

May 2, 2017

Mr. Aaron Hass  
Department of Public Works, Sewer Utility  
700 City Hall Annex  
25 West 4<sup>th</sup> Street  
Saint Paul, MN 55102

**Re: Final Design and Construction Services for the Stabilization of the Upper Cherokee Heights Ravine**

Dear Aaron:

Thank you for the opportunity to assist the City with Upper Cherokee Heights Ravine final design and construction services. As you are aware Barr prepared the *Cherokee Heights Culvert Analysis and Erosion Control Feasibility Study (Barr, 2015)* (Cherokee Heights Feasibility Study) on behalf of the City and the Lower Mississippi River Watershed Management Organization (LRWMO) last year. The *Brickyard Area of Lilydale Regional Park Stormwater Management and Slope-Stability Study (Barr, 2015)* (Brickyard Study) was also conducted by Barr on behalf of the City of Saint Paul Department of Parks and Recreation. Barr's project understanding, proposed scope of work, budget, schedule and team is described below.

**Project Understanding**

Currently, runoff from the drainage area is discharged to a low area (basin) just north of Annapolis Street and east of Cherokee Heights Blvd. via storm sewer and then conveyed beneath Cherokee Heights Blvd. by a 60-inch diameter culvert. High flow rates and velocities have caused erosion problems on the upstream and downstream end of the culvert.

Downstream of the culvert, runoff flows down the bluff through a steep ravine area and eventually flows to Pickerel Lake. Observation of the Cherokee Heights ravine channel revealed significant erosion along the channel bottom and side slopes, including undercutting of the toe of the slope, which contributes to instability of the ravine side slopes. Groundwater seepage may have also contributed to the erosion and unstable slopes. Barr evaluated several improvement options for stabilizing the approximately 300 feet of the downstream channel between the Cherokee Heights culvert and East Clay Pit Falls. To minimize erosion of the channel and side slopes and reduce the instability of adjacent banks within the ravine, the selected option includes regrading and stabilizing the channel by armoring the channel with rip-rap and a properly graded filter material to prevent migration of underlying fine-grained soils through the rip-rap. High flow velocities in the ravine channel preclude use of many bio-engineering techniques for stabilization, as these techniques typically would not withstand the magnitude of flow velocities.

Vegetation management will be implemented with the channel armoring and slope grading (see attached photographs of existing downstream conditions).

The Cherokee Heights Feasibility Study also included review of modifications to the upstream ravine or watershed tributary to the culvert to reduce peak flows and velocities through the culvert and minimize erosion. Although upstream modifications to reduce flows are not planned at this time, a task has been included to analyze and design permanent erosion control improvements, if needed, at the area upstream of the Cherokee Heights Ravine Culvert (see attached photographs of existing upstream conditions).

## **Scope of Work**

Following is a description of the proposed tasks.

### **Task 1: Preliminary Tasks**

1. Collect and review existing reports including the Cherokee Heights Feasibility Study and Brickyard Study, drawings, utility data, borings, street information, etc.
2. Perform pre-design inspection along the upstream and downstream repair areas with City staff.
3. Perform site survey of downstream repair area to establish current topography and develop base drawing for construction plans. Existing LiDAR information will be incorporated as feasible.

**Assumptions:** This task includes up to two (2) days of survey.

**Deliverables:** Periodic communications, emails, etc.

### **Task 2A: Upstream Repairs**

1. Following site visit, restoration alternatives will be identified.
2. Final design of selected alternative.
  - Review XP-SWMM model and storm sewer outlet velocities
  - Provide riprap/filter sizing recommendations
  - Prepare vegetation management recommendations
3. Preparation of 60% drawings (if necessary)
4. Preparation of 90% drawings (if necessary)
5. Preparation of final drawings (if necessary)

**Assumptions:** Site visit included in Task 1 will identify erosion issues and the scope will be limited to vegetation management and riprap sizing recommendations/design. No further site visits are included in this task

**Deliverables:** 60%, 90%, 100% drawings (electronic pdf)

## **Task 2B: Downstream Repairs**

1. Final channel stabilization and design – preliminary engineering was completed as part of the Cherokee Heights Feasibility Study.
  - Site work
  - channel design including revising XP-SWMM model due to increased drainage area and revising velocity computations
  - geotechnical design including slope stability and riprap/filter design.
2. Preparation of 60% drawings
3. Preparation of 90% drawings
4. Preparation of final drawings

### **Assumptions:**

- Final design will be based on improvement alternatives presented in the Cherokee Heights Feasibility Study,
- We assume that the Cherokee Heights culvert is stable; scope does not include modifications to the culvert
- Scope includes stabilizing channel invert and banks but does not include evaluation and stabilization of upper slopes
- Additional soil borings and soils testing are not anticipated or included
- The scope does not include contaminated soils/regulated fill issues, archeological or other cultural resources surveys, or threatened and endangered species issues
- Scope includes incorporating one (1) round of City edits into plans

### **Deliverables:**

- 60%, 90%, 100% drawings (electronic pdf)

## **Task 2C: Contract/Bidding Documents**

1. Final drawings will be prepared and arranged in a format for competitive bidding and use in construction of the project. We anticipate the bid package to include the following drawings:
  - Cover Sheet & Index (1 Sheet)
  - Plan & Profile: Existing Conditions (2 sheets)
  - Plan & Profile: Proposed Conditions (2 sheets)
  - Cross Sections – DS repairs (2 Sheet)
  - Erosion Control Plan and Details (2 Sheets)
  - Miscellaneous Details (2 Sheets)
2. Contract Documents that will be prepared for competitive bidding and subsequent construction include:

- Technical Specifications
- Advertisement
- Instructions to Bidders
- Bid Form
- Agreement
- General Conditions
- Supplementary Conditions
- Up to two (2) addenda, if necessary.

**Assumptions:**

- Scope includes incorporating one (1) round of City edits into specifications.
- The front-end documents will be based on the EJCDC Standard or City of Saint Paul standards, however scope does not include budget for cross referencing between these standards. In addition to the front-end documents, construction specifications will be prepared using the Construction Specifications Institute (CSI) standard format.

**Deliverables:**

- 90%, 100% Specifications (electronic pdf)

**Task 3: Opinion of Construction Cost**

1. Review the Cherokee Heights Feasibility Study and other appropriate data to aid in preparation of the opinion of construction cost.
2. Experienced contractors may also be contacted to discuss the project from a contractor's perspective to identify construction issues and their opinions of project costs.

**Deliverables:**

- 60% and final opinion of construction cost

**Task 4: Permitting**

1. Except as noted, City will take the lead on permitting and any easement acquisition.
2. Barr will prepare a Storm Water Pollution Prevention Plan (SWPPP) if disturbed area exceeds 1.0 acres. NPDES construction permit will be prepared by the Contractor.
3. Barr will support the City in its construction project site plan review process.

**Deliverables:** SWPPP

**Task 5: Cost Allocation**

1. The LMRWMO's cost allocation formulas will be used to reevaluate the cost allocation scenarios in the Cherokee Heights Feasibility Study among contributing member cities and

MnDOT. Cost allocation scenarios will include computations using the LMRWMO's allowable flow equation (for flow quantity), as well as two water quality cost allocation methods as outlined in the August 8, 2012 memo from Barr to the LMRWMO.

2. This task will also include technical assistance needed for cost allocation coordination among the stakeholders.

**Deliverables:** Revised cost allocations and technical memo

### **Task 6: Meetings**

Ensuring the project proceeds in a timely fashion and the City and other stakeholders are well-informed of the project status, four (4) meetings at City offices are included in the scope:

1. Kickoff meeting to update stakeholders of plan
2. Community meeting
3. 60% Stakeholder progress meeting
4. 90% Stakeholder progress meeting

**Deliverables:** Periodic communications, emails, meeting notes, etc.

### **Task 7: Bid Administration**

1. Barr will coordinate with the City and schedule and conduct a pre-bid meeting and prepare an attendance roster and meeting notes, as necessary. The pre-bid meeting may include a pre-bid walk-through with City staff and potential bidders
2. Barr will assist City with addressing prospective bidder questions during the bidding period.
3. Barr will prepare and issue up to two (2) addenda as appropriate to interpret, clarify, or expand the bidding documents.
4. Barr will prepare bid tabulation of all bids and assist the City in evaluating bids.

**Assumptions:** City will lead procurement process including advertising, copying and distribution of bidding documents and addenda, scheduling and conducting the bid opening and assembling and awarding the contract to the Successful Bidder.

**Deliverables:** Meeting minutes and addenda.

### **Task 8: Construction Services**

Construction services include the following tasks:

1. Construction observation services (up to 35 hours onsite per week for up to 4 weeks of construction). We will visit the project as appropriate to observe that the progress and quality of the work conforms in general to the Contract Documents. Construction activities will be documented with photographs and construction diaries and weekly construction reports.

2. Schedule and attend a pre-construction meeting and prepare meeting notes, as necessary.
3. Prepare field orders and change orders, as necessary.
4. Evaluate substitute materials and equipment proposed by Contractor and make recommendations to City concerning substitution.
5. Review shop drawings, samples, and other data which Contractor is required to submit
6. Attend safety briefings held by the Contractor, as necessary.
7. Attend weekly or other periodic construction meetings and prepare meeting notes, as necessary.
8. Review quantities and applications for payment and provide payment recommendation to the City.
9. Perform a final inspection of the completed work and prepare punch lists as necessary
10. Assist City with final contract closeout services, as necessary.
11. Prepare record drawings.

**Assumptions:**

- No additional survey will be performed (all survey and staking performed by contractor)
- If construction observation and support services are required over and above our proposed estimate, Barr will perform these services following authorization by the City and receipt of an executed contract amendment.

**Deliverables:** Meeting minutes; construction report and record drawings

**Project Schedule**

Table 1 summarizes the proposed general project schedule. Schedule will be coordinated with the City

**Table 1. Proposed project schedule.**

Task	Description of Task	Estimated Schedule
0	stakeholders review and sign JPA document	Spring 2017
1-6	Final design, Plans and Specifications	Fall 2017-Summer 2018
7, 8	Bidding and Construction	Fall 2018- Fall 2019

**Project Team**

Barr’s project management staffing approach for this project will be as follows:

*Jim Herbert, P.E., Vice President, Senior Civil Engineer*

Jim will serve as Barr’s principal in charge for the project. Jim was the principal for the *Cherokee Heights Culvert Analysis and Erosion Control Feasibility Study* and has over 30 years of experience in

design and construction, urban stormwater management, and tunnel/infrastructure inspection and repair for municipal and watershed management clients, including the City of Saint Paul.

*Janna Kieffer, P.E., Vice President, Senior Water Resources Engineer*

Janna will perform the cost allocation task and serve as a technical advisor on this project. Janna served as project manager for the *Cherokee Heights Culvert Analysis and Erosion Control Feasibility Study* and has 15 years of experience with stormwater management, including conducting hydrologic and hydraulic analyses, water quality modeling, design feasibility studies, and stormwater design reviews for municipal and watershed management clients, including the City of Saint Paul and LMRWMO.

*Nathan Campeau, P.E., CFM, Senior Water Resources Engineer*

Nathan will serve as Barr's Project Manager. Nathan has 15 years of water resources experience in final design and construction, hydrologic and hydraulic analysis, green infrastructure, flood-risk management design, and stormwater feasibility studies for municipal and watershed management clients, including the City of Saint Paul, Capitol Region Watershed District, and Ramsey-Washington Metro Watershed District.

Other key staff, who were also involved with the *Cherokee Heights Culvert Analysis and Erosion Control Feasibility Study* and the *Lilydale Regional Park Stormwater Management and Slope Stability Study*, include Tom McDonald, PE (channel stabilization design) and Bill Kussmann, PE (geotechnical design),

## **Project Budget**

The cost for project management is distributed throughout all tasks. Project management tasks include regular and timely communication and coordination w/ City and stakeholders, internal coordination, internal meetings and administration tasks.

Table 2 summarizes the estimated costs associated with each task described in the scope of services.

**Table 2. Estimated project costs.**

<b>Task</b>	<b>Description of Task</b>	<b>Estimated Budget</b>
1	Preliminary Tasks	\$16,000
2A	Upstream Repairs	\$52,500
2B	Downstream Repairs	
2C	Contract/Bidding Documents	
3	Opinion of Construction Cost	\$5,000
4	Permitting	\$4,000
5	Cost Allocation	\$4,500
6	Meetings and Project Management	\$9,500
7	Bid Administration	\$9,500
8	Construction Services	\$51,000
	<b>Total Estimated Project Cost</b>	<b>\$152,000</b>

Work covered by this scope of work will be charged on a time and expense basis and invoiced approximately every four weeks. Project expenditures will not exceed the total estimated project cost shown in the table without your authorization.

Please contact us if you have any questions about our scope of work or estimated budget.

Sincerely,



Jim Herbert, P.E.

Vice President  
Barr Engineering Co.

**Attachments**

- Upstream photographs
- Downstream Photographs