SCHEDULE 7

Concessionaire's Phase 2 Work Proposals

It is acknowledged by both Parties that notwithstanding that various provisions of the Concessionaire's Phase 2 Work Proposals state that a Sub-Contractor of the Concessionaire will have certain responsibilities or will perform certain actions, for the purpose of the Concession Agreement and as between HPTE and the Concessionaire, all actions and responsibilities set out herein as actions and responsibilities of any Sub-Contractor to the Concessionaire are deemed to be actions and responsibilities of the Concessionaire.

With respect to the attached proposals, Part 1 of this Schedule 7 is the entirety of the proposal except Section 2.13, which is Part 2 of this Schedule 7.

Part 3 – Volume I – Table of Contents

Part 3 – Volume I – Phase 2 Construction Work Proposal

2.0 – Highlights of Construction Work Proposal

Benefits of Plenary Roads Denver (PRD) Approach:

- Consistent design approach for entire corridor results in uniform, high-quality facility with predictable maintenance requirements.
- Established relationships with CDOT and many third parties streamline design review processes and accelerate completion schedule.
- Consolidated Public Information Program minimizes impact to local residents and businesses.
- Consistent maintenance of traffic and traffic patterns expedite traffic flow and minimize construction impact.

The Plenary Roads Denver (PRD) team is committed to providing the High Performance Transportation Enterprise (HPTE), a division of the Colorado Department of Transportation (CDOT), as well as your partners at the Regional Transportation District (RTD), the surrounding communities and other Project stakeholders, an efficient and economical solution to the transportation needs along the US 36 corridor. This Project provides the vital last link in the Managed Lanes/Bus Rapid Transit (BRT) system along the US 36 corridor. The composition of our team and our planned approach to the work present a number of unique opportunities, allowing the PRD team to provide HPTE a "best value" solution to completing construction and putting the long-awaited Managed Lanes into operation.

We have focused our proposal preparation efforts on developing a comprehensive plan for finance, design, construction, operation and maintenance of the Project. All members of our team have participated in developing our comprehensive approach, resulting in a proposed solution that reflects our careful consideration of all aspects of the work, and evaluates project costs over the complete life of the Project. This volume of the proposal presents detailed information concerning our approach to design and construction of a best-value facility. Some key highlights of our approach are summarized below:

Streamlined Work Flow

The PRD team includes the Ames/Granite Joint Venture (Ames/Granite JV) as the lead design-build (D-B) contractor. In addition, the D-B team has retained HDR Engineering, Inc. (HDR) to serve as the lead design firm. The Ames/Granite JV is currently CDOT's D-B contractor and HDR is the lead designer for the adjacent US 36 Phase 1 Managed Lanes Project. This continuity in participants allows our team the ability to provide unique and significant benefits to HPTE and all Project stakeholders. Key benefits include the following:

Consistent Design Approach. Continuity in the design team and upper management of the D-B organization will result in consistency and uniformity in design and construction along the US 36 corridor. By the time Phase 2 design gets underway, our team will already have a fully developed design for the Phase 1 Project that has been reviewed and approved by CDOT and the applicable stakeholders. We have incorporated similar design features into our preliminary designs for Phase 2. These proposed designs have been reviewed by our operations and maintenance (O&M) team members during the proposal process. This consistency in design approach will simplify the design review process for HPTE/CDOT and other reviewers who are already familiar with, and have agreed to, these approaches on Phase 1. It also provides our O&M organization the opportunity to plan a uniform and consistent approach to the maintenance program for the US 36 portion of the managed lanes system.

Coordination of Maintenance of Traffic Phasing. By using the same D-B contractor, the PRD team will be able to more easily coordinate construction activities and synchronize maintenance of traffic patterns between the two projects. We have planned our Phase 2 Project construction staging to match the traffic patterns being used for mainline US 36 maintenance of traffic on Phase 1. This approach simplifies construction and significantly reduces lane changes and other traffic impacts at the interface between the two projects.

Established Relationships and Understanding. As part of their work on Phase 1, the Ames/Granite JV and the HDR design team have established strong working relationships with CDOT, as well as the local jurisdictions, private utilities and irrigation companies. A significant number of these entities are also going to be involved in the Phase 2 portions of the Project. We clearly understand their requirements and preferences, and they have already worked through the design approval process as part of our Phase 1 design effort. This common knowledge and established working relationships, combined with our plan to provide a design that is consistent with Phase 1, will streamline the design review process for both HPTE/CDOT and all of the other reviewing parties on Phase 2.

However, we understand that there are also significant differences between Phase 1 and Phase 2. Two of the major stakeholders on Phase 2, the City of Boulder and Boulder County, were only peripherally involved with our Phase 1 work. In addition, the environmental conditions present in the Phase 2 areas are significantly more complex and challenging than what we encountered on Phase 1. Furthermore, Phase 2 involves more irrigation facilities, and the schedule for beginning work allows much less time for design and approvals for the irrigation crossing replacement/relocation work that needs to completed during the winter of 2013/2014.

To address these special challenges, we will set up a special focused task force to work with the City of Boulder and Boulder County on the environmental issues. This task force will begin work shortly after we are notified that we are the preferred proposer. In accordance with our approved **Alternative Technical Concept (ATC) 15**, the PRD team will engage with HPTE and CDOT prior to financial close to complete certain critical early work items. During this time, we will perform the environmental surveys, acquire needed permits and complete design of critical elements and other preparatory work so that these time-consuming activities do not delay the start of construction once financial close is reached. Similarly, we will establish a special task force to advance the design of the critical irrigation crossings and work closely with the affected irrigation companies so our plans are approved and work can begin as soon as financial close is reached.

Consolidated Public Information Program. Since the planned construction work on Phase 1 overlaps the anticipated construction period on Phase 2 by over a year, most stakeholders will view this as a single, large construction project. We propose to expand the current Phase 1 Public Information (PI) Program into a consolidated PI program that presents a unified and coherent source of construction and traffic information for stakeholders along the entire length of the corridor.

Established Management Plans. The process of drafting, reviewing and approving the required management plans typically consumes a significant amount of effort by both CDOT and the D-B team at the beginning of a new project. In this case, CDOT and other applicable stakeholders have already approved the Ames/Granite JV's Quality, Safety, Incident Management and other key management plans. We can quickly adapt these approved Phase 1 plans to address the Phase 2 Project, minimizing the HPTE/CDOT effort needed to complete these reviews. This will allow the Project design and construction teams the ability to more quickly focus on the final design process and critical construction planning.

Consistent Quality Program. Our proposed Project quality organization includes significant integration with the quality management organization on the Phase 1 Project. Our Phase 2 Quality Management Plan will mirror the CDOT-approved plan currently being executed on Phase 1. Similar to our approach with design and construction, we will augment the quality assurance staff on Phase 1 as necessary to allow key members of the established Phase 1 quality staff to assume similar roles on Phase 2, or to take on joint responsibility for both projects, resulting in a uniform and consistent approach to managing the quality of the completed product.

Reduced Operating and Life Cycle Maintenance Costs

During our preliminary design, the D-B team worked with our O&M partners to optimize the quality and durability of the Project elements when evaluated over the entire life of the Project. Our design incorporates a number of features that will provide a high-quality and long-lasting facility, thereby reducing the operating and life cycle maintenance costs that will be incurred during the 50-year concession period. By developing a design that optimizes costs over the entire life of the Project, we have provided HPTE with a more financeable solution for completion of the managed lanes along the US 36 corridor.

Increased Safety

As PRD's construction contractor, the Ames/Granite JV is committed to maximizing the safety of workers and the traveling public. This protection of the public and the safety of our workforce is our highest priority. The Ames/Granite JV empowers workers at all levels to take ownership of safety in accordance with our ultimate goal – zero incidents. Our efforts to maximize safety include:

- Simplified maintenance of traffic plan minimizes the number of traffic switches, improving driver expectancy.
- Construction phasing plan minimizes the amount of work that is done in the median, limiting the number of trucks exiting and entering traffic from the median.
- Traffic patterns will be uniform along the length of the construction zone, and will be well synchronized between the Phase 1 and Phase 2 Projects, minimizing crossovers that drivers have to make as they pass through the area.

- Full-width shoulders will be provided during maintenance of traffic (MOT) Phase 1 and Phase 3. During MOT Phase 2, and where physical constraints prohibit full-width shoulders, appropriately spaced emergency pull-outs will be provided.

Innovative Solutions

During proposal preparation, our task forces worked to identify opportunities to optimize the design of certain elements while providing appropriate consideration for long-term operation and maintenance costs. When our optimization efforts identified value that could be achieved by deviation from the RFP documents, we followed the prescribed process to propose ATCs. These ATC proposals were carefully reviewed and approved by our O&M team members before being submitted to HPTE.

Our proposal incorporates a number of these cost-saving ATCs that have been discussed with and approved by HPTE during proposal preparation. Again, these cost savings result in a more financeable Project. The ATCs are included in Volume II of this proposal, and are discussed in detail in the technical sections that follow.

Value-Added Features

The PRD team's proposal also incorporates a number of **value-added** features. These **value-added** features are further described in later sections of this proposal, which present details of our technical approach. The **value-added** elements included in our proposal design include the following:

- Phase 2 construction accommodates ultimate configuration to minimize future rework. Not only does our design "accommodate" the planned ultimate construction, but in most cases, we are building permanent elements of the work at their ultimate locations.
  - Retaining walls will be built in their ultimate locations.
  - Storm drainage trunk lines will be built in their ultimate locations, and will be sized to handle ultimate flows.
  - Roadway bridges and sign bridge structures will be built in ultimate locations.
  - Detention and water quality ponds will be built in ultimate locations, except where ultimate ramp layout conflicts with currently available right-of-way (ROW) for pond construction.
- Implementation of our **ATC-15** will allow the PRD team to engage with HPTE/CDOT before financial close to complete certain items of work to assure necessary irrigation relocations and other critical activities can be constructed during the first winter season.
- Vertical profile is adjusted to more closely match existing grade, allowing more extensive use of a cost-effective PCCP overlay pavement section.
- Eastbound and westbound vertical profiles are split in key areas to optimize earthwork and reduce retaining walls.
- Roadway profile is modified in several areas to reduce Project earthwork and retaining wall heights.
- A modified Bikeway subgrade approach minimizes the potential for future differential movement.
- The **value-added** smart phone application we developed on Phase 1 will be expanded to include traffic and construction information for Phase 2.

Project Coordination and Team Integration

The PRD team's technical proposal provides detailed information about the effective, economic and often unique solutions the PRD team has developed to address the transportation needs of this final link in the US 36 Managed Lanes system. Our ability to easily coordinate and consolidate construction activities, traffic movements and PI initiatives between the Phase 1 and Phase 2 contracts will streamline the HPTE/CDOT management and oversight efforts, and allow our team to present a unified and clearly understandable message to all the stakeholders along the corridor, who in many cases won't realize that there are two separate contracts underway along this major transportation corridor.

In addition, members of both our D-B and O&M teams have been engaged during the preparation of this proposal, and key O&M personnel will remain involved during the final design and construction process. This full integration of all elements of the concession team is critical to providing a Project that appropriately addresses the overall, long-term value of the constructed Project. The successful experience of our financing, design, construction and operations/maintenance partners on many similar projects provides HPTE with proof of our abilities, and confidence that this team can successfully construct and operate this important facility. We are confident that our proposal provides a best-value solution for all Project stakeholders.

2.1 – Phase 2 Construction

2.1.A – Phase 2 Construction Drawings

Phase 2 Construction Drawings – showing the major work elements associated with the roadway reconstruction, interchange improvements and the new US 36 Bikeway – are located in Volume I-A. These drawings also identify a number of **value-added** elements that are included in the PRD team's proposal.

Our proposed design does not deviate from the reference drawings related to horizontal alignment, ramp geometry, water quality pond locations or major drainage elements. In addition, our proposed design will not require any additional Design Exceptions beyond the three currently identified in the RFP. Furthermore, although grades of up to 4.5 percent are allowed by the footnote on Exhibit 13-1 - Roadway Design Criteria, our designers have been able to flatten the grades between Stations 1348 and 1352 to less than 4.0 percent, which meets the mainline maximum grade criteria.

2.1.B – Phase 2 Work Elements

This section of our proposal describes the major Phase 2 construction work elements that are part of the PRD team's proposal. For each technical area, we have identified how the elements we will construct during this phase of construction are compatible with, and will minimize rework during construction of, the Ultimate Configuration of US 36 in this area. In our discussion of many of the technical areas, we have also identified **value-added** elements of our proposal that pertain to that particular element of work.

2.1.B.1 – Pavements

Benefits of PRD Approach:

- Optimized design of PCCP pavement section using MEPDG provides predicted pavement design life of over 50 years.
- Overlay approach provides improved support for new pavement, reduced Project cost and accelerated construction schedule.
- Consistent pavement design approach on Phase 1 and Phase 2 allows coordinated and predictable planning for maintenance activities for a major portion of the US 36 corridor.

Scope. One of the most critical components of the US 36 Project is the pavement. Considering all of HPTE's Project goals, the PRD team is proposing to utilize Portland Cement Concrete Pavement (PCCP) for the US 36 mainline. Our team selected PCCP to provide HPTE and the public with high-quality, long-lasting and durable pavements that minimize long-term maintenance costs and are consistent with the pavement section used throughout the US 36 corridor. This approach also readily accommodates the future plans for construction of the Ultimate Configuration. PCCP was the preferred pavement section identified in the RFP, and our evaluation confirms CDOT's life cycle cost analysis identifying concrete pavement as the most economical solution.

Our proposal incorporates our approved **ATC-19**. This **value-added** approach incorporates a number of innovative modifications to the RFP requirements, including designing the pavements using the soon-to-be-adopted Mechanistic-Empirical Pavement Design Guide (MEPDG) design method, and the use of a rigid concrete overlay approach in areas where the proposed roadway profile closely matches the existing pavement grades. Our proposed pavement has a predicted design life of more than 50 years.

With the exception of the bus stop areas on the ramps which will utilize concrete pavement, we will use a hot mix asphalt pavement for all ramps and the roadway reconstruction on McCaslin. We elected to use the asphalt pavement in these areas for a number of reasons. First, the Ultimate Configuration identified in the Record of Decision (ROD) for the McCaslin Interchange will require significant geometric changes to the McCaslin roadway and the US 36 ramps. Most of the pavement in these areas will be completely reconstructed during the ultimate expansion. Providing asphalt pavement at this time minimizes the amount of "throw-away" cost when McCaslin and the ramps are reconstructed for the Ultimate Configuration. In addition, asphalt pavement expedites the construction schedule, and provides more flexibility for MOT traffic switches, thereby reducing both the severity and duration of impacts to the motoring public. And finally, using asphalt pavement for this interim configuration will provide a potential source for recycled material that can be used for construction when the Ultimate Configuration is built.

The proposed Bikeway will be surfaced with a 6-inch concrete pavement as prescribed in the RFP. Our proposal incorporates our approved **ATC-04,** which improves the subgrade by eliminating a layer of material that could potentially trap water and result in differential subgrade movement. This **value-added** approach provides a safer and more durable Bikeway, by reducing the risk of differential movement that could result in slab faulting and cracking. This pavement section is consistent with the Bikeway pavement being constructed in Phase 1 and provides added uniformity throughout the corridor.

Detailed information regarding the PRD team's pavement designs are provided in the pavement narrative (Section 2.2.B) of this proposal. The required Pavement Definition and Pavement Section Definition Drawings are provided in Volume I-A. The PRD team's pavement designs are summarized in the following Figure.

Figure 1.1: Pavement Designs

Roadway Segment	Pavement Type	Pavement Thickness
US 36 Mainline	PCCP	10 inches (per ATC-19)
US 36 Mainline (overlay areas)	PCCP	10 inches (per ATC-19)
McCaslin Blvd.	HMA	9 inches
Interchange Ramps	HMA	9 inches
Bikeway	PCCP	6 inches

Accommodating Ultimate Configuration. Our proposal provides HPTE with a mainline pavement design that significantly exceeds normal design life requirements. The PRD team has selected pavement designs that provide modern, durable pavement sections and minimize operating life cycle costs. The future auxiliary lanes associated with the Ultimate Configuration can be easily constructed adjacent to the pavement constructed for this Project. At the same time, we have minimized the costs for pavements that are designated to be completely realigned as part of the Ultimate Configuration.

Providing Value-Added Benefit and Cost-Effective Solutions. Through the use of the innovative and modern pavement design approach described in our approved **ATC-19**, we offer HPTE an optimized PCCP pavement design that provides a more financeable solution to achieving the Project goals. **Our concrete pavement design for the US 36 mainline is long-lasting and durable, and provides an optimized pavement thickness that meets or exceeds all design criteria and pavement life requirements affordably and without compromising quality.**

As indicated, our approach to design of the pavement incorporates our approved **ATC-19**. This ATC proposal consolidates a number of innovative **value-added** approaches that our team discussed with HPTE during the proposal process. There are two major elements to this ATC. First, it allows the use of an unbonded PCCP overlay. For approximately 40 percent of the Project, we have been able to match the existing grade of US 36 closely enough that the new concrete pavement can be placed directly on top of the existing pavement. This is more fully described in Section 2.2.B.

The second major element of this ATC is the ability to use the Mechanistic-Empirical Pavement Design Guide (MEPDG). HPTE approval of this design methodology enabled our team to utilize pavement design factors specifically tailored to the US 36 Project and environment. As a result of utilizing this design criteria tool, we identified a minimum pavement thickness that would be required to provide a 30-year pavement design life under the prescribed traffic volumes. We then increased the calculated minimum pavement thickness to extend the predicted design life. Our optimized design will provide a 10-inch-thick PCCP pavement for all US 36 mainline. The MEPDG analysis indicates the pavement design life for our proposed pavement is in excess of 50 years – significantly exceeding HPTE's design life requirement of 30 years.

2.1.B.2 – Earthwork/Geometry

Benefits of PRD Approach:

- All retaining walls will be constructed in their ultimate locations.
- Roadway geometry will be designed to provide proper vertical clearance when expanded to ultimate width.
- Profile will be adjusted to optimize earthwork, facilitate maintenance of traffic during construction and minimize retaining walls.
- McCaslin DDI constructed in conformance with the reference drawings provided with the RFP.
- The steeper than desirable grades currently allowed between Stations 1348 and 1352 are eliminated by the PRD team's design.

Scope. All of the earthwork and grading of the mainline will be completed to the Ultimate Configuration between McCaslin and the eastern end of the Project at 88th Street and to the interim condition from Foothills Parkway to McCaslin Boulevard. We have designed the geometry to efficiently utilize onsite materials and accommodate future widening associated with the Ultimate Configuration. Our design maximizes use of the available ROW and provides a design that will minimize long-term maintenance requirements associated with steep slopes and retaining walls.

Accommodating the Ultimate Configuration. Our design accommodates HPTE plans to build the Ultimate Configuration. Working within the current ROW constraints, our design minimizes throw-away work and reduces design and construction conflicts associated with the Ultimate Configuration.

In the areas along US 36 that are being constructed to the interim condition, such as McCaslin Boulevard to 88th

Avenue, our design has features that eliminate rework or throw-away in the future, including setting the mainline profile to accommodate ultimate vertical clearance requirements. Our D-B team members have previously been involved in projects that convert a conventional diamond interchange into a diverging diamond interchange (DDI) configuration. This experience will allow our team to effectively plan for efficient construction and traffic staging that will minimize the impacts to the many motorists who pass through this area on a daily basis.

All retaining walls along US 36 will be built at the alignments and to the heights required for the Ultimate Configuration, with the exception of the walls within the McCaslin DDI, which is not the Ultimate Configuration identified in the ROD. This means that except for the McCaslin Interchange area, all excavations, embankments and storm drain elements in wall areas will be completed to the Ultimate Configuration limits.

In areas not requiring walls, we will construct the most maintainable slopes possible within the currently available ROW. Therefore, when the Ultimate Configuration is eventually constructed in these areas, only minimal earthwork will be required to widen the embankments and add the additional auxiliary lane.

In the McCaslin DDI area, where ramps and cross-streets are being constructed to accommodate the bus ramps, we have reduced the excavations and embankments as much as possible to minimize the amount of earthwork that will be needed to construct the ultimate interchange configuration.

Providing Value-Added Benefit and Cost-Effective Solutions. The PRD team recognized early in the proposal process that minimizing earthwork was a key component in optimizing Project design, minimizing inconvenience to the public and expediting the Project schedule. Our proposed design provides several refinements that minimize earthwork quantities and optimize earthwork construction operations.

We have made several geometric refinements to the corridor, focused on optimizing the vertical profile of US 36 to reduce cuts and fills and maximize the potential to use our **value-added** overlay approach (**ATC-19**) for pavement reconstruction. In most cases, this meant trying to closely match the existing grades along the corridor, while still meeting all of the design criteria and matching into existing features. We have substantially reduced the amount of special material that needs to be imported, and the amount of waste material that needs to be hauled off the site. This effort not only minimized earthwork quantities, but also reduced retaining walls and significantly improved traffic phasing by minimizing the vertical difference between the new and existing roadway grades.

We also received HPTE approval of our **ATC-06** and **ATC-09**, which allows us to incorporate more of the onsite excavation materials into certain portions of the embankments. This **value-added** approach allows more use of the onsite excavation material, reducing the amount of waste material that needs to be hauled off site and then be replaced with imported borrow. These ATCs provide our team more flexibility regarding use of onsite materials, which is an essential element when planning work on a site where construction activities have to be phased to match maintenance of traffic operations.

Our approved **ATC-19**, which allows the use of a PCCP overlay, also reduces earthwork on the Project. By incorporating this ATC into our design, we were able to eliminate the need to remove the existing pavement and at least two feet of underlying material in approximately 40 percent of the Project area. This has significantly reduced the required volumes of excavation, imported granular borrow and aggregate base course.

2.1.B.3 – Bikeway

Benefits of PRD Approach:

- Modified approach to subgrade preparation minimizes the potential for future differential movement.
- Desired 12-foot width provided, except for the Cherryvale connection, where available ROW limits the Bikeway to an 8-foot width.
- Grades maintained at flatter than the maximum desirable 5 percent grade for 94 percent of the Bikeway alignment.

Scope. Our proposal provides a continuous Bikeway along US 36 from the new Table Mesa pedestrian bridge and future bus stop to 88th Street. This section completes the continuous Bikeway/trail system along the entire US 36 corridor. The Bikeway provides a number of connections to other regional bike trails that are currently in use. Our design for the US 36 Bikeway will provide all of the connections to adjacent on-street and off-street facilities that are identified in the RFP drawings and requirements. Additional discussion of the Bikeway is included in Section 2.1.C

Accommodating the Ultimate Configuration. We will build the Bikeway in its ultimate location in all areas where there is sufficient ROW. This will minimize the amount of throw-

away construction, and the amount of new Bikeway that will have to be rebuilt when the lanes associated with the Ultimate Configuration are added.

Providing Value-Added Benefit and Cost-Effective Solutions. Our design provides a Bikeway that is continuous along this section of the US 36 corridor, can be constructed within the Project budget, and provides the desirable width of 12 feet with the exception of the Cherryvale connection, where an 8-foot path is provided in accordance with the RFP. We will also maintain existing widths at locations where the path ties into the existing trail and sidewalk systems.

In reviewing the alignment for the Bikeway during our preliminary design, we carefully considered the Project goal of providing a facility that would serve all segments of the traveling public. As a result:

- All vertical grades along the Bikeway in the Basic Configuration meet the requirements of the RFP and AASHTO recommendations. Our Bikeway profile is at or below the 5 percent "maximum desirable" grade for over 94 percent of the total Bikeway alignment. There is a short distance where the bike path diverges off the mainline east of Coal Creek that the proposed grades exceed 5 percent in order to match the existing ground surface. Even in that area, however, Bikeway grades are still well below the maximum allowable grades identified in the RFP.
- The new Bikeway pavement will consist of six inches of concrete, as preferred by HPTE, the local jurisdictions and other stakeholder groups.
- In all areas where there are no ROW restrictions, the new Bikeway will be constructed to the ultimate desirable width of 12 feet.

In addition, we have modified the subgrade treatment prescribed by the RFP using our approved **ATC-04**. This **value-added** modification will improve the subgrade and subbase below the paved concrete. Our modified approach provides 24 inches of moisture-conditioned native material below the Bikeway pavement and aggregate base course. This approach eliminates the potential for water to become trapped in the originally specified layer of R20 material below the pavement, and thus decreases the potential for differential movement due to swelling soils or frost heave. By reducing the potential for differential movement and faulting of the pavement, our approach reduces future maintenance costs and improves Bikeway safety.

2.1.B.4 – Major Drainage/Irrigation Structures

Benefits of PRD Approach:

- Cross drains and irrigation structures will be designed in ultimate locations and will carry ultimate flow volume.
- Cross drains will be built to ultimate length, except where precluded by ROW limitations.
- Coal Creek structures will be modified to maintain the flow line below the invert of the pedestrian/Bikeway tunnel (during minor storm events).

Scope. Our proposal includes constructing all of the cross drains for the ultimate design flows and replacing all the US 36 cross drains within the Project limits. While some of the existing culverts could potentially be re-lined to gain the 75-year design life outlined in the RFP, the PRD team will replace all culverts to assure the 75-year design life is met and maintenance and inspection efforts will be minimized throughout the design life of the structures.

Irrigation company coordination will be a critical part of making this Project successful and meeting the Project's schedule. The PRD team has already met with each individual irrigation company that has facilities within this section of the corridor to discuss each company's requirements, goals for and concerns with this Project. The PRD team will keep the irrigation companies involved throughout the design and construction process to facilitate irrigation company approvals in a timely manner. The PRD team has, and will, continue to use the information provided by the irrigation companies to design and construct the irrigation facilities in an effort to meet the irrigation company's expectations for this Project.

The PRD team is proposing to use the design provided within the RFP documents for the South Boulder Creek crossing to avoid additional modeling and floodplain mitigation that would be required if the design is changed at this crossing. However, as the design progresses, if there are valid reasons to modify this design, the PRD team has previously reviewed and run the South Boulder Creek MIKE FLOOD model and can utilize this experience to remodel any design changes.

Accommodating the Ultimate Configuration. Where feasible, our proposal includes constructing the major drainage and irrigation structures to the Ultimate Configuration. This approach minimizes throw-away work and the future costs that will be incurred when completing the Ultimate Configuration. There are two major crossings where building the drainage structures to their ultimate location is not feasible because the ROW for the ultimate Table Mesa Interchange has not yet been acquired. These two crossings are:

- **Dry Creek #2.** A 6'x4' box will be constructed out to the current ROW lines. An additional 30' of ROW is needed to construct to the Ultimate Configuration on the north side and an additional 60' is needed on the south side.
- **South Boulder Canyon.** A 10'x4' box and 42" pipe will be constructed to the Ultimate Configuration on the north side and to the current ROW line on the south side. An additional 70' of ROW is needed to construct to the Ultimate Configuration on the south side.

Although these two crossings cannot be constructed to the Ultimate Configuration at this time, they have been designed to accommodate ultimate drainage flows, and will be constructed so that only simple culvert extensions will be necessary during the ultimate expansion. This will reduce future construction phasing issues and minimize costs and construction time during the ultimate expansion work.

The RFP states that the existing irrigation crossings should be the basis for sizing the proposed structures. While South Boulder Creek Irrigation Company said that its crossing was undersized and has been upsized appropriately with our design, the other irrigation companies have confirmed that the existing culvert sizes are sufficient for their irrigation flows. As part of our proposal design work, we have enlarged the crossings when necessary to accommodate the offsite drainage flows and maintain a headwater to depth ratio below the maximum levels allowed by CDOT. The PRD team will construct all of these crossings to assure the 100-year tributary flows and the deeded irrigation flows can be conveyed across the US 36 ROW according to CDOT criteria.

Providing Value-Added Benefit and Cost-Effective Solutions. Our team was able to identify several areas where value could be added at the major drainage crossings. The PRD team's proposal includes the following **value-added** items associated with the major drainage and irrigation structures:

- Reconstructing the culverts rather than relining them adds value as it reduces the inspection and long-term maintenance effort that will be required to ensure the design life is met.
- The PRD team has improved the design of the Coal Creek culverts to minimize the time that flows will impact the adjacent Bikeway tunnel and has adjusted the invert of the wildlife crossing to keep it one foot above the ordinary high water mark. This will make for a safer, more usable Bikeway crossing, make the wildlife crossing more effective and improve safety on US 36 by reducing traffic and wildlife interaction.
- The 10-year storm flow tributary to the Coal Creek crossing was modified from what was shown in the Master Drainage Report provided with the RFP. A 2006 Outfall Systems Plan (OSP) for Coal Creek outlined that the flow used in the FEMA floodplain analysis was not correct. The PRD team has used the 2006 OSP flows for the design of the pedestrian crossing at Coal Creek. These flows were significantly higher than what was used in the Master Drainage Report.

2.1.B.5 – Storm Sewers

Benefits of PRD Approach:

- Drainage elements will be designed and constructed to handle ultimate flows.
- Inlets will be installed at intervals that will accommodate ultimate build-out.
- Fused-joint HDPE pipe will be used in MSE backfill areas to eliminate leakage and loss of backfill materials.

Scope. Our design and proposal includes a complete and fully functional storm sewer system for the US 36 mainline, side streets and bikeway. All storm sewer systems will be designed and constructed to handle not only the interim configuration flows, but the Ultimate Configuration capacity as well. Our design team focused on developing a storm sewer system that will minimize maintenance, reduce rework needed during the ultimate expansion and minimize the cost of the Project.

Our design utilizes sheet flow drainage and ditches to convey the flows where possible. By minimizing storm sewer pipes and inlets and maximizing the use of open flow drainage and ditches, we are able to meet the Project goals of minimizing operating and life cycle costs and providing a quality product. Some areas are unable to have open ditches due to ROW constraints, retaining walls, roadside barriers or other factors. Storm sewers will be used in these locations to capture and convey flows.

Most of the storm sewer systems are proposed to be reinforced concrete pipe (RCP) with precast concrete inlets. Areas that require inlets and storm sewer within Mechanically Stabilized Earth (MSE) wall strap zones will be HDPE pipes with electrofusion welds to ensure the pipe joints are water tight. Using this pipe will reduce the risk of leakage behind the walls and the associated potential loss of select backfill. This configuration will also minimize the amount of structures that need to be maintained and reduce potential conflicts within the median by running the trunk line under the future outside shoulder rather than down the median shoulder.

Accommodating the Ultimate Configuration. Ditches will be constructed to convey the ultimate flows where they are able to be placed in their ultimate location and ROW allows. Where a closed drainage system is required, trunk lines will be designed and constructed to convey the ultimate flows. In areas that are retained by walls, inlets will be placed in the ultimate locations and to the ultimate required spacing. This will eliminate the need to add additional pipe or inlets in MSE reinforcing zones during construction of the future auxiliary lanes. In areas that are not retained by walls along US 36, inlets will be placed at the ultimate spacing, but the laterals will need to be extended and inlets moved out to the edge of the ultimate pavement when the Ultimate Configuration is constructed.

All of the water quality and detention ponds will be constructed for the ultimate expansion. The outlet structures will be constructed so they can be modified rather than rebuilt to treat and release flows for the ultimate conditions. This provides **added value** by reducing the cost of reconstructing the ultimate pond outlet structures.

Providing Value-Added Benefit and Cost-Effective Solutions. Our team was able to include design enhancements to maximize the improvements and incorporate the following **value-added** elements to the storm sewer elements of this Project:

- Minimizing highway sections with barrier to reduce the amount of closed drainage on the Project will minimize the required maintenance and potential issues of inlet clogging.
- The drainage pipe within this Project will consist primarily of reinforced concrete pipe. Reinforced concrete pipe used for the storm sewer lines will ensure that the design life is maximized and long-term maintenance costs are minimized. HDPE with fused joints will be used in MSE wall reinforcement zones to minimize the potential for leakage and the associated potential for loss of select backfill in these areas.
- Placing inlets in their ultimate locations and to their ultimate spacing along walls will allow the Ultimate Configuration to be built without having to add additional inlets that would conflict with MSE zone reinforcing straps.
- Spacing inlets for the Ultimate Configuration in areas not retained by MSE walls will allow the Ultimate Configuration to be constructed by simply extending the laterals. Our plan will not require additional tie-ins to the trunk line. This will minimize costs to construct the Ultimate Configuration.
- Pond outlet structures will be designed so they can be easily modified to release the flows at the ultimate rates.
- The roadway has been designed to minimize superelevated sections. This reduces the number of inlets that will need to be maintained. It will also reduce the amount of drainage facilities in the median and the number of potential conflicts with signs and other median features. This approach minimizes both construction and long-term maintenance costs.
- Hydrology provided in the Master Drainage Report that was included with the RFP was recalculated for offsite basins less than 90 acres using the rational method. This resulted in some offsite flows that were different than those provided with the RFP, since they were all calculated using CUHP regardless of their size. Our recalculation was necessary to ensure all drainage facilities conveying these flows are designed according to the RFP requirements.
- The media filter drain was redesigned so it could be used on slopes steeper than 4:1. This was necessary for areas where we were not able to construct 4:1 slopes and remain within the CDOT ROW. By redesigning the media filter drain, we were able to minimize the amount of closed drainage systems and in-line water quality structures, thereby reducing long-term maintenance costs along the corridor.

2.1.B.6 – Bridge Structures

Benefits of PRD Approach:

- Bridges will be built to ultimate lengths and span configurations.
- Maintenance access and fencing provided on utility bridge allows maintenance activities to occur without disrupting US 36 traffic.
- Class H concrete will be used for all bridge decks to reduce water infiltration and minimize corrosion.
- Concrete deck on Bikeway bridge at Coal Creek provides safer, more durable crossing with lower maintenance costs.

Scope. Our proposal includes all bridge work described in the RFP. The Basic Configuration includes new structures at the West Bound on and East Bound off ramps at the McCaslin Interchange, a Bikeway bridge crossing Coal Creek, a utility bridge as well as the identified rehabilitation and widening of the South Boulder Creek and McCaslin Bridges.

The bridge structures we have designed for this proposal are cost effective, conventional, safe, easily constructible and low-maintenance structures. No design variances are necessary.

Accommodating the Ultimate Configuration. All of the new bridges are designed to the Ultimate Configuration. The substructure locations and span arrangements accommodate the future Ultimate Configuration lanes and ramps. No rework will be required when elements of the ultimate US 36 are constructed. The Utility Bridge span lengths and abutment configuration have been optimized to eliminate rework. The abutment height was calculated based on the slope limits for the Ultimate Configuration and a portion of these abutments will be buried until construction of the Ultimate Configuration occurs.

Providing Value-Added Benefit and Cost-Effective Solutions. Every effort has been made to propose functional structures with minimal footprints that use details known for their longevity. The McCaslin widening and the two ramp bridges are jointless bridges with concrete diaphragms, known for durability in all environments. The existing expansion joints at the South Boulder crossing will be replaced, significantly reducing the potential for substructure deterioration. The PRD team will use Class H concrete in all bridge decks that carry vehicular traffic. This **value-added** improvement will help to limit water intrusion and minimize the potential for corrosion of the deck reinforcing.

Although options with lower initial cost are available, the PRD team plans to use a concrete deck for the Bikeway bridge crossing Coal Creek to take advantage of its durability as a PRD team **value-added** item.

The prestressed concrete tub girders supporting the utility pipe crossing were selected due to their shallow superstructure depth, reducing the roadway profile adjustment needed at this location. An added benefit that this girder type provides is the potential to be used as an inspection platform. When inspection or maintenance work needs to be performed on the pipelines, US 36 can remain fully operational. Utility bridge access will be controlled by abutment fencing and personnel gates. Safety fencing will be installed on the outside edges of the tub girder.

2.1.B.7 – Retaining Walls

Benefits of PRD Approach:

- Walls will be constructed in ultimate configuration locations.
- No retaining walls are required west of the McCaslin Interchange, thereby preserving the views from Davidson Mesa and the open space approaching Boulder.

Scope. Four wall types are planned for use within the US 36 corridor: MSE walls, cast-in-place (CIP) concrete walls, soil nail walls and block walls. Particular wall types were selected based on economy, efficiency and location. MSE walls are used at most fill locations, as well as a few specific cut walls where over-excavation of the existing native soils is practical and economical. In general, CIP walls are selected for the shorter fill and cut walls. Soil nail walls are planned for the taller cut walls and are used wherever proposed ROW is sufficient for the required nail length or in cut situations along US 36 under bridge overpasses. Block walls will be used at limited locations, mostly along the Bikeway.

Aesthetic treatments will be applied to all retaining walls in the corridor, regardless of wall type. MSE, soil nail and CIP walls will incorporate aesthetic facing treatments. Whether the wall facing is cast-in-place concrete or precast concrete panels, a color coating and graffiti protection will be applied to minimize long-term maintenance costs. No design variances are necessary for these walls. Our design does not require any major walls west of the McCaslin Interchange. This allows us to preserve the current views from Davidson Mesa and along the open space approaching Boulder.

Accommodating the Ultimate Configuration. All retaining walls on the Project are designed and will be constructed to fit the location and height required for the Ultimate Configuration, with the exception of the walls within the McCaslin DDI area. This interchange layout will require significant modification to achieve the Ultimate Configuration defined in the ROD.

Providing Value-Added Benefit and Cost-Effective Solutions. Throughout the corridor, every effort has been made to either eliminate retaining walls or to shorten wall heights (not altering the viewshed). This was accomplished by optimizing the profiles of US 36 and by carefully adjusting fill slopes. Our team also worked to take advantage of the economy provided by MSE walls. Not only does this wall type offer economy during initial construction, it has also proven to provide a long, maintenance-free service life.

With the exception of the McCaslin DDI area discussed above, the retaining walls will require no modifications in the future build out. By building retaining walls at the location and to the height needed for the Ultimate Configuration, we have eliminated future costs to CDOT. By optimizing the wall type for the particular wall function and location, we have provided a more financeable solution for the Project.

2.1.B.8 – Noise Walls

Scope. CDOT's preliminary design studies indicate noise walls are not required for this Project. Our proposed design does not differ from the RFP to the extent necessary to trigger the need for any new noise analyses.

Providing Value-Added Benefit and Cost-Effective Solutions. Our design incorporates horizontal and vertical geometry that will not require a new noise analysis.

2.1.B.9 – ITS/ETC Elements

Benefits of PRD Approach:

- Design consolidates ITS/ETC components to minimize number of poles and support structures.
- Consistent design team provides uniformity in ITS/ATMS along entire US 36 corridor.
- ETC installation and integration by E-470 Authority minimizes schedule and integration risk.

Scope. The Intelligent Transportation Systems/Electronic Toll Collection (ITS/ETC) components are an integral part of the overall traffic/congestion management approach for the US 36 corridor. The ITS/ETC elements for Phase 2 will be an extension of the work currently being performed on Phase 1. As part of the Phase 1 work, the fiber optic cable backbone will be installed along the entire Project length. The Phase 2 ITS/ETC elements will be integrated with this backbone to provide a complete system for the corridor.

Accommodating Ultimate Configuration. Our proposed design accommodates the Ultimate Configuration by placing the devices to minimize any disruptions caused by the future widening. Overhead sign bridges, median cantilevers and butterfly structures will be constructed in their ultimate locations. This will eliminate costly rework and traffic disruptions during construction of the Ultimate Configuration. Overhead cantilever structures that are placed on the outside roadway shoulder for the interim configuration will need to be relocated when the Ultimate Configuration is constructed. However, these structures are able to be reused, and will only require construction of a new drilled shaft foundation. Other devices, such as poles for CCTV cameras, detectors and travel time devices, will be placed in their ultimate locations wherever possible.

Providing Value-Added Benefit and Cost-Effective Solutions. For new devices that will be installed under Phase 2, we will coordinate the design to minimize the supporting infrastructure (e.g., poles, maintenance sites and cabinets). In addition, we can coordinate the Phase 1 construction and integration activities with the Phase 2 design. This will be accomplished by co-locating devices that use a common service pedestal and electrical service, and consolidating ITS devices with the required ATM sign bridges to minimize the number of support structures required for devices. Optimizing the use of the power infrastructure and support structures meets the Project goals to optimize cost and reduce rework for HPTE when the Ultimate Configuration is constructed. This will reduce procurement costs and it will dramatically reduce overall O&M costs by minimizing the number of different types of maintenance spare units.

Capitalizing on the Phase 1 activities will extend to the ATM software and integration work. The team doing the ATM software for Phase 1 will be maintained for Phase 2 to support the integration of additional devices into the system to provide consistent operation along the entire corridor.

In addition, the PRD team will be using the E-470 Authority to install and integrate the ETC components as each phase of the Project is completed. The use of this agency for ETC installation and integration will significantly reduce schedule and integration risks, since it is currently operating the ETC system on the I-25 Managed Lanes for CDOT, and has a unique understanding of the system and its requirements.

2.1.C – Bikeway Narrative

Benefits of PRD Approach:

- Bikeway conforms to configuration shown in RFP drawings to expedite local jurisdiction review and approval.
- Grades will be minimized to the extent possible, with 94 percent of the route having grades flatter than 5 percent.

The proposed US 36 Bikeway is a key element in long-range plan to make the US 36 corridor a multi-modal commuter facility. It will provide an additional element that improves

connectivity to the ever-expanding regional system of bikeways and multi-use trails. Upon completion of this Project, HPTE and the surrounding communities will have a continuous Bikeway along the entire US 36 corridor.

The Bikeway is designed to maximize user safety, minimize out-of-direction travel and reduce at-grade intersections and street crossings. Our design provides horizontal and vertical separation from mainline US 36 traffic to enhance the user experience and minimize the need for barrier separation between the Bikeway and the traffic lanes. As part of the overall goal to improve connectivity, the new Bikeway will also connect to existing on-street and off-street facilities at several locations along this portion of the corridor.

The proposed US 36 Bikeway will provide significant improvements in connectivity to existing community bike lanes and multi-use paths, and greatly reduce out-of-direction travel in this portion of the corridor.

Minimized Out-of-Direction Travel. The current Boulder to 88th Avenue bike route generally follows the local arterial street system. There are multiple arterial streets that are used for this bike trail, resulting in a trip length of about 10 miles. The new Bikeway alignment reduces the length of that trip to about 5.5 miles, a reduction of 4.5 miles. For a cyclist traveling at 10 mph, the new route paralleling US 36 provides a time savings of approximately 27 minutes.

Reduction in At-Grade Crossings and Bicycle/Motor Vehicle Interaction. Much of the existing bike route parallels and sometimes shares the existing local street system, resulting in many at-grade street crossings and situations where bicycle and motor vehicle traffic are combined. The proposed Bikeway provides a significant reduction in the potential for conflicts between bicycle and motor vehicle traffic. Our design incorporates grade-separated Bikeway crossings at South Boulder Creek, Cherryvale, Marshall Drive Connection and at the Coal Creek Trail Crossing. We have also provided pricing for a grade-separated crossing at McCaslin (Option 1).

Enhanced Connectivity. The proposed Bikeway enhances regional connections and improves the multi-modal effectiveness of the US 36 corridor by providing important connections to local trails, bike routes and alternate modes of transportation, such as the RTD Park-n-Ride facilities and BRT stations. Our bikeway will tie into the following off-street and on-street bikeways:

- South Boulder Creek Trail System
- Cherryvale Street System
- Marshall Drive Street System
- Dyer Road to McCaslin Boulevard
- Dillon Road Street System
- Coal Creek Trail System
- Health Park Drive Street System
- US 36 Phase 1 Bikeway at 88th Street

In addition to connections to existing trails, the Bikeway will include important connections to the RTD US 36 Park-n-Ride stations at McCaslin and Table Mesa. These connections further enhance the multi-modal aspects of the corridor, as commuters can utilize RTD's Bike-n-Ride program that allows them to bike to the stations, load their bicycles and ride the bus to more distant destinations.

2.1.D – Phase 2 Construction Work Aesthetics Narrative

Benefits of PRD Approach:

- Aesthetic treatments will match local jurisdiction preferences and reflect corridor themes.
- Aesthetics at McCaslin will match pre-approved concept drawings provided in RFP.
- Anti-graffiti coating will be provided on accessible vertical concrete surfaces.
- Utility bridge box girder conceals irrigation pipes and is visually consistent with other corridor bridges.

Basic Configuration Aesthetics Narrative

This construction Project offers an opportunity to enhance the visual landscape along the US 36 corridor. Our proposal includes aesthetic treatments to bridges and retaining walls that are tasteful and fitting for the existing environment and blend with the work being done on the Phase 1 Project. The selected aesthetic treatments provide uniformity of appearance throughout the corridor, complement the aesthetic features of existing structures and match the local corridor aesthetic preferences.

Specifics of the aesthetic treatments are described below. In general, all visible surfaces of retaining walls will receive a colored concrete stain or coating as well as an anti-graffiti coating. For bridges, a colored coating will be applied to both sides of the bridge rail, on the outside and underside of the

bridge deck overhang and on the outside and bottom flange of the fascia girders. In addition, a colored coating will be applied to all visible surfaces of bridge pier caps and columns and to abutment caps and wingwalls. As a **value-added** feature, an anti-graffiti coating will be applied on the front face of bridge rails and to exposed faces of abutment caps and wingwalls.

Bridge Aesthetics

The aesthetic treatments to bridges are specific to the location. Each major bridge is discussed in detail below.

McCaslin Interchange. Our design provides the basic color and texture of bridge components and abutment retaining walls that match those specified in McCaslin Interchange Enhancement Concepts. The Basic Configuration for these bridges includes Type 10 bridge rail and pedestrian screening fence, as well as the bow truss basket handle arch and bus shelters in the center median. These aesthetic treatments are shown in Figure 1.2.

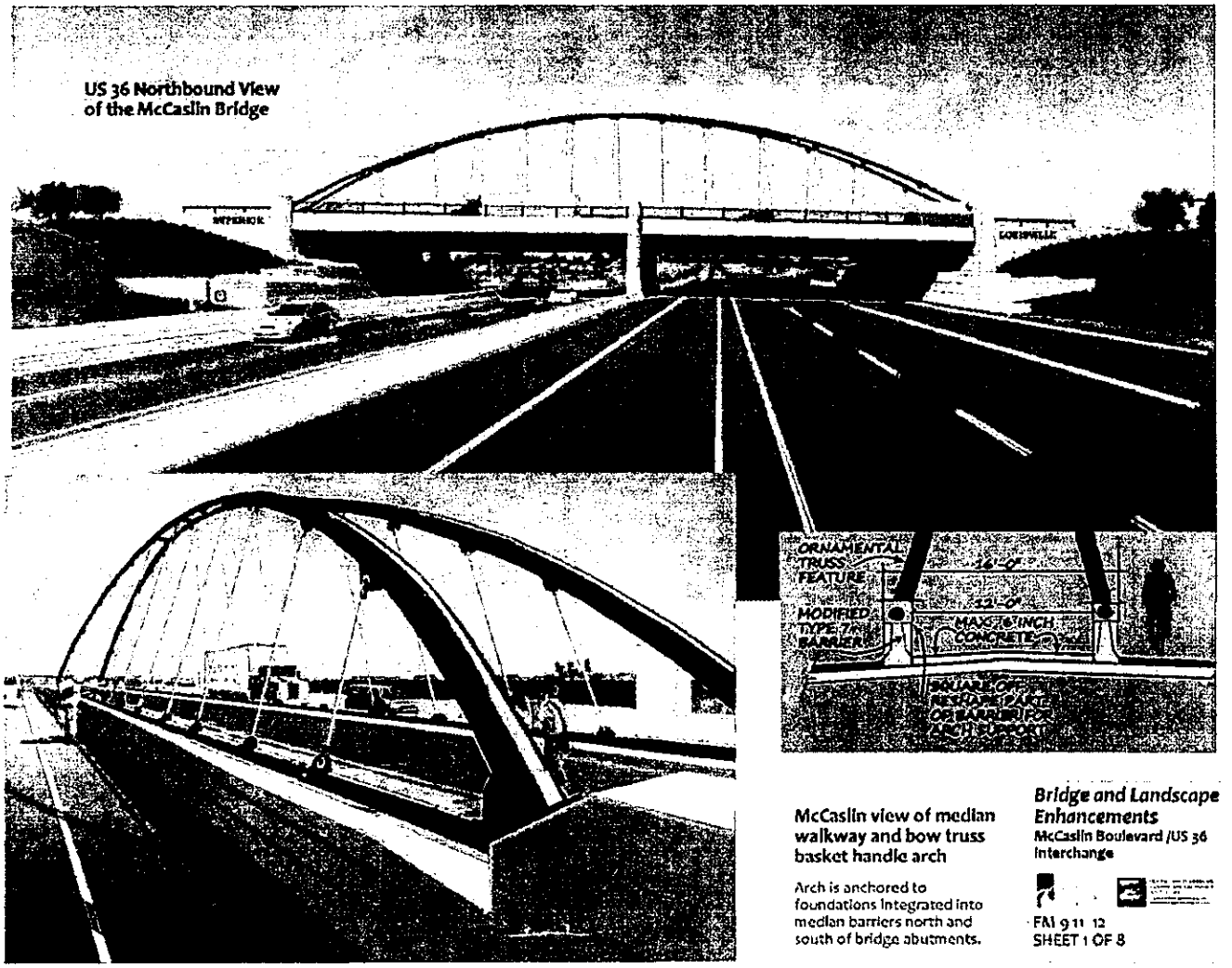
South Boulder Creek. The color and texture of the bridge rail, deck soffit and abutment retaining walls will match those throughout the corridor. All widened portions of the abutments and piers will be geometrically and aesthetically consistent with the existing bridge elements.

Utility Bridge. The PRD team's proposed design conceals pipes and is visually consistent with bridges along the remainder of the corridor.

Retaining Wall Aesthetics

Retaining walls not in the vicinity or viewshed of bridges will be of a uniform appearance throughout the corridor. The goal is to provide a simple and tasteful appearance that will complement the variety of structure textures and finishes that exist throughout the Project limits. A two-toned color scheme is proposed, with the retaining wall coping being one color and the wall face being of another color. The proposed wall color and texture scheme is shown in Figures 1.3 and 1.4. Our proposal allows for the option of local jurisdictions, within a limited time frame, to choose from a selection of three or four color and texture options, different from the corridor consistency and Broomfield concept developed as part of Phase 1, for walls within their jurisdiction.

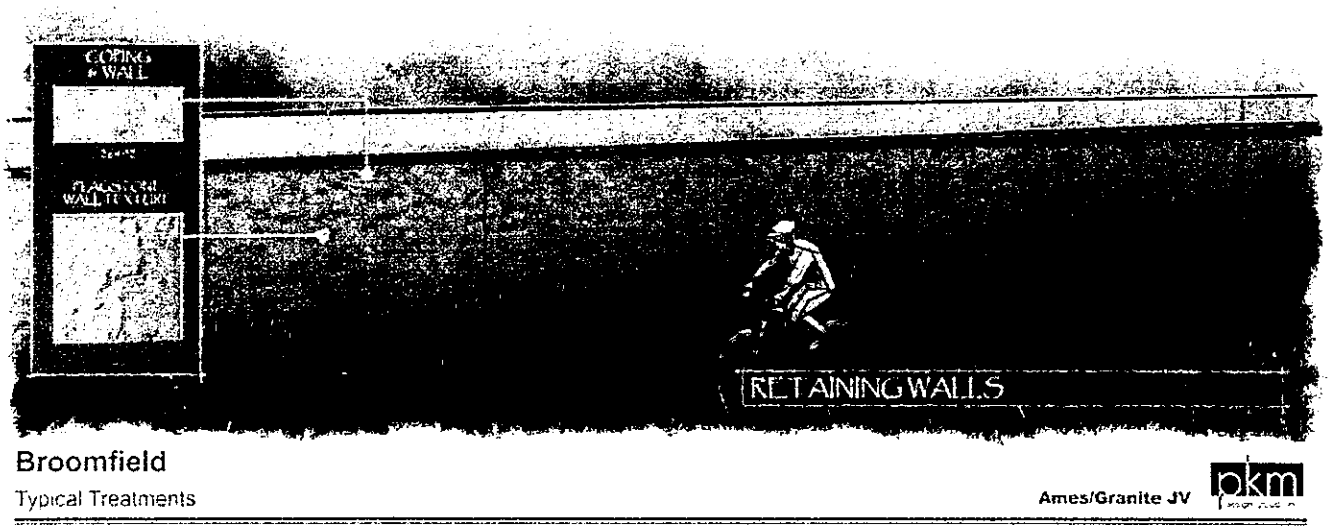
Figure 1.2: McCaslin Bridge Rendering



Courtesy of FHU and HPTE

Figure 1.3: Typical Retaining Wall Aesthetic Treatment

Figure 1.4: Typical Broomfield Retaining Wall Aesthetic Treatment



2.1.E – Additional Design Exceptions

Our design includes no design exceptions other than those mentioned in the Technical Requirements.

DRAFT JULY 10, 2012

Form 17 – Additional Design Exceptions

No.	Applicable Standard		Existing Standard (verbatim from standard)	Proposed Revision	CDOT Response For CDOT Use Only	FHWA Response For FHWA Use Only
	Originator	Title				
No Additional Design Exceptions						
Eliminated steeper than desirable grades between Sta 1348 and 1352						

2.2 – Pavement and Structures (Life Cycle)

Benefits of PRD Approach:

- Incorporation of overlay approach provides improved subgrade support for over 40 percent of new pavement.
- Additional pavement thickness provides added value, resulting in 50-year life expectancy for pavement sections.
- Bridges and box culverts designed to accommodate ultimate configuration.
- Class H concrete used in bridge decks provides added value, providing improved resistance to water intrusion and corrosion.

2.2.A – Pavement Definition Drawings

Pavement Section and Pavement Definition Drawings are located in Volume I-A.

2.2.B – Pavement Narrative

The PRD Team Pavement Design

The PRD team is committed to delivering high-quality pavements for the US 36 Project. Our design approach is consistent with the approach currently being used on the adjacent US 36 Phase 1 Project. Our key objectives include providing a pavement section that exceeds HPTE's expectations, and a pavement that minimizes life cycle maintenance costs. Our focus on these objectives during the proposal process is demonstrated by our extensive design effort that resulted in approved **ATC-19**, which provides an optimized pavement section and a best-value solution for HPTE, CDOT and all stakeholders along this portion of the US 36 corridor.

The PRD team's pavement approach begins with providing high-quality, long-lasting PCCP for the entire US 36 mainline.

All ramps and arterials will be constructed with sustainable hot mix asphalt (HMA) pavements. Figure 2.1 (Rigid Pavement Design Summary) and Figure 2.3 (Flexible Pavement Design Summary) summarize the PRD team's pavement designs for the US 36 Project.

The PRD team is incorporating our approved **ATC-19** into our pavement design for the project. This ATC includes a number of modifications to the RFP pavement design approach including:

1. Providing a modified subgrade consisting of 18" of material having an R-value of at least 50 underlain by 18" of moisture-conditioned, recompacted soil with swell less than 1 percent. This modification makes better use of readily available materials, provides a layer of stronger subgrade material immediately below the aggregate base and pavement layers, and meets CDOT's requirements for swell mitigation.
2. Calculating required pavement thickness using the MEPDG design methods, and then increasing the calculated pavement thickness in order to extend the period of acceptable pavement performance from 30 years to more than 50 years.
3. Using a PCCP overlay approach in areas where the proposed grades closely match the existing pavement surface. In the widening areas adjacent to the overlay areas, our design includes a layer of HMA below the PCCP to provide uniform support across the entire width of the new pavement. This **value-added** approach speeds construction and significantly reduces Project costs by reducing the amount of existing pavement that has to be removed, and the quantity of subgrade material that needs to be replaced.

These modifications provide added value to HPTE, CDOT and all Project stakeholders. Our modified approach provides improved subgrade support for the planned pavements, and significantly reduces initial costs, resulting in a more financeable Project. Our approach fully supports HPTE's primary goals of maximizing value while reducing costs and minimizing maintenance.

Overall, the PRD team has combined CDOT's pavement design requirements with innovative ATCs to offer HPTE long-lasting, high-performance pavements for the US 36 Project. Our pavement design approach takes advantage of the existing pavement structure to the extent possible, resulting in a high quality pavement that reduces up-front costs and provides for overall value for the Project. As importantly, our pavement approach provides HPTE with a pavement that is highly durable and long-lasting – ultimately providing the benefit of a pavement that minimizes life cycle maintenance costs.

Conceptual Pavement Design

For mainline US 36 pavement, the PRD team has reviewed HPTE's life cycle cost analysis and concurs that concrete pavement is the most economical solution. As a result, our proposal includes PCCP for all of the US 36 mainline pavement, including shoulders. Use of PCCP offers HPTE the most durable, dependable and low-maintenance pavement possible. **The PCCP proposed by the PRD team offers HPTE a pavement design life that will significantly exceed the HPTE required design life of 30 years, while minimizing both upfront costs and life cycle maintenance costs.**

For US 36 ramps and McCaslin Boulevard, the PRD team is proposing to construct HMA pavement consistent with those pavements constructed as part of Phase 1. However, the PRD team will construct PCCP pavements in bus stop areas of the ramps. The use of flexible asphalt pavement for the ramps and local streets offers a number of benefits to HPTE.

First, the Ultimate Configuration of the Foothills/McCaslin ramps will require significant geometric changes for the majority of the ramps and side streets, meaning that most of the pavement in these areas will be removed during construction of the Ultimate Configuration. Providing asphalt pavement minimizes the amount of "throw-away" costs when the ramps and side streets are reconstructed for the ultimate condition.

Second, asphalt pavement expedites the construction schedule and simplifies maintenance of traffic, thereby reducing the duration of impacts to the motoring public. Finally, the asphalt pavement constructed during this phase will provide a source of recycled material for new construction when the Ultimate Configuration is constructed in the future.

Overall, the use of asphalt pavement for the ramps and side streets reduces upfront costs, as well as future costs, for the Ultimate Configuration.

Figure 2.1: Summary of Rigid Pavement Designs

PCCP over Existing Mainline	PCCP over Existing Shoulder	New PCCP Construction Adjacent to Overlay	New PCCP Full-Width Construction – US 36
10-inch PCC ■ 1.5-in diam. Dowels ■ 15-ft trans. Joint space ■ MR = 650 psi ■ EPCC = 3,400,000 psi	10-inch PCC ■ 1.5-in diam. Dowels ■ 15-ft trans. Joint space ■ MR = 650 psi ■ EPCC = 3,400,000 psi	10-inch PCC ■ 1.5-in diam. Dowels ■ 15-ft trans. Joint space ■ MR = 650 psi ■ EPCC = 3,400,000 psi	10-inch PCC ■ 1.5-in diam. Dowels ■ 15-ft trans. Joint space ■ MR = 650 psi ■ EPCC = 3,400,000 psi
2.0-inch minimum HMA after milling	2.0-inch minimum HMA after milling	2.0-inch HMA (base)	6.0-inch ABC ■ EAGG = 20,000 psi
8.25-inch PCCP (existing) ■ EPCC = 1,400,000 psi		4.0-inch ABC ■ EAGG = 20,000 psi	
		18.0-inch R50 fill ■ R-value > 50	18.0-inch R50 fill ■ R-value > 50
Native Subgrade	Native Subgrade	Native Subgrade ■ 18-inch moisture treated	Native Subgrade ■ 18-inch moisture treated
IRI Limit			
50+ years	50+ years	50+ years	50+ years
Cracking Limit			
50+ years	50+ years	50+ years	50+ years
Faulting Limit			
50+ years	50+ years	50+ years	50+ years
Required ESALs			
15 million	15 million	15 million	15 million
Predicted ESALs			
28+ million	28+ million	28+ million	28+ million

Note: Predicted ESALs based on 1 percent compounded growth for 50 years.

Concrete Pavement Designs

In accordance with our HPTE-approved **ATC-19**, the PRD team used the AASHTO MEPDG to develop the most effective, reliable PCCP pavement designs possible, using the best state-of-the-art design tool available. The most significant site-specific inputs in the MEPDG process for the US 36 Project are the anticipated traffic levels and the local climate.

In performing the MEPDG design for the PCCP pavements, the PRD team chose to utilize conservative design details and inputs to offer HPTE a robust pavement design that provides a design life greater than the 30 years required in the Technical Requirements. **While the design indicates an 8-inch pavement would meet 30-year design life requirements, we are proposing to provide a 10-inch pavement, which provides a predicted pavement life of over 50 years.** These conservative design details and inputs are instrumental in achieving high-quality, smooth-riding, long-lasting pavements that minimize life cycle cost. A summary of the key design details and inputs are as follows:

- Our pavement approach includes the use of tied PCC shoulders. This allows the PCCP to carry more traffic loading by eliminating loading along the free edge of the pavement that would lead to mid-slab, transverse cracking. The use of tied shoulders also facilitates the use of the shoulder as a future travel lane when the planned auxiliary lanes are added in the future.
- The PRD team's concrete pavements utilize 15-foot joint spacing. This creates shorter slabs, which reduces the potential of mid-panel, transverse cracking.
- Our proposal includes 1.5-inch dowel bars across transverse joints. This provides a high level of load transfer, reducing the potential for development of faulting across those joints.

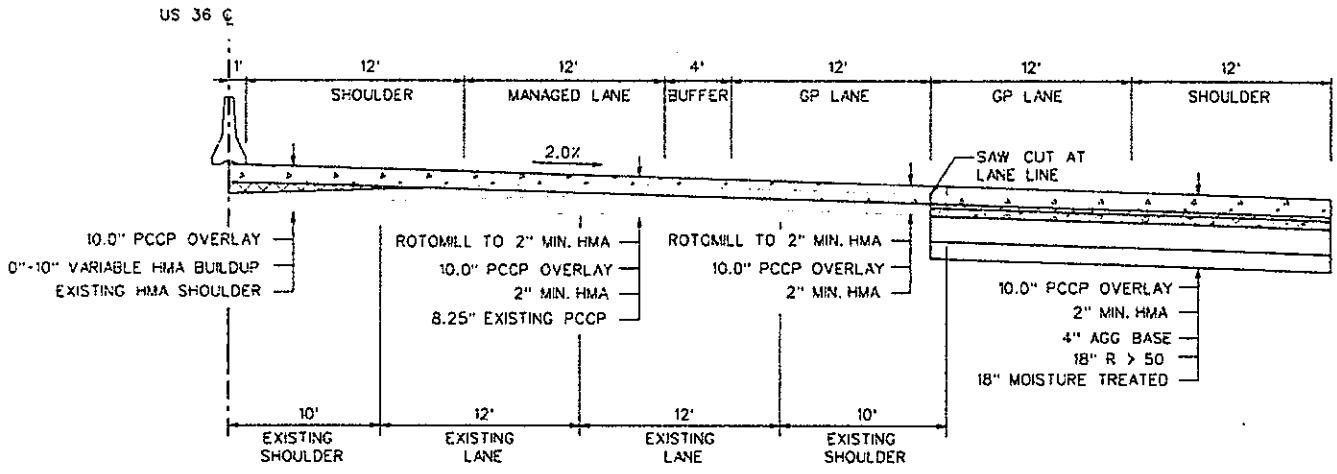
- The PRD team utilized a conservative R-value for subgrade strength in our MEPDG analysis. The subgrade layer in the MEPDG program reflects the 18" of minimum R-value 50 material underlain by native subgrade. Based on our review of information provided by HPTE, we estimate the native subgrade to have an R-value of 4. For the US 36 PCCP pavement design, we are using a composite R-value of 16 to represent the 18" of minimum R-value 50 material on the native subgrade soils. This is a conservative approach, given that the 18 inches of minimum R-value 50 material directly underlies the aggregate base course.
- We are using a conservative modulus value of 20 ksi for the aggregate base course.
- The PRD team's MEPDG design includes a reliability of 95 percent, the highest possible value noted in Table 1.3 of the CDOT 2013 Pavement Design Manual. This level of reliability imparts another level of conservatism in the pavement design process.

The conservative design details and inputs as described above combine to provide HPTE with a highly durable, long-lasting pavement that significantly minimizes the amount of required maintenance over the life of the pavement. Our MEPDG analysis indicates that the design life of our proposed concrete pavements will be significantly greater than the 30 years required in the Technical Requirements.

In combination with the MEPDG pavement approach, and as described in HPTE-approved **ATC-19**, the PRD team will provide an unbonded PCCP overlay for a significant portion of the US 36 mainline. This strategy takes advantage of the superior subgrade support provided by the in-place pavement structure where possible, optimizing pavement costs and providing consistency in materials and methods throughout the corridor. Additionally, this approach demonstrates environmental stewardship through the reduction of new material consumption.

In the overlay sections, the PRD team will construct a uniform thickness PCCP pavement section across the entire US 36 roadway. This constant thickness includes the PCCP overlay over the existing US 36 general purpose lanes and shoulders, as well as the PCCP pavement over the new-build section outside of the overlay section. For the new-build section adjacent to the overlay section, we will place the PCCP on 2 inches of HMA to provide a consistent base across the full width of the roadway. This is a superior **value-added** solution that results in more uniform smoothness profiles and maintainability requirements across the full width of the new US 36 pavement. Figure 2.2 illustrates the PRD team's overlay approach.

Figure 2.2: PCCP Overlay With Reconstructed Widening



Our analysis of the existing mainline pavement structure, based on deflection data provided by CDOT for the Phase 1 work, indicates that the overall existing pavement modulus is approximately 1.8 million psi. With this level of support, our MEPDG analysis indicates that a PCCP overlay of 8.0 inches would meet HPTE Technical Requirements. However, the PRD team is providing an overlay thickness of 10 inches, thereby providing a constant PCCP pavement thickness across the full width of the US 36 roadway, as well as throughout the length of the US 36 corridor. This constant thickness will significantly improve structural durability of the pavement and minimize maintenance needs for the US 36 pavement over the life of the facility.

Flexible Pavement Designs

For ramps and McCaslin Boulevard, the PRD team is providing flexible pavements in accordance with the requirements of the RFP. This includes designs that conform to the 2012 CDOT Pavement Design Manual and have been developed using the AASHTOWare DARWin pavement design program. For non-HPTE roadway pavements, our designs and sections conform to local agency requirements. Figure 2.3 summarizes our flexible pavement designs, which match those prescribed in Schedule 5, Section 10 of the Concession Agreement.

Figure 2.3: Summary of Flexible Pavement Designs

HPTE Roadways McCaslin EB On/Off Ramp McCaslin WB On/Off Ramp Scenic Outlook WB On/Off Ramp Foothills Pkwy EB On Ramp Foothills Pkwy WB Off Ramp	Total Pavement Thickness, inches	Top Lift, inches	Intermediate and Bottom Lifts, inches (HMA GR S)	ABC, inches	Moisture treated
Pavement layer Thicknesses, inches	9.0	2.0 (SMA)	7.0	6.0	18.0
[redacted]					
Pavement layer Thicknesses, inches	9.0	2.0 (SMA)	7.0	6.0	18.0

Surface and Subsurface Drainage

Pavement surface and subsurface drainage is an important aspect of pavement design that can impact the level of long-term maintenance required for pavements. Supporting HPTE's goal to minimize life cycle maintenance costs, we have evaluated pavement drainage to provide an approach that facilitates surface and subsurface water movement away from the pavement.

Surface Drainage. The PRD team's proposal includes a roadway section that is crowned at the median, except in areas of superelevation and the split normal crown section at South Boulder Creek. This drains water to the outside shoulder to the extent possible, away from the pavement structure. In superelevated sections, inlets will be provided along the median barrier to collect water draining from the high side of the roadway. All mainline pavements will be constructed with a cross-slope of at least 2 percent, to further facilitate water drainage to the shoulders and away from the driving surface. An exception to this occurs on the approaches to South Boulder Creek, where the cross slope transitions to match the 1.5 percent cross-slope of the existing bridge deck. All transverse and longitudinal joints will be sealed to prevent infiltration of water into the pavement subsurface.

Subsurface Drainage. The PRD team will extend the aggregate base course and minimum R-value 50 material to the side slope in areas where walls are not present. This will facilitate the movement of subsurface drainage away from the pavement structure. In areas of superelevation where a split profile is implemented, the PRD team will provide a sub-drain in the median of US 36 to collect subsurface drainage that would collect at the base of the R50 material.

In areas of superelevation where a PCCP overlay is being implemented, the PRD team will slope the base of the R50 material under the areas of widening away from the pavement and subgrade section. This will maintain a subbase/subgrade drainage flow path towards the outside of the roadway section and away from the existing subgrade beneath the overlay section. Typical sections of these subsurface drainage configurations are included in the typical roadway sections in Volume I-A.

Finally, we have evaluated sag vertical curves and have determined that in these areas, there are no locations along the alignment that have the potential to trap water beneath the pavement. As such, no subsurface drains are required in these areas.

Pavement Materials and Construction

Concrete Material Sources. Concrete material production will be sourced from a dedicated plant for the US 36 Project, assuring we produce a Project-specific concrete mix design that remains consistent and meets the high quality standards expected for this Project. The concrete plant will be set-up within the near vicinity of the Project. We will perform a final best value analysis to compare self-perform versus subcontracting concrete material production. This comparison

will consider experience with CDOT projects, quality control process, equipment resources and commitment to dedicate a concrete plant to the Project.

By having a plant dedicated to this Project, we can closely monitor and maintain high quality control procedures, while also providing our control over the production schedule, source and delivery of materials. With first-hand attention to the material production and testing, our team is better equipped to make proactive and quick adjustments if needed. This approach is not only convenient for material production availability, but will reduce the number of trucks required for wet batch hauling, and will be responsive to the Project's schedule needs. All aggregate, cement, flyash and additives will be procured from local sources and delivered and stored at the plant site to maintain maximum production efficiency and quality control.

Hot Mix Asphalt Material Sources. The HMA needs on the Project are limited to temporary detours, sidestreets and ramps. Because the production demands are not high, we will use a local subcontractor to produce and place the HMA on the Project. Final subcontractor selection will be made on a best value basis, considering price, quality of materials used and produced, experience with CDOT projects, and ability to perform the work to CDOT's and our quality control standards.

For HMA pavement designs we will use performance graded (PG) binder and will provide a stone mastic asphalt (SMA) mix in the top lift to improve overall life expectancy and reduce rutting or shoving on ramps and intersections.

Aggregates (Type and Source). For both PCCP and HMA, local aggregates will be utilized. There are three primary aggregate suppliers in the Denver market capable of supplying the volume and quality of aggregates required for this Project. The aggregate source used will be selected for each individual mix design and consider various factors such as price, quality of material and ability of the aggregate to function within our mix designs. All aggregates will be rigorously tested prior to being used in our plants for production of the final concrete or asphalt. Utilization of local aggregate suppliers is also part of our plans to meet the Project goals by maximizing engagement of local workers and businesses, and providing trucking opportunities for DBE haulers.

Approach to Quality Control of Materials. Quality pavements that are durable and reduce life cycle costs begin with a quality control plan that ensures the materials used are meeting or exceeding the mix design requirements. Further, the combination of these materials in the final mixes produced must work effectively together to deliver pavements that are produced properly at the plant and ensures the materials put in place on the roadway are correct. To achieve this we are committing to a comprehensive materials testing and inspection plan, previously developed and approved as part of the Phase 1 Project, prior to use in the mix production and after production at the plant site, but prior to placement on the roadway. Details of our proposed QC procedure are outlined in Section 2.3. Our dedicated QC/QA personnel will rely on their vast experience with CDOT projects and the materials testing and inspection processes we have refined through numerous projects that we have self-performed, specifically from the previous paving season on the US 36 Phase 1 Project, to achieve this Project's goal of providing a quality product that minimizes life cycle maintenance costs.

Construction Approach

In addition to producing high quality materials, constructing durable concrete pavements begins with proper planning, a process we have begun for this Project by developing an initial paving plan. Our approach optimizes the construction process by improving the placement, pavement joints, finish, ride quality and ultimately the quality of the final product. Again, we are able to draw from the plan developed as part of the Phase 1 Project, to assure consistency and maximize the paving sequence between Projects. As the first concrete paving season for this Phase 2 Project will occur in the summer of 2014, our project management team and quality team will have already overseen construction through the first paving season on the Phase 1 Project in 2013.

Our paving plan first considered the overall Project phasing, and how to phase the concrete pavement to optimize the construction process for both quality and production. Our Project traffic phasing plan provides large, uninterrupted work areas that maximize the length of concrete paving pulls and minimize short plugs and hand pours. For example, during construction of the westbound lanes of the Project between 88th Avenue and Foothills Drive, the full length and width of the US 36 mainline westbound pavement (from centerline to the outside edge of pavement) is planned to be machine paved with hand pours only at the off/on-ramp gores. By phasing the Project in this way, we have developed the largest work areas feasible and are able to maximize the length of concrete paving machine pulls to reduce transverse and longitudinal construction joints.

Our paving plan allows the concrete paving machines to optimize both the length and width of paving pull and to continue uninterrupted during construction shifts without the need to stop and establish unnecessary construction joints. This approach produces a final concrete pavement with the minimal number of construction joints. Reducing the number of joints in our concrete pavement improves the durability of the surface and minimizes long-term maintenance. In addition, most transverse construction joints are a source of a "bump" in the final surface due to difficulty of controlling the grade at the end and subsequent re-start of paving pulls. Finally, all concrete paving pulls will place the longitudinal construction joints at the permanent lane lines, out of the normal wheel paths, which reduces joint wear and maintenance. By minimizing construction joints, we are able to produce a better final ride surface, which further contributes to providing a longer-lasting pavement.

Whether the concrete paving work is self-performed or subcontracted, the paving equipment brought to the Project will have been previously inspected and maintained under a rigorous maintenance program. The selected equipment will utilize the latest technologies, such as automatic grade control systems, variable concrete vibration control, hydraulic adjustable finish floats and automatic dowel bar inserters. Our mainline concrete paving spreads will utilize concrete placers to spread uniform thickness of concrete ahead of the paver. By utilizing the concrete spreader to knock down the concrete in advance of the finish paver, the ride quality is improved. Concrete pavers will be electronically controlled two-track or four-track machines, depending on the width of pull. Automatic cure and tine machines will finish the pavement process to ensure accurate and uniform application of tines and curing compounds. Automating these final steps provides a greater level of quality pavement finish by taking away imperfections related to human application of the tine pressures and spraying a uniform and properly calibrated amount of curing compound to the surface.

2.2.C – Structures

Conceptual Assessment of Maintenance Cost and Ease of Re-Decking, Inspection and Maintenance

Bridges. We have designed all bridges to be durable, low-maintenance structures. Costs associated with inspection and maintenance will be low. With the exception of South Boulder Creek, all vehicular bridges will have durable prestressed concrete girders, which will require very little maintenance. The South Boulder Creek bridge is supported by, and will be widened with, steel girders to match the existing bridge stiffness and preserve the hydraulic opening below the structure.

All new bridges are designed as jointless structures, utilizing integral abutments that do not require bearings or expansion joints. Expansion joints are located only at the ends of the approach slabs where the roadway pavement is concrete. The lack of expansion joints eliminates, to a large extent, the seepage of water onto abutment seats, pier caps and girder ends, which is a significant cause of concrete deterioration.

The use of integral abutments allows for the use of simple and long-lasting elastomeric pads in lieu of more expensive bridge bearings. The elastomeric pads see no movement and essentially no rotation. Elastomeric bearings are generally considered to be maintenance free. All bridge decks will have a waterproofing membrane and asphalt wearing surface, in accordance with CDOT standard practice, which will further protect the bridge from intrusion of water and chlorides. The primary maintenance activity will be the normal milling and replacement of the asphalt wearing surface and waterproofing membrane.

Given the simplicity and uniformity of the bridge structures along the corridor, inspection of all bridges, new and widened, is anticipated to be routine and noncomplex. The use of special equipment or specialized inspection techniques or practices is not required.

We do not anticipate the need for deck replacement during the 75-year design life of the bridges. Our proposal includes the **value-added** use of less pervious CDOT Class H concrete in all the bridge decks. Because all bridge decks will be constructed of less permeable concrete and provided with a waterproofing membrane and bituminous wearing surface, the decks should be well protected from intrusion of water and chlorides. All new bridge decks will be constructed without longitudinal construction joints. Improvements in rebar coatings and concrete durability have increased the service life of modern bridge decks. With regular inspection and maintenance, and periodic replacement of the wearing surface and membrane, the need for a complete deck replacement in the next 75 years is not likely.

Box Culverts. All concrete box culverts will be new construction and should require no maintenance, other than periodic cleaning. The culverts are new cast-in-place or precast concrete and are designed per the AASHTO LRFD

and CDOT design standards and can be expected to meet a 75-year design life. The figure below lists all the box culvert replacements included in our proposal.

Figure 2.4: Culvert Replacements

Name	Location	Size
1126 Dry Creek	1122+70	6'x 4'
1144 SBCD	1143+78	10'x 4', +42" Overflow
1168 C27-Shearer	1167+02	8'x 2'
1182 C29-Marshallville	1182+18	8'x4'
1195 C30-Goodhue	1195+37	16'x4'
1213 C31-Davidson Ditch	1213+01	20'x5'
1266 C33-Louisville Inlet	1265+40	6'x 3'
1267 Pedestrian	1266+15	14'x 10'
1336C34-Coal Creek (Low Flow)	1335+54	20'x 11'
1336C34-Coal Creek (Ped)	1335+32	20'x 10'
1336C34-Coal Creek (Wildlife)	1335+77	20'x 11'
1357 Pedestrian	1357+06	14'x 10'
CV-V127	1334+76	4'x 2'
P-V581	1315+45	8'x 4'

Proposed Methods of Construction or Rehabilitation

The structures that will be constructed or rehabilitated for the US 36 Project are conventional types that have typically been used by CDOT along the US 36 corridor and throughout the Denver metropolitan area. The methods of construction will follow CDOT's Standard Specifications for Road and Bridge Construction and the standardized structural details shown in CDOT's Structural Worksheets will be utilized. Therefore, the proposed methods of construction are the same as those utilized on nearly all similar CDOT structures recently built in the region. The structure types, standardized details and construction methods have been proven to provide a quality, long-lasting product with minimal operating and life cycle maintenance costs.

The PRD team's quality management system will provide assurance that the products and workmanship conform to requirements. Careful attention to items such as concrete production, placing and curing is an important factor in providing a quality product with maximum durability and minimal operating and life cycle maintenance costs.

Bridge Foundations. All new bridge structures will utilize deep foundations consisting of either driven steel H-piles or drilled caissons. Founded in rock, these deep foundations will minimize the risk of differential settlement. This will minimize future maintenance costs. Although the foundation types for widened structures will match existing, they will be proportioned for actual loading and site conditions.

The use of driven steel H-piles at abutments and in-kind foundation widening at intermediate piers is a common approach for foundations on bridge structures along the corridor. Successful performance with minimal maintenance costs has been repeatedly demonstrated when using standard specifications for materials, equipment and installation methods.

Driven steel H-piles will typically be utilized at new bridge abutments. Materials, pile driving equipment and driving methods will be selected and performed in accordance with Section 502 of CDOT's standard specifications.

Bridge Substructures. Conventional cast-in-place concrete columns, pier caps and integral abutments will be used for bridge substructures. Work will conform to CDOT Standard Specification 601. Ensuring durability with low maintenance costs is particularly dependent on the quality incorporated into the following work operations:

- Formwork
- Reinforcing steel and embedded items
- Concrete mix materials, design and production
- Concrete placement
- Concrete finishing
- Concrete curing

The PRD team's superintendents and quality control personnel have the experience and capability to ensure these operations are performed with materials and workmanship that meet or exceed contract requirements. In addition, our independent QA staff will inspect and test all operations before certifying the work conforms to CDOT's specifications.

Bridge Superstructures. Precast concrete girders will be utilized at all new and widened bridges, with the exception of South Boulder Creek, to ensure minimal life cycle maintenance costs when compared to steel girders that require regular repainting. Local precasters familiar with CDOT standards will manufacture the girders, following quality control procedures that ensure the products meet or exceed requirements.

Bridge decks typically require the greatest share of life cycle maintenance costs for a structure. Therefore, providing a high-quality cast-in-place bridge deck is critical to minimizing operating and life cycle maintenance costs. Ensuring this quality begins with planning. Concrete will

be produced by local plants with quality control procedures that have demonstrated consistent conformance to CDOT specifications. As a **value-added** benefit to CDOT, the PRD team will use Class H mix designs for the deck concrete. Class H concrete will provide improved crack and permeability control – particularly when combined with the deck waterproofing and asphalt overlay. Pre-pour conferences will be held prior to deck placements to ensure consistent delivery of a uniform concrete mix and that sufficient workforce and equipment is available to properly place and finish the concrete. Proper curing is critical to providing a long-lasting concrete deck, and the Ames/Granite JV will perform this operation in accordance with Section 601.16 of CDOT's Standard Specifications.

The widened portion of the South Boulder Bridge will use a steel girder superstructure similar to the existing bridge to balance superstructure stiffness as well as reap the shallow superstructure benefits provided by steel. The girders at the South Boulder crossing are shallower and more closely spaced than existing to preserve the current hydraulics while accommodating the necessary bridge deck cross slope.

Retaining Walls. (See Volume I-A for wall locations and types.) Our design approach minimized the use of retaining walls throughout the corridor where possible. All retaining walls that couldn't be eliminated will be in accordance with CDOT standard wall designs. MSE walls will be primarily used for fill situations with sufficient working head room. At locations with deficient head room, such as under an existing bridge, soil nail walls will be used. Cast-in-place walls will be used in locations requiring minimal wall height. Block walls will be used near the Bikeway alignment where required wall height is minimal. All walls will be built to the requirements in the Ultimate Configuration.

I-25 Initial Work Package

Structure rehabilitation as defined in the Concession Agreement, I-25 Initial Work Package, will be completed in accordance with the information provided by HPTE.

Rehabilitated and Widened Structures

This proposal has two existing bridge structures that will be widened, rehabilitated and remain in place:

- US 36 South Boulder Creek
- McCaslin over US 36

These bridge widenings are described more fully in the following paragraphs.

Rehabilitation and Estimated Service Life

For these widened and rehabilitated bridges, elements that will remain in place include the bridge decks, girders, approach slabs, expansion joints and all substructure units. Many of these elements will receive some repair as part of the proposed work in this Project.

Figure 2.5: Bridge Elements Remaining in Place

Bridge Element	SIA Reported Condition	Action
US 36 Over South Boulder Creek – Widening and Rehab		
Bridge Deck	Good condition. No damage noted.	Repair per RFP. Mill, replace waterproofing membrane, HMA overlay.
Girders	Good condition. Peeling paint and some corrosion noted.	Clean and paint girders per RFP.
Expansion Joints	Asphaltic plug.	Install new joint at both abutments.
Bearings	Pitting or Surface Rust. No Section Loss.	Clean and repaint existing rocker bearings per RFP.
Bridge Rail	Good condition. No damage noted.	All bridge railing will be replaced.
Substructures	Good condition. Some isolated efflorescence and cracking noted.	Patch delaminated/spalled concrete and repair cracks per RFP.
McCaslin Blvd. Over US 36 – Widening and Rehab		
Bridge Deck	Good condition. No damage noted.	Repair per RFP. Mill, replace waterproofing membrane, HMA overlay.
Girders	Good condition. Isolated water staining noted.	Protect girders by replacing deck waterproofing membrane.
Expansion Joints	N/A	N/A
Bearings	Not inspected.	None required.
Bridge Rail	Not inspected.	Both railings replaced by new construction.
Substructures	Water staining.	Patch concrete and repair cracks on abutments and piers per RFP.

Bridge Decks. The bridge decks at South Boulder Creek and McCaslin are protected by an asphalt wearing surface and waterproofing membrane. The wearing surface prevents inspection of the bridge decks from above and so the bridge deck rating is made based on visual observation from below. The inspection reports indicate that both bridge decks rate "good." Given the deck condition, as well as the new

application of a wearing surface and waterproofing membrane, the life expectancy is estimated to be well over 25 years.

Bridge Girders. The bridge girders for all rehabilitated structures should have a much longer life span than the concrete bridge decks, as they are protected for the most part from water and deicing chemicals. Because the McCaslin bridge is jointless, and the entire joint at South Boulder Creek will be replaced by this Project, a major source of corrosion and deterioration is eliminated, namely the intrusion of water onto the girder ends at support locations. Given the current condition, and with frequent future bridge inspections, a service life of 25 years is expected for the girders.

Bridge Rail. All bridge rail on widened structures will be removed and replaced. The life expectancy of this railing is well over 25 years.

Expansion Joints. The PRD team proposes to either eliminate or replace all expansion joints. The replaced joints are expected to have a remaining life of at least 25 years with normal gland replacement. Unless the steel rails of the expansion devices are impacted by snowplow blades, repairs or maintenance beyond replacement of the glands is not expected.

Bridge Bearings. The widened bridges (South Boulder Creek and McCaslin) make use of elastomeric pads. The bearing pads at McCaslin experience no movement and act more as leveling pads than as true bearings. The widened portions of South Boulder Creek use elastomeric pads both in a fixed and expansion capacity. The bearings proposed at these locations will be elastomeric as well. These pads have an estimated life of well over 25 years. It is not expected that they should require replacement any time before the useful service life of the bridge itself.

Bridge Substructures. The existing abutments, pier caps and columns for all bridges remaining in place should not require any significant maintenance or repairs within the next 25 years or even beyond. The inspection reports indicate that existing substructures are in good condition and with continued periodic inspection, significant repairs are not foreseen.

Maintenance Requirements for Aesthetic Enhancements

A colored structural concrete coating or stain and an anti-graffiti coating will be applied, as discussed in Section 2.1.D. The useful life of the colored concrete coating is difficult to estimate and will vary depending on location and exposure conditions. The coating requires little maintenance, but the coating life may be extended in areas that receive salt-laden spray from passing vehicles by periodic washing. Commercial anti-graffiti coatings generally have a limited useful life, particularly if water-blasting is required to remove applied graffiti. Three to four power washings are often cited as the useful limit for these coatings. The coating proposed for use by the Ames/Granite JV has a similar life expectancy. The anti-graffiti coatings are easy and inexpensive to re-apply.

Retaining Walls

A set of wall drawings is included in the set of proposal drawings in Volume I-A. These sheets show the location of each proposed wall on the project, as well as the type of wall currently anticipated at each location. As previously discussed in 2.1.D, the aesthetic treatments on the retaining walls will be developed in conjunction with the appropriate jurisdiction, and all wall-facing elements will be easily maintainable.

2.2.D – Other Project Elements That Will Minimize Operating and Maintenance Costs

The PRD team understands that opportunities to maximize Project value while minimizing maintenance and operating costs extend well beyond pavement and structures. Throughout the development of our proposal, we worked to clearly identify the critical maintenance issues across all Project disciplines, and have developed solutions to deliver a complete facility that maximizes the current and future value for HPTE and all project stakeholders.

Roadway/Bikeway

The PRD team has put great emphasis on improvement of the roadway geometrics to not only enhance the project value and accommodate the Ultimate Configuration, but also to minimize life cycle maintenance costs for HPTE and stakeholders. Examples of refinements made by the PRD team include:

- Improvements to horizontal and vertical alignments to minimize or eliminate retaining walls, reducing the square footage of wall that will need to be maintained over the life of the facility.
- Use of the most maintainable slopes possible within the available ROW to reduce long-term costs.
- Consolidation of sign panels to common structures to minimize the number of overhead sign structures on the Project.

- Improved Bikeway pavement section to minimize swell potential, thereby minimizing potential for Bikeway pavement cracking.

Drainage

The PRD team has developed a drainage design that maximizes the effectiveness of drainage features, minimizing front-end drainage costs, as well as long-term drainage maintenance costs. Our design minimizes closed drainage systems in favor of more easily maintainable open drainage systems. Where closed drainage systems are required, our design decreases the number of required inlets, thereby reducing long-term maintenance costs for US 36. Our design also features a roadway typical section that is crowned at the median wherever possible, thereby locating drainage systems along the outside of the roadway to the extent possible. At South Boulder Creek, where our design matches the existing deck of the bridge and requires a median drainage system, we provide a new drainage outfall to the north. Drainage systems located along the outside of the roadway are easier to access and maintain as opposed to systems that are located in the median.

Our design further minimizes impacts to drainage elements by placing riprap flumes at the ends of ditches to avoid point discharge into irrigation crossings/ditches.

The PRD team proposes to utilize high-quality drainage materials to provide HPTE with a durable product that will maximize design life and minimize future maintenance costs. The PRD team will utilize reinforced concrete pipe for most storm drains, and fused HPDE pipe for storm drains in MSE wall reinforcing zones. This will also provide consistency with Phase 1 in construction materials and methods to benefit all future maintenance needs.

The PRD team recognizes that drainage elements will require maintenance, so our design has been developed to provide maintenance workers with safe and easy access to drainage features. Maintenance access is particularly important for storm water ponds. Similar to Phase 1, our design provides safe and convenient access points for maintenance personnel. In providing maintenance access to ponds, we have incorporated details that enhance the access, including flatter slopes.

ITS/ETC/ATM Components

The PRD team provides HPTE with an ITS/ETC/ATM design that minimizes long-term maintenance costs. We have evaluated the placement of the many ITS/ETC/ATM devices required for the Project and have consolidated devices where possible. For instance, we have consolidated ITS with required ATM sign bridges, which eliminates unnecessary support structures and reduces maintenance costs.

Devices and components are also located at the outside of US 36 to accommodate the Ultimate Configuration where possible. Overhead cantilever structures placed at the outside of US 36 will be constructed in the interim location. However, they will be able to simply be relocated to a new foundation during the Ultimate Configuration construction. Overhead sign bridges and overhead cantilevers located in the median will be constructed at their Ultimate Configuration location reducing future costly rework.

2.3 – Approach and Commitments for the Quality Program

Benefits of PRD Approach:

- Approved Phase 1 Quality Program will expedite start of design and construction.
- Established relationships and processes will streamline review and approval processes.
- Incorporation of current Phase 1 staff into new quality staffing plan will provide consistency and uniformity along the corridor.

PRD will have overall responsibility for assuring a quality program is developed and implemented to meet HPTE's expectations for the Project. During the design and construction phase, PRD will delegate and rely upon the Ames/Granite JV to develop and execute the quality program approved for the Project. The quality program proposed during the O&M period is discussed in Part 3, Volume III - Service Proposal.

HPTE will directly benefit from the Ames/Granite JV's development of the quality program on the US 36 Phase 1 Project. This existing plan can be quickly tailored to address the US 36 Phase 2 Project's specific requirements. By using the master Quality Management Plan (QMP) with specific quality procedures and requirements for Phase 2, we will be able to submit our base QMP immediately following contract award. This will allow the PRD team to quickly gain approval of the master QMP and for HPTE to have confidence an approved and fully comprehensive Quality Management System (QMS) will be in place prior to the start of design and construction.

The PRD team's QMS is derived from the International Organization for Standardization (ISO) 9000 family of standards. These standards represent an international consensus on good quality management practices. For US 36 Phase 2, our QMS will incorporate not only ISO practices, but also the best practices developed through our experience on the US 36 Phase 1 Project and more than 50 similar projects. With our experience, proven systems and award-winning results, HPTE can be confident in our team's ability to design and construct a durable Project that meets your long-term expectations for high-quality public-private works projects.

2.3.A – Provide Quality Policy Approach and Commitments

Our commitment to quality begins with top management, including the Quality Management Committee, which is comprised of executives from PRD, Ames and Granite. For US 36, top management has established the following quality policy statement for the PRD team's quality program:

> *The PRD team is committed to providing a quality US 36 Toll Concession Project that consistently meets or exceeds HPTE's needs and expectations, as defined by the contract requirements. We will accomplish this by integrating design, construction and O&M services working together to plan and provide quality construction, products and services. Our work processes will "build it right" while consistently monitoring and striving for improvement.*

Within our QMS, the role of top management is:

- To establish and maintain the quality policy and quality objectives of the organization
- To promote the quality policy and quality objectives throughout the organization to increase awareness, motivation and involvement
- To ensure focus on customer requirements throughout the organization
- To ensure that an effective and efficient QMS is established, implemented and maintained
- To ensure the availability of necessary resources
- To review and evaluate the performance of the QMS periodically
- To decide on actions regarding the quality policy and quality objectives
- To decide on actions for improvement of the QMS

The foundation of our quality policy is the **process approach** to achieve **continual improvement.** The purpose of the process approach is to enhance the PRD team's effectiveness and efficiency in achieving Project objectives. In relation to HPTE, this means enhancing customer satisfaction by meeting customer requirements. A major advantage of the process approach is in the management and control of the interactions between the functional hierarchies of the organization, which is especially important on a public-private partnership (PPP) Project. The process approach introduces horizontal management, crossing the barriers between different functional units and unifying their focus to the main goals of the organization.

The PRD team's commitment to our quality policy and objectives will be disseminated throughout our organization, including all levels of design, construction and services personnel and subcontractors. Our team also recognizes that quality goes beyond the physical design and construction products. Instead, quality must address all aspects of the Project, including the administrative and management services that are required to ensure that HPTE, CDOT, RTD, local stakeholders and the public all perceive the Project as being a success. The PRD team is firmly committed to developing and maintaining relationships, founded on partnering, that foster open communication and effective issue resolution among all parties.

2.3.B – Provide Quality Planning Approach and Commitments

Founded on our extensive D-B experience and proven industry standards, the QMP will document our commitment to quality and all quality requirements for the Project. Due to the extensive nature of the US 36 Project, the QMP will serve as the foundation for the development of subordinate plans, including the Design Quality Management Plan (DQMP) and the Construction Quality Management Plan (CQMP). These documents, along with the Materials Testing & Inspection Plan (MTIP) and supporting quality procedures, comprise our entire QMS.

The QMP will define comprehensive **proven planning methods** to ensure our team meets all requirements of the contract documents. These planning methods will include specific activities that incorporate quality in all aspects of our work. Quality planning activities for work elements include:

1. Identifying the processes, resources and personnel that are needed.

2. Ensuring the compatibility of design, construction, inspection and testing procedures.
3. Developing and maintaining documented procedures for QA, QC and quality improvement.
4. Identifying all measurable requirements of the contract documents.
5. Identifying hold points for QA and for HPTE's owner verification responsibilities.
6. Identifying, defining and implementing standards of workmanship for features of the work.
7. Identifying, preparing, and maintaining quality records for each feature of the work.
8. Developing a procedure for the preparation, control, approval and distribution of the QMP.
9. Developing effective QA audit procedures.
10. Developing corrective action and quality improvement plans.
11. Developing procedures for regular executive management reviews of the QMS.

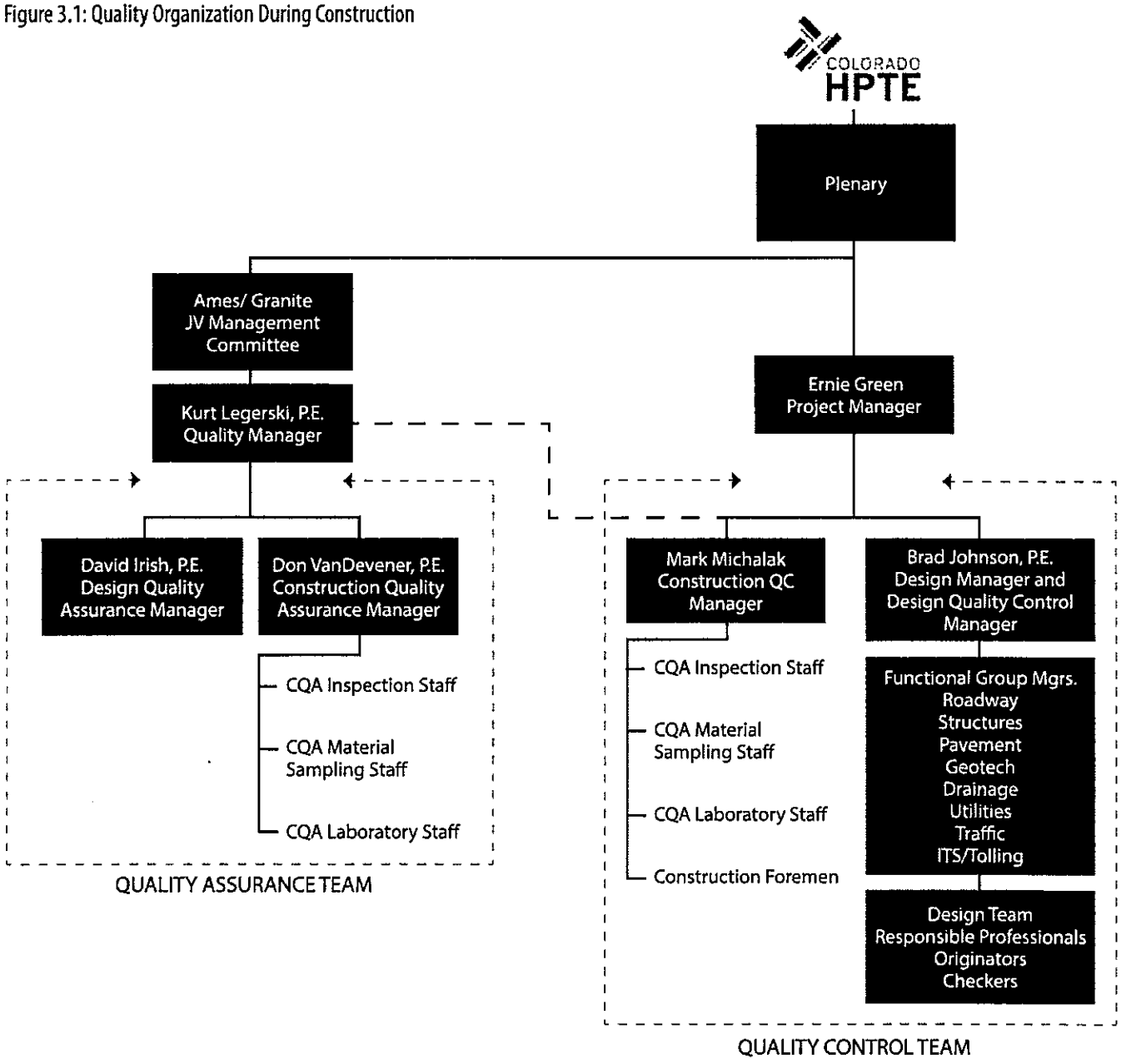
Specific management processes within the QMP address critical elements such as control of documents and records, internal audits, control of nonconforming product, corrective actions and preventive actions. Important elements of the QMP relating to planning are the Quality System Procedures for work plans and pre-activity meetings. Work plans will be prepared for critical construction activities and define the resource requirements, sequence of activities, management of safety hazards and quality hold points, inspections and test requirements. Pre-activity meetings will be held before beginning a new feature of work and provide orientation for the crews on the work plan, specifications, hold points and quality inspections and tests.

Planning is one step in a continuous process to achieve quality. We will implement the "Plan-Do-Check-Act" (PDCA) methodology as described in ISO 9001, which consists of an ongoing cycle of activities:

- **Plan.** Establish the objectives and processes necessary to deliver results in accordance with customer requirements and the organization's policies.
- **Do.** Implement the processes.
- **Check.** Monitor and measure processes and product against policies, objectives and requirements for the product and report the results.
- **Act.** Take actions to continually improve process performance.

While planning will be the first step in ensuring quality workmanship and materials, we will also continue planning throughout the job – adjusting our processes to continually improve our overall performance. The PRD team's planning began with the establishment of a Project organization that is qualified and committed to providing an effective quality program to ensure all work meets the requirements of the contract. Our quality organization, shown in Figure 3.1, illustrates this commitment in addition to showing lines of responsibility, authority, communication and interfaces with HPTE.

Figure 3.1: Quality Organization During Construction



For the leaders of our quality organization, executive management has assembled exceptional quality managers with proven success on similar work.

Kurt Legerski, PE, Quality Manager, has more than 15 years experience managing quality programs on complex transportation D-B and construction projects. His recent, relevant experience includes serving as the Quality Manager/ Construction QA Manager on the US 36 Phase 1 Project.

As Quality Manager, Kurt will be responsible for QA of all construction activities. He will report directly to the Ames/ Granite JV Management Committee and will be independent of the D-B Project Manager.

David Irish, PE, Design Quality Manager (DQM), will be responsible for all QA of design activities. He will report directly to the Quality Manager and will be independent of both the D-B Project Manager and Design Manager.

With 30 years of experience in transportation planning, engineering, and design, David's expertise is in developing and managing quality management systems for D-B projects. Relevant experience includes serving as the DQM on the US 36 Phase 1 D-B and providing Design Coordination and Design Quality Assurance for the $1.3B OTIA III State Bridge Delivery Program in Salem, OR.

Don Van Devener, PE, Construction Quality Assurance Manager, has extensive experience providing QC, QA and quality acceptance services on major highway and transportation-related projects in Colorado. Throughout his 16-year career, Don has performed similar roles on numerous relevant projects, including the Guanella Pass 80-2(4) project, I-70 at Burlington and the Rocky Mountain Arsenal project. Don has expertise in the inspection and documentation of all phases of CDOT projects including field, laboratory and final closeout.

In their roles as Quality Managers, Kurt, David and Don will have the following responsibilities, respectively, for construction and design activities:

- Develop, review and approve the QMP to provide documented procedures and process controls.
- Facilitate oversight of work to assure compliance with the requirements of the contract and the QMP.
- Approve quality processes and procedures.
- Provide adequate resources and trained personnel for QC and QA activities.
- Assure the adequacy and enforcement of quality procedures, processes, inspections and tests.
- Establish and implement procedures to control and assure that work performed by subconsultants, subcontractors and suppliers meet all requirements.
- Assure the approved QMP is being implemented and provide regular reports to the Ames/Granite JV executive management.
- Assure that quality records are properly prepared, completed, maintained and delivered to HPTE.
- Assure that QA staff is independent of the Project Manager and Design Manager and that QA and QC personnel operate independently of each other.
- Continually promote awareness of Project requirements in the contract and QMP.
- Assure, certify and provide documented evidence that the work meets contract requirements.

Throughout his career, **Mark Michalak,** Construction Quality Control Manager, has had the opportunity to build many different types of jobs and has done everything from asphalt paving with rubberized asphalt to crushing and producing on-site concrete and soil cement. Mark has served similar construction QC roles on recent, relevant projects, including the $57M Monument 250/Pack Truck Trail Border Fence D-B project in Dulzura, CA, and the $24M Mesquite Regional Landfill Roads and Drainage project in El Centro, CA.

In addition to his role as Design Manager, **Brad Johnson, PE,** will serve as our Design Quality Control Manager (DQCM), reporting directly to the Project Manager. In his role as DQCM, Brad will be responsible for assuring that process controls, such as checking, independent reviews, and functional group reviews, are in place to assure the design consistently meets requirements for quality assurance and certification.

2.3.C – Provide Quality Assurance Approach and Commitments

The quality control program will be described in the QMP and will include procedures to control production processes to meet all requirements of the contract. QC will include tests and inspections performed at established witness points within the work process or at defined frequencies. A Quality Assurance Program will also be described in the QMP. The Quality Assurance Program defines the procedures necessary to certify that the work complies with the requirements of the contract.

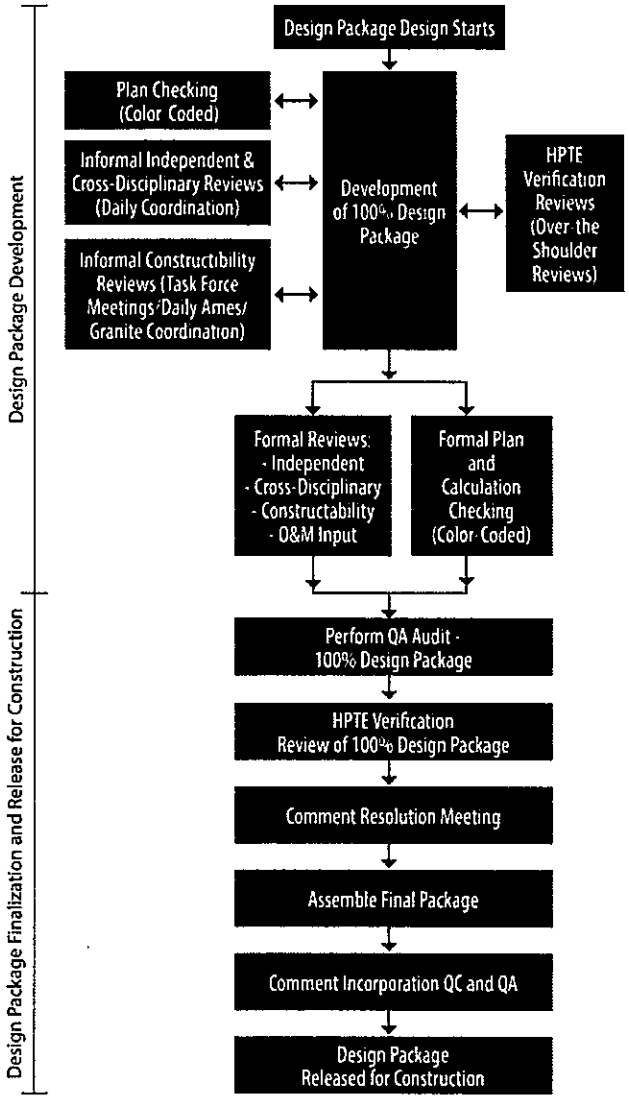
While QC and QA procedures may be similar and interrelated, the PRD team will assure that QA personnel do not participate in any QC activities and that they operate independently of QC personnel. Likewise, we will ensure that tests or inspections performed as part of the QC process are not used to satisfy QA requirements.

Approach for Design Quality Control and Quality Assurance

The DQMP will document our process and procedures to control and independently ensure that the design meets all requirements of the contract. This process is depicted graphically in the flowchart shown in Figure 3.2. The design quality process will include the same activities and steps being utilized on our Phase 1 Project, which include:

- **Design Inputs.** Define design inputs from contract documents and establish communications and checks.
- **Informal and Formal Coordination.** Establish informal and formal coordination between HPTE and PRD team members.
- **Design Task Force Meetings.** Conduct weekly discipline-oriented design task force meetings.
- **Over-the-Shoulder Reviews.** Engage team members and HPTE in over-the-shoulder reviews aimed at issue resolution and expediting formal reviews.
- **Design Progress Review Meetings.** Design progress review meetings will be led by HDR at agreed stages prior to RFC.
- **Released for Construction (RFC) Designs.** RFC designs will undergo QC checking process prior to independent QA.
- **Independent Technical Reviews.** Independent Technical Reviews will occur prior to RFC through a "peer review" arrangement.
- **Function Reviews.** Inter-Project function reviews will be conducted by different disciplines to eliminate design conflicts.
- **O&M Review.** A unique functional review will be conducted by the O&M services team focusing on long-term maintenance and durability of the Project.
- **Design Quality Control Certification.** Certification will be performed by DQCM to certify readiness for QA.
- **Design Quality Assurance Review and Audit.** A review and audit will be performed to assure proper compliance with DQMP and signify the design deliverable is RFC.
- **As-Built Documents.** Documents will be submitted to HPTE for acceptance.

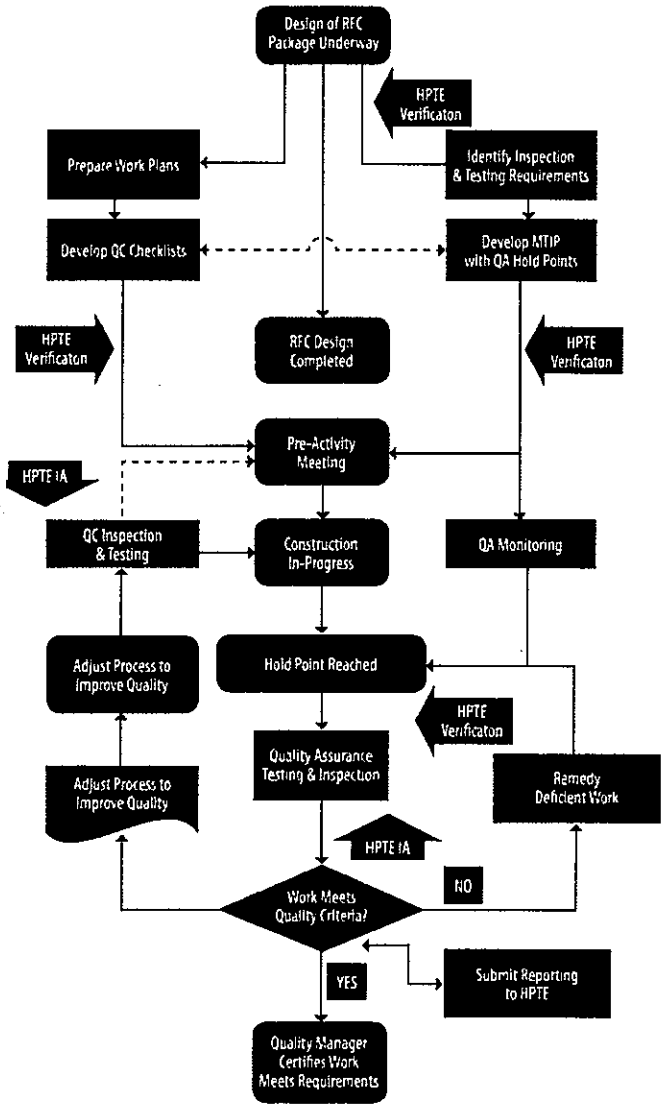
Figure 3.2: US 36 Toll Concession Project Typical Design Development Process



Approach for Construction Quality Control and Quality Assurance

The CQMP will document our process and procedures to control and independently ensure that the construction meets all requirements of the contract. This process is depicted graphically in the flowchart in Figure 3.3.

Figure 3.3: Construction Quality Process Flowchart



The construction quality process will involve specific activities as identified below:

- **Material Testing and Inspection Plan** (MTIP) will identify each work item to be inspected or tested and establish criteria, tests, inspection requirements and frequency for QC and QA.
- Defined **hold points** established in the work activities that require testing or inspection and subsequent authorization before proceeding further in work process.
- **Work plans** prepared for critical construction activities to define quality, production and safety procedures required for work activity to proceed.
- Conduct **pre-Activity meeting** prior to beginning a new work activity to provide orientation for the crews on the work plan, specifications, hold points and quality inspections and tests.
- Work will first pass **QC inspection and testing** to control our construction process and ensure subsequent QA inspection and testing is consistently passing.
- **QC procedures** will incorporate industry standard inspection as well as those outlined in CDOT's Construction Manual, Field Materials Manual, and Standard Specifications for Road and Bridge Construction.
- Statistical analyses of test and inspection results will be used to **monitor, document and adjust**. The results will be used to establish control charts, track variations over time and determine the need for changes or adjustments in the production processes to obtain required quality outcomes.
- **QA Inspection and Testing** will be performed at the hold points and frequencies defined in the MTIP, to independently inspect and test the work to confirm contract compliance.
- **Reporting and Record-Keeping.** Records of all inspections and tests performed will be prepared, maintained and delivered to CDOT.
- **Certification.** With each monthly pay request, the CQM will furnish confirmation that the work produced meets the requirements of the contract documents.

2.3.D – Provide Quality Improvement Approach and Commitments

Monitoring and Measurement. Our QMP will implement monitoring, measurement, analysis and improvement processes needed to ensure conformity of the QMS, continually improve its effectiveness and demonstrate conformity of the product. This is constantly being done through inspections, testing and audits.

Audits will be performed at planned intervals to determine that the QMS performs as planned and is effectively implemented and maintained. Monitoring and measurement

of processes and products will be conducted to demonstrate the ability of the processes to achieve planned results and to verify that product requirements have been met.

Control of Nonconforming Product. The QMP will include procedures to identify, report, control and remedy nonconforming work. The quality system procedure for nonconformance reports will address identification of nonconforming work (including tagging work products), evaluation of nonconforming work, and the means to provide for "repair" or "use as is" dispositions. In addition, the procedures shall ensure that the root cause of nonconforming work is identified and corrective actions are proposed and implemented that will prevent recurrence. The recommended remedy for nonconforming work will require approval by HDR and acceptance by HPTE prior to performance. The QMP provides QA and QC personnel the authority and procedural criteria to stop work that does not comply with Project quality requirements.

Continual Improvement. The PRD team continually strives to improve the effectiveness of our QMS. The QMP provides specific procedures addressing corrective actions and preventive actions. Corrective and preventive action procedures will include:

- Methods to investigate the cause of systemic nonconforming work and determine what corrective action is needed to prevent recurrence
- Methods to analyze processes and records to detect and eliminate the possibility of systemic nonconforming work from occurring
- New quality procedures, revision to existing procedures, re-training of personnel, removal and replacement of personnel, or other actions, to restore or improve the effectiveness of the program
- Methods to prioritize corrective and preventive action efforts based on the level of risk to the quality of work
- Controls to ensure that effective and preventive actions are taken when the need is identified

Preventive actions are taken to eliminate the causes of potential nonconformances in order to prevent their occurrence. Our team empowers its people to identify these potential problems and initiate positive changes to keep the Project in conformance with the requirements.

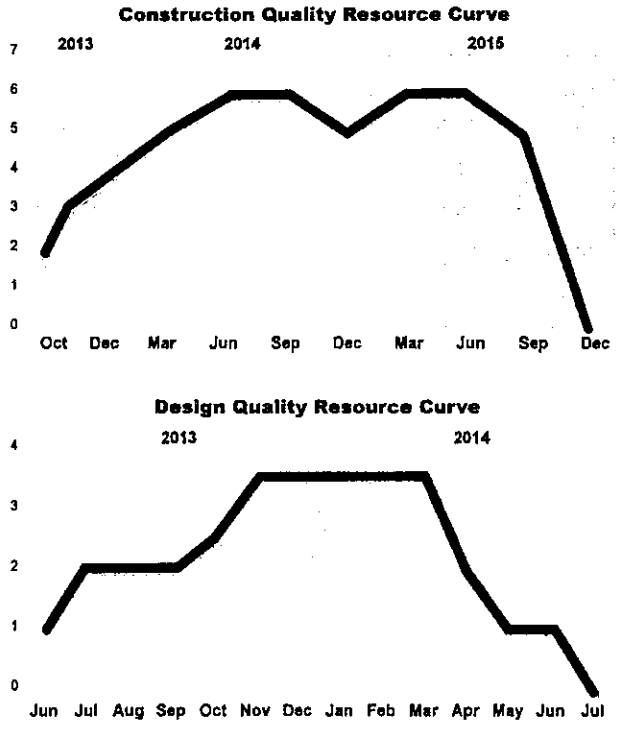
2.3.E – Provide a Quality Resources Loading Curve Depicting Resource Commitments of Quality Personnel for the Duration of the Project

The CQM and DQM will establish and maintain documented procedures for identifying training needs and requirements and will ensure all personnel performing activities that affect quality have been appropriately trained and are qualified. Personnel performing QA and QC activities will be trained in the specific quality plans, processes and procedures as specified in the QMP.

Personnel interfacing with HPTE's oversight efforts will receive specific training so that they understand their roles and responsibilities for cooperating and responding to audits. HPTE Project personnel are encouraged to attend and participate in all QMP training.

Our CQM and DQM will also be responsible for providing sufficient staffing levels for quality personnel to ensure proper control of the work. While these staffing levels may fluctuate with varying levels of design and construction activity, Figure 3.4 indicates our planned resource commitments.

Figure 3.4: Construction and Design Quality Resource Charts



2.4 – Project Management Plan

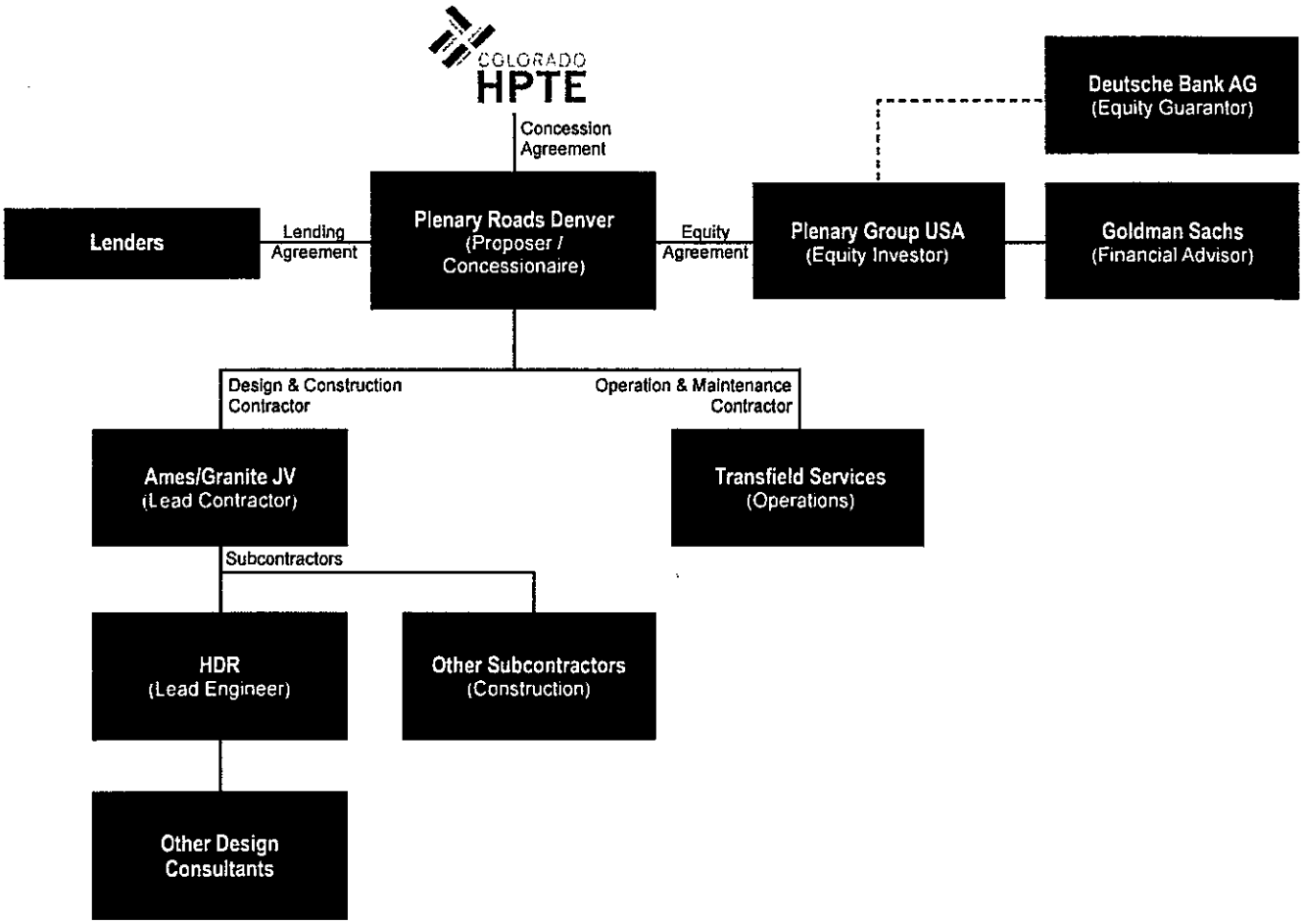
Benefits of PRD Approach:

- Use of design team from Phase 1 will eliminate learning curve, provide consistency and streamline CDOT and third party review and approval.
- Involvement of key Phase 1 management team members, supplemented by added staff, will provide seamless interface between Phase 1 and Phase 2 work activities.
- Co-located Project office as an expansion of the existing Phase 1 office optimizes staffing needs for entire Project team (approved ATC-18).
- Established meeting and communication processes streamline the flow of information within the Project team and with outside stakeholders.

2.4.A – Organization Chart

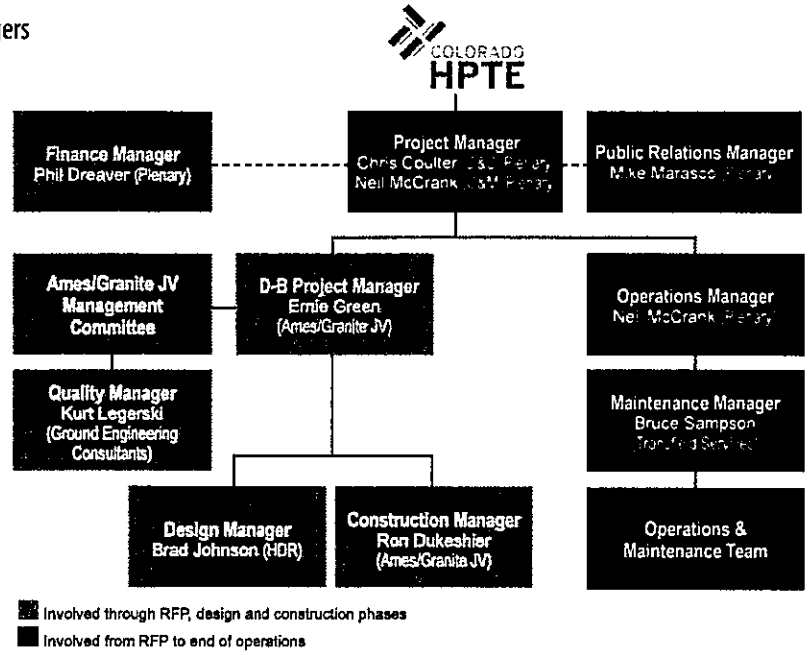
The PRD team has assembled a fully integrated team of financing, design, construction, maintenance and tolling operations professionals for this Project. Our team consists of highly qualified individuals from within the existing organizations of our team members, their specialty subcontractors and subconsultants. The overall structure of our team, and the contractual relationships between the various team members are illustrated in Figure 4.1 below:

Figure 4.1: Overall Structure and Contractual Relationships



Each of the firms on the PRD team has drawn from its pool of experienced senior personnel to staff the US 36 Project. Key functional managers at the upper levels of the PRD team's organization are identified in Figure 4.2 below:

Figure 4.2: Key Managers



With the exception of the Construction Manager, all of these individuals are the same individuals that were identified in our Statement of Qualifications. A more detailed listing, and information about the identified list of HPTE-designated Key Personnel, is provided in Section 2.5 of this proposal.

Equity Member. The PRD team for the US 36 Managed Lanes Concession Project is led by Plenary Roads Denver, a business unit of Plenary Group USA, Ltd. Project equity will be contributed by Plenary Group (Canada), Ltd., the largest PPP availability concession business in Canada (based on number of projects), where it performs the same role on each of these projects as it will on the US 36 Managed Lanes Concession Project. As shown on the organization chart, Plenary will coordinate the financing for the Project using a number of advisors, lenders and equity investors. The organization of the financial elements of the PRD team are addressed in detail in Part 2 – Financial Proposal. In addition to coordinating and providing all of the required financing for the Project, PRD will actively manage the Project delivery, from design and construction through the entire operations period.

The PRD team's organization below the Plenary umbrella is divided into two distinct elements – the D-B organization responsible for providing the completed facility, and the O&M organization that will operate and maintain the facility over the 50-year concession period.

Design-Build Organization

The detailed organization chart can be found as Figure 4.4.

Lead Contractor. The **Ames/Granite JV** will manage the D-B organization. This joint venture combines the extensive resources and talents of Ames Construction, Inc. and Granite Construction Company. This same joint venture is currently CDOT's prime contractor on the adjacent US 36 Phase 1 Project. These two large highway and heavy civil contractors are both CDOT-prequalified general contractors. Their proven local experience, extensive resume of successfully completed urban freeway D-B projects and current presence on the adjacent D-B Project makes them an ideal leader for the PRD team's D-B responsibilities on this Project.

Lead Designer. HDR Engineering, Inc. (HDR) will be a subcontractor to the Ames/Granite JV, and serve as the Lead Designer for the Project. HDR has completed over 30 large D-B transportation projects across the United States, including four large urban freeway reconstruction D-B projects with Ames and Granite. HDR is currently the lead designer for the Ames/Granite JV's US 36 Managed Lanes D-B Project.

Seamless Interface with Phase 1 Project. As the D-B contractor for the US 36 Phase 1 Managed Lanes/BRT D-B Project, the Ames/Granite JV is in an excellent position to coordinate and seamlessly integrate the Phase 2 Project with its Phase 1 work. Financial close and notice to proceed for

Phase 2 will not occur until mid to late 2013. By that time, design for Phase 1 will be complete, and construction will be well underway. This will allow many people from the Phase 1 design team to participate in the Phase 2 design efforts.

In addition, the Ames/Granite JV D-B management staff on Phase 1 consists of senior, experienced D-B personnel who will easily be able to handle the Phase 2 extension of the Project toward Boulder. Key personnel on Phase 1 will assume some responsibilities on Phase 2 to provide HPTE and CDOT with a uniform and consistent approach along the corridor. However, since there is a schedule overlap of about a year for major construction activities, we will provide a significant number of new staff members who will be dedicated to the Phase 2 construction.

Our team's ability to seamlessly coordinate the delivery of both phases of the US 36 Project provides a number of significant benefits to HPTE and CDOT, including certainty of delivery and consistency. Other benefits include:

- Consistency of design and construction will provide a uniform highway and managed lanes facility throughout the entire US 36 corridor.
- Enhanced ability to easily coordinate construction and maintenance of traffic activities between the two contracts will minimize impacts to motorists while construction is underway on either Project.
- Ready access to approved quality management, PI and other required management plans from the Phase 1 Project will expedite the start of construction on the Phase 2 Project.
- Establishing the Phase 2 Project office as an expansion of the existing Phase 1 office (**ATC-18**) will provide staffing efficiencies for both the design-builder and HPTE/CDOT, and allow both teams to work efficiently starting on day one.
- Established working relationships between the Ames/Granite JV and CDOT Project personnel will enhance coordination and cooperation for the Phase 2 work. Our D-B personnel have already learned how to work together.
- Established communication channels with utility companies common to both Projects will speed completion of utility relocation agreements and work orders.
- Staggered design schedules allow seamless transition of many design staff members who performed the Phase 1 design.
- Relationships that were established with local jurisdictions during Phase 1 work will enhance coordination and cooperation with these agencies during execution of the Phase 2 work.
- Consolidated PI program for both contracts provides stakeholders and the traveling public a single source for traffic and construction information along the entire corridor.

In summary, the majority of the D-B work on the US 36 Managed Lanes Concession Project can, for the most part, be managed by both the Ames/Granite JV and the HPTE/CDOT Project staff as a major expansion of the existing Phase 1 D-B Project, resulting in significant efficiencies for both parties. However, we recognize that the Phase 2 Project area presents a much more complex group of challenges relating to environmental issues than our D-B team had to address in Phase 1. The Phase 2 work will require properly timed surveys for Ute-ladies'-tresses orchid, Preble's Meadow Jumping Mice, burrowing owls, raptors and migratory birds, and potential relocation of Black Tailed Prairie Dogs. Many of these activities can only be performed in certain seasonal windows. Our approved **ATC-15** addresses our **value-added** plan to work with HPTE and CDOT during the period prior to financial close to accomplish necessary work tasks that will then allow us to perform critical construction work during the winter of 2013/2014.

In addition, a significant number of irrigation facilities cross the Phase 2 alignment and the Phase 2 schedule will require intense up-front coordination with the irrigation companies so that the relocation/replacement of these conduits does not adversely impact the Project completion schedule.

Consequently, we will establish a **value-added** special task force to focus on these front-end environmental and irrigation coordination issues shortly after we are selected as the preferred proposer. This team will proactively address the preliminary environmental and irrigation coordination issues that have the greatest potential to impact the Project schedule. They will be responsible for ensuring that the required environmental surveys are performed within the designated time frames, the irrigation company reviews and approvals are completed by the time construction begins in the fall/winter of 2013, and that all permits are acquired to facilitate a timely construction start shortly after financial close.

This D-B organization chart identifies the planned organizational structure of the D-B portion of the PRD team. As indicated on the organization chart, some of these individuals are already working on the Phase 1 Project. These individuals have been clearly identified on the organization chart to illustrate the close working relationship and extensive knowledge transfer that will be possible between these two projects. We will add additional personnel to augment our Phase 1 staff, thereby allowing the designated "dual-project" staff members to successfully perform their assigned roles. This integration of Project staff will provide a unique level of consistency and continuity between the two Projects during the D-B period. One of the significant benefits our team brings to HPTE is this inherent ability to more efficiently design and construct the Phase 2 Project.

Operations and Maintenance Organization. The other major component of the PRD team's organization will be responsible for operating and maintaining the facility for the duration of the concession period. This portion of the team will mobilize to the site as the various segments – I-25, US 36 Phase 1 and eventually the entire corridor – are turned over to our team. The details of the Project organization during this phase of the Project are presented in Volume III – Service Proposal.

2.4.B – Project Communication and Management

Note: We recognize that HPTE interfaces with a project management team that also includes representatives of CDOT and RTD. Throughout the management narrative, when we refer to "HPTE," we are referring to this entire management team.

The PRD team provides HPTE a unique ability to streamline Project communications during the D-B period. Our team includes the Ames/Granite JV as lead D-B contractor. Since the Ames/Granite JV is also CDOT's D-B contractor for the Phase 1 D-B Project, we will set up the Phase 2 Project office as an expansion of our existing Phase 1 office. Using this approach, HPTE, CDOT, PRD and the Ames/Granite JV staff – both Phase 1 and Phase 2 – will be co-located in the same office. This will provide an environment that maximizes opportunities for convenient communication and enhanced cross-Project collaboration and coordination.

During the D-B period, all formal communications will be between the designated representatives of HPTE and PRD's Project Manager. However, we also hope to take advantage of the close working relationships that have developed between the Ames/Granite JV and CDOT staff members at the Project level. Our **value-added** ATC proposal to consolidate the Project office will preserve our current "open office" atmosphere through the Phase 2 Project. This office arrangement will continue to allow the PRD team and the HPTE team to openly and informally discuss day-to-day planning, alternate design approaches, third party questions and other issues. This type of working relationship at the Project level reflects our desire for a true partnering relationship with HPTE, where everyone is focused on providing the best value for the overall Project.

We note that this section of our proposal is focused on the construction period. A description of PRD's approach to management and communication during the O&M period is presented in Part 3, Volume III - Service Proposal.

Approach to Management and Communication

The following items are key elements of our approach to management and communication processes during the D-B portions of this Project:

A Single Point of Responsibility. During the D-B period, the PRD Project Manager, Chris Coulter, will have full authority over and responsibility for the Project. He will be PRD's primary contact with HPTE, will oversee all Project operations and make final decisions regarding all administrative, technical and contractual matters. His responsibilities include coordinating and integrating the work of the D-B team, led by the Ames/Granite JV, and the O&M team, led by Transfield Services.

Once construction is complete, the project manager role will transition to the PRD O&M Project Manager, Neil McCrank. He will be HPTE's primary point of contact, and have authority to make decisions for the Concessionaire during the O&M period.

Consistency of Design-Build Organization. Ernie Green will manage all activities of the D-B subcontractor and will report to Chris Coulter. He will oversee all Project operations for the D-B organization. Ernie is currently the D-B Project Manager for Phase 1. As discussed in Section 2.5, additional personnel will be added to the Project staff, thereby allowing Ernie the ability to jointly manage the D-B efforts on both Projects. Brad Johnson, who is currently managing the design of the Phase 1 Project, will serve as the Design Manager for Phase 2. This consistency of key personnel will provide HPTE and CDOT assurance of a consistent design approach, and a well-coordinated construction effort along the entire length of the US 36 corridor.

Experienced Personnel Leading All Tasks. Our team has experienced lead personnel in all areas. All of our key managers, the designated D-B and O&M leads, as well as the PI, quality and safety managers have been selected for their relevant experience. Many of the discipline design leads from Phase 1, for which design will be complete before Phase 2 design starts, will be assigned similar roles in the Phase 2 design organization.

Clear Lines of Reporting. The organization chart for this Project (Figure 4.4) shows our team's structure and illustrates the interactive, functional relationships among the various departments. We have clearly identified individual responsibilities and authority in order to facilitate optimal communication and decision making. Since many of the proposed D-B staff members are currently working on Phase 1, these levels of responsibility and authority are already understood. The planned structure of the O&M organization is presented in Volume III – Service Proposal.

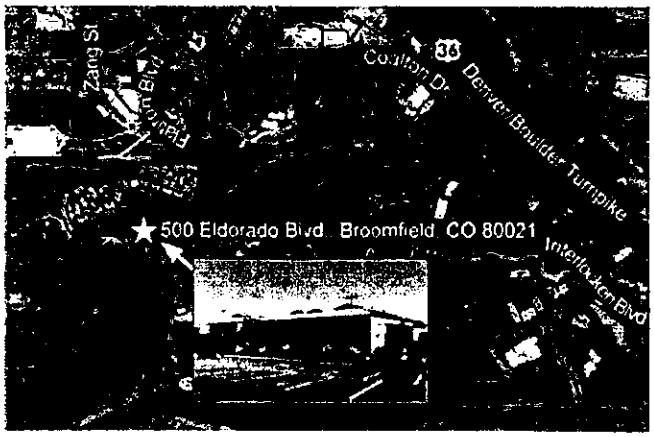
Efficient Task Forces. Our management plan emphasizes the use of a number of discipline-specific task forces. During proposal preparation, the Ames/Granite JV established major discipline task forces. The preliminary design and all proposed ATCs were reviewed and approved by our O&M team members before being submitted to HPTE. Once the contract is awarded, these task forces will continue to meet. The task forces include the design, construction and O&M members of the PRD team, and HPTE will be encouraged to participate in the task force activities. This is identical to the way the Ames/Granite JV and CDOT/RTD are working together on Phase 1.

Full Integration of HPTE Staff, Consultants and Stakeholders in Design-Build Process. The PRD team will fully involve HPTE in the planning and implementation of design and construction. Early and consistent involvement of HPTE contributes to the success of the Project. We have found that the most successful projects are the ones on which the designers, constructors, operators and owners collaborate closely throughout the design and construction process, resulting in a completed project that addresses the needs and concerns of all parties.

Co-Located Project Office. Project design and construction activities will be managed from a co-located Project office set up as an expansion of the current Phase 1 Project office at 500 El Dorado Boulevard in Broomfield, as shown on Figure 4.3.

The PRD management team, and all lead design and construction staff members for both Phase 1 and Phase 2, will be based in this office. This shared facility enhances communications at all levels of the Project team, and will facilitate the participation of HPTE in over-the-shoulder reviews, design coordination meetings and task force activities. Co-locating the Project office with the Phase 1 Project team will significantly enhance communications between the respective design and construction teams, and enhance coordination of activities between these two major Projects on the US 36 corridor. In addition, the consolidation of the two Project offices will allow HPTE and CDOT to maximize the utilization of their office support staff and other Project personnel.

Figure 4.3: Project Office Location



Internal Management Processes

Our internal management processes are described in the following sections.

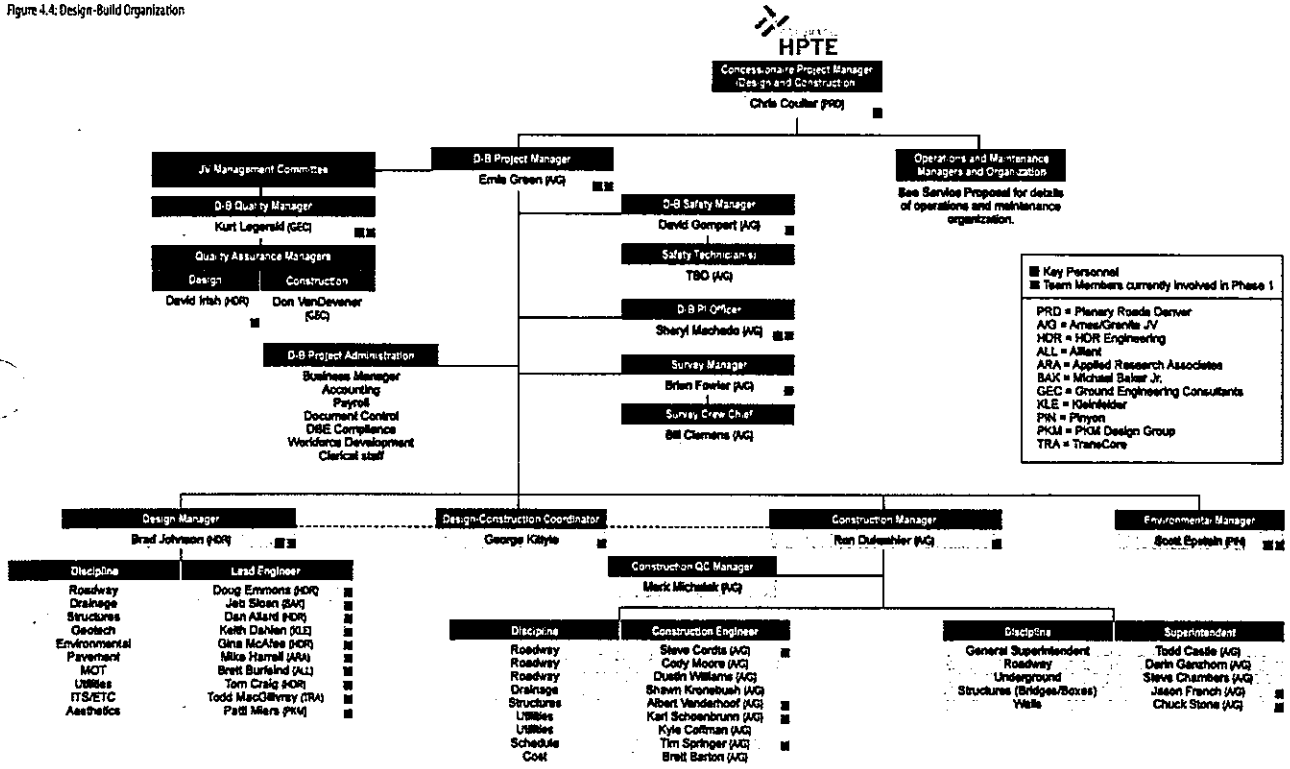
Design Management. The Ames/Granite JV has again selected HDR to lead the design effort – continuing the relationship that currently exists for the Phase 1 Project. HDR has again engaged the services of Michael Baker, Inc. to support the design effort. Brad Johnson of HDR will again serve as the Design Manager. Brad will be responsible for the coordination and execution of all design-related work on the Project. He will report to Ernie Green of the Ames/Granite JV, the D-B Project Manager. Brad will be supported by a group of experienced discipline design leads, as shown on the organization chart. Key elements of our design management approach include the following:

- Experienced design team will be led by a design manager with proven experience managing the design on large urban freeway D-B projects, including the US 36 Phase 1 Project.

Please see Page 43 for continued discussion.

Proposed Design-Build Organization. A detailed organization chart for the D-B portion of the PRD team is provided as Figure 4.4.

Figure 4.4: Design-Build Organization



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- Engineering tasks have been grouped by discipline to match the structure of the task forces.
- Design activities will be based in a co-located Project office to facilitate communication among the design, construction and O&M members of both the PRD and HPTE teams. Design discipline leads will be based in the co-located Project office.
- Our organization includes the same D-B Coordinator, George Kittyle, we used on Phase 1 to help facilitate the necessary communication and interaction between design, construction, O&M and HPTE staff members.

Construction Management. The Ames/Granite JV will be the lead contractor on the Project, and will self-perform large portions of the work. Ron Dukeshier will be the Construction Manager, responsible for the coordination and execution of all construction work on the Project. Ron will report to Ernie Green, the Project Manager. Ron will be supported by a group of construction superintendents, engineers and subcontractors, as illustrated on the organization chart. Key elements of our construction management approach include:

- The experienced construction team will be led by a construction manager with proven, large D-B Project experience.
- Lead construction personnel in each discipline will be involved during the design process to facilitate communication with the design leads and provide input regarding constructability.
- Maintenance of traffic is recognized as a critical element in the success of the Project, and the construction manager and lead discipline superintendents will participate on the maintenance of traffic task force.
- The Quality Manager and his staff will participate in the task force, design review and regular Project progress meetings.

Cost and Schedule Tracking. The members of the Ames/Granite JV have significant experience working in joint venture arrangements. Similar to our approach on Phase 1, we will use established cost and schedule monitoring processes to monitor the progress of this Project. These processes include the use of CGC cost accounting software and Primavera P6 scheduling software.

These established procedures allow our project management staff to track actual design or construction cost and progress against established targets. Regular monitoring and reporting allows us to identify potential problem areas early, giving our management staff an opportunity to more quickly modify operations or implement corrective actions. During preparation of this proposal, our team members developed a comprehensive P6 critical path schedule for the Project. A summary of this schedule is included in Section 2.8, which defines our commitments for completing work on this Project.

Document Control. The Ames/Granite JV's document control will utilize CDOT's Aconex system to transmit and receive official Project documents. This will allow the Project team to effectively communicate with the same system we are currently using with CDOT and RTD on the Phase 1 Project. Project documents will also be organized and stored at the Project office in a traditional file system on the Ames/Granite JV's Project server. Hard copies of certain documents will be filed in the Project office for convenient access. ProjectWise will be used to control and store design documents during the development of the design.

In addition, once a package is released for construction (RFC), it will be uploaded to a Microsoft SkyDrive established for the Project, allowing the Ames/Granite JV's personnel, subcontractors, consultants and HPTE/CDOT direct access to the most current RFC drawings. On the Phase 1 Project, we are developing a system that allows the Project team, including CDOT, to use electronic tablets to access the plans from SkyDrive. Document control is critical to effective management of a D-B project, where design documents are issued in discrete packages. Thorough document control is an important part of the overall quality process. Our document control procedures will ensure that only the most current, approved documents are used for construction.

Safety Management. The construction organizations on the Ames/Granite JV establish safety as the highest priority on all of their projects. Both companies have excellent safety records, and this corporate culture carries over to their activities as a joint venture. The Ames/Granite JV is committed to promoting, establishing and maintaining a safe environment for both our workers and the general public, and creating an atmosphere where accidents will not occur.

The success of our safety efforts is demonstrated by the excellent records of our team's individual companies. Each firm's statistics are consistently far better than industry averages. Key elements of our safety program include:

- Safety is never sacrificed for schedule, production or cost savings.
- Each employee is held accountable for creating a safe and productive job site and looking out for one another.

- All potential employees are subjected to pre-hire drug and alcohol screening.
- All new employees receive a comprehensive new-hire orientation and safety training.
- All employees participate in daily safety briefings, weekly toolbox safety training and task-specific training before beginning new work activities.
- Specific work activity plans are developed for special or unusual work activities, such as critical lifts, work over traffic or major traffic switches.

Environmental Compliance. Many of the design and construction staff members on the Ames/Granite JV have worked in the Colorado area for many years, and are very familiar with local, state and federal environmental requirements for the types of work that will occur on this Project. Our Environmental Manager will work with our design and construction teams make sure that all ROD commitments and other environmental requirements are addressed in design, and complied with during construction.

Our staff understands the processes, procedures and permitting requirements of the regulatory agencies that have jurisdiction over the various aspects of the work. We've constructed many similar projects with excellent environmental results. Our approach to environmental compliance is described in detail in Section 2.6 of this proposal.

As indicated earlier, we recognize that Phase 2 is a much more complex project from an environmental standpoint. We will establish a special task force to deal with these issues, particularly at the beginning of the job, when seasonal surveys and preliminary permitting activities need to be quickly completed. Scott Epstein of Pinyon Engineering, who is serving as the Environmental Manager on Phase 1, will be assisted by Gina McAfee of HDR during these early activities. Gina's extensive experience with environmental issues and concerns along the US 36 corridor will enhance our ability to complete the necessary activities in a timely manner.

Quality Management. The D-B members of the PRD team have successfully implemented contractor-controlled quality programs on large D-B projects of this type, and are currently executing the quality program on Phase 1. Kurt Legerski of GROUND Engineering Consultants, our proposed Quality Manager, is currently managing the quality program on the Phase 1 Project, and is also the Construction QA manager for that Project. Once Phase 2 begins, GROUND will transition Erik Campbell to be the Construction QA Manager on Phase 1, thereby allowing Kurt to assume the overall Quality Manager responsibilities for both Phases 1 and 2. Don VanDevener, PE, will be assigned as the Construction QA Manager for the Phase 2 Project. Our proposed quality program is described in detail in Section 2.3.

Internal Communication and Coordination

Communication within the PRD team, as well as the Ames/Granite JV D-B organization, is facilitated by both our organizational structure and our approach to execution of the D-B process. Our organizational structure provides parallel design and construction discipline leads with strong communication links, and includes a D-B Coordinator. This **value-added** position provides a full-time individual whose primary responsibility is to facilitate the critical communications between the design, construction and O&M portions of the PRD team for the full duration of the design work. Our approach to execution of the design and construction process is based on the task force organization described below.

Task Forces. The use of the task force approach to D-B assures close contact among the discipline-related design, construction, quality and O&M personnel during design development and construction. This relationship will be central to facilitating design development and constructibility reviews, ensuring quality input and checks, resolving issues and assuring that long-term life cycle and O&M costs have been properly considered for each specific design discipline.

Each discipline-specific task force will include representatives from each applicable area of the organization – design, construction, quality and O&M – and we will encourage representatives of HPTE's team to participate in the task force meetings and discussions. Depending on the specific work scope being addressed, the task force meeting might involve safety, environmental or PI personnel, or representatives of the affected city or other third party stakeholder, as deemed appropriate by PRD, the Ames/Granite JV, Transfield and HPTE. This approach provides for full integration of the entire team.

The task force structure promotes communication and sharing of ideas, which are critical elements for effective integration of the design, construction, quality and O&M elements of our team. Our team members have found this approach keeps every team member updated on design and construction status. It also maximizes the integration of constructability and maintainability during the design process, the time when the most significant improvements in life cycle cost can be achieved. Task forces also allow for more informed and timely

decision making. This structure allows the Project team to identify and address problems earlier and implement corrective actions more efficiently.

Co-Located Office during Design-Build Period. Based on our previous D-B experience, we know that executing a D-B project from a co-located office has many benefits. Therefore, we will establish a project office as an expansion of the Phase 1 Project office immediately after award of the contract. All project management staff from both projects, the lead designers and most of the design staff will work from this office. Plenary's Project Manager will also conduct his project construction period work from this location.

This approach significantly enhances internal communications. Instead of waiting for a regularly scheduled weekly meeting, people can easily walk down the hall to discuss a question or concern with other members of the team. The designers can get immediate feedback on their questions, and the construction staff can monitor the ongoing design process. Small group meetings focused on a specific issue can be arranged quickly, since the participants for those meetings are all in the building. The close proximity of design and construction team members from both Phase 1 and Phase 2, as well as the Concessionaire's Project Manager, in a co-located office setting significantly improves the frequency and quality of team communications.

Regular Meeting Schedule. The PRD team knows that effective project management requires adherence to an established meeting schedule. For this reason, we will conduct regular meetings during the D-B period to keep all team members informed of the status of the Project and help staff members coordinate design and construction schedules. We also know that regularly scheduled design coordination meetings are essential to keep everyone up-to-date on the status of design activities and to provide coordination and control during the design process. All meetings will have published agendas, minutes and action item lists. The anticipated schedule and frequency of regularly scheduled internal meetings is shown on Figure 4.5. Regular meetings will continue to be conducted during the full operations period, as described in greater detail in Part 3, Volume III - Service Proposal.

Communication and Coordination with HPTE and RTD

On a project of this type, the PRD team considers communication with HPTE, RTD and their consultants as "internal," not "external" communication. We encourage HPTE's and RTD's active participation in the task force process and their attendance at regularly scheduled design review, construction progress and transition planning meetings.

Task Force Participation. As indicated earlier, we will fully integrate HPTE and RTD into our D-B task forces immediately after award. We will encourage HPTE, RTD and their consultants to become full and active members of our Project team. Their active participation in our task forces will enhance their understanding of the Project, and keep their staff engaged in the problem-solving process.

Co-Located Office Facility. The other benefit of the co-located Project office is that it allows HPTE and RTD to become fully integrated into the D-B process. During the design phase, your representatives will be in close contact with our designers and key staff in each discipline, which will make the design review process more efficient. We will encourage the participation of HPTE and RTD in the regular design coordination meetings, and HPTE and RTD will have access to the current Project design information via the ProjectWise software.

Figure 4.5: Anticipated Meeting Schedule

Type of Meeting	Suggested Attendees	Frequency
Daily Briefing	Foremen, craft workers, subcontractors, QC/QA inspectors, safety representatives, HPTE/CDOT/RTD, project management	Daily prior to the start of each work shift
Design Task Force Meeting	Design discipline lead, construction discipline superintendents, D-B Coordinator, HPTE/CDOT/RTD, project management	Weekly for each discipline
Design Coordination Meeting	Design Manager, Construction Manager, D-B Coordinator, HPTE/CDOT/RTD, project management	Weekly during design process
Maintenance of Traffic Coordination Meeting	Construction Manager, Traffic Control Supervisor (TCS), PI Officer, Safety Manager, HPTE/CDOT/RTD, project management	Weekly and before each major traffic switch
Project Status Meeting	Plenary Project Manager, D-B Project Manager, Design Manager, Construction Manager, Quality Manager, PI Officer, Safety Manager, Utility Coordinator, Subcontractors (as requested), Traffic Control Supervisor, QC Manager, QA Manager	Weekly

Type of Meeting	Suggested Attendees	Frequency
PI Status Meeting	Plenary Project Manager, PI Officer, CDOT PI staff, project management	Weekly
Schedule Status Meeting	Project Controls Manager, Project Manager, Design Manager, Construction Manager, PI Officer, Utility Coordinator, HPTE/CDOT/RTD	Monthly
Executive Management Review Meeting	JV Management Committee, Plenary Project Manager, D-B Project Manager, Design Manager, Construction Manager, PI Officer, Quality Manager, Safety Manager, senior HPTE/CDOT/RTD staff	Quarterly
Operations/ Construction Coordination Meeting	Plenary Project Manager, D-B Project Manager, Operations Project Manager	Monthly
Transition Planning Meeting	Plenary Project Manager, D-B Project Manager, Operations Project Manager, HPTE/CDOT/RTD	Monthly; Weekly in the Period Leading Up to Full Services Commencement
Operations Meeting	Plenary Project Manager, Operations Project Manager, HPTE/ CDOT/RTD	Monthly Beginning at Full Services Commencement

Regular Meetings. As indicated in Figure 4.5, HPTE and RTD will be invited and encouraged to attend certain regularly scheduled meetings. We want the HPTE and RTD staff to become fully integrated into our team. HPTE and RTD will also be informed of, and invited to attend, all meetings that we hold with other stakeholders.

Communication and Coordination with Local Agencies, Utilities and Irrigation Companies

The PRD D-B team recognizes the importance of maintaining clear and open communications with the local jurisdictions, as well as the private utility and irrigation companies. To the extent permitted by the RFP, members of the Ames/Granite JV have met with City and County staff from Louisville, Superior and Boulder during preparation of this proposal to obtain their feedback on our plans for relocation of their utilities. We have also met with or talked to each of the private utility and irrigation companies impacted by the Project, several of them on more than one occasion, to discuss plans and schedules for the required relocation or reconstruction of their facilities.

Maintaining clear and open lines of communication with these third party stakeholders is important to the success of the Project because our design and construction activities will have significant impact on their current facilities. In addition, their schedules for work on their facilities, such as their relocation of utility lines, are critical to facilitating our construction activities. We will use slightly different methods of communication and coordination with each of these groups of stakeholders.

Local Jurisdictions. It is critical that we communicate and carefully coordinate our D-B efforts with the applicable representatives of the local jurisdictions. This Project will affect their existing infrastructure – streets, traffic signals and street lighting, as well as water, sewer and storm drainage systems.

The local agencies will be required to review and approve our design as it relates to those elements, so it is important that they be kept informed of our intentions as we progress through design. Typically, this interaction involves different people from the agency's staff. Depending on the structure of the city's organization, we may have to communicate with representatives of the Public Works Department, the Sewer and Water Department, the Traffic Department or other departments within the city organization, depending on which portion of the Project we are discussing.

In conjunction with HPTE, we will hold periodic meetings with the appropriate representatives of the local jurisdictions throughout the design and construction process. These meetings occur on an as-needed basis, depending on status of design and construction activities in the corridor. These meetings provide their representatives insight into our design intent, and allow an opportunity for their representatives to express their opinions and state their preferences. In certain circumstances, we have invited representatives of the third party agency to participate in our task force meetings. This early and active participation familiarizes the agency representatives with our approach to the Project, and usually expedites their formal review and approval process.

Utility and Irrigation Companies. These represent other critical groups of third party stakeholders. Most of the utility owners who have facilities within the corridor are going to be relocating or adjusting some of their facilities to accommodate the planned construction. Our approach to communication and coordination with them is very focused. We will hold one initial "utility kick-off" meeting that includes all of the utility and irrigation companies. During this initial meeting, we will introduce our utility relocation and coordination representatives, provide general information about the Project and the work schedule and develop a list of contact names and phone numbers.

After that initial meeting, all future meetings will generally be held on a one-on-one basis with the individual companies. These meetings generally concentrate on a single relocation, or a specific group of relocations that affect that company. Our utility coordination staff will continue to meet with the affected utilities until the design and construction of their required relocation work has been completed.

The D-B organization includes, as a **value-added** benefit, a full-time Construction Utility Coordinator to manage all utility activities in the field. The duties of the Construction Utility Coordinator include:

- Coordinating field activities for all relocations and betterments, and monitoring the work effort
- Taking responsibility for locating, surveying and marking all underground utilities, including coordinating with the Utility Notification Center of Colorado
- Coordinating utility relocation work with other Project activities to minimize maintenance of traffic impacts to the public
- Verifying that relocated services are installed in the proper location
- Ensuring that all work is performed according to the applicable requirements and is properly tested and inspected
- Coordinating with the Utility Task Force
- Monitoring and verifying that utility relocation activities are completed on schedule
- Updating the information on the utility tracking report

Communication and Coordination with Other Stakeholders

Clear, accurate and meaningful communication with the many groups of other stakeholders will be critical to success of the Project. These other stakeholders include a variety of different groups, including:

- Motorists on US 36 and the adjacent local street system
- Pedestrians and bicyclists in and near the US 36 corridor
- Local community or advocacy groups, such as 36 Commuting Solutions and Boulder Transportation Connections
- Property managers
- Hospitals and schools
- Large employers and businesses along the corridor
- Local residents
- Emergency services providers – police, fire, sheriff and ambulance services

The members of the PRD team have successfully completed many large D-B urban freeway reconstruction projects and have successfully carried out O&M activities on operating highways. The key to successful communication with these groups is to keep them informed about the progress of design, construction and maintenance and provide advance notice of any changes in traffic patterns that will affect their normal activities.

Communication with these groups of stakeholders during the construction period will be the primary focus of our team, led by Sheryl Machado, the D-B PI Officer. We consider the entire project management staff as part of our PI team. Although Sheryl will coordinate the efforts, we have found that it is important that our management team, particularly Ernie Green, the Ames/Granite JV Project Manager, and Ron Dukeshier, the Construction Manager, actively participate in these efforts. These individuals have detailed knowledge of planned activities and can best describe upcoming work and impacts to concerned neighbors. Plenary's Public Relations Manager will work with Sheryl to coordinate overall communications strategy to ensure consistent messaging across the entire PRD team. Our approach to PI is described in detail in Section 2.10.

2.4.C – Approach to Partnering

The major participants on the PRD team – Plenary, Ames, Granite, HDR, Baker and Transfield – share a similar corporate culture related to partnering. We work closely with our clients, solving problems and resolving issues on a day-to-day basis. We focus on working cooperatively as a team for the ultimate benefit of the Project. Each of our individual firms routinely does business this way, and that is the way that we will approach the US 36 Managed Lanes Concession Project. Either Granite or Ames was the first contractor to partner with state highway departments in Arizona, California and Nevada when the formal partnering process first began to be implemented, and

Figure 4.6: Marvin Black Award

our firms have won a combined 18 Marvin M. Black Excellence in Partnering awards, the highest national award for partnering.

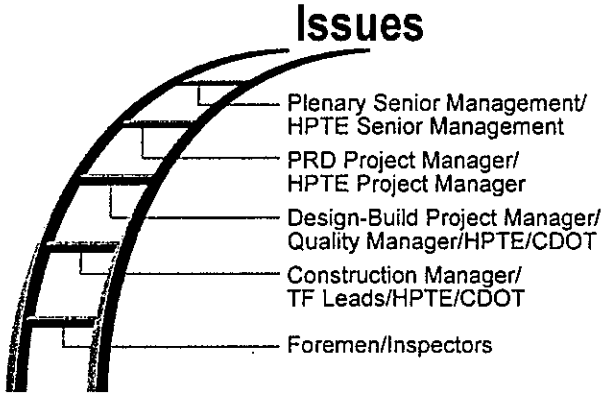
We will integrate the HPTE and RTD representatives into our Project team as quickly as possible because mutual cooperation is necessary for the Project to become a true success for all participants. This transition will be extremely easy, since many of the key individuals at the D-B level are already working together closely on the US 36 Managed Lanes Phase 1 Project, and both Project teams will be housed in the same building.

The PRD team will develop and maintain a true partnering relationship with HPTE, building on the mutual trust that has developed between our representatives during the SOQ and proposal process. As appropriate, we will also involve the various jurisdictions, utility and ditch owners, and local businesses and residents into the overall partnering effort.

We will work with HPTE to establish a procedure for resolving disagreements, conflicts and disputes as quickly as possible, and at the lowest possible level within the Project organization.

To encourage issue resolution to occur at the lowest levels within the organization, an Issues Resolution Escalation Ladder will be established during an initial partnering session. This arrangement, illustrated in Figure 4.7, identifies the parties at each level from the various organizations who are responsible for resolving any issues that develop.

Figure 4.7: Issues Resolution Escalation Ladder



A time limit will be established for issue resolution at each level. If the issue is not resolved within the required time frame, it is automatically elevated to the next level on the ladder. Our goal will be to settle all issues and conflicts at the Project level.

Before issues can be elevated to the next higher level on the escalation ladder, each party will be required to develop a written issue statement that describes the specific issues of disagreement. Once that issue statement has been developed, then each side develops a written justification for their viewpoint and both perspectives are presented to the next level on the escalation ladder. We have found that approximately 50 percent of the issues get resolved at the lower level merely by developing the issue statement.

Based on our past experiences with partnering on large design, build, finance, operate and maintain (DBFOM) projects, we know that effective partnering requires an early understanding and agreement on Project goals by all parties. Once agreement is reached on these key outcomes, the partnering process can be successful if all parties commit to work to meet the agreed goals throughout the full duration of the Project. The mechanics of our proposed partnering process include the following key elements:

Initial Input. An outside facilitator agreed to by PRD and HPTE will conduct interview sessions with key Project personnel from PRD, HPTE, RTD Ames-Granite and Transfield team. These interviews will collect information that PRD, HPTE, Ames-Granite and Transfield will use to establish the Project objectives and goals and to develop the measuring systems that will be used to track the team's progress in achieving these goals.

Partnering Kick-off Session. Once the interviews are completed and the initial information is compiled, we will hold an initial facilitated partnering session with key team members from PRD, HPTE, RTD, their consultants, Ames-Granite and Transfield. During this session, the HPTE, PRD Ames-Granite and Transfield project managers will share their visions for the Project and discuss the information obtained from the initial interviews. Based on the collected information, the Project team will review and refine the purpose statement for the Project and agree on the overall Project goals and objectives. The team members will also discuss their individual roles, responsibilities and expectations, and reach a collective agreement on the approach that the group will take to best reach each partner's vision of Project success.

Feedback/Evaluation Sessions. Periodically over the course of construction, representatives of PRD's senior management and the Ames/Granite JV Management Committee will meet with senior members of HPTE's staff to discuss the status of partnering efforts and the relationship between the parties. At these meetings, which will be held on a quarterly basis to begin with, the partners will provide comments and share feedback received from the Project team. These meetings will continue after Full Services Commencement with Transfield's upper management replacing the Ames-Granite representatives.

Follow-Up Partnering Sessions. Based on the feedback received and their assessment of key results, HPTE, PRD and the JV Management Committee will determine when follow-up partnering refresher sessions are needed, or when additional partnering sessions are required with other stakeholders to address specific issues. Based on our past partnering successes, we recommend the regularly planned partnering refresher sessions occur at least twice a year.

2.4.D – Key Personnel

The individuals filling the key personnel positions identified by HPTE are identified on Form 16 in Section 2.5 of this Proposal.

Each of the firms on the PRD team has drawn from their pool of experienced finance, design and construction and O&M experts to assemble a fully integrated organization for the US 36 Managed Lanes Concession Project.

Our key personnel were selected based on the following factors:

- Experience with financing North American transportation projects
- Experience with D-B projects
- Experience with urban freeway reconstruction
- Experience with quality control and quality assurance programs on large D-B projects
- Experience with PI on large urban transportation projects
- Experience with O&M of large urban highway facilities (tolled and non-tolled)

Project Managers. As shown on the organization charts at the beginning of this section, Plenary will provide two project managers. **Chris Coulter** will manage the Project during the Design and Construction phase, and **Neil McCrank** will assume the role of Project Manager as the Project nears completion and enters the full operations phase.

Chris brings more than 25 years of design, construction and contract management experience to the PRD team. He has successfully delivered projects throughout Australia, Southeast Asia and Canada. During the last 15 years, Chris has directed the delivery of government, infrastructure projects, including civil transportation projects, employing various contemporary delivery methods including numerous PPP procurements.

Neil has over 25 years' experience managing operations and maintenance. Neil's most recent experience includes leading Plenary Group's operation and maintenance team on the Disraeli Bridges project, in Winnipeg, Manitoba. For this project, Neil played the lead role developing operational and maintenance plans and overseeing the transition of the project into steady state operations. He now oversees the Disraeli Bridges project O&M team.

Financial Manager. Phil Dreaver will be the Financial Manager for the PRD team. Phil has significant experience raising and closing finance for PPP projects and is served well by his extensive background in banking. Phil has either directly led or provided management oversight for all of Plenary Group's debt and equity financings (over $5B in project financing). Phil's specific experience and expertise includes: leading and managing bidding consortia and developing highly rated, innovative financing solutions involving the underwriting of long-term debt and equity capital.

Public Relations Manager. Mike Marasco will be the Public Relations Manager for the PRD team. Mike is a media-trained spokesperson with extensive experience in public communications. Mike has performed a similar role in the delivery of numerous complex infrastructure projects in Canada. Prior to joining Plenary Group, Mike was Vice-President, Partnerships Development & Delivery for Partnerships BC (The Province of B.C.'s PPP procurement authority), where he was responsible for the development and resourcing of new partnership structures and opportunities, oversight of all projects and the management of public and client relations. During his tenure, Partnerships BC closed more than $4.7B in 11 infrastructure projects in health, transportation, advanced education and resource sectors.

Design-Build Public Information Officer. Sheryl Machado will serve as the PI Officer during the D-B period. Sheryl is currently serving in a similar role on the US 36 Phase 1 Project. She has already established lines of communication with most major stakeholders along the corridor and has a strong working relationship with CDOT's PI consultant for the corridor. Sheryl is an accomplished communicator and media professional. She has extensive contacts within the industry and understands local concerns. She has served as the Public Information Manager on several large transportation projects in the Denver and Colorado Springs areas. Her established relationships with CDOT's PI consultant for the corridor and familiarity with corridor stakeholders will enable her to best assist CDOT and HPTE in integrating the PI programs for projects, seamlessly presenting traffic and construction information to stakeholders along the entire corridor.

In addition, Mike Marasco, the Public Relations Manager, will oversee the PI effort, and will assist HPTE with PI activities not specifically related to the D-B operations. Chris Coulter will be the main contact for HPTE during the D-B period for issues related to the overall Concession Project, the phased implementation of tolling operations and similar Project-wide matters.

Design-Build Project Manager. The PRD team has added a very important Key Position, Design-Build Project Manager, to the list identified in the RFP. Because of the importance of closely coordinating the construction activities and maintenance of traffic operations between the two projects, **Ernie Green** will fill this **value-added** role. Ernie has 17 years of experience managing heavy civil and highway construction projects. He has significant experience in the management of D-B transportation projects. Ernie was the Project Manager on UDOT's $140M 11400 South at I-15 Interchange D-B Project in the Salt Lake City metropolitan area, Project Manager of the $103M Bull Mountain Railroad D-B Project in Montana and Deputy Project Manager/Project Manager on the $313M Legacy Parkway D-B Project, also in Salt Lake City. Ernie is currently serving as the Ames/Granite JV Project Manager on the US 36 Phase 1 Project. We will supplement the staff on each of the individual projects to support Ernie in his role as the lead manager of D-B activities for both Phases 1 and 2.

Design-Build Design Manager. Our Design Manager, **Brad Johnson, PE,** has 18 years of design management experience and has successfully managed the design for several large D-B projects, including the $244M TH 212 Project in Minnesota and the $1.1B I-15 CORE Project in Utah. Brad is currently serving as Design Manager on the US 36 Phase 1 Project, and thus has a unique and comprehensive understanding of corridor stakeholders and their issues. Since design of Phase 1 will be complete before Phase 2 final design needs to get underway, Brad will have the ability to bring many of the discipline design leads from Phase 1 to work on the Phase 2 design.

Design-Build Construction Manager. Our Construction Manager, Ron Dukeshier, has extensive experience in major transportation projects. He served as the Project Manager on the $194M Reno ReTRAC D-B grade separation project in Reno, NV, and as Project Manager on the $76M Pima Freeway projects in Phoenix, AZ. In addition, Ron successfully delivered Las Vegas' McCarran Airport Terminal 3 project as Project Manager, where he oversaw the concrete package for construction of the new 2-level, automated transit station at the airport.

Design-Build Quality Manager. Our Quality Manager, **Kurt Legerski, PE,** has extensive experience managing the quality programs on major CDOT reconstruction and improvement projects. He has successfully managed comprehensive inspection and testing programs for CDOT on major roadway and bridge construction projects in the Denver metropolitan area, including the recently completed Central Park Boulevard interchange on I-70, numerous reconstruction projects along I-225 between Parker Road and Sixth Avenue, the I-70 and E470 Interchange (Phase 2B), and the I-25 and Plum Creek Parkway interchange in Castle Rock. Kurt is currently serving as both the Quality Manager and Construction QA Manager for the Ames/Granite JV on the US 36 Phase 1 Project. As shown on the organization chart, when Phase 2 work gets underway, Kurt's assignments will be modified slightly. He will become the overall Quality Manager for both Projects, and other individuals will be assigned as Construction QA Managers for the two individual Projects.

Environmental Compliance Manager. Our Environmental Compliance Manager, Scott Epstein, has 10 years of environmental experience ranging from pre-National Environmental Policy Act (NEPA) planning studies, to NEPA documentation, through project delivery. Scott was a key member of the US 36 Environmental Impact Statement (EIS)/ ROD Project team, so he has extensive knowledge of the Phase 2 Project area and has worked with the Project stakeholders. He is also the Environmental Compliance Manager on the Phase 1 Project, where he has been instrumental in developing environmental processes and procedures for tracking contract, mitigation and permit requirements and working closely with his counterparts at CDOT and at local and state agencies.

Operations Manager. Neil McCrank will act as the interim Operations Manager until a permanent Operations Manager can be sourced from the local job market. For a detailed discussion of this approach and Neil's experience in this role, please refer to Part 3, Volume III - Service Proposal, Section 4.1.

Maintenance Manager. Bruce Sampson will perform the Maintenance Manager role for this Project. Bruce has more than 11 years of experience performing similar work. For a detailed discussion of Bruce's experience, please refer to Part 3, Volume III - Service Proposal, Section 4.1.

2.5 – Key Personnel

Benefits of PRD Approach:

- Key personnel will be shared between Phase 1 and Phase 2, and be supplemented with additional staff on each Project to maximize efficiency and effectiveness of Project staff.
- Experience and lessons learned on Phase 1 will automatically transfer to Phase 2 D-B activities.
- Consistent design team expedites design and approvals and provides uniformity along the corridor.

The PRD team has selected the individuals to fill the key positions identified in RFP Attachment D, Section 2.4.D. Some of these positions were previously addressed in the RFQ, and the individuals that we planned to assign to those positions were identified in our SOQ. Other key positions have been defined in the RFP, and we have now identified individuals to fill these additional key roles on the Project.

A complete list of the key positions and the individuals we have selected for these positions is presented on Form 16 on the following page.

The following supplemental information, requested by the RFP or identified in HPTE's responses to questions, is included in the Appendix at the end of this volume.

- HPTE approval letters for substitutions made to the individuals identified in the SOQ.
- Letters signed by PRD and the individual employers committing to make the named individuals available for this Project.
- Resumes of each of the Key Personnel identified on Form 16.

DRAFT JULY 10, 2012

Form 16 – Key Personnel Information

Name of Proposer: Plenary Roads Denver

PROPOSED KEY PERSONNEL

Position	Name	Key Personnel included in SOQ (Yes or No)	Employer's Firm Name
Concessionaire Project Manager (Design & Construction)	Chris Coulter	Yes	Plenary Group
Concessionaire Project Manager (Operations & Maintenance)	Neil McCrank	Yes	Plenary Group
Financial Manager	Phil Dreaver	No (not requested in RFQ)	Plenary Group
Design-Build PI Officer	Sheryl Machado	No (not requested in RFQ)	Ames Construction, Inc.
Design-Build Project Manager	Ernie Green	Yes	Ames Construction, Inc.
Design-Build Design Manager	Brad Johnson	Yes	HDR Engineering, Inc.
Design-Build Construction Manager	Ron Dukeshier	No (HPTE-approved substitution)	Granite Construction Co.
Design-Build Quality Manager	Kurt Legerski	Yes	GROUND Engineering Consultants
Design-Build Environmental Manager	Scott Epstein	No (not requested in RFQ)	Pinyon Environmental
Operations Manager	Neil McCrank	No (not requested in RFQ)	Plenary Group
Maintenance Manager	Bruce Sampson	Yes	Transfield Services Americas, Inc.
Public Relations and Community Outreach Manager	Mike Marasco	No (not requested in RFQ)	Plenary Group

Include CDOT approval letter for Key Personnel not included in SOQ.

2.6 – Environmental Compliance Approach and Commitments

Benefits of PRD Approach:

- Environmental staff will be enhanced to deal with the significantly more complex environmental issues associated with Phase 2 work.
- Proposed staff includes current staff from Phase 1 supplemented by additional personnel with extensive background in Phase 2 issues.
- Schedule has been established to accommodate required seasonal requirements for both preliminary surveys and relocation of environmentally sensitive species.

2.6.A – Impacts to Wetlands and Water Quality

Our environmental compliance approach has been specifically tailored to take advantage of lessons learned on Phase 1, both from the CDOT side and from the contractor side. Our environmental compliance team, comprised of Scott Epstein and Gina McAfee, provides unparalleled experience in the corridor, with the local agency stakeholders, with state and federal agencies, and with the EIS and Phase 1 activities. We bring these lessons learned to Phase 2, to result in a Project that assures early resolution of environmental issues and results in CDOT and Concessionaire savings in time and budget.

We clearly understand that the Phase 2 Project area is significantly more complex from an environmental standpoint than the areas our D-B team is currently addressing on the Phase 1 work. Therefore, we have augmented the environmental staff planned for Phase 2, and, as a **value-added** element of our approach, will establish a special Project team of environmental experts as soon as we are identified as the preferred proposer. This team will proactively address the preliminary work needed to resolve the many environmental challenges present in this portion of the corridor, and thereby minimize the potential schedule impacts of these sensitive resources.

Our approach:

- Minimizes the need for re-evaluation efforts
- Fosters local, state and federal agency collaboration
- Takes advantage of many lessons learned
- Minimizes impacts to wetlands, Section 4(f) properties, Preble's Meadow Jumping Mouse/Ute-ladies'-tresses orchid habitat and historic properties through interdisciplinary engineering team and environmental professional workshops
- Flags and focuses effort on critical early actions, including permits, surveys, relocations and nest removal work

Some of the lessons learned we propose to apply to this Phase 2 effort include:

1. **Wetlands.** For Phase 1, two wetland tracking systems were developed to document wetland impacts during both the design and construction phases. During design, the Environmental Compliance Manager (ECM) worked with the design leads to document the extent of wetland and areas where wetland impacts increased or decreased compared to the information provided in the RFP. A key part of this tracking was to document if the additional impacts were within the ultimate preferred alternative footprint, since the 404 permit was issued for that Project. The revised wetland files were then shown on all RFC drawings so that the construction staff were aware of the areas they could impact. Project biologists are working closely with the construction team to place construction fencing to delineate the area that can be impacted. During construction, the Project biologists are meeting with the construction team monthly to document physical wetland impacts, since this is required by the US Army Corps of Engineers (USACE) as a condition of the permit. The system we developed can be easily transferred to the Phase 2 work, saving time and money and making the overall Project tracking easier because of the consistency.
2. **Water Quality.** Multiple water crossings are required for this Project, including the crossing of impaired waters (South Boulder Creek and Coal Creek); therefore, significant effort will be required to protect water quality. Prior to any ground disturbance, a stormwater management plan (SWMP) will be prepared in accordance with CDOT standards, applicable regulations, good engineering, hydrologic and pollution control practices. The movement of pollutants from construction areas to receiving waters will be controlled via the appropriate selection and application of best management practices (BMPs) which include structural and non-structural BMPs, in addition to training and good housekeeping practices.

   If needed, dewatering activities can also impact water quality. The Project team will obtain a construction dewatering permit from the CDPHE for any temporary dewatering of groundwater during construction in

accordance with Water Quality Control Division (WQCD) requirements. We will provide all information needed to assist the WQCD in its evaluation and setting of a water quality standard for this permit, which includes but is not limited to a preliminary review of potential facilities in the Project area that may have contributed to groundwater contamination.

The members of the PRD D-B team have extensive experience in National Pollutant Discharge Elimination System (NPDES) permit requirements, including Phase I Municipal Separate Storm Sewer Systems (MS4) permit compliance and Construction Stormwater Permit compliance, including writing and implementing stormwater management plans (SWMPs). The team has completed SWMPs for design, construction and demolition projects throughout Colorado following State, CDOT and other municipality standards. Additional experience includes monitoring erosion control BMPs on construction sites and coordinating with on-site crews to maintain compliance with stormwater permits. We also provided expertise and assistance for the CDOT Water Quality Program Services contract. MS4 permit compliance areas include the Illicit Discharges Program (also known as Illicit Discharge Detection and Elimination [IDDE]), and Stormwater Outfall Reconnaissance Inventory Program.

3. **Local jurisdiction prairie dog impact permitting.** We learned that this process takes time and needs to be started early in the Project. This is especially important in the Phase 2 area because of the City of Boulder requirements that include a 60-day public notice for lethal control, which cannot be started until CDOT owns the City of Boulder ROW that contains the impacted prairie dogs. Our team's approach to this challenge includes immediate work to minimize impacts, then pursuing passive relocation options onto Boulder Open Space property, in partnership with City of Boulder stakeholders. If lethal control is needed, this process would be initiated immediately upon possession of the property by CDOT, with completion planned prior to March 2014.
4. **Early resolution** of any floodplain impacts and required mitigation at the South Boulder Creek Floodplain is important to Project scheduling. In order to avoid lengthy permitting reviews, our current plan is to construct the bridge widening at South Boulder Creek in conformance with the approved configuration shown on the RFP drawings.
5. **Ongoing coordination** with key local, state and federal stakeholders and regulatory agencies is important. For Phase 2, this will be especially critical because of the very sensitive resources located on both sides of US 36. We will coordinate with the City of Boulder and Boulder County as it relates to their open space properties, floodplain permits and more; with CDOT and the Federal Highway Administration (FHWA) as it relates to Section 404, Section 4(f), Section 106 and Section 7 requirements; and with CPW as it relates to SB 40 and other issues.

2.6.B – Impacts to Riparian Areas

There were two main lessons learned from Phase 1 related to riparian areas covered by Senate Bill 40 (SB 40). First, CDOT was very successful during the NEPA process in minimizing environmental impacts, including decreasing the required ROW. As a result, in Phase 1 there was not adequate area within CDOT ROW to replant trees and shrubs to meet the SB 40 mitigation requirements. Second, the SB 40 application is typically submitted after final design is completed, when impacts are fully defined and mitigation areas can be designed. Since the D-B process for the Phase 2 Project includes the need for early action items, there will be a challenge to develop the necessary information for SB 40 approval while maintaining the desired design and construction schedule. For Phase 2, we will identify ROW constraints at SB 40 crossings early in the design process and then coordinate with local jurisdictions to identify potential off-site mitigation areas, if necessary, and to meet with the Colorado Parks and Wildlife (CPW) district wildlife manager bi-monthly (a timing recommended by CPW during Phase 1) during the design phase to allow for an ongoing dialogue regarding the SB 40 approval.

2.6.C – Controlling Construction Noise

The PRD team will conduct our construction activities for this Project in a way that minimizes impacts to neighboring residents and businesses. We realize many of the required construction operations are, by their very nature, noise-producing activities. We have planned our work to conform to the noise ordinances of the jurisdictions through which the Project passes.

We will minimize construction noise impacts in the following ways:

Properly Trained Personnel. Our Project-specific orientation will include training to ensure all employees understand the measures that must be taken to minimize noise impacts to surrounding businesses and residential neighborhoods. Employees will receive periodic refreshers in these noise reduction measures during daily pre-work briefings and weekly toolbox training sessions.

Properly Maintained Equipment. All heavy equipment and hauling vehicles on the Project will be equipped with the manufacturer's recommended mufflers and other sound suppression features. All equipment will be regularly maintained, and defective equipment will be removed from service until it has been repaired.

Appropriately Scheduled Work. Construction operations near residential neighborhoods will be scheduled to occur during daytime hours. We will schedule inherently noisy activities, such as pile driving, to occur between the hours of 7:00 a.m. and 7:00 p.m., when the noise generated by the activity will be least disruptive. When night work is unavoidable, our DB PI Officer will work with the HPTE PI team to notify surrounding residents and businesses well in advance of the work. We will complete these operations quickly, to minimize the duration of the noise impact on the Project's neighbors.

Pre-Planning. Noise impacts can also be minimized by proper pre-planning of construction operations. For example, OSHA-required backup alarms are a frequent source of noise complaints. These impacts will be minimized by designing hauling routes and operations to avoid residential areas, and also to minimize the amount of backing that is required.

Added Value. During the proposal process, we have proposed and received approval for a number of ATCs, which will reduce the volumes of material that need to be hauled off of or back onto the Project site. This reduction in hauling will reduce hauling on the local street network surrounding the Project, and minimize noise impacts to adjacent businesses and residents.

2.6.D – Controlling Dust and Debris During Construction

The PRD team will control dust and debris on the Project as described below.

Dust Suppression. Areas of construction disturbance can become sources of wind-blown dust. The dust suppression techniques we will implement during construction include:

- Perform regular watering of disturbed areas
- Provide daily (or more frequent) sweeping to remove sediment tracked onto adjacent streets
- Perform watering in conjunction with street sweeping operations
- Limit the extent of areas of surface disturbance
- Provide vehicle tracking pads at construction exits to minimize tracking of mud off the site
- Cover trucks hauling soil and other dusty materials
- Provide temporary seeding of stockpiles and non-work areas
- Complete permanent seeding as soon as possible after grading is complete
- Establish and enforce defined haul routes

The Project superintendents will coordinate dust suppression activities in each work area. Foremen and field QC personnel will be trained to identify potential dust problems, and will notify appropriate construction supervisors so the problem areas can be addressed before a dust problem develops.

Debris Containment and Removal. Uncontrolled debris has a negative impact on neighboring properties and presents a potential safety hazard. Good housekeeping is an integral part of our construction site management process. Our foremen and superintendents are held accountable for the condition of their work areas. Measures we will use to control debris include:

- Provide adequate containers/dumpsters for anticipated debris
- Regularly empty waste containers to eliminate debris piles
- Train employees on the importance of good housekeeping
- Enforce good housekeeping at all work areas
- Provide for periodic "clean-up" crews to police the site as needed

Added Value. During the proposal process, we proposed and received approval for a number of ATCs that significantly reduce the volume of pavement removal, as well as the volumes of material that need to be hauled off of or back onto the Project site. Incorporation of these ATCs will assist in minimizing the potential impact of construction dust and debris by reducing the duration of potentially dusty on-site construction activities. In addition, incorporation of these ATCs will also reduce the amount of material that needs to be hauled off of or back onto the Project site. This

reduction in hauling will reduce construction traffic on the local street network surrounding the Project, and minimize the potential air quality impacts of the Project on the adjacent neighborhoods.

2.7 – Long-Term Safety Improvement Approach and Commitments

Benefits of PRD Approach:

- Pavement and structures designed with extensive consideration for long-term durability.
- Improved subgrade below Bikeway provides added value, reducing the potential for differential movement and slab faulting.
- Final design provides safe access and off-highway parking for long-term maintenance activities.

2.7.A – Approach and Commitments to Installation of Permanent Safety Features Within the Corridor

Safety of the permanent US 36 facility for the travelling public is of paramount importance to the PRD team. We understand that safer designs carry lower maintenance costs, lower societal costs of crashes and fewer liability claims. Our reputation and future success is directly dependent on providing HPTE with a product that is safe for all users, including HPTE, as well as our own maintenance staff during the 50-year concession period. The PRD team's proposal incorporates safety features as required by the RFP, but goes further to implement additional safety enhancements that provide added-value to HPTE and the traveling public.

A primary emphasis for the PRD team during the development of our proposal design has been to eliminate identified design exceptions and minimize the impact of the allowable deviations from Design Criteria identified in the notes at the end of Exhibit 13-1 of the Technical Specifications. Due to the current ROW constraints, we were not able to fully eliminate the three Identified Design Exceptions (Table 13.2-2). However, we were able to reduce the steeper grades allowed between Stations 1348 and 1352. The notes on Exhibit 13-1 allow up to a 4.5 percent grade in this area. We were able to reduce the grade in this area to at or below the desirable maximum 4.0 percent.

Full width shoulders and standard vertical clearances will be provided throughout the Project limits, except for Design Exception DE-2 at South Boulder Creek and at the McCaslin Boulevard bus ramps.

The PRD team's design provides separate bus and general purpose ramps at the McCaslin Boulevard DDI. This feature improves safety for US 36 by separating bus ramp movements from general purpose movements.

On the Bikeway, the PRD team will implement our approved ATC-4 that provides an improved pavement section. This ATC approach minimizes the potential for water to become trapped beneath the pavement, thereby reducing the potential for heave of the Bikeway surface due to soil swell or frost heave action. This will result in a more uniform and safer Bikeway surface for pedestrians and cyclists.

Aside from the safety enhancements discussed above, the Ames/Granite JV recognizes that HPTE has already incorporated numerous safety requirements into the requirements for the US 36 Project. The PRD team applauds the addition of these features and notes that all such features will be provided as part of the PRD team's proposal. Safety edge, one of FHWA's top proven safety countermeasures, will be utilized on the US 36 Project. The use of a 4-foot buffer between the managed lane and adjacent general purpose lane is yet another FHWA-supported feature that will be implemented on this Project to increase safety. Bicycle and pedestrian-safe drainage grates will also be used throughout the Project.

Finally, the PRD team's proposal design is in accordance with CDOT and AASHTO design requirements. Drainage features have been extended past the clear zone and in most cases have been extended to their ultimate location. Slopes and ditches conform to CDOT standards and the AASHTO Roadside Design Guide for safety. Our proposal utilizes recoverable slopes to the extent possible to minimize the introduction of barrier or guardrail. Our design includes appropriate lengths needed for barrier and guardrail, utilizes devices that conform to NCHRP 350 crash testing requirements, and features appropriate end treatments for the specific conditions encountered.

2.7.B – Long-Term Approach to Safely Accommodating Maintenance Personnel Within the Corridor

The PRD team recognizes that our O&M staff will need to maintain the completed US 36 Managed Lanes Project for many years.

Maintaining a high-volume urban highway can present many dangers for maintenance personnel. The PRD D-B team is

focused on designing and constructing a facility that is safe for all users, including maintenance personnel. Our design provides a number of enhancements that are specifically designed to maximize the safety of the men and women who will maintain the facility.

Design for Reduced Maintenance. The best way to maximize the safety of maintenance personnel is to minimize the amount of maintenance work that requires their presence on the corridor. Therefore, our design includes durable, low-maintenance elements to reduce the amount and frequency of required maintenance activities. Our design also minimizes the amount of retaining walls, resulting in less required maintenance.

Durable Pavement. We will construct a long-lasting, durable concrete pavement for US 36. Concrete pavement requires less maintenance and has a longer life expectancy than asphalt pavement. This will minimize the duration and frequency of pavement maintenance activities needed on the corridor.

Low-Maintenance Structures. New bridges will use low-maintenance elastomeric bearing pads, have no expansion joints or deck drains, and include a waterproofing membrane and asphalt overlay that will prolong the life of the bridge decks. The use of Class H concrete in all bridge decks will help to limit water intrusion and minimize the potential for corrosion of the deck reinforcing, further extending the life of the decks.

Safe Maintenance Access. The PRD team's design locates maintenance access points away from traffic wherever possible. Except in super-elevated sections and in the area near South Boulder Creek where we have to match the existing bridge cross-section, our proposal features a roadway surface that is crowned at the median. This places drainage elements that require regular maintenance along the outside of the roadway. Similarly, we have located ITS devices along the outside of the roadway to the extent possible. This improves safety for maintenance personnel, since working in the median has inherently greater risk than working on the outside edges of the roadway.

In addition to maximizing the number of maintenance elements located on the outside of US 36, we have provided convenient access to these items. When feasible, ITS/ATMS equipment and cabinets will be located outside of the clear zone. Where that is not practical, they will be protected by barrier or guardrail. Where access is not possible from outside the roadway, we will construct appropriate breaks in the barrier or guardrail to permit safe and easy access for maintenance personnel.

At variable message sign (VMS) locations, an 8-foot-wide access route will be provided beyond the roadway shoulder where ROW permits. This additional width will facilitate safe maintenance access to these devices and provide a safe parking location for maintenance vehicles. VMS structures will be equipped with walkways, and CCTV cameras will feature lowering devices to eliminate the need for maintenance crews to use a bucket-truck to access these devices.

Our design includes fence or railing at the ends of all box culverts and along the utility bridge to allow safe and efficient maintenance access on those structures. We will also provide safe and convenient access to permanent stormwater quality facilities (PSQF). All water quality inlets and in-line stormwater treatment devices are located in or adjacent to the roadway shoulders, and access roads into the water quality pond areas have been designed to provide safe access for maintenance personnel.

2.8 – Schedule Commitments

Benefits of PRD Approach:

- Proposed schedule meets HPTE's desired December 31, 2015, completion date for start of Managed Lanes operation.
- D-B team's experience on the US 36 corridor will expedite identification and resolution of schedule challenges.
- Extensive preliminary risk analysis will provide cost-effective, low-risk designs.

2.8.A – Commitments to Complete Phase 2 Construction Work

The PRD team commits to completing the Phase 2 construction work on or before December 31, 2015, delivering HPTE and the public the greatly anticipated completion of the US 36 managed lanes.

Through our experience delivering PPP and D-B highway construction projects, we understand the complexity of achieving financial close and executing the design and construction phases on time, subsequently initiating the services phase. We have worked to prepare a proposal that improves on the RFP design and applies our best practices to the planning of our construction approach. Incorporating lessons learned from our extensive experience results in

confidence that we can meet your time/schedule requirements for the US 36 Phase 2 Managed Lanes Project. To simply illustrate our approach to achieving the schedule requirements, we prepared a basic bar chart, shown below, that indicates our work sequences through all phases of the Project. This graphical diagram represents our plan to achieve the financing, design, construction, and begin operation and maintenance services by December 31, 2015.

To assure the Project details are all accounted for, we prepared a detailed activity critical path method (CPM) schedule using Primavera P6 release 7, from which the bar chart below was derived. This schedule incorporated all Project work activities, logic ties, calendar constraints, production-based durations and resources to define the critical path. The longest path currently flows through financial close, drainage design, construction of drainage crossings, roadway construction including aggregate base and concrete paving. Upon notice of award, we will further refine the CPM and keep it updated through the period between award and Financial Close. A dedicated schedule engineer will be assigned to the Project, focused on administration of the contract CPM baseline schedule, including monthly updates and look-ahead reports.

2.8.B – Document, Cost Control, and Schedule Management System

The PRD team has the necessary resources and proven Project controls to deliver this Project on time and on budget, with an approach to project management that is based on lessons learned from our combined experience delivering PPP and D-B projects. We have a thorough understanding of the best practice organization, and processes to capitalize on the PPP method for innovative solutions and efficient Project delivery. In addition, the Ames/Granite JV has established Project controls currently in-place on the US 36 Phase 1 Project that will form the basis of our management system and utilized for efficient delivery of the Phase 2 Project.

We will implement our project controls management plan for this Project, summarized in the following tables, by incorporating established cost and schedule control processes in order to track actual design and construction costs and progress schedules against established targets.

Figure 8.1: Summary Schedule US 36 Phase 2

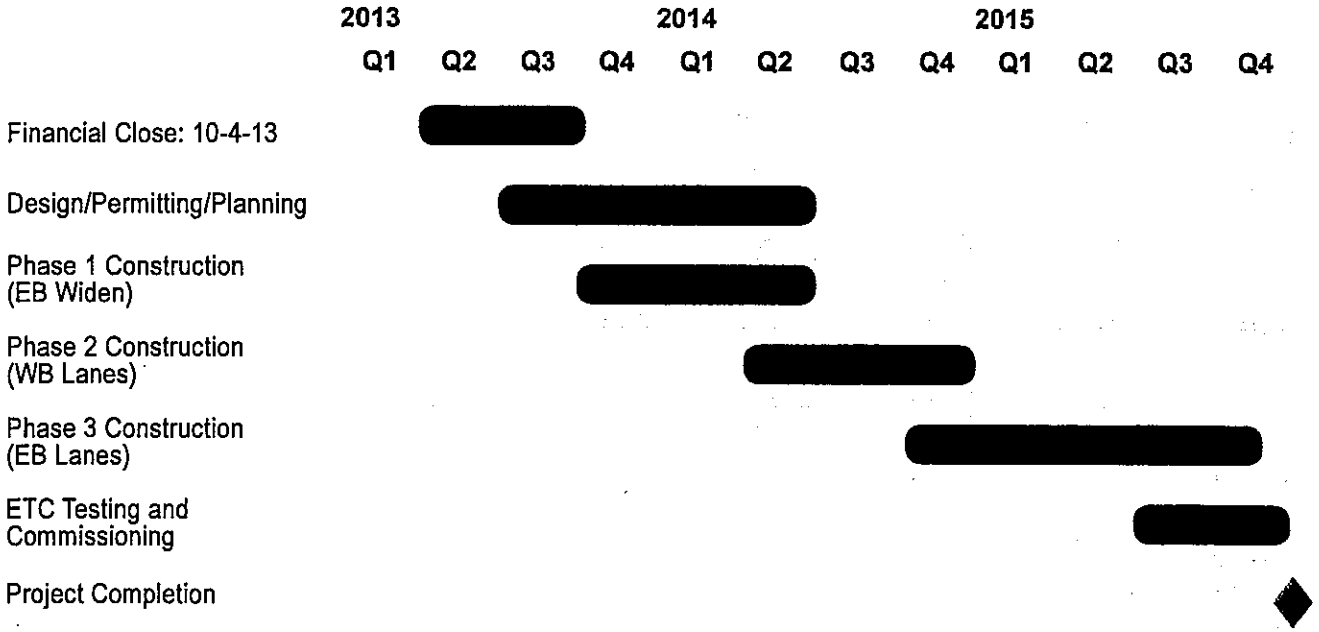


Figure 8.2: Plan and Approach to Document, Cost and Schedule Control

Strategy	Project Control Methodology
Regular Meetings. Maintaining the Project budget and schedule begins with communicating to all of the team members the established targets and goals for each activity.	■ Conduct a kick-off meeting immediately after NTP with both design and construction team members to review the commitments made to HPTE ■ Clearly identify Project objectives and establish key performance indicators for all team members ■ Monthly review towards achieving the Project commitments, and plan for upcoming months' activities ■ Additional design and construction specific meetings conducted frequently
Document Control. Document control is critical to effective control of a D-B project, where design documents are issued in discrete packages, and is the key to preventing rework.	■ Develop document control plan incorporating PRD, design, HPTE, A/G, Transfield ■ Train all team members on document control procedures ■ Implement ProjectWise for design document control ■ Implement CDOT's Aconex system for all official Project documents; including correspondence, meeting agenda, minutes, schedule, RFI's, and submittals ■ Maintain current RFC drawings on Microsoft SkyDrive for easy accessibility by all team members ■ Dedicated Project controls staff
Issues Control. Focusing the Project team on the key issues helps our management provide on time, on budget completion of complex, fast-paced projects.	■ Integrate issue resolution process to effectively track each item and carry it forward from week to week ■ Assign individuals to specific tasks and hold them accountable for completing within specific timeframe ■ Track each task as an action item, give a target completion date, and monitor until the task is complete or resolution is achieved
Cost Control. Regular monitoring and reporting allows us to identify potential problem areas early, giving our management staff an opportunity to quickly modify operations or implement corrective actions.	■ Use established cost monitoring process to monitor the progress of the Project, including recording daily costs and reviewing cost reports on a weekly and monthly basis ■ Monitor actual costs incurred as well as forecast the remaining and projected final costs ■ Prepare bid item summary reports monthly, and review progress made on each bid item activity; including quantities completed, amounts earned to-date and remaining amounts for Project completion
Schedule Control. The baseline schedule affects many stakeholders. Communicating schedule information will be critical in keeping design and construction moving forward to achieve on time completion.	■ Use Pimavera's P6 scheduling software to publish and distribute cost-loaded electronic baseline schedule ■ Prepare and update 90-day detailed operation schedule ■ Prepare and update a 3-week construction schedule ■ Prepare daily schedules for personnel and equipment assignments ■ Conduct weekly scheduling and coordination meetings ■ Provide training for subcontractors and subconsultants ■ Link design schedule to key milestone submittal dates ■ Conduct monthly comprehensive job schedule reviews teamwide

We recognize the schedule and fixed price established in our Proposal represent HPTE's expectations for delivery of and contribution to this PPP Project. With our history completing projects of similar size, scope and complexity successfully, we know how to bid the Project, fully understanding the schedule and cost for every element of work, and accurately evaluating and mitigating the associated risks that are the PPP Concessionaire's, D-B team's and Operator's responsibility.

Our approach begins by ensuring the scope of work we commit to in our Proposal is established from experience-based design, production and construction cost estimates, life-cycle estimates, quotes and firm bids. Our Project controls systems then provide continuous feedback during design and construction to confirm we stay within budget and on schedule.

Prevention of rework and delays is critical to the Project's success. In addition to the Project management controls discussed above, our approach to minimize rework and delays is achieved by creating a collaborative team atmosphere for design and construction, adherence to our QC/QA program, accommodation of operational issues, intensive detailed planning and scheduling, monitoring progress, and quickly responding to and resolving issues.

2.8.C – Approach to Identify, Assess, Manage and Allocate Project-Specific Risks

One of the primary concerns for both PRD and HPTE are additional costs, delays or public inconvenience that result from unanticipated and/or necessary changes that may occur on a PPP DBFOM project. Our approach to minimizing the risk from unknown changes is explained in more detail in

Figure 8.3, but begins by assuring the scope of financing, construction work and O&M services we commit to in our proposal is established from experience. Below, we have identified the 12 most significant risks and our mitigation strategies for each. As the contract evolves from award, to financial close, to design, construction and O&M, our team will continue to work collaboratively to identify new risks, determine ways to mitigate or minimize the risks, and discuss how to best allocate the risk.

Figure 8.3: Significant Risk Categories

Risk Category		Project Control Methodology
Stakeholder Coordination. Coordination of design, environmental, utility owners, CDOT, HPTE for design and construction approvals		Utilize team members with recent experience on Phase 1 Project. Leverage relationships developed on Phase 1 Project. Incorporate lessons learned to expedite submittals, reviews and approvals.
Consequences:	Schedule delays or increased Project costs	
Probability:	Low-Medium	
Tools for sensitivity analysis:	CPM schedule and design review comment resolution	
Allocation of risk:	Ames/Granite JV	
Construction Schedule. Meeting constraints for irrigation crossing schedule and paving work windows		Develop phasing and schedule to begin critical work activities constrained by work seasons as early as possible. Initiate early design packages, permitting and shop drawings. Allocate extra resources to critical activities.
Consequences:	Schedule delays and increased construction costs	
Probability:	Medium	
Tools for sensitivity analysis:	CPM schedule	
Allocation of risk:	Ames/Granite JV	
Revenue. Risk of revenue being less than forecasted		■ Making realistic assumptions in the traffic and financial models (especially traffic growth) ■ Structuring ramp, operating and other reserves to ensure the financial structure can withstand revenues below forecasts ■ Negotiating operating contracts that are flexible in that costs can be reduced for lower forecasted traffic volumes
Consequences:	Revenue are insufficient to pay for costs and debt servicing	
Probability:	Medium	
Tools for sensitivity analysis:	Traffic model and financial model scenario and sensitivity analysis	
Allocation of risk:	Plenary	
Increased Operating and/or Maintenance Costs. Risk of operating or maintenance costs being higher than budgeted due to inadequate budgeting, higher roadway wearing, weather events, etc.		■ Dropping down most operating and maintenance obligation to Transfield on a fixed-price basis and requiring financial security to back Transfield obligations ■ Contingency planning and budgeting ■ Ensuring insurance is adequate to cover damage to roadways due to accidents etc. ■ Performing wearing analysis to determine and budget based on how traffic volumes effect operations and maintenance costs (to account for correlation between revenue and costs)
Consequences:	Costs are higher than budgeted,	
Probability:	Low	
Tools for sensitivity analysis:	Stressing budgets and financial model scenario and sensitivity analysis	
Allocation of risk:	Transfield and Plenary	
Inflation. Costs of required inputs rise over time at a rate higher than projected		■ Inflation contingency has been added to the construction budget ■ Toll rates (and revenues) will rise in step to inflation at a minimum, which provides a natural hedge against inflation of costs ■ For cost items that do not rise with inflation (such as Asphalt costs that tend to rise with oil prices) PRD has budgeted contingency to allow for costs indexing higher than revenues ■ All financing is fixed-rate thereby eliminating any potential inflation effect on debt servicing
Consequences:	Costs are higher than anticipated	
Probability:	Low-medium	
Tools for sensitivity analysis:	Financial and Traffic Models – scenario analysis	
Allocation of risk:	Ames/Granite during construction; Plenary and Transfield during operations	

Risk Category		Project Control Methodology
Financing. Getting to financial close, meeting minimum financing metrics, refinance risk		■ Work pre-bid on structuring, with Goldman Sachs and its PABs desk, ensures a marketable debt structure to get to closing ■ Obtain Highly Confident letter from Goldman Sachs attesting to the marketability/ financeability of financial structure and specifically the PABS ■ Ensuring any feedback and structuring requirements are reflected in the financial model ■ Ensure the TIFIA Term Sheet (Attachment E of the RFP) provisions are adhered to and all other TIFIA assumptions are in line with precedent transactions. ■ Proper contingencies and debt/ramp reserves will see project through the most difficult stage – early ramp up ■ Our structure eliminates refinance risk by utilizing long term debt and completely amortizing it in financial close structure
Consequences:	Inability to achieve financial close; acceleration on debt during operating period; inability to refinance causing default under debt	
Probability:	low; low to medium; extremely low	
Tools for sensitivity analysis:	Financial model	
Allocation of risk:	Plenary and HPTE re financial close; Plenary for remainder	
Residual Value. Risk that the project is not at a future date worth what was projected at financial close		■ Our financing structure does not rely on refinancing debt, so this risk will not have a significant impact ■ The structure of the project is to handback the project to HPTE at the end of the concession, so there is no residual value assumption for end of term
Consequences:	Refinancing assumptions could be wrong, equity return adversely affected	
Probability:	Medium	
Tools for sensitivity analysis:	Financial model	
Allocation of risk:	Plenary	
Capacity. Risk of insufficient resources and personnel to carry out construction and the Services		■ Providing adequate contingency in both the construction and operations budgets ■ Ames/Granite will transition many resources from the Phase 1 project ■ Both Transfield and Plenary will hire project specific employees from the local market thereby eliminating the risk non-project tasks compete for resources ■ Transfield will leverage their significant national buying power to procure adequate resources ■ Ames and Granite will leverage their significant local relationships to ensure adequate resources and personnel ■ All PRD organizations will cross train employees on tasks to ensure maximum flexibility in scheduling
Consequences:	Cost overruns and schedule overruns during construction and cost overruns and financial penalties for sub-standard services during operations	
Probability:	Low during construction, low to medium during operations	
Tools for sensitivity analysis:	Stress testing costing and scheduling during the budgeting exercise	
Allocation of risk:	Ames/Granite during construction; Plenary and Transfield during operations	
Planning. Construction and/or operating planning does not adequately consider all possible eventualities or improper planning		■ Significant planning work was conducted in the development of our proposal ■ During the preferred proponent stage our team will advance all plans to completion ■ Key to planning is incorporating all disciplines in the planning process (such as the operator in the design and construction planning) ■ Leveraging the collective planning experience of our team in planning
Consequences:	Cost or schedule overruns or substandard product or services	
Probability:	Low	
Tools for sensitivity analysis:	Primarily budgeting and scheduling scenario testing	
Allocation of risk:	Ames/Granite during construction; Plenary and Transfield during operations	
Design. Design flaws resulting in cost overruns or degraded operability or maintainability		■ Third party technical reviews confirmed the soundness of the overall design ■ Specific design reviews for pavement were also solicited to confirm design soundness ■ Transfield and Plenary were closely involved in the design and ATC process
Consequences:	Cost of rectifying design flaws	
Probability:	Low	
Tools for sensitivity analysis:	Quality checks and peer reviews vetting the design	
Allocation of risk:	Ames/Granite JV	

Risk Category		Project Control Methodology
Legislative Policy. Risk new legislation results in increased costs		■ The Concession Agreement has been thoroughly examined to determine what legislative changes would not constitute a Change in Law ■ Contingency for legislative policy changes that PRD is exposed to have been created
Consequences:	Cost overrun or hindrances/ impediments to PRD properly carrying out construction or Services	
Probability:	Low	
Tools for sensitivity analysis:	Budgeting scenarios for potential legislative changes	
Allocation of risk:	Primarily Ames/Granite during construction; Plenary and Transfield during operations	
Technology. Risk that technology obsolescence results in higher than expected cost (this risk is primarily related to ETCS technologies and interoperability requirement)		■ Budgeting for increased replacement costs due to technologic obsolescence ■ Understanding technologies and accounting for expected changes
Consequences:	Cost overruns	
Probability:	Medium	
Tools for sensitivity analysis:	Budgeting and financial model sensitivities	
Allocation of risk:	Ames/Granite during construction; Plenary and Transfield during operations	

2.9 – Maintenance of Traffic Plan

Benefits of PRD Approach:

- Continuity of D-B team will allow close coordination between Phases 1 and 2 maintenance of traffic patterns.
- Maintenance of traffic plan is consistent with Phase 1 activities, minimizing traffic switches at the interface between the Projects.
- Consolidated PI program will streamline the process of providing relevant traffic information to stakeholders along the entire corridor.
- Traffic demand management initiatives being used on Phase 1 will be expanded to seamlessly address the needs of the Phase 2 portions of the US 36 corridor.

2.9.A – Traffic Management Plan

Introduction

The PRD team has developed an approach to this Project that is focused on maximizing, monitoring and maintaining regional mobility throughout the duration of the Project. Our maintenance of traffic plans include a construction phasing plan that will maintain all existing US 36 general-purpose lanes and interchange ramps, maximize cross street and intersection capacity and maintain access to all existing bicycle/pedestrian movements.

At the onset of our proposal effort, our team evaluated several different approaches to the phasing and maintenance of traffic of the US 36 Phase 2 Project. We did not take for granted that the phasing and maintenance of traffic that our D-B team is currently successfully implementing on the US 36 Phase 1 Project was the preferred phasing approach on the Phase 2 Project. Instead, we went back to the drawing board and explored multiple options in detail, evaluating how well each potential approach addressed our goal of minimizing inconvenience to motorists while providing a safe work zone that will allow construction activities to be performed efficiently.

Based on this evaluation, we concluded that the safest, fastest, least disruptive and most economical maintenance of traffic scheme is to construct the Project in halves, as our D-B team currently is on the US 36 Phase 1 Project.

Our plan maintains all general-purpose lanes and interchange ramps, maximizes cross street and intersection capacity, and provides the safest Project site with the minimum amount of required lane closures.

Key features and benefits of our phasing and maintenance of traffic approach that we are currently implementing on the Phase 1 Project and propose to implement on the Phase 2 Project are highlighted in Figure 9.1 on the following page.

Value Added – The Ames/Granite JV D-B team is intimately familiar with the US 36 corridor and will leverage our experience gained on the US 36 Phase 1 Project to successfully complete the US 36 Phase 2 Project.

After reaffirming that the "half-and-half" approach was the safest, fastest, least disruptive and most economical maintenance of traffic scheme for the Phase 2 Project,

Features and Benefits

Figure 9.1: Team Features and Benefits

Maintenance of Traffic Plan Features	Description	Benefits
All Existing Traffic Lanes Remain Open	All general purpose and auxiliary lanes will be maintained throughout construction.	■ Minimizes inconvenience to the public ■ Maximizes mobility through construction zone ■ Maintains driver expectancy
Minimal Traffic Switches	Phasing plan only requires two major traffic switches to construct Project.	■ Minimizes inconvenience to the public ■ Maintains driver expectancy
Temporary Concrete Barrier	Temporary concrete barrier will be placed between travel lanes and work zones.	■ Enhances safety for both the public and workers
Early Electronic Toll Collection (ETC) Integrator Work	Half-and-half phasing plan enables early start of ETC integrator work in completed median at end of Phase 2.	■ Enables efficient and accelerated construction schedule ■ Provides schedule certainty
Middle Work Zones Minimized	Constructing temporary paving and placing all traffic on either the westbound or eastbound half of the existing roadway will minimize work required in the middle of traffic.	■ Improves access in and out of work zones ■ Reduces need for lane closures ■ Improves safety through reduced interaction between public and construction traffic
Maintain Shoulders or Provide Emergency Pullouts	Shoulders will be provided in Phases 1 and 3. When shoulders are not feasible in Phase 2, emergency pullouts are provided.	■ Maximizes mobility through construction zone ■ Maintains safe travel in case of breakdowns or emergency response ■ Improves safety throughout the corridor
Large Work Zones	Phasing plan maximizes the length and width of construction work zones. Larger work zones enable concrete paving and other activities to be completed with fewer construction joints.	■ Improves quality of concrete paving through reduced joints and longer pulls, resulting in better ride quality ■ Enables efficient and accelerated construction schedule ■ Minimizes inconvenience to the public by accelerating construction schedule
Effective Use of Existing Materials	Half-and-half phasing plan enables use of existing roadway pavement and materials to be incorporated into final Project.	■ Stretches the budget through economical use of existing materials ■ Maximizes sustainability through reduced need for importing materials
Overhead Structure Installation Out of Traffic	Half-and-half phasing plan enables majority of overhead sign structures to be erected in Phases 2 and 3 in separate work zones.	■ Reduces number of required lane closures ■ Minimizes inconvenience to the public ■ Improves safety during construction ■ Allows lane-use sign integration and testing without live traffic

our team re-evaluated the approach to determine what improvements could be made to make the Phase 2 Project even more successful. Key improvements include:

- Constructing temporary ramps at both the McCaslin Boulevard and Foothill Parkway interchanges to eliminate the need for ramp closures.
- Increasing the Phase 1 temporary pavement width by 2 feet, resulting in a larger buffer between the existing median barrier and the temporary median barrier in Phase 2. The larger buffer provides the ability to install permanent median barrier in Phase 2, which improves the stability and reliability of our schedule.
- Implementing the alternating temporary median barrier in Phase 3, resulting in larger refuge areas for stranded vehicles, accelerated permanent median barrier installation and accelerated toll collection system installation and testing.

Beyond our tangible, proven successful maintenance of traffic plan, the PRD team provides inherent benefits to both HPTE and the traveling public by providing maintenance of traffic consistency and continuity between the Phase 1 and Phase 2 Projects. Specific benefits resulting from our team's intimate familiarity with the US 36 corridor include:

- First-hand experience interacting with the traffic volumes and driver tendencies on US 36.
- The PRD team's unique ability to implement a consistent approach to traffic management throughout the US 36 corridor.
- The PRD team's ability to design and implement maintenance of traffic on the Phase 2 Project that times

correctly with the Phase 1 Project schedule, eliminating crossovers at the transition between the two Projects.

- The PRD team's ability to generate a Phase 2 Traffic Management Plan (TMP) and Incident Management Plan (IMP) at the onset of the Project that complement the documents our team has already developed for the Phase 1 Project that includes input from CDOT.
- Consistent maintenance of traffic design and implementation staff members (including the maintenance of traffic Design Manager and Traffic Control Supervisor) on both Projects.
- Leveraging existing relationships and lines of communication between the Ames/Granite JV maintenance of traffic personnel and their counterparts within CDOT.
- Building upon the trust and relationships already formed between the Ames/Granite JV and the surrounding communities and Project stakeholders.

By leveraging our team's unsurpassed knowledge of the US 36 corridor, our established relationships and our proven successful and now further improved approach to phasing and maintenance of traffic, HPTE can be confident that the US 36 Phase 2 Project is the safest, fastest, least disruptive and most economical project possible.

Interchange Phasing Narrative

The McCaslin Boulevard and Foothills Parkway Interchanges along the US 36 corridor are significant to the overall mobility of traffic during construction. To address the Project goals of minimizing inconvenience to the public and maximizing safety of workers and the traveling public, we have developed maintenance of traffic plans that will minimize the construction impacts. Our traffic planning approach for interchanges considered the same factors and followed the same process that we used for the US 36 mainline.

Value Added – The Ames/Granite JV will construct temporary ramps at both the McCaslin Boulevard and Foothills Parkway Interchanges, allowing ramps to be constructed offline without requiring long-term ramp closures. Off line ramp construction minimizes the inconvenience to the traveling public and produces the highest quality final product.

As illustrated in the maintenance of traffic phasing plans included in Volume I-A, the PRD team was able to develop an approach to phasing the McCaslin Boulevard DDI that works seamlessly with our overall US 36 mainline phasing approach, leverages temporary ramps and signal systems to eliminate daytime ramp closures and maintain uninterrupted access to all quadrants, maintains two through lanes in each direction on McCaslin Boulevard and provides continuous RTD bus operations. In addition, the PRD team understands the importance of providing pedestrian safe passage through our work zone and has developed the McCaslin Boulevard phasing to maintain pedestrian movements at all times.

2.9.B – Maintenance of Traffic Commitments

Our commitments for lane closures, detours and maintaining access are described in the following sections.

Number and Duration of Lane Closures

The PRD team's maintenance of traffic approach does not include any long-term closures. We will maintain the current number of US 36 general purpose lanes, auxiliary lanes, arterial and local street lanes. Ramp closures will be limited to those allowed in the CDOT Region 4 Lane Closure Strategies (LCS) and minimized through the use of temporary ramps.

For the safety of the traveling public and our workers, a limited number of temporary closures have been identified that are required for safety-critical work activities. All temporary single lane closures will occur during off-peak hours in full compliance with the LCS. Lane closures will be scheduled to avoid disruption during special events, including athletic events and graduations at CU, the Bolder Boulder and other similar high-traffic situations.

Safety critical, single lane and full closures will be required for specific Project activities as described below:

- US 36 full closures will used to facilitate the following safety critical activities:
  - McCaslin Boulevard bridge widening. Closures will be limited to existing bridge demolition, girder erection and deck pours.
  - Overhead irrigation structure removal/installation activities.
  - Overhead sign installation. Our team will construct virtually all overhead signs offline, which will minimize the need for these closures.
- US 36, ramp, and cross street single-lane closures will occur at night to perform work directly adjacent to or over traffic.
- The McCaslin Boulevard DDI will require a weekend full closure for the final implementation of the DDI

configuration. The weekend full closure is imperative for the safety of our construction personnel and the traveling public. During this closure, final pavement markings, signal system activation and numerous other finishing activities will be completed to reverse the NB and SB McCaslin Boulevard traffic flow directions into the final DDI configuration. The PRD team has successfully replaced multiple traditional interchanges with DDIs, and in every instance has utilized a full weekend closure to complete the interchange transformation to allow for final implementation to be completed safely without traffic passing through a partially implemented DDI.

Safety-critical full closures will be submitted for approval by CDOT through the LCS Variance Request Process.

Figure 9.2 identifies the anticipated closures and the proposed detours for safety-critical work activities.

Utilization of Detours. We understand the impact that closures will have on this already congested corridor and have considered carefully the closures that have been listed in Figure 9.2. We have developed our phasing carefully to limit the number of closures required to those necessary for the safety of our workers and the traveling public. Of these closures, some are specified as full closures of US 36 for bridge demolition, girder erection, deck pours; overhead irrigation structure replacement; and overhead sign bridge installations. Other are specified as single lane closures to protect the traveling public from work adjacent to that travel lane.

For the nighttime full closure of US 36 outlined previously at McCaslin Boulevard for bridge construction, US 36 traffic will be detoured up the McCaslin exit ramp and immediately back down the US 36 entrance ramp, avoiding the need for a lengthy off-corridor detour. This will greatly reduce the impact as only one intersection will be involved in the detour route and it will be controlled by uniformed police officers to prioritize the movement of US 36 drivers.

For the nighttime US 36 closure outlined for the overhead irrigation structure installation, the detour routes 3E and 3W from the US 36 Traffic Incident Management Plan, Boulder Turnpike 2011 (TIMP) will be utilized.

For the closures listed for the installation of sign bridges, the PRD team will utilize the standard CDOT Rolling Blockade for Traffic Control (Standard Plan No. S-630-7) during overnight periods in instances where the overhead sign structure cannot be installed off line consistent with the overall construction phasing. The Ames/Granite JV has successfully implemented this approach on the Phase 1 Project as a way to avoid the need for a lengthy and disruptive full US 36 closure.

The McCaslin Boulevard detour that will be utilized during the weekend closure for final DDI implementation will use Dillon Road to 88th Street to Rock Creek Parkway and can be found in Part 3, Volume I-A.

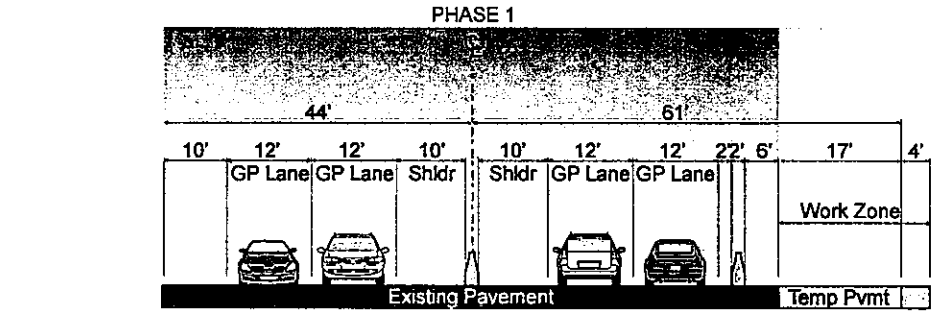
Detours will be fully developed by the maintenance of traffic task force, with input from the local jurisdictions as to the route itself and timing of the detour closure to minimize impacts to special events or seasonal traffic peaks.

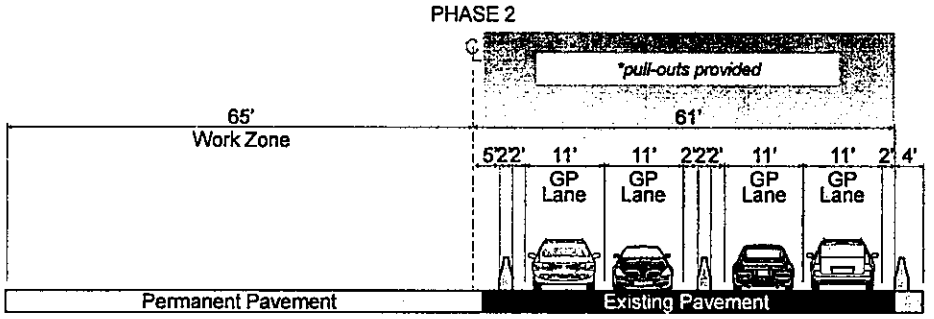
Details of our maintenance of traffic plan are discussed on the following pages, and a full set of maintenance of traffic phasing plans is included in Volume I-A.

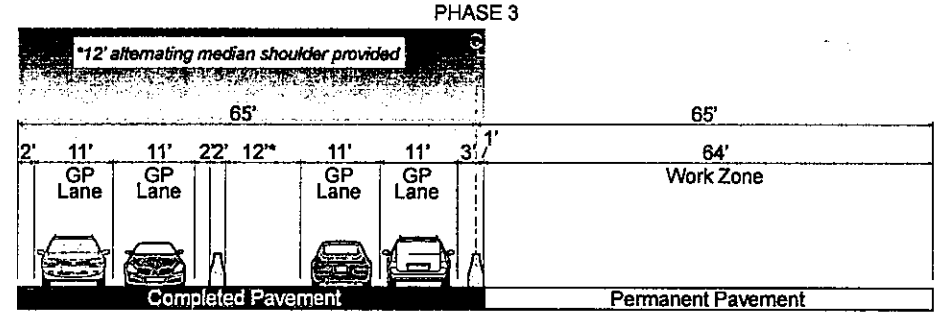
Figure 9.2: Lane Closure Commitments

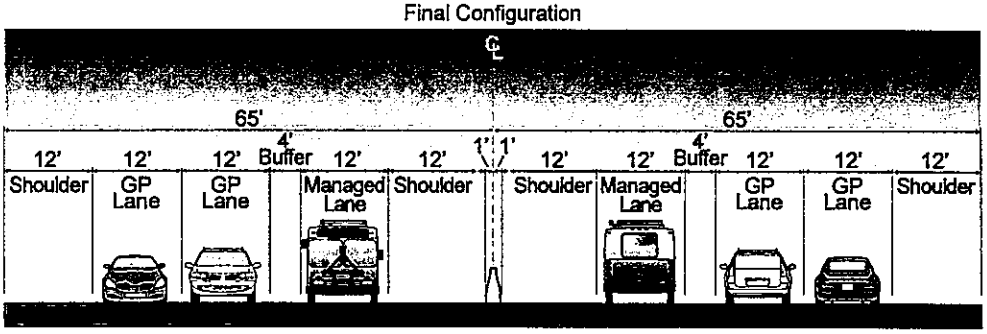
Location	Item of Work	Night/Weekend	Detour
US 36 Mainline Full Closures for Safety Critical Work			
US 36 EB/WB @ McCaslin Boulevard	Demolition, Girders, Deck	4 Nights + 2 Weekends	Ramp Utilization
US 36 EB/WB @ Irrigation Structure	Removal/Installation	2 Night	US 36 TIM Detour 3E/3W
US 36 Sign Bridge Installation	Erect Sign Bridges	6 Nights	Rolling Roadblock (CDOT Std Plan No. S-630-7)
US 36 Mainline and Ramp Single Lane Closures			
US 36 Single Lane Closures	Safety	100 Nights	MUTCD
US 36 Mainline Ramp Lanes	Ramp re-construction	20 Nights	MUTCD
Crossing Streets and Other Roads Full Closures for Safety Critical Work			
McCaslin Boulevard	Final DDI Implementation	1 Weekend	See Volume I-A, Sheet MD-01
Crossing Streets and Other Roads Single Lane Closures			
McCaslin Boulevard	Work Adjacent to Traffic	40 Nights	MUTCD

Figure 9.3: Four-Lane Typical Sections









US 36 Mainline Phasing Narrative

Phase 0 (Jan 2014 — Feb 2014)

Butterfly section removal on US 36 from the west Project limits to South Boulder Creek to facilitate Phase 1.

Phase 1 (Oct 2013 — Jun 2014)

Construct temporary pavement along the eastbound side of US 36 to accommodate all lanes of traffic during the second phase. All traffic remains in existing pattern, shoulders provided. Construction during this phase is primarily on the eastbound side and includes:

- Excavation and embankment
- Temporary westbound ramp construction
- Retaining walls
- Utility relocations
- Culvert extensions
- Storm drainage
- South Boulder Creek westbound bridge widening
- Coal Creek temporary eastbound bridge widening

Phase 2 (April 2014 — Dec 2014)

All traffic shifted to eastbound lanes and temporary pavement. Emergency pullouts provided. Construct westbound US 36 in its entirety. Specific construction elements in this phase include:

- Center median barrier
- Westbound side of Coal Creek box culvert
- Temporary eastbound ramp construction
- Erection of westbound sign bridges
- Start of ETC installation
- Completion of all westbound ramps

Phase 3 (Oct 2014 — Nov 2015)

All traffic shifted to the new westbound lanes. Alternating temporary center median shoulder provided. Construct eastbound US 36 in its entirety. Specific construction elements in this phase include:

- Erection of eastbound sign bridges
- Eastbound side of Coal Creek box culvert
- Completion of ETC installation
- Permanent striping on the eastbound side
- Completion of all eastbound ramps

Final Configuration

All lanes will be moved into their final configuration by November 2015.

Maintenance of Access, Including Pedestrians

Careful consideration has gone into the planning and approach that the PRD team will implement for the maintenance of access to pedestrian facilities and business frontages. The safety of pedestrians moving within and through the work zone is an important concern that we take seriously. For their safety, the PRD team is committed to implementing the following procedures to minimize these safety risks:

- Access through the work zone will be fenced with a warning barrier, such as orange construction fencing along pedestrian paths.
- The path or sidewalk will be maintained in a clean and usable form with signage clearly indicating the pathway.
- Construction traffic will be separated from pedestrian paths to eliminate the hazards associated with people on foot around moving equipment.
- A flagman will be used as needed at crossings to protect pedestrian traffic.

Access to business frontages will be maintained in all construction phases. The maintenance of traffic task force will identify all of the business-sensitive points and develop detailed phasing plans to either avoid the impact or minimize it in advance of the work. Our commitments regarding the maintenance of business access are as follows:

- Business access pathway detours will be developed with the business owners' input well before construction is scheduled to begin in their area.
- Any modification of access to businesses will be identified with signage clearly indicating the route.
- Additional business signage will be displayed in prominent locations if existing business signage is impacted.
- The construction working hours will be adjusted to accommodate the business where feasible.

Process to Produce Maintenance of Traffic Plans

The Ames/Granite JV has successfully developed, refined and implemented our process to produce maintenance of traffic plans on the US 36 Phase 1 Project and will expand our process to include the US 36 Phase 2 Project. Below is a brief description of that process.

Development of Maintenance of Traffic Plans. The maintenance of traffic plans that the PRD team developed for this Proposal will be refined as part of our final design process. To provide for efficient and consistent coordination with CDOT, RTD and stakeholders, we will establish an Maintenance of Traffic Task Force immediately upon Notice to Proceed. The Maintenance of Traffic Task Force will act as a forum for openly discussing the Project's approach to maintenance of traffic and to allow all stakeholders' voices are heard. The Maintenance of Traffic Design Lead will then take the information collected from the Maintenance of Traffic Task Force and generate the Traffic Control Plans (TCPs) in accordance with the CDOT M&S Standards and the Manual on Uniform Traffic Control Devices (MUTCD).

Implementation of Maintenance of Traffic Plans. Prior to implementing a major traffic change, the PRD team will host an informational meeting with local agency representatives, law enforcement, first responders and other interested stakeholders. The focus of the meeting will be to familiarize each participant with the upcoming changes and give them an opportunity to inform their other members and constituents.

Immediately after implementing a new maintenance of traffic phase, our Maintenance of Traffic Design Lead and Traffic Control Supervisor (TCS) will inspect the installation to make sure it conforms to the approved Traffic Control Plans and the MUTCD. The maintenance of traffic implementation and traffic shifts will also be video recorded to provide a record of the devices installed and their locations.

Monitor Maintenance of Traffic Plans. A key element to the success of any Maintenance of Traffic Plan is continually monitoring the plan to review that it meets the needs of the travelling public. Our TCS will be responsible for observing traffic flow through the construction zone and logging any notable traffic flow problems. Along with our Safety Manager, he will also have a primary responsibility to monitor how all aspects of the Maintenance of Traffic Plan are impacting safety.

Refinement of Maintenance of Traffic Plans. Throughout construction, the Maintenance of Traffic Task Force meetings will provide a forum for stakeholders to discuss current and future traffic control configurations. Led by our Maintenance of Traffic Design Lead, we will have an issue/resolution discussion at each task force meeting to best decide whether any changes need to be made to our plans. Our Maintenance of Traffic Design Lead will then refine the traffic control plans and, after review and approval, issue a new set to be implemented immediately.

Maintenance of Maintenance of Traffic Plans. Our TCS will be required to inspect all traffic control devices at the beginning and end of each shift. He will be responsible for

confirming that devices are functional and consistent with approved TCPs. Discrepancies will be corrected immediately and noted in his inspection report. Maintenance activities will be performed as necessary, including cleaning of signs and refreshing striping to maintain their visibility and effectiveness, as well as any necessary pothole repair.

Major Strategies to Improve Regional Mobility

Maintaining regional mobility during a large construction project on a major urban highway corridor is a challenge that our team has successfully overcome on many previous projects, including the current US 36 Managed Lanes Phase 1 Project. We will apply these same strategies to the Phase 2 portions of the corridor, building on the accomplishments we are already experiencing on Phase 1.

Our strategies for improving regional mobility – both during and after construction – involve three major elements:

- Develop and execute an effective maintenance of traffic plan
- Plan and provide a proactive and extensive Public Information program
- Implement innovative short-term and long-term Traffic Demand Management strategies

Each of these elements is discussed in the following sections of our proposal.

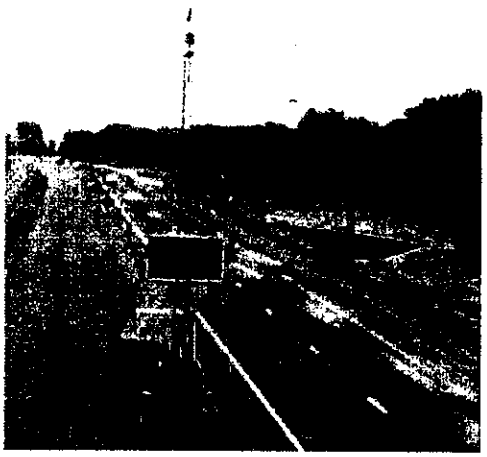
Effective Maintenance of Traffic Plan. The proposed sequence of construction phasing, and the associated Maintenance of Traffic Plan that we have presented in this proposal, was developed explicitly to minimize the impacts of construction on traffic using the US 36 corridor. Specifically, our maintenance of traffic plan:

- Maintains all existing general purpose and auxiliary lanes during all phases of construction.
- Minimizes the number of short-term lane closures needed for safety-critical activities during construction.
- Maintains all ramp movements, and all lanes and traffic movements on cross streets.
- Minimizes potential conflicts between construction activities and US 36 traffic by minimizing work in the median.
- Maximizes the amount of time full-width shoulders are available in each phase.
- Matches up with our planned "half and half" maintenance of traffic sequence on the Phase 1 Project to streamline traffic patterns at the interface between the Phase 1 and Phase 2 Projects.

To enhance our proposed phasing and Maintenance of Traffic Plan and further mitigate construction impacts, the PRD team will employ the following **value-added** strategies during construction:

Hotspot Traffic Trailers. Similar to our approach on our Phase 1 Project, we will continue to utilize Hotspot Traffic Trailers (HTT) to provide critical messaging for motorists. These units are based on a mobile platform and consist of a GPS-equipped trailer with a standalone sign, telescoping camera and wireless communication equipment providing an uplink to the CDOT Traffic Management Center (CTMC). (See Figure 9.4)

Figure 9.4: Hotspot Traffic Trailer

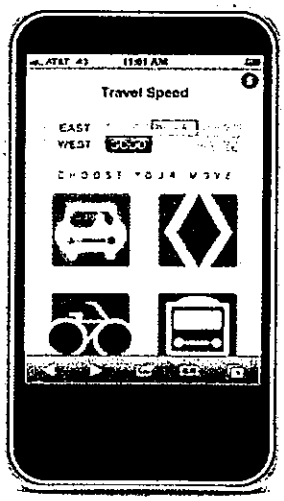


The HTT trailers will be deployed as directed by the CTMC or our TCS to augment existing message boards in specific situations and to assist in incident response along the corridor. This **value-added** feature gives the CTMC and our maintenance of traffic staff the ability to provide enhanced communication to motorists at the point-of-need more effectively than the stationary ITS system.

Smart Phone Application. As work on Phase 2 gets underway, we will expand the smart phone application developed on Phase 1 to include the Phase 2 construction area. This **value-added** application provides users with "at-a-glance" real-time traffic conditions in an easy-to-understand "Green-Yellow-Red" format. The application also includes a fully interactive map with live traffic cameras, plus dedicated information for HOV lanes, bikeways and bus routes. Live news updates get "pushed" to the user, much like an e-mail inbox. There is a

"new message" indicator on the home page that the user can tap to instantly see the news alert.

Figure 9.5: Smart Phone Screen Capture



Proactive and Extensive PI Effort. Our proposed D-B Public Information Plan is described in detail in Section 2.10 of this Proposal. Our plan for Phase 2 will be a seamless extension of the extensive program the Ames/Granite JV is currently executing with CDOT and its PI consultants for the Phase 1 Project. PI work for Phase 2 will involve enhanced efforts to reach major stakeholders and the general public in the Phase 2 portions of the corridor, including Louisville, Superior and the City of Boulder.

As the Ames/Granite JV is currently doing on Phase 1, the initial focus of our Phase 2 PI plan will be to communicate accurate and timely traffic information to the travelling public, and to provide motorists and Project stakeholders with advance notice of planned construction activities. This is a critical element of our maintenance of traffic plan. By providing accurate information to travelers and other stakeholders, they will be able to make informed decisions on alternate routes, travel times and modes of transportation. As described in Section 2.10, we have focused this portion of our PI Plan on being proactive (getting the message out early) and using many different methods and tools to convey our message to as many individuals and stakeholder groups as possible.

Our PI plan will also address how we will work with the local jurisdictions, community organizations (such as 36 Commuting Solutions and Boulder Transportation Connections), major employers, business groups and property managers along the corridor to enable them to provide appropriate information to their constituents. The extensive list of key stakeholders we have developed on Phase 1 already includes many stakeholders in western Broomfield, Louisville, Superior and Boulder. This key stakeholder list will be expanded to include additional key contacts who will be affected by the Phase 2 construction activities.

As an extension of the coordination work we are doing on Phase 1, we will also meet frequently with emergency responders and school districts and their bus companies to discuss any affects traffic phasing may have on their operations. We will continue to partner with RTD in planning and executing the work on ramps, bus stops and access routes near their Park-n-Ride areas. We will minimize impacts to RTD customers. Keeping these critical transportation elements moving efficiently is an important goal of our maintenance of traffic plan.

Traffic Demand Management Strategies. Major highway construction projects result in temporary changes in traffic patterns along the highway alignment. Because of the changes that occur during the course of a construction project, stakeholders that use the corridor for commuting, business or other purposes must have current, relevant information about those changes so that they can effectively manage their trip planning.

The members of the Ames/Granite JV team have recent successful experience in implementing Traffic Demand Management (TDM) strategies for construction projects on urban freeway corridors. Ames and HDR successfully partnered on the I-15 CORE project in Utah. Granite recently completed the reconstruction of I-64 through St. Louis for the Missouri DOT. In addition, the Ames/Granite JV is currently implementing a number of innovative TDM strategies as part of our work on the US 36 Managed Lanes Phase 1 Project. The TDM initiatives being implemented on Phase 1 will be expanded to include Phase 2 stakeholders and construction activities.

Our approach to TDM during the construction period includes both short-term and long-term strategies, as discussed below.

Short-Term Strategies. Our short-term TDM approach will be focused on reducing the volume of traffic that travels along the corridor, especially during peak hours. The Ames/Granite JV is currently working with Audrey DeBarros at 36 Commuting Solutions and a group of major stakeholders to implement a number of TDM initiatives on the Phase 1 Project. We have already had discussions with Bob Whitson at Boulder Transportation Connections to explore how these and

other options might be expanded to address TDM concerns on the Boulder end of the corridor.

An important first step in our TDM strategy is to make sure stakeholders who use the US 36 corridor are kept informed about the Project. This portion of the TDM effort will be closely linked to our PI activities, as described in Section 2.10. We will inform the stakeholders about planned construction activities and schedules, and describe how those activities will affect travel in the Project area. We will also provide them with information on the choices that are available to help them deal with the impacts of construction. Awareness of potential impacts and knowledge of available options allows stakeholders to make informed decisions about their travel plans.

The PRD team commits to continuing the TDM initiatives that have already been approved by CDOT and the TDM Action Committee and are currently being implemented by the Ames/Granite JV on Phase 1. These programs will be continued through the duration of Phase 2, and their focus will be expanded to include the additional group of stakeholders affected by construction in the Phase 2 portion of the corridor.

The TDM activities currently being utilized on Phase 1 that will be expanded to include the Phase 2 portions of the corridor include:

- Partnering with 36 Commuting Solutions to co-host quarterly "Workplace Ambassadors" lunch meetings where they communicate with their network of volunteer "Transportation Champions" from major employers along the corridor, such as Vail Resorts, Arista, Key Equipment Finance and the CirclePoint Corporate Center.
- Providing staff support and collateral materials for 36 Commuting Solutions as they work with employers and perform outreach at community events along the corridor to promote alternate working arrangements, and educate the public on transportation alternatives for this corridor.
- Providing Project staff members to make presentations at Chamber of Commerce and other business group events to provide Project information to the business community. On Phase 1, we are already working closely with Flatiron Mall, The Shops at Walnut Creek, The Westminster Promenade Shops, City Center Marketplace, Rocky Mountain Plaza and the Sheridan Park Office Park to distribute information to their membership.
- Hosting "Lunch and Learn" sessions at major employers and community gatherings to provide Project information to business owners and their employees, as well as residents of affected communities.
- Co-hosting CDOT's public meetings that provide information about transportation alternatives to a wide range of stakeholders.
- Promoting increased awareness of existing sources of alternate transportation planning, such as car pool and van pool opportunities associated with DRCOG's Ride Arrangers program.

In addition, we will also continue the following **value-added** TDM activities that are currently being performed on Phase 1:

- Maintaining the interactive Project Information Kiosk at the Flatirons Crossing Mall, and installing a similar kiosk at a high-traffic public area in Boulder. In addition to traffic and construction schedule information, the kiosks provide information about bus routes and schedules, and other suggestions to assist people in choosing appropriate alternate modes of transportation.
- Expanding our subsidy and distribution of RTD 10-ticket bus packets to stakeholders who are interested in sampling public transit. This "Try It, You'll Like It." program has been well-received by participants during the early stages of the Phase 1 Project, and is very popular at the Arista Development near the RTD Park-n-Ride facility at the 1stBank Center in Broomfield. We will continue to coordinate the distribution of these passes through 36 Commuting Solutions, and will initiate a similar program through Bob Whitson of Boulder Transportation Connections. Based on our conversations with Bob, this type of approach has previously been used in a limited way at the 29th Avenue Shopping Center, and was very successful in generating increased participation in RTD's ECO-Pass program.

Long-Term Strategies. The addition of managed lanes and improved bus facilities will alleviate congestion along the US 36 corridor. However, this portion of the metropolitan area is anticipated to experience continued growth. To avoid similar levels of congestion in the future, there has to be a fundamental change in the way people view transportation options. This corridor is home to many high-tech companies, which typically are receptive to and better able to implement alternatives such as flexible scheduling or telecommuting. The demographics of the corridor should make it easier to

accomplish a long-term change in the way people plan their travel.

Many people will modify travel patterns and work hours to cope with the inconveniences caused by construction. Our long-term strategy is to have the TDM initiatives we implement during construction convince them to make permanent changes in their travel patterns.

Our efforts during construction will proactively encourage the use of buses, car pools, van pools and alternative modes of transportation, flexible working hours, working from home and other means of reducing traffic along the corridor. We will make these alternate "coping mechanisms" convenient and desirable for both the employees and the employers to use. People need to personally experience the benefits associated with a different approach in order to make a fundamental change in their lifestyle. If that fundamental change can be encouraged by what we do during construction, many of these people will continue to use alternate methods of travel and working even after the Project is complete. It is our hope that the short-term strategies we implement during construction will result in lifestyle changes that persist long after the Project is completed.

2.9.C – Implementation of the US 36 Incident Management Plan

The Ames/Granite JV knows first-hand how vital an Incident Management Plan (IMP) is along the US 36 corridor and is committed to the complete and thorough implementation of a Project-specific IMP for the US 36 Phase 2 Project. Our team has already successfully implemented an IMP for the Phase 1 Project that clearly and concisely establishes the Ames/Granite JV's role in incident management and our interaction during the D-B period with the existing US 36 Traffic Incident Management Plan, Boulder Turnpike 2011 (TIMP).

At the onset of the US 36 Phase 2 Project, we will expand our current Phase 1 IMP to encompass both Projects, resulting in a single US 36 Construction Project IMP that works seamlessly with the existing US 36 Traffic Incident Management Plan. Then, as Phase 1 and Phase 2 construction is completed, we will work closely with the local emergency services providers and our O&M team members to transition to the long-term IMP that will be implemented on the corridor once construction is complete.

A single IMP that encompasses both the Phase 1 and Phase 2 Projects will eliminate the possibility of conflicting incident management protocols between the two adjacent construction Projects, resulting in the best response to an incident. The PRD team has a unique ability to seamlessly coordinate between Phase 1 and Phase 2 during the construction period, and to accommodate the phased transition to the long-term operating condition as construction is completed in each phase of the corridor. The following sections provide an overview of the Project-specific IMP that we will implement on the US 36 Phase 2 Project:

Incident Detection and Identification

The first step in incident management involves the detection and identification of an incident. The PRD team will maintain the data connectivity between the existing ITS and the CTMC to ensure real-time monitoring of traffic speeds and detection of incidents. Our supervisors in the field have already been trained in the IMP procedures and will notify CTMC, the PRD Courtesy Patrol and the Public Information Officer upon detection of an incident.

Upon detection, we will initiate the appropriate response based on the severity of the incident.

Incident Response

The second phase in the IMP involves the appropriate response to the incident. We will implement the Incident Definitions and Response Levels established in our Phase 1 Project IMP which are consistent with those established in the existing US 36 TIMP. Minor incidents not involving bodily injury will be responded to by the PRD team's courtesy patrol or our on-call wrecker service for overnight hours. Incidents involving multiple vehicles with possible injuries will require a response from the appropriate emergency response unit. The PRD team will notify the appropriate emergency response along with the CTMC and the PRD team's Public Information Office to assure all the appropriate actions are set into motion as quickly as possible.

In addition, all of the jurisdictional emergency response units and maintenance groups will be provided with our 24-hour direct phone number to the responsible on-call supervisor for that shift to further assist in the response to incidents. This will provide a single point of contact for the duration of the Project.

At the onset of an incident, the Ames/Granite JV field supervisors will be in direct contact with the emergency responders, helping identify construction access points and the quickest route through the work zone to the incident.

In addition, all of the jurisdictional emergency response units and maintenance groups will be provided with our 24-hour direct phone number to the responsible on-call supervisor for that shift to further assist in the response to incidents. This will provide a single point of contact for the duration of the Project.

Incident Site Management

The management of the incident site is critical to the safety of those involved in the incident, the safety of the incident responders and the safety of other travelers. With our large presence throughout the US 36 corridor, the PRD team will typically be the first responder to the site of an incident. Our supervisors understand the Response Incident Command established in the existing TIMP and supported by our Project-specific IMP. By implementing the established Response Incident Command, the PRD team has an efficient emergency response consistent with protocols currently in place on the US 36 corridor.

Additionally, our Traffic Control Supervisor will be mobilized in response to incidents equipped with additional maintenance of traffic devices and crews to set up advance warning and channelization.

Incident Clearance

The most visible step in incident management is the clearance of the incident, allowing traffic lanes to be restored. To mitigate the negative effects that a typical construction project has on incident clearance, the PRD team will provide 8-foot shoulders wherever possible and provide emergency pull-outs where sufficient shoulder width is not available. This will provide the room necessary for vehicles involved in incidents to clear the travel lanes and restore traffic flow.

In addition, the PRD team will provide a courtesy patrol during the hours stated in the RFP. Where traffic and other restrictions prevent access to the incident site, the PRD team commits to assist the response units by providing access through the work zone by moving barriers when needed and guiding responders through the work zone.

Motorist Information

A fundamental concept in our IMP is the rapid dissemination of information. Timely communication is critical for commuters to make decisions that will help them avoid delay. Immediately upon detection of an incident, the PRD team will notify the CTMC and initiate the IMP. The supervisors will also inform our Public Information Officer, Sheryl Machado, who will assist CDOT with communication about the incident.

2.10 – Approach and Commitments for the Public Information Plan

Benefits of PRD Approach:

- Phase 1 and Phase 2 PI efforts will be consolidated to provide stakeholders with a single source of project information for the entire US 36 corridor.
- Proven PI initiatives being used on Phase 1 will be expanded to seamlessly address Phase 2 needs.
- Consistent PI staffing from the Design-Builder and CDOT's consultant will result in a well-coordinated, consolidated PI program for both phases of the work.

The PRD team's approach to PI will involve two plans that address separate and distinct Project needs. The first PI plan will detail the proactive PI effort needed during the D-B period to support HPTE's goal of providing a diverse group of stakeholders with the information they need to minimize the impact of this major construction Project on their daily lives. This section of the proposal provides information about the PI plan that will be implemented during the D-B phase of the Project. This plan is focused on providing stakeholders with information regarding:

- **Project Vision** – a broad view of the overall purpose and benefits of the Project for the neighboring communities
- **Progress Updates** – timely and detailed information regarding current and upcoming construction activities and associated traffic and community impacts
- **Coping Information** – materials to provide stakeholders with information to help them deal with the impacts or inconveniences caused by the work

The second PI plan will address the information needs of motorists and other stakeholders during the time that PRD will be operating and maintaining the facility. This plan will address communication with stakeholders about things like maintenance activities, changes in HOV rules or modifications to the tolling systems or pricing structure, and is described in the O&M section of Volume III – Service Proposal.

Design-Build Phase Public Information. Since this Project will begin while construction is still underway on the US 36 Managed Lanes Phase 1 Project, most motorists and other stakeholders will see it as merely an extension of the Phase 1 work. Consequently, the PRD team will develop our PI approach for the Phase 2 Project to be a seamless extension of the PI activities the Ames/Granite JV team is already performing for Phase 1. Motorists, residents, local businesses and other stakeholders will continue to receive traffic and construction information for the entire corridor in the same ways that they are currently obtaining Phase 1 information.

We understand that CDOT's PI consultant for Phase 1, Communications Infrastructure Group (CIG), will also serve as HPTE's PI consultant for Phase 2. In order to provide the desired seamless interface between the two Projects, the Ames/Granite JV Phase 1 PI Officer, Sheryl Machado, will also serve as our PI Officer during the Phase 2 D-B period. This continuity of staff and seamless consolidation of the Phase1/Phase 2 PI programs will streamline the communication process, allowing HPTE and CDOT to provide information regarding the entire length of the corridor to all Project stakeholders in a unified, convenient, comprehensive and understandable manner.

Similar to our current work on Phase 1, HPTE's PI Officer and Project PI Liaison will control the dissemination of information about the Project to the public. The Ames/Granite JV PI Officer, Sheryl Machado, will continue to play a key role in the PI efforts. Sheryl will continue to work closely with the HPTE PI and Project staff. She will be responsible for providing the HPTE PI staff with timely and accurate information about the Project, and will be the on-site "face" of the Project – the person that local residents and businesses can readily access to obtain information, or to voice their concerns.

All PI efforts on the Project will be coordinated by the Public Information Task Force. Since many of the same key CDOT, CIG and the Ames/Granite JV PI personnel will be involved in both Projects, we anticipate this will be a joint PI Task Force, focused on addressing the combined needs of both Phase 1 and Phase 2. This combined PI Task Force will also include the Plenary Public Relations Manager, to provide continuity between all phases of work on the corridor.

The Public Information Plan (PIP) for Phase 2 will mirror the approved Ames/Granite JV PI plan, which is currently being implemented on Phase 1. The PIP will be a living document. The PI Task Force will continue to meet on at least a quarterly basis to review the effectiveness of our PI efforts, and make necessary adjustments to the plan based on feedback received from stakeholders as the Project progresses.

2.10.A – Innovative Strategies, Tactics and Solutions to Communicating Construction Information and Coping Messages

The goal of the D-B PI program on the US 36 Managed Lanes Projects is to provide timely and accurate information regarding construction activities to interested and affected parties. The RFP for Phase 2 identifies 17 separate categories of stakeholders. Each of these groups has slightly different information needs, and a slightly different approach is needed to maximize the effectiveness of our communication efforts to each group.

The majority of these stakeholder categories are also present on Phase 1, and our current PIP has been developed to meet their needs. We will review the current Phase 1 PIP, and update the existing communication matrix to make sure it includes any additional Phase 2 stakeholder groups, as well as identifying the specific communication tools that will be used to provide them with the information they need.

Communicating With the Public

This group includes anyone who will have contact with the Project during construction. It is a very diverse group that includes the motorists who use US 36 and the local street system, bicyclists and pedestrians who use the trails along the corridor and everybody who lives, works, shops or simply travels through the surrounding area.

Our basic approach to address the information needs of this large and diverse group is to consolidate our Phase 1 and Phase 2 PI efforts, so that interested parties can obtain traffic and construction information about the entire corridor through the same channels they are currently using to obtain information about Phase 1 activities.

Our approach includes the following activities:

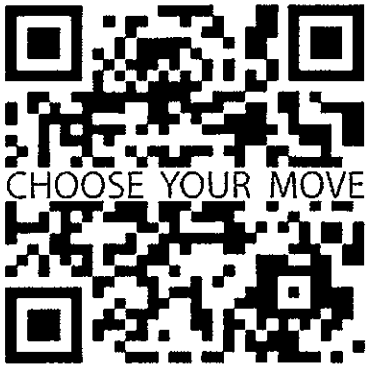
- **Public Meetings.** We will host public meetings prior to the start of construction at locations in the Phase 2 areas of the corridor selected by the PI staff and HPTE, and will host additional community or stakeholder meetings as warranted by construction phasing. These meetings will provide information about construction schedules, impacts, maintenance of traffic plans and other coping

information. Our experience on Phase 1 has taught us that meetings held for area-specific community or business groups get significantly better attendance if they involve food. Consequently, many of our informational stakeholder group meetings on Phase 1 have been planned as breakfast meetings or "Lunch and Learn" sessions. We plan to use the same approach for these group meetings on Phase 2.

- **Master Contact List.** Since many of the corridor stakeholders are common to both Phases 1 and 2, we will work with CDOT's "**govdelivery.com**" system to update and maintain the existing Phase 1 master list of contact information to include additional parties requiring or desiring information about the Phase 2 portions of the corridor.
- **Project Newsletter.** We will expand the regularly scheduled Phase 1 Project newsletter to include similar information for the Phase 2 areas. The existing newsletter will evolve into a consolidated US 36 corridor construction newsletter that addresses upcoming construction activities, anticipated changes in traffic patterns, Project progress photos, upcoming outreach opportunities and similar Project information for the entire corridor. This newsletter will be distributed to all interested parties electronically, and will be used as collateral material at outreach functions and events.
- **Telephone Hotline.** The existing Phase 1 24-hour hotline number, **(303) 404-7042**, will become the hotline number for both Projects. Our intent is to provide stakeholders with a convenient, consolidated information system, so they don't need to decide whether they should be calling the Phase 1 hotline or the Phase 2 hotline. The hotline will be answered during working hours, and voice mail will be available during non-working hours. In the event of an emergency, our PI Officer, Sheryl Machado, is on call 24/7, and her cell phone number is provided on the hotline for after-hours emergency calls. All calls to the hotline will be responded to within 24 hours. All calls and responses will be logged on the Public Contacts Log, which will be available to CDOT electronically and will be uploaded to the Project's Aconex database on a monthly basis.
- **E-mail Contacts.** Similarly, the existing Phase 1 e-mail address, "**info@us36expresslanes.com**" will be used to provide a means of collecting public comments on Phase 2. All contacts will be responded to within 24 hours. All contacts and responses will be logged on the Public Contacts Log, which will be available to CDOT electronically and will be uploaded to the Project's Aconex database on a monthly basis.
- **Social Networking.** We will provide HPTE with the information they need to update the CDOT pages on Facebook, and maintain the Project presence on Twitter. We are currently providing identical support to the CDOT PI staff on Phase 1.
- **Project Signs.** The PRD team will provide Project information signs and advance warning signs along the Project. Construction updates will be provided using both static and variable message signs along the corridor, as outlined in Section 2.9 – Maintenance of Traffic. Based on feedback received by the Ames/Granite JV during the early stages of Phase 1, we will provide more signage prior to construction activities that result in changes to bikeway, regional trail or parking/business access during the Phase 2 work.
- **Information Kiosks.** The Ames/Granite JV currently has an interactive information kiosk at Flatirons Mall. As an added-value, the information provided at this kiosk will be expanded to include the Phase 2 construction area and activities, and the kiosk will be maintained until the Phase 2 work is complete. We have partnered with 36 Commuting Solutions to provide commuting and alternate travel options at the kiosk. In addition, when Phase 2 gets underway, we will work with HPTE's PI staff and Boulder Transportation Connections to identify an appropriate high-traffic, public location in the City of Boulder where we can set up a similar kiosk to provide Project information in that portion of the corridor.

Figure 10.1: Information Kiosk

- **Project Website.** HPTE will host the public Project website on the CDOT server and will be responsible for all updating of the website. Our PI team will provide HPTE with updated information for the Project website on a weekly basis, or more frequently if warranted. We are currently performing identical support to CDOT for the Phase 1 Project, and have even provided a custom web address, "www.us36expresslanes.com", that links directly to CDOT's US 36 Project web page. We have also developed a QR code that allows users of mobile devices to link directly to this website.



Communicating With Stakeholders

There are many distinct groups of stakeholders along the corridor. Stakeholder groups include local government agencies, major employers, property management companies, local residents and community groups, local media organizations, emergency service providers and others that have been identified in our communication matrix. We have already identified the most effective tools for communicating with each group in our Phase 1 PIP. This existing matrix will be expanded to include the additional stakeholders on Phase 2 and identify the most appropriate communication tools to be used with each of them.

Our approach to communicating with all stakeholder groups will parallel our current efforts on Phase 1, including the following activities:

- **Government Contacts.** HPTE will control all communications with government agencies. Requests from government agencies will be directed to HPTE's PI staff. During construction, Sheryl and our PI team will assist HPTE by providing requested information regarding the Project and participating in meetings as requested by HPTE.
- **Media Relations/Contacts.** HPTE will control all media relations efforts, including news releases, traffic advisories and editorial or feature stories. Our staff will provide supporting information as requested. Any requests from the media received by our PI team will be directed to HPTE, as outlined in the "CDOT News Media Communications Guidelines."
- **Community Forums.** HPTE may arrange community forums with various stakeholder groups over the course of the Project. The D-B PI team will support HPTE by providing collateral materials and having PI or technical staff participate in the meetings when requested.
- **Property Managers.** The Ames-Granite JV's current PI efforts on Phase 1 have taught us that this stakeholder group can be very helpful in disseminating Project information. Most property managers already provide their tenants with weekly newsletters or updates. On Phase 1, we have been providing property managers a weekly packet of information, from which they frequently select applicable material and include it as part of their regular communications with their tenants. We will take a similar approach on Phase 2. Property managers from the Phase 2 areas of the corridor will be added to the list of contacts who receive the weekly packet of Project information. This process engages the property managers with our PI team, and allows them to individually select information that is most pertinent to their tenants. The feedback from this process on Phase 1 has been very positive.
- **RTD.** Our PI team will work closely with RTD to make sure that all construction activities that impact bus routes or bus stops are carefully coordinated to minimize impact, and that adequate advance notice is provided to users of the public transit system. As an example, our Phase 1 work required closure of a street near a bus stop. A number of RTD customers have traditionally left their cars parked along that street during the day. We coordinated with RTD well in advance of the street closure, placed flyers on the parked cars, placed advance-notice posters in the bus-stop shelters and provided a temporary VMS sign in the area. Our advance work was very effective in minimizing the impact of the street closure on these RTD bus patrons.
- **Emergency Response Providers.** Providing the local fire, police and emergency response community with current Project information is a critical element of our PIP. We have had very positive response to these efforts on Phase 1, where we had a special Project kickoff

meeting with key representatives of these agencies. We will plan a similar pre-construction kickoff for the emergency response community in the Phase 2 portions of the corridor.

- **Personal Contact.** We realize that there is often no substitute for good, old-fashioned, face-to-face contact. Similar to the approach we are using on Phase 1, Sheryl and other members of the PI team will go door-to-door and make personal contact with residents who will be affected by specific construction activities. In addition, we will continue to distribute door hangers and flyers to provide pertinent information about upcoming Project activities and changes in traffic or access patterns to every residence and business in the affected area. This approach has proven to be very effective, particularly when an upcoming construction activity is expected to be noisy. For example, the Lowell Avenue bridge replacement on Phase 1 is located in a predominately residential area. Prior to driving foundation piling for the new bridge, our PI team went door-to-door with flyers, to make sure that these noisy daytime construction activities would not disturb the sleep of any night-shift workers who might live in the area. We even had a block of rooms set aside at a nearby hotel to accommodate anyone whose sleep might have been affected by the noisy daytime work.
- **Project Tours.** We anticipate that HPTE may arrange for tours of the Project site to various individuals or stakeholder groups. When requested, the PRD team will provide a representative familiar with construction activities and schedules to accompany the tour groups. Usually, this will be a member of the D-B team, or the PRD Project Manager. In addition to the tours sponsored by HPTE, Sheryl and our Project management team will be available to provide site tours to local business or community groups, local scout troops or other interested stakeholder groups. The Ames/Granite JV has hosted a number of tours like this on Phase 1, and have found that stakeholders who participate in these activities generally feel an increased sense of ownership in the Project. Once they have been on site, they feel more connected to the Project and are better able to accept the temporary disruptions or inconveniences associated with our work.

Communicating With Local Businesses

Local businesses and their customers require accurate, timely information about the potential impacts of construction. This information is especially critical when construction operations will impact or temporarily close driveways or other normal access points to their business. They need to be assured that our construction planning has considered and accommodated the access needed by their customers and suppliers.

- **Initial Business Contacts.** Prior to the start of construction, Sheryl and members of the Project PI team will visit each of the businesses along the corridor, providing a packet of general information about the Project and construction schedule. These information packets will include all of the contact information for the Project team, including a "Contact Us" business card with the telephone hotline number, as well as e-mail, website and smart phone contact information. During these meetings, we will encourage the business owners to voice any concerns that they have about the upcoming work. To the extent possible, we will make adjustments to our construction plan to address their concerns. Business owners will be encouraged to contact our team at any time during the construction process if they have a question or concern about the construction activities.
- **Pre-Impact Contacts.** Immediately prior to any activity that will result in changes to a business access, members of our PI team will again visit the businesses that are to be affected, and advise them of the planned changes, alternate access routes and the anticipated construction schedule. When desired, we will assist the business in its efforts to inform their customers by providing maps showing the temporary access routes. The weekly packet of information provided to property management firms reinforces this message, since the property managers usually include this type information in their regular correspondence with their tenants.
- **Alternate Access Signing.** As part of the maintenance of traffic plan, we will develop "Open for Business during Construction" and trailblazer signs along any detoured access routes to direct customers and delivery personnel to the affected businesses.

2.10.B – Commitment to be Proactive and Flexible in Identifying and Responding to Concerns

PRD is committed to executing a seamless and proactive outreach effort to all Project stakeholders. We are committed to providing these stakeholders with a high level of dedication, expertise and professional delivery of timely, accurate Project information. Our past experience indicates that the most important thing to a business owner or any other stakeholder

is maintaining good two-way communication. When a concern arises on the Project, people need to be able to contact us and feel confident that their concern has been heard and understood, and will be addressed.

On Phase 1, the focus of the design-build period PIP will evolve as the Project nears completion. We plan to provide stakeholders with information that introduces them to the tolling operations on the managed lanes, provides information about obtaining vehicle transponders, teaches them about the use of the dual-position transponders that are new to the region and provides them with other helpful information as construction is completed and the tolled lanes go into operation. We will repeat those educational activities as part of our PI effort on the Phase 2 Project as construction in those areas nears completion.

Our commitment to employ a variety of communication methods and tools provides us the flexibility to respond quickly to concerns in a manner that matches the needs of a specific individual or business. Many of these methods have been discussed above, and are currently being used by our PI team on Phase 1.

When concerns about construction activities are raised by a stakeholder, Sheryl and the appropriate construction representative will visit the concerned party to discuss their issues and identify possible solutions. Stakeholders can be assured that our PI team is not just there to talk about their concerns – our team will respond with construction representatives who have authority to address and correct the problem.

We realize that there are many special events, including concerts, community festivals, athletic events and peak retail seasons that affect traffic along the corridor. As a result of our ongoing discussions with the local jurisdictions, community leaders and stakeholders, we will plan and sequence our activities to minimize the impact of our work on these events.

Our flexible and proactive approach to responding to concerns is best described by a few examples of successes that have been achieved by the efforts of the PI team and construction personnel from the Ames/Granite JV during the first few months of work on Phase 1.

- **Food Bank of the Rockies Fun Run.** Our PI staff was approached by the organizers of this event, and we were able to revise our schedule to delay the start of reconstruction on one of the box culverts on Phase 1 for over a week. The box culvert was part of their planned race course, and our rescheduling allowed us to keep the box available and unobstructed for their event.
- **Butterflies and Beer.** Based on conversations our PI team had with the managers of the Butterfly Pavilion, we delayed the start of our night shift operations on the day of that event until 9:00, to better accommodate traffic leaving their event, which ended at 8:00 PM.
- **Marilyn Manson Concert.** We worked with the representatives of the 1stBank Center to reschedule our planned activities to avoid construction impacts to traffic leaving this well-attended concert event.
- **CU Thursday Night Football Game.** In early October, the CU vs. Arizona State football game in Boulder was moved from Saturday afternoon to Thursday night to accommodate TV coverage of the game. We cancelled our planned night shift operations that evening so that we could avoid impacts to the anticipated heavy traffic volumes associated with the game.
- **Emergency Road Repairs.** While constructing the pavement widening needed to accommodate the temporary traffic patterns on Phase 1, our crews encountered problem areas in the existing pavement that needed significant repair work. These repairs had to be done almost immediately, on an emergency overnight basis, requiring significant coordination of our construction and maintenance of traffic personnel. The PI team actively participated in disseminating information regarding the traffic impacts of the unanticipated, short-notice lane closures needed to accommodate the repair work.

Our proposed PI staff has significant experience providing the necessary communications and advance notice to stakeholders for both planned and unexpected occurrences on urban freeway projects. They can quickly identify appropriate communication channels and work with CDOT staff to provide timely and accurate coping information to Project stakeholders. Our experienced team will take the same responsive and flexible approach to assist the HPTE PI team in addressing specific concerns of residents and businesses as we work our way through the Phase 2 portions of the US 36 corridor.

2.10.C – Keeping HPTE Informed

The PI program for this Project will be controlled by HPTE. As indicated previously, much of the work that Sheryl, the PRD Project Manager and the PI team will do involves providing the HPTE PI Manager and PI Liaison with the timely and accurate information they need for their PI activities. To make this program successful, the PI staff of both HPTE and PRD need to communicate and coordinate closely. Since key members of both parties are already working together very successfully on Phase 1, we anticipate the transition to incorporate Phase 2 information into the existing programs will be a smooth process, resulting in a seamless PI experience for stakeholders, whether they live, work or travel through either Phase 1 or Phase 2.

Although HPTE and CDOT will control the main communication channels, such as the Project website and news releases, Sheryl and her team will directly interface with many stakeholders, through face-to-face contacts and public meetings. During construction, she will have primary responsibility to respond to comments and concerns that are identified through the telephone hotline, e-mail, website or personal contacts. Sheryl will meet with the PRD Project Manager and HPTE's PI staff on at least a weekly basis to keep them updated on issues of concern to the stakeholders. All comments and concerns generated through any of the communication channels, and our responses to them, will be documented on the public contact log that will be maintained electronically in a location that is accessible to HPTE at any time.

We will provide HPTE with advance copies of the collateral items, such as newsletters, flyers, door hangers and other materials that we will use to educate stakeholders about the Project and advise specific groups about upcoming construction activities that may impact the areas of their homes or businesses. While we have primary responsibility to develop appropriate materials, these materials will be reviewed and approved by HPTE's PI staff before we print or distribute them.

As indicated earlier, our PIP needs to be a living document. The PI Task Force, which includes representatives of both the HPTE and PRD teams, will meet quarterly to evaluate the effectiveness of the PI efforts to date, and to adjust the PIP as needed to improve our communications with the various groups of stakeholders on this Project.

2.10.D – Plan for Releasing Information

The PRD D-B PI team will assist the HPTE PI team in its communications with Project stakeholders. We will provide information that accurately describes the proposed construction activities sufficiently in advance of the activity to allow HPTE ample time to disseminate the information through its established processes and procedures.

The D-B PI team is familiar with HPTE's requirements to provide advance notice of upcoming construction activities, changes to traffic patterns and cancellations or modification of previously scheduled activities. Our team will comply with the Project requirements for advance notice identified in the technical specifications, specifically Schedule 5, Section 4-Public Information, 4.6.1-Schedule for Information Dissemination, and Section 16-Maintenance of Traffic.

Updates to this information will be provided to CDOT as soon as we become aware of them. We will provide CDOT with at least 24-hour notice on updates regarding activities that directly impact the public, such as cancellation of planned closures, additional lane closures, closure removals or major traffic shifts. All updates to the information previously provided to CDOT will be discussed at the weekly Project meetings.

2.11 – Safety Management Plan Approach and Commitments

Benefits of PRD Approach:

- Proven safety programs and procedures from Phase 1 will be used on Phase 2.
- Current Phase 1 Safety Manager will also manage the additional safety staff assigned to Phase 2 to provide consistency along the corridor.

PRD and its D-B subcontractor, the Ames/Granite JV, are committed to minimizing inconvenience to the public while maximizing the safety of workers and the traveling public. The protection of the public and the safety of our workforce is our highest priority.

Measures the PRD team will take to incorporate permanent safety features that protect maintenance personnel and the public are discussed in Section 2.7 of this proposal. This section of our proposal addresses the proactive Safety Management Program we will use during the critical construction phases of the work.

The Ames/Granite JV empowers its Project management team and craft workers at all levels to take ownership of safety, continually striving to meet our ultimate goal—zero safety incidents. This culture of placing safety first is the foundation of our Safety Management Approach and Commitments.

Our accident prevention programs and safety approach have paid dividends in the past and are continually improving, as reflected by our safety statistics below:

Figure 11.1: Safety Statistics

Category	2011	2010	2009
Incident Rate	Ames: 1.88 Granite: 2.30 Industry Average: 3.8	Ames: 2.33 Granite: 2.20 Industry Average: 3.8	Ames: 2.50 Granite: 2.50 Industry Average: 3.8
EMR	Ames: 0.77 Granite: 0.73 Industry Average: 1.0	Ames: 0.84 Granite: 0.76 Industry Average: 1.0	Ames: 0.85 Granite: 0.76 Industry Average: 1.0

Personnel Safety

Our workforce safety approach begins with the philosophy that there is no work so urgent that we cannot take the time, expense and effort required to perform the work safely, with no accidents. This message is ingrained in our employees through extensive training, and continual emphasis on safety and risk management.

All personnel on the Project site will be trained in proper safety techniques. HPTE and CDOT Project personnel are invited to participate in our safety training, so that everyone on site has the ability to recognize safety concerns. Our team's dedication to a safe worksite will be apparent to everyone involved, including the members of the public who drive through the Project.

Our approach to safety begins with the firm belief that there is no work so urgent that we cannot take the time, expense and effort required to perform the work safely.

We will use a Project-specific Safety Plan that includes tools and practices that have proven successful on past D-B projects, and is currently being used on our US 36 Phase 1 work. The execution of the plan will be administered by Safety Manager, David Gompert, but all Project personnel are empowered with the authority necessary to correct unsafe acts and conditions and address unsafe behavior, including the authority to stop work if the conditions warrant this action.

The Safety Plan we are currently implementing on our US 36 Phase 1 Project will also be used for Phase 2.

Key elements of our Safety Plan include:

- Activity Hazard Analyses (AHAs)
- Project-Specific Safety Orientation
- Daily Safety Briefings
- Weekly Toolbox Safety Meetings
- Task-Specific Safety Training
- New Employee Monitoring/Mentoring
- Accident and Near-Miss Investigations
- Proactive Subcontractor Safety Management
- Drug-Free Workplace

Our new employee monitoring program allows seasoned workers to help new employees learn to safely perform their job assignments.

Public Safety

In addition to protecting our workers, the Project Safety Plan has been designed to address the safety of motorists and the general public. A key element of public safety is related to driver expectation. Motorists are able to drive more safely if they have advance knowledge of roadway conditions. Temporary traffic control devices will be placed in accordance with standard specifications. Existing signing will be maintained and construction signs will be added as required. In addition, our PI Officer will work with HPTE's PI team to provide advance notice of upcoming construction activities, traffic shifts and lane closures, resulting in a better informed and safer public.

Managing driver expectation is a key element in our approach to provide safe and efficient traffic flow through construction zones.

We will coordinate with the local emergency response agencies regarding incident response. If an incident does occur, emergency personnel will be able to quickly respond. Our primary goal is to minimize emergency incidents along

the Project corridor through effective public involvement, uncomplicated traffic phasing and clearly understood traffic routes through the construction zone. However, even something as simple as a flat tire, or a car running out of gas can create an emergency situation that must be promptly addressed. Our Incident Management Plan, outlined in Section 2.9.C, will mirror the plan we are currently implementing successfully on Phase 1.

Identifying key Project risks and planning safe work procedures prior to beginning work is one of our key approaches for establishing a safe Project. Although not all-encompassing, the following sections identify some of the more critical safety issues and anticipated mitigation measures associated with the work on the US 36 Phase 2 Project.

- **Elevated Structures.** Work plans for elevated structures will include providing appropriate barriers, signing and detours to prevent general public access below elevated work areas. All elevated formwork and beam bracing will be designed, reviewed and approved by an experienced engineer.
- **Traffic and Work Zone Interface.** The preliminary Project phasing plans presented in Section 2.9 provide simple, safe and predictable traffic patterns for both vehicular and pedestrian traffic through the construction zone. Proper delineation and advance warning prior to entering a construction area is key to safe and efficient traffic movement. Our Traffic Control and PI staff will provide the public with advance notice of upcoming construction activities and properly design and install the necessary signs and traffic control devices.
- **Underground Utilities and Drainage.** A competent person will supervise this work to make sure appropriate excavation safety, confined space and other applicable safety requirements are being followed. All underground utilities will be properly located in the field before starting work. Appropriate signs and barricades will be installed around utility work zones to prevent public access.
- **Material Hauling.** Key safety considerations for material hauling include:
  - Planning the haul routes to minimize the need for trucks to back into position.
  - Clearly identifying truck access points into and out of the construction area.
  - Providing appropriate acceleration and deceleration lanes for trucks to transition into or out of public traffic.

Properly planning trucking operations can significantly reduce the potential interaction between construction vehicles and the general public.

Environmental Safety

The PRD team is committed to establishing environmental safety processes and plans that protect our employees, the general public and the environment. We will minimize impacts of our work on the environment. Our environmental safety plan will also address hazardous materials, including the ones used in construction, as well as ones that may be encountered on the Project site.

The Project Safety Plan will include the following environmental components.

Hazard Communication Program. Hazardous materials anticipated on the site will be identified and the Safety Manager will be responsible for materials inventory, proper labeling, storage, handling and maintaining an updated set of Material Safety Data Sheets (MSDS). Training will be provided before employees are assigned duties that may cause exposure to hazardous chemicals.

Spill Containments and Procedures. Our Safety Plan will include an Emergency Spill Response Plan that outlines steps for spill prevention and provides both non-emergency and emergency spill response protocols. All site employees will be required to read and understand the plan.

Fueling and Maintenance Procedures. An operational control procedure to guide site employees on proper oil handling and refueling activities will be included. Because the Ames/Granite JV embraces sustainability as a practice, we have designed our equipment policies to prevent potential releases of oil and fuel to ground surfaces and waterways and to protect air quality with controlled emissions.

Contaminated Materials/Hazardous Substances. Contaminated material may be encountered during construction of the US 36 Project. The most likely materials are associated with existing asbestos-cement pipe that must be protected or relocated, and lead-based paint on bridges that are to be widened or rehabilitated. All workers will be trained in the identification of contaminated materials and hazardous substances prior to beginning excavations or other construction operations.

If contaminated soil or water, or other hazardous material is encountered during construction, work in the immediate area will cease and CDOT and the Safety Manager will be notified. Subsequent procedures will be undertaken in accordance with the Project Health and Safety Plan, Project specifications and applicable governmental regulations.

All workers will be trained to identify and properly respond to potentially contaminated or hazardous materials encountered during construction.

2.12 – McCaslin Interchange Underpass (Option 1)

Benefits of PRD Approach:

- Our D-B team has previously converted conventional interchanges to a DDI configuration, and can seamlessly integrate construction of the Option 1 pedestrian box into the DDI conversion process.
- The PRD team's design places walls, other elements of the DDI interchange and the optional pedestrian box at locations that will not conflict with construction of an enhanced DDI that would handle increased traffic volumes in the future.

If this option is exercised by HPTE, the PRD team will provide a minimum 10' high by 18' wide pedestrian undercrossing of the McCaslin Boulevard consistent with the RFP requirements. The concrete box will require retaining walls in addition to the standard wingwall design of the culvert. While acknowledging that the DDI is not currently viewed as the Ultimate Configuration for the McCaslin interchange, we have analyzed the DDI for future performance. We have designed the pedestrian box, as well as all walls and permanent roadway elements, outside the footprint of the improvements our analysis indicates would be needed to increase the capacity of the DDI. This provides CDOT with a practical and less costly alternative for the future, as opposed to constructing the ultimate interchange configuration shown in the ROD. Should CDOT elect to make capacity improvements to the DDI consistent with our analysis, the current infrastructure can remain in place. This will limit the amount of rework required in the future and is a **value-added** element of our design.

2.13 – Electronic Toll Collection System

Benefits of PRD Approach:

- The PRD team has the same ETC designers as Phase 1, resulting in consistent approach along corridor.
- ETC installation and integration will be provided by E-470, streamlining coordination and phased implementation of the ETC systems on the I-25 Managed Lanes, Phase 1 and Phase 2.
- Staging plan allows early installation of ETC elements, providing greater schedule certainty.

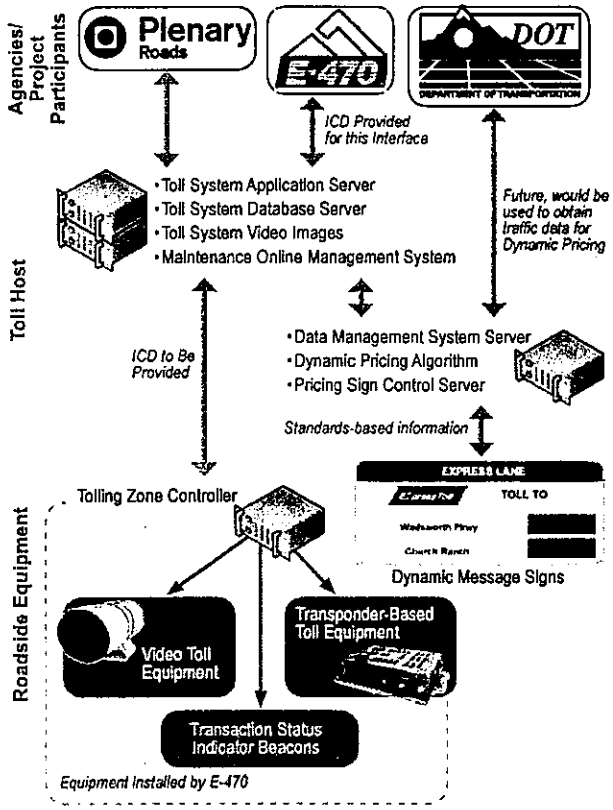
The Project team will deliver a complete and functional toll system that meets the performance requirements set forth in the RFP. The effort applied to the Electronic Toll Collection System (ETCS) will include the design, construction and integration of all of the system electronics, as well as the supporting infrastructure (structures, power, fiber optic communications) needed to support the O&M of the equipment.

2.13.A – System Design and Project Management Plan

The design of the ETC infrastructure will be performed in conjunction with the design of the ITS elements. This will ensure that design of the complete system (ITS and ETC) is done in a manner that fully supports both functions and that devices are not planned for locations that will present conflicts or otherwise interfere with the operations of the different systems. Specific features of the design that will be coordinated between the ITS and ETC systems include:

- **Structure.** Placement of structure so as to not interfere with the operation of other equipment or signage.
- **Power.** Shared use of the power infrastructure to minimize infrastructure construction and costs.
- **Communications.** Design of the fiber optic communications network to support both the ITS and ETC components and recognizing that communications for the ETC components may need to be kept separate.
- **Consistency.** Design of all components to be in alignment with the Phase 1 deployment as appropriate.

Figure 13.1: Toll System Interfaces



The ETC sites will be designed at the locations shown in the RFP documents, or as modified to be consistent with the final roadway layout and striping. The design of the structures (height and strength) will take into consideration the performance and installation requirements of the ETC equipment to ensure that requirements such as equipment mounting height and vibrations are met so that the equipment can operate efficiently. The structure and infrastructure layout will also be reviewed by personnel experienced with toll system operations to help ensure that the equipment is placed in locations that will support their optimal performance. (i.e., locating camera poles so that license plate cameras get an unobstructed view of vehicles).

The toll system work will include the development of a toll host that will collect data from the roadside equipment that will be provided by the E-470 Authority, assemble the individual transponder reads into toll trips and send the trip information to the E-470 back office for processing. This host system will also maintain the pricing schedule for the facility and will also support future dynamic pricing algorithms.

The management of the ETCS design will be integrated into the overall Project and design management procedures. Integrating the ETC components into our overall program will allow the ETC equipment design and construction to be tracked as part of the overall program. The ETC equipment can be installed, integrated and tested as required according to the critical dependencies identified under the overall Project schedule.

2.13.B – Master Test Plan

The testing of the ETCS will be conducted in a staged manner. The first elements will focus on testing of the supporting infrastructure to confirm that it is ready for the equipment installation and integration. The second step of the testing will focus on the installation and integration of the toll equipment to verify that it is working properly and creating the necessary toll transactions for the managed lane system. The third elements will be the system interfaces that allow the transactions to be sent to the E-470 Authority for processing. All required members of the PRD team will be involved in each stage of the testing.

The infrastructure testing will include testing and inspection of the infrastructure to ensure that it is ready for the installation of the ETC equipment. Performing these checks will help ensure that the ETC components can be installed in an efficient manner and that the ETC equipment installation and integration can be performed without delay. Specific elements of this test will include:

- **Cabinets.** Cabinets are installed and have power so ETC equipment can be mounted in the cabinets.
- **Conduits.** Conduits are installed, cleared of obstructions and have pull rope in place to facilitate the installation of cabling for the ETC components.
- **Communications.** Fiber optic cable is routed to the cabinet and properly terminated. Network equipment is installed in the cabinet and ready to be integrated with the ETC equipment. The fiber optic cable will be tested to verify that communications back to the communication hubs are in place.

After the ETC equipment is installed, testing will occur at each of the sites and for the overall ETCS. This testing will be performed by the E-470 Authority, which will be installing the ETC components. Members of the PRD team will observe and document the testing activities to verify that all equipment is functioning properly and that the system is operating in accordance with the performance requirements. This testing will include the following components:

- **AVI Read Accuracy.** Tests will be performed to verify that the AVI equipment at each location is properly reading the vehicle transponders. This will involve driving vehicles through the toll zones with transponders and verifying that the transponders have been read. As part of this test vehicles will also be driven in the adjacent general purpose lane to verify that the AVI system does not read transponders in vehicles in the adjacent lane.
- **Image Capture Accuracy.** For vehicles that do not have a transponder, the system will need to capture an image of their license plates. For this test, vehicles will be driven through the toll zone without a transponder and it will be verified whether the cameras capture images of the front and rear license plates. This test will verify that the image triggering mechanism (in-pavement loops) and image capture devices (cameras) are working correctly. The quality of the images in various lighting conditions will be reviewed to confirm that the images are readable.
- **Transaction Assembly.** For each vehicle that passes through the toll zone, the lane system will assemble a "vehicle transaction." This transaction will contain either transponder data or license plate images and will be transmitted to the toll host system for processing. This test will verify that all vehicle transactions are properly assembled and transmitted to the host system. It will also test the communications network to confirm that there is a communications path from each toll zone back to the toll host.

Testing of the system interfaces will consist of two pieces, from the roadside equipment to the toll host system, and then from the host system to E-470. The purpose of this testing will be to check that the data is being transmitted consistent with Interface Control Documents provided by the E-470 Authority and that both the PRD Host System and the E-470 can properly receive and process data sent from the other party. This testing will take place during development and prior to the commencement of tolling for the Phase 1 area. As the additional tolling points are brought online for Phase 2, the testing will be repeated to verify the operation of the complete system.

2.13.C – Implementation Plan

Interoperability of the ETC equipment will be assured by contracting with the E-470 Authority to furnish and install the ETC equipment for this project. The E-470 Authority will be installing the ETC equipment for the US 36 Phase 1 Project and currently supports the I-25 Express Lane equipment. By contracting with E-470, the Project team will have consistent equipment for all of the toll zones on the US 36 Managed Lanes, and all of the toll zones will be integrated with a common system. There should be no disruption to service for the I-25 and US 36 Phase 1 equipment because the same host system will be used and the Phase 2 equipment will simply be added to the existing system.

The host system will serve as the interface between the roadside equipment and the E-470 Authority. This system will be developed to comply with interface control documents that are provided by the E-470 Authority. Development of the host system will commence upon Notice to Proceed to ensure that the system is developed, tested and installed to support the tolling commencement date for Phase 1 of the corridor. As the additional tolling points for Phase 2 are brought online, they will be integrated with the host system to provide for tolling along the entire corridor.

As noted in the previous section, the implementation of the ETC infrastructure and components will be addressed in two stages. The initial work will include installing the infrastructure to have all of the sites ready to receive ETC equipment. This infrastructure includes overhead structures and pedestals, conduits and junction boxes and cabinets with electrical service and communications.

Once the infrastructure is competed at the sites, the work to install the ETC equipment will be performed. This work will be performed by the E-470 Authority and will include installing the equipment and cabling, terminating the cabling at the equipment and in the cabinet, energizing the equipment to check it is functioning and tuning the equipment for proper operation. Each of the sites will be integrated with the fiber optic communications network and initial testing will be performed to verify communications back to the communications hubs.

When the work is done at all of the toll sites, the testing detailed in the previous section will be performed.

The installation, tuning, integration and testing of the ETCS will all be included in the overall Project schedule so their progress can be tracked to the overall Project schedule and a tolling commencement date can be planned. This work will be linked to the appropriate predecessor tasks, including roadway and infrastructure construction, so any changes that may affect the planned equipment installation or Phase 2 tolling commencement can be identified early.