

STATEMENT OF WORK

PROJECT NUMBER: FRA2011.CRIS

PROJECT LOCATION: Front Range and I-70 Corridor

CONTRACT TYPE: Cost Plus Fixed Fee

CONTRACT SUBJECT: Colorado Interregional Connectivity Study

BACKGROUND

On June 23, 2009, the Federal Railroad Administration (FRA) issued a Notice of Funding Availability (NOFA) for the High-Speed Intercity Passenger Rail (HSIPR) Program in the Federal Register. In response, the Colorado Department of Transportation (CDOT), in concert with the Regional Transportation District (RTD), submitted an application to develop the Colorado Interregional Connectivity Study.

The Rocky Mountain Rail Authority (RMRA), a governmental authority made up of over 50 local governmental entities, completed a High Speed Rail (HSR) Feasibility Study in 2010 that examined HSR on the I-25 Front Range and I-70 Mountain corridors in Colorado. The study concluded that HSR was feasible within FRA guidelines on an I-25 north-south corridor from Pueblo to Fort Collins, and on an I-70 east-west corridor from Denver International Airport to Eagle County Regional Airport. The most feasible alignment and technology was identified for the purpose of ascertaining the most favorable cost benefit ratio, but no alignment or technology was selected or recommended.

The RMRA study indicated a very limited number of stations should be located in the Denver metropolitan region and that those stations would ideally also serve Regional Transit District (RTD) FasTracks stations. The study pointed out that alignment choices were limited in the Denver area due to existing rail traffic and an already heavily built environment. The RTD is currently engaged in various stages of planning for the locations of stations and alignments for its FasTracks rail system expansion. This study, the Colorado Interregional Connectivity Study, will examine the feasibility of using those stations and alignments for HSR, based on available and potential HSR alignments and ridership.

CDOT has begun developing a State Freight and Passenger Rail Plan (Rail Plan) independent of this study. A key aspect to the Rail Plan is the production of an accurate system description and inventory of the existing and proposed rail infrastructure. The inventory will include rail lines, facilities and operating and service attributes, from both freight and passenger perspectives.

The Division of Transit and Rail is anticipating beginning an Advanced Guideway System (AGS) Feasibility Study that will run concurrently and interface directly with this connectivity study. The AGS Study will be closely coordinated and used to supplement the Interregional Connectivity Study.

GENERAL OBJECTIVE

The primary purpose of the Interregional Connectivity Study is to serve as a planning document and provide preliminary recommendations for High Speed Intercity Passenger Rail (HSIPR) alignments, technologies and station locations in the Denver Metropolitan Region that will maximize ridership for the proposed RTD FasTracks system and future High Speed Rail service.

This study is primarily focused on the future high speed rail connections with the RTD FasTracks transit program. It will also determine optimal locations for a north-south (Colorado Front Range Corridor) HSIPR alignment from Fort Collins to Pueblo, and an east-west HSIPR alignment from Denver International Airport to Eagle County Regional Airport (I-70 alignment).

This planning project will enable CDOT and RTD to develop recommendations for High Speed Rail and/or Intercity Passenger Rail service. It will determine how proposed passenger rail service could best connect with the regional transit lines being developed in metro Denver, based on various alternative alignments and technologies. This will allow CDOT's Division of Transit and Rail to recommend a more efficient and effective approach that will integrate proposed passenger rail elements into the larger multi-modal and intermodal network.

This study will use findings from the Rocky Mountain Rail Authority (RMRA) study as a starting point. Together with analysis from the AGS study, and with the completion of the Interregional Connectivity Study, CDOT will have a point of departure for proposing HSIPR alignments which complement the existing system, maximize ridership and are cost-effective. Next steps are completing the required National Environmental Policy Act (NEPA) documentation and developing a detailed high-speed rail corridor Service Development Plan.

DESCRIPTION OF WORK

CDOT will work with the selected consultant to prepare the Interregional Connectivity Study as detailed below:

Task 1: Detailed Work Plan

CDOT will prepare a detailed work plan for the Interregional Connectivity Study project, to include a detailed scope and a Critical Path Method (CPM) schedule and budget. CDOT will then submit to FRA for review and approval. This detailed work plan will include integration of Stakeholder Involvement into each of the discrete tasks where warranted.

Task 2: Existing and Future Rail Service

The inventory, analysis and recommendations of the State Freight and Passenger Rail Plan will be used in the Interregional Connectivity Study to ensure uniform analysis and consistency in future rail initiatives. It is anticipated that the future system description and inventory of existing and proposed rail infrastructure portion of the State Rail Plan will be available for use

by early summer 2011. CDOT will summarize the inventory review and rail service recommendations from the State Rail Plan to be considered in the Interregional Connectivity Study.

Task 3: Establish Criteria and Scenario Development Process:

The Project Management Team (PMT), in collaboration with the Steering Committee, will establish criteria to assess connectivity, ridership, cost-effectiveness, safety, impacts on the environment and economic development.

CDOT and FRA have defined the endpoints to be used in the analysis as I-70 and Denver International Airport in the east, I-70 and Eagle County Airport in the west, I-25 at Fort Collins in the north and I-25 at Pueblo in the south. The PMT will use the RMRA's study as a starting point to investigate potential technologies and alignments. The Interregional Connectivity Study will identify a list of initial technologies with suitable operating characteristics for the **Front Range Corridor** for evaluation and inclusion in scenario development.

The concurrent AGS Study will identify and evaluate a range of technologies with suitable operating characteristics for the **I-70 Mountain Corridor** for evaluation and inclusion in scenario development. Findings from the screening conducted for the AGS Study will be included for use in the Interregional Connectivity Study.

Separate criteria will be developed for station siting and identifying stations for use in Task 4. Recommended criteria may include but are not limited to: interconnectivity for all modes of transportation, ridership potential, safety and security, environmental considerations and compatibility with station area planning goals and development potential.

The scenarios will result in a number of different system concepts (alignments, technologies, and stations), each of which will undergo a conceptual screening. A number of alignments will be analyzed, including those with exclusive corridors and those that may share corridors with other alignments such as highway, existing freight, and/or existing FasTracks alignments.

Screening will include identifying opportunities and constraints associated with each of the alignments. That process will involve consideration of technology (including speed or trip time goals), station locations, alignment location, and whether or not the alternative will enhance or hinder FasTracks rail operations. The scenario development and screening is expected to result in analysis that supports a short-list of alternatives that are technically feasible, cost-effective, and connectivity-enhancing. These alternative scenarios will be carried forward for more detailed demand and revenue estimation, cost estimation, financial analysis and environmental analysis.

Task 4: Demand and Revenue Estimation

Central to this study is a forecast of ridership and revenue impacts of new service on the Front Range Corridor from Fort Collins to Pueblo, and the I-70 Mountain Corridor from Eagle County Airport to the Denver International Airport. The analysis will consider segments and the full length of each corridor alone or in combination. There will be seven major steps in the process, as outlined below.

1. Determine appropriate base year for forecasting, and estimate the number of **base year trips** on air, auto, existing rail and bus modes.
2. Produce **trip forecasts** for each of the modes for the future year (anticipated to be 2035) of the analysis forecasting horizon.
3. Develop **demand model inputs (schedule, frequency, speed, and fare options)**, or modal characteristics for each of the existing modes and for the new or improved service.
4. Determine the appropriateness of developing and applying a state-of-the-practice intercity travel model for ridership forecasting. Using a diversion (or mode split) model or intercity travel model, estimate the **diverted trips** from each mode to the new or improved service and the **induced trips** due to service improvements.
5. Produce demand model outputs such as total revenues and passengers on the new or improved system. Such outputs could include average weekday passengers, average weekend day passengers, peak hour peak link line loads for fleet planning, and other ridership and benefit measures deemed appropriate by FRA.
6. Estimate the **ancillary revenues** expected from operating the rail system.
7. Summarize **ridership potential** of each alternative using such measures as average travel speed, service frequency, span of service, locations served and passenger fare.

Base year modal trip making and travel characteristics will be estimated from new data, or data from previous studies might be updated or factored to reflect changes in overall or regional modal trip making. Input data for the new rail services will be estimated using specific information about the corridor and rail technology employed.

The prediction of modal volumes and of induced trips in step 4 will take into account proposed rail alignments, possible station locations, current and future RTD FasTracks rail operations, and service characteristics (travel speed; service frequency; fare; and possibly others) of rail vis-à-vis the competing modes. Access/egress and connection options at the rail stations will also be reflected in the forecasts. The model should incorporate a local transit feeder distribution system at each station. Data collection and input preparation activities in step 3 will ensure that the modal service characteristics (as well as other types of data) required to estimate and apply the travel demand model is available.

The intercity travel model or mode diversion (or mode choice) model itself will be based as much as possible on locally-specific data including results of recent relevant travel surveys, and

applicable and transferrable coefficients from various travel forecasting models. It is expected that the model parameters and outputs will be reviewed and approved by RTD and the Metropolitan Planning Organizations (MPO's), in addition to CDOT and FRA.

Task 5: Capital Cost Estimation

The capital cost estimation process will provide a comprehensive estimate of all capital investments that must be made to operate the system, as defined by the scenario development process and the projected level of demand. It also will provide the detailed system description needed to support the estimation of operating and maintenance (O&M) costs and trip time calculations.

The major components of capital costs that will be covered include:

- Land Acquisition
- Right-of-Way (ROW) (track, signals, bridges, stations, etc.)
- Vehicles
- Stations (including concession areas) and Parking
- Maintenance Facilities
- Environmental Mitigation
- Design, project management, permitting.

Investments in ROW, advanced guideway and related systems (e.g., Positive Train Control signals, electrical power supply) depend on technology chosen, speed objectives, and various site-specific conditions.

Information from Task 8, Societal/Environmental Impacts Estimation will be used to include high-level environmental considerations in the cost-estimating task. Areas of environmental concern or potential environmental hazards (such as regulated materials, wetlands, cultural resources and park areas) should be identified and considerations of mitigating environmental impacts should be included in the estimates.

Capital cost estimates for each alternative scenario will be developed using a standardized spreadsheet developed in concert with the AGS project team for use in this study. The capital cost estimates should be based on local RTD experience (where applicable) and supplemented with national cost data when applicable. Capital cost estimating master spreadsheets should be developed for all of the scenarios forwarded for detailed analysis.

Each spreadsheet will define the elements to be estimated and specify the unit cost for each element. It is anticipated at this stage of study that quantities will be grossly defined, commensurate with the level of definition of the alignments. The estimate at this stage will

provide an order of magnitude comparison of costs and include project contingency, management and overhead costs, in addition to the major cost considerations outlined above. Overall contingency levels should be approximately 30%.

Task 6: Operating and Maintenance Cost Estimation (O&M)

O&M cost estimates for the HSIPR alignments must be accurately predicted to assess the financial viability of a scenario or service option. Estimates will need to account for cost variations that will occur with variations in system definition and demand levels. Inputs from Task 4, Demand and Revenue Estimation, should be used to complete this estimation. This task will need to be closely coordinated with the AGS Study Team. Analysis from the AGS study will be included for use in this task.

The O&M cost estimates for the HSIPR alignments should be developed using cost relationships for all of the functions and sub-functions of costs involved in operating a passenger rail system. The study will utilize the FRA's standard cost categories developed to assist in evaluating and selecting projects.

Cost estimation involves measuring the cost estimates in current dollar values to reflect recent corridor conditions. The level of detail in the estimation will depend on the resources available to the O&M task as a balanced study design progresses. At a minimum, major cost categories will be evaluated, including annualized costs for capital renewal and replacement.

This process will estimate the impact of these economies of scale for O&M depending on whether the corridors are operated individually or as a network.

A HSIPR Operating Plan will be generated for each scenario; the operating plan should include the following:

- Service Plan
- Travel Times
- Corridor Miles
- Hours of Service
- Number and location of Stations
- Vehicle characteristics
- Number of trains and vehicles required

Operating costs will be estimated for each HSIPR alternative based on the operating plan and vehicle characteristics for the alternatives. Total O&M cost estimates for all the HSIPR alternatives will include a comparison of costs for independent corridors and initial operating segments, versus combined systems.

Task 7: Financial Analysis

A financial analysis will be developed for each scenario in a process that uses outputs (capital cost, O&M cost, ridership and fares generated) from the demand and revenue estimating. Order of magnitude costs for each scenario should provide a cost comparison for future funding.

The study will develop high-level financing and funding plans for the initial operating segments, full corridors and full systems. The alternatives need to be evaluated in terms of financial feasibility and the ability of financing mechanisms to match costs. Legal structural implications need to be considered in the analysis as well. The analysis will consider different ways to generate federal, state, local and private sector support for the rail service. Specific alternatives to be considered include but are not limited to:

- Federal and State local match
- Local funding of a station
- Private sector opportunities and roles in provision of services and contracting
- Freight railroad contracting and funding options

The analysis will consider a full range of innovative financing proposed by the FRA and evaluate the potential roles for grants, including: Transportation Finance and Innovation Act (TIFIA) loans, Railroad Rehabilitation & Improvement Financing (RRIF) loans, and other financial instruments.

Task 8: Societal/Environmental Impacts Estimation

The study will examine social impacts as indicators of the relative value of social benefits of public investments. The economic, environmental and safety analysis conducted for the Rail Plan can be used as a basis for these studies. Direct regional economic impacts; e.g., changes in construction and permanent employment, and increases in overall regional travel and economic activity will be estimated and documented as further detailed below. The study will evaluate the following impacts:

- Air quality
- Noise
- Energy and congestion
- Land use and development effects, including TOD potential
- Fuel Cost Savings
- Initial and Permanent Employment Changes

- Safety benefits
- Reliability
- New Ridership on Rail and other modes due to improved transportation level-of-service (induced demand): and
- Consumer Surplus – a user benefit similar to the estimated time and cost savings often cited in evaluating highway projects

A high-level environmental review of each short-listed alternative should be conducted to determine sensitive community or natural resources that may be potentially affected. These may include but are not limited to historic resources, regulated materials, wetlands and parks or recreation resources. While many of these resources can likely be avoided during final design, potential for mitigation, and costs associated with mitigation, should be included in the analysis and order of magnitude environmental mitigation costs as part of capital cost estimating.

Task 9: System Planning Recommendations

The final component of the Interregional Connectivity Study is a general system review and summary that reviews the various scenarios, evaluates their financial viability and assesses their advantages and disadvantages.

The task will also include a review of the recommendations made in the financial analysis task. The assessment will highlight the advantages/disadvantages and obstacles to moving forward with the recommended scenario(s). Recommendations will include a summary based on the evaluation criteria about which scenario(s) are financially and legally feasible. In addition to the summary, these recommendations would include “Next Steps” which could include choosing an alignment or minimal operable segment for more detailed evaluation.

Before moving to Task 10, CDOT and the FRA will have an opportunity to review the recommendations made to this point.

Task 10: Report Preparation

The summary memos of the aforementioned tasks will be compiled into a Draft Interregional Connectivity Study for review and comment by CDOT and FRA, with major findings reviewed by the PMT and Steering Committee as needed.

After review of the draft study, the Final Interregional Connectivity Study will be compiled and reproduced for distribution as needed.

PERFORMANCE OBJECTIVES AND DELIVERABLES

The period of performance for the above work shall be 18 months, beginning June 2011 and ending November 2012. Major tasks schedule is proposed as follows and deliverable dates are outlined as shown below in the table:

Task 1 Deliverable: Detailed Work Plan, budget and CPM Schedule for FRA review.

Task 2 Deliverable: Summary of inventory review and recommendation of rail service features from State Freight and Passenger Rail Plan to be considered in the Interregional Connectivity Study.

Task 3 Deliverable: A technical memo documenting the process, including how criteria were established, data collected (including sources), analysis performed, and recommendations of alternatives requiring more detailed analysis.

Task 4 Deliverable: A demand forecast memo for use as a major section of the draft and final report.

Task 5 Deliverable: Capital cost estimation memo for use as major section in Draft and Final Study. The deliverable will be a detailed memorandum explaining the costing methodology, and an estimated total cost for each alignment estimates for the major components. This memo will be used as a major section in the Draft and the Final Study.

Task 6 Deliverable: Operating and maintenance cost estimation memo for use as major section in Draft and Final Study. The results of this task will be documented in a technical memo, which will summarize, along with results of Task 5, a detailed capital and maintenance cost projection interim deliverable.

Task 7 Deliverable: Memo summarizing financial analysis recommendations for use as major section in Draft and Final Study.

Task 8 Deliverable: Memo summarizing social and environmental impacts analysis for use as major section in Draft and Final Study.

Task 9 Deliverable: Summary of recommendations, opportunities, constraints and next steps. The FRA will have an opportunity to review the "Next Steps" summary before it is finalized. All related findings available from the concurrent AGS study will be included in the final recommendations. This should be a stand-alone memo that will be included as a conclusion of the Draft and Final report.

Task 10 Deliverable: Draft Interregional Connectivity Study for FRA review and Final Interregional Connectivity Study.

DRAFT PROJECT SCHEDULE

Schedule of Work

| | | |
|----------------|---|-------------------------------|
| Task 1 | Detailed Work Plan | September 2011 |
| Task 2 | Existing and Future Rail Service | October 2011 |
| Task 3 | Establish Criteria and Scenario Development Process | October 2011 to March 2012 |
| Task 4 | Demand and Revenue Estimation | December 2011 to July 2012 |
| Task 5 | Capital Cost Estimation | July 2012 to August 2012 |
| Task 6 | Operating and Maintenance Cost Estimation | July 2012 to August 2012 |
| Task 7 | Financial Analysis | August 2012 to September 2012 |
| Task 8 | Societal/Environmental Impacts Estimation | July 2012 to October 2012 |
| Task 9 | System Planning Recommendations | October 2012 to November 2012 |
| Task 10 | Report Preparation | November 2012 to January 2013 |

PROJECT COORDINATION

The Project Management Team (PMT) will be comprised of the FRA, the FTA, an RTD Representative, CDOT Division of Transit and Rail (DTR) Director, the DTR Project Manager and a Consultant Project Manager. In addition to the PMT, a Steering Committee will be convened. It is anticipated that Technical Advisory Groups may be warranted as well. The Steering Committee could include, but is not limited to representation from:

- Study Area Counties
- CDOT Region Program Engineers and Planners
- Transportation Planning Regions represented by the Statewide Transportation Advisory Committee Chairperson
- MPO representatives
- One representative from Action 22/Progressive 15/Club 20 (regional advocacy planning groups)
- Railroads
- Colorado Association of Transit Agencies

- Transit and Rail Advisory Committee
- Regional Transportation District
- Denver International Airport

PROJECT MANAGEMENT

The project management plan will be updated as necessary through the duration of this Project. The project will be monitored regularly by the CDOT DTR Project Manager and Project Management Team for quality assurance and to ensure milestone deadlines, technical analysis, and Stakeholder coordination are within expectations. Regularly scheduled meetings with the consultants and the Steering Committee members will evaluate the progress of the study.

FRA Updates and Review – At a minimum, CDOT will provide to FRA quarterly reports of progress and three deliverables for FRA review: a detailed Project Work Plan, the draft “Next Steps” summary, and the Draft Interregional Connectivity Study.

Stakeholder Involvement – CDOT will engage stakeholders at critical milestones in the project development process. This project will follow a modified Context Sensitive Solutions stakeholder process. The Steering Committee will assist the PMT at key milestones, including: defining desired outcomes and building consensus around the process, including criteria and scenario development, and analysis and finalization of the study. There may also be separate technical teams as needed.