN GEORGE & CHRISTINE
193 95 RIVERSIDE AVE
BURLINGTON VT 05401
- 196 SPOWKE JAS C & MARTHA F
P O BOX 226
COLCHESTER VT 05446
- 204 BRODY BARBARA F
183 RIVERSIDE AVE
BURLINGTON VERMONT 05401
- 207 BURLINGTON CITY OF
ELECTRIC DEPT
585 PINE ST
BURLINGTON VT 05401

Worksite #1
Individual Check Steps

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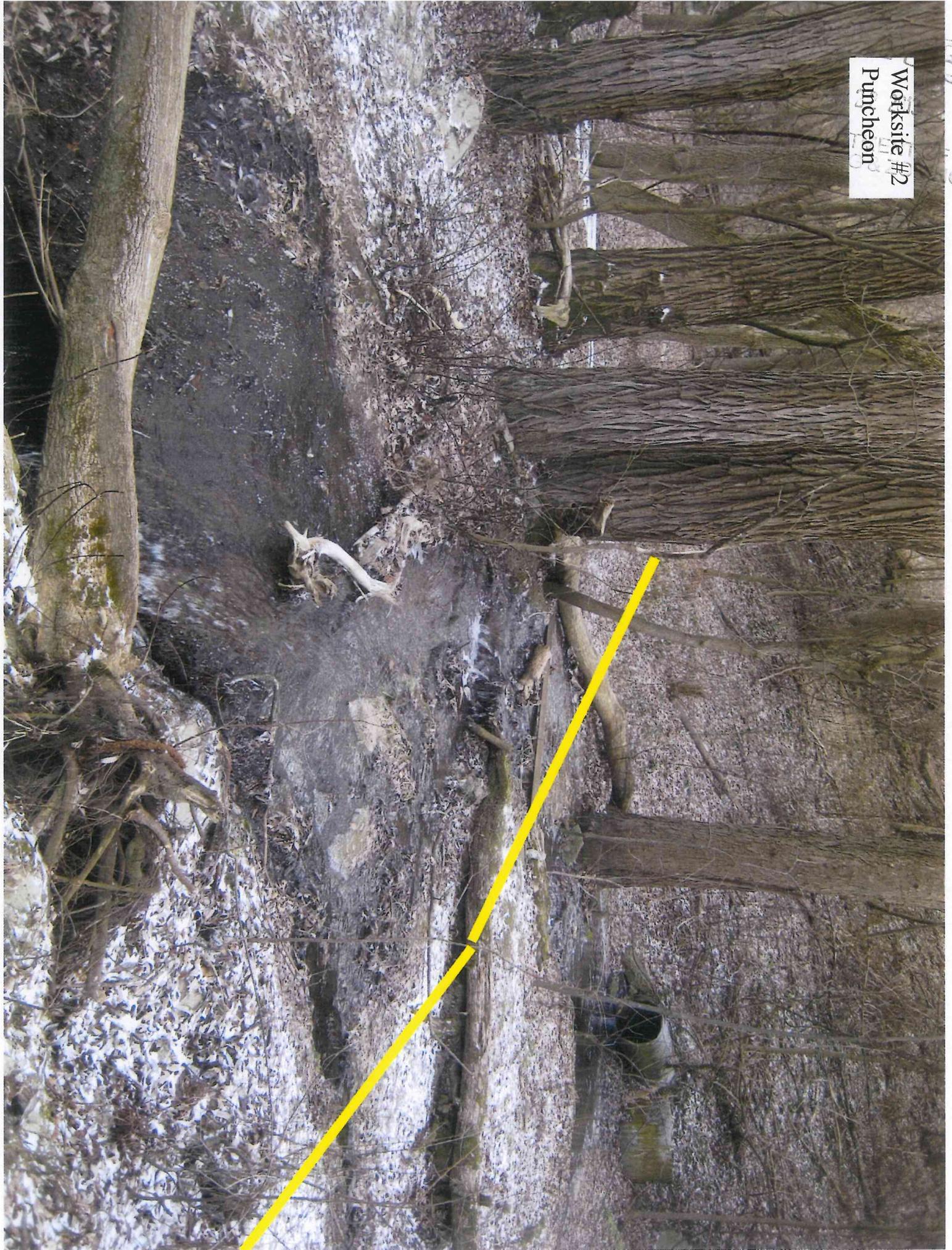
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NATURAL RESOURCES



Worksite #2
Re-route Trail



Worksite #2
Puncheon



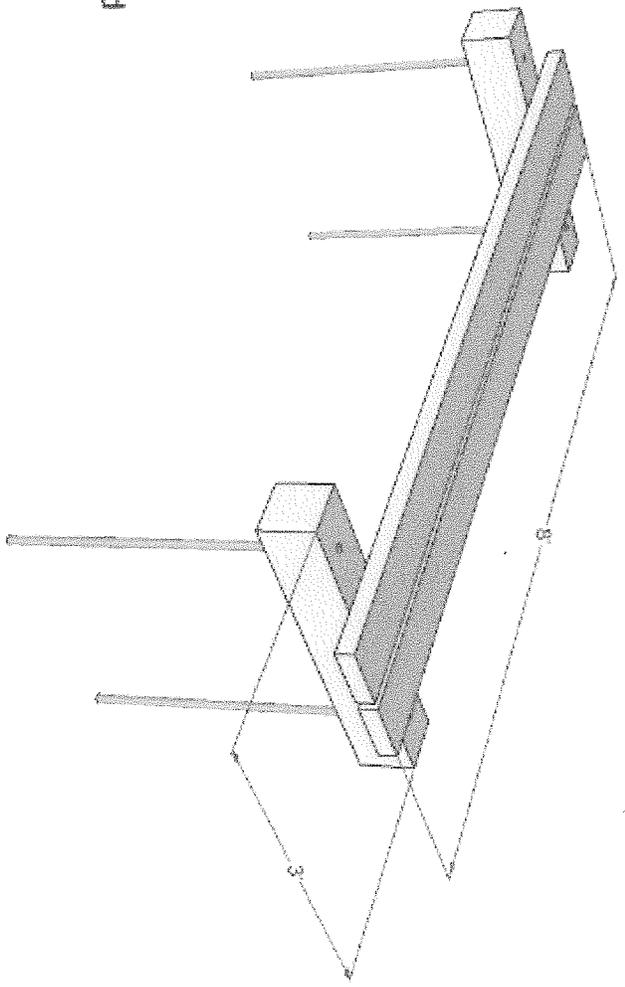
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Winoski Valley Park District
Punchoon Design

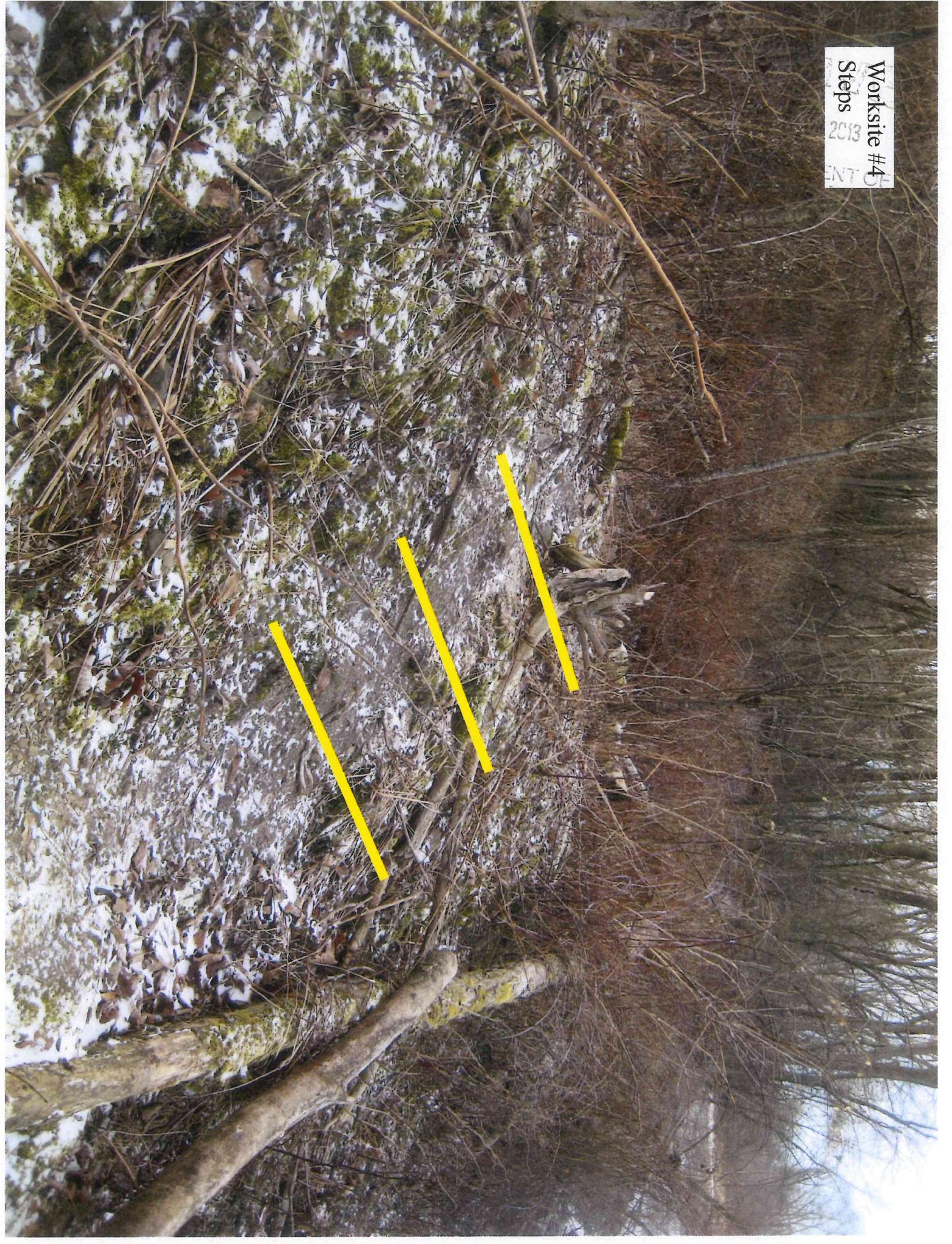
- Materials:
- (2) Sills 6" x 6" x 3' PT
 - (2) Decking 2" x 8" x 8' PT
 - (4) 3' lengths 1/2" rebar
- pre-drill holes. Can also be angled to help in areas known to flood.



Worksite #3
Re-route Trail/
TreePlanting



Worksite #4
Steps
2013
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Worksite #5 North Approach
Timberframe Steps



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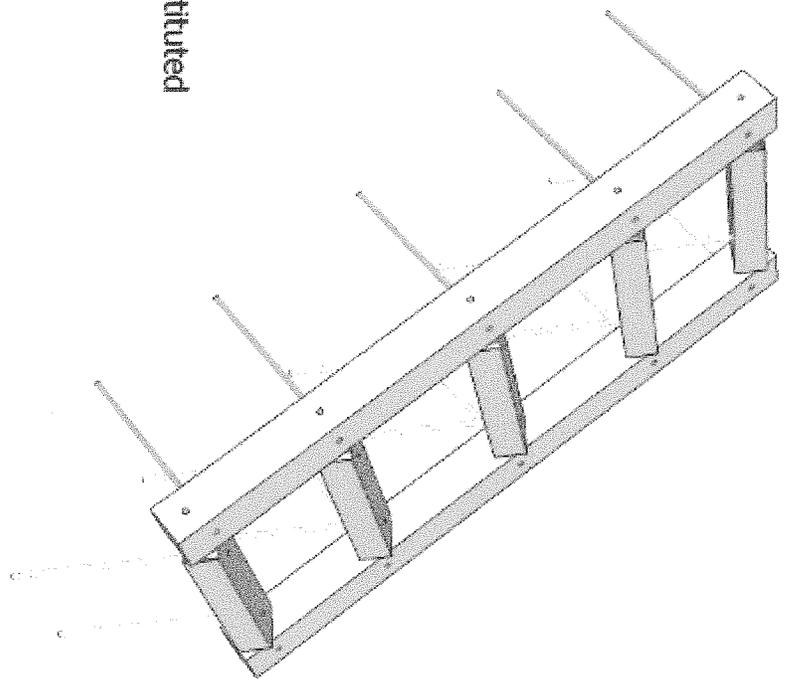
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Winooski Valley Park District
10' Timberframe Staircase

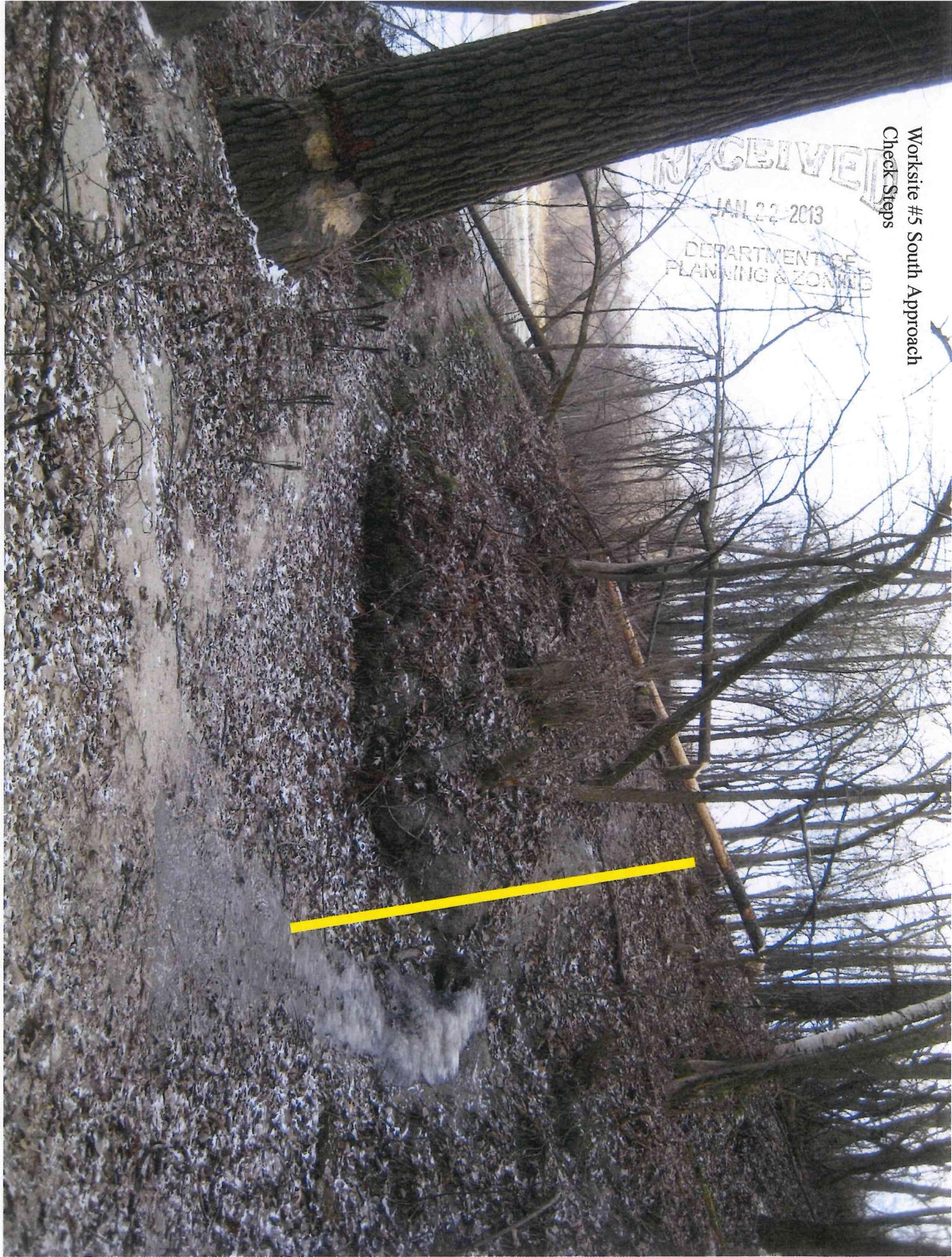
- Materials: * 6" x 6" can be substituted
- Stringers: (2) 8" x 8" x 10'
- Steps: (5) 8" x 8" x 3'
- Rebar: 90'

- (20) 3' @ 2 per stair
- 3' @ 5 per Stringer
- (10) 18" to hold steps in
place from side of stringer



Worksite #5 South Approach
Check Steps

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Riverwalk Trail
Check Step
Trail Construction Specifications

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Trail Spec: Check Steps

Rationale: Check steps are constructed to minimize steep grades in trails. If the running grade exceeds 10%, a check step will prevent erosion and allow for easier hiking. The steps should be comfortable to walk up and down and built solidly to prevent movement over time.

Construction Specification:

Material: Check steps at this site should be constructed from the 8x8 pressure treated timber that was salvaged from the existing bridge. This material is rot resistant and will provide solid footing for the steps.

Dimension: Check steps have a rise that range between 6 to 8 inches tall and a run that ranges from 12 inches to 10 feet. The run is determined by how steep the trail is. As the grade increases, the run measurement will decrease. This allows for a comfortable use by a range of hiking abilities.

Installation:

1. *Site Analysis:* Check steps are a series of rise and runs to gain vertical elevation. To determine the number of check steps needed, measure the total rise of the site and divide by an average step height of 8". This site will require a maximum of 12 steps to gain a maximum of 8 feet of rise. The total run for the site is 20', so the average run of each step will be 18".
2. *Step Installation:* The first step is installed perpendicular to the run of the trail and is rebared into place with 3, ½" pieces of rebar. The sides of the step are also installed and run back into the bank, allowing for the next courses of check steps to rest on top. Each step is backfilled with crushed stone and native soil. This pad of material becomes the stepping surface for each individual step. Measure back from the leading edge of the first step 18" and install the next step. Fill in the sides and continue upward.

Examples:



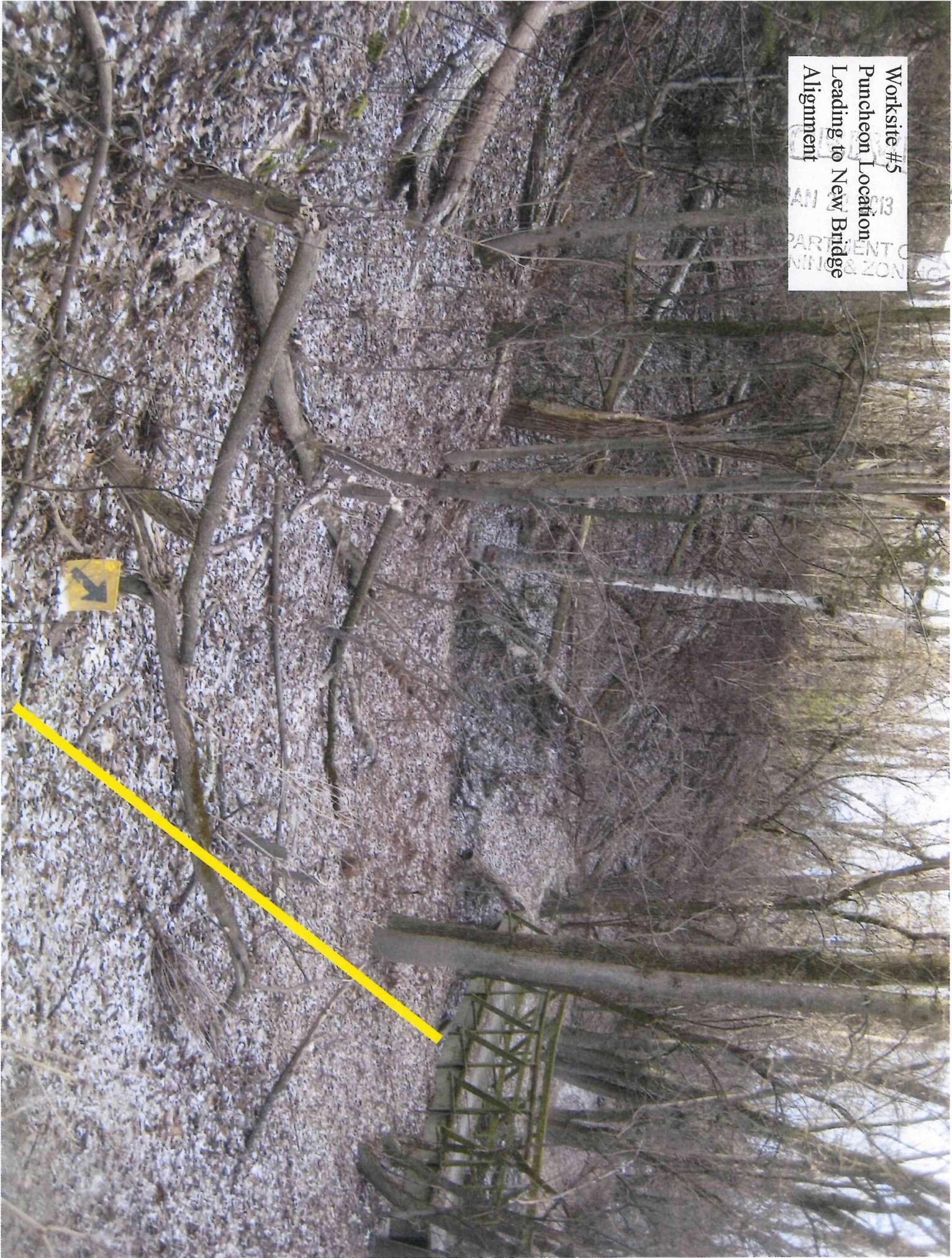
Hanging Rock State Park, NC (railing optional)



Worksite #5
Punchion Location
Leading to New Bridge
Alignment

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Worksite #6
New Bridge Construction



Winooski Valley Park District

Bridge Layout and Design

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During Tropical Storm Irene, the Winooski River rose to unprecedented heights. It flowed alongside the Riverwalk Trail in Winooski, forever changing the alignment of trail sections and displacing an already tenuous bridge structure.

After analyzing the site, it became clear that the existing bridge should be dismantled and replaced. The unique design has served its purpose, but does not fit the altered stream course.

This document, along with its attachments, explores how Timber & Stone, LLC proposes to dismantle the existing bridge, reuse its timber for a puncheon bridge and check steps, and construct a new bridge in its place.



Bridge Site

The flood waters were able to lift the bridge off its original site. Because the bridge was chained to a nearby tree, it did not float away. It is recommended for the new bridge to take the alignment outlined by the yellow line on the picture above.

As described in the attached Construction Specifications, the bridge's stringers should be made of steel and attached to a 10"x10" pressure treated sill that is rebarred to the ground. This tactic was not used in the original construction and will prevent uplift during future high water events.

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Existing Bridge with Proposed Layout (Yellow)

Bridge Design

The bridge's total length will be 40' and the clear span will be 32'. This dimension will require 2 steel stringers and one dimensional lumber center stringer.

The bridge's useable tread width will be 42" and the railing height will be 42".

See Construction Specification for more details.



Proposed Bridge Design
35' Bridge in Stowe, VT

Puncheon Bridge and Check Steps

The trail's approach to the bridge entails a steep and unstable descent and seasonal wetland crossing. To provide an approach that is both safe and sustainable, a series of check steps and a series of puncheon bridges should be installed.

See Construction Specification for more details.



Proposed layout of the puncheon bridges and check steps.

**Riverwalk Trail Bridge
Trail Construction Specification**

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Trail Spec: Bridges

Rationale: A timber bridge is used to cross either a gully or stream. The bridge should be constructed to match the use of the trail system and the character of the surrounding environment.

Construction Specification:

Material: Rot resistant lumber (ie: cedar, hemlock, white oak, locust, or PT) should be used. Careful attention should be paid to the dimension of lumber and its relevance to the overall span of the bridge.

Dimension: The dimension of the bridge should match that of the trail system and the anticipated users. The bridge outlined in this design should be built to provide a 42" wide useable tread.

Installation:

1. *Sills:* The sills are the members of the bridge that support the stringers. They are 10"x10"x6' ground contact rated pressure treated timbers. The sills are laid parallel with the stream or gully, triangulated to ensure squareness, and attached to the ground using ½" x 3' rebar pounded flush with the sill. Each sill requires 4 rebar.
2. *Stringers:* This bridge will require 3 stringers. For a span of 40', it is recommended to use W16x31x40 steel stringers with C9x13.4 steel diaphragms. The diaphragms should be installed at four equally spaced points. The center stringer should be made out of 2, 2x12 pressure treated laminated together with Liquid Nails and secured with 16D galvanized nails. Each section of the center stringer should be no longer than 16'.
4. *Steel Laminates:* The top of each steel stringer should be laminated with pressure treated wood to accept the wooden decking. This is achieved by securing a 2x8 to the top of the stringer flange and a 2x6 under the stringer flange. The gap between the two timbers is filled with a ripped piece of pressure treated wood and secured with 2" timberloc screws.
5. *Decking:* It is recommended to use 2 x 6 rough sawn white oak lumber as the decking boards. The decking should extend 1 ½" beyond the edge of the stringers on either side and should be cut out around each railing post. There should be not less than ½" spacing on the decking. This will allow for sufficient water drainage and a longer lasting bridge structure. Every 9th decking board should be 10 feet long. These boards will accommodate the outrigger supports for the railing posts.
6. *Railing Posts:* 6x6 railing posts are installed every 5 feet with 3, 8" timberloc screws. A 4x4 angled brace is attached to the post with 2, 6" timberloc screws at the post and 2, 6" timberloc screws to the deck board.
7. *Railing Infill:* To accommodate building codes related to openings in railings, the infill openings should be no more than 4" wide. This is achieved by securing 16' galvanized goat panels to the railing posts with galvanized staples. A 2 x 4 cedar kick rail is installed 4" off the deck.
8. *Top Cap:* A 2 x 8 rough sawn cedar top cap is attached to the top of the railing posts with 4" timberloc screws. The top cap should extend beyond the last railing post by 4" and should be rounded.

Riverwalk Trail Bridge
Trail Construction Specification

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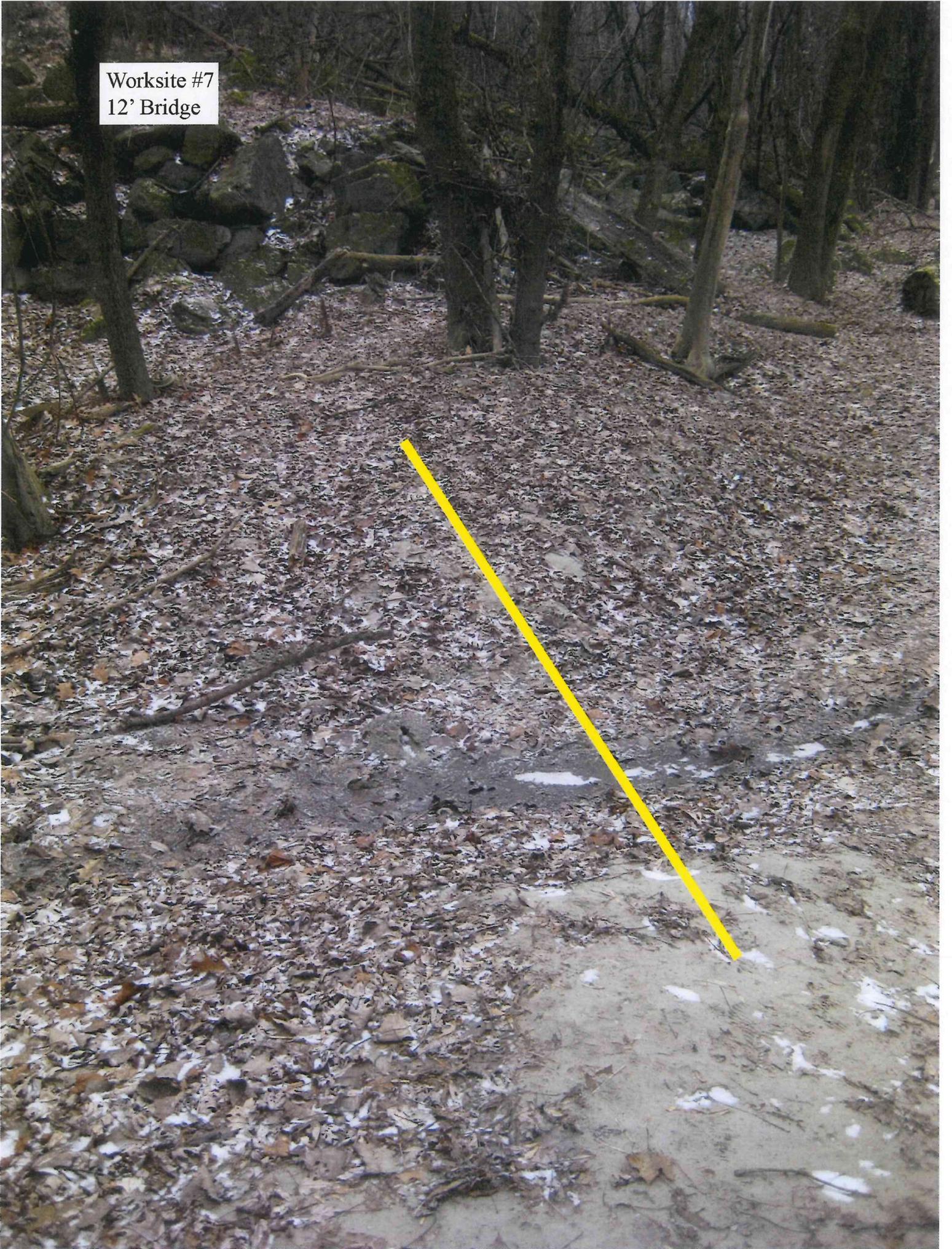
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Example:



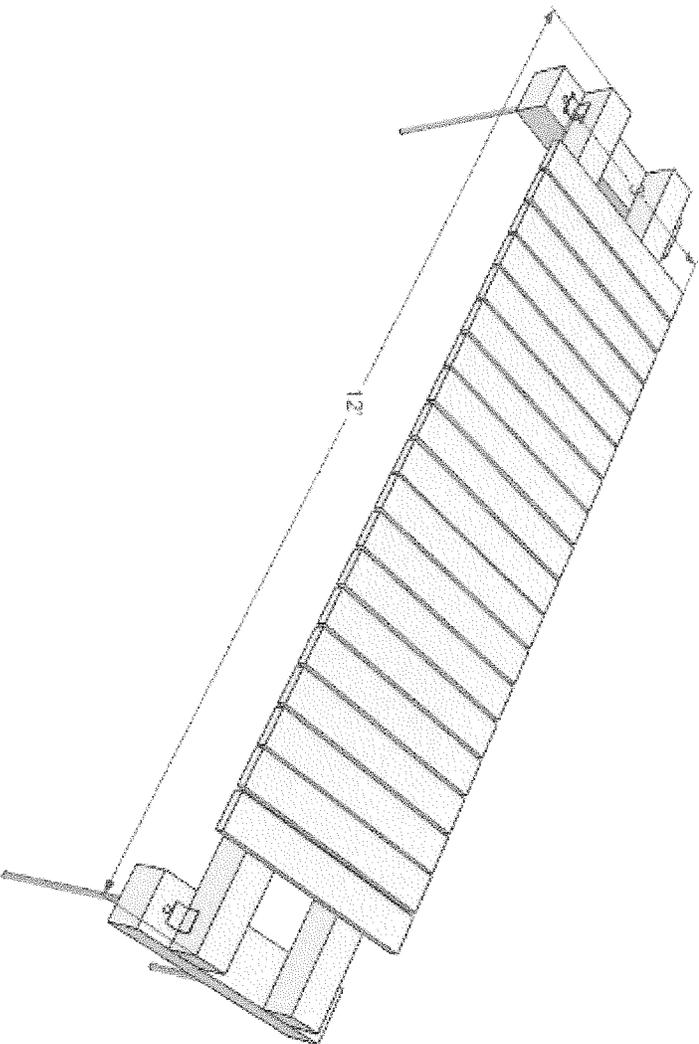
Mill Trail, Stowe, VT

Worksite #7
12' Bridge



Winooski Valley Park District
12' Bridge Design w/ 6" x 8" Footings

- Materials:
(4) 1/2" rebar 3' long
Sills : (2) 6" x 8" x 3' PT
Stringers : (2) 6" x 6" x 3' PT
Decking : (19) 2" x 6" x 3'
Braces : (4) 2 1/4" x 3'



Worksite #8
Steps



Worksite #9
12' Bridge

