Town of Unity

INVITATION TO BID

KANOKOLUS BEACH ACCESS STABILIZATION PROJECT

Released: October 8, 2025

Revised: November 14, 2025

Bid Process and Schedule:

Bids Due: Tuesday, December 2, either received at PO Box that morning or delivered to the Unity Town Office at 74 School Street by 6:00PM.

Sealed bid offers shall be clearly labeled
"Kanokolus Beach Access Stabilization Project" and submitted to:

Town of Unity
Attn: Board of Selectmen
74 School Street · PO Box 416
Unity, ME 04988

On-Site Pre-bid Meeting: Tuesday, October 28, 3:00 PM
Kanokolus Boat Launch, 295 Kanokolus Road, Unity
Requests for scope clarification and potential alternatives to specifications as published may be discussed at the pre-bid meeting but must be followed up in writing and answered as described below.

All questions must be directed by email to clerk@unityme.org and received by Friday, November 7th at 2:00 PM. Answers as well as any modifications to this package will be posted on the web site (www.unityme.org) by Friday, November 14th at 2:00 PM.

Bid Opening: Tuesday, December 2, 6:30 PM.

Contractors should note there is a simultaneous companion bid opportunity for related parking area work at the site. Contractors may bid on either or both projects and may offer a discount if selected for both.
See Invitation to Bid for "Kanokolus Boat Launch Parking Area Improvement Project".

The Town reserves the right to accept or reject any and all bids.

KANOKOLUS BEACH ACCESS STABILIZATION PROJECT

October 8, 2025 – Revised November 14, 2025

SECTION I. Background and Summary

The Town of Unity is partnering with Friends of Lake Winnecook in conducting watershed and shoreline improvements to reduce erosion and sedimentation into Unity Pond (Lake Winnecook). This beach access stabilization landscaping project is joined with a related parking area improvement project to address erosion and sedimentation at the Kanokolus Beach and Boat Launch site at 295 Kanokolus Road in Unity, Maine, while improving the recreational experience for site users. Bids are being sought for both projects and construction of each portion will need to be coordinated. The target completion date is May 14, 2026, ahead of seasonal high use commencing the following week.

The Town is submitting a Permit by Rule Application to the Maine Department of Environmental Protection for this project during the time of the bidding process. The Town and contractor(s) hired must follow any permit conditions applied to the project. These will be known before any contract is developed. Contractors should plan on applying best management practices for preventing sedimentation during construction.

Funding for this project is provided by the Town of Unity and a grant to Friends of Lake Winnecook provided by the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act. The funding is administered by the Maine Department of Environmental Protection in partnership with EPA.

SECTION II. Scope of Work

A. Option A: Hardscape and Willow Fascines Only

The contractor will accomplish the following hardscape access improvements adjacent to the boat launch site as noted in the Recommendations sections of the NPS Site Plan in Attachment A. Vegetative plantings and Erosion Control Mulch are not included in this bidding opportunity. However, the Town reserves the right to add such additional work to the scope of the selected bidder depending upon budgeted resources.

1. Deliver, place, and imbed all rocks and boulders shown and described in Attachment A.
2. Deliver and properly install willow fascines at the two access points south of the boat ramp as shown in Attachment A.
3. Remove, relocate and securely imbed kiosk at new site.
4. Deliver, place and imbed two four-foot wide granite steps to manage access south of boat ramp. (to be verified with DEP or infiltration steps)
5. Deliver and install infiltration steps to manage access on north side of boat ramp.
6. Deliver and securely install double 7’ leafed and wheeled split rail or stockade gate (14’ total span) between trees for maintenance access control. Contractors shall propose one or more gate options for the Town to approve.
7. Deliver, place and imbed two four-foot wide granite steps to manage access to beach area north of maintenance entrance.
8. Deliver and install loam/compost mix to amend soils behind installed rocks on north side of boat ramp.
9. Add gravel walkways as shown to guide traffic from parking area to stairways on north side

of boat ramp.

10. Slightly relocate existing boulder(s) on north side of boat ramp and grade to create level path for disability access.

B. Option B: Full Plan Installation

The contractor will install all items in Option A plus all plantings and erosion control mulch as described in Attachment A.

SECTION III. Standards and Specifications

A. Contractor Requirements/References

1. Contractor must provide at least 2 references of similar landscaping projects completed within the last 5 years.
2. Contractor must be currently certified in Basic Erosion and Sedimentation Control by the Maine Department of Environmental Protection.

B. Work Window

1. The site and access road will be ready for work to begin by April 15, 2026 or as agreed upon by the Unity Board of Selectmen, which may include allowing an exception during the spring posting season depending upon road and weather conditions.
2. All landscaping will be completed by May 14, 2026, or as otherwise agreed upon by the parties due to weather conditions or unforeseen circumstances, but no later than June 15, 2026.
3. The schedule of work will need to be coordinated with the parking area paving project.

C. Material and Construction Standards

1. The contractor will utilize professional landscaping standards to securely imbed materials into the ground. Specific instructions including rebar and loam are noted in Attachment A.
2. The contractor will propose one or more options for the maintenance gate to the Town for review and approval prior to contract signing.
3. The contractor will propose a method for resetting the kiosk in the ground to the Town for review and approval prior to contract signing.
4. For Option B, the number, species and size of plants to be installed shall be included in the bid. Final plant selection will be reviewed and approved by the Town prior to contract signing.
5. Designs for Infiltration Steps are provided in Attachment B.
6. Specifics for Toe Slope Protection Methods are illustrated in Attachment C.
7. Designs for Willow Fascines are provided in Attachment D.
8. A plan for erosion and sedimentation control will be proposed by the contractor and approved by the Town representative prior to commencing work.

D. Inspection of Work

1. The contractor will notify the Town representative when work is to be conducted. The Town representative will monitor the contractor's work to the degree felt necessary and will conduct an inspection when work is complete.
2. If the Town representative is not available, the contractor will document and photograph the installation methods of the kiosk and gate and provide these to the Town representative.

SECTION IV. Instructions to Bidders

A. Bid Process and Schedule – see Cover Sheet.

B. Contents of Bid. Each contractor shall submit the following:

1. Completed Bid Form (Attachment E)
2. Statement of Qualifications to perform the work
3. References from two similar landscaping jobs done within the last five years containing the owner, contact information for the owner's representative, description of job, photograph, location and year constructed.
4. Number, species and size of proposed plantings for Option B.

C. Pre-inspection. Each Contractor, before submitting an offer, shall become completely familiar with the required work and shall rely on their own investigation. No consideration will be granted for any alleged misunderstanding of the material to be furnished, the work to be done, or for any defects in the final product that are the result of the absence of pre-inspection of a site.

D. Site and Document Examination. At the time of the opening of the Bids, each Bidder will be presumed to have inspected the sites and to have read and be thoroughly familiar with the Bid documents. The failure or omission of any Bidder to receive or examine any form, instrument, or document shall in no way relieve any Bidder from all obligations in respect to that Proposal. The Unity Board of Selectmen reserves the right to accept or reject any or all Proposals or make a decision as may best serve the interests of the Town of Unity.

E. Basis of the Bid. The Bid shall be based on the materials, methods, equipment and products specified as well as Maine Bureau of Labor Standards Fair Minimum Wage Rates.

F. State Sales and Use Taxes. Maine State Sales and Use Taxes should not be included in any quotation for the permanent installation of material as the Town of Unity is exempt from payment of such taxes.

G. Contract Assignment, Subletting and Transfer. No Contract may be assigned, sublet, or transferred without the written consent of the Board of Selectmen.

H. Project Personnel and Business Background. Contractors may be required to furnish a statement of their business experience, record of accomplishments, financial responsibility, and the names of supervisory personnel to be assigned to this project, at the discretion of the Board of Selectmen.

I. Right to change or add work. The Board of Selectmen reserves the right to add, delete or adjust items in the scope of work in order to remain within or expend budgeted funds for these projects. Completion of the work is subject to the availability of funds. Such negotiations would take place after the award and reflect modifications in the work. Field change orders may also be prepared by the Unity Board of Selectmen or designee with associated adjustments in the contract price.

J. Clean up. At the completion of work, the site shall be left in a neat and clean condition, subject to approval of the Municipal Representative.

K. Performance bond. The selected Contractor may, at the discretion of the Town, be required to furnish a One Hundred Percent (100%) Contract Performance Bond to cover work associated with the Contract in according to Title 14 MRSA § 871. Should this option be chosen, the Town will allow the quote to be adjusted to reflect the cost of the Performance Bond.

L. Insurance. The Contractor shall furnish proof, within two weeks of notice to the Contractor of the acceptance of its offer, to the Town that the Company is covered by adequate Workers' Compensation Insurance and by the minimum Public Liability (PL) and Property Damage (PD) insurance required ($400,000 - $800,000 PL and $100,000 PD). The Contractor shall assume all responsibility for damage done to private property and for personal injury, all related to the project during the performance of the Contract. The failure to provide this certificate will constitute a breach of the Contract and may, in the discretion of the Municipality, result in termination of the Contract.

M. OSHA Safety Regulations. These projects are subject to compliance with all requirements of the Occupational Safety and Health Administration.

N. Warranties. The Contractor guarantees that the work to be done under this contract and the materials to be furnished by the supplier for use in the construction of the same will be free from defects or flaws. This warranty shall be for a period of one year from the date of completion. Maintenance of plantings, once inspected, are the responsibility of the Town.

O. Indemnification. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Municipality, and their agents, and employees against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees arising out of or resulting from the performance of the work regardless of standard of care. This indemnification extends to all costs and all attorneys' fees incurred by the Municipality.

P. Bid Due Date and Time and Other Conditions. Sealed bids arriving as directed on the cover sheet will be opened and reviewed at the Board of Selectmen meeting that evening with the intention of making an award during that meeting, subject to reference checks. All bids become the property of the Town of Unity. A bidder may withdraw at any time prior to the bid opening.

Q. Basis of Acceptance. In making its award determination, the Board of Selectmen will consider the bid price as well as the bidder's responsiveness, background, skill, references, and availability.

R. Acceptance period. The Municipality shall have up to a maximum of 30 days from the date of bid opening to accept an offer.

S. Notice of Acceptance. The Contractor will be notified in writing by the Municipality of the acceptance of its offer in whole, or in part, within five (5) business days of when it has been accepted.

T. Rejection of Offers. The Municipality reserves the right to reject any or all proposals whenever such rejection is in its best interest. The Municipality reserves the right to reject the proposal of a Contractor who has previously failed to perform properly or to complete on time Contracts of a similar nature. The Municipality also reserves the right to reject a proposal from a Contractor if an investigation shows that the Contractor is not in a position to perform the Contract. All bidders will be notified of the results of the bid award in writing.

U. Contract. Within sixty days of the Notice of Acceptance, the Municipality will prepare a contract for execution with the selected bidder to contain at a minimum the contents of the bid package, along with negotiated terms of changes in scope, communications protocols, designated project contacts, and any other necessary details.

V. Payment. Contract payment will be lump sum after the project is completed to the satisfaction of the Board of Selectmen. A proper invoice shall be submitted to the Town of Unity including work completed and pricing. Approved invoices will be paid within fourteen (14) days after approval.

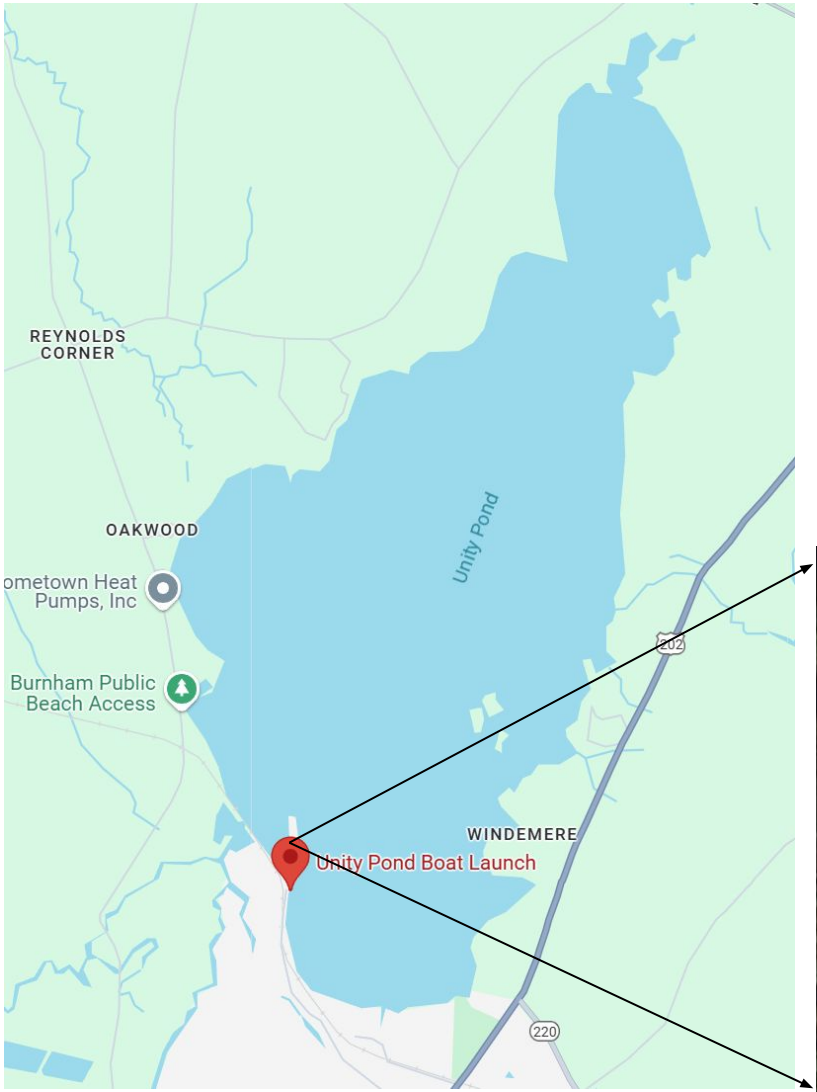
NPS SITE PLAN

#20250008 – Unity Pond Watershed Restoration Project, Phase III

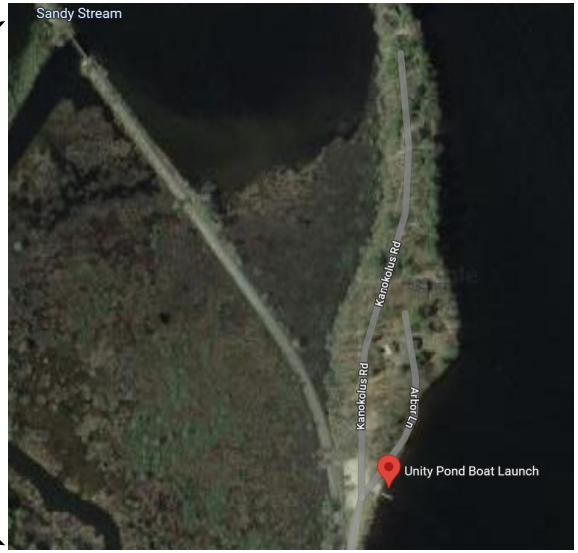
Unity Boat Launch/Kanokolus Beach
Unity, ME 04988
Map/Lot: 15-13
NPS Site #: 1-05

Prepared by Jennifer Jespersen, Ecological Instincts – Revised November 6, 2025 (v7)- following 11/4 review by DEP
For Friends of Lake Winnecook

Location Map (Unity Pond Boat Launch, Unity, ME)



N



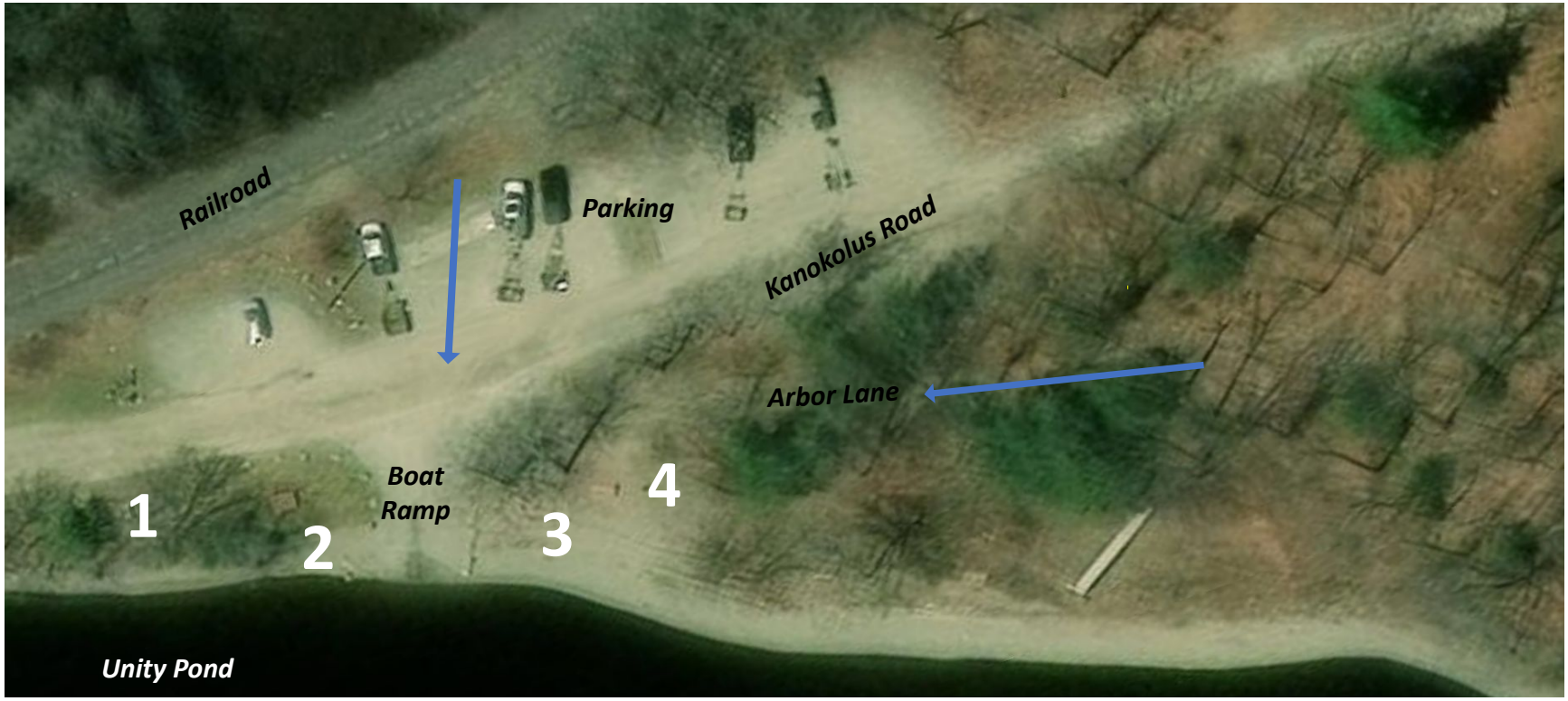
Site Description: The Unity Pond Public Boat Lauch, located on Kanokolus Road in Unity, ME features a boat launch and picnic area open to the public. The property is located on the east side of Kanokolus Road. A large gravel parking lot is located between the Belfast & Moosehead Railroad and Kanokolus Road. A kiosk is located on the grass to the right of the boat launch. This area also serves as a narrow picnicking area with picnic tables separated from Kanokolus Road by large rocks to prevent vehicles from parking on the grass. A sign at the kiosk directs people to this area as a “dog area”. To the left of the boat launch is a sloped hillside leading from the parking lot to the beach. Additional picnic tables are located here. Kanokolus Rd continues to the northeast, splitting near the beach access area at Arbor Lane which services residential homes on the point.

Project staff conducted a site visit on 5/2/2025 to provide technical assistance for a potential cost-share project as part of the Unity Pond Watershed Restoration (319 Grant) Project, Phase III. This plan focuses on reducing NPS pollution from the public beach and picnic areas as well as serving as a public demonstration site for NPS pollution abatement. A separate site plan will be incorporated that includes the road and parking areas.

Nonpoint Source (NPS) Problem(s): This property was identified as an NPS site during the 2020 Unity Pond Watershed Survey (Site #1-05). Stormwater runoff from the road and parking areas flow across this site carrying sediment and attached nutrients. There is evidence of shoreline erosion (near the kiosk to the right of the boat launch), bare soil that has been compacted by heavy foot traffic, eroding slopes due to lack of ground cover and compaction, and runoff from uphill parking lots and roads. Invasive plants (honeysuckle) were noted within the shoreland zone between Kanokolus Road and the lake.

Recommended Solution(s): The recommended BMPs for this location aim to reduce NPS pollution to Unity Pond by stabilizing the shoreline and other bare soil areas across the property, planting native vegetation, installing erosion control mulch, and increasing education around dog waste. Recommendations are shown in the site overview on page 4, and photographs on pages 5 - 12.

Site Overview (Kanokolus Beach):



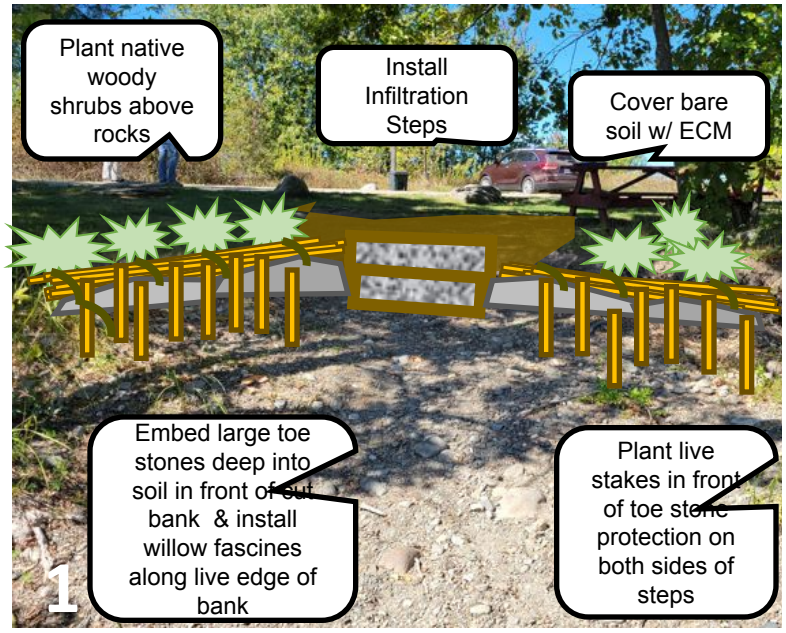
- **Kiosk, Dog Walking & Picnic Area-** Move the existing Kiosk to the south on the lawn and move "Dog Area" sign off the kiosk to the boat launch sign area across the road; consider installing doggy bags and bag disposal kiosk for pet waste; Revegetate thin or bare soil areas; plant native shrubs between the large stones to filter runoff from the road.
- **Shoreline Erosion-** Stabilize shoreline using a combination of stone, willow fascines, and native woody shrubs to prevent ongoing bank undercutting.
- **Beach Access Road/Path-** Define walking paths to keep people off vegetated areas; replace existing rotting terrace with large stones, revegetate bare soil with native shrubs and perennials; cover bare soil around plants and paths with 3-5" of erosion control mulch (ECM); add defined gravel walking paths and infiltration steps to access the beach.
- **Steep Bank Below Arbor Lane-** Revegetate the slope above with native vegetation; add ECM around all plants to cover bare soil.

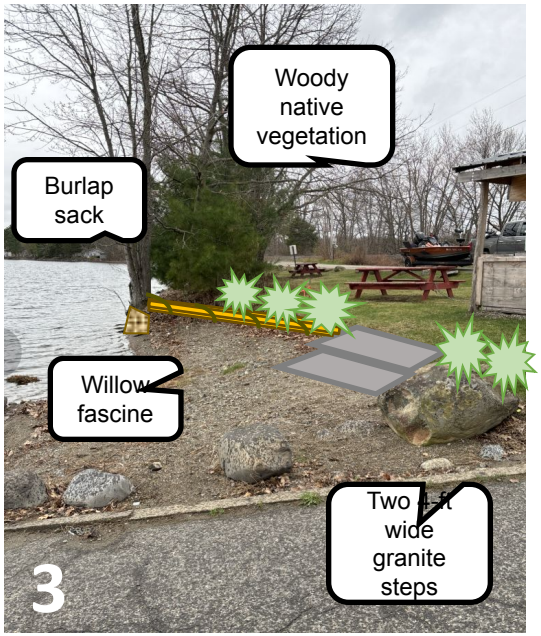
Recommendations:

Existing Conditions:

1. Cut Slope across from boat launch sign caused by ice scour (~ 16’ long), 22’ from MHW.
2. View of kiosk adjacent to boat launch.
3. View of beach in front of existing kiosk south of boat launch showing cut bank due to ice scour.

Recommendations:





Stabilize 16 ft. of cut-bank with toe slope protection using large rocks (24-36") inset into native soil; secure **willow fascines** securely between toe stones and cut bank; install **infiltration steps** (3' wide); plant **woody native vegetation** above rocks and **live stakes** below; **cover bare soil above steps and around picnic table with 3-4" of ECM** (16x24' area). MHW 11' from cut slope.

Move existing kiosk to the south to allow for clear access to the beach and for bird watching. **Move "pet area" sign** off kiosk to across the road at the boat launch sign area to minimize pet waste near shore.

Stabilize ~40' of cut bank with willow fascines trenched into the beach; install **4' wide granite steps** reinforced with rebar for shore access; **plant native woody shrubs in grass** behind toe slope protection; tuck **burlap sack** filled with a 50/50 mix of erosion control mix (ECM) and 4" minus stone to prevent ongoing erosion under tree roots.

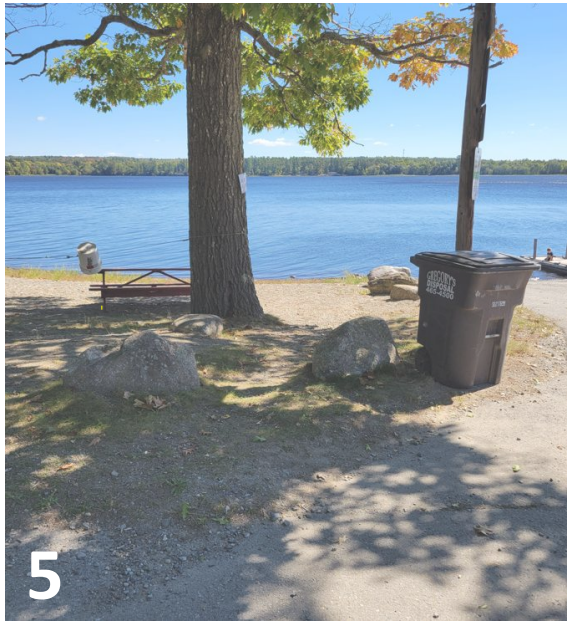
Recommendations:

Existing Conditions:

Bare sandy soil and evidence of rill and gulley erosion from Kanokolus Rd., boat launch runoff and foot traffic.

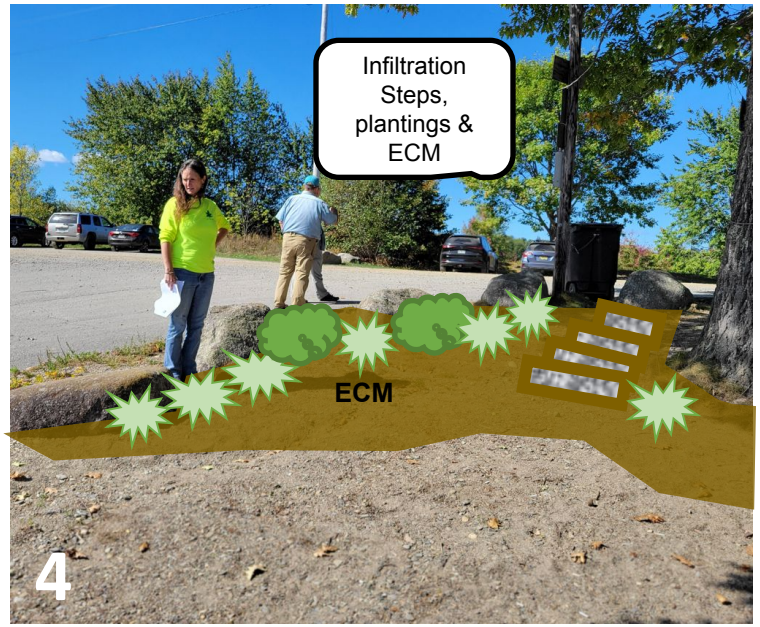
View from Kanokolus Rd. to lake (boat launch to right in photo).

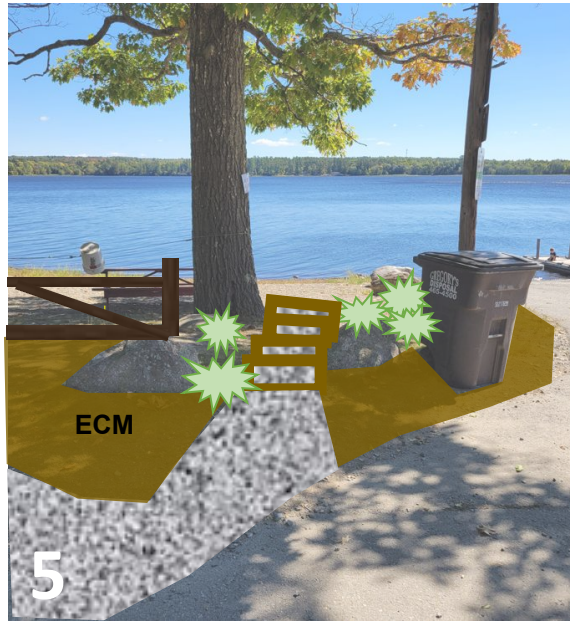
View toward Kanokolus Rd. between two trees with rope & buckets used for accessing picnic area with emergency vehicles or maintenance.



Recommendations:

- **Install infiltration steps** (14'L x3'W x 6" H) for access from parking to beach; **Add Erosion Control Mulch (ECM)** to cover bare soil around steps.
- **Add gravel walkway** from road to infiltration steps to formalize walking areas; **cover bare soil around walkway and steps with ECM; and plant native vegetation** around steps (approx. 20 plants).
- **Add an operable (14'Wx3'H) wooden split rail fence** (or other style) to close off area between trees and still allow maintenance access; **add ECM** to bare soil areas (3-4" deep) and remove buckets and rope; add shrubs to cover gaps between two tall trees and fence rail to prevent foot traffic.





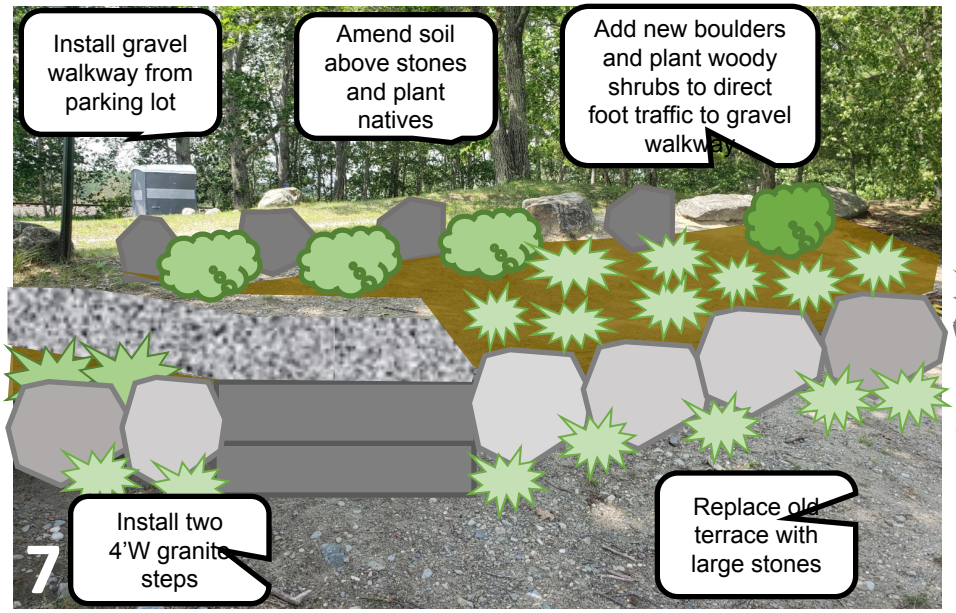
Recommendations:

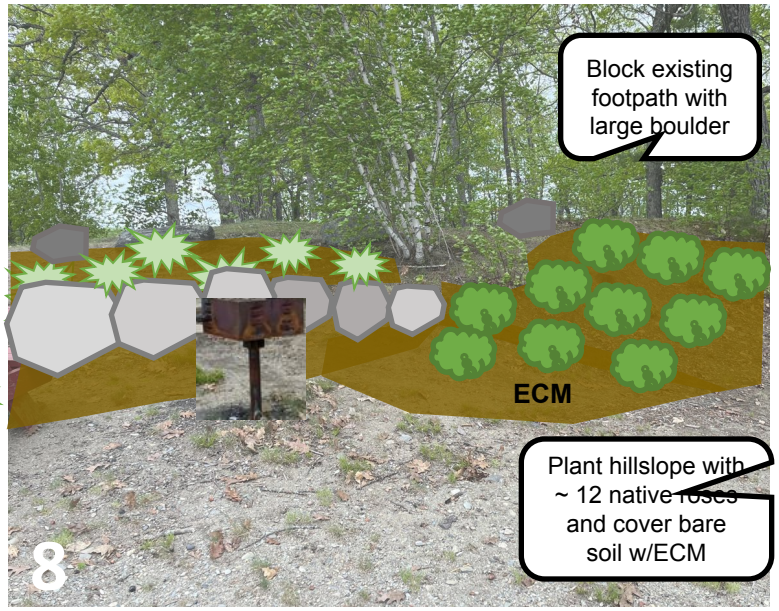
Existing Conditions:

View toward Arbor Lane & Kanokolus parking area showing large area of bare soil and undermining of terrace.

Steep slope looking uphill from lake to Arbor Lane. Terrace in photo 7 to left in this photo.

Recommendations:

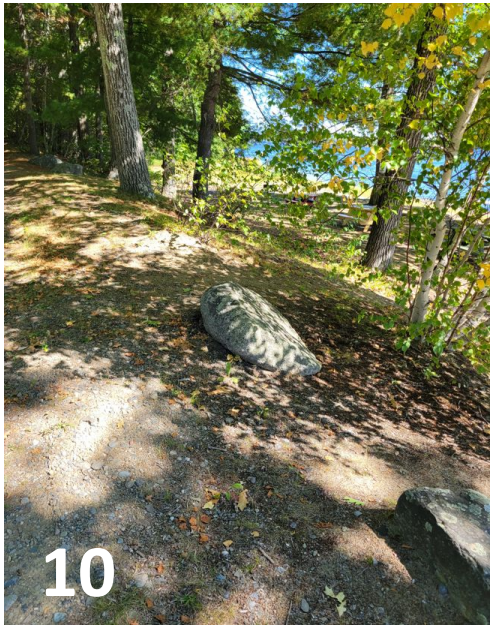




- **Install winding** walkway (3/4" crushed stone) from parking area to terraced area; **replace rotting wooden log terrace with large stone** (36") from large tree to birches on slope below Arbor Way (~60' long, see photo 8)- key stones into beach and add filter fabric between rock and soil; **install two 4'-wide granite steps** between stone (~ 4' from tree) to direct foot traffic to beach; **add 3-4 new boulders** between beach and Arbor Way to minimize foot traffic through this area; plant large native shrubs (e.g., spiraea, sweet fern, New England aster, bayberry, high bush blueberry) in gaps between rocks; **amend soil** above stone retaining wall and plant with a mix of hardy native vegetation; **add 3-4" of ECM** on bare soil above the terrace. Plant native plants below terraced area (consider native grasses such as little bluestem, tufted hair grass, etc.). Estimated 36 plants. MHW 45' to terrace.

- **Continue stone terrace across slope** to birch tree; **revegetate hillslope** below Arbor Lane with approximately a dozen Virginia roses.

Recommendations:

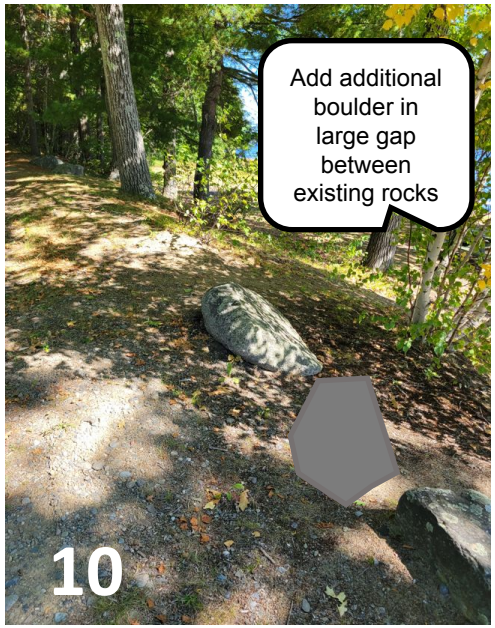


Several areas between Arbor Lane and the Kanokolus Parking area and between Arbor Lane and the beach experience heavy foot traffic resulting in bare, compacted soil.

Arbor Lane to left, lake to right.

View of the picnic area north of the boat launch.

Recommendations:



- **Cover all access paths between parking area and the beach with 3-5” of ECM** (~ 870 sq ft).
- **Add one additional boulder at top of slope to right of Arbor Lane** to minimize foot traffic down slope.
- **Move large rocks to allow handicap access to picnic area** from boat launch (should tie in at bottom of infiltration steps (shown in 4 & 5)). Path should be >36”.

INFILTRATION STEPS

~ controlling erosion on steep paths~

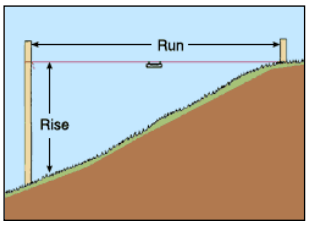
Portland Water District

Purpose: Infiltration steps use crushed stone to slow down and infiltrate runoff. They are effective on moderate slopes, but consider building wooden stairways on 1:1 slopes (45°) or areas where rocks or surface roots make it difficult to set infiltration steps in the ground.

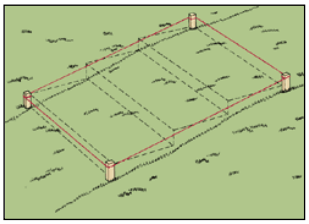
Note: Prior to installation, contact the Maine DEP and town Code Enforcement Officer to find out if permits are required.

Installation: Infiltration steps are steps built with timbers and filled with crushed stone or pea stone. See separate sheet for retrofitting existing timber steps. Build new infiltration steps as follows (adapted from www.homestore.com):

1. **Calculate the Rise and Run of Each Step**
   First, measure the overall rise and run of your steps in inches. The step height is determined by the 6" thickness of the timber. Divide the rise by 6 and round off to the nearest whole number to determine the number of steps. Divide the run by the number of steps to determine step width. A comfortable width will be at least 15".

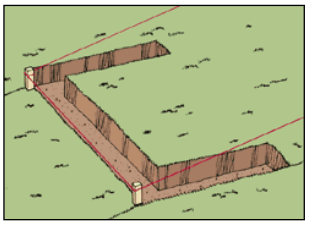


2. **Stake Out the Steps**
   Figure out the step width. A 4' width is comfortable for one person. Paths must be less than 6' wide in the shoreland zone. Drive stakes at each corner of the stairway and stretch string between them to outline the steps. Spray paint or sprinkle sand or flour on the ground to mark the outline.

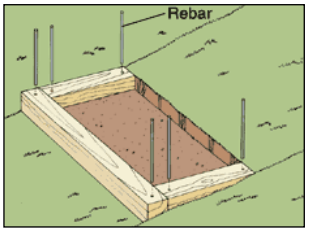


3. **Excavate the First Step**
   Starting at the bottom, dig a trench for the first timber (this will be little more than a shallow groove in the ground). Next, dig trenches for the side timbers, which need to be long enough to extend 6" past the next step's riser. Check to make sure the trenches are level.

   Note: Infiltration steps may not require side timbers, especially if the steps are in an eroded pathway where the surrounding land is higher. In this case, extend the timbers into the adjacent banks so water will not go around the steps.

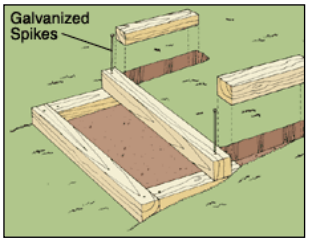


4. **Cut the Timbers**
   Cut the riser timber to length, then measure and cut the side timbers. Drill ½" diameter holes 6" from the ends of each timber. Position the step, then remove or add soil as needed to level it. Anchor the step by driving 18" long pieces of ½" diameter steel rebar through the holes and into the ground. Make sure the rebar is flush or slightly recessed since the edges may be sharp. Set the side timbers in place, and level and anchor them.



   Shovel out the soil inside the step to create a surface roughly level with the bottom of the timbers. Additional soil can be removed to provide more area for infiltration. Make sure to dispose of excavated soil in a place where it will not wash into the lake or other resource.

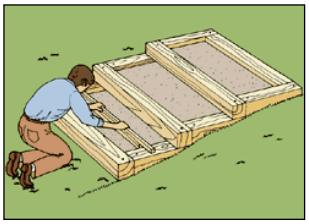
5. **Build the Next Step**



Measure from the front of the first riser to precisely locate the second riser. Dig a trench for the riser, and trench back into the hill for the sides, as before. Set the riser roughly in place with the ends resting on the side timbers below. The riser is attached to the side timbers below it with 12" galvanized spikes. Drill a pilot hole about 5" into the riser, and spike the riser into the side timbers below. Set the side timbers, drill ½" holes and pound in 18" rebar pieces into the ground as with the first step.

Excavate between the sides, as before. Continue up the hillside in this fashion. When installing the top step, cut the side timbers 6" shorter than the ones on the lower steps - these timbers do not need the extra length since no stairs will rest on them.

6. **Lay Down Geotextile Fabric and Backfill with Stone**



Line the area inside each set of timbers with non-woven geotextile fabric. This felt-like fabric will allow water to percolate through but will separate the stone from the underlying soil. Make sure the fabric is long enough to extend a few inches up the sides of the timbers.

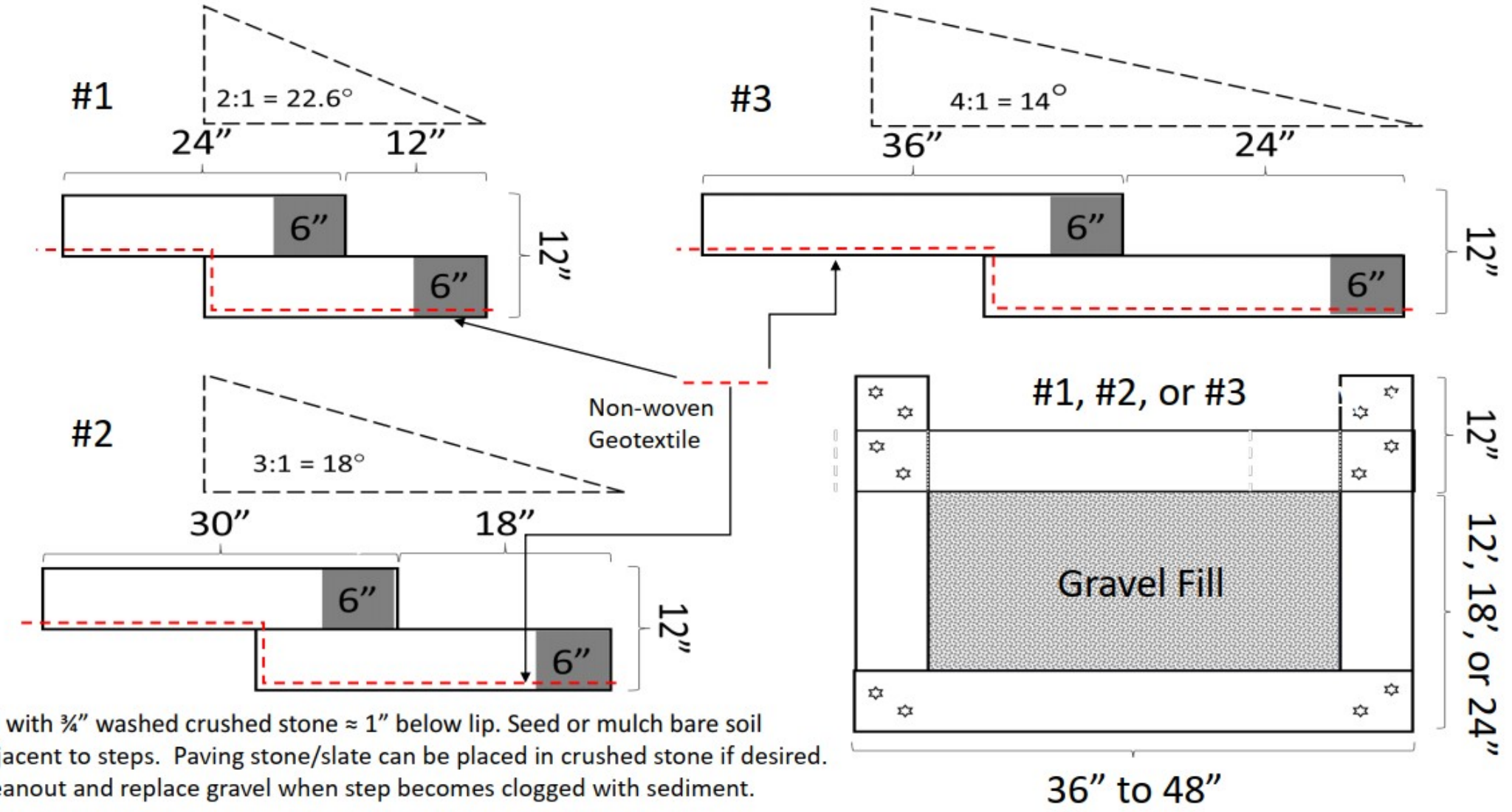
Fill each step with ¾" crushed stone or pea stone until it is about 1" below the top of the timber. This lip will break up water flow and encourage infiltration. Pea stone is comfortable for bare feet but may be more expensive and more difficult to find. Paving stones can also be set into crushed stone to provide a smooth surface for bare feet - as long as ample crushed stone is exposed to allow infiltration.

Seed and/or mulch bare soil adjacent to the steps. Planting areas adjacent to the steps with shrubs and groundcover plants to soften the edges and help prevent erosion.

Materials: Crushed stone and pea stone can be purchased from gravel pits. Contact your local Soil and Water Conservation District for suppliers of non-woven geotextile fabric. Other geotextiles, including landscaping weed barrier, can be substituted for smaller projects. Pressure treated timbers, cedar landscape timbers and steel rebar can be purchased from lumber and hardware stores. Some stores will cut rebar to the specified length for a small fee. Otherwise, rebar can be cut with a hack saw.

Maintenance: Replace rotten timbers. If the crushed stone or pea stone becomes filled up with sediment over time, remove, clean out sediment and replace.

4”X 6” Pressured Treated Infiltration Step Schematics



Fill with ¾” washed crushed stone ≈ 1” below lip. Seed or mulch bare soil adjacent to steps. Paving stone/slate can be placed in crushed stone if desired. Cleanout and replace gravel when step becomes clogged with sediment.

Resloping, Rock Toe and Rip Rap

Bank stabilization

Lake friendly living means using lakeshore BEST MANAGEMENT PRACTICES

BMP

Resloping, Rock Toe and Rip Rap

STANDARDs

Shorefront

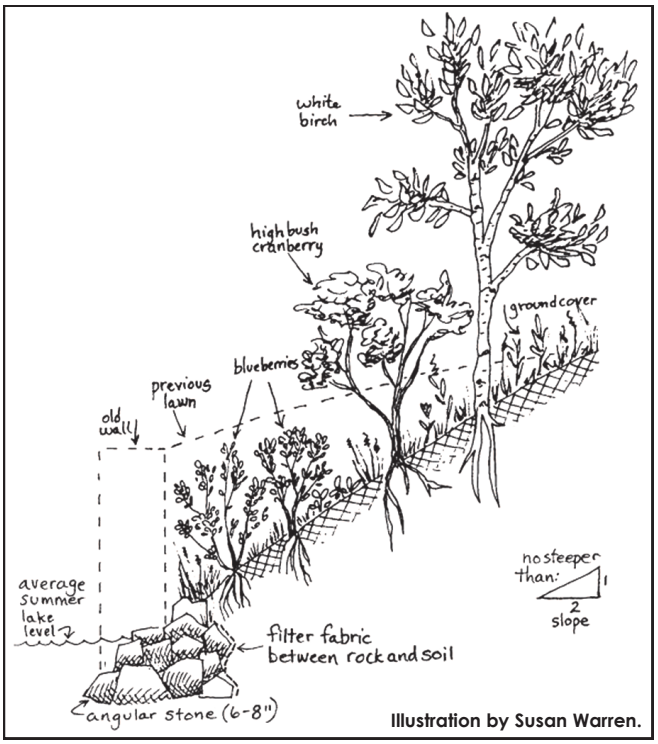
- Stable bank
- Natural Conditions

LAKE BENEFITS

All bank stabilization BMPs reduce the effects of erosion to shorelines and stream banks that empty into lakes and ponds. By reducing erosion, landowners are also reducing the amount of sediment and phosphorus that enters the lake. The most natural form of erosion control is the best option. As a result the BMPs are listed in order of implementation. Riprap should be considered a last resort for erosion control.

Resloping, Rock Toe and Rip Rap

Where erosion has already occurred, consider methods that will allow you to mimic a natural shore, rather than building a retaining wall. Walls are expensive to build, offer no lake habitat or ecological benefits, are a barrier to wildlife, and will require replacement over time.



A resloped bank stabilized with native vegetation and a shallow rock toe that is only partially visible above water giving it a natural look.

RESLOPING

Description: Resloping is a term that describes the regrading of an eroded bank to a moderate and more natural slope.

Purpose: To reduce the erosion of sediment and phosphorus into a lake by stabilizing a lake bank. Resloping also allows you to replace old retaining walls, as the drawing on the right illustrates.

How To: Reslope, if necessary to smooth erosion gullies, and replant native species above the rock toe. A 2:1 slope (2 feet horizontal to 1 foot vertical) or less can generally be stabilized with just vegetation. Use an erosion control blanket(example of straw), to cover bare soil while herbaceous vegetation becomes established.

Plant water-loving plants just below the eroding area. These will dampen the wave energy and trap eroding soil from above. Unless the erosion is severe, it may eventually self-stabilize. Choose quick growing native species and stay away from invasive species.

Note: Any work that occurs in the lake, below the average summer water level, requires a Shoreland Encroachment Permit. Read the BMP supplement *Understanding the Shoreland Encroachment Permit* for more details.

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Resloping, Rock Toe and Rip Rap

Bank stabilization

Shrubby vegetation planted above a rock toe prevents erosion better than grass or a lawn especially in circumstances of flooding and intense wave or ice action.

ROCK TOE

Description: Rock toes are low structures of rock placed along the water's edge of a shoreline. They often occur naturally along many Vermont lakeshores and are man made as a structural reinforcement of the bank, when wave action is the primary cause of the loss of bank material.

Purpose: Rock can be layered at the toe of the shoreline as an armoring technique to provide additional strength to banks. This will reduce the scouring of the toe and banks in high velocity wave events. Rock lining the shoreline toe is more effective at protecting the bank when combined with bioengineering practices such as live staking, plantings, and seeding. This combination is how natural lakeshores avoid bank instability and erosion problems.

How To: Most undeveloped natural shores have a line of cobble and rocks right at the water's edge. If rocks are already present at the water' edge, leave them there. Rocks in the10-16 inch size are typically better than larger ones because large rocks tend to just transfer the wave energy elsewhere, where as the smaller size rock deflects it back and forth between rocks. It is important to have vegetation overhanging the rocks to keep the sun from heating up the rocks and the water, as well as to provide bank support above the rock toe.

If the area is undergoing serious erosion, it may be necessary to excavate in order to establish a rock toe. Install filter fabric against the back side of the rocks to prevent soil from washing out from behind the rocks (see the illustration on the first page). The smaller size rock (10-16 inches) also grips more tightly together, holding in the soil better with less chance of soil being washed out through any large holes among the rock. The rock toe only needs to extend about six to nine inches above the water level. Using this approach allows you to mimic and re-establish a naturally vegetated shore.

RIPRAP

Description: Riprap is heavy, large, irregular-shaped rock fit into place, without mortar, to manage severely eroded lake banks or shorelines.

Source: Maine DEP

Purpose: Controlling shoreline erosion often does not require the use of riprap and should be used as a last resort. Instead, shoreline erosion problems can frequently be addressed by limiting foot traffic, diverting upland runoff, and stabilizing banks with native vegetation. These are more affordable and lower-impact solutions that still protect water quality and property values. Riprap should be used only where necessary and never to replace a stable, naturally vegetated shoreline.

Resloping, Rock Toe and Rip Rap

Bank stabilization

How to:

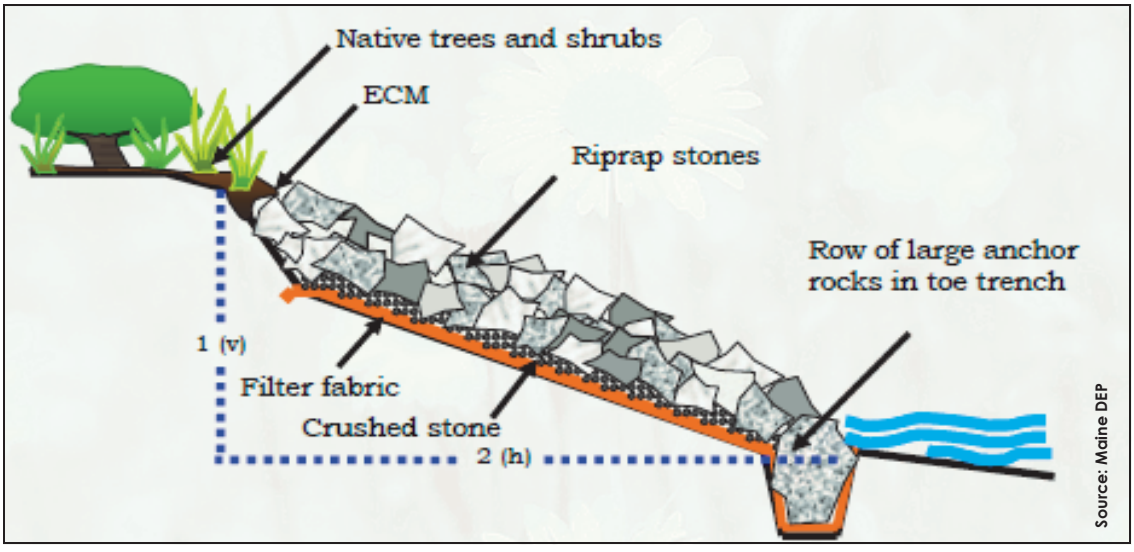
1. If necessary, excavate the bank so that the final riprap slope will be no steeper than 1:1 (horizontal to vertical) and no shallower than 3:1 (horizontal to vertical). Do not remove existing vegetation. Create a trench in the bank toe that is at least as deep as the height of your largest riprap stone (see illustration below).
2. Place a layer of filter fabric over on top of the exposed slope to prevent soil movement under the riprap. If filter fabric is used, it should be followed by a three inch thick layer of clean three fourths (3/4) inch crushed stone. Bury in filter fabric at the top of the riprap edge and at the base, extend it into the toe trench. If filter fabric is not used, a six inch layer of crushed stone ranging from three fourths to three (3/4 - 3") inches must be placed down. (Filter fabric is highly recommended because it protects the soil from being washed out from any gaps between the rocks.)
3. Immediately install the riprap layer. First place an anchoring row of large rocks in the trench at the toe of the bank. Riprap stones should then be hand-placed or very carefully dumped so that smaller stones fill the voids between larger ones. The riprap layer should be at least twice as thick as the average rock diameter.

Ensure that the riprap extends up the slope no more than two feet above the normal high water line.

1. Native trees and/or shrubs should be planted above the riprap. Vegetation provides habitat and can filter nutrients and pollutants from runoff, and helps stabilize the bank and secure the riprap. Planting non-native plants in the disturbed area is not permitted.
2. Disturbed soil above the riprap should be immediately stabilized with seed and hay mulch or permanently mulched.

Materials:

- Riprap: Purchase large angular stones from your local quarry or gravel pit. Do not take them from the shoreline (because they help prevent erosion) or from below the normal high water line (because they provide habitat for aquatic life).



Riprap installation.

- Filter fabric (also known as a geotextile) and available at most garden stores.
- Crushed stone may be purchased from your local quarry or gravel pit. Ask for washed stone only.
- Buffer plants can be purchased at local nurseries. See Lake Wise BMPs— *Live Staking* and *Planting and Maintaining Vegetation Areas*.

Excerpt from Midpeninsula Regional Open Space District / CA Resources Board

Best Management Practices and Standard Operating Procedures for Routine Maintenance Activities in Water Courses

WATTLES (LIVE FASCINES)

Construction Specifications:

Wattle Preparation:

- Cuttings shall be harvested and planted when the willows, or other chosen species, are dormant.. This period is generally from late fall to early spring.
- Choose plant materials that are adapted to the site conditions from species that root easily. A portion (up to 50%) of the bundle may be of material that does not root easily or dead material.
- The cuttings should be long (3 feet (1 m) minimum), straight branches up to 1 1/2 inches (4 cm) in diameter. Trimmings of young suckers and some leafy branches may be included in the bundles to aid filtration. The number of stems varies with the size and kind of plant material
- Cuttings shall be tied together to form bundles, tapered at each end, 6-30 feet (2-10 m) in length, depending on site conditions or limitations in handling.
- The completed bundles should be 6-12 inches (152-305 mm) in diameter, with the growing tips and butt ends oriented in alternating directions.
- Stagger the cuttings in the bundles so that the tips are evenly distributed throughout the length of the wattle bundle.
- Wattle bundles shall be compressed and tightly tied with rope or twine of sufficient strength and durability. Polypropylene ‘tree rope’ approximately a 3/16 inch (0.5 cm) diameter provides the necessary strength and durability.
- Wattle bundles shall be tied 12-15 inches (305-381 mm) apart.
- For optimum success wattles should be pre-soaked for 24 hours or installed on the same day they are harvested and prepared. The wattles should be installed within 2 days after harvest unless pre-soaked. Wattles must be stored in the shade and under cover or under water. They are live material and should be treated as such.

Installation:

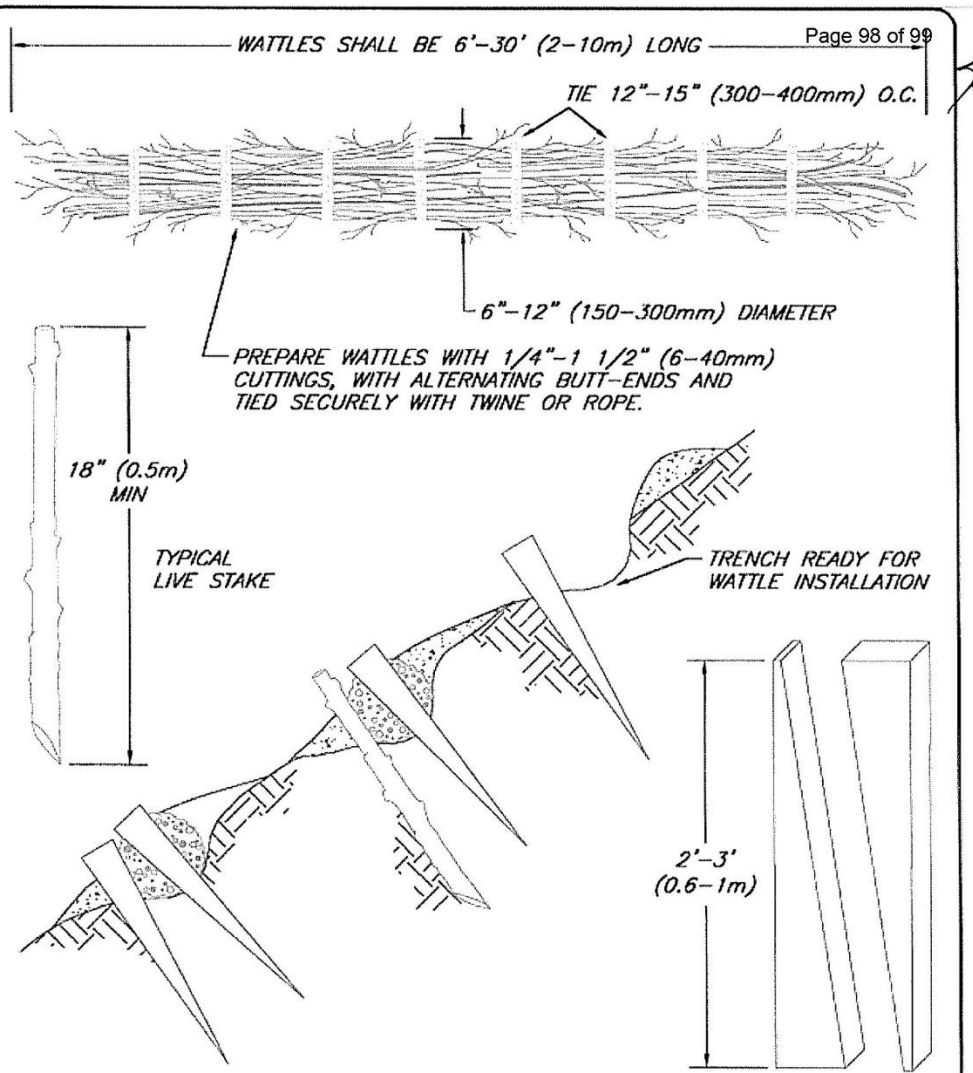
- Work shall progress from the bottom to the top of the slope .
- Install wattles into trenches dug into the slope on contour
- Spacing of contour tr enches (wattles) is determined by soil type, potential for erosion and slope steepness.
- Perform any slope repairs, such as gully repair, slope scaling, diversion dike, gabion, or toe wall construction, prior to wattle installation.
- Beginning at the base of the slope, dig a trench on contour. The trench shall be shallow, about 1/2 the diameter of the wattle. The trench width will vary from 12-18 inches (305-457 mm) depending on the slope angle.
- Place the wattles immediately after trenching to reduce desiccation of the soil.
- Wattles shall be staked firmly in place with one row of construction stakes on the downhill side of the wattling, not more than 3 feet (Im) apart. A second row of stakes shall be placed through the wattles, near the ties, at not more than 5 feet. (1.5 m) apart.
- Overlap the tapered ends of adjacent wattles so the overall wattle thickness of the wattle is uniform. Two stakes shall be used at each bundle overlap such that a stake may be driven between the last two ties of each wattle.
- Live stakes, if specified, are generally installed on the downslope side of the bundle. Drive the live stakes below and against the bundle between the previously installed construction stakes.
- Proper backfilling is essential to the successful rooting of the wattles Backfill wattles with soil from the slope or trench above. The backfill shall be worked into the wattle interstices and compacted behind and below the bundle by walking on and working from its wattling terrace.
- Repeat the proceeding steps to the top of the slope,
- Place moist soil along the sides of the live bundle. The top of the bundle should be slightly visible when the installation is completed..
- Plant the slope as specified.
- Seed and mulch slope. Shallow slopes, generally 3:1 or flatter may be seeded and mulched by hand. Steeper slopes should have seed applied hydraulically and the mulch shall be anchored with tackifier or other approved methods.

Inspection and Maintenance:

- Regular inspection and maintenance of wattle installations should be conducted, particularly during the first year.
- Repairs shall be made promptly. Stakes that loosen because of saturation of the slope or frost action shall be re-installed.
- Rills and gullies around or under wattles shall be repaired. Perform slope scaling and brush packing as necessary.

» Repairs to vegetative practices shall be conducted promptly.

- All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to assure continued performance of their intended function.

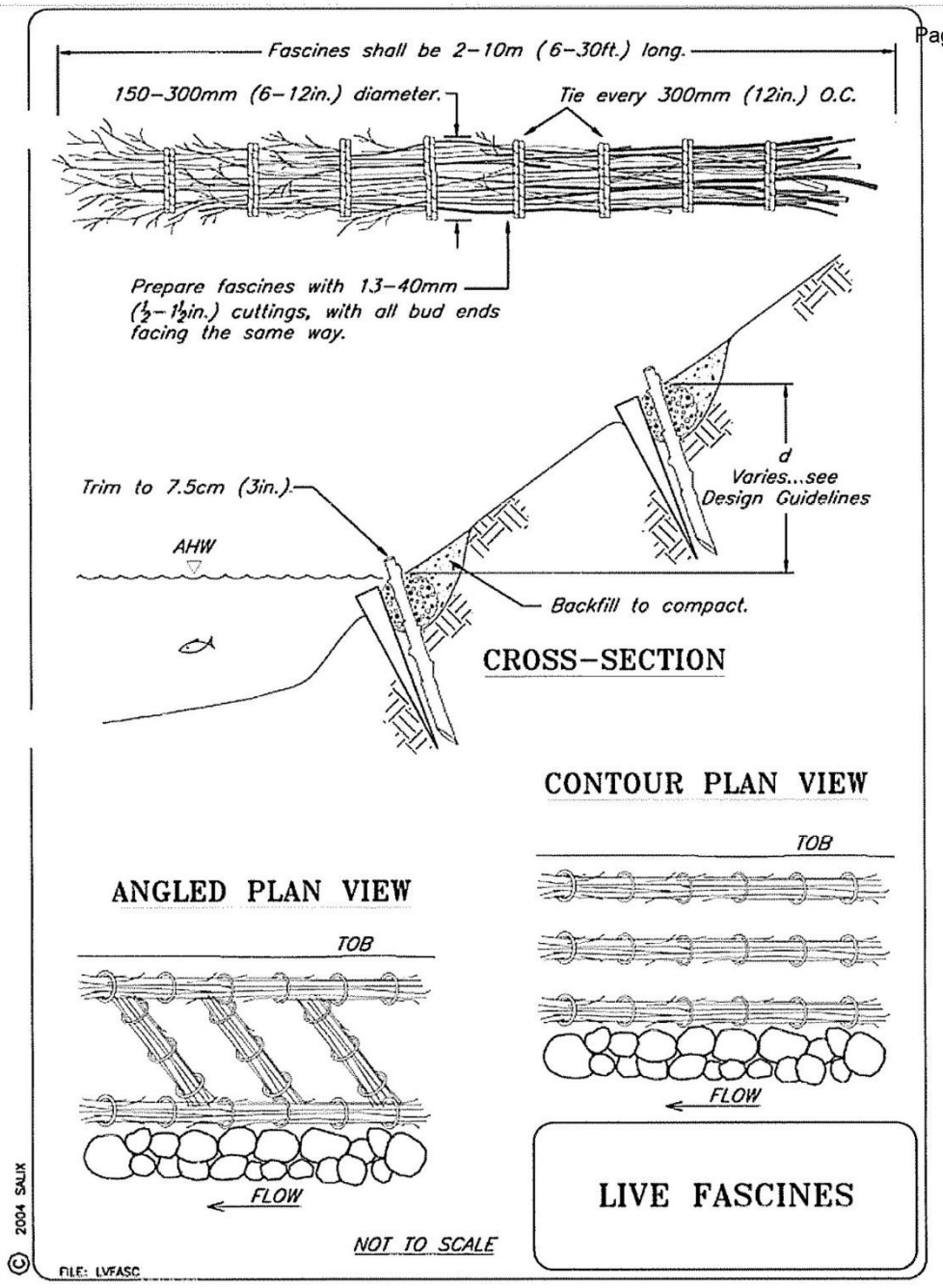


NOTES:
1. HARVEST AND INSTALL WATTLES DURING DORMANT SEASON.
2. INSTALL WATTLES ON SLOPE CONTOURS.
3. ALL WORK PROCEEDS FROM THE BOTTOM OF THE SLOPE TO THE TOP.
4. FILL OR PARTIALLY COVER WATTLE WITH SOIL FROM SLOPE OR TRENCH ABOVE.
5. COMPACT AND WORK SOIL INTO COMPLETED WATTLES.

WATTLE
(LIVE FASCINE)

© 1996 J. McCULLAH

FILE: WATTLE


Fascines shall be 2–10m (6–30ft.) long.
150–300mm (6–12in.) diameter.
Tie every 300mm (12in.) O.C.
Prepare fascines with 1.3–40mm (½–1½in.) cuttings, with all bud ends facing the same way.
Trim to 7.5cm (3in.).
AHW
d
Varies...see Design Guidelines
Backfill to compact.
CROSS–SECTION
CONTOUR PLAN VIEW
TOB
FLOW
ANGLED PLAN VIEW
TOB
FLOW
NOT TO SCALE
LIVE FASCINES
© 2004 SALIX
FILE: LVFASC

ATTACHMENT E. Town of Unity Bid Form

PROJECT: Kanokolus Beach Access Stabilization Project

BIDDER INFORMATION:

Company Name _____

Address _____

Telephone _____ Email _____

Name and Title of Authorized Representative _____

BIDDER SIGNATURE AND ACKNOWLEDGEMENT:
We herewith submit our bid in accordance with the requirements and specifications herein and acknowledge as follows:

1. We agree if selected to enter into a binding contract with the TOWN OF UNITY within 60 days of the Notice of Acceptance and to perform and furnish all work or products as specified in the bid package for the price named below and including all conditions stated therein.
2. We certify that we have familiarized ourselves with the nature and extent of the bid package documents, worksite, locality and any local conditions, laws and regulations that in any manner may affect cost, progress, performance or furnishing of the work.

3. We certify that we meet all requirements within the bid package, including minimum insurance coverages, bondability and DEP Basic Erosion and Sedimentation Control Certification.

4. We acknowledge that the needs for products and services are the best estimates of commodities at the time of this bid, but that these estimates may vary. We agree to supply the products and services required, whether ultimately costing more or less than these estimates, at the prices quoted herein.

5. Our statement of qualifications and references are attached.

6. With these acknowledgements, we agree to complete the work as advertised for the following price:

   Option A: $_____ **Option B: $** _____

7. (If applicable) We are also submitting a bid for the ***Kanokolus Boat Ramp Parking Area Improvement Project*** and if awarded both bids will reduce the quoted amount for this bid by:

   Option A: $_____ **Option B: $**_____

Hereby signed by BIDDER's Authorized Representative:

_____ _____

Signature Date