

Colorado Department of Transportation
Scope of Work for Tunnel Inspection and Asset Management Services

SOW
NPS TUNNEL INSPECTION & ASSET MANAGEMENT SERVICES

NON PROJECT SPECIFIC

COST PLUS FIXED FEE

SOW DATE: February 2014

PROJECT NUMBER: Non Project Specific

PROJECT LOCATION: Statewide

PROJECT CODE: Per Task Orders

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

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Comments regarding this scope may be directed to:

ENGINEERING CONTRACTS BRANCH

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I. GENERAL

The goal of this project is to perform a baseline inspection and one subsequent inspection of tunnels located in the state of Colorado, report the conditions of the individual tunnels to the Colorado Department of Transportation (CDOT), Staff Bridge, utilize a web based data management to gain efficiency in collecting and distributing data that integrates with our AASHTOWare Bridge Management (formerly known as AASHTOWare Pontis) databases, and meet compliance with any FHWA requirements and guidelines.

Tunnels will be referred to as “structures” hereafter in this Scope of Work (Scope). Tunnel inspections will be referred to as the “work” hereafter in this Scope. The Colorado Department of Transportation will be referred to as the “Owner” hereinafter in this Scope.

It is anticipated that task orders will be written to this contract for a period of four years to perform the following:

- A. Inventory and inspection tunnels in the state of Colorado.
- B. Development of a risk based asset management plan for tunnels.
- C. Development or recommendation of a web based data management system compatible with the AASHTOWare Bridge Management version 5.x databases. Integration with other databases may be required as identified in the individual task orders.

II. DEFINITIONS

- A. **AASHTO** – American Association of State Highway and Transportation Officials.
- B. **BRIAR** – Bridge Ratings, Inspections And Records
- C. **CDOT** – Colorado Department of Transportation.
- D. **ELECTRONIC DATA FILES** - Electronic files containing inventory and inspection data for each tunnel in the CDOT Project Manager specified version of AASHTOWare Bridge Management, or other database format, specified by the CDOT Project Manager. Electronic sketches of structures in a MicroStation compatible format as needed. PDF files of all inspection reports. JPG files of structure photographs.
- E. **ENGINEER** – CDOT Bridge Inspection Engineer or his/her designee.

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- F. **ERF** – Essential Repair Finding
- G. **FHWA** – Federal Highway Administration.
- H. **FY** – Fiscal Year
- I. **MUTCD** – Manual on Uniform Traffic Control Devices
- J. **NEW STRUCTURES** – Structures not previously inspected such as newly constructed structures requiring initial inspection or structures found to be qualifying and without prior inspections.
- K. **NHS** – National Highway System.
- L. **NTIS** – National Tunnel Inspection Standard – 23 CFR Part 650 National Tunnel Inspection Standards; Proposed Rule can be found at the following link: <https://www.federalregister.gov/articles/2013/07/30/2013-17875/national-tunnel-inspection-standards#h-4>
- M. **BrMEI** – AASHTOWare Bridge Management Element Inspection form. A structure inspection form found within the inspection module of AASHTOWare Bridge Management, on which the applicable structure element condition states and comments are reported for each structure inspected.
- N. **Project Manager** – CDOT Project Manager
- O. **SI&A** – Structure Inventory and Appraisal form, (formerly CDOT Form #422). An inventory and appraisal form found within the AASHTOWare Bridge Management inspection module that contains information about a structure.
- P. **STRAHNET** – Strategic Highway Network

III. INSPECTION STANDARDS

The work shall be carried out in accordance with the following documents and revisions thereto:

- A. Draft Specifications for the National Tunnel Inventory
<http://www.fhwa.dot.gov/bridge/tunnel/ntis/FinalDraftSNTI130701.pdf> found on the FHWA's website <http://www.fhwa.dot.gov/bridge/tunnel/library.cfm>
- B. Draft Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual

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<http://www.fhwa.dot.gov/bridge/tunnel/ntis/DraftTOMIEMan130705.pdf>
found on the FHWA's website
<http://www.fhwa.dot.gov/bridge/tunnel/library.cfm>

- C. Highway and Rail Transit Tunnel Inspection Manual found on FHWA's website <http://www.fhwa.dot.gov/bridge/tunnel/inspectman00.cfm>
- D. Bridge Asset Management and Inspection Manual (BRIAR Manual)
- E. CDOT Pontis Bridge Inspection Coding Guide
- F. AASHTO Manual for Bridge Evaluation
- G. Bridge Inspection Reference Manual
- H. Other documents as defined by individual task orders.

IV. CONSULTANT QUALIFICATIONS

The consulting firm shall be pre-qualified to conduct bridge inspection work for the State of Colorado, Department of Transportation and meet the requirements of the NTIS. The one exception to this is that the Consultant shall have a geologist or geotechnical engineer available to evaluate the structural geology of the tunnel or other geological features as needed.

V. PROJECT MANAGEMENT AND COORDINATION

The Contract Administrator for the work is:

Joshua R. Laipply, P.E.
Bridge Engineer
Colorado Department of Transportation
4201 East Arkansas Ave.
Room 107
Denver, Colorado 80222
(303) 757-9309

The Bridge Inspection Engineer and Project Manager for the work is:

Lynn E. Croswell, P.E.
Bridge Inspection Engineer
Colorado Department of Transportation
4201 East Arkansas Ave.
Room 107
Denver, Colorado 80222
(303) 757-9188

VI. PROJECT LOCATION AND QUANTITIES

The project location will be state-wide. The structures to be inspected will be identified within the individual task orders.

The following is a breakdown of current vehicular tunnels located in the state of Colorado:

- 22 State owned (On-System), 4 tunnels with full time staff
- 11 Local Agency owned (Off-System)

VII. PROJECT DURATION

- A. The work shall commence on the date specified in the notice to proceed and shall be completed as specified in the individual task orders.
- B. Completion is defined as (1) having submitted all structure inspection reports in the required format to the Project Manager or his/her designee for review, (2) the Project Manager or his/her designee having reviewed and approved the reports and (3) presentations of the final reports given to CDOT.

VIII. CONSULTANT RESPONSIBILITY

- A. The Consultant shall be responsible for the development of a web based data management system compatible with AASHTOWare Bridge Management version 5.x and NBIS databases.
- B. The Consultant shall draft a risk based wall asset management plan for review and potential adoption by the owner.
- C. The Consultant shall be responsible for the complete, timely inspection and reporting of all structures identified in individual task orders.
- D. The Consultant shall furnish all electronic equipment such as computers, laptops, tablets or other as necessary to complete the work.
- E. The Consultant shall submit completed inspection reports to the Project Manager as defined in individual task orders.
- F. The Consultant shall conduct the work in accordance with all governing safety rules and regulations applicable to the work.

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- G. The Consultant shall provide for their own lane closures, working with the appropriate maintenance sections and Region Traffic Engineers to close lanes when required. A list of contacts will be provided to the Consultant upon request.
- H. The Consultant will provide all necessary inspection and testing equipment, personal protective equipment (PPE), vehicles for transport and access to properly and adequately perform the work described herein.

IX. INSPECTION REQUIREMENTS

- A. Inspections and structure evaluations will be performed per the requirements of the Draft NTIS and CDOT in accordance with the most recent editions of the following:
 - 1. Draft Specifications for the National Tunnel Inventory
 - 2. Draft Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual
 - 3. Bridge Asset Management and Inspection Manual (BRIAR Manual)
 - 4. The CDOT Structure Inventory Coding Guide.
 - 5. AASHTO Manual for Bridge Evaluation
 - 6. Other documents as defined by individual task orders.
- B. Tunnels with significant mechanical systems shall be addressed with two inspections. Structural elements and critical functional systems inspection not to exceed 24 months, and other systems to be inspected at frequencies as determined by risk based methodology.
- C. For tunnels not staffed, the Consultant shall meet with each maintenance coordinator and the Project Manager prior to beginning work in the maintenance section. This meeting is to identify themselves to the coordinator, to learn of problem identified by maintenance, to present their plan of action to the coordinator, to determine any traffic control needs, and to obtain any additional information pertinent to the inspection.
- D. For tunnels staffed full time, the Consultant shall meet with each tunnel operations staff and the Project Manager prior to beginning work on the tunnel. This meeting is to identify themselves to the staff, to learn of problem identified by the staff, to present their plan of action to the staff, to determine any traffic control needs, and to obtain any additional information pertinent to the inspection.

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- E. Inventory digital color photographs are required for each structure as defined by individual task orders.
- F. Supplemental digital color photographs and sketches shall be taken and/or developed as necessary to give a clear understanding and documentation of distressed conditions.
- G. Digital cameras shall be a minimum of 8 megapixel resolution capabilities and be Global Positioning System (GPS) enabled. Photos shall be submitted in the Joint Photographic Experts Group (jpg) format. The photos shall be submitted on a compact disk (CD), DVD or flash drive or as directed by the Project Manager or his/her designee.
- H. Completed inspection reports shall be submitted to the Project Manager or his/her designee at the end of the month following the completion of field inspection work or at the end of the Task Order period whichever is earlier. For example, a submittal would be required on April 30th for field work completed in March.
- I. Each inspected structure shall be located using GPS equipment to obtain longitudes and latitudes as defined by individual task orders.
- J. Non-destructive testing may be required to determine the condition of tunnel components.
- K. Should destructive testing be necessary, pre-approval of the Project Manager or his/her designee will be required.

X. REPORTING

- A. All inspection data shall be submitted electronically.
- B. Completed inspection reports shall be submitted to the Project Manager or his/her designee.
- C. All inspection reports shall include the inspector's original or electronic signature and the appropriate date.
- D. As necessary, supplemental sketches, photos, plans, etc. shall be prepared and included as part of the inspection report to document the structures condition.
- E. Electronic report shall be submitted electronically in the AASHTOWARE Bridge Management version specified by the Project Manager and compatible with a Microsoft Windows based computer system. Electronic files may be e-mailed, CDs, DVD or flash drive at the consultant's option.

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XI. SERVICES AND MATERIALS AVAILABLE FROM CDOT

The following services and materials will be available to the consultant from CDOT:

- A. CDOT Structure Inventory Coding Guide, CDOT Pontis Bridge Inspection Coding Guide, AASHTOWare Bridge Management User's Manual, and BRIAR Manual.
- B. CDOT Staff will be available for reference on coding, or other related concerns.
- C. Most current designated STRAHNET and NHS routes (identified in the database).

XII. FINAL REVIEW

- A. Each electronic structure folder will be reviewed by the Project Manager or his/her designee for completeness and consistency. Each incomplete or inconsistent report will be returned to the consultant for review and for corrections
- B. The consultant shall hold a final report presentation meeting with CDOT when all inspection work is completed and reports have been accepted by the Project Manager or his/her designee. This presentation shall occur no later than 60 days from the date that the final reports are accepted.
- C. The Project Manager or his/her designee may accompany the consultant during field inspections or visit the office of the consultant to review procedures and inspection reports and to verify billings.

XIII. METHOD OF PAYMENT

These contracts will be paid for on a cost plus fixed fee basis. The consulting firms will bill for their actual costs, using the negotiated rates, incurred while performing the work. Consultants will bill monthly and include a project status update with each billing.

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APPENDIX A
IDENTIFICATION OF ESSENTIAL REPAIR FINDINGS

- A. **PURPOSE:** This appendix establishes the procedures of the Colorado Department of Transportation (CDOT), Staff Bridge Branch regarding the general subject of essential repair findings (ERF) for tunnels. Essential repairs are the repairs necessary to ensure the safe and continued service of the department's structures.
- B. **TYPICAL CONDITIONS:** The following represents typical but not all inclusive inspection findings which are considered to be a ERF:
1. A portion of the tunnel may fall and injure a person or damage property.
 2. Other conditions a defined in the individual task orders.
- C. It shall be the responsibility of the inspection team leader performing an inspection to be alert for conditions other than identified above which may also be considered a ERF. Such a finding shall be reported to the Project Manager or his/her designee upon return from the inspection or, if deemed necessary, immediately by telephone or in person.
- D. The criticality of the deficiency will result in one or more of the following actions with an importance described as follow:
1. Immediate closure.
 2. Restricted traffic usage.
 3. Urgent repairs.
- E. **SPECIAL ACTIONS REQUIRED OF THE INSPECTION TEAM LEADER:**
1. The team leader shall notify the Project Manager or his/her designee by phone, or in person, when the actions identified as 1 (Immediate closure) or 2 (Restricted traffic usage) above are appropriate. He or she should describe the unsafe condition and recommend immediate steps to be taken to insure safety to the traveling public. The consultant shall follow-up all verbal communication in writing within 3 business days.
 2. The consultant shall notify the Project Manager or his/her designee in writing, within one week, when the action identified as 3 (Urgent repairs) above is appropriate. This notice should include comments and photographs relative to an appropriate repair. This does not mean that the consultant must provide a design for the repair.
 3. The team leader shall provide written confirmation to the Project Manager or his/her designee for any action required above. E-mail confirmation with supporting documentation shall be sent to the Project Manager or his/her designee with "cc" to other as directed by the Project Manager or his/her designee on all essential inspection finding correspondence.