



East-West Gateway BMP Watershed Summit  
*If this Stream Could Talk* - Tower Grove Park- Nee Kee Nee  
October 16, 2024



EAST-WEST GATEWAY  
Council of Governments



# Speakers



**Bill Reiningger**  
**Executive Director, Tower Grove Park**

**Neil Eisenberger, ASLA, PLA,**  
**Principal, Lamar Johnson Collaborative**



# Learning Objectives

- Learning Objective #1 - ***Exploring Ecology, hydrology and the integration of natural systems in the public infrastructure system.*** Leveraging resilient design to solve modern engineering problems.
- Learning Objective #2 - ***Inclusive design and collaboration*** - Exploring equitable design through collaboration with and giving voice to the Osage Nation. Examine the nexus of national historic sites and Landscape Architecture.
- Learning Objective #3 - ***Outdoor recreation, education and play*** - Examine how green infrastructure and habitat creation can be leveraged within the public realm to create recreation, education and play opportunities.
- Learning Objective #4 - ***Public/private partnership*** - Understanding how private equity can positively influence public space.





# Agenda

1. Project Background
2. History
3. The Osage
4. Context
5. Project Statistics
6. Hydrology
7. Planting
8. Funding
9. Design
10. What's Next





# Project Background



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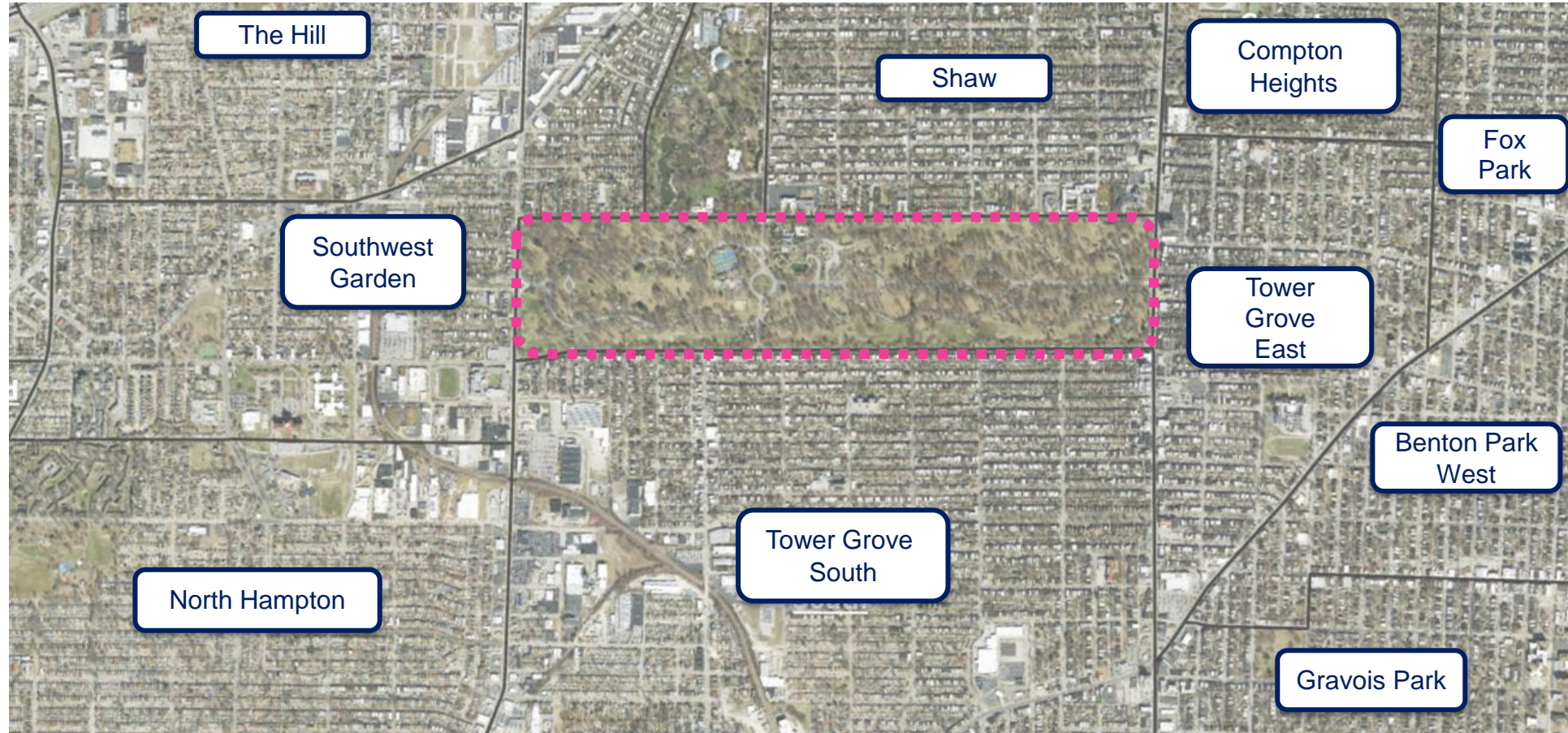


# Location





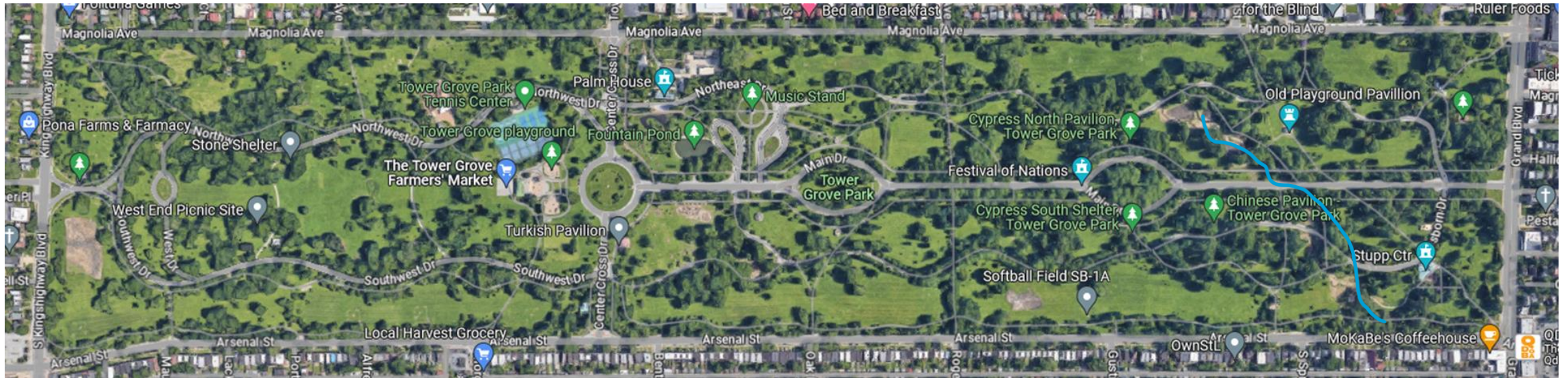
# Tower Grove Park





# Tower Grove Park

1.4 Miles



- 289 Acres





# History



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# History



- Opened in 1872
- Approximately 2.5 million annual visitors
- One of only eight National Historic Landmark Parks along with Central Park and Boston Public Garden
- Serves as a regional park for the city of St. Louis
- Largest collection of Victorian pavilions in the world



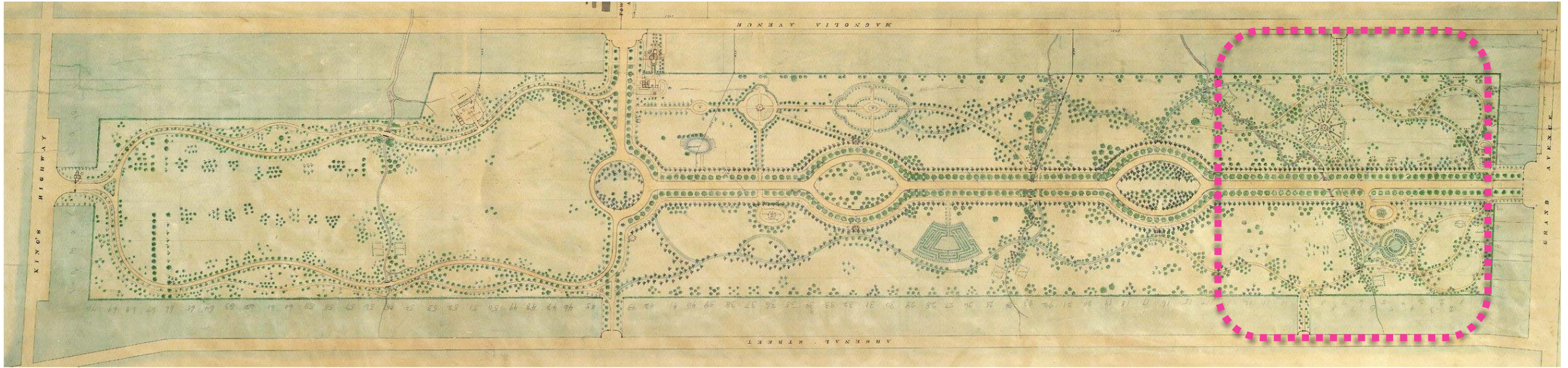
# History



- Level II Accredited Arboretum
- 6,800 trees - 340 tree types
- 2,000 wood shrubs
- 2 State Champion trees
- The estimated value of Tower Grove Park's tree population is about \$10.2 million
- The Park's trees provide about \$395,000 in annual environmental, economic, and social benefits
- National Audubon Society Important Bird Area providing habitat for more than 200 recorded resident and migrating bird species



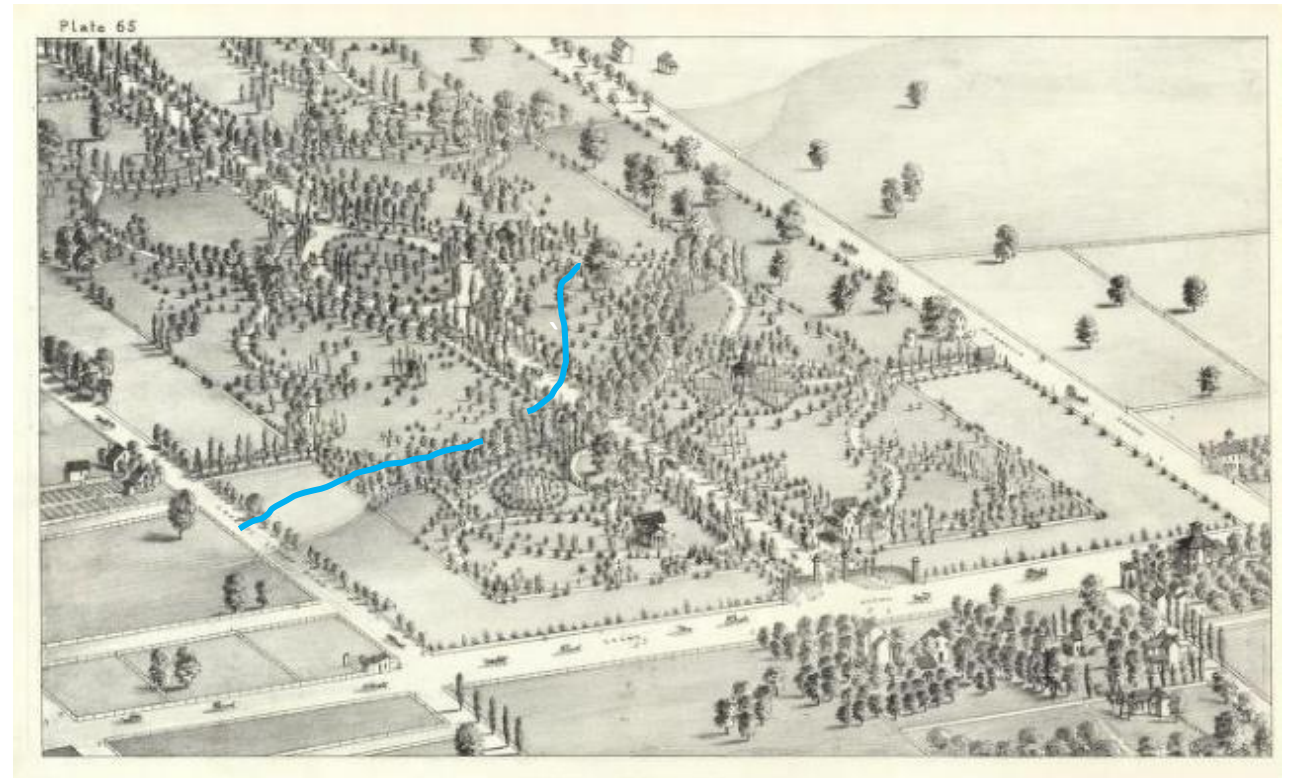
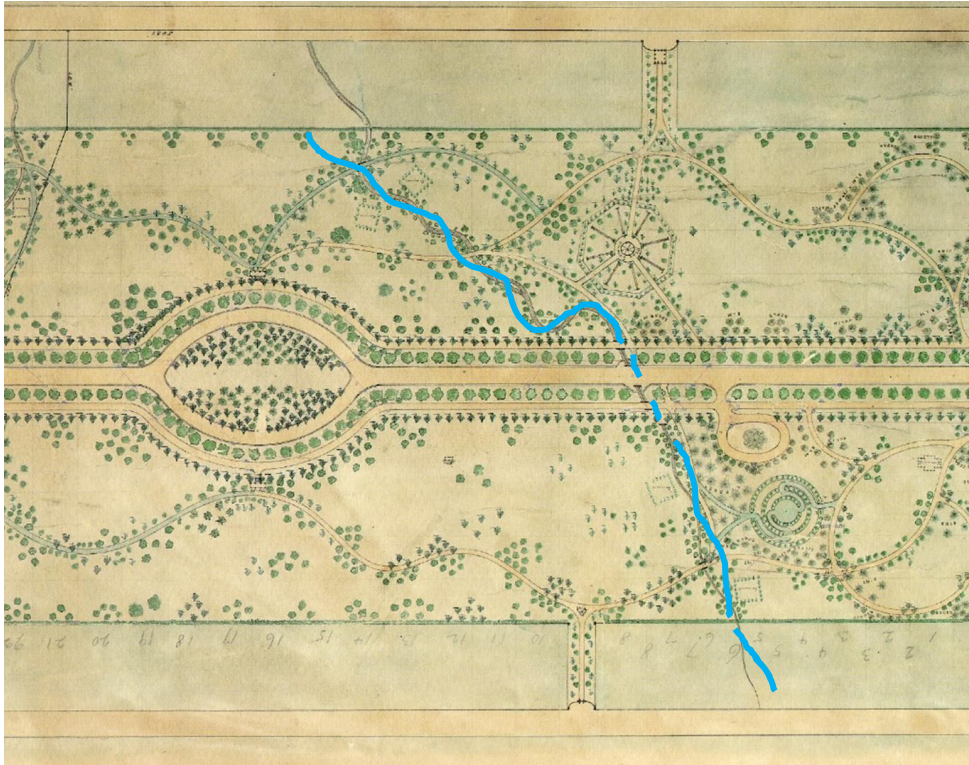
# Historic Site Plan - 1876



- Victorian strolling park
- Strong central access
- Scale of the park, roadways, etc. set up for carriages
- 3 historic stream alignments



# Historic Site Plan - 1876



- Approximately 1,600 LF
- 5 historic stone crossings







**Nee Kee Nee  
Project Origin**



# Project Origin + Timeline



- Recommended in the 2017 Master Plan
- Feasibility Study in 2018 to determine budget.
- Fundraised for this project in 2019
- Solicited for designers in early 2020
- Project Kick-Off April 2020
- Issue for Bid March 2021
- Construction begins May 2021
- Substantial Completion March 2022





# Project Goals + Objectives

- Restore historic stream, bridges and path alignments and provide new connections to other structures
- Provide area for recognizing original history of inhabitants of this area. The selected firm/team is expected to engage the Osage Nation.
- Provide Nature Exploration
- Mitigate 100% of Tower Grove Park's stormwater requirements for future construction projects







# The Osage

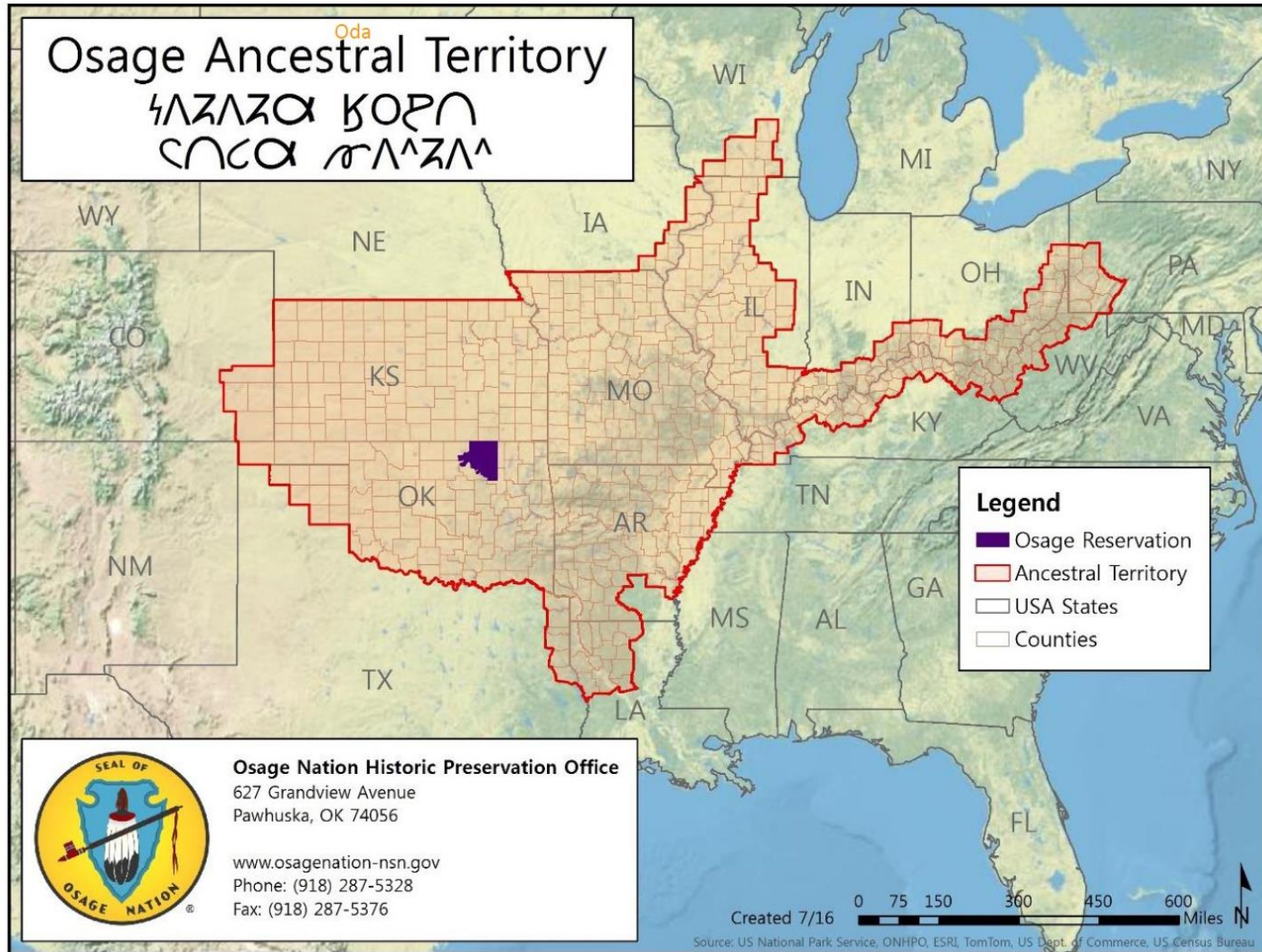
HAROLD HATZFELD



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# The Osage





# Why The Osage?



- Tower Grove Park formed a committee in 2018 to garner input on the statue
  - Committee recommended retaining and interpreting the statue.





# Why The Osage?

“All the News That’s Fit to Print”

## The New York Times

Vol. CLXXV No. 10,227 NEW YORK, WEDNESDAY, JUNE 10, 2020

**HOW THE CHARGES FOR A VIRUS TEST SOARED TO \$2,315**  
**PRICES GO UNREGULATED**  
Labs Taking Advantage When Congress Passes the Medical Bill

**Sales Rebound As U.S. Begins Its Long Thaw**  
Wholesale Resurgence, but Maybe Not for Long

**Reconsidering the Past, One Statue at a Time**  
Monument Confronts Story Symbols of a Difficult History

**Hope Meets Caution as Steroid Is Said to Reduce Virus Deaths**

**MONUMENT CONFRONTS STORY SYMBOLS OF A DIFFICULT HISTORY**  
The statue is by French-born artist Auguste Rodin, and it depicts a Native American man in a traditional dress, holding a bow and arrow. The statue is being moved from its original location in the city of St. Louis to a new location in the city of St. Louis. The statue is being moved by a crane and is being lowered into a truck. The statue is being moved to a new location in the city of St. Louis. The statue is being moved to a new location in the city of St. Louis.

- In response to the murder of George Floyd in Minneapolis on May 25, 2020, the equation changed in St. Louis.
- It was decided that the statue would be removed.
- The stream project served as a forum for the Osage voices to be heard



# Osage Influence



- Planting
  - Ethnobotany – Plant selection and placement. Seasonality
- Hydrology
  - Alignment of stream connects to settlement patterns
- Site Design
  - Osage symbology, story-telling



# Context



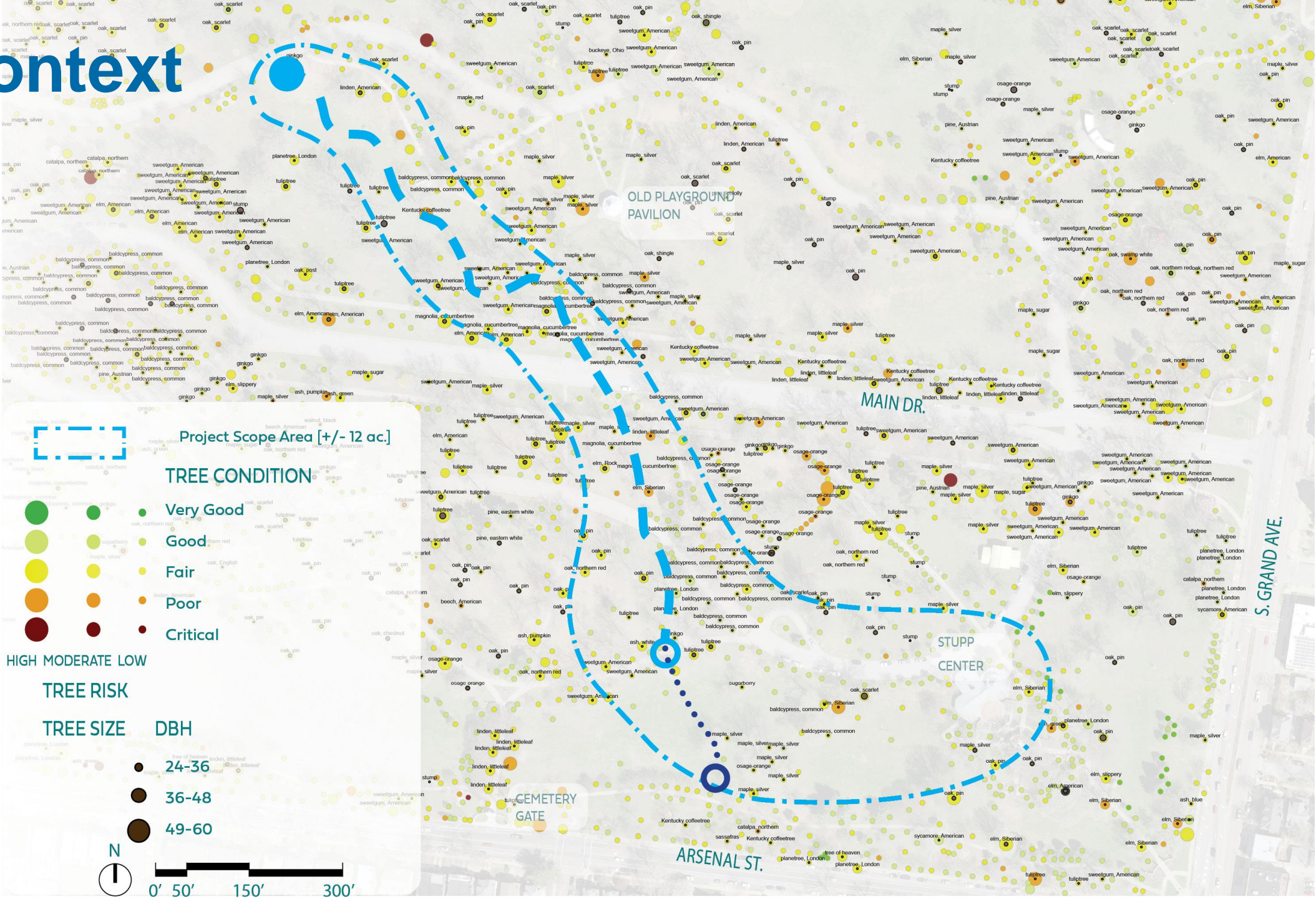


# Context



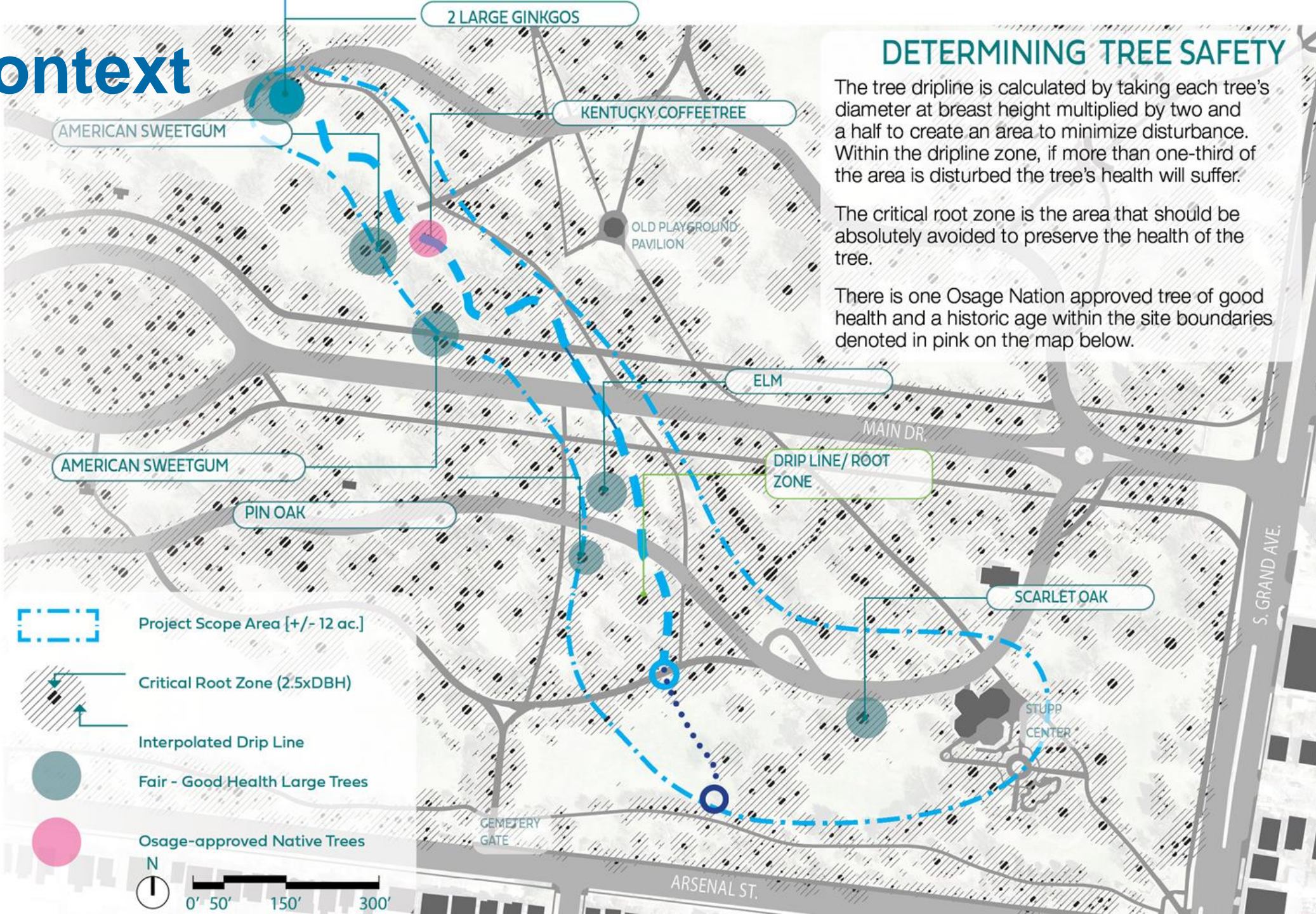


# Context





# Context



## DETERMINING TREE SAFETY

The tree dripline is calculated by taking each tree's diameter at breast height multiplied by two and a half to create an area to minimize disturbance. Within the dripline zone, if more than one-third of the area is disturbed the tree's health will suffer.

The critical root zone is the area that should be absolutely avoided to preserve the health of the tree.

There is one Osage Nation approved tree of good health and a historic age within the site boundaries denoted in pink on the map below.

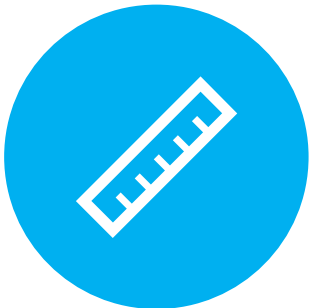


A lush green landscape featuring a stream bed composed of numerous smooth, rounded stones. The stream is surrounded by dense, vibrant green vegetation, including tall grasses and various shrubs. In the background, a stone bridge with a single arch spans across the stream, nestled among a thick forest of tall, leafy trees. The overall scene is a serene and naturalistic representation of a waterway in a park or natural area.

# Hydrology



# Stream Stats



1600' LONG



3-ACRE PROJECT  
AREA



CAPTURES &  
TREATS  
STORMWATER IN A  
43-ACRE  
WATERSHED  
**3.8 MILLION GAL  
ANNUALLY**



5 BMPS  
(RAINGARDENS)

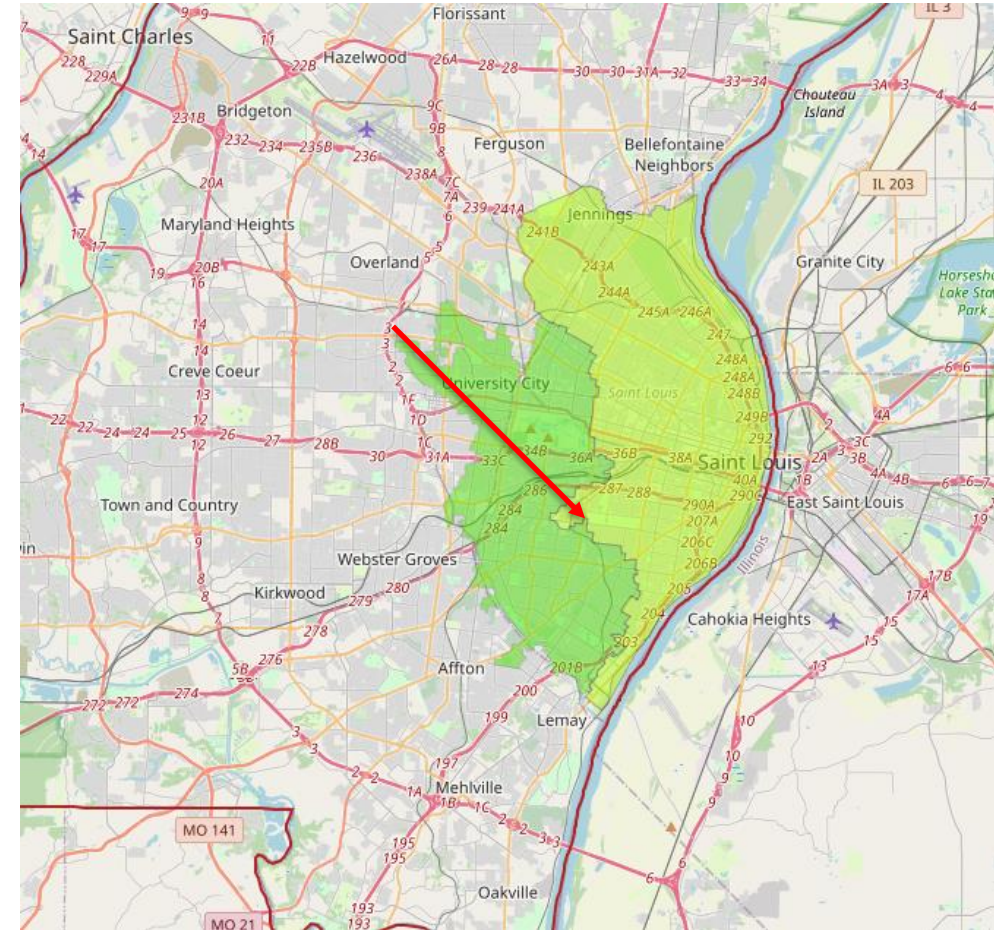




# MSD Project Clear



- Rainscaping Grants
  - Small- and large-scale grant opportunities
  - Must fall within the Mississippi or River Des Peres CSO
- Benefits
  - Reduce Water Problems and Basement Back Ups
  - Lower Maintenance
  - Support Biodiversity
  - Improve Water Quality
- Reimbursement Program
  - Application Process
  - Approval – Cost Estimate and Plans
  - Eligible Expenses
  - Award maximum is \$180,000 per drainage acre area treated





# How Does This Apply?

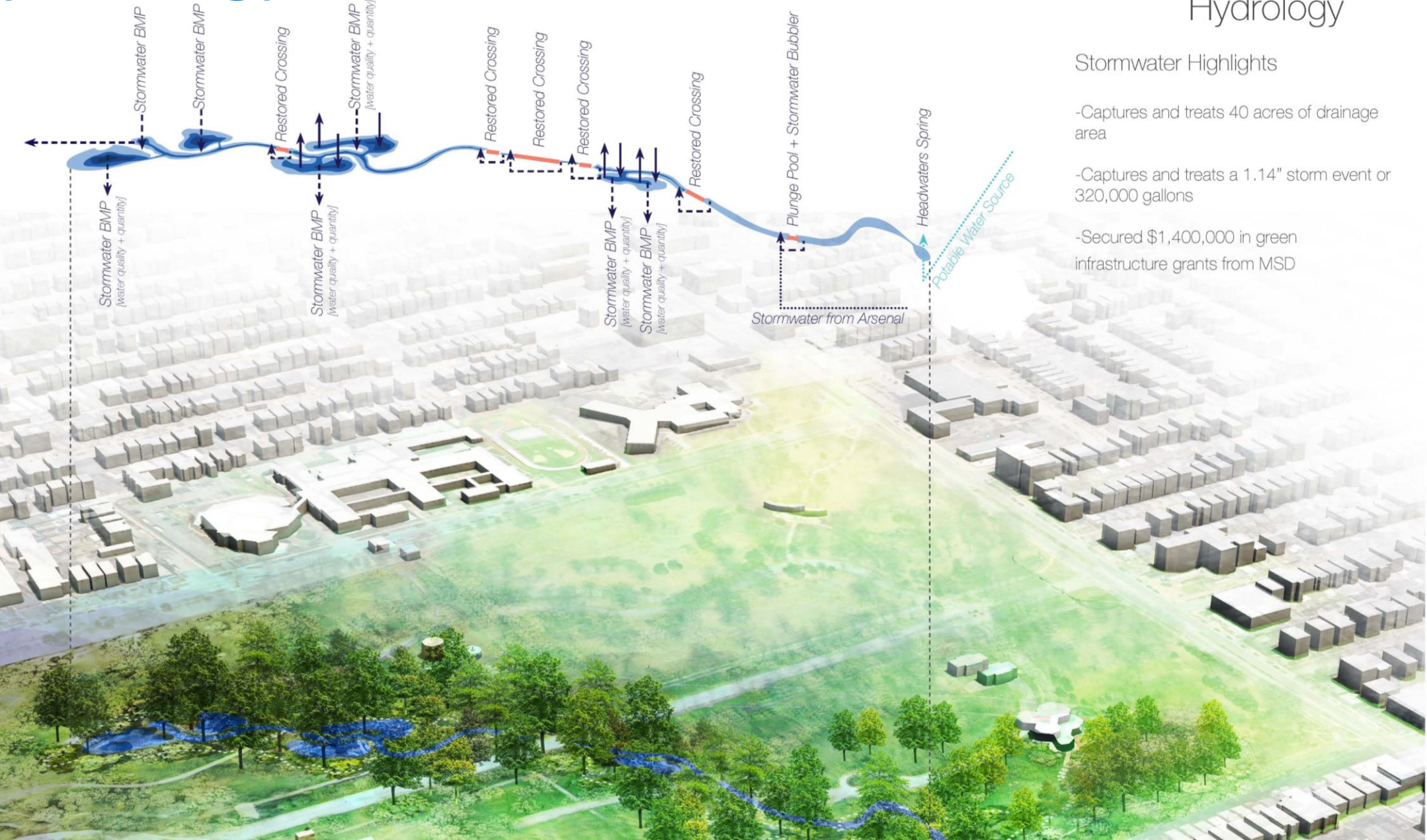


- Tower Grove Park identified and funded project for "daylighting" of historic stream, put underground in pipe around 1904
- Feasibility Study identifies opportunities for BMP (Best Management Practices) to manage volume reduction and treat water quality
- Project located in the Mississippi CSO (Combined Sewer Overflow)
- MSD Reimbursement available for project designed to its requirements





# Hydrology



## Hydrology

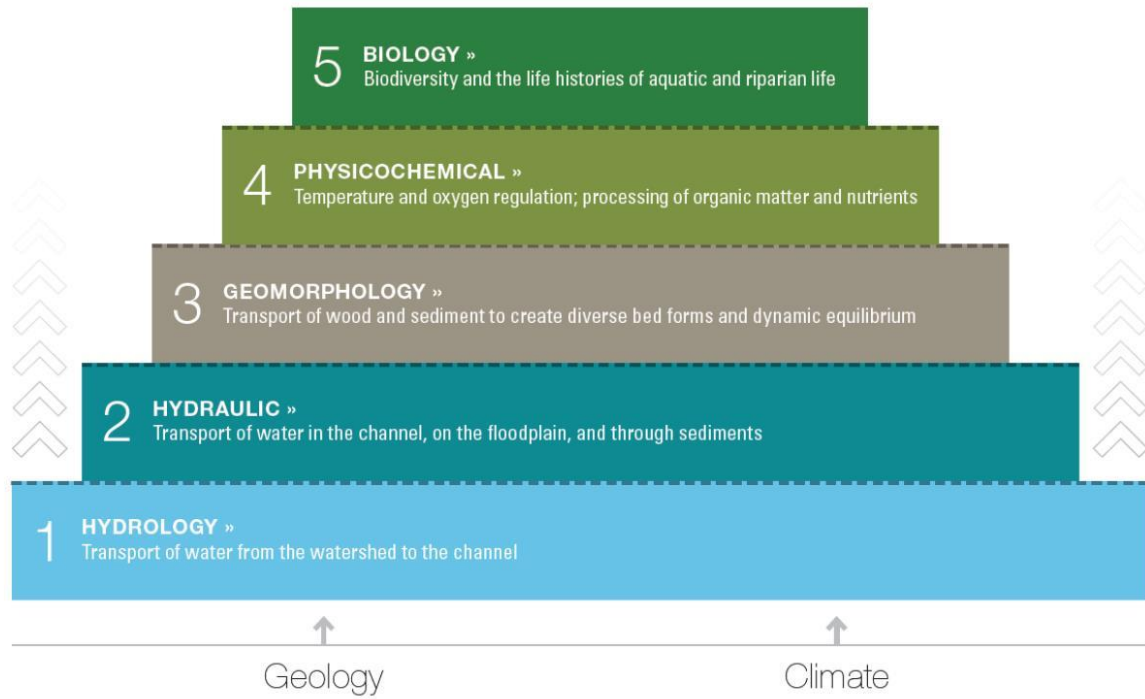
### Stormwater Highlights

- Captures and treats 40 acres of drainage area
- Captures and treats a 1.14" storm event or 320,000 gallons
- Secured \$1,400,000 in green infrastructure grants from MSD

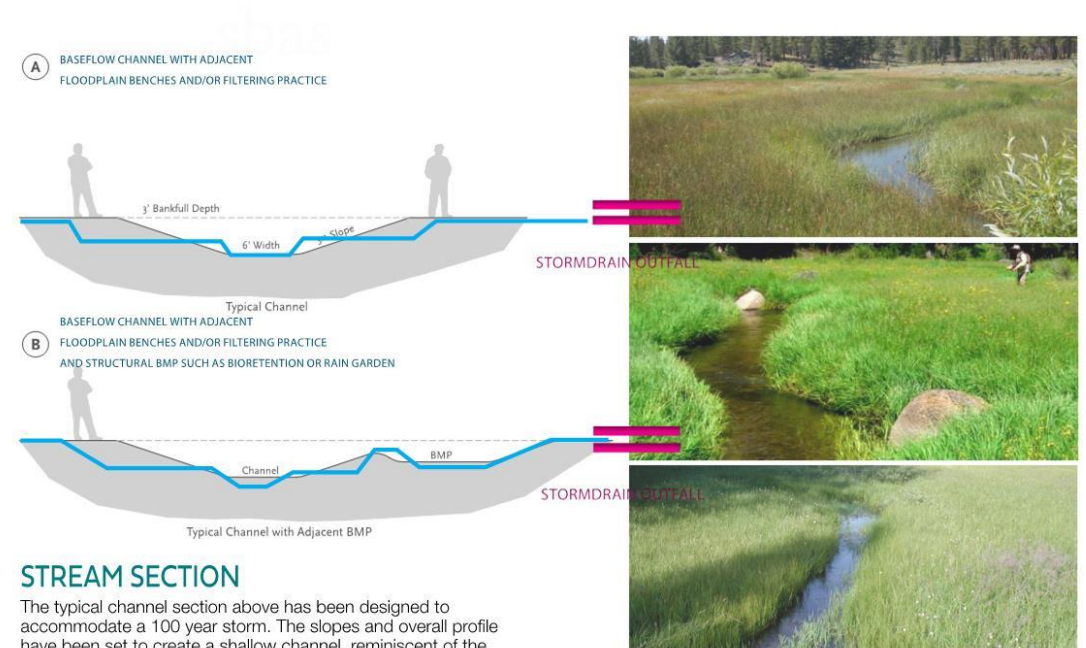


# Hydrology

## STREAM DESIGN PHILOSOPHY



## PROPOSED STREAM CROSS SECTION

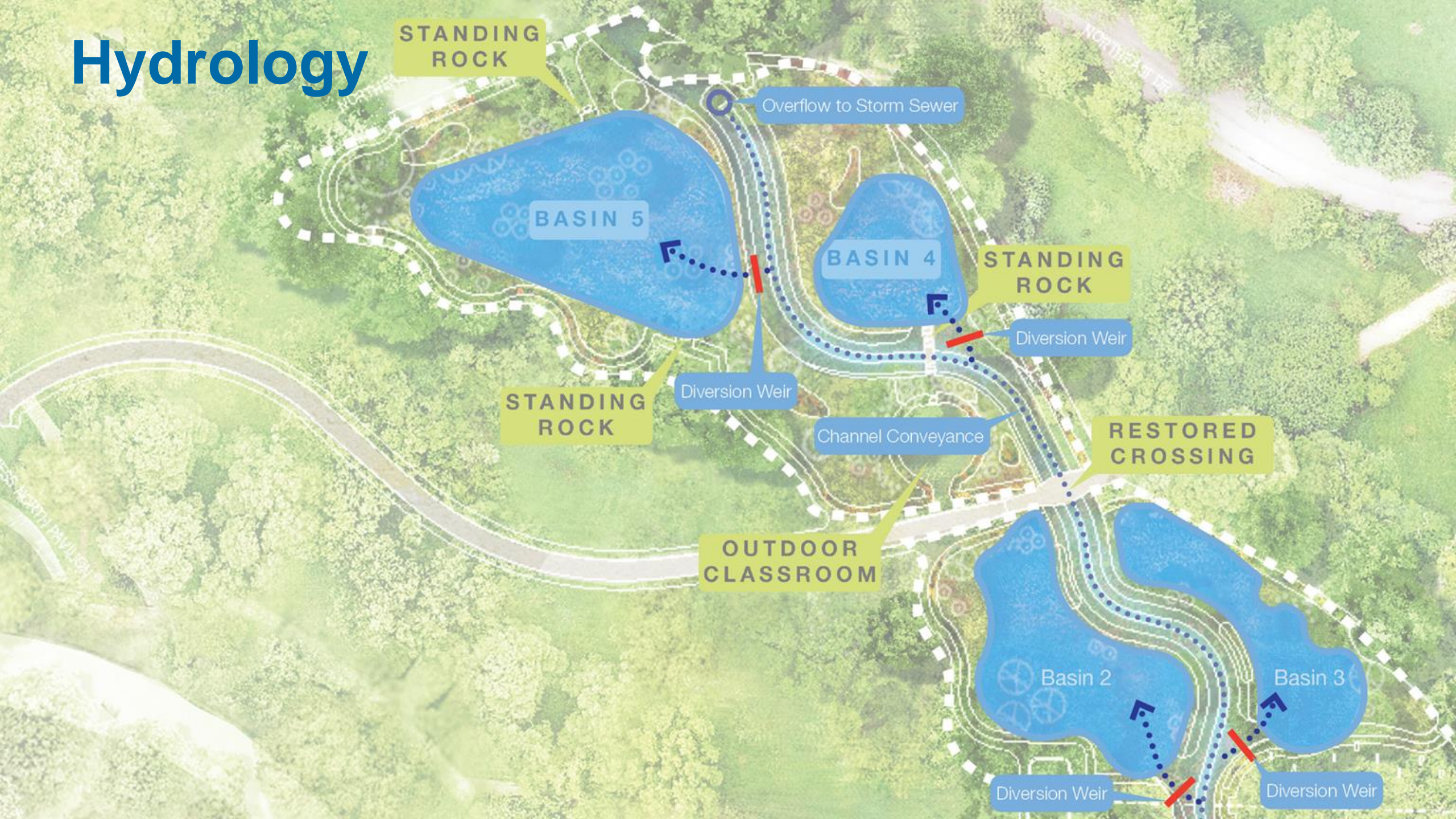


### STREAM SECTION

The typical channel section above has been designed to accommodate a 100 year storm. The slopes and overall profile have been set to create a shallow channel, reminiscent of the prairie streams shown in the adjacent photos. Low velocity flows and the relatively flat nature of the site lend to this stream typology, which fits with the character of the original stream.



# Hydrology







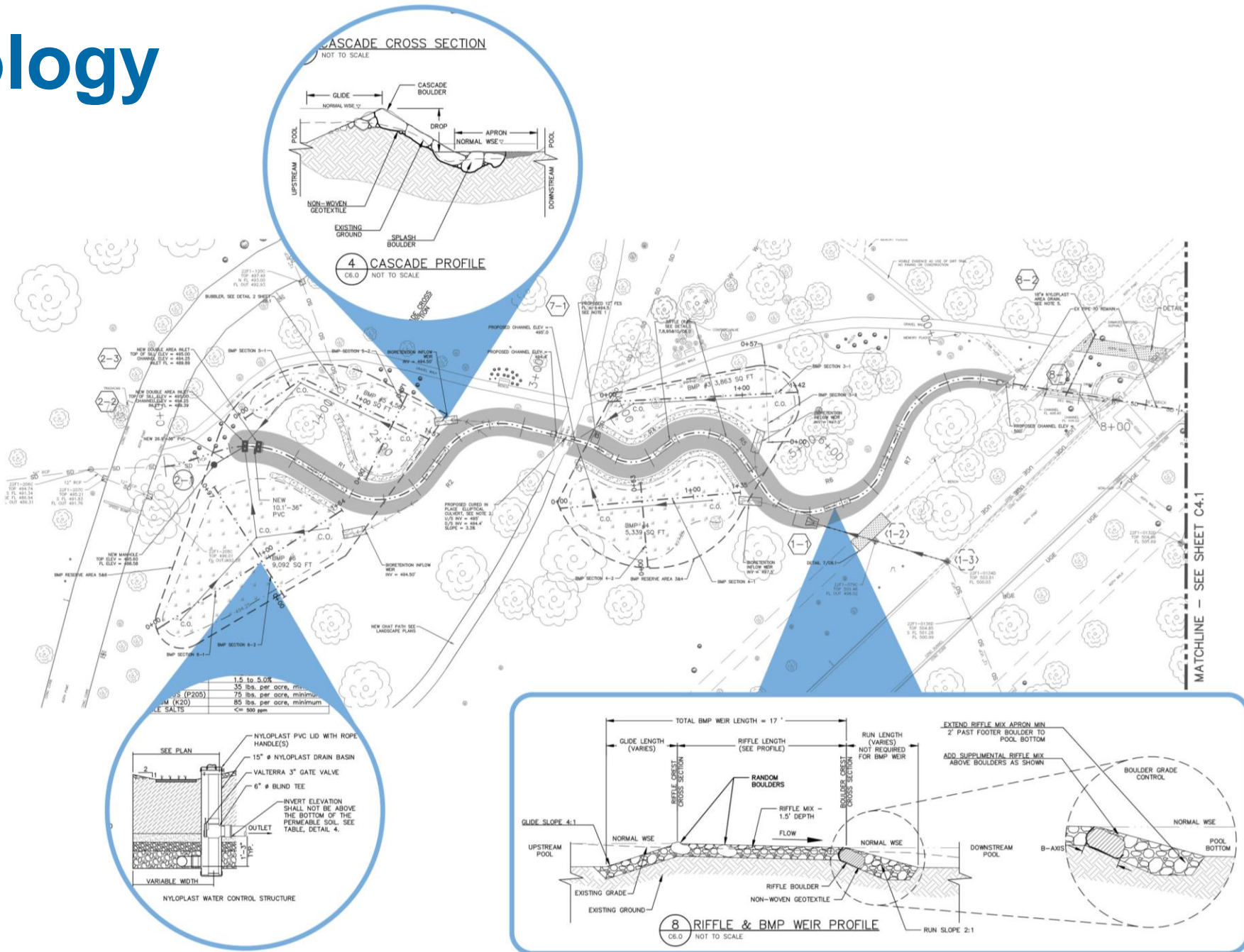






# Hydrology

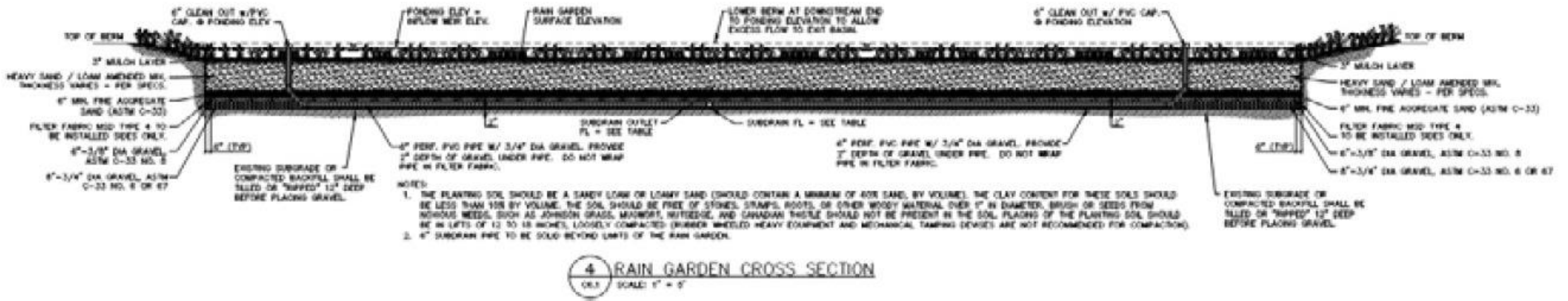
## Stream Details





# Hydrology

## BMP Details





# Hydrology

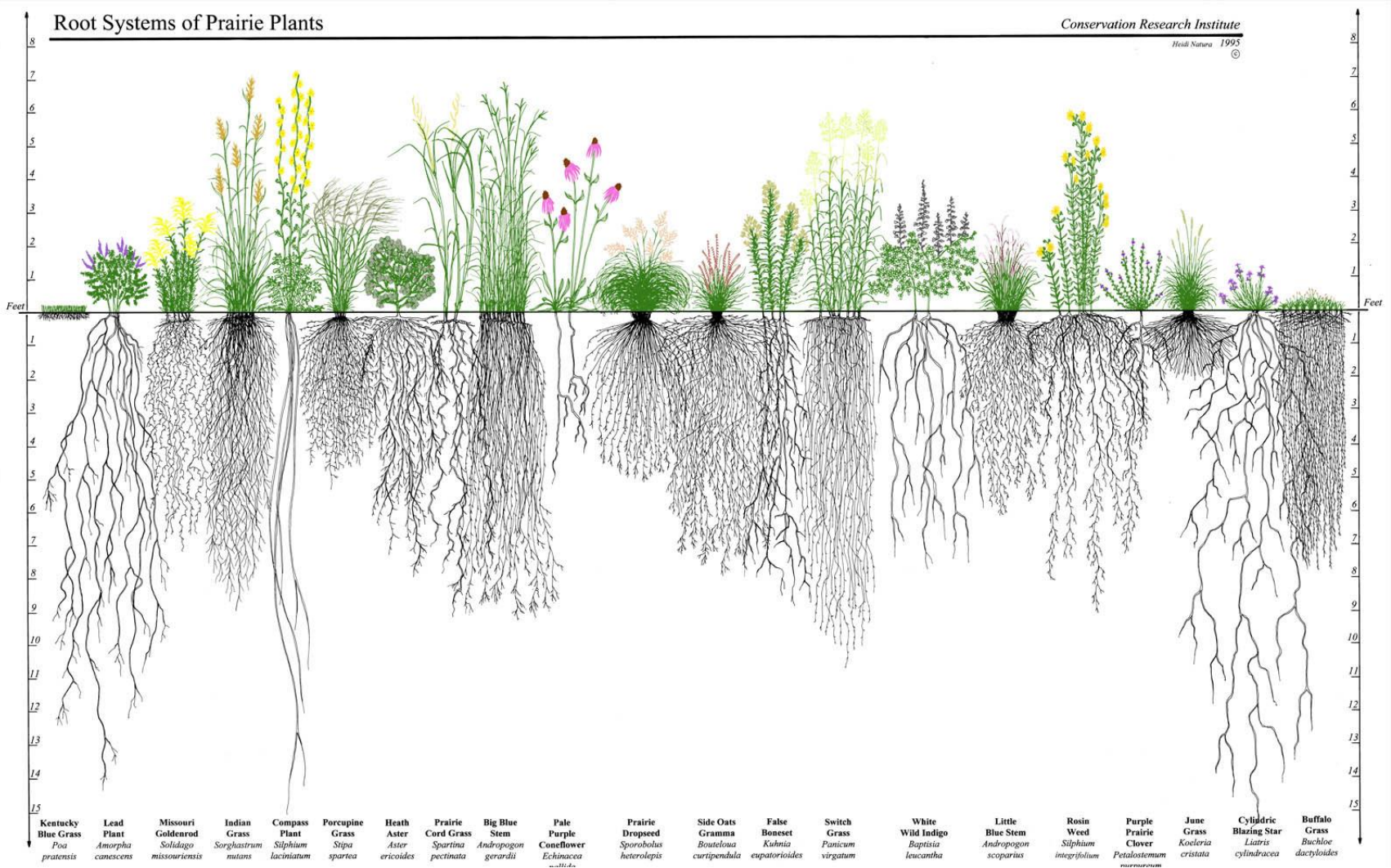
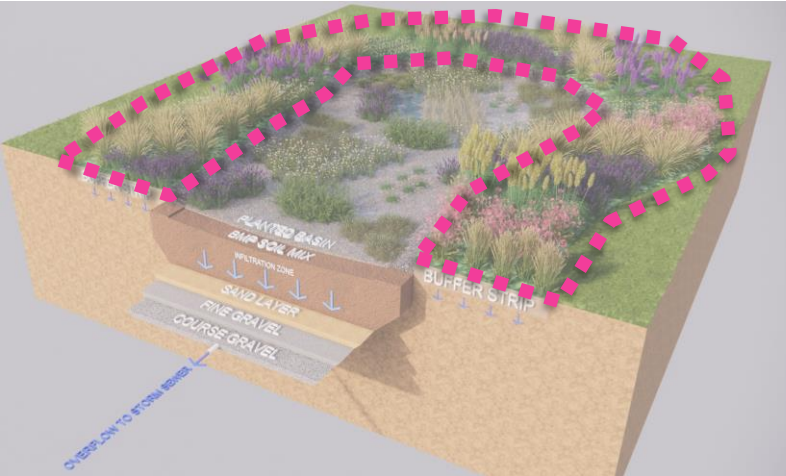
## Rain Gardens





# Hydrology

## Vegetated Buffers





A photograph of a butterfly and a bee on a purple flower spike. The butterfly is on the right, and the bee is on the left. The word "Planting" is overlaid in white text in the center. The background is a dense field of green plants.

# Planting



# Planting Stats



61 TREES



9,216  
PERENNIAL  
PLUGS



137 SHRUBS



1.9 ACRES SEEDED  
WITH NATIVE SEED





# Planting Strategy



- Designing within a historic park
- Ethnobotany/Cultural Significance
  - Trees
  - Shrubs
  - Seed + Plug Mixes
  - Formal Edge Plantings
- Seasonality
- Methodology





# Designing Within A Historic Park



Prior to NPS Review

After NPS Review



# Ethnobotany / Cultural Significance

## OSAGE NATION MOST MEANINGFUL PLANTS

### CERCIS CANADENSIS / REDBUD

- Charcoal from the wood of the redbud is assigned powerful mystic-symbolic properties by the Osage. During the war ceremony a large pile of redbud logs is burned outside each of the two "war lodges" and the charcoal from these fires is collected, crushed, and saved by the warriors. When going into battle this powder is then used to blacken the face, symbolizing "the leaping flames, which show no mercy"



### JUNIPERUS VIRGINIANA / JUNIPER

- The Osage assign certain symbolic and ritual attributes to this tree.



### SALIX SP. / WILLOW

- Osage symbol of immortality



### CAREX LURIDA / SHALLOW SEDGE

- Osage symbol of long life since it remains green throughout the year. Translated as grass that never dies



### RATIBIDA COLUMIFERA / PRAIRIE CONEFLOWER

- The plant is a life symbol for the Peace Gens of the Osage





# Ethnobotany / Cultural Significance

## OSAGE NATION MOST MEANINGFUL PLANTS

### ASIMINA TRILOBA / PAWPAW (ON SITE)

- Inner bark used for making twine. Fruit is sought after.



### MACLURA POMIFERA / OSAGE ORANGE (ON SITE)

- Osage used the wood for building bows



### CORNUS RACEMOSA / GRAY DOGWOOD

- Osage used the stems for making arrows



### RHUS TYPHINA / STAGHORN SUMAC

- Osage use the leaves for smoking in ceremonial contexts



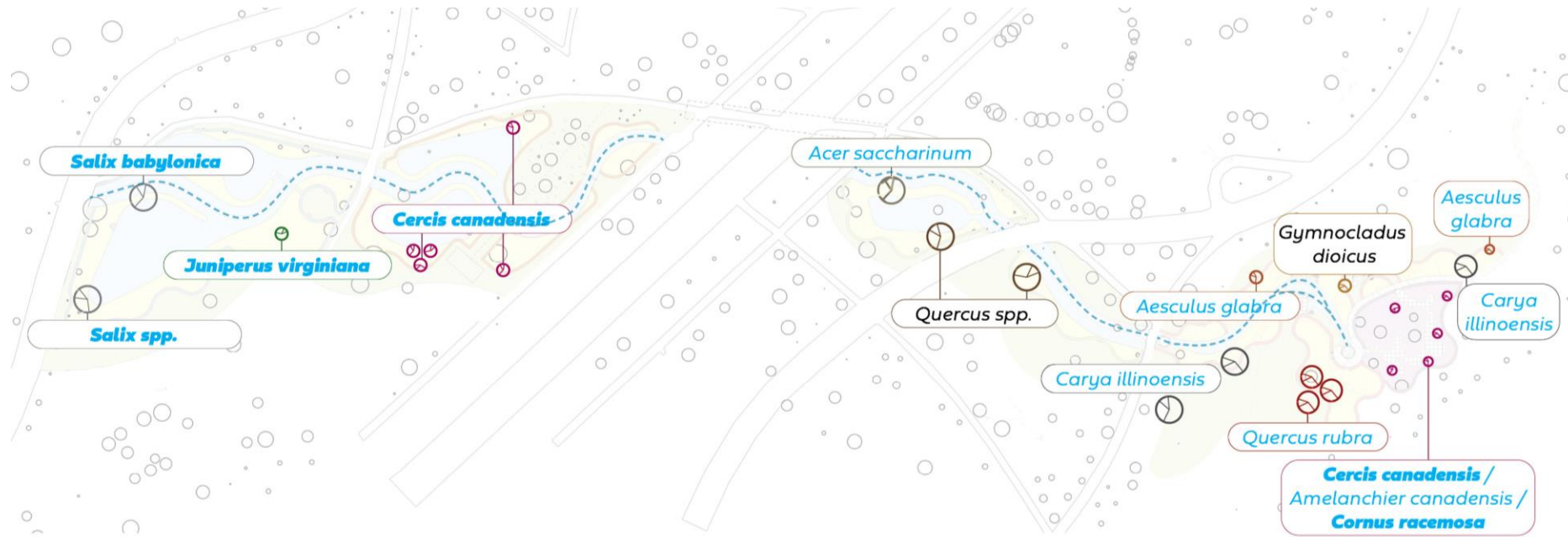
### SAMBUCUS CANADENSIS / ELDERBERRY

- Osage use stalks for pipestems of sacred pipes, children make popguns from stalks





# Trees



*Juniperus virginiana*

*Acer saccharinum*

*Quercus rubra*

*Aesculus glabra*

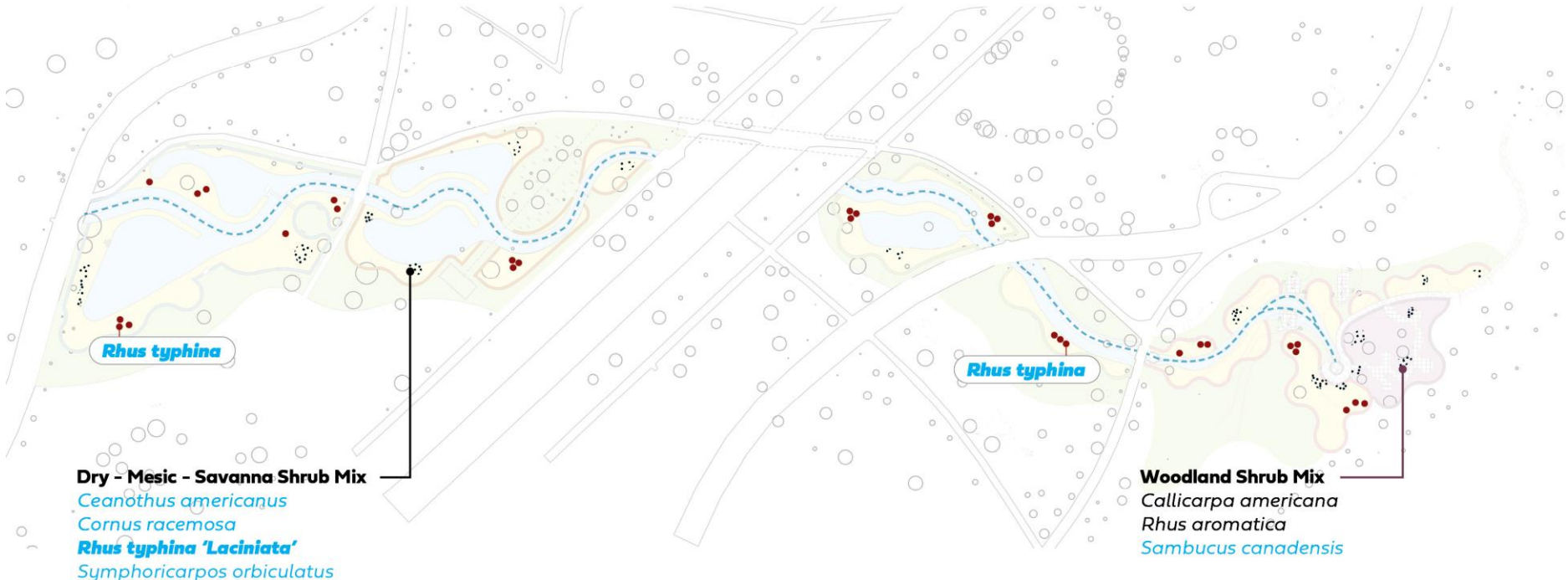
*Carya illinoensis*

*Cornus racemosa*





# Shrubs



*Rhus typhina*



*Rhus typhina*



*Ceanothus americanus*

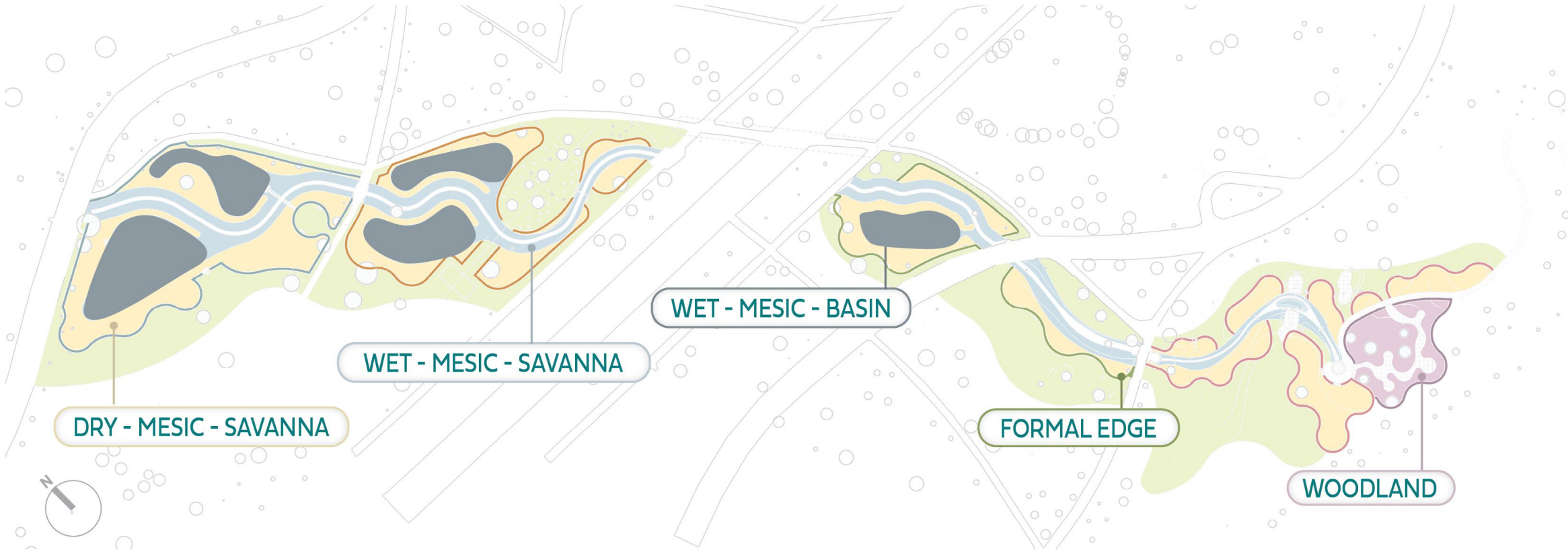


*Callicarpa americana*





# Seed + Plug Plant Communities





# Dry-Mesic Savanna Seed Mix



*Bouteloua curtipendula*  
*Carex* Sp.  
*Elymus canadensis*  
*Elymus hystrix*  
*Elymus virginicus*  
*Schizachyrium scoparium*  
*Achillea millefolium*  
*Asclepias tuberosa*  
*Aster oblongifolium*  
*Baptisia australis*

*Baptisia leucantha*  
*Boltonia asteroides*  
*Coreopsis lanceolata*  
*Coreopsis tinctoria*  
*Dalea purpurea*  
*Echinacea pallida*  
*Eryngium yuccifolium*

*Liatris aspera*  
*Liatris pycnostachya*  
*Monarda fistulosa*  
*Penstemon digitalis*  
*Ratibida columnifera*  
*Rudbeckia hirta*  
*Rudbeckia subtomentosa*  
*Rudbeckia triloba*

*Silphium laciniatum*  
*Solidago nemoralis*  
*Symphyotrichum drummondii*  
*Symphyotrichum laeve*  
*Vernonia baldwinii*



*Schizachyrium scoparium*



*Baptisia leucantha*



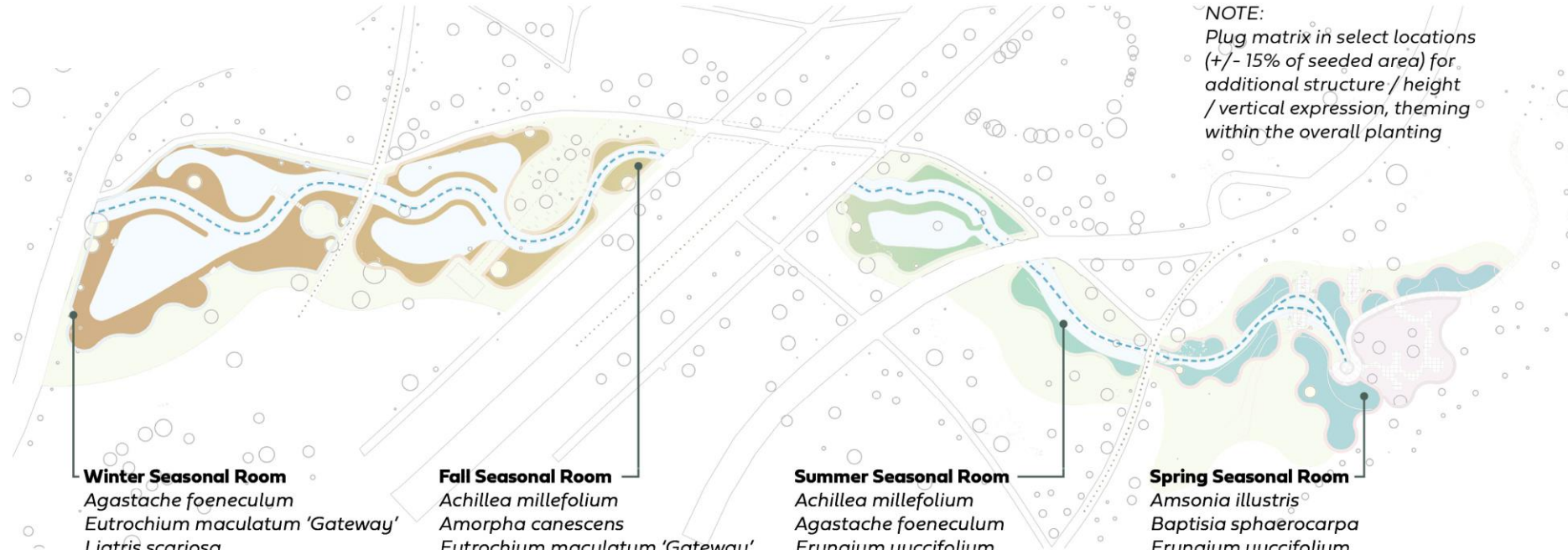
*Parthenium integrifolium*



*Silphium laciniatum*



# Dry-Mesic Savanna Plug Mix



## Winter Seasonal Room

- Agastache foeniculum*
- Eutrochium maculatum* 'Gateway'
- Liatris scariosa*
- subsp. *arundinacea* 'Skyracer'
- Molinia litoralis* 'Transparent'
- Rudbeckia maxima*
- Scutellaria incana*
- Veronicastrum virginicum*

## Fall Seasonal Room

- Achillea millefolium*
- Amorpha canescens*
- Eutrochium maculatum* 'Gateway'
- Liatris scariosa*
- subsp. *arundinacea* 'Skyracer'
- Molinia litoralis* 'Transparent'
- Silphium laciniatum*
- Veronicastrum virginicum*

## Summer Seasonal Room

- Achillea millefolium*
- Agastache foeniculum*
- Eryngium yuccifolium*
- Eutrochium maculatum* 'Gateway'
- subsp. *arundinacea* 'Skyracer'
- Molinia litoralis* 'Transparent'
- Silphium perfoliatum*
- Veronicastrum virginicum*

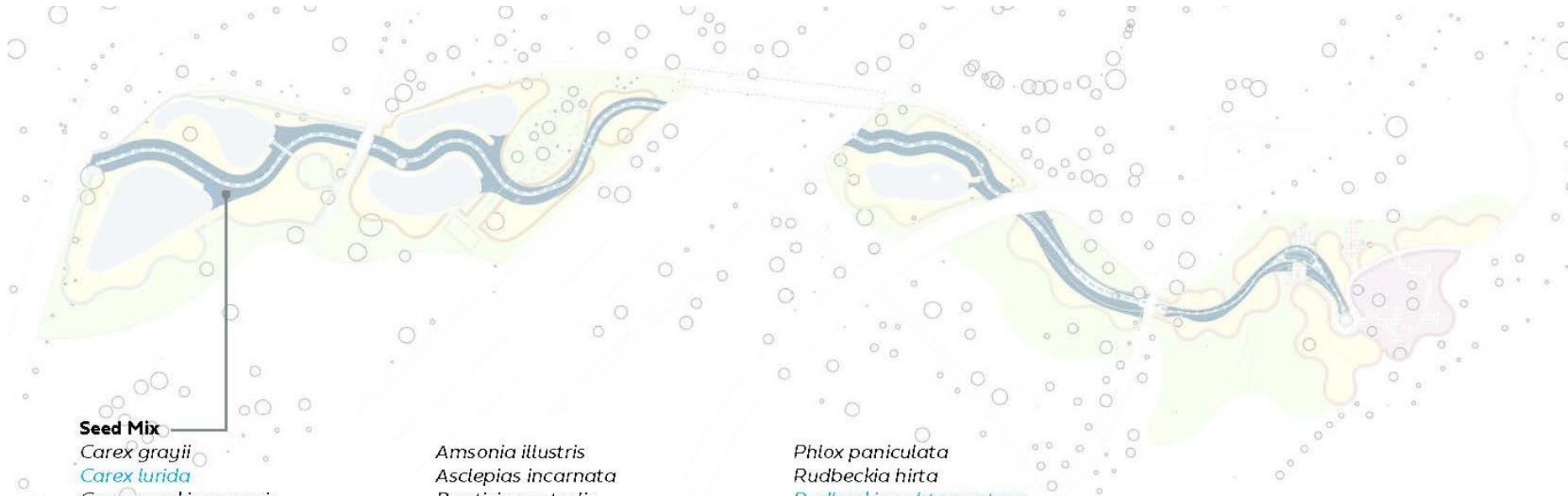
## Spring Seasonal Room

- Amsonia illustris*
- Baptisia sphaerocarpa*
- Eryngium yuccifolium*
- Eutrochium maculatum* 'Gateway'
- subsp. *arundinacea* 'Skyracer'
- Molinia litoralis* 'Transparent'
- Rudbeckia maxima*
- Scutellaria incana*
- Veronicastrum virginicum*





# West-Mesic Savanna Seed Mix



## Seed Mix

*Carex grayii*  
*Carex lurida*  
*Carex muskinumensis*  
*Carex vulpinoidea*  
*Elymus hystrix*  
*Elymus virginicus*  
*Panicum virgatum*  
*Schizachyrium scoparium*

*Amsonia illustris*  
*Asclepias incarnata*  
*Baptisia australis*  
*Chelone glabra*  
*Echinacea purpurea*  
*Eupatorium maculatum*  
*Heliopsis helianthoides*  
*Penstemon digitalis*

*Phlox paniculata*  
*Rudbeckia hirta*  
*Rudbeckia subtomentosa*  
*Rudbeckia triloba*  
*Symphyotrichum drummondii*  
*Symphyotrichum novae-angliae*  
*Veronicastrum virginicum*  
*Zizia aurea*



*Schizachyrium scoparium*



*Amsonia illustris*



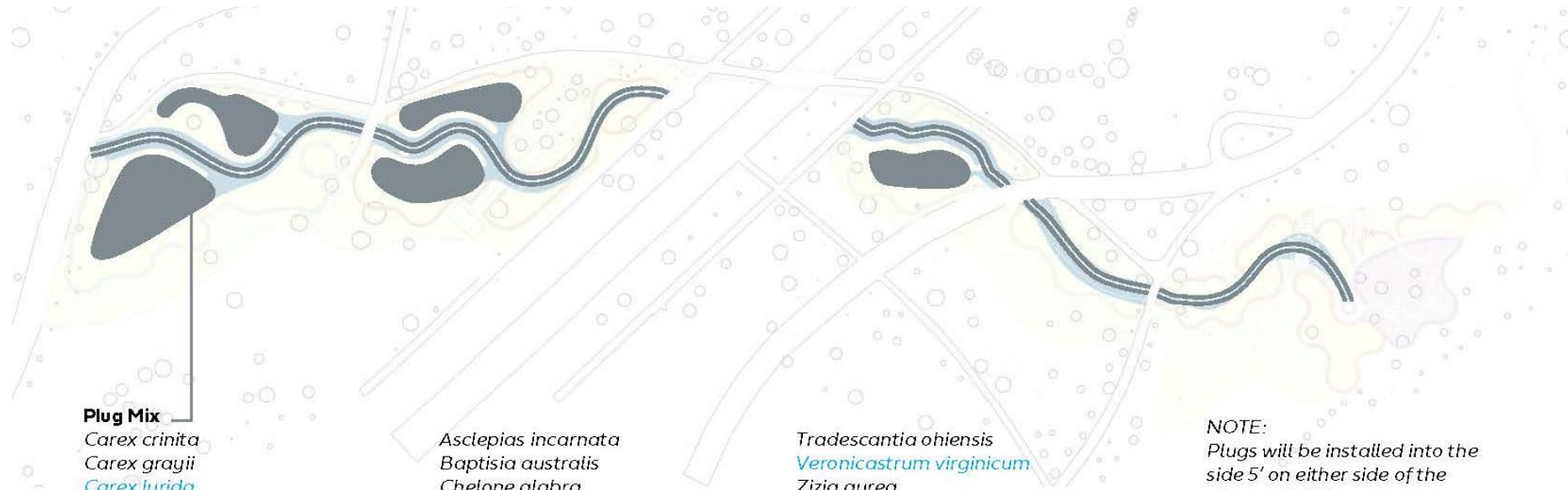
*Veronicastrum virginicum*



*Echinacea purpurea*



# West-Mesic Savanna Plug Mix



## Plug Mix

*Carex crinita*  
*Carex grayii*  
*Carex lurida*  
*Carex muskinumensis*  
*Carex vulpinoidea*  
*Juncus effusus*  
*Scirpus spp.*  
*Amsonia illustris*

*Asclepias incarnata*  
*Baptisia australis*  
*Chelone glabra*  
*Eupatorium maculatum*  
*Iris virginica* var. *shrevei*  
*Monarda fistulosa*  
*Pycnanthemum tenuifolium*  
*Symphotrichum novae-angliae*

*Tradescantia ohiensis*  
*Veronicastrum virginicum*  
*Zizia aurea*

NOTE:  
Plugs will be installed into the  
side 5' on either side of the  
stream at 36" o.c.



*Carex lurida*



*Juncus effusus*



*Iris virginica*



*Monarda fistulosa*



# Mesic Woodland Savanna Seed + Plug Mix



**Seed Mix**

- Carex albicans*
- Carex grayii*
- Carex pensylvanica*
- Carex vulpinoidea*
- Chasmanthium latifolium*
- Diarrhena americana*
- Aquilegia canadensis*
- Aruncus dioicus*

- Echinacea purpurea*
- Eupatorium maculatum*
- Eupatorium perfoliatum*
- Geranium maculatum*
- Maianthemum racemosum*
- Phlox divaricata*
- Phlox paniculata*
- Podophyllum peltatum*

- Polygonatum odoratum*
- Scutellaria incana*
- Senecio obovatus*
- Symphyotrichum laeve*
- Symphyotrichum oolentangiense*
- Tradescantia ohiensis*
- Zizia aurea*

**Plug Mix**

- Actaea 'Brunette'*
- Phlox paniculata*
- Eutrochium fistulosum*
- Veronicastrum virginicum*
- Aralia racemosa*
- Mertensia virginica*



*Carex vulpinoidea*



*Echinacea purpurea*



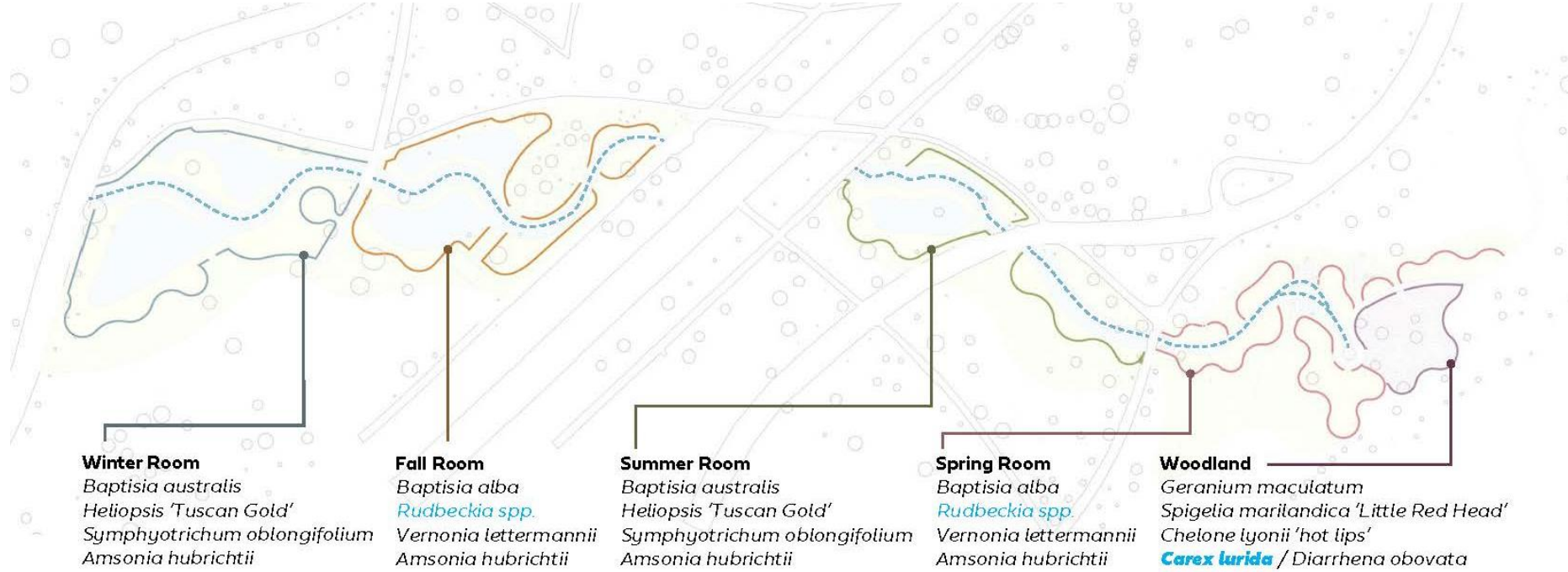
*Zizia aurea*



*Actaea 'Brunette'*



# Formal Edge Plantings



*Rudbeckia spp.*



*Chelone lyonii*



*Baptisia australis*



*Amsonia hubrichtii*



*Geranium maculatum*



*Baptisia alba*



*Vernonia lettermannii*





# Seasonality - Spring

## SPRING (APRIL 21-JUNE 21)

- The Osage year began in April/May
- Clearing fields and planting crops along river/creek by permanent villages
- Fields were tended (horticulture) only until plants had grown large enough not be choked out by weeds.
- In June, after plants established, prep began for summer bison hunt

REBIRTH / RENEWAL / HOPE / PLAYFUL / BLOSSOM / WATER SOURCE / HEART / MAGIC / MUSIC / SONG / 3 STONES / 3 RED OAK

BRIGHT GREEN / PINK / PURPLE / WHITE / YELLOW





# Seasonality - Summer

## SUMMER (JUNE 21-SEPTEMBER 21)

- Summer hunts were planned by all village chiefs - 3 main hunting areas.
- When leaving for hunt, houses stripped of coverings and valuable items secretly buried (kettles, axes, furs).
- Elderly, women and child remained in village.
- August, return to village to harvest crops and prep for fall hunt.
- Crops dried and stored in family caches in woods to hide from enemy raiders.

YOUTH / GROWTH / FREEDOM / VIGOR / ROMANCE / POTENTIAL / HARVEST

GREEN / PINK / PURPLE / WHITE / YELLOW



SUMMER



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# Seasonality - Fall

FALL (SEPTEMBER 21-DECEMBER 21)

- Fall hunts were planned by all village chiefs - 3 main hunting areas.
- September, left on fall bison hunt. Major objectives to secure hides for robes.

ADULTHOOD / MATURITY / MORTALITY / HARVEST / RIPENESS / ABUNDANCE / PROSPERITY / WEALTH / CHANGE / PREPARATION

ORANGE / REDS / YELLOWS / PURPLE





# Seasonality - Winter

WINTER (DECEMBER 21-APRIL 21)

- Returned to village in december and remain there until Feb/March when most families moved to small hunting camps for deer, bear, beaver, otter whose pelts were sought by european traders.
- In April they retruned to the village to plant crops and begin the cycle anew.

OLD AGE / DEATH / CONTEMPLATION / QUIET / RETREAT / RECONNECT

GRAY / WHITE / BROWN / BLUE





# Methodology– Perennial Plugs





# Methodology– Perennial Plugs





# Methodology – Native Plantings



- Seeds were harvested in June 2021 by the park and design staff from the Shaw Nature Reserve
- Park staff continue to monitor growth rates and plant health since installation







# Funding



# Initial Budget

Tower Green East Street Restoration Division		Pull Scope		Reduced Scope		11-10-20 BD		0-1-21 99% CD		2-10-21 CD		Notes
		\$2 Million	\$1.5-2.0 BD	\$1.0-1.5 BD	\$0.5-1.0 BD	\$0.2-0.5 BD	\$0.1-0.2 99% CD	\$0.05-0.1 99% CD	\$0.02-0.05 99% CD	\$0.01-0.02 99% CD		
PROGRAM BUDGET CHECKLIST		Budget	Estimate Update	Estimate Update	Estimate Update	Estimate Update	Estimate Update	Estimate Update	Estimate Update	Estimate Update		
<b>A. Construction Contracts</b>												
1. General Contractor - Construction	\$	1,145,000										
A. Mobilization, Office, Site Setup	\$	262,800	262,800	262,800	262,800	254,175	254,175	254,175	254,175	254,175		
B. Handicap	\$	198,600	198,600	198,600	198,600	191,440	191,440	191,440	191,440	191,440		Includes \$10k for animal cages. Reduce site lighting from scope.
C. Planting (94 including Screens & Bionectaria)	\$	144,217	144,217	144,217	144,217	250,389	250,389	325,000	325,000	325,000		
D. Screen Channel Daylighting & Plant Material	\$	153,250	153,250	153,250	153,250	130,250	130,250	130,250	130,250	130,250		
E. Screenstone Areas	\$	500,993	500,993	500,993	500,993	836,285	836,285	864,110	864,110	862,911		
F. Screen Crossings	\$	150,000	150,000	150,000	150,000	15,000	15,000	-	-	-		Assumes 10% of scope required.
G. Culvert A	\$	300,000	300,000	300,000	300,000	30,000	30,000	-	-	-		Assumes 10% of scope required.
H. Culvert B	\$	300,000	300,000	300,000	300,000	30,000	30,000	-	-	-		Assumes 10% of scope required.
I. Culvert C	\$	120,000	120,000	120,000	120,000	12,000	12,000	-	-	-		Assumes 10% of scope required.
J. Culvert D	\$	100,000	100,000	100,000	100,000	10,000	10,000	-	-	-		Assumes 10% of scope required.
K. Tree Crossing	\$	20,000	20,000	20,000	20,000	-	-	-	-	-		
L. Stone Channel Restoration	\$	30,000	30,000	30,000	30,000	-	-	-	-	-		
M. General Contractor General Conditions	8.0%	94,800	101,429	109,049	109,049	149,125	149,125	179,210	179,210	176,439		
16. General Contractor Fee	6.0%	78,780	130,717	130,717	130,717	86,244	129,791	141,100	141,100	142,016		
17. GC P&P Bond	1.0%	13,560	23,160	15,000	15,000	21,340	21,340	25,611	25,611	25,249		
18. GC Insurance	2.0%	27,420	46,842	46,842	46,842	31,238	43,166	51,615	51,615	51,002		
19. Design/Construction Contingency	10.0%	114,500	237,981	160,791	160,791	219,842	219,842	264,258	264,258	266,110		
Sub-Total	\$	2,818,687	2,817,790	2,768,700	2,768,700	2,418,243	2,418,243	2,506,818	2,506,818	2,461,206		
<b>B. Special Construction</b>												
1. Site Abatement	\$	-	-	-	-	-	-	-	-	-		
2. Site Prep	\$	10,000	-	-	-	-	-	-	-	-		Per LJC, no DMR permit required.
3. DMR Permit	\$	-	-	-	-	-	-	-	-	-		Included with A.12 Construction Cost
4. Builder's Risk Insurance	\$	-	-	-	-	-	-	-	-	-		\$10,000 Subcontractor and Bonded Sides
5. Exterior Signage/Special Signage	\$	10,000	10,000	-	-	-	-	-	-	-		~\$1.10
6. Field Building/User of Space	\$	20,000	20,000	-	-	-	-	47,000	47,000	47,000		Placeholder Budget
Sub-Total	\$	30,000	30,000	-	-	-	-	47,000	47,000	47,000		
<b>C. Furnitures &amp; Fixtures</b>												
1. Site Furnishings	\$	-	-	-	-	-	-	-	-	-		
2. Physical Fitness Equipment	\$	-	-	-	-	-	-	-	-	-		
3. Non-Permanent Appliances	\$	-	-	-	-	-	-	-	-	-		
Sub-Total	\$	-	-	-	-	-	-	-	-	-		
<b>D. Professional Services</b>												
1. Site Analysis (Phase I, Phase II, etc.)	\$	-	-	-	-	-	-	-	-	-		
2. Environmental Consultants	\$	-	-	-	-	-	-	-	-	-		
3. Survey	\$	25,270	25,270	25,270	25,270	25,270	25,270	25,270	25,270	25,270		Cost Survey by ARMA
4. Geotechnical	\$	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000		Permitting testing only.
5. Civil Engineering	\$	-	-	-	-	-	-	-	-	-		
6. Programming	\$	-	-	-	-	-	-	-	-	-		
7. Project Manager / Owner Rep	\$	99,903	99,903	99,903	99,903	99,903	99,903	99,903	99,903	99,903		
7A. Initial PM Services	\$	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300	3,300		LJC & EMA fees
7B. Architectural Design Fees (LJ/ChE)	\$	197,097	192,900	192,900	192,900	192,900	192,900	192,900	192,900	192,900		Subcontractors & Vendor fees
8A. Hydrology/Cultural Engagement	\$	68,110	68,110	68,110	68,110	68,110	68,110	68,110	68,110	68,110		
8B. Cultural Resources Survey	\$	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000		
8A. Feasibility Study	\$	17,424	17,424	17,424	17,424	17,424	17,424	17,424	17,424	17,424		DMV feasibility study
9. Materials Testing	\$	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000		
10. Utility Locates	\$	5,753	5,753	5,753	5,753	5,753	5,753	5,753	5,753	5,753		Budget and GPS
Sub-Total	\$	343,483	428,947	436,710	436,710	436,710	436,710	436,710	436,710	436,710		
<b>E. Technology</b>												
1. Phone/Headsets/Service	\$	-	-	-	-	-	-	-	-	-		
2. Computer	\$	-	-	-	-	-	-	-	-	-		
3. Filter Opex	\$	-	-	-	-	-	-	-	-	-		
4. Data Systems / Communication Wiring	\$	-	-	-	-	-	-	-	-	-		
5. Security Cameras	\$	-	-	-	-	-	-	-	-	-		
6. Perimeter Entry	\$	-	-	-	-	-	-	-	-	-		
7. Alert System	\$	-	-	-	-	-	-	-	-	-		
8. Audio Visual	\$	-	-	-	-	-	-	-	-	-		
9. Radio / Dispatch	\$	-	-	-	-	-	-	-	-	-		
10. Remote Data Communication Links	\$	-	-	-	-	-	-	-	-	-		
Sub-Total	\$	-	-	-	-	-	-	-	-	-		
<b>F. Land Acquisition</b>												
1. Primary Building Site Acquisition	\$	-	-	-	-	-	-	-	-	-		
2. Secondary Site Acquisition	\$	-	-	-	-	-	-	-	-	-		
Sub-Total	\$	-	-	-	-	-	-	-	-	-		
<b>G. Financing</b>												
1. Bond Council/Issuance Costs	\$	-	-	-	-	-	-	-	-	-		
2. Legal Council	\$	-	-	-	-	-	-	-	-	-		
3. Bond Sale/Advertisement	\$	-	-	-	-	-	-	-	-	-		
Sub-Total	\$	-	-	-	-	-	-	-	-	-		
<b>H. Miscellaneous Costs</b>												
1. Bid Document Advertisement	\$	-	-	-	-	-	-	-	-	-		
2. Construction Document Printing	\$	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500		
3. Meeting expense	\$	-	-	-	-	-	-	-	-	-		
4. Site	\$	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		TOP park board expenses/reimbursables
Sub-Total	\$	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500		
Sub-Total of A - H	\$	3,903,042	3,070,247	2,906,910	2,906,910	2,854,473	2,854,473	3,412,048	3,412,048	3,266,416		
Owner Contingency	5.0%	95,152	133,512	133,512	133,512	142,620	142,620	-	-	-		
<b>OWNER'S PROGRAM BUDGET</b>	\$	3,998,194	3,203,759	3,040,422	3,040,422	2,997,093	2,997,093	3,412,048	3,412,048	3,266,416		
<b>BUDGET</b>	\$	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000		
<b>OVER/(UNDER)</b>	\$	(1,801,806)	1,203,759	1,040,422	1,040,422	997,093	997,093	1,412,048	1,412,048	1,266,416		
<b>POTENTIAL MSD REIMBURSEMENT</b>	\$	273,600	628,993	628,993	628,993	919,813	919,813	1,201,000	1,201,000	1,512,107		

– Initial Total Program Budget \$2,000,000  
MSD Eligible Reimbursement of \$273,600



# Cost Monitoring – Eligibility



- Design team estimated an established eligible stormwater reimbursable scope items and breakouts
  - Hardscapes, plantings, channel daylighting, BMPs
- MSD approved eligible items and maximum reimbursement through application process
- Going into construction, MSDs commitment was **\$1,655,102!**





# Project Reimbursement



	Initial Budgets	Final Costs	
Total Project Budget	\$2,000,000	\$2,618,716	+\$618,716
Eligible MSD Reimbursement	\$273,600	\$1,425,484	+\$1,151,844

- Reimbursement able to fund the eligible construction expenses as well as design and foregone TGP project expenses
- TGP now able to fund additional projects with over \$800k in savings from original budget



An aerial photograph of a well-maintained landscape. A stone-lined stream flows through the center-left, surrounded by dense green vegetation and yellow wildflowers. A large, mature tree with a thick trunk stands on the right side, casting a shadow on the grass. A path leads from the foreground towards the background, passing through a grassy area with several other trees. The word "Design" is overlaid in white, bold, sans-serif font in the center of the image.

Design



# Site Plan



BASIN

Connection to Cypress Pavilion

MIDDLE REACH

HEADWATERS

Stupp Center

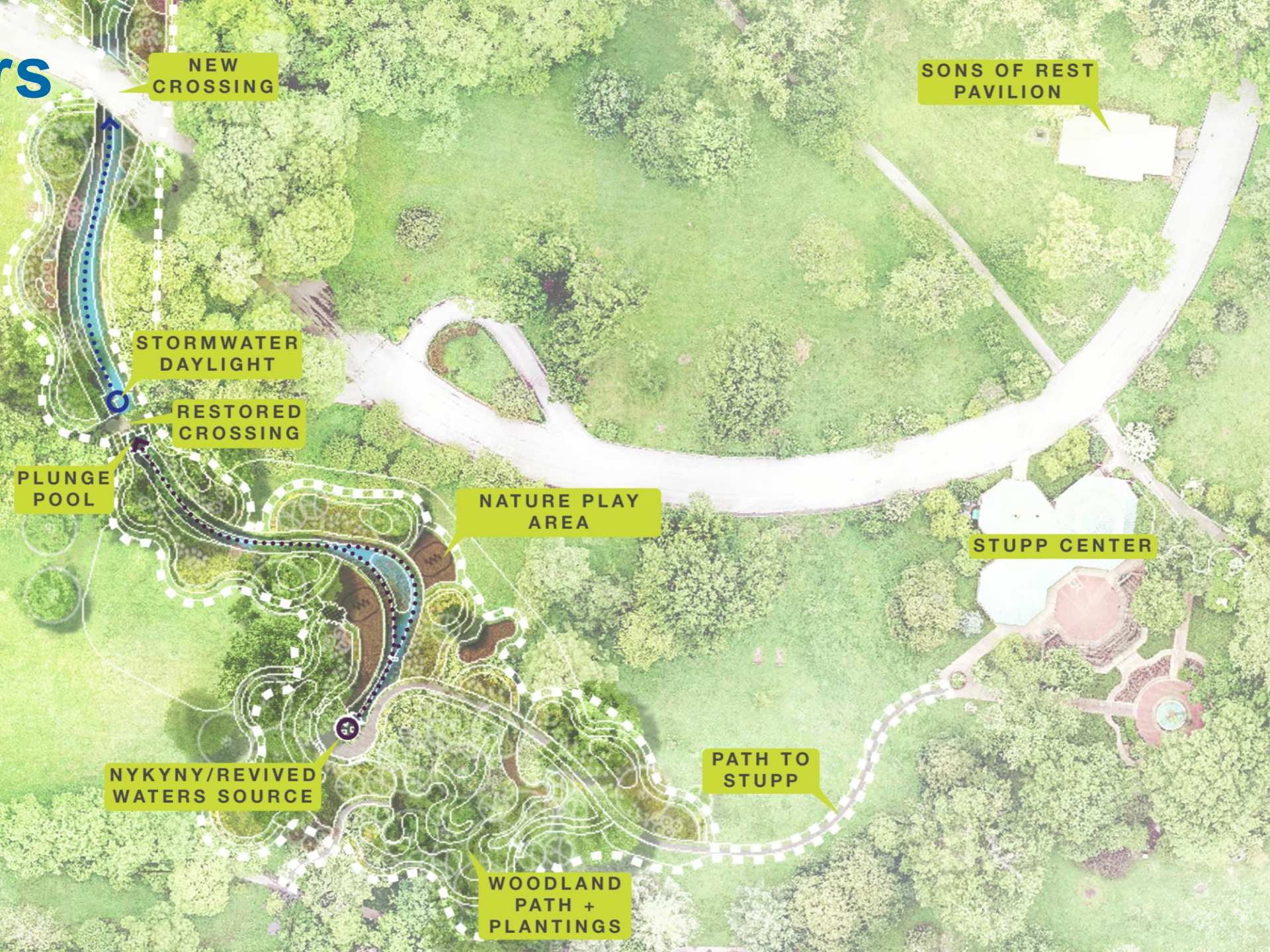
Connection to Stupp Center

- 1. Sitting Rock Overlook
- 2. Stream Crossing / Observation Rock
- 3. Informal Seating with Limestone Block Benches
- 4. Osage Village Layout with Salvaged Granite Markers
- 5. Scaled Osage Lodge Exhibit
- 6. Stream Steppers
- 7. Restored Stream Crossing
- 8. Plunge Pool
- 9. Red Oak Grove
- 10. Prairie Pocket
- 11. Low Water Crossing
- 12. Headwaters Gateway
- 13. Woodland Path
- 14. NYKYNY / Revived Headwater Source





# Headwaters



NEW  
CROSSING

SONS OF REST  
PAVILION

STORMWATER  
DAYLIGHT

RESTORED  
CROSSING

PLUNGE  
POOL

NATURE PLAY  
AREA

STUPP CENTER

NYKONY/REVIVED  
WATERS SOURCE

PATH TO  
STUPP

WOODLAND  
PATH +  
PLANTINGS



# Headwaters





# Headwaters





# Headwaters





# Headwaters





# Headwaters





# Headwaters





# Middle Reach

OSAGE LODGE

BASIN 2

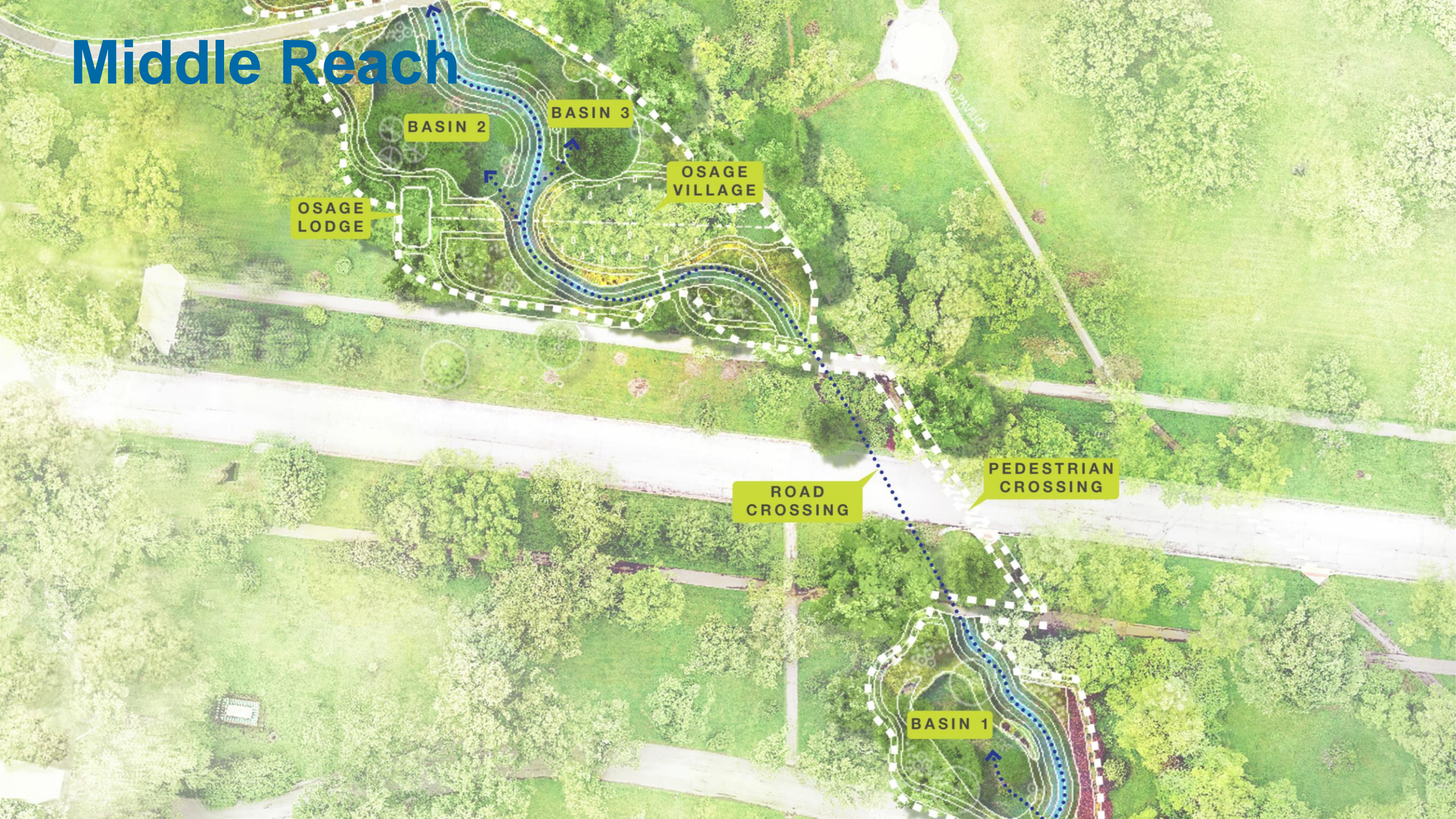
BASIN 3

OSAGE VILLAGE

ROAD CROSSING

PEDESTRIAN CROSSING

BASIN 1





# Middle Reach





# Middle Reach



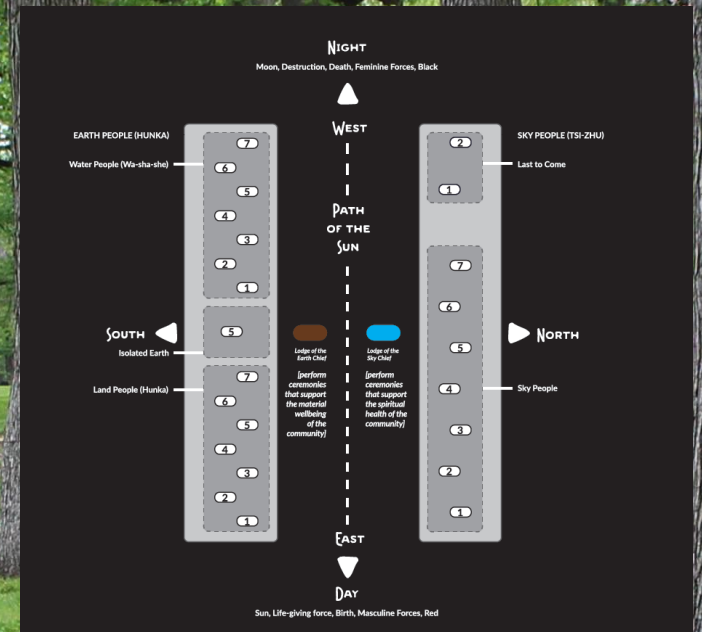


# Middle Reach – Osage Village



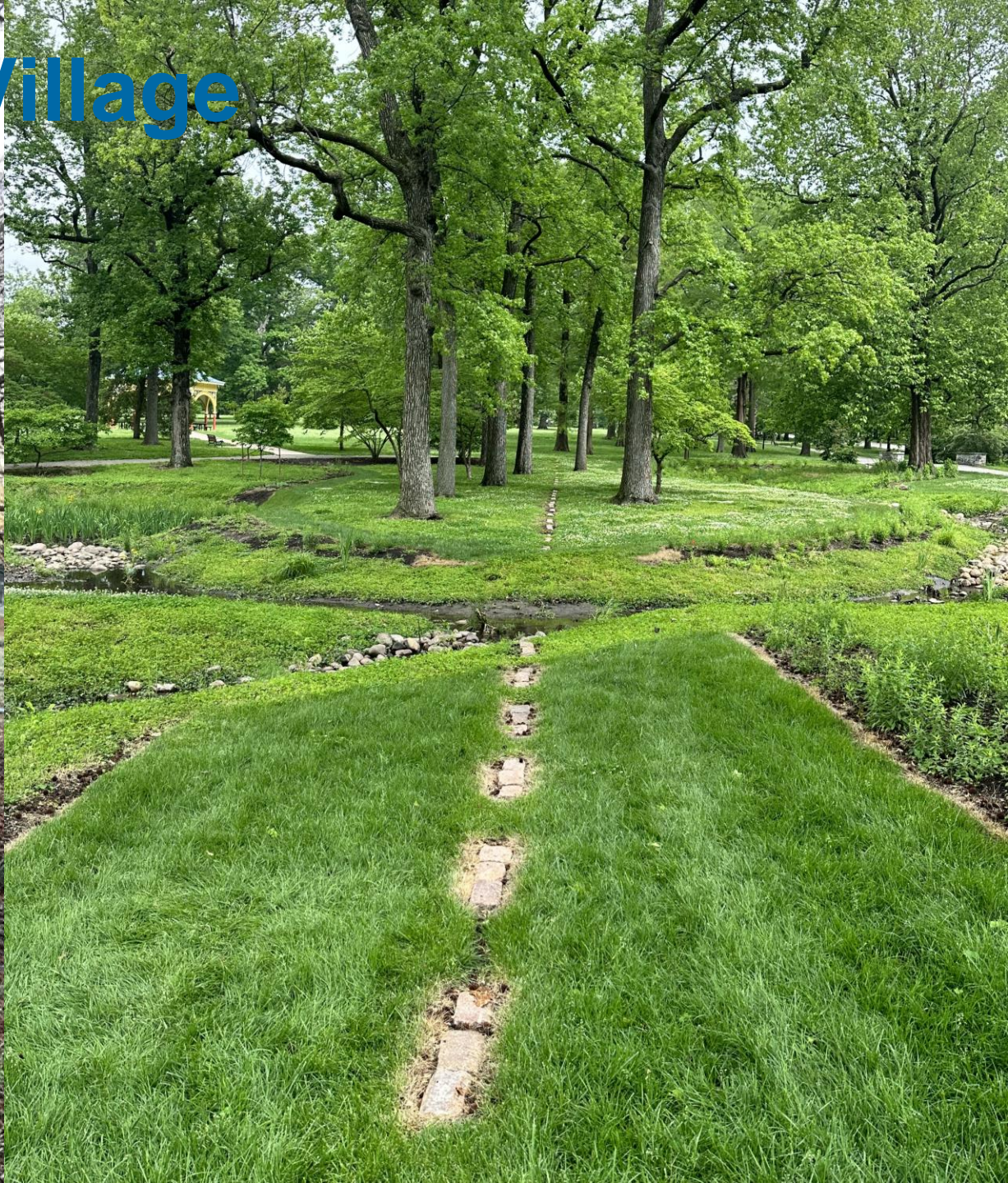


# Middle Reach – Osage Village



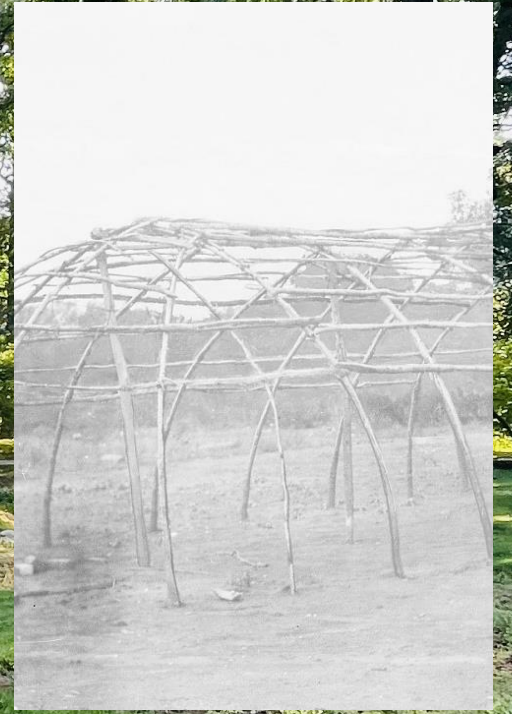


# Middle Reach – Osage Village





# Middle Reach – Osage Village





# Middle Reach





# Middle Reach





# Basin



STANDING  
ROCK

BASIN 5

BASIN 4

STANDING  
ROCK

STANDING  
ROCK

RESTORED  
CROSSING

OUTDOOR  
CLASSROOM

Basin 2

Basin 3



# Basin





# Basin





Basin



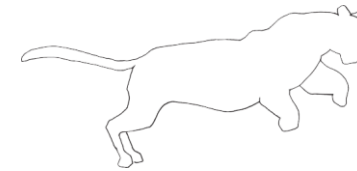
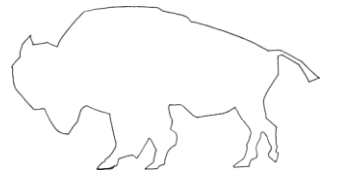
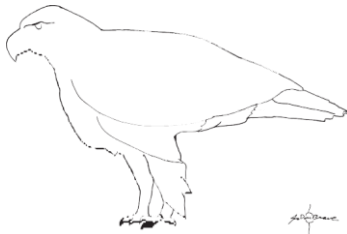
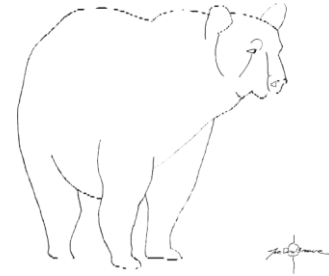
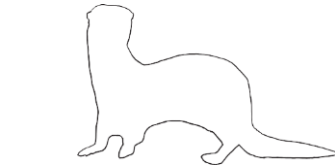
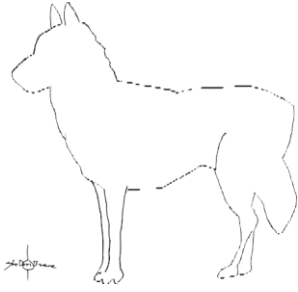


Basin





# Nee Kee Nee: Revived Water

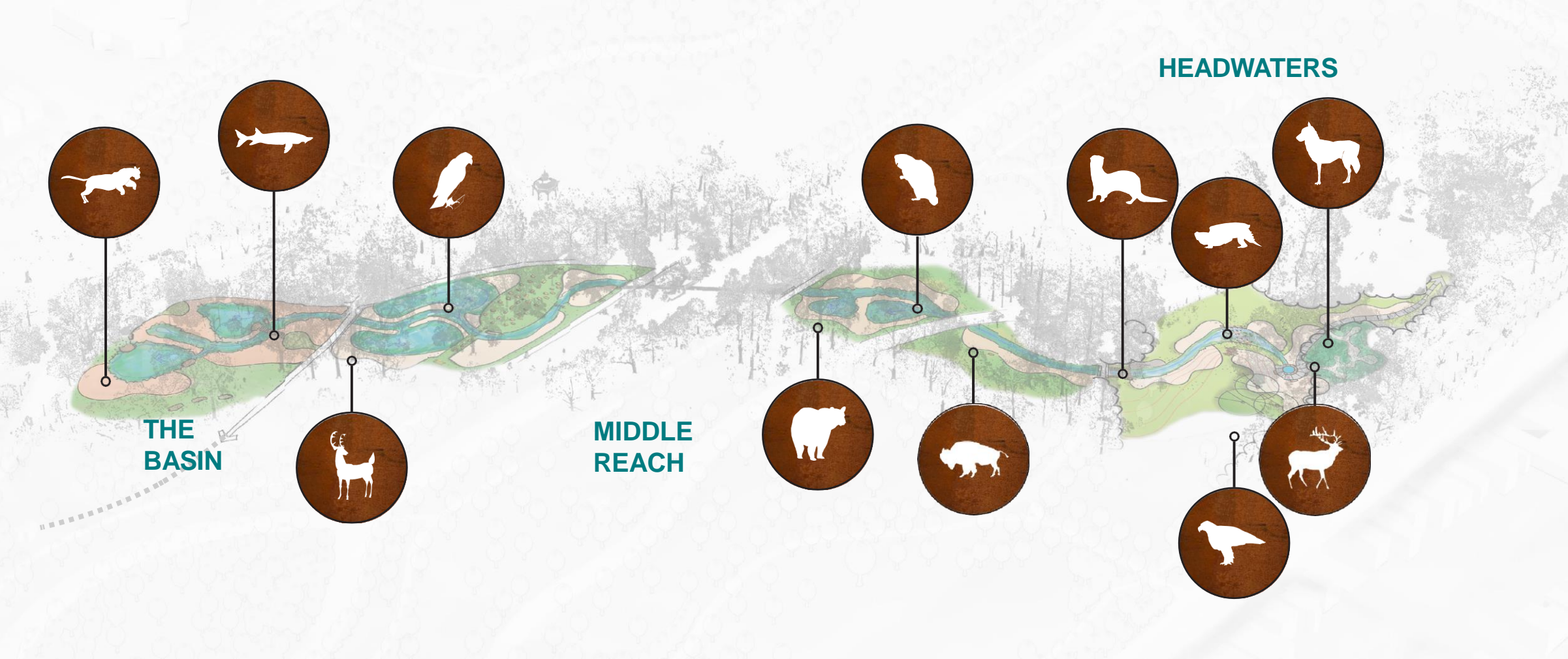


1. wolf
2. elk
3. eagle
4. turtle
5. otter
6. bison
7. beaver
8. bear
9. hawk
10. deer
11. sturgeon
12. cougar



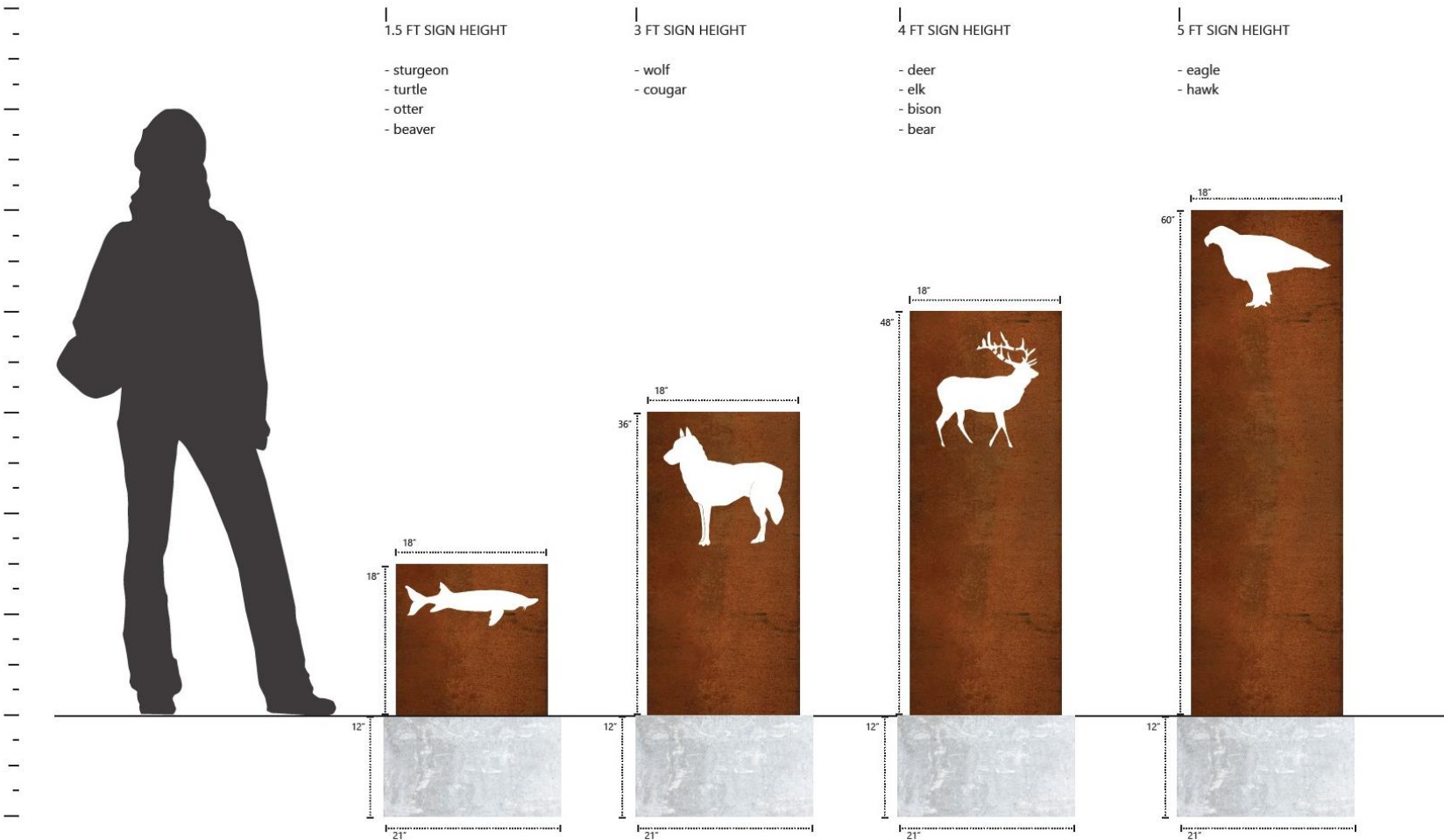


# Nee Kee Nee: Revived Water





# Nee Kee Nee: Revived Water





# Nee Kee Nee: Revived Water



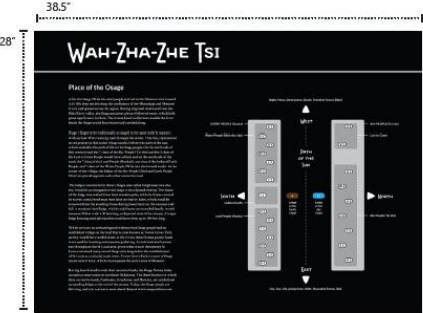
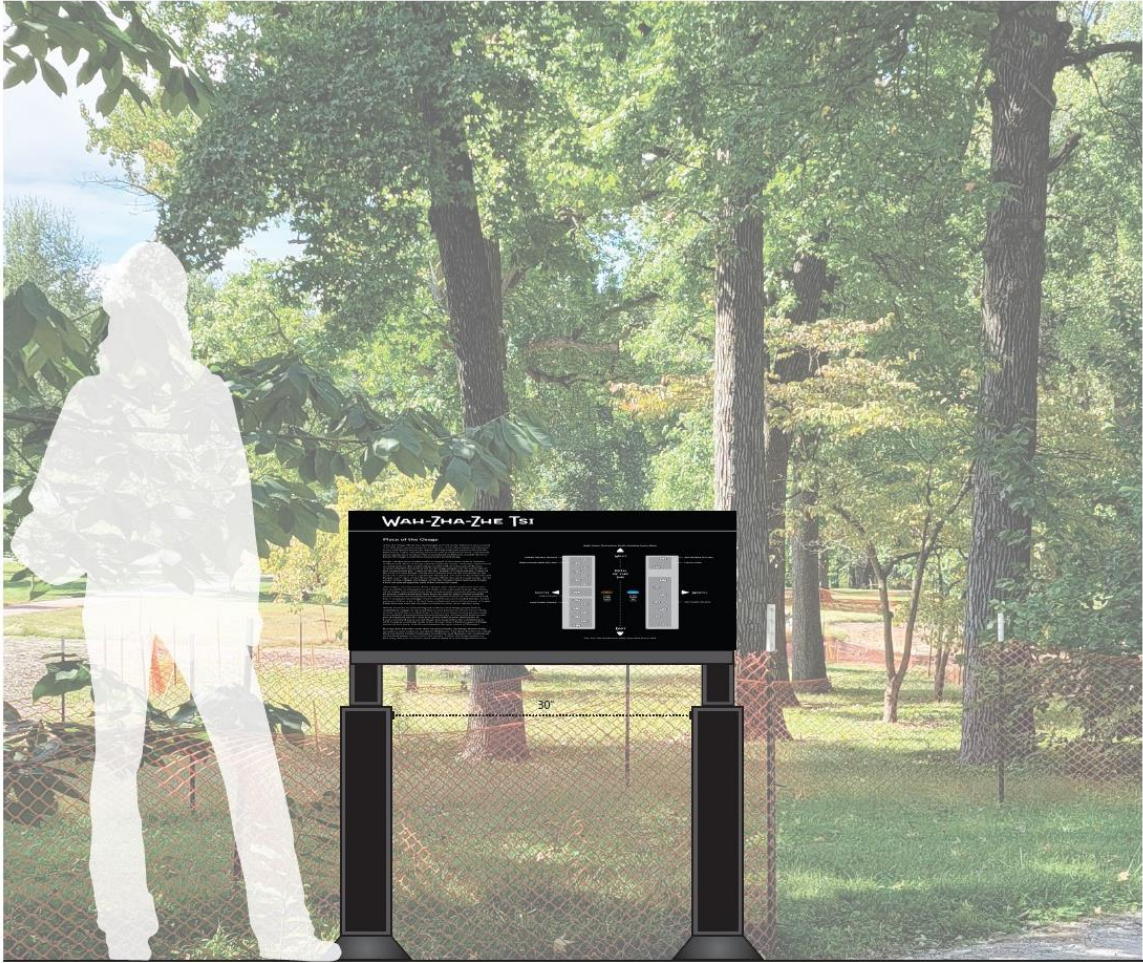


A young child with curly hair, wearing a bright green long-sleeved shirt and dark pants, is sitting on a large, cylindrical stone pillar. The pillar is part of a circular water feature with a concrete border and a central drain. The water is shallow and reflects the surrounding greenery. The scene is set in a park-like area with many trees and a grassy field in the background. The text "What's Next" is overlaid in white, bold font across the center of the image.

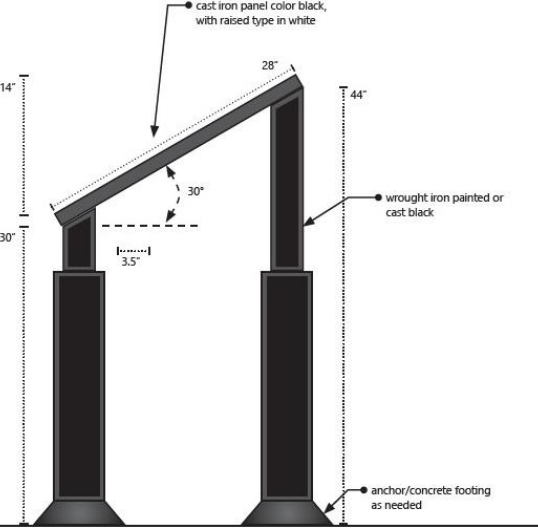
**What's Next**



# Wah-Zah-Zhe Tsi – Place Of The Osage



plan view





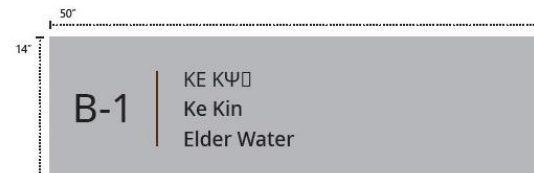
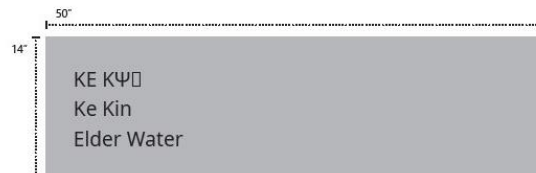
# Wah-Zah-Zhe Tsi – Place Of The Osage



Water People

Key Letter	Osage Orthography	English pronunciation	English Meaning
B-1	KE KΨ	Ke Kin	Elder Water
C-2	ΩA[A]E ΣKA	Wazhazhe Ska	White Water
D-3	ΠO>KA ΩA<ΔAKE	Ponka Washtage	Gentle Ponka
E-4	ΔA TAΞΨ	Da Thaxhen	Deer
F-5	MΨKΨ TE Σ]E ]E	Mekeh They Stse Tse	Cattail
G-6	OΣY KAΞE	Osu Kaxe	Clear the Way
H-7	ENA MΨ>]E ΔO>	Ehna MenTse Don	Bow

1.375" **Earth**  
Full size lettering, 1.375" cap height





# Project Partners



TOWER GROVE  
— PARK —





# Design Team

**Lamar Johnson  
Collaborative** ↗

 **DAVID MASON**  
+ A S S O C I A T E S

 Biohabitats

 Xsense



# Project Construction Team



TOWER GROVE  
— PARK —

Lamar Johnson  
Collaborative ↗

