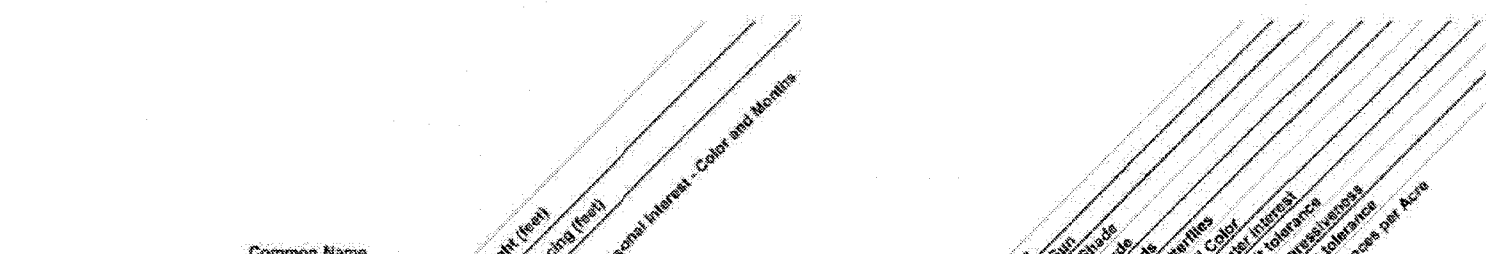


Date: 8/30/2018
 Michael G. Boerding
 License No. MO E-28643
 Professional Engineer



Latin Name **Common Name** **Height (ft)** **Spreads (ft)** **Seasonal Interest** **Color and Blooms**

FRUIT AREA MIX

Grasses/Sedges

- Andropogon lateralis* Spotted bluestem 1-2 1.5 blue x x x x x x x x x x x x x x x x
- Andropogon scoparius* Spikesedge 1-2 1.5 orange x x x x x x x x x x x x x x x x
- Bouteloua curtipendula* Sideleaf grama 1-2 1 tan x x x x x x x x x x x x x x x x
- Sporobolus vaginatus* Little bluestem 2-3 1.5 bronze x x x x x x x x x x x x x x x x
- Sporobolus heterostachus* Plains dropseed 2-3 1.5 tan x x x x x x x x x x x x x x x x

Flora

- Andropogon scoparius* Spotted bluestem 1-2 1.5 blue x x x x x x x x x x x x x x x x
- Aster filifolius* Aromatic aster 1-3 1.5 lavender x x x x x x x x x x x x x x x x
- Centaurea jacea* Jacobine compass 1-2 1.5 yellow x x x x x x x x x x x x x x x x
- Echinacea pallida* Pale purple coneflower 2-3 1.5 violet x x x x x x x x x x x x x x x x
- Fernandesia ovata* Yellow-flower yarrow 2-3 1.5 yellow x x x x x x x x x x x x x x x x
- Solidago nemoralis* Old field goldenrod 4-8 1.5 yellow x x x x x x x x x x x x x x x x
- Yucca filifolia* Maiden hair 1-3 1.5 yellow x x x x x x x x x x x x x x x x

Annuals (optional)

- Chamaecrista fasciculata* Partridge pea 1-3 1 yellow x x x x x x x x x x x x x x x x
- Coreopsis tinctoria* Plains coreopsis 2-4 1 yellow x x x x x x x x x x x x x x x x
- Rudbeckia hirta* Black-eyed Susan 2-3 1.5 yellow x x x x x x x x x x x x x x x x

SEED AREA MIX

Grasses/Sedges

- Carex acuticarpa* Yellow fringed sedge 2-3 1.5 tan x x x x x x x x x x x x x x x x
- Carex acuticarpa* River sedge 1-2 1.5 tan x x x x x x x x x x x x x x x x
- Carex muricoides* Pulsils sedge 2-3 1.5 tan x x x x x x x x x x x x x x x x
- Carex stricta* River sedge 2-3 1.5 tan x x x x x x x x x x x x x x x x
- Chaetochloa barbinervis* River oats 2-4 1.5 green x x x x x x x x x x x x x x x x
- Clara viridula* Virginia wild rye 2-3 1.5 yellow x x x x x x x x x x x x x x x x
- Clara viridula* Virginia wild rye 2-3 1.5 yellow x x x x x x x x x x x x x x x x
- Cyperus strictus* Forest green sedge 2-3 1.5 green x x x x x x x x x x x x x x x x

Flora

- Andropogon scoparius* Spotted bluestem 1-2 1.5 blue x x x x x x x x x x x x x x x x
- Chamaecrista fasciculata* Partridge pea 1-3 1 yellow x x x x x x x x x x x x x x x x
- Eragrostis ciliaris* Matt flower wild agave 1-2 1.5 lavender x x x x x x x x x x x x x x x x
- Lepidium virginicum* Southern blueflag iris 2-3 2 blue x x x x x x x x x x x x x x x x
- Lobelia spicata* Blue lobelia 2-3 1.5 blue x x x x x x x x x x x x x x x x
- Lobelia spicata* Blue lobelia 2-3 1.5 blue x x x x x x x x x x x x x x x x
- Parthenocissis vitacea* Smooth cord-grape 2-3 1.5 white x x x x x x x x x x x x x x x x
- Physalis peruviana* Ground cherry 2-3 1.5 yellow x x x x x x x x x x x x x x x x
- Rudbeckia hirta* Black-eyed Susan 2-3 1.5 yellow x x x x x x x x x x x x x x x x
- Solidago nemoralis* Old field goldenrod 4-8 1.5 yellow x x x x x x x x x x x x x x x x

Requirements
 Local Ecology Rule: Plants of Missouri or Southern Illinois ecotype are required.
 PUD means you live here or near that has been tested for quality and viability. This is done by most seed nurseries and should be included in your seed order.
 Dry denotes an area above the 1 year ponding or bank flow elevation.
 Wet denotes an area that is at or below the 1 year ponding or bank flow elevation.

Section 7: Seed Mix List **MSD Seeding Guide** **Seed: Shorter, less diverse mixes**

Planting, Water and Hardwood Bark Mulch Requirements

Water Availability	Required Planting Period	Minimum Container Size	Water Requirement First 3 Weeks*	Water Requirement After 3 Weeks*	Maximum Mulch Depth***
No ability to water after	Later Feb.-April only	2.25" x 3.75" or larger	Water each plug immediately.	Water until plants established***	1.5" for plugs
Manual watering with standard sprinkler	Late Feb.-Early June Sept.-October	4.5" x 5" (quart) or larger in summer & fall	1" (60 min) every 4 days	1" (60 min) every 7 days until plants established***	1.5" for plugs 2.5" for quarts
Automatic irrigation (set to water more frequently than normal during first two months after planting)	Late Feb. - Early Oct.	2.25" x 3.75" (plug) or larger in spring 4.5" x 5" (quart) or larger in summer & fall	1" (60 min) every 4 days in spring and fall 1" (60 min) every 3 days in summer	1" (60 min) every 7 days until plants established***	1.5" for plugs 2.5" for quarts

*This water amount includes natural rainfall. If you get a ½ inch of natural rain then you will need to add a ½ inch of water to meet the 1 inch requirement
 **Requires transport of water to the planting site in large containers and pouring enough water onto each plant (after planting) to moisten the entire planting pit
 ***Plants are established when roots have grown out of the container soil and into the native soil by 3-5 inches. This normally takes 3-4 months for most perennials and grasses and up to 6-7 months for trees and shrubs
 ****Shredded leaf compost is recommended for use with perennials and grasses. Shredded bark mulch is recommended for tree and shrub plantings at a depth of 3 inches

SEEDING VEGETATION SHALL MEET THE REQUIREMENTS OF THE FOLLOWING TABLE FROM THE MSD "LANDSCAPE GUIDE FOR STORMWATER BEST MANAGEMENT PRACTICE DESIGN"

Seeding and Vegetation Establishment Schedule Summary

Seeding Period	Notes
March-September	If soil is ready during this time, install first seeding consisting of cover crop and annuals only. Required native seed mix may only be seeded October-February.
October - February	Sow native seed mix. Include cover crop and annuals if first seed sowing seed mix germinates. Survey seedlings to determine germination success. 80% cover and 60% species survival is required. Begin mowing annual weeds. Do not let weeds grow over 12 inches.
June - September	Continue mowing weeds as needed. Do not let weeds grow over 12 inches. If required seeding success is not met, over seed October through February. Continue mowing if annual weeds continue to dominate.
Year 2	Mow or burn annually in late winter or early spring (January - March).

NOTE:
 FOR ALL OTHER SEEDING DETAILS INCLUDING SITE PREPARATION, SEEDING, EROSION CONTROL MATS, VEGETATION ESTABLISHMENT, ETC... REFER TO CHAPTER 2 OF THE "LANDSCAPE GUIDE FOR STORMWATER BEST MANAGEMENT PRACTICE DESIGN" BY MSD WITH A REVISED DATE OF MAY 2, 2012.

15 YEAR, 20 MINUTE HYDRAULICS

Line No.	LineID	Line Size (in)	Flow Rate (cfs)	Invert Dn (ft)	Invert Up (ft)	Line Length (ft)	Line Slope (%)	VelAve (ft/s)	Grnd/Rim Elev Dn (ft)	Grnd/Rim Elev Up (ft)	HGL Dn (ft)	HGL Up (ft)	Rim-Hw (ft)	Critical Depth (ft)	EGL Dn (ft)	EGL Up (ft)	Energy Loss (ft)	Capacity Full (cfs)	n-value Pipe
1	EX 16 - EX 17	36	64.22	476.00	478.11	171.83	1.23	9.52	479.42	485.61	479.00	480.68	4.93	2.57	480.28	482.22	1.538	73.91	0.013
2	EX 17 - EX 1	36	25.50	478.11	478.48	87.26	0.42	4.20	485.61	486.36	480.68	480.75	5.56	1.63	480.92	481.06	0.134	43.43	0.013
3	EX 1 - EX 2	36	23.61	478.48	479.19	163.46	0.43	4.77	486.36	488.43	480.80	480.94	7.42	1.56	481.05	481.41	0.363	43.96	0.013
4	EX 2 - EX 3	36	22.84	479.19	479.85	152.00	0.43	5.68	488.43	488.51	481.01	481.39	7.12	1.54	481.62	482.00	0.000	43.95	0.013
5	EX 3 - EX 4	36	21.72	479.85	480.05	93.89	0.21	4.72	488.51	486.65	481.71	481.91	5.14	1.50	482.06	482.26	0.200	30.78	0.013
6	EX 17 - GI 52	36	37.66	478.11	479.44	139.01	0.96	6.69	485.61	485.89	480.68	481.43	4.46	1.99	481.57	482.32	0.000	65.24	0.013
7	GI 52 - AI 34	36	36.15	479.44	480.78	165.34	0.81	7.33	485.89	488.20	481.43	482.73	5.47	1.95	482.29	483.59	0.000	60.04	0.013
8	AI 34 - EX 18	36	24.30	480.78	483.46	212.10	1.26	5.69	488.20	491.46	482.73	485.05	6.41	1.59	483.37	485.68	0.000	74.97	0.013
9	AI 34 - OS 35	24	11.17	483.24	483.50	53.00	0.49	5.47	488.20	488.30	484.48	484.74	3.30	1.20	484.94	485.20	0.261	15.84	0.013
10	EX 5 - EX 6	36	20.01	480.91	481.27	105.90	0.34	2.83	484.33	487.02	484.80	484.90	2.11	1.43	484.92	485.02	0.095	38.88	0.013
11	EX 6 - EX 7	36	15.84	481.27	481.60	93.88	0.35	2.24	487.02	486.86	484.91	484.97	1.88	1.27	484.99	485.05	0.053	39.54	0.013
12	EX 7 - EX 8	36	14.21	481.60	482.07	98.90	0.48	2.01	486.86	486.64	484.98	485.02	1.61	1.20	485.04	485.08	0.043	45.98	0.013
13	EX 8 - EX 9	36	12.37	482.07	482.30	85.55	0.27	1.79	486.64	487.09	485.03	485.05	2.03	1.12	485.08	485.10	0.026	34.58	0.013
14	EX 9 - MH 20	36	11.43	482.30	482.69	38.89	1.00	3.36	487.09	489.70	485.06	483.76	5.94	1.07	485.45	484.16	0.000	66.79	0.013
15	MH 20 - AI 21	24	11.43	483.00	484.12	22.49	4.98	8.07	489.70	490.70	483.76	485.33	5.37	1.21	484.27	485.84	0.000	50.48	0.013
16	AI 21 - AI 22	24	10.92	483.12	483.78	110.29	0.60	3.59	490.70	493.10	485.33	485.55	7.52	1.18	485.52	485.76	0.244	17.50	0.013
17	AI 22 - AI 23	24	10.04	483.98	485.04	176.43	0.60	4.60	493.10	494.10	485.58	486.17	7.93	1.13	486.05	486.64	0.000	17.53	0.013
18	AI 23 - MH 24	18	8.55	485.24	488.26	94.40	3.20	6.69	494.10	496.40	486.17	489.39	7.01	1.13	486.73	489.95	0.000	18.78	0.013
19	MH 24 - MH 25	18	3.33	488.46	488.84	127.90	0.30	3.12	496.40	496.60	489.39	489.66	6.90	0.69	489.52	489.84	0.318	5.72	0.013
20	MH 25 - CI 26	18	3.33	489.04	489.19	49.30	0.30	3.39	496.60	495.88	489.66	490.00	5.71	0.69	490.03	490.18	0.150	5.79	0.013
21	CI 26 - CI 27	12	0.84	489.39	489.87	48.00	1.00	2.16	495.88	494.06	490.17	490.25	3.81	0.38	490.31	490.40	0.000	3.56	0.013
22	CI 27 - CI 28	12	0.30	490.07	490.42	35.00	1.00	2.51	494.06	494.06	490.27	490.65	3.41	0.23	490.35	490.73	0.000	3.56	0.013
23	MH 24 - CI 30	15	5.22	489.26	489.53	26.85	1.01	5.61	496.40	495.31	490.11	490.46	4.85	0.93	490.56	490.90	0.000	6.48	0.013
24	CI 30 - CI 31	12	2.35	489.73	490.08	35.00	1.00	4.08	495.31	495.31	490.46	490.74	4.57	0.66	490.74	491.02	0.000	3.56	0.013
25	EX 12 - EX 13	24	0.77	481.35	482.13	105.55	0.74	0.25	483.68	493.87	484.80	484.80	9.07	0.30	484.80	484.80	0.001	19.44	0.013
26	FE 37 - MH 38	24	8.68	484.20	484.32	23.18	0.52	2.76	486.53	491.20	487.37	487.40	3.72	1.05	487.49	487.52	0.034	16.27	0.013
27	MH 38 - AI 40	24	8.68	484.50	485.07	13.77	4.14	2.76	491.20	492.00	487.48	487.50	4.48	1.05	487.60	487.62	0.020	46.02	0.013
28	MH 39 - AI 40	24	8.68	484.23	484.58	69.47	0.50	2.76	492.00	490.70	487.52	487.62	2.97	1.05	487.64	487.74	0.102	16.05	0.013
29	AI 40 - AI 40.1	18	8.36	484.78	485.30	52.20	1.00	4.73	490.70	491.80	487.73	488.06	3.39	1.12	488.08	488.41	0.331	10.48	0.013
30	AI 40.1 - CI 41	15	4.65	485.50	487.37	77.97	2.40	3.79	491.80	497.83	488.41	488.82	8.98	0.87	488.64	489.04	0.404	10.00	0.013
31	CI 41 - CI 42	15	3.56	487.57	487.92	35.00	1.00	3.16	497.83	497.83	488.85	488.91	8.89	0.76	488.98	489.09	0.110	6.46	0.013
32	CI 42 - AI 43	12	2.49	488.12	488.37	25.00	1.00	4.02	497.83	493.30	488.94	489.05	4.25	0.68	489.24	489.35	0.000	3.56	0.013
33	AI 43 - AI 44	12	1.66	488.57	489.87	129.68	1.00	4.12	493.30	495.80	489.05	490.42	5.38	0.55	489.27	490.64	0.000	3.57	0.013
34	AI 40.1 - CI 46	15	3.33	485.50	486.70	120.00	1.00	2.71	491.80	491.93	488.41	488.73	3.18	0.73	488.53	488.85	0.319	6.46	0.013
35	CI 46 - CI 47	12	1.55	486.90	487.25	35.00	1.00	1.97	491.93	491.93	488.75	488.82	3.05	0.53	488.81	488.88	0.066	3.56	0.013
36	EX 48 - EX 49	24	3.95	476.78	476.76	63.87	-0.03	1.26	479.11	481.60	478.78	478.80	2.78	0.70	478.80	478.82	0.019	0.00	0.013
37	EX 49 - MH 50	12	2.03	476.96	483.46	130.00	5.00	3.32	481.60	490.00	478.82	484.07	5.93	0.61	478.93	484.32	0.661	7.96	0.013
38	MH 50 - CI 51	12	2.03	483.66	487.83	119.00	3.50	5.40	490.00	492.87	484.07	488.44	4.43	0.61	484.32	488.69	0.000	6.67	0.013

STORM SEWER HYDRAULIC CALCULATIONS

