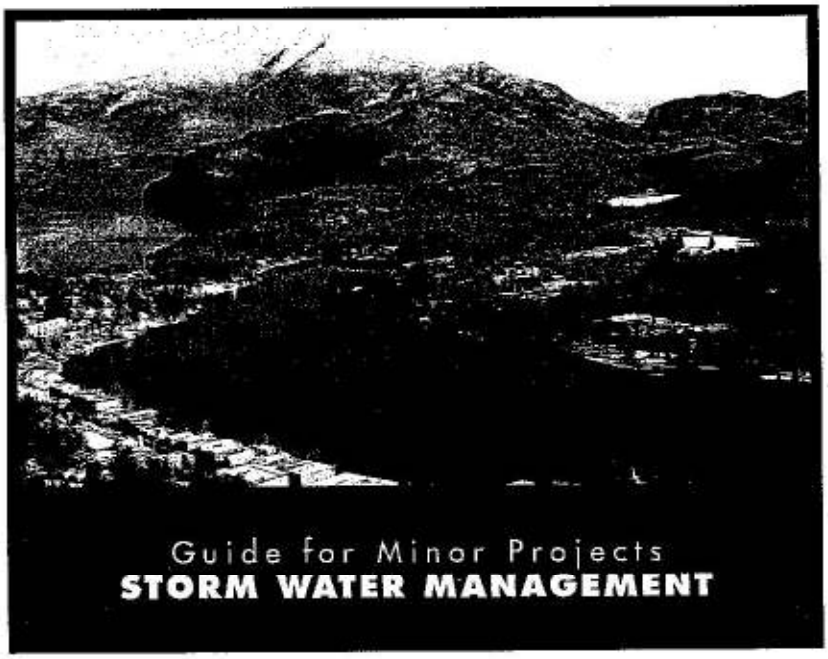

Guide for Minor Projects

STORM WATER MANAGEMENT

Village of Lake Placid and
Town of North Elba, Essex County, New York

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STORMWATER MANAGEMENT GUIDE FOR MINOR PROJECTS

This manual's purpose is to inform and assist property owners in meeting stormwater management ordinance requirements when commencing building or land clearing and grading projects. Property owners are encouraged to consult with Town/ Village Code Enforcement Officer (CEO) before commencing or contracting for any project. ❖ As a self-help guide, this manual presents an introduction to the stormwater program, defines jurisdictional projects, and discusses project application materials and procedures. It includes Best Management Practices (BMPs—actions and practices that can be used to reduce the flow rates and constituent concentrations in urban runoff) and design suggestions with information sheets and worksheets intended to aid the property owner in planning the site improvement.

A MESSAGE FOR PROPERTY OWNERS

The program places primary responsibility for adherence to the regulations with the property owner. ❖ Property owners should take active steps to ensure that all agents such as contractors, builders, landscapers, etc., obtain and conform to necessary permits. ❖ Legally obligated property owners should confirm permits and plans.

A MESSAGE FOR AGENTS

Since regulations prohibit any person from building or clearing, grading, excavating, etc., without a permit, builders, contractors and agents are also responsible for ensuring that projects are undertaken in accordance with a valid permit. ❖ Contractors should confirm permits and take care to comply.

ABOUT THE CODE ENFORCEMENT OFFICER (CEO)

The CEO is responsible for permit decisions and for issuance of clear and enforceable permits. ❖ The CEO determines when a permit is required, follows up on inspecting projects, and initiates any enforcement actions.

For information, call the CEO at the Village/Town Building, Planning and Zoning Department, at (518) 523-9518, 301 Main Street, Lake Placid, New York 12946.

ACKNOWLEDGEMENTS

Preparation of this guide and its supporting "Lake Placid/North Elba Stormwater Management Ordinance" have in large measure been based upon similar documents previously prepared by the Lake George Park Commission. The Park Commission's permission to rely upon its materials is deeply appreciated!

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Photograph and map credits are due Rolf Schulte, front cover; Sunita Halasz, NYS Adirondack Park Agency, rear cover.

Lake Placid / North Elba
Water Management Committee

INTRODUCTION

The Lake Placid/North Elba Stormwater Management Plan and Ordinance is a community-wide effort designed to protect and improve the water quality of our lakes, ponds and streams by reducing runoff and pollution contained in runoff as a result of development. ❖ Our water bodies are fed primarily by runoff from our drainage basins. Pollutants accumulate rapidly on hard surfaces during dry periods. Runoff washes those pollutants away, directing them quickly to the water bodies. Stormwater runoff from developed areas of the drainage basin often contains grease, lead, oil, salt, pathogens, nutrients (phosphorus and nitrogen), and sediments among other contaminants.

GUIDE FOR MINOR PROJECTS
STORMWATER MANAGEMENT

CONTENTS

Does my project need a stormwater management permit?

This manual is designed to assist in the completion of permits for projects classified as MINOR

EXEMPT—NO PERMIT REQUIRED

1. Emergency repairs to any stormwater control measure.
2. Development involving land disturbance and land clearing of less than 5000 sq. ft. which does not result in the creation of cumulative impervious surfaces of more than 1000 sq. ft., including but not limited to roofs, driveways, patios, etc.
3. Any logging or agricultural activity consistent with a soil conservation plan approved by the Essex County Soil and Water Conservation District or a timber management plan prepared in accordance with "New York State Forestry Best Management Practices for Water Quality," as promulgated January 2000, or subsequent revisions thereto, as applicable.
4. Activities of an individual engaging in home gardening by growing flowers, vegetables and other plants primarily for use by that person and his or her family.
5. Construction of an approved wastewater treatment system and construction of an approved dock, boathouse, or mooring.

MINOR PROJECTS

1. Any building, land clearing or development activity affecting between 5000 and 15, 000 square feet.
2. Creation of a two-lot, three-lot, or four-lot subdivision which may result in the construction of no more than one single-family residential structure and related accessory structures per lot, and will require land clearing or alteration activities of less than 15, 000 sq. ft. per lot and less than 15, 000 sq. ft. total for any subdivision road.
3. Any building, alteration or modification of a stormwater control measure excluding the maintenance, cleaning, or repair of such stormwater control measure.

MAJOR PROJECTS

Major projects are projects not defined as an exempt or a minor project. Stormwater controls for major projects must be designed by an engineer.

PREPARING PERMIT MATERIALS FOR A MINOR PROJECT

Considering stormwater management early in the project planning phase saves time and money. Preparing materials required for a minor permit, essentially a runoff control plan, should take about the same time it takes to complete an application for a building permitor site plan review. The review process is designed to run concurrently with the review process for a building permit or site plan review.

MINOR PROJECT PLAN PREPARATION STEPS:

1. Prepare a scale drawing showing key features of the site.
2. Calculate the newly created impervious area.
3. Calculate the volume of stormwater runoff.
4. Identify/choose the appropriate stormwater and erosion control measures.
5. Size and place the selected stormwater control measures.
6. Add stormwater and erosion control measures to the Project Plan.

Minor Project Plan—Example

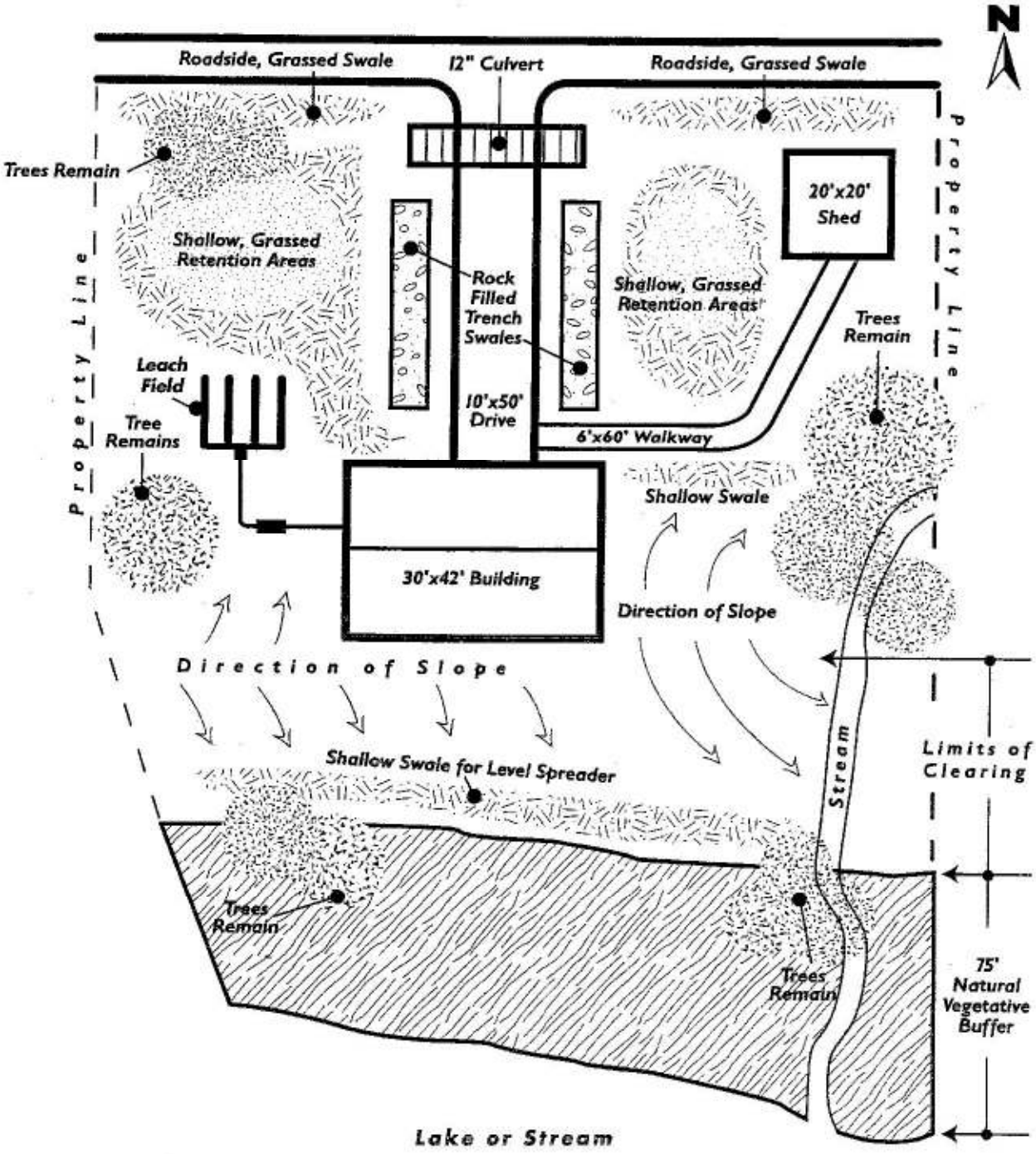
Property Owner _____

Tax ID# _____

Proposed by _____

Date _____ Drawn by _____

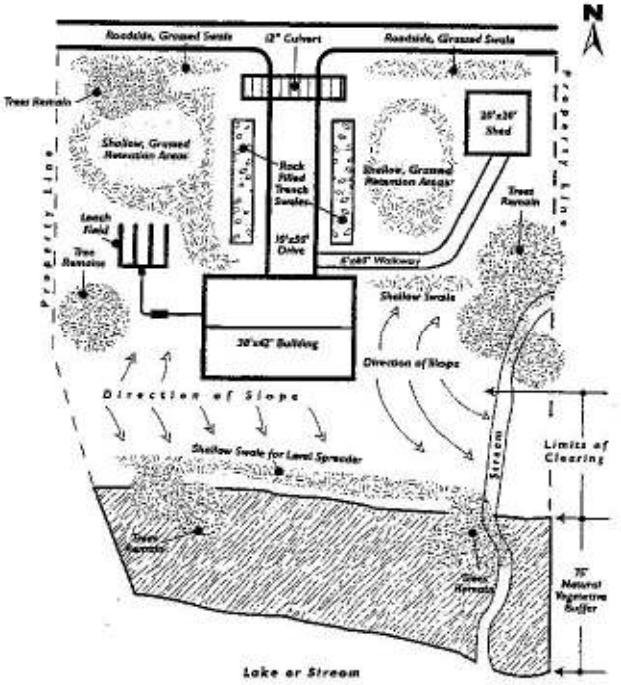
Scale _____



Minor Project Plan Preparation Steps

1. Prepare a Project Plan: a scale drawing showing key features of the site.
   The project plan can be developed from a tax map, site survey, or other accurate drawing of the site. The property and boundaries should be accurate in scale. The project plan should include:

   - a line showing the limit and location of area(s) that will be cleared for buildings, driveways and lawns.
   - the location of all structures, existing and proposed (house, shed, garage, etc.). Include driveways, parking areas, any other impervious surfaces, well and septic system.
   - the location of property boundaries, any streams or wetlands, and separation distances of structure(s) to any water body or stream.
   - indication whether property soil is normally wet or dry, and the angle/slope of the property in relation to any water body or stream.



2. Calculate the newly created impervious area.
   Identify the newly created and existing impervious areas. Note on the plan the area of each proposed structure and impervious surface (paved, walkways, etc.) and calculate the sum of the areas. For example:

   - 10' x 50' driveway =500 sq. ft.
   - 30' x 42' building footprint =1, 260 sq. ft.
   - 20' x 20' shed =400 sq. ft.
   - 6' x 60' walkway =360 sq. ft.

   Total impervious area =2, 520 sq. ft.

3. Calculate the volume of stormwater runoff.
   For small and medium size projects, simply multiply the total square footage of newly created total impervious surface by 1. 5 gallons. For Example:

   2, 520 sq. ft. x 1. 5 gallons/sq. ft.
   = 3, 780 gallons

   This volume is now used to size the stormwater control storage devices. Information about selecting stormwater storage devices follows.

4. Identify/choose the stormwater and erosion control measures. (See pages 6 & 7)

5. Size and place the selected stormwater control measures. (See pages 8 & 9)

6. Add stormwater and erosion control measures to the project plan. (See page 11)

Minor Project Plan Preparation Steps

STEP FOUR—Identify/choose the stormwater and erosion control measures

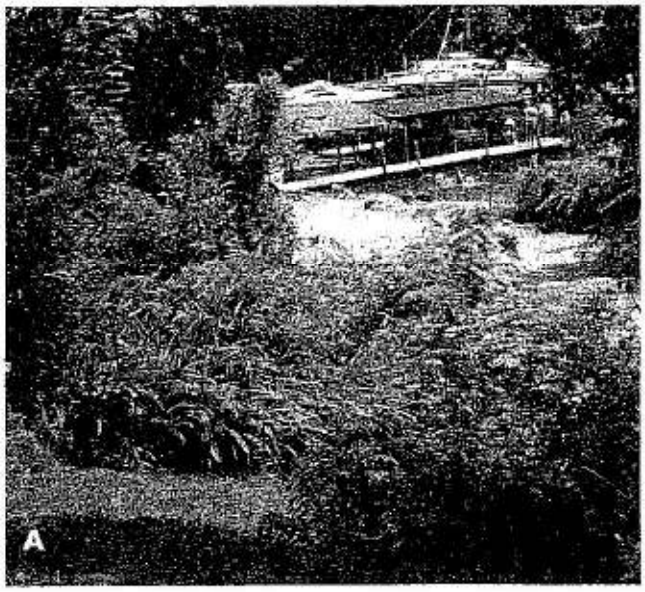
VEGETATIVE BUFFERS ARE PREFERRED–try to use these before resorting to structural controls. Vegetative buffers can satisfy the stormwater control requirements in some situations. Vegetative buffers are suggested if the following conditions exist on the site:

A—*Sheet flow is maintained*—flow is not channeled with curbs, gutters, etc.
B—*Slope is less than 15%*—15 feet of rise over 100 feet of ground.

As in the sample project plan, retain and use as much natural vegetative buffering as possible.

OTHER VEGETATIVE CONTROLS

C—*Shallow grassed retention areas*—effective, easy to construct and maintain—are recommended for some sites (smaller lots, poor soils, etc). Note the sample plan (page 4) for possible locations. Combination systems are also possible where the sheet flow would be directed to a vegetative buffer and the calculated, concentrated flow may need to be directed to a retention area. Shallow grassed retention areas can also often adequately capture and infiltrate the necessary amount of stormwater on level lots. Costs for these landscape measures are minimal when incorporated into the overall development plan. ❖ *Rule of thumb—build the shallow grassed retention area equal in size to the newly created impervious area and gradually slope the sides to a maximum depth of 6 inches.*



Shallow Grassed Swales are applicable to:
- open, flat areas
- sites with shallow groundwater or bedrock

Shallow Grassed Swales are NOT suited for:
- steep slopes or wooded areas

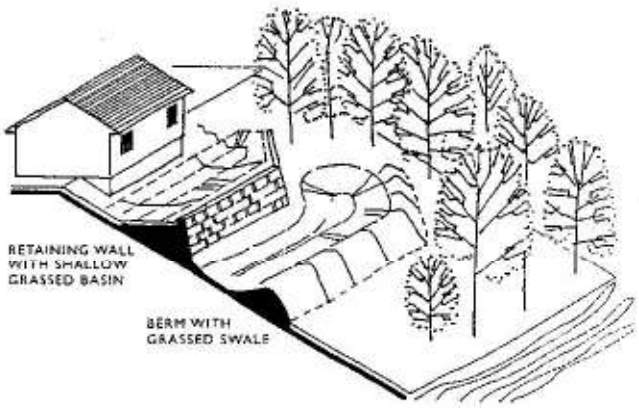
For Design and Construction:
- slopes should be very gradual to prevent erosion and allow mowing of grass.

Shallow Grassed Swale stormwater retention:
length(ft.) x width(ft.) x depth(ft.) x 4 = volume (gallons)

Minor Project Plan Preparation Steps

STEP FOUR—Identify/choose the stormwater and erosion control measures *(continued)*

STRUCTURAL MEASURES—Properly installed, infiltration devices serve on a long-term basis with little maintenance. They attenuate peak flows and recharge groundwater systems. Standing water is avoided and they will provide benefits even when the ground surface is frozen and phosphorus loading to the lake may be at its highest. On certain sites, it may be easier to use a combination of strategies or devices.

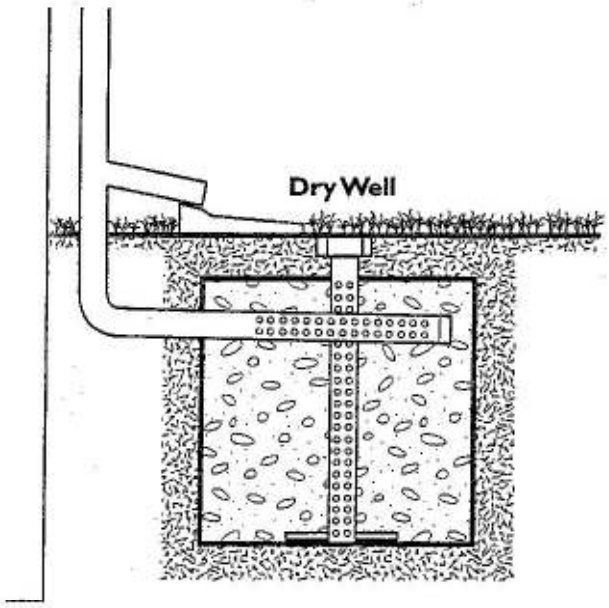


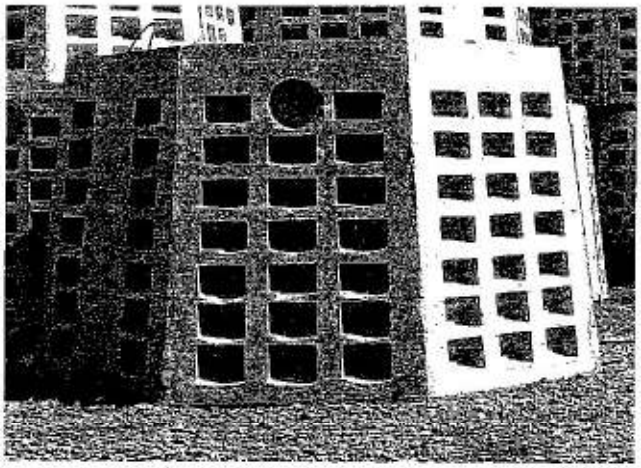
TRENCHES AND WALLS

On sites with moderate slopes (greater than 15%), infiltration trenches and retaining walls can be a cost-effective solution.

DRYWELLS

For difficult sites (i. e. , small lots with greater slopes), drywells may be a viable alternative.





INFILTRATION DEVICE SIZING

Example: As covered on page 5, 1300 sq. ft. of impervious surface requires 1950 gallons of stormwater storage/infiltration volume:

1300 sq. ft. x 1. 5 gallon/sq. ft. = 1950 gallons

Solution: One drywell, 8 ft. diameter by 4 ft. high, installed on a bed of stone 1 ft. thick and surrounded by a 1 ft. ring of stone would provide 2005 gallons of storage—sufficient since it exceeds the required 1950 gallons.

Or, a combination system: 31 feet of stone trench, 2 ft. wide by 4 ft. deep (31 ft. x 24. 4 gallons = 756 gallons) leading to a 6 ft. diameter by 4 ft. high dry well (1204 gallons) for a total volume of 756 + 1204 = 1960 gallons.

REQUIRED MINIMUM SEPARATION DISTANCES:

- Infiltration devices shall not be installed up gradient within 20 feet of the subsurface disposal portion of an on-site wastewater treatment system (leaching device).
- Infiltration devices for roadways, parking lots and other areas subject to vehicle traffic shall not be installed within 50 feet of any water well, wetland or water body.
- Infiltration devices and buildings shall be located to maintain maximum attainable horizontal distance separation from wells, wetlands and water bodies.
- The bottom of any infiltration device shall be a minimum of 2 feet above seasonal high ground water mark and 2 feet above bedrock.

SELECTION OF THE APPROPRIATE STORMWATER CONTROL MEASURES DEPENDS ON:

- The volume of storage (water) to be accommodated.
- Site conditions—the characteristics of your property that may limit the use of a particular device.
- The cost of purchase and installation.

Minor Project Plan Preparation Steps

STEP FIVE—Size and place the selected stormwater control measures *(continued)*

CONTROL MEASURE	DESCRIPTION	PROS AND CONS
Vegetative Buffers Filter Strips	Vegetative sections of land designed to accept runoff as overland sheet flow.	Inexpensive, especially if established prior to development. Work well in clay soils. Best when combined with other control measures. Minimum length should be no less than fifty to seventy-five feet. Should not be used to control large impervious areas.
Surface Basins Grassed Swales Depressed Area	A natural depression or wide shallow ditch used to temporarily store, route or filter runoff.	Inexpensive, easy to maintain. Efficiency is increased when combined with other control measures. The wider the swale, the greater the benefit for pollutant removal.
Infiltration Trench	A shallow, excavated trench that has been backfilled with stone to create an underground reservoir.	Believed to have high capability to remove particulate pollutants. Without pre-treatment, have short life spans. Application is limited by site conditions.
Drywells	Open-ended concrete cylinders with openings in the walls.	Usually can be installed underground and out of sight. May be more costly than vegetative measures. May not be applicable in areas with shallow depth to bedrock or groundwater.
Infiltrators	Sections of plastic arches similar in use to drywells.	Usually can be installed underground and out of sight. May be more costly than natural vegetative measures. Due to their lower profile, may be more applicable in areas with shallow depth to bedrock or groundwater than dry wells.

	STORAGE DEVICE	SIZE	VOLUME GALLONS	VOLUME CUBIC FEET
1	**Shallow Grassed Swale** (see pg. 6)	**L(ft) x W(ft) x D(ft) x 4 = GALLONS**		
2	Drywell	4 ft. diameter, 32 in. high *	434	58
3	Drywell	6 ft. diameter, 48 in. high *	1204	161
4	Drywell	8 ft. diameter, 24 in. high *	1107	148
5	Drywell	8 ft. diameter, 48 in. high *	2005	268
6	Drywell	8 ft. diameter, 60 in. high *	2453	328
7	Stone Trench	2 ft. wide x 4 ft. deep **	21 per linear ft.	2.8 per linear ft.
8	Stone Trench	4 ft. wide x 4 ft. deep **	42 per linear ft.	5.6 per linear ft.
9	High Capacity Infiltrator	3 ft. wide x 6.25 ft. long x 1.25 ft. high ***	24.7 per linear ft.	3.3 per linear ft.
10	Perforated Pipe	3 ft. diameter	53 per linear ft.	7.1 per linear ft.

* Drywells on 1 ft. stone bedding, surrounded by 1 ft. wide belt of stone. 35% stone porosity
** Assumed 35% porosity of Stone
*** Standard installation of 6 in. stone bedding

Minor Project Plan Preparation Steps

STEP SIX—Add stormwater and erosion control measures to the project plan

WHAT IS AN EROSION AND SEDIMENT CONTROL PLAN? An Erosion and Sediment Control Plan is required showing the site's existing surface features (buildings, slopes, clearing and grading) and how, where and when the site will be altered. For small projects, typical erosion control devices such as properly installed and maintained siltation fences and straw bale dikes are used to protect disturbed areas and temporary stockpiled soil.

Caution: Filtration Fences and Straw Bale Dikes are temporary erosion control measures. They should be maintained and relied upon only until revegetation of disturbed surfaces has been permanently established or other long term erosion control measures are in place. Illustrations of their construction are included in the pocket at the back of this Guide.

Select appropriate erosion control measures and show them on the Erosion Control Plan. Indicate how and when they will be implemented and maintained. Complete a Construction and Erosion Control Schedule to ensure the coordination of erosion and sediment control practices with construction activities. The Erosion and Sediment Control Plan may be drawn on the Stormwater Control Plan or may be prepared separately.

Information that can be used to select and design erosion controls can be found in the manual New York Guidelines for Urban Erosion and Sediment Control. This manual is available at the Essex County Soil and Water Conservation District Office. Planning assistance may also be available from the County Soil and Water Conservation District.

FIVE PRINCIPLES OF EROSION AND SEDIMENT CONTROL:

1. *Keep the disturbed area small.* The development plan should be prepared with a minimum of clearing and grading. Natural cover should be retained and protected wherever possible. Critically erodible soil, steep slopes, stream banks and drainageways need to be protected.

2. *Stabilize disturbed areas as soon as possible.* Two methods are available: vegetative and structural. Vegetative is mulching and seeding with grass, shrubs and/or trees. Structural is a constructed measure such as a diversion, storage basin, stone-lined channel, etc.

3. *Keep water runoff velocities low.* The removal of existing vegetative cover during development and the increase in impermeable surfaces after development will add to both the volume and velocity of runoff unless managed properly.

4. *Protect disturbed areas from water runoff.* Conservation measures can be used to prevent water from entering and running over the disturbed areas. Diversions and other control structures intercept runoff and either store or divert it away from vulnerable areas to stable outlets.

5. *Retain sediment within the site.* Sediment can be retained by two methods: filtering runoff or detaining it. Filtering can be done with filter fabric, straw bales and/or finely graded gravel. Detaining uses a storage basin that contains the runoff until many of the sediments drop out. However, the best way to control sediment is to prevent erosion.

Essex County Soil & Water Conservation District Office
Cooperative Extension Center, 67 Sisco Street, P.O. Box 232
Westport, New York 12993 Telephone (518) 962-8225

Erosion and Sedimentation Control Plan—Example

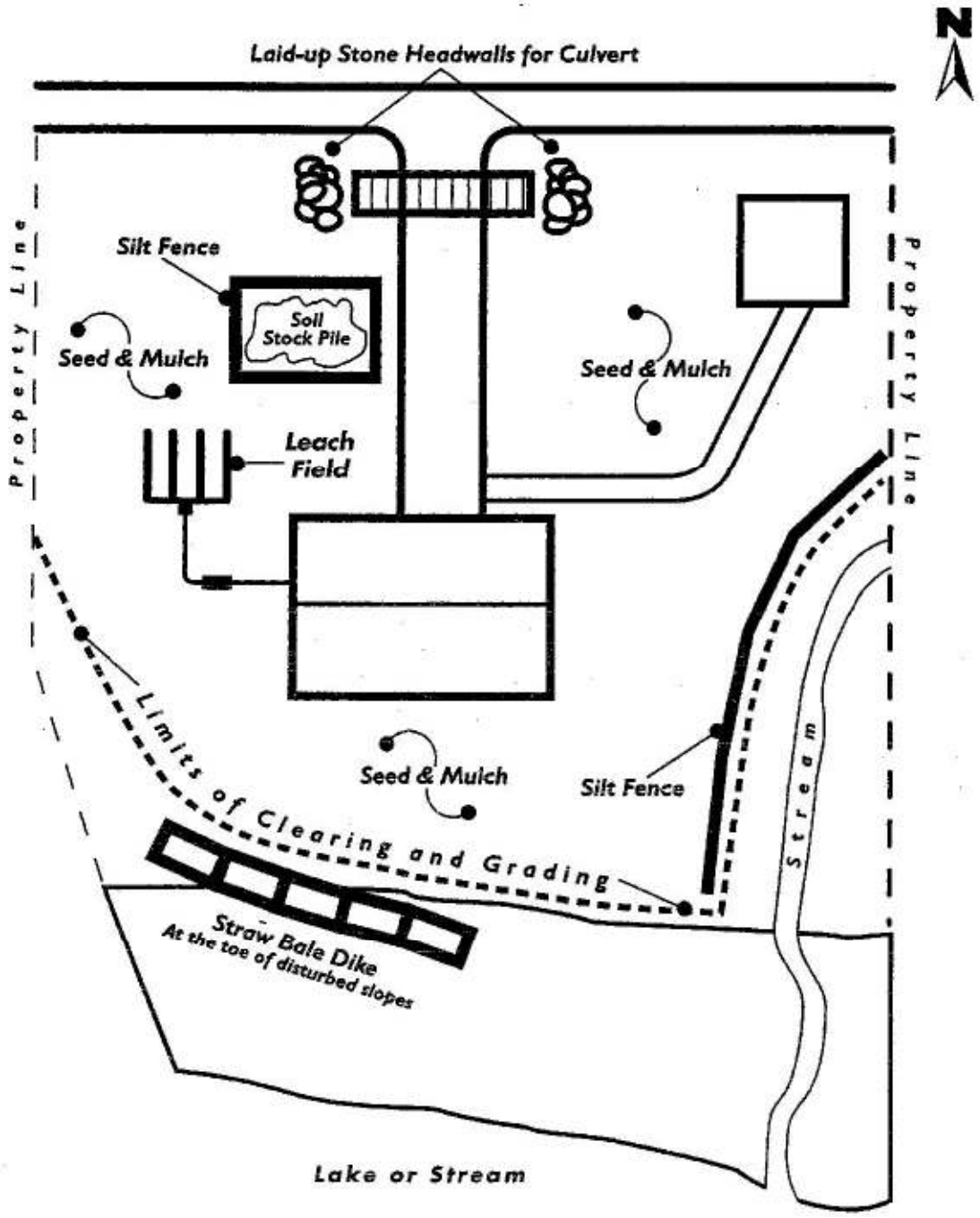
Property Owner _____

Tax ID# _____

Proposed by _____

Date _____ Drawn by _____

Scale _____



MAINTENANCE

As with a car, boat, home or other possessions which need to be regularly maintained, storm water facilities require periodic attention. Our high country environment is particularly challenging as extreme weather events occur with a frequency not necessarily experienced in other, lower elevation parts of the country. In addition, with a substantially shorter growing season, the ability of natural or planted vegetation to absorb moisture is limited.

When storm water is confronted, attention needs to be focused up-slope where runoff first occurs. Retention through on-site infiltration into soils is a "BMP," Best Management Practice.

It is not enough to construct a silt fence or water detention device, as contractors and their successors have an obligation to maintain the systems thereafter. This entails periodic clean-out of roof eves, dry wells, sumps, etc. Depending upon conditions, a checklist dating previous clean-outs will serve to assure the continued utility of the installed devices.

DEFINITIONS

Schedule "A" of the Lake Placid/North Elba "Stormwater Ordinance" contains numerous explanatory definitions relating to the Maintenance of water control devices. Among these is one relating to "An area covered by pavement, roof tops and/or other structures or materials, which is impervious to water or which substantially prevents infiltration of water into the soil at that location."

Schedule A

Lake Placid/North Elba "Stormwater Ordinance"

The following list of stormwater devices and their applications are detailed on separate sheets attached hereto.

CHECK DAM	Fabric and rock fence, or trench, to hold back sheet flow.
DRY WELLS	Open-ended porous concrete cylinders used mainly to retain stormwater from roofs and other impervious surfaces.
GRASSED SWALES	Natural depression or shallow trench used to temporarily store, route or filter runoff.
INFILTRATION TRENCH	Shallow, excavated trench has been backfilled with stone to create an in-ground reservoir.
MULCHING	To hold water on-site until it is evaporated or absorbed by soils having a slow infiltration rate.
RIP RAP	Stones, cobble used to protect areas susceptible to erosion.
SILT FENCE	Temporary barrier used to hold back or deflect water runoff. Difficult to maintain effectiveness.
STRAW BALE DIKE	A temporary barrier of straw or similar material used to intercept sediment-laden runoff. Difficult to maintain effectiveness.
URBAN FORESTRY	Retention, or replanting, or trees, shrubs, grasses or other natural vegetation to absorb precipitation.
VEGETATIVE BUFFERS	Used to accept runoff from overland sheet flow from upslope development.
WATER BARS	To deflect/divert water flow, mainly on impervious surfaces, to adjacent areas where water may be absorbed.

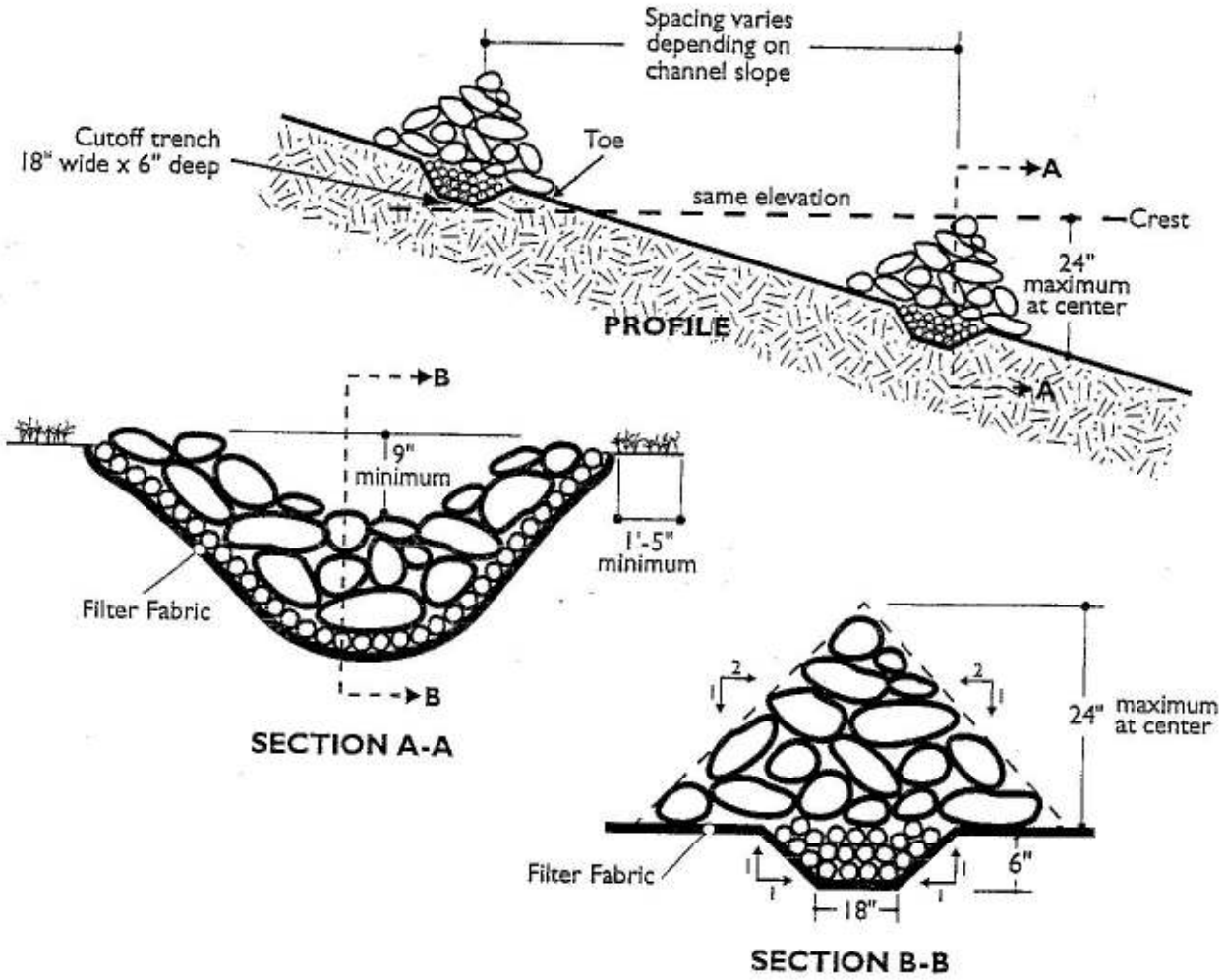
CHECK DAM

WHAT ARE THEY?

A check dam is a small temporary stone dam constructed across a drainageway. The purpose of a check dam is to reduce erosion in a drainage channel by restricting the velocity of flow in the channel.

Check dams are used as temporary or emergency measures to limit erosion by reducing flow in small open channels that are degrading or subject to erosion. The maximum drainage area above the check dam should not exceed two (2) acres. They should not be greater than 2 feet in height and the center should be maintained 9 inches lower than abutments are natural ground elevation.

Check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel. Remove sediment accumulated behind the dam as needed to allow the channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. Replace stones as needed to maintain the design cross-section of the structures.



DRY WELLS

WHAT ARE THEY?

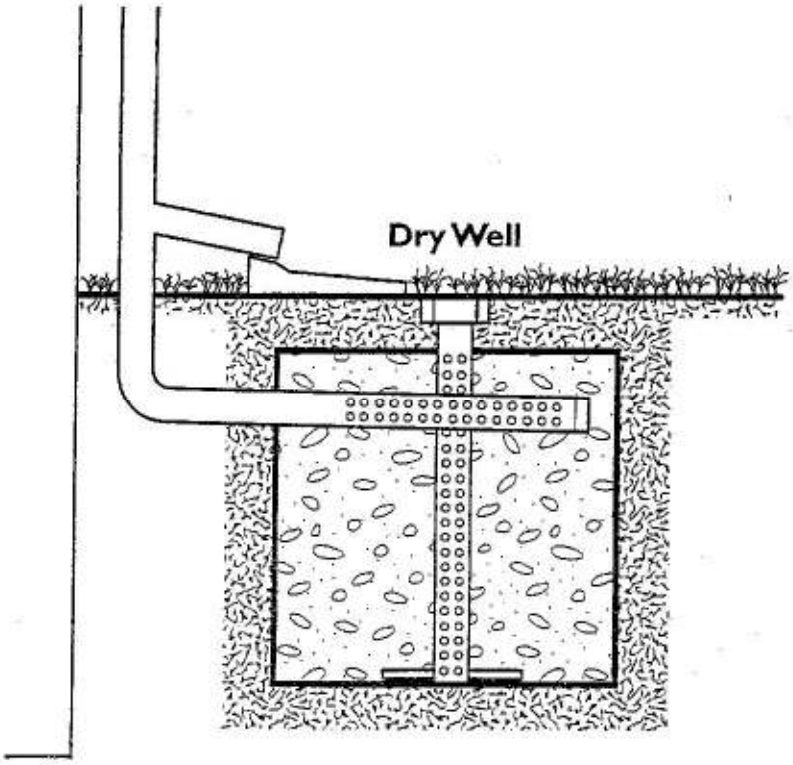
Dry wells are open-ended concrete cylinders with openings in the walls. They are similar to infiltration trenches but smaller with inflow from pipe; commonly covered with soil and used for drainage areas of less than 1 acre. They are designed exclusively to accept rooftop runoff from residential and commercial buildings.

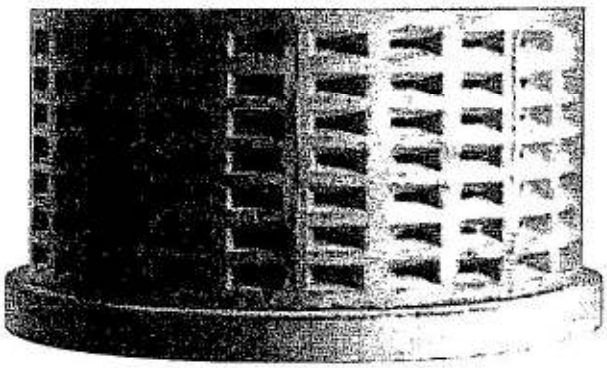
CAN I USE A DRY WELL FOR MY PROJECT?

As with infiltration trenches, the use of dry wells is severely restricted by soils, water table, slope and contributing area conditions. Dry wells must be situated a minimum of ten feet away from the building foundation. Rooftop gutter screens should be installed to trap any particles, leaves and other debris from entering the dry well and clogging soils.

HOW MUCH WILL IT COST?

The cost of a dry well is higher than the use of vegetative buffers, grass swales and filter strips. Dry wells average between $900 and $1,400.





GRASSED SWALES

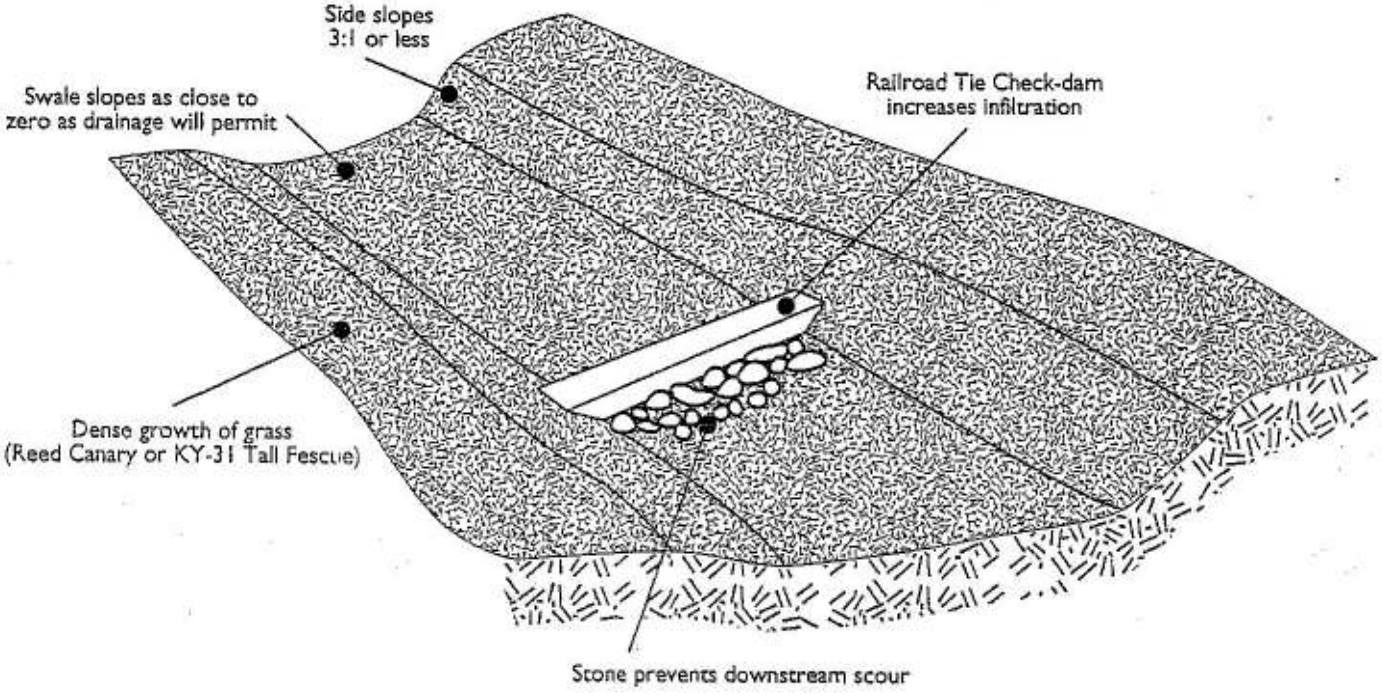
WHAT ARE THEY?

A swale is a natural depression or wide, shallow ditch used to temporarily store, route or filter runoff.

A grassed swale is an earthen conveyance system in which the filtering action of grass and soil are used to remove pollutants from stormwater. Enhanced grassed swales, or biofilters, use check dams and wide depressions to increase runoff storage and greater settling of pollutants.

CAN I USE A GRASSED SWALE FOR MY PROJECT?

The suitability of a swale at a site will depend on the area, slope and surrounding impervious area. The wider the swale, the greater the benefit will be for pollutant removal. They work best on minimum slopes. Swales can last a long time if properly designed, periodically mowed, and if sediment deposits are removed from time to time. After large storms, it is important to check for erosion failures. Grassed swales cost less to construct than curbs, gutters, and undergound pipe. Costs may run from $5 to $15 per linear foot.



INFILTRATION TRENCHES

WHAT ARE THEY?

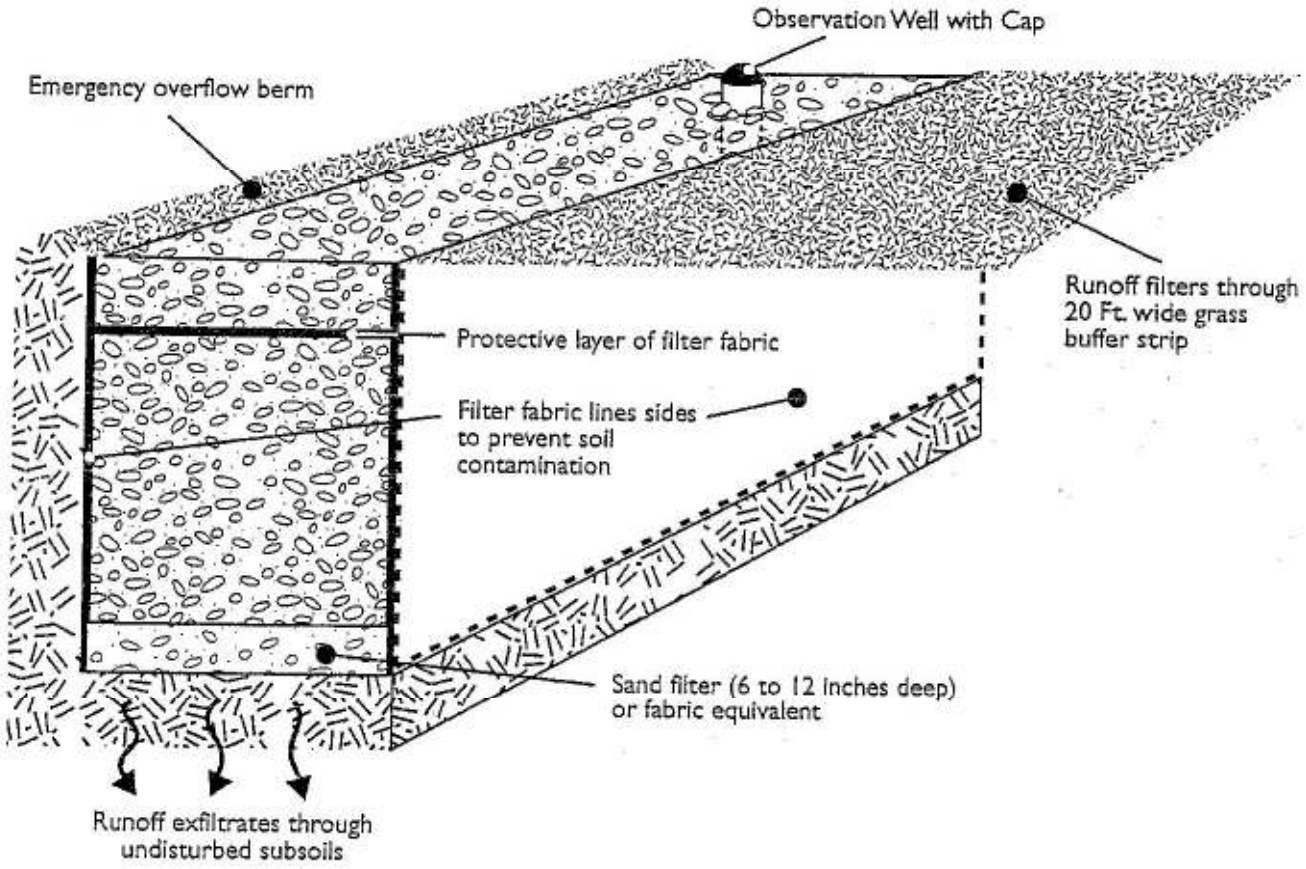
A conventional infiltration trench is a shallow, excavated trench that has been backfilled with stone to create an underground reservoir. Stormwater runoff diverted into the trench gradually exfiltrates from the bottom of the trench into the subsoil and eventually into the water table. Enhanced infiltration trenches have extensive pre-treatment systems to remove sediment and oil.

CAN I USE AN INFILTRATION TRENCH FOR MY PROJECT?

Trenches are believed to have high capability to remove particulate pollutants and a moderate capability to remove soluble pollutants. The use of infiltration trenches, like other infiltration practices, is severely restricted by soils, water table, slope and contributing area conditions. An underground trench is not feasible on sites with a slope greater than 20% and surface trenches are not recommended when contributing slopes are greater than 5%. Individual trenches are primarily an on-site control and are seldom practical or economical on sites larger than 5 or 10 acres.

HOW MUCH WILL IT COST?

The cost of the infiltration trench is somewhat higher than the use of vegetative buffers, filter strips and grass swales. Final cost will depend on the type of design and volume of stormwater runoff to manage.



MULCHING

Mulching is when straw, sawdust, leaves, plastic film or other suitable materials are applied to the soil surface. The purpose of mulching is to conserve moisture and modify surface soil temperature fluctuations, prevent surface compacting, reduce runoff and erosion, control weeds and help establish ground cover.

Mulching is used on soils subject to erosion, on critical areas and on soils that have a low infiltration rate. Prior to mulching, install the necessary temporary or permanent erosion control practices and drainage systems within or adjacent to the area to be mulched.

A general rule to remember is mulch within three (3) days of clearing and grading.

GUIDE to MULCH MATERIALS, RATES and USES

Mulch Material	Quality Standards	Application Rates /1000 sq.ft.	Application Rates /acre	Depth of Application	Remarks
1 Sawdust, green or composted	Free from objectionable coarse material	83-500 cu.ft.	—	1" to 7"	Most effective as a mulch around ornamentals, small fruits and other nursery stock. Requires 30-35 lbs. N/ton to prevent N deficiency while decaying mulch. One cubic foot weighs 25 lbs.
2 Wood Chips or Shavings	Green or air-dried Free from objectionalble coarse material	500 - 900 lbs.	10 to 20 tons	2" to 7"	Has about the same use and application as sawdust, but requires less N/ton (10 - 12 lbs.). Resistant to wind blowing. Decomposes slowly.
3 Wood Excelsior	Green or air-dried burred wood fibers	90 lbs.	2 tons	—	Decomposes slowly. Subject to some (1 bale) wind blowing. Packaged in 80 -90 lb. bales.
4 Wood Fiber Cellulose (Partly digested wood fibers)	Made from natural wood usually with green dye and dispersing agent	50 lbs.	2000 lbs.	—	Apply with hydromulcher. No tie down required. Less erosion control provided than 2 tons hay or straw.
5 Compost or Manure	Well-shredded, free of excessive coarse materials	400 - 600 lbs.	8 - 10 tons	—	Use straw manure where erosion control is needed. May create problem with weeds. Excellent moisture conserver. Resistant to wind blowing.
6 Cornstalks, shredded or chopped	Air-dried, shredded into 8" tp 12" lengths	150 - 300 lbs.	4 - 6 tons	—	Effective for erosion control, relatively slow to decompose. Excellent for mulch on crop fields. Resistant to wind blowing.
7 Gravel, Crushed Stone or Slag	Washed; Size 2B or 3A - 1 1/2"	9 cu. yds.	4 - 6 tons	3"	Excellent mulch for short slopes and around plants and ornamentals. Use 2B where subject to traffic. (Approximately 2000 lbs./cu.yd.). Frequently used over black plastic for better weed control.
8 Hay or Straw	Air-dried; free of undesirable seeds and coarse materials	90 - 100 lbs. 2 - 3 bales	2 tons 100 - 200 bales	cover about 90% surface	Use straw where mulch is maintained for more than three months. Subject to wind blowing unless anchored. Most commonly used mulching material. Best micro-environment for generating seeds.
9 Peat Moss	Dried, compressed, free of coarse materials	200 - 400 cu.ft.	1/2 - 1 ton	2" - 4"	Most effective as a mulch around ornamentals. Subject to wind blowing unless kept wet. 100 lb. bales (6 cu.ft.). Excellent moisture holding capacity.
10 Jute Twisted Yarn	Undyed, unbleached, plain weave. Warp 78 ends/yd., Weft 41 ends/yd. 60 - 90 lbs./roll	48" x 50 yds. or 48" x 75 yds.	—	—	Use without additional mulch. Tie down as per manufacturers specifications.
11 Excelsior Wood Fiber Mats	Interlocking web of excelsior fibers with photodegradable plastic netting	8" x 100" 2-sided plastic, 48" x 180" 1-sided plastic	—	—	Use without additional mulch. Excellent for seeding establishment. Tie down as per manufacturers specifications. Approximately 72 lbs./roll for excelsior with plastic on both sides. Use two-sided plastic for centerline of waterways.
12 Glass Fiber	1/4" thick, 7/16" dia., holes on 1" centers, 56 lb. rolls	72" x 30 yds.	—	—	Use without additional mulch. Tie down with T bars as per manufacturers specifications.
13 Plastic	2 - 4 mils	Variable	—	—	Use black for weed control. Effective for moisture conservation and weed control for small fruits and ornamentals.
14 Filter Fabrics	Woven or Spun	Variable	—	—	—
15 Straw or Coconut Fiber or combination	Photodegradable plastic net on one or two sides	most are 6.5 ft. x 3.5 ft.	81 rolls	—	Designed to tolerate higher velocity water flow, centerlines of waterways. 60 sq.yds. per roll.

From New York Guidelines for Urban Erosion and Sediment Control

MULCHING Continued

MULCH ANCHORING GUIDE

Anchoring Method or Material	Kind of Mulch to be Anchored	How To Apply
A *Manual*		
1 Peg and Twine	Hay or Straw	After mulching, divide areas into blocks approx. 1 sq.yd. in size. Drive 4 - 6 pegs per block to within 2" to 3" of soil surface. Secure mulch to surface by stretching twine between pegs in criss-cross pattern on each block. Secure twine around each peg with 2 or more turns. Drive pegs flush with soil where mowing and maintenance is planned.
2 Mulch Netting	Hay or Straw	Staple the light-weight paper, jute, wood fiber, or plastic nettings to soil surface according to manufacturer's recommendations. Should be biodegradable. Most products are not suitable for foot traffic.
3 Soil and Stones	Plastic	Plow a single furrow along edge of area to be covered with plastic, fold about 6" of plastic into the furrow and plow furrow slice back over plastic. Use stones to hold plastic down in other places as needed.
4 Cut-in	Hay or Straw	Cut mulch into soil surface with square edged spade. Make cuts in contour rows spaced 18" apart. Most successful on contour in sandy soil.
B *Mechanical*		
1 Asphalt Spray (emulsion)	Compost, wood chips, wood shavings, hay or straw	Apply with suitable spray equipment using the following rates: asphalt emulsion: 0.04 gallons per sq.yd.; on slopes use 200 gal/acre, on level use 150 gal/acre; liquid asphalt (rapid, medium, or slow setting) 0.10 gallons per sq.yd., 400 gal/acre.
2 Wood Cellulose	Hay or Straw	Apply with hydroseeder immediately after mulching. Use 750 lbs. wood fiber per acre. Some products contain an adhesive material.
3 Pick Chain	Hay or Straw	Use on slopes steeper than 3:1. Pull across slopes with suitable power equipment.
4 Mulch Anchoring Tool or Disk	Hay or Straw Manure/mostly straw	Apply mulch and use pull-a-mulch anchoring tool over mulch. When a disk (smooth) is used, set in straight position and pull across slope with suitable power equipment. Mulch material should be "tucked" into soil surface about 3".
5 Chemical	Hay or Straw	Apply Terra Tack AR 120 lbs/ac. in 480 gallons of water (#156/ac.) or Aerospray 70 (60 gal/ac.) according to manufacturer's instructions. Avoid application during rain. A 24 hour curing period and a soil temperature higher than 45°F are required.

From New York Guidelines for Urban Erosion and Sediment Control

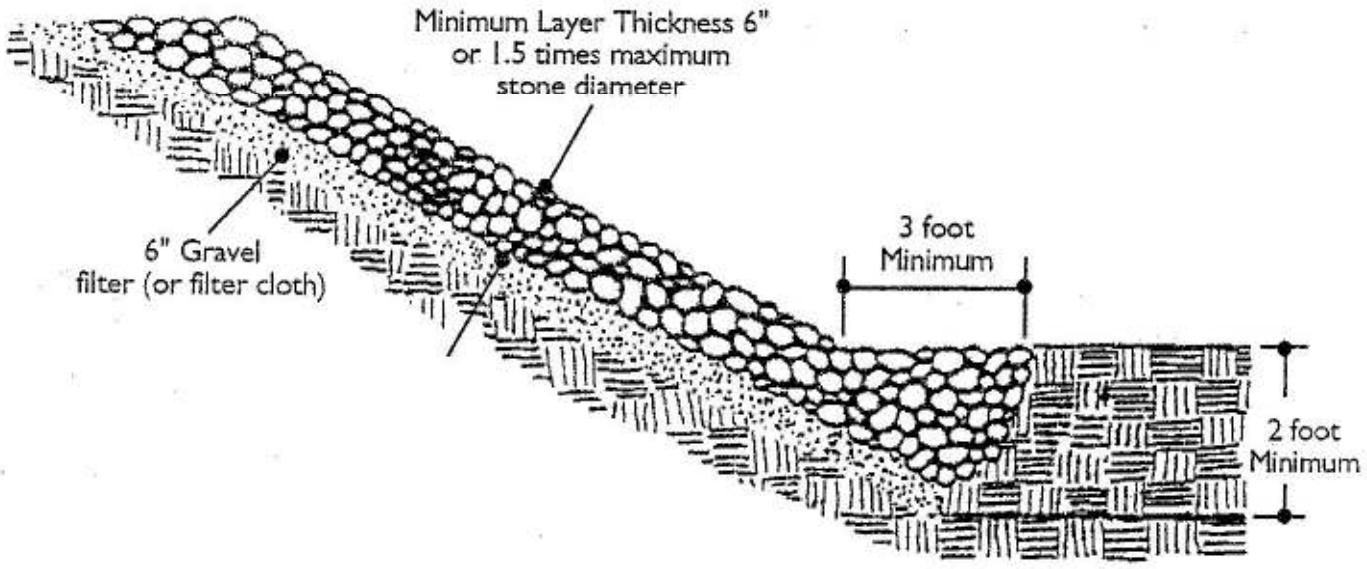
RIPRAP

FOR SLOPE PROTECTION

Large stones, cobbles or boulders are used to stabilize and protect areas subject to erosion. The purpose of riprap is to protect the soil from erosion forces and/or improve the stability of soil slopes that are subject to seepage or have poor soil structure.

Riprap is used for cut and fill slopes subject to seepage, erosion and weathering, particularly where conditions prohibit the establishment of vegetation. Riprap is also used for channel side slopes and bottoms, streambanks, on shorelines subject to erosion, and at inlets and outlets to culverts, bridges, slope drains, stabilization structures and storm drains. Stone for riprap should be hard, durable field or quarry material. It should be angular and not subject to breaking down when exposed to water or weathering. Sizes of stones used for riprap protection are determined by the purpose and specific site conditions. The minimum layer thickness should be 1.5 times the maximum stone diameter, but in no case less than 6 inches. A filter blanket is a layer of material placed between the riprap and the underlying soil to prevent soil movement into or through the riprap. Riprap should be placed so that it forms a dense, well-graded mass of stone with a minimum of voids. Be careful not to dislodge the underlying filter when placing the stones.

Riprap should be inspected periodically for scour or dislodged stones. Control weed and brush growth as needed.



Typical Riprap Slope Protection Detail

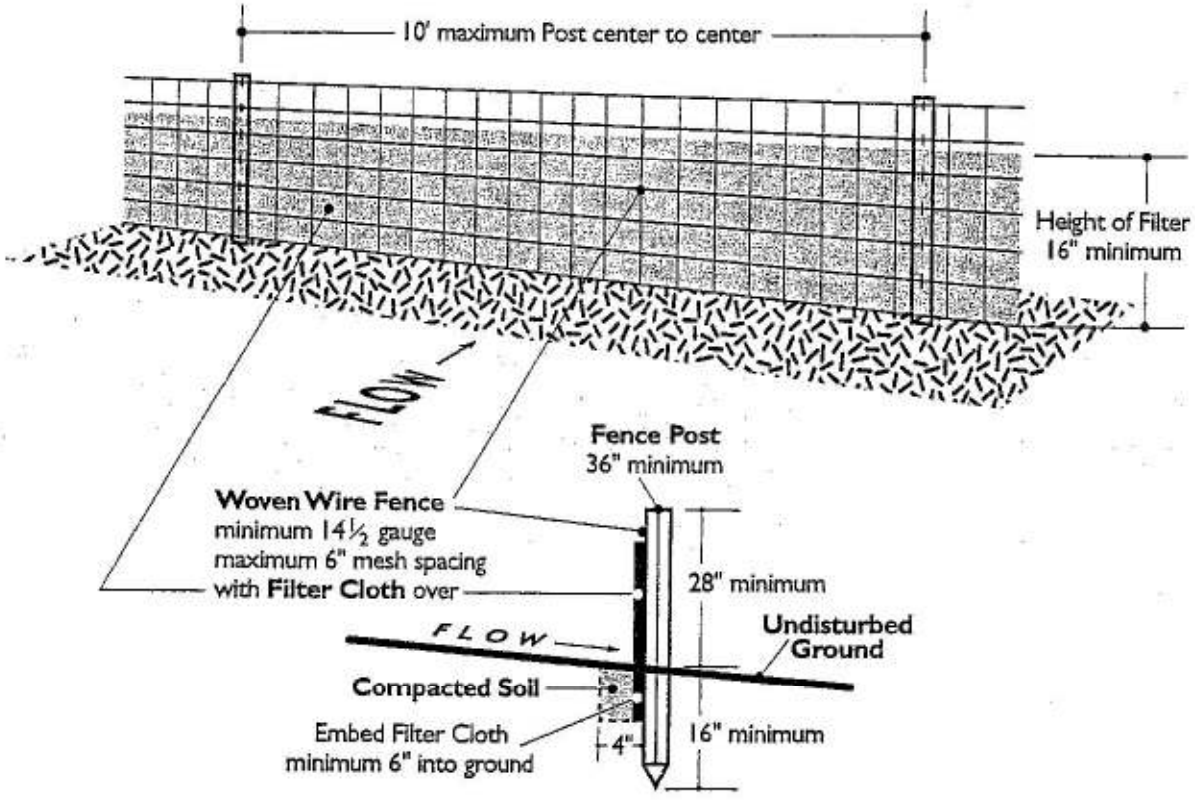
SILT FENCE

WHAT ARE THEY?

A silt fence is a temporary barrier of geotextile fabric (filter cloth) used to prevent sediment runoff from entering small drainage areas of disturbed soil.

A silt fence can be used to temporarily protect nearby streams, wetlands and wet areas from stockpiled soil from development. The silt fence should be constructed on the low side of the topsoil stockpile to prevent the sediment from being washed into the drainage system. The fence should extend around approximately 70 percent of the perimeter of the stockpile. Fence posts should be located downslope of the fabric to help support the fencing. Bury the fence approximately 8 feet deep to prevent undercutting. When joints are necessary, securely fasten the fabric at a support post with overlap to the next post. Filter fabric should be of nylon, polyester, propylene or ethylene yarn with extra strength—50 lb/linear inch (minimum)—and with a flow rate of at least 0.3 gallons/square foot per minute. Fabric should contain ultraviolet ray inhibitors and stabilizers. The posts should have a minimum length of 4 feet.

The maximum drainage area for overland flow to a silt fence should not exeed 1/2 acre per 100 feet of fence. This type of erosion control works best when there is no concentration of water flowing to the fence and erosion occurs in the form of sheet erosion (the removal of a fairly uniform layer of soil from the land surface by runoff water.) Maintenance should be performed as needed and material removed when "bulges" develop in the silt fence.

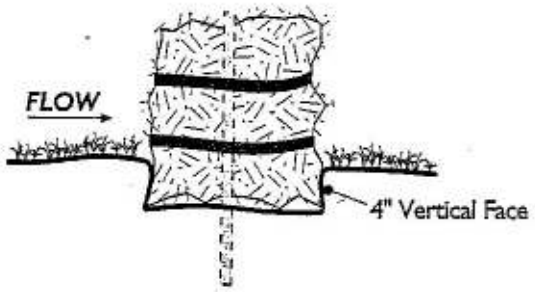


STRAW BALE DIKE

WHAT ARE THEY?

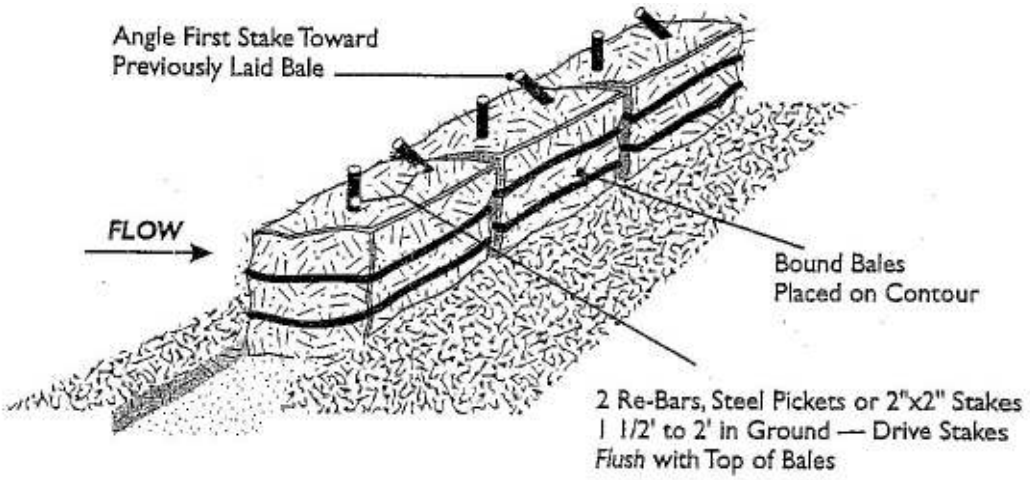
A straw bale dike is a temporary barrier of straw or similar material used to intercept sediment laden runoff from small drainage areas of disturbed soil. The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

The straw bale dike is used where there is no concentration of water in a channel or other drainage way and when erosion would occur in th form of sheet erosion (the removal of a fairly uniform layer of soil from the land surface by runoff water.) Straw bales should not be used if slope is more than 15 percent. Bales should be removed when they have served their usefulness so as not to block or impede storm flow or drainage.



BEDDING and ANCHORING DETAIL

Drainage Area No More Than 1/4 Acre per 100 Feet of Straw
for Slopes Less Than 25%



URBAN FORESTRY

WHAT IS URBAN FORESTRY?

Urban Forestry is preserving trees during construction, planting them after the site has been cleared, or homeowner landscaping after the project has been completed. With careful landscape design, as much as 50 percent of a residential lot can be converted into an attractive natural setting of trees, shrubs and ground covers. The amount of runoff generated from these landscaped areas is often 30 to 50 percent less than that produced from lawns. Trees, shrubs and ground covers provide many stormwater management benefits. When mature, these plants form a canopy that intercepts much rainfall before it reaches the ground.

CAN I USE URBAN FORESTRY FOR MY PROJECT?

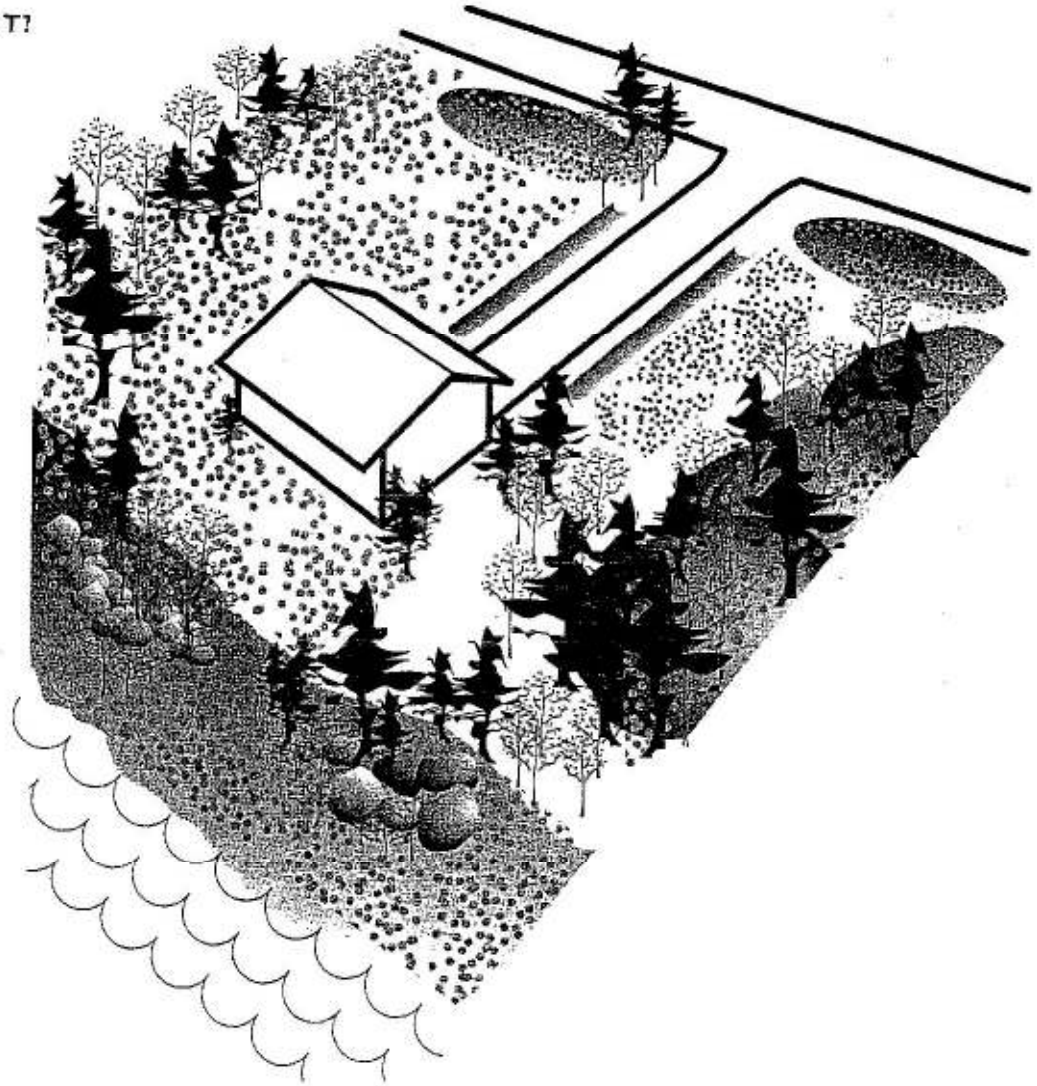
Reforestation or forest preservation measures can be applied to developed areas. The trick involves selecting the proper species and mix of trees and shrubs that are best suited to the growing conditions at the site. Urban forestry measures require very little concerted maintenance, except perhaps during the first few years after establishment, where extra care is needed to increase survival rates. Landscaping will also reduce heating and cooling bills for the home and reduce the effort and expense needed to maintain lawns. Shade trees planted next to streams can help keep water temperature cool and protect aquatic habitat. Trees can also stabilize streambanks to minimize erosion.

HOW MUCH WILL IT COST?

Costs are essentially non-existent if trees are preserved during the land clearing phase, although there may be some nominal costs in selecting the trees to be kept, and keeping heavy equipment away from damaging their trunks and roots during construction.

If planting seedlings, costs generally run about $100 to $200 per acre.

Using nursery stock and labor increases the cost to approximately $1,000 to $5,000 per acre.



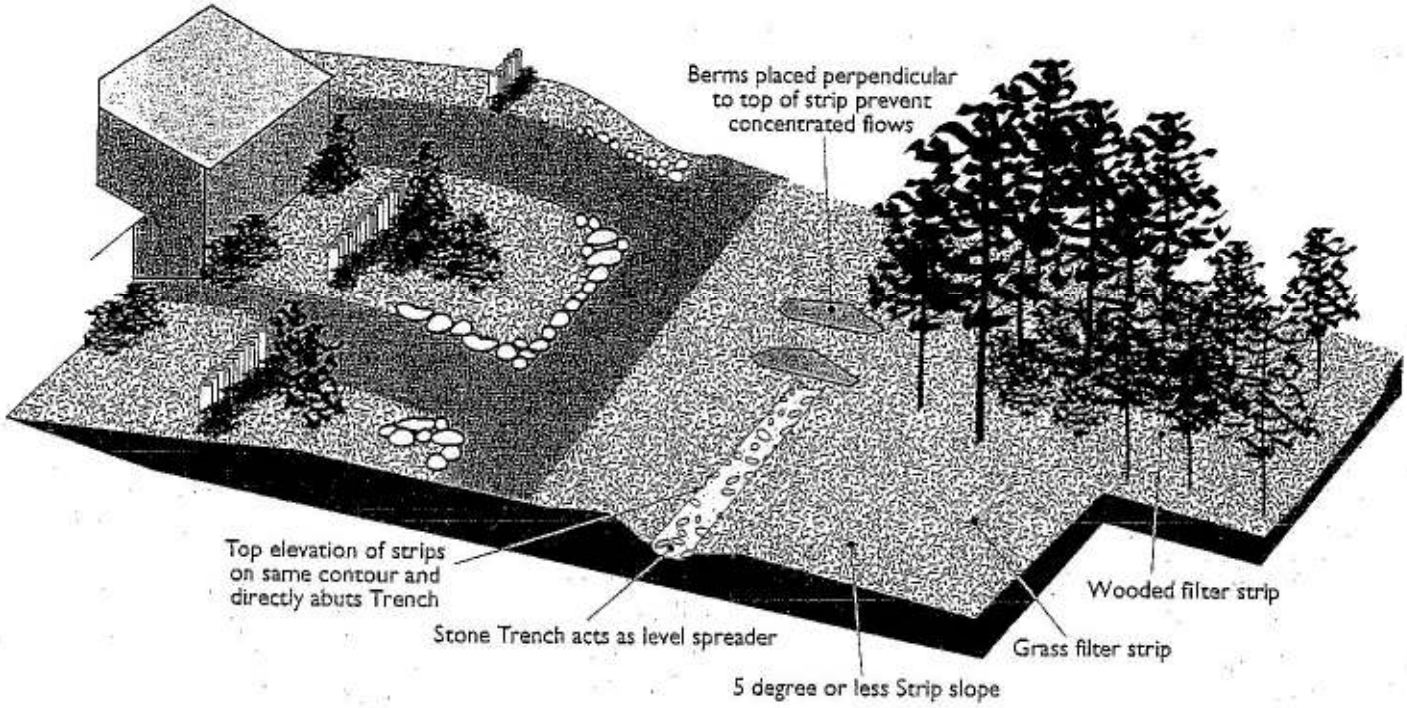
VEGETATIVE BUFFERS

WHAT ARE THEY?

Vegetative buffers are vegetated sections of land designed to accept runoff as overland sheet flow from upstream development. They may adopt any natural vegetated form, from grassy meadow to small forest. Vegetative buffers can effectively reduce pollutant levels in areas where runoff velocity is low to moderate.

CAN I USE A FILTER STRIP FOR MY PROJECT?

It is likely that vegetative buffers will be most effective in treating rooftop runoff and runoff generated from lawns and other pervious areas. Vegetated buffers should not be used to control large impervious areas, such as parking lots. Buffers should be used on slopes not more than 15 percent. They do work well in clay soil and where the water table is within three feet of the surface. Minimum length should be no less than fifty to seventy-five feet. Vegetative buffers require routine sediment removal, replanting and reseeding, and regrading. Mowing may be required for smaller strips. Corrective maintenance, such as weeding or replanting, may be needed more frequently in the first couple of years to assure stabilization. Vegetative buffer costs are low, especially if established before site development.

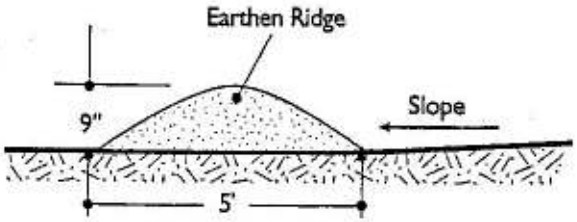


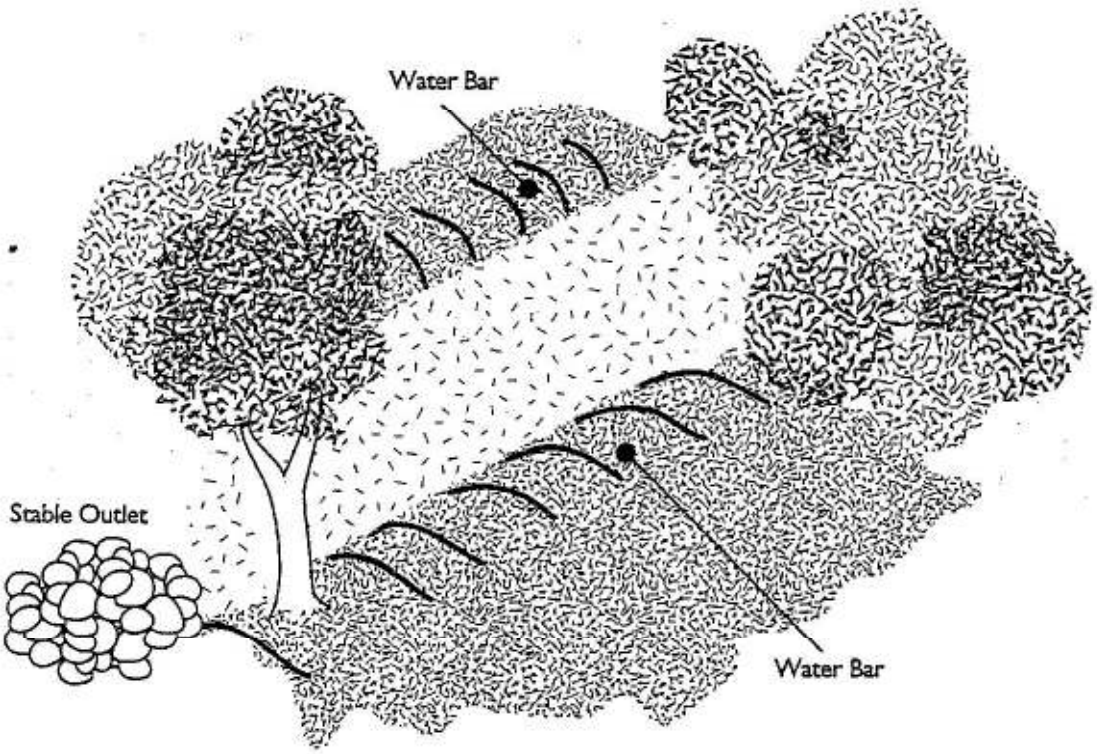
WATER BAR

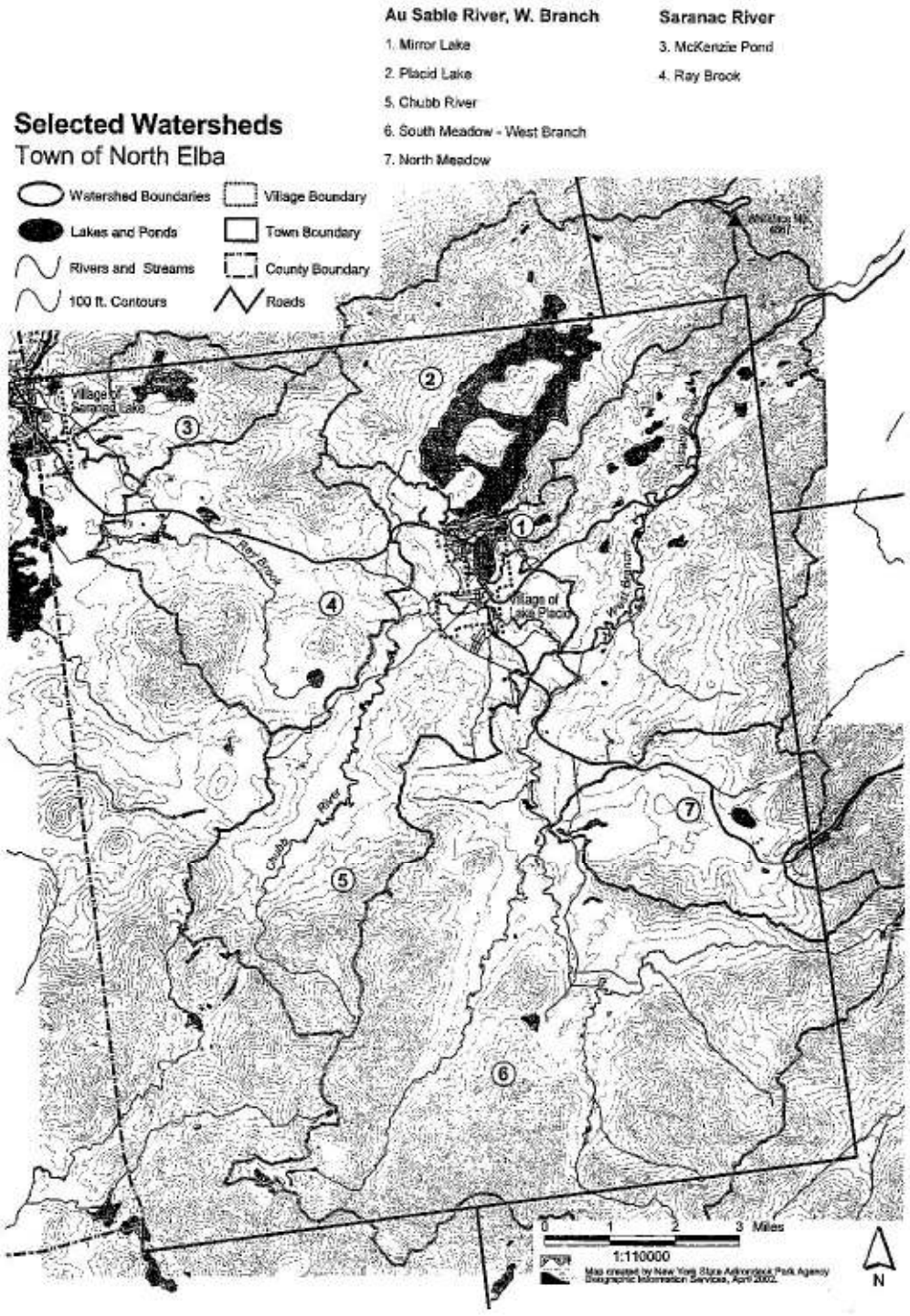
WHAT ARE THEY?

A water bar is a ridge constructed diagonally across a sloping road or utility right-of-way that is subject to erosion. The purpose of a water bar is to limit the accumulation of erosive volumes of water by diverting surface runoff at predesigned intervals.

Water bars are used when runoff protection is needed to prevent erosion on sloping access right-of-ways or either long, narrow sloping areas generally less than 100 feet in width. Height of the water bar should be a minimum of 18 inches measured from channel bottom to ridge top. Periodically inspect water bars for erosion damage and sediment. Vehicle crossings should be stabilized with gravel. Exposed areas should immediately be seeded and mulched. Check outlet areas and make repairs as needed to restore operation.







NOTE: Preparation of this Guide and its supporting "Lake Placid/North Elba Stormwater Management Ordinance" have in large measure been based upon similar documents previously prepared by the Lake George Park Commission. The Park Commission's permission to rely upon its materials is deeply appreciated!

Lake Placid/North Elba
Water Management Committee