

March 1, 2021

Steve Glueck City of Golden 1445 10th Street Golden, CO

RE: Kenneys Run Channel Improvements Extension (KRCIX) – 14<sup>th</sup> to 16<sup>th</sup> Street

Dear Mr. Glueck:

The following drainage report provides conceptual design information for extension of the Kenneys Run Channel Improvements Extension upstream of the Coors brewery.

Improvements for Kenneys Run are under construction from Clear Creek to 14<sup>th</sup> Street. The open channel improvements will provide a key outfall location for Kenneys Run stormwater discharges. The resulting flood risk mitigation benefits the brewery, the City of Golden, and multiple landowners. *Extension of these channel improvements from 14<sup>th</sup> Street up to 16<sup>th</sup> Street will reduce flood risk for the existing properties along Ford Street between Clear Creek and 16<sup>th</sup> Street.* 

Additionally, the sum of improvements to Kenny's Run between 16th Street and Clear Creek will provide the City of Golden with the opportunity to enhance the pedestrian connectivity and experience along this important corridor. Developing the streetscape along Kenny's Run will provide safe walking and biking routes from the neighborhoods on the southeast side of town to the downtown commercial district and adjacent Clear Creek Trail. Street level landscape enhancements as well as the naturalized landscape associated with the open channel, will provide an aesthetic experience for Golden residents and visitors.

The information presented herein is conceptual in nature. However, coordinated efforts with Coors and project stakeholders on Kenneys Run planning and design has generated an abundance of utility, terrain, and hydrology information relevant to this project. As this concept evolves through further planning efforts, additional information will be useful in refining benefit-cost and design alternatives.

Thanks for your efforts to advance this important flood risk reduction for the City of Golden.

Sincerely, ICON Engineering, Inc.

Man

Troy Carmann, PE | Principal tcarmann@iconeng.com| (303) 221-0802

#### I. GENERAL LOCATION AND DESCRIPTION

#### A. Location

a. Vicinity Map:



b. Location

Township 3S, 70W, Section 27

#### c. Adjacent roadways.

The project is in the vicinity of Ford Street, Jackson Street, and between 14<sup>th</sup> and 16<sup>th</sup> Street.

#### d. Project boundary.

Project is bounded by roughly the Coors Tour Lot on North, Ford Street on the East, Jackson Street on the West, and 16<sup>th</sup> Street on the South.

#### B. Description of Property.

#### a. General project description.

The Kenneys Run Channel Improvement Extension (KRCIX) project mitigates flood risk in Downtown Golden from approximately 16<sup>th</sup> Street to Clear Creek, primarily along the west side of Ford Street. The project improves hydraulic capacity for Kenneys Run using open channel and improved culverts.

#### b. Area in acres

The project covers approximately 3 acres.

#### c. Existing ground cover (type of trees, shrubs, vegetation, general soil conditions, topography, and slope)

The KRCIX project area is paved in asphalt and concrete with the exception of landscape buffers along Ford Street and isolated locations within the parking lots. Ground cover in the landscape area is grass with several dozen deciduous and evergreen trees. The topography is consistent and sloping from south to north, with existing pavement, curb, and gutter influencing localized drainage patterns from west to east. The existing conditions are fully developed with no native or open land.

d. Impervious area and area of disturbance, including weighted and nonweighted (total square feet of concrete surfaces, asphalt surfaces, roofs, etc.) pre- and post-construction impervious area, and anticipated area of disturbance in acres.

The pre-construction impervious area is approximately 2.5 acres of the 3 acre project footprint. The postconstruction impervious area is expected to be similar. The weighting of impervious areas is not relevant to the post-construction conditions given the change is construction of an open channel intended to convey stormwater. The area of disturbance, including staging and erosion control buffering is approximately 3 acres.

#### e. Major drainageways and drainage facilities

Clear Creek is the major drainageway at the downstream end of the project footprint. Kenneys Run is the focus of the project. Kenneys Run is currently conveyed within a series of closed conduits between Jackson Street on the south end of the project area and an existing outfall into Clear Creek located approximately 650 feet downstream of Ford Street. The existing Kenneys Run culverts do not have capacity for the 1% annual chance flood event and convey approximately 10 to 16% of the base flood flows.

Mr. Glueck 03/01/2021 Page 4 of 15

#### f. Irrigation facilities

There are no known irrigation facilities within the extension project footprint.

#### g. Easements within and adjacent to the site

Title work has not been completed for the project area at this time. The majority of the project footprint is within City Right-of-Way and will not require specific stormwater easements. Other portions of the project will require coordination with private property owners for a range of easements from temporary construction easements through permanent drainage easements.



Figure 1 - Parcel Snapshot for Project Area

#### II. MAJOR DRAINAGE BASINS AND SUB-BASINS

#### A. Major Basin Description

a. Reference to major drainageway planning studies such as flood hazard delineation reports, major drainageway planning reports, and flood insurance rate maps.

A 2020 update to the Clear Creek FHAD is in the final stages of approval as of the date of this report. Kenneys Run is covered 1983 Flood Hazard Area Delineation – Tucker Gulch / Kenneys Run study. The Flood Insurance Study for City of Golden and Jefferson County also identifies regulatory flood hazards along Kenneys Run and Clear Creek in and around this project site.

b. Major basin drainage characteristics, existing and planned land uses within the basin.

An updated hydrology study for Kenneys Run provides information on the watershed and runoff characteristics. The study includes both east and west forks of Kenneys Run to the top of the watershed and down to the confluence with Clear Creek. Design flows for the KRCIX project are approximately 3500 cfs in the 1% annual chance storm.

It is important to note a previously approved LOMR (16-08-1269P, effective 6/23/2017) on the West Fork of Kenneys Run includes a base flood hydrology reduction approved by FEMA. The LOMR updated the channel conveyance, floodplain and hydrology. The hydrology reduced base flows by approximately 1000 cfs. The LOMR was not extended downstream for schedule and budget reasons. But the flow reduction remains effective in the upper reach of the West Fork, tributary to the Kenneys Run project.

#### c. Identification of all irrigation facilities within the basin, which influence drainage design.

There are irrigation facilities on the downstream end of the brewery project reach, Aggie Ditch and Farmers Highline. These facilities are not directly impacted by the KRCIX project. However, there is an important aspect of water quality that needs to be addressed should any base flow conditions change in the Kenneys Run open channel. According to Aggie Ditch representatives, future work must confirm that the new channel conveyance has no adverse impact on water quality at the head gates. Existing conditions drain the Kenneys Run base flows downstream of the head gates in a series of pipes and box culverts. The new open channel projects would drain the base flows upstream of the head gates in a long, pervious, natural bottom channel.

				1% Annual Chance Design Storm		
				Existing	Future	
Tributary	Map Node	Design Location	SWMM Node	Peak Flow (cfs)	Peak Flow (cfs)	
Kenneys Run	KR1	Confluence (20th and Jackson)	STMH0202	2634	3173	
	KR2	18th and Jackson	STI0297	2704	3260	
	KR3	16th and Jackson	STI0321	2720	3281	
	KR4	14th and Ford	EF J010	2772	3345	
	OF1	Outfall 1	STO0193	1021	1011	
	OF2	Outfall 2	EF_Outfall1	1855	2432	

Figure 2 - Hydrology Study Flood Flow Values



Figure 3 - Hydrology Work Map showing project drainage area

#### **B. Sub-Basin Description**

#### a. Discussion of historic and proposed drainage patterns.

The sub-basins directly affected by the project footprint include areas on the brewery property and within downtown Golden. The historic condition of Kenneys Run flood flows is represented by a 2D model, included herein, which correlates with the effective FEMA flood hazard mapping. The historic condition base flood event exceeds the existing box culvert near 15<sup>th</sup> and Jackson Street, southwest of Ford Street, and spreads flow overland in a northeasterly direction. Flood waters spread north and east on both sides of Ford Street in depths ranging from a few inches to localized areas of ponding several feet deep.

The flood waters draining north through Downtown ultimately cross Ford Street following existing grades and discharge into Aggie Ditch and Clear Creek just north of the current Coors Wellness Center.

The flood waters draining north-easterly follow the gradual slopes across Ford Street and into Tour and Keg lots of the brewery. The tour lot, located south of 13<sup>th</sup> Street, quickly conveys the eastern flank of the flooding northeasterly and into 13<sup>th</sup> Street. The keg lot, north of 13<sup>th</sup> Street, accepts flows from Ford Street and from 13<sup>th</sup> Street, spreading the flood water into shallow flow into the brewery property. As flood waters reach the extension of 12<sup>th</sup> Street into the brewery, the sheet flow continues over the top of the Kenneys Run box culvert and piped Aggie Ditch. Sheet flows continue down the parking lot, with overbank impacts on the Keg Building and CBU building. Ultimately flowing into Clear Creek across the south bank of the walled section upstream of the pedestrian bridge and larger brewery buildings.

The existing condition drainage pattern along Jackson Street is key to the understanding of benefit-cost for this project. The native open channel for Kenneys Run was confined to a pipe and overland flow along Jackson Street starting near 16<sup>th</sup> Street. This further constrained an already tight floodplain corridor along Jackson Street. The resulting flood risk spreads out along both east and west sides of Ford Street between 15<sup>th</sup> and Clear Creek.

## b. Discussion of offsite drainage flow patterns and impact on development under existing and fully developed basin conditions

Drainage conditions outside of the project area are a primary concern for the project stakeholders. Drainage conditions downstream of the project site is the overland flooding through the brewery property. Drainage conditions upstream of the project site is the overland flooding through downtown Golden.

Under existing basin conditions, the drainage flow patterns and impact on development is significant. Mitigation of the flood risk is required to build structures compatible with downtown commercial services and industrial brewery facilities. Development is not prohibited in the floodplain, but the development permitted in this floodplain is not economically viable in the long term.

Under fully developed basin conditions, the drainage flow patterns and impact on development remains about the same. In fact, as the hydrology study (see appendix) indicates, the future regulatory flow conditions are actually lower than effective peak flows. This is a function of upstream improvements and hydrology reductions previously accepted by FEMA that were not fully transferred downstream.

The drainage flow conditions outside of the Kenneys Run Channel Improvements project and extension project are significant. Previous projects in south Golden have addressed several of the offsite drainage and flooding issues related to Kenneys Run. (i.e. Fossil Trace golf course ponds, channel stabilization, channelization at Golden High School, etc.) However, the downstream open channel project and this associated extension project are the key elements to leveraging the value of the past work.

Ideally, drainage infrastructure is improved from downstream to upstream. For a variety of legitimate reasons, Kenneys Run has mitigated drainage concerns largely from upstream to downstream. To make the most of the upstream improvements, this downstream project has to 'connect the dots' and 'remove the last hurdle' for maximum flood risk reduction in downtown Golden. In short, construction of the KRCIX project will benefit drainage conditions outside of the project area. This project completes the significant investment in Kenneys Run and results in the greatest benefit to flood risk reduction.



Figure 4 - Existing projects on Kenneys Run

#### **III. DRAINAGE DESIGN CRITERIA**

## A. Regulations: Discussion of the optional provisions selected or the deviation from the criteria, if any, and its justification.

The drainage design of the channel improvements follows drainage design criteria without deviation.

# B. Discussion on implementation of the "Four Step Process" including Runoff Reduction Practices, Water Quality Capture Volume, Stabilizing Drainageways and Source Control BMPs.

The project, when fully designed, is expect to implement all phases of the 'Four Step Process'.

#### C. Development Criteria Reference and Constraints

a. Discussion of previous drainage studies (i.e., project master plans) for the site that influence or are influenced by the drainage design and how the plan will affect drainage design for the site.

There are no known drainage studies specific to the project area between 14<sup>th</sup> and 16<sup>th</sup>. New development, which would generate these drainage studies, has been limited by the mapped flood risk in the area.

#### b. Discussion of the relationship to and effects of adjacent drainage studies

The Kenneys Run FHAD study and Clear Creek FHAD study had effects on the project design. The upstream channel improvements on Kenneys Run (near Golden High School) were a primary key in the understanding of the hydrology updates that affect the larger drainage area. The downstream study on Clear Creek was critical to understanding where Kenneys Run flow changes were modeled and the net effect on regulatory water surface elevations for the downstream property in the brewery property.

Adjacent drainage study work related to the brewery project, downstream on Clear Creek, led to other incidental effects on the project. The removal of the "Crawford Bridge" over Clear Creek has a net positive effect on the downstream flow conditions and will help convey flood waters from Kenneys Run through Clear Creek in a more efficient manner.

## c. Discussion of the drainage impact of site constraints such as streets, utilities, rapid transit, existing structures, and development or site plan

The streets, existing structures, and underground utilities have a significant impact on the drainage design. The work for this extension project will impact Ford Street, Jackson Street, and the utilities within those rights-of-way.

Conceptual design has identified gas and water lines as key utility conflicts for this project. The Xcel gas line in Ford Street and 13<sup>th</sup> Street is critical to the gravity flow conditions necessary in the upstream extension of Kenneys Run. Lowering the gas line under the extension box culvert will be critical.

Similarly, the water line in Ford Street is currently passing through the middle of the existing box culvert system under Ford Street. This water line must be either lowered or raised over the new box culvert under Ford Street. Lowering it will require specific fittings and additional excavation. Raising the water line is likely to require insulation and load protections.

	03/01/2021
ICONEIIGINEERIIIG	Page 10 of 15

Mr. Glueck

The transportation system in the project area will require dedicated planning and design. Early alternatives for the roadway have included a round-about at Ford-Jackson-14<sup>th</sup>. With the right property allowances, a round-about can improve traffic flow through the complicated intersection, but also provide important space for underground utility clearances. Vertical grade changes can be limited in the project footprint, but the ability to raise the roadway finished grade provides useful flexibility to the hydraulic design.

#### D. Hydrological Criteria

Additional hydrologic information is available in the Coors Kenneys Run Hydrology letter, September 2020.

It is important to note the effect of past Letter of Map Revision hydrology changes. The upstream LOMR 16-08-1269P, effective 6/23/2017, approved base flood flow reduction of 1000 cfs on the West Fork of Kenneys Run. See figure below.



Figure 5 - Approved flow reduction less than 800 feet upstream.

#### F. Water Quality

a. Include applicable Stormwater Quality Design Standards Checklist(s) for all BMPs

This project can magnify pre-treatment of open channel flows with trash vault, forebay, and trash grate features. The south end of the Coors open channel project has intentionally stopped the structural walls and held the invert of the grouted drop structure to accommodate future tie-in of the upstream culvert. The

upstream culvert can tie-into the open channel and include a near-conventional <u>forebay</u> for trash and debris collection. An access ramp from 14<sup>th</sup> Street would provide routine maintenance access for this water quality feature.

A *trash vault* could also be incorporated into the culvert discharge point between 13<sup>th</sup> and 14<sup>th</sup> Street. The trash vault could take advantage of the vertical drop between Ford Street and 13<sup>th</sup> Street along the proposed culvert-channel alignment. Nuisance, low, and first flush flows could be routed to an in-line trash vault. The maintenance of the vault would push location of the vault towards the east side of the channel to allow for vac-truck maintenance access from the Tour Lot access road.

<u>Trash grates</u> on the upstream end of the new Kenneys Run extension would be essential to limiting unauthorized access under the roadway, but also to restrain major debris. Initial concept drawings include the trash grates within the wingwall structures, essentially integrated with the channel wall along Jackson Street. This notion of integrating the trash rack into the structural elements of the culvert system can improve aesthetics and disguise large stormwater infrastructure.

Low flow diversions can be very useful in the design and maintenance of the new culverts under Ford Street. A single cell box culvert can convey low flows, with higher culvert cells dry during most runoff events. This isolates trash and pollutants in one cell for easier treatment. Furthermore, the maintenance of higher, drier box culverts is improved by eliminating daily flows and resulting water control operations during maintenance activities.

#### G. Modifications of Criteria

There are no modifications of criteria expected at this time. Further design will confirm how a retro-fit culvert extension and open channel improvements meet or exceed design criteria.

#### IV. DRAINAGE FACILITY DESIGN

#### A. General Concept

The KRCIX project mitigates flood risk along Kenneys Run through downtown Golden and ties to downstream improvements along the Coors Brewery. The project intercepts overland flows draining down the open channel and culverts along Jackson Street south of 16<sup>th</sup>. Flood flows within an improved open channel from 16<sup>th</sup> to downstream of 15<sup>th</sup> Street enter an improved culvert system under Jackson Street west of Ford Street. The culvert extension under Ford Street discharges storm flows into the open channel between 13<sup>th</sup> and 14<sup>th</sup> Street.

The resulting regulatory floodplain is reduced by containment within the open channel and culvert system. Flood risk areas currently mapped across the west side of Ford Street are reduced and regulatory base flood requirements are eliminated.

#### a. Discussion of concept and typical drainage patterns

The Kenneys Run corridor along Jackson Street west of Ford Street is confined by natural topography. The corridor is further constrained by development of residential and commercial structures. As flood waters drain through this constraint, there is a natural expansion of flow as the topography flattens out along Ford Street.

The downstream open channel project aims to contain stormwater within the channel, intercepting flows before they drain east and through the brewery. This upstream extension will act in a similar manner, intercepting the western overbank flooding before it leaves the constrained section at Jackson and Ford streets.

#### b. Discussion of compliance with off-site runoff considerations

The KRCIX project does not increase off-site runoff. There is likely a net decrease in impervious area.

#### c. Discussion of anticipated and proposed drainage patterns

This project intercepts the Kenneys Run discharges in an open channel, box culvert, and on-street conveyance system along Jackson Street near 16<sup>th</sup>. The culvert will discharge into the Kenneys Run channel downstream of Ford Street and convey base flows and all storm flows up to the 1% annual chance discharge through the Kenneys Run Channel, box culverts, and into Clear Creek.

#### **B. Specific Details**

#### a. Discussion of drainage problems encountered and solutions at specific design points

There are several key elements to a successful design of the KRCIX project. These are briefly explained here, but can be expanded in subsequent design and planning efforts.

Utilities. The existing gas and water lines in Ford Street are key utilities to design storm water improvements around. The sanitary sewer is an equally important utility, but has a potential re-alignment to the east side of the downstream open channel. Other dry utilities are in conflict, but can be realigned with franchise agreements and advanced planning.

## ICONENGINEERING 03/01/2021 Page 13 of 15

Mr. Glueck

Transportation. The traffic patterns at Ford and Jackson can be improved with this project. A traffic circle is a leading alternative for maximizing the traffic flow over the storm sewer improvements and around multiple connecting streets. Also, the finished grade profile of the roadway has to be raised as high as possible to ensure sufficient capacity of the box culvert. The elevation of Ford Street from the south and the residential structures along 14<sup>th</sup> west of Jackson are key to that design. There are other considerations for channel flow at 15<sup>th</sup> Street and pedestrian access that should also be considered.

Hydraulics. As utilities are routed around the storm sewer and the roadway is lifted above, there are key hydraulic design components to be determined. The upstream culvert headwater and wingwall configuration will be important to hydraulic efficiency. Horizontal alignment of the culvert will be important to minimizing bends and friction losses. Vertical alignment of the culvert is flexible given the downstream channel elevations and could be maximized to increase velocity, and downstream armoring.

#### b. Discussion of detention storage and outlet design

There is no detention storage for this project.

#### c. Discussion of measures implemented to treat the WQCV

There is no direct treatment of the water quality capture volume. Instead, water quality measures are expected to be implemented at the connection to the open channel with trash vaults, forebay, and trash rack measures.

#### d. Structural and non-structural control measures (BMPs) for the stormwater management design.

The KRCIX upstream channel improvements and box culvert under Ford Street are directly improving stormwater management through replacement of outdated metal pipes and over-confined channels. Indirect improvements will come through mitigation of flood risk, improved flood resilience for residential and commercial properties, and renewed viability of vacant or under developed parcels.

#### e. A summary table for each detention storage pond on the site to include:

There are no detention storage ponds on the project.

#### f. Discussion of maintenance access and maintenance responsibility

Maintenance will be typical of City of Golden stormwater channels and culverts. Open channel and water quality elements are eligible for assistance from the Mile High Flood District. Design features will aim to maximize access for ordinary maintenance equipment on a regular schedule.

## g. Discussion of easements and tracts for drainage purposes, including the conditions and limitations for use

The majority of the KRCIX work is within existing City right-of-way. Downstream improvements are within a pending 100-foot maintenance easement for the downstream channel improvements. Improvements upstream of Ford Street will require special coordination with private property owners.

Upstream properties are currently restrained by mapped flood risks and natural topography of the drainage channel. Additional land area will be required on a temporary and permanent basis to make the open channel safe, stable, and functional. Additional land area will be required to make the culvert headwall and wingwalls safe, efficient, and accessible for maintenance operations. Configuration of driveways and access

	03/01/2021
ICONENGINEERING	Page 14 of 15

to the commercial building south of Jackson and Ford will be impacted and require significant coordination during alternative analysis.

h. Discussion of the facilities needed offsite for the conveyance of minor and major flows to the major drainageway

The offsite conveyance of minor storm flows will remain as built in the existing conditions –pipe and overland flows funneled into an existing open channel. No other facilities are needed for conveyance of off-site flows (overland flows south of 16<sup>th</sup> Street).

#### **V. CONCLUSIONS**

#### A. Compliance with Standards

The project is expected to be compliant with the following standards.

- a. Compliance with City of Golden Stormwater Standards Manual
- b. Compliance with any existing Master Drainage Plans
- c. Compliance with the City's floodplain regulations
- d. Compliance with applicable State and Federal regulations

#### **B.** Drainage Concept

a. Effectiveness of drainage design to control damage from storm runoff

The project controls damage from storm runoff in minor and major storm events by way of reducing overland flow through the City of Golden and the Coors brewery.

b. Influence of proposed development on the Master Drainage Plan recommendation(s)

The proposed project is highly compatible with the general discussion of master plan drainage improvements for the downtown Golden and Coors brewery. Re-configuration of undersized and outdated corrugated metal culverts and concrete box culverts meets planned recommendations from several sources. Restoration of open channel drainage facilities is highly advantageous to operation, maintenance, and flood risk reduction priorities established by federal, state, and local agencies.

#### **VI. REFERENCES**

Subsequent design efforts will identify design and criteria references.

#### **VII. APPENDICES**

- A. Project Rendering.
- B. Engineering Concept Plan and Profile.
- C. Flood Hazard Mapping.
- D. Benefit Cost Analysis Concept.
- E. Construction Cost Estimate.





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Looking South



riparian water quality corridor proposed Kenny's Run overflow channel existing enclosed concrete culvert pedestrian circulation walking distance from downtown existing Kenny's Run improvements 



OOL OF MINES

GOLDEN HIGH SCHOOL



![](_page_17_Figure_0.jpeg)

![](_page_18_Picture_0.jpeg)

#### **Benefit Cost Analysis**

The restoration of an open channel and improved culverts on Kenneys Run between Clear Creek and 16th Street mitigate flood risk to many existing residential and commercial structures, as well as acres of vacant or outdated parcels.

The US Army Corps of Engineers evaluates major stormwater projects using a benefit-cost analysis that considers 'averted damages' as the benefit over the cost of the infrastructure project. Averted damages are evaluated over a 20 to 30 year period. For instance, a typical gas station with convenience store flooded with 18-inches of flood water has a one time damage of approximately \$500,000. For multiple city blocks, over an extended study period, the benefits of a flood mitigation project become significant.

#### $\mathbb{ICON}$ Engineering, Inc.

#### KENNEYS RUN 13th to 16th Conceptual Estimates

#### May 2020

ITEM	DESCRIPTION	PAY		UNIT	TOTAL COST OF
NO.	OF PROBABLE DESIGN ITEM	UNIT	QUANTITY	PRICE	ITEM
1	Mobilization	LS	1	\$300,000.00	\$300,000
2	Clearing and Grubbing	AC	0.5	\$208,000.00	\$104,000
3	Survey	LS	1	\$55,000.00	\$55,000
4	Traffic Control	LS	1	\$110,000.00	\$110,000
5	Water Control and Dewatering	LS	1	\$160,000.00	\$160,000
6	SWMP	LS	1	\$60,000.00	\$60,000
7	Earthwork - Excavation and Haul Offsite	CY	12,000	\$49.50	\$594,000
8	Earthwork - Complete and Place	CY	2,000	\$30.00	\$60,000
9	Earthwork - Clean Imported Fill	CY	300	\$54.20	\$16,260
10	Remove Asphalt	SY	8,280	\$15.00	\$124,200
11	Remove Concrete Pavement	SY	885	\$17.50	\$15,488
12	Remove Curb and Gutter	LF	1,557	\$15.00	\$23,355
13	Tree Removal	LS	1	\$21,000.00	\$21,000
14	Boulder Wall, Grouted	FF	1,200	\$103.00	\$123,600
15	Cutoff Sheet Pile, Steel (PZ-22)	SF	1,500	\$35.00	\$52,500
16	Sheet Pile Cap, Concrete	LF	150	\$100.00	\$15,000
17	Soil Riprap, Type L	CY	3,445	\$70.00	\$241,150
18	Concrete Sidewalk/Trail	SY	871	\$57.00	\$49,647
19	Handicap Access Ramp (ADA)	EA	4	\$1,150.00	\$4,600
20	Aggregate Base Course, Class 6 - (6")	CY	132	\$65.00	\$8,580
21	Hot Mix Asphalt - 6" Bottom Lift	TON	270	\$130.00	\$35,100
22	Hot Mix Asphalt - 3" Top Lift	CY	67	\$240.00	\$16,080
23	Concrete Curb and Gutter with 2-Foot Pan	LF	1,465	\$40.00	\$58,600
24	Sanitary Sewer Realignment	LS	1	\$100,000.00	\$100,000
25	Water Line Reconfiguration	LS	1	\$100,000.00	\$100,000
26	Building Demolition	LS	1	\$50,000.00	\$50,000
27	Structural Concrete - 2 - 10' X 8' Concrete Box Culverts	CY	300	\$515.00	\$154,500
28	Seeding/Mulch	AC	1.50	\$4,063.00	\$6,095
29	Erosion Control Blanket	SY	4,400	\$7.25	\$31,900

Subtotal \$2,690,654

Contingency (30%)

\$807,196

Estimated Construction Cost \$3,497,850