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|----------------------------|--|-------------|------------|
| Project Name | Marketplace District Reuse-Phase 2, System Plan | Date | 02/08/2024 |
| To / Contact info | BCWD Board of Managers | | |
| Cc / Contact info | Karen Kill, District Administrator | | |
| From / Contact info | Brett Emmons, PE; Kajol Annaduzzaman, PhD; Camilla Correll, PE; Ryan Fleming, PE | | |
| Regarding | Scope of Services for Marketplace District Reuse System Plan | | |

INTRODUCTION

This memo outlines a scope of services to advance the earlier work in 2022 - 2023 on exploring a regional/district approach to stormwater management based on reuse (Figure 1) in order to provide multiple benefits. The initial investigation found favorable results and indicated some promising opportunities; however, several assumptions and unknowns still need to be quantified. Advancing the analysis further into a more specific system plan of a district reuse system is needed as a next step and is outlined in these tasks.

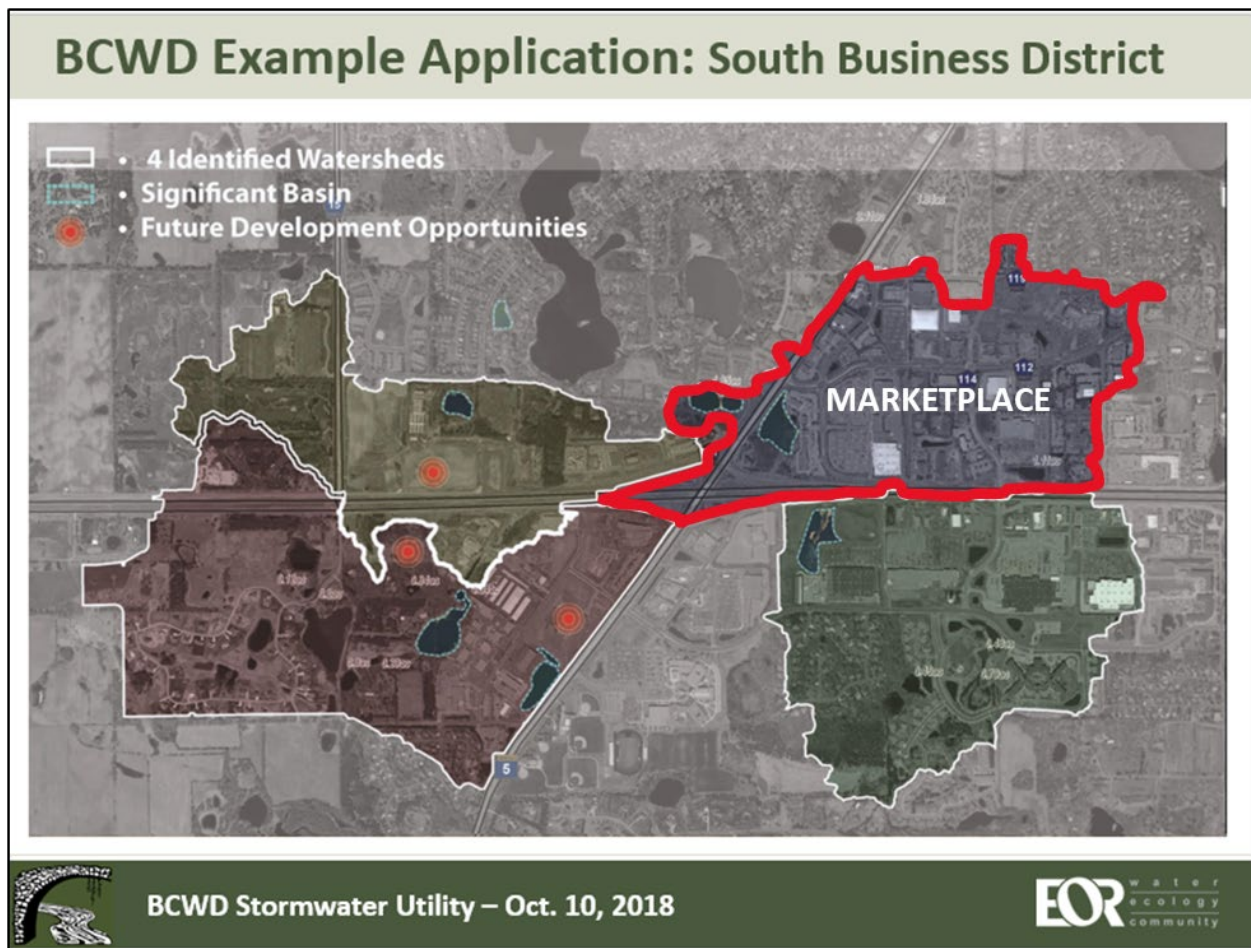


Figure 1: Areas of interest for stormwater reuse (Marketplace District Reuse Feasibility Study, 2023).

The potential for stormwater capture and use/reuse in BCWD grows out of the convergence of multiple factors. First, the BCWD identified growth along the Highway 36 corridor, consisting of both new development and redevelopment, as a key issue and challenge in the near future. There is a desire to be proactive and ready for those changes and work collaboratively with the development community as these projects come forward. The other major factor is that new restrictions that limit the use of infiltration in certain well-head protection areas, without city-initiated further groundwater studies. Infiltration has become the go-to solution to meet volume control standards, and thus many of the common tools used for volume control compliance are not available. Without a new approach like reuse, this leads to permits requiring non-standard solutions and associated special considerations each time. Regarding permitting, there have also been occasions for redevelopment projects when meeting District volume control standards is challenging for all parties. District reuse could provide an expedited solution that improves outcomes, providing a win-win alternative.

It is also important to acknowledge that under the status quo, there continue to be risks to the system and a lack of resiliency as the area develops and redevelops. It is timely now to advance a reuse alternative in this corridor. Those challenges include wellhead protection zones restrictions blocking infiltration BMPs that would have provided volume reductions. The risks include increasing flooding on Long Lake, continued water quality degradation of Long Lake (i.e., chlorides and nutrient loads), localized flooding in commercial districts, delays in permitting new projects, and unknown impacts of increasing withdrawals from the aquifers in the region.

BACKGROUND

Traditional stormwater management often involves swift conveyance and discharge, resulting in runoff that can lead to erosion, flooding, and pollution of water bodies. This project's approach is to redefine stormwater as a resource rather than a waste product. This underscores its potential for reuse in different applications, reflecting a shift toward integrated water management strategies across water sectors (stormwater, water supply, and wastewater), also often called a One Water approach.

Consistent with broader trends, the stormwater reuse project represents a progressive initiative aimed at addressing the challenges of stormwater management through the efficient capture and utilization of runoff (Figure 2). This also acknowledges the increasing significance of sustainable water practices and emphasizes the pivotal role stormwater can play in meeting diverse needs across various sectors. Economic reuse is designed to address pressing environmental, sustainable, economic, and water management challenges. Recognizing these challenges and emphasizing a sustainable design process, the project aims to set a precedent for responsible water use and stormwater management locally and in the region. In addition to addressing the challenges noted above, this project achieves the additional benefit of promoting responsible water use practices in sectors such as landscaping, recreational open spaces, and commercial activities to create lasting positive impacts on local water resources.

Environmental Benefits - The scope of the work aligns with broader environmental stewardship goals by mitigating the adverse impacts of stormwater runoff. By capturing, treating, and reusing stormwater as a resource, the aim is to reduce pollutant loads entering natural waterways, safeguarding ecosystems, and promoting biodiversity. Additionally, the intended water reuse efforts will contribute to the restoration of natural hydrological cycles, fostering resilience in the face of climate change.

Social Benefits – The scope of the work aligns with broader social and environmental justice concerns by improving access to clean drinking water (as a result of groundwater conservation benefits) and public safety by addressing localized flooding issues in areas that support vulnerable populations who need access to support services and healthcare facilities.

Economic Benefits - Beyond environmental benefits, stormwater reuse offers substantial economic advantages. By reducing demand for potable water, the project helps mitigate costs associated with water treatment and distribution, while at the same time providing stormwater solutions. Additionally, the creation of stormwater reuse systems generates employment opportunities as the systems need to be operated and maintained.

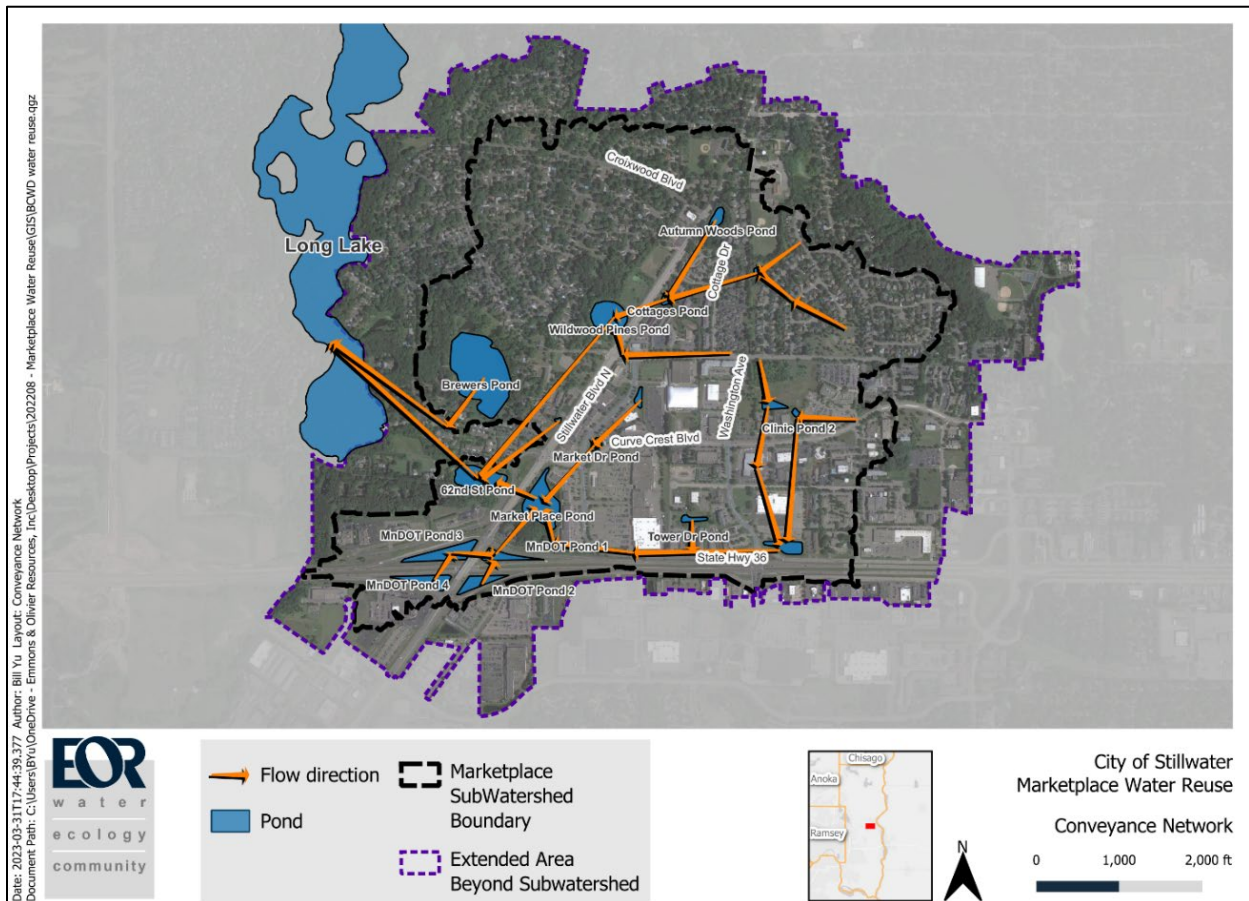


Figure 2: Stormwater storage ponds and pipe system conveyance network (Marketplace District Reuse Feasibility Study, 2023).

These benefits have been demonstrated in the BCWD as a result of the Highway 36 and County Road 15 Interchange Reuse Project. In that case, new restrictions in wellhead protection areas precluded the use of stormwater infiltration as an option to meeting the BCWD volume control requirement. This led to the transportation design team exploring other, more intensive methods (i.e. sand filters) until it was demonstrated that stormwater capture and reuse could be used. The application of this stormwater management technique resulted in a win-win-win solution. It streamlined the interchange stormwater permitting & met project goals to protect downstream lakes, it provided a desired secondary water source for the golf course, and it exceeded the district’s standards. The project was well received by all involved parties and provided the following co-benefits:

Environmental

- Less volume being delivered to Long Lake which helps to address flooding.
- Less volume being delivered to Long Lake which improves water quality.
- More water being used locally which maintains the hydrologic balance and contributes to less water being pulled from the groundwater system.

- Improving the quality of the Long Lake and downstream stream ecosystems for flora and fauna.

Social

- Conserving drinking water supplies for future growth.
- Enhancing the recreational value of downstream waterbodies (i.e., Long Lake).
- Promoting behavioral change and acceptance of this stormwater management technique by raising awareness of stormwater capture and reuse for those using the golf course.

Economic

- Less maintenance for the Minnesota Department of Transportation (MNDOT); offset by golf course voluntarily operating the system (water is valued resource).
- Reduce flood reduction mitigation measure for at-risk properties on Long Lake.
- Redundant water supply for golf courses reduces irrigation interruptions which limits negative experiences or avoidance of the course by golfers.
- Savings by the golf course in developing a backup water source.

SCOPE OF WORK

Task 1: Storage Capacity Evaluation

The scope of work for the stormwater storage capacity in ponds is needed to further refine and quantify the estimates assumed in the first phase. The information collection will focus on determining the maximum reasonable drawdown of storage volume in each facility. Review of the feasibility of using water from Brewer's Pond and other "natural" waterbodies is needed, both from state agencies (e.g., MNDNR) and adjacent property owners. Furthermore, this scope of work will allow for a balanced approach, ensuring that both quantitative (volume) and qualitative (quality of source water) aspects are thoroughly investigated.

This effort also includes coordination with the Washington Conservation District (WCD), who are collecting data on the numerous marketplace area ponds on pond depth and volume, along with understanding chloride levels in basins in spring. With the unusual winter thus far and lack of snow and deicing chemicals being applied, in order for the sampling to be representative of more normal conditions, it is possible the chloride sampling will be suspended until next year. The preliminary data on chlorides indicates that chloride levels are usually not excessive for most vegetation, and in high chloride levels, delaying irrigation slightly can address this. We still can proceed with the study, understanding that if data we collect next year is abnormally high or of concern, we may need to adjust the management program, but can continue with reuse being a feasible tool.

An important component of this task will be to conduct interviews with relevant stakeholders, including municipal authorities, environmental agencies, and local communities, to gather qualitative insights into the real-world functionality of the stormwater ponds and basins. Stakeholder input will help identify practical challenges, community perspectives, and potential improvements to the existing stormwater management infrastructure. This comprehensive evaluation will provide actionable insights into stormwater storage, supporting informed decision-making for pond management and potential enhancements to maximize storage efficiency.

Subtask 1.1: Data Gathering and Enhancement

- Gather more detailed data on pond(s) and design parameters, including side slopes, depths, and outlet controls.

- Improve estimated pond storage volumes using bathymetry data collected by the WCD in winter/spring 2024.
- Assess the potential for physical alterations, such as dredging, to improve storage availability.

Subtask 1.2: Drawdown Feasibility Evaluation

- Evaluate drawdown feasibility at varying levels (e.g., 6 inches, 1 foot, 2 feet, 3 feet) for each pond and modifications to outlet structures, to improve storage availability.
- Determine the lowest and highest practical water level range for optimal pond or reservoir functionality.
- Investigate the feasibility of implementing smart controls linked to weather predictions for optimized storage and improved results, and regardless of the reuse project, could be beneficial in the system operation for climate resiliency.

Deliverables:

- A brief summary of the practical alterations and technological enhancements for optimizing storage capacity and a table that summarizes the detailed parameters for each basin and feasibility of drawdown at varying levels.

Task 2: Integrating End Uses into the Assessment

The scope of work for assessing end-user opportunities in irrigation and commercial water reuse from treated stormwater involves a comprehensive approach to understanding opportunities and stakeholder perspectives. The project will commence with stakeholder identification and mapping, followed by input from key individuals. The primary goal is to quantify likely end uses quantities and needs by gathering insights into current water usage practices, challenges faced, and the potential for utilizing treated stormwater in irrigation and commercial activities. This scope of work aims to provide a holistic understanding of opportunities for utilizing treated stormwater, offering valuable insights for informed decision-making and sustainable water resource management. The goal is to review with a cross section of potential water users in order to have a better estimate of likely end user adoption rates. We do not expect to have formal commitment by end users at this stage and we would not be ready to commit to that yet either.

Subtask 2.1: Stakeholder Identification and Mapping

- Identify and map stakeholders from government bodies, road authorities, and private entities.
- Conduct interviews or use questionnaires to understand water usage practices, challenges, and opportunities for treated stormwater in irrigation and commercial activities.
- Create outreach materials, such as infographics and case studies, to effectively communicate how stormwater reuse works, the advantages of stormwater reuse, and address common concerns.

Subtask 2.2: End-User Irrigation Zones Assessment

- Assess public owner willingness to add the use of reused water and evaluate the feasibility of irrigating the initial assumption of 75% of public green spaces with reused water via input from water users.
- Assess private owner willingness to add the use of reused water and evaluate the feasibility of irrigating the initial assumption of 75% of prioritized private green spaces, primarily in commercial land use via direct outreach for input from a representative cross section of private water users.
- Include multi-family residential sites suitable for stormwater reuse irrigation even if not directly in Marketplace sub-watershed, promoting eco-friendly practices and water conservation in diverse and/or under-served settings.

- Design the system to facilitate water conveyance from downstream ponds to upstream irrigation areas, noting needs of pump station, valves, and treatment, depending on end use.
- Review cost-effectiveness of building on past investments and agreements for the Interchange at Hwy 36/15 and with the Applewood Hills Golf course for the use of stormwater in irrigation, and/or cart wash, including the extension of a pipeline/channel to connect to the existing highway ponds and reuse system.

Subtask 2.3: Commercial Beneficial Water Use Initiative

- Assess the willingness of hotels, fitness centers, breweries, commercial nurseries, and other commercial users to utilize treated stormwater for laundry, cooling towers, process waters, or facility cleaning, or other sustainable water usage options.
- Determine feasibility and collaboration potential for using stormwater in a carwash station near the Marketplace.
- Identify and engage key industries and initiate training programs to equip professionals with the knowledge and skills for proper utilization of stormwater reuse systems.

Deliverables:

- Revised GIS layers identifying green space/ irrigation areas to validate and update past assumptions, considering private owner willingness and collaboration potential.
- Summary of comprehensive stakeholder insights, which will provide stakeholder insights on opportunities for treated stormwater use in diverse and/or under-served sectors.

Task 3: Marketplace Stormwater Reuse Optimization

This portion of the project will focus on optimizing stormwater reuse in the Marketplace Area through efficient irrigation and other end uses integration. Activities include modeling benefits using the District's Hydrologic and Hydraulic (SWMM) model, preliminary system layout and design considerations, and associated cost estimation. Further aspects that need to be addressed include funding discussions and if a regional compliance approach to permitting can be implemented. The goal is to develop a sustainable framework for stormwater management, encompassing design, financial planning, compliance strategies to benefit the local community, and possibly streamline the development process, while also enhancing flood protection, improving water quality, and extending the capacity of the community water supplies.

Subtask 3.1: Modeling and Benefit Quantification

- Utilize data collected to test system performance and quantify High Water Level (HWL) reductions using the District's Hydrologic and Hydraulic model (SWMM).
- Analyze flood benefits through continuous simulation of past events on Long Lake or local streets, assessing the decrease in flood frequency or probability considering existing risks.
- Integrate annual water budget-based reuse modeling and event-based flood evaluation to enhance the understanding of the system's performance.
- Quantify water quality benefits by capturing and retaining pollutants, especially dissolved phosphorus, and concern pollutants, and associated downstream benefits.

Subtask 3.2: Preliminary System Layout/Design, Analysis and Costing

- Develop the system layout and design for selected reuse scenarios, up to three, and storage options in collaboration with the City and Watershed District.
- Evaluate pond storage effectiveness, considering volume combination, development demands, and irrigation opportunities.
- Review phasing issues and two scenarios to determine if sub-area systems would be feasible and practical, allowing for more flexibility in implementation.

- Provide a detailed cost estimate for each irrigation sub-district or districtwide, considering the preferred approach to ensure accurate financial planning.

Subtask 3.3: Funding and Regional Compliance Strategy

- Discuss cost-sharing options with partners, exploring permit fees, irrigation water supply user fees, and potential funding sources like grants, fostering a collaborative financial model for the project.
- Develop a comprehensive framework, policy language, and cost recovery process to guide how District/Sub-District Reuse can offset development impacts, meeting stormwater permit requirements, and ensuring alignment with regional compliance standards with transparent procedures to address legal considerations in supplying stormwater for irrigation or other greywater uses if opportunities for such applications are identified.

Deliverables:

- Map and tabular summary of SWMM analysis for High Water Level reductions and associate impacts/benefits.
- A comprehensive system layout map, showing key facilities, collection and distribution networks, pumps and valves, and system needs.
- Quantification of facility improvements in tabular format and estimated costs.
- Framework outline for a District compliance as a policy alternative for the Board, with the need to also coordinate with District Counsel.

Task 4: Stormwater Treatment Needs and Operational Guidelines

The scope of work involves developing a comprehensive treatment method for stored stormwater with the goal of enabling its safe and efficient reuse. The regulatory landscape on treatment requirements is not in-place and is still in flux. The project will include a two-fold approach, incorporating both alternative treatment techniques feasibility including costs-benefit analysis, and stakeholder interviews to ensure a holistic understanding of the requirements and challenges. This aims to establish an efficient stormwater treatment and reuse system tailored to specific end-users, such as irrigation use for public and multi-family residential areas, green streets, golf courses, nursery (with potted plants) and carwashes, hotel laundry, brewery processing/washing, and golf course cart wash facilities. This will involve analyzing different treatment methods such as filtration, sedimentation, and chemical processes. Additionally, stakeholder identified issues will provide valuable insights into the specific needs, concerns, and expectations related to stormwater reuse. Incorporating stakeholder input is essential for ensuring the developed treatment method aligns with both regulatory requirements and community preferences.

Subtask 4.1: Stormwater Treatment Strategy

- Evaluate stormwater volume, quality, and use patterns to determine suitable treatment methods and the required number of treatment systems.
- Determine primary end-users for stormwater reuse, specifying whether the treated water will be used solely for irrigation or a combination of irrigation and commercial purposes.
- Develop a strategy for allocating stormwater among various user groups, considering residential, commercial, and recreational entities.
- Identify responsibility for covering costs associated with implementing treatment methods and establish funding mechanisms for financial sustainability.

Subtask 4.2: System Installation and Operational High-level Guidelines

- Determine optimal installation sites for stormwater treatment systems, considering proximity to end-users and minimizing environmental impact.

- Define criteria for stormwater use in various applications, adhering to specific guidelines or regulations governing distribution for distinct purposes.
- Outline tasks and ideal state of responsibilities for day-to-day operation and maintenance of stormwater reuse systems, considering irrigation, commercial facilities, and recreational spaces based on guidance from other entities with similar systems.
- Explore plans for collaborative efforts or partnerships with stakeholders to ensure efficient and sustainable operation of stormwater reuse systems.

Deliverables:

- Develop a comprehensive Stormwater Treatment Strategy report encompassing the evaluation of volume, quality, and usage patterns, determination of treatment methods and system numbers, identification of primary end-users, allocation strategy, and a proposal for cost coverage and funding mechanisms ensuring financial sustainability.
- Develop comprehensive guidelines on the identification of optimal stormwater treatment system sites, criteria for diverse applications, day-to-day operational tasks, and responsibilities, as well as the exploration of collaborative efforts for sustainable and efficient partnerships.

Task 5: Final Report Delivery

Subtask 5.1: Draft and Final Report Delivery

- Develop draft report of the system plan for review and comment by BCWD and City of Stillwater.
- Incorporate comments and finalize report of the system plan to present to the BCWD Board.

Deliverables:

- Draft and Final Report of the System Plan.

PROJECT SCHEDULE

Timeline –If approved at the February 2024 Board Meeting, it is expected that Tasks 1 & 2 can be completed in 4-5 months.

If the Board decides to continue with the study at mid-year, the entire process will take 10-12 months, with preliminary findings in late 2024, for consideration in annual budgeting discussions. A draft report would be available in January 2025 and a revised report in February of 2025.

Table 2: Project Schedule

| Tasks | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb |
|--|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|
| SubTask | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-31 | 1-15 | 16-28 |
| 1.0 Storage Capacity Evaluation | M | | | X | | | | | | | | |
| 1.1 Data Gathering and Enhancement | | | | | | | | | | | | |
| 1.2 Drawdown Feasibility Evaluation | | | | | | | | | | | | |
| 2.0 Integrating End Uses into the Assessment | | M | | | X | | | | | | | |
| 2.1 Stakeholder Identification and Mapping | | | | | | | | | | | | |
| 2.2 End-User Irrigation Zones Assessment | | | | | | | | | | | | |
| 2.3 Commercial Beneficial Water Use Initiative | | | | | | | | | | | | |
| 3.0 Marketplace Stormwater Reuse Optimization | | | | | M | | | X | | | | |
| 3.1 Modeling and Benefit Quantification | | | | | | | | | | | | |
| 3.2 Preliminary System Layout/Design, Analysis and Costing | | | | | | | | | | | | |
| 3.3 Funding and Regional Compliance Strategy | | | | | | | | | | | | |
| 4.0 Stormwater Treatment Needs and Operational Guidelines | | | | | | M | | | | X | | |
| 4.1 Stormwater Treatment Strategy | | | | | | | | | | | | |
| 4.2 System Installation and Operational High-level Guidelines | | | | | | | | | | | | |
| 5.0 Final Report Delivery | | | | | | | | | | M | | X |
| 5.1 Draft and Final Report Delivery | | | | | | | | | | | | |

M Meeting
 Deliverable Development
 X Deliverable Due

COST ESTIMATE

The following scope of service shows the steps recommended to evaluate opportunities to apply reuse in the Market Plan Area and associated costs.

Table 1. Estimated budget for Scope of Services for Marketplace District Reuse-Phase 2, System Plan

| Task | Estimated Hours | Estimated Cost |
|---|-----------------|------------------|
| 1. Stormwater Capacity Evaluation | 86 | \$15,716 |
| 2. Integrating End Uses into the Assessment | 292 | \$54,511 |
| 3. Marketplace Stormwater reuse Optimization | 430 | \$76,026 |
| 4. Stormwater Treatment and operational Guidelines | 127 | \$25,376 |
| 5. Final Report | 103 | \$17,849 |
| TOTAL | 1,038 | \$189,478 |

REQUESTED ACTION

1. Consider approval of **Tasks 1 & 2** of this scope of services for an estimated cost of **\$70,226** from account 929-0012.

At a mid-year check-in (June) we will come back to the Board with preliminary findings from Tasks 1 & 2 and discuss continuing with the remaining tasks of the project.

FUTURE INITIATIVES – Next Steps Beyond Completion of this Study

Beyond the Comprehensive System Plan outlined in the scope above, there will still be a few more steps to put this approach into practice. To help the Board (and the City of Stillwater) visualize the next steps along this arc of the District Reuse approach, we are laying out some logical next steps after this project is completed, and if the approach is still deemed worthy to pursue.

Landowner Outreach and System Agreements

After initial outreach to landowners to better gauge interest and plan the system, the landowner connections and agreements will need to go a layer deeper to formalize the delivery of the water to the user. In some ways, this might not be very different than how entities receiving water supply from city currently would view the relationship, but this is a new system being proposed and must be explained and formalized. The Landowner Interest & Outreach component focuses on engaging private landowners to enhance stormwater reuse, ensuring a comprehensive approach to water conservation. The process involves strategic steps to maximize outreach effectiveness. Creating a positive public perception around stormwater reuse will ultimately lead to higher acceptance rates. A designated outreach team can initiate communication with landowners. The following is a menu of ideas that can be chosen from.

Landowner-Specific Resources

- Develop a systematic process for reaching private landowners, that could utilize a combination of direct communication, community engagement events, and online platforms.
- Designate a dedicated outreach team led by an experienced outreach personnel to spearhead communication efforts.
- Ensure that materials are easily accessible and tailored to diverse landowner needs and preferences.
- Establish a team of technical experts to provide guidance and assistance to landowners in designing and implementing stormwater reuse systems.
- Develop a hotline or online platform for landowners to seek real-time technical advice.

Community-Based Outreach

- Implement educational programs, including workshops and seminars, to raise awareness about the benefits of stormwater reuse and provide practical insights into implementing such systems.
- Collaborate with local environmental organizations and educational institutions to enhance outreach efforts.
- Foster partnerships with industry associations for wider reach and credibility.

Government/Municipality Initiative/Incentive and On-going Funding for Stormwater Reuse

As part of a commitment to sustainable water management, the community (municipality, watershed, etc.) should propose a comprehensive incentive/initiative system to encourage stormwater reuse for end-users. This initiative may promote water conservation, reduce reliance on potable water, and contribute to the overall sustainability of the community. This multifaceted approach could combine financial incentives, streamlined processes, educational initiatives, and recognition/award programs to motivate end-users and ensure the successful implementation of stormwater reuse. To promote widespread adoption of stormwater reuse, the following comprehensive approach that responsible authorities may offer to the end users':

- *Financial Incentives*
 - Offer rebates for stormwater infrastructure installation.
 - Provide subsidies or tax credits to commercial entities investing in efficient stormwater collection for reuse, including carwash stations, hotels, brewery, golf course, and other entities (both for on-site and/or regional systems).
- *Permit Expeditions and Zoning Adaptation*
 - Expedite permits to ensure swift approval for stormwater collection and reuse projects.
 - Adapt zoning regulations to accommodate harvesting infrastructure, providing flexibility for efficient implementation by end-users.
- *Regional Compliance for Permittees*
 - Develop a policy and approvals framework that would allow development to pay into this regional system to meet their stormwater permitting requirements.
 - Develop funding system that addresses both capital installation fees as well as user-fees for on-going operation and maintenance, swapping potable water fees for irrigation/other uses water fees, similar to the Waconia, MN system.
- *Educational Programs*
 - Launch public awareness campaigns about the benefits of stormwater reuse.
 - Conduct workshops and seminars for businesses, homeowners, and stakeholders to showcase practical aspects of implementation.
- *Advisory Services and Training Programs*
 - Establish a dedicated advisory team to guide end-users in stormwater reuse system design.
 - Provide training programs for industry professionals involved in stormwater management.
- *Certification Program and Awards*
 - Establish a certification program recognizing successful stormwater reuse practices, promoting sustainability.
 - Institute annual awards celebrating excellence in innovative stormwater practices, encouraging continuous improvement, and acknowledging outstanding contributions to environmental conservation.