

Engineering Services for Development Park Regional Storm System

Missoula County

Prepared for:
Missoula County
Finance/Development Authority/Fairgrounds

Prepared by:
Herrera Environmental Consultants, Inc.
101 East Broadway, Suite 610
Missoula, MT 59802
Contact: Heidi Houck, PE
hhouck@herrerainc.com



Introduction

The Missoula Development Park offers a unique opportunity for commercial, industrial, and technology-focused businesses to come together to meet the needs of a growing economy in Missoula. As the County passes the baton for the Development Park’s stormwater system to the City’s stormwater utility, it will be critical to understand the condition and effectiveness of the stormwater system components to ensure they can be operated effectively and maintained efficiently by the City.

CONTENTS

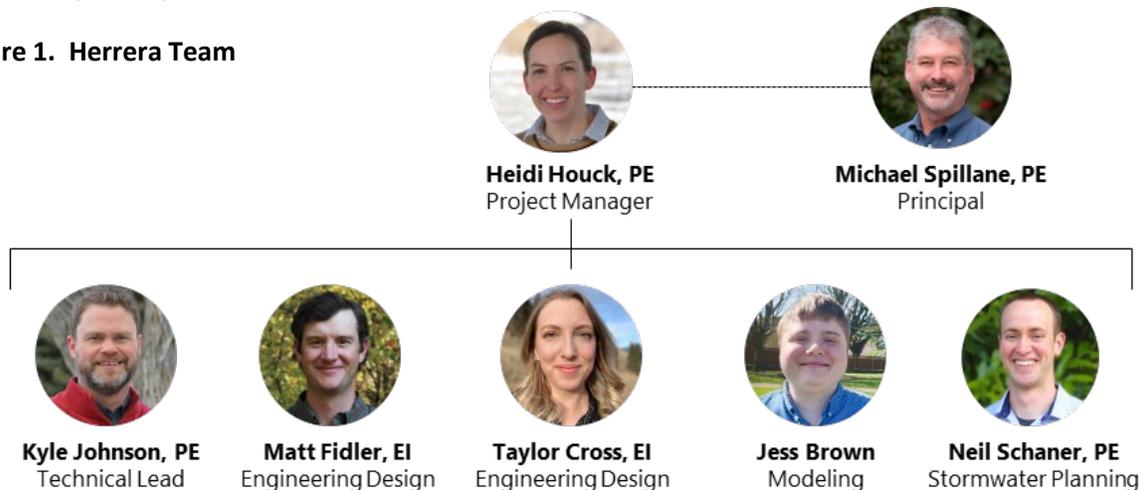
- Introduction..... 1
- Project Team 1
- Scope of Work..... 2
- Timeline..... 5
- Cost Proposal..... 5

Herrera's interdisciplinary team of design engineers and stormwater scientists frequently collaborate to develop plans for regional stormwater facilities to provide conveyance, peak flow attenuation, and water quality benefits. With experience in the full project lifecycle including planning, predesign, design, construction management, and post construction effectiveness monitoring we have carried numerous projects from condition assessment through rehabilitation, to facility operations. Depending on the situation and the urgency of the stormwater maintenance, repairs, or improvements required, we can work with the County and develop designs at varying levels of complexity to match the needs of the project site and the construction contracting process. This has resulted in hundreds of successfully designed, permitted, and fully operational stormwater facilities, with work self-performed by County crews or by a contractor selected through a public bid process.

Project Team

Our project team is depicted in Figure 1 below. **Heidi Houck** will lead our team and be the main contact for the County. Heidi is our Montana Regional Director and an experienced project manager and design engineer with a wealth of technical understanding expertise in stormwater engineering and site development. Heidi will be supported by **Kyle Johnson** as the technical lead, and **Matt Fidler** and **Taylor Cross** providing engineering design. **Jess Brown** will lead the modeling effort with stormwater planning support from **Neil Schaner**. Finally, **Michael Spillane** will be principal engineer and oversee and support Herrera’s delivery of this project. Resumes for all project team members are available upon request.

Figure 1. Herrera Team



Scope of Work

Herrera understands that the County and City need to understand how the regional stormwater system in the Missoula Development Park area is functioning, and ensure the stormwater elements City standards prior to adopting the system into the City's utility. Leveraging our team's expertise in stormwater facility design, utilities engineering, data management and analysis, and stormwater modeling we develop deliverables and recommendations that are robust, actionable, and well-supported by best-available science in pursuit of sustainable environmental outcomes. Herrera's stormwater practice also include experts in stormwater facility operations and maintenance and thus can help the County understand and reduce the on-going operations and maintenance effort of these new assets.

We have identified tasks for completing this project that cover the full lifecycle from data collection to alternatives analysis to recommended maintenance, repairs, and improvements. These tasks build on each other and create a process loop that the County can revisit and adjust in the future as stormwater management needs or requirements change.

DOCUMENTATION REVIEW

To gather existing information on the system and identify data gaps, we will review available documentation of the stormwater system, including the *Hydrology Report* (DJ&A, 1996), *Development Park – Analysis of Existing Parks as Functioning Stormwater Detention Basins Memorandum* (City of Missoula, 2022), City of Missoula GIS data, LiDAR data, previous site surveys, geotechnical data, environmental data, permits, and other historical documentation. Herrera will also interview key operations and engineering staff at the County and City to identify potential issues relevant to the challenges with the operations and maintenance of the stormwater system and opportunities to improve them. We will prepare a list of questions prior to the interviews, focused on known areas of ponding, maintenance concerns, or other operational issues.

CONDITION ASSESSEMENT AND CAPACITY ANALYSIS

Successfully completing this project requires a team that has a detailed understanding of stormwater infrastructure design and maintenance, and the role that stormwater data can play in a successful solution. Herrera will conduct a condition assessment of each asset to identify the original design configuration and purpose, current configuration, and condition. Prior to site inspections, we will prepare an assessment checklist and identify criteria for evaluating system components. After reviewing all available design information for the assets, the field work for site inspections will include:

- Conducting visual inspections to confirm existing configuration, assess system conditions, and identify operational, maintenance, and other concerns.
- Performing field surveys to fill data gaps on the stormwater system components, including pipe invert elevations, mainhole rim elevations, and other data not included in the City's GIS database. Herrera will contract with a local surveyor to accomplish this task.
- Evaluating the condition of mainhole structures, catch basins, drywells, stormwater inlets, pipes, valves, stormwater basins, open channels, culverts, outlets, and other components. Herrera will contract with a local pipe inspector to CCTV stormwater pipes to identify cracks, sagging, root intrusion, offset joints, or other issues that may cause inflow and infiltration.

The condition assessment will also include a conveyance capacity analysis to determine whether the stormwater system components meet the City's level of service requirements to accommodate the peak flow rate from the 10-year, 24-hour storm event. Existing GIS and LiDAR data, design plans and reports, as well as survey data collected during previous tasks, will be compiled, and used to develop a SWMM model. Herrera will build a below- and aboveground model to simulate multiple rainfall events and create holistic mitigation recommendations, if needed. Herrera will use GIS tools in conjunction with LiDAR and aerial imagery data to delineate drainage basins and determine pervious versus impervious land cover. We will draw on our experience building complex hydrologic and hydraulic models and evaluating their results, particularly whether a simulated hydraulic grade line shows surcharging above mainhole rim elevations and routing of surcharged flows. In addition to a 10-year event, a 100-year storm event will be evaluated to determine whether conveyance capacity within the public ROW, including roadway curb and gutter capacity, is exceeded and the potential flooding risks to private property, such as buildings. This analysis will help determine if additional conveyance or attenuation (detention or infiltration) capacity is needed in the stormwater system, which could be addressed by increasing the size of existing facilities or adding new facilities. The SWMM model will be calibrated by comparing to the 1996 Hydrology Report prepared by DJ&A and anecdotal observations provided by key staff interviews.

Based on the information collected during the documentation review, the results of the physical observations and evaluations of the stormwater system, and the capacity assessment, Herrera will prepare a conditions assessment memorandum. The memorandum will document the findings of the assessment including components in need of maintenance, repair, or improvement in order to provide a reliable and efficient stormwater system.

ALTERNATIVES ANALYSIS

Herrera will conduct an alternatives analysis to determine the actions required to address any identified capacity deficits, deferred maintenance, failing infrastructure, or opportunities to reduce the maintenance effort or increase effectiveness. Alternatives will be developed based on our deep understanding of how these best management practices function, capital and operational costs, input from key operations and engineering staff, and other considerations and priorities provided by the City.

Herrera will analyze alternatives by developing an evaluation criteria matrix and an evaluation ranking system, which will include consideration of system needs, capital and operational cost implications, risks, and other potential impacts. The matrix will score and rank the alternatives to identify preferred alternatives, with higher ranking alternatives being prioritized.

Alternatives will typically include:

- Maintenance – Vegetation management and control, sediment removal, trash removal, drywell maintenance, pipe jetting, and other maintenance activities.
- Repair – Pipe lining, crack sealing, stabilization of scoured areas.
- Retrofit – Increasing pipe size, pipe bursting, increased channel size, and/or detention basin improvements.
- Additional Infrastructure – If the capacity assessment shows the system doesn't meet City standards, Herrera will evaluate alternatives for additional infrastructure. Infiltration

alternatives will also consider pre-treatment such as sediment forebays, vegetated filter strips, vegetated swales, and/or hydraulic separators to protect Missoula's aquifer. Additional infrastructure investments could also be considered if they can be shown to sufficiently reduce the on-going operations and maintenance effort.

PRELIMINARY ENGINEERING REPORT

Alternatives and the preferred alternatives will be documented and detailed in a Preliminary Engineering Report. The report will include the assumptions, schedule constraints, and implementation requirements. The Preliminary Engineering Report will include conceptual designs for the repairs and improvements, based on City of Missoula Standards and will meet the requirements of Montana Department of Environmental Quality.

A design phase is anticipated to follow this and would be scoped and budgeted once the recommended preferred alternatives identified in the Preliminary Engineering Report are approved by the County.

PROJECT MANAGEMENT

Our firm prides itself on working closely with our new clients to foster trust for long-term collaboration. Herrera is committed to providing responsive, proactive communication throughout this project to ensure Missoula County's expectations and project needs are fully met. Our team values collaboration, beginning with a kick-off meeting between the Herrera team, Missoula County, the City of Missoula, and other project stakeholders to ensure a successful project. Regularly scheduled and effective communication between our team and County staff is the key to project success, including keeping each task on schedule and within budget. Our management approach to team interaction will include regular updates the County team, a clear schedule of interactions and deliverables and regular check-ins between our project manager and the County's project manager. Our staff routinely coordinate and implement public and agency engagement for our projects. This provides our clients with a comprehensive range of services from planning through design to post-design permitting, construction management, and environmental monitoring. We look forward to working closely with Missoula County to foster successful outcomes.

QA/QC PROCESSES

Quality assurance and quality control is embedded in Herrera's workflow, from our internal review processes for designs and documentation to our project management procedures emphasizing proactive client communications. Our authors take pride in producing their best possible product, which involves careful proofreading to prevent errors. During the QC process, a designated technical reviewer focuses on identifying any technical errors in the report product by carefully examining data, results, and conclusions. After the technical review is complete, our work products go through an editorial review for proper grammar, spelling, punctuation, report organization, and elimination of repetitive and irrelevant information.

Timeline

Herrera's key personnel are committed to this project from beginning to end. Internally, our team diligently maintains projections of technical and administrative staff workloads to anticipate periods of high utilization for individuals and for the team, enabling project managers to anticipate and maneuver for staff availability to carry out their projects to meet clients' schedules. Our estimated timeline for completing the various stages of the project is illustrated in the table below.

Task	Dates
Documentation Review	April – May 2023
Condition Assessment and Capacity Analysis	May - July 2023
Alternatives Analysis	July - August 2023
Conceptual Design and Preliminary Engineering Report	August – October 2023

Cost Proposal

Our estimated cost for completing each stage of the project is illustrated in the table below.

Task	Cost
Documentation Review	\$1,524
Condition Assessment and Capacity Analysis	\$70,474
Alternatives Analysis	\$16,226
Conceptual Design and Preliminary Engineering Report	\$27,023
Project Management	\$13,383
TOTAL	\$128,631