GENERIC SCOPE OF WORK BASIC CONTRACT

CONTRACT TYPE

- ❑ Specific Rate of Pay
- X Cost Plus Fixed Fee
- ❑ Other

SOW DATE: September 25, 2024

PROJECT NUMBER: FSA 2873-231

PROJECT LOCATION: US 287 between MP 355 and 385, Larimer County

PROJECT CODE: 26611

THE COMPLETE SCOPE OF WORK INCLUDES THIS DOCUMENT (ATTACHED TO THE CONTRACT FOR CONSULTANT SERVICES)

Comments regarding this scope may be directed to:

CONTRACTS AND MARKET ANALYSIS BRANCH

Engineering Contracts Unit

Marci Gray, Engineering Contracts Program Manager
303-757-9297

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APPENDICES

INSTRUCTIONS

Note: This Scope of Work is to serve as a template for the Colorado Department of Transportation (CDOT) to develop and negotiate solid contracts with Consultant teams on projects and tasks. The Consultant shall coordinate all activities, tasks, meetings, communications and deliverables with the CDOT/ Project Manager (PM) (or his or her designee) for this project. All submittals will be through the CDOT/PM or a designee, who will make appropriate distribution. Upon notice to proceed, the Consultant shall be responsible and will account for all effort contained in the Final Scope of Work.

SECTION 1 - PROJECT SPECIFIC INFORMATION

1. PROJECT BACKGROUND

This project consists of approximately fifteen distinct safety improvements on US287 between Ted's Place (MP 355) and the Wyoming border (MP 385). Improvements include passing lanes, slope flattening, shoulder widening, intersection expansion and reconfiguration, signing and striping, and wildlife crossing mitigation.

2. PROJECT GOALS

This project is intended to produce the following improvements:

A. Improve the overall safety of the corridor with a priority on reducing injury and fatal collisions.

B. Strategically and expeditiously implement proposed safety improvements based on available budget and future potential grant funding.

C. Have construction ready design packages for unfunded scope elements.

D. Reduce wildlife/vehicle collisions and provide for safe passage of wildlife across US287.

3. PROJECT LIMITS

This project is located on US287 between milepost 355 and milepost 385 in Larimer County.

4. PROJECT COSTS

The construction cost of this project is estimated at $65,000,000.

5. WORK DURATION

The time for the work described in this scope is approximately 36 months.

6. CONSULTANT RESPONSIBILITY AND DUTIES

Initial project identification and conceptual design was developed as part of the US287 Safety Assessment Report (Stolfus, 2023) and included as the Upper Segment in CDOT's MPDG Grant (2024). The primary scope elements are as follows:

Intersection Improvements:

1. Owl Canyon (LCR 72)
2. Red Mountain Road Intersection
3. Bonner Springs Ranch Road Intersection

Passing Lanes and Shoulder Widening:

4. Southbound MP 374.3-376.1
5. Southbound MP 363.5-365.6
6. Shoulder Widening, 7.5 miles (width to be determined, 6' min)
7. Slope Flattening

Wildlife Management:

8. Wildlife Fencing MM 363-367
9. Wildlife Fencing MM 369-372.5
10. Wildlife Fencing MM 379-382
11. Wildlife CrossingOverpass in the MM 363-367 area

The Consultant will be responsible for the design of these safety improvements, including survey, development of plans and specifications, development of reports and design for hydrology and hydraulics, geotechnical data collection and analysis, traffic analysis and recommendations for intersection improvements, and coordination with all impacted utilities.

The Consultant will also be responsible for reviewing recent crash data not included in the Safety Assessment Report and suggesting additions or revisions to better address safety concerns. Following coordination with Region 4, these revisions or additions will be included in the final plans and specifications.

The Consultant will be responsible for collecting survey data at intersections where modifications are proposed, where the roadway prism is widened, where guardrail or culverts are impacted, and potentially at impacted utilities.

The Consultant will be responsible for geotechnical investigation related to slope stability and structural design.

The Consultant will be responsible for hydrologic analysis and hydraulic design for stormwater culverts within the limits of each project. This may include sliplining, culvert replacement or extension, wingwall repair/replacement, and riprap design.

The Consultant will be responsible for utility coordination with all impacted utilities. The Consultant will communicate with Region 4 Utilities on a regular basis to ensure any necessary agreements are executed in a timely manner. Depending on the extent of ground disturbance, full SUE analysis may be necessary at some locations along the corridor.

The Consultant will be responsible for structural design for a wildlife crossing, as well as integrated and standalone wildlife fencing. The wildlife crossing may be an overpass or an underpass based on consultation with Region 4 Environmental and available funding.

The Consultant should anticipate monthly progress meetings in addition to milestone meetings. The Consultant Project Manager should expect to hold brief, informal weekly status meetings with the CDOT Project Manager.

The Consultant should expect to be involved in public outreach in some capacity, including website updates, stakeholder database maintenance, and potentially periodic newsletters.

The Consultant may be asked to identify funding opportunities and support grant application development to supplement construction budget shortfalls. Potential programs include Calendar Year 2025 IIJA calls for projects such as Rural, INFRA, and Wildlife Crossing Pilot Program.

The following work may be necessary for this project but will be completed by CDOT: pavement design, environmental clearances, ROW acquisition, and local agency coordination.

7. WORK PRODUCT

The Consultant work products are:

A. Reports (hard copy and/or digital, as required)
B. Traffic Modeling Output
C. Field Inspection Review (FIR) Plans and Estimate
D. Final Office Review (FOR) Plans, Specifications, and Estimate
E. AD/Bid Plans, Specifications, Cost Estimate
F. Construction Plan Package
G. Project Coordination
H. Schedules
I. Meeting Minutes
J. Professional Engineer Stamped Record Sets
K. Design Support During Construction

Requirements are further described in the sections that follow. All work required to complete this Scope of Work requires the use of English Units. All public-facing deliverables associated with this project must be accessible to the extent practicable.

8. WORK PRODUCT COMPLETION

All submittals must be accepted by the CDOT Contract Administrator or designee.

9. ADDITIONAL PROJECT INFORMATION

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

A. US287 Safety Assessment Report (2023)
B. US 287 Corridor MPDG Grant (2024)

Copies of these documents may be requested from CDOT.

SECTION 2 - PROJECT MANAGEMENT AND COORDINATION

1. CDOT CONTACT

The Contract Administrator for this project is: Heather Paddock, Region 4 Transportation Director.

Active day-to-day administration of the contract will be delegated to the CDOT/PM:

Name: Chad Hall
Title: Project Manager
Address: 10601 West 10th Street, Greeley, CO
Office phone: 970-302-1633
Cell phone: 970-302-1633
Email: chad.hall@state.co.us

2. PROJECT COORDINATION

Coordination may be required with the following:

A. City of Fort Collins
B. Larimer County
C. Upper Front Range TPR
D. Irrigation Ditch Companies
E. Colorado Division of Parks and Wildlife (CPW)
F. Federal Highway Administration (FHWA)
G. Utilities

The consultant should anticipate that a design that affects another agency has to be accepted by that agency prior to its acceptance by CDOT. Submittals to affected agencies will be coordinated with CDOT.

SECTION 3 - EXISTING FEATURES

Note: This Section lists known features in the area. It should not be considered as complete, and should include, as appropriate, information from Section 2 Project Management and Coordination. The Consultant should be alert to the existence of other possible conflicts.

1. STRUCTURES

C-16-J, C-16-K, C-16-AB, B-16-FP, B-16-E, B-16-G, B-16-H, B-16-GK, B-16-AD, B-16-W, B-16-AJ, B-16-GB, B-16-GA, B-16-FX, B-16-FY, B-16-FZ, B-16-GJ, B-16-R, B-16-AI, B-16-CP, A-16-A, A-16-C, A-15-Z, A-15-U, A-15-R, A-15-A

2. UTILITIES

Contact Utility Notification Center of Colorado (U.N.C.C.) at 1-800-922-1987 or 811

3. IRRIGATION DITCHES

SECTION 4 - GENERAL INFORMATION

1. NOTICE TO PROCEED

Work shall not commence until the written Notice-to-Proceed is issued by CDOT.

2. PROJECT COORDINATION

A. Routine Working Contact: Routine working contact shall be between the CDOT/PM and the Consultant Project Manager (C/PM) as defined in Appendix C.

B. Project Manager Requirements: Each Project Manager shall provide the others with the following:

1. A written synopsis or copy of their respective contacts by telephone and in person with others
2. Copies of pertinent written communications

3. ROUTINE REPORTING AND BILLING

The Consultant shall provide the following on a routine basis:

A. Coordination: Coordination of all contract activities by the C/PM

B. Periodic Reports and Billings: The periodic reports and billings required by CDOT.

C. 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.

4. PERSONNEL QUALIFICATIONS

The C/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) certification or other certifications may be required for project inspectors and testers.

All tasks assigned to the Consultant must be conducted by a person on the Consultant team that is qualified and has specific expertise in that task. The qualified person is a professional with the necessary education, certifications (including registrations and licenses), skills, experience, qualities, or attributes to complete a particular task. Design of any special project features must be directed, completed, and overseen by a professional engineer with significant experience in design of those special project features.

This contract requires that the prime firm or any member of its team be pre-qualified in the following disciplines for the entire length of the contract: Bridge Design, Civil Engineering, Geotechnical Engineering, Highway & Street Design, Hydrology and Hydraulics, Management (Contract Admin), Materials Testing, Structural Engineering, Surveying, Transportation Engineering, and Traffic Engineering.

5. CDOT COMPUTER/SOFTWARE INFORMATION

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

A. Earthwork	OpenRoads Designer (ORD)
B. Traffic	CDOT Statewide Travel Demand Model (others as appropriate)

C.	Drafting/CADD	ORD with CDOT's workspace
D.	Survey/photogrammetry	CDOT TMOSS, ORD
E.	Bridge check	CDOT Staff Bridge software shall be used in either design or design
F.	Estimating	Transport (an AASHTO sponsored software) as used by CDOT
G.	Specifications	Microsoft Word
H.	Scheduling	Microsoft Project
I.	Geographic Information System (GIS)	ArcGIS w/CDOT's geodatabase, formatting configurations & standards

6. COMPUTER DATA COMPATIBILITY

The data format for submitting design computer files shall be compatible with the latest version of the adopted CDOT software as of Notice to Proceed for the contract. The Consultant shall immediately notify the CDOT/PM if the firm is unable to produce the desired format for any reason and cease work until the problem is resolved. Refer to Section 8, Table 1 - Submittals, for additional information regarding current formats and the acceptable transmittal media.

7. PROJECT DESIGN DATA AND STANDARDS

A. General:
Appendix A provides a comprehensive list of state and federal reference material. However, Appendix A does not contain local agency reference material that may be pertinent to some projects. The consultant is responsible for obtaining and ensuring compliance with the most recent CDOT-adopted version of the listed references including standards and specifications, manuals, and software, or as directed by the CDOT/PM. Conflicts in criteria shall be resolved in coordination with the CDOT/PM.

B. Specific Design Criteria:
Appendix B is a list of specific project criteria. The list is comprehensive and may include items that are not required for tasks defined in this scope. The Consultant shall submit any proposed changes to the pertinent criteria to the CDOT/PM at one of the periodic progress meetings prior to initiating design.

C. 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.

SECTION 5 - PROJECT INITIATION AND CONTINUING REQUIREMENTS

Note: This list establishes the individual task responsibility. Those tasks identified as CDOT/Other should utilize an abbreviation system to indicate whether the task will be completed by CDOT or another agency (i.e. "C" for CDOT and abbreviations as provided below). The consultant shall maintain the ability to perform all work tasks that are indicated below by an 'X' in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Where appropriate, mark "N/A" for not applicable items.

***Other Agency Abbreviations:**

Section 5: Detailed Scope Elements	CDOT (C)/ Other*	Consultant	Not Applicable
A. **PROJECT MEETINGS** The types and numbers of meetings shall be flexible and determined by an interactive process as approved by the CDOT/PM.			
1. **Initial Project Kick-Off Meeting** Schedule and facilitate initial project kick-off meeting. All appropriate disciplines should be included in the scoping meeting. Create an invitation list, send notices with a draft agenda prior to the meeting, and provide meeting minutes to all those invited. Whenever possible, the kick-off meeting will include an on-site inspection to familiarize the entire project team with the character and conditions of the area. The scoping meeting will also be used to clearly identify scope elements, responsibilities and coordination necessary to complete the work.	C	X	
2. **Progress Meetings** CDOT and Consultant team will meet periodically as required (typically every two weeks). The meetings will review activities required to be completed since the last meeting, problems encountered/anticipated and potential solutions, project schedule update, action items, and coordination required with other agencies.	C	X	
3. **Public Meetings** The Consultant shall provide the presentation aids, and help conduct the meeting.	C	X	
a. Small Group Meetings (one-on-one) Meet with property and business owners or others directly affected by the project work to identify likely impacts and discuss possible mitigation or resolutions.			
b. General Public Meetings (information and workshops) The format of these meetings will be dictated by the project and goals for the meetings. These meetings may be used to establish communications with the public, add to the "contact list", and gather information regarding local concerns. The meetings may also take the form of a work session or workshop with the affected parties.			
c. Public Review Meetings These meetings are intended to disseminate project progress information to the public and representatives of local entities. Notices will be mailed at least 14 days in advance of these meetings to those on the "contact list".			

4. **Meeting Minutes** Project meeting minutes shall be completed by the Consultant and provided to the CDOT/PM within one week of the actual meeting. When a definable task is discussed during a meeting, the minutes will identify the "Action Item", the party responsible for accomplishing it, and the proposed completion date.		X	
5. **Contact List** Establish and maintain a computerized list of all appropriate interested parties for the communication process.		X	
a. The information on the list shall include as a minimum: ii. Name iii. Firm (if any) iv. Mailing/Email address v. Phone			
b. The contacts will be compiled from the list below, as supplemented by the Project Team and the attendees at public meetings: i) Public Agencies ii) Elected/Appointed Officials iii) Neighborhood Groups iv) Property Owners/Tenants v) Business Interests vi) Special Interests vii) Railroads viii) Media Contacts ix) Attendees from public meetings			
6. **Public Notices/Advertisements** Publicize the proposed project in accordance with the CDOT policies and procedures. Copies of the publication shall also be distributed to the individuals on the "contact list".		X	
7. **Communication Aids**		X	
a. Graphics Support – provide graphics for presentations and project documents. This may include slides, overhead projector slides, maps and plan views of conceptual design, computerized presentations and other displays for visual presentations at meetings.			
b. Newsletter – a newsletter which will contain project progress information and announcements will be published at the specified interval and will be distributed to those on the "contact list" specified by the CDOT/PM.			
c. Local Office – Obtain and maintain an office within the project area to conduct small group meetings and provide displays/information to the public.			N/A
d. Internet web pages – All external CDOT-related Web sites shall be hosted on CDOT's server and developed in-house with assistance from the Web Team and CDOT Communications. The use of all Web 2.0 and similar social marketing applications on behalf of CDOT (including all regions, divisions and offices) is strictly prohibited unless authorized by the Communications Director. No CDOT employee, contractor or consultant working for CDOT will post material on behalf of the agency on such applications without expressed written consent of the Communications Director.			

B. **PROJECT MANAGEMENT** At the kick-off meeting, or shortly thereafter, create and provide an approach for managing the project (i.e. involved staff, key team positions), including task orders, a schedule, document and agency reviews and other project needs. Should the overall project budget be $500 million or more, an official Project Management Plan (PMP) shall be prepared in accordance with the most recent federal authorization guidance. The Consultant shall coordinate all the work tasks being accomplished by all parties to ensure project work completion stages are on schedule.		X	
C. **DEVELOP A PROJECT SCHEDULE AND ASSIGN TASKS** The Consultant is responsible for coordinating the required work schedule for tasks accomplished by CDOT and other agencies. Prepare the initial project schedule for review by the CDOT/PM and consultant team, and refine to provide detail as requested. Modifications will be made as necessary in collaboration with CDOT and appropriate justification. The tasks covered by this Scope of Work are expected to take approximately 18 months to complete.		X	
D. **QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)** Prepare and submit a QA/QC plan as part of the planning documents noted above, and commit to adhering to the QA/QC process throughout the project.		X	
E. **VALUE ENGINEERING (VE) STUDY** A team of transportation design and construction experts will perform a Value Engineering (VE) study. The VE study will be conducted early enough in the project development process to allow evaluation and incorporation of VE recommendations in the NEPA document or design process, as appropriate. The VE study shall be performed in accordance with Federal Highway Administration's (FHWA) current guidelines and recognized techniques and will identify possible alternatives that may save the project cost, time, or other resources. An individual with prior experience and certification in facilitating VE studies (the VE facilitator) shall conduct each VE session. VE facilitators shall be qualified VE practitioners, experienced in performing and leading VE studies (have participated in several VE studies as a team member and several as a team leader), and have sufficient VE training, education, and experience to be recognized by the Society of American Value Engineers (SAVE) International as meeting the requirements for certification. The VE team will consist of individuals with no prior exposure to the project. Individuals that have some familiarity and history with the project shall provide briefings to the team. Consultants or firms shall not conduct studies of their own designs unless they maintain distinct organizational separation of their VE and design sections. The VE team will be assembled to review the Conceptual Background information and plans shall be provided to the team at least three weeks in advance of VE sessions. The VE facilitator will coordinate the study with CDOT, appropriate entities, and FHWA. The VE review team will formally evaluate each VE recommendation, and sufficient justification will be made for the acceptance or rejection of each. The VE facilitator will produce a document that summarizes the results, as well as the project elements investigated. The Consultant/PM shall prepare a written response detailing which recommendations were not included, the reasons for exclusion, and how all approved VE results will be incorporated into subsequent engineering efforts. These responses shall be forwarded to the CDOT/PM for distribution to the CDOT Region Transportation Director, FHWA, and other appropriate entities. All approved VE proposals shall be incorporated into the final design plans		X	

F. **OBTAIN NECESSARY RIGHT-OF-ENTRY AND PERMITS** Some activities may require work on land not controlled by CDOT. In such cases the Consultant shall obtain the necessary written permission to enter the premises. Written permission shall be coordinated with other CDOT staff and consultants that may need right-of-entry such as geotechnical and environmental personnel. Included in this written permission will be the names and telephone numbers of persons to contact should notification prior to entry be necessary.		X	
1. **Signature Copies** Permissions apply to CDOT personnel as well as Consultant personnel. CDOT Form 730 may be used for this purpose. Signed copies of written permission will be submitted to the CDOT/PM prior to entering private property for survey work.			
2. **Permits** Some activities such as materials testing on existing pavement and structures may require a permit. Permits will be obtained and copies submitted to the CDOT/PM.			

SECTION 6 - ENVIRONMENTAL WORK TASK DESCRIPTIONS

Note: This Section is written specifically for projects requiring an Environmental Impact Statement (EIS), an Environmental Assessment (EA), or a Categorical Exclusion (CatEx). It includes elements that are not required for all projects requiring NEPA protocol. Contact Region environmental personnel to determine which items in this section are necessary to address the requirements of the EIS, EA, or CatEx, or post-NEPA activities (ensuring that all of the commitments made by the NEPA document are implemented in the design package). Some tasks and resources are more appropriate depending on the Class of Action. Recommendations for each are made in parentheticals.

Use the CDOT NEPA Manual when completing this section to assure that the level of detail and documentation included meets CDOT expectations and requirements and any other applicable state and federal laws and regulations. Nothing in this Section precludes federal, state, or local agencies or officials from fulfilling their responsibilities under federal, state, or local laws and regulations, NEPA, as codified in 42 United States Code (USC), section 4321, et. Seq., or any of NEPA's implementing regulations.

This list establishes individual task responsibility. Those tasks identified as CDOT/Other should utilize an abbreviation system to indicate whether the task will be completed by CDOT or another agency (i.e. "C" for CDOT and abbreviations as provided below). The consultant shall maintain the ability to perform all work tasks that are indicated below by an 'X' in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Where appropriate, mark "N/A" for not applicable items.

***Other Agency Abbreviations**

Section 6: Detailed Scope Elements	CDOT(C)/ Other*	Consultant	Not Applicable
A. **PROJECT INITIATION**	C		
B. **ENVIRONMENTAL ANALYSIS AND DOCUMENTATION**	C		
C. **COST ESTIMATES AND FINANCIAL ANALYSIS**			N/A
D. **DATA COLLECTION, FIELD INVESTIGATION, MITIGATION MEASURES, AND DELIVERABLES**	C		
E. **DELIVERABLES**	C		
F. **PUBLIC AND AGENCY INVOLVEMENT**	C		
G. **NEPA DOCUMENTATION PROCESS**	C		

SECTION 7 - PRECONSTRUCTION WORK TASK DESCRIPTIONS

Note: The following activities of communication, consensus building, project team reviews, conceptual design, data gathering, documentation, and formal public notice shall be planned by the Consultant and coordinated with the CDOT PM. The time of their accomplishment may overlap and parallel paths of activity that should be planned to finish the development phase in accordance with the shortest possible schedule. A project plan shall be developed by the Consultant that satisfies the requirements of the project development. This plan must be approved by the Contract Administrator (see Section 2.01) before starting the work. Deliverables can be static reports and products, digital reports and products, and/or GIS data layers. The scope should be specific as to what type of deliverable is expected.

This list establishes the individual task responsibility. Those tasks identified as CDOT/Other should utilize an abbreviation system to indicate whether the task will be completed by CDOT or another agency (i.e. "C" for CDOT and abbreviations as provided below). The consultant shall maintain the ability to perform all work tasks indicated below by an 'X' in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Where appropriate, mark "N/A" for not applicable items.

***Other Agency Abbreviations:**

Section 7: Detailed Scope Elements	CDOT(C)/Other*	Consultant	Not Applicable
A. PROJECT INITIATION AND CONTINUING REQUIREMENTS			
1. **Environmental Mitigation and Requirements** Ensure that any mitigation commitments within the NEPA documentation are incorporated into the project.		X	
2. **Independent Design Review** An independent design review shall be performed on any design accomplished by others that will be used in this project. A report identifying the results of these reviews shall be submitted to the CDOT/PM within one week of the review.		X	
3. **Identify Design Criteria** Submit a copy of Appendix B -Specific Design Criteria with the appropriate items completed.		X	
4. **Initiate Survey** Arrange Preliminary Field Survey and/or Aerial Survey. CDOT Form 1217a is an outline of a complete survey request and may be used as a guide for completing the survey plan.		X	

5. **Traffic Control** Consultant field activities that interfere with traffic operations within existing roadways will require control of traffic. The Consultant shall plan and provide any required traffic control for the survey, testing, or the design process. Traffic control operations will be in accordance with the MUTCD. The proposed Method for Handling Traffic (MHT) must be submitted to the CDOT/PM. Also, certification of the Traffic Control Supervisor as a Worksite Traffic Supervisor by the American Traffic Safety Services Association (ATSSA) or as a TCS (Traffic Control Supervisor) by the Colorado Contractors Association (CCA) shall be required.		X	
6. **Structure Review Meeting** While the major structural design work is progressing, the Consultant shall meet periodically with the CDOT Structure Reviewer to review the work. These meetings may be in addition to, or in conjunction with, the Project Progress Meetings. The complexity of the structure shall be considered by the CDOT Structure Reviewer to determine the frequency of review meetings. Other required meetings are described in subsequent sections.		X	
7. **Initial Submittals** Submit the following samples to the CDOT/PM for approval:		X	
a. An original plan sheet that complies with this scope of work			
b. Photogrammetric and/or survey data and a drawing or photograph in accordance with the requirements specified in this scope of work			

Note: No original plan sheets or photogrammetric survey work will be accomplished until satisfactory samples have been received and approved by the CDOT/PM.

B. PROJECT DEVELOPMENT			
1. **Survey** Surveys will be conducted in accordance with the CDOT Survey Manual, the latest addendum thereof, and applicable state statutes. The completed survey shall be reviewed by the Region survey unit. Two weeks should be provided in the schedule to complete the review and sufficient time should be provided to address all comments provided by this review. Design shall not proceed until all comments resulting from this review have been satisfactorily addressed.		X	
a. Pre-survey Conference A pre-survey conference shall be held. The consultant shall attend the Presurvey conference prior to any right of way or survey work			
b. Survey Data Research Research shall be done as per current CDOT manuals			
c. Project Control Survey:			
i. Locate or Establish HARN Stations Project control shall be tied to the nearest Colorado High Accuracy Reference Network Station (HARN). In the event there are no HARN stations within 3 miles of the project (Order B, 1:1,000,000 accuracy), or HARN Densification (Order B-2, 1:500,000 accuracy), additional HARN Densification stations shall be set. NGS Blue Book procedures shall be followed for all HARN Densification stations. This will include proper spacing using proper monumentation, equipment, observation procedures, coordination through the Colorado State Geodetic Advisor and submission to NGS for inclusion in the National Database.			
ii. Monumentation Materials will be supplied by CDOT. Care is to be taken to install said monumentation in locations that are readily usable for the project and in a safe location so that they can be utilized throughout construction (no monumentation shall be set on or near the centerline of the proposed roadway).			
iii. Local Project Control			

Survey the required project control (centerline/baselines and elevation reference) as required. Prepare a control survey diagram showing graphical representation of all monuments used for control. Tabulate coordinates and physical descriptions of all found monuments and other physical evidence.			
d. Land Survey/Boundary Survey Tie aliquot, property and other land monuments to the control survey. Prepare a Land Survey Control Diagram showing graphical representation of all found aliquot, property and land monuments and their relationship to the project control. Tabulate the coordinates and physical description of all found monuments and other physical evidence.			
e. TMOSS (Topographic) Survey Collect the data required to produce a planimetric map and submit in TMOSS format. Features located will include, but not be limited to signs, mailboxes, fences, driveways, curb cuts, curbs, sidewalks, and edges of pavements. Horizontal accuracy shall be as specified for a CDOT class C or D TMOSS survey.			
f. Terrain (Relief or Elevation) Survey Collect elevation data and submit in TMOSS format. Natural ground elevations shall be as specified.			
g. Utility Survey (ONLY INCLUDE HOURS FOR TASKS NOT COMPLETED IN THE ENVIRONMENTAL SECTION ABOVE [SECTION 6]). Locate utility poles, manholes, valves, pedestals, guy wires, and other visible utility features. Survey underground utilities as marked by the utility companies. Determine invert elevations of manholes and vaults and survey the locations of utilities exposed by "potholing".			
h. Hydraulic Survey Locate existing bridge limits, bridge high chords and low girders, culvert invert elevations and locations and sizes, storm sewers, inlets, vaults, manholes, PWQ structures, and determine invert and rim elevations and sizes and materials. Accomplish existing drainage site surveys for designated culverts and bridges in accordance with the Drainage Design Manual. Prepare a topographic survey of the waterway, overbanks, and floodplain areas upstream and downstream to limits determined by the Region Hydraulic Engineer or his/her designee. Incorporate statewide LiDAR data from State of Colorado resources whenever available at www.coloradohazardmapping.com or https://geodata.co.gov/.			
i. Material Sources Survey designated material sources as specified.			
j. Supplemental Surveying: As required and specifically requested.			
k. Survey Report: Prepare a Survey Report as required in the Survey Manual.			
l. Photogrammetry			
i. Camera Calibration Report			
ii. Flight Plan			
iii. Flight			
iv. Contact Prints			
v. Negatives			
vi. Enlargements			
vii. Photo Index			
viii. Supplemental Survey (wing points)			
ix. Data Reduction a) *Topographic Contours*			

b) *Planimetric (Topography)*			
x. Map Compilation a) *Index Maps* b) *Finished Maps*			
m. Accuracy Tests: Tests are to be performed on a regular basis throughout the project by the consultant.			
n. Review by Professional Land Surveyor The accuracy tests are to be reviewed by the PLS in responsible charge for the project, and submitted to the project engineer and made part of the project records. Further review of all aspects of the field and office work shall also be the responsibility of the PLS in responsible charge.			
C. PRELIMINARY DESIGN			
1. **Traffic Engineering**		X	
a. Review locations with "potential for accident reduction map" and or traffic operations analysis and or the safety assessment report as provided by CDOT to determine which safety improvements will be incorporated into the project.			
b. Analyze the proposed project design with the traffic projection data			
c. Recommend the appropriate geometry (i.e., number of lanes, auxiliary lanes, storage lengths, weaving distances, etc.) in accordance with the current version of Highway Capacity Manual.			
d. The proposed design shall be reviewed to ensure compatibility with existing signing procedures throughout the preliminary roadway design process			
e. Use traffic data appropriate to the anticipated construction timing in developing detour alternatives.			
f. Develop the total ESAL for the design life and submit to the CDOT/PM for the pavement design.			
g. Submit the traffic data and recommendations to the CDOT/PM for review.			
2. **Materials Engineering** A preliminary soil investigation should be conducted. **CDOT will perform all materials work within CDOT ROW. The Consultant will perform any necessary materials engineering outside of CDOT ROW.**	C	X	
a. Determine test hole locations (horizontal and vertical) and coordinate with the CDOT/PM.			
b. Collect soil samples and test for: i. Classification ii. Moisture – Density Relationship iii. Resistance Value iv. Corrosiveness – Note locations of high corrosiveness with recommendations; see CDOT pipe material selection policy. v. Bearing Capacity			
c. Prepare and submit a soils investigation report.			
d. Prepare and submit pipe material selection report.			
3. **Pavement**	C		
a. Pavement Rehabilitation This section applies if the project includes existing pavement that is incorporated in the design for continued utilization.			
i. Determine the equivalent Design Traffic (18k ESAL) that the existing pavement can carry			
ii. Estimate the 18k ESAL's experienced by the existing pavement.			
iii. Obtain the projected 18k ESAL for rehabilitated pavement design period.			
iv. Perform a distress survey			

	v. Investigate the existing pavement structure			
	vi. Perform deflection testing to obtain the following: a) *Deflection profile* b) *Maximum deflection* c) *Deflection basin* d) *Differential deflections at transverse joints for portland cement concrete pavement (pccp)* e) *In place determination of the appropriate modulus for each layer and subgrade*			
	vii. Determine the remaining load carrying capacity from the above data. Design the feasible alternatives for the required rehabilitation (and widening if appropriate) utilizing the above investigations and test results. The design of the feasible alternatives shall be checked against the following: a) *The basic cause of distress which shall be corrected* b) *Effect on the rate of future deterioration* c) *Effect on surface characteristics* Where appropriate, any new pavement widening shall be included in the analysis.			
	b. New Pavement Structure The feasible alternatives of new pavement structure shall be designed utilizing procedures accepted by the CDOT/PM. New pavement designs for widening shall be compatible with adjacent rehabilitated existing pavement.			
	c. Pavement Justification			
	i. Basic factors: a) *Desired life expectancy (obtain design life from CDOT).* b) *Required maintenance activities intervals.* c) *Basis for performance life.*			
	ii. Analyze life cycle cost of the selected alternatives			
	d. Pavement Design Report Include all the above tests, investigations, analyses, and calculations performed. Submit to the CDOT/PM for acceptance.			
4.	**Existing Structures and Foundation**		X	
	a. Existing bridge condition investigation Determine condition of existing bridge deck, superstructure and substructure material as required.			
	b. Foundation Investigation Report			
	i. Prepare a Foundation Investigation Request showing requested test hole locations.			
	ii. Formulate drilling pattern, perform the necessary subsurface investigation and collect samples as required.			
	iii. Perform the appropriate laboratory tests and analyze the data. Determine strength, allowable bearing capacity and corrosiveness of foundation material.			
	iv. Perform lateral analyses (deformation, moment, and shear) for the caissons and/or piles which are subjected to lateral loadings. This may be a computer analysis which will consider the group effect and selection of the soil parameters.			
	v. If appropriate, a pile driving analysis using a wave equation will be accomplished.			
	vi. Submit the Foundation Investigation Report to the CDOT/PM for approval.			

vii. Prepare engineering geology plan sheet and copies of the Foundation Investigation Report foundation report with recommendations for type, size, and tip (bottom) elevation of the required foundation. Specify if pre-drilling, pile tip, casing, dewatering, etc., are needed for foundation construction.			
viii. If requested, perform a gradation analysis of the streambed/waterway native material using a sieve analysis, Wolman Count, or other acceptable method as directed by the Region Hydraulic Engineer or his/her designee.			
5. **Hydrology/Hydraulic Engineering**		X	
a. Data Collection and Hydrology			
i. Establish drainage basin data: delineate and determine size, waterway geometrics, vegetation cover, and land use.			
ii. Collect historical data: research flood history and previous designs in the project proximity; obtain data from other sources (e.g., MHFD, CWCB, CDOT Maintenance, and local residents).			
iii. Complete a project site visit to evaluate channel/overbank roughness coefficients, channel stability, vegetation, condition/adequacy of existing structures, Ordinary High Water, allowable high water, etc. Document the site visit with photos.			
iv. Select a design storm frequency based on the established criteria.			
v. Complete a hydrological analysis using existing studies or approved methods.			
vi. Perform a risk analysis.			
b. Hydraulics			
i. Complete preliminary design of minor drainage structures: a) *Determine locations, sizes, and alignment based on preliminary hydraulic design. Identify locations by highway station or coordinates, as appropriate.* b) *Determine the allowable headwater.* c) *Assess the degree of sediment and debris problems to be encountered* d) *Assess abrasion and corrosion levels based on CDOT Pipe Material Selection Policy.* e) *Prepare preliminary structure cross-sections and determine elevations, flow lines, slopes and lengths of the structures.* f) *Present initial designs of any necessary deck drainage or other drainage off the structure.*			
ii. Complete preliminary design of major drainage structures: a) *Complete hydraulic analysis and water surface profiles.* b) *Determine required hydraulic size/skew of major structures/channels* c) *Determine minimum low chord elevation per CDOT criteria* d) *Determine design storm and 500-year water surface elevations.* e) *Determine scour for design storm, the 500-year event, incipient overtopping condition, and maximum scour-inducing storm (if applicable).* f) *Assess channel erosion protection for structures.* g) *Present initial designs of any necessary deck drainage or other drainage off the structure.*			
iii. Complete preliminary design for Permanent Water Quality Control Measures (PWQ CMs) and outlet structures with details as needed. Adequate detail should be included in the FIR construction plan set if FIR-level decisions are required with respect to right-of-way, easements, maintenance, etc. to move to final design.			

	jjj. If required, identify and assist CDOT in coordinating potential funding participation of local, state, and/or federal agencies.			
	c. Prepare preliminary construction plans that include:			
	i. Drainage Plan Sheets ii. Drainage Detail Sheets as needed iii. Hydraulic Information Sheets as needed			
	d. Prepare a Preliminary Hydraulics Report or Preliminary Drainage Report in accordance with the CDOT Drainage Design Manual i. Introduction, Hydrology, Existing Structures and Design Discussion sections should be close to final at this level. Design Discussion should include CDOT and local criteria the project intends to meet. ii. Recommended design should be preliminary at this level and progress through final design. iii. All design assumptions and related design decisions shall be documented. iv. The Appendix shall contain: *a) Drainage basin maps* b) *Hydrology/hydraulic worksheets* c) *Drainage construction plan sheets.* d) *CDOT pipe material selection documentation* e) *Water Quality report and PWQ worksheets*			
	e. Perform internal QA/QC prior to submission to CDOT.			
6.	**Floodplain Assessment**		X	
	a. Identify location of regulatory floodplains and floodways published by FEMA and local agencies, and assess impacts of planned changes to those boundaries from CDOT activities or planned map revisions by others.			
	b. Add information to environmental resource mapping of existing conditions			
	c. Determine the adverse impacts of each alternative with respect to the base flood elevation (BFE), floodway boundary, and local drainage. This must include the impacts of construction and other "temporary" activities.			
	d. Analyze impacts and develop possible actions to mitigate for the adverse impacts, then coordinate with roadway and structural designers.			
	e. Analyze the impacts and mitigation. Included in the analysis will be a determination of significant impacts due to:			
	i) Single community access routes. ii) Risk for social or economic losses due to flooding iii) Alteration of beneficial floodplain values. iv) Recommend preparation of a local floodplain development permit for all work in floodplains and floodways, as required by state and federal law. v) Show all ground survey point elevations in the same vertical datum identified on the current effective FIRM. vi) Add notes to indicate the waterway name, jurisdiction and community number, panel number, date of current effective information, a sentence describing which local code requires permits, a sentence for permitting and no rise compliance, and a note recognizing that flooding may occur outside the mapped Special Flood Hazard Area (SFHA).			
	f. Prepare a Floodplain Information Sheet for the final approved plan set.			
	i) Show and clearly label the current effective 100-yr floodplain and floodway boundaries, and the 500-year floodplain (as applicable). ii) Show and clearly label all cross sections and BFE lines published on the current effective FIRM (note; all elevations must be reported in the same vertical datum identified on the current effective FIRM).			

	iii) Show and clearly label any fluvial hazards, buffer zones or erosion management zones. iv) Show the limits of disturbance for all permanent and temporary activities, and label as such. v) Show all ground survey point elevations in the same vertical datum identified on the current effective FIRM. vi) Add notes to indicate the waterway name, jurisdiction and community number, panel number, date of current effective information, a sentence describing which local code requires permits, a sentence for permitting and no rise compliance, and a note recognizing that flooding may occur outside the SFHA. vii) Add all conditions of approval from the local agency to the notes, especially for as-built survey and P.L.S. & P.E. re-certification requirements. viii) Add a note identifying any 625 Survey specials.			
	g. Prepare a Preliminary Floodplain Report or Memo as outlined in the CDOT DDM or as directed by the Region Hydraulic Engineer or his/her designee.			
7.	**Environmental – Water Quality**	C		
	a. Storm Water Management Plan Initiate a Storm Water Management Plan in accordance with:			
	i) Municipal Separate Storm Sewer Systems (MS4) ii) CDPHE's Construction Discharge Permit System requirements iii) CDOT's Erosion Control and Storm Water Quality Guide iv) Local agency SWMP/GESC/EC requirements v) CDOT's Standard Specifications vi) CDOT Standard Plans vii) Other appropriate documents			
	b. Topsoil sampling, *if applicable.*			
	i) Determine number for revegetation units required by coordinating with SWMP designer and design team. Number of samples: ii) Conduct topsoil sampling and send samples to laboratory for nutrient testing; refer to *topsoil sampling procedure* for laboratory testing requirements. iii) Insert topsoil amendments into the SWMP using the CDOT Amendments Calculator to determine quantities.			
	c. Vegetative Transects			
	i) Determine number of revegetation units required by coordinating with SWMP designer and Environmental Specialist. Number of transects: ii) Conduct vegetation transect(s) to determine existing vegetative percent cover as required for each vegetation unit as determined in the SWMP prior to construction disturbance. iii) Document transect location(s) and percent cover(s) onto an aerial map. Place map and photographs into Tab 17.			
	d. Prepare preliminary Permanent Water Quality (PWQ) plans in conjunction with Section 7.C.5.b.iii of this document.			
	i) Determine PWQ requirements (local agency MS4 requirements, CDOT requirements, etc.) ii) Develop PWQ alternatives that will meet CDOT and local agency MS4 requirements iii) Identify right-of-way requirements and utility impacts for alternatives iv) Identify all entities and v) Other appropriate documents			
	e. Prepare preliminary water quality report as an appendix to the Hydraulic Design Report to include PWQ Evaluation and Tracking Forms, cost estimate for PWQ CMs, etc.			

f. Conduct a PWQ meeting just prior to FIR to discuss alternatives with CDOT PWQ Specialist/Water Pollution Control Manager, Hydraulics Engineer, and Project manager.			
g. Perform internal QA/QC prior to submittal to CDOT.			
8. **Utility Coordination**		X	
a. Location Maps Obtain utility location maps from the Utility Companies which identify utility features in the project area. Requests and receipt of maps will be coordinated with the Region Utility Engineer via copies of request and transmittal letters.			
b. Reviews and Investigations Conduct field reviews and utility investigations with the Region Utility Engineer and Utility companies, as required, to ensure correct horizontal and vertical utility data. When possible this will be done utilizing non-destructive investigative techniques. The horizontal and vertical locations will be shown in the FIR plans and cross sections. When "potholing" is required, the Consultant shall be responsible for all necessary excavations.			
c. Incorporate utility locations in plans from utility survey			
d. Relocation Recommendations Submit necessary information for the relocation or adjustments of affected utilities to the Region Utility Engineer. The Region Utility Engineer will process the required agreements.			
e. Ditch Company Coordination Contact ditch companies through the Region Utility Engineer to coordinate ditch requirements and restrictions. Develop the plans for the necessary irrigation structures and submit to the Region Utility Engineer for Ditch Company review.			
9. **Roadway Design and Roadside Development** Coordinate all design activities with required CDOT specialty units and other outside entities.		X	
a. Roadway Design			
i) Input, check, and plot survey data			
ii) Verify that a project specific coordinate system approved by CDOT is used to identify the horizontal locations of key points. The coordinate systems used for roadway design and ROW shall be compatible.			
iii) Input and check horizontal and vertical alignments against all design criteria. Necessary variances and/or design decisions will be identified with justification and concurrence by CDOT & FHWA.			
iv) Provide alignments, toes of slope and pertinent design features, including permanent and temporary impacts, to the ROW, Utility and Environmental Managers.			
v) Plot/develop all required information on the plans in accordance with all applicable CDOT policies and procedures.			
vi) Using current approved CDOT software, generate a 3 dimensional design model and produce preliminary quantities			
b. Roadside Development: For roadside items including but not limited to, guardrails, delineators, ditches, PWQ CMs, landscaping, sprinkler systems, sound barriers, bike paths, sidewalks, lighting, curb ramps, truck escape ramps, and rest areas provide the following layouts in the plans:			
i) Critical locations in the plans for irrigation sleeves and other utility conduits underneath the proposed roadways.			
ii) Coordinate the roadside items with the Stormwater Management Plan (SWMP).			
10. **Right-of-Way**	C		

The following work shall be done by, or under the immediate supervision of, a Professional Land Surveyor (PLS). The following work may be included as part of a Surveying contract or part of a Right-of-Way plans preparation contract.			
a. Research			
b. Ownership Map For additional detail on required drafting software, see Section 8 Submittals. Project coordinate system ownership map shall be submitted along with a "Project Narrative".			
11. **Major Structural Design** Major structures are bridges and culverts with a total length greater than twenty feet or retaining walls with a total length greater than one hundred feet and a maximum exposed height at any section of over five feet. This length is measured along centerline of roadway for bridges and culverts, and along the top of wall for retaining walls. Overhead sign structures (sign bridges, cantilevers, and butterflies extending over traffic) are also major structures, but are exempt from the structure preliminary design activity defined here. The CDOT Structure Reviewer will participate in coordinating this activity.		X	
a. Structural Data Collection			
i) Obtain the structure site data. The following data, as applicable, shall be collected: (Typical roadway section, roadway plan and profile sheets showing all alignment data, topography, utilities, preliminary design plan) Right-of-Way restrictions, preliminary hydraulics and geology information, environmental constraints, lighting requirements, guardrail types, recommendations for structure type, and architectural recommendations.			
ii) Obtain data on existing structures. When applicable, collect items such as existing plans, inspection reports, structure ratings, foundation information, and shop drawings. A field investigation of existing structures will be made with notification to the Resident Engineer.			
b. Structure Selection and Layout			
i) Review the structure site data to determine the requirements that will control the structure size, layout, type, and rehabilitation alternatives. On a continuing basis, provide support data and recommendations as necessary to finalize the structure site data.			
ii) Determine the structure layout alternatives. For bridges, determine the structure length, width, and span configurations that satisfy all horizontal and vertical clearance criteria. For walls, determine the necessary top and bottom of wall profiles.			
iii) Determine the structure type alternatives. For bridges, consider precast and cast-in-place concrete and steel superstructures and determine the spans and depths for each. For walls, determine the feasible wall types.			
iv) Determine the foundation alternatives. Consider piles, drilled caissons, spread footings, and mechanically stabilized earth foundations based on geology information from existing structures and early estimates from the project geologist. To obtain supporting information, initiate the foundation investigation as early as possible during the preliminary design phase.			
v) Determine the rehabilitation alternatives. Continued use of all or parts of existing structures shall be considered as applicable. The condition of existing structures shall be investigated and reported. Determine the modifications and rehabilitation necessary to use all or parts of existing structures and the associated costs.			
vi) Develop the staged construction phasing plan, as necessary for traffic control and detours, in conjunction with the parties performing the roadway design and traffic control plan. The impact of staged			

construction on the structure alternatives shall be considered and reported on.			
vii) Compute preliminary quantities and preliminary cost estimates as necessary to evaluate and compare the structure layout, type, and rehabilitation alternatives.			
viii) Evaluate the structure alternatives. Establish the criteria for evaluating and comparing the structure alternatives that, in addition to cost, encompass all aspects of the project's objectives. Based on these criteria, select the optimum structure layout, type, and rehabilitation alternative, as applicable, for recommendation to CDOT.			
ix) Prepare preliminary general layout for the recommended structure. Prepare structure layouts in accordance with current standards. Special detail drawings and a detailed preliminary cost estimate shall accompany the general layout. The special detail drawings shall include the architectural treatment. Perform an independent design and detail check of the general layout.			
c. Structure Selection Report Prepare a structure selection report to document, and obtain approval for, the structure preliminary design. By means of the structure general layout, with supporting drawings, tables, and discussion, provide for the following:			
i) Summarize the structure site data used to select and layout the structures. Include the following: *a) Existing structure data, including sufficiency rating and whether or not the structure is on the "select list".* *b) Project site plan* *c) Roadway vertical and horizontal alignments and cross sections at the structure* *d) Construction phasing* *e) Utilities on, below, and adjacent to the structure* *f) Hydraulics:* *g) Channel size and skew, design year frequency, minimum low girder elevation, design year and 500-year high water elevations, estimated design year and 500 year scour profiles, and channel erosion protection* *h) Preliminary geology information for structure foundation* i) *Architectural requirements*			
ii) Report on the structure selection and layout process. Include the following: *a) Discuss the structure layout, type, and rehabilitation alternatives considered* *b) Define the criteria used to evaluate the structure alternatives and how the recommended structure was selected* c) *Provide a detailed preliminary cost estimate and general layout of the recommended structure*			
iii) Obtain acceptance by CDOT on the recommended structure and its layout. Allow approximately two weeks for review of the structure selection report. The associated general layout, with the revisions required by the CDOT review, will be included in the FIR plans. The structure selection report, with the associated general layout, must be accepted in writing by CDOT prior to the commencement of further design activities.			
d. Foundation Investigation Request Initiate the foundation investigation as early in the preliminary design phase as is practical. On plan sheets showing the project control line, its stations and coordinates, utilities, identify the test holes needed and submit them to the			

project geologist. The available general layout information for the new structure shall be included in the investigation request.			
12. **Construction Phasing Plan** 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. This plan shall accommodate the existing traffic movements during construction (detours). A preliminary traffic control plan will also be developed which will be compatible with the phasing plan.		X	
13. **Preparation for the Field Inspection Review (FIR)**		X	
a. Coordinate, complete, and compile the plan inputs from other branches: materials, hydraulics, traffic, right-of-way, environmental and water quality, and Staff Bridge.			
b. If a major structure is included in the project, including a PWQ CM, a general layout (which has been accepted by CDOT) will be included in the FIR plans.			
c. Prepare the preliminary cost estimate for the work described in the FIR plans based on estimated quantities.			
d. The FIR plans shall comply with CDOT requirements and shall include a title sheet, typical sections, general notes, plan/profile sheets, and preliminary layouts of interchanges/intersections. The plan/profile sheets will include all existing topography, survey alignments, projected alignments, profile grades, ground line, existing ROW, rough structure notes (preliminary drainage design notes, including pipes, inlets, ditches and channels), and existing utility locations.			
i) The following items will be mandatory for the FIR plans: *a) Preliminary earthwork (plotted cross sections at critical points with roadway template and existing utility lines at known or estimated depths)* *b) Catch points* *c) Proposed Right-of-Way* *d) Pit data (if required)* *e) Soil profile and stabilization data* f) *Structure general layouts (if applicable)*			
ii) Typical plan sheet scales will be as follows: *a) Plan and Profile 1 inch = 50 Feet (Urban)* *b) 1 inch = 100 Feet (Rural)* c) *Intersections 1 inch = 20 feet*			
e. The ROW ownership map shall be included in the FIR plan set			
f. The plans shall be submitted to the CDOT/PM for a preliminary review prior to the FIR			
g. FIR plan reproduction not to exceed 0 sets			
h. The preliminary construction phasing including preliminary traffic control plan with proposed detours will be included in the FIR plan set			
i. CDOT form 1048 – project scoping procedures completion checklist			
14. **Field Inspection Review**	C	X	
a. Attend the FIR			
b. The FIR meeting minutes shall be prepared by the C/PM, approved by the CDOT/PM, and distributed as directed			
c. The FIR original plan sheets shall be revised/corrected in accordance with the FIR meeting comments within thirty (30) working days			
d. Design decisions concerning questions raised by the FIR will be resolved in cooperation with the CDOT/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 standard design criteria along with the written justification for each one shall be submitted to the CDOT/PM			

15. **Post-FIR Revisions** The Consultant shall complete the revisions required by the FIR before this phase of work is considered to be complete		X	
a. Update project schedule			
b. Coordinate activities			
c. Finalize design decisions, variances, justification process, and traffic signal warrants			
D. FINAL DESIGN			
1. **Traffic Engineering**		X	
a. Prepare and provide permanent signing/pavement marking plans			
b. Signalized intersections:			
i) Prepare and provide the signal warrant study			
ii) Prepare plan sheet with intersection condition diagrams and required traffic signal design and forward to appropriate agency. Prepare 1 inch to 20-foot scale intersection plan sheet for each intersection which will have a traffic signal designed for it.			
iii) Prepare and provide the construction traffic control plans and quantities			
2. **Materials Engineering**	C	X	
a. Finalize and provide the stabilization plan/pavement design report.	C		
b. Finalize geotechnical considerations and incorporate them into the plans.		X	
i) Rock fall			
ii) Rock cut			
iii) Landslides			
iv) Other			
3. **Environmental Permits**	C		
This activity is concurrent with final design and must be completed prior to the advertisement for construction. Coordinate between the agencies, the Environmental Manager and the PM and prepare and submit application and design information to the Environmental Manager for the following permits:			
a. 401 Permit Process (Water Quality Certification)			
b. 402 Permit Process (Point Source Discharge)			
c. 404 Permit Process (Discharge of Fill)			
d. Senate Bill 40 Certification			
e. CDPS or NPDES Storm Water Permit for Construction Activities			
4. **Structures**		X	
Ensure approval of the Foundation Investigation Report from CDOT/PM			
5. **Hydrology, Hydraulics and Floodplain Management**		X	
a. Data Review Review data and information developed under the Preliminary Hydraulics Report, Preliminary Drainage Report, and/or Preliminary Floodplain Report, and update both/all in accordance with decisions made since the FIR.			
b. Hydrology and Hydraulics			
i) Review data and information developed under the preliminary hydraulic investigation and update per FIR decisions			
ii) Complete final design for minor drainage structures a) *Finalize horizontal and vertical locations and sizes for all drainage structures based on hydraulic design. Update locations in construction plans by highway station or coordinates, as appropriate* b) *Make final recommendations for pipe material based on CDOT Pipe Material Selection Policy guidelines. Document recommendations in a letter with supporting design information.* c) *Finalize structure cross-sections and profiles to determine the elevations, flow lines, slopes and lengths of structures.*			

d) *Finalize deck/structure drainage in coordination with CDOT Staff Bridge or their designee.*			
iii) Complete final design for major structures. a) *Finalize hydraulic analysis elevations, flow lines, water surface profiles and hydraulic information.* b) *Finalize configuration, size and skew of major structures and channels.* c) *Coordinate final water surface profiles and final low girder elevation for selected structures.* d) *Finalize channel scour profiles for design year and 500-year scour for selected structures.* e) *Finalize channel erosion protection limits and mitigation measures for selected structures and provide appropriate details.* f) *Finalize deck/structure drainage in coordination with CDOT Staff Bridge or their designee.*			
iv) Complete final design for all drainage details required for minor and major drainage structures.			
v) Recommend culvert pipe sizes, type, shape and material for proposed construction detours.			
vi) Erosion and sedimentation problems identified with solutions in place, including but not limited to erosion and scour countermeasure designs, analyses and reports.			
c. Prepare final construction plans in accordance with requirements in the CDOT Drainage Design Manual (DDM) i) Drainage Notes ii) Drainage Tabulation Sheets iii) Drainage Plan Sheets iv) Drainage Profile Sheets v) Drainage Detail Sheets vi) Bridge Hydraulic Information Sheets vii) Floodplain Information Sheet			
d. Prepare a Final Hydraulic Design Report or Final Drainage Report in accordance with the requirements of the CDOT DDM			
i) Review data and information in the Preliminary Hydraulic Design Report and/or Preliminary Drainage Report and update in accordance with decisions made at FIR ii) Finalize all sections of the report and include Bridge Hydraulic Information Sheets. All design assumptions and related design decisions shall be documented in the report.			
iii) Provide a PDF copy of the Final Hydraulic Design Report or Final Drainage Report to the CDOT Project Manager for disbursement to appropriate parties.			
iv) Floodplain & floodway information incorporated into the plan sheets			
v) Bridge hydraulic information incorporated into the plan sheet			
vi) Provide digital linework from all drainage and floodplain analysis in GIS Shapefiles, AutoCAD/Civil3D drawings, or MicroStation/OpenRoads drawings. All CAD or MicroStation drawings must be compressed into a single drawing. All surfaces (DTMs, TINs, Rasters, etc.) must be separated and labeled clearly for archiving and rediscovery			
e. Prepare Final Floodplain Report			
i) Include the Floodplain Information Sheet from the plan set in 11x17 with all other hydraulic mapping information relevant to requisite permits and certifications			

ii) List and identify all applicable ordinance or code, and describe how those specific standards were addressed and resolved			
iii) Discuss all alternatives analyzed, analysis results, recommendations, and final design direction			
iv) Record all relevant current effective floodplain information, like community number, panel number(s), effective date(s), waterway names, cross sections, BFEs, and contact name and information for local floodplain administrators contacted for the project.			
v) Provide a copy of approved floodplain development permits and no rise certifications			
vi) Identify all construction and as-built stipulations required from approved permits and certifications			
vii) Provide all background survey information on 11x17 or smaller			
viii) Identify future actions required prior to CDOT project close-out, especially as-built survey and P.L.S. certification, and final P.E. re-certification with local agencies.			
f. Perform internal QA/QC on all hydrologic, hydraulic and floodplain information prior to submittal to CDOT.			
6. **Environmental – Water Quality**	C		
a. Storm Water Management Plan			
b. Permanent Water Quality			
c. Prepare a Final PWQ report as an appendix to the Final Hydraulic Design Report.			
d. Conduct a PWQ meeting just prior to FOR to discuss documentation of PWQ with CDOT PWQ Specialist/Water Pollution Control Manager, Hydraulics Engineer, and Project Manager.			
e. Perform internal QA/QC prior to submittal to CDOT.			
7. **Utility Coordination** Following the finalization of the roadway horizontal alignment and profile grade and the horizontal and vertical location of drainage structures, sewers, and other underground structures, coordinate with the Utility Engineer to identify and resolve any conflicts to finalize utility clearances.		X	
a. Prepare and provide final utility plans			
i) The final utility plans shall be prepared following the resolution of the FIR comments, the completion of the final hydraulic design, and the completion of the design of the other items in the list in paragraph (b) below.			
ii) The final utility plans shall include all horizontal and vertical locations of the existing and proposed utilities and any other details which would indicate possible utility conflicts.			
iii) The new or revised utility locations will be added to the plan topography. Conflicts will be resolved and appropriate pay items and specifications added, if required, to adjust utilities.			
b. Final railroad plans			N/A
8. **Roadway Design and Roadside Development**		X	
a. Roadway design. Prepare and provide final roadway design plans incorporating all input from applicable CDOT specialties and outside entities.			
b. Roadside design			
c. Landscaping			
i) Determine the most economical alternative, finalize concept, and complete the plan.			

ii) Verify that an acceptable safe recovery distance exists between traveled way and all trees to be planted.			
iii) Coordinate special permits that may be required.			
iv) Verify availability of plant materials and submit letter to the CDOT/PM certifying that designated plants are available.			
d. Prepare and provide plans for sprinkler systems, bike paths, sound barriers, truck escape ramps, rest areas, and others, as appropriate.			
e. Lighting plans			
i) Provide a foundation investigation for each high mast light location.			
ii) After approval of the locations of the lights, the lighting design will be completed with the following information shown on the plan sheets: a) *Circuit type and voltage of power source* b) *Location of power source (coordinated with the utility engineer)* c) *Lumina ire type and lumens* d) *Light standard type and mounting height* e) *Bracket arm type and length* f) *Foundation details* g) *Size and location of electrical conduit* h) *Locations of power sources(s)/lighting control center(s) (if appropriate)* i) *Location of direct burial cable* j) *Size of wiring and/or direct burial cable*			
iii) Coordinate with local entities			
f. Prepare and provide wetland mitigation plan.			
9. **Right-of-Way Plans and Activities** Reference the CDOT ROW and surveying manual requirements for the following:	C		
a. Initiate ROW authorization process			
b. Ownership Maps			
c. Authorization Plan			
d. Right-of-Way Plan Revisions			
e. Final ROW Plans and Monumentation			
f. Appraisals			
g. Appraisal staking			
h. Title Insurance and Closing Services			
i. Acquire needed parcels including title insurance and closing services coordinated with the Region ROW Manager			
10. **Final Major Structural Design** During the conduct of this activity, the Consultant shall participate in structural review meetings with the CDOT Structural Reviewer.		X	
a. Structure final design			
i) Perform the structural analysis. Provide superstructure design, substructure design and document the design with design notes, detail notes, and computer outputs.			
ii) Perform final design check from design and detail notes.			
b. Preparation of structure plans and specifications Prepare and provide the Structural Plans and Specifications, including any revisions identified during the independent check.			
c. Independent design, detail and quantity check			
d. Prepare and provide the bridge rating and field packages			
11. **Construction Phasing Plan** A final construction phasing plan will be developed which integrates the construction of all project work elements into a practical and feasible sequence. This plan shall accommodate the existing traffic movements during construction,		X	

and a final traffic control plan will be developed which shall be compatible with the phasing plan.			
12. **Preparation for the Final Office Review (FOR)**		X	
a. Coordinate the packaging of the plans			
i) Collect plans from all design elements and collate the plan package. Include all items listed in the Project Development Manual.			
ii) Calculate plan quantities and prepare the tabulations and Summary of Approximate Quantities.			
b. In addition to the plan sheets, the special provisions shall be provided. 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. Appropriate mitigation commitments made within any environmental documents should be included in the plans and specifications.			
c. Prepare FOR Estimate. Item numbers, descriptions, units and quantities shall be listed and submitted to the CDOT/PM.			
d. Submit the FOR Plans and specifications (Originals) to the CDOT/PM for a preliminary review prior to the FOR.			
e. FOR plan reproduction			
13. **Final Office Review**	C	X	
a. Attend the FOR			
b. The FOR meeting minutes shall be prepared, approved, and distributed within two weeks of the meeting as directed.			
c. The FOR original plan sheets and the specifications shall be revised in accordance with the FOR meeting comments and submitted to the CDOT/PM within four (4) weeks after the FOR.			
d. Submit the final revision of the plans after CDOT review.			
E. PRIOR TO AD			
1. **Construction Plan Package** 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.		X	
a. Electronic copies of the following:			
i) Roadway *a) Horizontal and vertical data* *b) Staking data* *c) Earthwork quantities* d) *Cross sections*			
ii) Major structures An independent set of the following shall be submitted to the CDOT Structural Reviewer for each major structure. *a) Structure grades* b) *Structure geometry*			
b. Final engineering package. The consultant shall submit electronic copies of the following:			
i) All project calculations or worksheets			
ii) All final reports and their approvals: Traffic, hydraulics, lighting, pavement design and economic analysis, geology foundation report, etc. All reports will have the latest revisions included.			
iii) Copies of variances, design decisions, and variance approvals			

iv) Project meeting minutes			
v) Utility clearance package vi) Utility agreements and information regarding the utility location and clearance conditions			
vii) Maintain an environmental mitigation tracking tool for all environmental document commitments.			
viii) Bridge construction packet ix) Includes bridge grades, geometry, and quantity calculations or worksheets			
x) Any other information unique to this project and deemed important to the effectiveness of construction.			
c. Record plans sets. In coordination with CDOT the responsible Consultant Engineer shall seal an electronic record set.			
2. **FEMA CLOMR Submittal** Prepare a Conditional Letter of Map Revision package and submit to FEMA and the local Floodplain Administrator for community concurrence, for any work in the floodway that alters the BFE or floodway boundary, or as required by the local permitting agency's Floodplain Administrator.			N/A
3. **Water Rights Reporting** If the project includes a detention or water quality pond, water rights reporting is required once the pond is substantially complete. See Section 8, Services After Design for additional information.			N/A
4. **All project permits, approved and in-hand.**			N/A
F. CORRIDOR MANAGEMENT SUPPORT			
1. **Design Control**			N/A
a. Provide the required staff, communication equipment and computer systems with appropriate software for tracking and monitoring the planning efforts.			
b. Conduct periodic corridor progress meetings at an interval acceptable to the CDOT/PM. The following shall be reviewed:			
i) Activities complete since the last meeting			
ii) Problems encountered			
iii) Late activities			
iv) Activities required by the next progress meeting			
v) Solutions for unresolved and anticipated problems			
vi) Information or items required from other agencies			
c. Develop a quality assurance program that ensures correct error-free plans are produced by the project designers.			
d. The consultant shall coordinate the technical aspects of the planning efforts such as:			
i) Ensuring that the separate projects all utilize the same reference and data base for horizontal and vertical control.			
ii) Bearings, coordinates, grades and elevations are identical for common control lines on separate projects.			
iii) Earthwork balance is accomplished where appropriate			
2. **Information Services**			N/A
a. Provide a management information system to monitor and report progress. This System will include a computer terminal and/or software for the CDOT/PM that the consultant shall furnish and maintain. This system will:			

i) Provide access to current project data and status (e.g., progress versus schedules and cost estimates versus budgeted funds)			
ii) Include the project schedules for submittals and key events			
iii) Identify progress with respect to the schedules			
iv) Identify critical path activities			
v) Provide upon demand the scheduled submittals/key events for designated time periods			
b. Produce and periodically update a strip map which outlines the entire corridor. The Information Shown on this Map will Include the following:			
i) Preliminary engineering project limits			
ii) Construction project limits			
iii) Construction project estimated costs			
iv) Construction project Advertise-for-Bid (AD) dates			
v) Other information that is considered appropriate			
3. **Budget Planning Support**		X	
a. Maintain a current file of project cost estimates. The date and type of each estimate will be identified.			
b. Maintain a current file of existing and proposed funding for projects. Types of funding sources will be identified.			
c. Develop a proposed ad schedule based on the estimated costs and the existing and anticipated future funding. The proposed ad schedule will be compared to the design schedule. Adjustments to the design and ad schedules may be made with CDOT concurrence.			
d. A continuing evaluation of cash flow requirements and drawdown schedules administrative, preliminary engineering, right-of-way, utility, and construction costs will be accomplished. The funding requirements will be compared with the budget, also on a continuing basis. CDOT will be notified immediately of changes in funding requirements. (this will be completed when needed)			
e. Identify possible grant alternatives to supplement project funding. Develop proposal materials.			

SECTION 8 - SERVICES AFTER DESIGN

Note: The Consultant shall appoint a responsible member of the firm to be the contact person for all construction services. That person should be available until the end of construction to coordinate the following services.

Deliverables can be static reports and products, digital reports and products, and/or GIS data layers. The scope should be specific as to what type of deliverable is expected.

This list establishes the individual task responsibility. Those tasks identified as CDOT/Other should utilize an abbreviation system to indicate whether the task will be completed by CDOT or another agency (i.e. "C" for CDOT and abbreviations as provided below). The consultant shall maintain the ability to perform all work tasks which are indicated below by an 'X' in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Where appropriate, mark "N/A" for not applicable items.

***Other Agency Abbreviations:**

Section 8: Detailed Scope Elements	CDOT(C)/Other*	Consultant	Not Applicable
A. **REVIEW OF SHOP DRAWINGS** Review contractor shop and auxiliary drawings as directed by the CDOT/PM.		X	
1. **Maintain a log of all submittals which includes the following information:**			
a. Submittal description			
b. Date received			
c. Date transmitted back to the sender			
2. **The review of submittals shall be done by a licensed professional engineer who is acceptable to the CDOT/PM.**			
3. **Review Shop Drawings** Review the construction contractor's shop drawings for conformance and compliance with the contract documents, the provisions of the current "Standard Specifications for Road and Bridge Construction, and the period of work shown in the CDOT specifications in conjunction with the contract work.			
B. **CONSTRUCTION SERVICES**			N/A
When requested by the appropriate Program Manager, the Consultant shall provide the services described below			
1. **Coordinate Schedule** Coordinate and evaluate contractor's construction schedule at start of construction and continuously throughout construction phase.			
2. **Provide field observation prior to, and on the day of, the following:**			
a. Pile driving and/or caisson drilling			
b. All major concrete pours			

c. Placement of girders			
d. Splicing of girders			
e. Post-tensioning duct and anchorage placement			
f. Post-tensioning operations			
3. **Technical Assistance** Provide technical assistance to CDOT project personnel on an as-needed basis. This service shall include, but not be limited to, the following:			
a. Respond to questions in the field that arise relative to the plans, details or special provisions			
b. Review girder erection plan			
4. **Report Submittal** The following reports/submittals shall be maintained and submitted:			
a. Diary - A complete diary will be accomplished daily for each field observation activity.			
b. Documentation/justification - Changes/revisions/documentation justifying changes and/or revisions to plans and specifications			
c. Progress reports - Monthly progress reports will be submitted for the Consultant's activities.			
d. Calculations, drawings, and specifications as needed.			
e. Daily time sheets - This will be filled out daily on a form approved by the Project Engineer. This sheet will remain with the Project Engineer.			
C. **POST DESIGN PLAN MODIFICATIONS**			N/A
1. When requested by the Program Manager through the CDOT/PM, the Consultant shall provide design services for plan modifications required by unforeseen field conditions. 2. Revisions to PWQ CMs and drainage design should be performed by the Engineer of Record.			
D. **POST CONSTRUCTION SERVICES**			N/A
1. **Final Earthwork or Interim Determination** Compute the final or interim as-built earthwork quantities. This will include the required surveying, engineering technician, and computer support.			
2. **"As-Built" Plans** Redline the original plan set in a "track changes" manner so that design information is shown alongside as-constructed information.			
3. **PWQ CM GIS Attribute Tables and Feature Classes** Information shall be submitted that meets all the reporting requirements of the MS4 Permit and the CDOT PWQ Program, including pond volume certification.			
4. **Revisions to the Final Right-of-Way Plans** Review the final Right-of-Way line to identify any excess property due to construction changes. Prepare Final Plan Revisions, including legal Descriptions of excess property			
5. **Monument the Right-of-Way**			
a. Reset all monuments referenced prior to construction that have been damaged or destroyed.			
b. Reset any control monuments disturbed or destroyed by construction that are necessary to set Right-of-Way monuments.			
c. Set all new Right-of-Way monuments as shown on final plans (or reference monuments, if necessary).			
6. Set property corners on all remainder parcels Required monumentation will be as directed by the CDOT/PM.			

	7. Deposit ROW Plans A Record Plan Set updated for revisions and showing all monuments set subsequent to construction, must be signed and sealed by the Professional Land Surveyor responsible for the work. The Record Set must be deposited in the appropriate county office in accordance with CRS 38-50-101 and CRS 38-51-107. A copy of the deposited plan set must be delivered to the CDOT/PM.			
	8. **FEMA LOMR Submittal** Prepare a Letter of Map Revision package and submit to FEMA after receiving approval from the community Floodplain Administrator. This LOMR shall be based on the P.L.S. certified as-built topographic information and corresponding modifications to the modeling and report that were submitted to FEMA for the CLOMR application for all work that will alter the regulatory floodplain or floodway, or as required by the local permitting agency's Floodplain Administrator.			
	9. **Update Floodway No Rise Certification** Stipulations for no rise in regulatory floodways often include as-built surveys, certifications, and other operational standards. Check project specials from CDOT and floodplain development permit stipulations from local agencies issuing the permit to determine what is required.			
	10. **Water Rights Reporting** Submit pond information to the water rights reporting website. Pond information submitted should reflect the as-built condition for pond volume and stage/storage/discharge relationships, and any other information requested by the water rights reporting website during upload.			

SECTION 9 - CONTRACT CONCLUSION (CHECKLIST)

1. SUPPLEMENTAL WORK

It is anticipated that this contract may be supplemented for:

A. Preliminary Design for Additional Scope
B. Final Design for Additional Scope
C. Construction Services
D. Final Earthwork Determination

2. CONTRACT COMPLETION

This Contract will be satisfied upon acceptance of the following items if applicable:

A. Project Schedule
B. Project Progress Meeting Minutes
C. Traffic Control Plan(s)
D. All documents found In Research
E. All Permission to Enter Property forms
F. Monumented & Surveyed Ground Control Diagram(s)
G. Legally Deposited Control Survey Diagram(s)
H. Digital TMOSS Data
I. Photography Products
J. Ownership Map
K. Survey Report (including monument recovery forms)
~~L. Monumented and Sealed ROW Plans~~
M. Legally Deposited Survey Plans
N. Legal Descriptions (Signed and Sealed)
O. NOAA-NGS Blue Book
P. Completion of review of contract submittals
Q. Design Plans, Specifications, and Final Estimate
~~R. All Environmental Permits~~
S. All Environmental, Utility, and ROW Clearances
T. Floodplain Memo/Report (as determined by Region 4 Hydraulics)
U. Hydraulic Design Report, including PWQ design (signed and sealed)
V. Structural Report (signed and sealed)
W. Geotechnical Report (signed and sealed)
X. Materials Report
~~Y. Environmental Technical Resource Reports~~
~~Z. Environmental NEPA Documents~~
AA. Floodplain Development Permit & No Rise Documents
AB. GIS shape files

TABLE 1 – SUBMITTALS

Note: This list establishes the individual task responsibility. Those tasks identified as CDOT/Other should utilize an abbreviation system to indicate whether the task will be completed by CDOT or another agency (i.e. "C" for CDOT and abbreviations as provided below). The consultant shall maintain the ability to perform all work tasks which are indicated below by an 'X' in the consultant column, in accordance with the forms and conditions contained herein, and the applicable CDOT standards. Where appropriate, mark "N/A" for not applicable items.

***Other Agency Abbreviations**

Submittals

Electronic Copy		Work Tasks	CDOT (C)/ Other*	Consultant	Not Applicable
PDF	**Orig.**				
	X	Periodic Reports		X	
X		Billings		X	
	X	Meeting Minutes		X	
X		Project Schedule		X	
	X	Completed Specific Design Criteria		X	
X		Survey Plan		X	
X		Approved MHT's			X
X		Traffic Control Supervisor Certification			X
X		Permissions to Enter		X	
	X	Initial Submittal of TMOSS and/or MOSS Compatible Data		X	
X	X	Initial Submittal of an Original Plan Sheet			X
		Project Development			
	X	Public Communication Contact List		X	
		Route Location Survey			
X		Traffic Control Supervisor Certification			X
X		Approved MHT's			X
	X	Survey data in raw, unedited formats		X	
	X	Pothole data including invert elevations		X	
X		Existing culverts report		X	
X		Access report			X
X		Topographic survey notes		X	
X	X	Contour plan checked for errors		X	
X	X	Survey control diagram		X	
		Field books		X	
	X	Electronic Survey Files		X	
	X	Survey TMOSS Data		X	
	X	Monument Records		X	
X	X	Control & Monumentation Plan Sheets		X	
X		Aerial Photography Index Map Sheets			X
X		Aerial Photography Contact Sheets			X
		Permits			
X		401 Permit			X
X		Dewatering / 402 Permit			X

X		404 Permit			X
X		SB 40 Permit			X
X		Wildlife Certification			X
X		CDPS Storm Water Permit			X
X		CDPHE Discharge Permit			X
X		Floodplain Development Permit (approved)		X	
X		No Rise Certification (approved)		X	
X		No Rise Recertification at As-Built (approved)	C		
		Environmental Work Tasks	C		
X	X	Appropriate NEPA Document (CatEx, EA, EIS, FONSI or ROD)			
X	X	Figures and Exhibits from NEPA Document			
X	X	Air Quality Technical Report			
X	X	Geologic Technical Report			
X	X	Water Quality Technical Report			
X	X	Wetland Finding Report			
X	X	Integrated Noxious Weed Management Plan			
X	X	Biological Resources Report			
X	X	Biological Assessment			
X	X	Historic Resource Technical Reports			
X	X	Section 4(f) Documents			
X	X	Paleontological Technical Report			
X	X	Environmental Justice Technical Report			
X	X	Transportation Technical Report			
X	X	Noise Technical Report			
X	X	Hazardous Materials Documentation (ISA/MESA)			
		PRELIMINARY DESIGN			
	X	Electronic Survey Data		X	
X		Traffic Data & Recommendations		X	
X		Geology & Soils Investigation Report		X	
X		Pavement Design Report	C		
X		Existing Bridge Condition Report		X	
X		Foundation Investigation Report		X	
X		Engineering Geology Plan Sheet(s)		X	
X		Preliminary Hydraulic Design Report, including preliminary PWQ design		X	
X		Preliminary Floodplain Report		X	
X	X	Preliminary Storm Water Management Plan	C		
X		Utility Relocation Recommendations		X	
X	X	Irrigation Ditch Structure Plans		X	
		Right-of-way			
X		Memorandum of Ownership	C		
X	X	Preliminary Ownership Map (include in FIR Plan set)	C		
X		Structural Selection Report		X	
X		Foundation Investigation Request		X	
X		Final Materials Recommendations		X	
X		Final Pavement Selection Report	C		
X		Intersection Traffic Report		X	
X		Traffic Report		X	
X		Preliminary Cost Estimate		X	
X	X	FIR Plan Set		X	
X		List of deviations from Standard Design Criteria		X	
X	X	Corrected FIR Plan Set		X	
		FINAL DESIGN			

X	X	ROW Authorization Plans	C		
X		Final Hydraulic Design Report, including preliminary PWQ design		X	
X		Final Floodplain Report		X	
X	X	Final Utility Plan Set		X	
X	X	Final Railroad Plan Set			X
X		PUC Exhibit			X
X		Correspondence with Agencies, Entities, and Public	C	X	
		Right-of-way	C		
X		Area Calculations			
X	X	Authorization Plans			
X		Legal Descriptions			
X	X	Final Right-of-way Ownership Map			
X	X	Stabilization Plans			
		Traffic Engineering			
X		Safety Assessment		X	
X	X	Signing/Pavement Marking Plans		X	
X		Signal Warrant Study		X	
X	X	Signalized Intersection Plans & Specifications		X	
X	X	Traffic Control Plan		X	
		Roadside Planning			
X	X	Landscape Plan & Specifications			X
X		Certification of Plant Availability			X
X	X	Irrigation Plans & Specifications			X
X	X	Bike path Plans & Specifications			X
X	X	Sound Barrier Plans & Specifications			X
X	X	Truck Escape Ramp Plans & Specifications			X
X	X	Rest Area Plans & Specifications		X	
X	X	Lighting Plans & Specifications		X	
X	X	Structure Final Review Plans & Specifications		X	
X	X	Construction Phasing Plan		X	
X	X	Storm Water Management Plan	C		
X		FOR Plans & Specifications		X	
X		FOR Cost Estimate		X	
X	X	Final Review Revisions		X	
		Construction Plan Package			
X	X	Final Plans, Specifications & Estimate Package for Ad		X	
X	X	Final Cross Sections		X	
X		Schedule of Quantities		X	
X		Design Decisions		X	
X		Variances		X	
X		Findings In the Public Interest			X
	X	Original Surface Digital Terrain		X	
	X	Final Surface Digital Terrain Model		X	
	X	Design Digital Terrain Model		X	
	X	Staking Data		X	
X	X	Earthwork Quantities		X	
X	X	Mass/Haul diagram			X
X		Project Calculations		X	
X		Worksheets		X	
X		Design Notes		X	
X		Independent Design Review Reports		X	
X		Roadway Design Data Submittal		X	
X		Major Structure Design Final Submittal		X	

X		Bridge Construction Pack		X	
X		Record Plan Sets		X	
X		As-Built Plan Sets (if required)			X
X		Approved no rise recertification or written and approved evidence that all floodplain permit conditions are resolved		X	

APPENDIX A
REFERENCES

1. AMERICAN ASSOCIATON 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
J. Load Resistance Factor Design (LRFD) Specifications

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

A. Design Guide (all volumes)
B. Bridge Design Guide
C. Bridge Detailing Manual
D. Bridge Rating Manual
E. Project Development Manual
F. Erosion Control and Stormwater Quality Guide
G. Field Log of Structures
H. Cost Data Book
I. CDOT Traffic Analysis and Forecasting Guidelines
J. Drainage Design Manual
K. Landscape Architecture Manual
L. NEPA Manual
M. Environmental Stewardship Guide
N. Various CDOT Environmental Resource Guidance (i.e Air Quality, Hazardous Materials, Noise, Visual)
O. Quality Manual
P. Survey Manual
Q. Field Materials Manual
R. Standard Plans, M & S Standards

S. Standard Specifications for Road and Bridge Construction and Supplemental Specifications

T. Item Description and Abbreviations (with code number) compiled by Engineering Estimates and Market Analysis Unit ("Item Book")

U. Right-of-Way Manual

V. The State Highway Access Code

W. Utility Manual

X. TMOSS Generic Format

Y. Field TMOSS Topography Coding

Z. Topography Modeling Survey System User Manual

AA. Interactive Graphics System Symbol Table

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

A. No. 27.1 Social Marketing – Use of Web 2.0 and Similar Applications

B. No. 31.1 Website Development

C. No. 501.1 Requirements for Storm Drainage Facilities and MS4 Facilities

D. No. 503.1 Landscaping with Native Plant Species and Managing the Pollinator Highway

E. No. 1050.1 Contracts with Local Agencies for Maintenance of State Highways

F. No. 1601 Interchange Approval Process

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. Executive Order 12898

F. Executive Order 11988 & 13690 FHWA Federal-Aid Policy Guide

G. FHWA NHI Hydraulic Circular (HEC) and Hydraulic Design Series (HDS) Reports

H. Technical Advisory T6640.8A

I. U.S. Department of Transportation Order 5610.1E

J. Geometric Geodetic Accuracy Standards and Specifications for Using GPS Relative Positioning Techniques

K. ADAAG Americans With Disabilities Act Accessibility Guidelines

L. 23 CFR 771, the FHWA Technical Advisory T6640.8A

M. 44 CFR 59-72, standards of the National Flood Insurance Program (NFIP)

N. U.S. Army Corps of Engineers Wetlands Delineation Manual of 1987 and appropriate regional supplements

5. AREA:

A. Manual for Railway Engineering

B. Urban Storm Drainage Criteria Manual (MHFD, formerly UDFCD)

C. Any appropriate local agencies references as appropriate

APPENDIX B
SPECIFIC DESIGN CRITERIA

Note: The following criteria will be developed by the consultant and coordinated with the CDOT/PM prior to starting the design. The Consultant shall develop the CDOT Form 463 and insert a copy upon completion.

1. ROADWAY

A. BASIC DESIGN

The basis for design will be the data in CDOT Form 463, Design Data. A copy of the latest applicable Design Data form will be furnished to the consultant.

B. GEOMETRIC AND STRUCTURE STANDARDS:

a Design Speed, horizontal alignment, curvature, vertical alignment, sight distance and superelevation is specified in Form 463.

b Use of Spirals

c Passing Sight Distance

d Decision Sight Distance

e Frontage Roads, Separation Width

f CDOT Access Code

g Airway – Highway Clearances Design Guide

h Bridges and Grade Separation Structures, Clearances to Structures and Obstructions, CDOT Design Guide

i Curb and Gutters, Type

C. GEOMETRIC CROSS SECTION are as specified in Form 463

D. INTERSECTIONS AT GRADE:

a. Type
b. Special Considerations

E. TRAFFIC INTERCHANGES:

a. Type
b. Ramp Type
c. Special Considerations

F. DESIGN OF PAVEMENT STRUCTURE:

a. Pavement Type & Percent Trucks are as specified in Form 463
b. Economic Analysis Period
c. Design Life

G. MISCELLANEOUS DESIGN CONSIDERATIONS:

a. Fence Type
b. FEMA Flood Zone
c. Design Flood Frequency

H. ROADSIDE DEVELOPMENT

a. Landscaping
b. Specifications for Revegetating Disturbed Areas to be provided by CDOT
c. PWQ Design
d. Noise Control
e. Type
f. Guardrail and End Treatments

I. LIGHTING:

a. Type

APPENDIX C
DEFINITIONS

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

Acronyms

AASHTO	American Association of State Highway & Transportation Officials
ADT	Average two-way 24-hour Traffic in Number of Vehicles
AREA	American Railway Engineering Association
ATSSA	American Traffic Safety Services Association
AT&SF	Atchison, Topeka & Santa Fe Railway Company
ADAAG	Americans with Disabilities Accessibility Act Guidelines
BAMS	Bid Analysis and Management Systems
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BNRR	Burlington Northern Railroad
CA	Contract Administrator – CDOT Manager responsible for completion of the contract
CAP	CDOT's Action Plan
CBC	Concrete Box Culvert
CDOT	Colorado Department of Transportation
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 (as defined in Section 2 of this document)
CDOT/STR	Colorado Department of Transportation Structure Reviewer – The CDOT Engineer responsible for reviewing and coordinating major structural design
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
COG	Council of Governments
COGO	Coordinate Geometry Output
CONSULTANT	Consultant for the project
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 (as defined in Section 2 of this document).
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.
CWCB	Colorado Water Conservation Board
DDM	Drainage Design Manual
DEIS	Draft Environmental Impact Statement
DHV	Future Design Hourly Volume (two-way unless specified otherwise)
DRCOG	Denver Regional Council of Governments
D&RGW	Denver & Rio Grande Western Railroad
EA	Environmental Assessment
EIS	Environmental Impact Statement

ESAL	Equivalent Single Axle Load
ESE	Economic, Social and Environmental
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHPG	Federal Aid Highway Policy Guide
FHWA	Federal Highway Administration
FIPI	Finding In Public Interest
FIR	Field Inspection Review
FONSI	Finding of No Significant Impact
FOR	Final Office Review
GIS	Geographic Information Systems
GPS	Global Positioning System
LA	Professional Landscape Architect registered in Colorado
MAJOR STRUCTURES	Bridges and culverts with a total clear span length greater than twenty feet. This length is measured along the centerline of roadway for bridges and culverts, from abutment face to abutment face. Retaining structures are measured along the horizontal distance along the top of the wall. Structures with exposed heights at any section over five feet and total lengths greater than a hundred feet as well as overhead structures including (bridge signs, cantilevers and butterflies extending over traffic) are also considered major structures.
MHFD	Mile High Flood District (formerly UDFCD)
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).
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGS	National Geodetic Survey
NICET	National Institute for Certification in Technology
NOAA	National Oceanic and Atmospheric Administration
PAPER SIZES	See Computer-Aided Drafting Manual(CDOT); Table 6-13 and Table 8-1
PE	Professional Engineer registered in Colorado
PM	Program Manager
PLS	Professional Land Surveyor registered in Colorado
PRT	Project Review Team
PS&E	Plans, Specifications and Estimate
PROJECT	The work defined by this scope
PWQ CM	Permanent Water Quality Control Measure
ROR	Region Office Review
ROW	Right-of-Way: A general term denoting land, property, or interest therein, usually in a strip acquired for or devoted to a highway
ROWPR	Right-of-Way Plan Review
RTD	Regional Transportation Director
T/E	Threatened and/or Endangered Species
SFHA	Special Flood Hazard Area
SH	State Highway Numbers
TMOSS	Terrain Modeling Survey System
TOPOGRAPHY	In the context of CDOT plans, topography refers to existing cultural or manmade details.
USACE	United States Army Corp of Engineers

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