



# Large Project Partnering: T-REX Projects' Success a Model for the Industry

The T-REX project is a model for how the partnering process should be implemented on large complex projects of any nature.

*By Bill Spragins*



On Nov. 16 and 17, 2006, public and transportation officials from all levels of government gathered in Denver to celebrate with project team members the successful completion of the \$1.7 billion design-build multi-modal Transportation Expansion Project (T-REX). A number of factors contributed to the success of this project, including unprecedented agreements between local, state, and federal agencies, an innovative procurement approach, and well thought-out staffing plans for all organizations involved.

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Yet, a key supporting element was the implementation of the most extensive and committed partnering effort ever undertaken for a project of this size and complexity. The process was carried out from the executive level through all task force discipline teams and helped the project team deal with the continual flow of issues they encountered during the five-year project duration. This article reviews key elements of the process and the results achieved.

## KEY PROJECT STAKEHOLDERS

- T-REX — a partnership between the Colorado Department of Transportations (CDOT) and the Regional Transportation District (RTD)
- Southeast Corridor Constructors (SECC) — Kiewit Construction Group and Parsons Transportation
- Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA)

## THE PROJECT

This massive multi-modal transportation project involved the reconstruction of I-25 and I-225 for 17 miles and the addition of 19 miles of a new double-track, light-rail transit line including 13 new stations (see project map in Exhibit 1). The area involved included the two major business districts between downtown Denver and the Denver Tech Center. The scope of this project also included:

- Adding one through-lane on each side of the highway for a total of four lanes in each direction
- Adding two through-lanes on each side of the highway for a total of five lanes in each direction
- Constructing seven interchanges, including I-25/I-225
- Reconstructing or widening 60 bridges
- Improving drainage, including 29 miles of pipe
- Maintaining three lanes of traffic during daylight hours in each direction.

## PROJECT SUCCESSES

The project achieved success in a number of key goal areas, including:

**Community:** A primary focus of the project was to achieve minimal impact to the traveling public by keeping six lanes of traffic open during construction. Accomplishing this in a major urban area affecting multiple municipalities and under the public microscope was a remarkable achievement. Through a robust public information program and superior traffic management techniques, the project team achieved above an 80% approval rating among residents and a 93% approval rating among commuters.

**Safety:** The project's safety record was six times lower than OSHA's incident rate for heavy-highway construction.

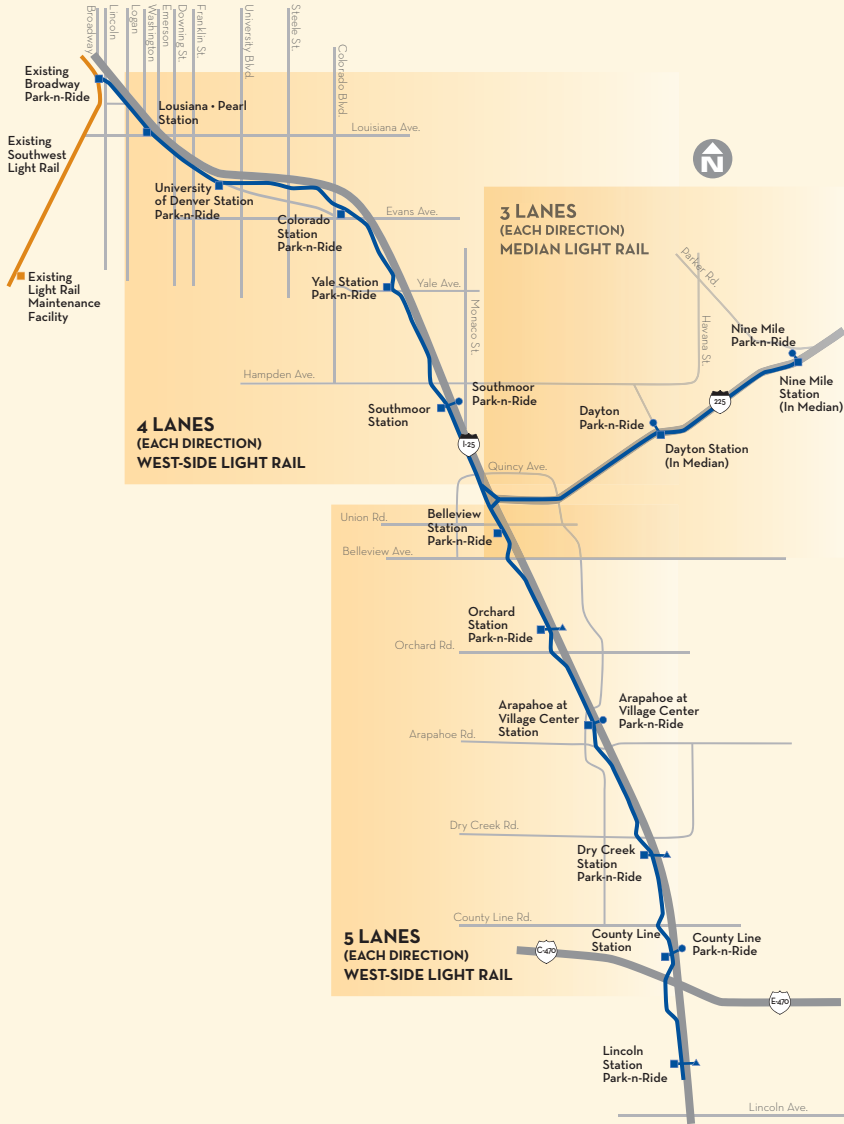
**Cost:** The project was completed under the established base-budget of \$1.67 billion. More than \$74 million in third-party enhancements were added to the scope without impact to the schedule.

**Quality:** The project's quality control and assurance program achieved ISO 90001:2000 certification. The team

*The T-REX project was selected by the Associated General Contractors of America as a winner of the Marvin M. Black Excellence in Partnering Awards for 2007. This award identifies excellence in partnering, celebrating the success of stakeholders in teambuilding, improving communication, and delivering superior project quality. FMI is pleased to have been a partnering consultant on this project. Bill Spragins led the FMI team.*

Exhibit 1  
**T-REX Project Map**

■ Light Rail Alignment



developed a paperless documentation system, enabling all field inspection and test results to be entered into hand-held computers on-site.

**Schedule:** The project was completed 22 months ahead of the original seven-year time table. The light rail segment was completed a month ahead of SECC’s proposed schedule, opening to revenue service in November 2006.

**PARTNERING PROCESS**

With assistance from Charles Cowan & Associates and FMI Corporation, the T-REX project partnering process was perhaps the most committed and extensive partnering effort completed on a major public works project since the industry began

Exhibit 2  
**T-REX Partnering Process**



using partnering in the late 1980s. Partnering was developed based on the principles of collaboration, accountability, and consistency (see Exhibit 2). Collaboration among team members is critical in a design-build environment where the number of issues requiring decisions and the speed of decision making increases dramatically from the typical design-bid-build project delivery method. Individual accountability is also crucial, especially within a large organization like T-REX that developed quickly and continually evolved as the various phases of the project initiated and completed. Finally, consistent communication is essential within an organization comprised of more than 20 task-force teams. The T-REX partnering process embraced all of these principles, and its implementation was embraced at the executive level throughout the task-force teams.

**EXECUTIVE-LEVEL PARTNERING**

“We took a top-down approach to partnering, and I don’t think partnering would have been nearly as successful if the top officials from every organization hadn’t sent a strong message to emphasize their commitment to the process,” said Larry Warner, former T-REX Project Director.<sup>1</sup> On T-REX, executives from CDOT, RTD, FHWA, FTA, and their counterparts from SECC began meeting in July 2001 in bi-monthly board of directors partnering sessions and then quarterly for the final three years of the project. According to Tom Howell, SECC Project Director, “Both teams worked hard early on to put together their individual teams so they would accept the partnering process as an opportunity to work together at bringing the project in on budget and within schedule.” A total of 24 executive-level sessions were

held during the project's five-year duration. At the initial session, a project charter of mutual goals was developed, a team evaluation process established, and issue-escalation principles agreed upon. The group reviewed team goals, listened to the project-management team's status report, discussed key issues, and established action plans at continuing partnering sessions.

#### PROJECT-LEVEL PARTNERING

To promote communication and a sense of partnering, the entire project team, including T-REX staff, SECC, and the City and County of Denver, set up offices in the same office buildings.

"Everyone had almost daily contact with their counterparts from other organizations," said Warner.<sup>2</sup> "This facilitated timely decision making." The comprehensive formal approach to partnering included the following activities:

- Approximately 40 kick-off and follow-up partnering sessions at the task-force team-level and with third-party stakeholders
- Approximately 40 separate 90-minute meetings with the project management steering committee to review partnering results and determine future partnering strategy
- Four, formally facilitated issue-escalation meetings where position papers were presented by each organization to the next level of management and plans forward were established to resolve the issue(s).

"This process allowed for issue resolution at the lowest practical level," said Bill Murphy, former project director for SECC. "Formal partnering provided an excellent working environment in which team members developed personal relationships

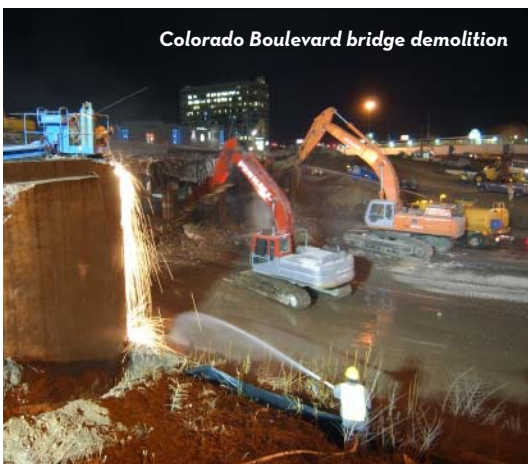
that helped minimize disputes on the job."<sup>3</sup>

The face-to-face interaction that the partnering process provided also helped to establish trust among the project's team members. "Once we went through the process of meeting people, then the critical question became 'will we work together or handle things as separate entities?'" said Deputy Project Director Del Walker. "Being

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*Colorado Boulevard bridge demolition*



able to look straight into the eyes of your counterparts from SECC and know you could trust them was key.”

The activities of the project-level partnering process and the subsequent sub-categories are summarized as follows:

#### **INITIAL AND FOLLOW-UP PARTNERING SESSIONS**

Each task-force team held their own initial partnering session to develop team goals and an issue escalation ladder specific to their discipline needs. The first teams to hold separate sessions were the public information team and the design teams. As the project progressed, kick-off sessions were held for all newly mobilized teams. The last team to

hold a kick-off session was the landscape team, nearly three years into the project.

Follow-up sessions were held periodically throughout the project. Co-leads of the task-force teams were empowered to call their own follow-up sessions as needed. At other times, the project management steering committee directed a team to hold a session given the phase of the project or the results of a particular team evaluation/report (see “Ongoing Team Evaluations and Co-Lead Reporting” on page 31).

#### **THIRD-PARTY STAKEHOLDER PARTNERING SESSIONS**

Although the City and County of Denver were not contractual project parties, they did control the right-of-way on the peripheral and frontage roads immediately adjacent to the mainline highway for almost 50% of the project. Another impetus for the third-party stakeholder partnering sessions was the fact that numerous businesses and homeowners within city jurisdiction would potentially be impacted by project activities — unless communication was carefully coordinated. In order to ensure expectations were clearly established between the city, the T-REX team, and SECC, a series of partnering sessions were held exclusively with the city team. The first session was held before the final design was started, and then two other sessions were held during the first year of the project. At these sessions, issue escalation protocol was established and continually reviewed, including how technical and commercial issues would be addressed.

Four representatives from the city moved with the project team to the main project offices housing the T-REX staff and SECC team, further enhancing communication on the project. The city representatives attended construction task force follow-up partnering sessions, which were held periodically during the project. This was particularly helpful in aligning expectations during reconstruction of the

two largest intersections of the project (Hampden Boulevard and Colorado Boulevard), the two most heavily traveled intersections along the corridor.

The Transit Oriented Development (TOD) task-force team held a “lessons learned” session close to project completion. T-REX, SECC staff, representatives from the major jurisdictions along the corridor, and developers participated in the session. A preliminary survey solicited input on pluses (successes) and deltas (opportunities for improvement) during each phase of the project. The session focused on key conclusions reached by phase and produced a white paper that will be available to other rail programs around the nation. The immediate beneficiary should be RTD’s FasTracks program, a \$4.7 billion multi-corridor build-out across the Denver metro area to take place during the next decade.

### ONGOING TEAM EVALUATIONS AND CO-LEAD REPORTING

The co-leads of each task-force team submitted a report (monthly for the first 18 months and then bi-monthly) that summarized deal-breakers (issues on which task force members had disagreed, reached an impasse, and required escalation), rocks (issues being worked on but not needing escalation), and goal progress. Additionally, a team evaluation was conducted for each task force that surveyed the status of team relationships (see Exhibit 3). All of this was then rolled up into a master report of all task-force teams that was reviewed by the project management steering committee

Exhibit 3

#### Partnering Team Evaluation

Task Force/Team \_\_\_\_\_ # Evals. Sent \_\_\_\_\_

Date \_\_\_\_\_ # Returned \_\_\_\_\_

1. Communication between partners \_\_\_\_\_

**Average:** \_\_\_\_\_

Comments: \_\_\_\_\_

• \_\_\_\_\_

2. Timely resolution to issues and conflicts \_\_\_\_\_

**Average:** \_\_\_\_\_

Comments: \_\_\_\_\_

• \_\_\_\_\_

3. Cooperation between partners \_\_\_\_\_

**Average:** \_\_\_\_\_

Comments: \_\_\_\_\_

• \_\_\_\_\_

4. Morale/enjoy working on project \_\_\_\_\_

**Average:** \_\_\_\_\_

Comments: \_\_\_\_\_

• \_\_\_\_\_

5. Trust among partners \_\_\_\_\_

**Average:** \_\_\_\_\_

Comments: \_\_\_\_\_

• \_\_\_\_\_

Observations: \_\_\_\_\_

• \_\_\_\_\_

Ideas for Improvement: \_\_\_\_\_

• \_\_\_\_\_



Colorado Boulevard bridge demolition and the audience

in a 90-minute meeting. To further drive accountability for the process, co-leads from select task-force teams were rotated into this meeting to provide an in-depth explanation of their team results. Over the course of the project, 15 different task-force teams reported at these meetings, and at least five reported more than once. The steering committee used the results of these ongoing evaluations and reports to determine strategy for the next reporting period. In most cases, project leaders followed up on the various issues raised. But numerous follow-up partnering sessions were initiated from these meetings as well, and the information generated from these reports was consolidated and presented to the executive board of directors.

Most teams follow a development pattern of forming, storming, norming, and performing, and this certainly played out on the T-REX project. The results of the team evaluations are depicted in Exhibit 4 starting in January 2002. After an initial high score of around 4.00 (“meeting expectations”) near the team’s formation, scores then dropped on subsequent evaluations to a 3.70 level in a storming phase as the

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team dealt with numerous design issues. Once the design phase moved toward completion and construction fully ramped up, scores rebounded and the team moved into a “performing” mode. The drop in scores during the December 2002 to April 2003 period can be attributed to uncertainties revolving around the Hampden and Colorado Boulevard change negotiations. In the April to June 2004 period, new task-force teams were initiated that were focused on project completion activities. Once these teams jelled, scores once again rebounded for the remainder of the project.

“One of the teams that came late

into the process, was put in a crunch, and the result was a poor set of initial numbers,” said Deputy Project Director Del Walker. “However, with follow-up partnering efforts things improved, and in the end, the scores also improved significantly.” Overall, the evaluation trend was a healthy one that ended on a high note, achieving “above expectations” for the majority of the project’s final year, finishing at 4.27. The final evaluation summary of all task-force team scores is detailed in Exhibit 5.

**ISSUE ESCALATION MEETINGS**

During the last month of the project, team members discussed the partnering process. Specifically, the issue-resolution process was commonly cited as being a key contributor to the project’s success. Members noted that this process kept parties meeting and talking while working through difficult issues. It also required task-force

Exhibit 4  
**Partnering Evaluation Summary:**  
**T-REX Project – December 2001-July 2006**

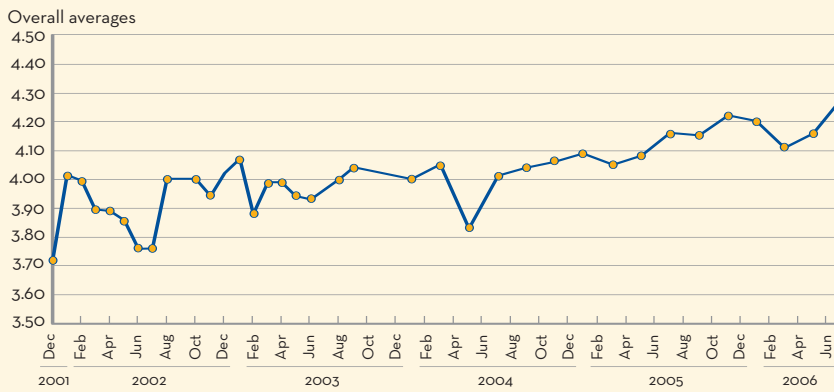


Exhibit 5  
**Partnering Evaluation Summary – June-July 2006**  
 Scale: 1–5 (4 = “Meeting Expectations”)

Teams	Communication Between Partners	Timely Resolution of Issues and Conflicts	Cooperation Between Partners	Morale/Enjoy Working on the Project	Trust Among Partners	Average
Construction Combined	4.00	3.80	4.20	4.00	4.00	4.00
Contracts	4.70	4.00	5.00	5.00	4.70	4.68
Document Control	5.00	5.00	5.00	4.00	5.00	4.80
EEO/Civil Rights	No submittal	No submittal	No submittal	No submittal	No submittal	No submittal
DBE	No submittal	No submittal	No submittal	No submittal	No submittal	No submittal
Environmental	4.00	4.50	4.50	4.50	4.50	4.40
ITS	4.14	3.14	3.43	4.00	3.43	3.63
Landscape	4.00	3.91	3.91	3.91	3.91	3.93
LRT Combined	4.05	3.85	4.30	4.25	4.10	4.11
Stations	4.10	4.00	4.50	4.40	4.30	4.26
Systems	4.00	3.70	4.10	4.10	3.90	3.96
Track Work	Project Complete	Project Complete	Project Complete	Project Complete	Project Complete	Project Complete
MHT	4.29	4.00	4.43	4.29	3.86	4.17
PCIP/Safety	4.63	4.63	4.63	4.63	4.63	4.63
Project Controls	4.25	4.00	4.50	4.75	4.50	4.40
Public Information	4.00	4.00	4.60	4.60	4.00	4.24
Quality Management	4.79	4.43	4.57	4.71	4.36	4.57
Right of Way (ROW)	4.25	4.00	4.25	4.25	4.25	4.20
Systems Safety	4.00	4.00	4.00	4.00	4.00	4.00
Utilities	4.00	3.80	4.40	4.60	4.40	4.24
<b>AVERAGE</b>	<b>4.27</b>	<b>4.06</b>	<b>4.37</b>	<b>4.36</b>	<b>4.23</b>	<b>4.27</b>

Exhibit 6

**Issue Resolution/Escalation Process**

Issue Escalation Ladder		Issue Escalation Process
Level 1	Task Force Teams T-REX SECC	If a specific issue cannot be resolved by the TREX and SECC representatives at a given level, resulting in a disagreement or an impasse at problem resolution, then the issue must be escalated to the next level of management with the following information prepared: <ul style="list-style-type: none"> <li>• Project goal(s) impacted and contract provisions affected</li> <li>• Facts to the issue</li> <li>• Actions taken to date</li> <li>• Proposed resolutions</li> <li>• Timeline needed to resolve the issue</li> </ul>
Level 2	Task Force Co-Leads T-REX SECC	
Level 3	Discipline Managers T-REX SECC	
Level 4	Primary Management Teams Larry Warner, T-REX Rick Clarke, T-REX Bill Murphy, SECC	
Level 5	Executive Team Tom Norton, CDOT Cal Marsella, RTD Al Kirkwood/Steve Hansen, SECC	
Dispute Review Board	Robert Smith, Chair Bill Peckham Ray Dodson	If an issue cannot be resolved following the issue escalation process, the issue is presented to a Dispute Review Board (DRB). The DRB is comprised of three members with the chair reserved for a lawyer or retired judge. The contractor may appeal the final DRB decision in accordance with C.R.S. 24-4-106.

members or co-leads to escalate an issue to the next level of management when they reached an impasse on it (see Exhibit 6). The issue was then either resolved or escalated further through the levels of management. If all levels of management were exhausted, then the issue was taken to a neutral dispute review board, which existed to assist the team in resolving the issue.

“Setting up counterparts in the beginning was crucial,” Project Director Rick Clarke said. “Then, it was having the discipline to keep the follow-up going. Additionally, the team took a ‘let’s do what’s best for the project’ approach. So we got the best technical solution first and then resolved the contractual aspects later. It was clear nobody was going to hold the other side hostage.”

Key issues resolved using this process included:

- HDPE pipe substitution
- I-25/I-225 interchange reconfiguration
- Public information team identity
- Municipality permitting fees
- Compensation for private utilities
- Dry Creek station design
- LRT ADA curve ramps
- Right-of-way Studebaker property
- Arapahoe station design.

Of the thousands of issues the team dealt with throughout the project, only 35 entered into the formal issue escalation process. Of those 35, all were resolved within the team at the following levels of management:

- Twenty-one issues were resolved within the project co-lead or task-force levels.
- Nine issues were resolved at project management level.

- Five issues were resolved at the executive level.
- Zero issues went before the Dispute Review Board.

The T-REX project is a model for how the partnering process should be implemented on large complex projects of any nature. The process enabled the team to achieve major accomplishments in a relatively short time period.

The following key conclusions on partnering should be considered for other large transportation projects and programs:

- Absolute commitment to the partnering process is required from both executive and project management levels, shown more through action and follow-through rather than through words.
- Constant follow-up and reinforcement of the process is required to instill and maintain proper behaviors, particularly in regard to issue resolution.
- Continually measure the process, and make adjustments to it as necessary.
- The owner and design-build construction teams should appear and function seamlessly to each other, regardless of how many separate organizations are involved.
- Task-force and discipline teams need to function as integrated teams.
- The issues will always be there — focus on consistent processes that will help in the resolution of those issues. ■

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<sup>1</sup> Colorado Construction, November 2006

<sup>2</sup> Colorado Construction, November 2006

<sup>3</sup> Colorado Construction, November 2006