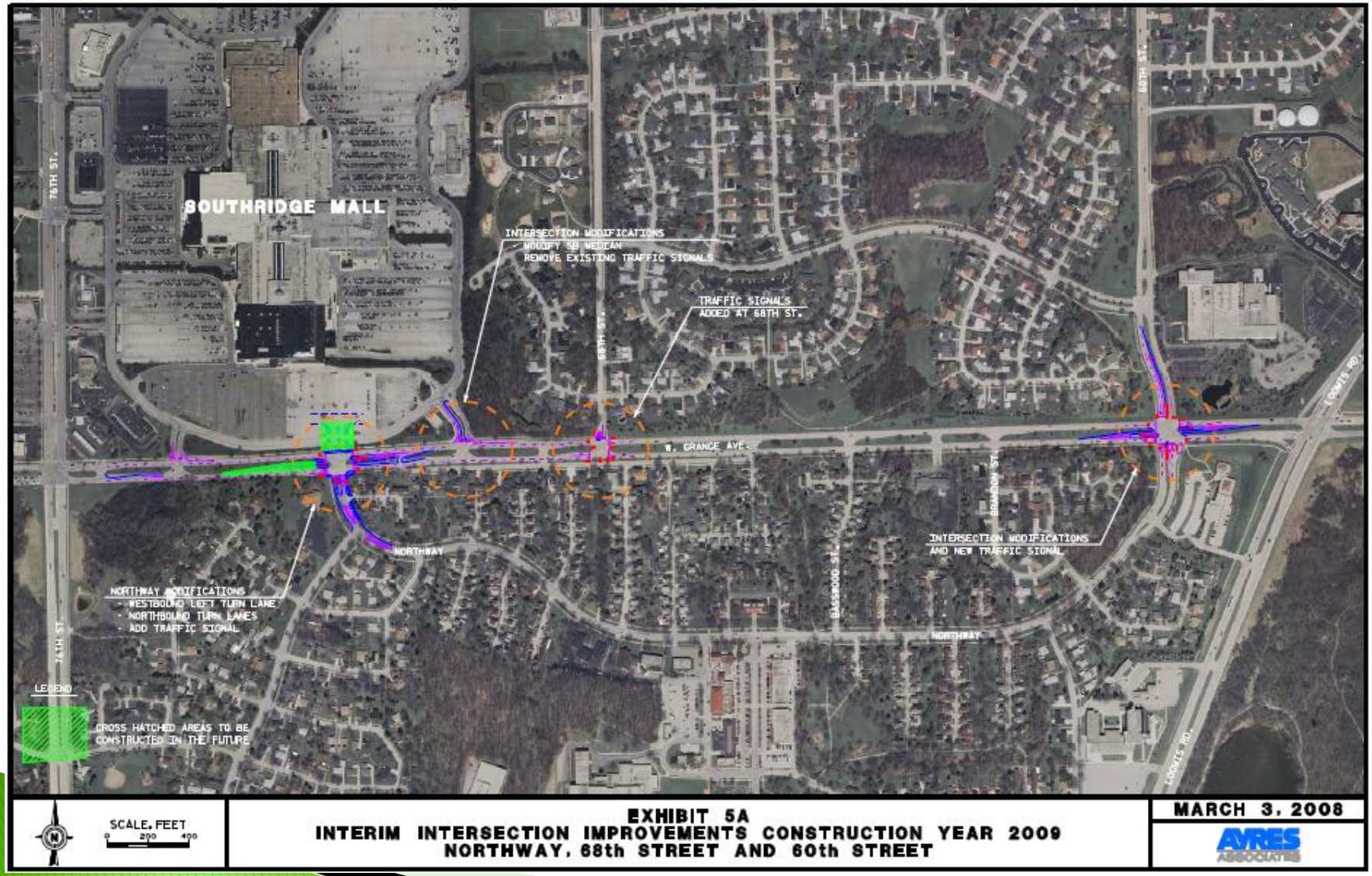
VILLAGE OF GREENDALE
W. Grange Avenue Bioswale Project

2012 Waukesha County Storm Water MS4 Permit Workshop
March 14, 2012

Project Background

- Transportation improvement project along W. Grange Avenue from W. Loomis Road to S. 76th Street, in the Village of Greendale.
- Pavement was severely deteriorated, storm water conveyance structures were dated, and the street lighting was at the end of its service life.

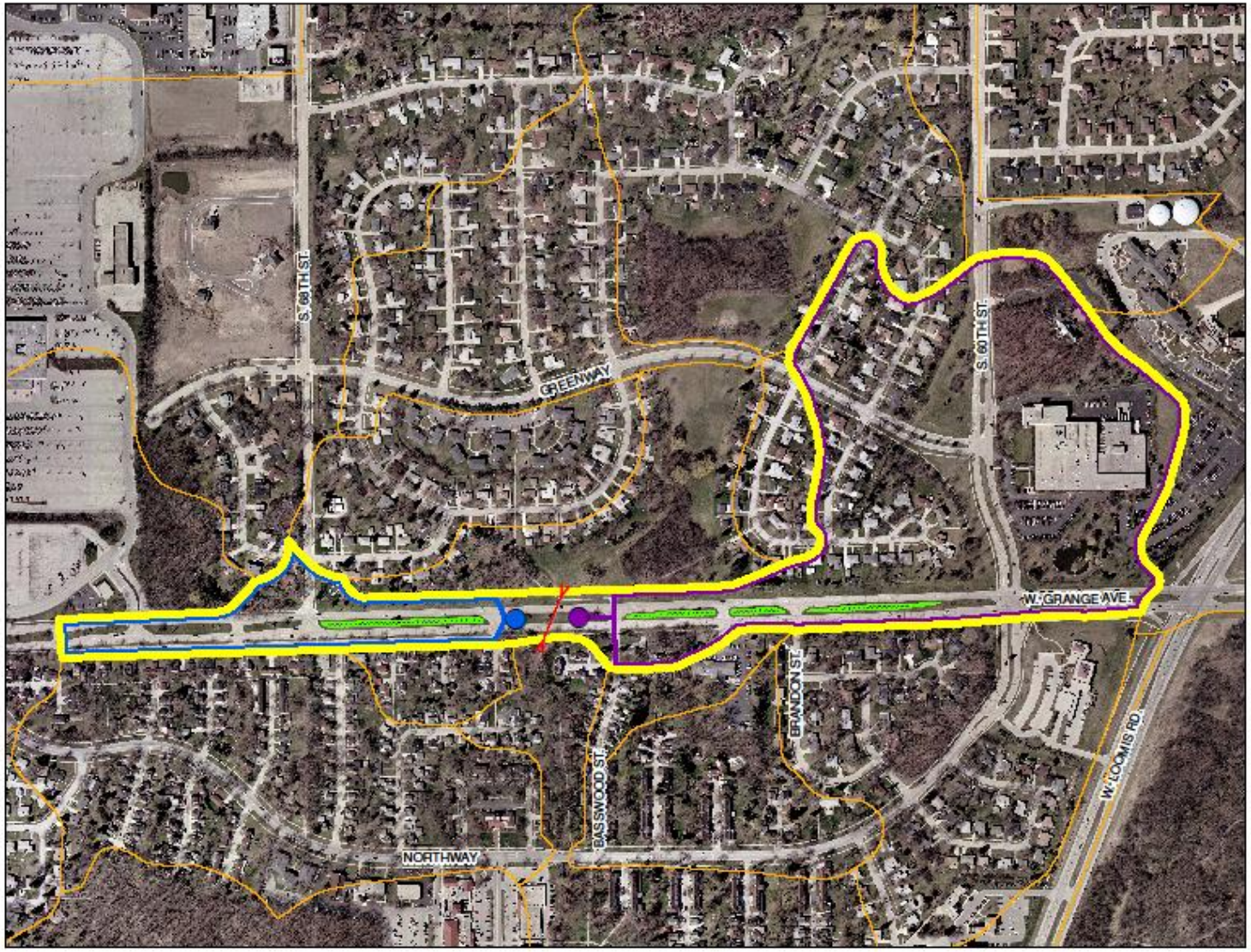
Project Limits



Project Background

- Project included:
  - Pavement rehabilitation/curb & gutter repair
  - Intersection improvements
  - Traffic signal & street lighting improvements
  - Storm water management enhancements (bioswales in medians & 2 Stormceptor units)
- The project is within the Dale Creek subbasin of the Root River Watershed
- Design completed by Ayres & Associates

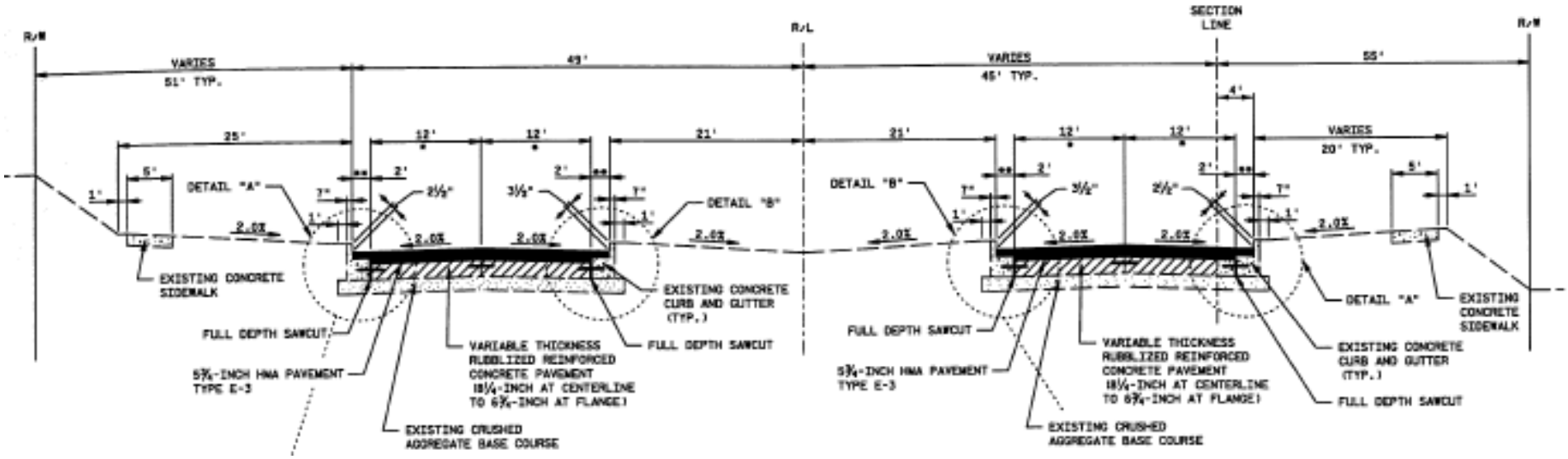
Drainage Basins



Unique Conditions

- Median width of 40 ft along Grange Avenue
- Fairly deep storm sewer system that discharges directly to Dale Creek
- Storm sewer runs down the center of the medians
- The Village wanted to gain Total Suspended Solids (TSS) removal credits to meet the WPDES Permit goals

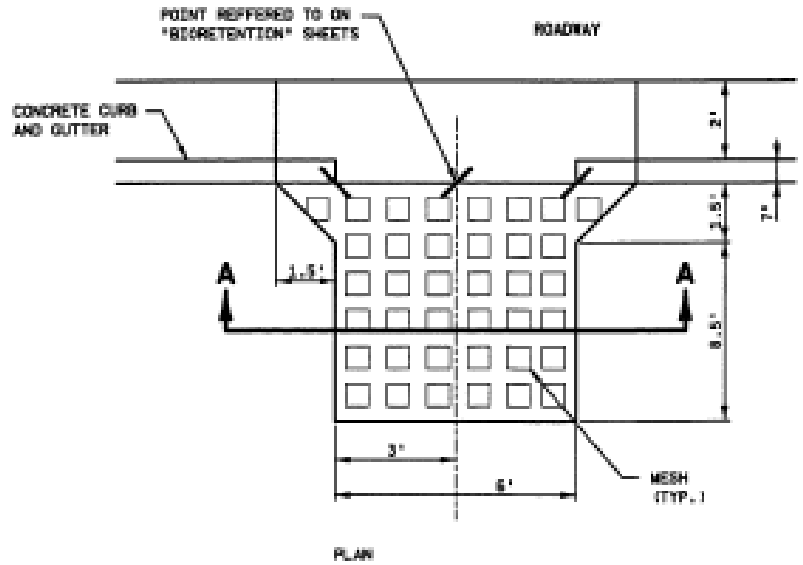
Typical Roadway Cross Section

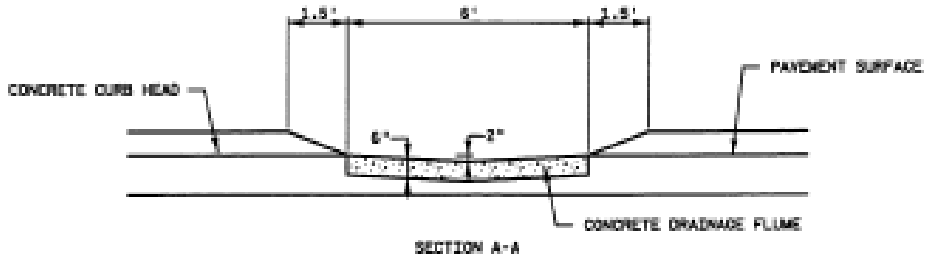


Bioswale Design Details

- Bioswales were only feasible within medians that had a storm sewer depth of approximately 6 feet
- Total bioswale surface area within the medians is 0.64 Acres (1400 lineal feet)
- 10 foot wide grass buffer strip along curb lines to protect from snow plowing and road salt
- 41 curb openings equally distribute the runoff via concrete flumes

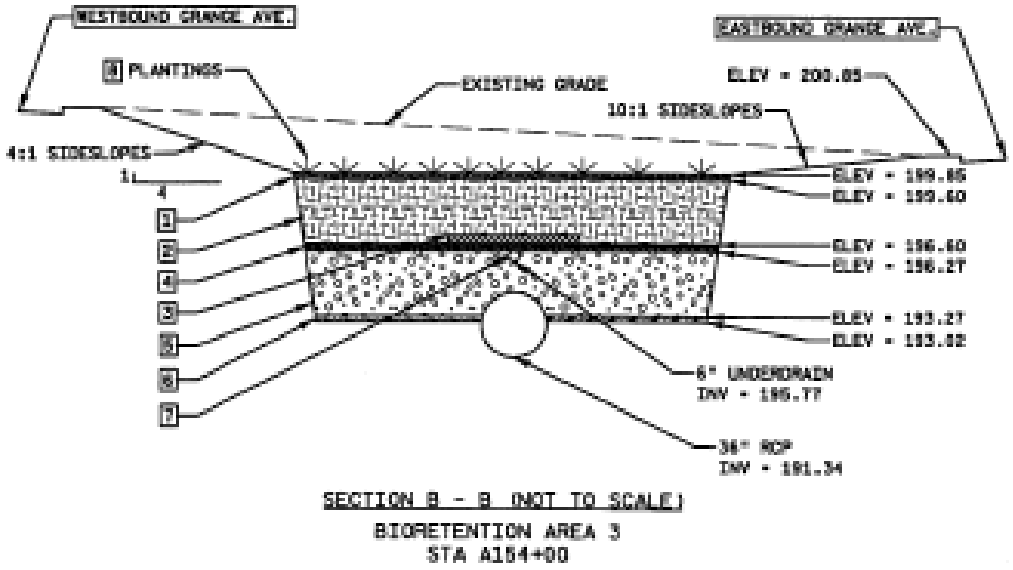
Concrete Flumes





Bioswale Design Details

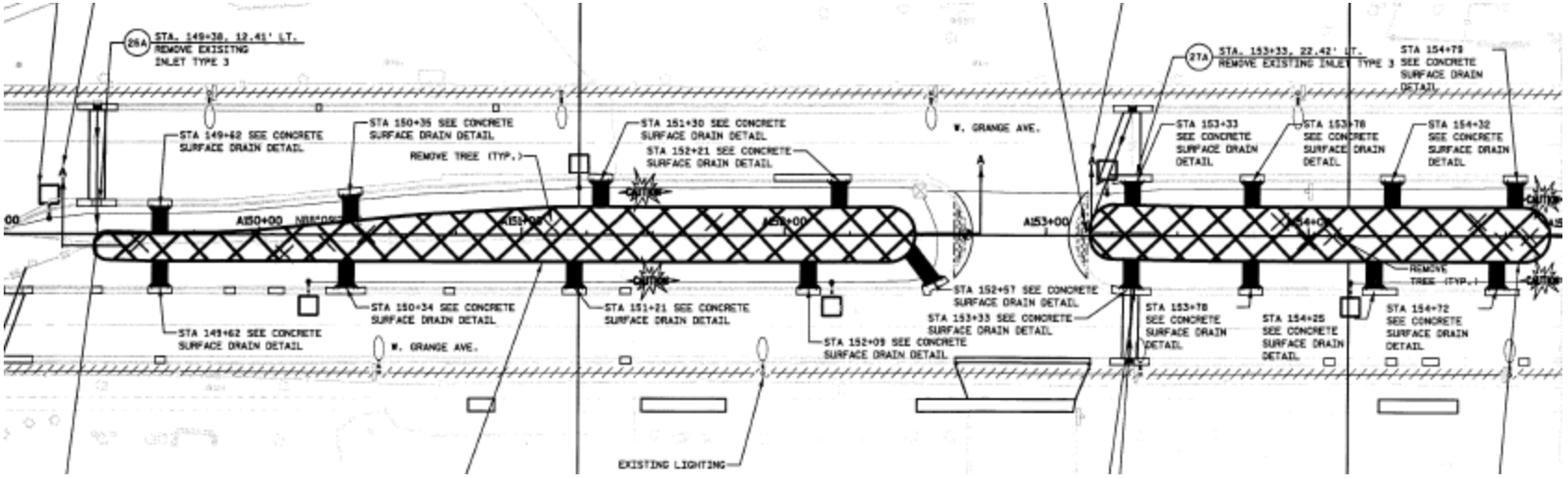
- Maximum ponding depth of 12”
- 3” mulch layer
- 36” engineered soil mix layer
- 6” underdrain piping connected to the storm sewer system
- 36” aggregate storage layer
- 3” sand interface
- Removes 770 lbs of TSS annually

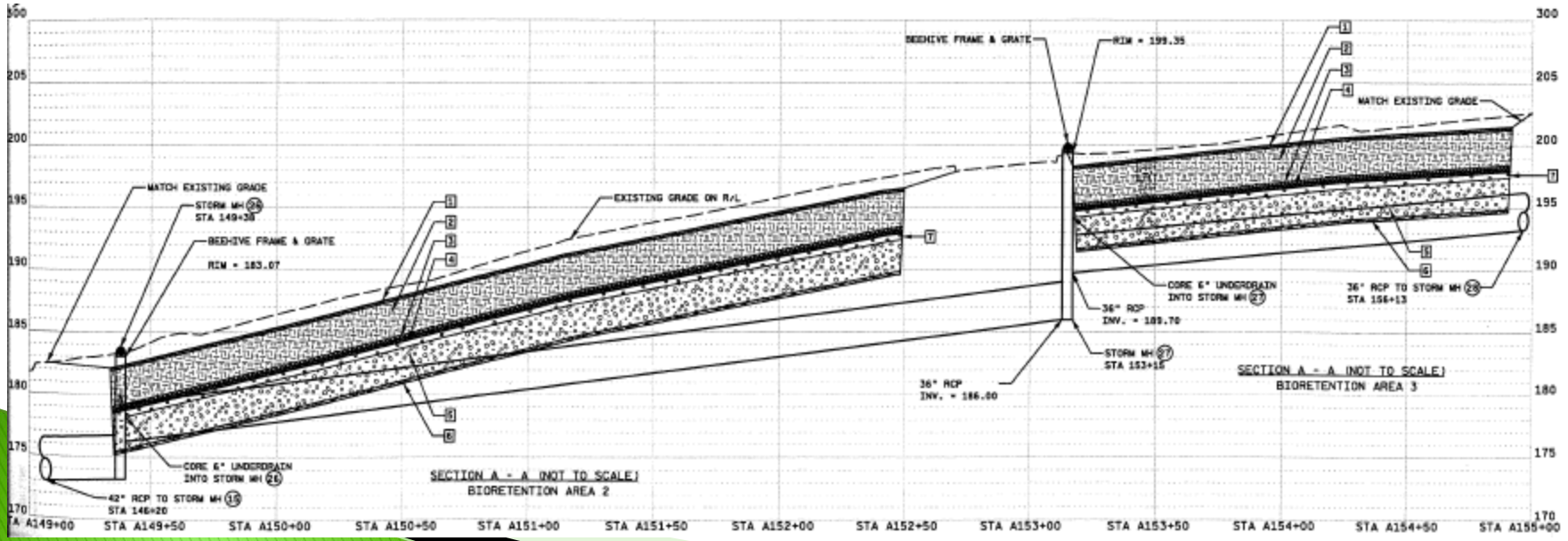


SECTION B - B (NOT TO SCALE)

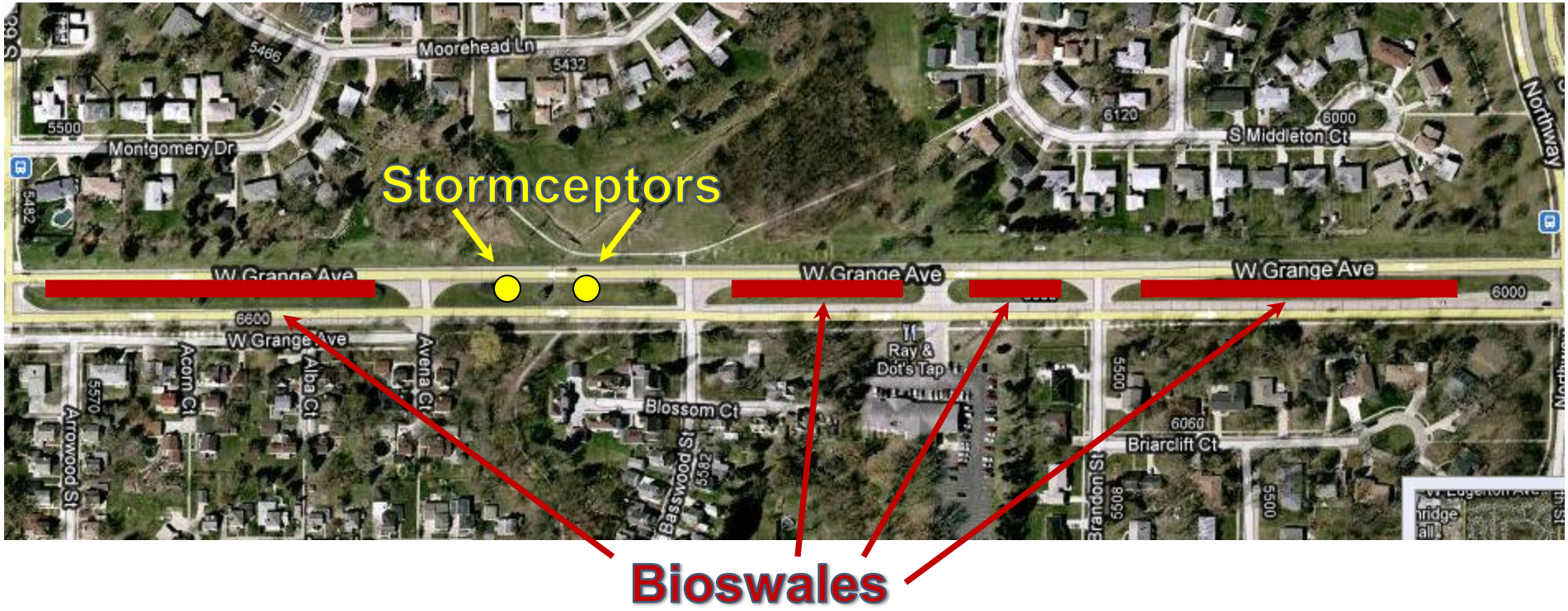
BIORETENTION AREA 3
STA A154+00

Bioswale Plan and Profile

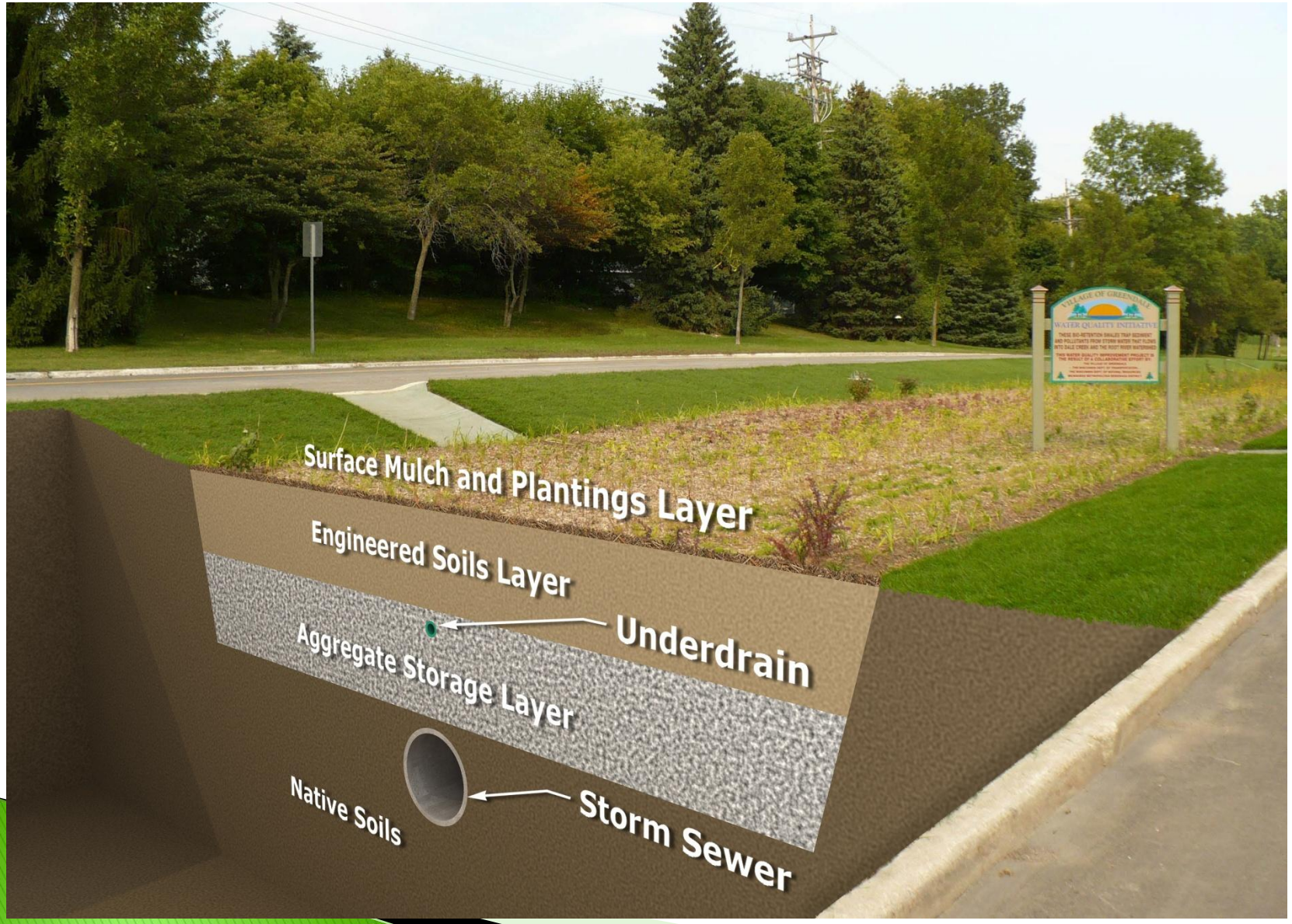




Bioswale Locations



Bioswale Cross-Section



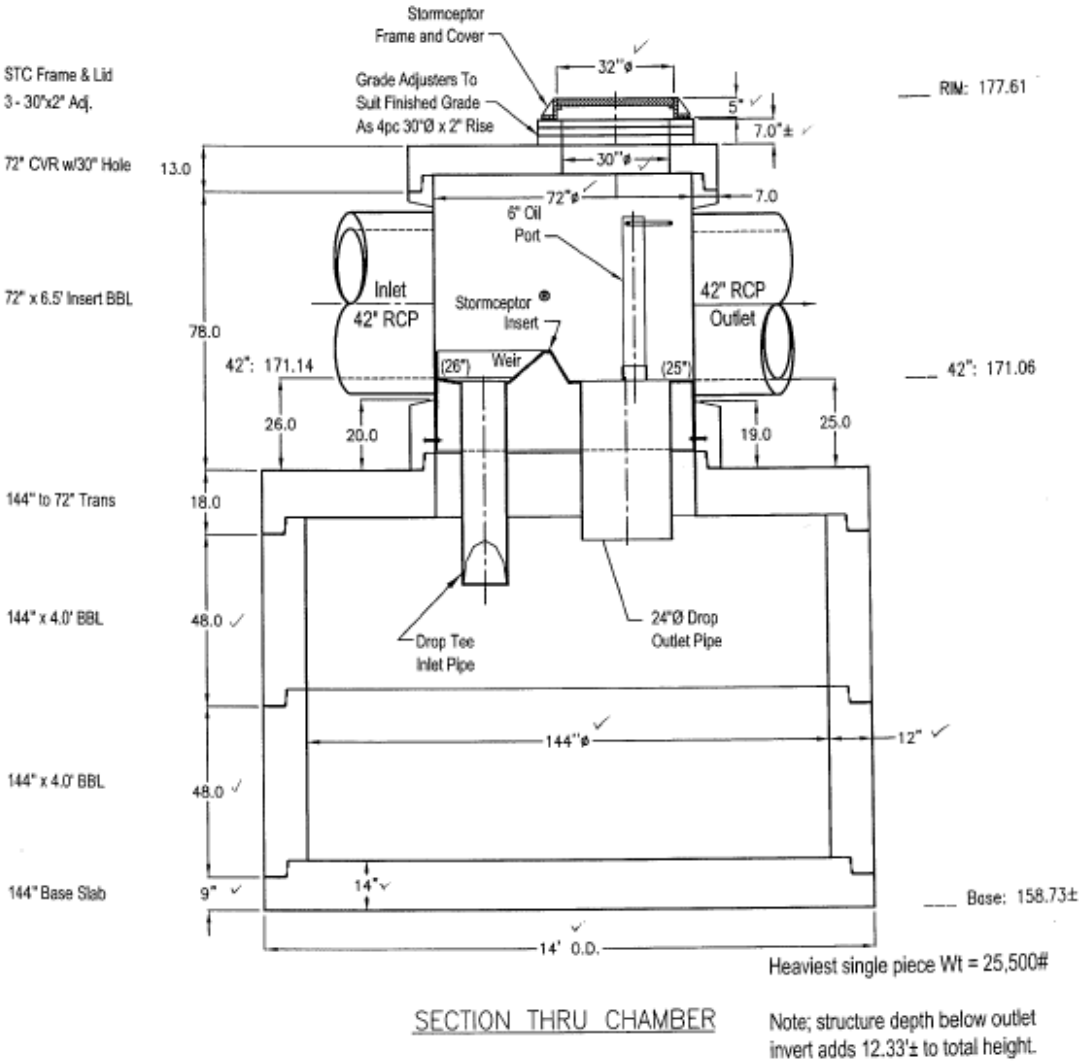
Stormceptor West of Dale Creek

- Model STC 2400
- Total Drainage Area = 7.63 Acres
- Device Depth = 15.5 feet
- 8-foot chamber diameter
- Removes approximately 215 lbs of TSS annually

Stormceptor East of Dale Creek

- Model STC 7200
- Total Drainage Area = 40.82 Acres
- Device Depth = 19 feet
- 12-foot chamber diameter
- Removes approximately 1,270 lbs of TSS annually

Stormceptor East of Dale Creek



Heaviest single piece Wt = 25,500#

SECTION THRU CHAMBER

Note; structure depth below outlet invert adds 12.33'± to total height.

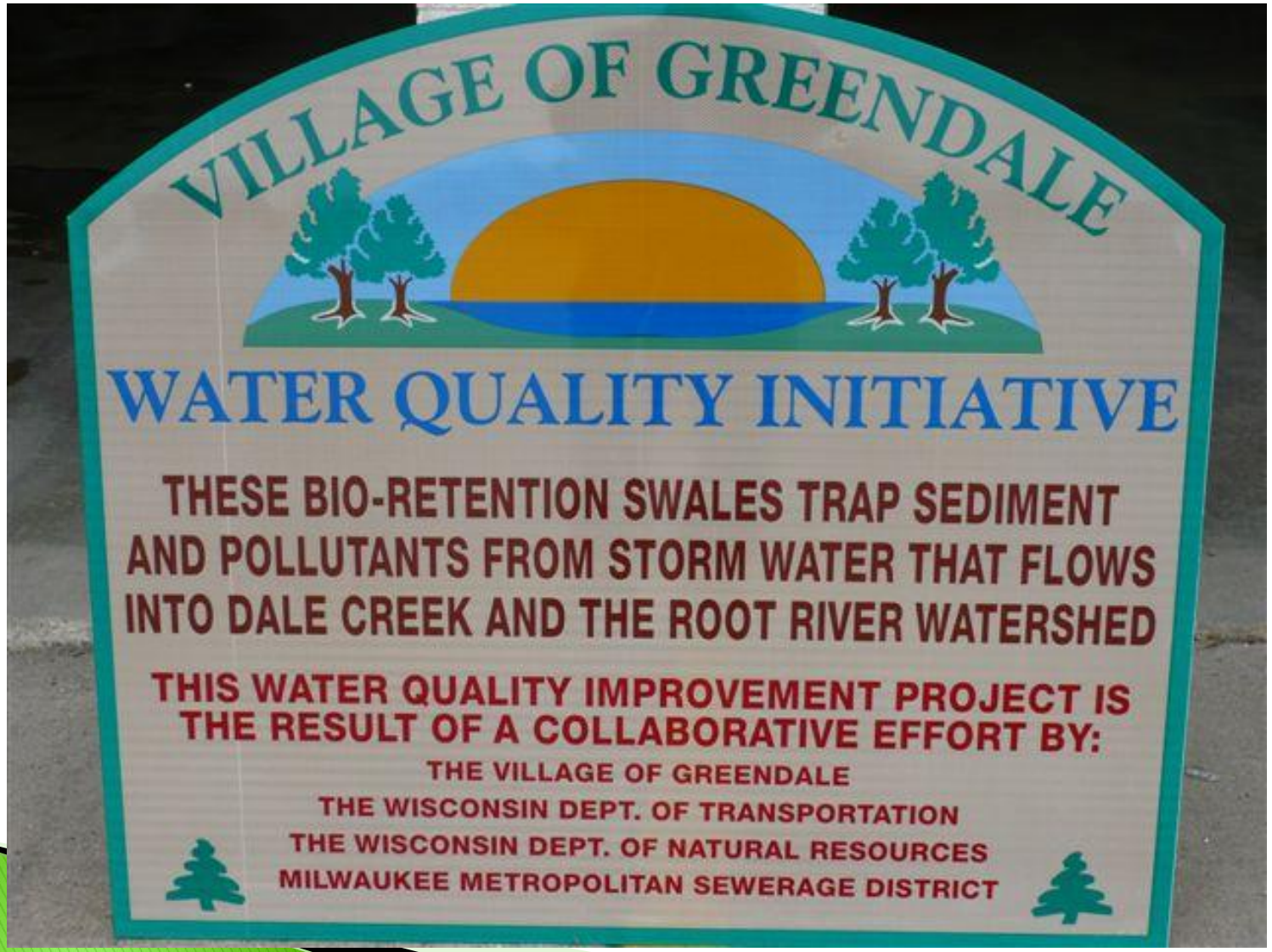
Total Project Results

- Total Project Area = 50.94 Acres
- Total TSS Removal = 2,255 lbs annually
- Total Bioswale Cost = $212,000 (~$151/ft)
- Total Stormceptor Cost = $96,000

Long-term Maintenance

- Life expectancy of the bioswale is approximately 10 – 20 years with annual maintenance for the vegetation
- The bioswales are mowed with low ground pressure equipment each year to help control weeds
- The plantings have performed at or above expectations with minimal replacement

Public Education



Project Team

- The Village is proud to have been part of this beneficial Water Quality Initiative Project
- Collaborative Effort:
  - Village of Greendale
  - Wisconsin Dept. of Transportation
  - Milwaukee Metropolitan Sewerage District
  - Wisconsin Dept. of Natural Resources

Contact Information

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rmcfaul@greendale.org

MMSD
www.mmsd.com
Video - http://www.youtube.com/watch?v=Hs_GuzQnQCE

VILLAGE OF GREENDALE
W. Grange Avenue Bioswale Project
Construction Photos

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NEW HOLLAND LS180
FIATALLIS

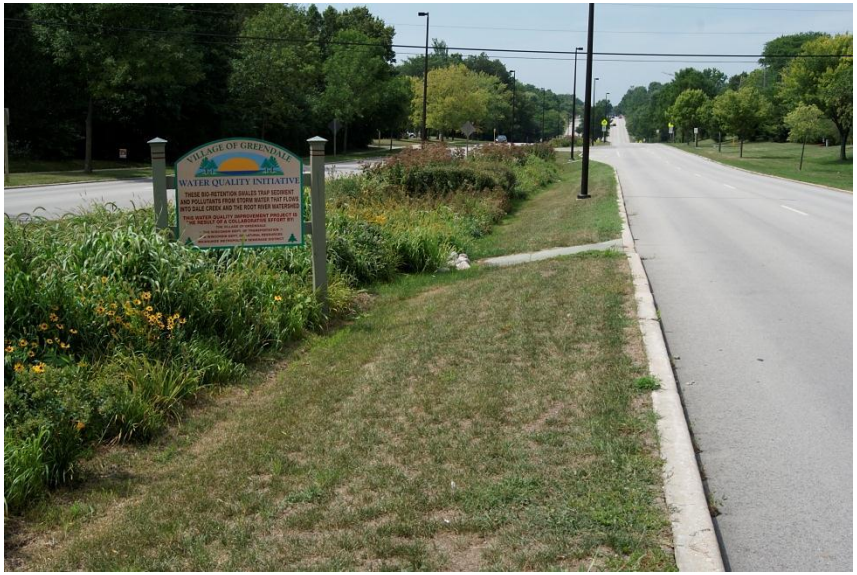

STOP


SPEED
LIMIT
25

SUMMER 2011

FALL 2011

SUMMER 2011



FALL 2011

SUMMER 2011

FALL 2011

SUMMER 2011

FALL 2011

SUMMER 2011

FALL 2011

SUMMER 2011

FALL 2011

Biorentention Area Plantings

Plantings for Bioretention Area	Height	Space	Blooms
Butterfly Milkweed (Asclepias Tuberosa)	1-2 ′	1′	May-June
Moonshine Yarrow (Archillea Filipendula ‘Moonshine’)	2-3′	18″	June-Frost
Black-eyed Susan (Rudbeckia Hirta)	1-2′	1′	May-Frost
Marsh Milkweed (Asclepias Incarnatal)	3-5′	1′	June-August
Fire Ring Yarrow (Achellea Millefolium ‘Fire King’)	1-2′	1′	May-Frost

Biorentention Area Plantings

Plantings for Bioretention Area	Height	Space	Blooms
Blazing Star (Kuatrus Spicata)	2-3′	18”	June-Frost
Joe Pye (Eupatorium Maculation)	4-5′	2’	June-Frost
Bee Balm Bergarmot (Monarda Fistula)	2-3′	18”	Late May-Fall
New England Aster (Aster Novae-Angliae)	4-5′	2′	Midsummer-Frost
Purple Cone Flower	2-3′	18”	June-August

Biorentention Area Plantings

Daylilies for 3 Ft. Daylily Bands

Plantings for Bioretention Area	Height	Space	Blooms
Pardon Me Daylily (Hemerocallis 'Pardon Me')	20-30"	2'	Re-Bloomer
Stella de Oro Dayllily (Hemerocallis 'Stella de Oro)	15-18"	2'	Re-Bloomer
Little Wine Cup Daylilly (Hermerocallis 'Little Wine Cup')	20-24"	2'	Re-Bloomer
Strawberry Candy Daylily (Hermerocallis 'Strawberry Candy')	24-36"′	2′	Re-Bloomer

Biorentention Area Plantings

Shrubs for Shrubbery Groupings

	Height	Space	Blooms
Red Barberry (Berberis Thunbergii)	4-5”	2-4’	April-May
Burning Bush (Compactus)	6-10’	2-4’	Fall
Highbush Cranberry (Viburnum Opulus Var.)	10-15”	2-4’	Fall

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