COLORADO DEPARTMENT OF TRANSPORTATION

PRELIMINARY SURVEY SCOPE

Date: _____
To: _____
From: _____

☐ CDOT Form 463a attached
☐ CDOT Form 1048a attached

PROJECT INFORMATION	Project Number	Project Location	Project Code
Highway Number	From Mile Post	To Mile Post	City or County Designation
County		Municipality	

Accounting Information	PE Budget	Authorization Date	Survey Budget	Authorization Date
	$		$	
Fund	Project Code	Phase	Participation	Function

Schedule Information

	Scheduled date	Actual date
Date survey is needed:	_____	_____
FIR date:	_____	_____
FOR date:	_____	_____
Right-of-way review date:	_____	_____
Right-of-way PR:	_____	_____
Ad date:	_____	_____

Sketch of Area or Special Instructions:

Distribution: Region Program Engineer, Region ROW Manager, Traffic Engineer, Project Structural Engineer, Hydraulics Engineer, Materials Engineer, Region Planning/Environmental Manager, Resident Engineer

Roadway Design Requirements
Completed by the Project Manager

Proposed project type:	
Proposed typical section	Proposed clear zone width
Length of mainline survey	Width of mainline survey
Number of lanes	Proposed side slopes (attach as constructed plans)
Other special instructions	

Major Structure Requirements ☐ **Not Applicable**

Completed by Project Manager with input from Project Structural Engineer

Number of interchanges (attach as constructed plans)	Number of major interchange structures	Length of ramps

Special details to include in survey

Check all that apply: **Structure ID No: _____** **Mile Point: _____**

- ☐ Existing structure
- ☐ New structure
- ☐ TMOSS all features within typical limits described in the Survey Manual (Chapter 3, Section 07)
- ☐ Note attached utilities
- ☐ Bridge expansion device elevations
- ☐ Clearance heights required
- ☐ Tenth points required
- ☐ Deck cross-section normal to a control line
- ☐ Tie bridge/box corners to the new projected design alignment. Attach new projected design alignment COGO run.

☐ TMOSS special limits (describe):

☐ List additional structure features needed:

☐ Other special instructions:

Drainage Structure Requirements ☐ **Not Applicable**

Completed by the Project Manager with input from the Hydraulics and Project Structural Engineers.

Number of drainages crossed (attached as constructed plans)	Number of major drainage structures	Length of channels to be surveyed

Major Drainage Structures

Check all that apply: **Structure ID No:** _____ **Mile Point:** _____

- ☐ Existing structure
- ☐ New structure
- ☐ TMOSS all features within typical limits described in the Survey Manual. (Chapter 3, Sections 07 and 09)
- ☐ Note attached utilities
- ☐ Deck cross-section normal to a control line
- ☐ Visible high-water mark
- ☐ Present water level
- ☐ FEMA flood plain requires Federal bench mark
- ☐ Tenth points required
- ☐ Tie bridge/box corners to the new projected design alignment. Attach new projected design alignment COGO run.

☐ TMOSS special limits (describe):

_____

☐ List additional structure features needed:

☐ Other special instructions:

Number of minor drainage structures: _____

Check all that apply:

- ☐ Include electronic CDOT Form 283 in TMOSS notes
- ☐ Include width of head walls in TMOSS notes
- ☐ TMOSS special limits described below (describe)
- ☐ Include type and height of inlets in TMOSS notes
- ☐ TMOSS limits described in Survey Manual. (Chapter 3, Section 09)

☐ Other special instructions:

Right-of-Way Requirements ☐ **Not Applicable**

Completed by the Project Manger with input from the Right-of-Way Office Surveyor.

Is right-of-way involvement anticipated on this project? ☐ Yes ☐ No

Are Forest Service and/or Bureau of Land Management clearances needed on this project? ☐ Yes ☐ No

Number of property owners _____. (Attach assessors' maps, deeds, subdivision plats, right-of-way plans, preliminary plots, permission to enter forms.)

☐ Professional land surveyor responsible for plans will research deeds and plats at a later date.

Check all that apply:

☐ Tie the following aliquot corners:

Section	_____	Township	_____	Range	_____
Section	_____	Township	_____	Range	_____
Section	_____	Township	_____	Range	_____

Other:

☐ Establish straddle ties as described in Survey Manual (Chapter 3-05) on all section corners

☐ Establish references and complete a monument record form for all corners that require a monument record form.

☐ Search for and tie the following owners property pins: (per Survey Manual Chapter 3-08, and 4-03)

☐ Search for and tie all right-of-way markers found

☐ Include possession evidence and all improvements within _____ feet (minimum = 5' per CRS) of the right-of-way line in the TMOSS survey

☐ Include possession evidence like corner markers and all improvements within _____ feet (minimum = 5' per CRS) of the following property owners' perimeter lines: (attach a list if necessary)

☐ Include evidence of burial grounds and cemeteries in TMOSS

☐ Include evidence of easements like paths, utility markers, and risers, poles and valves, in the TMOSS survey

☐ Note street names and alleys in TMOSS survey

☐ Note street address numbers in TMOSS survey

A note is required on all survey markers found and tied in TMOSS. The note must include a description of the monument size, shape, material, color, and markings.

Access ☐ **Not Applicable**

Number of accesses _____ ☐ Electronic CDOT Form 277 in TMOSS ☐ Paper CDOT Form 277
Special instructions:

Railroad Crossing Requirements Not Applicable ☐

Railroad name	Address of railroad right-of-way office
Person to contact at railroad	Phone number and, if known, e-mail address of contact

Check all that apply:

RAILROAD CROSSING ID NO: _____
APPROXIMATE HIGHWAY STREET LOCATION _____

- ☐ Area affected by the proposed design railroad milepost _____ to railroad milepost _____
- ☐ Show if railroad right of way is fenced
- ☐ Locate and tie railroad milepost (required for any railroad acquisition)
- ☐ Show all lines and note sidings
- ☐ Note type and condition of rail bed surface and material at all crossings
- ☐ Survey profile grade on top of both rails at road crossings
- ☐ Survey as-situated alignment
- ☐ Survey terrain data within railroad right of way
- ☐ Locate all railroad topography in TMOSS including switches, sensors, signs, signals, X-bucks, etc.

Traffic Requirements
Completed by the Project Manager with input from the Traffic Engineer ☐ **Not Applicable**

Check all that apply:

- ☐ Signing changes are required on this project
- ☐ Signalization changes are required on this project
- ☐ Include all traffic control devices in TMOSS
  Include the following in a note:
  - Panel size
  - Panel reflective quality--high or low
  - What is on the sign
  - Date on sign
  - Post material
  - Post size

- ☐ Include the following details at signalized intersections:
  - Controller location
  - Detector loop locations

- ☐ Include end anchor type on all guardrail installations

Environmental Requirements ☐ **Not Applicable**

Completed by the Project Manager with input from the Environmental Manager

Wetlands ☐ **Not Applicable**

Check all that apply:

- ☐ Survey previously identified wetland limits for mapping by tieing in pin flags that have been established by the wetland biologists
- ☐ Survey wetland limits while working with the wetland biologists as the wetlands are identified. Coordinate schedule with a wetland biologist
- ☐ Do not survey in wetland limits. Provide the final AutoCAD drawing file to the environmental manager and wetland biologist. The wetland limits will be added to the AutoCAD drawing by environmental personnel.
- ☐ Note possible wetland areas in TMOSS notes
- ☐ Perform TMOSS survey for wetland design/enhancement. Describe area to be surveyed. (Attach a location map)
- ☐ Make appropriate land ties to describe and purchase a wetland or construction parcel or easement
- ☐ Locate monitoring wells

NOTE: Inform the environmental manger and wetland biologist that the survey is complete by means of a courtesy copy of the survey transmittal letter whenever the survey request includes any wetland option checked above.

Hazardous Materials ☐ **Not Applicable**

Are there any known hazardous materials located in the proposed work zone? ☐ Yes ☐ No

CAUTION: Surveying around hazardous materials requires special training and equipment. Contact the Environmental Manager if hazardous materials are suspected on a project.

Noise ☐ **Not Applicable**

- ☐ Locate buildings within 30 meters (100 feet) of the proposed centerline
- ☐ Locate buildings within 60 meters (200 feet) of the proposed centerline
- ☐ Locate buildings within 90 meters (300 feet) of the proposed centerline
- ☐ Locate buildings within 120 meters (400 feet) of the proposed centerline
- ☐ Locate buildings within _____ meters (_____ feet) of the proposed centerline
  (Record the distance and the height to the top of the highest windows in the effected buildings.)

Utility Requirements ☐ **Not Applicable**

Completed by the Project Manager with input from the Utilities Engineer

Include owner name, contact person, address, and telephone number. Always show whether or not utilities are on CDOT right of way.

Check all that apply:

- ☐ A. Gas Owner: _____
  - ☐ 1. Buried, overhead or crossing
  - ☐ 2. Size and pressure
  - ☐ 3. Location From locates _____, From potholes _____ (horizontal and vertical)
  - ☐ 4. Locate vents, valves, markers, etc.
- ☐ B. Transmission lines Owner: _____
  - ☐ 1. Buried, overhead, crossing
  - ☐ 2. Elevation of lines
    - ☐ a. Depth
    - ☐ b. Height at poles
    - ☐ c. Height at low point of sag
  - ☐ 3. Type of structures
    - ☐ a. Lattice
    - ☐ b. Single pole
    - ☐ c. "H" frame
  - ☐ 4. Construction
    - ☐ a. Steel
    - ☐ b. Wood
    - ☐ c. Other
  - ☐ 5. Kilo volt rating
  - ☐ 6. Single points (poles, etc.)
  - ☐ 7. Guy-anchor poles
- ☐ C. Electric lines (local) Owner: _____
  - ☐ 1. Buried, loose cables or in ducts; overhead, crossing
  - ☐ 2. Kilo volt rating
  - ☐ 3. Elevation at poles, at sag points, depths
  - ☐ 4. Type and construction of poles
- ☐ D. Telephone Owner: _____
  - ☐ 1. Buried, loose cables or in ducts; overhead, crossing
  - ☐ 2. Fiber optics or conventional wire cables
  - ☐ 3. Location of pedestals, vaults, regeneration stations
  - ☐ 4. Local services (drops, etc.) above, on, below surface
- ☐ E. Water (domestic) Owner: _____
  - ☐ 1. Buried or supported
  - ☐ 2. Size and type of pipes
  - ☐ 3. Angle and junction points
  - ☐ 4. Locations of valves, meters, vents, drains, etc.
- ☐ F. Sanitary sewers Owner: _____
  - ☐ 1. Size and type of pipe
  - ☐ 2. Manholes
    - ☐ a. Inlet and outlet elevations
    - ☐ b. Top of manhole elevations

Utility Requirements, continued

- ☐ G. Television Owner: _____
  - ☐ 1. Buried, overhead
  - ☐ 2. Owned poles, attached to others
  - ☐ 3. Cables loose, in ducts
  - ☐ 4. Depth
  - ☐ 5. Locate pedestals, etc.
- ☐ H. Pipelines Owner: _____
  - ☐ 1. Buried or aerial
  - ☐ 2. Size and type of pipe
  - ☐ 3. Pressure
  - ☐ 4. Product--gas, oil, water, etc.
- ☐ I. Irrigation company Owner: _____
  - ☐ 1. Basic size of ditch
  - ☐ 2. Flow-from ditch company
  - ☐ 3. Direction of flow
  - ☐ 4. Period of use
  - ☐ 5. Ditch cross-sections
  - ☐ 6. Locate all division boxes
  - ☐ 7. Get elevations of all boxes, drops, etc.
- ☐ J. Miscellaneous Owner: _____
  - ☐ 1. Get all details (explain):

Survey Requirements
Completed by the Project Manager with input from the Field Survey Coordinator

Check all that apply:

Survey requested:

- ☐ Control monuments and TMOSS
- ☐ Control monuments and TMOSS by aerial methods
- ☐ Right-of-way preliminary field ties and investigation
- ☐ Survey for overlay quantities
- ☐ Other:

Horizontal Control ☐ **Not Applicable**

Horizontal control by: ☐ CDOT ☐ Consultant

Horizontal control in _____ meters or _____ feet

Horizontal control method:

- ☐ Traverse with total station
- ☐ Trilateration with total station
- ☐ Triangulation with total station
- ☐ GPS densification and bluebook
- ☐ GPS fast-static where densification has been completed
- ☐ Establish "as constructed" centerline from right-of-way markers (Attach right-of-way plans)
- ☐ Establish new alignment (Attach COGO run)

Estimated number of control monuments required = _____

Establish control monuments on approximately _____ spacing

Specify monuments to begin and end horizontal control survey on:

Horizontal control tolerances required:

- ☐ CDOT type A ± 0.030m error circle
- ☐ CDOT type B ± 0.076m error circle

Documentation required in submittal (check only those needed):

- ☐ Original and two copies of field books
- ☐ Traverse file from data collector on CDROM
- ☐ COGO input and output of closures on CDROM
- ☐ CTL or CTM file on CDROM
- ☐ GPS file on CDROM
- ☐ Control diagram drawing file on CDROM
- ☐ PPT file
- ☐ Copies of any new monument records from this survey

A note is required on all survey markers found and tied in TMOSS. The note must include a description of the monument's size, shape, material, color, and markings.

Vertical Control ☐ **Not Applicable**

Vertical control method:

- ☐ Differential level closed loop through control monuments
- ☐ Trigonometric level closed loop through control monuments
- ☐ GPS differences from known bench marks

Tolerances on vertical control are ± 0.0066m times the square root of the distance traversed in kilometers.

Known bench marks in the vicinity with NAVD '88 elev's:

Mark Number: _____ Elevation: _____ m.
Mark Number: _____ Elevation: _____ m.
Mark Number: _____ Elevation: _____ m.

- ☐ Establish a bench mark on each control monument
- ☐ Establish additional bench marks every _____ meters
- ☐ A complete "Report on the Condition of Survey Mark" is required on all found federal bench marks
- ☐ Establish vertical control for an aerial survey. Tolerance on wing points: ☐ 0.030m ☐ 0.010m
- ☐ Establish profile grade on "as constructed" centerline
- ☐ No elevations needed-overlay quantity survey only

Documentation required:

- ☐ Original and two copies of field books
- ☐ Copy of NA2002 reduced field book file on disk
- ☐ Final elevations included in CTL file on disk

Topography ☐ **Not Applicable**

Topographic survey method:

- ☐ TMOSS
- ☐ TMOSS by aerial and photogrammetry

Locate features:

- ☐ All within survey area
- ☐ Utility surface appurtenances only
- ☐ Streets, roads, and approaches only
- ☐ Drainage and irrigation structures only
- ☐ Structures only
- ☐ Landscaping features only
- ☐ Others:

Tolerances on TMOSS topographic survey is:

± 0.305m for horizontal position
± 0.030m for elevation

Other topographic methods do not include elevations.

Topography, continued

Distances between shots in TMOSS on any given string should not exceed:

FEET	METERS
☐ 25	☐ 7.5
☐ 50	☐ 15
☐ 100	☐ 30
☐ 150	☐ 45
☐ 200	☐ 60

Documentation required: ☐ Digital ☐ Paper

Submit electronic products on:

- ☐ CDROM
- ☐ IOmega ZIP disk
- ☐ IOmega JAZZ disk
- ☐ E-mail attachments
- ☐ Other: _____

Electronic products required:

- ☐ One AutoCAD drawing called code#LDF.DWG or code#LDM.DWG showing the proper topographic symbols as produced by the PICS line driver program. All field notes shall be shown on the drawing. The drawing shall have all entity layers condensed to eliminate the TMOSS connectors.
- ☐ One AutoCAD drawing called code#ALL.DWG containing all three-dimensional spatial data in raw form (not line driven). All TMOSS shot notes shall be shown on this drawing. This drawing will be used to create a TIN. Triangle sides in the TIN should not exceed: _____. All boundary strings should be defined.
- ☐ One PICS Generic file called code#ALL.GEN or code#ALL.GEM used to create the code#ALL.DWG above.
- ☐ One set of MOSS GENIO input files which include:
  code#ALL.GND, code#ALL.DRG, code#ALL.INF,
  code#ALL.DRI, code#ALL.TOP, code#ALL.DRT
- ☐ All TIN model and project files from Eagle Point Surface Modeling work.
- ☐ One COGO input file consisting of a listing of all control points and property data used to create Survey Control Diagram for right of way.
- ☐ Two copies of an AutoCAD drawing called code#SCD.DWG of the survey control diagram to be delivered at the FIR.
- ☐ All segment .SDR files, data collector files, and .SDF files
- ☐ An AutoCAD drawing which includes contours on _____ interval and _____ index contour interval

Paper products required:

- ☐ Three sets of line driven AutoCAD drawings of the topography generated by PICS with the notes layers activated plotted on paper. Scale required: _____
- ☐ Form 283's and 277's in electronic format in TMOSS only
- ☐ Three copies of all Culvert Reports (Form 283)
- ☐ Three copies of all Access Reports (Form 277)
- ☐ Two copies of topography field books

☐ Original field books

Overlay Surveys ☐ **Not Applicable**

☐ Use measuring wheel or tape to establish stationing on:
☐ 100' intervals ☐ 250' intervals ☐ 500' intervals
☐ 1000' intervals ☐ Other: _____

☐ Establish milepost references
☐ Gather topographic data by station and offset
☐ Gather topographic data by milepost and offset
☐ Included guardrail height samples
☐ Include overhead clearances on utilities and structures
☐ Include sign locations and heights
☐ Tabulate existing delineators
☐ Tabulate hazards within clear zone limit of _____
☐ Reference striping and no passing zones
☐ Tabulate striping for inclusion in the plans
☐ Establish centerline and take cross-sections. Cross-section interval: _____
☐ Locate and reference aliquot corners in the area affected by the proposed design
☐ Tabulate aliquot corners for inclusion in the plans
☐ Tabulate all government survey monuments; i.e., bench marks horizontal control

Paper products required:

☐ Two copies and the original of all field books