BIORETENTION GARDEN DESIGN

Planting Design

Overview

- Sustainable design context
- Garden character and form
- Plant arrangement
  - Aesthetics
  - Function
- Ideal plants – aesthetically
- Ideal plants – functionally
- Plant types
- Plant selection basics

Sustainable Design – Context for Bioretention Gardens

- Enhances landscape aesthetic and functionality
- Maximizes environmental benefits and quality
- Minimizes resource inputs and maintenance requirements

One Step Back

Green infrastructure *is the interconnected network of open spaces and natural areas, such as greenways, wetlands, parks, forest preserves and native plant vegetation, that naturally manages stormwater, reduces flooding risk and improves water quality.*

(http://greenvalues.cnt.org/green-infrastructure)

Garden Character and Form

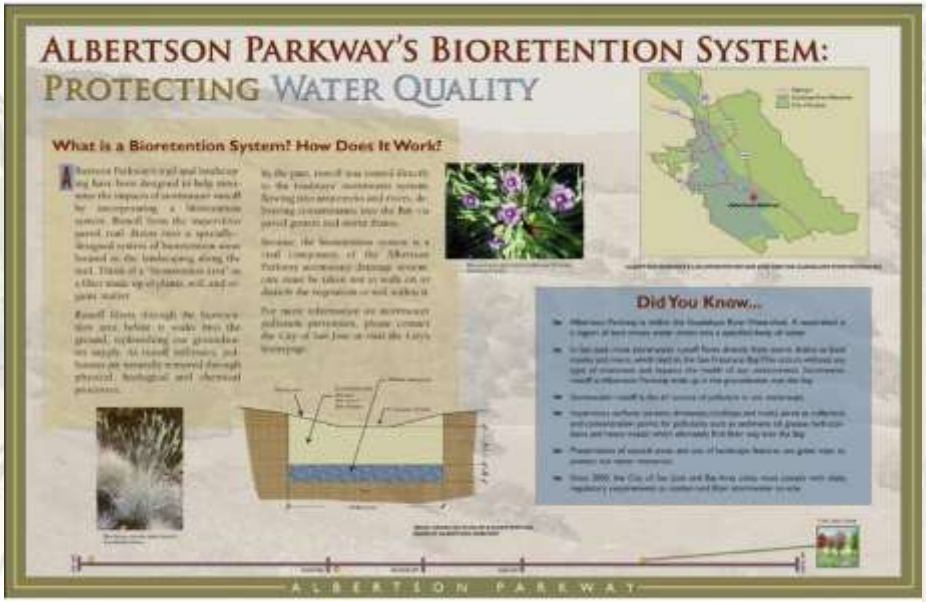
- **CRITICAL TO UNDERSTAND CLIENT AND PUBLIC BIASES AND EXPECTATIONS FOR GARDEN CHARACTER**
- Neat and tidy = high maintenance and inputs
- Fuzzy and informal = typically lower maintenance (unless managed to look neat and tidy)

Neat and tidy + fuzzy and informal = compatible (?)

Garden Character Acceptance

- Research (Joan Nassauer, Univ. Michigan) shows two approaches – both important:
  - **Intelligent Care (education)**
  - **Vivid Care (obvious beauty)**
- Thoroughly integrating "neat" and "fuzzy" will tone down contrasts and help unify garden appearance with surrounding landscape

Intelligent Care



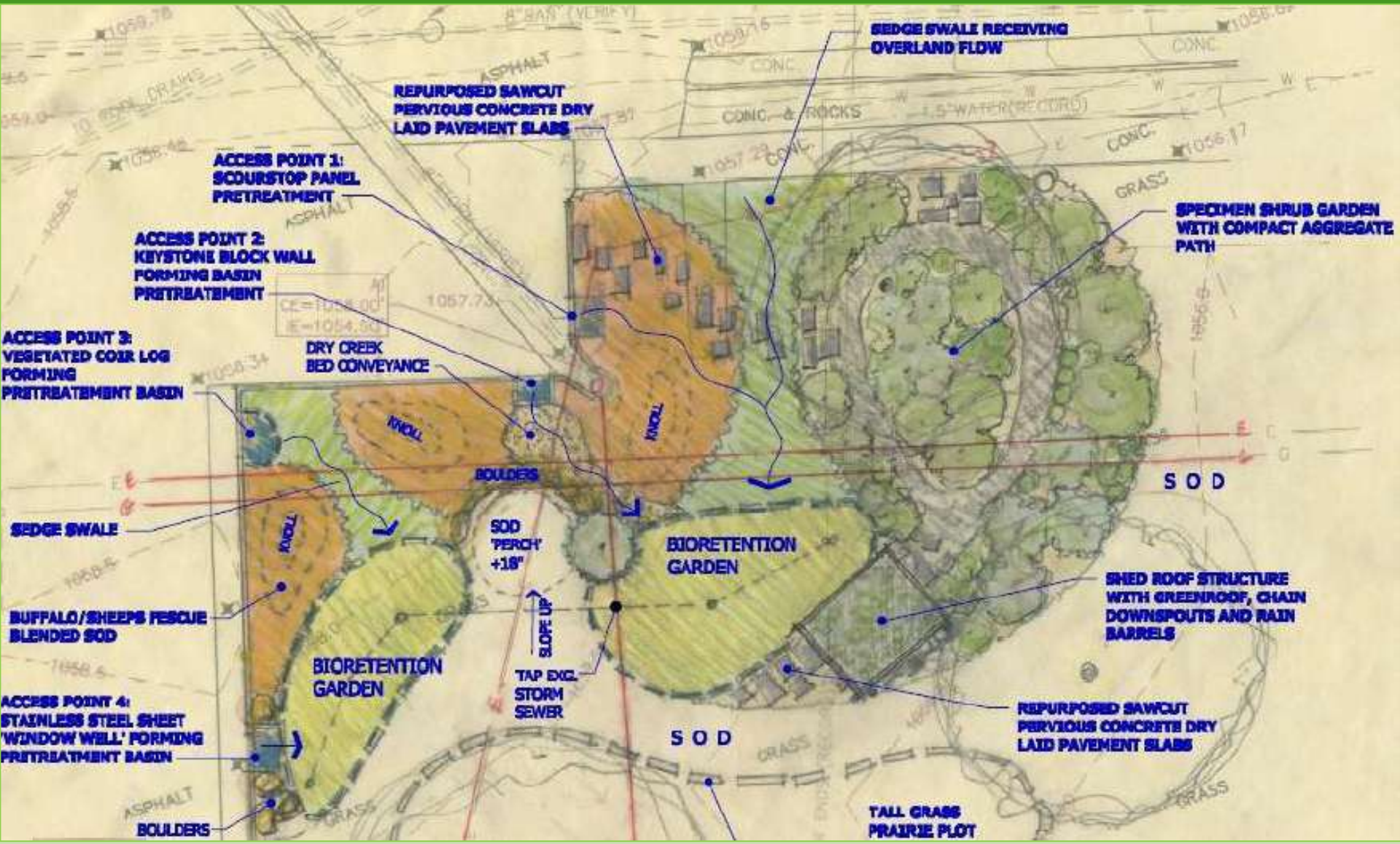
Vivid Care

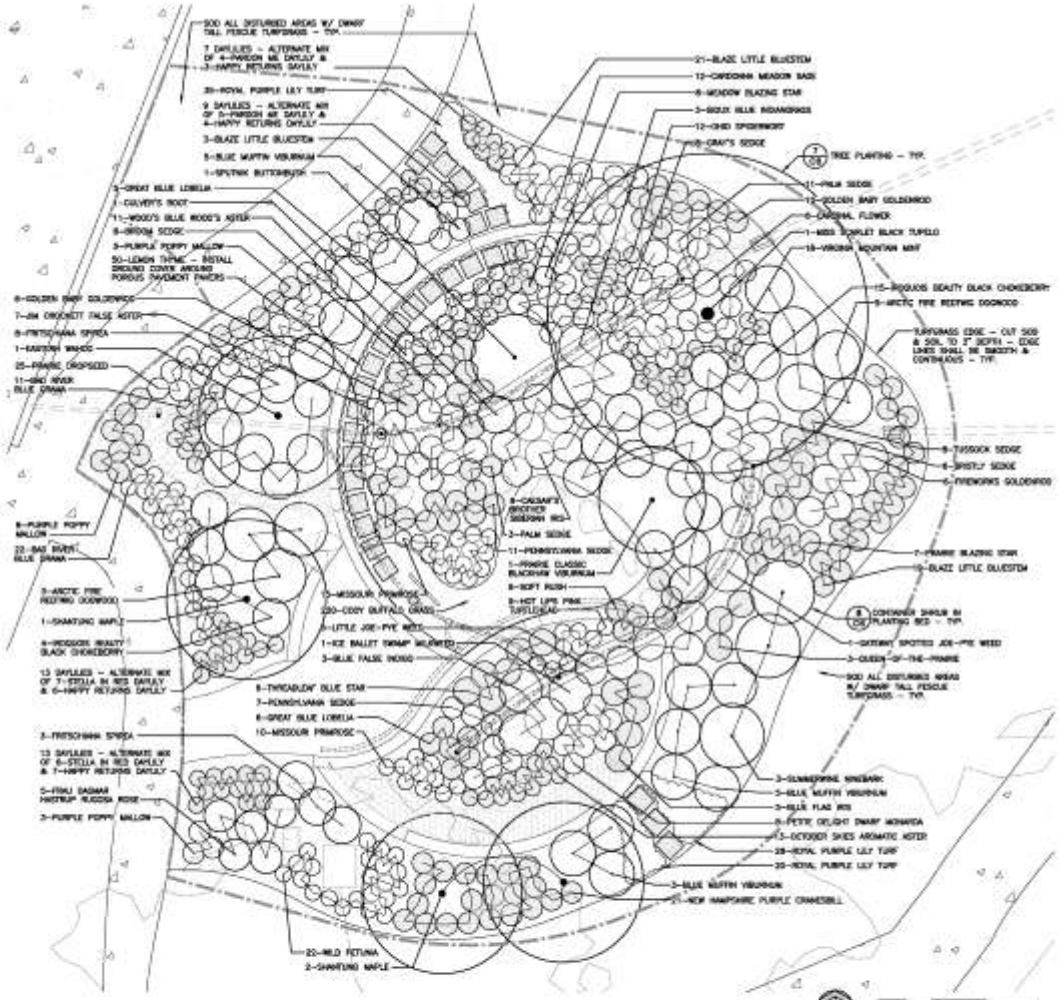
Garden Form

- Dictated by location and designer/property owner
- Curving edges more natural, tend to be more popular
- Most landscapes have curving bed lines; appropriate to use as visual cue for bioretention garden bed lines
- Regardless, design theme ties landscape together; bioretention shouldn't be visually separate

Garden Form (cont.)

- Straight edges and angled corners appear more formal, are possible but less common
- May require a mix depending on context
- Minimize "left-over" areas that will ultimately be difficult to maintain
- **In most landscapes, the bioretention garden should extend beyond the bioretention garden**


SEDGE SWALE RECEIVING OVERLAND FLOW
REPURPOSED SAWCUT PERVIOUS CONCRETE DRY LAID PAVEMENT SLABS
ACCESS POINT 1: SCOURSTOP PANEL PRETREATMENT
ACCESS POINT 2: KEYSTONE BLOCK WALL FORMING BASIN PRETREATEMENT
ACCESS POINT 3: VEGETATED COIR LOG FORMING PRETREATEMENT BASIN
DRY CREEK BED CONVEYANCE
SPECIMEN SHRUB GARDEN WITH COMPACT AGGREGATE PATH
KNOLL
KNOLL
KNOLL
BOULDERS
SOD
SEDGE SWALE
SOD 'PERCH' +18"
BIORETENTION GARDEN
SHED ROOF STRUCTURE WITH GREENROOF, CHAIN DOWNSPOUTS AND RAIN BARRELS
BUFFALO/SHEEPS FESCUE BLENDED SOD
SLOPE UP
BIORETENTION GARDEN
TAP EXG. STORM SEWER
ACCESS POINT 4: STAINLESS STEEL SHEET 'WINDOW WELL' FORMING PRETREATMENT BASIN
SOD
REPURPOSED SAWCUT PERVIOUS CONCRETE DRY LAID PAVEMENT SLABS
BOULDERS
TALL GRASS PRAIRIE PLOT
ASPHALT
CONC.
GRASS



PLANTING PLAN

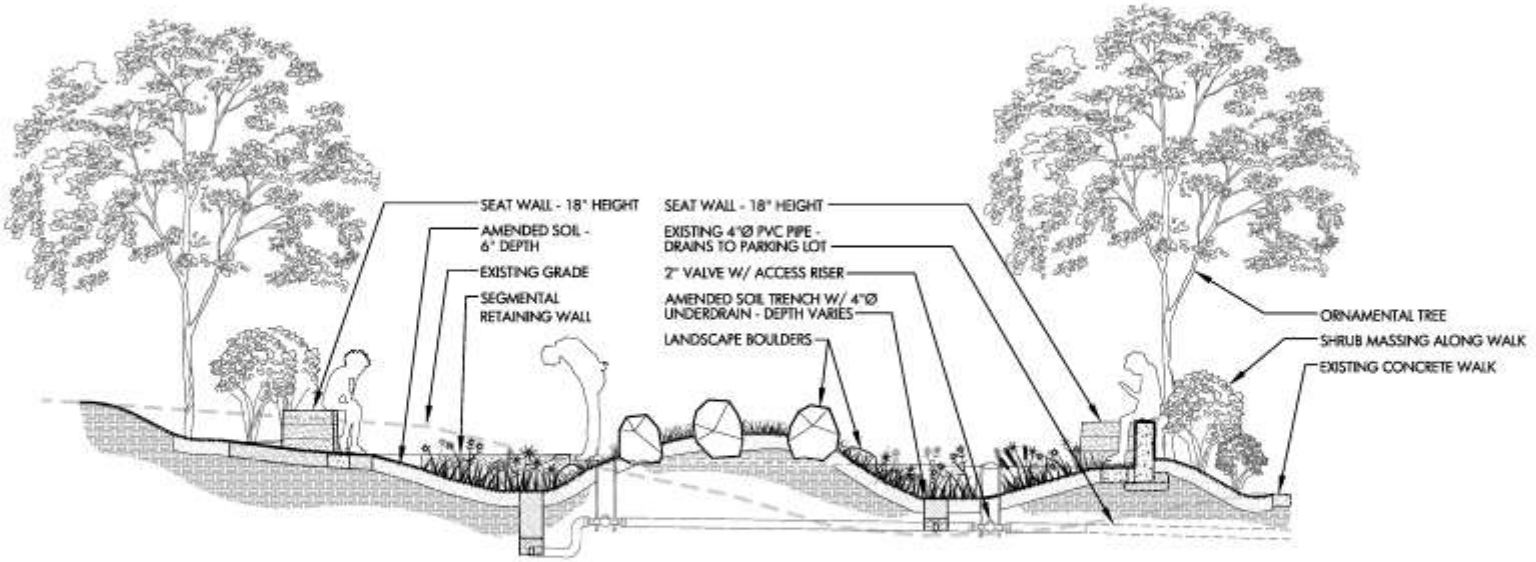
SCALE: 1" = 5'-0"

PLANT SCHEDULE

COMMON NAME	BOTANICAL NAME	QTY.	SIZE	ROOT COND.	SPACING
CANOPY TREES					
Allen Scarlet Black Tupelo	Nyssa sylvatica 'Allen Scarlet'	1	2" Cal.	B&B	As Shown
UNDERSTORY/ORNAMENTAL TREES					
Shantung Maple	Acer truncatum	3	1 1/2" Cal.	B&B	As Shown
Prairie Classic Blackhaw Viburnum	Viburnum prunifolium x rufidulum 'Prairie Classic'	1	1 1/2" Cal.	B&B	As Shown
SHRUBS					
Arapaho Beauty Black Chokeberry	Aronia melanocarpa 'Morton'	19	24" Ht., 3 Cal.	Cont.	As Shown
Spanish Buttonbush	Cephalanthus occidentalis	1	30" Ht., 5 Cal.	Cont.	As Shown
Arctic Fire Redtwig Dogwood	Cornus sericea 'Farrow'	9	30" Ht., 3 Cal.	Cont.	As Shown
Eastern Wahoo	Euonymus atropurpureus	1	36" Ht., 5 Cal.	Cont.	As Shown
Summer Wine Ninebark	Physocarpus opulifolius 'Summer Wine'	3	30" Ht., 3 Cal.	Cont.	As Shown
Frau Dagmar Hastrup Rugosa Rose	Rosa rugosa 'Frau Dagmar Hastrup'	5	24" Ht., 2 Cal.	Cont.	As Shown
Fritschiana Spirea	Spiraea fritschiana	11	18" Ht., 2 Cal.	Cont.	As Shown
Blue Muffin Arrowwood Viburnum	Viburnum dentatum 'Blue Muffin'	13	24" Ht., 5 Cal.	Cont.	As Shown
PERENNIALS & GROUNDCOVER					
'Threadleaf' Blue Star	Amsonia hubrichtii	8	1 Gallon	Cont.	As Shown
Ice Ballet Swamp Milkweed	Asclepias incarnata 'Ice Ballet'	1	1 Gallon	Cont.	As Shown
Wood's Blue Wood's Aster	Aster x oblongifolius 'Wood's Blue'	11	1 Gallon	Cont.	As Shown
October Skies Aromatic Aster	Aster oblongifolius 'October Skies'	13	1 Gallon	Cont.	As Shown
Blue False Indigo	Baptisia australis	3	1 Gallon	Cont.	As Shown
Jim Crockett False Aster	Boltonia asteroides var. latisquama 'Jim Crockett'	7	1 Gallon	Cont.	As Shown
Bad River Blue Grama	Bouteloua gracilis	33	4 1/2" Pot	Cont.	As Shown
Cody Buffalograss	Buchloe dactyloides	220	Sq. Ft.	Sod	As Shown
Purple Prairie Mallow	Callirhoe involucrata	16	1 Gallon	Cont.	As Shown
Bristly Sedge	Carex comosa	8	4 1/2" Pot	Cont.	As Shown
Brown Sedge	Carex aquatilis	8	4 1/2" Pot	Cont.	As Shown
Gray's Sedge	Carex grayi	8	4 1/2" Pot	Cont.	As Shown
Palm Sedge	Carex muskingumensis	14	4 1/2" Pot	Cont.	As Shown
Pennsylvania Sedge	Carex pensylvanica	19	4 1/2" Pot	Cont.	As Shown
Tussock Sedge	Carex stricta	9	4 1/2" Pot	Cont.	As Shown
Hot Lips Pink Turtlehead	Chelone lyonii 'Hot Lips'	5	1 Gallon	Cont.	As Shown
Little Joe-Pye Weed	Eupatorium dubium 'Little Joe'	5	1 Gallon	Cont.	As Shown
Gateway Spotted Joe-Pye Weed	Eupatorium purpureum 'Gateway'	1	1 Gallon	Cont.	As Shown
Queen-of-the-prairie	Filipendula rubra	3	1 Gallon	Cont.	As Shown
New Hampshire Purple Cranesbill	Geranium sanguineum 'New Hampshire Purple'	21	1 Gallon	Cont.	As Shown
Happy Returns Daylily	Hemerocallis 'Happy Returns'	20	1 Gallon	Cont.	As Shown
Pardon Me Daylily	Hemerocallis 'Pardon Me'	9	1 Gallon	Cont.	As Shown
Stella in Red Daylily	Hemerocallis 'Stella in Red'	13	1 Gallon	Cont.	As Shown
Cassie's Brother Siberian Iris	Iris sibirica 'Cassie's Brother'	9	1 Gallon	Cont.	As Shown
Blue Flag Iris	Iris versicolor	5	1 Gallon	Cont.	As Shown
Soft Rush	Juncus effusus	8	4 1/2" Pot	Cont.	As Shown
Meadow Blazing Star	Liatris ligulistylis	9	1 Gallon	Cont.	As Shown
Prairie Blazing Star	Liatris pycnostachya	7	1 Gallon	Cont.	As Shown
Royal Purple Lilyturf	Liriope muscari 'Royal Purple'	83	2 1/2" Pot	Cont.	12" O.C.
Cardinal Flower	Lobelia cardinalis	6	1 Gallon	Cont.	As Shown
Great Blue Lobelia	Lobelia siphilitica	11	1 Gallon	Cont.	As Shown
Petite Delight Dwarf Beebalm	Monarda didyma 'Petite Delight'	6	1 Gallon	Cont.	As Shown
Missouri Primrose	Oenothera missouriensis	25	1 Gallon	Cont.	As Shown
Virginia Mountain Mint	Pycnanthemum virginianum	18	1 Gallon	Cont.	As Shown
Wild Petunia	Ruellia humilis	22	4 1/2" Pot	Cont.	As Shown
Cardinal Meadow Sage	Salvia serotina 'Cardinal'	12	1 Gallon	Cont.	As Shown
Blaze Little Bluestem	Schizachyrium scoparium 'Blaze'	43	1 Gallon	Cont.	As Shown
Fireworks Goldenrod	Solidago rugosa 'Fireworks'	8	1 Gallon	Cont.	As Shown
Golden Baby Goldenrod	Solidago sphacelata 'Golden Baby'	18	1 Gallon	Cont.	As Shown
Sioux Blue Indiangrass	Sorghastrum nutans	3	1 Gallon	Cont.	As Shown
Prairie Dropseed	Sporobolus heterolepis	25	1 Gallon	Cont.	As Shown
Lemon Thyme	Thymus citriodorus	50	2 1/2" Pot	Cont.	12" O.C.
Ohio Spiderwort	Tradescantia ohiensis	13	1 Gallon	Cont.	As Shown
Culver's Root	Veronicastrum virginicum	1	1 Gallon	Cont.	As Shown

PLANTING LEGEND

UNIVERSITY OF NEBRASKA - OMAHA WELCOME CENTER BIORETENTION GARDEN



UNO WELCOME CENTER BIORETENTION GARDEN - SECTION 'A-A'

HORIZONTAL SCALE: 1"= 5'-0" VERTICAL SCALE: 1" = 2'-6"

Plant Arrangement - Aesthetics

- Massing
- Plant heights
- Repetition
- Defined edges
- Plant types

Massing

Plant Heights

Repetition

Repetition (Less is More)

Defined Edges

Defined Edges (cont.)

Design (Dominance) Elements

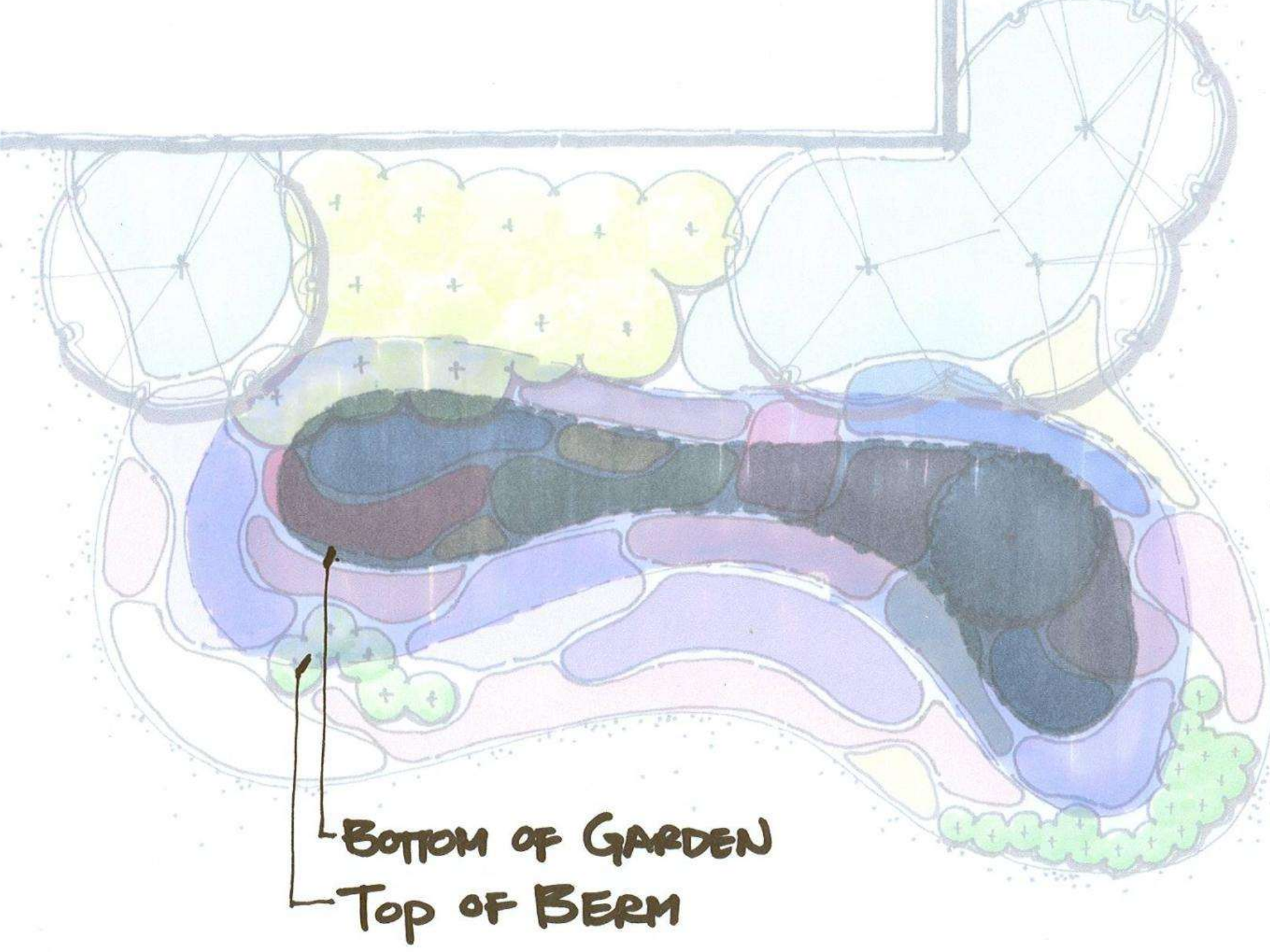
- Color
- Texture
- Form
- Line

Plant Arrangement - Function

- Soil Moisture
- Sun/Shade
- Soil Texture and structure
- Potential time for inundation
  - Days vs. hours
  - Garden maturity factor
- Chemicals and salt
- Preference vs tolerance

Soil Moisture

- Bioretention gardens tend to hold water by the hour vs by the day
- Plants lists may need to be adjusted "down" in garden depending on conditions
- Areas of garden not directly over drainage cell will retain more moisture


Bottom of Garden
Top of Berm

Sun/Shade

- Full sun = six hours of sun/day minimum
- Part shade = morning/afternoon; afternoon shade preferred; filtered or moving shade during the day
- Full shade = no direct sun, but few plants tolerate heavy dense full shade

Plant Arrangement - Summary

- Group/mass similar kinds of plants, fewer varieties overall, repeat plant masses
- Maximize flowering when practical **while ensuring** long/overlapped bloom times
- Create distinct patterns with plant masses, and distinct edges with bed edges

Plant Arrangement – Summary (cont.)

- Appropriate plant heights scaled to garden size and surroundings
- Use a low groundcover plant around garden edge to unify character regardless of wide species variety throughout garden