

Stormwater Basin Retrofit for East Whiteland Township

Location: Township of East Whiteland, Pennsylvania

Client: Valley Forge Trout Unlimited

Size: 1 Acre

Cost: \$18 Thousand

Status: Built 2006

As part of a larger effort to address the environmental impacts of development on the Valley Creek watershed, Viridian Landscape Studio worked with Cahill Associates to retrofit a conventional stormwater detention basin in East Whiteland Township, PA. The client, Valley Forge Trout Unlimited, received \$18,000 in grants from the National Fish and Wildlife Foundation and the Valley Creek Trustee Council to cover design, implementation, and outreach for basin naturalization and retrofit. The basin was re-graded and its outlet structure raised to hold six inches of water for two to three days after small storms. The planting design by VLS used native species able to tolerate fluctuating water levels and periods of inundation, similar to conditions found in riparian and floodplain ecosystems. The combination of increased retention time and naturalized plantings allows more water to infiltrate back to groundwater and pollutants to be removed before the stormwater exits the basin. The trees and shrubs will also reduce the total volume of stormwater through evapotranspiration. Unlike conventional detention basins planted in exotic turf grass, this basin retrofit will provide native habitat while improving stormwater quality.



Volunteers planted 300 live stakes and 200 container-grown trees and shrubs. After planting, the basin was seeded with wet and dry native meadow mixes.



Live stakes (foreground) are simple to install and provide an inexpensive way to provide rapid shrub cover in the basin. Once established, the stakes will also provide structural reinforcement at the inlet, preventing the loss of soil during high-velocity flows.

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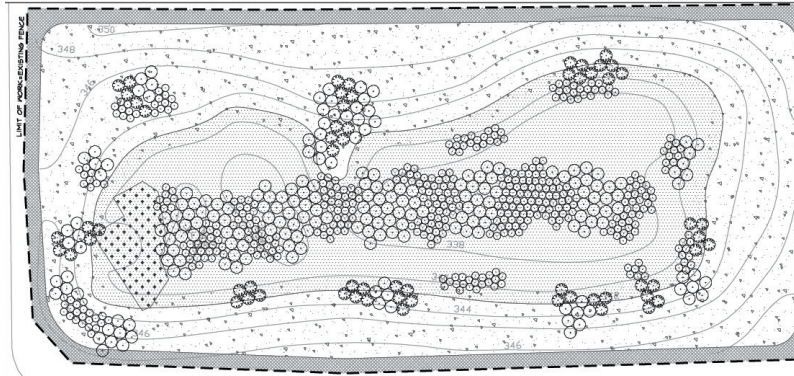
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FIRST YEAR MAINTENANCE

LOW-MOW TURF GRASS:

1. MOW TURF AREAS AS SOON AS TOP GROWTH IS TALL ENOUGH TO CUT. MOW GRASS TO 4-5 INCHES HIGH. REPEAT MOWING TO MAINTAIN SPECIFIED HEIGHT WITHOUT CUTTING MORE THAN 40 PERCENT OF GRASS HEIGHT. DO NOT DELAY MOWING UNTIL GRASS BLADES BEND OVER AND BECOME MATTED. DO NOT MOW WHEN GRASS IS WET.

2. WATER OR SUPPLEMENT NATURAL RAINFALL TO PROVIDE A MINIMUM RATE OF 1 INCH PER WEEK UNTIL A HEALTHY, DENSE, CLOSE STAND OF GRASS HAS BEEN ESTABLISHED.

NET 1 DRY MEADOW AREAS:

1. MOW MEADOW AREAS TO A HEIGHT OF 6 INCHES WHEN WEEDS REACH 10 INCHES IN HEIGHT.

2. MOW ON A MONTHLY BASIS THROUGH GROWING SEASON. REMOVE OR FINELY CHOP AND REDISTRIBUTE MOWINGS TO PREVENT CUT WEEDS FROM SMOOTHERING NATIVE GRASS SEEDLINGS. THE USE OF A FLAIL-TYPE MOWER IS RECOMMENDED BECAUSE IT CHOPS MATERIAL INTO FINE PIECES, ENCOURAGING MORE RAPID BREAKDOWN OF LEAF LITTER AND PREVENTING SMOOTHERING OF SEEDLINGS.

3. WATER OR SUPPLEMENT NATURAL RAINFALL TO PROVIDE A MINIMUM RATE OF 1 INCH PER WEEK.

SECOND YEAR MAINTENANCE

LOW-MOW TURF GRASS:

1. MOW TURF AREAS AS SOON AS TOP GROWTH IS TALL ENOUGH TO CUT. MOW TO 4-5 INCHES HIGH. REPEAT MOWING TO MAINTAIN SPECIFIED HEIGHT WITHOUT CUTTING MORE THAN 40 PERCENT OF GRASS HEIGHT. DO NOT DELAY MOWING UNTIL GRASS BLADES BEND OVER AND BECOME MATTED. DO NOT MOW WHEN GRASS IS WET.

NET 1 DRY MEADOW AREAS:

1. MOW MEADOW AREAS TO A HEIGHT OF 6 INCHES IN MID SPRING BEFORE WARM SEASON GRASSES EMERGE, BUT WHEN GOOD SEASON WEEDS ARE ACTIVELY GROWING. IF NET MEADOW AREAS ARE TOO WET TO MOW IN SPRING, MOW IN LATE FALL. REMOVE OR FINELY CHOP AND REDISTRIBUTE MOWINGS.

2. INSPECT 1-2 TIMES ANNUALLY FOR INVASIVE SPECIES. IF BIENNIAL WEEDS SUCH AS SHEET CLOVER, WILD PARNIP, QUEEN ANNIS LACE, OR BURDOCK, APPEAR, THEY SHOULD BE MOWED OR WEED WHACKED TO A HEIGHT OF 12 INCHES OR LESS WHEN IN BLOOM. DO NOT ALLOW BIENNIAL WEEDS TO GO TO SEED.

3. TO MAINTAIN MEADOW AND PREVENT SUCCESSION TO WOODY HABITAT MOW TO A HEIGHT OF 6-8 INCHES EVERY TWO YEARS IN MID SPRING. REMOVE OR FINELY CHOP AND REDISTRIBUTE MOWINGS.

GENERAL REQUIREMENTS

1. DO NOT MOW OR USE WEED WHACKERS NEAR TREES & SHRUBS.

2. DO NOT MOW TO LESS THAN RECOMMENDED MOWING HEIGHT.

3. INSPECT ALL SEEDING AREAS FOR BARE SPOTS (GREATER THAN 1 SQUARE FOOT) IN LATE SUMMER. RESEED BARE SPOTS WITH APPROPRIATE SEED MIXES DURING THE FALL SEEDING WINDOW (AUGUST 15 - SEPTEMBER 30) OR SPRING SEEDING WINDOW (APRIL 15 - JUNE 15).

4. REPLENISH MULCH AROUND TREES AND SHRUBS EACH SPRING TO SUPPRESS WEEDS. REMOVE WEEDS BY HAND AS NEEDED. VIGOROUS WEED CONTROL IS NEEDED FOR THE FIRST THREE YEARS OR UNTIL TREES ARE TALL ENOUGH TO SHADE OUT COMPETING WEEDS.

5. INSPECT TREE SHELTERS AND STAKES TO ENSURE THEY ARE SOUND AND UPRIGHT. REMOVE DECOMPOSING SHELTERS AND PIECES. REMOVE TREE SHELTERS THAT HAVE BEEN SPLIT ALONG THE LASER LINE BY FAST-GROWING TREES.

6. MONITOR FOR DEER DAMAGE DURING ESTABLISHMENT YEARS. USE REPELLANT AS NEEDED.

7. ESTABLISH AN EMERGENCY DROUGHT WATERING PLAN FOR THE FIRST AND SECOND YEARS. IF NO WATERING IS PROVIDED, BE PREPARED TO RESEED BARE AREAS AND REPLACE DEAD OR DAMAGED TREES & SHRUBS IF LOSS IS 20% OR GREATER.

To ensure success of the East Whiteland Township Basin Retrofit project, the township was given a Two-Year Maintenance & Monitoring Plan for the establishment period of the plantings.

Annually, Viridian joins Trout Unlimited and East Whiteland Township for site observation and assessment of basin conditions. This maintenance training program includes a discussion with township officials on small storm management, outlet structure modifications, inlet stabilization, native plantings and planting techniques, as well as invasive management. This basin retrofit serves as a model for the Township, Pennsylvania Environmental Council and has been featured in the GreenTreks video, “Rethinking Basins: Putting Nature to Work” - <http://vimeo.com/33424531>

First year, second year and general maintenance recommendations for plant establishment



3 years after installation: The live stakes have grown into large shrubs and the native meadow is fully established.