

PUBLIC WORKS DEPARTMENT MEMORANDUM
#06-2020

DATE: March 9, 2020
TO: Honorable Mayor Meredith Leighty and City Council Members
THROUGH: Heather Geyer, City Manager *hmg*
FROM: Kent Kisselman, PE – Director of Public Works *KHK*
SUBJECT: CR-57 – Community Center Drive Bridge Rehabilitation Addendum #1

PURPOSE

City Council is considering CR-57, a resolution to approve Addendum #1 to the contract for the Community Center Drive Bridge Rehabilitation Project.

BACKGROUND

The Colorado Department of Transportation through their bridge inspections program has identified certain deficiencies at the Community Center Drive bridge. These deficiencies will reduce the lifespan of the bridge. A delay in beginning rehabilitation of the bridge will mean increased repair costs as the deficiencies worsen.

The City received a proposal from Atkins to address the issues at the bridge. Tasks A and B (completed January 2020) consisted of Atkins preparing a report on the recommended repairs. This addendum is for Task C, in which Atkins will generate complete construction plans, specifications and an engineer estimate for the rehabilitation. The City will then issue an invitation for bids for a contractor to complete the work in 2021.

STAFF RECOMMENDATION

Attached to this memorandum is CR-57, a resolution that, if approved, would authorize the Mayor to execute Addendum #1 to the contract between the City and Atkins for the Community Center Drive Bridge Rehabilitation Project. Staff recommends approval of CR-57.

BUDGET/TIME IMPLICATIONS

Additional cost for this project will be funded by a supplemental appropriation to the Capital Projects Fund.

2020 CIP	\$40,000.00
2019 Community Center Drive Bridge Evaluation	\$17,000.00
2020 Community Center Drive Bridge Plans and Specifications	\$65,200.00
Total Contract Amount	(\$82,200.00)
Supplemental Appropriation	\$42,200.00

STAFF REFERENCE

If Council members have any comments or questions they may contact Kent Kisselman, Director of Public Works, at 303.450.4005, kkisselman@northglenn.org.

ATTACHMENT

1. Atkins Structure Rehabilitation Report

CR-57 – Community Center Drive Bridge Rehabilitation Addendum #1
Community Center Drive Bridge Rehabilitation Addendum #1 contract

THE CITY OF NORTHGLENN



STRUCTURE REHABILITATION REPORT

Community Center Drive Bridge Over I-25



December 20, 2019

Prepared By:
ATKINS

Member of the SNC-Lavalin Group

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1 Executive Summary

1.1 Project Description

Community Center Drive Bridge is located on Community Center Drive between Huron St, to the west, and Malley Dr, to the east. The bridge is a vital connection for the City of Northglenn being one of three I-25 crossings within the limits of the City. The existing structure is a two span prestressed tub girder bridge with the existing pier in the median of I-25. Community Center Drive (CCD) connects 112th Avenue at Huron St to 120th Avenue east of I-25. CCD is two lanes in each direction with a median and sidewalk on the north side of the bridge.

Figure 1 Location Map of Community Center Drive Bridge



1.2 Purpose of Report

The purpose of this report is to break the down damage that is occurring to the CCD over I-25 bridge, see what issues are causing the damage and to propose the best course of action to rehabilitate the abutments and other items that are cause for concern. These items may include

- Approach slabs settling at the end of the approaches.
- Cheek walls connected to the back wall of the abutments cracking and needing repaired or replaced
- Removal of backwall
- Bearing replacement
- Abutment seat repairs
- Water moving behind and under the wingwalls and abutments
- Bridge rail and pedestrian rail repair and bridge rail replacement

1.3 Structure Rehabilitation Recommendations

The structure repair at Community Center Drive for the City of Northglenn will entail a two phased approach with traffic being moved to one half of the bridge for each phase of the construction. Temporary shoring will be required during both phases of the construction of project to allow traffic to continue crossing I-25 while the bridge repairs are completed. The removal of the approach slabs, and the removal of the median, bridge rail, sidewalk and portions of deck past the existing expansion joint will be required in the bridge repair work. Once these have been removed the MSE backfill will be removed to provide access to the abutment backwall. The backwall will be removed down to the abutment bearing seat and any removal of wingwall for repair and replacement will be done at this stage of construction. Each girder will be jacked vertically off their seat slightly and the bearing devices under each girder will be replaced. Once this has occurred portions of the diaphragm concrete will be removed and any excess concrete that spilled during the placement of the original backwall will be cleaned. Reinforcing and formwork for the overhanging diaphragm (semi-integral diaphragm) will be placed and the diaphragm will be poured in place. The MSE backfill will be installed and the new approach slab with the expansion joint at the end of the approach slab will be poured in place.

During phase one construction the reinforcing will extend past the new concrete with the required lap distance installed and will to be protected in place. The traffic will switch sides of the bridge and the repair work for the second phase will occur in the same manner as described for phase one. Once both sides of the abutment and approach slabs have been replaced, the neoprene seal for the expansion joints will be put in place and the bridge will reopen all lanes.

2 Site Description and Design Issues

2.1 Existing Structure

CCD Bridge is located on Community Center Drive between Huron St, to the west, and Malley Dr, to the east. The existing structure is a two span prestressed tub girder bridge with the existing pier in the median of I-25. The west approach is at grade with a two-tiered MSE retaining wall below and wrapping around the west abutment. The east approach ramps up to the bridge with an MSE retaining wall on the north side along Boondocks, the south side grades out. There is an MSE retaining wall in front of the east abutment.

2.1.1 West Abutment (Abutment 1)

The west abutment backwall is being displaced and pushed away from the abutment seat by several factors. The original design of the bridge intended the backwall to have a minimum 1.75 inch gap between it and the superstructure. Misrepresentation of expansion joint gaps in the bridge plans when the bridge girders were set and construction issues or mistakes while pouring the backwall caused the superstructure to have no gap between it and the backwall. The expansions joint appeared to have been set with the appropriate gap at time of placement, but the structure below was not able to expand appropriately. This has caused the superstructure to push against the backwall binding the bridge and causing the backwall to be displaced from the cheek walls and the abutment seat. With the backwall being displaced and pushed away from the bridge, the cheek walls at the abutment ends are showing stress cracking and concrete spalling.

In addition to the superstructure displacing the backwall, the approach slab connection used in the bridge design is older design which Colorado Department of Transportation (CDOT) no longer allows to be used. The approach slab is attached as a direct connection placed on top of the backwall. This created a fixed connection between the approach slab and the backwall causing further displacement in the backwall as the approach slab settles and tries to pull away from the bridge.

With the settlement of the approach slab, the bridge rail has begun to crack at the expansion joint. The pedestrian rail attached to the bridge rail was not provided a slip joint, or a means to expand and contract. This caused the pedestrian rail at each bridge rail expansion joint to bow out away from the bridge due to the expansion of the superstructure.

2.1.2 East Abutment (Abutment 3)

The east abutment backwall is being displaced and pushed away from the abutment seat to a lesser degree than the west abutment by several factors. The original design of the bridge intended the backwall to have a minimum 1.75 inch gap between it and the superstructure. Misrepresentation of expansion joint gaps in the bridge plans when the bridge girders were set and construction mistakes while pouring the backwall caused the superstructure to have no gap between it and the backwall. The expansion joint appeared to have been set with the appropriate gap at time of placement, but the structure below was not able to expand appropriately. This has caused the superstructure to push against the backwall binding the bridge and causing the backwall to be displaced from the cheek walls and the abutment seat. With the backwall being displaced and pushed away from the bridge, the cheek walls at the abutment ends are showing stress cracking and concrete spalling.

In addition to the superstructure displacing the backwall, the approach slab connection used in the bridge design is older design which Colorado Department of Transportation (CDOT) no longer allows to be used. The approach slab is attached as a direct connection placed on top of the backwall. This created a fixed connection between the approach slab and the backwall causing further displacement in the backwall as the approach slab settles and tries to pull away from the bridge.

With the settlement of the approach slab, the bridge rail has begun to crack at the expansion joint. The pedestrian rail attached to the bridge rail was not provided a slip joint, or a means to expand and contract. This caused the pedestrian rail at each bridge rail expansion joint to bow out away from the bridge due to the expansion of the superstructure.

There was evidence of water potentially getting behind the wingwall and under the approach slab and exiting near the abutment and pilaster on the north side. Recent heaving of median at the end of the approach may also be evidence of this.

2.2 ROW Impact

All proposed work on the bridge is intended within the current limits of roadway and bridge, no additional ROW impacts are anticipated. Coordination with CDOT during construction work may be required.

2.3 Traffic Detour

CCD is one of three streets that crossover I-25 in the City of Northglenn. The street is vital to the City in allowing emergency services from the Justice Center to access the east side of I-25 quickly and cannot be completely closed during construction. Therefore, the work will be done in two phases,

shifting traffic to single lane access in each direction at Justice Center Drive and Malley Drive during each phase of repair work. This will allow half the repair work to be completed during each phase.

2.4 Utilities

There are several different utility conduits running through the sidewalk and bridge barriers, the contractor will need to verify whether all conduits have utilities within them before work begins and come up with a plan on how to work with the utilities in the structure. The existing plans do not show any existing utilities near the abutment, but the contractor should verify existing utilities before work begins.

2.5 Roadway Design Features

The roadway features on the bridge and the approaches leading up to the bridge are not intended to change from the existing design. The purpose of the work is to repair the approach slabs and bridge abutments.

3 Structure Design Criteria

3.1 Design Specifications

The primary design code in which the abutments will be designed is the *AASHTO LRFD Bridge Design Specifications*. The existing structure was designed to AASHTO 2nd Edition LRFD with 1999, 2000 and 2001 Interims. The design shall be subjected to the most current version at the start of the design unless the existing elements cannot meet current standards, then it will be based on the existing design code. The most current design code is the 8th Edition, published in 2017 and prior to the commencement of the final design, an agreement with the City of Northglenn shall be reached to understand which code will be used as the basis of the design.

3.2 Construction Specifications

CDOT specifications will be followed for this project. The project team may develop construction specifications that apply to the bridge and/or may adopt existing specifications published by other agencies such as the City of Northglenn and AASHTO.

All welding of the bridge steel superstructure will be specified to conform to the American Welding Society (AWS) D1.1/D1.1M structural welding code. Fabricators will be required to be certified by the American Institute of Steel Construction (AISC) for simple and major steel bridges.

Shop fabrication, welding, as well as field assembly and erection will be subject to strict quality control and quality assurance (QA/QC) procedures throughout fabrication and construction.

3.3 Loading

The major loading conditions the bridge rehabilitation will be subject to include thermal, earthquake, dead, and live. Specific loading requirements are as follows:

<i>Thermal Loads:</i>	
Thermal range - Concrete	-20 to 105 degrees F
Thermal range - Steel	-20 to 110 degrees F
Expansion bearing assembly at tall abutment (sliding friction per manufacturer's design)	
<i>Seismic Loads:</i>	Detailing per AASHTO, Seismic Zone 1
<i>Dead Loads:</i>	Self-weights of concrete substructure, approach slabs, sidewalks, barriers, railings and wearing surfaces
<i>Live Loads:</i>	HL-93: Design Truck or Design Tandem and Design Lane loads Impact Multi-presence factors Braking Loads Pedestrian Load: 75 pounds per square foot of sidewalk area Colorado Permit Truck
<i>Earth Loads:</i>	
Equivalent Fluid Pressures	Active, at-rest or passive
Live Load Surcharge	Dependent on geometry and component

3.4 Software Used by the Designer

The rehabilitation designs discussed and presented within this report have been developed using hand calculations created in EXCEL spreadsheets. These calculations are very preliminary in nature and serve the purpose of confirming rehabilitation requirement, but not to fine tune the dimensions of the rehabilitation. Additionally, CDOT preliminary design guides, information drawn from previous designs and CAD software has supported the design assumptions.

The final design phases will likely invoke the usage of numerous design and analysis software tools. For the bridges, industry-standard software packages that may be utilized could include, but are not limited to:

- SAP2000
- LARSA
- L-PILE

4 Structure Rehabilitation

4.1 Rehab Considerations

The intent of this repair is to remove damaged portions of the bridge and improve the abutments. The expansion joint at each abutment is no longer standard practice with CDOT. This repair will replace the existing backwall with an overhanging diaphragm. By converting the backwall to an overhanging diaphragm (also called a semi-integral abutment), the expansion joint can be moved to the back of the approach slab, thereby removing any reoccurrence of current issues and will remove any future water damage to the abutment due to the expansion joint seals leaking over time.

The costs for this project will involve the following processes.

- Traffic Control
- Removal of Portions of Present Structure
- Repair and Replacement of Deficient Components

The three processes above will be the main concern for construction, design and overall costs. There are additional evaluation concerns for the structure rehabilitation but do not hold as much value in the process and project cost, they include the following:

- Maintenance and Durability
- Constructability
- Initial Construction Costs

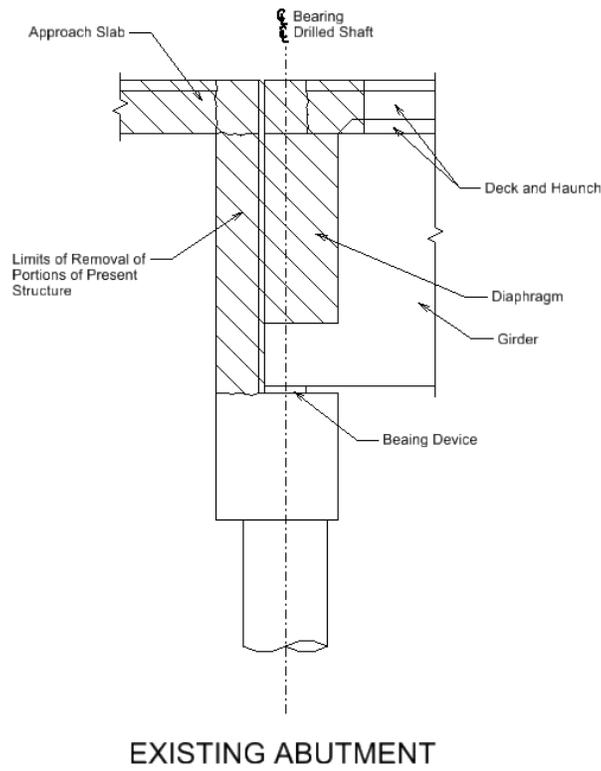
4.2 Traffic Control

The traffic control will be done in two phases. Each phase will consist of two-way traffic continuing on the opposite side of the bridge. During the first phase, traffic will shift to west bound and the sidewalk will still be available for pedestrian and bike traffic. The second phase will shift traffic to the east bound lanes and the sidewalk will be closed. An alternative route for bike and pedestrian traffic will be assigned.

4.3 Removal of Portions of Present Structure

The removal of structure will require the use of temporary shoring placed in the median of the approach slabs and potentially at the end of wingwalls to allow the approach slabs, sidewalk and bridge rails to be removed up to the expansion joint and partially onto the bridge in two phases. The mechanically stabilized backfill (MSE) will need to be excavated to approximately 2.5 ft below the top of the abutment seat. The backwall will then need to be removed with care given to avoid hitting the bridge girders and tensioned strands within the girders as well as portions of the wingwall where the backwall is currently tied into. This will allow the contractor to repair portions of the wingwall that have deteriorated. After removal of the backwall, the reinforcing in the diaphragms will need to be exposed along with portion of the deck with care given to protecting the reinforcing. Any excess concrete from when the backwall spilled past the forms during the original pour will need to be removed from the girders. See figure below.

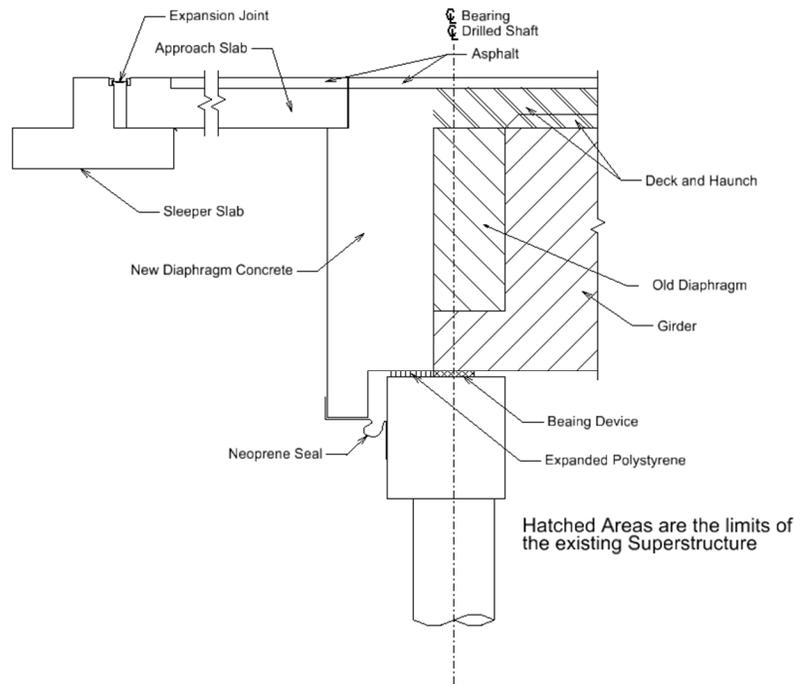
Figure 1 Removal of Portions of Existing Structure



4.4 Repair and Replacement of Deficient Components

After the backwall and portions of the wingwall have been removed, exposing the girders, diaphragms and bearing devices, the repair can begin. Due to the shear deformations in the bearing devices, the bearings at each abutment should be replaced. The contractor will be able to access the bearings from the back of the abutment and will be required to jack each girder up enough to remove and replace the bearings. The girder jacking points and procedure for the bearing replacement will be included in the design plans. The bearings should be replaced before the exposure of the existing diaphragms. When the bearings have been replaced the expanded polystyrene, new reinforcing and form work should be put into place to pour the new abutment diaphragm. The new diaphragm will overhang the abutment seat and remove the need for an expansion joint at the abutment. The new expansion joint will be moved to the end of the approach slab in accordance with CDOT standards, thereby removing any recurrence of current issues of the girder and deck pushing against backwall and will remove any future water damage to the abutment due to the expansion joint seals leaking over time. See the figure below.

Figure 2 Abutment Repair



PROPOSED ABUTMENT FIX

With the use of temporary shoring and construction phasing, access to only half the width of the bridge will occur at a time. The overhanging diaphragm, wingwall, MSE fill and approach slab will be placed in phase one leaving a gap for reinforcement. This means that the rebar from the first phase will be exposed during the second phase of the repair and will need to be protected until the second phase can be poured allowing the approach slab, diaphragm portions and deck to work as continuous units within themselves. The mechanical portions of the expansion joint will be put in place during each phase with the neoprene seal for the joint installed at the end of the project to provide a continuous seal.

Once the overhanging diaphragm has been placed the MSE backfill can be put in place. The new overhanging diaphragm will have a pinned connection to the approach slab allowing the approach slab to move without causing rotation in the diaphragm. After the approach slab has been poured the sidewalk, median and bridge rails can be replaced. The expansion joint, at the end of the approach slab, and asphalt surfacing will finish out the bridge work.

By moving the expansion joint to the back of the approach slab, only one section of the current pedestrian rail may need to be fixed, where the section spanned the existing expansion joint location. The buckling of this section may not allow for the rail to be reused and potentially could require replacement at each of the 4 locations.

Some repairs along the wingwalls and the base of the pilasters are required, areas where the top of ground is below the bottom of wall and pilaster will need to be filled to prevent water from getting

behind the abutment. Shear cracking in the wingwalls will need to be inspected to see if additional repairs are needed as the project moves towards the construction phase.

4.5 Maintenance and Durability

The maintenance and durability of the bridge repair will greatly impact the long-term performance of the structure and significantly impact the overall lifecycle costs of the structure. Ultimately, the long-term success of any structure is dependent on timely and routine maintenance.

Deicing salts and chemicals can cause reinforcing and structural steel to corrode in the event of consistent exposure. Both approach slabs will feature a 3" wearing surface of hot bituminous pavement (HBP) asphalt with waterproofing directly on the approach slabs and portions of deck involved in the repair work. This system will be the most effective and limiting the steel reinforcing exposure to deicing salts and chemicals. Additionally, all concrete in the bridge deck, approach slabs, sidewalk, type 7 bridge rails, abutments and wingwalls in accordance with CDOT design criteria and existing plans will utilize epoxy-coated reinforcing which will provide another layer of protection for the steel reinforcing.

A list of anticipated maintenance activities within the first 75 years of operation after the repair and for the repaired items only along with the anticipated frequency of maintenance items are summarized below. The maintenance items over the first 75 years of operations can be reasonably expected as follows:

- Mill and Overlay the existing HBP asphalt every 25 years.
- Reapply a structural coating on the outside of the bridge every 30 years.
- Recoat all barrier railing and pedestrian railing every 30 years.
- Replace the expansion device glands once, at approximately 15 years.
- Routine inspections every two years for the duration of the bridge in service.

4.6 Environmental

There were no anticipated environmental issues known for this project at the time this report has been written.

4.7 Constructability

The primary constructability challenge will be the removal of concrete portions on the abutment and wingwall while keeping rebar and girders protected. Protection of existing reinforcement during the removal of concrete will save time and cost during the repair. These challenges should be within the means and methods of an experienced General Contractor.

4.8 Initial Construction Costs

The construction cost for the repair options are summarized below. These construction costs include material costs, final design engineering, and materials testing. Additionally, mobilization has been estimated at 10% of the construction cost and a 15% contingency has been applied to the overall cost. Pricing in construction costs came from looking at the last five years of CDOT Cost Data. A detailed breakdown of each cost and design fee is included in Appendix A.

- Total Estimated Construction Cost with Traffic Control **\$762,220**
- Total Estimated Design Fee with Traffic Control **\$65,200**

5 Structure Rehabilitation Recommendation

5.1 Conclusion

The structure repair at Community Center Drive for the City of Northglenn will entail a two phased approach with traffic being moved to one half of the bridge for each phase of the construction. Temporary shoring will be required during both phases of the construction of project to allow traffic to continue crossing I-25 while the bridge repairs are completed. The removal of the approach slabs, and the removal of the median, bridge rail, sidewalk and portions of deck past the existing expansion joint will be required in the bridge repair work. Once these have been removed the MSE backfill will be removed to provide access to the abutment backwall. The backwall will be removed down to the abutment bearing seat and any removal of wingwall for repair and replacement will be done at this stage of construction. Each girder will be jacked vertically off their seat slightly and the bearing devices under each girder will be replaced. Once this has occurred portions of the diaphragm concrete will be removed and any excess concrete that spilled during the placement of the original backwall will be cleaned. Reinforcing and formwork for the overhanging diaphragm (semi-integral diaphragm) will be placed and the diaphragm will be poured in place. The MSE backfill will be installed and the new approach slab with the expansion joint at the end of the approach slab will be poured in place.

During phase one construction the reinforcing will extend past the new concrete with the required lap distance installed and will to be protected in place. The traffic will switch sides of the bridge and the repair work for the second phase will occur in the same manner as described for phase one. Once both sides of the abutment and approach slabs have been replaced, the neoprene seal for the expansion joints will be put in place and the bridge will reopen all lanes.

Appendix A: Quantities & Cost Breakdown

Community Center Drive Bridge

Preliminary Construction Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Unit price</u>	<u>Cost</u>
Earthwork				
Remove Portions of Present Structure	1	LS	\$ 60,000.00	\$ 60,000.00
Structure Excavation	997	CY	\$ 25.00	\$ 24,925.00
Structure Backfill (MSE)	997	CY	\$ 53.00	\$ 52,841.00
Shoring	1	LS	\$ 15,000.00	\$ 15,000.00
			SUBTOTAL	\$ 152,766.00
Bridge				
Asphalt (HMA)	58	TON	\$ 100.00	\$ 5,814.88
Concrete (Class D)	299	CY	\$ 750.00	\$ 224,328.02
Reinforcing Steel Epoxy	11328	LB	\$ 1.35	\$ 15,292.67
Structural Concrete Coating	106	SY	\$ 9.00	\$ 954.00
Bearing Device (Type I)	20	EA	\$ 1,200.00	\$ 24,000.00
Expansion Joint (0-4in)	157	LF	\$ 265.00	\$ 41,671.25
Waterproofing (Membrane)	261	SY	\$ 20.00	\$ 5,219.81
Bridge Rail Type 7	139	LF	\$ 105.00	\$ 14,586.26
Pedestrian Rail (Special)	34	LF	\$ 100.00	\$ 3,400.00
			SUBTOTAL	\$ 335,266.90
Contractor				
Mobilization	1	LS	\$ 48,803.29	\$ 48,803.29
Contingencies	1	LS	\$ 73,204.93	\$ 73,204.93
			SUBTOTAL	\$ 122,008.22
			TOTAL	\$ 611,000.00
Design Fee				\$ 60,000.00

COMMUNITY CENTER DRIVE BRIDGE
ESTIMATE OF PHASING COSTS
December 11, 2019

CDOT ITEM NO.	ITEM DESCRIPTION	UNIT	UNIT PRICE	SHIFT TRAFFIC	
				QUANTITY	COST
614-70010	MODIFICATION OF SIGNAL FACE	EA	\$ 1,000.00	4	\$ 4,000.00
627-00005	EPOXY PAVEMENT MARKING	GAL	\$ 160.00	10	\$ 1,600.00
630-00000	FLAGGING	HR	\$ 30.00	40	\$ 1,200.00
630-00003	UNIFORMED TRAFFIC CONTROL	HR	\$ 100.00	20	\$ 2,000.00
630-00007	TRAFFIC CONTROL INSPECTION	DAY	\$ 200.00	50	\$ 10,000.00
630-00012	TRAFFIC CONTROL MANAGEMENT	DAY	\$ 830.00	150	\$ 124,500.00
630-80335	BARRICADE (TYPE 3 M-A)	EA	\$ 180.00	4	\$ 720.00
630-80341	CONSTRUCTION TRAFFIC SIGN (PANEL SIZE A)	EA	\$ 50.00	20	\$ 1,000.00
630-80358	ADVANCE WARNING OR SEQUENCING ARROW PANEL (C TYPE)	EA	\$ 1,600.00	2	\$ 3,200.00
630-80359	PORTABLE MESSAGE SIGN PANEL	DAY	\$ 65.00		\$ -
630-80360	DRUM CHANNELIZING DEVICE	EA	\$ 30.00	100	\$ 3,000.00
TOTAL					\$151,220

DESCRIPTION OF OPTIONS:

The "Shift Traffic" option will divide the project into two phases with two-way traffic on the opposite side of the bridge during construction. It is assumed each phase will take 2.5 months for a total of 5 months of construction. This option will require some traffic signal head modifications to put proper signal heads types over for the shifted traffic.

DESIGN FEE ESTIMATE:

The design fee to produce plans for the work shown above is estimated at \$5200.

SPONSORED BY: MAYOR LEIGHTY

COUNCILMAN'S RESOLUTION

RESOLUTION NO.

No. CR-57
Series of 2020

Series of 2020

A RESOLUTION APPROVING ADDENDUM NO. 1 TO THE PROFESSIONAL SERVICES AGREEMENT BETWEEN THE CITY OF NORTHGLENN AND ATKINS FOR THE COMMUNITY CENTER DRIVE BRIDGE REHABILITATION PROJECT

WHEREAS, the City of Northglenn entered into a Professional Services Agreement with Atkins on September 19, 2019 for the Community Center Drive Bridge Rehabilitation Project; and

WHEREAS, the City desires to supplement the Agreement with an Addendum No. 1 to allow for an additional scope of services to provide complete construction plans, specifications, and engineering services for the Community Center Drive Bridge Rehabilitation Project.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF NORTHGLENN, COLORADO, THAT:

Section 1. Addendum No. 1 to the Professional Services Agreement between the City of Northglenn and Atkins, attached hereto, in an amount not to exceed \$65,200.00 for engineering services for the Community Center Drive Bridge Rehabilitation Project is hereby approved and the Mayor is authorized to execute same on behalf of the City of Northglenn.

DATED, at Northglenn, Colorado, this _____ day of _____, 2020.

MEREDITH LEIGHTY
Mayor

ATTEST:

JOHANNA SMALL, CMC
City Clerk

APPROVED AS TO FORM;

COREY Y. HOFFMANN
City Attorney

ADDENDUM #1 TO AGREEMENT FOR PROFESSIONAL SERVICES

THIS FIRST ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES is made and entered into this ____ day of _____, 20____, by and between the CITY OF NORTHGLENN, State of Colorado (hereinafter referred to as the "City") and Atkins (hereinafter referred to as "Consultant").

RECITALS:

A. On September 19, 2019 the City and Consultant entered into an Agreement for Professional Services for Community Center Drive Bridge Rehabilitation services (the "Agreement").

B. The parties desire to supplement the Agreement with this Addendum #1 to allow for additional monies for:

Exhibit A, Exhibit B

AGREEMENT

NOW, THEREFORE, it is hereby agreed that for the consideration hereinafter set forth, that Consultant shall provide to the City, professional _____ services as needed in the manner provided in the Agreement.

1. The Scope of Services in the Agreement is hereby supplemented to include the monies for Task C as described in Exhibit A attached hereto as **Exhibit A**, and incorporated herein by this reference (the "Additional Monies"). Consultant shall commence work on the original Scope of Services within ten (10) days of the issuance of a Notice to Proceed.

2. Subparagraph A. of Article IV entitled "Compensation" is hereby amended to provide as follows:

A. Compensation shall not exceed \$65,200 for the work described in **Exhibit A** to this Addendum # 1.

3. The original Agreement is in full force and effect and is hereby ratified by the City and the Consultant. The original Agreement and this Addendum constitute all of the agreements between the City and the Consultant.

IN WITNESS WHEREOF, the parties hereto each herewith subscribe to the same in duplicate.

CITY OF NORTHGLENN, COLORADO

By: _____

Meredith Leighty

Print Name

Mayor

Title

Date

ATTEST:

Johanna Small, CMC, City Clerk

APPROVED AS TO FORM:

Corey Y. Hoffmann, City Attorney

CONSULTANT

Kenneth Hawkins
By: Kenneth Hawkins

VP, Sector Manager 2-5-2020
Title Date

ATTEST:

Julie A. Woodward
SR OPERATIONS COORD 2/5/20
Title Date

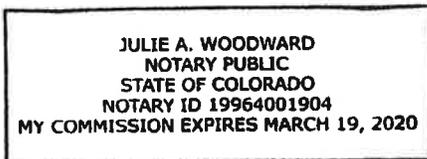


EXHIBIT A

January 22, 2020

Mr. Michael Roman, PE
City of Northglenn
12301 Claude Court
Northglenn, CO 80241

Re: Contract #2019-099 Addendum #1 request for scope of work and design cost for Task C of the original proposal for Community Center Drive bridge rehabilitation in the City of Northglenn

Dear Mr. Roman,

The City of Northglenn (City) has requested Atkins to submit an addendum to the current contract based on design services for Task A and B from the original scope and fee submitted on June 21. The addendum is to add Task C from the original scope and fee for the design and development of construction plans regarding structural repairs to take place on the Community Center Drive Bridge over I-25. It is our understanding that the City would like Atkins to provide an outline of design and construction costs to repair the damage to the bridge abutments and approach slabs observed from previous field meetings. Northglenn would like Atkins to design and provide construction drawings for the repair that will remove damage that has occurred to the structure and a repair that will last the life of the bridge.

Task C – Design, Drawing Development, 95% Submittal and Final Submittal

Scope of Work

The work anticipated in this task are:

- Develop sheets to show demolition and temporary shoring required
- Develop sheets to show the required repairs necessary to fix the current issues brought forth in the Task B report. Any additional design outside of the recommendations in the City of Northglenn Structure Rehabilitation Report dated December 20, 2019, will not be considered as part of Task C.
- Develop sheets to show traffic phasing and detours required for construction of the repairs.
- Develop quantities and cost estimates for the work to be completed.
- Estimated Sheet List to be submitted to the City of Northglenn at 95% and Final Submittal
 - Cover Sheet
 - General Notes and Quantities
 - Traffic Detour Phase I
 - Traffic Detour Phase II
 - Demolition Plan Phase I

- Demolition Plan Phase II
- Demolition Details Sheet 1 of 2
- Demolition Details Sheet 2 of 2 (If Required)
- Abutment Diaphragm Details Sheet 1 of 2
- Abutment Diaphragm Details Sheet 1 of 2 (If Required)
- Wingwall Details
- Bearing Device (Type I) And Jacking Details
- Bearing Jacking Details (If Required)
- Approach Slab Details
- Bridge Expansion Device Sheet 1 of 2
- Bridge Expansion Device Sheet 2 of 2
- Bridge Rail Type 7 Sheet 1 of 2
- Bridge Rail Type 7 Sheet 2 of 2
- Excavation and Backfill Details
- Mechanically Stabilized Backfill

Analysis and Recommendation Assumptions

- Design plans will follow the final recommendation from the report submitted during Task B, additional field visits may be required to review current conditions and take field measurements, and the existing as-built bridge plans dated 9/5/2002.
- Design plans will address the following observed issues:
 - Ends of bridge girders and end diaphragms contacting abutment backwall causing substandard expansion joint width and closure.
 - Excessive concrete cracking and spalling occurring in abutment back wall.
 - Settlement and undermining of bridge approach slabs.
 - Cracking and settlement of current bridge rail.
- Design plans will show traffic phasing and detours during the construction process
- Cost information will be based on the latest CDOT cost data book available via CDOT's website.
- Design for the plans will only involve repairs to the bridge backwall, wingwalls, barriers and sidewalks from the abutment to the end of approach slabs, and replacement of bearing and expansion joints. It will be assumed that any roadway or landscaping elements will be repaired/replaced in kind if the City decides to move forward with repairing the bridge.
- Design for the plans will not include utility relocates, pedestrian railing replacements beyond the deformed sections, and any permanent landscaping or roadway reconfiguration.
- Final drawings for repair will be provided in PDF format and AutoCAD (if requested).

Schedule and Submittals

The anticipated timeline for the design and detail of construction plans is proposed as follows. This schedule is provided as a guide to the City for planning purposes and may be revised or shifted as needed.

- Atkins receives Notice to Proceed.
- Meeting to discuss schedule and deliverables

- Analysis and development of rehabilitation and traffic sheets with 60% over the shoulder review – Approximately three (3) weeks.
- Meeting to address over the shoulder comments (if required)
- Address over the shoulder comments, continue sheet development and create cost estimate for 95% Submittal for the City to review. – Approximately two (3) weeks
- Review and comment period by the City – Approximately two (2) weeks.
- Meeting to address 95% review comments (if required)
- Submit Final recommendation report from Task B, rehabilitation plan set including traffic detour and phasing, and construction estimate to the City – Approximately two (2) weeks.
- Total calendar duration from NTP to Final is assumed to be approximately ten (10) weeks.
- All submittals will be transmitted to the City as PDF's and AutoCAD files (if requested) via email.

Summary

Atkins will move forward with the rehabilitation design and development of structural and traffic control plans based on the City's decision from the report findings from Task B. The design and drawings will be based on current CDOT and AASHTO LRFD design practice unless loading cannot be met. If loading cannot be met the design will revert to the original design code the bridge was designed for. Costs will be based on quantity estimates and CDOT cost data. Atkins will submit a 60% over the shoulder submittal of the rehabilitation and traffic control plans in pdf format for the City to review while continuing to progress the design towards 95%. Any comments submitted by the City between the over the shoulder submittal and the 95% submittal will be addressed at the 95% Submittal. The 95% submittal will include the design plans and cost estimate of the bridge in pdf format. The 95% Submittal review comments will be addressed, and the report, plans and cost estimate will be resubmitted to the City as a Final Submittal. The end deliverables at the Final Submittal will include the Task B report, plans detailing the construction, demolition and traffic phasing in pdf format and AutoCAD files of the plans (if requested).

Task A and B have been completed from the original scope and fee proposal and a rehab recommendations report has been submitted to the City. Atkins would like to ask the City of Northglenn to please consider approving \$65,200 for our design task order to complete the services listed as Task C above. A preliminary construction and traffic control estimate is in the \$760,000 range. After considering our proposed request, if you have any questions or need any additional information, please feel free to contact me via email at brian.gattshall@atkinsglobal.com or by phone at 720.475.7044.

Sincerely,

Atkins



Brian Gattshall, P.E.

Senior Bridge Engineer I

Attachments:

Community Center Drive Bridge over I-25 Rehabilitation Design Cost.PDF

EXHIBIT B - Original Scope of Work dated June 21, 2019

ATKINS	Community Center Drive Bridge over I-25 Rehabilitation Design Cost		
	Exhibit A		
		Calculation by BDG	Date 1/22/2020

Task C Structural Design								
Position	QC Review Structure	Senior Engineer I Structure	Engineer I Structure	CADD Designer I/II	QC Review Traffic	Sr Engineer II Traffic	Engineer I Traffic	Total
Staff	P. Greco	B. Gattshall	J. Smith	D. Delgado	L. Kunselman	L. Lauvray	J. Mitchell	
	4.21%	34.68%	13.04%	40.09%	1.04%	3.80%	3.13%	100.00%
Hours	12	190	100	261	4	20	24	611
Hourly Rate	\$229.00	\$119.00	\$85.00	\$100.16	\$170.00	\$124.00	\$85.00	
Total	\$2,748.00	\$22,610.00	\$8,500.00	\$26,141.76	\$680.00	\$2,480.00	\$2,040.00	\$ 65,200

EXHIBIT B

June 21, 2019

Mr. Michael Roman, PE

City of Northglenn

12301 Claude Court

Northglenn, CO 80241

Re: Request for proposal of Community Center Drive bridge rehabilitation in the City of Northglenn

Dear Mr. Roman,

Based on an email received on May 28, 2019 and a field meeting on June 5, 2019, the City of Northglenn (City) has requested Atkins to submit a scope and fee proposal for the development of recommendations regarding structural repairs to take place on the Community Center Drive Bridge over I-25. It is our understanding that the City would like Atkins to provide an outline of design and construction costs to repair the damage to the bridge abutments and approach slabs observed during the field meeting. Northglenn would like to explore options for the repair to limit additional damage occurring to the structure and a repair that will last the life of the bridge.

Scope of Work

The tasks anticipated in this proposal are:

- Review of the existing bridge plans and latest inspection reports to develop a bullet list of probable bridge issues caused by the details from the original design.
- Review of site visits and inspection photos to develop a bullet list of possible issues that occurred during construction.
- Develop sheets to show the required repairs necessary to fix the current issues and bring the portions of the being replaced bridge up to current code in areas that don't conflict with the existing structure.
- Develop sheets to show construction and traffic phasing required for construction of the repairs.
- Develop quantities and cost estimates for the work to be completed.

Analysis and Recommendation Assumptions

- Recommendations will be based from the latest inspection report dated 6/13/18 (Inspected on 1/10/18), photos and measurements obtained during site visits, and the existing as-built bridge plans dated 9/5/2002.
- Recommendations will address the following observed issues:
 - Ends of bridge girders and end diaphragms contacting abutment backwall causing substandard expansion joint width and closure.

- Excessive concrete cracking and spalling occurring in abutment back wall.
- Settlement and undermining of bridge approach slabs.
- Cracking and settlement of current bridge rail.
- Cost information will be based on the latest CDOT cost data book available via CDOT's website.
- Recommendations will only involve repairs to the bridge structure. It will be assumed that any roadway or landscaping elements will be repaired/replaced in kind if the City decides to move forward with repairing the bridge.
- Drawings for repair will be provided in PDF format and AutoCAD (if requested).

Schedule and Submittals

The anticipated timeline for the completed review and memo is proposed as follows. This schedule is provided as a guide to the City for planning purposes and may be revised or shifted as needed.

- Atkins receives Notice to Proceed.
- Review, analysis and development of a recommendation memo – Approximately three (3) weeks.
- Review and comment period by the City – Approximately one (1) week.
- Analysis and development of rehabilitation sheets, cost estimate and comment resolution for recommendation memo – Approximately six (6) weeks.
- Submit 100% rehabilitation plan set and construction estimate to the City for review.
- Review and comment period by the City – Approximately two (2) weeks.
- Submit Final recommendation memo, rehabilitation plan set, and construction estimate to the City – Approximately two (2) weeks.
- Total calendar duration from NTP to Final is assumed to be approximately fourteen (14) weeks.
- All submittals will be transmitted to the City as PDF's via email.

Task A – Project Management

Atkins may need an additional field visit, but it is anticipated that the review and design period will require minimal coordination with the City. Atkins will continue to work with the City through the different design phases and review process to produce a bid package.

Task B – Review and Recommendations Development

Atkins will develop recommend repairs based on information given in the latest inspection report (dated 6/13/18, inspected 1/10/18), the existing as-built bridge plans dated 9/5/02, and photos and measurements obtained during site visits prior to the first submission of the recommendation. Recommendations will be summarized in text format. Design and construction costs will be based on quantity estimates from the existing plans and CDOT cost data. Discussion will also be provided regarding possible causes of the damage currently noted. The observations and conclusions/recommendations developed under this Agreement are based solely on elements of the existing information and construction exposed to view on the dates indicated, unless herein noted otherwise. No liability is assumed by Atkins, expressed, implied or otherwise, for the condition of elements not exposed to view, nor for any recommended repair that may or may not be undertaken as a result of Atkins' reliance on this information or inspections.

Task C – Review, Design, Drawing Development and 100% Submittal

Atkins will address the memo review comments and proceed with design and development of rehabilitation plans based on the City's decision. The design and drawings will be based on current CDOT and AASHTO LRFD design practice unless loading cannot be met. Costs will be based on quantity estimates and CDOT cost data. Atkins will resubmit the recommendation memo as well as plans and cost estimate for the 100% Submittal. The 100% Submittal review comments will be adequately addressed, and the memo, plans and cost estimates will be resubmitted to the City as Final.

Task D – Construction Management/Special Inspection of Proposed Work

Atkins Construction Management (CM) group has qualified individuals that will insure the work is proceeding smoothly during every aspect of the construction phasing. A cost estimate will be included in recommendations memo if the City decides to use Atkins for CM work.

Summary

Given the items listed above, Atkins would like to ask the City of Northglenn to please consider approving \$17,000 for our design task order to complete the services listed as Task A and B above. A preliminary rough construction estimate is in the \$400,000 to \$500,000 range. After considering our proposed request, if you have any questions or need any additional information, please feel free to contact me via email at brian.gattshall@atkinglobal.com or by phone at 720.475.7044.

Sincerely,

Atkins



Brian Gattshall, P.E.

Senior Bridge Engineer I