



**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.

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### 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.



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### 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](http://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](http://www.michigan.gov/slope-restoration).
  - This planting was small in scope about 1 acre and located on M-10 in the City of Southfield.

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### 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.

**MDOT Metro Region Slope Committee Members:**

Greg Johnson, CFD, MDOT Executive	Darwyn Heme, Roadside Analyst, Lansing Maintenance
Andrew Zeigler, Region Planner, Metro Region	Ahmad Azmoudeh, Maintenance Engineer, Oakland TSC
Drew Buckner, Macomb TSC Manager	Scott Wheeler, Roadside Program Specialist, Lansing Maintenance
Sharon Ferman, Resource Specialist, Metro Region	<b>Landscape contractor &amp; plant advisor:</b>
Nanette Alton, Landscape Architect, Roadside Development	Marine City Nursery: Landscape Contractor; Warren and Pat Senger
Gina Red-Craig, Maintenance Engineer, Macomb TSC	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




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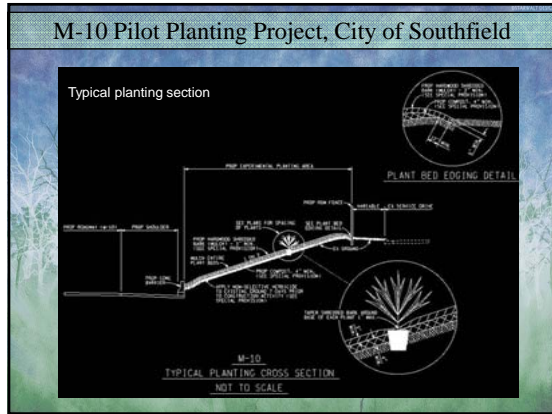
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### M-10 Pilot Planting Project, City of Southfield

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

Item/Category	Estimated Price/Quantity	Estimated Total Price	Proposed Award	Supplemental Price/Notes
Mulching & Cultivating, 1st Season Min.	1,000.00 LB	9,770.00000	9,770.000	
Site Preparation, Max	1,000.00 LB	20,116.25000	20,116.250	
Tree Stems, 6 inch to 18 inch	6,000.00 Ea	348,410.000	1,472,800.000	
Mulching & Cultivating, 2nd Season, Min.	1,000.00 LB	12,078.00000	12,078.000	
	8,893.00000 Ea	2,500.000	14,732.500	Alum. Sambucus susp. moutanum, 3 1/4" pot
	600.00000 Ea	5,250.000	3,150.000	Cheerilee 'Purple Rain' Magnolia
	30.00000 H	125.00000	4,500.000	Arbicultural Vets
	699.00000 Ea	5,250.000	3,669.750	Nepeta x faassennii 'Walkers Low', #1 pot
	426.00000 Ea	12,000.000	6,100.000	Panicum virgatum 'Cloud Nine', #2 pot
	900.00000 Ea	9,250.000	4,987.500	Panicum virgatum 'Heavy Metal', #1 pot
	289.00000 Ea	12,000.000	3,420.000	Panicum virgatum 'Touffroureux', #1 pot
	676.00000 Ea	9,250.000	3,049.000	Panicum virgatum 'Rostrahibusch', #1 pot
	26,182.00000 LB	2,500.000	80,430.000	Prunella sp. 'Snow King' Compound 4" stock only
	1,334.00000 Ea	12,000.000	18,000.000	Rosa x 'Hardy White', #2 pot
	290.00000 Ea	4,750.000	1,377.500	Dracopis sp. 'The Blues', #1 pot
	400.00000 H	50,000.000	30,000.000	Shrubbed to 6" stock
	843.00000 Ea	5,250.000	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

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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



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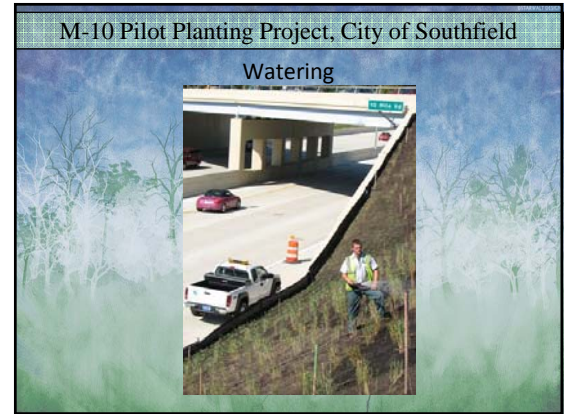
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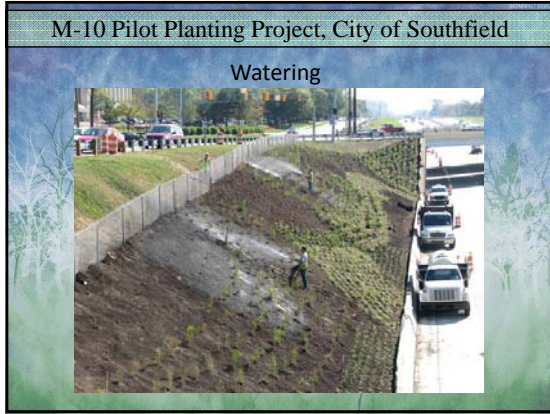
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### I-696 Slope Restoration

SYN	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
Af	Acer x freemanii 'Autumn Blaze'	Autumn Blaze Maple	3-5 inch 30' O.C.	
Mw	Malus 'Bob White'	Bob White Crabapple	1 inch 15' O.C.	
Md	Malus '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.	
Lb	Ulmus parvifolia	Loadbark Elm	1.5 inch 30' O.C.	
Mpf	Malus 'Prairie Fire'	Prairie Fire Crabapple	1 inch 15' O.C.	
Ap	Acer platanoides	Norway Maple	3 inch 25' O.C.	
Lv	Ligustrum x viciory	Golden Vioary Privet	45 Cont 7.5' O.C.	

### I-696 Slope Restoration

SYN	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
Lm	Larix laricina	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 30' O.C.	
Lc	Larix laricina	Lightbulb Larch	3-5 inch 25' O.C.	
Lv	Ligustrum x viciory	Golden Vioary Privet	5" HT 40' O.C.	
Md	Malus 'Bob White'	Bob White Crabapple	1 inch 20' O.C.	
Md	Malus 'David'	David Crabapple	1 inch 20' O.C.	
Mpf	Malus 'Prairie Fire'	Prairie Fire Crabapple	1 inch 20' O.C.	
Mw	Malus 'Frost Striker'	Frost Striker Crabapple	1 inch 25' O.C.	
Po	Physocarpus opulifolius 'World's Best'	Common Ninebark	45 Cont 12' O.C.	
Bj	Berberis japonica	Grovel Weed	40 Cont 3.5' O.C.	
Ft	Forsythia x intermedia 'Lemon Gold'	Arnold Dwarf Forsythia	40 Cont 4' O.C.	
Ft	Forsythia x intermedia 'Lemon Gold'	Lynchwood Gold Forsythia	40 Cont 8' O.C.	
Pg	Parthenocissus 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 18' O.C.	
Lb	Ulmus parvifolia	Loadbark Elm	0.5 inch 40' O.C.	
Vd	Viburnum dentatum	Arrowwood Viburnum	24 inch 25' O.C.	
Sb	Sierisilla asarifolia	Southern Bush Honeyuckhol	40 Cont 3.5' O.C.	
Lr	Larix laricina	Northern Bush Honeyuckhol	40 Cont 3.5' O.C.	
Wl	Wickstroemia caryophyllata	Walkers Low	40 Cont 3' O.C.	
Sj	Spiraea japonica	Japanese Spiraea	45 Cont 3.5' O.C.	




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## 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!

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## Hamtramck Slope Restoration Project, City of Hamtramck

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




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## 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!



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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](http://www.asla.org).



## Slope Restoration in Metropolitan Detroit

*"A sustainable solution to erosion."*

Nanette Alton, LLA  
Michigan Department of Transportation  
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