Sauk Creek Corridor Plan

Completed by City Engineering
February 5, 2025

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Approved by the Common Council, March 11, 2025
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The Corridor Plan as written includes high level concepts and locations of improvements to achieve the general goal of the plan. It should be considered a water quality plan for upcoming stabilization and pond improvements projects. The Corridor Plan doesn't include all aspects of flood mitigation or the Pheasant Branch Watershed Study. Each design phase will need to be permitted which may involve modifications to the plan.

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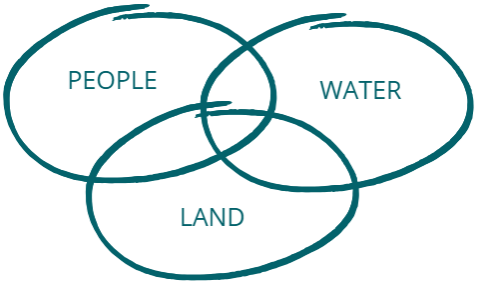
Executive Summary

The Sauk Creek Greenway serves many purposes from providing drainage conveyance, to serving as urban habitat for birds, insects and other wildlife. The greenway also provides the corridor for the existing sanitary sewer interceptor that currently serves 10,000 people across 870 acres (1.3 square miles) of land in the area. In addition, there are many other ecological services that the greenway provides including reduction of the urban heat island effect and resilience to the effects of climate change, as well as providing sanctuary, recreational benefits and nature to those that live, work or visit the area. The corridor is considered a natural area that holds extreme importance to many residents and visitors. While the greenway is quite natural and wild, there is still a need to provide maintenance both to be able to keep the greenway functional from a stormwater perspective and to improve the health of the woods.

Since the time the area had developed, the City has provided minimal maintenance to the corridor. A sewer access path was built in 2010 to enable maintenance and ensure the functionality of the sanitary sewer interceptor located within the greenway. The sewer access path also provides necessary access for tree management in areas adjacent to it when trees inevitably fall for a variety of reasons.

The Sauk Creek Greenway was identified as a greenway that did not have stable banks and needed repairs. As part of the Madison General Ordinance and Municipal Separate Stormwater System Permit (MS4) regulatory systems, the City is required to control Total Suspended Solids (TSS), or sediment, from entering downstream waterways. The stormwater modeling that is completed as part of the MS4 permit requirements assumes that channels that convey stormwater to our various treatment devices (ponds, etc.) are stable, which is clearly not the case within the Sauk Creek Greenway. As such, the stormwater utility has a responsibility to stabilize the channel, and keep it stabilized.

In 2018, the City began community discussions on the overall health of the greenway, particularly the erosion, channel blockages and degradation of the stream corridor. Later that year a historic, large rainstorm occurred that changed the trajectory of those discussions and soon after that, the Pheasant Branch Watershed Study began. The watershed study looked at existing drainage and flood mitigation needs and was critical to help fully understand the function of the greenway and how it interfaces with flooding and extreme events that have been increasing due to climate change. Upon completion of the watershed study, the City kicked-off the Sauk Creek Greenway Corridor Planning process.



The intent of the Sauk Creek Corridor Plan was to develop a plan with the Community that improves downstream water quality by addressing the unstable banks, balances existing ecological and stormwater function with future ecological needs, and establishes guidelines for how the greenway will be managed moving forward. The plan is intended to balance the main components of the corridor: water, land and people. This plan will discuss the background and history of the greenway, the goals and objectives of the corridor plan, the history, maintenance and existing conditions within the corridor, the ecological assessment, the planning process and public input that shaped the plan, and the final proposed corridor plan. It will demonstrate how the corridor impacts the concepts of Water, Land and People. This plan should be considered a high-level guidance document that generally describes

those issues and concerns noted above, provides recommendations, and will be used to provide the framework in the future as projects, management and maintenance are implemented.

Chapter 1 - Introduction

Background and History of the Greenway

The Sauk Creek Corridor boundary for this plan includes 34.9-acres of Stormwater Utility owned land bounded by Old Sauk Road and North High Point Road on the north end, Farmington Way, Walnut Grove Park and Tamarack Trails Community on the east, Tree Lane on the south, and Haen Family Park, and the Sauk Creek Neighborhood on the west. See Figure 1.

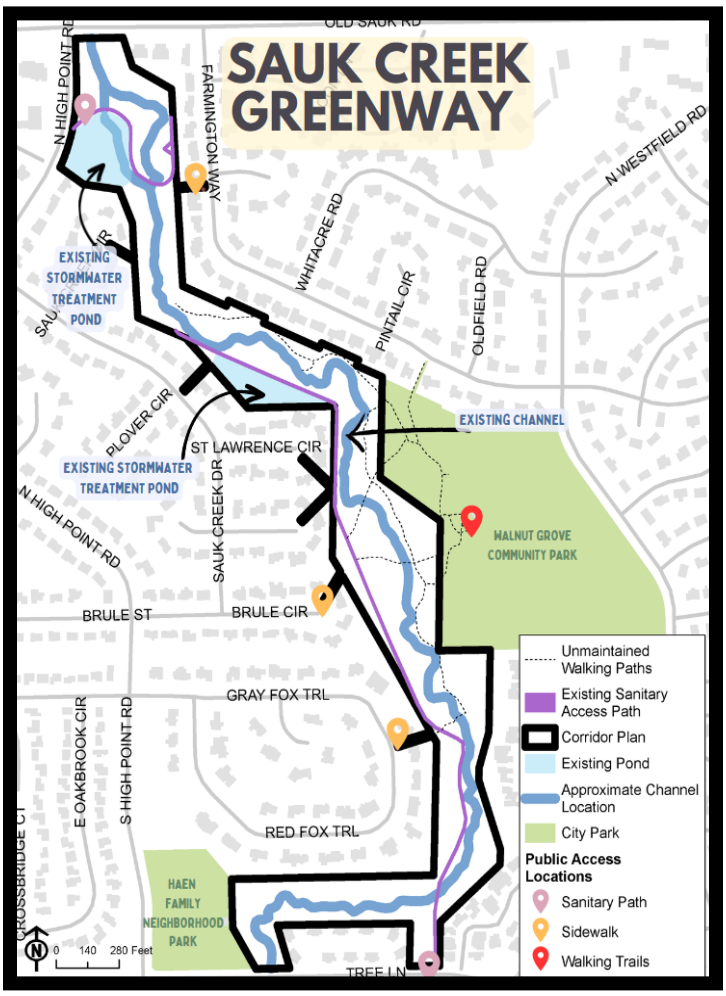


Figure 1

The corridor was dedicated to the City via several subdivision plats from 1976 through 1987, concurrent with the development of the adjacent neighborhoods. The major intended use for the corridor was for drainage purposes. In 1987, a 21" diameter regional sanitary sewer interceptor was installed within the greenway to serve the adjacent and upstream development.

A greenway is a corridor of protected open space that is maintained for stormwater conveyance. As such, when it rains, a greenway will become an urban waterway that safely conveys stormwater through it. In the Sauk Creek Corridor, there are 2 adjacent stormwater treatment ponds that are designed to remove nutrients, improving the water quality of the stormwater that enters them.

The greenway serves as a major stormwater conveyance spine for the Pheasant Branch Watershed with drainage from ~1,268 acres flowing through the greenway (see Figure 2). There are widespread flooding issues throughout the watershed, but the structures immediately adjacent to the Sauk Creek greenway do not flood.

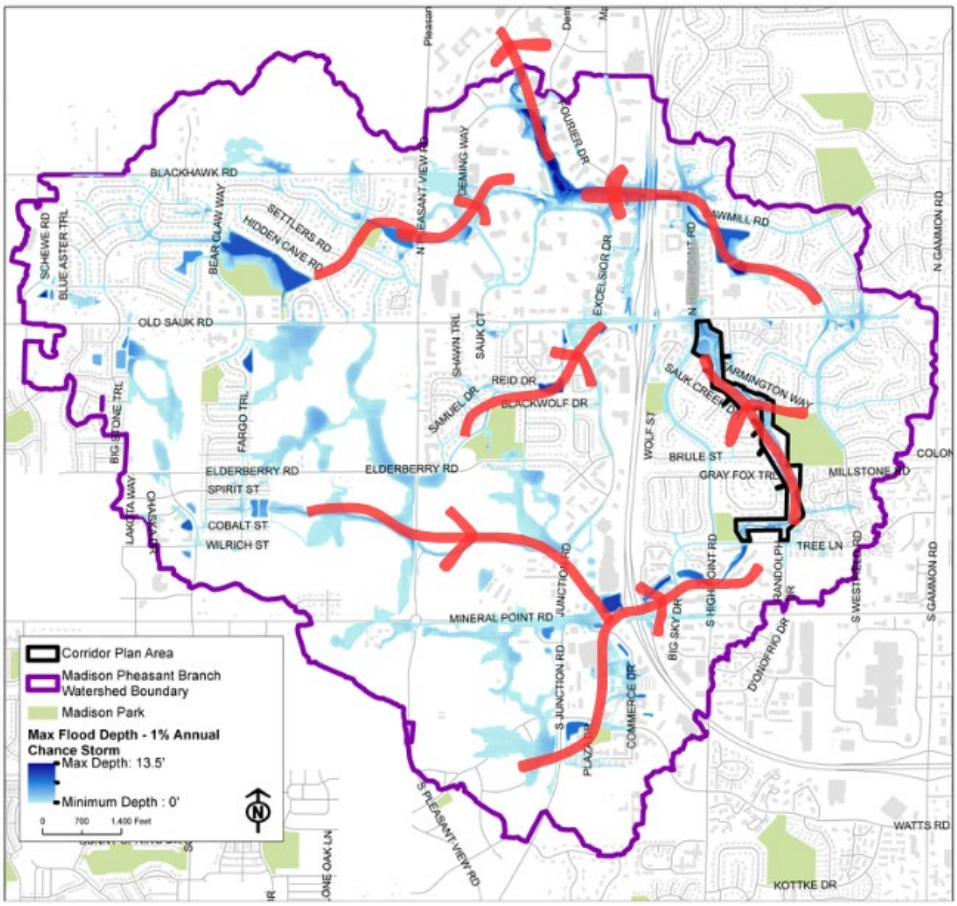


Figure 2 Flow within the Pheasant Branch Watershed

The Sauk Creek greenway has a defined channel and non-regulatory floodplain, and when the water leaves the main channel, it enters the floodplain, slowing the water moving through the system. In this greenway, the floodplain for the channel is much lower than the adjacent homes and development, so when the floodplain is activated, it does not result in flooding to adjacent structures.

Prior to the 2010's, the City did not have feasible access into the greenway for many maintenance activities, including clearing out large, erosive channel blockages, or for maintenance of the sanitary sewer interceptor. Much of the channel and the corridor has gone unmaintained except for some smaller scale tree removals and invasive species removals primarily performed by volunteers. In the 2010's the City built sanitary access paths in order to provide maintenance access for the sanitary sewer that runs north-south through the greenway. This path has also provided access for some limited additional maintenance of the channel, but most of the corridor is not accessible via the access path due to the wooded nature of the lands.

There are existing unmaintained walking paths that have been established by the Community throughout the greenway. The greenway provides for passive recreation opportunities on these paths, and on the existing sanitary access path that is maintained by the City. A significant goal of the corridor plan is to consider all uses of the corridor. This is consistent with both the stakeholder goals and Madison General Ordinance which provide those lands dedicated as Greenways and Parkways "may serve multiple purposes including, in addition to their principal use for storm drainage, vehicular and/or pedestrian traffic,

sanitary sewers, water mains, storm sewers, storm water retention basins, park development and other related uses."

The greenway is a unique space, especially as many other nearby greenways were deforested when the area was converted to cropland and subsequently developed to urban uses. However, much of the Sauk Creek greenway remained largely untouched as development proceeded around it. Therefore, there are many old, large oaks within the greenway that have immense ecological value.

Based on the analysis of historical data completed in the Ecological Assessment by Heartland Ecological Group Inc. (see Appendix 1 – Ecological Assessment), the corridor historically appeared to consist primarily of oak savanna and/or oak woodland dominated by bur oak, white oak, and hickory that was initially impacted by cropland conversion and pasture prior to the 1930s. As residential development replaced agricultural land use, there was an increase in tree density and canopy closure within the greenway. There is currently dense residential development as well as some parkland surrounding the entire corridor.

From an ecological standpoint, the legacy oaks are a treasure, but the ecological assessment notes the overall health of these mature oaks is declining. It also notes there is very little oak regeneration, while the younger generation of trees trends towards species that are "less ecologically desirable." The shrub layer is dominated by buckthorn which contributes to the suppression of oak and other slower-growing native hardwood tree species, as well as an herbaceous groundlayer. The assessment notes that overall biodiversity and ecological functionality of the site is in decline. The corridor plan provides an opportunity to improve site biodiversity and ecosystem functions by controlling some of the invasive species, restoring native herbaceous and shrub layers and replanting trees such as oaks, hickories and other native hardwoods to better direct the future canopy composition towards a new generation of trees that are part of the natural ecological community.

Goals and Objectives

The adjacent neighborhoods highly value the corridor in its current state for its wildlife habitat and high canopy coverage with its mitigating impacts on the urban heat island, and carbon sequestration benefits. The Community also has concerns for the future ecological health of the corridor and the potential tree and habitat loss that may come from more use and potential large-scale projects that may occur. Based on these concerns the Community requested an environmentally sensitive approach to the corridor plan with an emphasis on a robust engagement process.

In addition to the Community's goals, the City's project goals relate both to the public infrastructure needs of the area along with the ecological benefits of the greenway. These include construction of a stable/non-eroding stormwater channel, reconstruction of non-functioning stormwater ponds, the ability to maintain and effectively respond to sanitary sewer maintenance needs, and creation of a healthy woodland, and accomplishing these while incorporating the Community's goals. The healthy woodland habitat would help meet a number of those goals by providing functions such as erosion control, infiltration, and wildlife habitat. The City's primary goals are to stabilize the channel, maintain the existing infrastructure via new and existing access, and improve the ecological functionality of the site through ecological restoration within project boundaries. Another primary goal of this plan is to provide a clear and concise guidance

document that balances the various requests and objectives and will provide the framework for management of the lands moving forward.

Stormwater Goals

The Sauk Creek Greenway is a part of the main spine of the Pheasant Branch Watershed and thus needs to convey a significant amount of stormwater through the corridor. A comprehensive flood study was completed for this watershed following the August 20, 2018, flood event. Approximately ~1,268 acres of the watershed drain through this greenway (see Figure 2). The stormwater needs to pass through the greenway safely without causing flooding to adjacent structures and pass that flow in a way that doesn't negatively impact downstream water quality. In its current state, the channel will continue to erode, negatively impacting the existing sanitary access path, adjacent private property, adjacent trees, and downstream runoff water quality. Erosion will continue to provide for sediment migration downstream, to the flatter portion of the channel between the two ponds and move sediment downstream to Wexford Pond and Lake Mendota. Ponds are not 100% effective at removing sediment, and the downstream ponds, both at N High Point Road, and at Wexford, are undersized based on today's design standards, meaning they capture even less sediment than the ponds designed today do. The City's ponds are designed and modeled assuming upstream channels are stable; therefore, sending sediment downstream knowing a portion of it will continue to flow further downstream to water bodies is contrary to the citywide goals of trying to protect our receiving waters (Lake Mendota and Lake Monona).

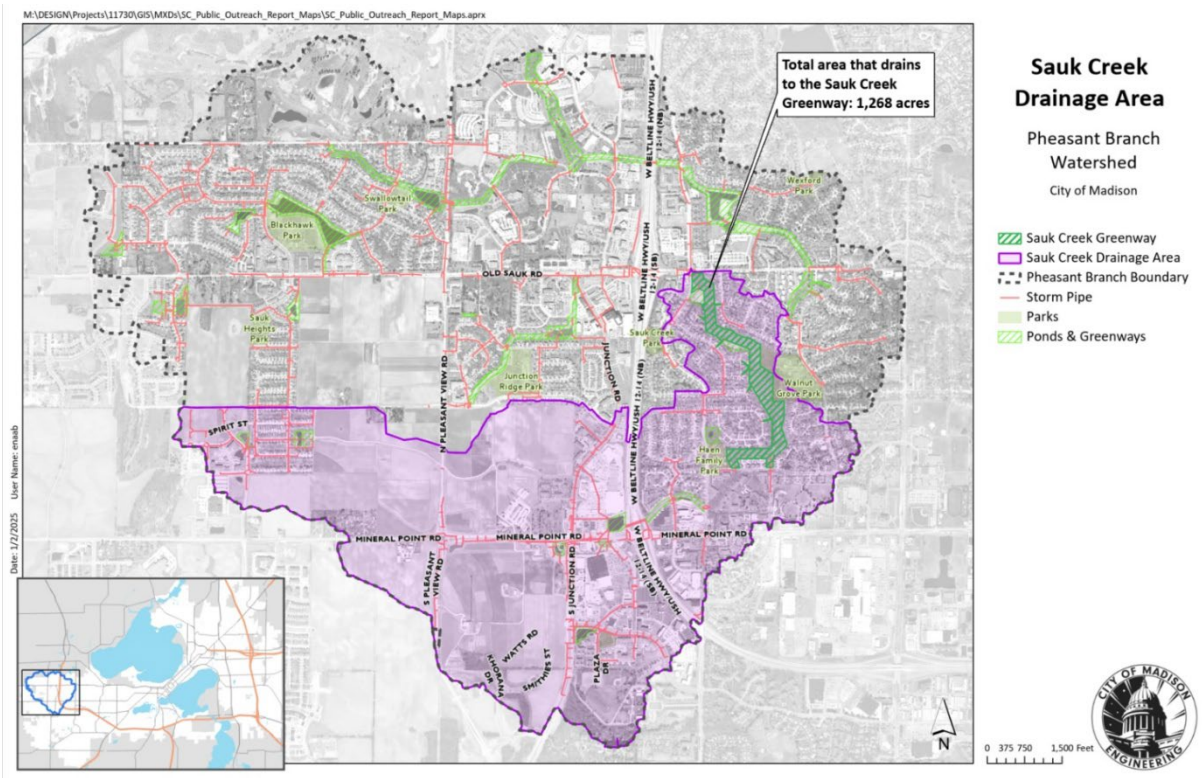


Figure 3 Portion of Pheasant Branch Watershed that drains to the Sauk Creek Greenway

Over time, storm events have eroded and allowed for the low flow channels to meander, widen and find new flow paths throughout existing Sauk Creek greenway. This in turn creates eroded banks and sends sediment and nutrients downstream, filling in ponds and waterways, and contributing to harmful algae blooms and poor water quality in downstream rivers and lakes. Some of the sediment from the greenway can be seen in the northern section between both ponds where the channel flattens, and water slows down causing some larger sediment to settle out. The sediment accumulates quickly, filling downstream pond Wexford Pond, behind High Point Church. Wexford Pond was recently dredged at a cost of $1M to remove the accumulated sediment. Without stabilization, more projects such as this would become necessary on a more frequent basis.

As a result of the continued erosion, there are many trees adjacent to the channel that have fallen within the channel itself. When these trees pile up, they can create log dams that hold back water within the channel and force the stormwater over at the lowest point (think of a small waterfall), resulting in significant movement of the main channel, widening and eroding of the channel just downstream of the blockage. There are many examples of this occurring and causing further erosion in a self-reinforcing cycle of erosion and subsequent tree loss.

Figure 4 Log dam created a channel blockage and led to erosion on adjacent bank

The erosion and resulting sediment migration has a negative impact on our downstream ponds, waterways, the Pheasant Branch Conservancy, and lakes Mendota and Monona. Stabilizing the banks of badly eroding channels is in alignment with the City of Madison Comprehensive Plan, Imagine Madison, to improve lake and stream water quality, and is in alignment with the Renew the Blue guide from the Yahara CLEAN compact, which specifically lists stabilizing drainage corridors as a recommended action. Additionally, in order to be compliant with State and Federal laws, the City needs to maintain stable stormwater channels.

As noted earlier, the reinforcing cycle of downed trees blocking the channel contribute to the erosion and bank instability. To efficiently complete maintenance of the downed trees the right access is needed that supports the various equipment that is to be used. Currently, the City does not have equipment access to the majority of the channel, apart from portions of the channel along the sanitary access path, to allow removal of fallen trees causing blockages in the channel. Access is needed to allow for future channel maintenance, and as part of any future construction project where improvements need to be made to stabilize eroding banks.

Maintenance Goals

While much of the feedback received by the City during the public outreach process has requested a smaller City footprint in the greenway, it's clear by the numerous requests the City receives to maintain the greenway and remove downed/dead trees and channel blockages that many residents desire more maintenance of the greenway. Since 2018, Engineering Operations has received over 40 requests for tree removals in the Sauk Creek Greenway alone. Currently, the City has limited access to reach areas that are not adjacent to the existing sanitary access path. This includes limited access for properties along Farmington Way, Red Fox/Gray Fox, and many areas with downed trees within the channel. To accommodate those requests from neighbors, and to maintain essential City infrastructure, well thought of access points are necessary. Additionally, being able to effectively get equipment to locations within the greenway is necessary for mowing existing ponds to prevent invasive, woody vegetation from shading out the herbaceous vegetation, which can create bare soil where erosion could occur.

Routine tree removals and tree care will be decreased if the appropriate access roads are not provided to allow the necessary equipment access to complete the work. The City has limited resources to maintain the ~1,500 acres maintained by the Stormwater Utility citywide, and areas with defined access paths are prioritized over those without for the safety of crews. There is limited ability to purchase specialized equipment or hire specialized contractors to perform the work that is needed to maintain the trees, so providing the appropriate access to the lands for the typical equipment that is used elsewhere in the city will make it so those lands can benefit from many routine maintenance activities.

A major 21" diameter sanitary sewer interceptor that carries wastewater was constructed within the corridor in 1987 as the lands in this area were developing. Installing sanitary sewer through greenways was, and is still, common practice as greenways are often the lowest point of the area making it a logical place to locate gravity sewer. Unfortunately, when the sanitary sewer was designed, there was little to no consideration for how it was to be maintained. The maintenance of the sanitary sewer interceptor includes use of sanitary Vactor trucks, which are used to clean and maintain the system by sucking up debris and sludge with a vacuum while using high-pressure water jets to clean and break up blockages (See Figure 18). Due to the size and weight of these Vactor trucks, it's important to have the necessary access roads that can support Vactor trucks to respond to an emergency if it occurs after a rainfall event or during a wet period. Response times will be slower without the ability to utilize a Vactor truck which could be disastrous for adjacent properties and for the environment if there was a potential sewer backup or overflow of wastewater into the channel.

The City needs to maintain this regional sanitary sewer that runs north-south through the greenway. This sewer is serviced via the existing sanitary access path that was built in the 2010's. The sanitary sewer requires regular preventive maintenance including cleaning and television documentation of pipe condition. The sewer also needs to be accessible during a blockage or overflow event that could result in

sewage backups in adjacent residential basements or into the channel. The quicker the City is able to respond, the more effectively they are able to manage an emergency. Currently, the access path is not suitable for use with the necessary equipment for a period of up to several days to weeks following a rain event, or during wet times of the year. Ensuring the path is also cleared of brush and mowed is important for the operators to be able to drive safely along the path.

By considering maintenance access with the corridor plan, the City and Community are able to thoughtfully consider access needs and requests, what can be accommodated, and also importantly, what limitations to maintenance should be considered when making these decisions. Where maintenance access improvements are included in the corridor plan, they can then be paired with a construction project, which serves a dual purpose. The design phase of each construction project will include Community feedback on individual impacts to trees, exact locations for access, planned restoration, and budgeted long-term ecological restoration work to establish desirable native plants, in turn improving wildlife habitat and help promote stormwater infiltration, among many other benefits. On the contrary, when the City doesn't have access established and is requested or needs to complete maintenance in a space where there currently isn't a route, creating access in a haphazard way (that may include tree removals and disturbances to the lands) can be more detrimental than having these routes already identified during a detailed Community engagement and planning process to make the decisions beforehand. With the City's limited resources, budgeting in advance for projects is important to ensure there is funding to do this kind of engagement, planning and design of these routes. When City staff respond in emergency situations with limited access that haven't been budgeted, designed or planned, the inevitable result is unintended consequences that may include loss of desirable trees, and lack of resources for subsequent restoration of the area.

Ecological Goals

An ecological assessment of Sauk Creek Greenway performed by Heartland Ecological Group Inc. (see Appendix 1 – Ecological Assessment) identified the historical natural communities of the greenway as being largely oak-dominated communities such as oak savanna, oak woodland, southern dry-mesic forest and oak-hickory forest. The assessment goes on to describe the ecological health of the greenway as degraded and identifies several key ecological threats including replacement of oaks with "less ecologically and economically desirable species"; spread of invasive species such as buckthorn and garlic mustard; land use encroachments and introduction of invasive horticultural plants by adjacent properties; erosion due to lack of cover by perennial vegetation; and flooding and sedimentation of the channel. The current conditions in the greenway have led to both undercutting of trees and to large

> *Oaks are being replaced by trees that are more common in the landscape and provide less ecological value. Oaks are considered critical keystone species that provide an enormous contribution to our food webs, as many moths, butterflies, and insects depend on oaks to lay their eggs. These caterpillars and insects in turn are used as food for young birds, and the cycle continues (Tallamy 2021). Oaks also provide acorns that feed numerous wildlife.*
> *-Heartland Ecological Group, Sauk Creek Ecological Assessment*

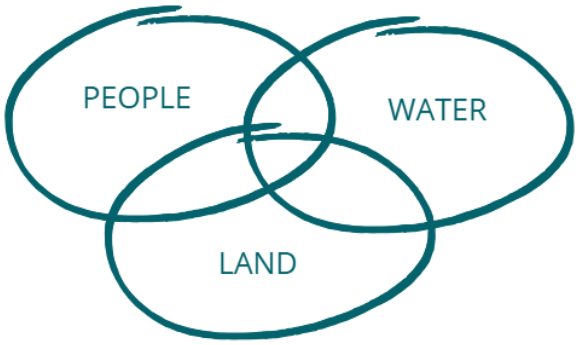
sections of trees being buried under layers of excess sediment, impacting their health. Oak loss may be further exacerbated by the presence of oak wilt, identified in the greenway in 2024.

The ecological assessment notes that oak health and ecological functionalities in the greenway are in decline. The assessment also notes that without intervention in the form of ecological restoration there will likely be mature oak die-off from competition from other species, fire suppression, lack of regeneration, disease such as oak wilt, and erosion and sedimentation issues. Additionally, invasive species will continue to proliferate and spread without efforts to control their populations, limiting the ability of native herbaceous species, such as remnant pockets of wild geranium, Solomon's seal and jack-in-the-pulpit, to grow.

Ecological restoration of the project area could help mitigate the instability and erosion of the channel by conversion of bare ground to areas that are planted with deep rooted native herbaceous plants, shrubs and trees. Adding native plants back to the site in the form of tree and shrub plantings, herbaceous plug plantings and seed mixes suited to various site conditions will also improve the biodiversity and wildlife habitat offered by the greenway. Preserving as many mature canopy trees as possible will help retain woodland benefits in the area. Planting supplemental trees in areas affected by project grading may also help direct the next generation of canopy towards oak, hickory and other slower-growing hardwood species that are currently struggling to regenerate in the greenway.

Input and Balance

The City originally came to the Community with the need to stabilize the greenway in 2018. At that time, the Community requested a more robust engagement process where they could weigh in on the design. Later that year, massive flooding occurred on the west side, and the Sauk Creek Greenway project was put on hold until the Pheasant Branch Watershed Study was complete.



When the Pheasant Branch Watershed Study was complete, the City re-launched the Sauk Creek Greenway engagement in 2023 with a broader engagement approach. The plan aims to balance the needs of water (stormwater), land (ecology and wildlife), and people (maintenance requests, mobility, accessibility). Due to the size and complexity of this greenway and adjacent ponds, including additional considerations for trees and other vegetation, public use, mobility and accessibility on public land, and based on the feedback that we received, we called this broader approach a "Corridor Plan." The Corridor Plan includes the entire stormwater corridor – not just the part of the greenway that was included in the 2018 project, but the entire greenway, and the existing adjacent stormwater treatment ponds.

The Sauk Creek Greenway corridor is a Community asset with many people enjoying the channel and the woods, including people who live very close, those that bring their dogs to the adjacent dog park at Walnut Grove and many who walk on the unofficial walking trails that cross through the park and greenway. Part of the outreach effort therefore included seeking input that reached beyond just an engineering approach but to gain insight on how the various needs and desires are intertwined and how to balance that with the

functional needs of the greenway channel and lands. Learning how the Community values the lands and how the lands are used by those living in and around the area as well as the importance of this area for wildlife that depends on the health of the corridor, was a key component in the engagement process. To gain more insight on how the larger Community values the corridor Focus Groups were also done to gain feedback on the broader Community that use the space.

The primary objective of the plan is to obtain Community feedback on the greenway corridor as a whole, instead of as individual construction projects. Therefore, the entire process was driven by defining what the Community would be able to provide input on and use that input to shape the proposed corridor plan. Each meeting consisted of explaining engineering needs and restoration concepts to the Community and asking them to weigh in on options. It should be noted that the City's West Area Plan was running concurrently during part of this process, and in that plan, they were considering including a multi-use path north-south through the corridor. The Community was largely opposed to including a paved, multi-use path within the corridor, and shared that at both West Area Plan and Sauk Creek Corridor Plan meetings. This ultimately shaped the removal of a north-south multi-use path from both plans.

The corridor plan is a high-level plan that shows generalized locations of design concepts, ecological needs and trajectories, and maintenance needs related to the greenway corridor. Specific designs will occur as each project is budgeted and during the detailed design development. Much of the input received during the last phases of the corridor plan was more specific in nature and will be noted to be included during the design phases.

Chapter 2 –Existing Conditions and Maintenance

Existing Conditions

Regional Sanitary Sewer

A regional sanitary sewer runs through the Sauk Creek Greenway Corridor. There are approximately 10,000 people served by this sanitary sewer, which is approximately 870 acres of area. Approximately 600,000 gallons of sewage flows through the sewer each day, which is enough to cover a 1/3-acre lot 5.5 feet deep with sewage. Future development on the west side is anticipated to increase the total area served by the regional sewer to 1,100 acres.

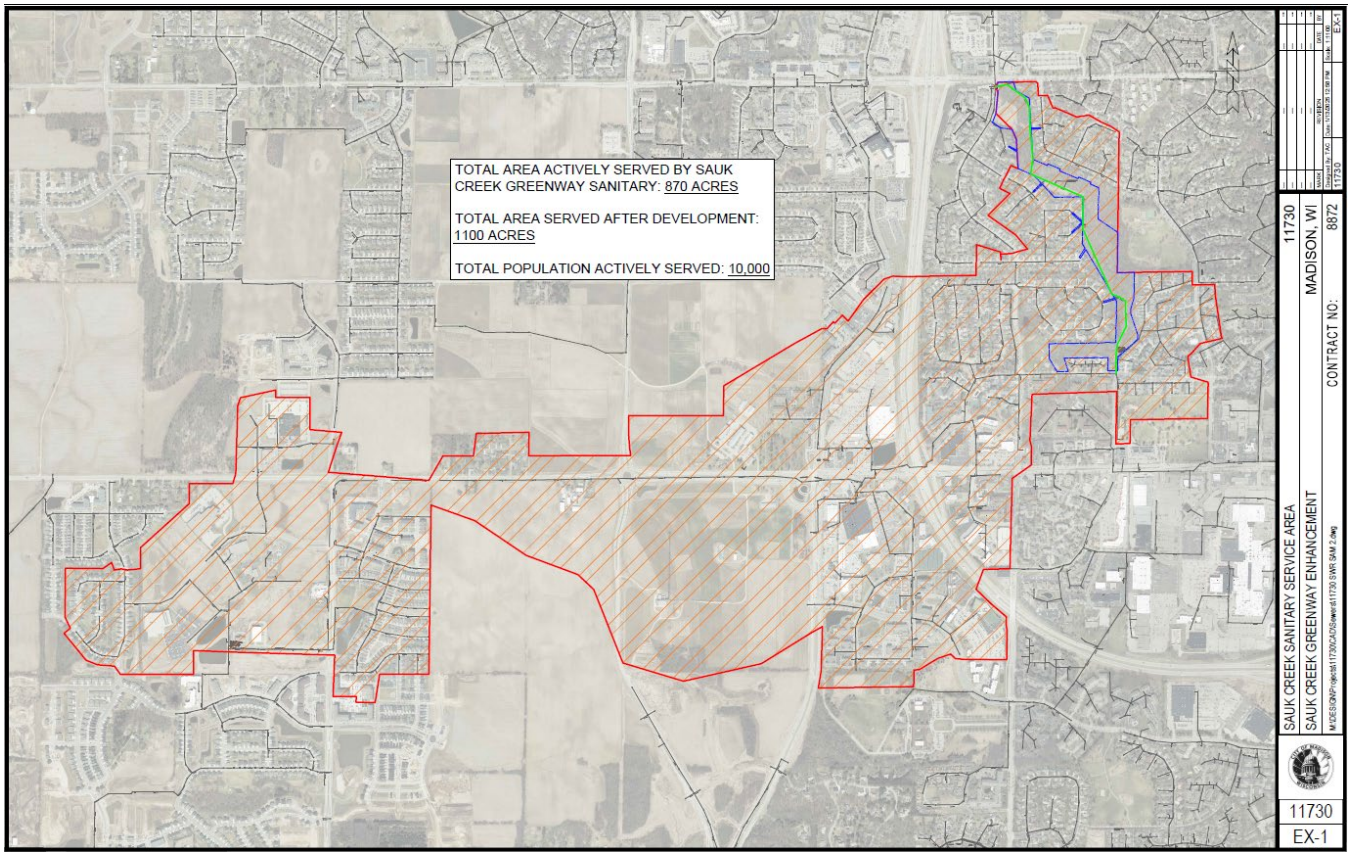


Figure 5

Stormwater Conveyance

The Sauk Creek Greenway is a part of the main spine of the Pheasant Branch Watershed and thus needs to convey a significant amount of stormwater through the corridor. It can be challenging to put the amount of flow that the greenway needs to accommodate into perspective.

There are two components to stormwater runoff that are evaluated when looking at quantity and impact of storm events these are peak flow and total volume.

Peak flow means the highest rate or peak rate of water flowing during or after a rainfall event. For example:

- For a typical large summer storm, the peak flow through the greenway is ~290 cubic feet per second (CFS) of water flowing through the greenway during the 50% annual chance storm event (a type of summer storm we see most years, often referred to as a 2-year event, which is about 2.5" of rain in 24 hours). To put it into perspective, that is equivalent to approximately **10,730 garden hoses running at the same time.**
- For a large flood-level event (the 1% annual chance storm, or 6.7" of rain in 24 hours), the peak flow is 820 cubic feet per second, or **30,340 garden hoses running** to equal the same amount of peak flow.

Total volume is another way to understand the amount of stormwater that passes through the greenway more in relation to infiltration. An acre foot is equal to one acre of area that is one foot deep. For example:

- For a typical large summer storm (50% annual chance storm), 86 acre-feet of stormwater flow through the greenway throughout the storm. Currently within the corridor, stormwater is only intentionally detained in the 2 stormwater ponds, that are about 3.1 acres total. If you tried to hold all the stormwater from a 50% annual chance storm in these two ponds it would be stacked nearly 28 feet high (~ equivalent height of a 3-story building).
- For a large flood-level event (the 1% annual chance storm, or 6.7" of rain in 24 hours), 290 acre-feet of stormwater flow though the greenway throughout the storm. Currently within the corridor, stormwater is only intentionally detained in the 2 stormwater ponds, that are about 3.1 acres total. If you tried to hold all the stormwater from a 1% annual chance storm in these ponds it would be stacked nearly 94 feet high (~equivalent height of a 9-story building).

Currently the greenway is conveying stormwater so that adjacent properties do not flood. There is flooding downstream of the greenway during a 1% annual chance storm on Old Sauk Road and High Point Road. Part of the Pheasant Branch Watershed Study process analyzed if the Sauk Creek greenway could contribute to mitigating that flooding downstream by holding water within the greenway. The study found that the existing stormwater ponds were not big enough to have an impact on downstream flooding, even if they were maximized.

Additionally, increasing grading required to increase the stormwater ponds would cause additional tree impacts. Holding more water within the greenway by adding berms increases the water depth. This may have unintended negatively impacts to the existing trees that have not adapted to having standing water on top of their roots for prolonged periods of time.

Since tree removals are one of the largest concerns for the greenway, the corridor plan did not consider modifying changing flow needs from a flood perspective, but the intent is to be sure that the channel can be stable as stormwater is conveyed through the system.

The Community requested the City assess how to decrease flows to the greenway in order to mitigate the need to stabilize the banks. Due to the existing soil and ground cover conditions, flows would need to be dramatically reduced to allow for un-stabilized banks to handle the stormwater forces of most storms. As stated, the intent of the project is to create stable banks that would allow storms to flow through the channel without resulting in large amounts of bank erosion.

Bank Condition

There are many banks within the Sauk Creek Greenway that are actively eroding and are not stable. The greenway is part of a main spine of the Pheasant Branch Watershed and 1,268 acres of lands contribute to the runoff upstream of the greenway. State regulation assumes that channels within a municipality are stable. Stabilizing the banks of badly eroding channels is in alignment with:

- The City of Madison Comprehensive Plan, Imagine Madison, to improve lake and stream water quality
- The Renew the Blue guide from the Yahara CLEAN compact, which specifically lists stabilizing drainage corridors as a recommended action

There are several key areas within the channel that are problematic from a bank stabilization perspective:

- Outside banks at large curves in the channel that are being eroded by the more frequent, intense rain events
- Eroding areas adjacent to key infrastructure including the sanitary sewer, sanitary access path, and private property
- Areas that have eroded excessively due to a large channel blockage that resulted in the channel widening for water to move through. You can see many sections of the channel that are 2x the width of the rest of the channel where these blockages resulted in widening of the channel.

- The area near the existing concrete weir that was installed in the late 1980's when the ponds were built. The weir has since failed and is a good example of how the water widens and erodes the channel.

Figure 6 Concrete weir installed when pond was built to hold back water and route it into pond. The length of the concrete weir shows original width of the channel and how much it has widened.

Figure 7 Channel widened due to erosion. Can see widened channel section in foreground near tire.

The existing bank condition graphic below shows where there are many banks that are over 3 and 4 feet tall that are at such a steep slope that they are not considered stable (steeper than 2h:1v slope, vertical or undercut banks). The banks mapped in red, and orange are highly susceptible to erosion, and the banks in blue and green are moderately susceptible to erosion.

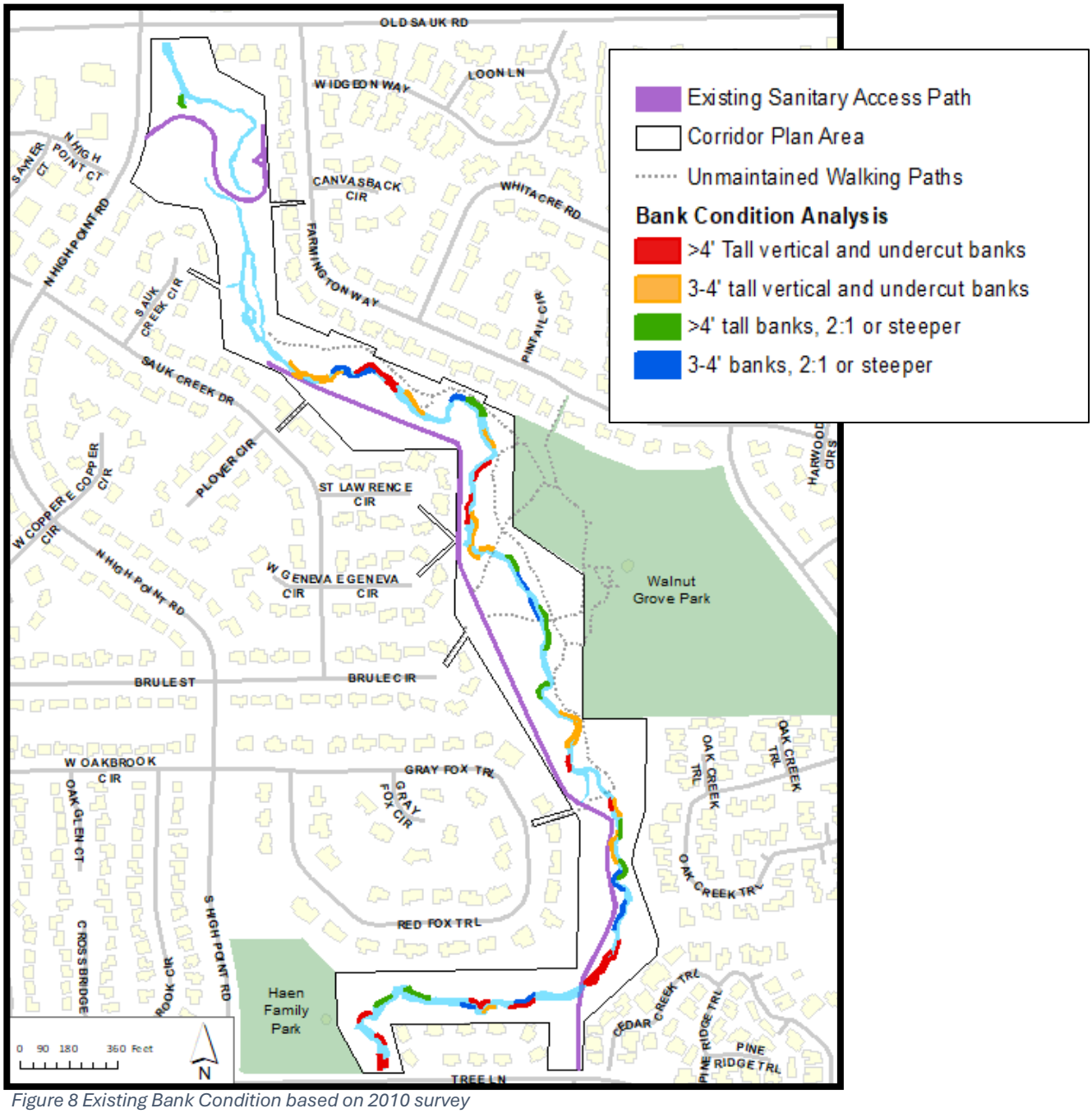


Figure 8 Existing Bank Condition based on 2010 survey

The City hired a consultant to complete a channel assessment, and part of the assessment was to model the erosion potential within the corridor. The erosion potential is related to the forces caused by quickly moving stormwater (flow velocity). Bank erosion potential is determined by modeling peak flow velocities of the 10% annual chance storm. As shown in Figure 9 there are many sections of the greenway with high

or moderate erosion potential which generally coincides with the current bank condition assessment. Understanding where existing bank conditions are poor and where the susceptibility of continued erosion is high helps provide insight into the locations and stabilization techniques that could be used to help stabilize the channel.

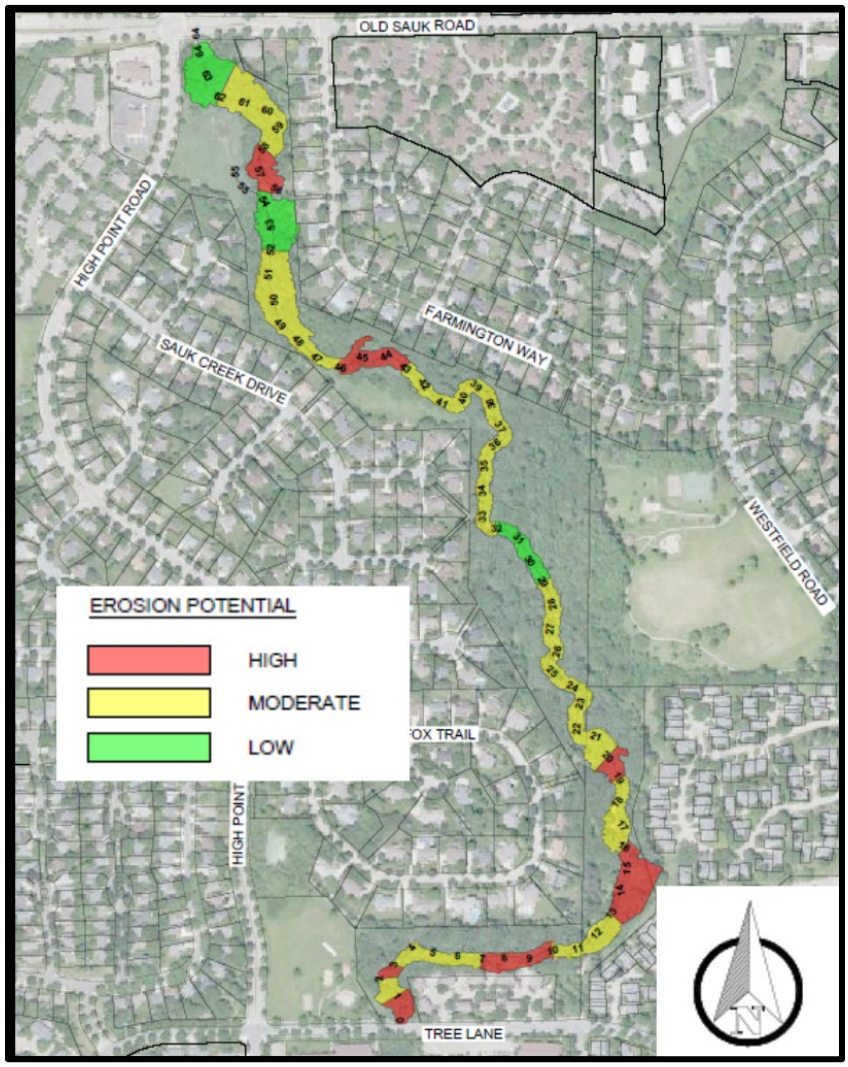
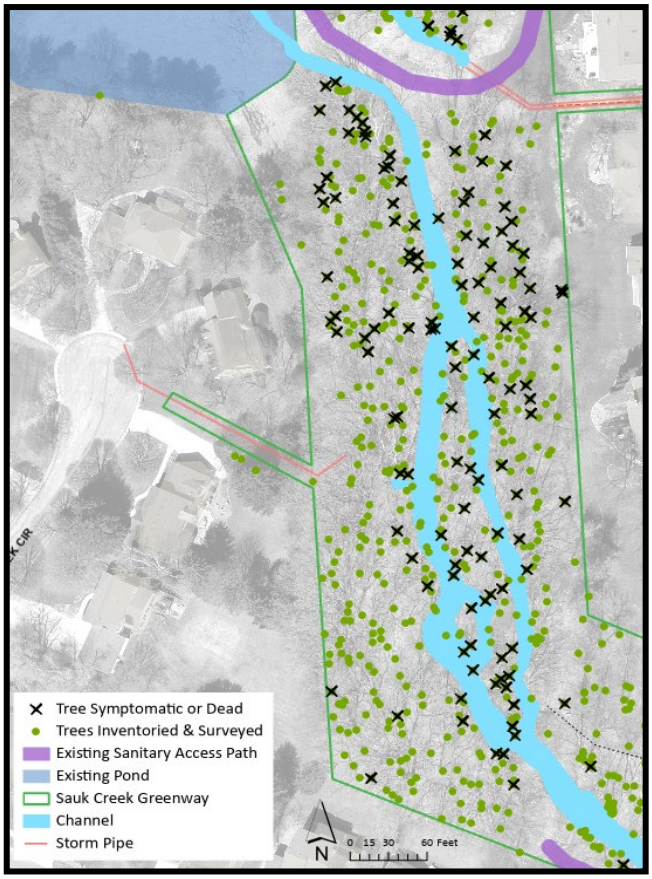


Figure 9 Modeled Erosion Potential

Sedimentation in the Channel

The active erosion within the channel has added to sedimentation accumulating in specific sections of the greenway.

On the north end of the channel in between the St Lawrence Pond and High Point Pond (the existing stormwater treatment ponds between Plover Circle and Canvasback Circle, as shown on Figure 12), the channel flattens out longitudinally which causes the stormwater to slow down and spread out. This is confirmed by neighbors that report that stormwater reaches the edge of their properties along Farmington Way and parts of Sauk Creek Circle. The slowing of the water allows for the sediment to drop out in this location, some of it coming from the upstream actively eroding banks. This is very evident when you walk this area and see tree root flares buried in sediment and very little groundcover.



This sedimentation in the northern end is likely exacerbated by the channel being routed into High Point Pond which can create a backwater or standing water condition in the greenway allowing water to slow more and drop out more sediment.

From a stormwater perspective, slowing down the stormwater can be beneficial for diminishing erosive forces (which you can see based on a lack of eroded banks through this area, per Figure 8), and settling out some sediment and nutrients before they wash downstream. However, depositing this much sediment in a wooded area can negatively impact the trees, as seen by the quantity of dead trees within the northern area, and the large quantity of maintenance requests for removal of dead trees by adjacent residents. Additional soil added to the tree root zone frequently impacts the overall tree health, in particular oak trees, which are more sensitive to sedimentation. For more on how sedimentation affects trees and other vegetation please refer to Chapter 3: Ecological Assessment.

Removing sediment that is widely spread out and over existing vegetation and trees/tree roots would be very difficult and labor intensive to do without utilizing skidsteers or similar equipment, which may end up causing more damages to the vegetation that is already impacted. Being able to either capture or mitigate the deposition of the sediment prior to it depositing in sensitive areas is a more environmentally sound and sustainable approach.

Infiltration Capacity

One of the functions of the stormwater corridor is to slow down and infiltrate stormwater. During large events that cause flooding, infiltration within the greenway has a minimal impact due to the volume of water moving through the corridor (as noted earlier, a large flood-level event such as the 1% annual chance storm, 290 acre-feet of stormwater flow though the greenway throughout the storm). However, the way the greenway currently functions, water leaves the channel whenever it rains more than 1 inch and the floodplain is activated, allowing the wooded floodplain to help slow the flows and infiltrate. Deep rooted vegetation can help promote infiltration with fibrous roots that create channels through the soil increasing porosity. For example, one study showed native switchgrass infiltrates 7.5in/hr compared to urban turf at .29 in/hr. An additional benefit is that ground cover can also hold the soil in place and minimize erosion, so areas of the floodplain aren't washed away as easily if the ground is bare or if it has shallower rooted plants. Deep-rooted, shade tolerant herbaceous vegetation compatible with woodland settings are proposed in the ecological restoration.

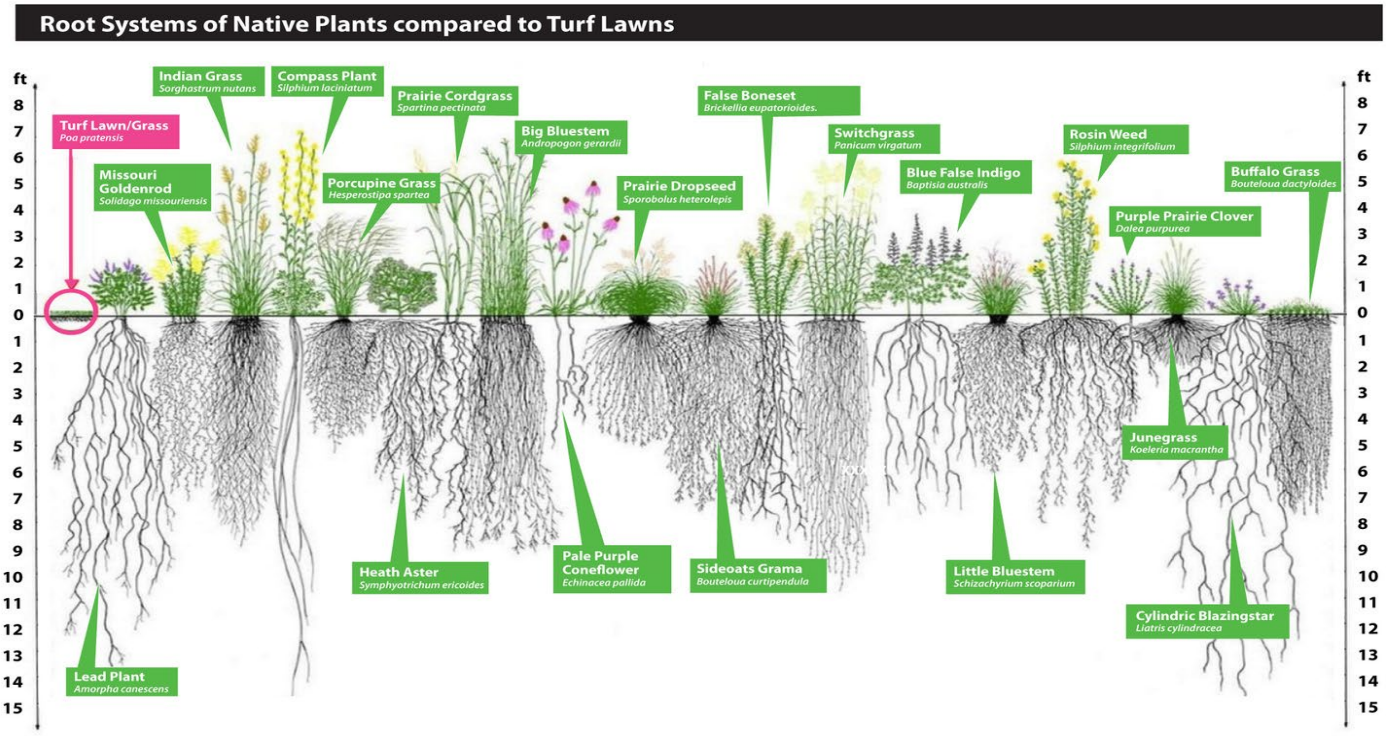


Figure 10

In analyzing the impact of upstream development on flows through the greenway, the City found that the neighboring areas that drain to the Sauk Creek greenway (Sauk Creek Neighborhood, Tamarack Trails, Oakbridge Community, small portion of Walnut Grove) make up 17% of the drainage area, yet contribute 67% of the peak flow that results in downstream flooding in the 1% annual chance storm. This is in part due to timing of stormwater flows, and the way the region developed. Water that is upstream in the more commercial areas on the other side of the beltline contributes significantly to the total flows; however, they

are far enough away and are routed through a series of ponds and/or greenways that function like ponds, so that area's contributing runoff takes a much longer time to get to the greenway than the water from homes and streets that are nearby. In larger storms where there is a lot of rain and the runoff from the commercial areas arrives at the greenway then is exacerbated by the runoff from the neighboring areas, which causes flooding. Additionally, the neighborhoods adjacent to the Sauk Creek greenway developed before there was an infiltration requirement for new development, so the water tends to run off faster from these neighborhoods than in areas where there are more stormwater management and infiltration features in place. Adding more infiltration will help with the flooding potential in smaller events, but in large scale events the impact of this infiltration, while still important, is lesser as it cannot keep up with flow of water.

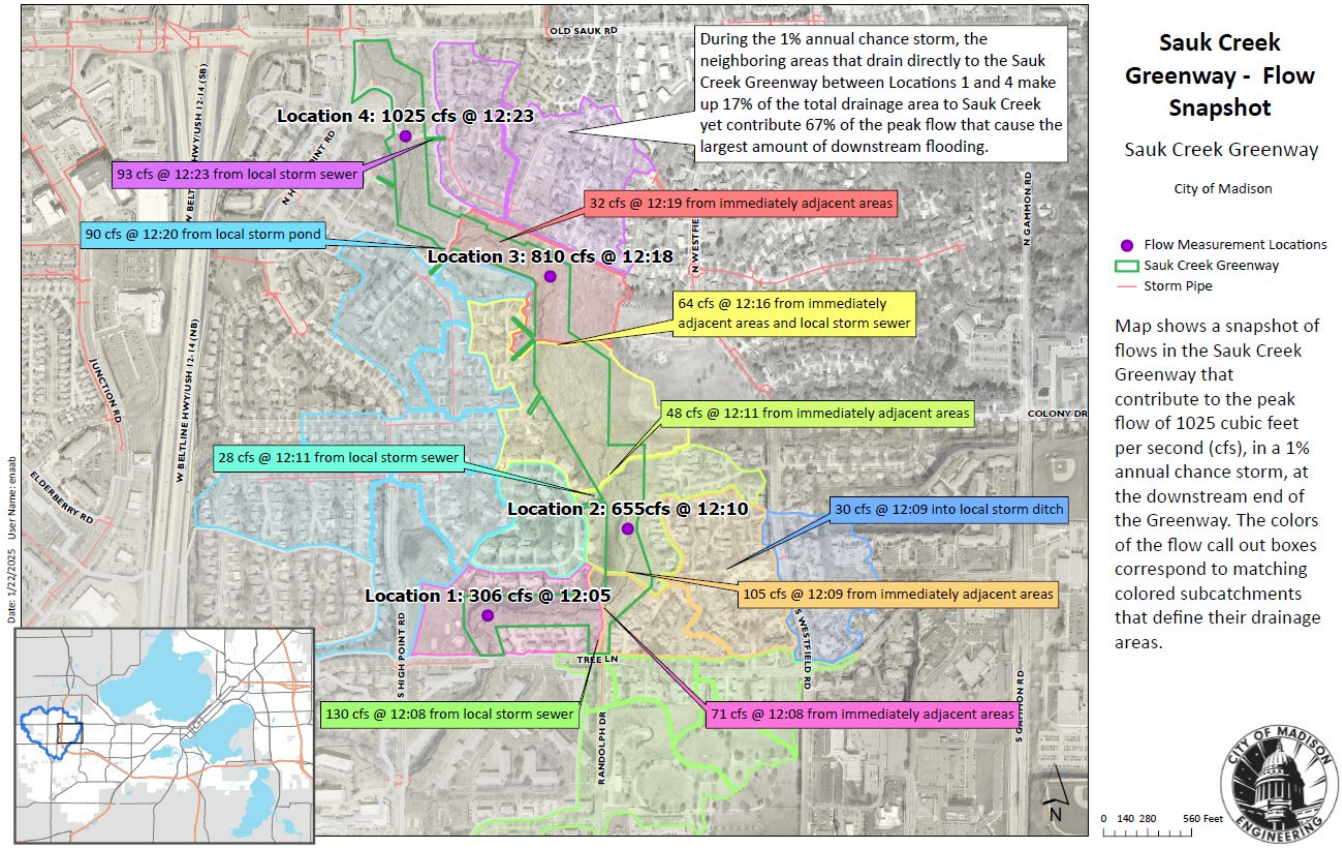


Figure 11

Existing Pond Condition

There are two existing stormwater ponds within the corridor. Both ponds were built with the adjacent development in the late 1980's and early 1990's to meet the stormwater development requirements of the time, which was detention of the 10% annual change storm, or commonly referred to as the 10-year event. To put this into perspective, today's standards for new development requires detention for the 200-year storm event. Both ponds were designed to collect flows from the channel, as well as treat stormwater directly from the neighborhood. The ponds are undersized for this amount of stormwater and capture only a small percentage of the sediment that we typically see captured in a properly sized detention basin.

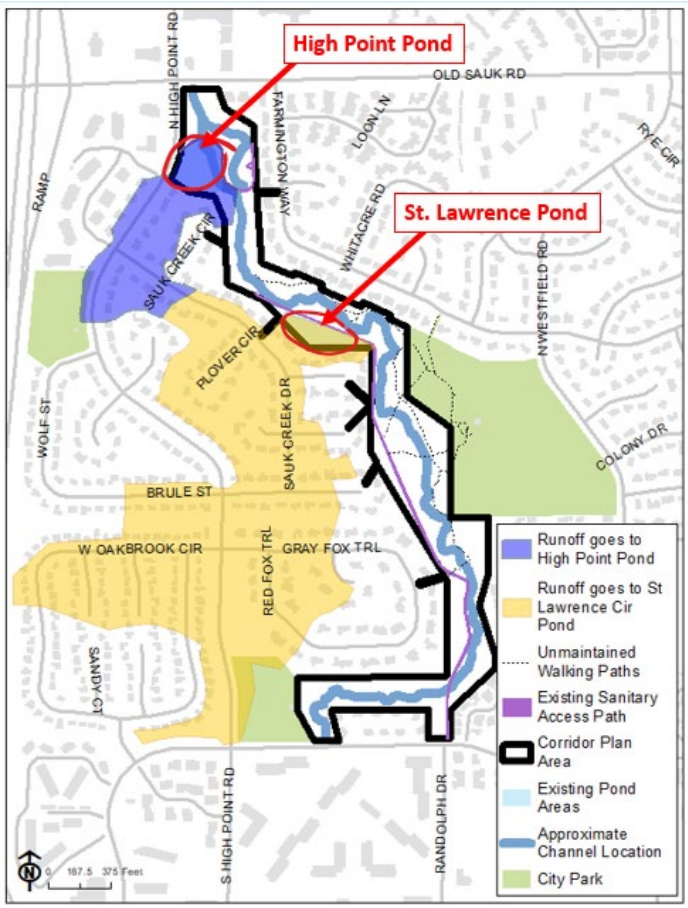


Figure 12

St Lawrence Pond

The St Lawrence Pond was designed to take small flows from the channel by backing up water behind a weir and directing that water into the pond, along with the water from the Sauk Creek Neighborhood (see yellow drainage area in Figure 12). This pond was originally designed to provide 10-year detention. By today's engineering standards, the pond is undersized to treat all the water that was directed to it. The weir in the channel has failed, and the pipes directing water from the channel filled with sediment. Additionally, the pipe that brings water from the Sauk Creek Neighborhood from Sauk Creek Drive broke and water is not effectively entering the stormwater pond. Therefore, the pond is not currently functioning correctly for detaining water as originally designed. With the pipe from the neighborhood properly connected, the pond currently captures 0.5% of the Total Suspended Solids (TSS), or sediment.

Figure 13 St. Lawrence Pond from access path, looking northwest

The pond is currently a "dry pond" or a detention basin, meaning that stormwater is collected in the pond, and is meant to slowly drain out completely which helps settle sediment and nutrients out prior to entering the main channel. However, latest engineering Best Management Practices (BMPs) demonstrate the pond could be more effective at treating stormwater if it was designed to be a biofiltration basin with the existing

native soils at the bottom of the pond being replaced with two feet of engineered media and the addition of an underdrain. The bottom would be planted with native plants that help increase infiltration. This conversion could bring the pond in line with today's stormwater standards and be properly sized to more effectively treat the stormwater coming from the Sauk Creek Neighborhood.

High Point Pond

The High Point Pond was designed to treat flows that come from N High Point Road and Sauk Creek Drive (see purple drainage area in Figure 12). When the pond was built it diverted the low flow channel from the greenway into the pond. The pond is also a "dry pond" or detention basin, meaning that it fills with water during a storm event, and slowly releases the water downstream but isn't intended to hold water permanently. The berm on the north side of the pond is the controlling elevation of how high the pond can fill before it overtops northerly into the channel and down High Point Road. The pond currently captures 7% of the Total Suspended Solids (TSS), or sediment, entering the pond. The 7% capture assumes regular maintenance. This pond does not have adequate storage for the sediment load, and as it fills with sediment, its treatment potential decreases.

Figure 14 High Point Pond

The active upstream bank erosion from the Sauk Creek channel is sending large amounts of coarse sediment into the High Point Pond, which is easily visible. Routine cleaning to remove this is required to keep the pond functioning as intended. However, the amount of sediment accumulating is challenging to remove in a dry pond. This is because the sediment spreads out along the bottom of the pond, and to dredge (dig it out), you need to disturb much of the pond, and afterwards work to re-establish the vegetation. Additionally, stormwater modeling and research has shown that dry ponds, if not maintained, will re-suspend the sediment as water flows through the pond system, so they are less effective at capturing and holding the sediment in comparison to a wet pond (a pond that has a permanent pool of water in it). Current practices for new construction usually include a wet pond that will allow sediment to settle out. The cleaner water that leaves the pond is then sent to an infiltration basin where it soaks into the ground. This normally requires a land area of about 10% of the total drainage area. A system of this size to treat all the water entering the Sauk Creek Greenway would need to be 120 acres to meet current development standards. Due to the limited space available a wet pond and infiltration basin would not be a feasible in this area.

Wetlands

There are a variety of delineated wetlands within the Sauk Creek Greenway corridor. In the southern portion there are small, delineated areas within the east-west channel banks. On the northern portion, they are 2 delineated wetlands in the area between both ponds. The proposed improvements largely avoid impacting wetlands based on their conceptual layouts. During each detailed design phase when improvement locations are determined, wetland impacts will be mitigated to the greatest extent possible, and all necessary permitting will occur.

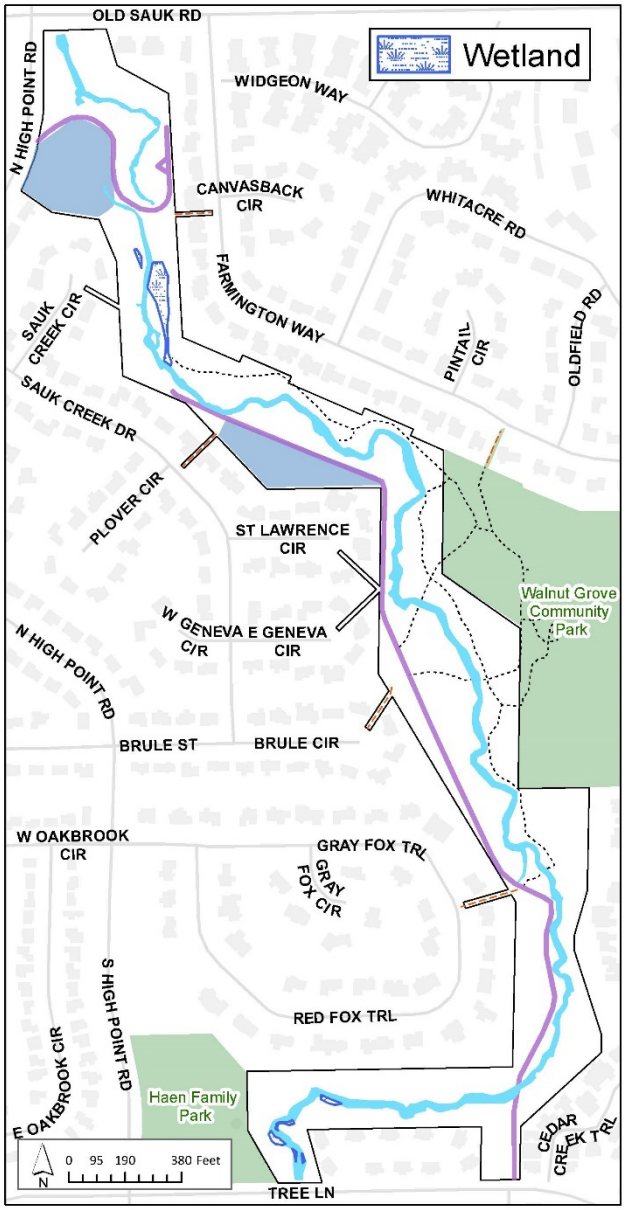


Figure 15 Delineated wetlands within the Sauk Creek Greenway Corridor

Existing Maintenance

The Stormwater Utility and Sanitary Utility are tasked with maintaining effective stormwater and sanitary infrastructure Citywide. The funding for supporting the Utilities is provided by the monthly municipal bills collected for properties within the City. The Stormwater Utility (SWU) manages ~1,500 acres of publicly dedicated vegetated land and additional 500 acres of public/private stormwater land. Sauk Creek Greenway is 34.9 acres, which is just 1.7% of SWU maintained land.

To put this into perspective, City Engineering Operations also maintains:

- 790 miles of sanitary sewer main
- 549 miles of storm sewer
- 39,313 stormwater structures
- 308 ponds, infiltration basins and raingardens

Within the Sauk Creek greenway, the stormwater ponds and sanitary access path are scheduled to be mowed one time per year to maintain invasive species spread and prevent the growth of volunteer woody vegetation that over time, could render the access unusable. In many instances this type of invasive vegetation can also shade out the native herbaceous vegetation that helps promote infiltration of water and stabilization of the soils.

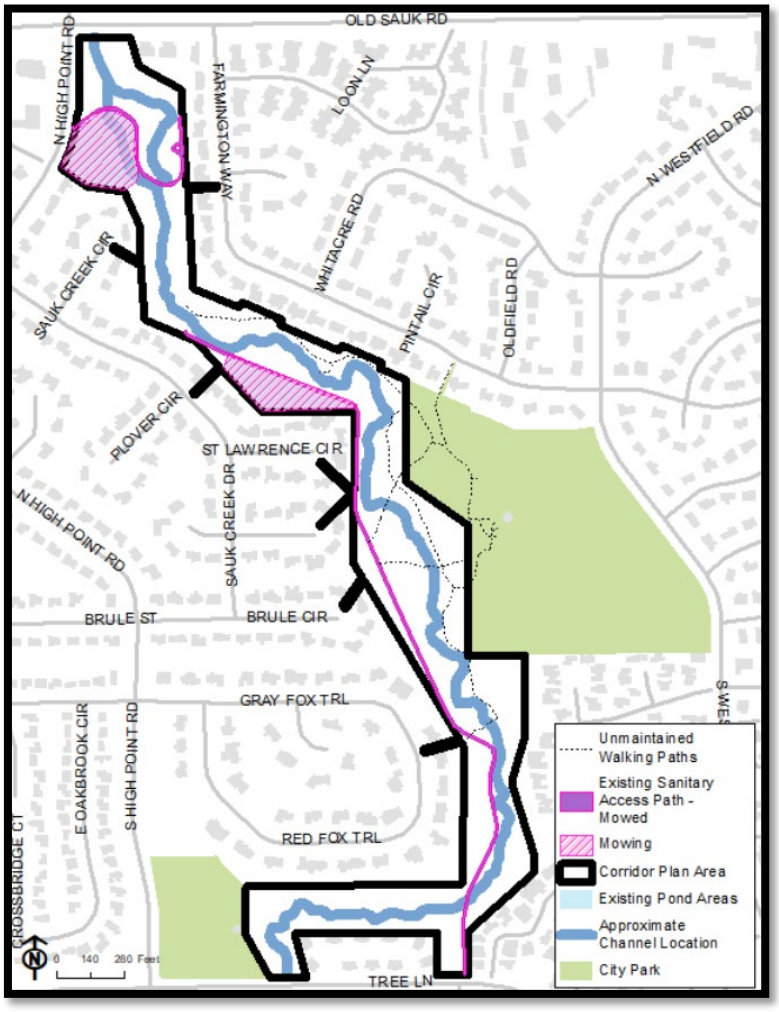


Figure 16

The sanitary sewer that runs through the greenway is regularly cleaned with a Vactor truck and televised as part of preventative maintenance schedule. This section of sanitary sewer is programmed for preventative

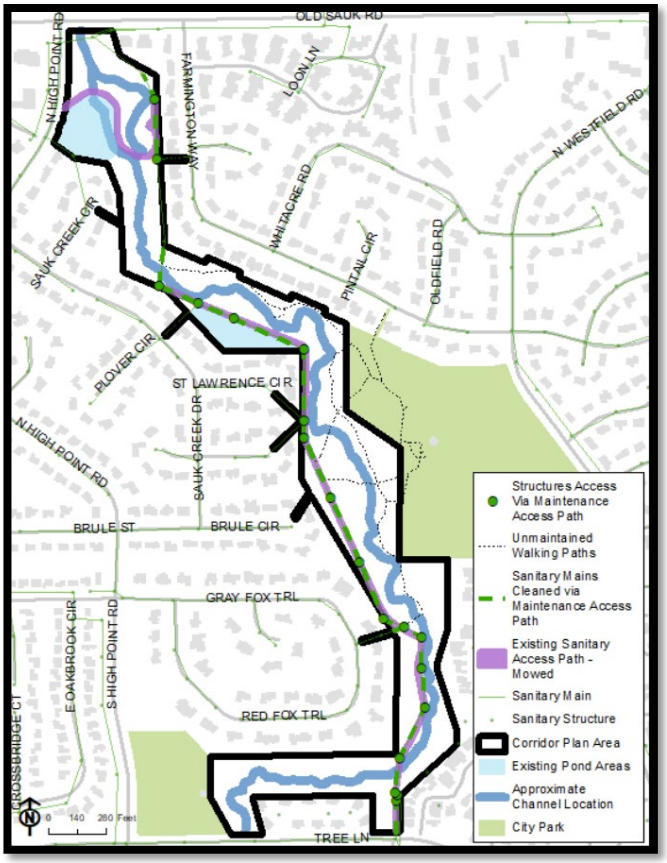


Figure 17

maintenance at a minimum of every 3 years to help prevent sanitary sewer back-ups. Many times, sanitary sewer backups are caused during large rain events when flood waters inundate the sanitary system which is not meant to carry that much flow. Water can enter the system when pipes and structures are broken, which is what this maintenance program is meant to detect. However, many times floodwaters also enter the sanitary sewer system when buildings or underground parking garages flood, which drain to the sanitary sewer. This type of preventative maintenance and related access needs is increasingly necessary to ensure there are no blockages in the system that would also exacerbate the issue, causing backups during extreme rain events, having a negative impact on public health and the environment.

Sanitary Access Paths

The City has nine 2100 Vactor trucks (see Figure 18) that operate 7 days a week, and are designed specifically to accommodate the cleaning and maintenance needs of over 790 miles of sanitary sewer mains citywide. Vactors are very large, heavy, cumbersome trucks, but they are very effective in keeping our sanitary sewers clear of back-ups and removing back-ups during an emergency. The Vactor truck needs to be able to clean the sanitary sewer that runs north-south through the greenway and access the sewer during an emergency. Vactors are the most effective tool for addressing sanitary sewer back-ups, which is essential in large regional sanitary pipes. When there is a back-up that needs to be cleared, Vactors need to be able to access the sanitary access structures adjacent to the back-up.

Figure 18

Figure 19 Failed sanitary access path

The City built 2 access paths in the early 2010's within the greenway to allow for access to the structures needed to clean the entire stretch of sanitary sewer. When the southern path was built, an articulated concrete block crossing of the channel was installed at the crossing near Tree Lane and Randolph Dr. (see Figure 19) This crossing did not hold up during large storm events, particularly the 2018 historic rain event, and has since failed. Currently, for the Vactor truck to access the sewer within in the greenway along the rest of the path, a temporary crossing is installed with swamp mats, which are typically large wooden planks, and are used to create a temporary road when the ground is wet or unstable. This takes 1-2 days of work for a City Engineering Operations crew to load, haul, and assemble swamp mats to create safe access for the Vactor truck and televising equipment, and it can only be completed when there isn't rain in the forecast for a series of days. If a sanitary sewer backup, or another sanitary sewer emergency is reported, the process to install swamp mats creates an unreasonable response time to address an emergency. Additionally, during typical maintenance, the amount of time crews need to spend installing a temporary road prevents them from completing other maintenance activities during those days anywhere else along the almost 800 miles of sewer mains in the city.

Figure 20 Existing sanitary access path along back of lots (red dashed line shows approximate property line)

As part of the access road installation in the early 2010's, Engineering staff agreed to install sod along many of the back lots of St Lawrence and Geneva Circle and put 6 inches of topsoil and seed on rest of the sanitary access path. The topsoil and seed were originally installed to help with concerns by the adjacent owners. This was a concept that proved over time to not be as robust as originally thought. Though the addition of the topsoil and seed for the access path was an improvement from having no access at all, it has not been as successful as originally hoped.

Since this access path was installed, the City has realized that placing 6" of topsoil and sod on top of the gravel access is insufficient for Vactor trucks (Vactor trucks weigh >70,000 lb). Vactor trucks tend to sink into the topsoil, and the grass is very slippery in wet, or even dewy conditions. Vactors are full of liquid, making them challenging to drive due to the shifting weight, and their large, wide attachments make maneuvering

extra challenging. It is risky to use the portion of sanitary access path that is covered in sod except in very dry conditions. This concept has been used in other areas of the City with limited success as well, and the City is currently not implementing these topsoil or sod covered paths where they are needed for Vactor truck access. Other reinforcement options that would allow for the use of grass on top, such as geogrid reinforcement with topsoil and turf on top, have also proven to not hold up to large vehicle traffic.

Figure 21 Vactor and crew cleaning sanitary mains via access structure in Sauk Creek greenway

Using multiple pieces of smaller equipment to address emergencies along the regional sanitary sewer from adjacent access structures on nearby streets or cul-de-sacs does not provide sufficient response times to an emergency. One Vactor truck is unable to clean or address a blockage around a sharp turn where the other mains tee into the regional interceptor. Therefore, it would be necessary to bring in multiple pieces of equipment. To mobilize additional crews, and equipment, during an emergency can take 2-4x longer to respond. The City's goal is to respond to back-ups within 1 hour. This response time is critical on a regional sewer that has 25,000 gallons of sewage hourly that could be backing up into somebody's home, or into the greenway.

Additionally, the Vactor's suction boom has an approximate reach of fifteen feet from the truck. Any further away and suctions is not usable. In the event any debris is being pulled through the line, which is often the case when clearing a back-up, suction is needed to remove blockages and fully clear the back-up. The lack of access prevents this from happening.

Other smaller pieces of equipment that have both jetting and suction functions needed are available on the market, but lack fresh water and debris tank storage capacity and are far less effective when dealing with larger pipes. The City is able to provide such a high level of service to its residents (bringing annual sanitary sewer back-ups down from the 100-350 annual back-ups in the 1990's to only having 10's of back-ups in the 2020's) by having the most efficient equipment to service the 790 miles of sanitary mains, which increases as the City continues to develop.

In many cases, sewer overflows happen in extreme weather events when stormwater flow inundates the sanitary systems, especially if they are already blocked in some way. Ensuring access during a variety of types of weather and ground conditions is very important to the overall maintenance of the sanitary sewer. The City's dedication to protect homes from sanitary back-ups and protect adjacent natural resources requires access in all conditions. Additionally, because of the proximity to people's property and the concerns for privacy, the access path has not been maintained on a regular schedule with mowing and brush cutting to allow for equipment to traverse the path with the large equipment that is needed.

Tree Maintenance Requests

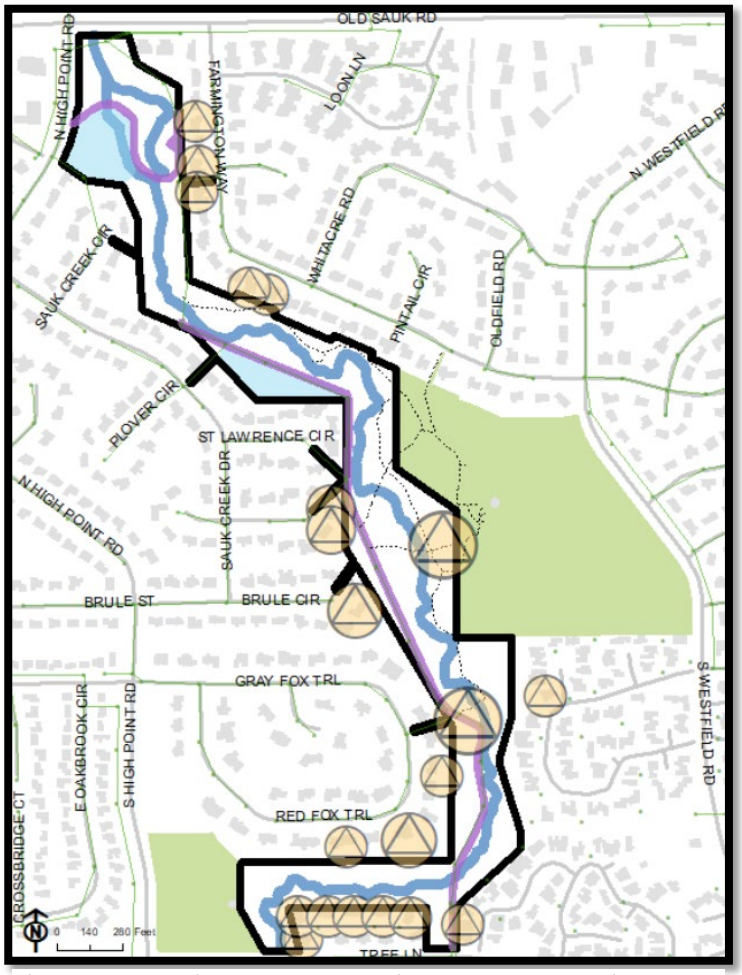


Figure 24 Areas with documented maintenance requests since 2018

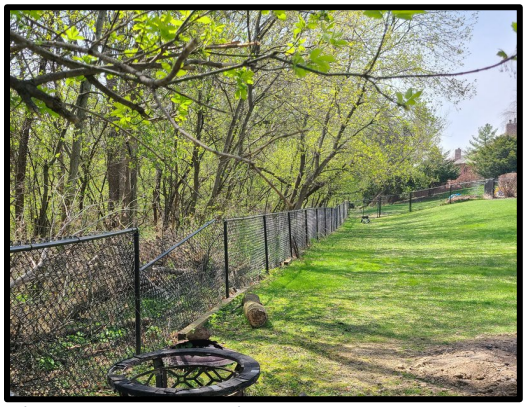


Figure 23 Example maintenance request – tree falls on fence damaging fence

Figure 22 Example request - tree falls on edge of greenway and destabilizes adjacent tree creating a risk to adjacent private property

The City receives frequent requests to remove standing dead, or fallen trees within City lands. Since 2018, Engineering Operations has received >40 requests for tree removals in the Sauk Creek Greenway alone.

Many requests related to trees impacting private property are for trees that often grow quickly from the edges of the greenway and reach out over the property line to sunnier backyards. Trees that "reach" often are growing at an angle out of the ground and can drop limbs or fall onto private property damaging private improvements such as homes, garages or fences. Often areas are challenging to access, and additional trees need to be removed to access the actual tree that is the real concern.

The City has also received complaints on the lack of restoration within the greenway generally, and in particular, restoration following tree removal requests. However, the City does not have resources to dedicate to restoration following many tree removal requests without them being linked to a capital improvement project.

Channel and Tree Maintenance Access Paths

Maintenance is a top concern of the Community. Currently the City is limited in what and when work can be done due to limited access in the corridor area. Without a designed access path, channel maintenance, and trimming or tree removal maintenance practices are difficult to address throughout the greenway. Without sufficient access, these requests take additional time, resources and personnel to respond to. Some requests cannot reasonably be accommodated due to access restrictions. Limited access often results in delays when responding to emergencies and delays in completing preventative maintenance and maintenance requests from residents. By including maintenance access paths, the City can improve on all of these items.

Maintenance access paths must be designed to support equipment intended to use it. The City designs general channel and tree maintenance access paths with a gravel base. Some of the main goals of the design include:

- Provide stable surface so that equipment doesn't significantly rut paths, or have potential to get stuck
- Provide access to essential infrastructure (sanitary sewer) during an emergency
- Will hold up to stormwater flows
- Design paths so that they are robust enough to not require regular repair

When the channel gets blocked, it tends to dam up with additional debris, sometimes causing huge tangles of fallen trees, large limbs, leaves and other debris. Removing large blockages requires the correct equipment. The type of equipment needed to safely and efficiently remove a large channel blockage is an excavator with a grapple bucket. Generally, the large blockages that are likely to lead to significant erosion have a variety of stacked heavy limbs and trunks that have a loaded force on them (keep in mind the weight of a large down tree trunk is thousands of pounds). When crews must manually cut or pull apart log jams, there is a hazard of loaded limbs, unloading their stored force and snapping back, which could cause equipment damage, and more importantly it can endanger the cutting crew. However, an excavator with a grapple bucket can allow the operator to grab and lift logs, increasing the distance from equipment and reducing the need of ground crews manually cutting the jam apart. Using the appropriate size equipment can mean a log jam can be safely managed in hours vs days.

Figure 26

Figure 25

For tree removal requests, there is a variety of equipment used, depending on if the tree is standing or down. The largest pieces of equipment are excavators with grapple hook (shown in Figures 25 and 26), and a tandem axel dump trunk. Sometimes smaller scale tree removal requests can be managed with equipment such as a mini excavator, bandit chipper, track bobcat or a 1-ton truck (shown below). Tree removals that require specialized equipment or technical felling techniques often are performed by a City approved contractor. Contractors who are hired by the City possess the equipment and skills to perform specialized tree removals. However, scheduling the contractor and the higher associated costs for these services delay response time and reduce funds for other maintenance activities.

Figure 28 1-ton truck

Figure 27 Mini excavator

Figure 30 Bandit Chipper

Figure 29 Track bobcat

Figure 31 Bucket truck may be utilized by City-hired contractor

Chapter 3 - Ecological Assessment

Heartland Ecological Group Inc was commissioned by the City to complete the Ecological Assessment for the corridor. For entire assessment, see Appendix 1 – Ecological Assessment. Per the assessment, much of the greenway was likely oak savanna and oak woodland, historically. The original Land Survey in 1830s found bur oak and white oak trees. Subsequent conversion of these natural habitats to agricultural uses, altered the native plant community and reduced the frequency of fire on the landscape, allowing development of a denser woodland habitat. The Bordner Survey in 1939 found low to medium density oak-hickory woods surrounded by pasture and cropland.

The land has since been impacted by residential development resulting in continued fire suppression, fragmentation of natural ecological communities, introduction and proliferation of invasive species, soil disturbance and erosion, and increased stormwater runoff.

Figure 32

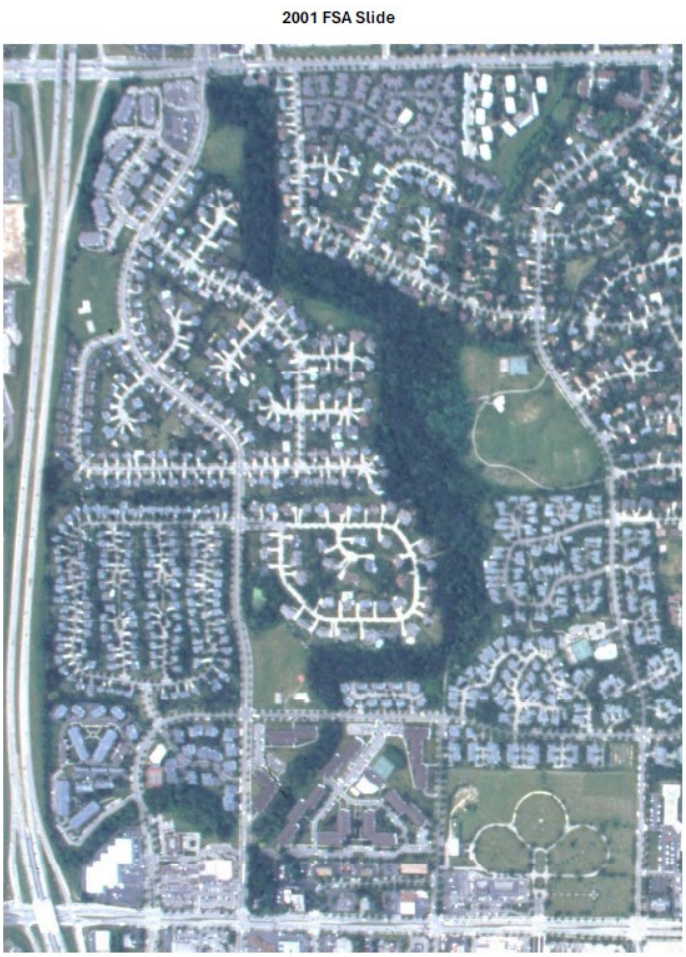


Figure 33

Oak dominated woodlands are still prevalent in the Study Area and include oak savanna, oak woodland, southern dry-mesic forest and oak-hickory forest. The oak communities are in decline and are being replaced by invasive species or common disturbance species that, unlike the historical communities, are

not endangered or threatened[1]. The shrub and herbaceous layers are dominated by invasive species and oak regeneration is being suppressed by faster tree and shrub growth of species such as buckthorn, honeysuckle, box elder, ash saplings, etc. Only a few oak saplings were observed regenerating along sunnier trail areas or streets.

It is noted in the assessment that in addition to degraded vegetation, the channel lacks overall stability and the channel and stormwater ponds are not providing optimal stormwater function. Dead and downed woody material are common and contributing to channel blockages. Excess sedimentation in some areas has likely contributed to tree decline or death.

Human usage of the channel causes further degradation through the introduction of invasive horticultural species such as periwinkle, daylilies and bishop's weed, and through yard waste dumping and encroachments, such as the expansion of lawn into the greenway, which remove the potential for native vegetation to grow.

Despite these threats to ecological functionality and health, the greenway is an important corridor for wildlife habitat and passive recreation in an urbanized landscape and protection from further threats is important to identify as part of a successful management plan.

Figure 34 Root flare on mature oak tree is buried under sediment.

Ecological Overview from Results of Ecological Assessment

The ecological assessment sectioned the greenway into 15 areas based on dominant vegetation or a reference natural community. These areas may provide guidance on design and restoration approaches. For example, areas identified as having "large oaks in the canopy" may require a more sensitive approach during the design, construction and restoration process than areas identified as "highly disturbed woodlands."

[1] Oak woodlands are listed by WDNR as having a state conservation status of "S1" or "critically imperiled." https://apps.dnr.wi.gov/biodiversity/Home/detail/communities/9135 https://dnr.wisconsin.gov/topic/NHI/calypso/EOReport.html#:~:text=State%20Rank&text=S1%20%3D%20Critically%20imperiled%20in%20Wisconsin,severe%20threats%20or%20other%20factors.

Oak Woodlands

Areas 1, 2, 6, 8, 9, 10, 12, 13, & 15

- Large oaks prominent in canopy but in decline
- Lack native understory species indicative of oak savanna and oak woodland
- Degraded by invasive species
- Oaks being replaced by more mesic species that can tolerate lower light levels and are not fire-dependent

Area 1

- Channelized erosion

Areas 9 & 10

- Less soil disturbance and invasive herbaceous species compared to other woodland areas

Area 12

- Significantly degraded by flooding and sedimentation

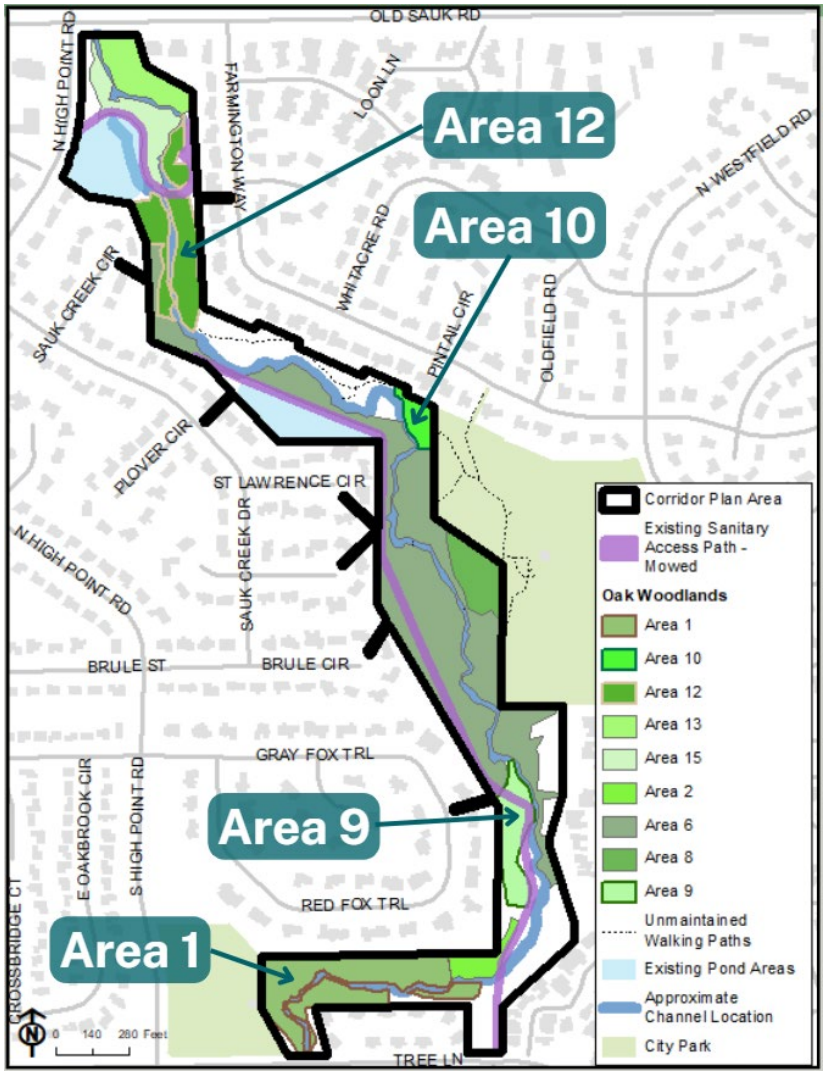


Figure 35

Oak Savanna Restoration

Area 14

- Understory clearing
- Native vegetation and oak regeneration

Mesic and Lowland Forest

Areas 5 and 11

- Low to no tree cover in 1937 aerial

Area 5

- Degraded lowland/floodplain forest dominated by cottonwood, dying green ash, and box elder
- Lawn encroachment, eroded channels, sedimentation from channel flooding

Area 11

- Mesic trees such as black walnut, hackberry, and elm with limited oaks and a degraded understory
- Horticultural plants

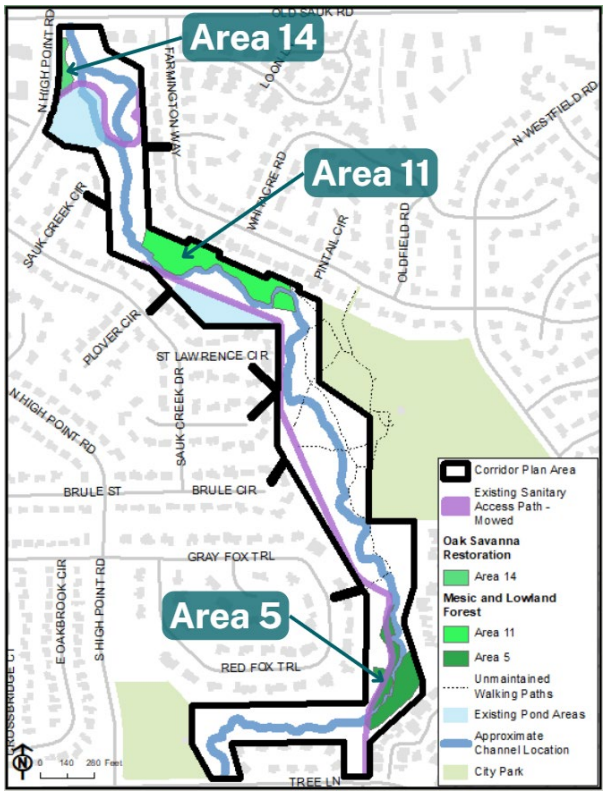


Figure 36

Pine Plantation

Area 3

- Planted red and white pine
- Red pine in poor health - dying or have fallen
- Sparse understory

Highly Disturbed Woodlands

Areas 4 & 7

- Appear pastured with no trees in 1937 aerial
- Not representative of natural woodland communities
- Few desirable canopy trees with degraded understories
- Stormwater runoff, horticultural ground covers

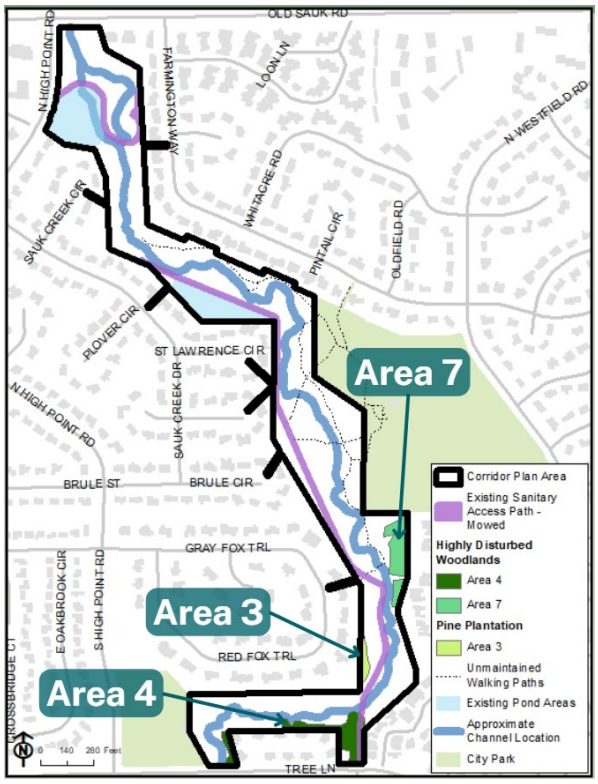


Figure 37

Ecological Threats to the Sauk Creek Corridor

Replacement of Oaks

The ecological assessment states that oaks are being replaced by trees that are "more common in the landscape and provide less ecological value." Oak trees are known to have special ecological significance as critical keystone species that provide an enormous contribution to our food webs, as many moths, butterflies, and insects depend on oaks to lay their eggs[2]. Retaining this keystone species is therefore crucial to the support of local wildlife. On Sauk Creek greenway this critical resource appears to be in decline. The tree inventory completed by a contracted arborist shows ~20% of oaks are in poor or very poor condition (2017 inventory + 2023 scouting of additional oaks in decline). The ecological assessment goes on to note a lack of oak regeneration in the greenway, meaning that as mature oaks are in decline, they are not being replaced by new oak growth. The implications for the future canopy are a less diverse canopy with fewer keystone oaks.

Invasive species

Invasive species are replacing native species, limiting the regeneration of native trees and shrubs, and altering the litter layer and soil chemistry of the greenway. The most prevalent invasive species include:

- Dame's rocket
- Garlic mustard
- Reed canary grass
- Common buckthorn
- Invasive bush honeysuckle
- Horticultural species such as daylily and periwinkle

Garlic mustard and common buckthorn are allelopathic and release chemicals into the soil that can inhibit the growth of other plants and alter the soil chemistry. Buckthorn also produces berries that sicken and weaken birds[3]. If left uncontrolled, invasive species may dominate an area to the extent that native tree, shrub and herbaceous species greatly decline, or even disappear locally, thereby reducing the ability of native wildlife that depend on them to survive.

Land Use & Encroachments

Yard waste dumping, mowing or allowing lawn and invasive horticultural plants to grow into the greenway spreads non-native species that are outcompeting native herbaceous species.

The loss of native plant biodiversity results in reduced ecosystem services such as pollinator habitat. Yard waste dumping, especially excessive or ongoing dumping, may suppress the ability of vegetation to grow at all or add excessive nutrients or organic matter to downstream habitat and water bodies.

Erosion

Steep slopes in the woodland and steep channel banks are susceptible to erosion. Bare ground and areas lacking herbaceous perennial vegetation are more prone to erosion, which is part of a feedback loop that

[2] https://mywisconsinwoods.org/wp-content/uploads/2018/10/Fayram_Intro-to-WI-Oak-Ecology-Fall-2018.pdf
[3] https://fmr.org/updates/conservation/buckthorn-how-can-shrub-be-so-harmful

has negative impacts to downstream water quality. Stabilizing bare soil with vegetation will be beneficial to water quality and overall soil health.

Flooding and Sedimentation from Channel

Sedimentation from channel flooding leads to loss of herbaceous layer plants. Tree health is impacted when the bases of trees are smothered by sediment. For example, sections of the channel along the northern part of the greenway exhibit such dense sediment deposition that tree root flares appear to be buried, arresting the ability of the tree to exchange gases and nutrients and leading to potential root rot, decay or death[4]. Continued sedimentation leads to concerns with tree mortality, blockages of the drainage way from downed trees and overall tree regeneration when continued sedimentation occurs.

Figure 38

Oak Health Update

Although not included in the Ecological Assessment, the City shared that during project site walk-throughs in 2024, staff noticed that some oaks that were healthy in the 2017 inventory had died. The City hired a certified arborist to investigate, and they confirmed oak wilt is present in the corridor. The arborist also noted other diseases and stressors such as drought, root rot and sedimentation.

Oak wilt is increasingly an issue county and state-wide. It is important to note that managing for oak wilt is complex and resource intensive. The City will evaluate oak wilt at this site as part of the design process for each phase of construction. The City is actively communicating across agencies regarding how to address oak health citywide.

A key component to managing oak wilt in a minimally invasive way is to remove recently dead red oaks from the woodlot. These oaks that have succumbed to oak wilt harbor fungal mats that are spread by insects to nearby trees. Removal of recently dead red oaks may slow the spread of oak wilt however removals will be dependent on where there is access.

Any designs to minimize tree impacts will be complex. The City plans to hire an arborist with expertise in woodlot management to assist during the individual design phase processes to help identify tree related issues, tree preservation techniques and tree protection during construction.

[4] https://extension.psu.edu/are-my-trees-buried-too-deep#:~:text=The%20decay%20fungi%20that%20begin,is%20green%20and%20looks%20healthy.

Chapter 4 - Planning Process and Public Input

Planning Process

The City's approach to the Corridor plan was to work with the Community to first develop an overarching and robust engagement process that would be used to guide the planning process. This engagement process was used as a roadmap for getting input and creating a plan that addresses the need to safely convey stormwater, improve water quality, create maintenance access to mitigate large erosion source points from large log blockages, and perform ecological restoration while also taking input and residents' concerns and desires into account. The corridor plan will serve as a guide for future management of the lands and will be a guide for future stormwater improvement projects.

The Corridor Plan consists of 7 major steps as outlined below:

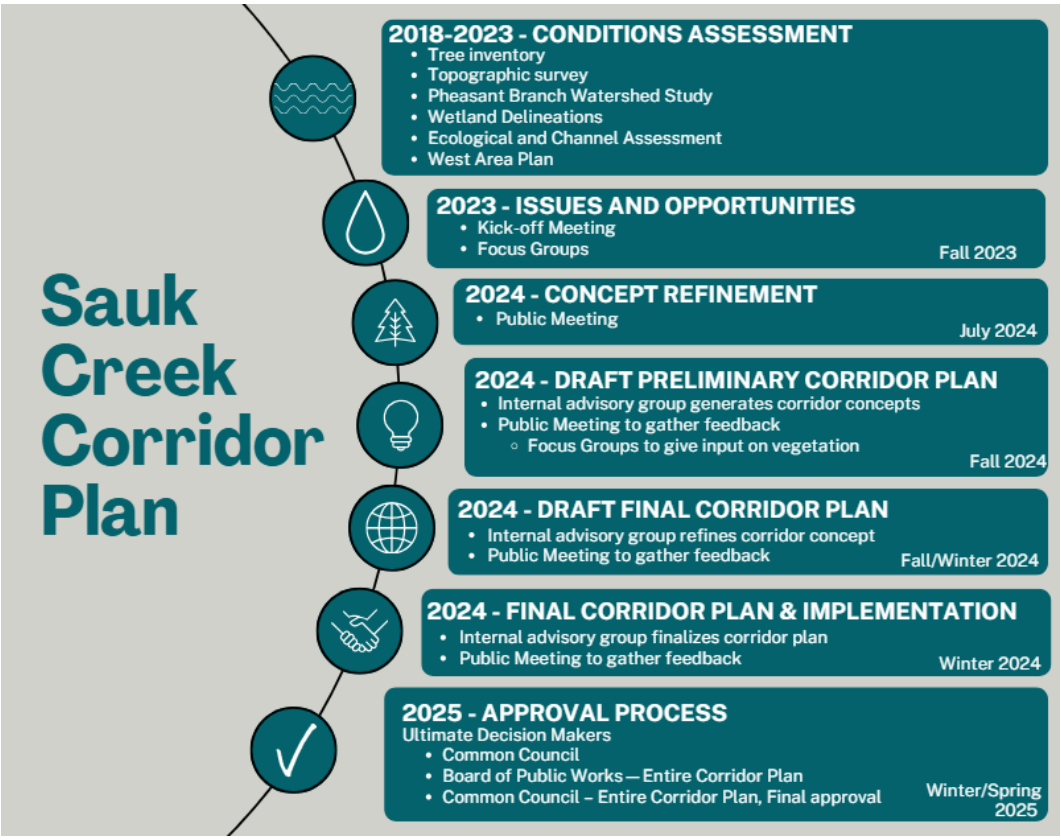


Figure 39

Knowing there would be many competing interests and goals within the corridor, the City wanted to provide as many opportunities as possible for residents to both hear the information the City needed to share to empower the Community to make informed decisions on different design elements, and also hear from each other where there were differences so that all could understand how the plan would balance all the voices and needs.

An outline of the overall corridor planning process is provided below:

Phase One: 2018-2024 Conditions Assessment

- Tree Inventory (2017 and 2021)
- Topographic survey (2021)
- Pheasant Branch Watershed Study
- Wetland Delineations (2017, 2021)
- Ecological and Channel Assessment (2023)
- West Area Plan (2023-2024)

Phase Two: Identifying Issues and Opportunities

- Public Meeting #1 In-person:
  - Monday, November 6 from 6:30-8:30pm at Vel Phillips Memorial High School. Nov. 6, 2023 In-Person Kick-off Meeting PowerPoint Presentation PDF
- Public Meeting #2 Virtual:
  - Thursday, November 9th from 6:30-8:30pm via Zoom. Nov. 9, 2023 Public Information Meeting Recording
- Sauk Creek Neighborhood Association (additional engagement request from neighborhood)
  - November 15, 2023 at 6:30pm
- Focus Group Meeting #1:
  - Lussier Community Dinner – 1/19/24
- Focus Group Meeting #2:
  - Walnut Grove Park – 6/15/24
- Focus Group Meeting #3:
  - Alicia Ashman Library – 6/15/24
- Focus Group Meeting #4:
  - Haen Family Park –6/15/24
- Online Survey #1 – Share Your Values and Goals (November 6, 2023-May 24, 2024)

Phase Three: Concept Refinement

- Public Meeting #3 Virtual
  - Public Meeting, July 9th, 2024. July 9, 2024 Public Information Meeting Recording.

Phase Four: Draft Preliminary Corridor Plan

- Internal Advisory Group Meeting #1
- Public Meeting #4 Virtual Public Meeting
  - October 22nd, 2024. Oct. 22, 2024 Public Information Meeting Recording
- Online survey

Phase Five: Draft Final Corridor Plan

- Internal Advisory Group Meeting #2
- Public Meeting #5
  - Virtual meeting, December 4th, 2024. Dec. 4, 2024 Public Information Meeting Presentation with Polling Results
- Site walk and talk with residents, December 17, 2024 (Added per neighborhood request)
- Online survey for input on draft plan (December 4th, 2024-Jaunary 5th, 2024)

Phase Six: Final Corridor Plan & Implementation

- Internal Advisory Group Meeting #3
- Public Meeting #6:
  - Virtual meeting, January 22nd, 2024. Slides not yet available

Phase Seven: Approval Process

- Common Council (introduction only)

- Board of Public Works
- Common Council

Engagement Strategies

A variety of engagement strategies were used to develop this overall engagement plan. Some of these strategies were the standard use of postcard mailings, public informational meetings, and polling during meeting. While other strategies relied on online surveys, social media, signage and in person focus groups.

Focus groups were also included in this outreach plan to help engage as many groups as possible. The focus groups were identified to try to gain input from the larger community with the intent to gather insights and perspectives outside of the typical public meeting forum. The first round of focus groups was intended to reach those that may have barriers for attending public meetings, including children, parents with small children, people of color, or people renting their homes. The focus groups occurred at locations that included adjacent parks, a nearby community center and the regional library.

In addition, the City hosted a neighborhood walk through to learn about additional site specific concerns and posted signage to help draw in larger groups that may only be visiting the area but would not necessarily be notified of the public meetings by a standard mailing.

Engagement Statistics

Public Information Meetings (PIMs)
- 6 PIMs for Corridor Plan development
- 1 previous PIM (2018)
- 3 Pheasant Branch Watershed Study meetings
- 478 meeting registrants (Corridor PIMs 1-5)

Focus Groups
- 4 first round focus groups with 70 participants
- 5 vegetation-specific focus groups breakout rooms

West Area Plan Collaboration
- 3 open house/public meetings

Snail Mail
- 29,879 postcards sent

Media Presence
- 7 news interviews

Online Engagement
- Custom webpage with subpages on main topics (water, land and people)
- 7,110 webpage views (as of 11/22/24)
- 140 people subscribed to receive email updates

Requests for Feedback
- 27 in-meeting polling questions
- 44 returned comment cards
- Goals and Values Online Survey
  - 143 participants
- Draft Corridor Plan Online Survey
  - 169 participants, 1,104 open-ended responses

Signs in Public Spaces
- 16 signs in greenway and adjacent parks
- 2 rounds of signs and fliers in libraries

***All outreach is additional to our typical design outreach process that will occur for each phase of design**

Internal Advisory Group

To ensure we were hearing from all experts, the City established an internal advisory group that helped review input and direct the proposed corridor plan. The Internal Advisory Group consisted of:

- Stormwater Utility
    - Stormwater engineers
    - Landscape architect
    - Stormwater Vegetation Coordinator
    - Engineering Operations Supervisors
- Transportation Engineering (for initial input on Multi-Use paths*)
- Traffic Engineering (for initial input on Multi-Use paths*)
- Forestry / City Forester
- Parks
    - Operations
    - Conservation/Restoration
    - Landscape Architect, Planning
- Planning (for coordination with West Area Plan)

*Multi-use paths were removed from this planning process as a result of the recommendations of the West Area Plan.

The advisory group provided useful insights in balancing the competing desired uses of the corridor, and in helping identify issues related to trees, canopy cover and habitat concerns. The advisory group is supportive of the final proposed plan.

Parks is very supportive of the invasive species removal and the proposed work complements Parks' efforts to manage park natural areas with a focus on ecological sustainability. Parks is also supportive of connecting Haen Family Park into the maintenance access path to provide a walking trail connection to Walnut Grove Park. The Sauk Creek Greenway Corridor in connection with Haen Family Park and Walnut Grove Park are a nice urban habitat corridor and having a sustainable forest canopy into the future while providing stormwater benefits and erosion control will have a positive impact on the overall health of the area. --Paul Quinlan, the City of Madison Parks Conservation Resources Supervisor

What we heard from Community Input

Following the process described above, the City began requesting high-level input on community values to guide the corridor plan process and from there used public input meetings to get input on different detailed elements of the plan.

High-level Community Values

The first round of engagement on the plan was centered around sharing and getting consensus on the outreach plan approach, understanding the Issues and Opportunities the Community sees within the corridor, and getting an understanding of the Community's values and goals for the corridor.

The City's top goals within the corridor were to stabilize the channel, improve water quality, and create maintenance access. Those that attended the first public meetings (an in-person kick-off meeting, a virtual kick-off meeting, or responded to the online survey) shared their top goals included:

1. Minimizing tree loss
2. Improve the health of the forest
3. Improve conditions for native plant and tree species

4. Stabilize the channel
5. Increase resiliency to climate change
6. Promote biodiversity
7. Create Maintenance Access

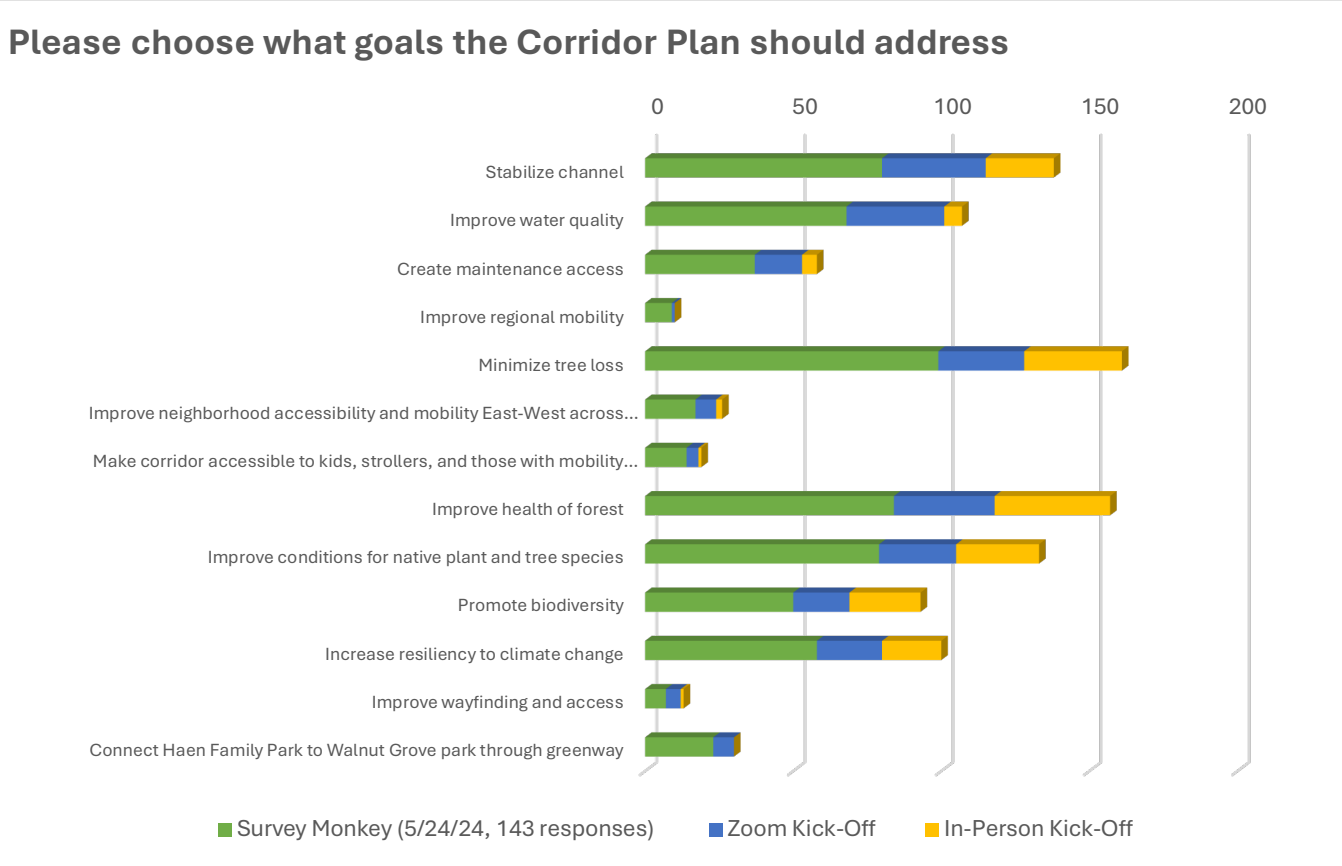


Figure 40

During the first round of public meetings, and the online survey the City received 173 comments and questions. The top topics included:

1. Wildlife concerns
2. Minimizing tree loss
3. Want “natural” or “wild” corridor
4. Maintenance
5. Watershed Stormwater Management

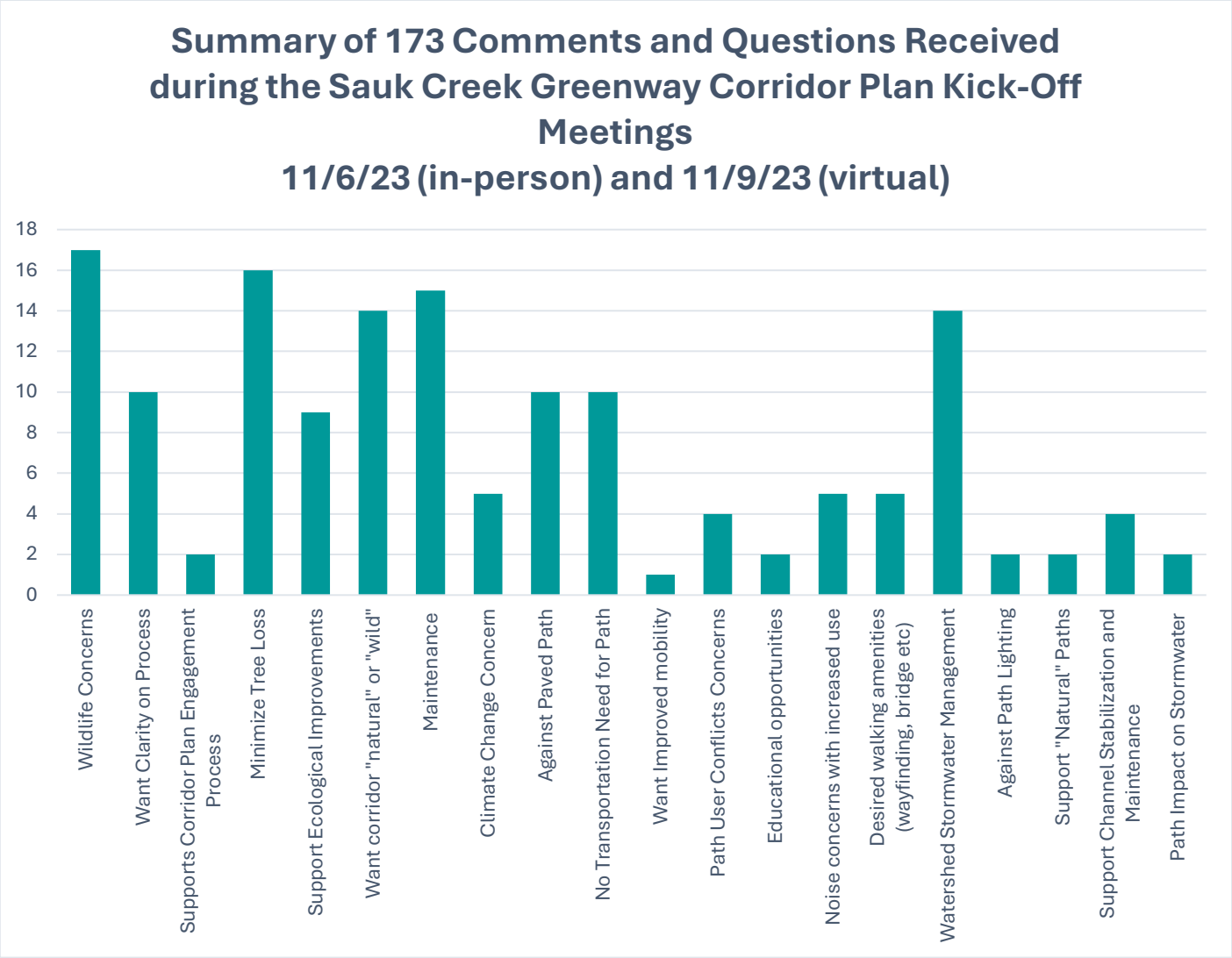


Figure 41

In order to bring all voices into the conversation, the City considered the recommendations from broader, inclusive planning efforts. This included the Imagine Madison, Comprehensive Plan (August 2018) and the West Area Plan (2023-2024). The Comprehensive Plan included >14,000 interactions to gather input and feedback. This reflects the collective values of the City, and due to the intentional, inclusive and deliberate engagement, the plan brought voices into the conversation that do not always have the time or ability to share their perspectives.

The following goals from the Imagine Madison, Comprehensive Plan coincide with the Sauk Creek Greenway Corridor:

- Expand and improve the city's pedestrian and bicycle networks to enable safe and convenient active transportation.
- Ensure all populations benefit from the City's transportation investments.
- Improve lake and stream water quality.

- Improve and preserve urban biodiversity through an interconnected greenway and habitat system.
- Develop a healthy and diverse urban tree canopy.

Those that attended the public meetings and took the online survey also shared that the following values from the City of Madison's Comprehensive Plan, Imagine Madison, were important to them:

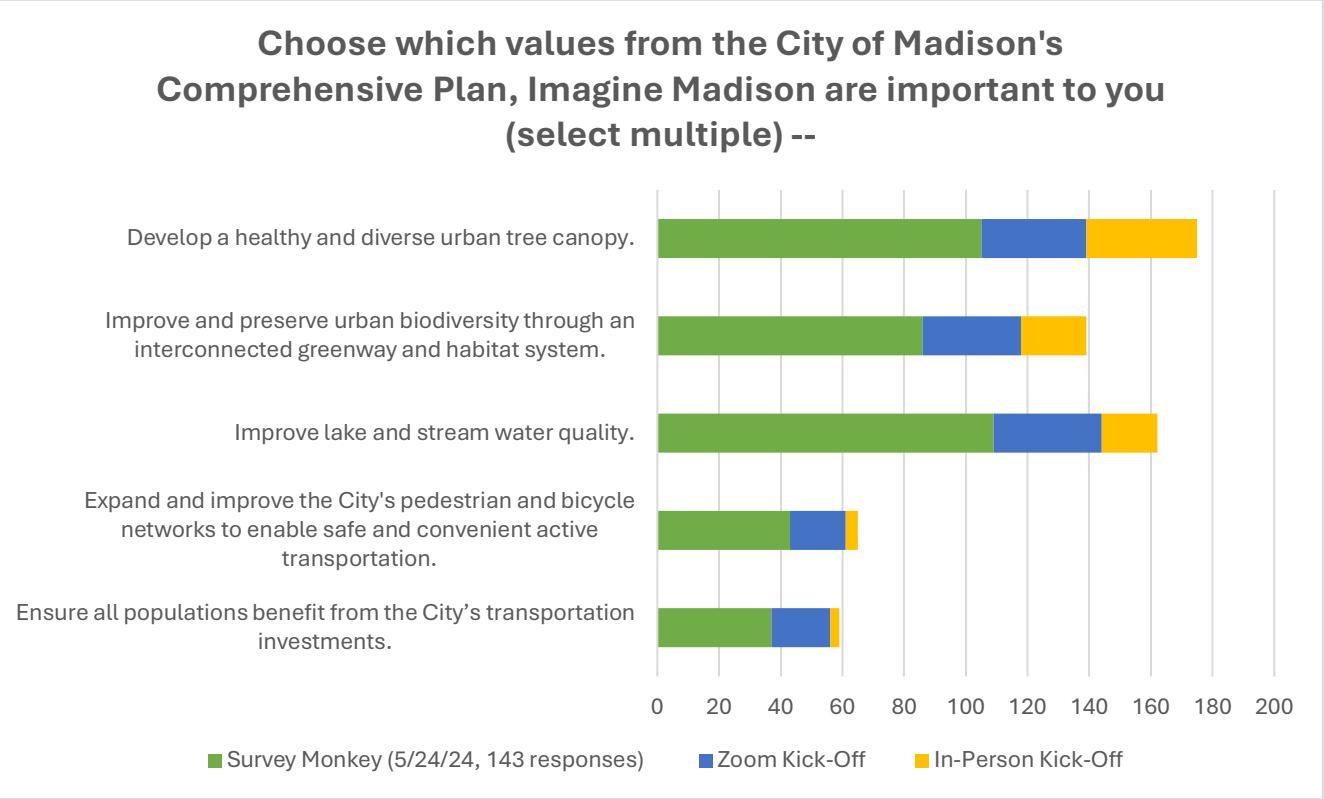


Figure 42

People also shared how they currently use the corridor, with people primarily using it for passive recreation.

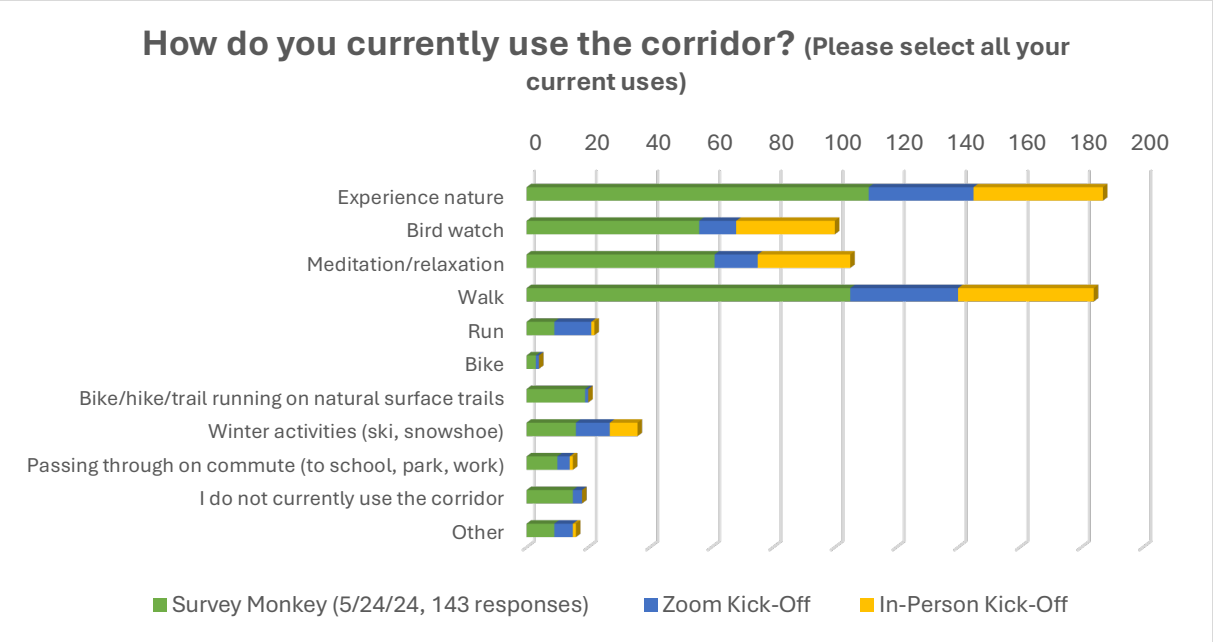


Figure 43

Maintenance access

Maintenance access was in the top 4 comments and questions the City received in the first round of meetings identifying Issues and Opportunities, and in the top 7 goals of the aggregate community. Upon hearing the Community's interests, concerns and questions about the City's current maintenance of the greenway, during the second public meeting the City shared detailed information about the existing maintenance and requested more information from those that attended on what was important to them. The numerous maintenance requests Engineering Operations received for standing dead or downed trees within the Sauk Creek greenway since 2018, shows that the public would like regular tree-related maintenance completed within the greenway. During a public meeting, respondents shared it is somewhat important, or very important that the City have access to remove dead/down trees in the following situations:

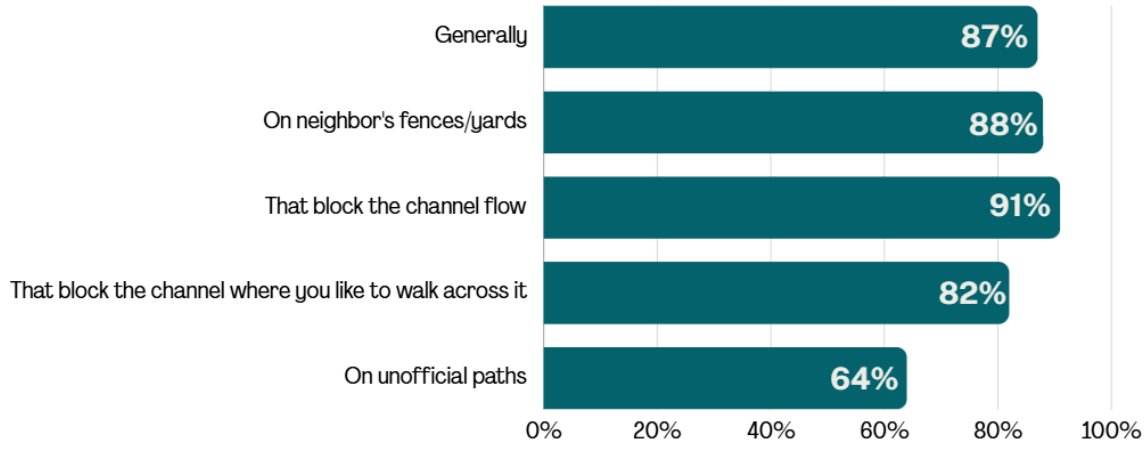


Figure 44

In the Kick-off Meeting Issues and Opportunities comments and questions, many wanted the City to be able to maintain the corridor, and specifically respond to channel blockages and tree removal requests in a timely manner.

Input from Focus Groups

The City of Madison hosted 4 focus groups to get broader Community-level input from those that historically have not attended formal public meetings. The greenway is a large Community asset with visitors that walk through when they are visiting adjacent parks. Walnut Grove is a community park with a dog park that attracts many visitors from beyond the adjacent neighborhoods. Recreationally, the greenway serves as a wooded corridor that connects Walnut Grove Park to Haen Family Park and is used as wooded area for people from the broader community to connect with nature. Teacher and students at nearby Vel Phillips Memorial High School, Thomas Jefferson Middle School, and the Lussier Community center sited the Sauk Creek Greenway as an area that they like to visit. Additionally, those that utilize the nearby Alicia Ashman Library shared their interest in utilizing the greenway for recreation. Therefore, the City worked to hear their voices by conducting drop-in focus groups at the Lussier Community Center's monthly community dinner, Walnut Grove Park, Haen Family Park, and the Alicia Ashman Library.

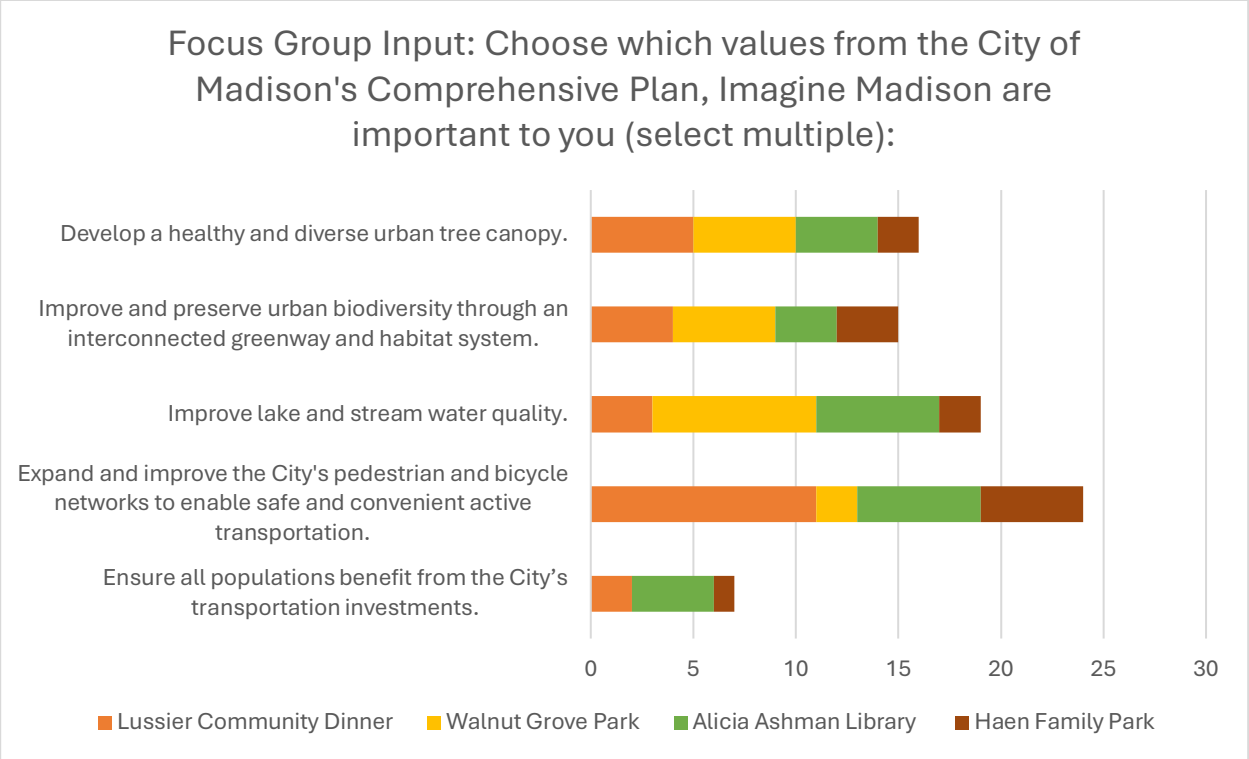


Figure 45

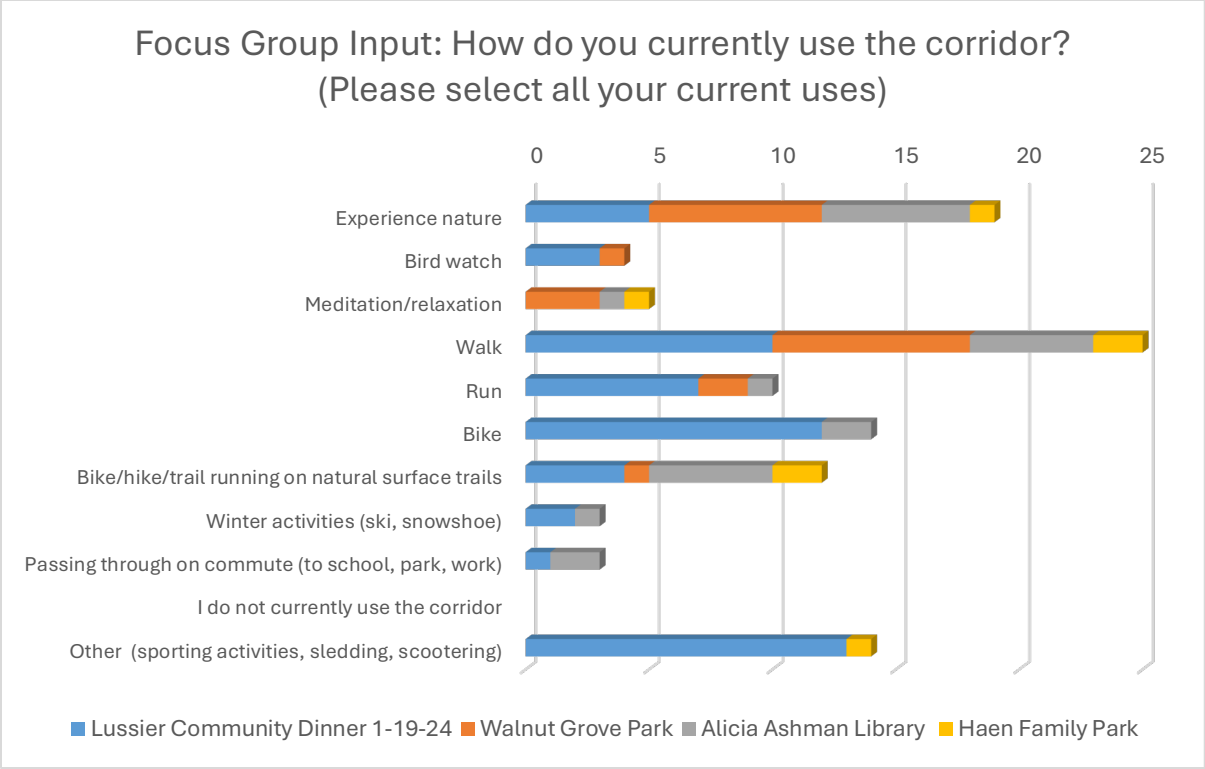


Figure 46

The following are some general themes began to emerge from the focus groups:

- Interest in making the greenway more clearly marked as public land
- Staff at Lussier were interested in using the corridor for educational purposes and their own recreation
- Broader support for multi-use paths for biking, scootering, etc. that connect to the parks, and north-south through the greenway in comparison to what was heard during the traditional public meetings (Multi-use paths were originally discussed in corridor plan, but are no longer included due to public input)
- Broad desire for access to the corridor from Haen Family Park
- Families in Alicia Ashman library area interested in N-S access thru corridor to Tree Lane
- Broad support for improving biodiversity, improving water quality
- Interest in improving maintenance and removing down trees
- Confusion of where public property boundary is within corridor
- Concerns about existing path connectivity including paths leading to random dead-ends for hikers/mountain bikers, often ending on private property, and a lack of a clear north-south walking trail connection
- Focus Group meeting attendees appeared to be a younger, more diverse population than compared to other public meetings where demographic information was collected. All the people were actively utilizing key community resources adjacent or nearby the corridor.

Input from Community Site Walk Throughs

On Tuesday, December 17, 2024, the City hosted 2 community walk-throughs to receive input on the draft plan, and answer questions. There was a walk through in the southern section, and a separate walk through

for the northern section. The City received valuable input about different plan elements. You can see a full account of comments and a summary of the on-site questions and responses in the Appendix 2 – Engagement Summary.

1. The walk throughs offered an opportunity for the Community to show City staff areas of concern and ask questions about specific site features. It offered City staff the opportunity to show the Community where proposed improvements on the map were generally located on the ground and remind the Community why different elements of the plan were proposed. It was a nice recap for those that did not review the material from each previous public meeting to understand the background, and to dispel some misconceptions of proposed improvements and impacts.
2. The Community seemed generally receptive to ecological restoration, with some still voicing concerns over any tree loss (including buckthorn) at the end of the walk through.
3. There was general confusion about what work and equipment is needed to complete the construction, and what type of equipment and work will be needed for ongoing city maintenance.
4. For the 10' gravel maintenance access paths –people think the intent is to regularly re-gravel to keep clear. The City only intends to apply gravel when the paths need repairs, not for aesthetics. In the end we anticipate they will look more like Heritage Prairie example photo than Owen Park example photo.
5. Residents want City to slow water down by creating dams in the channel.
6. Concerns about restoration that occurs with one-off maintenance requests for tree removals- in particular the area off the existing paved section of the access path adjacent to Tamarack near Tree Lane and Randolph Dr.
7. Confusion over phases of construction and timelines.
8. Requests to have ponds remove sediment and leave banks without stabilization. However, ponds are not 100% effective, so by allowing unstable banks upstream, we are still negatively impacting downstream water quality.
9. Concerns about the impacts on infiltration in the corridor due to the installation of the gravel path. However, any runoff that cannot infiltrate on the gravel path will just runoff over the ground adjacent to it and infiltrate there. The proposed narrow path will not impact the overall corridor's ability to infiltrate stormwater.
10. Concerns about locating gravel access paths in areas where private property (Tamarack, and folks along Farmington) have large amounts of runoff leaving their property.
11. Recommended using horses to remove trees instead of equipment. Resident provided contact for their friend that completes this type of work.

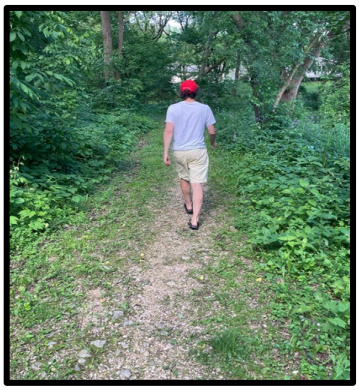


Figure 47 Gravel access path in Heritage Prairie Greenway

Southern Section

1. Southern walk thru had fewer tree concerns, likely due to the proposed paths being farther from homes.
2. Residents requested we avoid disturbing a population of native bloodroot spring ephemerals on hill near 3b crossing which is something the City had noted and intends to design around.
3. Residents pointed out some low points near 3b crossings with erosion that City should be mindful of during design.

4. Request to install simple logs/boulders for a natural-looking stairway and stream crossing (lots of sliding in mud to get people over the channel in walk-through).
5. For maintenance access path 2a: 10' maintenance access path from Haen Family Park to Sanitary Access Path
    - People requested to minimize tree impacts
    - Requested to minimize wildlife impacts
    - Requested both to make sure there was a connection to the park
    - Someone else requested we consider dead ending the path so it doesn't connect through to minimize people using the path, and therefore wildlife impacts
6. For maintenance access path 2b, and crossing 3b
    - Consider location with minimal impacts to trees, native wildflowers, and secondary channel erosion

Northern Section

1. Generally, there were broad concerns from adjacent homeowners about the access paths inviting more people to use the public greenway. The main concerns cited were privacy, crime, and wildlife impacts.
2. Contrarily, others were interested in more clear private property boundary delineations to be able to walk through the greenway without feeling like they were in people's backyards, especially in areas with significant turf grass encroachments into the greenway.
3. Property owners that live adjacent to the greenway that have turf encroachments that they use as additional backyard did not want any changes to these spaces.
4. Along St Lawrence Cir and E Geneva Cir, where the sanitary access path that is covered in 6" of topsoil and sod runs through backyards, homeowners say that rutting had never been observed here; City staff spoke to the fact that they are careful about timing visits to the greenway for when conditions are very dry and allow for safe, rut-free access.
5. Some are assuming that access will become a bike path.
6. Questions regarding maintenance resources for sewer access and scheduling around conditions – ability to accommodate special requests.
7. People concerned about sedimentation on downstream (north) end. City explained that we are not planning to do work there to minimize the footprint of project, per resident feedback to minimize project impacts.
8. In northern section, some residents remarked that new channels had been created in the past

Figure 48 Jojo answering questions from community in northern section of greenway

three years in the areas most affected by sedimentation.

9. Some concerns about timing of gravel sanitary access path installation, but staff responded that the intent is not to install the full gravel path immediately.
10. For maintenance access path: 2d: 10' gravel maintenance access path along Farmington Way between ponds
    - Most people who spoke up at the walk through were not interested in this path, and the City explained maintenance implications of not having a path, and why it is currently proposed there. Some did acknowledge they'd like faster tree removal maintenance and the possibility to haul out felled material.
    - Some interest in switching the path to other side of the channel. But there was some back and forth here and not total agreement.
11. 3C: concrete ford, maintenance access path crossing location
    - Resident pointed out that it's near stormwater outfall and that should be considered with design location.
    - Someone else pointed out that it's near the access sidewalk from Sauk Creek Drive, so it's a nice spot to cross the channel to get on the maintenance path for hikers/walkers.
12. 2C: 10' gravel maintenance access path from Plover Circle to St Lawrence Cir along Farmington Way
    - People concerned about access adjacent to homes
    - Concerned about gravel wash out
    - Concerned about removing shrubby buckthorn underlayer that is "holding in bank". City staff described the three tiers of roots from herbaceous species, shrubs and trees that will be replanted to hold the bank better than the existing buckthorn
    - Concerns about wildlife impacts if construction equipment and more people enter the greenway. City staff explained how improving habitat offerings via ecological restoration will offer more habitat. Right now, the greenway is on a trajectory to be less diverse which will be worse for wildlife. Additionally, much larger disturbances to wildlife were the conversion to pasture, and the residential development. If wildlife returned to the greenway after that, we believe that short term small impact construction will not negatively impact wildlife use in the long-term.

Input from Online Survey to Provide Input of Individual Features of Draft Corridor Plan

The online survey was created to collect feedback from residents on the draft corridor plan, and to provide insights for the finalization of the final corridor plan. The survey was open from December 4th, 2024 until January 6, 2025. The survey received 169 unique responses.

The online survey included 18 open-ended questions that prompted respondents to provide feedback on specific areas of the draft plan. It also included 4 multiple choice questions to gage respondents' overall impressions of the corridor plan development process, and several questions to help better understand respondents' previous levels of engagement during the corridor planning process.

Overall, the respondents' knowledge of the project varied greatly as well as did their history of past engagement with the corridor plan development process. Of the total respondents to the online survey

- 33% (56 responses) of survey respondents stated they had viewed the presentation slides.
- 33% (56 responses) of survey respondents stated they had not viewed any information about the draft plan – they had neither attended the public meeting on 12/4/24 (where the draft corridor plan was first presented and explained), reviewed the recording of the meeting, nor reviewed the presentation slides of the meeting.
- 29% (49 responses) of survey respondents stated that they had attended the public meeting
- 13% (22 responses) of survey respondents stated that they had watched the recorded virtual meeting.

In total the City received 1,104 open-ended responses to the 18 open-ended survey questions. Overall, we found:

- ~31% (52 total) of respondents expressed that they were generally opposed to the draft plan
- ~55% (93 total) of respondents expressed they felt generally neutral or did leave positive or negative comments about the draft plan
- ~14% (24 total) of respondents expressed they were generally supportive of the draft plan

Generally oppositional survey responses

Of the 31% that were opposed to the draft plan:

- Some expressed that they were not supportive of any element of the draft plan, and a significant majority expressed that they were opposed to most aspects of the draft plan.
- Some felt improvements to the ponds should be prioritized over anything else.
- Respondents were split between those who felt there should be no riprap placed in the channel, and those who felt there should only be riprap placed in the channel to protect the sanitary path or to protect homes from flood damage.
- Some responses indicated that aspects of the project were generally seen as unnecessary as they would cause harm to wildlife, the environment, the canopy, and the natural appeal of the greenway.
- The main suggestions of those who were opposed to the draft corridor plan included:
    - Complete the project using "minimally invasive" methods
    - Regularly dredge the Wexford Pond as an alternative to channel stabilization.
- Many expressed confusion or a misunderstanding about the proposed plan.
- 35% of respondents had not reviewed the corridor plan (did not attend the meeting, review the meeting recording, or by review the meeting slides where the draft corridor plan was presented.)

Generally neutral survey responses

The 55% of respondents who were generally classified as neutral to the project, most either provided little feedback or they only had comments, suggestions, or clarifying questions. Generally neutral survey responses include those who were not generally opposed to the project, but who were concerned about the less robust options presented in the draft corridor plan.

- Some of these respondents expressed they preferred an asphalt path as it would provide better access to users of the greenway, and it would be a more durable option in the long-term.
- Some survey respondents felt neutral about the project expressed they would prefer both access paths to be less wide and would prefer them to be grass covered.

- Some survey respondents felt the upper corridor maintenance access path, specifically along Farmington Way between the ponds, was unnecessary and they preferred it not be included in the plans.
- Some expressed concerns about the long-term maintenance that would be needed for the various aspects of the project.
- 39% of respondents in this group identified that they had not reviewed the draft corridor plan by attending the meeting, reviewing the meeting recording, or by reviewing the meeting slides where the draft corridor plan was presented.

Generally supportive survey responses

For classification purposes, this includes respondents who were generally in support of the project, the majority were happy with most of the aspects of the project and how resident feedback was incorporated into the plans. Some respondents stated that they were not excited for all the changes to the greenway, they stated that they understood why certain choices were needed for the long-term health of the greenway.

- Respondents expressed they preferred the construction to be as non-destructive as possible and that as many trees as possible be saved.
- Respondents were generally in support of removing invasive species, but did still express some concerns about whether maintenance work could keep invasives from growing back.
- Respondents in this group recommended a modification to the south section of the 2b maintenance access path, to reduce the risk of runoff damaging the path.
- Respondents offered alternative crushed rock options for the sanitary and channel maintenance access paths.
- 8% of respondents had not reviewed the draft corridor plan by attending the meeting, reviewing the meeting recording, or by reviewing the meeting slides were the draft corridor plan was presented.
- 50% of respondents attended most of the corridor plan meetings
- 71% of respondents were interested in completing ecological restoration volunteer work.
- By composition, those in this group had consistently engaged the most with the corridor development process, felt they could see how the community input shaped the draft corridor plan and seemed the most interested in being involved in the future restoration efforts in the greenway.

For more specific survey information, please see Appendix 2 – Engagement Summary.

How the Community Input Shaped the Corridor Plan

Community Input and Specific Plan elements

During the first round of input, we heard that the Community's top goals were to:

- Minimize tree loss
- Improve the health of the forest
- Improve conditions for native plant and tree species
- Stabilize the channel
- Increase resiliency to climate change
- Promote biodiversity
- Create maintenance access

The City used those goals to develop plan component options that address the City's needs within the greenway to maintain stable infrastructure and allow the Community to weigh in. Notably, there are a variety of improvements that were not included as preliminary options based on Community feedback. The elements not included were:

- North-south multi-use path (this was removed from the West Area Plan based on community feedback)
- East-west multi-use path that was included in the West Area Plan but based on preliminary engineering analysis it was taken off the table at this time due to the impacts to the surrounding area.

The Community's concerns around the construction and disturbance footprints of these paths would compete with one of their major goals of minimizing tree loss.

At the very beginning of the planning process, upon hearing concerns from the Community, a large scale, full corridor engineered channel design was also taken off the table as a potential option. The Community wanted to limit the footprint of the stormwater improvements, so sedimentation issues on the north end are not addressed with this plan either. The Community was able to weigh in on the extent of the channel stabilization once the City prioritized the banks most susceptible to erosion.

During the 2-hour public meetings the City shared the baseline engineering knowledge needed to understand the options proposed, explained the advantages and disadvantages to different stormwater and restoration design elements, and asked for the Community to weigh in on how to proceed. This was an important element of the plan because it allowed the Community to provide input on different elements of the plan while understanding the baseline City needs and design elements. Over the course of 3 public meetings, the Community selected:

Type of channel stabilization

- The options included: boulders (riprap), boulder footer with soil lifts, and boulder footers with vegetation
- Community selected: boulders (riprap) to minimize tree impacts

The extent of channel stabilization

- The options included whether the entire channel should be stabilized, only the worst sections, or something in-between.
- Community selected: Bank stabilization in areas that are steep, vertical or undercut

Type of channel maintenance access cover

- The options included gravel, soil and vegetation, or paved.
- The Community originally equally preferred gravel and a topsoil/vegetation cover so the City originally proposed gravel as it is more economical and provides improved access.
    - Based on input from the community walk through and draft corridor plan survey, the City changed the plan to not specify the cover type for channel maintenance access paths. Each design phase will determine the cover for each path.

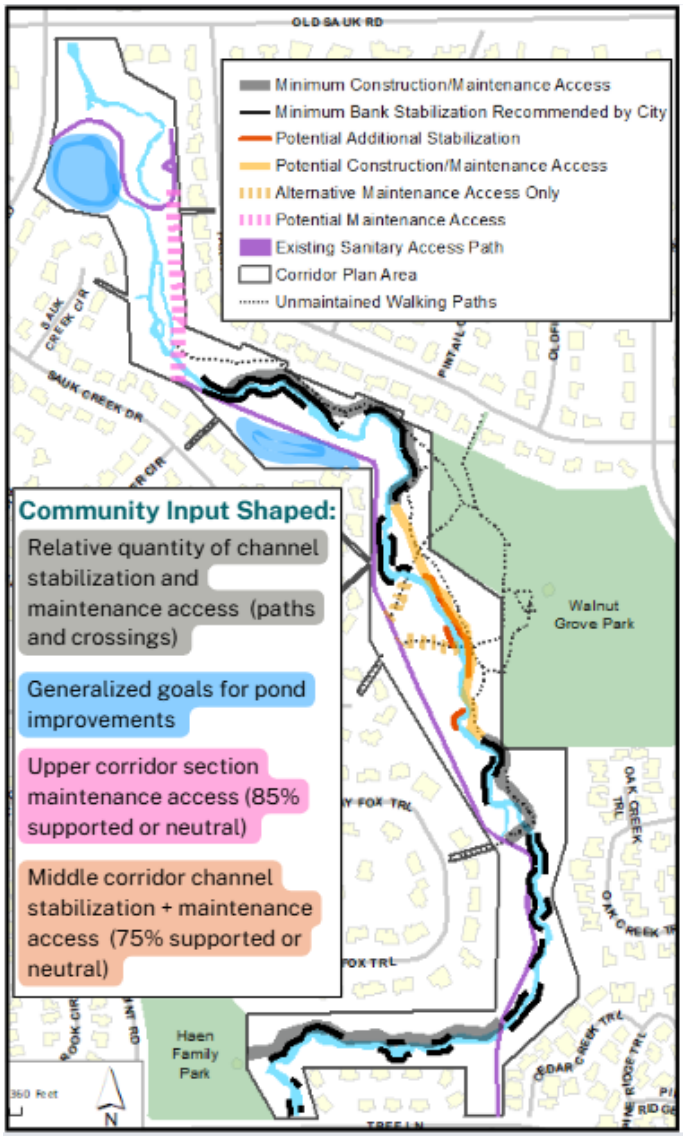


Figure 49 Graphic shown during third public meeting when community polling provided guidance on large sections of corridor improvements.

Extent of stabilization and access in middle corridor section

- The options included stabilizing the moderately unstable banks, and creating an access path along the channel, or just creating two access spurs to the channel (see Figure 49)
- Community selected: stabilize channel and include thru-path
    - Community walk through input prompted shifting the crossing of the 2b access path to the north to avoid low area with frequent erosion of walking paths

Maintenance access in upper corridor section

- The options included adding access along Farmington Way on the east side of the channel to provide tree maintenance access, and some minimal channel maintenance access, or do not create a maintenance access path

- Community selected: create maintenance access path
    - Community walk through input prompted switching the location of the access path to the west side of the channel.

Design guidance

- The options were to agree, disagree, or not be sure with the following – that the City should utilize the following tree prioritization guidelines while designing the specific location of the improvements (i.e. shifting channel stabilization or maintenance access to avoiding specific trees) during the future design phases.
    1. **Priority 1:** Design around the largest quantity of healthy, native trees that are included in the natural ecological communities identified in the ecological assessment
    2. **Priority 2:** Design around healthy trees not included in the natural ecological communities identified in the ecological assessment
- The Community agreed with the prioritization

Restoration guidance

- The options were if the City should remove all, remove some, or remove no DNR Invasive Species (as identified in NR 40) in a 10-20' buffer outside the construction limits, and off the sanitary access path, to create additional replanting opportunities
- Community selected creation of additional replanting opportunities by removing most NR 40 invasives in a buffer around the project area and construction access.

For specific polling questions and the responses, please see the Appendix 2 – Engagement Summary.

How Community's High-Level Values and Goals Shaped the Plan

The Community's high-level values and goals shared during the kick-off meetings, and throughout the corridor planning process are accomplished through a variety of elements of the corridor plan, summarized below.

Improve the health of the woods including concerns about threats identified in the ecological assessment (Invasive species, erosion, replacement of oaks, flooding and sedimentation from the channel)

- Thinning invasive species within 10-20' of project area to protect restored areas from adjacent invasives
- Replanting with native herbaceous and shrub species suitable in wooded areas
- Creating light openings and planting new oaks
- Stabilizing channel to reduce downstream sedimentation

Minimize impacts to trees

- Limiting channel stabilization to spot treatments instead of both banks, or a full-channel stabilization project including bed and banks
- Utilizing existing access paths where possible
- Ecological restoration to promote new generation of forest
- Stabilizing channel with riprap as opposed to alternative options that require additional grading and therefore tree impacts
- Completing detailed design to minimize impacts to healthy, native trees following the design guidance agreed to by the Community.

- Hiring an arborist to assist during design phases & construction

Promote biodiversity, improve health of woods and conditions for native plant and tree species, specifically concern about protecting existing oaks, and replanting new oaks

- Thinning canopy crowding around mature oaks
- Thinning buckthorn to reduce negative impacts to birds and negative impacts to the soil from its allelopathic chemicals
- Controlling invasive herbaceous species like garlic mustard, Dame's rocket, burdock
- Monitoring and planning for oak wilt impacts
- Replanting oaks and other native trees, native shrub layer and native woodland wildflowers, grasses and sedges.

Stabilize channel and improve downstream water quality

- Stabilizing banks most susceptible to erosion with natural materials
- Pond improvement goals will increase stormwater treatment, infiltration, and maintenance
- Expanding native groundcover to encourage additional infiltration within the corridor

Increase resiliency to climate change

- Improving conditions for existing oaks and hickories that are stressed in changing climate
- Reducing impact on canopy with projects by minimizing channel restoration areas
- Stabilizing channel and improving ground cover to reduce erosion during larger storm events and help downstream water quality
- Improving access to the sanitary sewer to reduce the risk of back-ups impacting adjacent homes or the greenway

Promote biodiversity & protect and improve wildlife habitat

- Improving habitat offerings with appropriate ecological restoration
- Collecting wildlife sightings via iNaturalist data, eBird to improve species specific responses
- Timing construction to avoid nesting seasons whenever possible
- Working with UW Urban Canid lab to track fox and coyote denning in area

Provide access to remove dead/downed trees

- Providing maintenance/construction access in more areas, especially where bank stabilization is proposed
- Siting maintenance access along areas with frequent tree removal requests
- Offering options for improved maintenance access along property lines in the southern East-West section

Additional Input Incorporated

In addition to the identifying the top goals of the Community there were additional aspects of the engagement that provided key guidance in what should or should not be included in the plan recommendations.

Bike path recommendations

- Majority of the Community did not want a north-south multi-use path that was originally in West Area Planning draft, as well as a variety of other historic City planning documents including the 1984 Park

and Open Space plan, the 1991 and 1997 Park and Open Space Plans, the 2000 adopted Bicycle Transportation plan for the Madison Metropolitan area, and the 2015 adopted Bicycle Transportation plan for Madison Metropolitan Area and Dane County.
    - The City responded by removing the North-south multi-use path from the West Area Plan, and therefore the Sauk Creek Corridor Plan
- Community did not want east-west path recommended in West Area Plan to improve neighborhood mobility and connectivity
    - The City investigated the potential locations for an east-west path connection through the greenway, and found it did not overlap enough with the stormwater improvements to be included in the corridor plan.

Collaboration with experts

- Community wanted more holistic group of experts weighing in on the tree canopy than just the certified arborists that completed the tree inventory
    - City hired Heartland Ecological Group to complete a comprehensive Ecological Assessment of the corridor. See Appendix 1 – Ecological Assessment.
    - City formed an Internal Advisory Group with experts in ecology, landscape architecture, which also included the City Forester
    - City used data obtained from the engagement section of the concurrent Stormwater Utility Vegetation Management plan where appropriate to provide supplemental general guidance on the level of service and future maintenance
- Community wanted an environmentally sensitive, minimal footprint project to stabilize the channel
    - City obtained recommendations on more environmentally sensitive spot treatments of worst areas with riprap as opposed to stabilizing the entire channel
- A resident shared that Seven Bridges Park in Milwaukee was a good example for the City to use for Sauk Creek. The City thinks this is a great suggestion, and looked at the restoration plan that their Friends group had posted on their website and saw many similarities between proposed actions there and what we propose to do in disturbed project areas at Sauk Creek. Their restoration plan, like ours, places great emphasis on revegetating areas of bare soil. It also plans to stabilize banks with riprap and create better stabilized paths.

Additional requested engagement

- Community wanted additional opportunities to provide input on the draft corridor plan after the fourth public meeting
    - City developed an online survey to allow public to comment for 30+ days on each element of the proposed plan
    - The City also hosted two site walk-throughs with four City staff members to better hear and visualize resident concerns on-site

How Differing Views were Balanced

Differing Views Shared during Corridor Plan		How the City balanced perspectives
People want corridor wild and natural	People want channel maintained and invasives removed	City proposing maintenance access paths along channel that can double as construction access. Restoration is proposed adjacent to the project area only in areas of disturbance but limited to a fraction of the greenway.
People want corridor wild and natural	People want to improve the health of the forest, increase biodiversity, and improve downstream water quality	City minimizing footprint of stormwater improvements and restoration
People do not want bicyclists allowed to use paths	People want safer crossings of the channel	City not including paved maintenance access paths which are often used by bicyclists, and designing basic channel crossings for maintenance access that can also be used by hikers
Desire to minimize tree impacts	Requests by property owners to remove leaning or dangerous trees	City considering where many trees are dying and most maintenance requests are occurring. Routing maintenance access paths near these areas so that trees at risk of damaging private property can be more readily addressed, and including options for improved long-term management along property lines in select locations
Desire to minimize tree impacts	Tree loss is already occurring and the Ecological Assessment predicted continued tree loss, especially for oaks, without intervention such as invasive species control and replanting efforts	Restoration will improve the health of existing oaks and create a future canopy of hardwood species. Project footprint is minimized as much as possible. Plans to design stormwater elements around healthy, native trees
Concerns about citywide canopy coverage	~85% of trees on private property - Urban Forestry Task Force Report	City will work to minimize impacts to the percentage of canopy cover by minimizing the scope of the project, as well as completing environmentally sensitive design with the help of arborists during each design phase. Restoration efforts will make sure oaks and other native hardwood trees will be in the canopy for future generations

The Urban Forestry Taskforce Report encourages additional canopy citywide	The Urban Forestry Task Force Report Recommendation #8: "The City Forester and Engineering Division should work cooperatively to develop standards for tree plantings in greenways…and identify strategies to minimize erosion from shaded exposed soil that can result with trees and moving stormwater while maintain the inherent functions of greenways."	City balancing the need to maintain a main spine of the stormwater conveyance infrastructure while maintaining as many trees as possible
People want gravel paths that are accessible for walkers and hikers	People want grass paths to minimize visual impact to nearby properties	City proposes channel maintenance access paths in gravel, and consider adding topsoil and native vegetation on top of paths where they get close to adjacent properties if that is desired by adjacent property owners
People want process slowed down and more time	People are concerned about valuable resources spent on planning	City adhering to proposed corridor plan schedule as best as possible based on what was shared during the kick-off meeting in 2023.
People want to improve downstream water quality	People do not want the City to stabilize the channel, and want to use downstream stormwater treatment ponds to trap sediment	City proposing bank stabilization and phasing of project improvements to reduce erosion but spread out the projects to not have as large of an impact all at once, however doing nothing is not a viable option because it does not meet the City's stormwater goals. Ponds are not 100% effective at removing sediment, and the downstream ponds, both at N High Point Road, and at Wexford, are undersized meaning they capture even less sediment. The City's ponds are designed and modeled assuming upstream channels are stable, therefore knowingly sending sediment downstream knowing a portion of it will flow to downstream water bodies we are trying to protect (Lake Mendota and Lake Monona).

Community's Perception of Public Meetings

Generally speaking, following each meeting, the City received positive input on the formal comment cards that were provided that the meetings were effective, they learned about the process, and they felt they were able to share their input. However, it should be noted that not everyone had felt they had their voices heard on particular subjects and additional input was provided via emails at different points during the entire planning process. Input provided from the first three public meetings (Kick-Off Meeting, Concept Refinement Meeting, and Preliminary Corridor Plan Meeting), showed that 92% of respondents who took

the after-meeting surveys agreed or strongly agreed with the statement “I felt this meeting was useful and I plan on engaging in future meetings on this subject”. 74% agreed or strongly agreed with the statement “I felt like I was able to share my concerns and ask questions during this meeting”, and 76% agreed or strongly agreed with the statement “My ideas and opinions were acknowledged” with the remaining 24% feeling neutral about the statement. Additionally, when asked whether they felt they had a greater understanding on different aspects of the project or process after the meeting, 88% of the responses stated they agreed or strongly agreed, with only 2% of the responses stating they disagreed or strongly disagreed.

After the draft corridor plan was shared during the fourth public meeting, the City received a variety of concerns about the Community’s ability to provide input during virtual public meetings. The City understands these concerns about the format of the virtual meetings, but found that virtual meetings provide the most number of people the opportunity to attend the meetings and receive the information to provide informed input, along with making recordings available to those that were unable to attend. It also allows us to leverage some of the technology to do things such as polls throughout the meeting, which gives attendees an opportunity to provide input they may be uncomfortable speaking in front of a group.

The City completed the kick-off meeting in-person and virtually to allow the highest number of people to be able to attend. The in-person format had a handful of people dominate the conversation, and the City had a hard time sharing information while being talked over. The City heard from a number of people that the in-person set-up made it especially challenging for those with hearing issues. The meetings are also very heavy on information and content so being able to have them recorded was another reason the meetings were moved to the virtual format.

Post meeting comment cards were provided for participants to weigh in on the effectiveness of the meetings. Summaries of the comment cards are included in Appendix 2 – Public Engagement.

Community members who attended the public information meetings and who shared their opinions through the post-meeting comment cards and online surveys

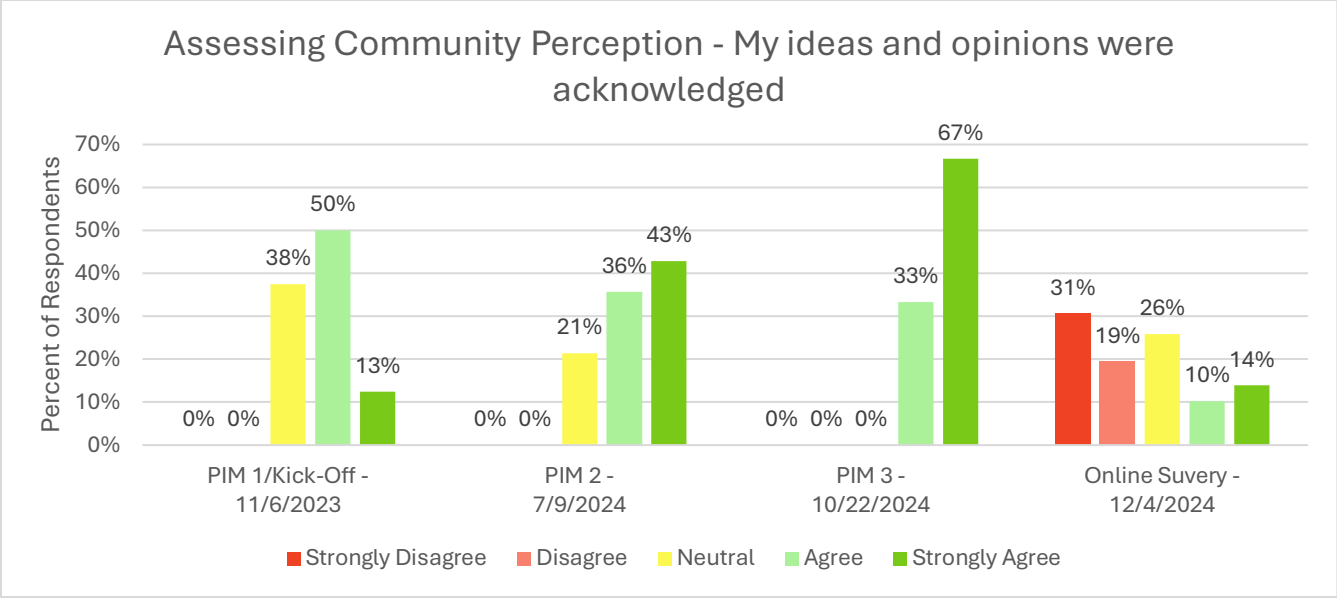


Figure 50 Assessing Community Perception - My ideas and opinions were acknowledged
Feedback from PIM 1-3 was collected from meeting attendees via in-person and virtual comment cards. Online Survey was open to all community members. Wording of question varied slight between the PIMs. For full data, see Engagement Summary Appendix – Public Information Sections.

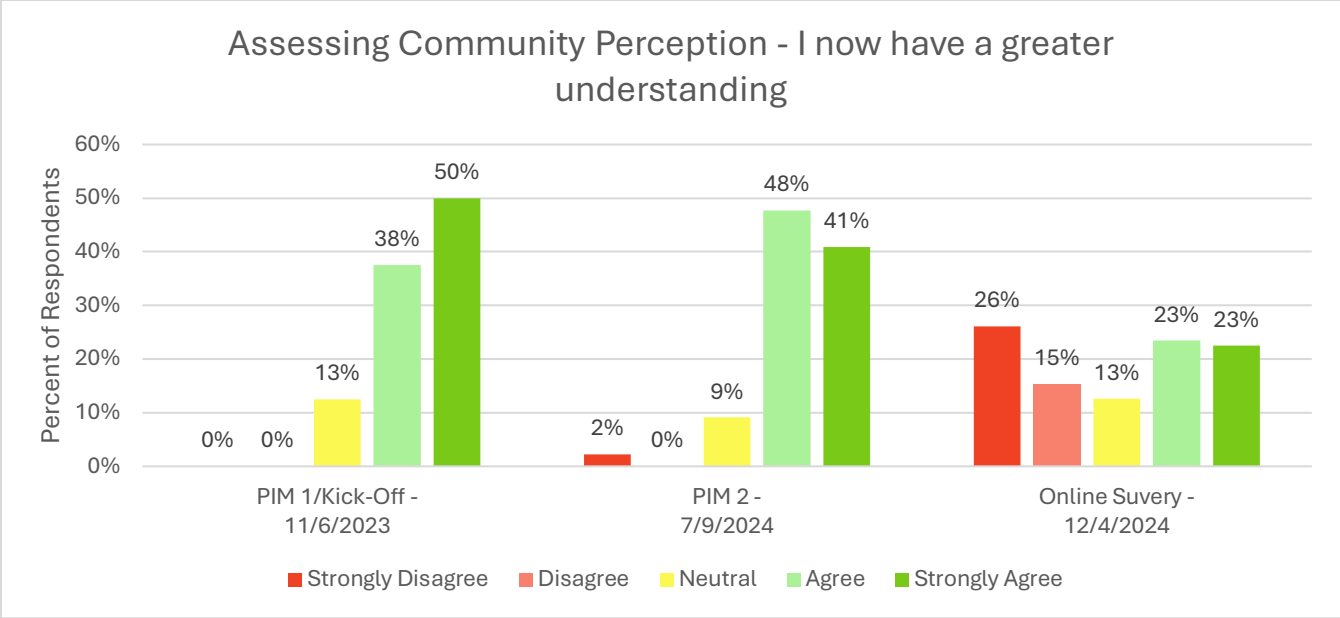


Figure 51 Assessing Community Perception - I now have a greater understanding
Feedback from PIM 1-2 was collected from meeting attendees via in-person and virtual comment cards. Online Survey was open to all community members. Wording of question varied slight between the PIMs. A similar question was not asked for PIM 3. For full data, see Engagement Summary Appendix – Public Information Sections.

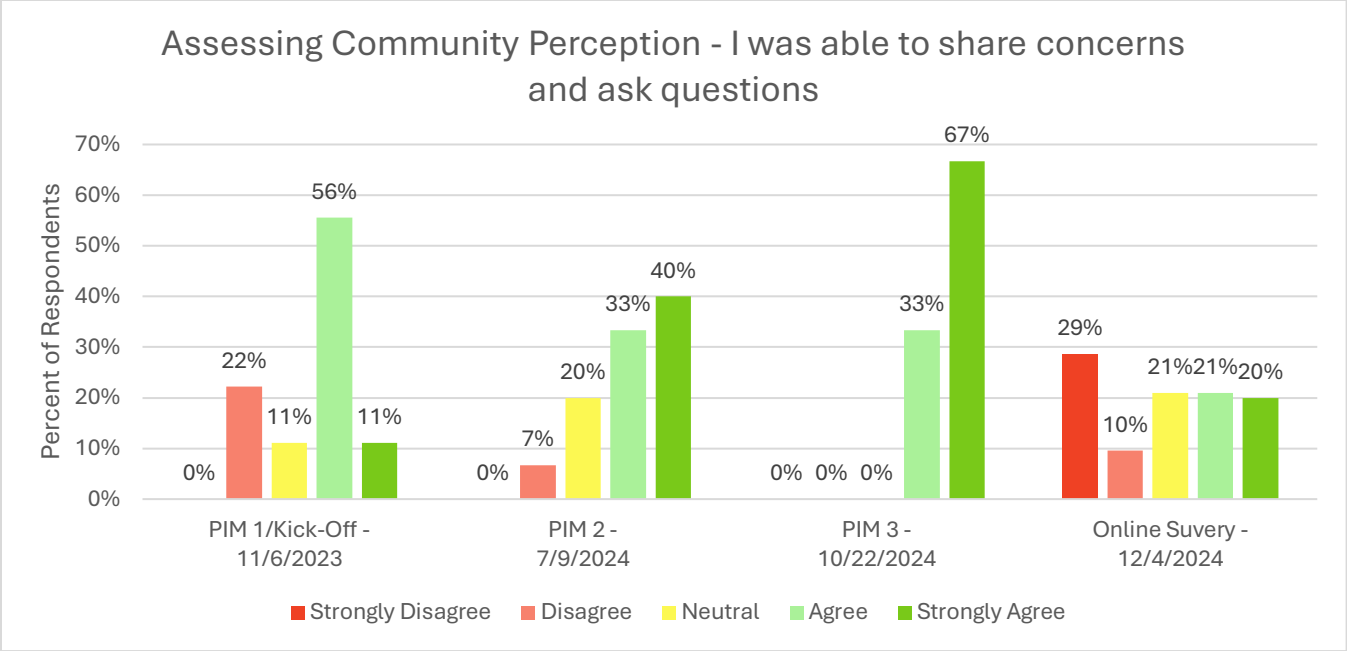


Figure 52 Assessing Community Perception - I was able to share concerns and questions
Feedback from PIM 1-3 was collected from meeting attendees via in-person and virtual comment cards. Online Survey was open to all community members. Wording of question varied slight between the PIMs. For full data, see Engagement Summary Appendix – Public Information Sections.

Who Shared Input

Below you can see a map of who registered for the public meetings, and who responded to the online survey about the draft corridor plan:

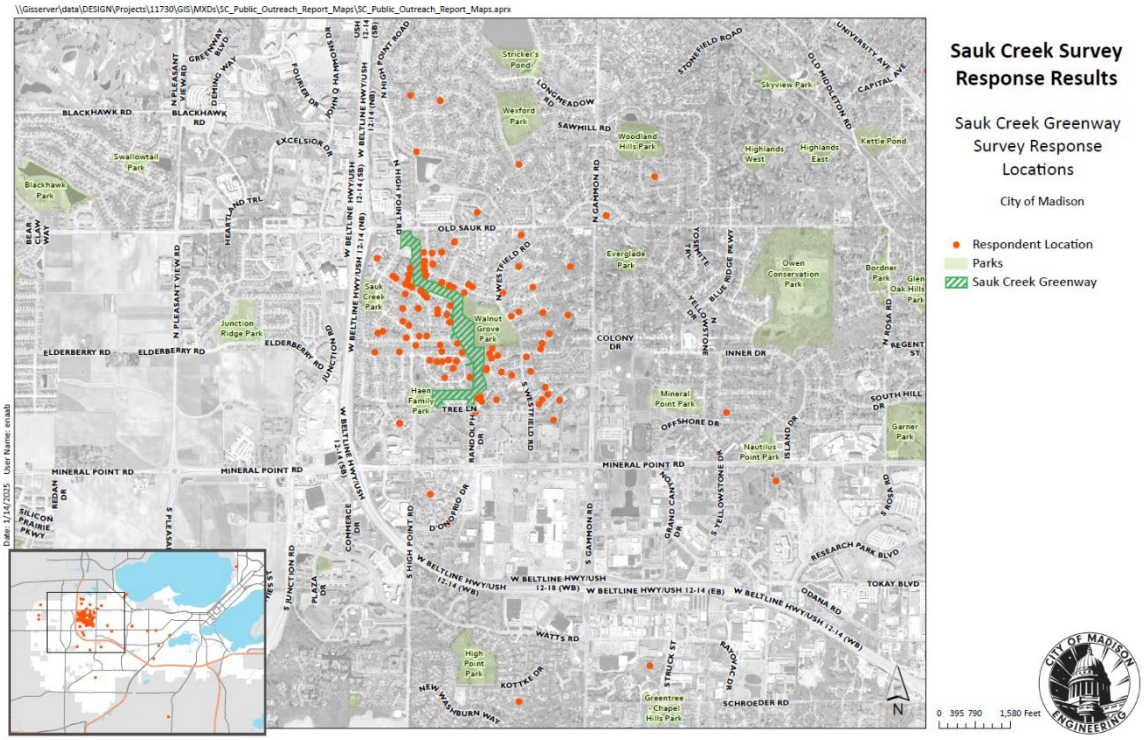


Figure 53 Draft Corridor Plan Online Survey Respondents

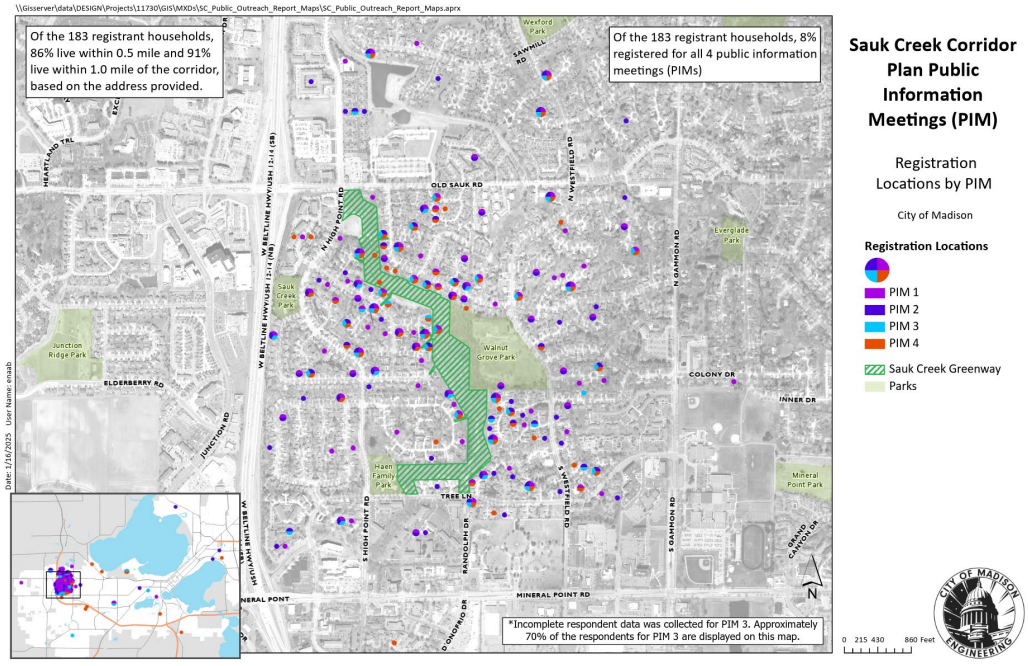
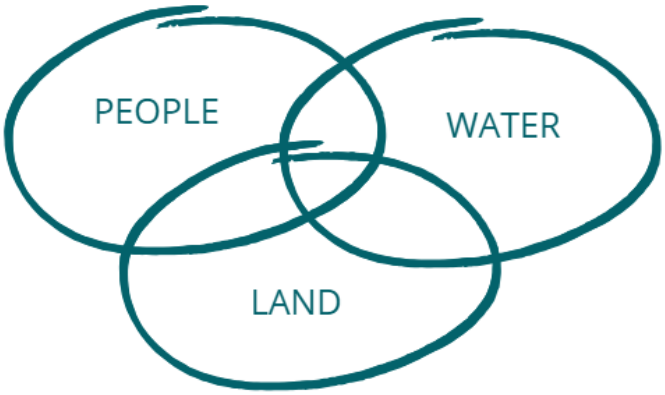


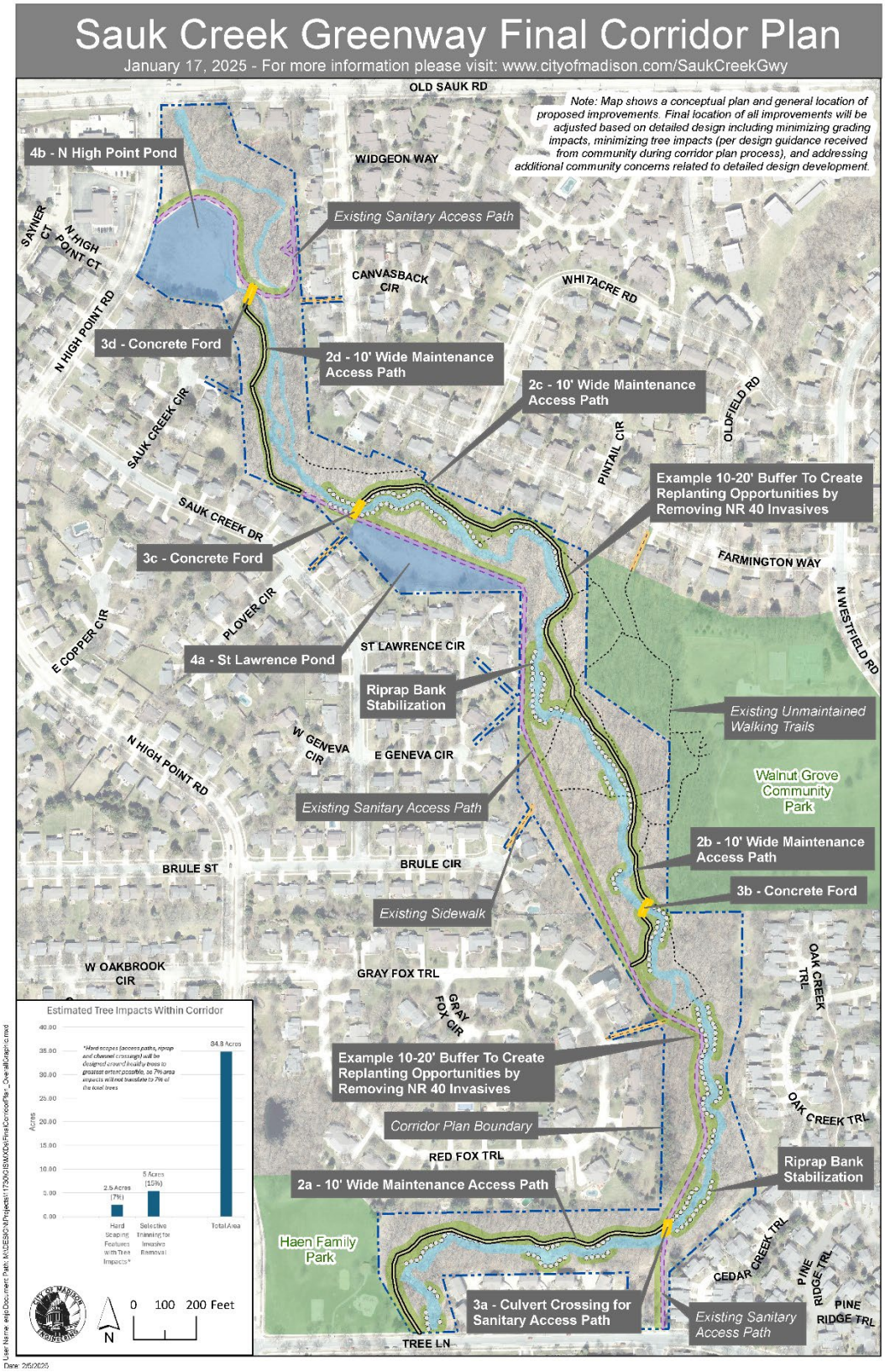
Figure 54 Sauk Creek Corridor Public Information Meeting Registration Locations

Chapter 5 - Corridor Plan

The Sauk Creek Corridor Plan reflects the Community's input to complete minimally invasive, environmentally sensitive improvements. The proposed corridor plan is in alignment with the City's Comprehensive Plan, Imagine Madison, the Vegetation Management Plan, and the Sustainability Plan Goals. This plan was created by the joint efforts of the City and the Community, who volunteered many hours of time attending meetings, filling out surveys, and attending Community walk-throughs to guide the development of the plan. The City received input throughout every phase of the engagement process, and this was used to develop a plan that is a compromise that reaches the goals of the Community and the City. We believe the plan provides for future improvements to water quality, the health of the woods, and continue to be a welcoming destination for wildlife and people alike to enjoy.

The improvements in the plan would be funded from the Stormwater Utility Capital Budget which is funded by the "stormwater" charge on monthly municipal services bill. The average single-family house pays $12-$13/month (2025) which is used to fund ALL the operations of the entire stormwater sewer system as well as funding capital projects.





[View the full-size PDF Corridor Plan](#).

The corridor plan reflects the community's desire to complete minimally invasive, environmentally sensitive improvements. There are no formal multi-use paths within the plan, per the community's desires.

The plan is broken down into six major components:

- Stormwater Improvements
- Ecological Restoration
- Maintenance Plan
- Construction Considerations
- Design Considerations
- Public use of Corridor

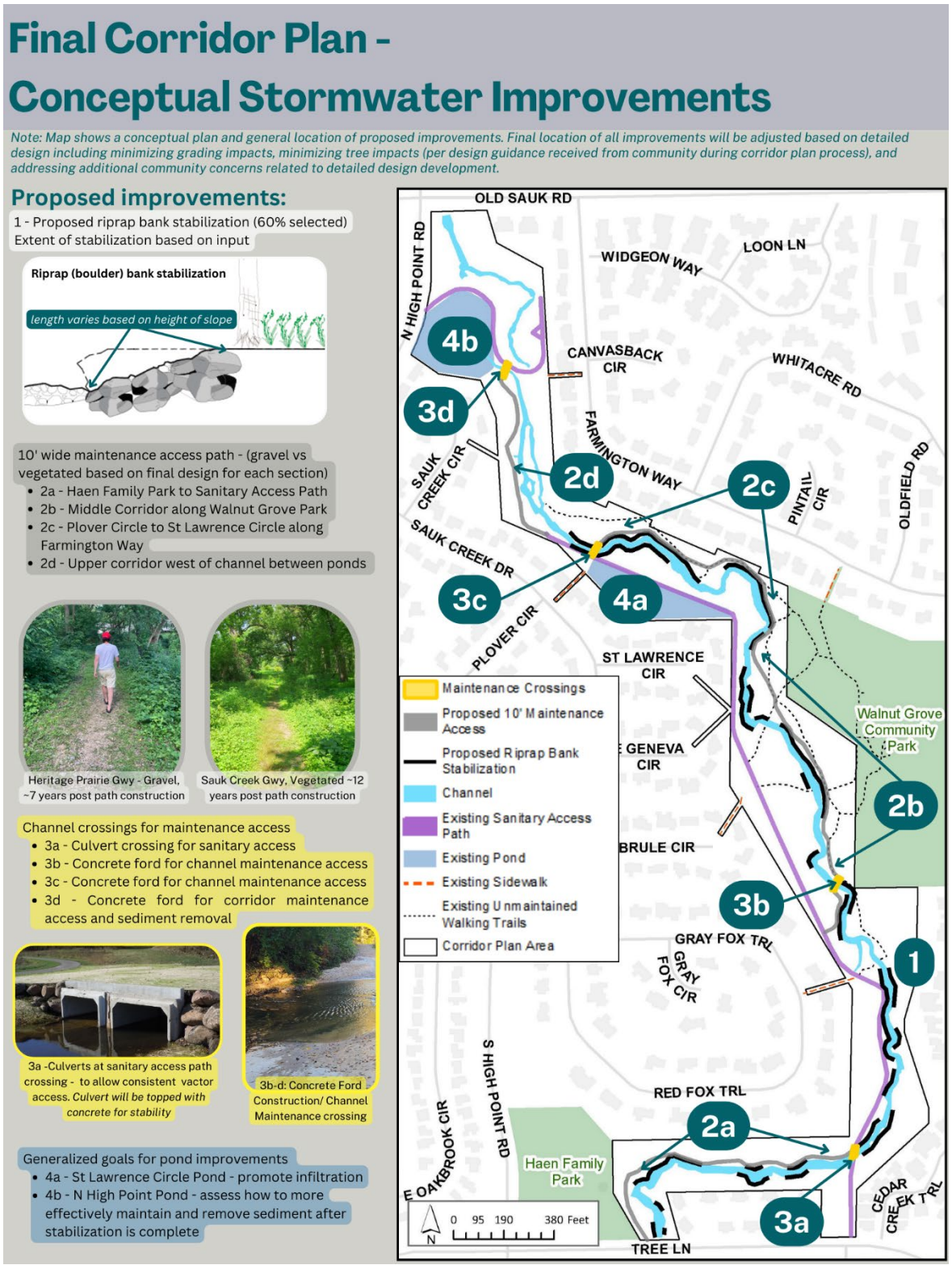
The corridor plan proposes high-level concepts that are intended to identify generalized issues and opportunities in the corridor and be used as a guide for future design and maintenance. These concepts are not meant to be the final design and more input on nuanced aspects of future designs will be sought during design development for the public works contracts.

Examples of things that are not covered in the corridor plan, but will be established during detailed design development with the input of the Community:

- Specific location of each improvement
- Grading extents
- Tree impacts – will be worked through during design, with basic design guidance to prioritize designing around the following:
    - **Priority 1:** Design around the largest quantity of healthy, native trees that are included in the natural ecological communities identified in the ecological assessment
    - **Priority 2:** Design around healthy trees not included in the natural ecological communities identified in the ecological assessment
- Exact extents and locations of channel stabilizations including options for alternative stabilization options where there won't be tree impacts
    - Whether channel stabilization needs to cut into the bank, or if there is enough channel capacity that it can be partially filled into the channel to help preserve the existing top of bank for tree or private property protection
    - Whether other nature-based bank solutions can be used in particular areas without impacting additional healthy trees, including soil lifts, tree revetements etc.

Stormwater Improvements

The stormwater improvements included provide for channel stabilization measures, maintenance access, dedicated greenway crossing improvements and pond improvements.



Channel Stabilization

Extent of Stabilization

Historically in areas with eroding channels in wooded areas, the City has followed engineering practices to either stabilize the entire channel by softening the slopes and replanting with herbaceous vegetation to hold the banks in place, or moderately softening the banks and applying riprap to stabilize the bed and banks. Typically, when this is done, the intent is to convey a 50% annual chance (2-year) storm within the main channel which is considered the "channel forming" design event, so often times the channel is enlarged during this process.

When Engineering brought this concept to the Community in 2018, the Community was interested in different options and very concerned about tree impacts. This input was considered carefully upon the re-launching of the Corridor Plan. Community input was the main driver on the extent of proposed stabilization within the corridor.

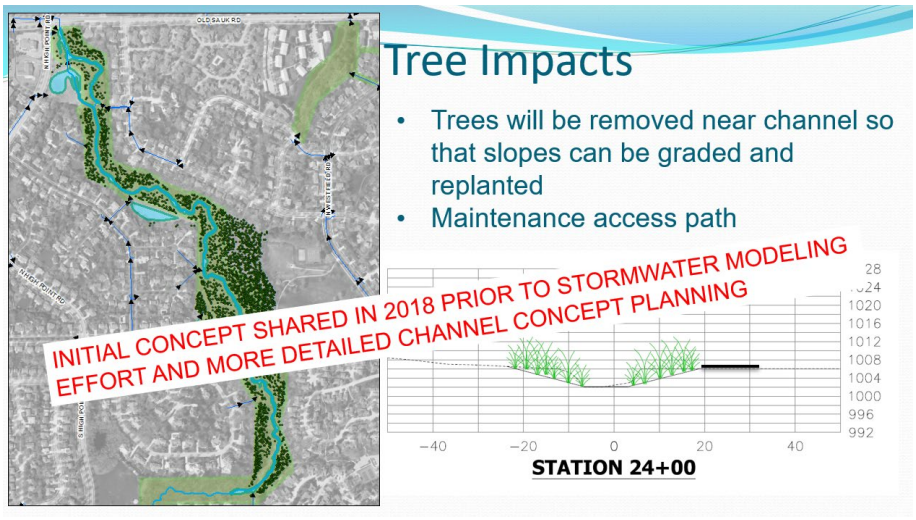
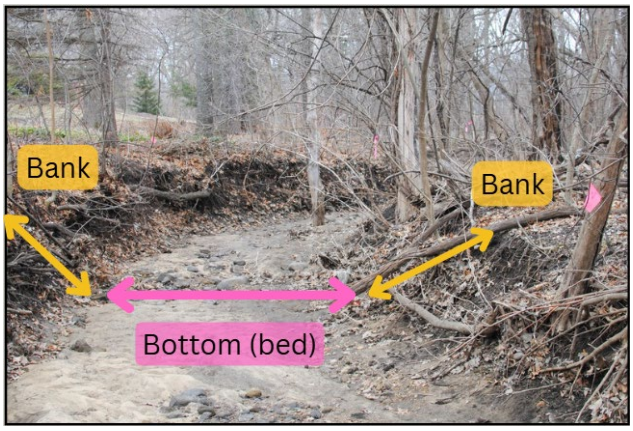


*Figure 55 Slide from 2018 public information meeting – this is *not* what was proposed on relaunching the corridor plan*

Upon completing the Pheasant Branch Watershed Study the detailed hydrology and hydraulics model was used to assess the erosive forces of the flows through the channel, the City and consultant hired to assess the channel determined the channel bed (bottom) was stable, and that the floodplain (area where the water leaves the channel) functions well to dissipate energy in higher flows. As such, the banks are the largest supplier of additional sediment, and the recommendation to minimize impacts to the corridor was to stabilize the banks, **not** expand or lower the entire channel. This is a significant decrease in project impact and scope than was originally proposed.



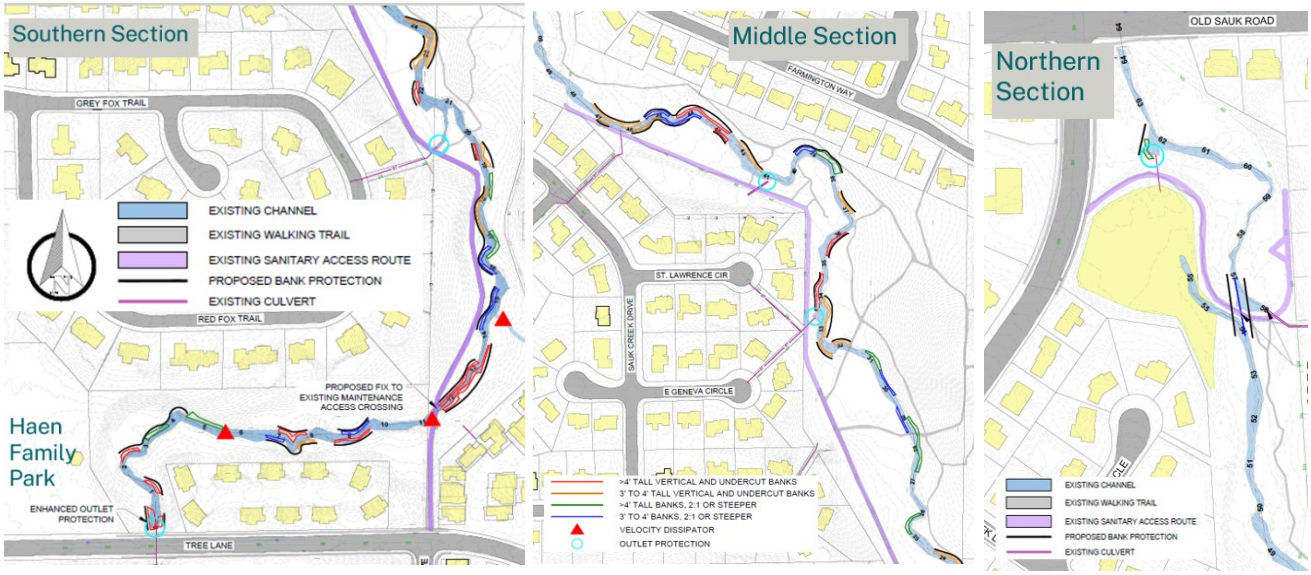
From that recommendation, the City provided a variety of options for the Community to choose from ranging from the smallest scope (Option 1), to a larger scope (Option 2):

Option 1 – Selective Mitigation – City Priority Areas:

Stabilize channel banks in highest priority areas. This includes:

- Banks that are vertical or undercut (red or orange in Figure 8)
- Banks that are 2:1 or steeper areas (green or blue) where banks are at high potential for erosion (per modeling)
- Banks that are 2:1 or steeper banks (green or blue) adjacent to other repairs
- Banks that could damage adjacent infrastructure

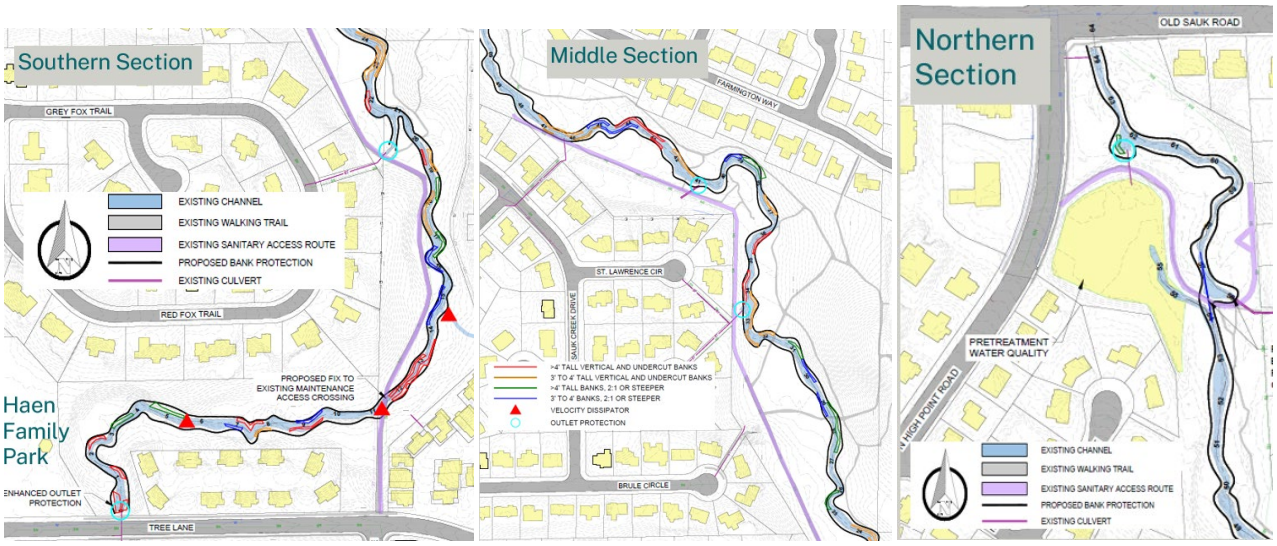
This option's intent is to show the very baseline intervention needed to stabilize the worst sections of the channel. It would involve less impacts to the channel and adjacent trees. However, it would still result in channel bank sediment being sent downstream to Wexford Pond, Pheasant Branch Conservancy and Lake Mendota. Additionally, it could result in needing future projects to stabilize other parts of the channel depending on how stable the channel is after completing the spot-bank treatment.



View larger Selective Mitigation Graphic here.

Option 2 – Full Mitigation:

The second option was to stabilize all of the channel's banks. This would be more permanent, as would be less likely for the "edges" of the stabilization to become a new weak point and would send less sediment downstream. However, this would result in more impacts to adjacent trees and have a higher up-front cost.



View larger full mitigation graphic here.

Community Selection of Extent of Stabilization

At the second public information meeting the City polled the Community about the extent of stabilization they'd like to see with the following options:

1. Option 1: Begin with bank stabilization in City's priority areas only (red/orange banks -- least stable)
2. A mix of Option 1 and Option 2: Begin with bank stabilization in all areas identified to have steep or vertical/undercut banks
3. Option 2: Stabilize all banks throughout channel

Polling results:

- 45% of people selected Option 1
- 44% of people selected a mix of Option 1 and Option 2
- 11% of people selected Option 2

Based on this input, the City began with a base stabilization option that was something close to Option 1 with a few additional banks – it proposed to stabilize:

- Option 1 banks, the highest risk banks (red/orange category), banks that could damage adjacent infrastructure, and additional banks with 2:1 or steeper areas (green or blue) where banks are at high potential for erosion (per modeling) or are adjacent to other repairs
- Banks at risk of eroding (green/blue) that are adjacent to the above banks
- Connections between banks to limit the riprap/bare bank interface

There were a variety of moderately at-risk banks in the middle of the channel that the City asked for additional input on whether the Community would want stabilized, including establishing construction and maintenance access included along the channel. 75% of those polled selected to stabilize the middle of the channel, and create through-access, or chose that they would be OK with either option presented. Therefore, the City included to stabilize the middle banks and create through access in the corridor. More

information on the polling questions and breakdown can be seen in the Appendix 2 - Engagement Summary.

In summary, Community input dictated the extent of bank stabilization, and the scope and impact decreased significantly from the original proposal based on Community concerns and input.

Type of Stabilization

There are a variety of options to stabilize banks within a channel that have pros and cons. The City with the channel assessment consultant selected a variety of options that would be applicable within the greenway based on the channel conditions. Notably, options that relied on wooded material (such as tree revetements) degrade quickly in channels without baseflow. While there may be banks that would be suitable to try this type of stabilization, the City was looking for a primary stabilization option to be used on most banks. During the design phase, the City can investigate if specific, select banks are suitable for other types of stabilization.

Additionally, during the design phase, each healthy tree that is part of the natural communities as defined in the ecological assessment at the top of each bank that is planned to be stabilized would be assessed to see if it is possible to save the tree by adjusting the bank stabilization. Options would include installing steeper stabilization to minimize the grading, or adding stabilization into the channel as opposed to flattening out the banks, if there was sufficient channel conveyance capacity in that section. Trees would not all be removed just because they are near the top of a bank that needs to be stabilized.

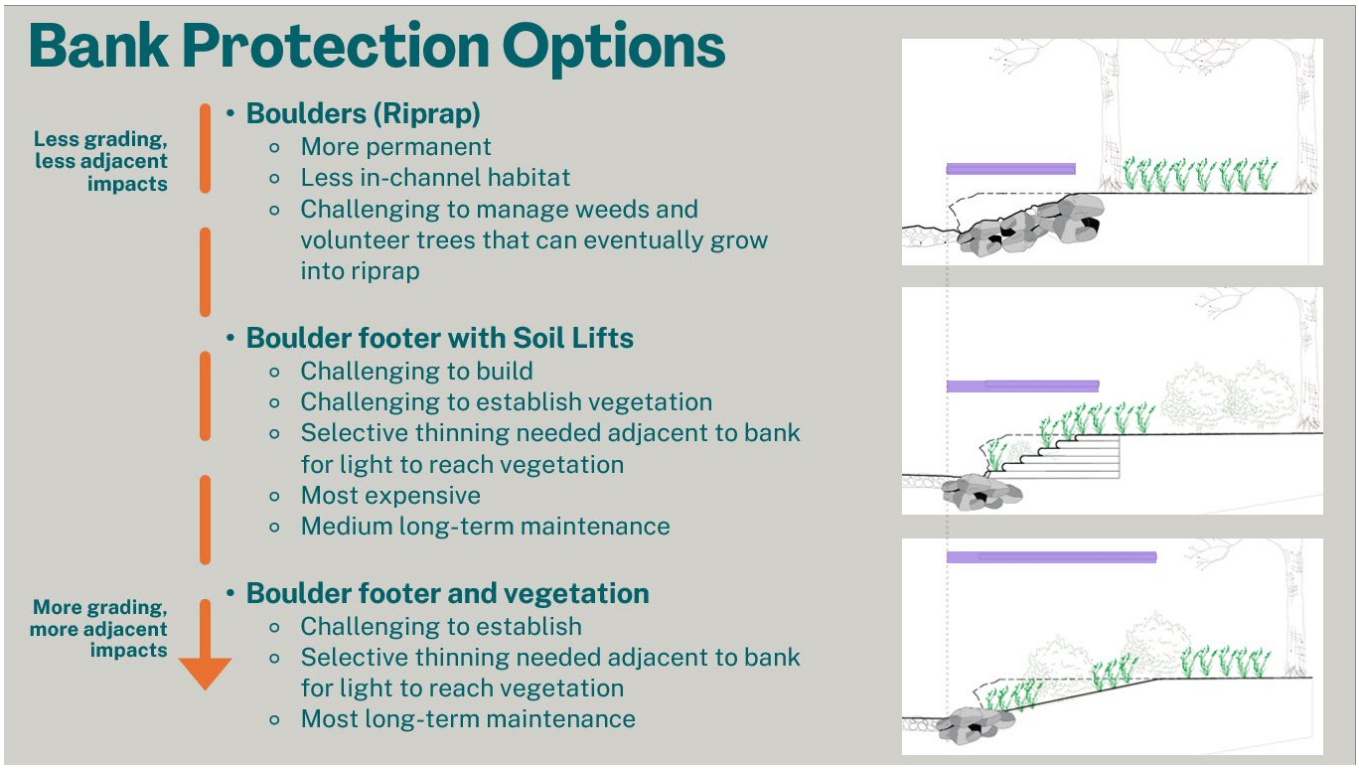


Figure 56

Community Selection of Primary Bank Stabilization

The City explained each option and the pros and cons to the public at the second public meeting, and riprap (rock boulders) were selected by the Community (60% approval) to stabilize the banks. The key benefits to riprap are that it involves less grading and doesn't need light to grow (unlike stabilizing with vegetation) and therefore there are less adjacent impacts. It is also simpler to construct than other methods and is immediate protection against the forces of the stormwater. Riprap can also withstand higher shear forces, and is naturally abundant in the channel, so it should blend in well with the rest of the channel.

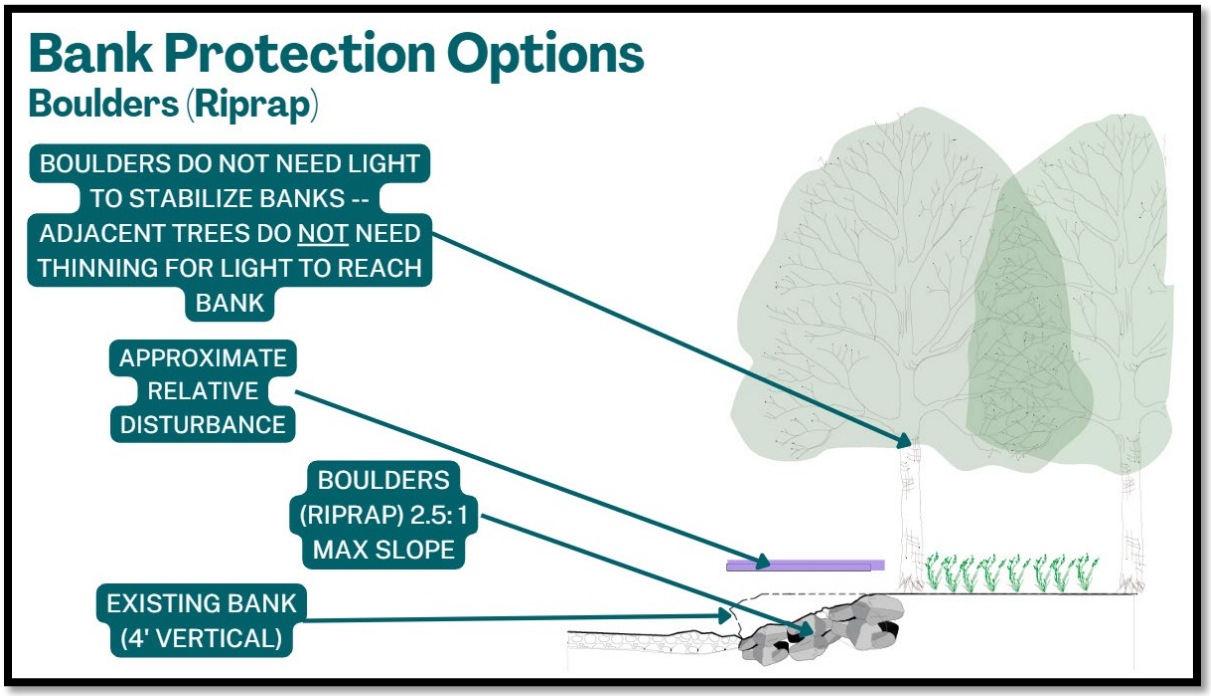


Figure 57

The corridor plan shows riprap in the areas that were identified in the bank analysis as being >3' tall and being steeper than 2:1, vertical or undercut. During each detailed design phase, the City will assess if any banks look stable and does not require riprap stabilization, Engineering will consider using environmentally sensitive or nature based stabilization, or if any other banks look unstable and need spot repairs. The greenway is a dynamic system, so it is important to assess bank condition at the time of each project.

Total Impact on Corridor

Based on the proposed plan, if you assume all the areas shown will need riprap, the average bank height if 4' tall, and you grade back the banks at 2.5:1 slope, the approximate total acres of riprap applied will be 1.1 acres, or 3% of the total corridor. This is a high approximation because many banks are less than 4' tall, and grading will be minimized to the greatest extent possible to save adjacent, healthy trees.

10’ Maintenance Access Paths

Maintenance access paths are necessary to complete maintenance to the channel, and can double as construction access, thus limiting impacts to trees.

The width of the paths was determined based on the equipment the City would need to use on the paths. This was based on the type of maintenance requests we received in the pasts (removing dead or downed trees, and removing large channel blockages). The maintenance and equipment are described in Chapter 2-Channel and Tree Maintenance Access.

To accommodate this equipment, a 10’ wide access path with a gravel base is required and the typical design cross section is shown below in Figure 58. The path has a larger sized gravel (gradation No. 2) 7” thick base and is topped with 3” of finer gravel (gradation No. 3) to create a walkable surface. Since the equipment isn’t as heavy, bulky or hard to maneuver as a Vactor, and stormwater emergencies in the greenway are less time-sensitive than sanitary overflows, there are options for what can go on top of the gravel base with a variety of considerations for each as outlined below.

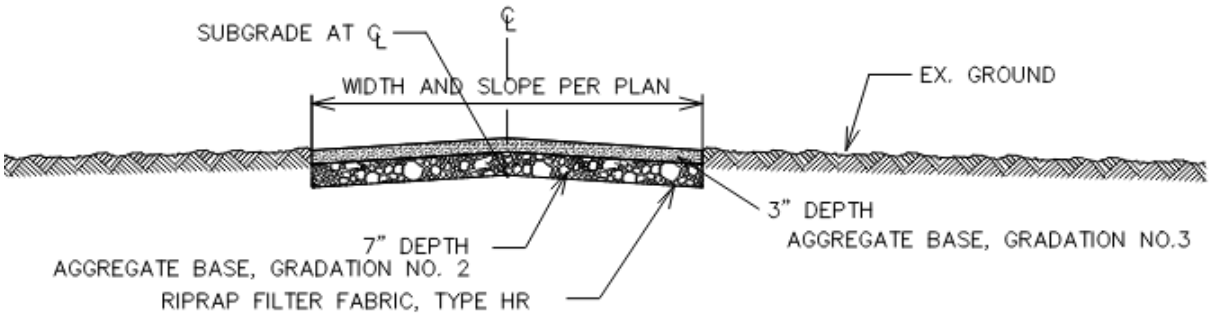


Figure 58

1. **Soil and Vegetation Considerations**

- Can limit access when area is wet to avoid rutting
- Rutting can lead to less level surface for other users
- Needs annual mowing
- Less clear edges

2. **Gravel Only Considerations**

- Can washout and need repair
- More defined edges of path

*note, the gravel on the surface is a very small crushed gravel to make it easy to walk on

3. Paved path Considerations

- Universal access
- More expensive to repair
- Clearly defined edges of path

Community Selection

The City presented the options to have access paths with 1. Soil and vegetation, 2. Gravel only, 3. Pavement, and explained the considerations as outlined in the Channel and Tree Maintenance Access Path section to the Community during the second public meeting. The Community vote results showed they were equally Ok with the soil and vegetation, or gravel only.

Figure 59

Gravel is more cost effective, easier to maintain, provides improved access in comparison to soil and vegetation, and it more clearly delineates the path for operators which can prevent adjacent soil compaction. However, where the paths are near private property, people often request that it is vegetated. The final cover type on each proposed access will be determined during each design phase.

Locations of access paths shown on corridor plan are approximate. The design will determine the final location and will navigate around trees, as prioritized based on the Community input, and minimize impacts to adjacent properties. The design will assess the shear forces of the stormwater that may flow over the path during different events based on stormwater modeling and propose additional enforcements where necessary to avoid washout. The path will be built on grade throughout most of the corridor to avoid water backing up on either side of the path, and to minimize grading. In areas where grading may be needed along steeper slopes, such as in the east-west section, the City will consider using glacial field stone walls to minimize grading and protect adjacent trees. You can see an application of this in Figure 59.

The maintenance access paths will be different from the existing sanitary access path. They will wind through wooded areas to avoid trees. A good, nearby example for the Community to see similar width paths, and the impact to the space, would be the un-paved paths in Wexford Park (see Figure 60). These paths offer walking routes for neighbors, can be used as maintenance access paths for Parks, and an abundance of wildlife can be viewed throughout the park. A major difference between the paths that are

Figure 60

proposed with the Sauk Creek Corridor Plan and the Wexford Park paths is that the City is not proposing to woodchip the Sauk Creek maintenance access paths due to the stormwater flows through the corridor that could wash the woodchips downstream. Whereas in Wexford Park, volunteers maintain the trails and spread woodchips on the non-paved trail system. This has caused a mounding effect on the paths in Wexford Park. Maintenance access paths within Sauk Creek Corridor would be designed to be flush with the existing surface to avoid disrupting flow paths or washing out the paths.

It is expected that due to the wooded nature of the greenway, and the high quantity of adjacent trees that will remain following the construction of the paths, in time leaf litter and soil will settle on the paths and cover the edges with soil and vegetation even if they are not vegetated. In areas where a gravel path is selected during the design process, the City does not plan to continually replace gravel to prevent vegetation growth. The City anticipates any gravel paths will look similar in cover to the Heritage Prairie Greenway paths (which used a different gravel base) as the long-term path condition.

Figure 61 - Heritage Prairie Greenway ~7 years post-gravel maintenance access path construction

It is important to note that the access paths are not intended to be used as formal bike paths nor are they intended to be paved in the future.

Individual Proposed Maintenance Access Paths

For paths 2a-2c, 10' wide gravel access paths allow for the construction of riprap bank stabilization, as well as future tree and channel maintenance. These paths are sited on the side of the channel where more stabilization needs to occur to avoid equipment needing to reach into or over the banks and destabilize an existing stable bank. Their location also considers previous tree maintenance requests to provide a double benefit where the City has struggled to access trees that are at risk of damaging private property historically. The paths are also generally located to avoid impacts to healthy, native trees that are included in the natural ecological communities identified in the ecological assessment based on the 2017 data, which will be updated and reconsidered prior to each design phase.

Path 2b was an optional path that Community opted to include via a poll during a public meeting.

On both paths 2a and 2c there were recommendations from the public to consider including an intentional break (dead ends) in the paths so that they would not connect through in order to prevent people from walking on them. On path 2a, the concern was that more people walking through this area would disturb wildlife. For path 2c, there were concerns about wildlife impacts, and that the paths would be too close to

the adjacent private property. While the City is empathetic to these concerns, there are a variety of needs and desires related to path connectivity that are important to consider. There are a variety of people at public meetings, responding to meetings, and those in the focus groups, with concerns about the existing dead-ending paths, and lack of connectivity within the greenway which impacts wayfinding. Creating more clear access from Haen Family Park into the greenway would provide more equitable access to the corridor for people renting apartments south of Tree Lane. Additionally, an added benefit to creating clear, accessible walking routes is shown to have health benefits to communities. Another consideration is that dead end access paths are more challenging for maintenance operators to turn around, or back out an entire stretch. Sometimes, creating enough space for a turnaround can be more disruptive than continuing the access. Another concern is that regarding human use negatively impacting wildlife. Urban adapted wildlife that are tracked can be found citywide, including neighborhoods, or parks with robust path networks. These include, but aren't limited to turkeys, fox, coyote, squirrels, rabbits, other small mammals, in addition to a wide variety of songbirds, and raptor species such as owls and hawks. Some of these species can be , as seen and are tracked via the Urban Canid project or online via the eBird app. Anecdotally the City sees the urban adapted wildlife citywide, in many areas with similar or even more limited habitats. Providing and maintaining habitat in the greenway is a major component to this plan, however including in neighborhoods and parks with robust walking paths, so the City does not believe that this concerns limiting path connections outweighs the benefits to improvement maintenance access and equitable accessibility.

Path 2d is a 10' wide gravel access path that allows for maintenance of an area where neighbors regularly request maintenance of dead standing or dead, fallen trees. As explained in the Ecological Assessment, the massive amounts of sedimentation in this area is contributing to tree mortality in this area, and the trees that are mostly newly growing are fast-growing, shallow-rooted box elders. The path was originally proposed in the draft plan on the east side of the corridor, where it was generally located to avoid impacts to healthy, native trees that are included in the natural ecological communities identified in the ecological assessment based on the 2017 data. However, based on neighborhood input, and because the path isn't needed for construction, the City proposed to shift the access path to the west side of the channel to move it away from property lines, and keep the path more in the center of the corridor.

Total Impact on Corridor

The current proposed maintenance access paths (2a-2d) as shown on the Stormwater Improvements map, when assuming an additional 10% of impacts for grading, account for 1.3 acres of total impacts, which is 4% of the total corridor.

Maintenance Crossings

The corridor plan proposes a variety of channel crossings where the maintenance access path needs to cross the channel. During the initial phases of the input when multi-use paths were being considered, the City received input that people wanted improved channel crossings, including bridges, and others were firmly against adding bridges over the channel. Bridges are expensive to build and challenging to maintain. They are built and maintained for transportation features such as roads or multi-use paths. Since multi-use paths were removed from the corridor plan, there are not bridges proposed within the plan. The crossings below are designed to accommodate the maintenance vehicles needed at each location, and the improvements should double for improved access for those using the greenway for passive recreation.

Crossing 3a

The existing articulated block ford used for sanitary access crossing near Tree Lane and Randolph failed shortly after it was installed. Currently it doesn't allow for access to the sanitary sewer with the Vactor truck when there is any notable flow of stormwater through the greenway, and as explained in the Sanitary Access Paths section, it takes 1-2 days for crews to prepare the crossing for the Vactor to cross. Due to this restriction, the City is proposing to install a culvert crossing to allow for access throughout the year. This will allow for reduced City resources and specific weather planning when needing to preform preventative maintenance, and increased access during an emergency.

Box culverts are concrete square shaped storm sewers that will be 14-20' long (meaning the crossing will be 14-20' wide). A culvert allows the low flows of water to pass through the channel as normal while creating a safe, stable crossing overtop of the culverts. The culvert will be designed to match the approximate size of the existing channel to not create a bottleneck, and safely have water also flow over the top when it leaves the channel bank during large rain events.

Figure 62 – Example of a box culvert

An example of a box culvert can be seen in Figure 62, however it is not representative of how the culverts will look in scale, cover, or surrounding vegetation (including trees).

Crossing 3b-d

The rest of the crossings are not part of the sanitary access path, and do not need to be designed for Vactor truck access. Therefore, these are proposed as concrete fords that can be used as a maintenance crossing. Fords are to be placed at the same elevation of the channel bottom, and have sloped banks to allow for equipment to drive up and down the banks across the channel without destabilizing the banks. These are proposed as concrete to hold up to the stormwater and debris flows. The articulated concrete block ford was damaged in 2018 (as seen in Figure 19) did not hold up to the forces of water during large storm events. Any fords that would be constructed of less durable options such as the articulated concrete block that was originally installed, and including gravel or washed stone, are not able to withstand the stormwater forces and would also be washed downstream. These less durable options are not suitable for long-term maintenance access. While fords cannot be crossed during high water, they will allow the large amounts of trees and debris to easily flow over them. This reduces the maintenance need, and risk that they could cause water to

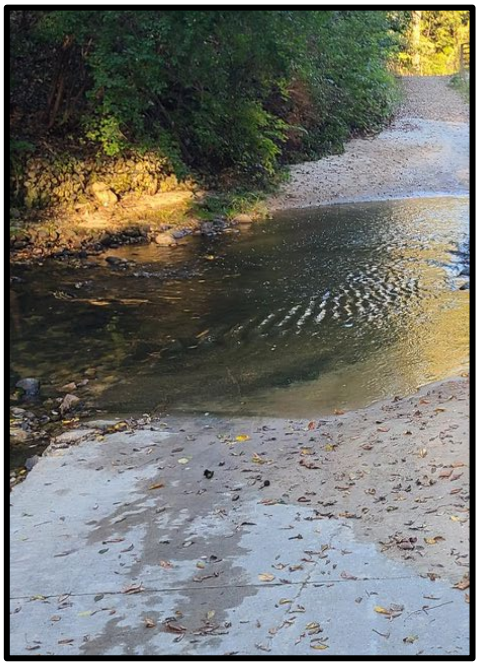


Figure 63 – Example of a concrete ford, shown with baseflow (Sauk Creek doesn't have baseflow, so crossing would often be dry)

back-up behind them. There are several examples of concrete ford crossings in the City of Middleton's Pheasant Branch Conservancy.

Total Impact on Corridor

The total impact of the crossings on the corridor are a maximum of .09 acres, which is 0.3% of the total corridor area.

Pond Improvements

There are 2 ponds located within the Sauk Creek corridor. These ponds are located near St Lawrence Circle and near the intersection of High Point Rd and Old Sauk Road (see Figure 12). Both ponds are not functional as they were originally designed. Improvements to these ponds will provide water quality benefits and also provide additional infiltration.

St Lawrence Circle Pond potential improvements

The proposed goals within the pond include:

1. Improve flow of water into pond near Plover Circle (repair + clear out pipes and outlet)
2. Turn pond into a biofiltration system. Deepen and add two feet of filtration medium with an underdrain. Restore with native plants to promote infiltration (improve water quality).
3. Remove failed diversion structure from channel

All these goals will help pre-treat and infiltrate some of the stormwater from the area in yellow in Figure 12 in small events. It will not have a notable impact on channel capacity. Additionally, the options for improving infiltration in the pond do not result in a permanent wet pool of water in the pond. It would look similar to how it looks today in-between rain events.

The Community shared it is important for them to have functioning ponds sooner, so the City will work to reconnect the pipe (from goal #1) independent of the other improvements.

High Point Pond potential improvements

The proposed goals for the pond include:

1. Improve design so sediment can be removed more easily
2. Reconnect main channel to bypass pond
3. Assess sediment loading after channel stabilization to determine improvement options

The City would like to be able to actively remove the sediment that is accumulating within the pond more effectively, and with less community disturbance that it would currently entail.

Total Impact on Corridor

The current pond footprints total 3.1 acres of the corridor. This is the maximum disturbance footprint for any pond improvements. Therefore the total proposed disturbance would be 3.1 acres, which is 9% of the total corridor. However, notably, there are not any tree impacts within the existing ponds.

Final Corridor Plan - Conceptual Ecological Restoration

Note: Map shows a conceptual plan and general location of proposed improvements. Final location of all improvements will be adjusted based on detailed design including minimizing grading impacts, minimizing tree impacts (per design guidance received from community during corridor plan process), and addressing additional community concerns related to detailed design development.

PROPOSED ECOLOGICAL RESTORATION

- Long-term goal to direct future canopy towards native hardwood growth with emphasis on keystone oaks
- Preserve as many mature canopy trees as possible
- Plant native trees, woodland shrubs, plugs (where applicable) and seed. Ex: oaks less susceptible to oak wilt, hickories, witch hazel, canada anemone etc.
- Control invasive species. Ex: pull garlic mustard and dame's rocket

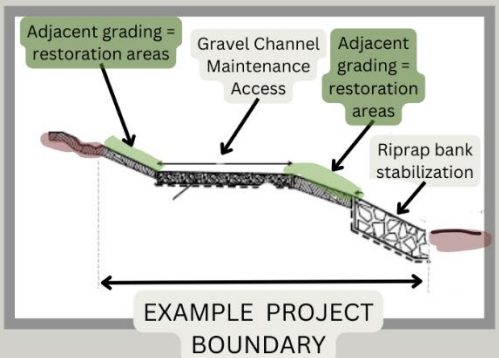
Wild geranium in Sauk Creek greenway

Native rosy sedge and Virginia creeper on a wooded stormwater pond

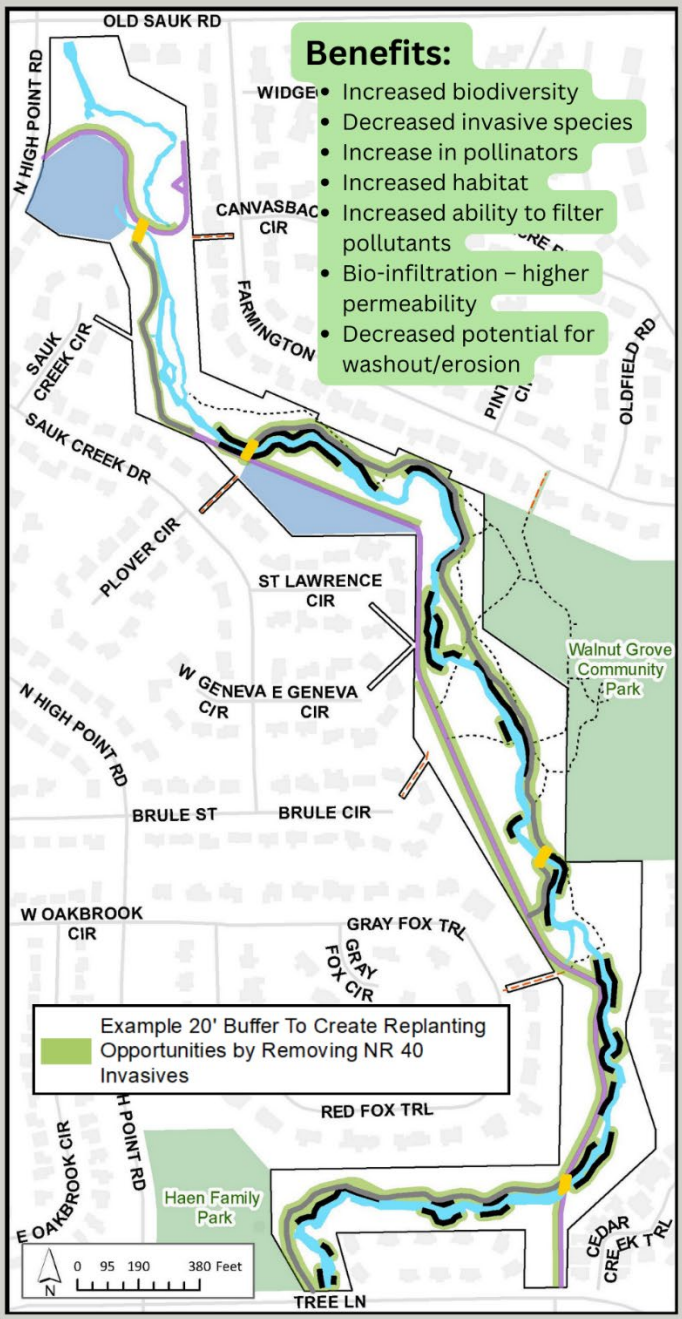
Young oak regeneration where pockets of light are created.

WHERE RESTORATION WILL OCCUR

1. **Within the Project Boundary: areas graded to complete the stormwater improvements - not shown on map, but shown in graphic below. Grading extents to be defined during design, and minimized wherever possible.**



2. **Within 10-20' of Project Boundary and existing Sanitary Access Path (green area on map): create tree replanting opportunities by removing NR 40 invasives. Replant disturbed ground with native seed.**



The Ecological Restoration plan is an important component of the overall corridor plan and identifies the goals and implementation strategies for the greenway and woods.

Goals of Ecological Restoration

Goals for ecological restoration on the greenway were shaped by Community and expert input including the Community's desire to see the area remain wooded and "natural"; the ecological assessment; contracted arborist tree inventories and Engineering and other City staff expertise from the internal advisory group. Based upon this feedback the following goals were identified:

1. Direct the growth of the future canopy towards native hardwood growth with an emphasis on keystone oak species
2. Preserve as many existing mature canopy trees as possible
3. Direct revegetation efforts towards natural communities identified in the ecological assessment
4. Create or enhance existing wildlife habitat and proceed with sensitivity towards wildlife already using the greenway

Future Canopy

The goal for the future canopy is that it be composed of native hardwood trees, primarily oaks. Oaks are a keystone species in Wisconsin, supporting over 500 butterfly and moth species alone[5]. This in turn supports insectivorous birds and other wildlife, as well as providing pollinators that maintain plant populations. The ecological assessment notes that the current canopy still supports mature oaks, but there is little oak regeneration, and that faster-growing species have now reached the canopy and already dominate the canopy across most of the greenway[6]. The shrub layer is composed primarily of buckthorn and box elder. Concerns about the presence and health of oaks in the greenway are shared by the Community. During polling 97% of respondents reported being somewhat or very concerned about preserving the health of existing oaks and 93% of respondents thought it is somewhat or very important to get new oaks to grow in the greenway.

To support a more diverse and ecologically functional canopy, ecological restoration efforts will place an emphasis on replanting oaks in areas disturbed by project work. Hickory, hackberry and other hardwood tree species will also be planted to further diversify the canopy and protect against known and potential pest and disease pressures. Native shrubs such as elderberry, witch hazel, Eastern wahoo, and others will be planted to provide competition for invasive shrub and tree sapling growth and to provide wildlife habitat.

Controlling undesirable woody plant growth, in particular NR 40 invasive species such as buckthorn, is a crucial part of ensuring the success of plantings. During the first 2-3 years following construction, this work will be completed by an ecological restoration contractor. In subsequent years, the work will be performed by Engineering Conservation staff. To further expand replanting opportunities and widen the potential impacts of canopy improvements while protecting replanted disturbed project areas from invasive species pressures, the City asked the Community if they would like to see selective thinning of NR

[5] https://mywisconsinwoods.org/wp-content/uploads/2018/10/Fayram_Intro-to-WI-Oak-Ecology-Fall-2018.pdf
[6] Page 9 of Ecological Assessment https://www.cityofmadison.com/engineering/documents/projects/Heartland%20Eco%20Assessment%20Report_Sauk%20Creek%20Greenway_20240516.pdf

40 species within a 10 – 20' buffer of the project area. 82% of the Community polled supported removing all (47%) or the majority (35%) of invasives within 10-20' of the project area. See "Community Input on Thinning Invasives" section below for more information.

Preservation of Mature Trees

Preservation of a mature tree canopy with an emphasis on species that are included in the natural ecological communities identified in the ecological assessment (particularly keystone species like oaks) aligns with all the other goals for ecological restoration in Sauk Creek Greenway. Mature trees have many benefits including carbon storage, mitigation of the urban heat island effect, wildlife habitat and aesthetic benefits, and preservation of mature trees aligns with goals laid out in the Urban Forestry Task Force report[7]. Minimizing tree loss and impacts has also consistently been a top priority for the Community.

A guiding principle for the design phase of the project will be to avoid impacts to healthy, mature canopy trees. This will be accomplished by limiting channel stabilization to spot treatments; utilizing existing access paths where possible; and stabilizing the channel with riprap as opposed to alternative solutions that require additional grading. During both the design and construction phases of the project, a certified arborist will be hired to assist with planning for avoiding tree impacts, and for on-site implementation of tree protection efforts and monitoring during construction work.

Revegetate using Natural Communities as Guidelines

Ecological restoration in project areas will use natural communities as guidelines for what plant species to revegetate. "Natural Communities" are defined historical assemblages of native plant species[8]. Using natural communities as references when doing ecological restoration offers the benefits of increasing biodiversity and ecosystem services on a site, since these known assemblages represent stable ecological communities that have coexisted and coevolved over long time periods. Interest in improving the ecological health and diversity of the greenway as a whole has been another top priority of the Community with "support ecological improvements" and "improve lake and stream water quality" ranking highly in the Kick-off Meetings as well as Focus Group polls. Additional polling from the second Public Information Meeting found that 87% of respondents are somewhat or very interested in expanding coverage and increasing the diversity of native herbaceous species (non-tree or shrub plants) in the greenway and 55% of people thought that native forest overstory with native diverse understory would be aesthetically pleasing, resilient to flooding and erosion, and beneficial to ecosystem services.

There are stormwater benefits to revegetating using native species. Native trees, particularly slower-growing hardwood species, have deep, broad root systems that help control against erosion. Native shrubs may provide interim woody root erosion control while newly planted trees mature. Native herbaceous species tend to have deep and fibrous root systems that provide additional soil stabilization benefits, as well as the ability to open small pores in the soil to faster infiltrate water and filter pollutants.

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[7] https://madison.legistar.com/View.ashx?M=F&ID=8033567&GUID=9B1BC88B-FD1E-4CC6-B4DC-72D52838455E
[8] https://apps.dnr.wi.gov/biodiversity/Home/Index/Communities

Revegetation efforts will focus on replanting of trees, shrubs and herbaceous species that are part of the natural communities identified by the ecological assessment. The ecological assessment identifies oak woodland, southern dry-mesic forest, and oak-hickory forest as reference natural communities, as well as sections of lowland or floodplain forest. Exact locations of revegetation efforts will be tailored to specific site conditions. For example, areas close to the channel may receive native wetland shrubs, trees and sedges, rushes and wildflowers, while more upland areas may receive denser plantings of oaks, hickories, and oak woodland herbaceous affiliates. If a denser stand of mature trees is to be preserved, revegetation efforts in this area will focus more on shade tolerant herbaceous species or shrubs, rather than tree replanting. If an area has lost more canopy, replanting efforts will focus on denser tree and shrub replanting. To account for the fact that Sauk Creek Greenway is an urban corridor with highly unique pressures and interests, additional consideration will be given to more novel combinations of species outside of defined reference natural communities.

Controlling invasive species, particularly herbaceous and woody invasive species with high potential to disrupt ecological restoration, is a crucial part of ensuring the success of revegetation efforts. During the first 2-3 years following construction, this work will be completed by an ecological restoration contractor. In subsequent years, the work will be performed by Engineering Conservation staff.

Create or Enhance Existing Wildlife Habitat and Proceed with Sensitivity to Existing Wildlife

Ecological restoration of project areas has the potential to enhance habitat offerings for wildlife already using the greenway and expand the habitat offerings to species not currently benefiting from the greenway. For example, a lack of native herbaceous species leaves fewer resources for herptiles such as turtles and salamanders, as well as nectar-reliant pollinators like bees, wasps, butterflies, moths etc. Improvements to wildlife habitat are inherent in other proposed ecological restoration goals as improving the diversity and ecosystem functionality of disturbed areas by revegetating using natural communities as a guideline, and with an emphasis on keystone oak species directly benefits wildlife. Ensuring that the canopy contains keystone oak species into the future continues to provide this high-quality resource to wildlife. Restoring native herbaceous species and shrubs, notably absent across much of the greenway according to the ecological assessment, provides nuts, berries, nectar, shelter and many additional wildlife habitat features. Expanding the diversity and cover of native plant species on site in turn supports a broader array of Wisconsin wildlife. Urban areas are known to have the ability to support even specialized species such as pollinators[9].

Many wildlife species already use the greenway as habitat, and project planning and implementation will attempt to minimize impacts to these individuals. Other ecological restoration goals provide direct benefits to existing wildlife, as for example, preserving mature, healthy trees continues to provide this resource to nesting birds, mammals or sheltering insects. An emphasis on protecting oak trees has the potential to protect even larger groups of wildlife since this keystone species supports such a wide diversity of wildlife. A supporting action for preserving mature trees and replanting native trees is to control invasive species. This action directly benefits wildlife already on site by removing buckthorn, a species whose berries sicken and weaken birds[10].

[9] https://www.xerces.org/blog/earth-week-urban-habitat
[10] https://fmr.org/updates/conservation/buckthorn-how-can-shrub-be-so-harmful

Monitoring for wildlife provides opportunities to better protect individuals and species groups already using the greenway. Monitoring already occurs through casual user observations, or through citizen science tools such as iNaturalist and eBird. "Wildlife concerns" have consistently ranked amongst the highest concerns of the Community about the proposed project and many residents have a deep knowledge of wildlife use on the greenway from decades of site use. The City will utilize observations posted both formally to citizen science sites, as well as anecdotal observations shared through public outreach efforts to help inform construction practices. Already, there are numerous reports of owls, songbirds, coyotes, fox, deer and turkey using the greenway. Knowing that these species are utilizing the greenway has allowed the City to consult with experts about best construction practices with regards to specific species. For example, the City has been in touch with UW Urban Canid lab and will utilize their data and expertise to monitor for denning coyotes and fox on the greenway. The City has also consulted with ornithologists at UW-Madison about timing construction for avoiding bird, especially raptor, nesting season. Raptors tend to nest earlier than other bird species, so timing construction to accommodate their nesting may provide benefits to later nesting species.

Another practice that provides benefits to wildlife is to leave dead trees, standing or fallen, as wildlife habitat if they do not pose a hazard to people or property.

Finally, the City will evaluate the potential of herptile relocation efforts for turtles, frogs, and salamanders before construction. This approach has been utilized successfully on other stormwater reconstruction projects.

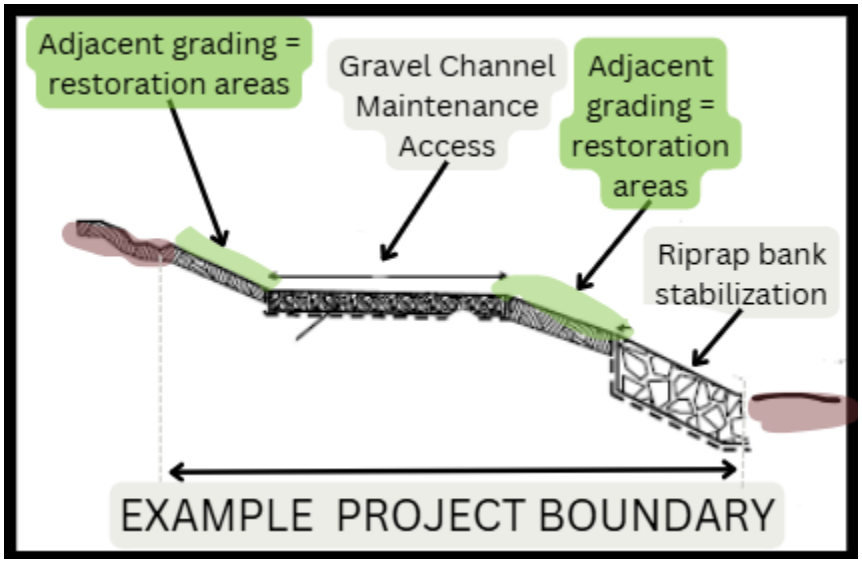
Trajectory of the Corridor without Ecological Restoration Efforts

Without ecological restoration efforts the likely ecological trajectory of the greenway is towards a less biodiverse, less ecologically functional space. The ecological assessment states that oak health and ecological functionality on the greenway are in decline. The report notes that without intervention in the form of ecological restoration we are likely to see mature oaks die off from competition from other species, fire suppression, lack of regeneration, disease such as oak wilt, and erosion and sedimentation issues; invasive species continue to proliferate and spread; erosion due to lack of vegetation, both herbaceous vegetation on the groundlayer in the short-term and the presumed loss of deep-rooted oak and other slower-growing tree species that provide a deeper form of erosion control in the long-term; continued loss of all trees in areas most affected by erosion and sedimentation; and the continued spread of horticultural invasives that fragment and interrupt the ability of native herbaceous species, such as remnant pockets of wild geranium, Solomon's seal and jack-in-the-pulpit to grow. The corridor will see more invasives, tree disease and die offs. As the canopy trends towards a lower diversity composition of the fastest growing tree species such as box elder, the canopy risks being less resilient to future vectors that target such species. Interventions in project areas may provide a buffer of more diverse native plant and wildlife habitat, as well as better stormwater management. Ecological restoration efforts with similar goals and approaches are in line with best conservation practices practiced by many public and private land

managers including City of Madison Conservation Parks[11], Dane County[12], and a wide variety of non-profit organizations.

Where Ecological Restoration Will Occur

Restoration efforts will occur in areas adjacent to stormwater improvements where grading needs to take place in order to install them. Since the corridor plan is a high-level conceptual design, the extents will be determined during the design phases and will be dependent on-site conditions. Grading limits will be minimized to every extent possible to minimize disturbance to the corridor and existing vegetation.



Invasive species were identified as a threat to the ecological health of the greenway in the Ecological Assessment and was shared as a top concern of the Community. The Wisconsin DNR Invasive Species Identification, Classification and Control Rule (NR 40) is part of WI Administrative Code that defines certain species as "invasive" and places restrictions on their use or transport. Some tree or shrub species known to be in the Sauk Creek greenway that are regulated by NR40 include:

- Black locust *(Robinia pseudocacia)*
- Burning bush *(Euonymous alatus)*
- Common buckthorn *(Rhamnus cathartica)*
- Siberian elm *(Ulmus pumila)*
- White mulberry *(Morus alba)*

In addition to controlling these species within project boundaries, there are benefits to the ecological restoration efforts and the ecological health of the greenway in general if the City pursues limited control of invasive woody species adjacent to the project boundaries. These benefits will largely be realized by

[11] Parks 2023 Land Management Plan defines ecological restoration approaches broadly for many Conservation Parks and areas: https://www.cityofmadison.com/parks/documents/LandMgmPlanAdopted2023.pdf
Kettle Park Pond restoration efforts blog post: https://www.cityofmadison.com/parks/blog/?Id=30698;

[12] Dane Co completed projects describes many projects that pursue ecological restoration approaches with similar goals to those proposed for Sauk Creek Greenway: https://lwrd.danecounty.gov/completedprojects
Woody brush control guidance webpage from Dane Co: https://www.danecountyparks.com/Volunteer/Invasive-Tree-and-Brush-Removal

improved plant and wildlife diversity on site. This is because invasive tree and shrub species can grow aggressively, outcompeting native tree and shrub species thereby reducing the availability of native trees and shrubs to the wildlife that evolved with them and depend on them; some of these species can additionally suppress the growth of native plants by exuding chemicals that create inhospitable soil conditions for other plant life. For example, buckthorn can directly harm birds by producing tempting berries that cause diarrhea, leading to calorie deficits for birds that consume them; and all of these species increase shading and suppress native herbaceous groundlayer species that would provide habitat for birds, insects, small mammals and other wildlife that use this corridor.

There are many reasons to support control of these species, particularly where they are adjacent to our project boundaries where we will be pursuing the restoration efforts described below.

How Public Input Shaped the Plan

Many of the goals for ecological restoration on the greenway overlap with Community concerns about the greenway. The Community's high-level values and concerns included: minimizing tree loss, improving the health of the forest, improving conditions for native plant and tree species, increasing resiliency to climate change, and promoting biodiversity.

The Community shared the following related to the Ecological Assessment:

- Threats Community is most concerned about include:
    - Invasive Species
    - Erosion
    - Replacement of Oaks
    - Flooding and Sedimentation from the channel
- 97% of respondents are somewhat or very concerned about preserving the health of existing oaks.
- 93% of respondents think it is somewhat or very important to get new oaks to grow in the greenway.
- 87% of respondents are somewhat or very interested in expanding coverage and increasing the diversity of native herbaceous species (non-tree or shrub plants) in the greenway.
- 55% of people thought that native forest overstory with native diverse understory would be aesthetically pleasing, resilient to flooding and erosion, and beneficial to ecosystem services.

The majority of the Community also requested that the City remove all or the majority of DNR NR 40 invasive species in a 10-20' buffer around the project area and the sanitary access path that will be used as construction access, to create additional areas for restoration and replanting. This will improve wildlife habitat offerings in the greenway and protect restoration efforts within project boundaries.

The proposed restoration plan meets these goals by:

- Performing initial control of invasive species, particularly invasive shrubs such as buckthorn.
- Performing ongoing invasive species control including woody plant control, as well as herbaceous invasive plant control of common aggressive species such as garlic mustard, dame's rocket and burdock, as well as horticultural invasives such as periwinkle, bishop's weed and daylily.
- Planting native trees, especially oaks.
- Planting native shrubs and herbaceous species to increase native plant diversity on site and therefore wildlife habitat.

- Ongoing maintenance and replacement if necessary of tree and shrub plantings.
- Ongoing maintenance of herbaceous species including supplemental seeding and plug planting as needed.

These actions prioritize invasive species control and improve biodiversity of the site and therefore wildlife habitat offerings. These actions do not propose the creation of an oak savanna but prioritize preservation of the woodland nature of the site, while addressing the unhealthy balance of invasive trees and shrubs that are currently affecting the health of existing mature trees and shifting the canopy composition away from a diverse, oak-dominated canopy. Ecological restoration offers the opportunity to direct future canopy goals by controlling less desirable and more common woody plants in favor of native tree plantings, especially oaks.

Community Input on Thinning Invasives

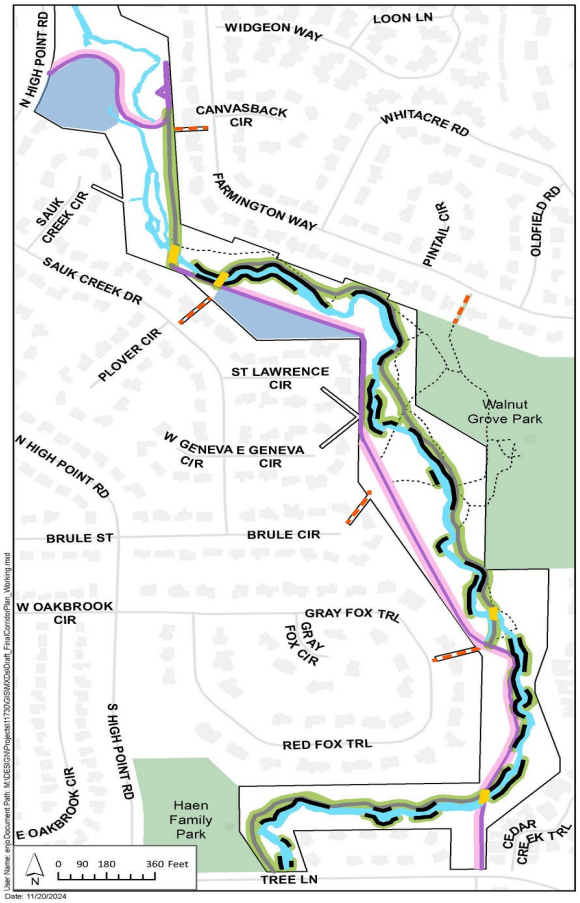


Figure 64

We asked the Community to weigh in on if they would like the City to remove all, remove the majority, or keep all NR 40 invasive trees and shrubs within 10-20' of the project area as shown in Figure 64 in green. 82% of the Community polled supported removing all (47%) or the majority (35%) of invasives within 10-20' of the project area.

The City will proceed balancing removing all, and saving select trees with canopy impacts in 10-20' outside the project area during the design phases. Areas with removals will be replanted with native seed and trees, where applicable.

In an effort to find additional replanting opportunities to meet the Community's desires to see new oak regeneration within the corridor, the City identified that the existing sanitary access path has created some opportunities for light pockets to replant native trees that are included in the natural ecological communities identified in the ecological assessment. These areas are shown in pink on Figure 64.

61% of the Community was in support of completing this additional restoration work (as shown in pink) generally, with 24% opposing. In each design phase, the Community will have the opportunity to weigh in on areas they'd prefer there is less restoration and replanting.

Implementation

During Construction

Preserve healthy, mature canopy trees with emphasis on species that are included in the natural ecological communities identified in the ecological assessment.

Utilize certified arborists to provide enhanced tree protection zones and on-site monitoring during construction.

Figure 65 Periwinkle invading a greenway understory

Post-Construction Invasive Species Control

Control herbaceous invasive species especially reed canary grass, garlic mustard, dame's rocket, burdock, daylily, periwinkle, goutweed and other horticultural plants.

There will also be ongoing control of invasive woody species growth.

Post-Construction Native Planting

- Plant native trees: bur oak, swamp white oak, swamp-bur hybrid oak, shagbark hickory, bitternut hickory, hackberry or others
- Plant native woodland shrubs: witch hazel, bladdernut, pagoda dogwood, Eastern wahoo, elderberry or others
- Plant native plugs in select areas, particularly for stabilization along channel, or in areas where tree removal has created pockets of light: species to be determined based on final design plan, but would include **woodland** or **wetland** species.
    - Examples: giant Solomon's seal, mayapple, wild geranium, Canada anemone, ostrich fern, sensitive fern, columbine, big-leaved aster, elm-leaved goldenrod, zigzag goldenrod, Virginia bluebells, figwort, great blue lobelia, Jacob's ladder, golden Alexander, Virginia wild rye, silky wild rye, riverbank wild rye, bottlebrush grass, common wood sedge, rosy sedge and others

- Sow native seed across entire disturbed area. Components would include woodland and partially shade tolerant species as well as some wetland species, particularly aggressive species, along channel.

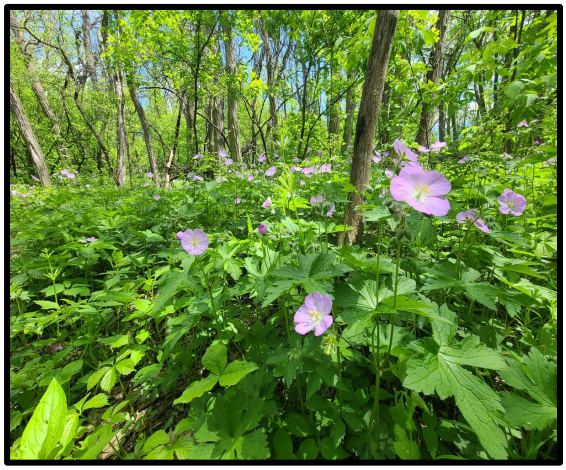


Figure 67 Wild geranium in Sauk Creek greenway

Figure 66 Native rosy sedge and Virginia creeper dominate the groundlayer in this wooded portion of Bram St pond

Figure 68 Canopy oaks are not being replaced in areas where shrub layer is too dense as seen in background. Young oak will be planted along edges of restoration areas where pockets of light will be created.

Post-Construction Ecological Restoration Contract

For the first 3-5 years after construction, the project area will be maintained by an ecological restoration firm that will focus on invasive species control and targeted actions to foster native plant growth.

Ongoing Targeted Maintenance

Project areas that are restored become "Tier 1 Vegetation Maintenance" sites managed by Engineering Conservation staff. These sites receive the highest level of vegetation maintenance service across stormwater land.

Level of Service

- Each site receives a maintenance visit at least twice during the growing season; this includes targeted invasive species control at this visit overseen by conservation staff.
- Supplemental native seeding, tree, shrub or plug planting as needed.
- These sites may be burned on a maintenance cycle of 3 to 7 years if site conditions, and species composition allows.
- Each site will receive spot brush cutting of woody invasives every 3 years, alternating prescribed burn years if applicable.
- Each site receives a flora survey once every 3 to 5 years.
- Hybrid Non-Native Cattails and Reed Canary Grass are typically managed in these areas if they are new populations or impede stormwater flow contributing to flooding.

> **Tier 1**
>
> These sites are characterized by their great diversity of native species and receive the highest level of maintenance for ecological restoration. These sites are primarily rain gardens, bioretention basins, native plant demonstration beds, ponds, greenways and shorelines with vegetation most closely resembling a native ecosystem. Tier 1 sites are characterized by majority native plant cover, high diversity of native plant species, low invasive plant presence, and great potential for supporting species specialists that require native plants.

Total Impact on Corridor

While the restoration areas are hard to define prior to having a complete design, it is possible to use the same assumptions to estimate impact as were made in approximating the maintenance access path grading at 10% of the total path area. That would result in 0.1 acres of disturbed areas. Knowing there's additional construction impacts where we'd want to restore along the edges of paths, we can assume there'd be 0.8 total acres for a couple feet on either side of the paths or riprap, or 2.3% of the corridor.

The selective thinning of DNR NR 40 invasives would occur within 10-20% of the corridor.

Maintenance Plan

The 10' wide maintenance access paths allow the City to provide the following maintenance:

<u>Where adjacent to the channel</u>

1. Install riprap bank stabilization
2. Maintain channel by removing severe blockages that created dams and are at risk of causing severe erosion

<u>Where nearby adjacent properties</u>

1. Remove adjacent trees that are at risk of damaging private property
2. Allows more opportunity to remove the large piles of felled tree material if desired by the adjacent property owner, and are not needed for wildlife habitat

In general paths provide

1. Improved response time for emergencies, and general maintenance requests
2. Better access throughout the corridor for residents who utilize the space to recreate as City will manage trees that fall on access paths where currently volunteers maintain the unofficial walking paths
3. Limit the need of to obtain right of entry's entry agreements that delay maintenance crews from addressing problems.
4. Having designed access in an emergency limits long term impacts, such as a sanitary repair/SSO sanitary sewer overflows into the watershed, downed trees on private property.
5. Access helps reduce the need of private contractors, allowing more work to be scheduled in - house, which could reduce response time in emergencies.
6. Access allows alternate tree removal techniques and equipment to be used, reducing cost and reducing impacts to surrounding vegetation, option to remove felled material from site.
7. More proactive maintenance approach vs reactive.
8. May allow removal of adjacent recently dead red oak trees that are key contributors to the spread of oak wilt

The project area, where restoration work is completed, will be maintained as a Tier 1 vegetation area and maintained as described in "Ongoing Targeted Maintenance" section.

Maintenance limitations

The existing unmaintained walking trails will continue to not be maintained by the City, except where they overlap constructed 10' wide maintenance access paths.

In the area along Farmington Way from 7617 Farmington Way to 7629 Farmington Way, where the 2d path was originally proposed, residents will continue to see delays in tree removal requests, and material will not be able to be hauled away. With the path being shifted away from the property line and to the opposite side of the channel, that is the level of service that the City is able to provide.

Construction Considerations

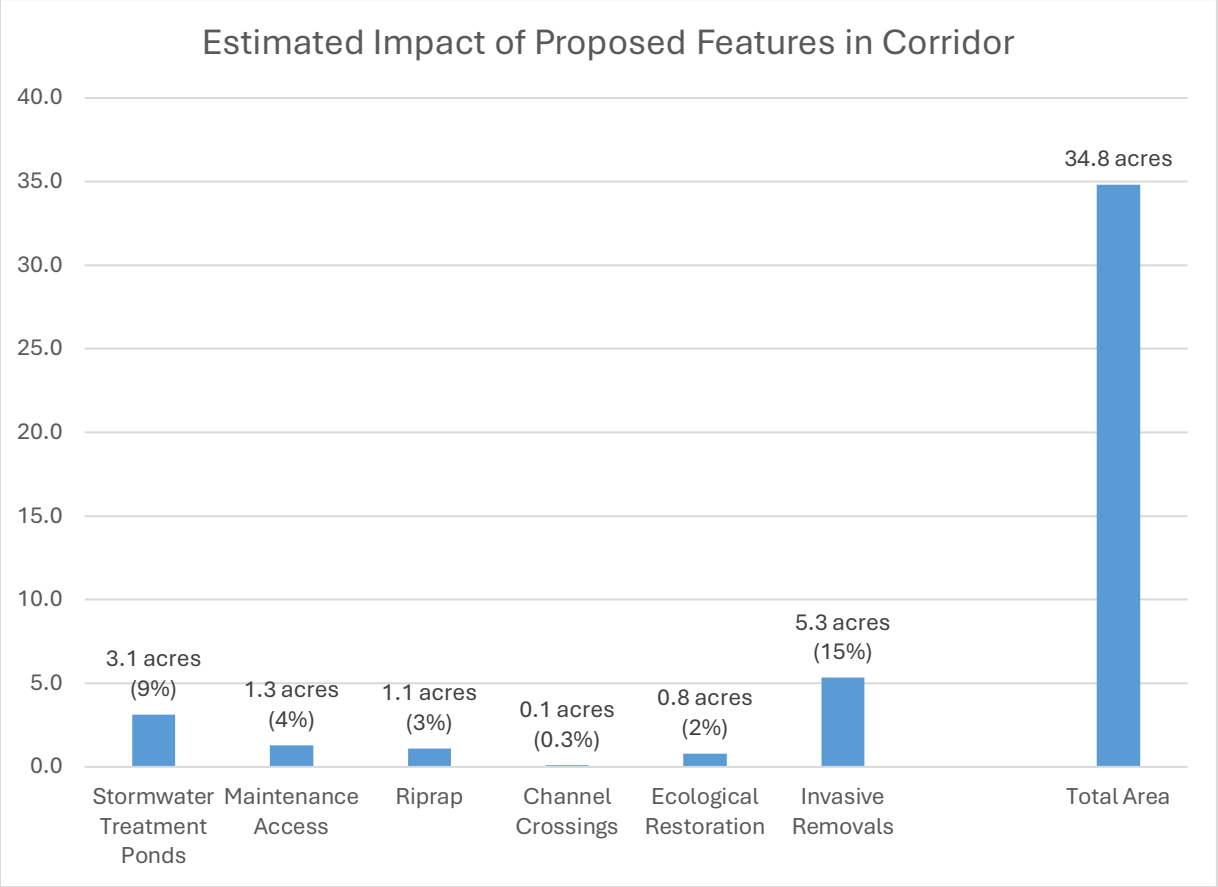
When the sanitary access path was built in the 2010's, 6" topsoil and sod were placed in areas along backyards at homeowner's request. In the past 10+ years, City found the topsoil creates rutting issues, and the grass is too slippery for safe, consistent Vactor access, which is necessary to respond to sanitary emergencies that require quick response times. The City cannot relocate sanitary sewer now, and relocating the sanitary path farther into the greenway would cause more tree & canopy impacts.

To minimize tree impacts, the existing sanitary access from Tree Lane to Plover Circle will be main spine for future construction access when channel repairs are completed. Where possible along the sanitary access path that is directly adjacent to private property along St. Lawrence Cir and Geneva Cir, the City will look for practical ways to minimize disturbance to the adjacent homeowners and the access path. This includes investigating if it is possible to install proposed riprap on the western bank of the channel behind St. Lawrence Circle and Geneva Circle from within the channel, as opposed to on the top of the bank, to

minimize top of bank disturbance. Moving forward, repairs of the sanitary access path (north and south paths) will be completed with gravel, including any necessary repairs following construction projects.

During each design phase, the City will review additional construction access options to spread out the impact of adjacent construction. This may include reviewing additional access points with the use of Temporary Limited Easements, or using the channel bed for construction in discrete locations to minimize construction access impacts.

The graph below shows the final total approximate impact of each element of the proposed plan in relation to the corridor overall.



Design Considerations

Phase 1 – Southern Channel Repair and Maintenance Access

1 – Proposed riprap bank stabilization

- Assess bank on east side of creek near E Geneva Cir and St Lawrence Cir to verify if banks will begin undermining the sanitary access road and/or sanitary sewer, and if they should be stabilized as part of Phase 1. If determined to be included, assess whether in-channel stabilization can be achieved.
- Field inspect all proposed riprap locations and minimize limits of stabilization wherever possible

2a: Maintenance Access Path from Tree Lane to the sanitary access path

- Prevent impact to high quality trees
- Minimize impacts to trees along Haen Family Park to ensure there is still sufficient tree coverage to separate the park from the creek
- Create clear walking connection from Haen Family Park to access path
- Stay close to channel to avoid excessive grading of topography near Haen Family Park
- Requested to minimize wildlife impacts

2b: Maintenance Access Path in Middle Corridor along Haen Family Park

- Consider alternative alignments to minimize impacts to hillside with bloodroot and other native wildflowers near the proposed 3B crossing
- On south end, consider nearby Sanitary Access Path in relation to channel. Consider crossing location and if it can be shifted farther north depending on where construction access is needed for bank stabilization
- Consider impact of Tamarack run-off and area where existing out-of-bank erosion is occurring near the existing pedestrian crossing. Make sure there is a way for this run-off to pass safely under or over the path.

3a: Culvert channel crossing of existing sanitary access path

- Minimize impacts to adjacent trees
- Design culvert to be property sized

3b: Concrete ford crossing for maintenance access path

- Minimize impacts to adjacent trees
- Design with rough surface to maintain foot traction
- Design to minimize impacts to adjacent area
- Closely consider crossing locations based on surrounding erosion and adjacent runoff from Tamarack
- Consider ways to improve crossings for pedestrians including investigating similar energy dissipaters that function as stepping stones (similar to what are seen at the Pheasant Branch Conservancy concrete ford crossings).

Preventing down trees on neighbor's fences/yards along Tree Lane and Red Fox Trail

88% of respondents shared that it was somewhat important, or very important that the City have access to remove dead/down trees on neighbor's fences and yards.

Figure 69

For 10'-20' from property line in high-complaint areas along the Tree Lane Park apartments, and Red Fox Trail (as shown in yellow on Figure 69) the City proposes to:

- Create access by removing trees that lean over fences (primarily box elder and buckthorn)
- Prevent the growth of trees that lean into light opening (yards)
- Work to establish native herbaceous understory
- Do not replant trees within 10' of property line in high-issue areas

The City will request input from directly impacted, adjacent neighbors during design phase to see if this is desired. If not desired, City will have limited ability to respond to tree removal requests, and removal request will not be followed by formal restoration and revegetation efforts.

Phase 2- Northern Section of channel stabilization and maintenance access

1 – Proposed riprap bank stabilization

- Remove failed in-stream dam from St. Lawrence pond and determine if riprap stabilization is needed on adjacent banks
- Field inspect all proposed riprap locations and minimize limits of stabilization wherever possible

2c: Maintenance Access Path Plover Circle to St Lawrence Circle along Farmington Way

- Prevent impact to high quality trees
- Keep path as far from private property along Farmington Way as possible
- Consider lining property line with native shrubs for additional screening where path is close to private property

2d: Maintenance Access Path Upper corridor west of channel between ponds

- Keep path near channel to make more desirable for walkers viewing nature, and less close to backyards
- Consider lining property line with native shrubs for additional screening where path is close to private property

3c: Concrete ford crossing for maintenance access path

- Consider stormwater outlet from Sauk Creek Drive/Plover Circle on where to locate the crossing
- Design with rough surface to maintain foot traction
- Design to minimize impacts to adjacent area
- Consider that current location aligns well with the sidewalk from Sauk Creek Drive, so it is a nice spot to cross the channel to get on the maintenance path for hikers/walkers
- Consider ways to improve crossings for pedestrians including investigating similar energy dissipaters that function as steppingstones (similar to what are seen at the Pheasant Branch Conservancy concrete ford crossings).

3d: Concrete ford crossing for maintenance access path

- Design with rough surface to maintain foot traction
- Design to minimize impacts to adjacent area
- Consider ways to improve crossings for pedestrians including investigating similar energy dissipaters that function as steppingstones (similar to what are seen at the Pheasant Branch Conservancy concrete ford crossings).

4a: St Lawrence Circle Pond (Southern Pond)

- Provide ongoing maintenance

4b: N High Point Pond (Northern Pond)

- Prefer final vegetation is tall for deer bedding habitat
- Consider planting upland spaces with full sunlight to plant oaks or have them seed in naturally

Construction Access on Existing Sanitary Access Path

The City heard resident concerns from residents along Geneva Cir and St Lawrence Cir related to:

- Concerns about aesthetics adjacent to backyard (homes along the access path on St. Lawrence Cir and Geneva Cir maintain the sanitary access path on public land in the greenway to turf, and use it as an extension of their backyard)
- Want to preserve canopy cover
- Desire to shift construction access into channel
- Concerns about tree removal between western bank of channel and access path

- Requests channel to be shifted east away from property boundary further into public wooded area

Proposed Modifications to consider as notes for design phases:

- Use riprap to keep channel from migrating closer to private property
- Where possible on western bank, install riprap steeper to minimize grading and tree impacts
- Investigate the impact on healthy, native trees of shifting the channel east
- Minimize additional thinning of WDNR NR 40 invasive trees between the western bank and the access path
- Look at ways to shift the sanitary access path towards the channel (balancing tree impacts with path location)
- Investigate ways to install riprap in channel behind St. Lawrence Cir and Geneva Cir to minimize disturbance to the sanitary access path to the amount practical. During design, consider access point to channel that was identified in walk-through as a way to install riprap from the channel for this section.
- If desired, consider planting native shrubs along property line if space allows to buffer sight lines from private yards to gravel sanitary maintenance access path within the greenway.

Public Use of Corridor

Multi-Use Paths

The City views a multi-use path as a paved path that is maintained and within the City's transportation network. There are no proposed multi-use paths proposed with the corridor plan. The north-south multi-use path was removed from the West Area Plan final recommendations, and an east-west connection was recommended for improved mobility and accessibility across the greenway.

While the originally proposed north-south route may have overlapped much more of the stormwater improvements, a preliminary review of concepts showed that the East-West connection has less efficiencies to construct at the same time as the stormwater improvements that are generally following the channel north-south. Due to lack of overlap, the east-west multi-use path will **not** be included with corridor plan and will **not** be built with the stormwater improvements. Stormwater improvements will be built in a way that doesn't preclude east-west multi-use connections in the future.

You can learn more in the October 22, 2024 Public Information Meeting Presentation with Polling Results presentation slides 54-63. The findings will be documented for consideration in the future.

Improving Wayfinding and Access

The City heard that people struggled to navigate the corridor's dead-end paths (both the sanitary access paths, as well as the unmaintained walking path network that developed organically). Community members that use the trails recreationally expressed frustrations with the haphazard trail network, and that many parts of the greenway felt like they were in people's backyards. Conversely, a property owner within the greenway cited people walking paths that dead end up to their yard as a reason for placing "private residence" signs along paths within the greenway, see Figure 70.

Figure 70 Private Residence sign attached to a tree by a resident within the public corridor.

The City also heard that that many that do not live adjacent to the corridor, did not know it existed as land that could be used by the public. The main entries are currently an unmarked access road between Tamarack Trails and Tree Lane Apartments, unmarked trails off Walnut Grove Park, and small sidewalks that run between homes in a variety of places along the corridor.

The City hopes to improve access and wayfinding with the proposed projects by clearly making the greenway as a public space at the entrances, and including maps of the official maintenance access paths at entry points to the corridor so that people can see where and how they can navigate the greenway.

The City also heard interest from Community members about using the corridor as an outdoor classroom. Where possible the City will look to include educational signage about the work and stormwater system in within the corridor.

Additionally, during the 2021 topographic survey, a variety of encroachments were found within the corridor. These were identified and are likely due to the lack of knowledge of where property lines existed. With the survey, fiberglass public property boundary markers were placed for people to understand the boundary of public and private lands. The City's General Ordinances allows for certain encroachments on ponds and greenways with the appropriate agreements. Some of the encroachments that prevented maintenance access to the ponds and sanitary access path were requested to be removed in 2022.

Volunteer and other ways to make a difference

Planned ecological restoration efforts as part of the proposed project offer an opportunity for interested residents to make a positive impact on the ecological health of the greenway. During the course of public outreach efforts, it has become very clear that residents highly value Sauk Creek Greenway for aesthetic and recreational purposes and that the ecological health and services the greenway offers are a high priority. Volunteering may be adapted to individual interests and abilities to enhance these ecological and

recreational services. Volunteering generally falls into two categories: hands-on, planned group activities, and individual activities or citizen science.

Hands-On Work

Hands-on work must be coordinated with the Stormwater Vegetation Coordinator for Engineering. Interested volunteers select a volunteer liaison to communicate with the Stormwater Vegetation Coordinator, who can then provide a site walk-through and demonstration of how to perform needed activities, as well as coordinate removal of plant material after a volunteer event. Hands-on work may include:

- **Dig or hand pull invasive herbaceous species** such as dame's rocket, garlic mustard, burdock to reduce competition with native plants
- **Collect native seed** and sow to diversify herbaceous native plants
- **Selective brush clearing** especially invasive shrubs such as buckthorn, honeysuckle, privet, burning bush and others to create pockets of light for oak regeneration and herbaceous native plants
    - Small brush can be removed with a brush wrench or loppers
    - Volunteers with chainsaw experience and certifications may be able to use chainsaws for larger invasive brush removals
    - Brush piles may be periodically removed by City if placed on curbs or along access paths

Citizen Science

Citizen science provides land managers a wealth of information from those who use, know and love the site the most. Land managers may use this information to inform restoration actions such as targeting a previously unknown invasive species on site; replanting a native species that has been diminishing on site; planting species to better support previously unknown wildlife on site and many others. Citizen science efforts typically include logging wildlife, plant, fungus or other natural observations on an online platform.

- **Citizen Science** (ongoing and can be done independently of organized volunteer restoration efforts): Post wildlife and plant sightings to the City of Madison Stormwater iNaturalist page; https://www.inaturalist.org/projects/stormwater-species-of-madison-wisconsin
    - Or participate in WI DNR Bumble Bee Brigade; https://wiatri.net/inventory/bbb/

Build a Raingarden on your Property

The peak flows described in the Chapter 2 – Infiltration Capacity section and in Figure 11 highlight that the neighborhoods that drain directly into the Sauk Creek Greenway have a disproportional impact on peak flows moving through the greenway. This presents a unique opportunity for those in the neighborhood that are concerned about downstream flooding, peak flows within the greenway, and improving infiltration within their area to recharge the groundwater (and in the long-term the aquifer), to install raingardens on their property that can infiltrate stormwater from their roofs. If enough people are able to infiltrate all of their roof water for the 1% annual chance event, that could begin to have an impact on downstream flooding, but also would significantly increase the regional infiltration. The added benefit to infiltrating roof

water is that it is considered clean water, as opposed to stormwater that has collected salt and other heavy metals from streets, parking lots, etc. Additionally, raingardens, planted with native vegetation to improve infiltration rates with their deep roots, would improve wildlife habitat throughout the Community. The Stormwater Utility highly values raingardens built on residents' property and has developed a credit on the stormwater bill that those residents can apply for.

Be a good environmental Steward!

- Plant a tree in your yard!
- Be a good stormwater steward
    - Leave the leaf
    - Build a rain garden
    - Follow recommendations from Ripple Effects
- **Convert lawn to Native Landscaping**
    - WDNR and UW-Extension "Landscaping Alternatives for Terrestrial Invasive Flowers and Grasses"
    - Woody Invasives of the Great Lakes Collaborative (WIGL) "Landscape Alternatives for Invasives Trees, Shrubs & Vines"
    - Native and non-native root comparison chart
- **Avoid planting Invasive Plants**
    - Dane County Invasive Tree & Brush Removal
    - Woody Invasives of the Great Lakes Collaborative (WIGL)
    - Invasive Plants Association of Wisconsin (IPAW)
- **Be mindful of Oak Wilt**
    - DNR Oak Wilt
    - UW Extension: Oak Wilt
    - Identify, Prevent, and Control Oak Wilt

Appendices

Appendix 1 - Ecological Assessment

Sauk Creek Greenway Ecological Assessment Report – May 16, 2024.

Appendix 2 – Engagement Summary

Sauk Creek Corridor Plan Engagement Summary

Appendix 3 – Fact Sheet

Fact Sheet – Sauk Creek Corridor Plan

Appendix 4 – Public Comments on Final Corridor Plan

Public Comments on Final Corridor Plan