**WORK ORDER 1**

**Objective 1**: Create a planning section for implementing GI practices in the Stormwater Manual.

The Contractor will work with the Minnesota Pollution Control Agency (MPCA) Project Manager (PM) to develop planning content for green infrastructure (GI) in the Minnesota Stormwater Manual (manual). The Contractor will identify and recommend information, resources, and case studies on planning for GI and how that can be incorporated into the manual.

**Task A**: **Build a page in the stormwater manual**

Create a GI planning page in the stormwater manual.

**Subtask a: Meet with MPCA and Technical Team to review and draft planning page in the stormwater manual.**

The draft page will be completed under previous work order (contract ID 188059). Project team will work with MPCA PM to arrange a 2-hour meeting with the Technical Team to review the draft planning page.

**Subtask b: Research and compile information to address any data gaps or needs identified under Subtask a.**

Using publicly available resources, research and compile planning content for GI in the stormwater manual to meet gaps identified by MPCA and Technical Team. This content could include, but is not limited to:

* General description of planning as it relates to GI practices
* Steps involved in the planning process
* Regional considerations
* Who should be involved in the planning process
* Common and perceived roadblocks for GI implementation and how to overcome them
* How to incorporate GI into ordinances
* Example ordinances
* How GI can be planned to complement stormwater systems and other infrastructure like transportation and wastewater
* Costs and benefits of planning during planning phase vs. after implementation
* The role planning for GI can play in climate resiliency
* Links to external planning guidance and resources

The level of detail of the planning content will be dependent on the availability of publicly available information. Work with the MPCA PM to identify O&M case studies, and develop the content for those case studies. The number of case studies developed will also be dependent on the availability of content materials.

**Subtask c: Finalize the Planning page in the Stormwater Manual**

Make changes to the draft Planning Page based on the feedback received from MPCA and the Technical Team

**Objective 1 Timeline:** January 2022 – December 2022

**Objective 2**: Identify the role of GSI in climate mitigation and climate adaptation (climate resilience)

The Contractor will review available literature and, as appropriate, gather input from stormwater professionals, to provide a document summarizing potential applications of GSI for climate resilience.

**Task A**: **Provide information on potential impacts GSI has on climate resiliency**

The Contractor will work with the Minnesota Pollution Control Agency (MPCA) project manager (PM) to refine a list of potential impacts GSI has on climate resiliency. The following list will be used as a starting point for developing the final list.

* Reducing flooding impacts associated with extreme precipitation events
* Mitigating impacts of drought
* Enhancing groundwater recharge, including impacts on baseflow
* Reducing severity and impacts associated with urban heat island
* Mitigating and reducing negative impacts to shorelines, such as erosion and flooding
* Lowering energy demands at the site and watershed scale
* Sequestering carbon

The list could also be structured along general themes, such as “technical guidance”, “policy guidance”, and “tools/modeling guidance”.

For each item in the list developed, the contractor will provide a brief description, summary and discussion of the potential impact of the item on climate resiliency. Where appropriate, photos, schematics, or other illustrations and tables will be included. The contractor will provide a draft report summarizing the results of this task for review by MPCA. Feedback and comments from MPCA will be incorporated into the final deliverable.

**Objective 2 Timeline:** January 2022 – December 2022

**WORK ORDER 2**

1. **Goals, Objectives, Tasks, and Subtasks**

**Goals:** This work order contains two goals. First is to incorporate information on green stormwater infrastructure (GSI) and climate resiliency into the Minnesota Stormwater Manual. Climate resiliency includes both climate mitigation and climate adaptation. This goal will be achieved by developing and providing guidance for practitioners on how to identify, plan, develop, and implement sustainable stormwater practices that address climate resiliency, and by providing links to case studies and resources that illustrate this guidance. The second goal is to provide information for the Minnesota Stormwater Manual that supports a stormwater Plant Selection Tool being developed by Metro Blooms and supported by the Minnesota Board of Water and Soil Resources (BWSR) and the MPCA. This tool will contain links to the Minnesota Stormwater Manual, where users of the tool will find additional information, guidance, and recommendations for using the Plant Selection Tool.

**Goal 1, Objective 1**: **Provide guidance and case studies on implementation of strategies and practices for GSI climate resiliency**

**Task A: Develop guidance for practitioners**

Develop guidance for practitioners to implement GSI strategies and practices that address climate resilience. This includes but is not limited to the following.

* Enhanced design of infiltration practices, including dynamic design, manipulating soil/media, incorporating vegetation, and increasing storage
* Enhancing water detention by GSI practices
* Enhancing interception and evapotranspiration for vegetated practices
* Enhancing harvest and reuse systems
* Combining grey and green practices
* Planning GSI systems
* Integrating individual practices within treatment systems
* Preserving natural areas
* Modeling

The guidance is anticipated to be fairly high level and conceptual as the state of the science is still evolving on this topic. The expected level of detail can be similar to that found in other pages in the stormwater manual, such as this one: <https://stormwater.pca.state.mn.us/index.php?title=Green_Infrastructure_benefits_of_constructed_wetlands#Design_considerations>.

Where feasible, the contractor will provide links to case studies and references illustrating the above strategies and practices. Provide a list of and links to recommended resources, articles, and tools that provide information on GSI and climate resiliency.

The contractor will provide a draft report summarizing the results of this task for review by MPCA. Feedback and comments from MPCA will be incorporated into the final deliverable.

**Goal 1 Timeline:** October 2022 – March 2023

**Goal 2, Objective 1: Provide information on vegetation for stormwater management for the Minnesota Stormwater Manual.**

**Task A**: **Provide information and materials for the Minnesota Stormwater Manual that support the Plant Selection Tool being developed by Metro Blooms**

The Contractor will work with MPCA, BWSR, and Metro Blooms to provide supporting information as the Plant Selection Tool is developed. Potential examples of the information to be developed include defining terms (e.g., pollinator forage, native species, nitrogen fixing), explaining scales used in the selection tool (e.g., low, medium, high salt tolerance), explaining concepts (e.g., compaction, water flow through a best management practice), and providing images (e.g., schematics, photos).

It is anticipated that the contractor will receive further guidance from MPCA as the Plant Selector Tool is developed, and that contractor support will be aligned with the proposed level of effort and timeline for this objective.

**Task B:** **Provide guidance and recommendations for establishing perennial vegetation cover at construction sites**

The Contractor will provide guidance and recommendations for meeting MPCA NPDES Construction Stormwater General Permit (CSWGP) requirements for establishing perennial vegetation before or during the establishment of the final desired species (pollinators or natives). This includes but is not limited to selection of appropriate seed mixes, procedures for establishment, and timing. Note: Prior to termination, the CSWGP requires permittees to establish a uniform perennial vegetative cover (i.e., evenly distributed, without large bare areas) with a density of 70 percent of the native background vegetative cover on all areas not covered by permanent structures, or equivalent permanent stabilization measures.

**Goal 2 Timeline**: October 2022 – June 2023