

REQUEST FOR PROPOSAL

Book 1

Scope of Work Basic Contract

Construction Manager/General Contractor (CMGC) Services

CONTRACT DATE:

PROJECT NUMBER: IM 0703-348

PROJECT LOCATION: 2400 Medium Volt MCC Replacement

PROJECT CODE: 17148

March 11th, 2010

Table of Contents

Title Sheet	1
Table of Contents	2
1.0: Project Summary and Key Events Schedule	3
2.0: Project Specific Information	6
3.0: Referenced Items Needed by the Contractor.....	8
4.0: Existing Features	9
5.0: Project General Information.....	11
Appendix A – Scope of Work	14
Appendix B – Scope of Work Preconstruction Responsibilities	18
Appendix C – References.....	28
Appendix D – Definitions.....	30

1.0: PROJECT SUMMARY AND KEY EVENTS SCHEDULE

NOTE: Contractors delivering their proposals in person must check into CDOT's Headquarters Building before being allowed to proceed to the Agreements Branch to submit their proposals CDOT reserves the right to reject any and all proposals or parts thereof, and to waive informalities or irregularities.

By submission of a proposal, the Contractor agrees to the State of Colorado terms and conditions.

Region 1 of the Colorado Department of Transportation (CDOT) is requesting proposals from qualified individuals and/or firms interested in providing CM/GC services, herein referred to as the Contractor, who will partner with the design team on this project. As part of the design team the selected contractor will provide input on schedule, phasing, constructability, cost and estimates, value engineering, and plan review throughout the design process.

In addition to aiding the design process the selected Contractor will be asked to prepare and submit a Guaranteed Maximum Price (GMP) for the labor, equipment, and materials that will be required to construct the project based on the design process, plans, specifications, and estimate packages after the FOR (Final Office Review) of the project.

If the GMP is accepted by CDOT, a Notice to Proceed will be issued to the Contractor after the completion of the Pre-Construction Phase so that construction of the project can begin.

If the GMP is not accepted by CDOT, CDOT reserves the right to end the Contractor's participation in the project development process at the completion of the design phase and advertise the project. If the project is advertised for competitive low-price bids, the Contractor will not be allowed to submit a competitive bid for the project.

Although the selected Contractor will be contracted for both the design and construction services of this project through this selection process, the selected Contractor is not guaranteed to receive a Notice to Proceed to perform the construction if services are terminated at the completion of the design phase.

Please read Book 1 and Book 2 of the Request for Proposal (RFP) thoroughly before responding. Telegraphic or electronic bids (Facsimile, Western Union, Telex, email, etc.) will not be accepted directly in CDOT's Agreements Branch Office. Illegible responses may be rejected as non-responsive.

1.1 Project Information

- **Project Number:** IM 0703-348
- **Project Location:** 2400 Medium Volt MCC Replacement, Eisenhower Johnson Memorial Tunnels
- **Sub-account Number:** 17148
- **Requested Services:** Construction Manager/General Contractor (CM/GC)
- **Source(s) of Funding for CM/GC Contract:** FHWA and Senate Bill 1

1.2 CDOT Project Management and Coordination:

The Contract Administrator for this project is:

Mark Vessely, P.E.
Resident Engineer
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5601
Fax: (303) 512-5675
Mark.Vessely@dot.state.co.us

CDOT Project Management Team and Point of Contact:

Benjamin Acimovic, P.E.
Project Manager/Project Management Team
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5814
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Benjamin.Acimovic@dot.state.co.us

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Project Management Team
P.O. Box 399, Dumont, CO 80436
Telephone: (303) 512-5682
Fax: (303) 512-5675
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Project Coordination:

- CDOT Project Management Team
- CDOT Tunnel Maintenance Staff
- Selected Project Design Consultant
- Selected Project GMGC Contractor
- Federal Highway Administration (FHWA)
- The Contractor shall partner with the Design Consultant, CDOT Management Team, and the CDOT Tunnel Maintenance Staff as part of the design team.

1.3 Key Events Schedule:

A. Public Notice Phase

- First Advertisement: March 11th, 2010
- Mandatory Pre-Proposal Meeting: March 29th, 2010

A mandatory Pre-Proposal Meeting will be held at **9:00am on Monday March 29th, 2010** in the Auditorium at CDOT Headquarters, 4201 East Arkansas Ave., Denver, CO, 80222. Sign-in and attendance at the Pre-Proposal Meeting is required in order to submit a proposal.

B. Short List Phase

- Submission of Statement of Interest (SOI)/Proposal April 8th, 2010

Deliver **six (6)** hard copies along with **one (1)** electronic copy PDF file on a CD or flash drive of the SOI/WP to the Colorado Department of Transportation Contracting Office Randy Perkins, 4201 Arkansas Ave. 4th Floor, Denver, Colorado 80222.

- Short List Panel Meeting April 19th, 2010
- Short List Approval April 26th, 2010
- Notification of Short List Candidates April 26th, 2010

C. Selection Phase

- Selection Panel Meetings (Interviews) May 6th, 2010
- Chief Engineer/Approval May 13th, 2010
- Contractor Notification May 20th, 2010

D. Contract Approval/Execution

June 17th, 2010

2.0: PROJECT SPECIFIC INFORMATION

2.1 Project Background

The Eisenhower Johnson Memorial Tunnel (EJMT) is administered by CDOT and is a main artery for commercial transport and public travel on Interstate 70. The tunnel was constructed in two phases: The westbound bore or North Tunnel was completed in 1973 and the eastbound bore or South Tunnel was completed in 1979. The tunnel is located in the Colorado Rocky Mountains at an elevation above 11,000 feet.

In 2006 an electrical inspection report by Parsons Brinkerhoff Quade & Douglas, Inc. evaluated the electrical equipment at the EJMT and identified equipment that required replacement. Following the recommendations of that report, CDOT recently replaced the 480V motor control switchgear for the north bore of the EJMT. The replacement of the 2400V motor control centers (MCC) for the south bore was the next proposed equipment replacement. The motor control centers serve the supply and exhaust ventilation fans inside each bore of the EJMT.

Hatch Mott MacDonald and Parsons produced a conceptual design for the replacement of the 2400v motor control centers, provided a white paper studying the feasibility of sole sourcing the MCC equipment, and issued a preliminary report that evaluated replacement options. Their report evaluated each options of 4 options based on constructability, safety, operational capability, maintainability, space planning, cost, and impact to future construction schedules.

Following these reports and the completion of the conceptual design, CDOT evaluated multiple methods for project delivery. The previous 480V MCC switchgear replacement project was performed under the traditional design-bid-build. When compared to design-bid-build, the Construction Manager/General Contracting (CM/GC) method offers CDOT more contractor involvement in the design. Due to the operational, safety, and logistical restrictions in the East and West Portal ventilation rooms and the control that is required to be maintained by the tunnel operations staff, CDOT eliminated design-build as a delivery choice. After comparing the pros and cons of each delivery method, the CDOT Project Management team found that CM/GC was the most suitable method for this project.

2.2 CM/GC Introduction

CM/GC is a contracting method that involves the Contractor in the design process. The intent is to form a partnership with CDOT, the Design Consultant, and the Contractor. The goals of this partnership are to mitigate risk, improve the construction schedule, streamline the design process, and produce a project that adheres to the budget. An important role of the Contractor is to help acquire the constructability information to reduce risk in the design and construction phase. We anticipate the involvement of the Contractor will help reduce errors in design, improve constructability and meet budget goals.

The Design Consultant relies on the expertise of the Contractor to deliver an improved product in less time and at a lower cost than design-bid-build construction processes. The Design Consultant relies on the Contractor for the following expertise during the pre-construction phase:

- The skills and knowledge to estimate the quantities of materials, labor, and equipment needed for construction.
- The skills and knowledge to determine the tasks (work breakdown structure) needed to complete the Project and estimate the costs, duration, and sequence of these tasks.
- An understanding of the availability, cost, and capacities of materials, labor, and equipment.
- The skills and knowledge to identify potential risks (including financial risks) and methods to mitigate them during the design process.
- Provide information on constructability, phasing, and provide other design input.

At the Request for Proposal (RFP) stage, the Contractor shall provide CDOT with a preliminary estimating model for estimating Project costs. The accepted estimating model will serve as a basis for all Opinion of Probable Construction Cost (OPCC)

estimates in the program and the development of the proposed Guaranteed Maximum Price (GMP) at an agreed design milestone. The initial OPCC will be delivered within 60 days of Notice to Proceed.

During the design process the Contractor works with the Consultant and the CDOT Project Management Team to:

- Identify and mitigate risks.
- Continually update the project estimate.
- Participate in up to three formal reviews of the design at designated design milestones.
- Participate in risk analysis workshops at agreed-upon milestones.
- Provide up to three progressively refined OPCCs (estimates) at designated design milestones.
- Continually provide informal input on constructability, value engineering, and cost as requested.
- Provide open-book examination of cost model by CDOT, the program manager, and the designer.
- Prepare a Guaranteed Maximum Price (GMP) Proposal to CDOT with appropriate backup documentation.

Because this approach minimizes risk, the construction cost is expected to be less than with conventional design-bid-build projects. If the Contractor is awarded the fixed-price construction Contract, their role will be to construct the Project within the GMP and propose solutions that will help achieve the goal of staying within the budget. If the Project cannot be delivered within the allocated budget, CDOT retains the option to cancel the Project, reduce the scope, or deliver the Project by other means. Early phasing may be considered for early procurement of long lead items or for long lead tasks that can be completed and turned over to another Contractor should negotiations for final construction cease. Early utility construction may be considered with the understanding that early phases are not a guarantee of selection for final construction. Early phases must be independent and severable from the final construction. Final construction will not begin until the design phase is substantially complete.

2.3 CM/GC Proposal Instructions

Instructions on preparing a Statement of Interest (SOI)/Proposal for this project are found in Book 2 of this Request for Proposal.

2.4 Project Scope of Work and Pre-Construction Activity List

The Contractor's Scope of Work is described in detail in Appendix A of Book 1 of the RFP. Appendix B lists the responsibilities of all project team members including CDOT, the Contractor, and the Design Consultant.

3.0 REFERENCED ITEMS NEEDED BY THE CONTRACTOR

3.1 CDOT Standards, Manuals, specifications, etc.

The Contractor shall obtain and utilize the most recent CDOT adopted references including standards and specifications, manuals and software or as directed by the CDOT/PM.

3.2 Applicable Design Standards

The following standards are applicable:

- Institute of Electrical and Electronic Engineers (IEEE);
- National Electrical Manufacturers Association (NEMA);
- National Electric Code (NEC) (NFPA 70);
- American National Standards Institute (ANSI);
- International Electrotechnical Commission (IEC);
- Underwriters' Laboratories, Inc. (UL);
- American Society for Testing and Materials (ASTM);
- National Electrical Safety Code (NESC);
- Occupational Safety and Health Administration (OSHA); and
- InterNational Electrical Testing Association (NETA)

3.3 References and Definitions

Project relevant references and definitions are located in Appendix C and D of this RFP. Additional references and definitions may be added if required or identified as vital to the project goals.

4.0: EXISTING FEATURES

4.1 Existing Conditions

The existing Johnson (South Tunnel) tunnel ventilation system consists of twelve fans, six supply and six exhaust, that are housed in East and West ventilation equipment rooms located at each end of the portal.

The South Tunnel ventilation fans are 2400V dual speed motor driven fans that have four operational speeds and are utilized for pollution ventilation and fire smoke control. There are four 2400V Motor Control Cabinets (MCC), two in each of the electrical equipment rooms. The MCCs have two speed, two winding starters for the 24 motors that support the 12 fans. The MCCs were manufactured by General Electric (GE). They are over 30 years old and are approaching the end of their determined useful life cycle.

The East electrical equipment houses three supply fan and three exhaust fan MCCs (each bank of three fans will be referred to as a single MCC line-up). This arrangement is replicated at the West Portal electrical room. Each fan is driven by two dual-speed motors, with motor one rated 600/100 HP and the second motor rated 200/25 HP.

The existing 2400V MCC line-up have been modified to include additional feeder circuits that provide feeds to transformers and distribution circuits in the tunnels cross cut electrical spaces. These circuits supply 277V tunnel lighting circuits. Part of the tunnel lighting is fed from the North Tunnel 480V system and part from the South Tunnel 2400V.

Refer to drawings 239141-E-303 East End Option 2 and 3 2400V MCC Location Plan and 239141-E-302 West End Option 2 and 3 2400V MCC Location Plan for layout of the existing MCC line-ups at the East and West electrical equipment rooms.

4.2 Existing Tunnel Ventilations Operation

The EJMT Fire Emergency Ventilation Study identifies the following modes of operating the ventilation system:

- Under conditions of good visibility, Monday to Friday, tunnel operators switch on two of the 200/25HP fans at the 25HP speed. During poor visibility and on Sundays and Holidays all 12 fans 600/100HP are operated at 100 HP;
- Ventilation requirements in the South (Johnson) Tunnel are generally lower than in the North (Eisenhower) Tunnel. A prevailing West to East wind moves in the direction of traffic in the South Tunnel and contributes to the tunnel ventilation.

4.3 Existing Tunnel Ventilation Restrictions

Tunnel operations must be maintained at all times. Based on the configuration above, one exhaust fan per MCC line-up and one intake fan per MCC line-up only may be out of service for extended periods for one end of the tunnel. The EJMT Tunnel Operations staff have confirmed the following operational restrictions for the existing tunnel ventilation system:

- If one of the three fans in an MCC line-up is out of service, smoke will be controlled by use of the remaining two fans in the line-up;
- Having one fan down per MCC line-up is acceptable (e.g. West Supply 5 and West Exhaust 5);
- A complete outage of any one complete MCC line-up should not exceed 10 hours. Only one complete MCC line-up per ventilation building is acceptable, and
- MCCs outages need to be planned to occur during weekdays to minimize the impact on tunnel users during high traffic volume periods.

It is noted that the East end MCC cubicle line-up has a spare cubicle. To achieve compatibility of floor space and cable connections, it is recommended that a spare cubicle will be also added to the new MCC. By NEC standards, 2400V MCCs require a clearance of 4 feet live to ground clearance and 5 feet live to live.

**Note: This information is available in the Eisenhower/Johnson Memorial Tunnel 2400V Medium Switchgear Conceptual Design Evaluation – Preliminary Report. Copies of this document may be obtained from Consultant Management section on the CDOT external website at <http://www.dot.state.co.us/Consultants/>.

4.4 Existing Utilities

Complete utility information will be available at the Design Workshop after selection of the Contractor and the Consultant for this project is complete and Notice to Proceed has been issued. For all information on the existing utilities in the EJMT that will be impacted by this project please contact Benjamin Acimovic at (303) 512-5814

5.0: PROJECT GENERAL INFORMATION

5.1 Notice to Proceed

Work will not commence until the written Notice-to-Proceed is issued by CDOT with certification from the Contractor that the work will be completed within the allotted time. Work may be required, night or day, on weekends, on holidays, or on split shifts. CDOT must concur in time lost reports prior to the time lost delays being subtracted from time charges. Subject to CDOT prior approval the time charged may exclude the time lost for:

- Reviews and Approvals.
- Response and Direction.

5.2 Project Coordination

5.2.1 Routine Working Contact

The routine working contact will be between the CDOT Project Manager (CDOT/PM), the Design Consultant Project Manager (C/PM), and the Contractor Project Manager (CMGC/PM).

5.2.2 Project Manager Requirements

Each Project Manager will provide the others with the following:

- A written synopsis or copy of their respective contacts (both by telephone and in person) with others.
- Copies of pertinent written communications.

5.3 Routine Reporting and Billing

The Contractor will provide the following on a routine basis:

Coordination:

Coordination of all contract activities will be conducted by the CDOT/PM. The CMGC/PM shall keep regular contact with the C/PM and the CDOT/PM on a weekly basis.

Periodic Reports and Billings:

The periodic reports and billings required by CDOT Procedural Directive 400.2 (Monitoring Consultant Contracts).

General Reports and Submittals:

In general, all reports and submittals must be approved by CDOT prior to their content being utilized in follow-up work effort.

5.4 Personnel Qualifications

The Contractor Project Manager (CMGC/PM) must be approved by the CDOT Contract Administrator. Certain tasks must be done by Licensed Professional Engineers (PE) or Professional Land Surveyors (PLS) who are registered with the Colorado State Board of Registration for Professional Engineers and Land Surveyors.

National Institute for Certification in Engineering Technology (NICET) or other certifications may be required for project inspectors, electrical technicians, and testers.

5.5 CDOT: Computer/Software Information

The Contractor shall utilize the most recent CDOT adopted software. The primary software used by CDOT is as follows:

- | | |
|-------------------|--|
| 1. Estimating | Microsoft Excel 2007 spreadsheet or other compatible estimating software |
| 2. Scheduling | Microsoft Project 2007 |
| 3. Specifications | Microsoft Word 2007 |

5.6 Project Design Data and Standards

General:

Appendix D is a list of technical references applicable to CDOT work. The Contractor is responsible for ensuring compliance with the latest CDOT adopted version of the listed references. Conflicts in criteria shall be resolved by the CDOT/PM.

Construction Materials/Methods:

The materials and methods specified for construction will be selected to minimize the initial construction and long-term maintenance cost to the State of Colorado. Non-typical construction materials and methods must be approved in writing by CDOT.

5.7 RFP Dates

Contractors are required to meet the dates set for the SOI/WP submission, the oral interviews, and negotiation meeting. Contractors are also required to meet the information submittal dates outlined in the summary sheet. Failure to meet these dates will result in the Proposal being considered non-responsive.

5.8 Required Availability of Key Personnel

When Contractors list personnel in the Project Management Team/Capability of the Contractor section of the Proposal, the Contractor is agreeing to make the personnel available to complete work on the Contract at whatever level the Project requires. Personnel changes will be reviewed by CDOT's Project Manager to assure the replacement is equally qualified and has adequate experience. CDOT will only allow changes in key personnel when caused by circumstances outside the control of the Contractor (i.e. employee leaves employment with the Contractor). Changes in key personnel for the convenience or benefit of the Contractor will not be allowed. Key personnel will consist of the list presented in Project Management Team/Capability of the Contractor section of the Proposal.

5.9 Applicable Federal and State Regulations

The Contractor shall conform to all applicable State and Federal regulations including Title VI of the Civil Rights Act of 1964, DBE Bid Conditions, and recognized industry, safety, environmental and design standards.

5.10 Debarment Certification

Federal and State regulations require certification by prospective participants (including contractors, subcontractors, and principals) as to current history regarding debarment, eligibility, indictments, convictions, or civil judgments. The selected Contractor will be required to certify in accordance with Contract Standard Terms and Conditions.

5.11 Required Proposal Contents

The Proposal from the Contractor should contain the information identified in the Request for Proposal Book 2 Statement of Interest (SOI)/ Proposal Instructions.

5.12 Proposal Evaluation Procedures

The Proposal shall be evaluated by a CDOT selection board.

5.13 Conditions of the Proposal

All costs related to the preparation of the Proposal and any related activities such as interviews are the sole responsibility of the Contractor.

5.14 Organizational Conflicts and Ineligible Firms

The Contractor will include a full disclosure of all potential organizational conflicts or interest in the Proposal.

By submitting its Proposal, each Contractor agrees that, if an organizational conflict of interest is thereafter discovered, the Contractor will make an immediate and full written disclosure to CDOT that includes a description of the action that that the Contractor has taken or proposes to take to avoid or mitigate such conflicts. If an organizational conflict or interest is determined to exist, CDOT may, in its discretion, cancel the Contract. If the Contractor was aware of an organizational conflict of interest prior to the award of the Contract and did not disclose the conflict to CDOT, CDOT may terminate the contract for default.

No firm that is ineligible for State contracts may be part of any Contractor. Each Contractor is responsible for determining eligibility of its team members.

5.15 Bidding and Award of the Construction Contract

Contractor will prepare and submit electronic bid documents for the GMP submittal and shall meet the requirements for Prequalification on projects valued at \$1,500,000 to \$5,000,000 per the CDOT Rules for Prequalification, Debarment, Bidding, and Work on Colorado Department of Transportation Road, Highway and Bridge Public Projects.

5.16 Construction Contract Bonds

Provide a letter from a surety company indicating that the Contractor is capable of obtaining Payment and Performance Bonds covering Project No. IM 0703-348 (17148); 2400V Medium Voltage Switchgear, for at least \$2,750,000. The surety submitting the letter must be a surety company or companies licensed by the State of Colorado and listed in the current United States Department of the Treasury Circular 570 as acceptable sureties for the bond amount on Federal Bonds. Letters indicating "unlimited" bonding/security capability are not acceptable.

Performance and Payment Bonds will be required at the time the Guaranteed Maximum Price is accepted. The final value of the Bonds will equal the negotiated amount of the negotiated GMP.

APPENDIX A: CM/GC SCOPE OF WORK

A.1 Project Background

The project background is as described above in Section 2.0.

A.2 Project Description

During pre-construction, the Contractor shall assist and partner with CDOT and the Consultant in developing the design and arriving at a Guaranteed Maximum Price (GMP) as described in these documents.

A.3 Project Goals

This project is intended to produce the following improvements:

1. To produce the final design and specifications for the replacement of the 2400v Motor Control Cabinets (MCC's) at the EJMT.
2. To replace the 2400 medium volt motor control centers (MCC).
3. To facilitate and foster collaboration, communication, and partnership with all members of the project team.
4. Encourage Innovation and value engineering.
5. Accelerate Delivery of the Design and Construction Schedules.
6. Zero Change Orders on CM/GC Project.
7. To successful deploy the CM/GC method on a CDOT project.

A.4 Planned Improvements

This project is located on I-70, at milepost 213.651, in Summit County. The project will be located inside the EJMT (Eisenhower Johnson Memorial Tunnels) in the electrical control areas for the south bore.

A.5 Project Costs

The construction cost of this project is estimated to be between \$1,000,000 and \$2,750,000. The final negotiated GMP will determine the actual cost of the project construction.

A.6 Work Duration

The time period for the work described in this scope is approximately 120 days for design and 240 days for construction.

A.7 Work Product

The Contractor work products are:

1. Constructability Reports
2. As-Built Verification Review
3. Cost Savings Reviews
4. Value Engineering Proposals

5. Preliminary Construction Schedules
6. Construction Phasing Plans
7. FIR Plan Set and Specifications Review
8. FOR Plan Set and Specifications Review
9. Final Plan Set and Specifications Review
10. Formal Written Reviews for each Plan Set Review
11. 3 Opinion of Probable Construction Cost Estimates
12. GMP Proposal

A.8 Work Product Completion

All submittals, reports, and reviews must be accepted by the CDOT Contract Administrator or designee.

A.9 Additional Project Information

Additional information regarding this project is included in the following documents:

[List available pertinent documents]

1. Eisenhower/Johnson Memorial Tunnel 2400V Medium Voltage Switchgear Conceptual Design Evaluation (Hatch Mott Macdonald (September 2009)
2. Eisenhower/Johnson Memorial Tunnel Power Study (PB Americas for Colorado Department of Transportation (May 2007)
3. White Paper – Sole Sourcing of MCC Equipment (July 9, 2009)
4. Electrical Inspection Report Vol I, Parsons Brinkerhoff Quade & Douglas, Inc. (June 2006)
5. 2400V MCC 15% Plan Set
6. I-70-3(80) 220 As-Builts (EJMT Tunnel) Plan Set

Copies of these documents may be obtained from Consultant Management section on the CDOT external website at <http://www.dot.state.co.us/Consultants/>.

A.10 Scope of Work

This draft scope of work has been reviewed by CDOT and reflects a plan of approach based on the known goals. One factor determining the selection of CM/GC is the ability of that Contractor to analyze the project goals, evaluate the work elements, and formulate a proposal. This process may produce new approaches or modification to the project work elements. Because of that, all Contractors should be aware that the Final Scope of Work for a project will be produced with input from the selected Consultant and the selected Contractor.

The Contractor will be part of the design team. As part of the design team, the Contractor will provide input on schedule, phasing, constructability, material availability, and cost throughout the design phase of the project. The Contractor tasks during the design phase include:

1. The Contractor shall attend initial project workshop. The Contractor shall be introduced to the project, the stakeholders, the EJMT Staff, the CDOT Project Team, and the Consultant Designer. This workshop includes the following tasks:
 - a. Introduction to the project, the project team, and the project stakeholders.

- b. Project status, goals, objectives, funding, preliminary schedule, etc.
 - c. Presentation of project elements
 - d. Identifying project risks and developing an initial risk management plan
 - e. Project site and equipment tour
 - f. Scheduling of bi-weekly project, FIR, and FOR meetings
 - g. Question and Answer Session
2. The Contractor shall partner with the Consultant Designer, CDOT Project Team, and EJMT Staff as part of the design team. As part of the design team the Contractor will provide input on schedule, phasing, constructability, materials and equipment availability, cost, etc throughout the design process. To facilitate partnering during design, CDOT anticipates co-locating the CDOT Project Manager, a representative from the Consultant Designer, and a representative of the Contractor at a location in Golden, the EJMT, or other location agreed to by these individuals.
 3. The Contractor shall check and field verify all applicable as-built plans of the Eisenhower Johnson Memorial Tunnels (EJMT) that concern the replacement of the 2400v Motor Control Centers.
 4. The Contractor shall be required to prepare quantity and Opinion of Probable Construction Cost estimates during the course of the design phase.
 5. The Contractor shall be required to attend all project design team meetings. Project team meetings will be held to discuss project status, determine quantities, resolve issues, and coordinate work load. These meetings include:
 - a. Bi-weekly Project Team Progress Meetings
 - b. FIR (Field Inspection Review)
 - c. FOR (Final Office Review)
 - d. GMP (Guaranteed Maximum Price) Negotiation Meeting
 6. The Contractor shall be required to attend all plan submittal meetings and provide written comments on the design plans. Written comments shall be provided prior to or at the plan submittal meetings. Plan submittals include but are not limited to: FIR (30%), FOR (90%), Final PS&E (100%) and any utility relocation submittals. Comments should be related to constructability, clarifications, design errors or omissions, affect on schedule, affect on cost, or value engineer suggestions/recommendations.
 7. The Contractor shall provide and develop plan, specification, estimate reviews, and the following deliverables:
 - a. Constructability Reports
 - b. Cost Savings Reviews
 - c. Value Engineering Proposals
 - d. Best Value Recommendations
 - e. FIR Plan Set and Specifications Review
 - f. FOR Plan Set and Specifications Review
 - g. Final Plan Set and Specifications Review

- h. Formal Written Reviews for each Plan Set Review
 - i. Review and confirm all quantities on the project for use in GMP pricing
 - j. GMP Proposal and Electronic Bid Submittal (EBS) submittal.
8. Identify areas of potential risks. Participate in risk meetings and provide input on methods to reduce risks. Participate and provide input in assigning risk responsibility.
 9. The Contractor shall be required to prepare construction schedules and construction phasing. The Contractor will update both schedules and phasing throughout the design phase.
 10. The Contractor shall be required to prepare quantity and cost estimates during the course of the design phase. These will be Opinion of Probable Construction Cost Estimates that will follow the Contractor's proposed cost model.
 11. The Contractor shall verify quantities of the construction package. The Consultant will provide quantities as part of the design process. Provide an independent review and acceptance of quantities to achieve GMP.
 12. The Contractor shall provide recommendations to achieve the CM/GC goal of zero change orders.
 13. The Contractor shall participate as determined in project action teams
 - a. Track and document risk and its cost and schedule impacts
 - b. Track and document innovation and its cost and schedule impacts
 14. CDOT may request the Contractor to submit a bid on early action items or for the acquisition of long lead items. CDOT and the CM/GC shall enter into negotiations for the construction of the contract when both the contractor and CDOT agree the design has progress to the appropriate level. If negotiations for a final construction price and the schedule are not successful, CDOT reserves the right to place the project for open bid. In this case the Contractor shall be compensated for their preconstruction services, and CDOT will have no further obligations to the Contractor.
 15. The Contractor shall submit a GMP proposal and an Electronic Bid Submittal (EBS).
 16. The Contractor shall ensure all environmental, safety, and permit commitments that are specified in the plans, specifications, and contract documents are implemented during construction if the GMP is accepted by CDOT.

APPENDIX B: SCOPE OF WORK PRECONSTRUCTION ACTIVITIES

This list establishes the Contractor's collaborative or full responsibility for and participation in the tasks which are indicated below by an 'X' in the Contractor column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Selected work tasks shall be assigned only after coordination and consultation with CDOT and the selected Consultant firm. The Contractor should review this entire section to identify applicable material. Contact the Colorado Department of Transportation/Project Manager (CDOT/PM) if clarification is required.

The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice should be planned by the appropriate responsible party and coordinated with all team members. The time of their accomplishment will overlap and parallel paths of activity should be planned to finish the development phase in accordance with the shortest possible schedule. The type and number of meetings, documents, etc., will depend on the category and characteristics of the project work. A proposal shall be developed by the Contractor which satisfies the requirements of the project development. This plan must be approved by the Contract Administrator before starting the work.

B-1: PROJECT INITIATION AND CONTINUING REQUIREMENTS

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
1. Initial Project Scoping Meeting (Workshop)	__X__	__X__	__X__
Identify scope elements, responsibilities and coordination necessary to complete the work.			
1. Project site tour and equipment inspection	__X__	__X__	__X__
2. Project Status, Goals, Elements, Objectives, Schedule Review	__X__	__X__	__X__
3. Identify Project Risks and Develop Initial Risk Management Plan	__X__	__X__	__X__
4. Review applicable environmental documents	__X__	__X__	__X__
5. Independent Design and Applicable As-Built Review	_____	__X__	__X__
6. Develop a Project Schedule and Assign Tasks	__X__	__X__	__X__
7. Schedule bi-weekly progress meetings, FIR, FOR, and Milestones	__X__	__X__	__X__
8. Identify Design Criteria	__X__	__X__	__X__
9. Discussion of possible early delivery items	__X__	__X__	__X__
10. Question and Answer Session	__X__	__X__	__X__
2. Progress Meetings			
a. CDOT, Contractor, and Design Consultant Project Managers	__X__	__X__	__X__

The managers will meet periodically as required (typically at two-week intervals). These progress meetings will be used to coordinate and track the work effort and resolve problems. The meetings will review the following:

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
2. Provide construction plans, specifications, and cost estimates at FIR, FOR, and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT).	_____	_____	___X___
3. Plot/Develop all required information on the plans in accordance with all applicable CDOT policies and procedures and all included industry standards for electrical design.	_____	_____	___X___
4. Use design model/plans to produce preliminary quantities	_____	_____	___X___
d. Constructability Reviews and Reports	_____	___X___	_____
e. Construction Phasing Plan	_____	___X___	___X___
A construction phasing plan shall be developed for all projects which integrates the construction of all the project work elements into a practical and feasible sequence.			
f. Value Engineering Proposals	_____	___X___	_____
g. Cost Savings Reviews	_____	___X___	_____
h. Preliminary Construction Schedule	_____	___X___	_____
i. Long Lead Time GMP Submission and Proposal	___X___	___X___	_____
j. Long Lead Time Negotiations	___X___	___X___	_____
k. Long Lead Time Item Procurement	___X___	___X___	_____
l. Opinion of Probable Construction Cost Estimate (FIR)	_____	___X___	_____
2. Preparation for the FIR (Field Inspection Review)	___X___	___X___	___X___
a. Coordinate, complete, and compile the plans with inputs from other branches: materials, hydraulics, environmental, traffic, right of way, maintenance, safety, and Staff Bridge if applicable.	___X___	_____	___X___
b. Prepare the preliminary cost estimate for work described in the FIR plans based on estimate quantities.	_____	___X___	___X___

	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
c. The FIR plans and specifications shall comply with CDOT Requirements and shall include: title sheet, typical sections, General notes, plan/profile sheets, and preliminary layouts.	_____	_____	___X___
d. The following items will be mandatory for the FIR plans:			
• Preliminary Electrical Wiring Diagrams			
• Cabinet Design			
• All applicable Electrical Design			
e. The plans shall be submitted to the CDOT/PM and the GMGC/PM for preliminary review at least one week prior to the FIR.	___X___	_____	___X___
f. The plans will be reproduced by CDOT.	___X___	_____	_____
g. The CDOT Project Management Team and the Contractor will provide written reviews of the FIR PS&E package.	___X___	___X___	_____
h. The Construction Phasing will be included in the FIR plan Set.	_____	___X___	___X___
i. Prepare FIR Estimates.	_____	_____	___X___
j. Prepare FIR Opinion of Probable Construction Cost Estimate.	_____	___X___	_____
k. CDOT Form 1048 – Project Scoping Procedures Completion Checklist.	___X___	_____	_____
3. Field Inspection Review	___X___	___X___	___X___
a. Attend the FIR			
b. The FIR meeting minutes shall be prepared by the CDOT/PM and distributed as directed.			
c. The FIR original plan sheets shall be revised/corrected in accordance with the FIR meeting reviews and comments within thirty (30) working days.			
d. Design decisions concerning questions and comments received at the FIR will be resolved in cooperation with the CDOT/PM, C/PM, and the CMGC/PM. The C/PM shall document the decision and transmit the documentation to the CDOT/PM for approval.			
e. A list of all deviations from the standard design criteria along with written justification for each one shall be submitted to the CDOT/PM.			
4. Post-FIR Revisions and Memo	_____	_____	___X___

The Design Consultant shall complete the revisions required by the FIR before this phase of work is considered to be complete. A Post-FIR memo will be produced by the Consultant to document and confirm that the changes discussed at the FIR have been completed and integrated into the design.

<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
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B-3: FINAL DESIGN

1. Final Design	___X___	___X___	___X___
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CDOT/PM will coordinate all design activities with required CDOT specialty units, tunnel staff, the Contractor, the Design Consultant, and other outside entities. Design Consultant is responsible for the electrical design, plans, specifications, and estimate packages at each formal review.

2. Electrical Engineering and Design	_____	___X___	___X___
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a. Utility Coordination	_____	_____	___X___
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b. Electrical Design and Systems Integration Development	_____	_____	___X___
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c. Electrical Design	_____	___X___	___X___
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1. Provide construction plans, specifications, and cost estimates at FIR, FOR and AD stages of design development necessary for the bidding of replacement of the 2400v Motor Control Centers (MCC) and all associated Control wiring at the Eisenhower Johnson Memorial Tunnels (EJMT).	_____	_____	___X___
--	-------	-------	---------

2. Plot/Develop all required information on the plans in accordance with all applicable CDOT policies and procedures and all included industry standards for electrical design.	_____	_____	___X___
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3. Use design model/plans to produce preliminary quantities.	_____	_____	___X___
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4. Plans should include all of the following that are applicable:

- a. *Circuit type and voltage of power source*
- b. *Location of power source (coordinated with the utility engineer)*
- c. *Size and location of electrical conduit*
- d. *Locations of power sources(s)/lighting control center(s) (if appropriate)*
- e. *Location of direct burial cable*
- f. *Size of wiring and/or direct burial cable*

d. Constructability Reviews and Reports	_____	___X___	_____
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e. Value Engineering Proposals	_____	___X___	_____
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f. Cost Savings Reviews	_____	___X___	_____
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g. Tentative Construction Schedule	_____	___X___	_____
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	<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
3. Project Review	___X___	___X___	_____
a. Update Project Schedules (Construction and Design)			
b. Coordination of Activities			
c. Finalize design decisions, variances, and justifications			
4. Materials Engineering (Electrical):	_____	___X___	___X___
Finalize and provide the justification report for the sole sourcing Of the MCC switchgear (if required).			
5. Construction Phasing Plan	_____	___X___	___X___
A final construction phasing plan will be developed which integrates the construction of all project work elements into a practical and feasible sequence.			
6. Obtain permits	___X___	___X___	_____
This activity is concurrent with final design and must be completed prior to the advertisement for construction. Coordinate between the agencies, the Region Environmental Manager and the CDOT/PM and prepare and submit application and design information to the Region Environmental Manager to obtain all applicable permits. Obtaining all other required permits will be designated the responsibility as per the CDOT standards and specifications			
7. Plan Preparation for the Final Office Review	___X___	___X___	___X___
a. Coordinate packaging of the plans.	___X___	___X___	_____
Collect plans from all design elements and collate the plan package.			
Include all applicable items listed in the Project Development Manual.			
Calculate plan quantities and prepare the tabulations and Summary of Approximate Quantities.			
b. In addition to the plan sheets, the specifications and special provisions will be included in the FOR PS&E package.	___X___	___X___	_____
c. This will consist of those unique Project Special Provisions which have to be written specifically for items, details and procedures not adequately covered by CDOT's Standard specifications and Standard Special Provisions. Also a list of the Standard Special Provisions which are applicable to the project shall be prepared. The Project Special Provisions shall be provided in the CDOT format and submitted with the project plans.			
d. Prepare FOR Estimates	_____	_____	___X___
e. Prepare FOR Opinion of Probable Construction Cost Estimate	_____	___X___	_____
f. Item numbers, descriptions, units, and quantities shall be listed and submitted to the CDOT/PM.			
g. Submit the FOR Plans, Specifications, and Estimate Package to the CDOT/PM and CMGC/PM for preliminary review prior to FOR meeting.	___X___	_____	___X___
h. FOR plan Reproduction () Sets	___X___	_____	___X___

<u>CDOT</u> <u>Other</u>	<u>Contractor</u>	<u>Design</u> <u>Consultant</u>
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i. The CDOT Project Management Team and the Contractor will provide written reviews of the FOR PS&E package.	___X___	___X___	_____
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8. Final Office Review	___X___	___X___	___X___
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- a. Attend the FOR meeting.
- b. The FOR meeting minutes shall be prepared by the CDOT/PM and distributed as directed.
- c. The FOR original plan sheets shall be revised/corrected in accordance with the FOR meeting reviews and comments within thirty (30) working days.
- d. Design decisions concerning questions and comments received at the FOR will be resolved in cooperation with the CDOT/PM, C/PM, and the CMGC/PM. The C/PM shall document the decision and transmit the documentation to the CDOT/PM for approval.
- e. A list of all deviations from the standard design criteria along with written justification for each one shall be submitted to the CDOT/PM.

9. Post-FOR Revisions and Memo	_____	_____	___X___
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The Design Consultant shall complete the revisions required by the FOR before this phase of work is considered to be complete. A Post-FIR memo will be produced by the Design Consultant to document and confirm that the changes discussed at the FIR have been completed and integrated into the design.

10. GMP Proposal and Negotiations	___X___	___X___	_____
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- a. Notify CDOT/PM at a point where a GMP proposal can be sufficiently prepared. _____ ___X___ _____
- b. Prepare and submit the Construction GMP Proposal. This GMP will include the final Opinion of Probable Construction Cost Estimate. _____ ___X___ _____
- c. Submit an electronic EBS to the CDOT/PM. _____ ___X___ _____
- d. Review the Construction GMP Proposal. ___X___ _____ _____
- e. Negotiate a final GMP. ___X___ _____ _____

11. Construction Plan Package	___X___	___X___	___X___
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The bid plan construction contract package shall consist of the revised FOR plans and will completely describe the work required to build the project including project special provisions and detailed quantities.

- a. Final engineering package. The Contractor, Design Consultant, and CDOT Project Team shall submit 2 copies, in 3-ring binders of the following:
 - 1. All project calculations or worksheets: _____ _____ ___X___
 - 2. All final reports and their approvals: _____ ___X___ ___X___

<u>CDOT</u>	<u>Contractor</u>	<u>Design</u>
<u>Other</u>		<u>Consultant</u>

Constructability reports, cost savings reviews, value engineering proposals, economic analysis, electrical design, etc. All reports will have the latest revisions included.

- | | | | |
|---|---------|---------|---------|
| 3. Copies of variances, design decisions, and variance approvals. | _____ | _____ | ___X___ |
| 4. Written reviews of the Final PS&E Packages | ___X___ | ___X___ | _____ |
| 5. Project meeting minutes. | ___X___ | _____ | _____ |
| 6. Utility clearance package. | ___X___ | _____ | ___X___ |

Utility agreements and information regarding the utility location and clearance conditions.

- | | | | |
|--|---------|-------|---------|
| 7. Environmental clearances, 404, 401, wetlands, endangered species, etc. | ___X___ | _____ | _____ |
| 8. Any CDOT, federal, or local entity clearances. | ___X___ | _____ | _____ |
| 9. Any other information unique to this project and deemed important to the effectiveness of construction. | ___X___ | _____ | _____ |
| 10. Record Plan Sets: | ___X___ | _____ | ___X___ |

Three (3) record plan sets for final design will be produced which shall bear the seal and signature of the responsible Design Consultant Engineer on each sheet. One (1) set shall be retained by the Design Consultant for three (3) years. The other set shall be submitted to CDOT. The original plan drawings shall not bear a seal.

B-4: Construction

- | | | | |
|--------------------------------------|-------|-------|---------|
| 1. Project Construction Coordination | _____ | _____ | ___X___ |
|--------------------------------------|-------|-------|---------|

The Design Consultant shall provide Electrical Engineer to serve as a subject matter expert to CDOT during the installation and commissioning of the new MCC. The Design Consultant Electrical Engineer shall to assist the team during construction, provide technical assistance/advice, and provide design support if required by CDOT.

- | | | | |
|-------------------------|-------|---------|-------|
| 2. Project Construction | _____ | ___X___ | _____ |
|-------------------------|-------|---------|-------|

If the GMP is accepted by CDOT, the Contractor shall construct the project according to the final PS&E package, in accordance to all applicable safety and building standards and specifications, and permits within the GMP.

APPENDIX C: REFERENCES

1. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) PUBLICATIONS (using latest approved versions):

- a. A Policy on Design Standards-Interstate System
- b. A Policy on Geometric Design of Highways and Streets
- c. Guide for Design of Pavement Structures
- d. Standard Specifications for Highway Bridges
- e. Guide for the Design of High Occupancy Vehicle and Public Transfer Facilities
- f. Guide for the Development of Bicycle Facilities
- g. Standard Specifications for Transportation Materials and Methods of Sampling and Testing – Part 1, Specifications and Part II, Tests
- h. Highway Design and Operational Practices Related to Highway Safety
- i. Roadside Design Guide

2. COLORADO DEPARTMENT OF TRANSPORTATION PUBLICATIONS (using latest approved versions):

- a. CDOT Design Guide (all volumes)
- b. CDOT Bridge Design Guide
- c. CDOT Bridge Detailing Manual
- d. Bridge Rating Manual
- e. Project Development Manual
- f. Erosion Control and Storm Water Quality Guide
- g. Field Log of Structures
- h. Cost Data Book
- i. Drainage Design Manual
- j. CDOT Quality Manual
- k. CDOT Survey Manual
- l. CDOT Field Materials Manual
- m. CDOT Design Guide, Computer Aided Drafting (CAD)
- n. Erosion Control and Storm water Quality Guide
- o. Standard Plans, M & S Standards
- p. Standard Specifications for Road and Bridge Construction and CDOT Supplemental Specifications
- q. Item Description and Abbreviations (with code number) compiled by Engineering Estimates and Marked Analysis Unit, CDOT
- r. Right-of-Way Manual, Chapter 2, Plans and Descriptions Procedures and General Information
- s. The State Highway Access Code

- t. Utility Manual
- u. TMOSS Generic Format
- v. Field TMOSS Topography Coding
- w. Topography Modeling Survey System User Manual
- x. Interactive Graphics System Symbol Table

3. **CDOT PROCEDURAL DIRECTIVES** (using latest approved versions):

- a. No. 400.2 Monitoring Consultant Contracts
- b. No. 501.2 Cooperative Storm Drainage System
- c. No. 514.1 Field Inspection Review (FIR)
- d. No. 516.1 Final Office Review (FOR)
- e. No. 1217a Survey Request
- f. No. 1304.1 Right-of-Way Plan Revisions
- g. No. 1305.1 Land Surveys
- h. No. 1601 Interchange Approval Process
- i. No. 1700.1 Certification Acceptance (CA) Procedures for Location and Design Approval
- j. No. 1700.3 Plans Specifications and Estimates (PS&E) and Authorization to Advertise for Bids under Certifications Acceptance (CA)
- k. No. 1700.5 Local Entity/State Contracts and Local Entity/Consultant Contracts and Local Entity/R.R. Contracts under C.A
- l. No. 1700.6 Railroad/Highway Contracts (Under Certification Acceptance)
- m. No. 1905.1 Preparation of Plans and Specifications for Structures prepared by Staff Bridge Branch

4. **FEDERAL PUBLICATIONS** (using latest approved versions):

- a. Manual on Uniform Traffic Control Devices
- b. Highway Capacity Manual
- c. Urban Transportation Operations Training – Design of Urban Streets, Student Workbook
- d. Reference Guide Outline – Specifications for Aerial Surveys and Mapping by Photogrammetric Methods for Highways
- e. FHWA Federal-Aid Policy Guide
- f. Technical Advisory T6640.8A
- g. U.S. Department of Transportation Order 5610.1E
- h. Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques
- i. ADAAG Americans With Disabilities Act Accessibility Guidelines

5. **AREA:**

- a. Manual for Railway Engineering

APPENDIX D: DEFINITIONS

- 1) AASHTO- American Association of State Highway & Transportation Officials
- 2) ADT- Average Daily Traffic in Number of Vehicles
- 3) ADAAG- Americans with Disabilities Accessibility Act Guidelines
- 4) BAMS- Bid Analysis and Management Systems
- 5) CAP- CDOT's Action Plan
- 6) CDOT- Colorado Department of Transportation
- 7) CDOT/PM- Colorado Department of Transportation Project Manager – The CDOT Engineer responsible for the day to day direction and CDOT Consultant coordination of the design effort.
- 8) CDPHE- Colorado Department of Public Health and Environment
- 9) CEQ- Council on Environmental Quality
- 10) COG- Council of Governments
- 11) COGO- Coordinate Geometry Output
- 12) CONSULTANT- Consultant for this project
- 13) CONTRACT ADMINISTRATOR- Typically a Region Engineer or Branch Head. The CDOT employee directly responsible for the satisfactory completion of the contract by the Consultant. The contract administration is usually delegated to a CDOT Project Manager.
- 14) C/PM- Consultant Project Manager – The Consultant Engineer responsible for combining the various inputs in the process of completing the project plans and managing the Consultant design effort.
- 15) CMGC/PM Contractor Project Manager – The Contractor Project Manager also known as the Construction Manager/General Contractor firm responsible for completing all CM/GC services on this project.
- 16) FHPG- Federal Aid Highway Policy Guide
- 17) FHWA- Federal Highway Administration
- 18) FIPI- Finding In Public Interest
- 19) FIR- Field Inspection Review
- 20) FOR- Final Office Review

- 21) GPS- Global Positioning System
- 22) MPO- Metropolitan Planning Organization (i.e. Denver Regional Council of Governments, Pikes Peak Area Council of Governments, Grand Junction MPO, Pueblo MPO, and North Front Range Council of Governments).
- 23) MS4- Municipal Separate Storm Sewer System
- 24) NEPA- National Environment Policy Act
- 25) NGS- National Geodetic Survey
- 26) NICET- National Institute for Certification in Technology
- 27) NOAA- National Oceanic and Atmospheric Administration
- 28) PAPER SIZES- See Computer-Aided Drafting Manual (CDOT); Table 6-13 and Table 8-1
- 29) PE- Professional Engineer registered in Colorado
- 30) PM- Program Manager
- 31) PLS- Professional Land Surveyor registered in Colorado
- 32) PRT- Project Review Team
- 33) PS&E- Plans, Specifications and Estimate
- 34) PROJECT- The work defined by this scope
- 35) ROR- Region Office Review
- 36) ROW- Right-of-Way: A general term denoting land, property, or interest therein, usually in a strip acquired for or devoted to a highway
- 37) ROWPR- Right-of-Way Plan Review
- 38) RTD- Regional Transportation Director
- 39) T/E- Threatened and/or Endangered Species
- 40) SH- State Highway Numbers
- 41) TMOSS- Terrain Modeling Survey System
- 42) TOPOGRAPHY- In the context of CDOT plans, topography normally refers to existing cultural or man-made details.
- 43) UD & FCD- Urban Drainage and Flood Control District
- 44) USCOE- United States Army Corp of Engineers

Note: For other definitions and terms, refer to Section 101 of the CDOT Division of Highways Standard Specifications for Road and Bridge Construction and the CDOT Design Guide.