


Slope Restoration in Metropolitan Detroit


"A sustainable solution to erosion."

Nonette Alton, LLA
Michigan Department of Transportation
Roadside Development Unit
Lansing, Michigan



What's the issue?

In the metropolitan Detroit, erosion on steep slopes adjacent to the interstate is a serious maintenance, safety and aesthetic issue. The standard treatment for covering slopes is seeding. While turf grass seed can be a solution to some erosion problems, it is presenting many challenges as well. Our goal is to demonstrate alternatives to turf as a solution for slope stabilization.



What's the issue?

Goals for alternative slope restoration projects

- Alleviate and reduce the safety and financial concerns associated with mowing steep slopes.
- Decrease or eliminate environmental damage to Michigan waterways by covering the eroded slopes with vegetation that catches run-off and slows water velocity.
- Showcase alternative slope treatments that can be used in similar slope situations around the metro area.
- Reduce maintenance costs associated with mowing, and redirect savings to address other important maintenance operations such as litter collection, weeding, and watering.
- Find attractive alternative plants that will flourish in harsh urban conditions and will create interest and beauty for the traveler as well as the adjacent residents and businesses.

What's the issue?

Goals for alternative slope restoration projects



What's the issue?

- Historically seeding was the standard soil erosion control measure.
- The public in metro Detroit came to expect manicured roadsides.



What's the issue?

- Mowing practices on steep slopes create rills, gully's, which promotes erosion.
- Safety hazards associated with mowing steep slopes.



What's the issue?

•The MDOT is required to follow the laws set forth under Part 91, Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act, Public Acts 1994 PA 451, which protects soil an sediments from entering Michigan's waterways.



Cornell University Research

- Cornell University Study, "*Deciduous Woody Groundcovers*" by the Department of Horticulture
 - Study to identify plants useful in slope stabilization
 - Design process, site assessment, plant selection maintenance

For more information:

www.hort.cornell.edu/uhi/outreach/pdfs/dwgc.pdf

The MDOT design process

- In 2005 the slope committee agreed to locate a test plot on the 110 million dollar M-10 reconstruction project, turning idea to action.
 - The first alternative slope restoration project is called the MDOT pilot planting project. See details on the web at www.michigan.gov/slope-restoration.
 - This planting was small in scope about 1 acre and located on M-10 in the City of Southfield.

The MDOT design process

In 2004, a group of administrators, engineers, landscape architects, maintenance engineers and analysts formed the Metro Region Slope Committee to discuss the long standing problems associated with steep slopes.

- Discussed the problem in depth until a full understanding was reached.
- We brainstormed on solutions, best practices in other states and possible alternatives.

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MDOT Metro Region Slope Committee Members:

Greg Johnson, CFO, MDOT Executive

Andrew Zeigler, Region Planner, Metro Region

Drew Buckner, Macomb TSC Manager

Sharon Ferman, Resource Specialist, Metro Region

Nanette Alton, Landscape Architect, Roadside Development

Gina Red-Craig, Maintenance Engineer, Macomb TSC

Darwyn Heme, Roadside Analyst, Lansing Maintenance

Ahmad Azmoudeh, Maintenance Engineer, Oakland TSC

Scott Wheeler, Roadside Program Specialist, Lansing Maintenance

Landscape contractor & plant advisor:

Marine City Nursery: Landscape Contractor; Warren and Pat Senger

Arthur Cameron, Professor of Horticulture, Michigan State University

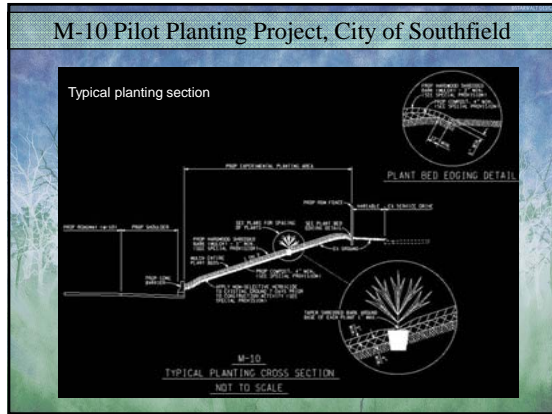
M-10 Pilot Planting Project, City of Southfield

Location Map



M-10 Pilot Planting Project, City of Southfield





M-10 Pilot Planting Project, City of Southfield

Panicum virgatum 'Heavy Metal'
Heavy Metal Switch Grass

Panicum virgatum 'Rostrahibusch'
Red Switch Grass

Nepeta x faassennii 'Walkers Low'
Walkers Low Nepeta

Sporobolus heterolepis
Prairie Dropseed

Plant selection criteria: Drought, heat tolerant, zone 3-5, low maintenance

M-10 Pilot Planting Project, City of Southfield

Description	Estimated Unit Quantity	Estimated Unit Price	Estimated Amount	Supplemental Description
Mulching & Cultivating, 1st Season Min.	1.000LS	9,770.00000	9,770.000	
Site Preparation, Max	1.000LS	26,116.25000	26,116.250	
Tree, 8 inch to 18 inch	6.000Ea	346.41000	1,472.460	
Mulching & Cultivating, 2nd Season, Min.	1.000LS	12,878.80000	12,878.800	
	8,893.000Ea	2.50000	14,732.500	Alum Bentonite susp. montanum, 3 1/4" w/2"
	600.000Ea	5.25000	3,150.000	Chenaria Purpurka 'Magnus'
	30.000H	125.00000	4,500.000	Cultivata Vitis
	889.000Ea	5.25000	3,688.750	Nepeta x faassennii 'Walkers Low', #1 pot
	426.000Ea	12.00000	5,112.000	Panicum virgatum 'Cloud Gate', #2 pot
	900.000Ea	5.25000	4,725.000	Panicum virgatum 'Heavy Metal', #1 pot
	285.000Ea	12.00000	3,420.000	Panicum virgatum 'Tuffway', #1 pot
	676.000Ea	5.25000	3,540.000	Panicum virgatum 'Rostrahibusch', #1 pot
	28,182.000Ea	2.50000	70,455.000	Compacted 6" stone wrap
	1,334.000Ea	12.00000	16,008.000	Rosa x 'Early Wanda', #2 pot
	290.000Ea	4.75000	1,377.500	Doronicum Scaparium 'The Blue', #1 pot
	600.000H	50.00000	30,000.000	Shredded Bark Mulch
	843.000Ea	5.25000	4,425.750	Sporobolus heterolepis, #1 pot

Total Estimated Project Cost \$228,803.710

Actual Award to low bid Marine City Nursery: \$192,903.75

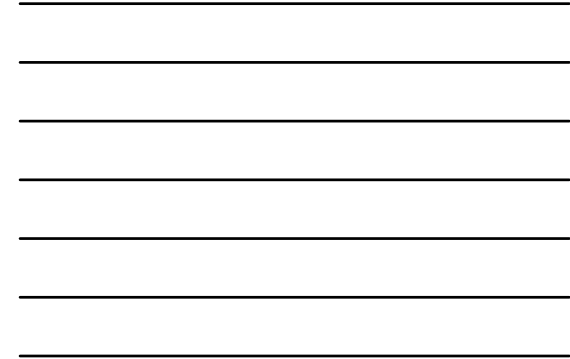
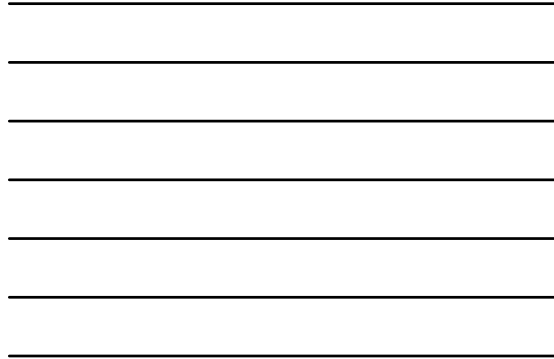
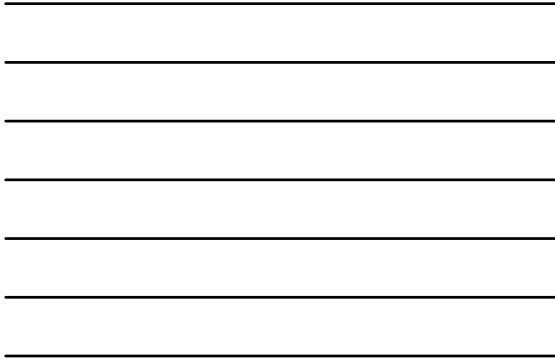
Total Planted Space: 1 Acre

M-10 Pilot Planting Project, City of Southfield

Site Preparation

- Site prep includes:
 - Herbicide application
 - Brush and stump removal
 - Organic debris removal
 - Existing turf was left in place after herbicide application in order to maintain stability of the slope.

Seven days after herbicide application



M-10 Pilot Planting Project, City of Southfield


Pneumatic Compost Application

- Pneumatic compost application includes:
 - Compost as specified in Pneumatic Compost Special Provision
 - Compost was mixed with tackifier that holds soil in place when exposed to water.
 - Compost was applied to even out gullied slope and create an even surface.



M-10 Pilot Planting Project, City of Southfield

Pneumatic Compost Application

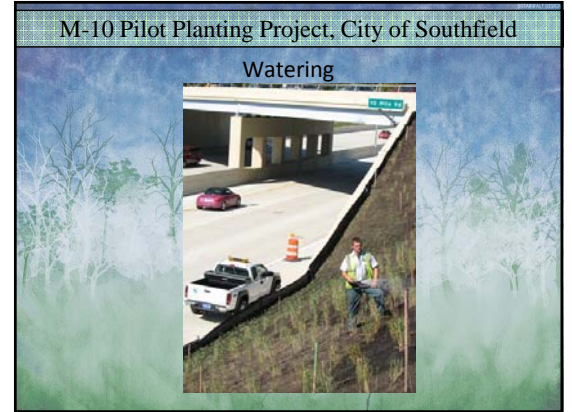
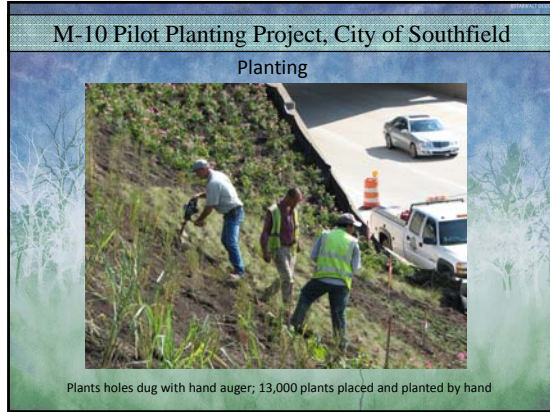


Compost being blown on to cover gullies and uneven surfaces; maximum depth of 4 inches

M-10 Pilot Planting Project, City of Southfield

Planting











I-696 Slope Restoration

PHASE 1 PLANT LIST

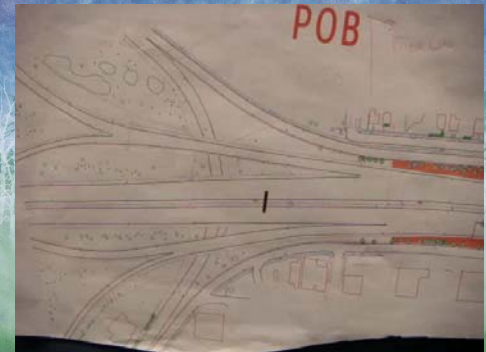
SYM	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
Af	Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	3-5 Inch 30' O.C.	
Mw	Morus 'Bob White'	Bob White Crabapple	1 Inch 15' O.C.	
Md	Morus 'David'	David Crabapple	1 Inch 15' O.C.	
Pg4	Pinus glauca	White Spruce	4' HT 15' O.C.	
Pg5	Pinus glauca	White Spruce	5' HT 20'	
Pn4	Pinus nigra	Austrian Pine	4' HT 15' O.C.	
Pn5	Pinus nigra	Austrian Pine	5' HT 20' O.C.	
Po	Physocarpus opulifolius	Common Ninebark	45 Cont 9' O.C.	
Pp4	Pinus pungens var glauca	Blue Spruce	4' HT 15' O.C.	
Pp5	Pinus pungens var glauca	Blue Spruce	5' HT 20' O.C.	
Rg	Rhus aromatica 'Grow Low'	Fragrant Sumac	40 Cont 6' O.C.	
Rt	Rhus typhina	Staghorn Sumac	24 Inch 12' O.C.	
Vd	Viburnum dentatum	Arrowwood Viburnum	24 Inch 7.5' O.C.	
Lp	Ulmus parvifolia	Leadbark Elm	1.5 Inch 30' O.C.	
Mf	Morus 'Prairie Fire'	Prairie Fire Crabapple	1 Inch 15' O.C.	
Ap	Acer platanoides	Norway Maple	2 Inch 25' O.C.	
Lv	Ligustrum x vicary	Golden Vioary Privet	45 Cont 7.5' O.C.	

I-696 Slope Restoration

PHASE 1 PLANT LIST

SYM	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
Lm	Lonicera caerulea	Hedge Maple	8-10' HT 40' O.C.	
Ap	Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	3-5 Inch 40' O.C.	
Ap	Acer platanoides	Norway Maple	2 Inch 20' O.C.	
Lc	Lonicera caerulea	Hedge Maple	3-5 Inch 25' O.C.	
Lv	Ligustrum x vicary	Golden Vioary Privet	5' HT 40' O.C.	
Mw	Morus 'Bob White'	Bob White Crabapple	1 Inch 20' O.C.	
Md	Morus 'David'	David Crabapple	1 Inch 20' O.C.	
Mf	Morus 'Prairie Fire'	Prairie Fire Crabapple	1 Inch 20' O.C.	
Mw	Morus 'Prairie Fire'	Prairie Fire Crabapple	1 Inch 20' O.C.	
Po	Physocarpus opulifolius 'World'	Common Ninebark	45 Cont 12' O.C.	
Bl	Berberis ligularis	Grovel Weed	40 Cont 3.5' O.C.	
Fr	Fraxinus americana 'Amorosa Dwarf'	Amorosa Dwarf Fraxinella	40 Cont 4' O.C.	
Fl	Fraxinus americana 'Lynwood Dwarf'	Lynwood Dwarf Fraxinella	40 Cont 8' O.C.	
Pg	Parthenocarpus quinquefolia	Virginia Creeper	40 Cont 12' O.C.	
Pg4	Pinus glauca	White Spruce	4' HT 20' O.C.	
Pg5	Pinus glauca	White Spruce	5' HT 25' O.C.	
Pn4	Pinus nigra	Austrian Pine	4' HT 20' O.C.	
Pn5	Pinus nigra	Austrian Pine	5' HT 25' O.C.	
Pp4	Pinus pungens	Blue Spruce	4' HT 20' O.C.	
Pp5	Pinus pungens	Blue Spruce	5' HT 25' O.C.	
Rg	Rhus aromatica 'Grow Low'	Fragrant Sumac	40 Cont 6' O.C.	
Rt	Rhus typhina	Staghorn Sumac	24 Inch 12' O.C.	
Lp	Ulmus parvifolia	Leadbark Elm	0.5 Inch 40' O.C.	
Lp	Ulmus x glomerata	Flowering Elm	3-5 Inch 25' O.C.	
Vd	Viburnum dentatum	Arrowwood Viburnum	24 Inch 12' O.C.	
Es	Elaeagnus angustifolia	Southern Bush Holly	40 Cont 3.5' O.C.	
Fr	Fraxinus americana	Northern Bush Holly	40 Cont 3.5' O.C.	
W	Wisteria ssp. floribunda	Walters Low Catclaw	40 Cont 3' O.C.	
Sj	Spiraea japonica	Japanese Spiraea	45 Cont 3.5' O.C.	

I-696 Slope Restoration















I-696 Slope Restoration

Fun Facts!

- 55,000 plants will be installed in this project, laid end on end they would stretch about 21 miles!
- Largest slope restoration project MDOT has designed and delivered, to date.
- Project is funding by the American Recovery and Reinvestment Act and has a budget of \$13 million dollars.
- Together, all the plants on this site will remove 33 million pounds of carbon dioxide from the air over a 40 year period!

Hamtramck Slope Restoration Project, City of Hamtramck

I-75 between Grand Trunk Western R.R. to Commor Avenue in the city of Hamtramck.



Hamtramck Slope Restoration Project, City of Hamtramck



Plant List

- Forsythia x intermedia 'Lynwood Gold'
- Rhus aromatica 'Gro Low'
- Panicum virgatum 'Shenandoah'

- Most areas contain no compost
- Plants were not watered properly
- Weeds were allowed to grow large enough to take over site
- Extensive weeding and foot-traffic
- Still flourishing!



Founded in 1899, ASLA is the national professional association for landscape architects, representing more than 16,000 members in 48 professional chapters and 68 student chapters. The Society's mission is to lead, to educate, and to participate in the careful stewardship, wise planning, and artful design of our cultural and natural environments.

Learn more at www.asla.org.



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