



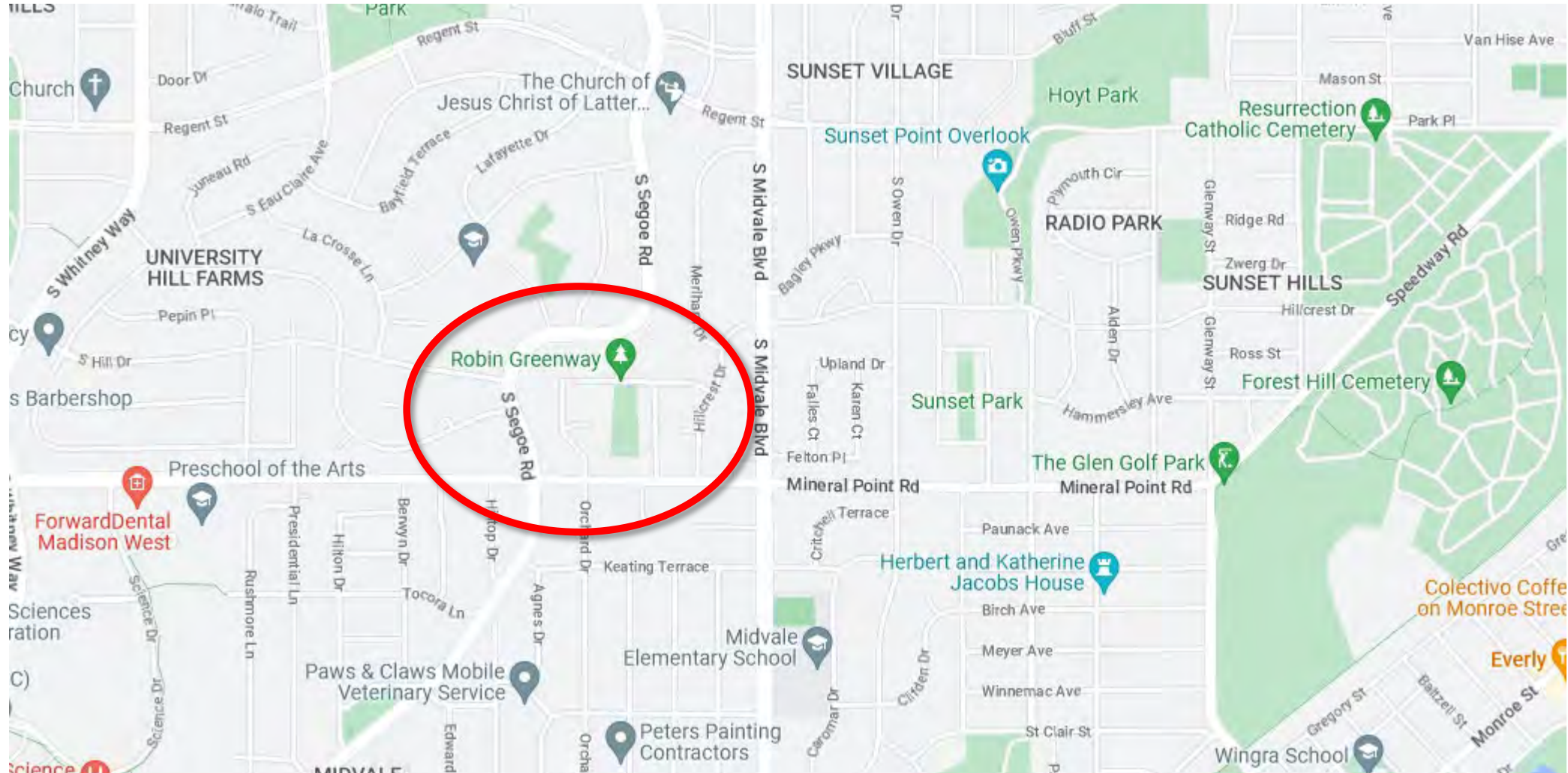
Robin Greenway & Orchard Drive Culvert

Habitat Stewardship Subcommittee
City of Madison Engineering Division
May 9, 2023

Presentation

- Background
- Project Approach and Public Engagement
- Tree Removals Based on Public Engagement
- Tree Removals for Construction
- Proposed Landscape and Restoration Plan

Background



Background

- July 2022 Storm
 - Trees in Robin Greenway fell, causing service outages, damages to houses
 - Utility companies removed trees under their emergency protocols to restore service
 - Removals caused significant erosion
- Culvert undersized and failing, needs to be replaced
- Unstable slopes in narrow culvert ditch

Image x – Monday June 13,
looking S from Gregg Rd, at
entrance to Greenway

Image and map sent
to City by Jeff
Jambois

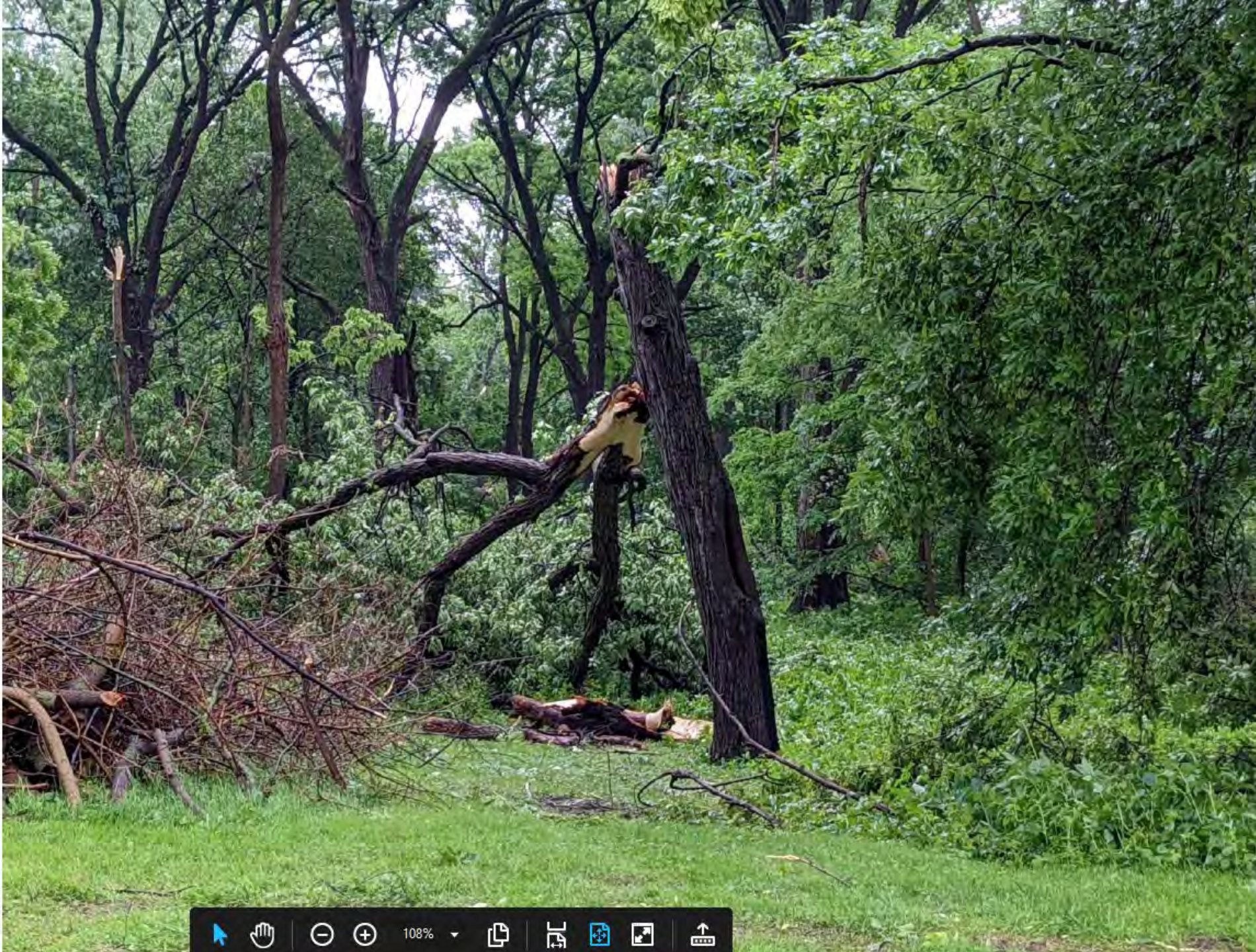


Image x – Wednesday June 16,
looking E from within
Greenway

Image and map sent
to City by Jeff
Jambois



Image x – Thursday July 7,
looking NW from 318 Robin
Parkway

This is the first major rain
event since City Engineering
left the Greenway

Image and map sent
to City by Jeff
Jambois



Looking south from Gregg Rd , south May 21, 2022



Debris and erosion post storm - July, 13, 2022



Looking north, November 7, 2022



Erosion post storm – July 13, 2022



Standing on Orchard Drive, looking towards Robin Greenway January 17, 2023



Looking down at existing culvert from south side of Orchard Drive.



Looking towards Orchard Drive from Robin Greenway January 17, 2023.



Looking towards Orchard Drive from triangle parcel across from larger Robin Greenway.



Background

- \$850,000 approved in the 2023 Capital Budget
- Budget for Project Goals Funds:
 - Culvert reconstruction and stabilizing slopes
 - Greenway restoration (seeding, planting, tree work, landscape maintenance plan)
 - Plan for careful long term access to avoid ground disturbance issues and damaging vegetation restoration efforts

2023 Capital Budget: Finance Committee Amendments						
Agency:	Stormwater Utility			Amendment #:	4	
Project:	Citywide Flood Mitigation			Page #:	163	
Sponsor:	Council President Furman			Project #:	11513	
Co-Sponsor(s):	Alder Tishler; Alder Verveer					
Amendment Narrative						
Add \$700,000 in GO borrowing and \$150,000 in Stormwater Reserves in 2023 to fund work on the Robin Greenway.						
Amendment Amount						
	2023	2024	2025	2026	2027	2028
GO Borrowing	\$700,000					
Other	\$150,000					
Total	\$850,000	\$00	\$00	\$00	\$00	\$00
Fiscal Impact						
Annual Debt Service	\$82,061.00					
Taxes on the Average Value Home (TOAH) Impact	\$0.00					
Analysis						
The proposed amendment would add funding for design and construction for a culvert replacement at Orchard Street and extension of that culvert through the drainageway. It would also fund maintenance path construction and restoration work within Robin Greenway in 2023. This site was heavily damaged by a windstorm and sustained significant tree loss. The necessitated removal of wind damaged trees within the narrow drainageway may cause side slope stability issues, which may impact private properties (A.D. 11). The estimated total cost is \$850,000, with \$700,000 funded through stormwater supported GO borrowing, and \$150,000 from Stormwater Reserves.						
Operating Impact						
Annual Operating Impact	\$00.00					
This project is not anticipated to have significant operating costs. Future maintenance costs will be absorbed in the agency's budget.						
Result						
Action	Adopted					
Vote	Unanimous					
	Yes	No	Not Voting			

Project Approach and Public Engagement

- January 2023 – Certified arborist evaluation, topographic survey
- February 9th 2023 PIM 1 – Listening Session and Public Feedback
 - Mailed notice to ~ 800 residents, listed on website, sent to subscribers of Robin Greenway updates, sent to alder
 - 13 Live Online Polling Questions & Breakout Rooms and Report Back
- March 14th 2023, PIM 2 – In Person Meeting Presentation of Two Concepts
 - Mailed notice to ~ 800 residents, listed on website, sent to subscribers of Robin Greenway updates, sent to alder
 - Presentation of Two Concepts Based on Feedback from One & Design Workshop in Groups iClicker Polling Question “Check in” from PIM 1 to see if opinions have changed
- April 11th, 2023, In – Person Walkthrough Presentation of Final Concept
 - Coordinated with neighborhood volunteer, sent to alder, listed on website, sent to subscribers of Robin Greenway updates

Project Approach and Public Engagement

- Main Goals:
 - Replace Culvert
 - Remove Dangerous Trees
 - Stabilize Slopes of Narrow Channel
 - Identify Priorities Related to Condition of Species
 - Identify Priorities Related to Understory
 - Identify Priorities Related to Invasive Species
 - Identify Priorities to Remove Power Line Conflicts
 - Determine Preferences for Tree Removal Phasing



Eroded slope in channel

Project Approach and Public Engagement

Project Site All Existing Trees

Legend

Existing Contours (1 foot)

West Parcel

Species (37)

- American Elm (5)
- Norway Maple (22)
- Siberian Elm (9)
- White Pine (1)

East Parcel

Species (177)

- American Elm (13)
- Basswood (4)
- Black Cherry (5)
- Black Locust (37)
- Black Walnut (10)
- Box Elder (31)
- Buckthorn (3)
- Bur Oak; Bur Oak (9)
- Burning bush (2)
- Canadian Hemlock (1)
- Cottonwood (1)
- Crabapple (3)
- Green Ash (3)
- Hackberry (8)
- Mulberry (6)
- Norway Maple (10)
- Red Elm (1)
- Red Maple (1)
- Red Oak (1)
- Redbud (1)
- Shagbark Hickory (5)
- Siberian Elm (4)
- Silver Maple (12)
- Unknown (3)
- Western Red Cedar (1)
- White Spruce (1)
- Yew ssp (1)

West Parcel

East Parcel

Robin Parkway

City of Madison Stormwater Engineering Property

City of Madison Stormwater Engineering Property

Orchard Drive

Mineral Point Road



0 100 200 Feet

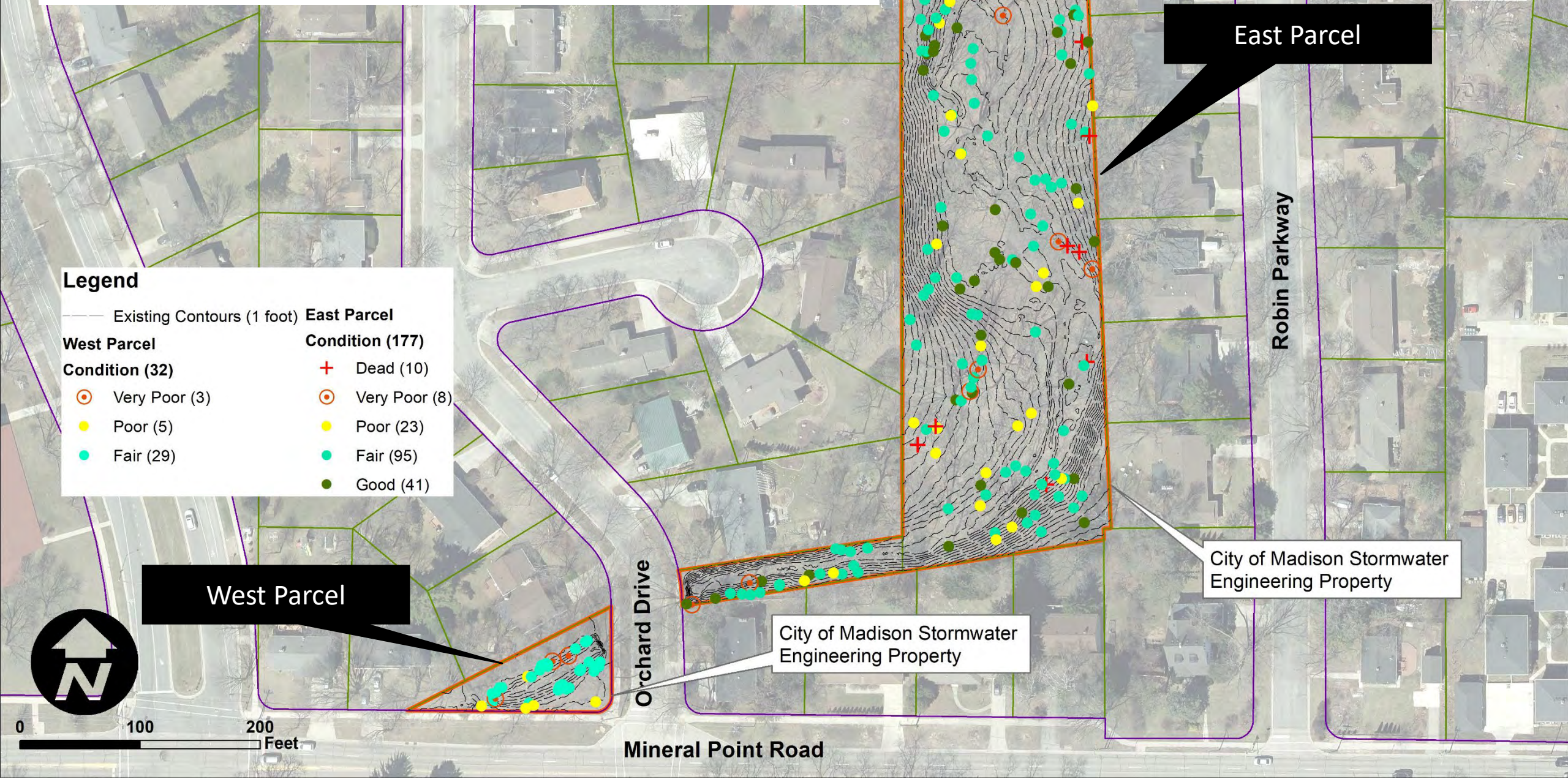
Project Approach and Public Engagement

Tree Removals – Tree Condition

Rating	Health	Structure	Form	% Rating
Excellent	High vigor and nearly perfect health with little or no twig dieback, discoloration, or defoliation.	Nearly ideal and free of defects.		81% to 100%
Good	Vigor is normal for the species. No significant damage due to disease or pests. Any twig dieback, defoliation, or discoloration is minor.	Well-developed structure. Defects are minor and can be corrected.	Minor asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.	61% to 80%
Fair	Reduced vigor. Damage due to insects or diseases may be significant and associates with defoliation but is not likely to be fatal. Twig dieback, defoliation, discoloration and/or dead branches may comprise up to 50% of the crown.	A single defect of a significant nature or multiple moderate defects. Defects are not possible to correct or would require multiple treatments over several years.	Major asymmetries/deviations from species norm. Mostly consistent with the intended use. Function and aesthetics are not compromised.	41% to 60%
Poor	Unhealthy and declining in appearance. Poor vigor. Low foliage density and poor foliage color are present. Potentially fatal pest infestation. Extensive twig and/or branch dieback.	A single serious defect or multiple significant defects. Recent change in tree orientation. Observed structural problems cannot be corrected. Failure may occur at any time.	Largely asymmetric/abnormal. Detracts from intended use and/or aesthetics.	21% to 40%
Very poor	Poor vigor. Appears to be dying and in last stages of life. Little live foliage.	Single or multiple severe defects. Failure is probably or imminent.	Visually unappealing. Provides little or not function in the landscape.	6% to 20%
Dead				

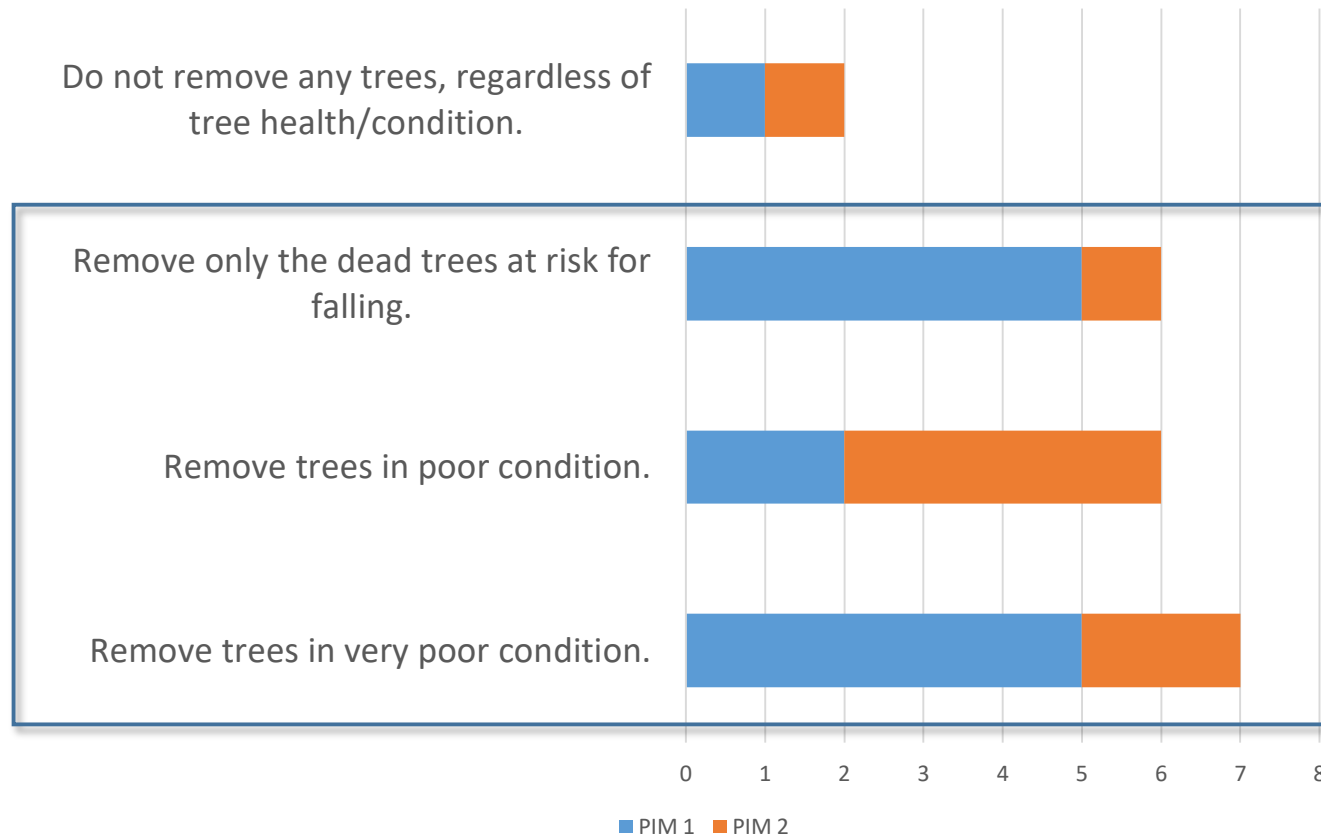
Project Approach and Public Engagement

Project Site Tree Condition



Project Approach and Public Engagement – Tree Removals – Tree Condition

What are your preferences on tree removals related to tree condition?



Public Engagement Regarding Understory Vegetation

- Most Important Goal for Greenway: “when managed for native habitat, they increase biodiversity” and “they provide public greenspace.”
- Consensus: Meeting attendees voted that they agree an important goal for the City for this project is to replant native trees, while also providing tree spacing to allow sunlight for healthy understory vegetation.
- Consensus: Meeting attendees voted that they agree that an important goal for this project is to establish a native groundlayer to minimize erosion.

Project Approach and Public Engagement

Tree Removals – Invasive Species

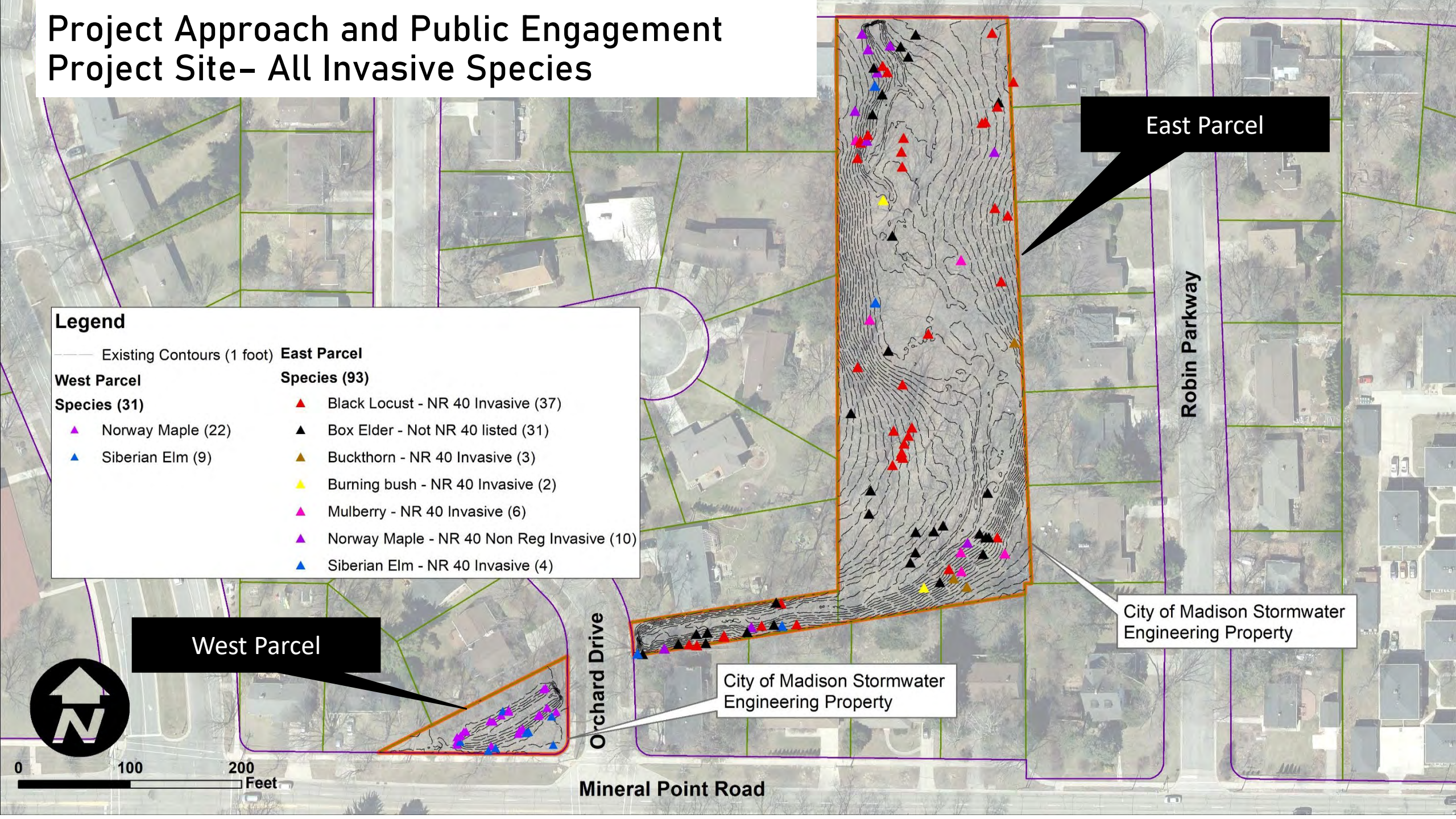
- Invasive Species
 - WDNR NR 40 Invasive Species
 - WDNR NR 40 Non-regulated Invasive Species
 - Native Species to Southern Dry Mesic Forest Ecological Landscape

Wisconsin DNR NR 40 Invasive Trees

- Regulated and Restricted
 - Black locust *Robinia pseudocacia*
 - **Native to parts of Wisconsin “Ecological Threat: Its vigorous vegetative reproduction forms extensive, dense groves of clones that exclude native vegetation.” (WDNR)**
 - Burning bush *Euonymus alatus*
 - **Native to China “Ecological Threat: Dominates hardwood forests shrub layer, prolific seed producer, not palatable to white-tailed deer, resulting in greater browse damage to native herbaceous plants.” (WDNR)**
 - Common buckthorn *Rhamnus cathartica*
 - **Native to Africa, Central Asia “Ecological Threat: Creates dense shade, eliminating regeneration of tree seedlings and understory species. Allopathic; produces chemical compounds that inhibit growth of other vegetation. Invades oak forests, riparian woods, savannas, prairies, old fields and roadsides.” (WDNR)**
 - Siberian elm *Ulmus pumila*
 - **Native to China “Ecological Threat: displacing native vegetation and reducing forage for native fauna”**
 - White mulberry *Morus alba*
 - **Native to China “Ecological Threat: Invades open forests, woodland edges, prairies, fields and disturbed areas. Outcompetes and hybridizes with our native mulberry, replacing those populations.” (WDNR)**
- Non-regulated
 - Norway Maple *Acer platanoides*

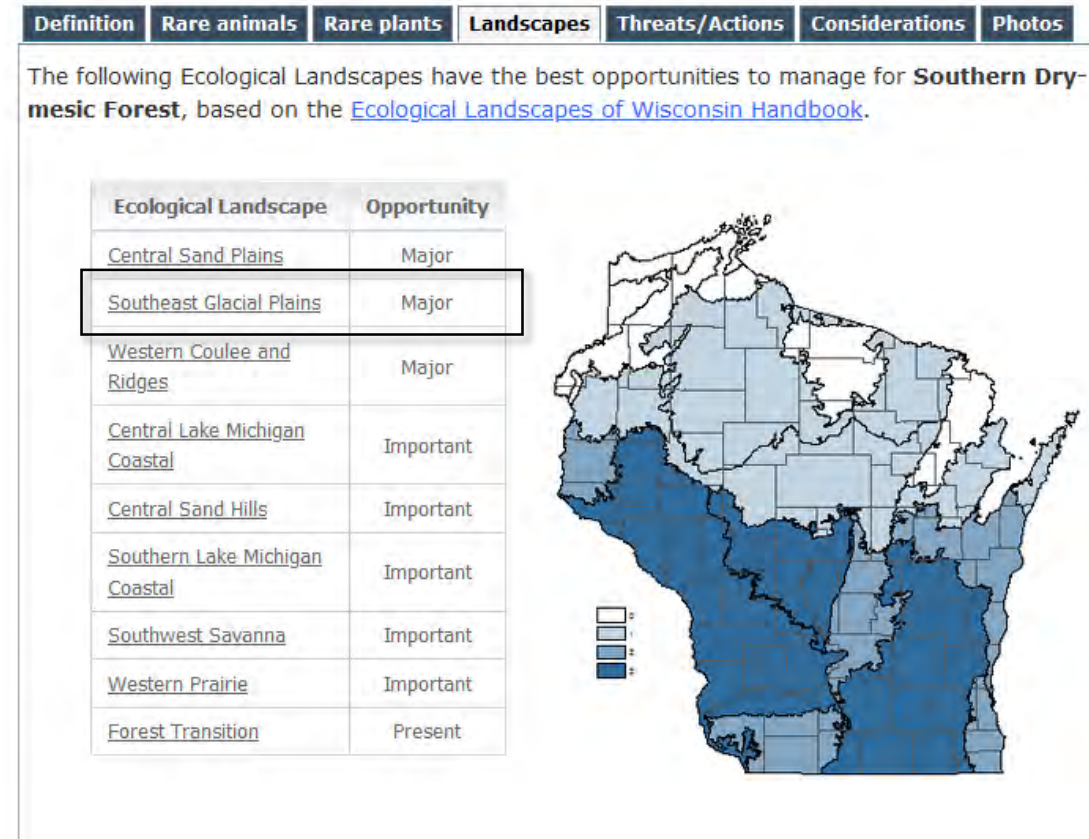
Project Approach and Public Engagement

Project Site- All Invasive Species



Trees – Southern Dry-mesic Forest

- Southeast Glacial Plains Ecological Landscape which includes:
 - Southern Dry-mesic Forest – Red oak, white oak, basswood, sugar and red maples, white ash, hickory and black cherry, American elm, butternut, ash, ironwood
 - Robin Greenway: ash, basswood, black cherry, black locust, black walnut, box elder, buckthorn, bur oak, Canadian hemlock, cottonwood, crabapple, eastern red cedar, American elm, euonymous, hackberry, mulberry, Norway maple, red maple, redbud, red oak, shagbark hickory, Siberian elm, silver maple, spruce, western red cedar, white oak, yew



Project Approach and Public Engagement

Project Site – Southern Dry-mesic Forest

Legend

— Existing Contours (1 foot)

West Parcel

Species (27)

- Norway Maple (22)
- Siberian Elm (9)

East Parcel

Species (126)

- Black Locust (37)
- Black Walnut (10)
- Box Elder (31)
- Buckthorn (3)
- Burning bush (2)
- Canadian Hemlock (1)
- Cottonwood (1)
- Crabapple (3)
- Mulberry (6)
- Norway Maple (10)
- Siberian Elm (4)
- Silver Maple (12)
- Unknown (3)
- Western Red Cedar (1)
- White Spruce (1)

West Parcel

East Parcel

Robin Parkway

City of Madison Stormwater Engineering Property

City of Madison Stormwater Engineering Property

Orchard Drive

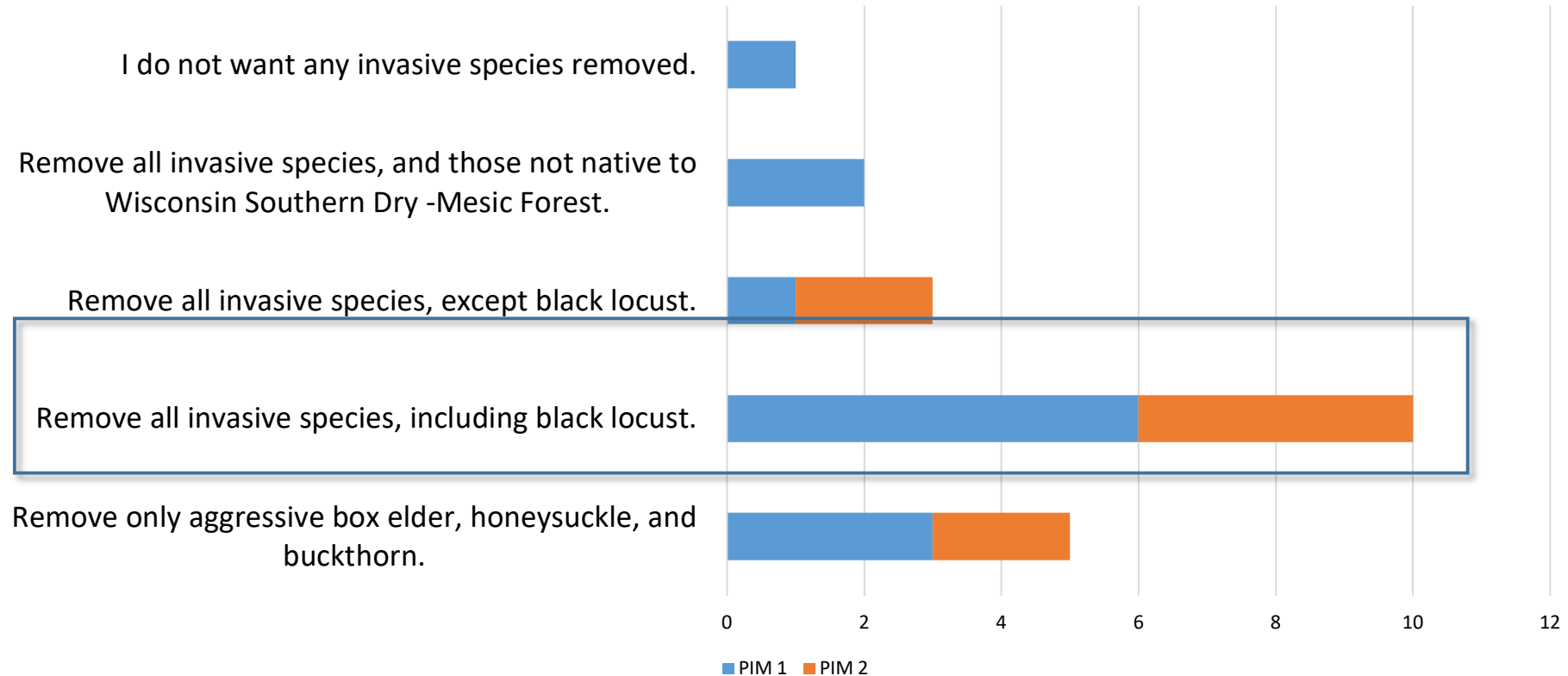
Mineral Point Road



0 100 200 Feet

Project Approach and Public Engagement Tree Removals – Invasive Species

What are your preferences on removing invasive trees/shrubs at Robin Greenway?



Project Approach and Public Engagement Power Line

Legend

— Existing Contours (1 foot)

East Parcel

Species

- Black Locust (2)
- Yew ssp (1)

East Parcel

Robin Parkway

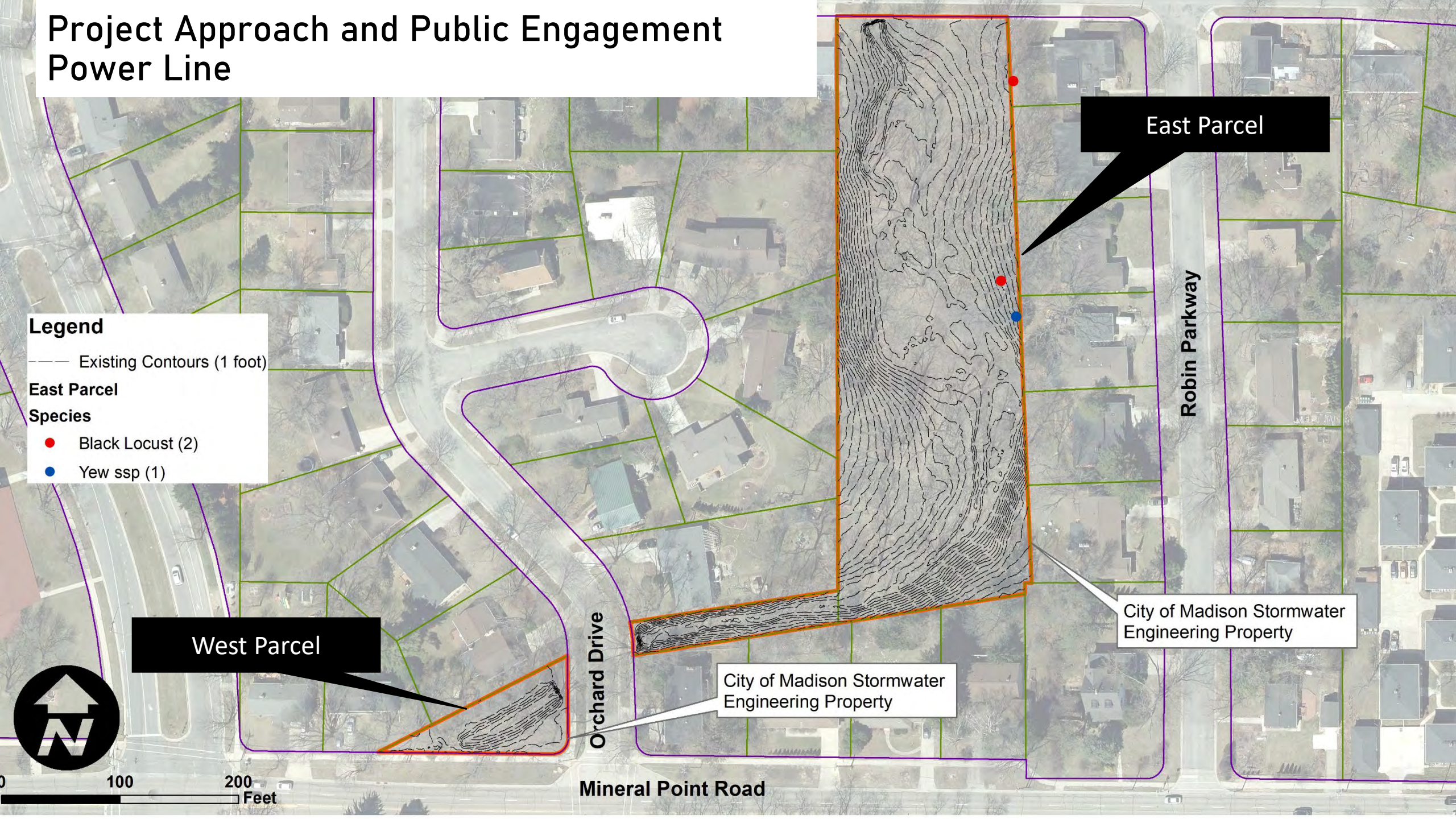
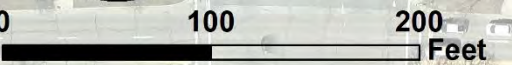
City of Madison Stormwater
Engineering Property

City of Madison Stormwater
Engineering Property

West Parcel

Orchard Drive

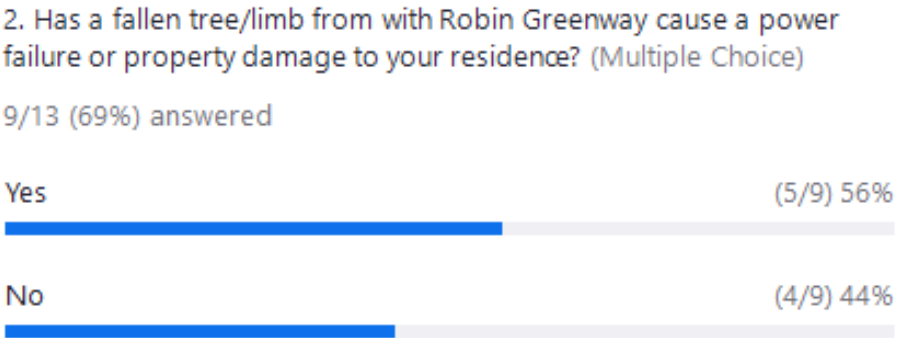
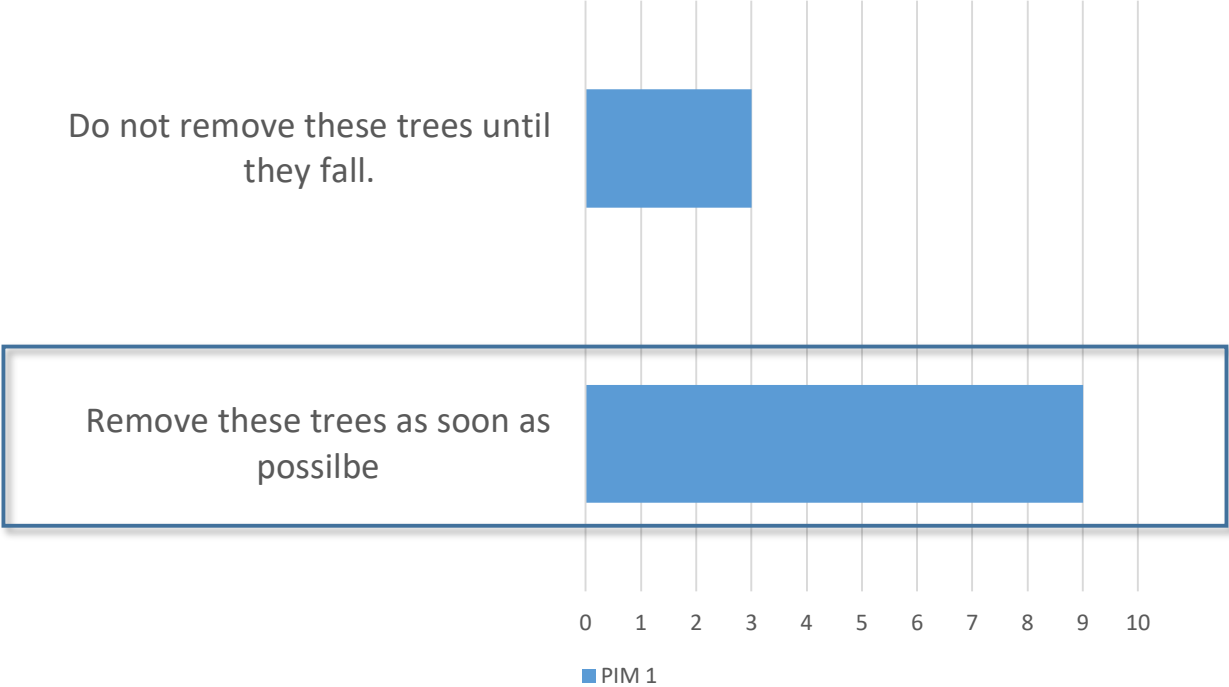
Mineral Point Road



Project Approach and Public Engagement

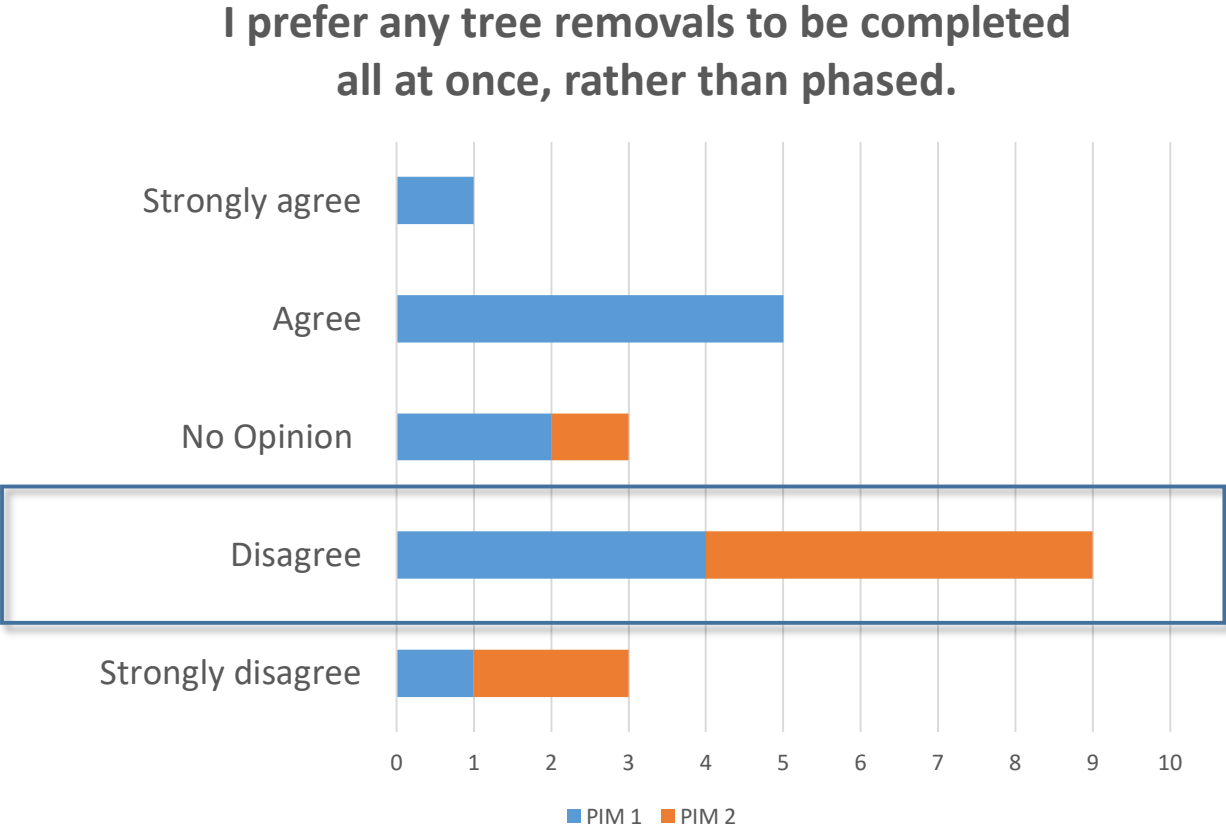
Tree Removals – Power Lines

A certified arborist has identified two trees that conflict with power lines.



Project Approach and Public Engagement

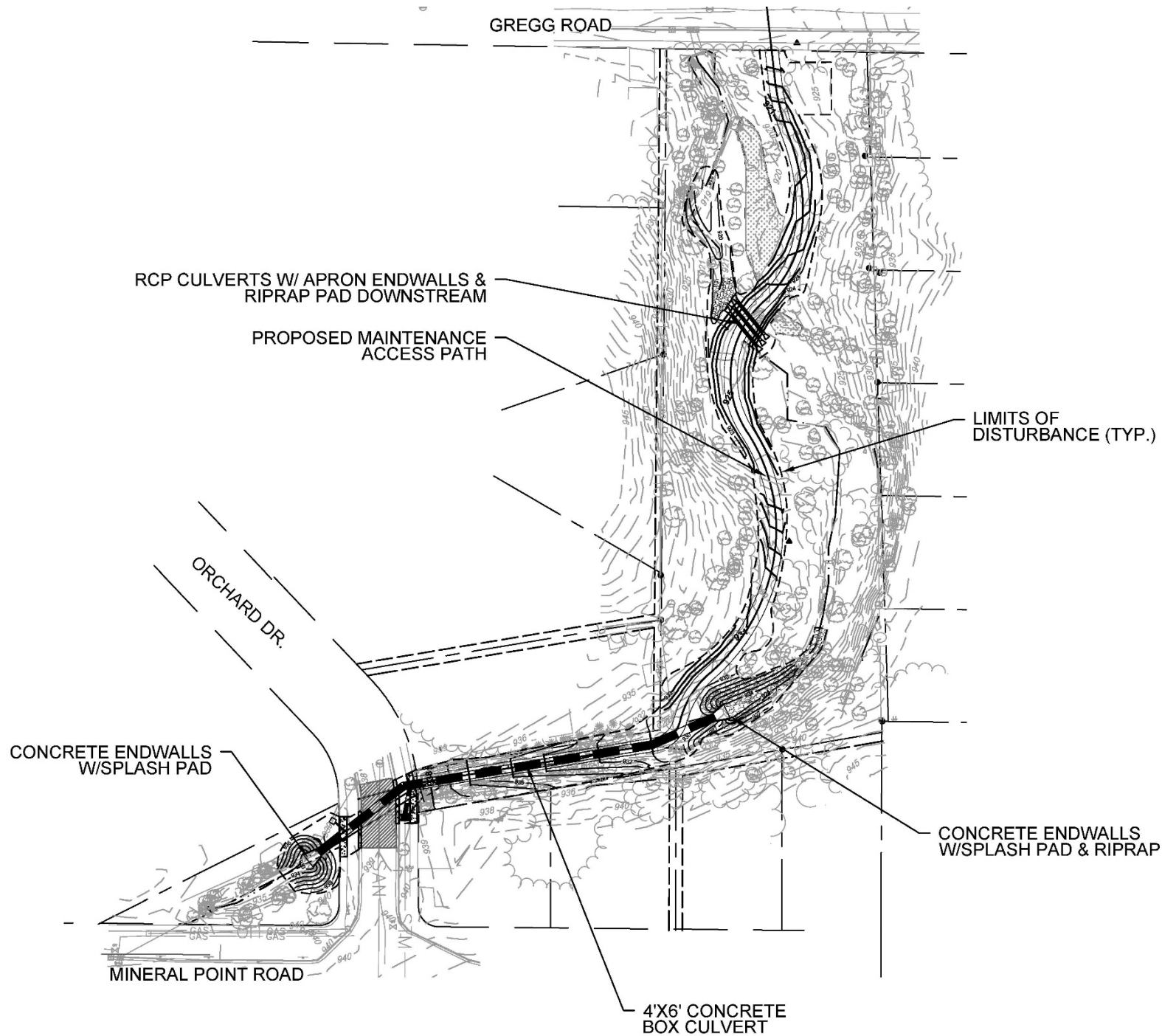
Tree Removals – Phasing

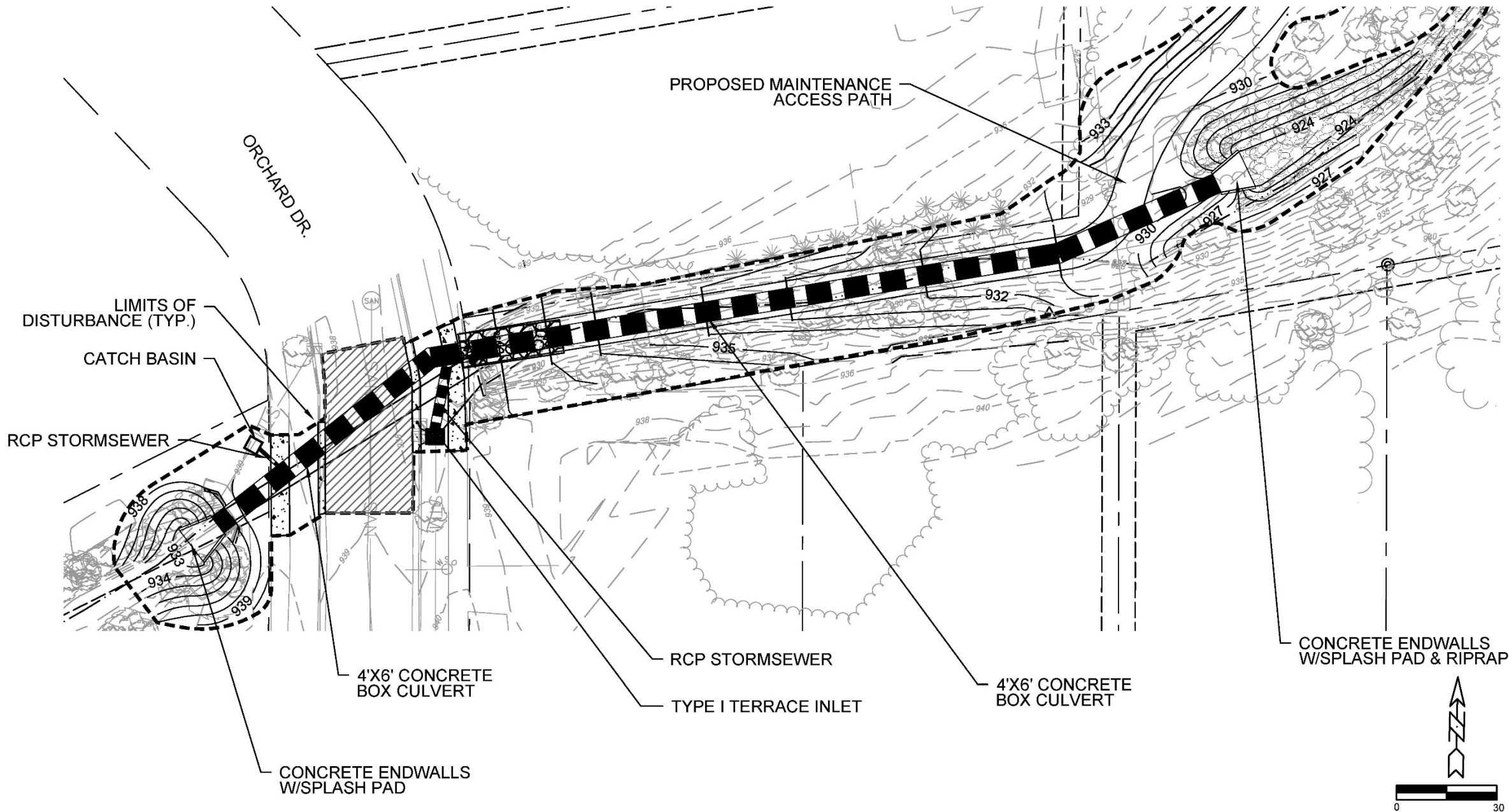


Final Design – Tree Removals

Public Engagement – Tree Invasive Status

- Tree Removals Based on Invasive Status
- Tree Removals Based on Tree Condition
- Tree Removals Based on Construction
- Phasing





Final Design Landscape Plan

Legend

Pro_Pipes

GradingExtents

Existing Contours (1 foot)

Vegetated Access Path

Existing Trees to Remain

Ex. Tree DBH

- 3.5 - 8.5 (44)
- 8.5 - 15. (23)
- 15. - 28.5 (21)
- 28.5 - 52.5 (10)
- 52.5+ (includes multistem) (2)

Proposed Trees and Shrubs

Proposed Trees and Shrubs (35)

Proposed Native Seeding

Prairie/Savanna Seed

Wet Mesic Forbs and Grasses

Woodland Forbs and Grasses

East Parcel

Robin Parkway

City of Madison Stormwater
Engineering Property

City of Madison Stormwater
Engineering Property

West Parcel

Orchard Drive

Mineral Point Road



0 100 200 Feet

Final Design

Tree Removals - Tree Condition

Legend

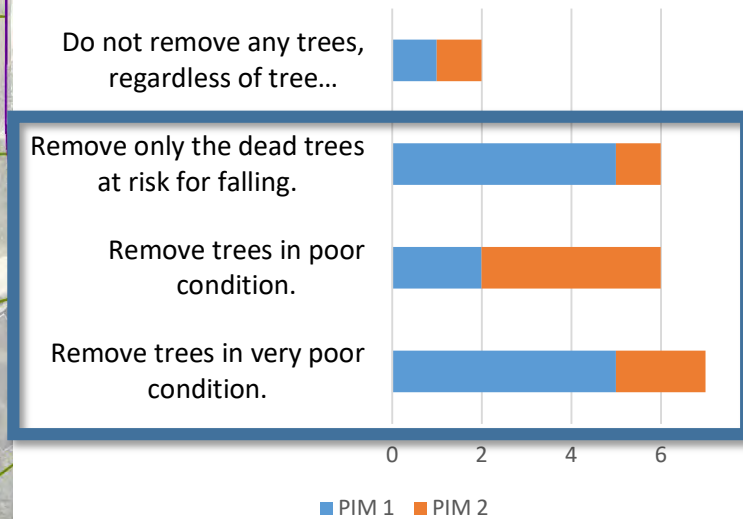
- Proposed Pipe
- Vegetated Access Path
- Grading Extents
- Existing Contours (1 foot)

East Parcel

Species (16)

- + Dead, American Elm (1)
- + Dead, Black Cherry (2)
- + Dead, Bur Oak; Dead (2)
- + Dead, Red Oak (1)
- + Dead, Shagbark Hickory (1)
- + Dead, Unknown (3)
- ⊙ Very Poor condition, Black Locust (3)
- ⊙ Very Poor condition, Buckthorn (1)
- ⊙ Very Poor condition, Bur Oak (1)
- ⊙ Very Poor condition, White Spruce (1)

What are your preferences on tree removals related to tree condition?



West Parcel

East Parcel

Robin Parkway

City of Madison Stormwater Engineering Property

City of Madison Stormwater Engineering Property

Orchard Drive

Mineral Point Road



0 100 200 Feet

maple, black locust, box elder, siberian elm.

Final Design Tree Removals – Invasive Species

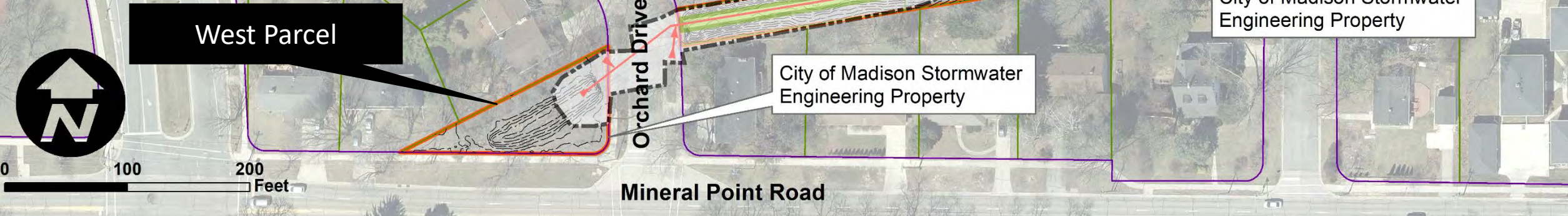
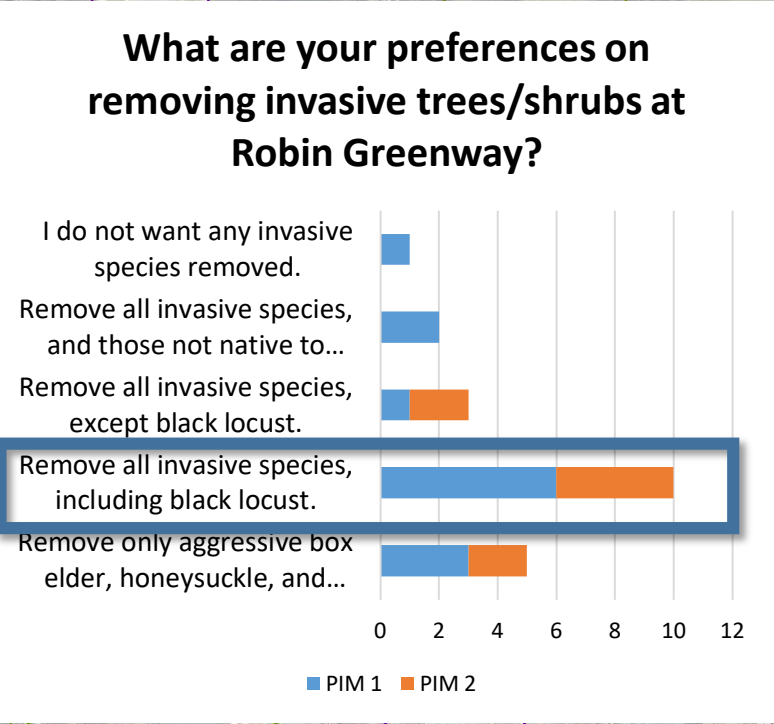
Legend

- Proposed Pipe
- Vegetated Access Path
- Grading Extents
- Existing Contours (1 foot)

East Parcel

Invasive Removals (59)

- Black Locust (Protect) (6)
- Norway Maple (Protect) (2)
- Black Locust (Remove) (20)
- Box Elder (Remove) (21)
- Buckthorn (Remove) (2)
- Burning Bush (Remove) (2)
- Norway Maple (Remove) (6)
- Siberian Elm (Remove) (2)
- White Mulberry (Remove) (6)



Tree Removals – Power Line Conflicts



Final Design Tree Removals - Construction

Legend

→ Proposed Pipe

Vegetated Access Path

Grading Extents

Existing Contours (1 foot)

West Parcel

Species (10)

- American Elm
- Norway Maple
- Siberian Elm

East Parcel

Species (36)

- American Elm (6)
- Black Locust (7)
- Box Elder (10)
- Norway Maple (8)
- Siberian Elm (3)
- Silver Maple (2)

West Parcel

East Parcel

Robin Parkway

City of Madison Stormwater
Engineering Property

City of Madison Stormwater
Engineering Property

Orchard Drive

Mineral Point Road



0 100 200 Feet

Legend

→ Proposed_Pipes

Vegetated Access Path

GradingExtents

Existing Contours (1 foot)

West Parcel (10) - 338 Orchard Drive

● Construction Conflict Trees to be Removed (10)

East Parcel (101) - 4609 Gregg Rd (Robin Greenway)

+ Dead Trees to be Removed (10)

▲ Invasive Trees to be Removed (59)

● Construction Conflict Trees to be Removed (26)

⊙ Very Poor Condition to be Removed (6)

East Parcel

Robin Parkway

West Parcel

Orchard Drive

City of Madison Stormwater
Engineering Property (West Parcel)

City of Madison Stormwater
Engineering Property
(East Parcel - Robin Greenway)

For more information please see:
<https://www.cityofmadison.com/engineering/projects/robin-greenway-and-orchard-drive-culvert>

Mineral Point Road



0 100 200 Feet

Final Design – Tree Removals

Phasing

- Leave identified larger, healthy black locust and Norway maple. Volunteers have committed to assisting with new growth sprout treatment. Re-evaluate in a few years volunteer efforts. If resprouts are not managed, remove these species.
- Phasing: Leave “poor quality” trees and re-evaluate if condition deteriorates to “very poor quality” in a few years after new plantings have had time to establish.
- Do not remove invasive trees on western parcel, a small fragmented parcel which does not warrant ecological restoration.

Landscape and Restoration Plan

- Existing Trees to Remain – 102 (26 west parcel, 76 east parcel)
- Proposed Trees – 29 (2 trees west parcel, 27 trees east parcel)
- Proposed Shrubs – 8 (5 west parcel, 3 east parcel)
- Native Understory Forbs, Sedges, Rushes and Grasses

Ecological Restoration to promote Oak Woodland

- Trees
 - Allegheny serviceberry (*Amelanchier laevis*)
 - *Ostrya virginiana* (Ironwood)
 - Shagbark hickory (*Carya ovata*)
 - Swamp White Oak (*Quercus bicolor*)
 - Bur Oak (*Quercus macrocarpa*)
- Shrubs
 - Bladdernut (*Staphylea trifolia*)
 - Nannyberry viburnum (*Viburnum lentago*)



Wisconsin Ecological Community	Global Endangered Ranking	State Endangered Ranking
<u>Oak Openings</u>	<u>G1 Critically Imperiled</u> <u>At very high risk of extinction or elimination</u>	<u>S1 Critically Impaired in Wisconsin</u>
<u>Oak Woodlands</u>	<u>GNR</u> <u>Global Rank not yet Assessed.</u>	<u>S1 Critically Impaired in Wisconsin</u>
<u>Mesic Prairie</u>	<u>G2 Imperiled</u> <u>At high risk of extinction or elimination</u>	<u>S1 Critically Impaired in Wisconsin</u>
<u>Oak Barrens</u>	<u>G2 Imperiled.</u>	<u>S2 Imperiled in Wisconsin.</u>
<u>Wet Mesic Prairie</u>	<u>G2 Imperiled</u>	<u>S2 Imperiled in Wisconsin.</u>
<u>Dry Mesic Prairie</u>	G3 Vulnerable	S2 Imperiled in Wisconsin.
<u>Southern Mesic Forest</u>	G3? Vulnerable	S3 Vulnerable in Wisconsin.
<u>Dry Prairie</u>	G3 Vulnerable	S3 Vulnerable in Wisconsin.
<u>Southern Mesic Forest</u>	G3? Vulnerable	S3 Vulnerable in Wisconsin.
<u>Wet Prairie</u>	G3 Vulnerable	SU Unrankable
<u>Southern Dry Mesic Forest</u>	G4 Apparently secure	S3 Vulnerable in Wisconsin.
<u>Southern Dry Forest</u>	G4 Apparently secure	S3 Vulnerable in Wisconsin.
<u>Southern Sedge Meadow</u>	G4? Apparently secure	S3 Vulnerable in Wisconsin.
<u>Southern Dry Forest</u>	G4 Apparently secure	S3 Vulnerable in Wisconsin.
<u>Emergent Marsh</u>	G4 Apparently secure	S4 Apparently secure in Wisconsin

Ecological Restoration

- Species included in Seed Mixes

- Virginia wild rye
- Common wood sedge
- Brown fox sedge
- Beak grass
- Long – beaked sedge
- Wood mint
- Harebell
- Bottlebrush grass
- Wild columbine
- Tall anemone
- Blue wood aster
- Big leaved aster
- Jacob's ladder
- Zigzag goldenrod
- Elm-leaved goldenrod
- Sweet cicely
- Solomon's seal



Wood mint



Columbine



Brown fox sedge



Jacob's ladder

Balancing Ecosystem Services

Prairie, Oak Savanna, and Oak Woodlands *Rare and Disappearing Landscapes*



Prairies

Historically, 18 million acres of prairie occurred in Minnesota.
Approximately 1% remains today.



Oak Savannas

Historically, 50 million acres of oak savanna occurred in the Midwest. **Only 0.06% remains today.**

Globally, oak savannas in northern latitudes (temperate zone) are **one of the world's most endangered ecosystems.**



Packard, S., & Mutel, C. F. (Eds.). (2005). *The tallgrass restoration handbook: for prairies, savannas, and woodlands* (p. 504). Washington: Island Press.

	CO2 Reduction (lbs)	CO2 Emission(lbs)	
Tree per Year	-48		https://www.usda.gov/media/blog/2015/03/17/power-one-tree-very-air-we-breathe
Gallon of gas tailpipe CO2 emmission		19.5	https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning
Driving one mile		0.89	https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning
Pair of Levi Jeans		73.6	https://www.bbc.com/future/article/20200310-sustainable-fashion-how-to-buy-clothes-good-for-the-climate
Pair of jeans made in India		89	https://www.bbc.com/future/article/20200310-sustainable-fashion-how-to-buy-clothes-good-for-the-climate
Polyester Shirt		12	https://www.bbc.com/future/article/20200310-sustainable-fashion-how-to-buy-clothes-good-for-the-climate
Cotton Shirt		5.2	https://www.bbc.com/future/article/20200310-sustainable-fashion-how-to-buy-clothes-good-for-the-climate
One .25 lbs hamburger		3	https://blogs.sw.siemens.com/simcenter/engineering-the-low-carbon-lab-grown-hamburger-of-the-future/
1 pound of beef		14.8	https://content.sierraclub.org/grassrootsnetwork/sites/content.sierraclub.org.activistnetwork/files/teams/documents/GreenhouseHambuger%202009.pdf
Pound of Cheese		21	https://www.climateq.co.uk/resources/the-carbon-footprint-of-food/
6 pack of New Glaurus Fat Tire		7	https://www.sestrasystems.com/carbon-footprint-beer/
Flight from Dane County Airport to Washington DC (Round trip, economy)		860	https://co2.myclimate.org/en/portfolios?calculation_id=5730453&localized_currency=USD
Trees per Acre per Year	-2300		https://extension.umn.edu/managing-woodlands/carbon-minnesota-trees-and-woodlands#manage-for-carbon-sequestration-rates-2244061
Prairie per Acre Per Year	-2204		https://tallgrassontario.org/wp-site/carbon-sequestration/
Car per Year		10,141	https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning
Burgers sold by McDonalds in a Day (6.5 Million/Day)		57,200,000	https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning
Methane from Gas Stoves in the US per Year		50,570,650	https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning