

(Local \$CDOTWRK)
PROJECT: CC 0253-249 (21156)

REGION: 1 (JH)

CONTRACT

THIS CONTRACT, executed this ____ day of _____, _____ by and between the State of Colorado, for the use and benefit of the Colorado Department of Transportation (“State” or “CDOT”) and Adams County Government, 4430 S. Adams County Parkway, C5323, Brighton, Colorado, 80601, CDOT Vendor #: 0002000055 (“Local Agency” or “Department of Transportation”), and the State and the Local Agency together shall be referred to as the “Parties.”

RECITALS

1. Authority exists in the law and funds have been budgeted, appropriated and otherwise made available and a sufficient uncommitted balance thereof remains available for payment of project and Local Agency costs in Fund Number 400, Function 3015, GL Acct. 4512000010, WBS Element or Cost Center , (Contract Encumbrance Amount: \$0.00).
2. Required approval, clearance and coordination have been accomplished from and with appropriate agencies..
3. Section 43-2-102 and 103, C.R.S require the State to maintain state highways (including where such highways extend through a city or an incorporated town), and 43-2-135 describes certain specific responsibilities of the State and affected local entities (respectively) with respect to state highways that are also part of a local street system;
4. The Local Agency has estimated the contribution and is prepared to provide the funding required for their contribution toward the Project, as evidenced by an appropriate ordinance or resolution duly passed and adopted by the authorized representatives of the Local Agency, which expressly authorizes the Local Agency to enter into this agreement and to expend its funds for the Contribution
5. The Local Agency has funds available and desires to provide 100% of the funding for the Work.
6. This contract is executed under the authority of §§ 29-1-203, 43-1-110; 43-1-116, 43-2-101(4)(c) and 43-2-144, C.R.S. and **Exhibit B**.
7. The parties hereto desire to agree upon the division of responsibilities with regard to the project.

THE PARTIES NOW AGREE THAT:

Section 1. Scope of Work

The work under this Contract shall consist of the 30% design on a Diverging Diamond Interchange at I-25 and SH 7, and the Local Agency shall provide their Contribution toward the Project, in I-25 and SH 7 Interchange, Colorado, as more specifically described in **Exhibit A**.

Section 2. Order of Precedence

In the event of conflicts or inconsistencies between this Contract and its exhibits, such conflicts or inconsistencies shall be resolved by reference to the documents in the following order of priority:

1. This Contract
2. **Exhibit A** (Scope of Work)
3. Other Exhibits in descending order of their attachment.

Section 3. Term

This agreement shall be effective upon approval of the CDOT Chief Engineer or designee. The term of this agreement shall continue through the completion and final acceptance of the Project by the State, FHWA and the Local Agency.

Section 4. Project Funding Provisions

- A. The Local Agency has estimated the total cost of the Contribution and is prepared to provide its funding, as evidenced by the signing of this Contract, which expressly authorizes the Local Agency the authority to expend its Contribution toward the Project.
- B. The contribution is estimated to be \$600,000.00.
- C. **The maximum amount payable by the Local Agency under this contract shall be \$600,000.00** unless such amount is increased by an appropriate written modification to this contract executed by the Parties hereto before any increased cost is incurred
- D. The Parties hereto agree that this contract is contingent upon all funds designated for the project herein being made available from state sources, as applicable. Should these sources fail to provide necessary funds as agreed upon herein, the contract may be terminated by either party, provided that any party terminating its interest and obligations herein shall not be relieved of any obligations which existed prior to the effective date of such termination or which may occur as a result of such termination..
- E. The Local Agency will make a one time payment of \$600,000.00 on or before December 1, 2016.

Section 5. Project Payment Provisions

- A. The Local Agency will reimburse the State for incurred costs relative to the project following the Local Agency's review and approval of such charges, subject to the terms and conditions of this agreement.
- B. If the Local Agency is to be billed for CDOT incurred costs, the billing procedure shall be as follows:
 - 1. Upon receipt of each bill from the State, the Local Agency will remit to the State the amount billed no later than 60 days after receipt of each bill. Should the Local Agency fail to pay moneys due the State within 60 days of demand or within such other period as may be agreed between the parties hereto, the Local Agency agrees that, at the request of the State, the State Treasurer may withhold an equal amount from future apportionment due the Local Agency from the Highway Users Tax Fund and to pay such funds directly to the State. Interim funds, until the State is reimbursed, shall be payable from the State Highway Supplementary Fund (400).
 - 2. If the Local Agency fails to make timely payment to the State as required by this section (within 60 days after the date of each bill), the Local Agency shall pay interest to the State at a rate of one percent per month on the amount of the payment which was not made in a timely manner, until the billing is paid in full. The interest shall accrue for the period from the required payment date to the date on which payment is made.
- C. The State will prepare and submit to the Local Agency, no more than monthly, charges for costs incurred relative to the project. The State's invoices shall include a description of the amounts of services performed, the dates of performance and the amounts and description of reimbursable expenses. The invoices will be prepared in accordance with the State's standard policies, procedures and standardized billing format.

Section 6. State and Local Agency Commitments

The Scope of Work (**Exhibit A**) describes the work to be performed.

- A. Design [if applicable]
 - 1. If the work includes preliminary design or final design (the "Construction Plans"), or design work sheets, or special provisions and estimates (collectively referred to as the "Plans"), the State shall comply with the following requirements, as applicable:
 - a. perform or provide the Plans, to the extent required by the nature of the work.
 - b. prepare final design (Construction Plans) in accord with the requirements of the latest edition of the American Association of State Highway Transportation Officials (AASHTO) manual or other standard, such as the Uniform Building Code, as approved by CDOT.
 - c. prepare special provisions and estimates in accord with the State's Roadway and Bridge Design Manuals and Standard Specifications for Road and Bridge Construction.
 - d. include details of any required detours in the Plans, in order to prevent any interference of the construction work and to protect the traveling public.
 - e. stamp the Plans produced by a Colorado Registered Professional Engineer.
 - f. provide final assembly of Plans and contract documents.
 - g. be responsible for the Plans being accurate and complete.

- h. make no further changes in the Plans following the award of the construction contract except by agreement in writing between the parties. The Plans shall be considered final when approved and accepted by the parties hereto, and when final they shall be deemed incorporated herein.

B. Construction [if applicable]

1. If the work includes construction, the State shall perform the construction in accordance with the approved design plans and/or administer the construction all in accord with the Scope of Work (**Exhibit A**). Such administration shall include project inspection and testing; approving sources of materials; performing required plant and shop inspections; documentation of contract payments, testing and inspection activities; preparing and approving pay estimates; preparing, approving and securing the funding for contract modification orders and minor contract revisions; processing contractor claims; construction supervision; and meeting the Quality Control requirements of the FHWA/CDOT Stewardship Agreement.
2. Subject to Section 5, if the State is the responsible party:
 - a. it shall appoint a qualified professional engineer, licensed in the State of Colorado, as the State Agency Project Engineer (SAPE), to perform that administration. The SAPE shall administer the project in accordance with this agreement, the requirements of the construction contract and applicable State procedures.
 - b. if bids are to be let for the construction of the project, the State shall, in conjunction with the Local Agency, advertise the call for bids and upon concurrence by the Local Agency will award the construction contract(s) to the low responsive, responsible bidder(s).
 - (1) in advertising and awarding the bid for the construction of a federal-aid project, the State shall comply with applicable requirements of 23 USC § 112 and 23 CFR Parts 633 and 635 and C.R.S. § 24-92-101 et seq. Those requirements include, without limitation, that the State/contractor shall incorporate Form 1273 in its entirety verbatim into any subcontract(s) for those services as terms and conditions therefore, as required by 23 CFR 633.102(e).
 - (2) the Local Agency has the option to concur or not concur in the proposal of the apparent low bidder for work on which competitive bids have been received. The Local Agency must declare its concurrence or non-concurrence within 3 working days after said bids are publicly opened.
 - (3) by indicating its concurrence in such award, the Local Agency, acting by or through its duly authorized representatives, agrees to provide additional funds, subject to their availability and appropriation for that purpose, if required to complete the work under this project if no additional federal-aid funds will be made available for the project.
 - c. If all or part of the construction work is to be accomplished by State personnel (i.e. by force account), rather than by a competitive bidding process, the State will ensure that all such force account work is accomplished in accordance with the pertinent State specifications and requirements with 23 CFR 635, Subpart B, Force Account Construction.

Section 7. ROW Acquisition and Relocation

If the Project includes right of way, prior to this project being advertised for bids, the State will certify in writing that all right of way has been acquired in accordance with the applicable state and federal regulations, or that no additional right of way is required.

Any acquisition/relocation activities must comply with: all applicable federal and state statutes and regulations, including but not limited to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended (P.L. 91-646) and the Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs as amended (49 CFR Part 24); CDOT's Right of Way Manual; and CDOT's Policy and Procedural Directives.

Allocation of Responsibilities are as follows:

- Federal participation in right of way acquisition (3111 charges), relocation (3109 charges) activities, if any, and right of way incidentals (expenses incidental to acquisition/relocation of right of way – 3114 charges);
- Federal participation in right of way acquisition (3111 charges), relocation (3109 charges) but no participation in incidental expenses (3114 charges); or
- No federal participation in right of way acquisition (3111 charges) and relocation activities (3109 expenses).

Regardless of the option selected above, the State retains oversight responsibilities. The Local Agency's and the State's responsibilities for each option is specifically set forth in CDOT's Right of Way Manual. The manual is located at <http://www.coloradodot.info/business/manuals/right-of-way>.

If right of way is purchased for a state highway, including areas of influence of the state highway, the local agency shall immediately convey title to such right of way to CDOT after the Local Agency obtains title.

Section 8. Utilities

If necessary, the State will be responsible for obtaining the proper clearance or approval from any utility company, which may become involved in this Project. Prior to this Project being advertised for bids, the responsible party will certify in writing that all such clearances have been obtained.

Section 9. Railroads

In the event the Project involves modification of a railroad company's facilities whereby the work is to be accomplished by railroad company forces, the State shall make timely application to the Public Utilities Commission requesting its order providing for the installation of the proposed improvements and not proceed with that part of the work without compliance. The State shall also establish contact with the railroad company involved for the purpose of complying with applicable provisions of 23 CFR 646, subpart B, concerning federal-aid projects involving railroad facilities, including:

1. Executing an agreement setting out what work is to be accomplished and the location(s) thereof, and that the costs of the improvement shall be eligible for federal participation.
2. Obtaining the railroad's detailed estimate of the cost of the work.
3. Establishing future maintenance responsibilities for the proposed installation.
4. Prescribing future use or dispositions of the proposed improvements in the event of abandonment or elimination of a grade crossing.
5. Establishing future repair and/or replacement responsibilities in the event of accidental destruction or damage to the installation.

Section 10. Environmental Obligations

The State shall perform all work in accordance with the requirements of the current federal and state environmental regulations including the National Environmental Policy Act of 1969 (NEPA) as applicable.

Section 11. Maintenance Obligations

The State will maintain and operate the improvements constructed under this agreement at its own cost and expense during their useful life, in a manner satisfactory to the State and FHWA. The State will make proper provisions for such maintenance obligations each year. Such maintenance and operations shall be conducted in accordance with all applicable statutes, ordinances and regulations. The State and FHWA will make periodic inspections of the project to verify that such improvements are being adequately maintained.

Section 12. Record Keeping

The State shall maintain a complete file of all records, documents, communications, and other written materials, which pertain to the costs incurred under this agreement. The State shall maintain such records for a period of three (3) years after the date of termination of this agreement or final payment hereunder, whichever is later, or for such further period as may be necessary to resolve any matters which may be pending. The State shall make such materials available for inspection at all reasonable times and shall permit duly authorized agents and employees of the Local Agency and FHWA to inspect the project and to inspect, review and audit the project records.

Section 13. Termination Provisions

This agreement may be terminated as follows:

- A. Termination for Convenience. The State may terminate this agreement at any time the State determines that the purposes of the distribution of moneys under the agreement would no longer be served by completion of the

project. The State shall effect such termination by giving written notice of termination to the Local Agency and specifying the effective date thereof, at least twenty (20) days before the effective date of such termination.

- B. Termination for Cause. If, through any cause, the Local Agency shall fail to fulfill, in a timely and proper manner, its obligations under this agreement, or if the Local Agency shall violate any of the covenants, agreements, or stipulations of this agreement, the State shall thereupon have the right to terminate this agreement for cause by giving written notice to the Local Agency of its intent to terminate and at least ten (10) days opportunity to cure the default or show cause why termination is otherwise not appropriate. In the event of termination, all finished or unfinished documents, data, studies, surveys, drawings, maps, models, photographs and reports or other material prepared by the Local Agency under this agreement shall, at the option of the State, become its property, and the Local Agency shall be entitled to receive just and equitable compensation for any services and supplies delivered and accepted.

Notwithstanding the above, the Local Agency shall not be relieved of liability to the State for any damages sustained by the State by virtue of any breach of the agreement by the Local Agency, and the State may withhold payment to the Local Agency for the purposes of mitigating its damages until such time as the exact amount of damages due to the State from the Local Agency is determined.

If after such termination it is determined, for any reason, that the Local Agency was not in default or that the Local Agency's action/inaction was excusable, such termination shall be treated as a termination for convenience, and the rights and obligations of the parties shall be the same as if the agreement had been terminated for convenience, as described herein.

Section 14. Legal Authority

The Local Agency warrants that it possesses the legal authority to enter into this agreement and that it has taken all actions required by its procedures, by-laws, and/or applicable law to exercise that authority, and to lawfully authorize its undersigned signatory to execute this agreement and to bind the Local Agency to its terms. The person(s) executing this agreement on behalf of the Local Agency warrants that such person(s) has full authorization to execute this agreement.

Section 15. Representatives and Notice

The State will provide liaison with the Local Agency through the State's Region Director, Region 1, 2000 South Holly Street, Denver, CO 80222. Said Region Director will also be responsible for coordinating the State's activities under this agreement and will also issue a "Notice to Proceed" to the Local Agency for commencement of the work. All communications relating to the day-to-day activities for the work shall be exchanged between representatives of the State's Transportation Region 1 and the Local Agency. All communication, notices, and correspondence shall be addressed to the individuals identified below. Either party may from time to time designate in writing new or substitute representatives.

If to the State:
Stephanie Alanis
CDOT Region 1
2000 South Holly Street
Denver, Colorado 80222
303-398-6747

If to the Local Agency:
Jeanne Shreve
Adams County Government
4430 S. Adams County Parkway, C5323
Brighton, Colorado 80601
720-523-6847

Section 16. Successors

Except as herein otherwise provided, this agreement shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

Section 17. Third Party Beneficiaries

It is expressly understood and agreed that the enforcement of the terms and conditions of this agreement and all rights of action relating to such enforcement, shall be strictly reserved to the State and the Local Agency. Nothing contained in this agreement shall give or allow any claim or right of action whatsoever by any other third person. It is the express intention of the State and the Local Agency that any such person or entity, other than the State or the Local Agency receiving services or benefits under this agreement shall be deemed an incidental beneficiary only.

Section 18. Governmental Immunity

Notwithstanding any other provision of this agreement to the contrary, no term or condition of this agreement shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, § 24-10-101, et seq., C.R.S., as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons or property arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of § 24-10-101, et seq., C.R.S., as now or hereafter amended and the risk management statutes, §§ 24-30-1501, et seq., C.R.S., as now or hereafter amended.

Section 19. Severability

To the extent that this agreement may be executed and performance of the obligations of the parties may be accomplished within the intent of the agreement, the terms of this agreement are severable, and should any term or provision hereof be declared invalid or become inoperative for any reason, such invalidity or failure shall not affect the validity of any other term or provision hereof.

Section 20. Waiver

The waiver of any breach of a term, provision, or requirement of this agreement shall not be construed or deemed as a waiver of any subsequent breach of such term, provision, or requirement, or of any other term, provision or requirement.

Section 21. Entire Understanding

This agreement is intended as the complete integration of all understandings between the parties. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein by writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a writing executed and approved pursuant to the State Fiscal Rules.

Section 22. Survival of Agreement Terms

Notwithstanding anything herein to the contrary, the parties understand and agree that all terms and conditions of this agreement and the exhibits and attachments hereto which may require continued performance, compliance or effect beyond the termination date of the agreement shall survive such termination date and shall be enforceable by the State as provided herein in the event of such failure to perform or comply by the Local Agency.

Section 23. Modification and Amendment

This agreement is subject to such modifications as may be required by changes in federal or State law, or their implementing regulations. Any such required modification shall automatically be incorporated into and be part of this agreement on the effective date of such change as if fully set forth herein. Except as provided above, no modification of this agreement shall be effective unless agreed to in writing by both parties in an amendment to this agreement that is properly executed and approved in accordance with applicable law.

Section 24. Disputes

Except as otherwise provided in this agreement, any dispute concerning a question of fact arising under this agreement, which is not disposed of by agreement, will be decided by the Chief Engineer of the Department of Transportation. The decision of the Chief Engineer will be final and conclusive unless, within 30 calendar days after the date of receipt of a copy of such written decision, the Local Agency mails or otherwise furnishes to the State a written appeal addressed to the Executive Director of the Department of Transportation. In connection with any appeal proceeding under this clause, the Local Agency shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Local Agency shall proceed diligently with the performance of the agreement in accordance with the Chief Engineer's decision. The decision of the Executive Director or his duly authorized representative for the determination of such appeals will be final and conclusive and serve as final agency action. This dispute clause does not preclude consideration of questions of law in connection with decisions provided for herein. Nothing in this agreement, however, shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

THE REMAINDER OF THIS PAGE IS INTENTIONALLY LEFT BLANK

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

* Persons signing for The Local Agency hereby swear and affirm that they are authorized to act on The Local Agency's behalf and acknowledge that the State is relying on their representations to that effect.

<p>THE LOCAL AGENCY Adams County Government</p> <p>By: Title:</p> <p>_____</p> <p>*Signature</p> <p>Date: _____</p>	<p>STATE OF COLORADO John W. Hickenlooper, GOVERNOR Colorado Department of Transportation</p> <p>By _____</p> <p>Joshua Laipply, P.E., Chief Engineer (For) Shailen P. Bhatt, Executive Director</p> <p>Date: _____</p>
<p>2nd The Local Agency Signature [if Needed]</p> <p>By: Title:</p> <p>_____</p> <p>*Signature</p> <p>Date: _____</p>	

**Draft Scope of Work for
I-25 & US 36 Bus on Shoulder (BOS)
Denver, Arapahoe, Douglas, and Adams Counties, Colorado
July 15, 2016
CDOT Region 1**

PROJECT DESCRIPTION

The Colorado Department of Transportation (CDOT) is examining the potential for bus on shoulder (BOS) operation between on I-25 between C-470 and 84th Avenue and on US 36 between Pecos Street and I-25. The BOS study will evaluate both the northbound and southbound directions.

Recognizing that RTD buses often experience congestion in the counter-flow direction of I-25 (particularly in the PM peak), the intent of this project is to reduce travel time for buses without adversely affecting safety and operations of I-25 general purpose traffic. The purpose of this study is to determine the feasibility of implementing BOS, document the benefits and impacts of BOS, and prepare a cost estimate of the improvements based on a concept design.

PROJECT STUDY AREA

The study area for this project will include I-25 from C-470 (MM 194) to 84th Avenue (MM 218.5) and US 36 from I-25 (MM 57.2) to Pecos Street (MM 55.9).

SCOPE OF WORK

1. Project Administration and Management

Muller Engineering will review and process invoices and provide other project administration throughout the duration of the project. The Project Administration for this Task Order will be:

For CDOT: Leela Rajasekar, P.E.
CDOT – Region 1 Traffic
2000 S. Holly Street
Denver, Colorado 80222
Phone: 303.757.9862
E-mail: Leela.raajasekar@state.co.us

For Consultant: Karl Buchholz, P.E.
777 S. Wadsworth Blvd, Suite 4-100
Lakewood, Colorado 80226
Phone: 303.988.4939
E-mail: kbuchholz@mullereng.com

The Project Administration and Management task includes:

- Contract administration – administer project contracts, track expenditures, and monitor work progress.

- Monthly progress reporting – create and monitor monthly progress reports and invoicing.
- Conduct general coordination with CDOT and CH2M.
- Quality control and quality assurance of work tasks and deliverables to CDOT.

2. Project Initiation

- a. Kick-off Meeting – Prepare for and attend project kick-off meeting with CDOT and RTD to discuss project scope, schedule, data collection, critical issues and deliverables. Prepare and distribute meeting minutes within one week of the meeting date. The meeting attendees should include CDOT disciplines from Traffic, Maintenance, Environmental, Materials, Hydraulics, Bridge and Utilities. RTD attendees should include Bus Operations, Service Planning and Scheduling, and Street Operations. Additionally, FHWA, local stakeholders, and the Colorado State Patrol will be invited to the meeting.
- b. Data Collection
 - i. Obtain speed, volume, and occupancy counts in 15-minute intervals for each lane of I-25 and US 36 during a seven day period. The data will be obtained from CDOT's COGNOS system.
 - ii. Using existing data sources (ramp meter data, previous studies, etc.), obtain AM and PM peak hour ramp volume data for all entrance and exit ramps in the study area.
 - iii. Download Inrix™ travel time, speed, and bottleneck data for I-25 from MM 194 to MM 220 and on US 36 from MM 55 to MM 57. Download data for seven day period.
 - iv. From RTD, collect existing RTD bus route, ridership, and bus travel time data for weekdays and weekends from 5:00 AM to 9:00 PM. Also, collect ridership and schedule information from CDOT for Bustang bus service on I-25 (*by CH2M*).
 - v. Obtain CDOT accident data on I-25 and US 36 within the study area for the most recent 3 year period.
 - vi. Using as-built drawings, OTIS data, and Google Earth imagery as resources, determine measurements of lane, shoulder and barrier widths at representative locations along the study area for I-25 and US 36. Identify drainage inlets, fixed obstructions (horizontal and vertical clearance to bridges and sign structures), structure numbers, utility conflicts, pavement type and ROW information. Shoulder width data will be supplemented by field measurements collected by Muller Engineering. CDOT Region 1 Maintenance will provide a mobile attenuator vehicle and driver for mobile operation traffic control. This task is expected to require one evening/morning of overnight work.

- vii. Obtain future bus ridership forecasts from RTD based upon completion and implementation of North Metro Rail Line and Flatiron Flyer BRT (*by CH2M*).
 - viii. To the extent that data is available, collect I-25 and US 36 incident data from CDOT, State Patrol and Mile High Courtesy Patrol. Review the I-25 Express Lanes Incident Management Plan (*by CH2M*).
- 3. Progress Meetings and Presentation of Study – Regular progress meetings will be held at approximately 4-6 week intervals during the course of the project. It is estimated that a total of eight (8) progress meetings will be held with CDOT and RTD staff and project stakeholders. Muller and CH2M staff will also be available to present the Feasibility Study to CDOT and RTD management (two meetings).
- 4. Research and Literature Review (*by CH2M*)
 - a. Research TCRP and FHWA studies relevant to bus on shoulder implementation.
 - b. Review other DOT studies and lessons learned from MnDOT, VDOT, Caltrans, WSDOT, and FDOT.
 - c. Organize and compile above research into a summary technical memorandum for the study.
- 5. Overview and Description of BOS Operations

Using the results from Task 4, prepare an overview document that summarizes the general concept of operation for BOS on I-25 and US36. The document will also identify design criteria for BOS such as minimum shoulder width, clear zone, vertical clearance, and design speed. This overview will serve as a guiding document for the Feasibility Analysis. Details of the BOS operation will be determined during the feasibility analysis.
- 6. Feasibility Analysis
 - a. Geometric Analysis –Utilize data collected in Task 2 to assess existing lane and shoulder widths in the study area. Pinch points will be identified at under/overpass locations (e.g. 44th Avenue) and at barrier flare-outs. As-built information provided by CDOT will be used to confirm adequate vertical clearances and pavement thickness along the inside and outside shoulders.

The above information will be reviewed with CDOT and RTD to determine geometric deficiencies that would need to be improved for BOS operation. The intent of the geometric analysis will be to provide a continuous usable shoulder for BOS operation through the length of the study area. Some pinch point locations may be deemed too costly to improve and, therefore, will require buses to use the general purpose lanes to bypass them. Improvement options that will be considered will include, but not be limited to, minor shoulder widening (where feasible), relocation of the concrete barrier into the shoulder of the N. I-25 Bus/HOV facility, and narrowing of general purpose lane widths. Lane width narrowing may require pavement resurfacing, which will be evaluated as part of the geometric feasibility analysis.

Organize and compile above geometric report findings and recommendations into a summary technical memorandum for the study.

- b. Safety Analysis – Compile and review the most recent three years of crash data from CDOT’s accident database using CDOT’s Safety Performance Function (SPF) and Diagnostic Analysis to identify accident patterns and problem segments. Specific safety issues that will be evaluated include accident types (e.g. sideswipe), location (e.g. off road right/left), time-of-day and day-of-week trends, and accident frequency in the counter-flow direction of peak period traffic.

Using information gathered from Task 4, determine if other BOS projects elsewhere in the United States resulted in any negative or positive safety impacts after implementation of BOS operation.

Organize and compile above safety analysis findings and recommendations into a summary technical memorandum for the study.

- c. Traffic Operations Analysis – Using traffic data gathered from COGNOS and/or Inrix™ over a one year period, determine the number of days, peak periods and duration of time when traffic speeds drop below various speed thresholds (e.g. 15, 25, 35 mph). Conduct statistical analysis of the data to identify a 25th, 50th, and 75th percentile travel time conditions for I-25 and US 36. The 50th percentile data will be used to analyze the “typical week” to determine vehicle travel speeds, volumes, and occupancy in each lane of I-25 and US 36 by time-of-day and day-of-week.

Determine annual hours of congestion for each segment of I-25 for each speed threshold. This information will be used to determine potential BOS usage and to estimate potential travel time savings for RTD buses.

- d. BOS Traffic Control – Review geometric and traffic conditions, and evaluate the effectiveness of inside shoulder or outside shoulder operation. Factors to consider will include shoulder width, ramp volumes, bus entrance/exit maneuvers, adjacent lane travel speeds, and signing and striping treatments. This information will also be compared to information gathered during Task 4 regarding inside and outside BOS operation elsewhere in the U.S. Prepare typical sections and a typical ramp exit/entrance signing, striping, and ITS treatments for BOS operation for both scenarios.
- e. Bus Operations Analysis (*by CH2M*) – Review information collected from RTD and CDOT (for Bustang) during the data collection task. Determine bus characteristics such as the width, capacity, and weight for over-the-road coach buses. Analyze routes, schedules, and ridership data to assess the existing bus operations including deadhead routes. Estimate the daily and annual travel time and user cost savings associated with contraflow bus on shoulder operations. A generalized user cost will be determined through consultation with CDOT and RTD. Organize and compile above bus operations analysis findings and recommendations into a summary technical memorandum for the study.
- f. Maintenance, Enforcement, and Emergency Vehicle Considerations (*by CH2M*) –

Assess the potential implications of counter-flow bus on shoulder operations on: snow removal, general maintenance, enforcement, and emergency vehicle/incident response. Determine bus operating procedure for when the shoulder is blocked or in use by maintenance, enforcement, incident, or emergency vehicles. Organize and compile above maintenance, enforcement, and emergency vehicle operational considerations findings and recommendations into a summary technical memorandum for the study.

- g. Environmental Overview (*by CH2M*) – Review the proposed project and develop a preliminary assessment of potential environmental issues (i.e. Desktop Review). Review the existing corridor resource evaluation and environmental documentation, and determine the likely level of NEPA documentation that will be required (PEL, Cat-Ex, EA, etc.). Provide a summary overview describing the likely next phase of the project.
- 7. Concept Design – Using aerial imagery provided by CDOT, prepare concept level plans for I-25 and US 36 within the study area limits. The plans will show proposed pavement markings, lane dimensions, begin/end transitions, proposed barrier, proposed overhead signing, ITS devices, areas of pavement resurfacing, gore area treatments (if applicable), and typical sections. In addition, emergency pull-out locations will be identified along with other potential mitigation measures as determined during the feasibility analysis. Concept plans will be prepared on 11x17" sheets (1"=100', approximately 35 sheets) in electronic PDF and Microstation format.
 - 8. Concept Plan Cost Estimate – Prepare planning level cost estimate of proposed concept plan. Major construction items to estimate include pavement, barrier, overhead signs, pavement markings, and removal/reset items. Ancillary items will be estimated as a percentage of the cost of the major items. A contingency of 20% and construction engineering indirects of 22.1% will be added to the cost estimate.
 - 9. Performance Metrics and Benefit-Cost Analysis (*by CH2M excluding item 9c and 9d*)
 - a. Estimate daily and annual bus travel time and monetary savings (total and per rider)
 - b. Estimate annual RTD bus operations and maintenance savings (monetary)
 - c. Estimate additional annual CDOT maintenance (monetary)
 - d. To the extent possible, estimate expected change in annual accidents. This will include a monetized estimate of the likely change in crashes as input to the cost/benefit analysis. Unless other data are provided by CDOT, the most recent available documentation from the FHWA and NHTSA will be used to quantify the estimated value of crashes by severity in monetary terms.
 - e. Prepare Benefit-Cost Analysis – The Benefit-Cost analysis will consider the cost of infrastructure improvements to upgrade the shoulder lane for BOS operation, annual maintenance costs, and potential safety costs. Benefits will be determined from monetized travel time savings for bus riders, monetized bus operation savings, and bus maintenance savings. A return on investment will be determined

based on the costs and annualized savings of the project.

10. Documentation – The above findings will be summarized in a draft report and submitted to CDOT and RTD for review and comment. Ten (10) hardcopies of the report will be provided along with an electronic PDF copy and native software copies (e.g. MSWord and MSEXcel). Comments received from the draft report will be incorporated into a final report. Ten (10) hardcopies of the final report will be provided along with an electronic PDF copy and native software copies (e.g. MSWord and MSEXcel).

SCHEDULE

The draft study report will be completed within fourteen (14) months from the notice to proceed date. Submittal of the final report will be completed within three (3) weeks of receiving comments from CDOT and RTD.

WORK NOT INCLUDED IN THIS SCOPE

- A. Public Meetings
- B. Project Newsletters/Website
- C. Traffic simulation modeling
- D. Topographic Survey
- E. Structural Engineering
- F. Field Data Collection of Traffic Volumes/Speeds
- G. Geotechnical/Materials Engineering/Pavement Coring
- H. Environmental Clearances
- I. Utility investigations and reviews

LOCAL AGENCY RESOLUTION OR ORDINANCE