

August 8, 2018

Laura Jester  
Administrator  
Bassett Creek Watershed Management Commission  
16145 Hillcrest Lane  
Eden Prairie, MN 55436

RE: 90% Design plans – Westwood Hills Nature Center Water Quality Project

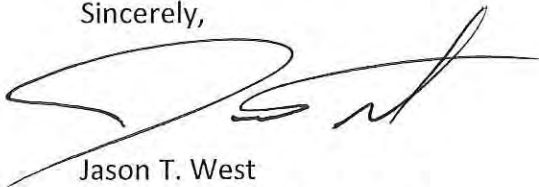
Dear Ms. Jester,

Please find attached the 90% design plans and the engineering letter presenting information about the feasibility study, the design features of the project, and the approval/permitting needs for the Westwood Hills Nature Center Water Quality project.

This project will be constructed by the city per the future cooperative agreement between the City of St. Louis Park and the BCWMC, with the plans and specifications being subject to the approval by the Commission. I am requesting that this project be included with the Commission packet for the August 2018 regular meeting. City staff and the project design engineer will be at the meeting to present the project and answer any questions.

If you have any questions or need any additional information, please contact me at 952.924.2554 or [jwest@stlouispark.org](mailto:jwest@stlouispark.org).

Sincerely,



Jason T. West  
Recreation Superintendent

Enclosure

August 8, 2018

Ms. Cindy Walsh  
Operations & Recreation Director  
City of St. Louis Park  
3700 Monterey Drive  
St. Louis Park, MN 55416

**Re: 90% Design Plans – Westwood Hills Nature Center Linear Stormwater Feature Project  
City of St. Louis Park**

Dear Ms. Walsh:

Attached please find the 90% design plans for the Westwood Hills Nature Center (WHNC) Linear Stormwater Feature Project. The Bassett Creek Watershed Management Commission (BCWMC) is funding the WHNC Linear Stormwater Feature Project (BCWMC CIP project WST-2: Westwood Lake Water Quality Improvement Project) through a 2019 ad valorem levy (via Hennepin County). Per the future cooperative agreement between the City of St. Louis Park and the BCWMC, the city is to construct the project, with plans and specifications subject to approval by the Commission. Also, per the future cooperative agreement, the 90% design plans for this project must be submitted to the BCWMC for review and approval. If the attached 90% plans meet the city's approval, we recommend submitting them, along with this letter, to the BCWMC for inclusion in the meeting packet for their August 16<sup>th</sup> meeting. Barr staff will present the 90% plans to the BCWMC at the meeting and answer any questions from the BCWMC.

The remainder of this letter presents information about the feasibility study, the design features of the project, and approval/permitting needs.

**Feasibility Study Summary and Selected Project**

The BCWMC completed the *Feasibility Report for Westwood Lake Water Quality Improvement Project (May 2018)* to evaluate options improving water quality at the WHNC project site. The BCWMC selected completing concept 3 which is a linear stormwater feature on the north side of the building. The selected project will provide water quality improvement by (1) providing additional stormwater runoff storage, and (2) reducing runoff volume, and sediments and nutrients in the water, through infiltration, evaporation, or evapotranspiration. The project will also include educational benefits through signage, pedestrian bridges, and interactive pumps. WHNC receives over 40,000 visitors per year, many of whom are part of a programmed group. The City expects the number of visitors to rise, with the new facility being nearly five times the size of the existing facility. WHNC staff will develop educational curriculum based on the bog and the hydrologic cycle represented through the linear stormwater feature.

**Design features – 90% plans**

The primary design features of the proposed work, as shown on the attached 90% plans, include:

1. Pumps, storm sewer, and structures. The storm sewer and structures will store stormwater runoff from a majority of the building roof and the surrounding areas on the north side of the building. Solar- and hand-powered pumps will be used to pump the water from the underground storage

to the upstream end of the constructed intermittent stream. Solar- and hand-powered pumps will be located in one area on the site, on a concrete patio. The pump patio will also include a large sign describing the hydrologic cycle and how the system mimics that cycle. A draft version of that sign attached. A rain gauge and manhole will be installed near the pump patio. There will be a float in the manhole that will rise out of the manhole, indicating how much water is in the underground storage. Staff will be able to measure, or have children measure, the amount of rainfall in the rain gauge on a daily basis, and equate that to how full the storage pipes are. Staff can also create curriculum about the hydrologic cycle, and illustrate concepts like infiltration and evaporation with the system. The solar pump will operated only when the sun is shining. This is another opportunity to educate children, and adults, about solar power and the pump and solar power operates. The building will also have solar panels on the roof, which allow for further conversations and teaching opportunities. In some weather, the system will be dry. This provides further ways to educate visitors regarding droughts and extreme weather conditions.

2. Intermittent stream and small lined ponds. The runoff and pumped water will flow through a series of lined ponds, stream sections, and trench drains at three locations. At the upstream end, the water will flow from the pump outlets into a V-shaped trough; the water will then drop from the trough into the upper pond. The pond will 12 inches deep and the bottom will be lined. When the pond is full, water will overflow from the pond, flow over a grade control structure, into a steep stream section which transitions into a shallow slope stream section. At the end of the stream, water will flow through a trench drain and drop from the trench drain into the lower pond. Water will flow over the lower pond grade control structure. The stream channel downstream of the lower pond is similar to the stream channel upstream of the lower pond. There is a second sidewalk crossing at the downstream end of the channel. The water will flow through the trench drain, into a catch basin structure, and be returned to the underground storage.
3. Bog. A bog will be created near the building, adjacent to the lower pool. The bog is a modification from the feasibility study, but it furthers the BCWMC goals of increasing water quality treatment and providing educational opportunities, as well as unique habitat. The water source for the bog will be the solar pump that will pump water from the underground storage to the bog. Education signage will be included at the east end of the bog. The signage will be around three feet wide by two feet tall, and the content will define a bog, how it forms, and plant and animal species native to bogs. A draft of the sign is attached. In addition to the bog sign, the nature center staff plan to build a curriculum around bogs to teach children more about the habitat.
4. Access points. The stream will have several access points for people to explore. Access will be achieved through stone steps leading from sidewalks to the bottom of the stream.
5. System overflow. When the underground storage and above ground sand filter area are full, water will overflow into a biofiltration basin to the west. If the biofiltration basin is full, water will overtop the trail to the west and flow into Turtle Pond or down to Westwood Lake. The building

floor elevation is 896.0. The overflow into the biofiltration basin is 893.0, and the overflow over the trail is 893.4.

### Opinion of cost

The table below summarizes our opinion of costs, based on the 90% design plans:

**Table 1 Opinion of Cost Summary**

Item Description	Cost
<b>Project costs eligible for BCWMC reimbursement:</b>	
Mobilization and Erosion Control	\$14,500
Earthwork	\$10,900
Upper and Lower Ponds	\$ 7,850
Sidewalk Crossings with Drop Structures	\$10,000
Storm Sewer (underground storage)	\$19,250
Storm Structures	\$18,500
Channel Rock and Access Points	\$76,200
Bog Soil, Plants, Liner, and Railing	\$36,200
Trees, Shrubs, Herbaceous Plants, and VRSS	\$24,600
Pumps, Solar Panels, Structure, Concrete Pad	\$20,100
Signage	\$ 6,000
<b>Total estimated construction costs</b>	<b>\$244,100</b>
Contingency (+10%)	<b>\$24,400</b>
Engineering, Design, Construction Observation costs	\$ 81,000
<b>Total construction and engineering costs</b>	<b>\$349,500<sup>i</sup></b>

<sup>i</sup> This opinion of cost (Class 1, 90% design completion per ASTM E 2516-06) is based on partially complete designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -10% to +10%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.

Per the future cooperative agreement between the city and the BCWMC, the BCWMC's total reimbursement for this project may not exceed \$404,500, less Commission expenses. Commission expenses are expected to be around \$53,500, leaving \$351,000 for engineering design and construction expenses. The total estimated construction and engineering costs are within the reimbursable costs allowed for this project.

### Approvals/permit requirements

In addition to BCWMC approval of the plans, other permits/approvals will be required for this project.

The project will not include any work below the Westwood Lake ordinary high water level (OHWL), so a MDNR Public Waters Work Permit is not required.

A USACE joint permit is not required.

A Minnesota Pollution Control Agency (MPCA) Construction Stormwater General Permit is required as part of the larger project and will be obtained by the general contractor after the city awards the project. In addition, a stormwater pollution prevention plan (SWPPP) will be included in the construction drawings.

**Recommendations**

We recommend that the city request 1) BCWMC approval of the 90% drawings, and 2) BCWMC authorization for the city to proceed with 100% plans and contract documents.

If you have any questions, please contact me at 952-832-2724 or [mkimble@barr.com](mailto:mkimble@barr.com).

Sincerely,

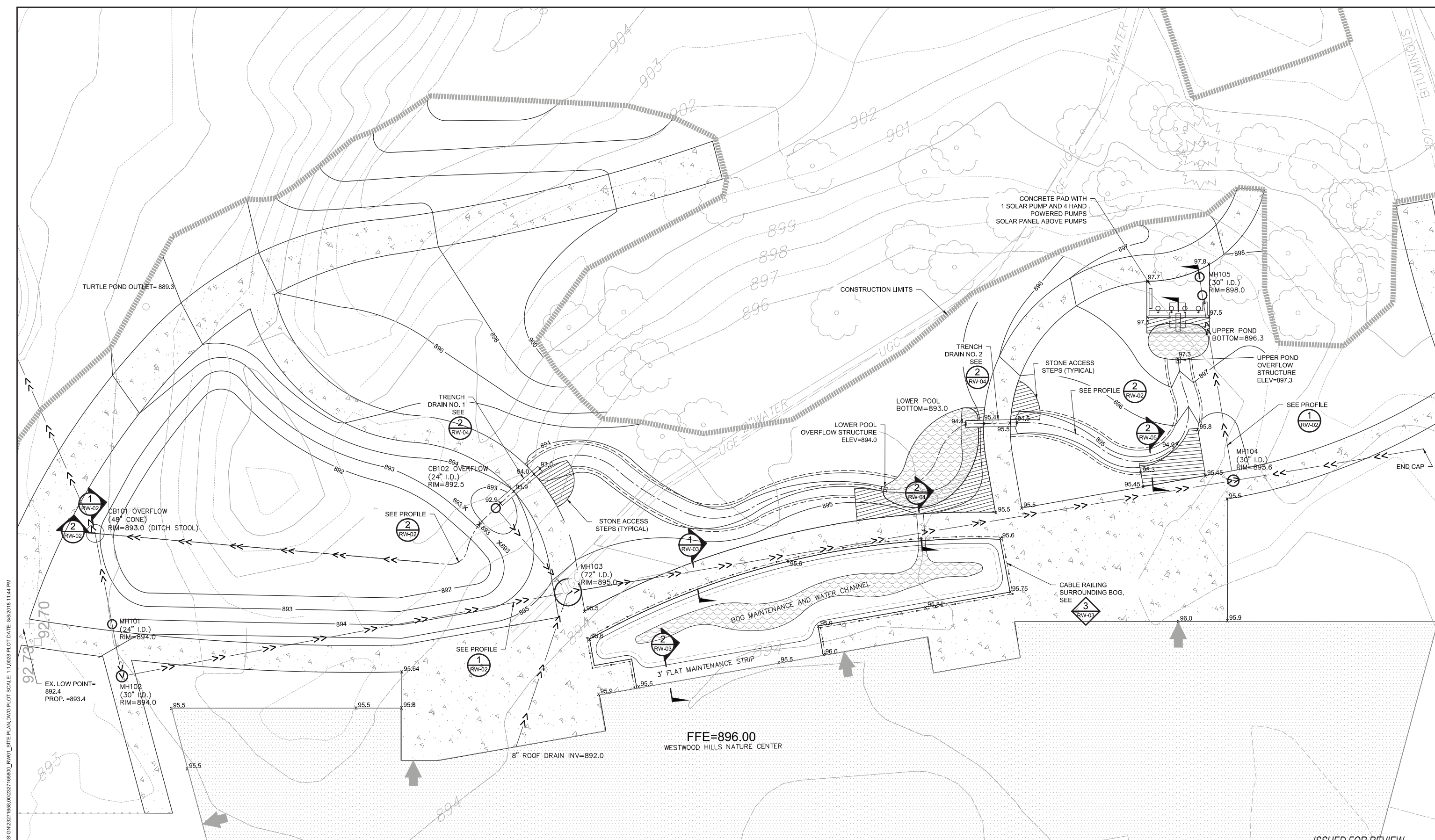


Michelle Kimble, P.E.  
Sr. Civil Engineer

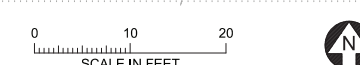
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CADD USER: Michelle Kemble FILE: M:\DESIGN\23271658\00\2327165800\_RW01\_SITE PLAN.DWG PLOT SCALE: 11/02/28 PLOT DATE: 8/8/2018 11:44 PM



1 PLAN: LINEAR STORMWATER FEATURE AS SHOWN



ISSUED FOR REVIEW  
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
C	KJN3	MAK	KAL	8/08/18	FOR BCWMC 90% REVIEW MEETING
B	JPP	MAK	KAL	7/23/18	FOR CLIENT 50% REVIEW MEETING
A	JPP	MAK	KAL	7/11/18	FOR CLIENT AND BCWMC 50% REVIEW

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME: \_\_\_\_\_  
SIGNATURE: \_\_\_\_\_  
DATE: \_\_\_\_\_ LICENSE #: \_\_\_\_\_

CLIENT	7/11	7/23	8/08				
BID							
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
DATE RELEASED							

**BARR**  
Corporate Headquarters: Minneapolis, Minnesota  
Ph: 1-800-632-2277 Fax: (952) 832-2801 www.barr.com

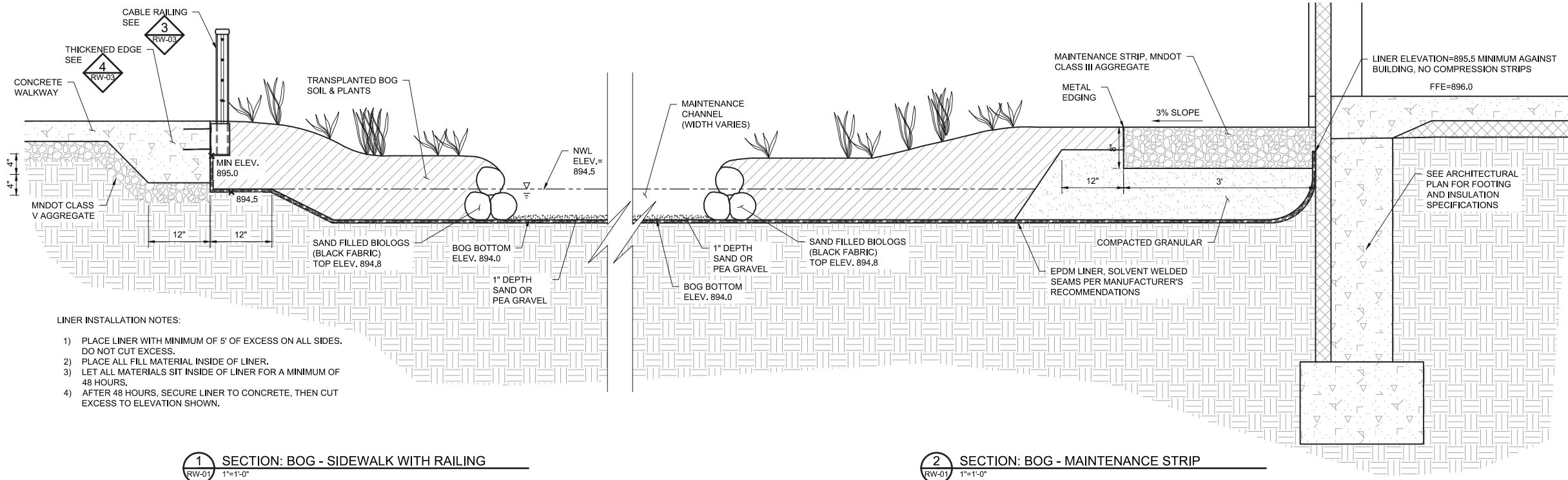
Project Office:  
BARR ENGINEERING CO.  
4300 MARKETPOINTE DRIVE  
Suite 200  
MINNEAPOLIS, MN 55435  
Ph: 1-800-632-2277 Fax: (952) 832-2801 www.barr.com

Scale	AS SHOWN
Date	8/08/2018
Drawn	KJN3
Checked	MAK
Designed	MAK
Approved	KAL

CITY OF ST. LOUIS PARK

WESTWOOD HILLS NATURE CENTER NORTH RAIN WATER FEATURE		BARR PROJECT No. 23/27-1658
PLAN LINEAR STORMWATER FEATURE		CLIENT PROJECT No.
DWG. No. RW-01	REV. No. C	

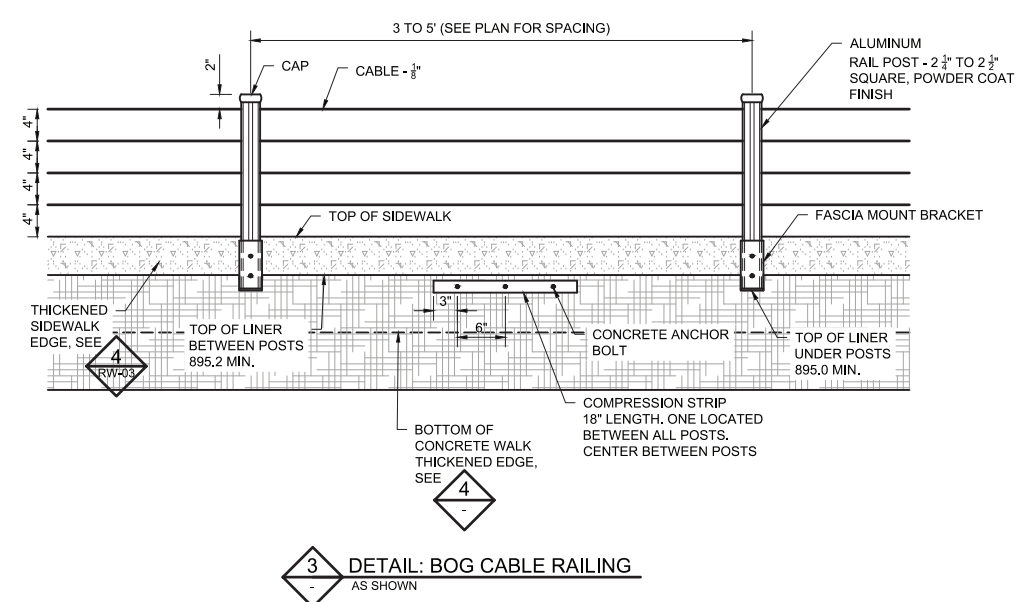




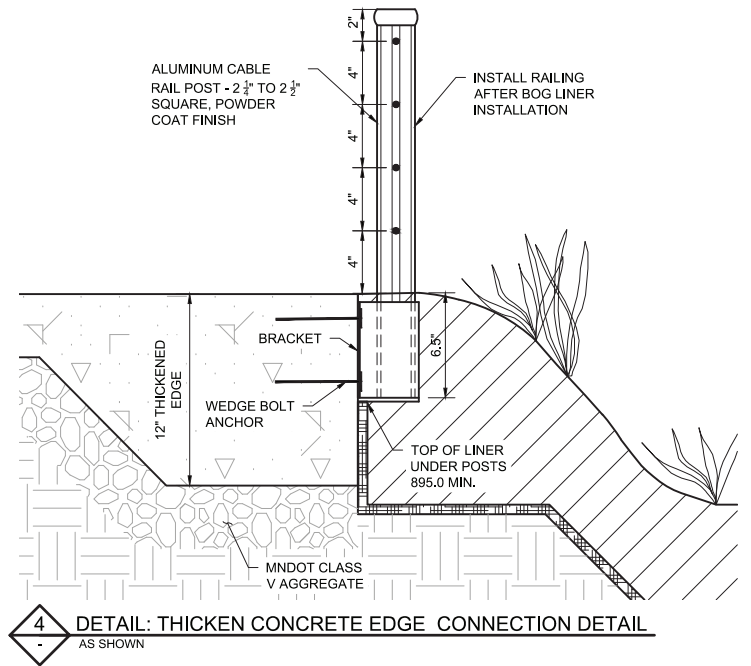
- LINER INSTALLATION NOTES:**
- 1) PLACE LINER WITH MINIMUM OF 5' OF EXCESS ON ALL SIDES. DO NOT CUT EXCESS.
  - 2) PLACE ALL FILL MATERIAL INSIDE OF LINER.
  - 3) LET ALL MATERIALS SIT INSIDE OF LINER FOR A MINIMUM OF 48 HOURS.
  - 4) AFTER 48 HOURS, SECURE LINER TO CONCRETE, THEN CUT EXCESS TO ELEVATION SHOWN.

**1 SECTION: BOG - SIDEWALK WITH RAILING**  
RW-01 1"=1'-0"

**2 SECTION: BOG - MAINTENANCE STRIP**  
RW-01 1"=1'-0"



**3 DETAIL: BOG CABLE RAILING**  
AS SHOWN



**4 DETAIL: THICKEN CONCRETE EDGE CONNECTION DETAIL**  
AS SHOWN

ISSUED FOR REVIEW  
NOT FOR CONSTRUCTION

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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B	JPP	MAK	KAL	7/23/18	FOR CLIENT 50% REVIEW MEETING
A	JPP	MAK	KAL	7/11/18	FOR CLIENT AND BCWMC 50% REVIEW

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CONSTRUCTION							
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DATE RELEASED							

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 Suite 200  
 MINNEAPOLIS, MN 55435

Corporate Headquarters:  
 Minneapolis, Minnesota  
 Ph: 1-800-632-2277

Scale	AS SHOWN
Date	08/08/2018
Drawn	KJN2
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Designed	MAK
Approved	

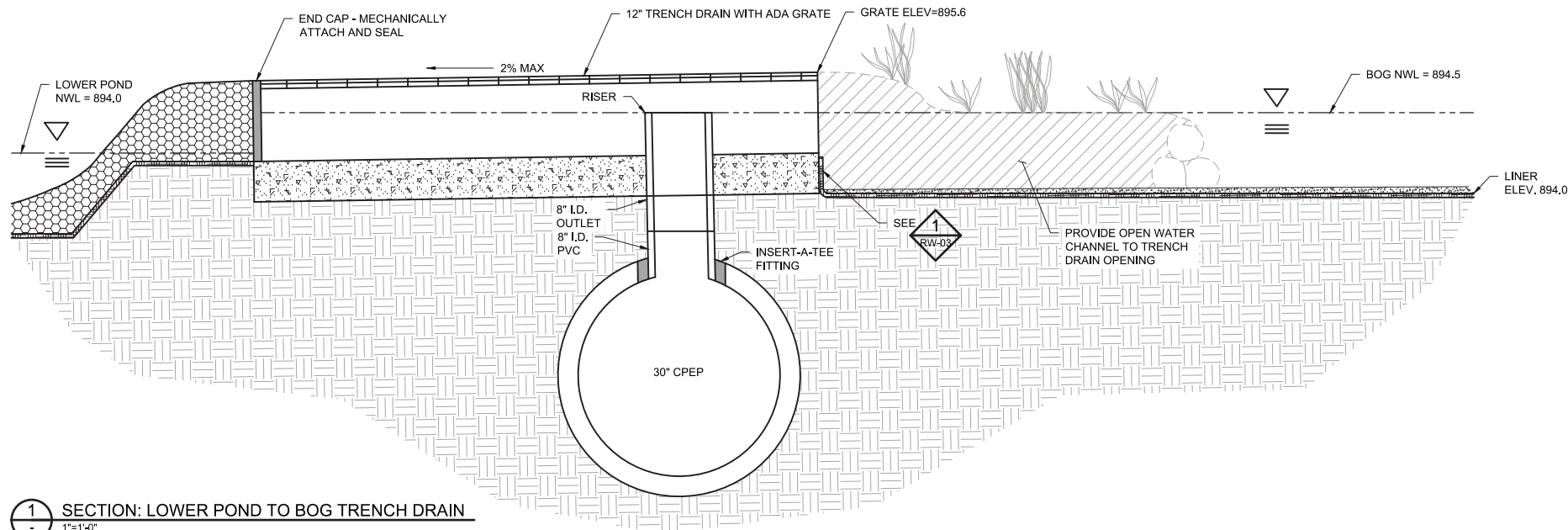
CITY OF ST. LOUIS PARK

**WESTWOOD HILLS NATURE CENTER**  
 NORTH RAIN WATER FEATURE

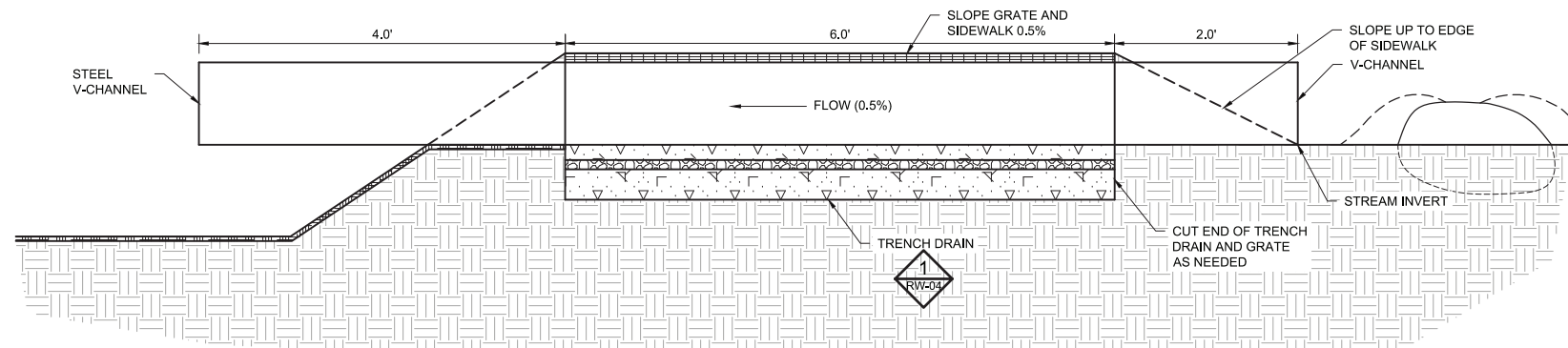
**BOG SECTIONS AND DETAILS**

BARR PROJECT No.	23/27-1568
CLIENT PROJECT No.	
DWG. No.	RW-03
REV. No.	C

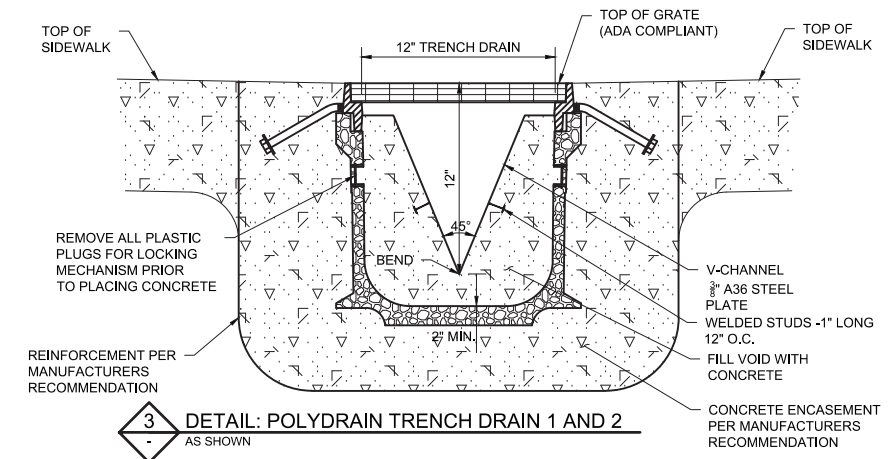




1 SECTION: LOWER POND TO BOG TRENCH DRAIN  
1"=1'-0"



2 SECTION: POLYDRAIN - TRENCH DRAIN 1 AND 2  
1"=1'-0"



3 DETAIL: POLYDRAIN TRENCH DRAIN 1 AND 2  
AS SHOWN

ISSUED FOR REVIEW  
NOT CONSTRUCTION

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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	KJN2	MAK	KAL	8/08/18	FOR BCWMC 90% REVIEW MEETING

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 PRINTED NAME: \_\_\_\_\_  
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 DATE: \_\_\_\_\_ LICENSE #: \_\_\_\_\_

CLIENT	8/08						
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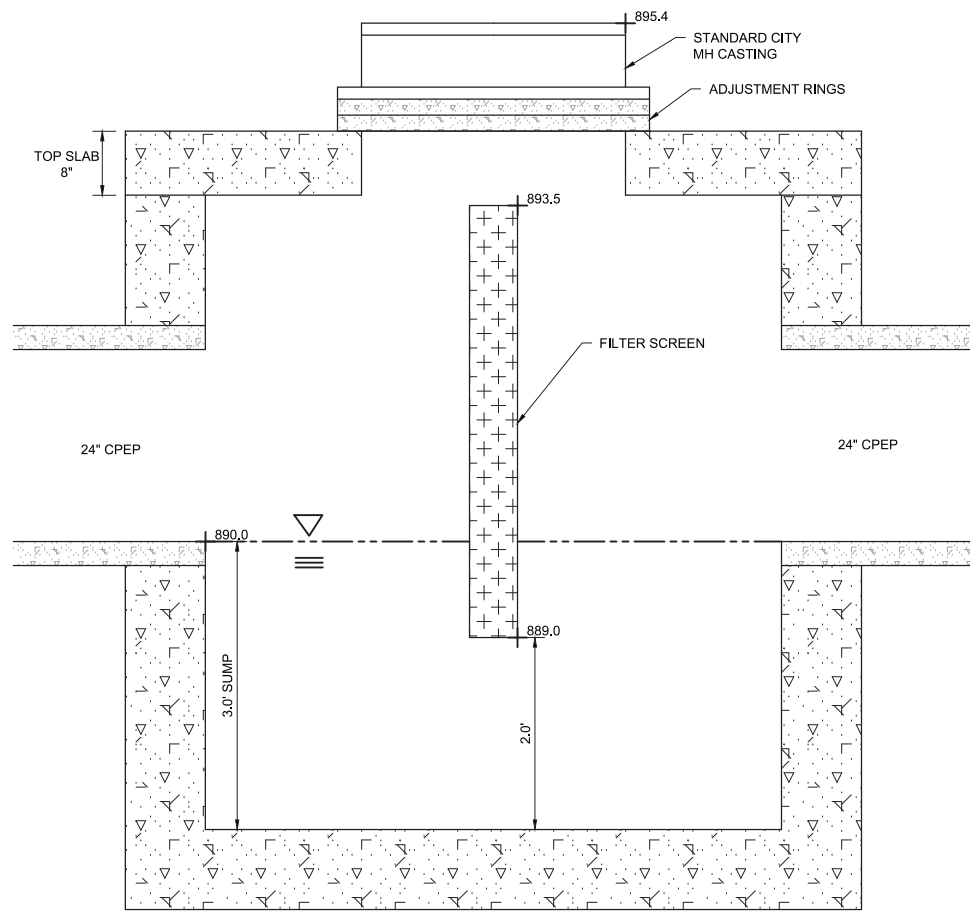
**BARR**  
 Project Office:  
 BARR ENGINEERING CO.  
 4300 MARKETPOINTE DRIVE  
 Suite 200  
 MINNEAPOLIS, MN 55435  
 Corporate Headquarters:  
 Minneapolis, Minnesota  
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 Ph: (952) 832-2601  
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Scale	AS SHOWN
Date	08/08/2018
Drawn	KJN2
Checked	MAK2
Designed	MAK2
Approved	KAL

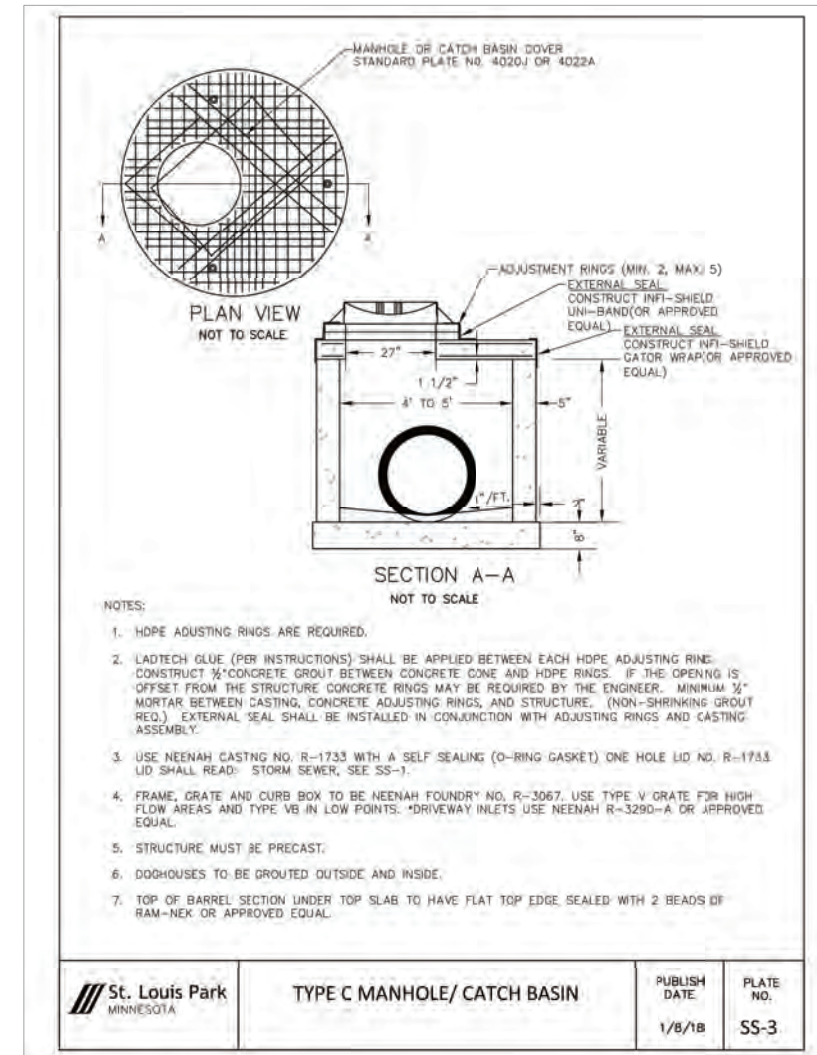
CITY OF ST. LOUIS PARK

WESTWOOD HILLS NATURE CENTER  
 NORTH RAIN WATER FEATURE  
 POND AND TRENCH DRAIN  
 SECTIONS AND DETAILS

BARR PROJECT No.	
23/27-1658.00	
CLIENT PROJECT No.	
DWG. No.	REV. No.
RW-04	A

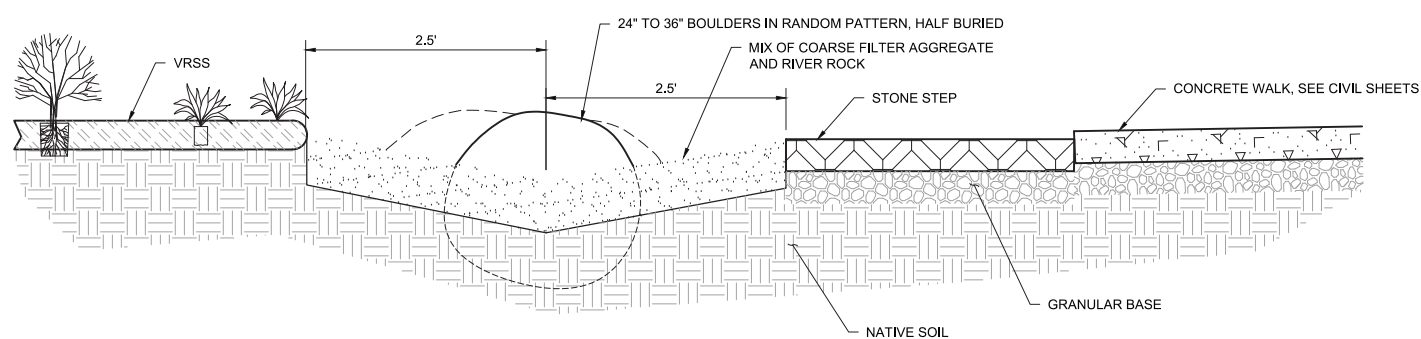


**1** DETAIL: MH103 - 72" MANHOLE STRUCTURE  
1"=1'-0"



- NOTES:
- HOPE ADJUSTING RINGS ARE REQUIRED.
  - LADTECH GLUE (PER INSTRUCTIONS) SHALL BE APPLIED BETWEEN EACH HDPE ADJUSTING RING. CONSTRUCT 1/2" CONCRETE GROUT BETWEEN CONCRETE CONE AND HDPE RINGS. IF THE OPENING IS OFFSET FROM THE STRUCTURE CONCRETE RINGS MAY BE REQUIRED BY THE ENGINEER. MINIMUM 1/2" MORTAR BETWEEN CASTING, CONCRETE ADJUSTING RINGS, AND STRUCTURE. (NON-SHRINKING GROUT REQ.) EXTERNAL SEAL SHALL BE INSTALLED IN CONJUNCTION WITH ADJUSTING RINGS AND CASTING ASSEMBLY.
  - USE NEENAH CASTING NO. R-1733 WITH A SELF SEALING (O-RING GASKET) ONE HOLE LID NO. R-1733 LID SHALL READ: STORM SEWER, SEE SS-1.
  - FRAME, GRATE AND CURB BOX TO BE NEENAH FOUNDRY NO. R-3067. USE TYPE V GRATE FOR HIGH FLOW AREAS AND TYPE VB IN LOW POINTS. DRIVEWAY INLETS USE NEENAH R-3290-A OR APPROVED EQUAL.
  - STRUCTURE MUST BE PRECAST.
  - DOORHOUSES TO BE GROUTED OUTSIDE AND INSIDE.
  - TOP OF BARREL SECTION UNDER TOP SLAB TO HAVE FLAT TOP EDGE SEALED WITH 2 BEADS OF RAM-NEK OR APPROVED EQUAL.

	<b>TYPE C MANHOLE/ CATCH BASIN</b>	PUBLISH DATE	PLATE NO.
		1/8/18	SS-3



**2** SECTION: STREAM CHANNEL  
1"=1'-0"

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CADD USER: Michelle Kimble FILE: M:\DESIGN\232716580\02327165800\_RW05\_UPPERPOND\_SECTION\_DETAILS.DWG PLOT SCALE: 1:1 PLOT DATE: 8/8/2018 8:16 PM  
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NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	KJN2	MAK	KAL	8/08/18	FOR BCWMC 90% REVIEW MEETING

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  
 PRINTED NAME: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 DATE: \_\_\_\_\_ LICENSE #: \_\_\_\_\_

CLIENT	8/08						
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DATE RELEASED							

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Scale	AS SHOWN
Date	08/08/2018
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Designed	MAK
Approved	KAL

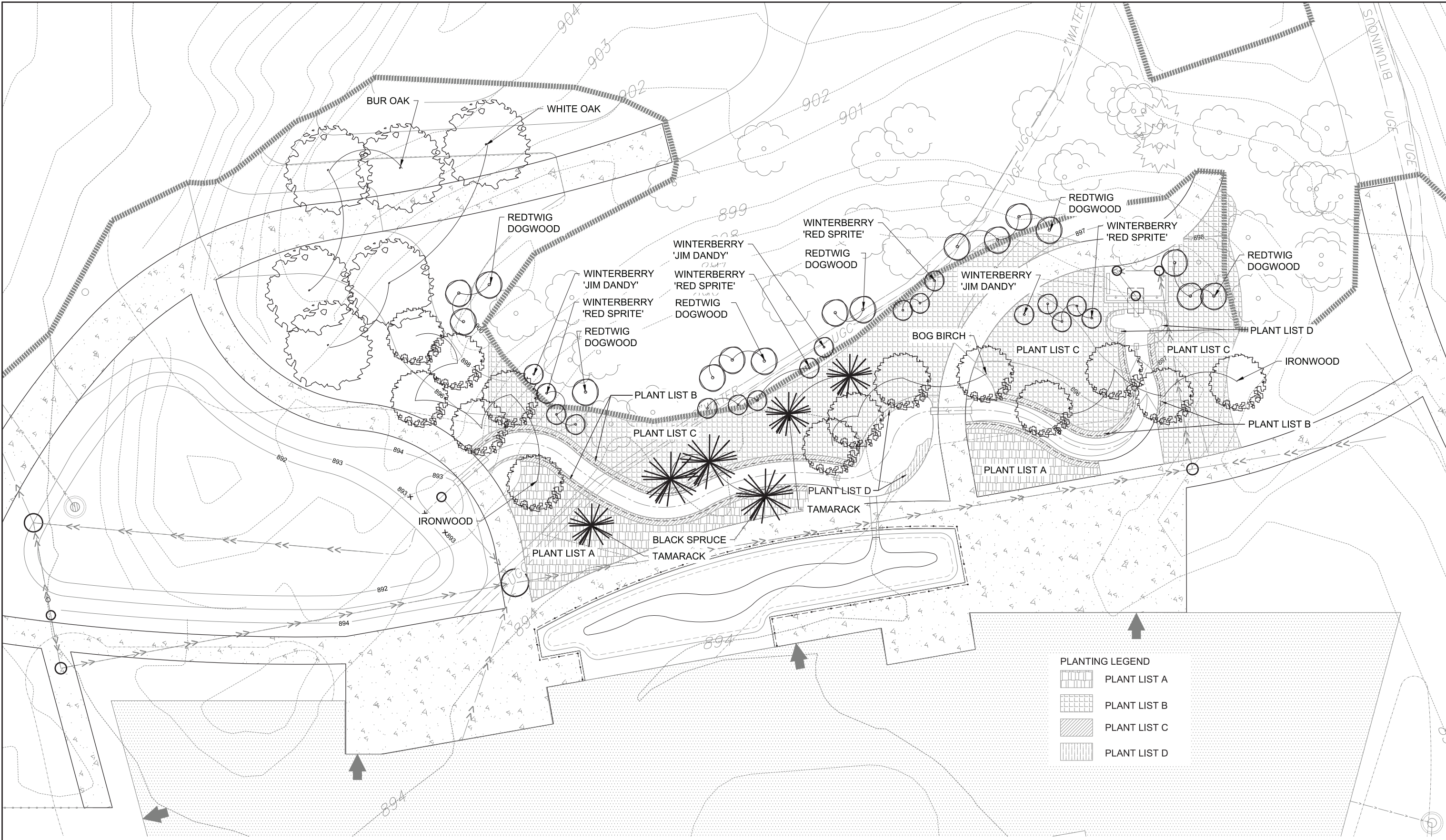
CITY OF ST. LOUIS PARK

WESTWOOD HILLS NATURE CENTER  
 NORTH RAIN WATER FEATURE  
 UPPER POND SECTIONS  
 AND DETAILS

BARR PROJECT No.	23/27-1658.00
CLIENT PROJECT No.	
DWG. No.	RW-05
REV. No.	A



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 KJN2: M:\Design\23271658\00\23271658\_LANDSCAPE PLAN\_BASE.dwg Plot at: 07/27/2018 14:32:06



1 PLAN: PLANTING PLAN  
AS SHOWN



PRELIMINARY  
DRAFT

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	KJN3	MAK	KAL	8/08/2018	FOR BCWMC 90% REVIEW MEETING

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINTED NAME: \_\_\_\_\_  
 SIGNATURE: \_\_\_\_\_  
 DATE: \_\_\_\_\_ LICENSE # \_\_\_\_\_

CLIENT	BID	CONSTRUCTION	RELEASED TO/FOR	A	B	C	0	1	2	3

**BARR**  
 Corporate Headquarters: Minneapolis, Minnesota  
 Ph: 1-800-632-2277

Project Office:  
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 MINNEAPOLIS, MN 55435  
 Ph: 1-800-632-2277  
 Fax: (952) 832-2601  
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Scale	AS SHOWN
Date	08/08/2018
Drawn	KJN2
Checked	MAK
Designed	FJR
Approved	KAL

CITY OF ST. LOUIS PARK

WESTWOOD HILLS NATURE CENTER  
 NORTH RAINWATER FEATURE  
 PLANTING PLAN

BARR PROJECT No. 23/27-1658.00	
CLIENT PROJECT No.	
DWG. No. L1	REV. No. A



**PLANT SCHEDULE: RAIN GARDEN 1**

Zone A Plants				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Meadow garlic	<i>Allium canadense</i>			
Large-leaved aster	<i>Aster macrophyllus</i>			
Harebell	<i>Campanula rotundifolia</i>			
Bebb's sedge	<i>Carex bebbii</i>			
Plains oval sedge	<i>Carex brevior</i>			
Palm sedge	<i>Carex muskingumensis</i>			
Fox sedge	<i>Carex vulpinoidea</i>			
Narrow-leaved cotton grass	<i>Eriophorum angustifolium</i>			
Bottle gentian	<i>Gentiana andrewsii</i>			
Alum root	<i>Heuchera richardsonii</i>			
Dotted blazing star	<i>Liatris punctata</i>			
Great blue lobelia	<i>Labelia siphilitica</i>			
Gray goldenrod	<i>Solidago nemoralis</i>			

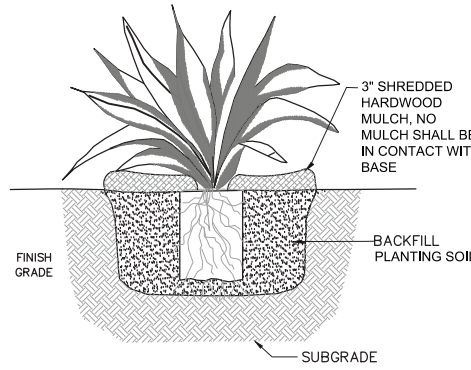
Zone B Plants				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Sweet flag	<i>Acorus americanus</i>			
Marsh marigold	<i>Caltha palustris</i>			
Fringed sedge	<i>Carex crinita</i>			
Tussock sedge	<i>Carex stricta</i>			
Rattlesnake manna grass	<i>Glyceria canadensis</i>			
Blue flag iris	<i>Iris versicolor</i>			
Cardinal flower	<i>Labelia cardinalis</i>			
Green bulrush	<i>Scirpus atrovirens</i>			

Zone C Plants				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Columbine	<i>Aquilegia canadensis</i>			
Swamp milkweed	<i>Asclepias incarnata</i>			
Butterfly weed	<i>Asclepias tuberosa</i>			
Whorled milkweed	<i>Asclepias verticillata</i>			
Large-leaved aster	<i>Aster macrophyllus</i>			
Sideoats grama	<i>Bouteloua curtipendula</i>			
Plains oval sedge	<i>Carex brevior</i>			
Turtlehead	<i>Chelone glabra</i>			
Flat-topped aster	<i>Doellingeria umbellata</i>			
Narrow-leaved coneflower	<i>Echinacea angustifolia</i>			
Flowering spurge	<i>Euphorbia corollata</i>			
Large-leaved aster	<i>Eurybia macrophylla</i>			
Joe-pye weed	<i>Eutrochium maculatum</i>			
Wild strawberry	<i>Fragaria virginiana</i>			
Wild geranium	<i>Geranium maculatum</i>			
Sneezeweed	<i>Helenium autumnale</i>			
Hispid sunflower	<i>Helianthus hirsutus</i>			
Common ox-eye	<i>Heliopsis helianthoides</i>			
Rough blazing star	<i>Liatris aspera</i>			
Meadow blazing star	<i>Liatris ligulistylis</i>			
Tall blazing star	<i>Liatris pycnostachya</i>			
Turk's cap lily	<i>Lilium michiganense</i>			
Great blue lobelia	<i>Labelia siphilitica</i>			
False salomon's seal	<i>Maianthemum racemosum</i>			
Starry salomon's seal	<i>Maianthemum stellatum</i>			
Golden ragwort	<i>Packera aurea</i>			
Woodland phlox	<i>Phlox divaricata</i>			
Obedient plant	<i>Physostegia virginiana</i>			
Mountain mint	<i>Pycnanthemum virginianum</i>			
Zig zag goldenrod	<i>Solidago flexicaulis</i>			
Stiff goldenrod	<i>Solidago rigida</i>			
Smooth aster	<i>Symphotrichum laeve</i>			
Acute aster	<i>Symphotrichum auletanjense</i>			
Arrow-leaved aster	<i>Symphotrichum urophyllum</i>			
Tall meadow rue	<i>Thalictrum dasycarpum</i>			
Hoary vervain	<i>Verbena stricta</i>			
Culver's root	<i>Veronicastrum virginicum</i>			
Heart-leaved Alexander	<i>Zizia aptera</i>			

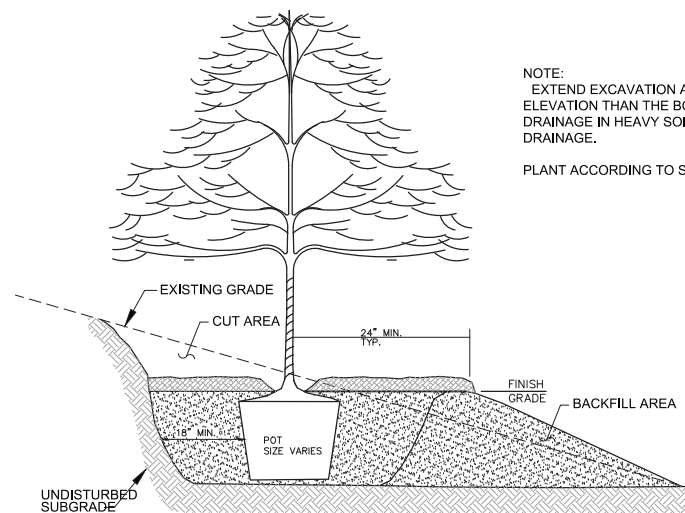
Zone D Plants				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Pickereelweed	<i>Pontederia cordata</i>			
Arrowhead	<i>Sagittaria latifolia</i>			
Giant bur-reed	<i>Sparganium eurycarpum</i>			
Northern Water Plantain	<i>Alisma triviale</i>			

Trees				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Ironwood	<i>Carpinus caroliniana</i>	as shown		#5 pot
Tamarack	<i>Larix laricina</i>	as shown		#10 pot
Black Spruce	<i>Picea mariana</i>	as shown		#5 pot
Bog Birch	<i>Betula glandulosa</i>	as shown		#2 pot
White Oak	<i>Quercus alba</i>	as shown		#7 pot
Bur Oak	<i>Quercus macrocarpa</i>	as shown		#7 pot

Shrubs				
COMMON NAME	SCIENTIFIC NAME	QUANTITY	SPACING	SIZE
Redtwig Dogwood	<i>Cornus sericea</i>	6' O.C.		#2 pot
Winterberry 'Jim Dandy'	<i>Ilex verticillata 'Jim Dandy'</i>	5' O.C.		#2 pot
Winterberry 'Red Sprite'	<i>Ilex verticillata 'Red Sprite'</i>	5' O.C.		#2 pot



**1 DETAIL: PERENNIAL PLANTING**  
L2 NOT TO SCALE

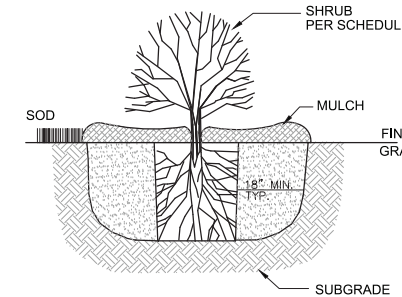


**2 DETAIL: PLANTING ON A SLOPE**  
L2 NOT TO SCALE

- HERBACEOUS PLUG AND POT PLANTING NOTES:**
1. PROVIDE AND INSTALL PLANTS PER SCHEDULE.
  2. EXCAVATE HOLE 3 TIMES WIDTH OF ROOTBALL.
  3. BREAK BOTTOM OF ROOTBALL TO LOOSEN ROOTS.
  4. PLANT THROUGH MULCH ALIGNING ROOTBALL TOP EVEN WITH SOIL - DO NOT PLANT TOO DEEP OR TOO SHALLOW. FIRM SOIL TO ENSURE GOOD CONTACT WITH ROOTS.
  5. BACK FILL WITH PLANTING SOIL FIRM SOIL AROUND ROOT MASS TO MAINTAIN PLUMB AND ENSURE NO AIR GAPS AROUND ROOT MASS.
  6. APPLY 3\"/>

NOTE:  
EXTEND EXCAVATION AND BACKFILL SOIL TO A POINT DOWNSLOPE EQUAL TO OR LOWER IN ELEVATION THAN THE BOTTOM OF THE HOLE DIRECTLY BENEATH THE PLANT TO INSURE ADEQUATE DRAINAGE IN HEAVY SOILS. GRANULAR SOIL MUST BE ADDED AS BACKFILL IN AREAS OF POOR DRAINAGE.

PLANT ACCORDING TO SHRUB AND TREE PLANTING DETAILS ON THIS SHEET.



**3 DETAIL: SHRUB PLANTING**  
L2 NOT TO SCALE

- NOTES:  
SCARIFY BOTTOM AND SIDES OF HOLE PRIOR TO PLANTING.  
REMOVE DEAD OR DAMAGED BRANCHES. RETAIN THE NATURAL FORM OF THE SHRUB.  
HAND LOOSEN ROOTS OF CONTAINERIZED MATERIAL. IF NECESSARY, SCORE OUTSIDE OF SOIL MASS TO REDIRECT CIRCLING FIBROUS ROOTS.  
SET SHRUB ON UNDISTURBED NATIVE SOIL OR ON THOROUGHLY COMPACTED BACKFILL SOIL, AT THE SAME DEPTH AS IT WAS GROWN IN THE NURSERY.  
BACK FILL WITH PLANTING SOIL - SEE SPEC. DISH TOP OF BACKFILL BY 3\"/>

**PLANTING NOTES:**

1. POTHOLE ALL EXISTING UTILITIES WITHIN THE PROJECT LIMITS BEFORE EARTHWORK BEGINS.
2. INFORM THE LANDSCAPE ARCHITECT OF PLANTING TWO DAYS PRIOR TO PLANT DELIVERY.
3. CONTRACTOR SHALL COORDINATE LAYOUT OF ALL PLANTS WITH DIRECTION OF LANDSCAPE ARCHITECT IN THE FIELD.
4. PLACE SHREDDED HARDWOOD MULCH (MN/DOT SPEC 3882.2 TYPE 6 - WEED SEED FREE SHREDDED HARDWOOD.) TO A DEPTH OF 3\"/>

PRELIMINARY  
DRAFT

CADD USER: Michelle Kumbie FILE: M:\DESIGN\23271658\00\23271658\00\L2 PLANTING DETAILS.DWG PLOT SCALE: 1:1 PLOT DATE: 8/7/2018 11:27 PM  
Xrefs in Drawing: M:\Design\23271658\00\23271658\_SITE PLAN.dwg  
K:\J2\_M:\Design\23271658\00\23271658\_LANDSCAPE PLAN\_BASE.dwg Plot at 0. 07/27/2018 14:32:06

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA.				
PRINTED NAME	SIGNATURE			
NO.	BY	CHK.	APP.	DATE
REVISION DESCRIPTION				
DATE				
LICENSE #				

CLIENT	B/OB				
BD					
CONSTRUCTION					
RELEASED TO/FOR	A	B	C	0	1 2 3
DATE RELEASED					

Project Office:  
**BARR ENGINEERING CO.**  
4300 MARKETPOINTE DRIVE  
Suite 200  
MINNEAPOLIS, MN 55435

Corporate Headquarters:  
Minneapolis, Minnesota  
Ph: 1-800-632-2277  
Ph: 1-800-632-2277

Scale	AS SHOWN
Date	08/08/2018
Drawn	KJN2
Checked	MAK
Designed	FJR
Approved	KAL

WESTWOOD HILLS NATURE CENTER NORTH RAIN WATER FEATURE	
PLANTING DETAILS	

BARR PROJECT No. 23/27-1658.00	
CLIENT PROJECT No.	
DWG. No. L2	REV. No. A



# WHAT IS A PEAT BOG?

Bogs are a special type of wetland found on saturated, acid peat soils. They support a unique collection of trees, low shrubs and herbs, growing on a mat of sphagnum moss. In Minnesota, most bogs are found north of the twin cities.

**BOG FORMATION  
DIAGRAM  
GOES HERE**



You can find a bog not too far from here at Wirth Park and \_\_\_\_\_.

## HOW IS A BOG CREATED?

Bogs originate on a floating mat of sedges usually at the edge of a lake that becomes colonized by sphagnum mosses. As the mat gradually thickens and becomes more stable, it is populated by evergreen shrubs of the heath family (Ericaceae). Eventually, tamarack and black spruce can be supported by the mat. Peat accumulates when plant material does not fully decay because of cold, acidic and low-oxygen conditions.

In peat bogs the annual rate of biomass production is greater than the rate of decomposition. This makes bogs very efficient at absorbing carbon dioxide.

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HOME TO THESE SPECIES

### SPHAGNUM MOSS

Sphagnum mosses are the characteristic species of bogs. They play an important role in keeping the bog environment acidic by their production of organic acids. Sphagnum mosses are commonly known as peat moss. Approximately 20 species of Sphagnum are found in our area.



### PITCHER PLANTS

Pitcher plants are extremely well-adapted to this wet, highly acidic environment. Peat bogs are low in nutrients. To compensate, pitcher plants are carnivorous – they “eat” insects that get trapped in the bowl of water they hold (actually, they dissolve them) to get the nutrients they need.



### TAMARACK TREES

Tamaracks are hardy, cold-tolerant deciduous conifers. The needles turn golden in autumn and drop annually. Both tamaracks and black spruce trees are found in fully developed peat bogs. (more info to be added)



### WOODLAND CARIBOU


Woodland Caribou are a threatened subspecies of reindeer that primarily live in bogs, marshes, lakes and river regions. (more info to be added)





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# UNDERSTANDING THE HYDROLOGIC CYCLE

 This water feature mimics a natural hydrologic cycle. The water drop symbol indicates engineered elements used throughout the system.

The hydrologic cycle is the movement of water from the surface of oceans and lakes into the atmosphere, over land, and back to the earth's surface. During this process, water changes from liquid to solid (ice) to gas and back to liquid.

