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OPTIMIZING OPERATIONS AND MAINTENANCE OF LID BMPS

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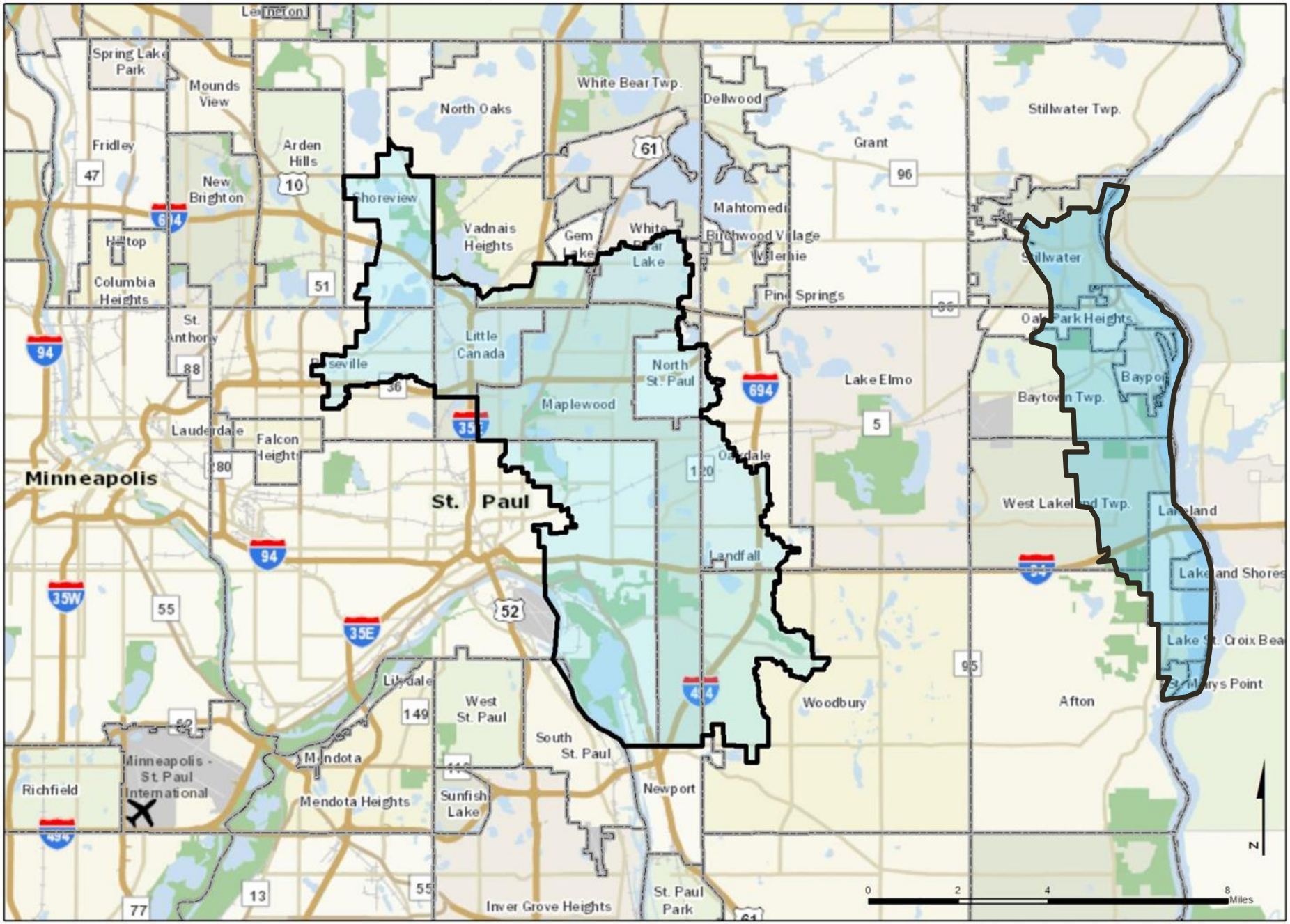
WASHINGTON CONSERVATION DISTRICT

operations and maintenance

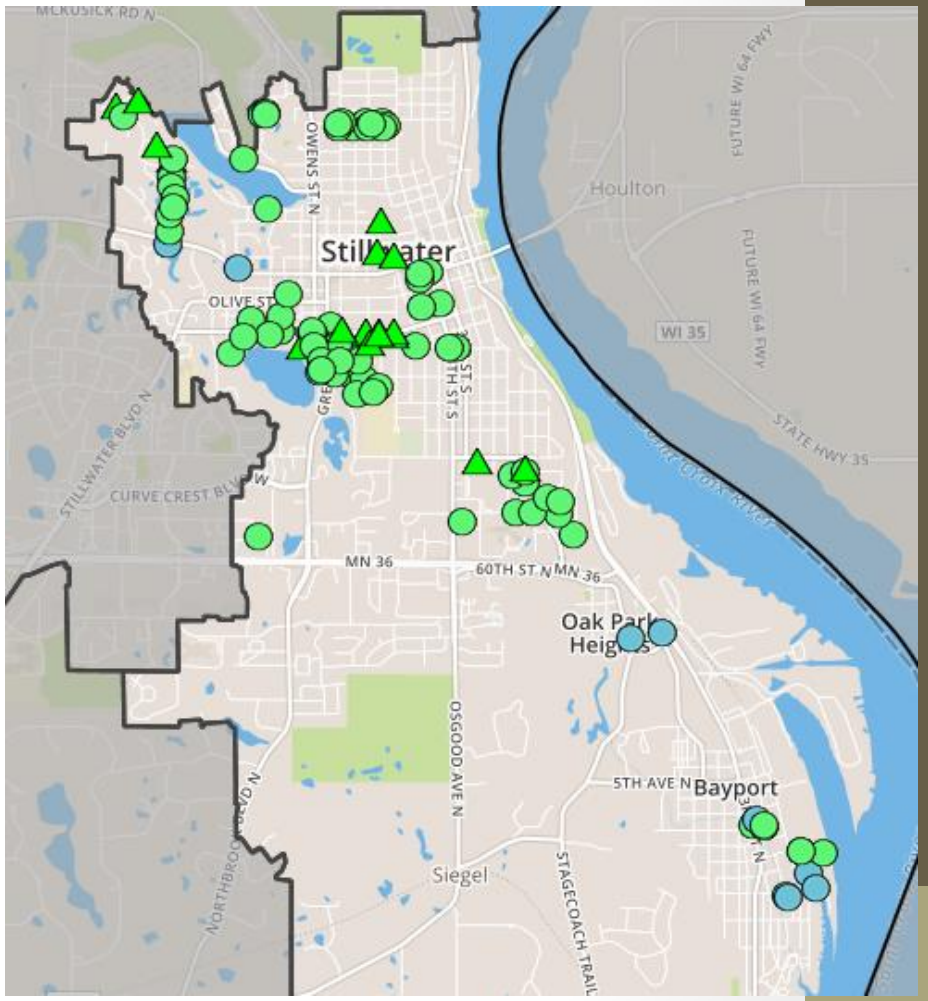
Ramsey-Washington Metro Watershed District

Middle St. Croix Watershed Management Organization



MSCWMO Development and TMDL BMPs

- Create or fully reconstruct 560 m² impervious surface
- MIDS- 25 mm or 12.5 mm
- Retrofit bioretention basins each year to address TMDLs.
- Annual inspections of 111 bioretention BMPs.



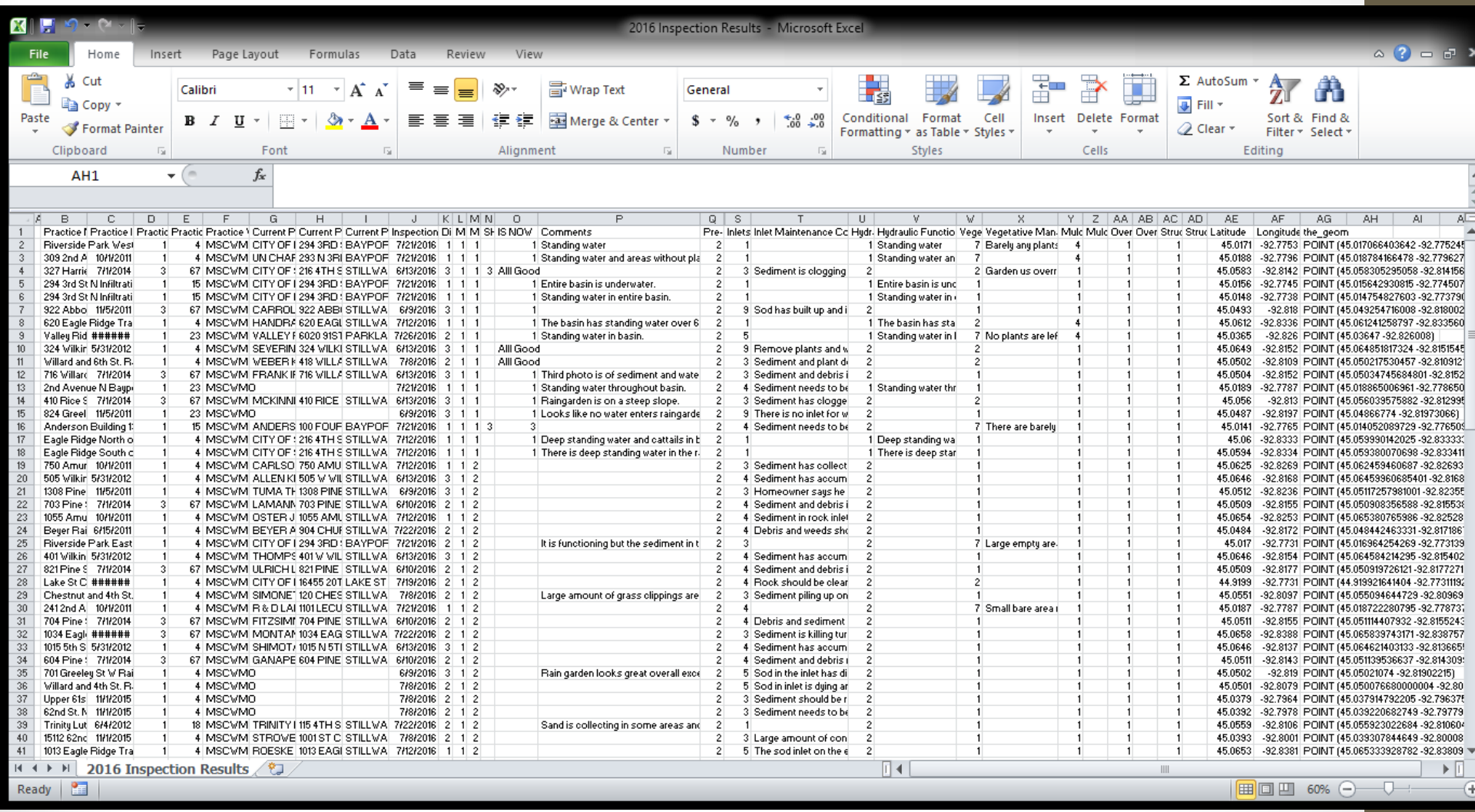
Development and TMDL BMPs

- Volume reduction required on projects disturbing 0.4 hectare or more of land
- New development and redevelopment
- Annual inspections 300+ BMPs

RAMSEY-WASHINGTON
METRO WATERSHED DISTRICT

Geospacial Tracking & Inspections

There's An App For That!



Inspections

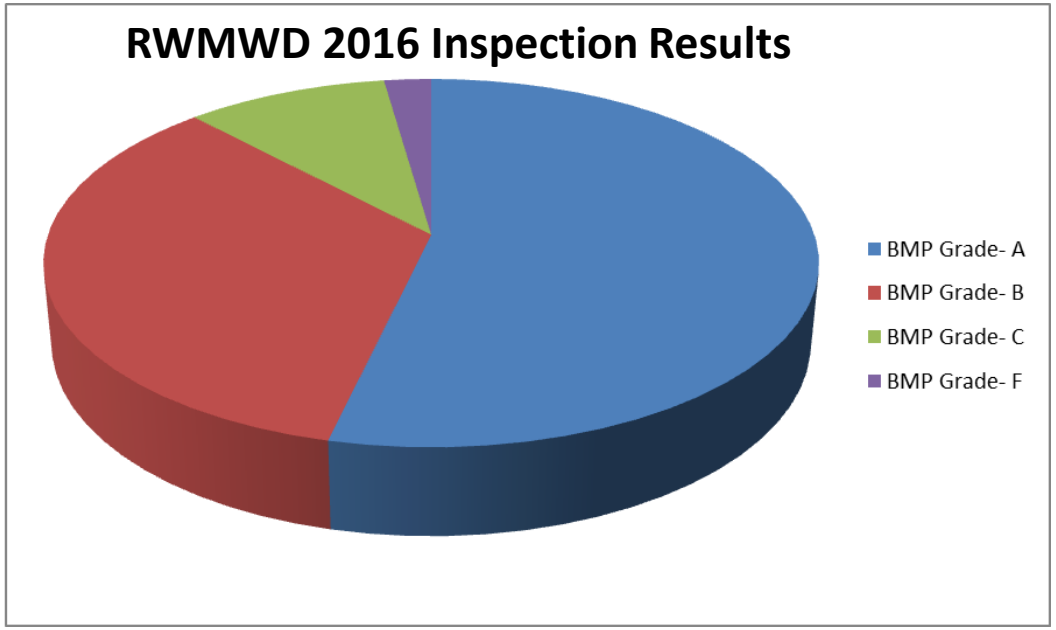
Maintenance Priority

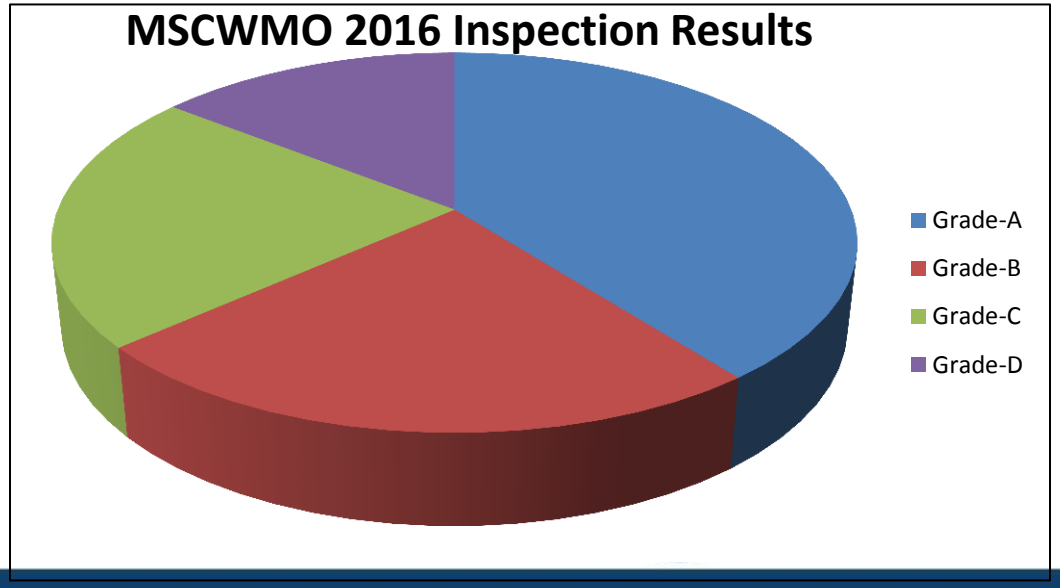
- A= Continue Annual Maintenance
- B= Aesthetics (weeding, inlet clean-out, invasive plant management)
- C= Restore partially functioning BMP (replacing plants, mulching, minor grading)

BMP Grading System

- D= Restore non-functioning BMP (full restoration)

How are we doing?





RWMWD Pilot Program

Two Projects

- Little Canada Bioretention Basins
  - 57 bioretention basins
    - 250 ft² (18.5-23.2 m²)
  - Ranged from 2-12 years old
  - No prior routine maintenance
- Living Streets
  - 31 Bioretention Basins
    - 200 ft² (18.5-23.2 m²) each
  - Newly installed
  - More formal plantings

RWMWD Program Results Summary

	Living St 2013	Living St 2014	Little Canada 2013	Little Canada 2014
Starting Grade	A	A	C	A
Avg Size	200	200	250	250
Total Hours	79	77.75	232.5	173
Total Cost	$6,668	$6,601	$20,498	$16,317
Avg cost/ garden	$222	$220	$359	$286
Avg time/garden	2.6	2.6	4.1	3.0

RAMSEY-WASHINGTON
METRO WATERSHED DISTRICT

MSCWMO Program

Stillwater TMDL and Street Reconstruction BMPs

- 104 Bioretention Basins
  - 250 square feet
- 10% 2-5 years old
- 90% 5-12 years old
- Complaint driven maintenance.

MSCWMO Program Results Summary

	2015	2016	2017
Median Starting Grade	C+	C+	B
Total Number of Raingardens	111	104	104
Total Hours	416	480	232.5
Total Cost*	$15,808	$18,240	$8,835
Avg cost/ garden	$141	$175	$84
Avg time/garden	3.7	4.6	2.2

*Calculated based on $38 per hour

MSCWMO Program Results Details

Minnesota Conservation Corps Crew

- 13 crew days in 2015 and 2016
- Time includes mulching in 2015 and 2016.
- Sod inlet replacement in 2015.
- Plant replacements and watering in 2016.

Inspection Example

Constructed 2008

Inspections starting in 2013

Date	Maintenance Needed	Maintenance Priority	Pre-Treatment Maintenance Required	Inlets Maintenance Required	Inlet Maintenance Comment	Vegetative Management Required	Vegetative Management Comment	Mulching Required
11/18/2013	Yes	C Partially Functioning	Yes	Remove Sediment	Sediment has built up and stormwater is bypassing.	Weeding	Very weedy. Weeding needed.	No
9/9/2014	Yes	D Nonfunctional	Yes	Remove Sediment	Inlet sod is blocking water from entering the basin.	Weeding	Raingarden is becoming overgrown, weeding is necessary.	No
8/25/2015	Yes	D Nonfunctional	Yes	Remove Sediment	Sod is prohibiting water from entering the basin. Remove sod and lower inlet elevation and placing new sod.	Weeding	Weeding needed on the west side of the basin. Plant replacement needed on the east side of the basin. Needs 20 additional plants.	1 Inch Thick

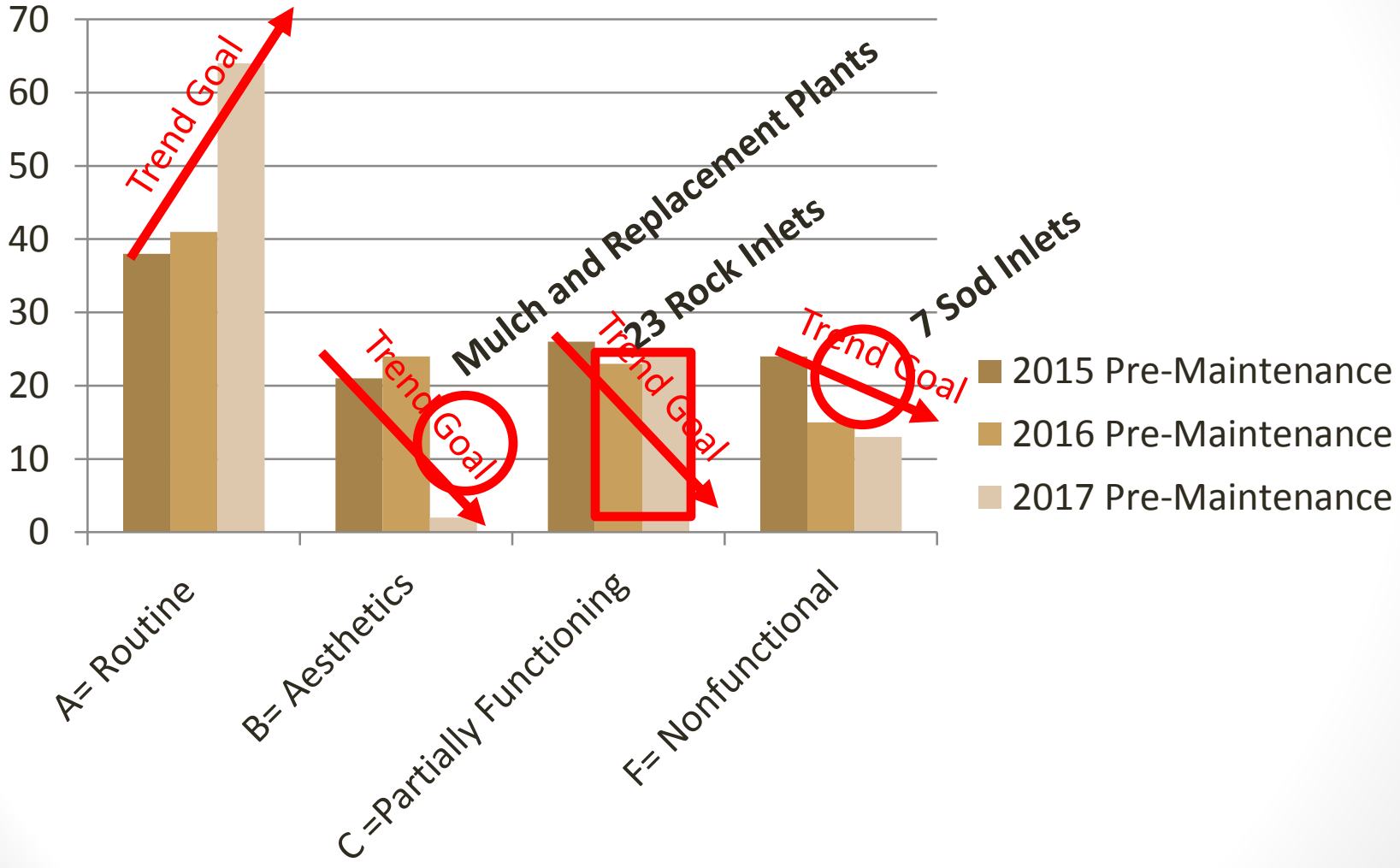
2015 Weed Control, Inlet sod replacement, Weed Control, Plant Replacement, Mulching, Inlet sod watering.

2016 Annual Maintenance

2017 Annual Maintenance

Date	Maintenance Needed	Maintenance Priority	Pre-Treatment Maintenance Required	Inlets Maintenance Required	Inlet Maintenance Comment	Vegetative Management Required	Vegetative Management Comment	Mulching Required
8/25/2015	Yes	D Nonfunctional	Yes	Remove Sediment	Sod is prohibiting water from entering the basin. Remove sod and lower inlet elevation and placing new sod.	Weeding	Weeding needed on the west side of the basin. Plant replacement needed on the east side of the basin. Needs 20 additional plants.	2 Inch Thick
7/8/2016	Yes	**B** Aesthetics	**No**	**No**	**No**	**Plants**	20 Additional plants needed.	**No**
7/11/2017	No							

Reducing the Maintenance Burden



Reducing the Maintenance Burden

Inlets

- Rock Inlets: 1 hour per maintenance visit.
- 46 hours in 2016 picking rock.

Reducing the Maintenance Burden

Rain Guardian—Turret

Standard exterior dimensions:

46" x 50" base, 19.5" total height

Turret prices:

Light-Duty Rated (541 lb. concentrated load)—Contact ACD

Heavy-Duty Rated (2,456 lb. concentrated load)—Contact ACD

Galvanized steel grate (2-piece)

Anodized aluminum filter frame and fiberglass filter grid

Steel reinforced, cold joint secured monolithic concrete riser and base (1,030 lbs.)

Manufactured by: FORTERRA Structural & Specialty

Rain Guardian—Bunker

Standard exterior dimensions:

51.25"L x 20"W x 15.75"H

Bunker price:

Light-Duty Rated (316 lb. concentrated load)—Contact ACD

Galvanized steel grate (1-piece)

Anodized aluminum filter

Pre-assembled recycled plastic (95%+) chamber (50 lbs.)

Reducing the Maintenance Burden

Forebays

MDR Watershed 63,000 m^2

Year 4 = 13 m^2 sediment

Reducing the Maintenance Burden

Spring Clean Up

- 45%-55% of annual maintenance time
- Annual Spring Raingarden Clean Up in 2018
  - 59 volunteers
  - 80 raingardens maintained.
  - Fun community event!
- Partnership with Lake Associations and Local Nonprofit.

Reducing the Maintenance Burden

Quantity of Raingardens to Actively Maintain

ADOPT-A-RAINGARDEN

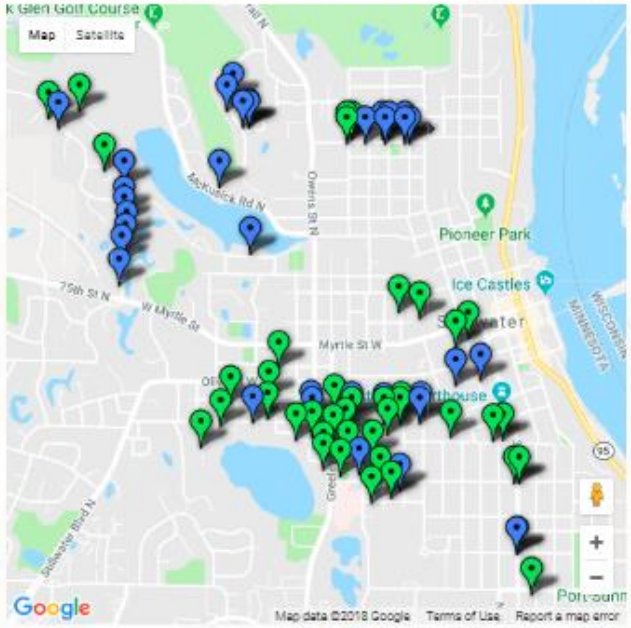
Since 2006, citizens and local government partners have installed more than 1000 raingardens in Washington County to protect our lakes, rivers and streams! Raingardens catch runoff from a rooftop, driveway or street and soak it into the ground before it can reach a storm sewer or nearby waterway. Raingardens also beautify our local communities and provide habitat for pollinators.

VOLUNTEER TO "ADOPT-A-RAINGARDEN" IN YOUR NEIGHBORHOOD TODAY!

Adopting a raingarden is a great way to build community, keep your neighborhood looking spiffy, protect your local lakes and rivers, and get fresh air and exercise!

HERE'S WHAT YOU'LL NEED TO DO

1. Use the map to find a raingarden in need of love and sign-up using our on-line form
    - We'll contact you in a few days to drop off materials and answer any questions you might have.
2. Visit your garden 2-3 times per year to weed, thin plants, pick up litter, and remove built-up sediment in the inlet.
3. Contact us if you notice any major problems with the garden, such as water not draining more than 48 hours after it rains.

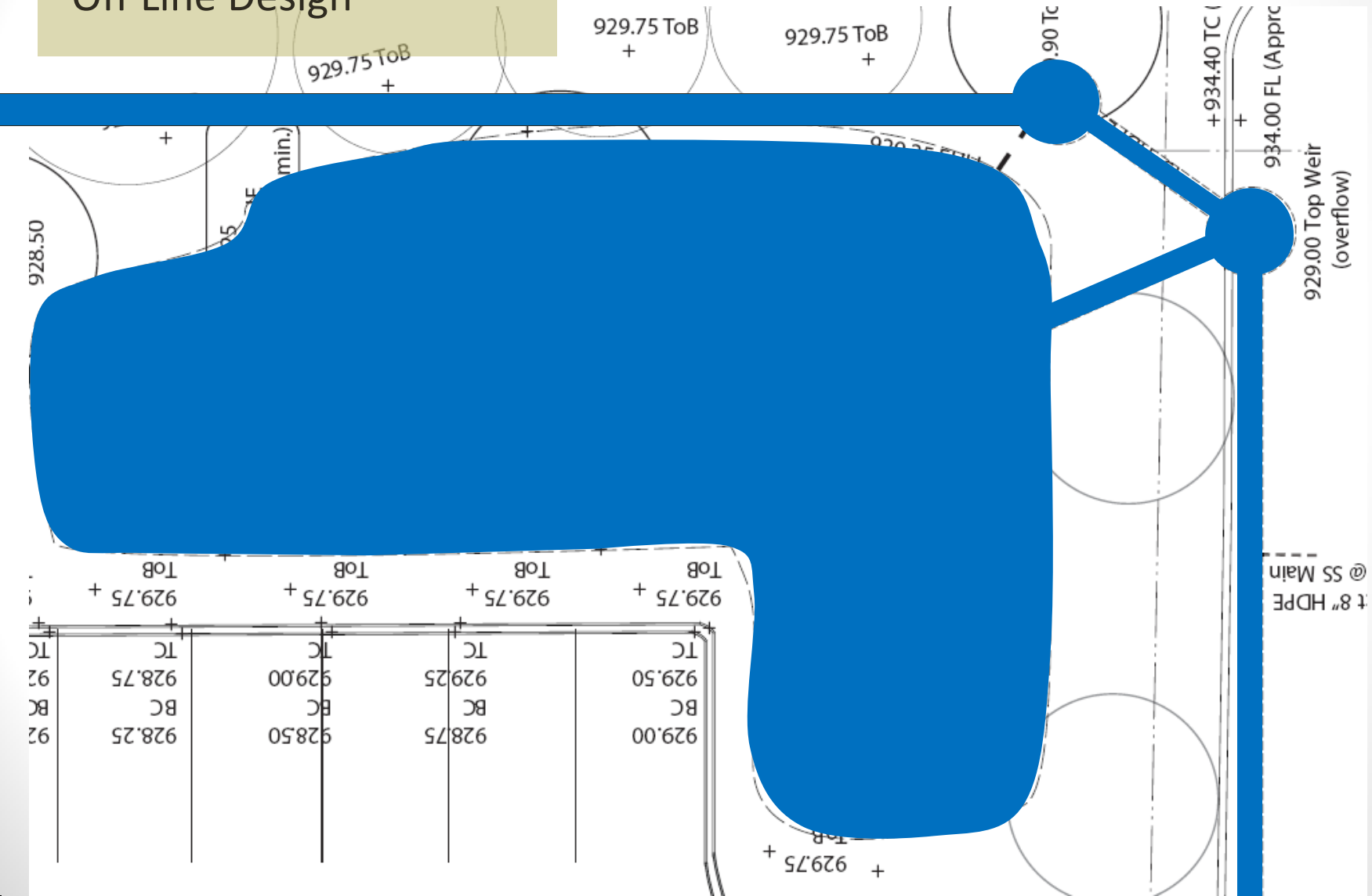


BLUE = ADOPT ME! **GREEN = ADOPTED**

Reducing Non Functional BMPs

Construction Standards

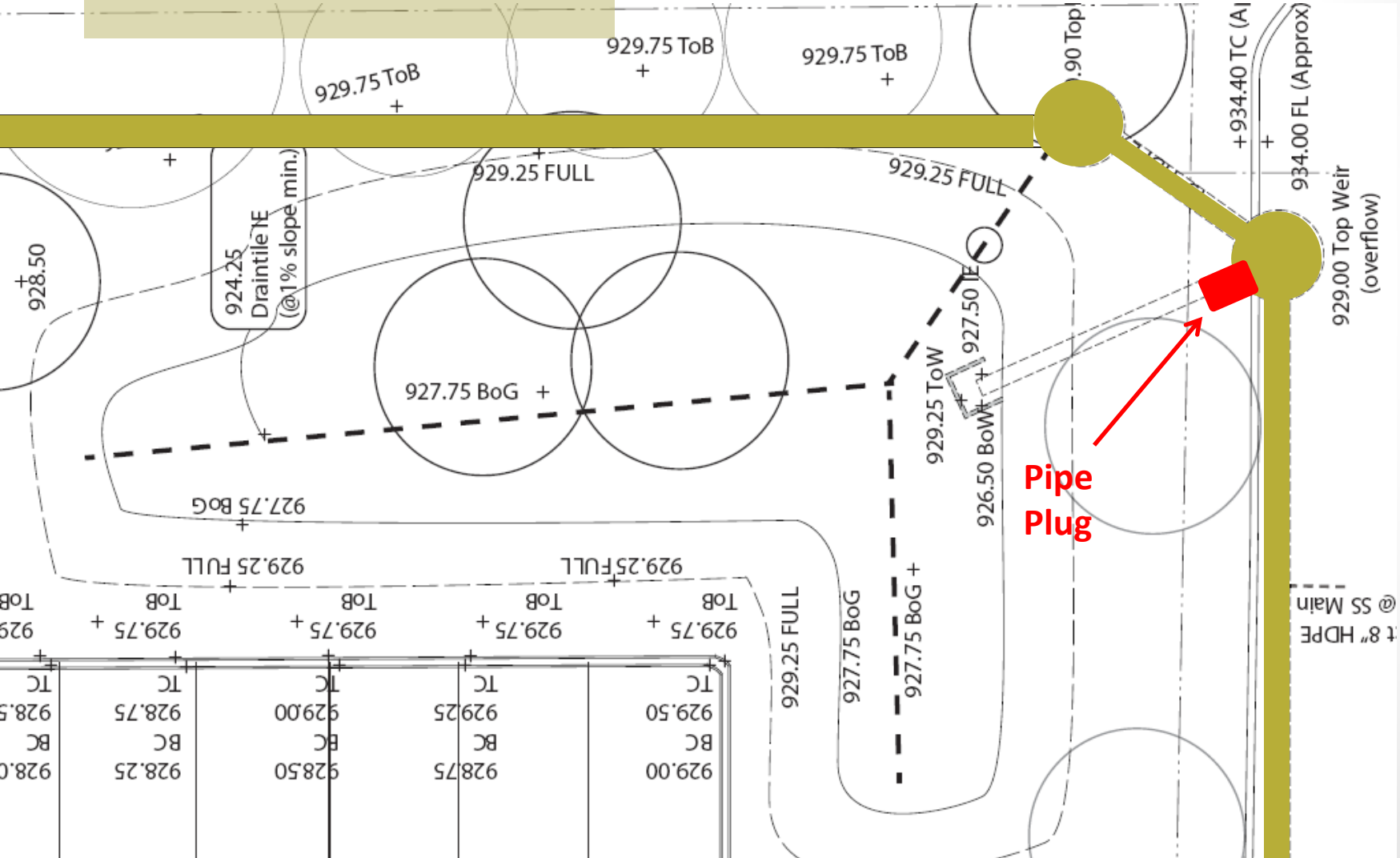
Off Line Design



Reducing Future Non-Functional BMPs

Construction Standards

Off Line Design



Reducing Future Non-Functional BMPs

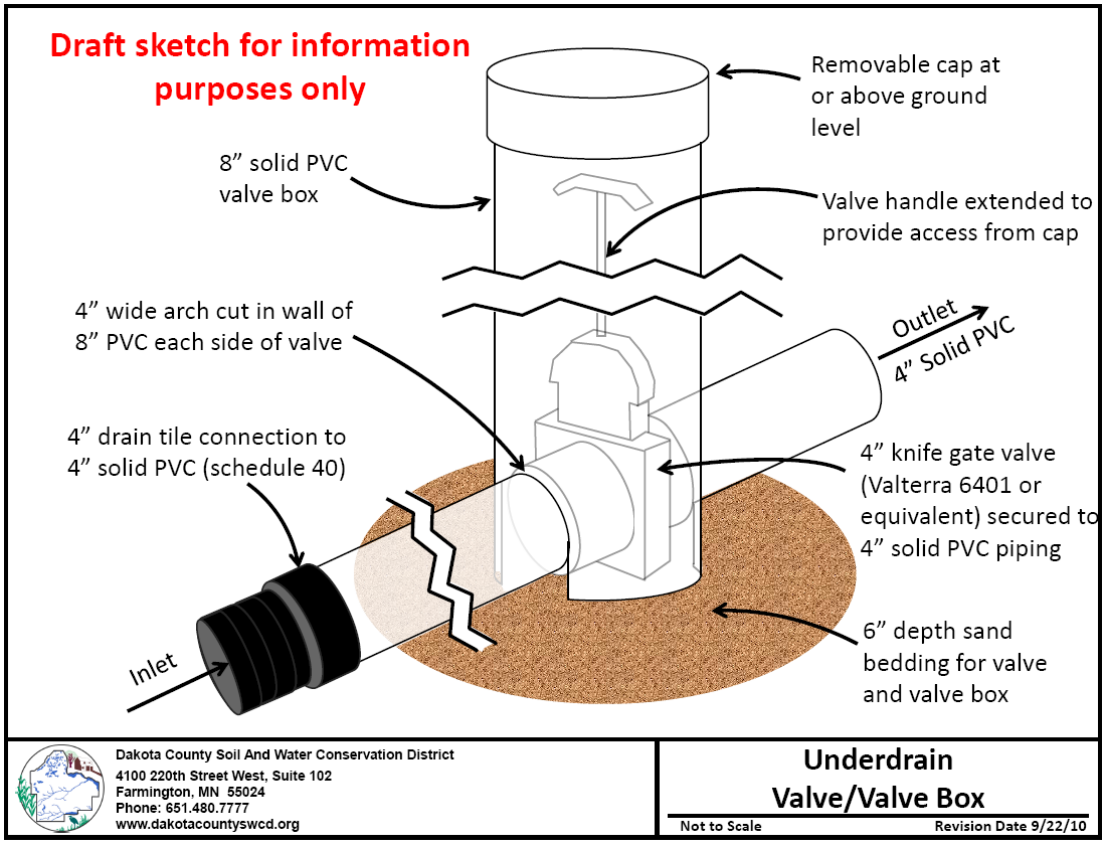
Construction Standards

Excavation within 3.0’ of final grade prohibited until contributing drainage area is fully stabilized.

Reducing Future Non-Functional BMPs

Underdrains with Gate Valves

Underdrain suspended 1.0’ off the bottom of excavation bedded in bioretention soil media with gate valve



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