# Organizing for Efficiency: The Denver Teamwork Experience

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The Regional Transportation District's (RTD's) first light rail system, the Central Corridor, is a 5.3-mi-long at-grade rail line that runs from a southern terminus, through the central business district (CBD), to a northern terminus in metropolitan Denver, Colorado. This first line is the spine of a planned regional rapid transit system and was designed with simplicity and the ability to expand as demands require. RTD modified and accentuated its organization in order to design, construct, and implement this transit system to ensure it would be both usable and acceptable to the Denver metropolitan communities. To enhance RTD's experience in light rail transit (LRT) construction, administration was conducted in-house, whereas design and construction management were performed by professional consultants and construction contractors. A small but very motivated RTD team was created and trained in construction procedures and standards, quality assurance, project management, materials management, and RTD's procurement and contracting procedures. This team, which included an operations superintendent, worked together, communicating and coordinating all activities to meet the priorities set by RTD's general manager to ensure that the objectives of safety, quality, budget, and operational effectiveness were achieved. As construction progressed, a larger integration/activation team evolved and a small operations start-up team was created. Operations, training, maintenance, safety certification, and staffing plans were developed, and operations personnel became involved in preparations for revenue start-up by participating in the integrated systems testing and activation. All equipment was tested, safety was certified, and revenue service was simulated to ensure that all LRT system elements functioned together to provide a safe, reliable, and efficient service. RTD's light rail system started revenue service on October 10, 1994. Typical of all new systems, the first few months were tests of flexibility and patience. It was a time of learning; adapting to equipment problems, customer needs, procedural problems, and training needs; and preparing for expansion and growth. By using the experienced professionals, technology, and innovations available, RTD has inaugurated a successful light rail system and now is looking to the future for further expansion.

he Regional Transportation District's (RTD's) first light rail system, the Central Corridor, runs from 30th Avenue and Downing Street through the Five Points Business District and downtown Denver, by the Auraria higher education campus, and then along railroad right-of-way to I-25 and Broadway (see Figure 1).

The corridor is a 5.3-mi-long at-grade rail line that meets the Americans with Disabilities Act (ADA) requirements, includes 14 stations, and carries approximately 15,000 riders per day. The northern terminus, located at 30th and Downing, is a bus transfer station and includes a small park-and-ride. At the southern terminus at I-25



FIGURE 1 Proposed rapid transit corridors.

and Broadway, passengers from express, regional, and local bus routes also transfer to light rail transit (LRT) to complete their trip into the Denver central business district (CBD). There are also approximately 700 automobile spaces in the park-and-ride lot located here.

This first line, the spine of the planned regional rapid transit system, demonstrates light rail technology, including its efficient and reliable service, its high-speed and high-capacity characteristics, and the flexibility to operate within Denver's downtown city streets. Since its revenue service opening in October 1994, it has removed hundreds of daily bus trips from the core city area, reducing air pollution and traffic congestion. It has provided an opportunity for economic development in commercial areas along the transit line and has demonstrated RTD's commitment to rapid transit in the Denver metropolitan region (Figure 2). The LRT line is a conventional light rail system powered by 750 VDC nominal overhead power. Using offthe-shelf technology, the system with its 11 Siemens Duewag Corporation Model SD100 light rail vehicles, capable of speeds up to 55 mph, provides the ridership capacity necessary in completing the transfer of thousands of daily bus passengers as well as hundreds of new park-and-ride automobile transfers to LRT for the trip into the CBD. For ease of operation, as well as safety considerations, most of the alignment is double tracked with typical automatic block system signals in the high-speed rail section and traffic control devices or gated crossings at all intersections.

The system was designed with simplicity in mind along with the ability to expand and grow. The organization of RTD was modified to accomplish the goal of designing, constructing, and implementing a transit sys-



FIGURE 2 Central corridor light rail line.

tem that would be useful and acceptable to the Denver metropolitan communities.

## ORGANIZATIONAL PHILOSOPHY

Trial and error became the major means of problem solving for many emerging light rail organizations of the 1980s, principally because surface trolley systems were discontinued in the 1950s. Since that time technology had dramatically changed, and experienced rail transit personnel were retired and lost to the industry. In light of this, during the 1980s a new generation of transit professionals had to be developed to accommodate the resurgence of rail projects. After two decades of technological development throughout North America, Denver was able to take advantage of both the advances and the new-generation transit professionals.

RTD organized its design and construction team and implemented the design criteria for building its first light rail system with this philosophy in mind.

#### DESIGN/CONSTRUCTION TEAM APPROACH

The design and construction of light rail was organized for flexibility. Because of the limited amount of committed funding and the lack of sufficient LRT experience of the staff, project administration was conducted in-house while design and construction management, as well as the actual construction, were performed by professional consultants and construction contractors. A new RTD department was formed to provide oversight of the project management responsibilities. The department was basically separated into three oversight management responsibilities: LRT project coordination, LRT systems management, and LRT community relations (Figure 3).

Ensuring minimal costs comparable with other similar systems and an aggressive schedule required the staff to be sized accordingly. As with any major project, organizing staff requires a clear, concise line of communication internally and with other governmental agencies supporting the project. As shown in Figure 3, the structure was formed to facilitate the needed communication and to maximize the efficiency of interagency interface.

To facilitate the evolution of the project, the staff was trained in team building and partnering strategies. Furthermore, staff training included construction procedures and standards, quality assurance, project management, materials management, and RTD's procurement and contracting procedures. This accumulation of training provided the framework for continuity and uniformity to the efforts of all project team members.

As a means of ensuring a simple and manageable project, six steps were integrated into the project:

1. There was one formal point of contact. RTD staff, the designer, each construction contractor, and all other

parties involved had one formal contact person who took responsibility for their assignment.

2. All vital communications between project parties were accomplished in writing and filed for the project record.

3. The weekly progress meetings had agendas that were distributed. It was expected that all concerned individuals would attend and come prepared. Action items would be assigned with the item completion or report date, and solutions to problem issues were relentlessly pursued.

4. All projects and contracts had time and financial constraints. Goals were set with emphasis on schedule adherence and cost-effective solutions to project challenges.

5. All project participants understood the extent of their role, nature of their responsibilities, and the contributions expected and needed for achieving a successful project.

6. All participants held to the win-win partnering philosophy. It was understood that the successful project implementation would be a team effort. A win-win philosophy ensured that all participants—RTD staff, designer, contractor, consultant, and other external agency representatives—would achieve their objectives.

RTD's Department of LRT Construction was arranged to see that coordination and integration needs of all participants were met, and it was sized and organized to meet the priorities set by RTD's general manager to ensure that the objectives of safety, quality, budget, and operational effectiveness were achieved. As implementation of the project proceeded from preliminary engineering efforts through design, construction,



FIGURE 3 Early light rail construction.

and start-up phases, the organization evolved to ensure the maximum efficiencies of personnel.

During preliminary engineering, the Director of LRT Construction assumed the lead management role, reporting directly to the general manager with support in the areas of project controls, technical support, community relations, and operations.

During final design and construction, the director of LRT Construction, under the supervision of the general manager, led the effort with a larger team consisting of project engineers, system engineers, construction managers, an operations superintendent, and a community relations coordinator (see Figure 4). The team focus was on constructibility, system integration, utility relocation and agency coordination, right-of-way requirements, value engineering, cost control, and design integrity, all within the confines of project construction safety and future system safety.

### **OPERATIONS START-UP TEAM**

As has been noted, the operations superintendent was involved as a project team member early in the design phase of the project. This decision was based on the new philosophy that future successful revenue operation of any project greatly depended on designing and constructing a system with that goal in mind. The value of early involvement by key operating and maintenance personnel was recognized and addressed so that operating and maintenance requirements appropriate to RTD were defined and addressed in the system's design criteria and efforts. With the fiscal constraints and schedule placed upon itself, RTD took every precaution to build a system that would operate efficiently and effectively. As all of us are painfully aware, the costs associated with change orders and modifications require that close scrutiny be given to ensuring that efficiencies necessary to operate the system are addressed before start-up.

Whereas it is sometimes difficult to determine the proper timing to actually establish the initial light rail operating organization, on the basis of experiences of projects in the 1980s, it was decided that operations input was necessary during preliminary engineering. The position of general superintendent of Light Rail Operations was filled and became an extension to the design and construction staff, acting as a project manager for the procurement of rail vehicles, shop equipment, and track/appurtenances. In addition, operations personnel were involved in the development of the design criteria as well as the designing process, ensuring that operational needs and maintenance requirements were addressed appropriately. As the construction progressed, operations staff also participated in quality control and in review of any required design modifications.

Along with these project team responsibilities, the operations superintendent took on the role of developing the operations plan, training plan, maintenance plan, and safety certification plan as well as the staffing of the operations start-up team. The early preparation of the operating plan provided the training perspective necessary to ensure that project managers and engineers knew how the system should operate as they dealt with the day-to-day construction questions. The operations plan finalized the design criteria and, more important, set the stage for the interaction required from the various departments and groups within RTD involved in the project, and it introduced them to the concepts of how the proposed system would operate.



FIGURE 4 Light rail construction.

As the operations start-up team was selected and developed, several qualifications were considered: (a) experience and knowledge of light rail transit and system start-up; (b) flexibility or adaptability to changes; (c) enthusiasm for the project; (d) strong leadership skills including team building, a strong sense of vision, the ability to communicate that vision effectively to other team members, and a strong sense of the value of training both as a trainer and trainee; and (e) the ability to convince through displaying confidence and patience. The key operations management position selections were made on the basis of those qualifications. Figure 5 highlights the RTD start-up organization and the reporting hierarchy. In reviewing each of the qualifications noted above, the one requiring a certain amount of experience in light rail transit was of utmost importance. To provide insight into the development of the operational organization and lend credence to the input being provided to design and engineering, a certain amount of related experience is required. In addition, a network of contacts in the industry becomes beneficial in overcoming the weaknesses in experience based on the different system operating characteristics. Peer review and property visits are also essential to provide reality checks and add insight into the needs of emerging organization.

As the system neared its construction completion date, the semitrained operations personnel began to



FIGURE 5 RTD Light Rail Operations start-up organization.

make final preparations for revenue start-up by participating in the integrated systems testing and, finally, activation.

### INTEGRATION/ACTIVATION TEAM

The purpose of the system integration was to ensure compatibility among various elements of the project as well as with the entire RTD transit system. Although team members came from various departments, the systems manager was responsible for coordinating the testing and documenting the results for safety certification. Integration documentation was to verify the following project elements:

• Design documents were in compliance with the design criteria and were consistent with operating plans and procedures.

• LRT signals, city traffic signals, fare vending, communications, and traction power were compatible.

• The right-of-way, track work, stations, and other facilities accommodated and functioned with the systems elements.

• The design documents and as-built drawings were consistent with what was constructed.

In addition to ensuring compatibility with existing elements, the integration activities were also to make certain that project facilities and systems would be compatible with future extensions. The final design for these extensions would be cross-checked to ensure that specifications would share common characteristics. Some of the elements considered and carried forth were

• Track gauge, standard 4 ft 81/2 in.;

- Traction power voltage, nominal 750 VDC;
- Communications and signal systems;

• LRV car body characteristics such as crush strength, anticlimber/collision post locations, clearance envelope, and weight;

• ADA requirements for station platforms and facilities; and

• Other components that may be duplicated for consistency and ease of maintenance.

As noted previously, the operations plan was used to guide the start-up and systems integration testing and prerevenue service phases of the project. The operations plan was a dynamic document, changing as required to incorporate technical advances, specific design changes, equipment changes and modifications, and budget alterations. The plan was also the guide for staff training and development needs.

The integrated systems team consisted of systems contractors/suppliers, construction management, project engineers and inspectors, RTD LRT systems engineer, operations maintenance/transportation staff, and safety compliance officers. The goals of this team were to ensure that the testing program was completed as required and the proper documentation presented for safety certification. The testing program described the objectives, methodology, management controls required, and the verification of compliance to ensure the system's readiness for revenue operation. The objectives were to verify contract compliance and completeness; validate and demonstrate the performance of the system; demonstrate the safety certification elements and service characteristics; validate the training of LRT operations staff; and integrate personnel, equipment, and procedures into the RTD transit system.

While the integration testing team provided the system elements for documentation and revenue operation, the activation team readied the entire organization for the start-up. The activation team was assigned a manager for coordination and consistency but included representation from every department within the organization. Through this coordination, the team completed the preparation required to ensure community acceptance and safety and the schedule reliability and performance needed to service the metropolitan region.

In preparation for the revenue service date of October 10, 1994, all equipment was activated, tested, and safety certified, and revenue service was simulated to make certain that all LRT system elements functioned together to provide a safe, reliable, and efficient service. The activation process, and the team designated, followed a comprehensive plan that encompassed all the activities required for the full integration into the RTD transit operation (see Figure 6).

Eleven major task categories along with checklists of many other detailed tasks were identified to complete the preparation for revenue service:

1. Select and hire the staff required to operate and support the LRT.

2. Complete all engineering and maintenance procedures and agreements.

3. Complete all transportation policies, procedures, and rules.

4. Complete training of all LRT personnel to assume their role in operations.

5. Develop and then complete all safety certification elements as well as arrange for ongoing safety evaluation and support.

6. Identify and develop security requirements.

7. Identify and complete all required agreements, ordinances, and so forth with external agencies.

8. Prepare an integrated service plan to include train schedules and revisions to bus routes and schedules.

9. Ensure that material management and inventory control requirements are integrated into the LRT department.

10. Prepare financial/budgeting requirements to ensure completion of capital projects and ongoing operational needs.

11. Provide public information including safety outreach training and marketing of the RTD's newest form of transportation alternatives.

As these tasks were actively pursued, the activation team was broken out into various committees that provided periodic updates on their progress. Because of the enormous commitment, enthusiasm, and energy on the part of all participants of the activation team, the startup was a tremendous success. However, with the advent of this new form of transportation service, continued enthusiasm and commitment were necessary to demonstrate the effectiveness and efficiencies over the coming years. The newest RTD division of Light Rail Operations prepared itself to accomplish this task.

# Operations Team Development—The 5-Year Plan

As any participant can affirm, the first few months of operation are a test of flexibility and patience. That period becomes a time of learning; adapting to equipment

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| A   |          | 2.1         | STAFFIN  | IG (J. C | lațiin)    |         |         |         |                |          |          |            |                |                      |          |
| Develop Job Descriptions  | PCT 84   |             |          |          |            |         |         |         | 1              |          |          |            |                |                      |          |
| 21-011  |          |             |          |          |            |         |         |         |                |          |          | <u> </u>   | ·              |                      |          |
| Rice Staff And Initiate Training Process                        | PCT 55   |             |          |          |            |         |         |         |                |          |          |            | J              |                      |          |
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| 2.2-008<br>Utilize Available Training From Other Properties     | PCT 40   | 1 🖬         | _        |          |            |         |         |         | <u> </u>       |          |          |            |                |                      |          |
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| 2,2-011<br>Complete Training Regulrements/Certification         | PCT 30   |             |          |          |            |         |         |         | 1<br>T         |          |          | T          |                |                      |          |
| 3 3-013   | <u> </u> |             |          |          |            |         |         |         |                |          |          |            |                |                      |          |
| Establish Recentification Requirements                          | PCT S    |             |          |          |            |         |         |         | 1              |          |          |            |                |                      |          |
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| Establish Re-current Training Processe I                        | PCT 5    |             | <b>-</b> |          |            |         |         | ····    | 1              |          |          |            |                |                      |          |
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| 2.3-003<br>Beview And Test Rules                                | PCT 10   |             |          |          |            |         |         |         | Ļ              |          |          |            |                |                      |          |
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| 2.3-006<br>Review And Test SOP's I                              | PCT 10   |             |          |          |            |         |         |         | 1 <u></u><br>T |          |          | 1          |                |                      |          |
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| Subsit SOP's For Safety Certification                           | PCT 97   |             |          |          | -          |         |         |         |                |          |          |            |                |                      |          |
| 2 3-010   |          | -           |          |          |            |         |         |         | <u> </u>       |          |          |            |                |                      |          |
| Review/Approve Accident Investigation Procedures                | PCT 80   |             |          |          |            |         |         |         |                |          |          |            |                |                      |          |
| 2.3-016   |          |             |          |          |            |         |         |         |                |          |          |            |                |                      | <u> </u> |
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| 2.3-017<br>Field Yerify Estimate Run Times                      | PCT 1    | E           |          |          | <u></u>    |         |         |         |                |          |          | <u> </u>   |                |                      |          |
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| 2.3-018<br>Update Planned Operating Schedules 8                 | PCT O    |             |          |          |            |         |         |         | 1              |          |          | <u></u>    |                | _                    |          |
| 3 9-010   |          | <u> -</u> _ |          |          |            |         |         |         |                |          |          |            |                |                      |          |
| Complete Schedule And Run Cuta                                  | PCT Q    |             |          |          | 1          |         |         |         | [              |          |          | <u> </u>   |                |                      |          |
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FIGURE 6 Activities required for full integration into RTD transit operation. (continued on next page)

problems, customer needs, procedural problems, and training needs; and preparing for expansion and growth. It is truly a time when the weaknesses of the system and the team are exposed. During this time the organizational needs must be closely scrutinized and modified to meet the challenges of the next few years. As a means of meeting the demands of change within the operation, it is essential to have a plan for organizational expansion. This plan of expansion is based on assumptions, projections, and industry examples and considers the following elements:

- System maturity including warranty expiration,
- Additional LRV/equipment procurement,

• Modifications or retrofits to existing vehicles or facilities,

- Extensions/new-start project completion,
- Scheduled service level changes,
- Labor agreement changes,

• Training needs for recertification and apprentice programs, and

• Budget constraints.

As with all other aspects of the project, the staffing of Light Rail Operations was done with budgeting as a primary consideration. In addition there was a philosophy that by using minimum staff, the amount of training and the use of time and energy could be controlled: cross-training would be given and personnel strengths and skills would be enhanced. It was hoped, too, the challenges that make the job duties more interesting and rewarding would persist.

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| 2 3-020  |                                       |                              |                |      |                        |               |         |
| Develop Abnormal Operations Schedule PCT                                 | 0                                     | 1                            | r              |      |                        |               |         |
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| Prepare Schedule Recovery Option/SOP's PCT 6                             | 55                                    | · · · · · ·                  |                |      |                        |               |         |
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| 2 2-023  |                                       |                              |                |      |                        |               |         |
| Develop Namegement Information System Forms/Repo PCT 7                   |                                       |                              |                |      |                        |               |         |
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|  | 2.4 RAIL MAINTENANCE                  | ELEMENTS (J. Claflin)        |                |      |                        |               |         |
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| 12.4-004<br>Develop Standard Maintenance Operating Procedure - PCT - 9   | 15                                    |                              |                |      |                        |               |         |
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| Develop Naintenance Standards PCT 5                                      | 50                                    |                              |                |      |                        |               |         |
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|  | 2.5 LRT ENGINEERING                   | STSTER DESIGNERS (R. Larson) |                | 1    |                        |               |         |
| 2,5-002<br> Review/Formalize Design Criteria PCT 4                       |                                       |                              |                | ľ    |                        |               |         |
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| Conduct Internal Quality Assurance Audits PCT 6                          | 5                                     |                              |                |      |                        |               |         |
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| Develop Integration Testing Procedures PCT 2                             | ·5                                    | I                            |                |      |                        |               |         |
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| Develop LHD Standards For Rs-Builts PCI 7                                | · · · · · · · · · · · · · · · · · · · |                              |                | 1    |                        |               |         |
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| Convert As-Built Drawings To CAD Standards PCT                  | 30  |       |         |                                       | 1            |          |      |         |              |        |             |      |          |             |             |  |
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| 2.5-015<br>Operations Acceptance PCT                            | 20  |       |         |                                       |              |          |      |         |              |        |             |      |          |             |             |  |
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| 2.6-005   |     |       |         |                                       |              |          |      |         |              |        |             |      |          |             |             |  |
| Review Contractor's Safety Programs PCT                         | 60  |       |         |                                       |              | Т        |      |         |              |        |             |      |          |             |             |  |
| 2.6-006   | -+  |       |         |                                       | <u> </u> · · |          |      |         |              |        |             |      |          |             |             | <u> </u>                                     |
| Safety Centify Building And Mobile Equipment PCT                | 98  |       |         |                                       |              |          |      |         | 1            |        |             |      |          |             |             |  |
|   |     |       |         |                                       | ļ            |          |      |         |              |        |             |      |          |             |             |  |
| 2.6-009<br>Develop Hezerd Tracking Procedures PCT               | 10  |       |         |                                       | <u></u>      | Ť        |      |         |              |        |             |      |          |             |             |  |
|   |     | L     |         |                                       |              |          |      |         |              |        |             |      |          |             |             |  |
| 2.6-010<br>Prepare Occupational Safety Plan PCT                 | 10  |       | - C.    | · · · · · · · · · · · · · · · · · · · |              |          |      |         | r            |        | 1           |      |          |             |             |  |
|   |     |       |         |                                       |              |          |      |         |              |        |             |      |          |             |             |  |
|   |     | 2.7 6 | SUS SER | WICE INT                              | EGRATION (   | B, Ryn   |      | (n      |              |        |             |      |          |             |             |  |
| 2.7-001   |     |       |         |                                       |              |          |      |         | <u> </u>     |        | 1           |      | l        |             |             |  |
| Husbaus and belonice high hot                                   | 22  |       |         |                                       |              |          |      |         |              |        |             |      |          |             |             | 1  |
| 2 7-002   |     |       |         |                                       |              |          |      |         |              |        |             |      | i        |             |             |  |
| Conduct Public Hearings PCT                                     | 0   |       |         |                                       | 1            |          |      |         |              |        |             |      |          |             |             |  |
| A 7 AM  |     |       |         |                                       | <u> </u>     |          |      |         |              |        |             |      | <u> </u> |             |             | <u>                                     </u> |
| Revise Routes, Schedules And Labor Needs PCT                    | 0   |       |         |                                       | 1            |          |      |         | 1            |        |             |      |          |             |             |  |
|   |     |       |         |                                       |              |          |      |         |              |        |             |      | L        |             |             | l  |
| 2.7-004<br>Prepare Public And Bus Operator Information Need PCT | 5   |       |         |                                       | 1            | =+       |      |         | 1            |        |             |      | <u> </u> |             |             |  |
|   |     | l     |         |                                       | 1            |          |      |         |              |        |             |      |          |             |             |  |
| 2.7-005   | 50  |       |         |                                       | 1            |          |      | C       |              |        |             |      |          |             |             |  |
|   | ~   |       |         |                                       |              |          |      |         |              |        |             |      | 1        |             |             |  |
| 2.7-007 Chanter Chanter In Fan Service Totant Dat               |     |       |         |                                       |              | <u> </u> |      |         | <u>L</u>     |        |             |      | <u> </u> |             |             | 1  |
| pervice integrat PCI  |     |       |         |                                       | 1            | T        |      |         |              |        |             |      |          |             |             |  |
|   |     |       |         |                                       |              |          |      |         |              |        |             |      |          |             |             |  |
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|  |                             | 2.       | 8 FARE   | COLLECTION | (Beuthe)/(  | Clafi  | in/Fez      | el)   |             |        |              |              |              |              |          |
| 2,8-001  | PCT 5                       | וך       |          |            |             |        |             |       |             |        |              |              |              |              |          |
| licker vesign  | 101 3                       |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
| 3 8-003  |                             | -+-      |          |            |             |        |             |       |             |        |              |              |              |              | <u>t</u> |
| Define Fare And Structure  | PCT 50                      |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       | ļ           |        |              |              |              |              | <u> </u> |
| 2.8-004  | PCT 0                       | 1        |          |            |             |        |             |       | r           |        |              |              |              |              |          |
|  |                             |          |          |            |             | 1      |             |       |             |        |              |              |              |              | l        |
| 2 8-005  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
| Develop Fare Marketing Plan & Requirements                             | PCI 0                       | '   '    |          |            | Į           |        |             |       |             |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
| 2,8-006<br> Develop Fare Structure Signage                             | PCT 0                       |          |          |            | 1           | -      |             |       | 1           |        | <b>·</b>     |              |              |              |          |
|  |                             |          |          |            |             |        |             |       |             |        |              | <u> </u>     |              |              |          |
| 2.8-007  |                             |          |          |            |             |        |             |       | 1           |        |              |              |              |              |          |
| Neverop IAN Secarcing hisu Hug hubben                                  | ru 3                        | '        |          |            |             | - i    |             |       |             |        |              |              |              |              |          |
| 3 8-009  |                             | -        |          |            | 1           |        |             |       | <u> </u>    |        |              |              |              |              | 1        |
| Develop TVH Emergency Servicing Procedures                             | PCT S                       | i        |          |            | 1           | T      |             |       |             |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              | ┨•       |
| 2.8-009<br>Develop TVM Security Policy And Response Plan               | PCT 0                       |          |          |            | -1          |        |             |       |             |        | )            |              |              |              |          |
|  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
| 2.8-010  |                             | .        |          |            |             |        |             |       | 1           |        |              |              |              |              |          |
| Develop TVN Administration/Accounting Procedures                       | PCI 3                       | '        |          |            |             | - 1    |             |       |             |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       | <u> </u>    |        |              | 1            |              |              |          |
| Develop/Implement Fare Enforcement Policy                              | PCT 20                      | )        |          |            | 1           | _      |             | ·     | 1           |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              |          |
| 2.8-013<br>Develop Experience Inspection Propries/Policies/Procedu     | PCT 50                      |          |          | <u>.</u>   | uj — C      |        |             |       |             |        |              |              |              |              |          |
|  |                             |          |          |            |             |        |             |       | 1           |        |              |              |              |              |          |
| 2.8-014  |                             | .+       |          |            |             |        |             |       | 1           |        |              | 1            |              |              |          |
| Develop Ridership Data Collection Procedures                           | PCT 25                      | <b>)</b> |          |            |             | I      |             |       |             |        |              |              |              |              | }        |
|  |                             |          |          |            |             |        |             |       |             |        |              |              |              |              | <u> </u> |
|  |                             | 2        | , 9 PVBL | IC INFORMA | ILON CH. Ra | aymort | 1)          |       |             |        |              |              |              |              |          |
| 2.9-002<br>Computity Outreach  | PCT 30                      | 0        |          |            |             |        |             | _     | 1           |        |              | - <u></u>    |              |              |          |
|  |                             |          |          |            | 1           |        |             |       | <u> </u>    |        |              |              |              |              | <u> </u> |
| 2.4-005  |                             |          |          |            |             |        | C           |       |             |        |              | 1            |              |              | ÷        |
| Public Safety Dutreach Program   | PUI 90                      | "        |          |            |             |        |             |       |             |        |              |              |              |              | 1        |
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| 2 9-002  | -ſ`_     | 1100000    | 287 670 811 2 |          |         |         |          |      |        |               |                                       |                    |                          |            |
| Community Outreach / Relations PCT 37              | -        |            |               |          |         |         |          |      |        |               | <u> </u>                              |                    |                          |            |
| A 0-005  | +-       |            | ···           |          |         |         |          |      |        |               | ļ                                     |                    |                          |            |
| Ablic Safety Dutreach Program PCT 37               | -        |            |               | 1        |         |         |          |      |        |               | 1                                     |                    |                          |            |
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| Custoner Communication PCT 0                       |          |            |               |          |         |         |          |      |        | <b></b>       |                                       |                    |                          |            |
|  |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.9-007<br>General Adventising/Narketing PCT 37    |          |            |               |          |         |         |          |      |        |               | r<br>1                                |                    |                          |            |
|  |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.4-008<br>Media Relations PCT 37                  |          |            |               |          |         | _       |          |      |        |               | 1                                     |                    |                          |            |
|  |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.9-009<br>Detail Promes                           |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
|  |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.9-013  | +        |            |               |          |         |         | _        |      |        |               |                                       |                    |                          |            |
| Special narrente PCI 13                            |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.9-014  |          |            |               |          |         | _       | _        |      |        |               | l                                     |                    |                          | -          |
| Construction impacts program PCI 46                | 1        |            |               | 1        |         |         |          |      |        |               |                                       |                    |                          |            |
| 2.9-015  | +        |            |               | ┨        |         |         |          |      |        |               | l                                     | · · · · ·          |                          |            |
| Internal Communications PCT 0                      | 1        |            |               |          |         | <b></b> |          |      |        |               |                                       |                    |                          | <b>/</b> / |
| 2 9-016  | +-       |            |               | <u> </u> |         |         |          |      |        |               |                                       |                    |                          |            |
| Momentos PCT 40                                    | -        | -          |               |          |         |         |          | -    |        |               |                                       |                    |                          |            |
| 2 9-017  | -        |            |               |          |         |         | _        |      |        |               | · · · · · · · · · · · · · · · · · · · |                    |                          |            |
| Sponsorship Program PCT 37                         | •        |            |               |          |         |         | 1        |      |        |               |                                       |                    |                          |            |
| 3 0-016  | -        |            |               |          |         |         | _        |      |        |               |                                       |                    |                          |            |
| Special Events Tours/Open House PCT 41             | 1        |            |               | Î.       |         |         |          |      |        |               |                                       |                    |                          |            |
|  | _        |            |               | ļ        |         |         |          |      |        |               |                                       |                    |                          |            |
| Grand Opening PCT 0                                |          |            |               |          |         |         |          |      |        |               |                                       | · · · ·            |                          |            |
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| Date Date 10HAP14 Critical activity per/late Dates |          | RE         | GIONAL        | TRANSPI  | ORTATIO | N DIS   | TRI(     | CT - | • ••   | Onte I        | Prepared by<br>Revisi                 | y U'Brien-Kr<br>on | naitzberg<br>Ticheckerii | Approved   |
| Preject Finish 18800794 e                          |          |            | 1             | ACTIVAT  | ION PLA | AN      |          |      |        | Ē             |                                       |                    |                          |            |
| (c) Primeveno Systems, Inc.                        |          |            |               |          |         |         |          |      |        |               |                                       |                    |                          |            |

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|   | 2.9 PUBLIC INFORMATIO | N (n. Kayancho)      |                                       |                                       |
| 2.9-009 PCT 0   |                       | <u> </u>             |                                       | T                                     |
| TRATEMENT MOVESTICATION RETURN LOW BILL TO CONTRACT TO CONTRACT TO CONTRACT TO CONTRACT TO CONTRACT TO CONTRACT |                       |                      |                                       |                                       |
| 2 4-012   |                       |                      | · · · · · · · · · · · · · · · · · · · |                                       |
| Prepare Program For General Public/Eldenly/Handi PCT 50   |                       |                      |                                       |                                       |
|   |                       |                      |                                       | <u>├</u>                              |
| 2.9-013 Provide For General Public/Fiderly/Han PCT 0  |                       |                      |                                       | 1                                     |
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| 2 9-014   |                       |                      |                                       |                                       |
| Prepare Information Inquiry Needs Program PCT 50  |                       | · •                  |                                       | 1                                     |
|   | l                     |                      |                                       | <u></u>                               |
| 2.9-015<br>Implement Training For Information Inquiry Needs PCT 0   |                       | 1                    | 1                                     |                                       |
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| 2.9-016   |                       |                      |                                       |                                       |
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| A A-A17   |                       |                      | <u> </u>                              |                                       |
| Prepare For And Conduct Tours/Open House/Grand 0 PCT 80   |                       |                      |                                       |                                       |
|   |                       |                      |                                       | · · · · · · · · · · · · · · · · · · · |
|   | 2. 10 CLAINS/INSURANC | (), Beacon           |                                       |                                       |
| 2 10-002  |                       |                      |                                       |                                       |
| Review Claims Procedures/Hodify As Required - HE PCT 75   |                       |                      |                                       |                                       |
|   |                       |                      |                                       |                                       |
| 2.10-003 PCT 70   |                       |                      |                                       | ۲ <del>۱</del>                        |
|   |                       |                      |                                       |                                       |
| 2 10-001  |                       |                      |                                       |                                       |
| Adjust Insurance Requirements Based On Needs PCT 70   |                       |                      |                                       | 1                                     |
| L   |                       |                      | ·                                     |                                       |
| 12.10-006<br>Provide Incident Investigation Training PCT 60   |                       |                      |                                       |                                       |
|   |                       |                      |                                       |                                       |
|   | 2 11 OPERATIONS       |                      |                                       |                                       |
| 2 11-001  | -                     |                      |                                       |                                       |
| Sign Nording PCT 50   |                       |                      |                                       |                                       |
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|   | 2.12 NATERIALS NANAG  | ENT                  |                                       |                                       |
| 2 12-002 Port Annual Proceed parts  |                       |                      | 1                                     |                                       |
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| Project Start 1500992   |                       | ACTIVATION PLAN      |                                       |                                       |
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| 2.12-004<br>Set-up Storeroom At Light Rail Operations Facil                      | PCT 85 |                     |                     |         |                |               |           |     |           |           | ł                     |           |                    | 1          |  |
| 2.12-005<br>Receive Spane Parts Fom All Light Rail Equipment                     | PCT 25 | -                   |                     | <br>    |                |               |           |     |           |           |                       | ····      |                    |            |  |
|  |        | 2.19 SECURI         | ITY                 |         | +              |               |           |     |           |           |                       |           |                    |            |  |
| 2.13-001<br>Develop Security Requirements And Strategies                         | PCT Q  | ]===                |                     |         | ╈              |               | -         |     |           |           |                       |           |                    |            |  |
| 2.13-002<br>Prepare Security Plan  | PCT Q  |                     |                     |         |                |               |           |     |           |           |                       | ·         | <u> </u>           |            |  |
| 2.13-003<br>Develop Security Liason  | PCT 30 |                     |                     | 1       | Ŧ              |               |           |     |           |           | <u>+</u><br>1         |           |                    |            |  |
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|  |        | U <u>NOV</u><br>199 | DEC<br>3            | JAN     | FEB            | M             | <u>ar</u> | APR | HAY<br>19 | JUN<br>94 | JUL                   | AUG       | SEP                | <u>OCT</u> |  |
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| (c) Primovana Svatena, Inc.  |        |                     | FE                  | BRUARY  | 11,            | 1994          |           |     | ·····     |           |                       |           |                    |            |  |



FIGURE 7 Projected growth for RTD's Light Rail Operations.

Along with these considerations is the requirement to address the areas where additional staffing may be needed or redirected. One such area that during the first year of operation has shown the need for additional staffing resources is training and safety program development. The training needs now emerging are recertification for both operators and mechanics, external agency safety training and emergency response, and the development of future employees to fill positions that open up owing to attrition or to expansion and growth. It is important that changes in full-time employees are noted early and justified thoroughly in order to provide systematically planned financial impacts. The planned growth for RTD's Light Rail Operations is very conservative and based on the needs projected and assumed during the next few years. Figure 7 details the projected growth through 1999 and before start-up of the Southwest Corridor.

The transit industry should be pleased that the various teams involved with the RTD in Denver, Colorado, did not "reinvent the wheel," but in an effort to be efficient and effective in its process used the experienced professionals, technology, and innovations that were available. This process was accomplished with an open mind and the intention not only to learn lessons, but to remember them for future use as well.

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