



June 9, 2020

Mr. Robert Haines, PE
City of La Crosse
400 La Crosse Street
La Crosse, WI 54601

Re: Additional Services for CBC Project # 22756-W, Bliss Road Slope Stabilization Plan; Engineering Assessment of a Culvert and Gully Located East of W5717 Bliss Road – CBC Quotation No. 20-242-12W

Dear Bob,

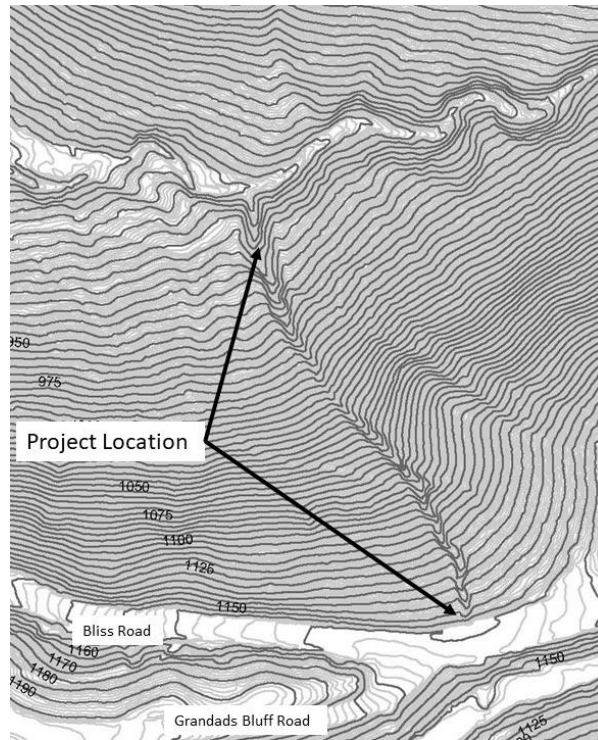
Per our discussions on May 19, 2020, CBC Engineers and Associates (CBC) is pleased to present to you a scope of services to complete an engineering assessment of a culvert and gully located east of W5717 Bliss Road. The existing culvert has been destroyed by deterioration, stormwater runoff velocities and discharges associated with Bliss and Grandads Bluff Roads. The pipe has been exposed and separated and the downstream erosion of the gully is extreme. The road was recently repaired due to the undercutting caused by stormwater further degrading the receiving gully. Figure 1 presents recent photos of the existing pipe and gully.

Figure 1



Based upon our understanding of the project CBC would offer the following scope of services associated with the project location depicted in Figure 2.

Figure 2



Hydrologic Evaluation

Based upon the one foot contour interval topography that CBC has acquired from La Crosse County, the watershed contributory to the culvert will be delineated. The watershed hydrology will be calculated utilizing the HydroCadd™ computer software system. The 2,10, 25, 50, and 100 year storm events. The rainfall records will be compiled from NOAA Atlas 14, MSE-4 distributions, and will be specific to La Crosse County. Resultant flows and volumes that are computed will be compiled and summarized.

Hydraulic Evaluation

The existing gulley formation is steep and highly eroded. Remediation of the gulley was considered impractical. Reducing upstream discharge velocities through diversion, capture and storage, and structural velocity dissipation systems should be considered. Each system will impact the downstream velocities that impact the gulley erosion. A hydraulic analysis of the gulley will be completed utilizing HydroCadd™ computer software system that will be based upon the existing conditions and the aforementioned rainfall events. This will establish the base line hydrograph and velocities attributed to the various stormwater discharge conditions.

Alternative Analysis

Reducing the discharge velocities and peak flows will impact the gulley erosion and reduce sediment transport to the valley floor. Various alternative considerations maybe considered. CBC will evaluate the following alternatives:

- Permeable pavement system to capture, detain, and divert stormwater
- Terraced stormwater detention pond system
- Velocity reduction structures and pipe extensions

A hydraulic analysis for each alternative will be completed utilizing the HydroCadd™ computer software system under each rainfall event. The subsequent outflow will be routed through the existing gulley system. The existing condition flows and hydrographs will be compared and evaluated as to the impact upon the existing gulley hydraulics.

Cost Estimates

Based upon each alternative evaluated, CBC will prepare preliminary quantities and construction cost estimates. This information will be completed in Microsoft Excel.

Bedrock Evaluation

The potential for existing bedrock to impact any of the proposed alternatives is a concern. The City has indicated that they may have bedrock data associated with the construction of Grandads Bluff and Bliss Roads. If this information is not available, the other option is to complete soil borings to determine the depth to bedrock at specific locations within the project limits. Since the alternatives have not been developed at this time, soil boring locations, type, and depth have not been identified. Therefore, soil borings will be considered an additional service and is not included, but maybe performed upon authorization, in this proposal.

Recommendation

Upon completion of the alternative analysis, CBC will provide a recommended alternative for the consideration of the City. The alternative will be based upon, but may not be limited to, the hydraulic impact to the receiving gulley, the ability to construct the improvement, the cost to construct the improvement and environmental impacts.

Integration into the Final Bliss Road Report

The alternative analysis and resulting recommendations will be integrated into the final “Slope and Gulley Stabilization Plan for Hixon Forest and Bliss Road, Phase 1” report.

Compensation

CBC will complete the scope of services based upon our current hourly rates, which have been attached to and made part of this proposal, with a fee budget of **\$8,000**.

The project will be billed under a separate phase to our current Bliss Road contract.

Should you have any questions or concerns please do not hesitate to contact via email at toddweik@cbceng.com or telephone at 262-219-2938.

Sincerely,

CBC Engineers and Associates



Todd B. Weik, PLA, CPESC
Manager LID Design Services