Submitted To

# Rocky Mountain Rail Authority

June 11, 2008

DRAFT

# Project Management Plan (PMP) for High Speed Rail Feasibility Study


Submitted by

TEMS

Transportation Economics & Management Systems, Inc.

in association with

Quandel Consultants, LLC

# Project Management Plan (PMP)

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For

## Rocky Mountain Rail Authority
## High Speed Rail Feasibility Study

***Prepared by:***

***Transportation Economics & Management Systems, Inc. / Quandel Consultants, LLC***

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# 1.0 Overview: Study Purpose

The purpose of the Project Management Plan (PMP) is to provide guidelines for the completion of the Rocky Mountain Rail Authority High Speed Rail Feasibility Study. The PMP will -

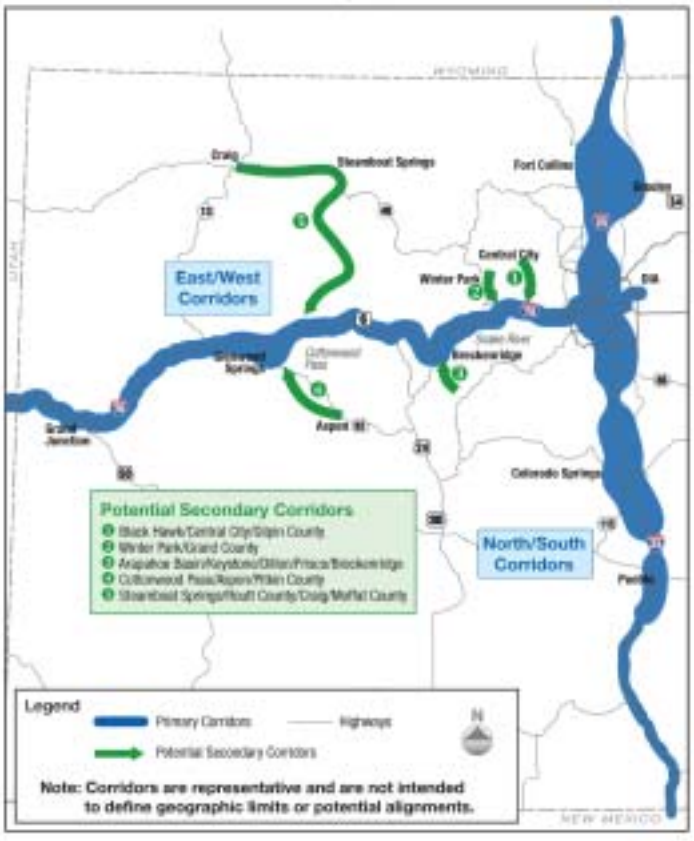
- Establish the framework and process for the management and execution of the RMRA High Speed Rail Study.
- Outline the project scope, budget, resource requirements, roles, responsibilities, authorities of study team, the PMC and the RMRA Steering Committee, and other stakeholders.
- Outline the technical performance requirements for the management and control of the project from initiation of concept design through final delivery to the customer/user.
- Establish decision rules for the review of inquiries and proposals for changes.

Providing a quality study on schedule and within budget is the primary objective of all study team members. The operating procedure described in this plan supplements existing procedures used by the study team to perform technical analysis. It is intended that this management plan be a living document subject to change as conditions warrant or as project experience dictates.

The Study Background, Project Objectives, Business Plan Approach, Study Corridor definition, and Coordination requirements are specified in Appendix A: Contract Scope of Work appended to the Project Management Plan.

The purpose of the study is to provide a comprehensive and objective assessment of the feasibility of implementing high speed rail in the I-70, I-25, and secondary corridors of the study region. These corridors are shown on the map below.

**Potential Colorado High Speed Rail Corridors**



The aim of the study is to assess high speed passenger rail options (alternatives) in terms of USDOT Federal Railroad Administration (FRA) criteria, both in terms of public private partnership potential and high speed rail feasibility factors. The two public private partnership criteria and the six high speed rail factors are described in detail in Appendix A - Scope of Services.

A key element in the project approach is the use of a Business Plan Approach that is specifically geared to allow the evaluation of a wide range of passenger rail technology alignments and service levels. This will provide a wide range of evaluation criteria including financial, economic and community benefits that address the needs of the FRA, as well as local decision makers.

In carrying out the study, the RMRA requires a very high level of coordination with other studies taking place in Colorado, as well as providing a thorough understanding of local and state expectations for passenger rail service in each corridor. This includes levels of passenger ridership, location of stops, train speeds and schedules, potential alignments, implementation plans, and the financial and economic benefits of building such a project.

In setting the framework for the study, the RMRA recognizes that the current work may provide a framework for the planning of a high speed rail system, but other and more detailed issues may be raised that will need to be dealt with by further work. Such further work will of course be dependent on the RMRA obtaining suitable funding.

# 2.0 Work Plan

## 2.1 Work Tasks

Listed below is a summary of major tasks to be completed during the course of the RMRA High Speed Rail Feasibility Study. The Work Breakdown Structure (WBS) is shown in the Work Schedule 2.3, and each major task is given below.

| TASK CODE | TASK NAME | TASK DESCRIPTION |
|---|---|---|
| **1** | **Project Management** | To effectively manage the study effort and coordinate with the PMC and RMRA Steering Committee. To provide Project Management Plan coordination with relevant studies, to prepare monthly progress reports |
| 1.1 | Steering Committee Meetings | Steering Committee meetings will be held monthly to provide the Steering Committee with insight into the progress of the study and future work efforts. |
| 1.2 | PMC Coordination Meetings | On a bi-weekly basis, the PMC and the SPM will meet or conference call to discuss study progress and evaluate the key steps to be taken in the next month. |
| 1.3 | Monthly Progress Report | A monthly progress report will be submitted to the PMC describing the work completed to date, and identifying any issues or concerns that need to be addressed in the coming month. |
| 1.4 | Project Management Plan | The Project Management Plan describing the management of the project and all its activities will be submitted for approval of the PMC and Steering Committee. |
| **2** | **Peer Review Panel** | Three (3) Peer Panels will be created, with each panel meeting two times. Panels will address ridership/revenue, alternatives development/evaluation, and development costs and financing. The first panel will address data and methods, the second panel will review results and findings. |
| 2.1 | Develop Panels | Work with PMC to develop Peer Review Panels with the appropriate balance between academic, empirical, and local expertise. |
| 2.2 | First Peer Review Panel | For each topic, hold a meeting to review data methods and range of analysis. |
| 2.3 | Second Peer Review Panel | For each topic hold meeting to discuss alternatives analysis results. |
| 2.4 | PowerPoint Presentations | For each of the six (6) peer review meetings, prepare appropriate PowerPoint presentations. |
| 2.5 | Response to First Peer Review Panel | With PMC prepare a response to the questions and issues raised in the peer review panel. |
| 2.6 | Response to Second Peer Review Panel | With PMC prepare response to the questions and issues raised in the panels. |
| **3** | **Scoping/Outreach** | Effectively engage the public to develop a comprehensive understanding of issues and desires related to the study. Provide coordination of Public Input and Technical and Policy Outreach. |

| | | |
|---|---|---|
| 3.1 | Scoping | Provide in both I-70 and I-25 corridors consultation with stakeholders and other related studies. This includes scoping workshops with I-70 Coalition, I-25 corridor communities, and Denver Metropolitan Area. Develop project purpose and need statement to guide alternatives analysis, propose study goals and objectives. Prepare Scoping Technical Report. |
| 3.2 | Ongoing Public Input | Coordinate with local organizations to develop the following community partnership program. This will include meetings, three (3) project updates, and five (5) presentations in geographically dispersed areas. Provide media relations, monthly project updates and stakeholder database. |
| 3.3 | Policy Outreach | Provide Policy Outreach coordination. This will include conducting two (2) workshops in the I-70 corridor, two (2) workshops in I-25 corridor, and two (2) workshops in Denver area. The workshops will gather data on alternatives development and alternatives analysis to allow public and governmental review of proposed plans and areas of collaboration. |
| 3.4 | Stakeholder Outreach Approach Report | Prepare a stakeholder outreach approach report identifying the process for contracting, meeting, and communicating with stakeholders. |
| 3.5 | Scoping Technical Report | Prepare a scoping report that identifies the scope of the alternatives that the public would like to have considered in the study. |
| **4** | **Methodology, Data Collection and Existing Conditions** | Develop study databases and assess existing conditions. |
| 4.1 | Methodology Report | Prepare Methodology Report describing the study methodology and requirements for review by Peer Panel, PMC and Steering Committee. |
| 4.2 | Market Database | Develop market database including origin/destination, socioeconomic, network, and stated preference information. |
| 4.3 | Engineering Database | Prepare the right-of-way existing conditions database describing geographic, topography and existing infrastructure of I-70, I-25, and secondary corridors. |
| 4.4 | Technology Database | Prepare rail vehicle technology database with speeds from 79-mph to high speed rail options. |
| 4.5 | Property Database | Develop a property database to assess station locations and the character and value of properties in each corridor. |
| 4.6 | Existing Conditions Report | Prepare a report describing the base conditions in terms of each corridor. This will include market, operations, engineering, and property conditions. |
| **5** | **Preliminary Service Scenarios** | In this task the potential infrastructure technology and operations options are defined. |
| 5.1 | Identification of Alternatives | Develop the range of technology, alignment and service options that could be feasible in the I-70, I-25 and secondary corridors. |

| | | |
|---|---|---|
| 5.2 | Development of Initial Service Concepts | Identify the preliminary service options for both a base and improved service level for each technology. |
| 5.3 | Alternative Development Workshop | Hold the Alternatives Development Workshop with the RMRA Steering Committee to reach consensus on the range of alternatives. |
| 5.4 | Alternatives Development Technical Report | Prepare a report on the potential alternative alignments, technologies, markets, stations and operations for high speed passenger rail service in the I-70, I-25 and secondary corridors. |
| **6** | **Alternatives Analysis** | In this task, carry out an Interactive Analysis of market, engineering, and operations to establish the ridership, revenue, capital and operating costs of alternatives, and to further refine the alternatives for consideration. |
| 6.1 | Ridership Forecasts | Prepare ridership forecasts for each option for base and forecast years. |
| 6.2 | Revenue Forecasts | Prepare revenue forecasts for each option for base and forecast years. |
| 6.3 | Evaluation of Alternatives | Assess engineering and operations potential for the proposed corridors. |
| 6.4 | Operating and Capital Costs | Identify Operating and Capital Costs for each proposed option. |
| 6.5 | Ridership and Revenue Report | Prepare a ridership and revenue report describing the markets and potential revenue for different alternatives |
| 6.6 | Alternatives Technical Report | Prepare a report comparing each of the proposed passenger rail alternatives. |
| **7** | **Feasibility Determination** | Provide a clear understanding of costs, finances and economic benefits of proposed options for the I-70, I-25 and secondary corridors. |
| 7.1 | Financial Analysis | Prepare a financial analysis for the preferred options, including a Proforma Cash Flow Analysis |
| 7.2 | User Economic Analysis | Prepare a demand side FRA approved user benefit Economic Analysis for the preferred options. |
| 7.3 | Community Economic Benefits | Prepare a supplyside community benefit Economic Analysis for the preferred options. |
| 7.4 | Financing and Funding Arrangements | Evaluate the Financing and Funding arrangements for the preferred alternatives for each corridor. |
| 7.5 | Institutional Framework | Identify the character of the Institutional Framework to be used to support the development of the RMRA project. |
| 7.6 | Allocation of Costs and Revenues | Carry out an evaluation to show how costs and revenues will be allocated to different stakeholders for the proposed alternative(s). |
| 7.7 | Final Recommendation | Following consultation with the PMC and Steering Committee, develop a feasibility based recommendation for implementation in the I-70, I-25 and secondary corridors. |
| **8** | **Task Documentation** | This task is concerned with documenting the results of the study. |

| | | |
|---|---|---|
| 8.1 | Implementation Plan | An Implementation Plan will be developed to show how the projects in each corridor should be developed. |
| 8.2 | Business Plan | A Business Plan will be prepared describing the technical analysis and findings of the study. |
| 8.3 | Draft Final Report | A draft report will be prepared that will provide a comprehensive description of all the work undertaken for the project. This will be submitted first for approval by the PMC and on incorporation of the PMC comments; it will then be submitted to the Steering Committee as the draft final report. |
| 8.4 | Final Report | The comments of the PMC and Steering Committee will be incorporated in the final report and it will be submitted for approval. |

## 2.2 Major Milestones

The Study Team will track major milestones, which provide an overview and status to the RMRA Steering Committee and Project Team, and the public. The following is a selection of the major milestones that will apply:

| | |
|---|---|
| Task 2: First Peer Review (3 meetings)<br>Second Peer Review (3 meetings) | Oct 1-31, 2008<br>Jan 7-30, 2009, |
| Task 3: Stakeholder Outreach Approach Report<br>Technical Scoping Report | July 15, 2008<br>Sept 29, 2008 |
| Task 4: Methodology Technical Report<br>Existing Conditions Technical Report | Aug 15, 2008<br>Sept 29, 2008 |
| Task 5: Alternatives Development Workshop<br>Alternatives Development Report | Oct 4, 2008<br>Dec 15, 2008 |
| Task 6: Ridership and Revenue Report<br>Alternatives Analysis Report | Jan 21, 2009<br>Jan 21, 2009 |
| Task 7: Final Recommendation Memorandum | Mar 3, 2009 |
| Task 8: Final Reports | |
| Draft Report | May 14, 2009 |
| Final Report | June 15, 2009 |

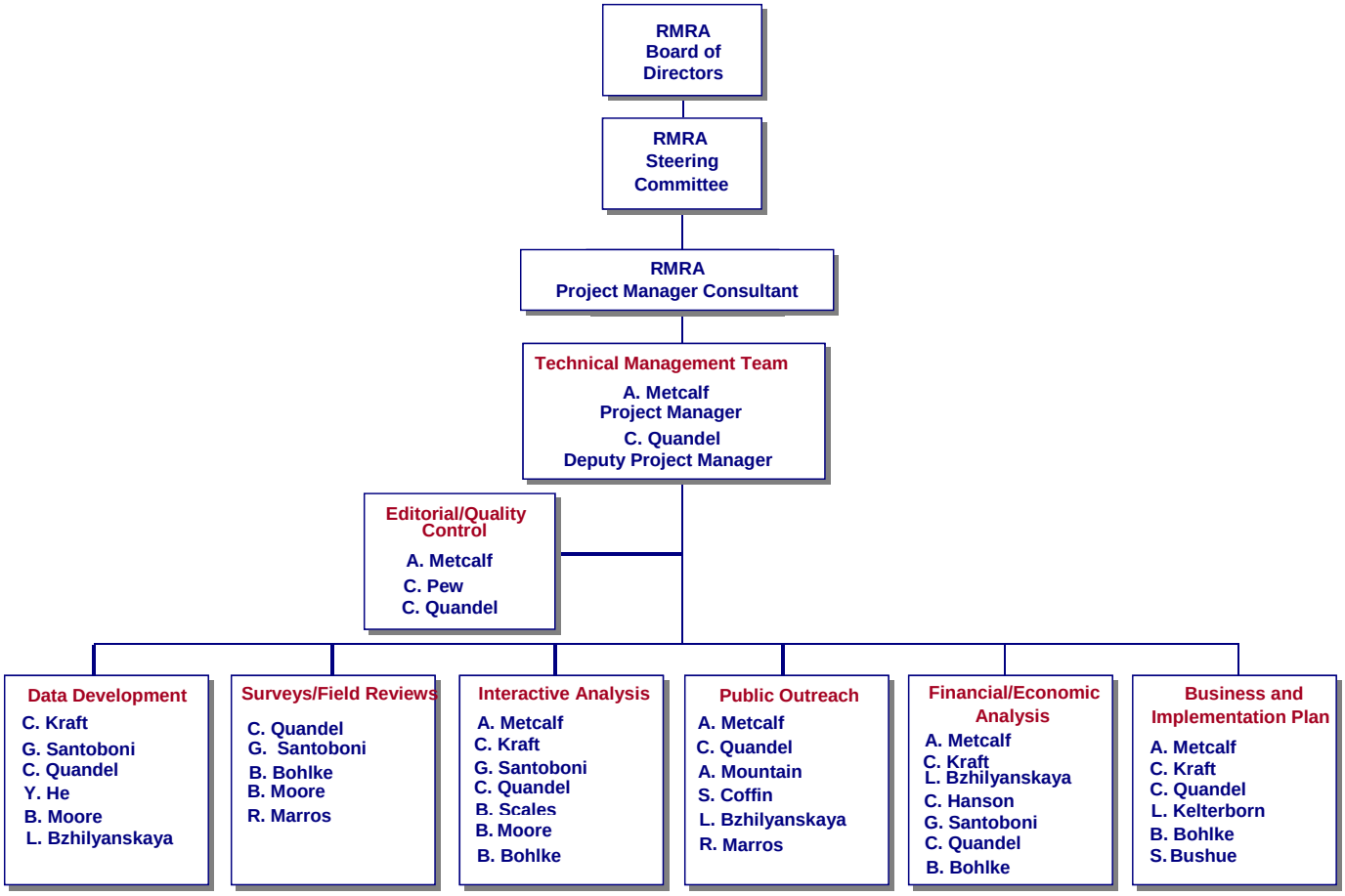
## 2.3 Work Schedule (see Appendix B)

Appendix B provides a detailed work schedule for the project. It will be updated monthly.

# 3.0 Project Organization: Roles and Responsibilities

The RMRA HSR Feasibility Study Consultant's project roles and responsibilities, including, but not limited to, the positions shown below and detailed on the following page.

**RMRA HSR FEASIBILITY STUDY ORGANIZATION STRUCTURE**



## KEY PROJECT PERSONNEL PROJECT ROLES AND RESPONSIBILITIES

| NAME/POSITION | PROJECT ROLES/RESPONSIBILITIES |
|---|---|
| Alexander Metcalf, PhD<br>Project Manager | As Project Manager, Dr. Metcalf will direct the overall project providing project management for the Public Outreach process, Peer Review organization and execution, as well as, ridership and revenue, financial and economic analysis. Dr. Metcalf will work closely with Mr. Quandel to manage and implement the Interactive Analysis that will be used to define alternatives and assess the most effective options. Dr. Metcalf, Mr. Quandel, and Dr. Kraft will be the principal authors of the Feasibility Business Plan Report. |
| Charlie Quandel<br>Deputy Project Manager | Mr. Quandel will act as Deputy Project Manager and will support Dr. Metcalf in organizing and managing the study. Mr. Quandel and Dr. Metcalf will work closely with Mr. Mountain to develop the Public Outreach process, the PMC to organize the Peer Review process, and Ms. Celia Pew, and Dr. Kraft to prepare the final Feasibility Business Plan Report. Mr. Quandel will direct the engineering analysis and work closely with Dr. Metcalf and Dr. Kraft on the Interactive Analysis, and both the development and selection of passenger rail options for the I-70, I-25 and secondary corridors. |
| Celia Pew<br>Editorial/Quality Control | Ms. Pew has the overall responsibility for Quality Control and report and technical paper preparation. She will be responsible for assuring the quality of all final study products. |
| Edwin "Chip" Kraft, PhD<br>Managing Operations Planner | Dr. Kraft will lead TEMS evaluation of passenger train technology, train speeds, train schedules, capacity issues and develop estimates of operation and maintenance costs. He will lead the analysis of railroad impacts and railroad cost assessment. Dr. Kraft will work closely with Dr. Metcalf to manage the financial and economic analysis process and Mr. Quandel to develop the implementation planning process. Dr. Kraft will support the development of the final Feasibility Business Plan Report. |
| Andy Mountain<br>Public Outreach | Mr. Mountain will lead the Public Outreach program. He will manage the communications program and provide outreach to the public and private sectors. Specifically, Mr. Mountain will facilitate coordination with communities in the I-70, I-25, and secondary corridors. For scoping he will arrange three workshops, one with the I-70 Coalition, one with the Denver Metropolitan Region, and one with the I-25 communities. He will coordinate public input by preparing three communications updates, and conducting five community presentations across the region. The work will include media relations, project updates, and stakeholder database. In terms of public outreach he will lead community workshops for the I-70, Denver Metropolitan Area, and I-25 corridor. He will support Dr. Metcalf and Mr. Quandel in preparing presentations, interim technical memorandums, and the Feasibility Business Plan Report. |
| Giovanni Santoboni, PhD<br>Senior Demand Analyst | Dr. Santoboni will be responsible for developing the rail passenger corridor demand model. Dr. Santoboni will calibrate the COMPASS™ Demand Model to estimate rail ridership, as well as, auto and intercity bus traffic. He will estimate revenues, and determine competitive fare levels. He will develop the market database including transportation network, origin-destination and stated preference data for the study area. |

| | |
|---|---|
| Brian Scales, PhD<br>Rail Technology Expert | Dr. Scales will provide input on the range of technology that may be considered for the I-270, I-25 and secondary corridors. He will work closely with Dr. Kraft on developing technology options for the Interactive Analysis. |
| Lyudmila Bzhilyanskaya, PhD<br>Financial Planner/Economist | Dr. Bzhilyanskaya will develop the socioeconomic database for the demand model. This will include long-term projections of income, population, employment, and economic growth. Dr. Bzhilyanskaya will also develop the economic scenarios for central, upper, and lower economic growth and provide consistent disaggregate economic projections. She will also perform the financial and economic analysis, which includes estimating financial rates of return and economic benefits using US DOT FRA standards and criteria. She will perform the community economic analysis, and will work with Dr. Metcalf and Mr. Mountain in developing a technical report and presentation. |
| Robert Marros<br>Planning Analyst | Mr. Marros as planning analyst will serve as lead analyst responsible for GIS system design and task management and special analysis, extensive demographic analysis and map development for technical reports. |
| Brenda Bohlke, PhD<br>Managing Engineer | Dr. Bohlke will provide engineering input on the development of alignments using tunnels. She will advise on the physical layout and potential alignment options. She will be responsible for supporting Mr. Quandel in developing Capital Costs for tunnel options. |
| Steve Coffin<br>Senior Consultant /Public Outreach | Mr. Coffin will serve as Senior Consultant for the Public Outreach program. He will support Mr. Mountain in facilitating workshops, preparing outreach materials, and developing project update materials. |
| Carl Hanson<br>Noise and Vibration Analysis Team | Mr. Hanson will lead the noise and vibration analysis team. He will work closely with Mr. Quandel and provide input to the assessment of alignments and the environmental review. |
| Larry Kelterborn<br>Technology Evaluation Assessment | Mr. Kelterborn will support the Technology Evaluation Assessment providing innovative engineering solutions and strategic consultant support |
| Yang He<br>Transportation Analyst | Dr. He will be responsible for the development of the passenger and freight forecasting models. This will include surveys, database development model, calibration and forecasts of traffic and revenues. |
| Bob Moore<br>Senior Engineer | Mr. Moore as Senior Engineer will support Mr. Quandel in developing route alternatives, assessing options, and carrying out the Interactive Analysis. In addition, he will help estimate Capital and Operating Costs. |

# 4.0 Communication Plan

The purpose of this protocol is to set out the procedures that will be adopted to ensure effective communications between the RMRA Steering Committee and the study team. It will also describe the procedures used by the Study Team to interact with each other and provide an efficient and effective reporting system.

## 4.1 Study Team Project Manager and RMRA Project Management Consultant Communications

The principal project management coordination will be between the Study Team Project Manager (SPM), and the RMRA Project Management Consultant (PMC). The PMC will act as the intermediary between the study team, RMRA Board, RMRA Steering Committee, and RMRA Chairman. These two individuals will use a variety of media, phone, email, fax, and meetings to provide effective administration of both the study team's activities and its interface with the RMRA Study Steering Committee(s). This will include:

- Bi weekly conference calls/meetings to maintain oversight of the project process.
- Development of peer review program and schedules to provide effective oversight of the technical program and range of scenarios.
- Review of monthly progress reports and billing by the study consultant team.
- Review of study steering committee discussions and implications for the consultant future work program.
- Review of RMRA Steering Committee presentations and documentation such as, technical memorandum, maps, graphics and reports.

## 4.2 Study Team Project Manager (SPM), Project Management Consultant (PMC) and Chairman of RMRA Study Management Consultant (SMC)

As appropriate and at key milestones, the PMC will involve the Chairman of the RMRA Study Steering Committee in the conference calls between the PMC and the SMC. The purpose of these discussions will be to:

- Brief the Chairman of the Study Steering Committee on critical issues.
- Obtain guidance on technical and legal issues relating to the study.
- Confirm and obtain approval for analysis issues.

## 4.3 Study Team and RMRA Study Steering Committee

On a monthly basis and at specific predefined workshops and meetings the study team will make presentations and answer questions from the RMRA Study Steering Committee. Presentations will be in the form of PowerPoint slides designed to reflect in a straight forward way the technical development of the project, database findings, technical analysis procedures and results, alternatives development and assessment results, financial and economic conclusions, implementation and business plan findings.

A critical step in the technical process will be the Alternatives Development Workshop at which the alternatives for the given I-70, I-25, and secondary corridors will be selected for further

assessment and analysis. The results of this assessment will be documented in an Alternatives Development Technical Report, and in the Ridership and Revenue Reports.

## 4.4 Study Team

The study team will communicate with each other by means of regular internal conference calls, emails, and workshops. A reference database will be established to support technical analysis and file management.

## 4.5 Communication Plan

The communication plan for the project is broken into two sub-areas, Internal and External Communications, and is presented below in tabular form. Both sub-areas acknowledge that the project partners cannot realize their vision nor can the project delivery team attain our mission without a sufficient, timely and accurate flow of information. The items addressed below identify what the item is, who is the primary contact, how the information moves and when it happens. We also recognize that effective communication demands effective listening and viewing project decisions from our client's perspective.

In order to assure successful delivery of this project, it will be necessary for the project delivery team to accurately inform each other of their needs, updates and timelines. Minutes from meetings listed below will be electronically routed to affected groups as appropriate.

**External Communication**
Timely and meaningful exchange of information external to the project team is critical to secure a positive commitment from stakeholders and the general public. As indicated in the table, that flow may be written or oral, formal or informal.

| What | Who | How | When |
|---|---|---|---|
| **With Stakeholders** | | | |
| Conduct Workshops | Andy Mountain | Workshops will be setup | As appropriate |
| Provide Project Updates | Andy Mountain | Project updates will be prepared | As appropriate |
| Media Relations | Andy Mountain | News releases/media conference/coordination with Tom Schilling | As appropriate |
| **With Public** | | | |
| Public Involvement | Andy Mountain | Community Partnership Program | As needed |
| Website | Andy Mountain | Furnish Project Presentations | Monthly |
| Meetings | Andy Mountain | Presentations to communities | As needed |
| **With Other Transport Organizations** | | | |
| Other Studies | Alexander Metcalf<br>Charlie Quandel | Meetings | As needed |

| | | | |
|---|---|---|---|
| Railroads | Alexander Metcalf<br>Charlie Quandel<br>Chip Kraft | Meetings | As needed |
| MPOs | Alexander Metcalf<br>Chip Kraft | Meetings | As needed |

**Internal Communication**
Effective internal communications is open, honest, continuous and efficient. The table below addresses communication between and among the teams as well as communication protocol.

| What | Who | How | When |
|---|---|---|---|
| Steering Committee | Study Project Manager | As Requested | Monthly |
| PMC | Study Project Manager | As Requested | Bi-weekly |
| Peer Review | Alexander Metcalf<br>Charlie Quandel<br>Chip Kraft | Six (6) meetings/presentations | As Agreed |
| Team Members | Functional Manager | Set Protocols | As needed |
| Team Members | Functional Manager | Phone/Email | As needed |
| QA/QC | Alexander Metcalf<br>Charlie Quandel<br>Celia Pew | Memo/Presentations/Reports | As needed |

## 4.6 Official Communications

All contract related communication will be sent in writing to the following individuals:

Mr. Mark Boggs
PBS&J
4601 DTC Boulevard
Suite 700
Denver, CO 80237

Ms. Celia M. Pew
TEMS, Inc.
116 Record Street
Frederick, MD 21701

# 5.0 Quality Control Procedures

## 5.1 Project Management Planning and Responsiveness

The Study Team recognizes that strong management systems, technical credentials, personnel resources, and geographic familiarity are necessary to guarantee successful project management. The project management system recognizes, understands and addresses the functions of planning, organizing, directing and controlling project activities, and also the inherent relationships among tasks, schedules, and resources that must be optimized to provide a quality end product in a cost-effective manner.

The project management system will be based on a Work Breakdown Structure (WBS) formulated to address the objectives of the RMRA Steering Committee. The WBS identifies all tasks necessary to complete the products required for successful project completion. The WBS identifies individuals responsible for task completion, schedule and budget available for task completion, input requirements, output relationships and Steering Committee approvals/decisions. The WBS enables efficient tracking, auditing and reporting to the PMC Project Manager and RMRA Steering Committee.

Primary benefits of the Study Team project management system will be providing the PMC Project Manager and Steering Committee with:

- Single Point-of-Contact – A Project Manager with overall responsibility who will actively participate in project activities from start to finish. In carryout these functions, the Project Manager will be supported by the Deputy Project Manager.
- Efficiency/Close Coordination – An efficient management plan that clearly defines the roles and responsibilities of the individual members of the Study Team and, at the same time, incorporates the needs and concerns of other interested parties.
- Capability and Capacity – Multi-disciplinary, creative member firms experienced with the Steering Committee policies and procedures, with a thorough technical understanding of the alternative analyses process for concept and feasibility studies.
- Continuity and Responsiveness – The commitment to ensure staff continuity and quick response to the needs and concerns of the PMC Project Manager and RMRA Steering Committee.
- Flexibility – The ability to adapt and respond to project requirements as new information becomes available.

## 5.2 Project Control

Effective use of TEMS' project management program provides the key to meeting project schedule milestones. Project reporting and control procedures will be specifically tailored to the needs of the Project Manager and Steering Committee. TEMS will utilize its Cost/Schedule Control Program to provide internal management data to the management team and task managers along with reporting data and progress to the Steering Committee. The Cost/Schedule Control Program will be adapted to the project work plan and project tasks. This program provides the following tools for the Project Manager to ensure that budgets and schedules are met:

- Detailed Contract Schedule – Provide a detailed Contract Schedule in Gantt format for the Study Steering Committee approval. The detailed schedule will identify all the major project activities and work elements and will be submitted in a time-scaled logic diagram along with the appropriate schedule analysis narration. This schedule will be updated

monthly to reflect actual progress of the project in terms of individual tasks and overall percentage completion. This schedule will be consistent with the information included in the Project Management Plan (PMP).

- Summary Contract Schedule – This schedule will summarize the detailed Contract Schedule, depicting the detailed schedule elements in a bar chart format. This schedule will provide the original control schedule baseline for the PMC. Based on monthly updates to the Detailed Contract Schedule, this schedule will also be updated.
- Project Management Plan (PMP) – A PMP report, generated within ten (10) business days of receipt of the Notice to Proceed, will serve as the basis for monitoring consultant performance and tracking accomplishments versus resources expended. The PMP task breakdown, will quantify as realistically as possible the time-phasing and planned accomplishments for the design effort.
- Project Control – Monthly reports detailing budget hours, labor budgets by task and team expenditures including sub-consultant costs will allow project resources to be monitored and evaluated against pre-established budgets.

## 5.3 Quality Management Program

Study Team members were selected not only on the basis of technical expertise, but also for their commitment to quality management. Quandel Consultants, LLC has an internal quality assurance program that complies with that of TEMS.

The Study Team's Quality Management Program is founded on a belief in "Quality Focus and Customer Service." This program centers on Total Quality Project Management, beginning with the strong commitment of company management. It is a continuous program wherein all members of the team focus on on-time product delivery within the project budget. Through this program, the Project Manager is empowered to provide services to the client without impedance from unnecessary corporate bureaucracy. The program can be summarized as follows:

- Quality Commitment – Project management team members are empowered to work with clients as their customers and make decisions to ensure we are meeting project needs and objectives.
- Total Involvement – Quality begins with a commitment of the management of the firm and is practiced by all employees.
- Measurement – Quality is defined as conformance to client requirements. Once project requirements are established, client satisfaction is measured by the team's performance in meeting these requirements.
- Technical Experience – Quality management requires that knowledgeable and experienced technical specialists be matched to project needs. We develop project teams with experienced project managers and technical specialists committed to solving project issues and implementing project solutions. Task Managers include, Alexander Metcalf (Ridership/Revenue), Charlie Quandel (Engineering), Andy Mountain (Public Outreach), Chip Kraft (Operations and Finance), and Lyudmila Bzhilyanskaya (Economics).
- Data Management – Data/record management programs are designed to allow the Study Team and the client to reconstruct project decisions after project completion.
- Quality Control Plan – A Quality Control Plan is specified for each client and project to ensure the technical quality of the project throughout all phases of a project. Each plan is developed to ensure that appropriate project coordination and reviews are completed for all disciplines.

**Quality Control Matrix Items**

| QA/QC Item | Lead | Checked | Approved | Standard(s) or References | QC Dates Scheduled* | Date Executed |
|---|---|---|---|---|---|---|
| Project Management | Alex Metcalf<br>Charlie Quandel | | | Benchmarks | | |
| Q/C of Technical Documents | Alex Metcalf<br>Charlie Quandel<br>Celia Pew | | | Benchmarks | | |
| Public Outreach | Andy Mountain | | | | | |
| Peer Review | Alex Metcalf<br>Charlie Quandel<br>Chip Kraft | | | | | |
| Ridership/Revenue | Alex Metcalf | | | Benchmarks | | |
| Engineering | Charlie Quandel | | | Benchmarks | | |
| Operations/Finance | Chip Kraft | | | Benchmarks | | |
| Economics | Lyudmila Bzhilyanskaya | | | Benchmarks | | |
| Implementation Plan | Charlie Quandel | | | Benchmarks | | |
| Business Plan | Chip Kraft | | | Benchmarks | | |

* To be determined

## 5.4 Quality Document Control

Procedures are in place to control and distribute project documents. Technical documents will be initially reviewed by task leaders, and then edited by Celia Pew supported by Andy Mountain. This procedure includes:

- Control of project documents including review by task leaders (as specified in 5.3) and Celia Pew, Andy Mountain, Alex Metcalf, and Charlie Quandel
- Distribution of approved documents to appropriate individuals and organizations.
- Control of document changes.
- Elimination of obsolete documents.

Documents include:

- Presentations - PowerPoint
- Technical Memorandum - interim/final
- Milestone Reports - draft/final
- Business Plan - draft/final

## 5.5 Project Management Consultant (PMC) Documents Review

The PMC will review all documents and reports produced by the Study Team. The following process will be adopted:

**Technical Reports:**

Draft to PMC - one (1) week for review

Comments from PMC - one (1) week to incorporate

Final draft to Steering Committee - one (1) week to review prior to Committee meeting

Final technical report produced in two (2) weeks

**Feasibility and Business Plan Reports:**

Draft to PMC - two (2) weeks for review

Comments from PMC two (2) weeks to incorporate

Final draft to Steering Committee two (2) weeks for review prior to Committee meeting

Final report produced in two (2) weeks

# 6.0 Billing Procedures and Resources Allocation

The purpose of this section is to describe the billing procedures to be used during the course of the RMRA High Speed Rail Feasibility Study being undertaken by the Study Team. Each member of the Study Team will use the same procedures for submitting invoices. The process includes:

- Each consultant preparing a progress report describing the work they have completed for each task for the invoice period. The work should be in line with the master project timeline that has been prepared as part of this Management Plan. The progress report will:
  - Describe the work completed per month by task during the invoice period.
  - Any issues/concerns on holdups in the work, together with proposed remedies, mitigation or work arounds proposed to overcome the problems.
  - Prepare a progress report describing the task completion percentage.
  - Identify budget or scope issues.
  - Describe the next months work program and how it impacts the project schedule.
- Prepare a monthly invoice by the 10th business day of the month including each firm's contribution and costs. Each firm will submit its previous month's costs and expenses to TEMS by the 5th business day of the month.
  - Identify the direct expenses associated with the project including air fares, subsistence, accommodations, local travel, survey team expenses etc.
  - Prepare an invoice based on task completion percentage as described in the progress report.
  - Estimate next month's likely level of expense to the nearest $20,000 to provide a warning of likely cost levels.
- The conditions for payment include:
  - Acceptance or notification of problems by PMC within ten (10) days of receiving the invoice.
  - Invoices received by the 10th day of the month will be paid at the end of the month.

The Total Project Budget is shown below and contains all estimated costs for the project including all project development costs, design services, site preparation and construction costs, construction support, and project support and occupancy costs.

## Project Budget and Cash Flow

### Estimated Cash Flow*
### Rocky Mountain Rail Authority Rail Feasibility Study

| | Jun-08 | Jul-08 | Aug-08 | Sep-08 | Oct-08 | Nov-08 | Dec-08 | Jan-09 | Feb-09 | Mar-09 | Apr-09 | May-09 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Task 1 Project Management | 10,602 | 5,000 | 3,000 | 3,000 | 3,000 | 2,000 | 2,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | **43,602** |
| Task 2 Peer Review Panel Support | 2,000 | 5,000 | 4,000 | 30,000 | 4,000 | 3,000 | 4,000 | 26,328 | | | | | **78,328** |
| Task 3 Scoping / Outreach | 10,000 | 18,712 | 20,000 | 15,000 | 10,000 | 20,000 | 10,000 | 10,000 | 15,000 | 15,000 | 25,000 | 25,000 | **193,712** |
| Task 4 Methodology/Data Collection/Existing Conditions | 50,000 | 35,000 | 24,666 | 10,000 | | | | | | | | | **119,666** |
| Task 5 Preliminary Service Scenarios | | 5,000 | 5,000 | 10,000 | 15,000 | 15,000 | 8,072 | | | | | | **58,072** |
| Task 6 Alternatives Analysis | 10,000 | 30,000 | 30,000 | 40,000 | 50,000 | 47,000 | 55,000 | 50,000 | 6,171 | 10,000 | | | **328,171** |
| Task 7 Feasibility Determination | | | | | | 20,000 | 20,000 | 40,000 | 47,313 | | | | **127,313** |
| Task 8 Documentation / Deliverables | | | 5,000 | | 5,000 | | 5,000 | | 5,000 | 45,770 | 56,029 | 30,000 | **151,799** |
| Labor by Month | 82,602 | 98,712 | 91,666 | 108,000 | 87,000 | 107,000 | 104,072 | 129,328 | 76,484 | 73,770 | 84,029 | 58,000 | **1,100,663** |
| Expenses by Month | 10,000 | 30,000 | 30,000 | 30,000 | 6,350 | 6,350 | 6,350 | 6,350 | 6,350 | 6,350 | 4,650 | 6,350 | **149,100** |
| **Total by Month** | **92,602** | **128,712** | **121,666** | **138,000** | **93,350** | **113,350** | **110,422** | **135,678** | **82,834** | **80,120** | **88,679** | **64,350** | **1,249,763** |

*Subject to change based on schedule revisions

# 7.0 Decision Rules for Change

In developing the RMRA Business Plan, changes to the project scope, schedule, and resources may occur. The sources of these changes may be internal or external. Internal constraints can result from task challenges such as, lack of information or unexpected technical problems (e.g., tunnels). External changes can result from stakeholders, resource changes, or constraints due to physical limitations (e.g., right-of way).

The impact of change can be positive or negative, and managing change is an important factor for success. The following defines the plan the Study Team will use to manage change:

1. Identify source and nature of change.
   - Determine type of change (e.g., Scope Creep)
   - Determine impact of change (e.g., size, scale)

2. Communicate change issue to management
   - Document change issue with PMC
   - Present change options to PMC and Study Steering Committee

3. Obtain direction on how to handle change issue
   - Adjust or maintain work plan as required
   - Provide resource estimates as needed

4. Implement change plan
   - Revise work plan, resources, timescales as needed
   - Monitor and evaluate team adjustment

# Endorse the Plan
# Project Team Commitment

**Work Plan Endorsement Statement**

By committing to this Work Plan the Study Team Members agree to undertake the duties and responsibilities and directives as described in the PMP dated June 11, 2008.

"We endorse this Work Plan and are committed to actively supporting it. We accept responsibility for fulfilling any aspect of the plan that applies to us, including providing resources, actively participating, and effectively communicating. We know what to do and are prepared to act. Our endorsement is an active and positive statement that we are committed to fulfilling the responsibilities designated in this plan."

| Name | Initials | Role |
|---|---|---|
| Alexander E. Metcalf | _____ | Project Manager, Ridership & Revenue, Economics |
| Charles Quandel | _____ | Deputy Project Manager, Engineering |
| Celia M. Pew | _____ | Editorial/Quality Control |
| Edwin "Chip" Kraft | _____ | Operations/Finance |
| Andy Mountain | _____ | Public Outreach |

# Endorse the Plan
# Management Endorsement

**Work Plan Endorsement Statement**

By endorsing this Work Plan the Executives and Steering Committee members agree to undertake the duties and responsibilities and directives as described in the PMP dated June 11, 2008.

"We endorse this Work Plan and are committed to actively supporting it. We accept responsibility for fulfilling any aspect of the plan that applies to us, including providing resources, actively participating, and effectively communicating. We know what to do and are prepared to act. Our endorsement is an active and positive statement that we are committed to fulfilling the responsibilities designated in this plan."

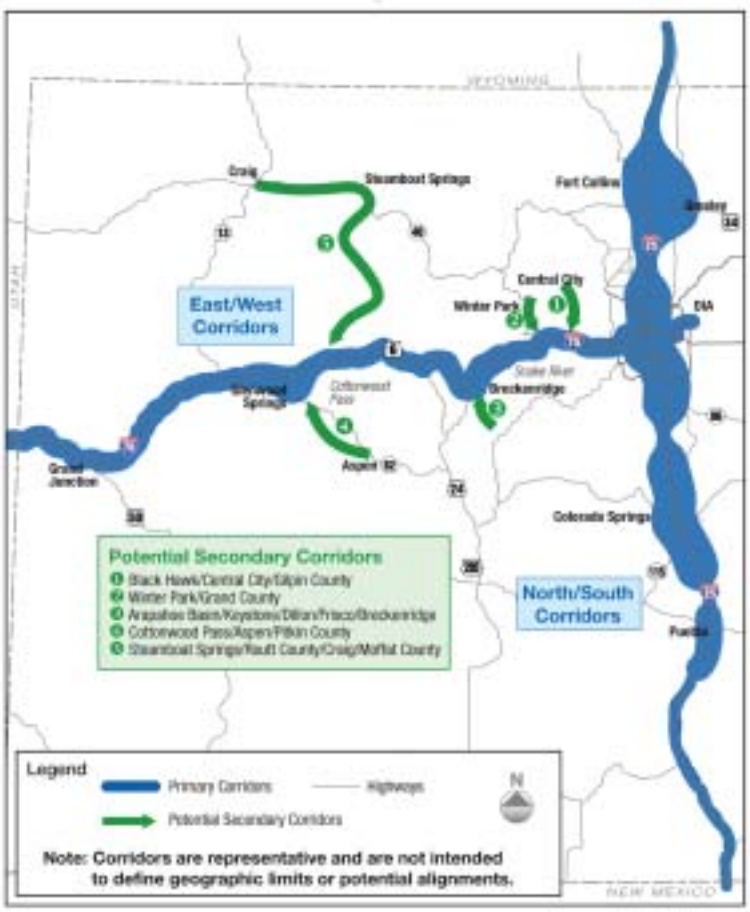
| Name | Initials | Role |
|---|---|---|
| Harry Dale | _____ | Chairman Study Steering Committee |
| Mark Boggs | _____ | Project Management Consultant |
| Steering Committee Member | _____ | Witness |

# Appendix A: Contract Scope of Work

## 1.0 Study Background

The State of Colorado has awarded funds to the Rocky Mountain Rail Authority (RMRA), an intergovernmental authority that was created for the purpose of conducting a study of the feasibility of providing high speed passenger rail service along Colorado's Front Range from Wyoming to New Mexico and along the I-70 corridor from Denver to the Utah state border including secondary corridors as shown on Exhibit 1. The Rail Feasibility Study (RFS) will provide an assessment of the feasibility of providing intercity rail service in these corridors and will specifically address the Federal Railroad Administration's (FRA's) public/private criteria* and six feasibility factors that are critical to receiving a FRA High Speed Rail Designation for each project corridor.

**Exhibit 1: Potential Colorado High Speed Rail Corridors**




*High Speed Ground Transportation for America, USDOT FRA 1997
Maglev Deployment Program: USDOT FRA, 1999

## 1.1 Project Objectives

The overall objective of the RFS is to complete a fresh, objective assessment of the feasibility of implementing high speed rail service generally within the I-25 and I-70 west corridors and to identify the next steps that should be pursued by RMRA and partner agencies in the implementation of that service. This will be done by building on previous efforts, coordinating closely other ongoing relevant studies, surveying stakeholders within the two corridors, and identifying the most effective high speed rail options for each corridor. This will position the RMRA and Colorado to gain high speed rail designation from the FRA for one or both of the study corridors.

The FRA public/private partnership criteria are:

1. Positive operating ratio (operating revenue/operating costs)
2. Positive cost benefit ratio

The six FRA high speed rail feasibility factors are as follows:

1. Whether the proposed corridors include rail lines where railroad speeds of 90 miles or more per hour are occurring or can reasonably be expected to occur in the future.
2. The projected ridership associated with the proposed corridors.
3. The percentage of the corridors over which trains will be able to operate at maximum cruise speed, taking into account such factors as topography and other traffic on the line.
4. The projected benefits to non-riders, such as congestion relief on other modes of transportation servicing the corridors.
5. The amount of federal, State and local financial support that can reasonably be anticipated for the improvement of the line and related facilities.
6. The cooperation of the owner of the rights-of-way that can be reasonably expected in the operation of the high-speed rail passenger service in the corridors.

Additional objectives for the RFS are as follow:

1. To identify the most feasible technology(s) that are applicable for Colorado (recognizing that these technologies may vary depending on the corridors).
2. To identify the need for and benefits to Colorado of implementing high speed rail service.
3. To identify opportunities and concerns of local governments within the corridors regarding implementation of high speed rail service.
4. To define potential station locations and pros and cons of each.
5. To identify the opportunity to maximize the use of existing transportation corridors.
6. To identify recent and emerging vehicle and guideway technology innovations that have the potential to minimize cost and environmental impacts, particularly in the mountainous terrain of the studied corridors.
7. To identify systems that are inter-operable in the primary corridors and that could be developed in system phases.

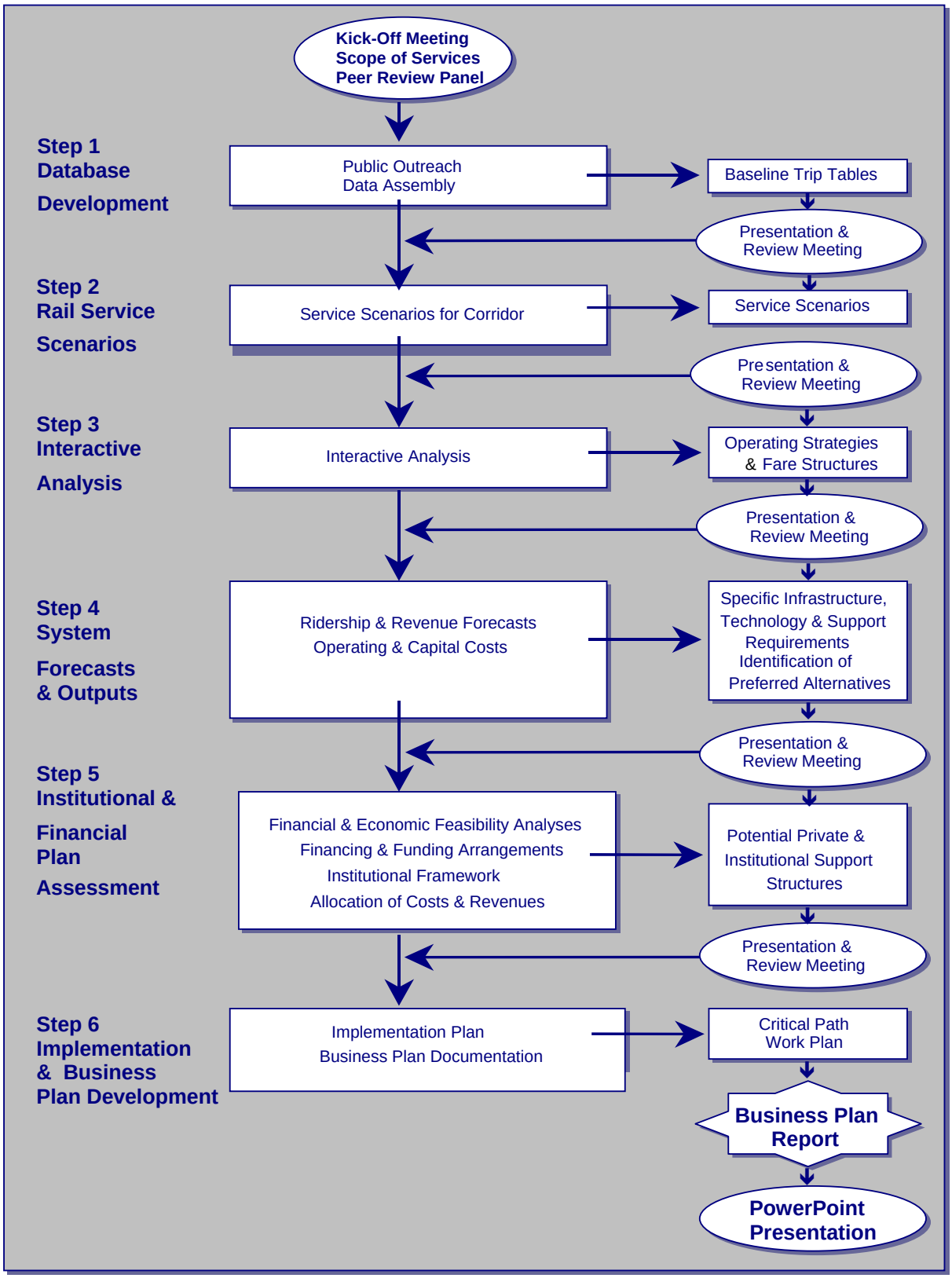
## 1.2 Business Plan Approach

To ensure all of these factors are fully evaluated, the Study Team will use the Business Plan Approach that TEMS has successfully used in more than thirty states to develop intermodal rail, high speed rail, and maglev plans. The selection of an appropriate high speed rail system is "market driven." The difference in the selection of one high speed rail option over another is heavily dependent on the potential ridership and revenue. The difference between the 125 mph and 150 mph option may be as little as 500,000 riders per year. To ensure such differences are properly measured, the TEMS Business Plan Approach carries out a very detailed and comprehensive market analysis. The output of this market analysis is then used to determine the right rail technology for any corridor. The Business Plan Approach, as shown in Exhibit 1, sets out a six-step process for accessing corridors and measuring FRA issues and criteria.

The six steps are:

1. Database Development – Assembling the engineering, market, operational, technology, and community input to the process.
2. Formulation of Rail Service Scenario – Setting up the rail/maglev options to be considered for the study.
3. Interactive Analysis – Assessing engineering, market, operational, technology, and social data to identify and develop the most effective rail/maglev solutions.
4. Systems Forecasts and Outputs – For the most effective options, generating ridership, revenue, operating costs, capital costs, and financial and economic feasibility solutions. This includes user and community benefits, as well as FRA criteria.
5. Assessment of Institutional and Financial Plan Options – Developing the institutional framework, and funding plan for developing the Rocky Mountain Rail Plan
6. Implementation and Business Plan – Developing both Implementation and Business Plans along with pro forma financial cash flows.

## EXHIBIT 1: BUSINESS PLAN SIX-STEP PROCESS



## 1.3 Study Corridors

Two primary corridors and several secondary corridors will be examined in the course of preparing the RFS. These corridors are shown on Exhibit1. The two primary corridors are Interstate 25 from the New Mexico border to the Wyoming border and Interstate 70 from Denver International Airport (DIA) to the Utah border. The RFS will examine the I-25 corridor broadly and generally within existing rail corridors, and examine I-70 generally within the existing I-70 corridor, which has no existing rail corridor east of Minturn. Consideration will be given to whether the examined intercity service can and should be extended directly to DIA or should be provided by coordinated service by the Denver area's Regional Transportation District.

Secondary corridors within the I-70 corridor are also to be evaluated. The TEMS Team will develop screening methods consistent with the study budget to assess the potential for rail service in the secondary corridors to support or strengthen service within the primary corridors, as well as to effectively address transportation system needs within those secondary corridors.

## 1.4 Coordination with Previous and Current/Ongoing Studies

The Colorado Transportation Commission on November 16, 2006 adopted a resolution directing Colorado Department of Transportation (CDOT) staff to work with RMRA to collaboratively develop a scope of work for the study project that explicitly does not duplicate the efforts of previous or current CDOT studies and published technical reports and makes the best use of the information contained in these studies to further evaluate the feasibility of rail transit in the major east-west and north-south corridors of the State of Colorado. The approach to completing the RFS is intended to ensure that findings of previous and ongoing studies are used to the maximum extent possible without duplication of effort. Of particular relevance and importance in this regard is coordination with the I-70 Coalition SB1 Transit Land Use Planning Study and CDOT's Colorado Railroad Relocation Implementation Study. In particular, it is intended that the work of the I-70 Coalition will serve to identify potential station locations and general alignments that will then be used by the TEMS Team to quantify ridership, revenue, and cost estimates within the I-70 corridor.

## 1.5 Overall Plan Development

The RFS will collect sufficient information required to determine the feasibility of high speed rail service on the two study corridors. During the process of addressing study objectives, the RFS will develop a thorough understanding of local and State expectations for a possible passenger rail project in the Study Corridors, inventory the existing rail infrastructure, develop and evaluate a set of alternative intercity rail corridors that also reflect existing and programmed local transit services, and select the best corridors from among the alternatives considered for inclusion in the project, with input from CDOT, the NWCOG/I-70 Coalition, the Regional Transportation District, and the various MPOs and TPRs. This work strategy will provide a complete definition of an outline of a potential passenger rail project, including alignments, station and support facility locations, ridership, train speeds and operating schedules, benefits to non-riders, capital and operating costs, and financing. The project will investigate right-of-way needs and examine the use of the CDOT right-of-way for the high speed rail corridor, the sharing of existing track with the Class 1 railroads or use of part of their right-of-way, or use of other rights-of-way. Also included will be cost effectiveness analysis, decision analysis, economic analysis and limited environmental analysis.

## 1.6 Future Work

RMRA originally intended to conduct an expanded study that would provide a more detailed examination of potential issues not resolved in the RFS, provide new information concerning economics and other impacts, and provide more detailed alignment and other infrastructure definitions with improved understanding of urban design and transit support opportunities. Depending on success in gaining funding from the FRA and neighboring states, that Rail Corridor

Study may become the second phase of this rail development effort. However, there is no commitment on the part of RMRA to conduct this second phase of work.

# 2.0 Work Tasks

The Business Plan process and detailed work tasks to be completed during the Rail Feasibility Study are defined below

In setting out the study tasks, the TEMS Team has integrated its Business Planning process for passenger rail feasibility study with the tasks set out in the RFP. In doing this, the RFP tasks have been expanded and TEMS has added additional analysis (e.g., community benefits analysis) and, in one case, a entirely new task (Task 8, Business Plan) to ensure that the study products would provide a sound and effective guide, which the RMRA Steering Committee will need to implement the project.

To correlate the TEMS Team's Business Plan approach with the scope of services contained in the RFP, a correlating notation (e.g., BP Step 1 – Database Development) has been added to task titles and otherwise noted in the text for various tasks.

## 2.1 Task 1 – Project Management

The TEMS Team will mobilize immediately upon execution of the agreement. An in depth study plan meeting will be held with the RMRA Steering Committee to identify priorities, finalize scope issues, and prepare the study management plan. This meeting will ensure that the study scope is focused on the concerns and expectations of the RMRA Steering Committee and that appropriate timelines, milestones, and resource use are developed to meet the needs of the study. A final study work plan will be prepared for presentation to the RMRA Steering Committee for their review and approval.

The TEMS Team will conduct internal project management activities necessary to effectively manage the study effort and to coordinate with the RMRA and its committees and partner agencies:

1. Project Management Plan Preparation – A Project Management Plan will be prepared within 10 days of the Notice to Proceed and will include, at a minimum, a work plan, staffing plans, Quality Control procedures, schedule, communications protocol, and billing procedures.
2. Steering Committee Coordination – The TEMS Team will meet monthly with the RMRA Steering Committee.
3. Coordination with the Project Management Consultant (PMC) – The TEMS Team will meet/conference call bi-weekly with the PMC.
4. Coordination with other study teams (I-70 coalition, CDOT freight relocation, etc.).
5. Preparation of meeting notes for all official project meetings (excluding RMRA Board or Steering Committee meetings).
6. Monthly progress reports and invoices.

## 2.2 Task 2 – Peer Review Panel Support

This study will use the services of three (3) Peer Review Panels. The reason for using Peer Review Panels is to increase study credibility, develop new ideas not hindered by existing institutional constraints, improve customer value through value engineering and other similar processes, and suggest ways to develop programs that increase collaboration and seamless flows between the affected agencies; (e.g., local government, RTD, RFTA, PPRTA, CDOT and the Federal agencies).

The PMC will coordinate the selection of the Peer Review Panels and meeting logistics, but the deliberations of the Peer Review Panels will be independent of the RMRA. They will be open to the public, interested Board members and others. A summary of each panel's discussions and a summary of their deliberations will be prepared as a technical report by the PMC. The Peer Review Panels will be developed to examine the following technical areas:

- Travel demand, revenue, and model integration
- Alternatives development and evaluation
- Overall system design, cost, finance and implementation

Each panel will meet twice, once early in the process to review the study methodologies proposed by the TEMS Team and once later in the process to review and assess the study findings.

At each panel meeting, the TEMS Team will make a PowerPoint presentation of its approach, assumptions, and methodologies, and findings and conclusions. For each meeting, the TEMS Team will field its top professionals and one individual will lead the TEMS Team's review. These individuals include:

- Dr. Alexander E. Metcalf (Project Manager) - Ridership, Revenue and Model System
- Dr. Edwin Kraft (Managing Operations Planner) - Alternatives Development and Evaluation
- Mr. Charles Quandel (Deputy Project Manager) - Overall System Design, Cost, Finance and Evaluation

The TEMS Team will coordinate its work with the PMC who will organize and provide logistical support to the Peer Review Panel process. The PMC will provide logistical support for the Peer Review Panels. The TEMS Team will work with the PMC to define Peer Review Panel objectives and agendas and will serve as a resource to each of the panels, providing requested information and meeting with the panels to review study information. Peer Review Panel sessions should be considered to be project milestones for scheduling purposes.

**Deliverables:** For this task, the TEMS Team will prepare for Steering Committee and PMC review the following:

- Six PowerPoint presentations
- Meeting notes for all official project meetings (excluding RMRA Board and Steering Committee meetings)
- TEMS Team review and response to comments by the Peer Review Panels

## 2.3 Task 3 – Scoping/Outreach (BP Step 1 – Database Development)

### 2.3.1 Scoping

In each of the two primary corridors and secondary corridors specified above, the appropriate local government, MPO, TPR, Transportation District or Authority, Public Land Agency, and the I-70 Coalition will be consulted to define for their jurisdiction how they would prefer passenger rail service to be developed within their jurisdiction including guideway alignment (on-grade or aerial), station and vehicle support facility location, and vehicle technology. Particularly important in the scoping process will be understanding issues and opportunities in the Denver metropolitan area, where it is envisioned that the eastern terminus of the east-west corridor will be DIA, and where RTD is advancing a program of urban passenger rail facilities that include service to DIA. RMRA will take the lead in facilitating scoping discussions that should at a minimum include CDOT, RTD, the City and County of Denver, the Denver Regional Council of Governments (DRCOG), and DIA. During the Scoping phase, the TEMS Team will:

- Coordinate with the I-70 Coalition's County Based Input Teams to participate in one scoping workshop specific to the I-70 corridor.
- Arrange and facilitate two County Based Input Team workshops, one for the I-25 corridor and one for the Denver Metropolitan Area.

In addition, these workshops will explore the following:

- Identification of potential station locations (note: the I-70 Coalition Land Use Planning Study is expected to provide proposed station locations and potential alignments for the I-70 corridor.)
- Identification of willingness of local governments to implement land use planning and zoning changes necessary to support the rail passenger alignment, location and development of rail stations and associated Transit Oriented Development, and vehicle support facilities.
- Identification of potential Community Social and Economic issues related to the development of high speed passenger rail service.
- Identification of potential impacts to public lands.

All scoping discussions will be summarized by the TEMS Team, which will create a corridor scoping report for both the I-70 corridor and I-25 corridor including secondary corridors. Common areas of both agreement and disagreement will be identified and documented in the corridor scoping reports. Through the scoping task, the TEMS Team will develop the following:

- Statements of proposed project purpose and need that will guide development of alternatives.
- Proposed study goals and objectives to serve as the basis for the evaluation of alternatives.

Planning issues will be addressed at the corridor level first by the TEMS Team and then by the RMRA Board through the Steering Committee. The RMRA website will be used to facilitate the discussion of this report with local jurisdictions and the general public and capture the requirements for each corridor. The TEMS Team will provide information that can be posted to the website, but will not be responsible for maintenance or monitoring of the website.

### 2.3.2 Coordination of Public Input

Input relating to the rail system alternatives evaluated in the RFS needs to be obtained from RMRA member jurisdictions and Colorado's general public and incorporated into the RFS. The TEMS Team will coordinate with business, non-profit and economic development organizations to develop a community partnership program. As part of this program, the TEMS Team will develop three communications updates for these organizations to distribute to their members and other interested stakeholders and conduct five community presentations in geographically diverse areas of the study areas. The RFS Final Report will identify the areas of concern, outstanding issues and travel needs identified through this public outreach process. Public and local government input may also help determine the future direction and activities for the RMRA organization.

The TEMS Team should leverage similar scoping and public involvement activities being conducted by the I-70 Coalition Land Use Planning Study team. The RMRA does not intend that the RFS will be conducting separate scoping and public involvement in the I-70 corridor.
Other activities by the TEMS Team will include:

- Media Relations – The TEMS Team will develop and maintain a list of media contacts in the study area and develop/distribute up to six (6) news releases or op-ed articles during the study. The TEMS Team also will prepare and facilitate three (3) media conference

calls in coordination with key milestones (scoping, alternatives development; alternatives analysis). The TEMS Team also will reserve five (5) hours per month to respond to unsolicited media inquiries.

- Monthly Project Updates – The TEMS Team will develop twelve (12) project updates. These updates will be provided to the RMRA for posting on their website and also distributed to the project stakeholder database.
- Stakeholder and Comment Database – The TEMS Team will develop and maintain a database of all stakeholder contacts and comments. This will be done by providing content and form for a page on the RMRA website that will enable stakeholders to register for project updates and submit comments. The TEMS Team will maintain a database of all comments and generate twelve (12) monthly reports summarizing issues identified in the comments.

### 2.3.3 Technical and Policy Outreach and Decision Making

The TEMS Team will coordinate with the I-70 Coalition's County Based Input Teams to participate in two additional workshops specific to the I-70 corridor and arrange and facilitate an additional four (4) County Based Input Team workshops, two for the I-25 corridor and two for the Denver Metropolitan Area to gather information on alternatives development and alternatives analysis to allow public and governmental review of each corridor plan and identify areas of potential collaboration.

**Deliverables**: For this task, the TEMS Team will prepare for Steering Committee and PMC review the following:

- Stakeholder Outreach Approach technical memorandum
- Scoping technical report, including stakeholder meeting results, proposed project purpose and need, and study goals and objectives, that will serve as the basis for identification of alternatives and alternative evaluation measures.

Note: All presentation materials developed by the TEMS Team for public presentation will be approved by the Steering Committee and the RMRA for content and format prior to public presentation or release.

## 2.4 Task 4: Methodology, Data Collection and Summary of Existing Conditions (Including Summary of Previous Reports) (BP Step 1 – Database Development)

As a first element of this task the TEMS Team will prepare a methodology technical report that defines methods for scoping involvement, ridership/revenue forecasts, railroad operations, simulation, and alternatives development screening. This report will be assembled in an iterative fashion, with various scope aspects provided as separate chapters/sections.

Working from existing resources (previously cited studies, railroad records, and other sources as needed), the TEMS Team will describe previous findings and conclusions relevant to the RFS, and existing conditions relevant to the development of high speed rail service and to the estimation of potential ridership. An inventory of the existing rail system within the primary and secondary rail corridors being evaluated in the RFS will be prepared, to identify current rail speed limits and current and future capacity. The TEMS Team will create a technical report that summarizes these conditions and provides a synopsis of relevant previous planning efforts.

A key element of this task will be engaging freight rail operators in discussion of constraints and opportunities for using existing rail corridors for new or enhanced passenger service. The TEMS

Team will be responsible for coordinating with CDOT and railroads to gather information regarding existing and future conditions, and specifically will coordinate with CDOT and its consultant for the CDOT Colorado Railroad Relocation Implementation Study.

The analysis will consider both the I-70 corridor from the Utah border to Denver International Airport, and the I-25 Front Range corridor from Wyoming to New Mexico. In addition, the potential for secondary rail corridors from Central City, Winter Park, Breckenridge, Aspen and Craig will also be considered.

Marketing, engineering, and operating data will be gathered for each corridor/secondary corridor so that analyses can be performed that allow both the short and long-term potential of a corridor to be determined. For example, if a corridor is not feasible in the short term, it is possible that rail service would be justified by 2020 or 2025.

The data assembly will be oriented toward the specifications of four major data systems. They include:

- Market database
- Engineering database
- Technology database
- Station database

### 2.4.1 Market Database

The market database will consist of four components – origin/destination data, socioeconomic data, network data and stated preference data. This will allow an Investment Grade methodology to be developed and high quality forecasts of ridership and revenue to be estimated.

- Origin/Destination Data – As part of the study, TEMS will develop a comprehensive origin/destination database for the study corridors. The data will be drawn from existing MPO and statewide databases including origin destination data, statewide AADT data, bus schedules, and regional traffic flow estimates. The data will be for travel by rail, bus and auto and will be on a trip-purpose basis (business, commuter and social/tourism). The data will be aggregated on a county/sub county level in rural areas and at an aggregate MPO zone level for urban areas. For this study, the data and zone system will be refined to ensure it properly reflects demand in the I-70 and I-25 Front Range Corridors. It is anticipated that 300 to 400 zones will be used to represent the rail corridors.
- Socioeconomic Data – An extensive socioeconomic database will be developed for Colorado. The data will be drawn from state and federal sources as well as private sector sources (e.g., Woods and Poole). It will contain population, employment and income forecasts on a zone basis. These will be reviewed with the PMC and Steering Committee and adjusted to the proposed 300-400 zone system to provide an effective database for the Rocky Mountain Corridors.
- Network Data – Comprehensive modal networks will be developed for each mode of intercity travel (auto, rail and bus). The networks, which will identify access and egress times, and costs, will be built for business and non-business travel. A refined set of networks will be developed for the Rocky Mountain Corridors to show the strength of modal competition and connections in the corridor.
- Stated Preference Data – To develop Investment Grade level forecasts, the TEMS Team will complete a Stated Preference survey. The survey will be similar to recent high speed rail surveys completed by TEMS in the Midwest (9 states), Ohio (5 states), Gulf (5 states), and Mid Atlantic (4 states). The survey will collect data on Value of Time, Value of

Frequency, Value of Access, Value of Reliability, and Modal Attributes. Data will be collected using a quota survey methodology as approved for Investment Grade studies.

### 2.4.2 Engineering Database

The engineering database will consider both the east-west corridors and north-south corridors together with potential secondary corridors. In each case, an engineering database will be gathered and where necessary developed, to provide the basis for estimating the likely level of civil engineering costs associated with the proposed rail service.

The TRACKMAN™ Track Management System will be used to provide a milepost-by-milepost record of the rail gradients and track geometry of the right-of-way. The data will be complied from compiled from existing sources includes railroad timetables, track charts, USGS topographic maps, and commercially available orthophotography and as-built plans for the I-70 and secondary highways. The data will be reviewed and updated as required. This will be achieved by a field review of the right-of-way and track in the corridor by the engineers and operation planner on the TEMS Team. Potential track upgrades and improvements for different passenger rail speeds and operations will be assessed and improvements will be identified and listed.

### 2.4.3 Technology Database

The technology database for the passenger rail speed options will be developed by reviewing the results of previous TEMS studies and soliciting information from manufacturers to update TEMS existing databank. It is anticipated that the focus will be on a wide range of high speed technologies from 90 to 125 mph, but also the potential for new technologies to provide higher speeds.

### 2.4.4 Property Database: Stations and Rail Right-of-Way

A property database will be developed for the corridors, which will assess existing properties along the rail line. The analysis will identify whether the property is residential, non-residential including commercial, industrial, vacant, agricultural, natural resources. The data will be mapped and an inventory of property values will be derived from state and federal property valuation sources (i.e., Colorado Division of Property Taxation and U.S. Department of Commerce-BEA Statistics).

**Deliverables**: For this task, the TEMS Team will prepare for Steering Committee and PMC review the following:

- Methodology technical report to be submitted at the start of this task in support of the Peer Review Panel meetings (including outreach, ridership and revenue forecasting, cost estimating, alternatives development, and alternatives analysis)
- Existing Conditions technical report (including opportunity to upgrade existing track to accommodate high speed passenger rail service)

## 2.5 Task 5: Define Preliminary Service Scenarios for the I-70 and Front Range Corridors (BP STEP 2: Formulation of Rail Service Scenarios)

In this task, the potential infrastructure and operations alternatives will be assessed in relation to the market demand for services to develop a set of potential alternatives.

### 2.5.1 Identification of Physical Alternatives

Previous studies have identified a wide range of technology, alignment, and service options as having feasibility for providing improved intercity transit/rail passenger service in Colorado. A major emphasis of this study is to provide a fresh look at the feasibility of previous proposals, and to reflect recent advances in technology that might be applicable for Colorado. The I-70 PEIS alternative analysis demonstrates the advantage of an aerial system over an on-grade system in reducing impacts to the natural and built environments in the mountain corridor. The TEMS Team will examine various passenger rail vehicle and guideway technologies, both aerial and on-grade, including class of track and grade crossings; that are best suited for each of the two major corridors. Due to the range of natural and built environments in each corridor, specific corridor segments may require the examination of unique and specialized vehicle and guideway options that are currently outside FRA compliance.

In this task, alternatives will be identified and screened with the RMRA prior to beginning detailed evaluation of those alternatives. Elements of alternatives definition will include at a minimum the following:

- Technology (considering a broad range of traditional and emerging technologies, and providing verifiable operating characteristics of each of the various rail types and technologies)
- Alignment (as needed to optimize use of existing rail facilities and/or to access identified station locations, and considering both at-grade and elevated vertical alignments)
- Need for grade separations with existing streets and highways due to increased rail operating speeds.
- Service frequency and speed
- Service to critical trip destinations [e.g., resorts, major employment centers, intermodal transfers (e.g., DIA or DUS)]
- Station location/frequency
- Interstate rail service assumptions

In developing the methodology for identifying alternative vehicle and guideway technologies, the TEMS Team will identify techniques for ensuring that a reasonable basis for cost estimating (i.e., unit pricing) has been established.

### 2.5.2 Development of Initial Service Concepts

Once the range of options is established, the TEMS Team will explore opportunities to attract riders and create greater value and revenue. In addressing this issue, the TEMS Team will initially consider two potential levels of service, each targeted to different traveler needs. These include:

- Base Level Service Concept – a base level service operating within the context of a "stand alone" service. A basic fare would be established for this service. The base level service provides a platform against which additional speed improvements can be evaluated in both financial and economic terms.
- Improved Service Concepts – service improvements that would be associated with a refined level of engineering and operation considerations given the character of the market. Improvements would include changes in travel times due to improved infrastructure, increased frequencies, improved reliability, improved train stopping patterns and higher quality of service. It would also provide for improved transportation access and connections at stations, such as taxis, limos and transit. Fares will be optimized to maximize revenue potential.

### 2.5.3 Alternatives Development Workshop

The TEMS Team will lead alternatives development workshops for each primary corridor with the RMRA board, to reach consensus on the range of alternatives to be carried into alternatives evaluation, and will prepare meeting notes to document conclusions reached during the workshop. It is anticipated that each workshop will be a full day.

### 2.5.4 Peer Review Panel Evaluation of Selected Alternatives

Following the Alternatives Development Workshop, the Peer Review Panel will be convened to review and evaluate the alternatives. The TEMS Team will support this effort and will report its findings and conclusions to the RMRA Board and Steering Committee.

**Deliverables:** For this task, the TEMS Team will prepare for Steering Committee and PMC review the following:

- Alternatives Development technical report (including results of Alternatives Development workshop)

## 2.6 Task 6: Alternatives Analysis (BP Step 3: Interactive Analysis and BP Step 4 Systems Forecasts and Outputs)

The Interactive Analysis is designed to develop the most efficient and effective alternatives for passenger rail service in the Rocky Mountain Corridors. In these tasks, ridership and revenue are assessed against infrastructure needs and costs, and operating requirements and costs.

The introduction of new rail systems, which provide substantially reduced travel times, higher comfort levels, and frequently lower fares has radically changed travel patterns and brought communities closer together. In general, intercity travel is increasing, marked by a substantial increase in travel demand and distances traveled, as well as a significant shift toward rail use as a result of higher gas prices.

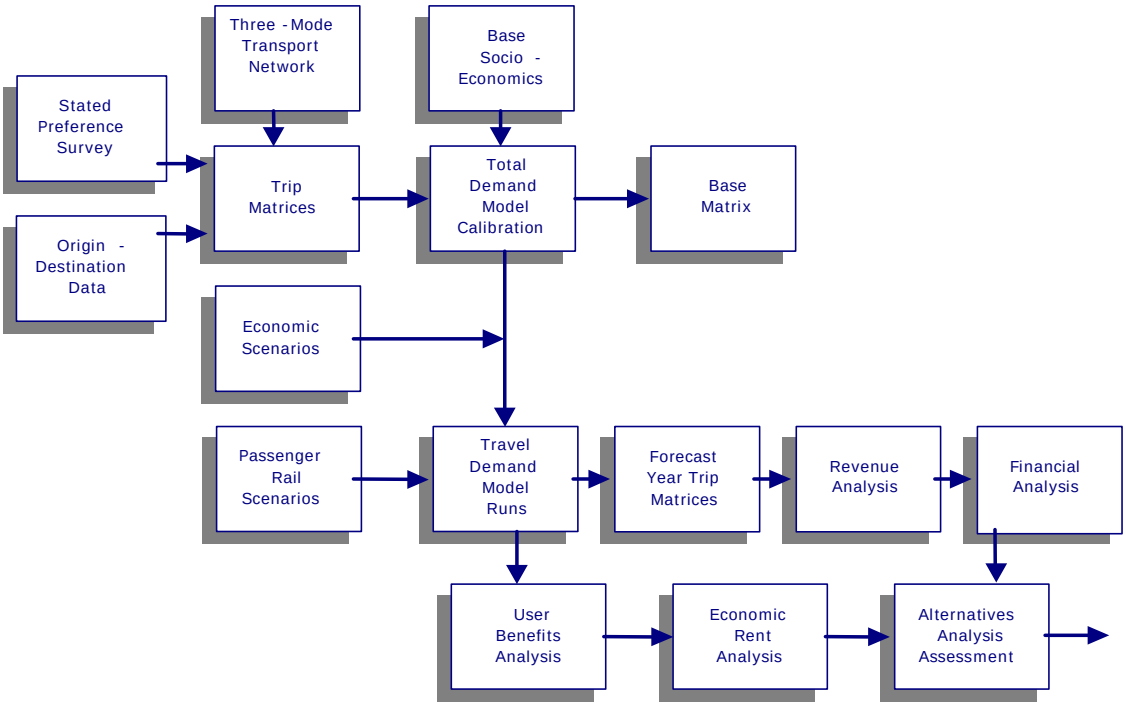
To effectively predict the change pattern and overall rail travel demand levels for new rail systems, models are needed that can accurately forecast the impact of trip making increases and the role of the rail mode. To meet these needs, TEMS developed the COMPASS™ Model System, which is a fundamentally new approach to transportation analysis. It combines existing regional transportation planning techniques with new market research techniques. COMPASS™ has the advantage of having been tested in North America, and Europe on various high speed rail projects as they progressed from planning, to engineering, to implementation. It provides Investment Grade caliber forecasts, and meets Wall Street requirements for ridership and revenue analysis. It provided the foundation for the Midwest, Ohio, Florida, Gulf Coast, Northeast ridership and revenue forecasts, and will be calibrated to reflect conditions in the Rocky Mountain Corridors.

Contrary to conventional methods of analyzing demand on the basis of existing or historical demographic/travel data, the COMPASS™ Model, while including such data in the analysis, subordinates it to a detailed dynamic behavioral assessment of an individual's innate travel characteristics. Using an advanced market research technique, Abstract Mode Trade-Off Analysis, these innate travel characteristics are formulated as preference utilities or demand elasticities, yielding a precise measurement of the responsiveness of travel demand to improvements in the overall level of service and the relative competitive position of alternative modes.

As shown in the exhibit below, the COMPASS™ Model includes three key sub-models:

- Total Demand Model
- Induced Demand Model
- Modal Split Model

**EXHIBIT 3: COMPASS™ RAIL DEMAND MODEL STRUCTURE**




Using the COMPASS™ approach to rail forecasting, the TEMS Team will:

- Eliminate the potential shortcomings of other model approaches, which often rely upon historical data that reflects rail's current negative image and tend to underestimate a new and modern rail system.
- Overcome the propensity inherent in conventional planning models to fail to identify accurately the market share for all modes. Typical MPO models are geared to forecasting the dominant mode (auto) and are frequently biased in their calibration procedures to coefficients and parameters that reflect auto travel. Unless a model explicitly represents the response of individuals to the modes other than auto (rail, bus, and air) differently through model coefficients such as the value of time, it is inevitable that the model will not be able to provide effective rail forecasts.

To overcome the limitations of conventional models, the TEMS analysis will firstly adjust the local MPO data to a behavioral purpose basis. Instead of using such purposes as Home-Shop or Home-Work, the TEMS approach will use the behavioral purposes, i.e., business, commuter, shopper, social travel, and tourist travel. Secondly, the COMPASS™ model uses the output of a Stated Preference survey to develop mode and purpose, Values of Time, Values of Frequency, and Values of Accessibility to provide a correct behavioral response to travel options.

### 2.6.1 Ridership and Revenue Forecasts

Using the rail service scenarios developed in Task 5, total demand and market share forecasts for passenger rail traffic on a weekday, and weekend basis will be prepared for five-year intervals for the study period 2008-2040. To forecast the impact of regional economic growth on total demand, socioeconomic scenarios will be prepared that identify how the likely changes in income, population, and employment will effect rail ridership and revenue over the study period.

The forecast strategies that will be developed include train frequency, commercial speed, stopping patterns and passenger interchange and access. Using these inputs, as appropriate, alternative strategies will also be prepared for other intercity transportation modes, so that the impact of investment in these modes is incorporated into the overall demand analysis. This task will consider likely MPO investment over the study period and will be carried out in conjunction with the PMC and RMRA Steering Committee.

The rail ridership forecasts will be assigned to show segment volumes, station volumes, and passenger miles and revenues on an annual basis. The forecasts will also be provided on an origin and destination basis and on a corridor, segment, and city pair basis. For each technology option, rail revenues will be generated. Revenues will be based on a fare/tariff structure, which can be compared with fares and costs of competing traffic (auto and bus). This will ensure that the optimum revenue stream is generated for the rail service, and will provide a basis for considering higher fares and lower subsidies for the Rocky Mountain passenger rail service. Revenues will be given in 2008 dollars. The resulting rail ridership and revenue will be benchmarked against comparable intercity corridor volumes and revenues. Benchmarking provides a high level of confidence to Wall Street investors.

### 2.6.2 Evaluation of Alternatives

The TEMS Team will prepare a comprehensive evaluation of all alternatives. Because the study must consider feasibility of rail service both in the two primary corridors and in several I-70 secondary corridors, the TEMS Team will develop an evaluation structure that allows screening of secondary corridors as well as more detailed evaluation of alternatives within the primary corridors. At a minimum, alternatives evaluation will consider the following for the various vehicle/guideway combinations:

- Ridership and revenue (annual, peak weekday and peak weekend)
- Cost (capital, including right-of-way, and operating/maintenance costs)
- Inter-operability (technology, etc.) between corridors
- Opportunity for system phasing
- Public acceptance
- Environmental impacts
- Safety
- Local development and institutional issues
- Implementation/construction impacts
- Accommodation of key travel markets
- Potential for use of existing transportation corridors
- Opportunity for achieving high speed objectives

The determination of appropriate high speed rail service depends on balancing the trade-off between revenues and costs for any given route and associated technology. Higher levels of ridership generate higher revenues, which permit a greater level of infrastructure investment, and

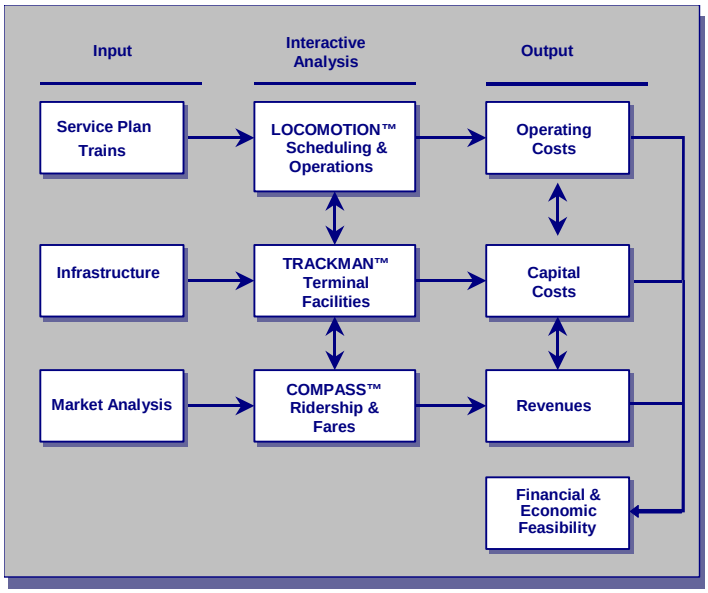
thus higher speeds. Lower levels of ridership and lower revenues require that infrastructure investment be minimized and/or the use of more sophisticated vehicles (e.g., tilt technology to compensate for inadequate track geometry).

To accommodate these relationships, the TEMS Team will employ an Interactive Analysis as the most efficient means of developing an appropriate passenger rail service alternatives and identifying infrastructure needs.

The Interactive Analysis utilizes a number of computer systems, permitting a rapid evaluation and re-evaluation of route, technology, and/or ridership factors:

- TRACKMAN™ to assess the right-of-way and route improvement options
- LOCOMOTION™ Train Performance Calculator to assess the performance of technologies
- COMPASS™ Rail Demand Model to assess ridership and revenue levels

**EXHIBIT 4: INTERACTIVE CHARACTER OF THE**




The result of the Interactive Analysis is an operating strategy for each route/alternative technology option that optimizes the infrastructure, technology and traffic levels.

For the proposed corridor, the first step in the Interactive Analysis is to identify the most appropriate route alignment and train speed. To achieve a desired train speed, the route is examined and specific infrastructure improvements are proposed for each mile track. For the purpose of this study, TEMS unit costs will be used as a basis to generate estimates for improvements. However, these unit costs will be adjusted to local conditions to reflect local labor, materials, and tax conditions.

The actual operating speed of the train along the track is calculated using LOCOMOTION™. Output from LOCOMOTION™ will be examined to identify specific bottlenecks, such as bridges, crossings, tunnels and curves that restrict train speeds unnecessarily and reduce the overall timetable performance of a specific technology.

The output of LOCOMOTION™ provides an assessment of train running times for any given set of infrastructure proposals. By reviewing the timetables, the level of infrastructure improvements can be increased or reduced to meet specific timetable and thus specific ridership needs. In this way, the Interactive Analysis will result in the development of an operating strategy for each right-of-way/corridor and technology that best combines infrastructure requirements, operating speeds and frequencies, and potential ridership.

It should be noted that the time saved by removing impedance would be different for different train technologies. For example, removing moderate curves is less important than removing bridge speed restrictions for trains with steerable trucks.

Where restrictions are found, TRACKMAN™ will be used to identify the cost of upgrading the right-of-way. By using LOCOMOTION™ and TRACKMAN™ together, a priority ranking of improvements can be developed. This consists of a cost per train travel time minutes saved and cost-per-revenue dollar earned.

The Interactive Analysis will identify key bottlenecks that prevent a given technology from achieving its maximum capability, listing the priorities for each train type, and estimating the civil engineering costs to overcome these bottlenecks. Equally, the analysis will be used to assess the effect of train speed on ridership levels and the cost of aligning the track to avoid locations with important environmental or cultural characteristics. In each case, the required infrastructure improvements will be quantified in terms of the full range of factors that affect infrastructure costs (grading, track quality, signaling, and grade crossing protection.)

### 2.6.3 Operating and Capital Costs

For each of the technology options, a set of 2008 operating costs will be developed that are based on the operating timetable. The operating unit costs will include the following:

- Track maintenance
- Train crew
- Rolling stock maintenance
- Electrification maintenance
- Signals and communications maintenance
- Energy costs
- Track fees
- Insurance
- Terminal personnel
- Administration
- On-board services
- Operator profit

Capital costs for the passenger rail service include cost for rolling stock, as well as infrastructure costs. Rolling stock costs for the various technologies will be obtained directly from equipment manufactures.

As for infrastructure costs, the TEMS Team has a set of unit costs derived from ongoing studies in Midwest, Florida, Mid Atlantic, Ohio, New York, and Gulf Coast, which have been updated to 2008 dollars. It is proposed that these be reviewed and adjusted to reflect specific conditions in the Rocky Mountain Corridors. The infrastructure cost databank will include unit costs for the following:

- Land and right-of-way
- Sub-grade, structures, and guideway
- Track
- Rolling stock
- Signals and communications
- Electrification
- Demolition
- Stations
- Maintenance facilities
- Highway and railroad crossings
- Fencing

**Deliverables:**

- Ridership and Revenue Forecasts technical report
- Alternatives Analysis technical report (to include technology, operating, and cost assumptions)

## 2.7 Task 7 – Feasibility Determination (BP Step 5: Assess both Institutional and Financial Plan Options)

The purpose of this task is to provide a clear understanding of the proposed alternatives for the main corridor and secondary corridors in order that the RMRA and other decision-making agencies have a clear picture of the way each option meets financial, economic and FRA requirements. To this end, the TEMS Team will not only carry out financial and demand-side economic analyses that are required to meet these objectives, but will also carry out a supply-side analysis that quantifies the employment, property value, and income impacts on communities. The supply-side analysis has proved particularly useful in justifying rail projects to local communities (e.g., Ohio Hub and Florida Statewide Rail Plan).

In this task, the TEMS Team will consolidate the results of the preceding tasks to prepare an overall analysis of the feasibility of implementing high speed intercity rail service in the primary and secondary corridors under consideration and will prepare needed documentation of study findings and conclusions suitable for consideration by RMRA and other decision-making agencies. This task primarily consists of financial analysis, overall feasibility assessment, and response to the FRA's public/private criteria and the high speed rail feasibility factors.

To provide a clear understanding of the value of different route investments, the TEMS Team will carry out the follow-up analysis:

- Comprehensive financial analysis
- Comprehensive user benefits (consumer surplus) and non-user benefits analysis
- Community analysis (Economic Rent) identifying jobs, income, property values

In addition to the financial and economic plan, the TEMS Team will develop institutional and financing agreements for the project. This will include an allocation of costs analysis that shows who pays what to whom.

### 2.7.1 Financial Analysis

The financial analysis will be based on a detailed cash flow analysis of passenger revenues, operating and maintenance costs, and infrastructure and rolling stock costs. The analysis will include the discounting of costs and revenues to an appropriate base year, the establishment of an infrastructure cost implementation program, and the assessment of both Net Present Values and Internal Rates of Return showing the overall worth of the rail service in financial terms.

In addition, a number of ancillary revenue/cost relationships will be defined in the financial analysis, including project profitability (rate of return), operating ratio (cost/revenue relationship), investment standards (investment dollar/passenger mile), and train efficiency (cost/train mile). These will be used to provide a comparative analysis of corridor performance. Pro forma cash flow financial plans will be provided for the preferred alternatives.

### 2.7.2 Economic Analysis of User and Non-User Benefits

In the economic analysis, transportation user costs and benefits will be assessed in terms of increased user benefits (consumer surplus), increased trip making (regional mobility), reduced journey travel times and congestion (travel time savings), and improved quality of service (maximum service levels). The economic analysis will be based on the flow of economic costs and benefits over time and the impact of the proposed rail service on both users and non-users. This analysis will include resource savings, energy savings, accident savings, and producer surplus. The economic benefits and costs will be discounted to an appropriate base year and evaluated in terms of Net Present Values, Internal Rates of Return, and Cost-Benefit Ratios. The analysis will also include a public sector constrained capital assessment.

### 2.7.3 Economic Benefits for Communities

A critical output is the measure of community benefits generated by developing the corridor. This shows the communities the benefits they will get from the implementation of the high speed rail corridors. This has been used successfully in the public outreach program to develop community support (e.g., Ohio Hub, MWRRI, and Florida). TEMS has developed the Economic Rent Analysis as a mechanism for estimating the increase in jobs, income, property values, and the expansion of the tax base, as a result of implementing high speed rail projects. This is an additional task that TEMS feels is essential to the public outreach process.

### 2.7.4 Financing and Funding Arrangements

Transportation funding across Colorado and the entire nation is deficient for meeting projected travel demand. For this reason, the TEMS Team will explore new and independent funding streams that are separate from typical highway funding sources (such as the motor fuel tax) for the construction and operation of the passenger rail system being considered in this study. The development of this funding stream may require legislative action and/or voter approval of a statewide ballot initiative.

For the optimum alternative(s) identified and evaluated in Task 6, the TEMS Team will evaluate the financing requirements as they relate to overall feasibility. Assumptions will be developed regarding the timing of program implementation, to establish cash flow requirements, and opportunities for securing private sector financing will be considered. The TEMS Team will develop a finance plan for the operating and capital cost of the passenger rail system in an iterative manner. Based upon income streams forecasted for each scenario by the ridership model, two finance plans will be developed, using both high and low economic forecasts. The analysis should clearly identify any needed front-end or ongoing public support that would be required to implement and sustain the operations, and identify potential sources of funding.

The analysis will consider different ways to generate federal, state, local, and private sector support for the rail service. Specific issues to be considered include:

- Federal and state match
- Local funding of stations
- Private sector roles in provision of services and contracting
- Freight railroad contracting and funding options

The analysis will consider the full range of innovative financing proposed by the FRA and evaluate the potential roles of grants, TIFIA loans, Amtrak participation, franchising, GANS and other financial instruments.

### 2.7.5 Institutional Framework

Given a full understanding of the needs of the rail service, infrastructure costs, operating finances, and the potential role of the private sector, an assessment will be made of the potential institutional arrangements that will need to be developed for implementation of the rail service. The full range of potential arrangements will be assessed and recommendations made on the basis of the roles of different parties, potential financial commitments, cost and revenue sharing, and other organizational and efficiency considerations. Key criteria will include:

- Pro forma cash flows
- Administrative and operating costs
- Legal requirements and related needs (e.g., insurance)
- Ease of implementation
- Transferability
- Pay-off year and financial attributes

### 2.7.6 Allocation of Costs and Revenues

Revenue and cost allocation procedures will be developed that show the financial responsibilities of each party along with the timeline for finalizing contractual arrangements. Critical issues to be assessed include:

- Cooperative arrangements
- Maximization of private sector opportunities
- Financing mechanisms
- Strengthening institutional capabilities

Consistent with previous direction to make maximum use of existing information, consideration of financing options will begin with review and incorporation of the findings of the recently completed Blue Ribbon Panel on Transportation Finance. However, these finding should not be seen as restricting examination of innovative finance strategies.

### 2.7.7 Final Evaluation and Recommendation

From the alternatives developed and identified in preceding tasks, the TEMS Team will identify an optimum high speed rail system alternative(s), with a clear rationale for the elimination of screened alternatives, and prepare a final evaluation of the feasibility of those system(s). It is recognized that the feasibility analysis conducted as part of the RFS will contain many contingencies and uncertainties. For this reason, the TEMS Team will identify and assess the risks and uncertainties that will influence the project's feasibility as it progresses through further development. For example, examination of the feasibility of rail service in the I-25 corridor must take into account any likelihood for the relocation of rail freight service to a new corridor east of Denver. The final evaluation must clearly identify the risks (e.g., availability of freight railroad trackage and right-of-way) and propose strategies for reducing the impact of those risks.

Because a principal objective of the study is to position the Colorado corridors to be added to the nation's prospective high rail corridors, the final evaluation must provide clear and concise responses to FRA's public/private partnership criteria and the six factors regarding high speed rail feasibility. During conduct of the study, the TEMS Team will coordinate with FRA and CDOT to ascertain expectations in this regard.

## 2.8 Task 8 – Documentation/Deliverables (BP Step 6: Implementation and Business Plan)

For the selected alternative(s), an implementation and business plan will be devised.

### 2.8.1 Implementation Plan

Using the outputs of the previous tasks, an implementation plan will be developed that sets goals, timetables, and arrangements for implementing passenger rail service in the Rocky Mountain Corridors. The timeline for planning, environmental analysis, preliminary engineering, final engineering, and construction will be set out in a realistic program to show the implementation milestones and the opening year for passenger rail operations. Alongside the physical implementation process will be a second set of milestones that identify the funding needs and institutional framework for developing the system. Action plans for lead agencies, local communities and private sector partners will be identified in the implementation process. A key element of the plan will be the interaction of physical facility provision, funding, and institutional development. The implementation plan will seek to define authority and responsibility for ensuring the success of the development process. The implementation plan will recommend an action program that sets out the steps that need to be followed to ensure the successful implementation of passenger rail in the Rocky Mountain Corridors.

### 2.8.2 Business Plan Documentation

A business plan report will be prepared describing databases, research methods, ridership and revenue forecasts, results of the financial and economic feasibility analyses, proposed institutional framework, financing and funding arrangements, and implementation plan. The report will describe the study results in the context of a corridor implementation program and make recommendations to the RMRA Steering Committee for maximizing the benefits of a passenger rail service in the Rocky Mountain Corridors.

### 2.8.3 Next Steps

While the RFS is expected to provide a reasonable assessment of the feasibility of implementing intercity rail service in Colorado, it is recognized that the RFS will not provide final answers. In addition to the conclusions reached regarding rail service and program financing feasibility, the RFS will identify needed follow-on studies, as well as administrative and other governmental actions that need to be taken by the RMRA or other Colorado agencies. Coordination with the RMRA and other government entities during the RFS will be documented in the final report.

**Deliverables:** For this task, the TEMS Team will prepare for Steering Committee and PMC review the following:

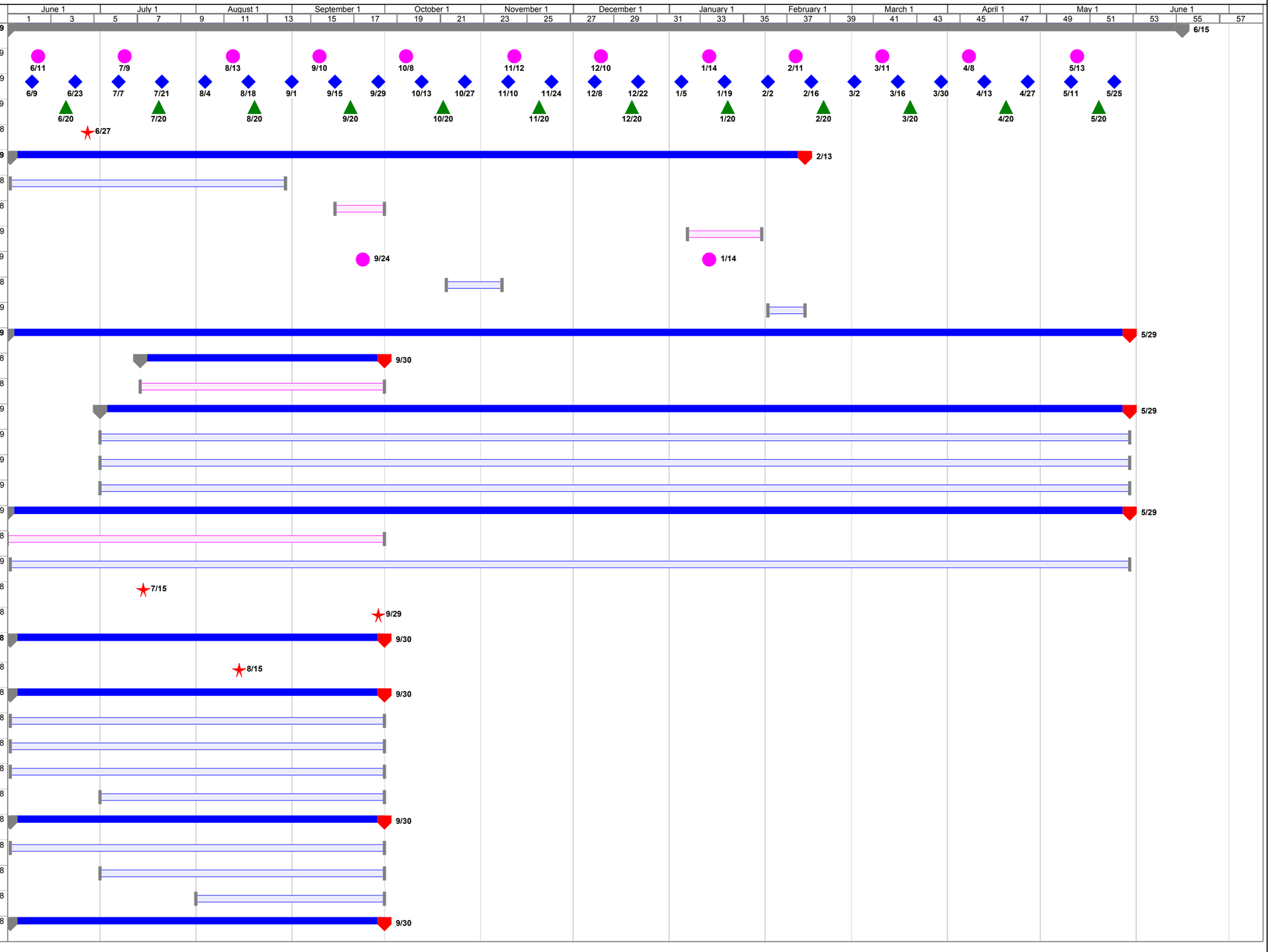
1. Rail Feasibility Report, summarizing the entire RFS process and the conclusions and recommendations of the alternatives evaluation, with particular emphasis on phasing and financing opportunities. (10 draft and 50 final)
2. Project Management Plan (5 draft and 10 final)
3. Technical Reports (10 draft and 25 final)
   a. Scoping
   b. Methodology (including outreach, ridership and revenue forecasting, cost estimating, alternatives development, and alternatives analysis)
   c. Existing Conditions (including opportunity to upgrade existing track to accommodate high speed passenger rail service)

d. Alternatives Development (including results of the Alternatives Development workshop)
e. Alternatives Analysis (including technology, operating and cost assumptions)
f. Ridership and Revenue Forecasts
g. Implementation Plan
h. Business Plan
i. Financing and Funding Plan

# Appendix B: Work Schedule

# 2.3 Work Schedule

| ID | Task # | Task Name | Start | Finish |
|---|---|---|---|---|
| 0 | **1** | **Project Management** | **Sun 6/1/08** | **Mon 6/15/09** |
| 1 | 1.1 | Steering Committee Meetings | Wed 6/11/08 | Wed 5/13/09 |
| 14 | 1.2 | PMC Coordination Meetings | Mon 6/9/08 | Mon 5/25/09 |
| 67 | 1.3 | Monthly Progress Report | Fri 6/20/08 | Wed 5/20/09 |
| 80 | 1.4 | Project Management Plan | Fri 6/27/08 | Fri 6/27/08 |
| 81 | **2** | **Peer Review Panel** | **Mon 6/2/08** | **Fri 2/13/09** |
| 82 | 2.1 | Develop Panels | Mon 6/2/08 | Fri 8/29/08 |
| 83 | 2.2 | First Meetings (3) - Data Methodology | Mon 9/15/08 | Tue 9/30/08 |
| 84 | 2.3 | Second Meetings (3) - Alternatives Analysis | Wed 1/7/09 | Fri 1/30/09 |
| 85 | 2.4 | Powerpoint Presentation | Wed 9/24/08 | Wed 1/14/09 |
| 88 | 2.5 | Response to Panel (1) | Tue 10/21/08 | Fri 11/7/08 |
| 89 | 2.6 | Response to Panel (2) | Mon 2/2/09 | Fri 2/13/09 |
| 90 | **3** | **Scoping/Public Outreach** | **Sun 6/1/08** | **Fri 5/29/09** |
| 91 | 3.1 | Scoping | Mon 7/14/08 | Tue 9/30/08 |
| 92 | 3.1.1 | Scoping Workshops (3) | Mon 7/14/08 | Tue 9/30/08 |
| 93 | 3.2 | Ongoing Public Input | Tue 7/1/08 | Fri 5/29/09 |
| 94 | 3.2.1 | Media Relations | Tue 7/1/08 | Fri 5/29/09 |
| 95 | 3.2.2 | Monthly Updates | Tue 7/1/08 | Fri 5/29/09 |
| 96 | 3.2.3 | Stakeholder Database | Tue 7/1/08 | Fri 5/29/09 |
| 97 | 3.3 | Policy Outreach | Sun 6/1/08 | Fri 5/29/09 |
| 98 | 3.3.1 | Policy Outreach Workshops (6) | Sun 6/1/08 | Tue 9/30/08 |
| 99 | 3.3.2 | Policy Outreach Coordination | Mon 6/2/08 | Fri 5/29/09 |
| 100 | 3.4 | Stakeholder Outreach Approach Report | Tue 7/15/08 | Tue 7/15/08 |
| 101 | 3.5 | Scoping Technical Report | Mon 9/29/08 | Mon 9/29/08 |
| 102 | **4** | **Methodology, Data Collection and Summary of Existing Conditions** | **Mon 6/2/08** | **Tue 9/30/08** |
| 103 | 4.1 | Methodology Report | Fri 8/15/08 | Fri 8/15/08 |
| 104 | 4.2 | Market Database | Mon 6/2/08 | Tue 9/30/08 |
| 105 | 4.2.1 | O/D Data | Mon 6/2/08 | Tue 9/30/08 |
| 106 | 4.2.2 | Socioeconomic Data | Mon 6/2/08 | Tue 9/30/08 |
| 107 | 4.2.3 | Network Data | Mon 6/2/08 | Tue 9/30/08 |
| 108 | 4.2.4 | Stated Preference Survey/Data | Tue 7/1/08 | Tue 9/30/08 |
| 109 | 4.3 | Engineering Database | Mon 6/2/08 | Tue 9/30/08 |
| 110 | 4.3.1 | Track Chart Database | Mon 6/2/08 | Tue 9/30/08 |
| 111 | 4.3.2 | Track Review | Tue 7/1/08 | Tue 9/30/08 |
| 112 | 4.3.3 | Engineering Cost Database | Fri 8/1/08 | Tue 9/30/08 |
| 113 | 4.4 | Technology Database | Mon 6/2/08 | Tue 9/30/08 |



# 2.3 Work Schedule

| ID | Task # | Task Name | Start | Finish |
|---|---|---|---|---|
| 114 | 4.4.1 | Technology Review | Mon 6/2/08 | Tue 9/30/08 |
| 115 | 4.4.2 | Technology Database | Fri 8/1/08 | Tue 9/30/08 |
| 116 | 4.5 | Property Database | Mon 6/2/08 | Tue 9/30/08 |
| 117 | 4.5.1 | Develop Station Plan | Mon 6/2/08 | Tue 9/30/08 |
| 118 | 4.5.2 | Develop Station Database | Fri 8/1/08 | Tue 9/30/08 |
| 119 | 4.6 | Existing Conditions Report | Mon 9/29/08 | Mon 9/29/08 |
| 120 | **5.0** | **Preliminary Service Scenarios** | **Tue 7/1/08** | **Fri 11/14/08** |
| 121 | 5.1 | Review Alternative Routes/Technology | Tue 7/1/08 | Fri 10/31/08 |
| 122 | 5.2 | Develop Service Concepts | Tue 7/1/08 | Fri 10/31/08 |
| 123 | 5.3 | Alternatives Development Workshop Preparation | Fri 8/1/08 | Tue 10/14/08 |
| 124 | 5.3.1 | Alternatives Development Workshop | Tue 10/14/08 | Tue 10/14/08 |
| 125 | 5.4 | Alternatives Development Technical Report | Fri 11/14/08 | Fri 11/14/08 |
| 126 | **6** | **Alternatives Analysis** | **Mon 9/1/08** | **Fri 1/30/09** |
| 127 | 6.1 | Calibrate COMPASS™ Demand Model | Mon 9/1/08 | Fri 11/28/08 |
| 128 | 6.2 | Prepare Ridership and Revenue Forecasts | Mon 11/3/08 | Fri 1/30/09 |
| 129 | 6.3 | Interactive Analysis | Mon 9/1/08 | Fri 1/30/09 |
| 130 | 6.4 | Develop Operating and Capital Costs | Fri 10/31/08 | Fri 1/30/09 |
| 131 | 6.5 | Ridership and Revenue Report | Wed 1/21/09 | Wed 1/21/09 |
| 132 | 6.6 | Alternatives Technical Report | Wed 1/21/09 | Wed 1/21/09 |
| 133 | **7** | **Feasibility Determination** | **Fri 10/31/08** | **Tue 3/3/09** |
| 134 | 7.1 | Financial Analysis | Mon 11/3/08 | Tue 3/3/09 |
| 135 | 7.2 | Economic Analysis - Users | Mon 11/3/08 | Tue 3/3/09 |
| 136 | 7.3 | Economic Analysis - Communities | Thu 1/1/09 | Tue 3/3/09 |
| 137 | 7.4 | Financing and Funding Arrangements | Thu 1/1/09 | Tue 3/3/09 |
| 138 | 7.5 | Institutional Framework | Fri 10/31/08 | Tue 3/3/09 |
| 139 | 7.6 | Allocation of Costs and Revenues | Thu 1/1/09 | Tue 3/3/09 |
| 140 | 7.7 | Final Recommendation | Mon 2/2/09 | Tue 3/3/09 |
| 141 | 7.7.1 | Recommendation Memorandum | Tue 3/3/09 | Tue 3/3/09 |
| 142 | **8** | **Task Documentation** | **Mon 2/2/09** | **Mon 6/15/09** |
| 143 | 8.1 | Implementation Plan | Mon 2/2/09 | Thu 4/30/09 |
| 144 | 8.2 | Business Plan | Mon 3/2/09 | Fri 5/29/09 |
| 145 | 8.3 | Draft Report | Thu 5/14/09 | Thu 5/14/09 |
| 146 | 8.4 | Final Report | Mon 6/15/09 | Mon 6/15/09 |