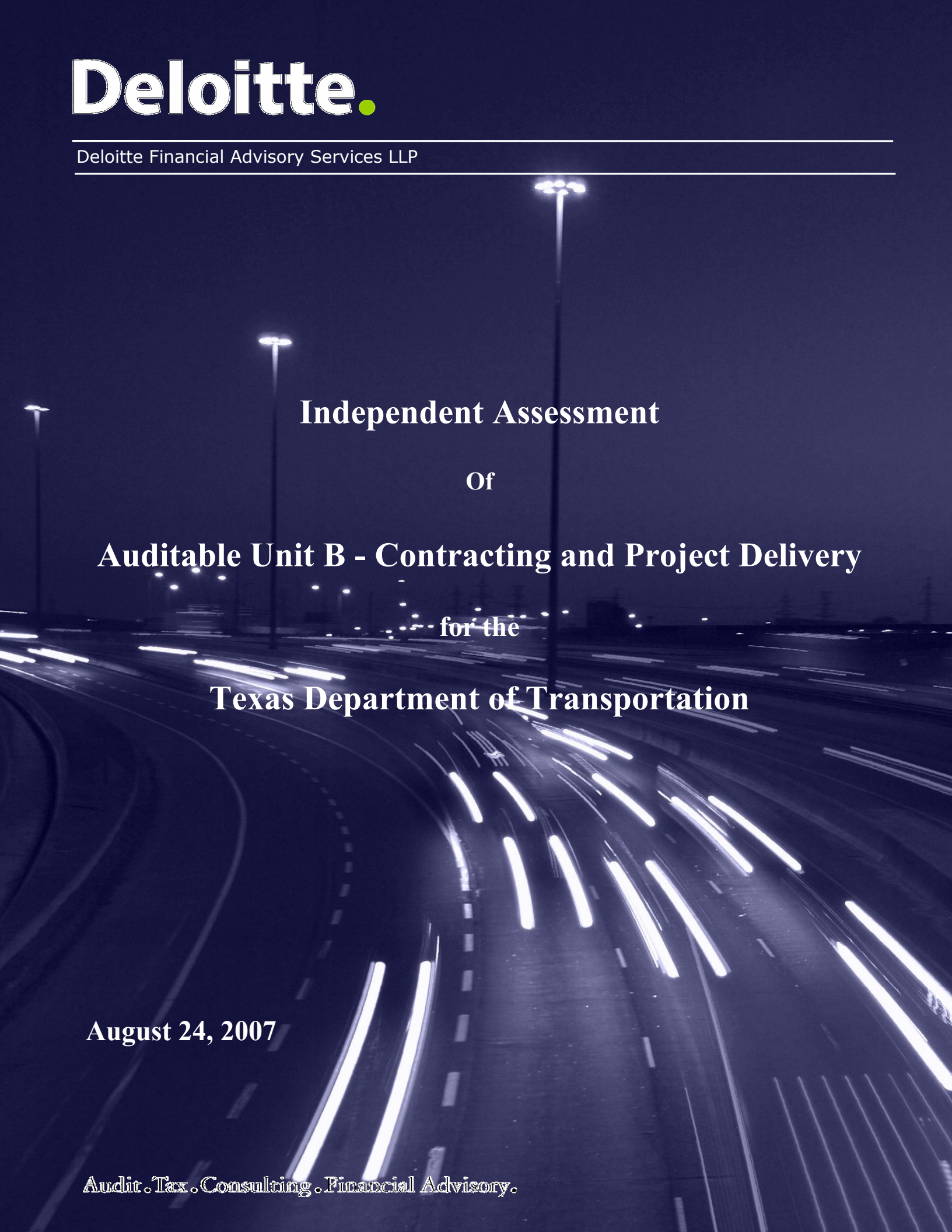


Deloitte.

Deloitte Financial Advisory Services LLP

Independent Assessment

Of

Auditable Unit B - Contracting and Project Delivery

for the

Texas Department of Transportation

August 24, 2007

Audit. Tax. Consulting. Financial Advisory.

Table of Contents

Section 1: Executive Summary

The Texas Department of Transportation ("TxDOT" or "Department") provides a variety of diversified services to the citizens of Texas, all of which are focused on achieving its key goals including congestion relief, safety enhancement, economic opportunity expansion, air quality improvement, and asset value growth. To meet these goals, comply with statutory requirements of the Transportation Code, and to prepare for the 2009 Sunset Review process, TxDOT contracted with consultants for five independent assessments of TxDOT's management and business operations. The auditable units assessed included: Transportation Funding, Contracting and Project Delivery, Consumer Services, Management and Support Functions, and Field Operations. TxDOT retained Deloitte Financial Advisory Services LLP ("Deloitte FAS") to conduct the independent assessment of TxDOT operations related to Auditable Unit B – Contracting and Project Delivery. The objectives of the independent assessment were to improve the quality of the statewide transportation services, identify opportunities for enhancing revenue, develop strategies to improve the efficiency and effectiveness of operations, highlight exemplary and innovative practices, and recommend opportunities for reducing risks and improving operations at TxDOT's Central Office.

Deloitte FAS conducted the assessment using a TxDOT prescribed three phase approach. Phase 1 consisted of a high level risk assessment which identified areas for further detailed evaluation and assessment. Phase 2 consisted of the development of a work plan that detailed Deloitte FAS' approach to evaluate the high priority items identified and recommended for further evaluation and assessment in the first phase. The final phase, Phase 3, of work included the implementation of the work plan, including the detailed assessment of high priority items, and development of recommendations to assist TxDOT in achieving its goals. During the course of the engagement, Deloitte FAS conducted nearly one hundred interviews with TxDOT personnel from the various Divisions and Offices, in combination with select District personnel and external stakeholders, to develop a comprehensive understanding of the TxDOT organization as related to Contracting and Project Delivery.

The focus of the independent assessment was to identify areas of potential risk that TxDOT was exposed to along the Contracting and Project Delivery process in addition to highlighting any observed leading business practices. Deloitte FAS' detailed analysis of findings, risks, impacts, conclusions, and recommendations are contained in the following sections of the Auditable Unit – B Contracting and Project Delivery Report.[1] Listed below is a Summary of Findings followed by a brief description of Key Findings and Recommendations.

Summary of Findings

The Unit B - Contracting and Project Delivery assessment was conducted in accordance with the outline developed in the Phase 2 Work Plan which focused on assessing high risk issues documented in the Phase 1 Audit Plan and Risk Assessment. The overarching approach during all

[1] For the purposes of this document, "audit" is a generic term that means analysis and evaluation of business operations as defined by TxDOT's RFP. This engagement was performed in accordance with the American Institute of Certified Public Accountants ("AICPA") Statement on Standards for Consulting Services. Due to the nature of this engagement, Deloitte FAS was not retained to perform an evaluation of internal controls and procedures, and our services do not constitute an engagement to provide audit, compilation, review, or attestation services as described in the pronouncements on professional standards issued by the AICPA or any successor standards setting body. Therefore, our findings do not result in the expression of an opinion or other form of assurance with respect to TxDOT's internal control systems or financial statements. Had Deloitte FAS performed additional procedures, other matters might have come to our attention that would have been included in this report.

of the phases of this assignment focused on assessing the impact that TxDOT People, Processes, and Technology play in the overall Contracting and Project Delivery process. The following items describe and summarize the issues and impacts identified during the engagement.

People

This area of assessment focused on evaluating if TxDOT currently has the proper number of people, skill sets, authorities, roles, and responsibilities in the proper location within the organizational structure at the Division and Central Office level to effectively and efficiently operate.

Staffing issues were the primary concern for most of the individuals interviewed. The issues varied from inadequate number of staff to complete the required tasks given the current limitations on Full Time Equivalents ("FTEs"), overworked staff and the level of experience and training of staff in certain roles within the Department. An overarching issue identified was the retention of existing TxDOT employees and the transfer of knowledge of seasoned TxDOT personnel. While this issue is common today in many public and private sector organizations, the effects on TxDOT appear to be even greater considering the increased level of consultant usage within the Department and the added responsibility of TxDOT personnel to oversee and manage the external consultant professionals.

Process/Policy

Overall, the various Divisions assessed during Deloitte FAS' evaluation of TxDOT's Contracting and Project Delivery Process appear to have well defined policies and procedures in place to govern the typical day-to-day operations. The level of guidance and on-line access to the majority of the supporting information is an operational strength that warrants acknowledgement. However, Deloitte FAS did identify some areas of oversight that the Divisions and Districts should consider implementing to improve the efficiency of their operations.

For example, to increase the efficiency of the project development process, TxDOT should require the Districts to develop a comprehensive project development schedule once a project is determined to be ready to proceed into the environmental document development phase. This type of schedule should only be required for projects of a certain magnitude and complexity as determined by TxDOT policy. The schedule would include the Environmental Tracking System ("ETS") estimated timeline for document approval and also estimate the other key milestones. In addition the schedule would be distributed to all affected groups and offices in the District as well as the affected Divisions. The schedule would need to be created, monitored, and updated by the responsible party at the District.

As indicated above, most of the policies and procedures assessed provide the guidance needed to effectively manage the organization, but certain areas need to be evaluated and modified as appropriate. These issues are highlighted in the following Key Findings and Recommendations section below and are explained in detail in the body of the report.

Technology

The Auditable Unit D – Management and Support Functions group was tasked with evaluating TxDOT's overall Information Technology ("IT") program. Deloitte FAS' assessment of technology focused on the systems and programs used by TxDOT to manage and support the Contracting and Project Delivery functions. While TxDOT still operates the majority of its core programs off of a mainframe computer system, when needed they have branched out to use industry standard applications to help develop transportation projects. These programs include the American Association of State Highway and Transportation Officials ("AASHTO") developed *Estimator* and *SiteManager*. In addition, TxDOT has developed specific IT programs to meet certain project

delivery and contracting needs that are not met with off the shelf computer applications such as the Bid Proposal System ("BPS") and Contractor Bidding System ("CBS"), which aid in the construction contract award process.

Deloitte FAS' assessment identified nearly 200 applications and stand-alone software packages that are currently being used by the Department to assist in its Contracting and Project Delivery processes. Divisions and Districts have a certain level of flexibility in choosing applications to meet their needs beyond the Department supported applications. The scope of Deloitte FAS' assessment did not provide for a detailed evaluation of all systems supporting Contracting and Project Delivery functions. However, based on the number of applications identified across the Department, Deloitte FAS recommends that an in depth evaluation would be appropriate to assess these systems and verify their necessity and effectiveness.

Key Findings and Recommendations

Adequacy of Project Controls

The project controls for any large capital construction program are typically a key element to providing quality, cost-effective and timely completion of projects that in turn provides for efficiency in planning, design, and construction. Based on Deloitte FAS' experience with transportation capital programs, having adequate controls and procedures to monitor cost and schedule status is critical to the successful delivery of a project. TxDOT currently has well defined and established control procedures in place for the construction of TxDOT transportation projects. Some of the suggested areas of improvement involve adjustments or minor modifications to the current policies. TxDOT also has well defined procedures for the development and management of project schedules, but in certain instances, lacks the appropriate skills and experience to fulfill and enforce these procedures during the design and construction process.

Risk: Schedule Monitoring and Control Procedures

Given the duration and complexity of certain projects developed by TxDOT, scheduling is a critical tool that needs to be used to effectively and efficiently aid in the delivery of transportation projects. Deloitte FAS evaluated several different aspects of project scheduling during the assessment. The major issue identified was the varying level of experience and proficiency of individuals within the Department tasked to develop and/or manage project schedules. All TxDOT projects require some type of contractor developed construction schedule. Based on the complexity of the project, the schedule can range from a simple hand written bar chart to a computer aided Critical Path Method ("CPM") schedule. In some instances, the level of scheduling knowledge of the TxDOT personnel is not sufficient to fully understand and manage the schedule required for a project. TxDOT staff must have the necessary experience to monitor and manage the schedule requirements placed on a contractor for a particular project. Additional training and a schedule support function for the Districts needs to be provided to TxDOT staff in this area. These items, among other scheduling issues, are addressed in the detailed section of this report.

Risk: Cost Monitoring and Control Procedures

During the assessment, various Construction Division personnel expressed concerns with the level of experience with change order negotiation skills at some of the District construction field offices. With the majority of the change orders processed by TxDOT falling below the Administrative Change Order level, the Districts are evaluating, negotiating, and approving them without support

(unless specifically requested by the District) from the Division. While this practice is in accordance with TxDOT policy, it is important to ensure that the Districts have adequately trained personnel to fulfill these responsibilities effectively. Deloitte FAS, recommends TxDOT consider reducing the current threshold for change order administrative approval and consider a formal change order review process with the effected Divisions, to keep all parties abreast of changes in the field. It is important that the Districts have the ability to manage construction projects, but it is also critical that TxDOT manage this process effectively and provide oversight when needed.

Deloitte FAS also identified an operational strength in the current system employed by TxDOT to track unit prices submitted during the bidding of projects, which allows the Department to stay abreast of current material price fluctuations within each District and for the entire State on average. This tool allows the Department the ability to develop engineer's estimates that provide TxDOT the capability to more accurately program the annual project letting schedule.

Risk: Bid Assessment Procedures

Currently, there is insufficient attention given to the risk of bid collusion in the post letting process, and there is an operational barrier and a risk involved in not knowing if contractors are working together to circumvent the competitive bidding process. Given the volume of work produced by the Department and the number of projects with one or two bidders, the potential for collusion should be treated with a higher priority. While it is difficult to detect collusion, having an active program can act as a deterrent to contractors potentially engaging in such activities. TxDOT should accelerate the implementation of procedures and training regarding collusion analysis and more closely monitor this risk in the letting process for construction contracts.

While evaluating the potential risk concerning TxDOT's bid assessment procedures, Deloitte FAS identified an area believed to be an operational strength in the contractor bidding process. The current automated process used by TxDOT in the bidding process appears to be an operational strength. Once a bid package for a project is requested by a contractor, the contractor's name is entered into BPS which interacts with other TxDOT systems to determine whether a contractor has the available financial capacity to complete the specific project. This process generates a report of exceptions that are then evaluated by personnel in the Contract Letting and Processing Branch of the Construction Division to confirm the results. This process helps to protect TxDOT against awarding a contract to a contractor who may not have the ability to successfully complete a project by preventing them from entering the bidding process.

Risk: Contracting and Project Delivery Information Technology Evaluation

The technology used by TxDOT to execute, manage and deliver projects plays an important role in the success of the Department's achievement of its overall goals and objectives. TxDOT has historically relied on numerous computer applications to track the various aspects of a project from its inception through project implementation. Based on Deloitte FAS' assessment, the Department has nearly 200 applications and software packages available for use by TxDOT to assist with Contracting and Project Delivery. TxDOT should consider conducting a study to help streamline the available IT application and system population that the Department supports by identifying which programs are obsolete and which programs are accomplishing similar goals so those programs can be retired. This would also help reduce the total number of managed applications.

In light of TxDOT's policy change to now track total project cost, the Department has augmented the Design and Construction Information System ("*DCIS*") to incorporate the total cost for each stage of project development. Although this should allow the Department to determine the total project cost, various IT applications will still need to be accessed to assess and manage the detail supporting each of the individual project development segment costs. Without a single system, the Department is at risk of losing data from the manual transfer of information between systems and ultimately taking additional time and effort to implement and manage the total project cost approach.

Effectiveness of Project Delivery Systems

Effective project delivery systems or contract delivery methods are key to the development and execution of large capital improvement projects. In evaluating this area, Deloitte FAS identified areas of potential opportunity for TxDOT to complete projects more effectively and efficiently.

Risk: Alternative Contract Delivery

The majority of the TxDOT staff interviewed during the assessment recognize the benefit of having the ability to deliver projects using the Design-Build ("DB") approach. Given TxDOT's desire to develop and implement transportation projects in the most effective and efficient manner, the Department needs the ability to choose the most applicable delivery approach based on the qualities and characteristics of the particular project. Therefore, TxDOT should address the issue of how it evaluates and implements the potential use of the DB approach on future projects, regardless of whether TxDOT decides to add staff or a separate section to the Texas Turnpike Authority ("TTA") to develop both toll and non-toll viable DB projects. In addition, TxDOT should work with State law makers to modify existing legislation to allow for greater use of DB projects. DB projects provide an additional tool to TxDOT for completing projects in a timely and cost effective manner and should be evaluated for inclusion as a delivery method for all appropriate projects.

The Central Texas Turnpike System, SH130 segments 1-4 ("SH130") is the first project being developed by TxDOT as a DB. In order to implement the first DB project, TxDOT modified its current project delivery approach to include: frequent communication between TxDOT and the developer, combined office space for the staff of both groups to operate and collaborate in, development of new technology to manage the project and innovative funding for the project. The ability of TxDOT Administration to provide the support and flexibility necessary for projects like SH130 is an operational strength.

Risk: Project Development Process

The period of time required to develop a project from initial inception to construction can vary widely based on a number of factors which include but are not limited to the complexity of the project and the availability of funding. Deloitte FAS selected certain discrete points in the typical life-cycle of selected TxDOT projects to evaluate the effectiveness of the existing project development process. The majority of the issues and risks identified with the project development process stem from a lack of communication.

The deficient communication issues appear to cause unnecessary anxiety for TxDOT Division and District staff. This issue is highlighted by the lack of internal TxDOT communication around modified and accelerated letting dates for projects. Changes to project letting dates that are not communicated to the appropriate TxDOT personnel appear to negatively impact the effective management of TxDOT resources. This impact results in disruption to the planned TxDOT review and approval timeline and causes various Divisions to reallocate resources to address the impacted project. Thus, Deloitte FAS recommends certain modifications to the existing process that could

help improve the lines of communication. A single detailed project development schedule used by the District and the relevant Divisions to manage a project through the development process could help avoid some of the current communication weaknesses. With better communication between the Division and District, the project development process should operate more efficiently and allow the TxDOT staff to better handle any changes to the project development timeline including changes to the letting date.

Risk: Inspection Services

Inspection services are an integral part of constructing quality transportation facilities. Having the proper policies to govern the inspection process and adequate resources to carryout those policies is an essential requirement. TxDOT traditionally uses its own staff to perform most construction and maintenance inspection services. TxDOT believes that this is the best way to verify that work is completed according to its specifications. Deloitte FAS evaluated the role that the Construction Division plays in the guiding and monitoring of the construction inspection process. Based on the information assessed, Deloitte FAS believes that additional steps can be taken by the Construction Division to help improve the level of consistency within the inspection program. It should be noted that TxDOT is already in the process of making significant progress in this area. They have developed and started the implementation of an Inspection Development Program ("IDP"), but additional steps are needed to add consistency to the statewide inspection program.

Various Departments of Transportation ("DOTs") use consultants to perform Construction Engineering Inspection ("CEI") services, which allow the DOTs to supplement and bolster internal staff as needed. This approach is not currently being used by TxDOT. Given the restriction on FTEs, TxDOT could benefit from the use of CEI consultants to help assist in the construction inspection process. The outsourcing of CEI services may not always be the most cost effective approach for inspection services, but Deloitte FAS believes that this is a justified expenditure compared to the risk exposure associated with not having an adequate number of trained internal personnel to perform necessary inspection services. Deloitte FAS is not suggesting the outsourcing of TxDOT's entire construction inspection program, but merely recommending that TxDOT consider the use of CEI firms on an as needed basis to supplement their existing inspection staff, which would provide flexibility in allocating resources.

Risk: Incentive and Disincentive Contracting Practices

Incentive/disincentive contract provisions are commonly used by TxDOT to achieve the goal of reducing the impact to the traveling public by encouraging the early completion of traditional transportation projects. Based on Deloitte FAS' assessment, contractors are typically able to accelerate project completion, thus achieving at least a portion of the incentive. However, it appears that TxDOT does not have a system in place for the Districts and Divisions to evaluate if the baseline project completion schedule is accurate and aggressive enough to promote the schedule acceleration intended by the incentive/disincentive clause. In addition, TxDOT should consider modifying the existing *SiteManager* codes to allow for the capture of all incentive/disincentive payments, which would permit an assessment of all incentive/disincentive contract provisions currently being used by the Department. This enhancement would enable TxDOT to better monitor progress and update the program as necessary to promote the successful use of these provisions.

Risk: Environmental Affairs

The Environmental Affairs ("ENV") Division has a unique role in the Department. Like other Divisions, ENV assists TxDOT Districts in meeting their letting schedules, but ENV also has programmatic agreements in place which allows them to make environmental decisions on behalf of other agencies, such as the Federal Highway Administration ("FHWA"). Deloitte FAS evaluated

the current process used by the ENV Division to review and approve environmental documents submitted by the Districts. The primary concern for the ENV Division relates to the current number of ENV employees and their workload. All TxDOT projects pass through the ENV Division, and given the importance of environmental clearance for projects, TxDOT is at risk of operating with an understaffed Division. Like most Divisions and Districts within the Department, ENV has supplemented its staff with consultants in order to meet the increased workload where possible, but certain responsibilities need to be completed by TxDOT staff. Without addressing the current workload and staffing issues, the ENV Division is at risk of creating unnecessary bottlenecks or delays to the project development process.

In assessing the ENV Division, Deloitte FAS also identified an area of operational strength. TxDOT has developed a tool within their electronic ETS that provides estimating capabilities for all classifications of environmental documents. This tool allows the Districts to enter the proposed future letting date of a project, and through historical data tracked in ETS, it establishes an estimated timeline for the various reviews and submittals to meet the proposed letting date. The estimating tool is based on historical project data for typical highway projects in Texas that did not have significant environmental impacts. This tool, if properly used, can provide a fairly well estimated timeline for planning the environmental document approval process, which could also aid in the management of resources. Going forward, TxDOT has identified that the current ETS timeline tool can be improved and is in the process of updating ETS with expanded selection choices for additional project circumstances and issues.

Management of Consultant Contracts

Due to the significant increase in the volume of contract lettings and the staffing restriction imposed by the legislature, TxDOT has been required to use external consultants in virtually all Districts and Divisions to help deliver projects. While the Divisions use similar contracting structures for different types of consulting services (i.e., "Evergreen" contracts), several methods exist for procuring and managing consultant contracts. Deloitte FAS evaluated three Divisions, Design, Right of Way ("ROW") and ENV to identify the efficiency of the consultant selection process, evaluate consultant contract administration and oversight, and identify potential leading practices. Findings and recommendations related to each of these Divisions are discussed in the detailed analysis section of this report. The findings and recommendations discussed below are consistent throughout each of the abovementioned Divisions.

Risk: Management of Consultant Contracts

The Executive Order imposed by TxDOT Administration, which limits Evergreen contracts to a $2 million cap, has required Districts to use numerous consultants to meet demand. While this helps to develop the skills of the other consulting firms and fosters greater competition, it can hinder the project development process and increase the contract administrator workload. In addition, training on TxDOT policies, standards, and evolving requirements should be considered for new consultants to alleviate the time requirement to on-board new consultants.

There is an inconsistency in the structure of consultant management and administration at District level. Deloitte FAS recognize that the size of each group is dictated by issues such as number of consultant contracts; however, following a standardized procurement process appears to be difficult for the smaller Districts due to resource constraints. Each of the Divisions assessed has developed extensive guidance to ensure the Districts understand the policies and procedures for the consultant selection process, the need to maintain proper documentation in District files and the documentation submittal requirements to the Division. The Divisions should consider providing a mechanism for the Districts to efficiently track consultant contracts and work authorizations to provide both the Divisions and Districts with a consistent summary of outstanding contracts, as much of this information is currently maintained remotely by project.

TxDOT's consultant contract structure, which requires consultants to be paid a set negotiated price for each deliverable as determined by their contract (for applicable contracts), was identified as an operational strength. The consultant is not paid until the deliverable is complete, which helps prevent consultants from delaying contract work and helps TxDOT minimize its exposure if work is not completed.

Risk: Oversight of Consultant Contracts

It is critical for the Districts and Divisions to have adequate internal resources to manage the expanding number of consultants being used to meet the letting schedule. The increased use of consultants has required TxDOT personnel to adjust their typical day-to-day responsibilities, as many individuals are now being asked to manage consultants versus performing technical work. While some TxDOT employees have experience managing consultants, it appears that many employees may not be trained in managing and overseeing consultant work such as monitoring work progress, evaluating invoice payments, coordinating work tasks, and ensuring compliance with TxDOT policies and procedures. The Department should consider providing training for individuals related to consultant oversight, as well as provide them with proper tools, such as cost tracking and scheduling software to manage the consultants more efficiently.

In addition, it is critical that TxDOT maintain their expertise in delivering projects, thus TxDOT should consider developing a consultant specific section within Districts, for the Divisions mentioned, comprised of volunteers willing to focus on consultant oversight or develop a rotational program to support the section. Focused attention on consultant oversight should provide better management, while at the same time allow TxDOT to maintain its in-house expertise.

The quality of consultant services is also critical to the timely and cost effective completion of projects. At a minimum, TxDOT should consider conducting semi-annual evaluations for all consultants and storing all consultant evaluations in an online database. The Design Division Consultant Contract Office ("CCO") has developed a database in addition to a web interface which will allow project managers to directly input consultant evaluation information. This database implementation is scheduled to be complete in August 2007, which will provide an efficient mechanism to review past consultant work and identify any weaknesses that need to be addressed and monitored during the evaluation and consultant selection processes. Consultants new to TxDOT require additional supervision and require project managers to conduct additional reviews, which take up valuable time and potentially impact the project delivery process. TxDOT should consider requiring consultants that have never worked with the Department to complete a training course on TxDOT standards and requirements to alleviate the time requirement that project managers typically spend with these consultants. The Districts and Divisions need to focus on growing the consultant pool to ensure adequate quality resources have been procured to prevent a bottleneck or delay in the project delivery process.

Comprehensive Development Agreements

TxDOT implemented the Comprehensive Development Agreement ("CDA") program in order to meet transportation needs that currently exceed funding sources. Deloitte FAS sees the CDA program (the "Program"), which has been successfully used in Canada, Europe and Australia via Public Private Partnerships ("PPPs"), as an opportunity for the Department to meet its demands. By using this alternative project development tool, TxDOT can design and construct projects in partnership with private firms. These projects can be developed using methods such as Design-

Build and concessions[2]. For concession projects, the fees and revenues received can be used to complete other critical TxDOT projects. However, the CDA program requires TxDOT to operate with an entirely different approach from its traditional project delivery approach and conduct business in a new way. As such, TxDOT needs to be properly organized if it is to be successful in executing the Program.

Risk: CDA Program Structure

TxDOT is committed to the CDA program. This is evident through the Department Leadership's outlook on the Program as well as the number of projects that are in various stages of procurement and development throughout multiple Districts. The TTA Division is the Office of Primary Responsibility ("OPR") for the CDA program. Many TTA professionals spend a majority, if not all of their time supporting the CDA program. In addition, professionals from all pertinent Divisions as well as District professionals devote a significant amount of time to the CDA program and the project procurements. For many of these people, this work is in addition to their normal workload. These professionals are working to advance the individual project procurements as well as develop materials and procedures to make the CDA program streamlined and programmatic. For example, TxDOT developed the screening process to determine the applicability of the CDA program for a particular project. Going forward, each new project will be environmentally cleared for toll and non-toll projects and will be evaluated whether it should be developed using the CDA process. The selection criteria were developed after significant effort to determine a process that would fairly evaluate a project's suitability as a CDA project. After a project is selected for development through the CDA program, TxDOT has extensive Request for Qualifications ("RFQ") and Request for Proposal ("RFP") processes that require involvement from many Divisions and Districts to choose the best value private partner.

TxDOT has engaged financial and legal consultants to assist with the delivery of the Program. The consultants from Goldman Sachs, KPMG and Nossaman Guthner Knox Elliot LLP ("Nossaman") provide the developers' and lenders' perspective as well as assist with creating Program documentation, such as the conflict of interest policy. The financial consultants also help TxDOT develop the sensitivity analysis and financial model for the projects as well as evaluate the financial aspects of the proposals. Nossaman helps develop the Program legal documentation and supplements TxDOT staff in the procurement process. Use of these consultants helps the Department effectively evaluate CDA opportunities since the consultants have the perspective of the global PPP industry.

Since no CDA projects have been entirely completed, the ability to measure the success of the Program to date is limited. The Department has established certain criteria for measuring success such as structuring agreements with private partners that meet or exceed the financial model developed by TxDOT and its consultants. The Department has not identified specific metrics for the construction and post-construction phases, although it believes completing projects years ahead of when they would have been completed under the traditional Design-Bid-Build, publicly funded approach is one measure.

CDA projects represent an opportunity for TxDOT to meet its transportation demands, and they have made significant strides to develop the Program, but TxDOT needs to fully recognize the required business transformation from traditional project delivery to the incorporation of CDA projects. This transformation should be communicated throughout the Department to confirm TxDOT's support of the Program and define the skill sets necessary to succeed with this Program. In light of the moratorium placed on new CDA projects and those not grandfathered into the

[2] A TxDOT concession includes the granting of a private entity exclusive rights to finance, design, build, operate, and maintain an asset over a long period in exchange for developer retention of all or a portion of the toll revenue. TxDOT retains ownership of the asset and any improvements made during the concession period.

Program, the Department should take the next two years to more fully develop the programmatic approach and employee support necessary to successfully deliver the Program once the moratorium is lifted.

Risk: CDA Human Resource Management

Considering that the CDA program requires a different approach due to the alternative project delivery process, TxDOT employees supporting this Program need to develop a different set of skills. When the Program was first deployed, it was strongly supported and staffed by TxDOT Department and Division Administrators. This provided consistency throughout the Program. Throughout the process, additional TxDOT employees have become involved in the Program. Unfortunately, a majority of the Program knowledge resides with a select number of key individuals. This results in excessive amounts of work for these employees and an added risk to TxDOT if any of them were to leave the Department. The fundamentals of this Program are primarily delivered through on-the-job training. Specific training materials do not exist. However, TxDOT is in the process of developing the outline for a CDA Manual, which would form the basis for training, and the ENV Division has developed their programmatic approach. In addition, TxDOT currently relies on support from technical, financial and legal consultants. TxDOT would like to eventually minimize their reliance on these consultants, but in order to do so, TxDOT would need to hire or train additional staff to support the program.

TxDOT needs to develop proper training materials that can be used to educate Division and District employees on the fundamentals of CDAs. TxDOT should use the presentations it has delivered to the public and the investor community to present its vision of the CDA program as a basis for the Program training materials. In addition, TxDOT has been and should continue to utilize the expertise of its consultants to develop TxDOT employees' technical, financial and legal skills as appropriate. Deloitte FAS realizes that a moratorium has been placed on the CDA program via SB792. While this moratorium may change TxDOT's CDA program, it could provide them with time that would have been devoted to pursuing new CDA projects to focus on developing the exempt projects and time to more fully develop their programmatic approach and educate and train its staff. The Department should utilize any potential time provided by the moratorium to develop training materials and administer them to the employees that are a good fit for the Program.

In order to achieve its objective of reducing its reliance on consultants to support the CDA program, TxDOT should consider recruiting private sector professionals with applicable experience. This will require TxDOT to reevaluate its compensation package if it is to entice prospects with the proper technical, financial and legal skills. TxDOT should also capitalize on the eagerness of its Division and District employees who want to become involved in the CDA program and consider providing them with additional educational opportunities that would better prepare them for roles in the Program.

Acknowledgements

The above Executive Summary provides a high-level overview of the most common themes arising from the assessment; however, the entire report should be read in order to fully understand Deloitte FAS' observations and recommendations.

Deloitte FAS appreciates the cooperation extended by the employees of TxDOT, including personnel at both the Division and the Districts. Deloitte FAS was impressed with the knowledge and dedication of the TxDOT employees that were encountered during the course of work. The individuals interviewed and those who provided access to relevant information contributed greatly to the quality of the project and the development of this report.

Section 2: Background

Introduction

TxDOT provides a variety of diversified services to the citizens of Texas, all of which are focused on achieving its key goals including congestion relief, safety enhancement, economic opportunity expansion, air quality improvement and asset value growth. To meet these goals, comply with statutory requirements of Transportation Code, Title 6, Chapter 201.109(b) (5) and to prepare for the 2009 Sunset Review process, TxDOT contracted consultants for five independent assessments of TxDOT's management and business operations.

To facilitate the assessments, TxDOT divided its management and business operations into the following auditable units:

A. Transportation Funding
B. Contracting and Project Delivery
C. Consumer Services
D. Management and Support Functions
E. Field Operations

The Texas Transportation Commission ("TTC") determined that multiple vendors would be used in conducting assessments of the above units in order to gain professional expertise with differing perspectives and to promote independence. As such, Deloitte FAS was retained to conduct an independent assessment of TxDOT's operations related to Auditable Unit B – Contracting and Project Delivery, as referenced above and in Specification # TxDOT 946-20-10.

Objective

Deloitte FAS conducted an evaluation and analysis of the key management and business operations or areas related to Contracting and Project Delivery within TxDOT to achieve the following objectives:

1. **Quality** - Improve the quality of the statewide transportation services by providing counsel on ways to better manage resources;
2. **Increased Revenue** - Identify opportunities for enhancing revenue to maximize financial resources available;
3. **Efficiency** - Develop strategies to remove operational barriers and improve the efficiency and effectiveness of operations;
4. **Innovation** - Highlight exemplary and innovative practices, both internal and external to TxDOT; and,
5. **Development of Opportunities** - Provide a conclusion(s) relevant to these objectives and recommend opportunities for reducing risks and improving operations at TxDOT's Central Office.

Section 3: Scope of Assignment

The scope of work for Contracting and Project Delivery required an analysis and evaluation of the activities, tools and procedures used by TxDOT to develop, deliver, maintain and administer the various components of highway or multi-modal projects. Within the Contracting and Project Delivery Auditable Unit, the operational areas TxDOT suggested for consideration included, but were not limited to the following:

1. **Contracting** – effectiveness of the various contracting activities relating to consultant engineering, construction, maintenance and rehabilitation and comprehensive development agreements.

2. **Quality and Cost of the Transportation Projects** – comparison of in-house conventional projects and outsourced projects, applicability of design/build/maintain process, wider use of warranty specifications, and impact of incentive and disincentive contract clauses.

3. **Quality, Cost and Efficiency of Project Components** – route studies, environmental process, right of way process, cost recovery (utility delays, design errors/omissions), roadway materials, inspection, and traffic operations.

4. **Business Opportunity Programs** – effectiveness and level of compliance of program requirements for Historically Underutilized Businesses, Disadvantaged Business Enterprises ("HUBs" and "DBEs"), Commercially Useful Function ("CUF").

5. **Aviation** – aviation grant management program.

In order to complete the scope outlined above, Deloitte FAS was required to use a three phased approach that included an initial risk assessment, the development of an audit work plan, and a detailed evaluation of high risk areas identified during the risk assessment. The process utilized during the three phased approach is described in more detail in the following section.

Section 4: Project Approach

In compliance with requirements defined by TxDOT, the scope of the assessment of each auditable area included three primary phases. Phase 1 included a high-level assessment of the risks within each auditable area. Phase 2 included the development of an audit work plan to be used to organize and deliver a detailed assessment of TxDOT's high risk management and business operations within each auditable area. Phase 3 included the execution of activities and procedures listed in the approved Audit Work Plan to assess the management and business operations within the prescribed areas of each auditable unit. At the completion of Phase 3, each vendor developed preliminary and draft audit reports for evaluation and approval by TxDOT.

This document includes the deliverable for completion of Phase 3 titled, "Independent Assessment of Auditable Unit B – Contracting and Project Delivery".

Phase 1

Phase 1 included a high-level assessment of the risks associated with Contracting and Project Delivery. This assessment was conducted during the first thirty calendar days of the engagement. The information gathered in this phase served as a means for TxDOT to establish a priority, based on the level of risk to TxDOT operations, and focus for the areas to be assessed during the execution of the Audit Work Plan. At the completion of Phase 1, Deloitte FAS developed and submitted the "Audit Plan and Risk Analysis" report.

In order to assess and evaluate TxDOT's Central Office Contracting and Project Delivery processes and meet the objectives of the Phase 1 risk analysis, Deloitte FAS considered the typical lifecycle of a highway or multi-modal construction project and selected specific TxDOT Divisions and Offices to evaluate and assess the areas of greatest risk for further assessment. In doing so, Deloitte FAS evaluated the following twelve TxDOT Divisions and Offices to develop the Audit Plan and Risk Analysis:

- Aviation
- Bridge
- Construction
- Design
- Environmental Affairs
- Finance
- Maintenance
- Right of Way
- Texas Turnpike Authority
- Business Opportunities
- Traffic Operations
- Transportation Planning and Programming

To develop and complete the Audit Plan and Risk Analysis deliverable for Phase 1, the Deloitte FAS team performed the following activities:

- Evaluated organizational, policy, procedural and operational reports and other documentation related to TxDOT Central Office management and operations;
- Analyzed the twenty-eight TxDOT Divisions/Offices as compared to the typical lifecycle of a

highway or multi-modal construction project to identify the appropriate Divisions/Offices for the Phase 1 assessment;

- Identified and conducted interviews with management and staff within the TTC, TxDOT Central Office Administration and twelve of the twenty-eight TxDOT Divisions/Offices;
- Developed risk assessment matrices of TxDOT Central Office management and operations;
- Conducted a comparative analysis of information gathered from interviews and TxDOT documentation related to the various Divisions/Offices evaluated;
- Identified recommended focus areas for Audit Work Plan development and more detailed assessment; and
- Prepared and submitted Phase 1 Risk Assessment Report titled, Audit Plan and Risk Analysis.

Deloitte FAS' Audit Plan and Risk Analysis was submitted to the TxDOT Audit Oversight Committee ("AOC") on February 13, 2007 and approved by the TxDOT AOC on April 4, 2007.

Phase 2

Phase 2 included the development of an audit work plan for conducting the detailed, independent assessment based on the priority areas identified in Phase 1. The Audit Work Plan included a description of scope, activities, and major milestones that served as a guide to the more detailed assessment of TxDOT's management and business operations. At the completion of Phase 2, Deloitte FAS developed and submitted the Audit Work Plan for review on April 4, 2007, which was approved by the TxDOT AOC on April 23, 2007.

Below are the priority areas that were identified in Phase 1 for further analysis in Phase 3. Priority areas were organized into the four major categories identified in Phase 1: Adequacy of Project Controls, Effectiveness of Project Delivery Systems, Management of Consultant Contracts and Comprehensive Development Agreements.

1. **Adequacy of Project Controls:** Schedule Monitoring and Control Procedures, Cost Monitoring and Control Procedures, Bid Assessment Procedures, and Contracting and Project Delivery Information Technology Evaluation.

2. **Effectiveness of Project Delivery Systems:** Alternative Contract Delivery, Project Development Process, Inspection Services, Incentive and Disincentive Contracting Practices, and Environmental Affairs Process and Organizational Structure.

3. **Management of Consultant Contracts:** Management and Oversight of Consultant Contracts.

4. **Comprehensive Development Agreements:** CDA Program Structure and Human Resource Management.

Phase 3

To develop and complete the Preliminary, Draft, and Final Audit Report deliverables for Phase 3, Deloitte FAS analyzed the issues/opportunities identified during Phase 1. Deloitte FAS analyzed Division level and District level roles in each issue/opportunity, as necessary. In addition, Deloitte

FAS worked with the other TxDOT engagement teams evaluating Auditable Unit D – Management and Support Functions and Auditable Unit E – Field Operations to coordinate analysis efforts to maximize efficiency and cost effectiveness.

In addition, during the Phase 3 evaluation, Deloitte FAS identified operational strengths and exemplary practices currently being utilized by the Divisions and/or Districts. Further, Deloitte FAS explored the potential leading practices identified in Phase 1 and identified any additional leading practices being used by TxDOT related to Contracting and Project Delivery.

The following procedures were conducted to meet each of the objectives of Deloitte FAS' independent assessment of Auditable Unit B - Contracting and Project Delivery:

Conducted Interviews with Stakeholders

Deloitte FAS conducted interviews with the TTC, TxDOT Central Office Administration, select Division management and personnel, and select District Office management and personnel to gain an understanding of the project development, project delivery and support operations processes.[3]

Assessed Existing Policies, Procedures and Related Documentation

Deloitte FAS assessed the adequacy of TxDOT's processes and procedures within various Divisions/Districts and evaluated consistency, prioritization and effectiveness of organizational practices and controls. Based on discussions and documentation analyzed, Deloitte FAS then identified strategies for process improvements, alignments and business transformations.[4]

Performed Project File Assessments

Deloitte FAS performed project file assessments and conducted District site visits to evaluate specific project related documentation as necessary[5].

Evaluated other State Departments of Transportation and Leading Industry Practices

Deloitte FAS evaluated how other State DOTs manage projects to determine if there are potential benefits to be gained by TxDOT and/or to identify potential leading practices. In addition, Deloitte FAS assessed contracting methodologies used by other transportation agencies to identify potential applicability to TxDOT projects. Deloitte FAS also identified and documented any operational strengths and exemplary practices currently being utilized by TxDOT. At the same time, Deloitte FAS assessed the processes used by TxDOT to gather and disseminate leading practices, lessons learned, and general issues/concerns encountered by Divisions/Districts during the course of their operations.

Reported Observations and Recommendations

Based on Deloitte FAS' observations and findings in Phase 3, research into industry leading practices, and discussions with TxDOT personnel, Deloitte FAS prepared and developed this report, "Independent Assessment of Auditable Unit B – Contracting and Project Delivery", with the following format for each of the issues identified in the Phase 1 report:

[3] See Appendix A for a list of TxDOT personnel interviewed during Phase 3 work efforts.
[4] See Appendix B for a list of the documents reviewed during Phase 3 work efforts.
[5] See Appendix C for a list of the TxDOT projects assessed during Phase 3 work efforts.

- Background
- Observations/Findings
- Impact
- Operational Strengths/Leading Practices (where applicable)
- Conclusions/Recommendations

An effort was made to address all issues identified in the Phase 1 report. Deloitte FAS' detailed observations, findings and recommendations are contained in the following sections of this report.

Section 5: Detailed Observations, Findings and Recommendations

Audit Area: A. Adequacy of Project Controls	**Issue:** i. Schedule Monitoring and Control Procedures

Background:

Based on the assessment conducted for the first phase of Deloitte FAS' engagement, the adequacy of project controls was identified as a priority area requiring further analysis. The project controls for any large capital construction program are critical to providing quality cost and schedule metrics, which in turn provide for efficiency in planning, design, and construction. Based on Deloitte FAS' experience with transportation capital programs, having adequate controls and procedures to monitor cost and schedule status is critical to the successful delivery of construction projects on time and within budget.

In an attempt to evaluate the project development process and the controls in place to monitor construction schedules, Deloitte FAS selected several projects to perform a detailed evaluation of the process. The goal of the assessment was to identify completed TxDOT projects that would allow Deloitte FAS to meet with the individuals responsible for project controls to understand the process. During the evaluation, Deloitte FAS interviewed numerous people within TxDOT's Construction Division and select TxDOT Districts. As part of the assessment, Deloitte FAS also evaluated the current policies and procedures in place for the control of construction projects.

Observation/Findings:

In the process of evaluating TxDOT's current policies and procedures in place to monitor and administer the implementation phase of transportation projects, Deloitte FAS identified the following:

- The Construction Division is responsible for the development and updating of the TxDOT policies and procedures that govern the construction process.
- The current role of the Construction Division is to support the construction functions of the various Districts. The Construction Division does not directly oversee any construction projects or activities.
- Project development and construction duration schedules are developed by the Districts very early in the process but were not formalized for the projects Deloitte FAS evaluated. More detailed estimated schedule durations are developed during the Plans, Specifications & Estimate ("PS&E") process by the designers (in-house or consultant). Any changes to the detailed estimated schedule duration are done by the Plan Reviewers at the Design Division during the PS&E review.
- The in-house estimated schedule duration is developed based on the area engineer's experience. An administrative circular distributed in 1993 concerning production rates appears to be the only reference material available to assist TxDOT personnel in developing activity durations. Given the importance and complexity of determining reasonable production rates for the development of project completion schedules, it appears TxDOT does not currently provide sufficient training and assistance in this area. A lack of experience in determining accurate production rates, which are impacted by factors such as location and project type, appears to affect TxDOT's ability to develop precise estimated duration schedules for projects.
- With the assistance of the Plans, Specifications, and Estimate Manual and the Construction Contract Administration Manual ("CCAM"), the District is responsible for determining the desired type of progress schedule that the contractor will be required to submit for a particular project. The District can select from one of the following methods:
    - Bar Chart

Audit Area: A. Adequacy of Project Controls	**Issue:** i. Schedule Monitoring and Control Procedures

- Basic CPM schedule or
- CPM schedule developed using either *Primavera Project Planner ("Primavera")* or *Suretrak* project management program.

- When a CPM schedule using either *Primavera* or *Suretrak* is specified in the contract, the current TxDOT policy[6] suggests that the District construction section be familiar with the software.
- The District also has the ability to select from the following accelerated contract provisions to include in the bid documents to help accelerate the completion of the project:
  - Calendar Day Definition for Working Day
  - Incentive Using Contract Administrative Cost
  - Milestones with Incentive/Disincentives
  - Substantial Completion
  - Lane Rental Disincentive
  - A+B Provisions
- The proficiency of scheduling knowledge and expertise varies within each District. Some Districts have dedicated staff that focuses on the scheduling needs of that District. The Construction Division also maintains a group of scheduling experts within the Claims, Disputes, and Special Programs Section that may assist the District when requested. The Division will maintain an Evergreen contract with a consultant for CPM scheduling services that a District can request the use of on an as needed basis. In addition, some Districts have their own Evergreen CPM consulting contracts.
- A number of individuals within TxDOT have expressed concern with the current level of scheduling knowledge and proficiency within the Department.
- An evaluation of TxDOT construction contracts completed in FY 2006 indicated that 482 out of 819 (approximately 59%) projects were granted time extensions to the originally scheduled completion date. While this information does not provide reasoning for the time extensions, it does provide insight into the volume of time extensions granted by TxDOT.
- During construction, TxDOT's construction inspectors and project managers track construction working days through *SiteManager* while the contractor is required to submit a monthly schedule update. Additional working days or time extensions are typically granted either by letter or change order.
- Typically, time extensions are authorized via a change order. However, change order signature authority is a function of dollar value and if the dollar amount is below the threshold needing the Assistant Executive Director of Engineering Operations' review or is not part of a dispute resolution, the Construction Division will not review the time extension prior to its issuance. Thus, the responsibility for reviewing and approving a time extension may fall to the Area Engineer and the District Engineer in certain circumstances.
- If the contract requires a CPM schedule for the project, then the need for a time extension must be justified using that CPM schedule. Effectively evaluating the request for time extension is an area of weakness given that some of TxDOT Districts and/or Divisions have limited experience with CPM scheduling.

[6] Refers to the Construction Contract Administration Manual Section 10 - Prosecution and Progress, Chapter 2 – Progress Schedules.

Audit Area: A. Adequacy of Project Controls	**Issue:** i. Schedule Monitoring and Control Procedures

- TxDOT offers two courses for training specific to CPM scheduling. One course is directed towards the design staff and the development of CPM schedules. The other course is directed towards the construction personnel's management of CPM schedules. Districts receive a list of offered courses at the beginning of the fiscal year and are encouraged to identify which courses they would like to make available to their personnel.
- Once TxDOT grants a time extension to a project the revised duration becomes the new contractual time determination, which is used to calculate TxDOT's percentage of on-time project completion. TxDOT does not currently track and monitor the baseline schedule durations compared to the actual time required to complete the project. Tracking this, along with reasons for approved time extensions, would provide a more accurate assessment of on-time project completion.
- TxDOT includes liquidated damages ("LD") clauses in all of its construction contracts. Based on industry experience, effective enforcement of LD clauses in construction contracts can help reduce project delays and potential construction claims.
- The rates for LDs are determined for the Department and vary based on the total contract amount; those values are documented in TxDOT Special Provision 000-275. The current process employed by TxDOT allows for LDs to be automatically assessed against the contractor for any days that exceed the contractual time duration. The Districts have the authority to approve all time extensions to the contract within their signature authority, regardless of when the extension is requested.
- Given the current LD tiers established in TxDOT's specifications, the magnitude of the LDs compared to the amount of the contract value for larger contracts (>$5M) may not provide adequate compensation for the Department's actual project administrative costs.
- One common issue identified as causing project delay involves utility relocation issues. Since this is not a contractor caused issue, TxDOT typically grants time extensions for these delays. TxDOT's inability to require utilities to respond in a timely fashion impacts its ability to start projects on time and control the project schedule.

Impact:

The monitoring and control of construction schedules is a critical component to the successful implementation of any large transportation project. The following impacts have been identified during the assessment that appear to affect the current process:

- If TxDOT does not address its noted lack of experience in developing estimated project schedule durations and the ability to properly monitor and evaluate contractor construction schedules, TxDOT personnel may potentially be granting unwarranted time extensions that are ultimately delaying the implementation of the asset to the public and spending additional funds that are not required.
- Without sufficient scheduling expertise, TxDOT will not be able to properly forecast potential delays and take proactive measures to mitigate those delays.
- TxDOT continues to have projects that have extended durations and time over-runs due to utility issues and conflicts. Currently, TxDOT is unable to hold the utility companies accountable for delays when the utility companies fail to relocate prior to project letting. Unless this situation is rectified, project progress will continue to be impacted.
- If TxDOT does not reevaluate the LD values in their specifications and the use of accelerated contract provisions (i.e. incentives/disincentives), contractors may not have adequate incentive

Audit Area: A. Adequacy of Project Controls	**Issue:** i. Schedule Monitoring and Control Procedures

to complete large construction projects in the most time effective manner.

Operational Strengths/Leading Practices:

Based on Deloitte FAS' research and experience, certain DOTs have developed memorandums of understanding and agreements with utility companies to expedite the relocation process. If the utility fails to relocate in a timely fashion, the DOT has the ability to authorize the contractor to relocate the utility and then the DOT will back charge the utility company.

Conclusion/Recommendation for Improvements:

TxDOT has policies and procedures in place for developing project schedules, requiring contractors to provide schedules, and monitoring project schedules and progress during the course of a project. However, based on Deloitte FAS' assessment, current opportunities to receive training may not provide TxDOT personnel with the exposure to gain the proper knowledge and experience necessary to effectively carry-out these policies and procedures. Schedule management is critical to the timely and cost effective completion of transportation related projects. Without effective schedule management, it will be difficult for TxDOT to ensure the efficient use of its financial resources.

- Given the size and complexity of TxDOT construction projects, it is important for the Department to utilize the appropriate type of scheduling methodology for particular projects. TxDOT should consider developing more detailed criteria for the Districts to evaluate which scheduling method is best suited for a particular project.
- The current specifications require the contractor to meet with the TxDOT engineer at the start of a project to conduct a preconstruction conference. In addition to the preconstruction meeting activities provided in the CCAM agenda, TxDOT should also conduct a meeting to review the contractor's fully developed schedule prior to the start of construction. The items covered during this meeting should include a detailed walk through of the contractor's schedule to understand the base schedule and allow for a formal approval of the contractor's schedule prior to the start of the work.
- TxDOT needs to provide additional training to its personnel on construction project schedules. In addition, TxDOT needs to provide additional training opportunities in the use of project management software, such as *SureTrak* and *Primavera,* to be able to effectively enforce the policies and procedures currently included in their construction contracts. This is critical if TxDOT hopes to be able to effectively evaluate and monitor contractor schedules, forecast potential delays, properly evaluate time extension requests being made by contractors and accurately assess LDs against contractors.
- The last time that TxDOT reviewed average production rates was over a decade ago in an administrative circular distributed in 1993. As such, TxDOT should consider conducting a study of recently completed projects to develop average production rates that more accurately represent the current construction environment. This study should track information from each of the Districts to determine local and statewide average production rates. These rates would allow TxDOT to develop an estimated project duration schedule that better represents recently completed TxDOT projects.

TxDOT should consider commissioning a study to see how much money is lost by TxDOT due to delays caused by utility conflicts. The study should be used to negotiate an agreement with the utilities to expedite the relocation process by a certain date, and if not moved, allow TxDOT to back charge the utility for related costs.

Audit Area: A. Adequacy of Project Controls	**Issue:** ii. Cost Monitoring and Control Procedures

Background:

Based on the Phase 1 assessment, project controls was identified as an area of risk that required further evaluation. More specifically, the development and monitoring of a project's budget throughout the project's life cycle from inception, design and through construction completion.

The project controls for any large capital construction program are typically a key ingredient to providing quality, cost and schedule measures, which in turn provides for efficiency in planning, design, and construction. Based on Deloitte FAS' experience with transportation capital programs, having adequate controls and procedures to monitor cost and schedule status is critical to the successful delivery of a project.

Observation/Findings:

According to TxDOT's Transportation Programming and Scheduling Manual, a computerized cash-flow model is used to predict the availability of funds for the Unified Transportation Program ("UTP"). Input for UTP includes the predicted federal-aid funding, the predicted State funding, the federal-aid matching requirements, the cost of operating TxDOT, the cost of operating and maintaining the highway system, and current contractual obligations. The model allows researchers to analyze various scenarios of funding options, program funding levels, and letting schedules. TxDOT's Financial Planning Group ("FPG") meets periodically to review the projected revenues, expenditures, program funding levels, and cash flow forecasts associated with various funding strategies and to recommend program levels and the size of the construction program.

Examining TxDOT's operating budget for previous years, including FY 2006 helps to explain and understand how TxDOT is fiscally managed. TxDOT's operating budgets contain the following line items:

- Salaries And Wages
- Other Personnel Costs
- Professional Fees And Services
- Fuels And Lubricants
- Consumable Supplies
- Utilities
- Travel
- Rent-Building
- Rent – Rent Machine And Other
- Debt Service
- Other Operating Expenses Client Services
- Grants
- Capital Expenditures

The following chart outlines the operating budget and capital expenditures for the past three fiscal years:

Fiscal Year	Operating Budget	Capital Expenditures*	Other**
2004	$5,555,360,153	$3,743,533,431	$1,811,826,722
2005	$7,142,149,825	$5,047,426,618	$2,094,723,207
2006	$8,484,397,526	$6,165,820,287	$2,318,577,239

* Roadway construction and inter-modal operations

**Project development, design, construction inspection, and overhead costs.

Audit Area: A. Adequacy of Project Controls	**Issue:** ii. Cost Monitoring and Control Procedures

As seen from the data above, TxDOT operates a very large capital budget. Based on Deloitte FAS' analysis, TxDOT appears to have the policies and procedures to track capital expenditure costs and has a significant amount of data involving project development costs. TxDOT currently does not have the ability to track development cost and capital expenditures to the estimated costs for those items. While important cost data appears to be collected that compares estimated cost, awarded cost, and final payment, it is just as important to have a budget tracking tool that allows an evaluation of the budget from project inception through completion of construction. Based on Deloitte FAS' work to date, it does not appear as though TxDOT uses such a tool.

Design and Planning Budget

Based on Deloitte FAS' interviews and discussions during the Phase 1 assessment, the current development of the District and Division design budgets are generated on an annual basis with a mid-year check point. These budgets are historically overstated and not fully exhausted creating an over allocation of funds that could be allocated for other items. Hence, the process in which the design budget is developed and monitored is an area that was recommended for further evaluation in this phase.

- A typical project's design budgeting process seems to be intertwined within TxDOT's operating budget and currently TxDOT does not have the ability to review or manage the development cost on a project basis.
- A project is given a Control Section Job ("CSJ") number by the Transportation Planning & Programming ("TP&P") Division for project development purposes. The project development process then is tracked in TxDOT's automated mainframe *DCIS*. Any work that was done before the CSJ number is assigned, such as scoping, data collection and construction estimating, does not appear to be tracked specifically to a CSJ number and is considered District overhead. The District then has the ability to transfer project overhead costs to the CSJ number after it is assigned.
- Once a project is assigned a CSJ number, expenditures (i.e., time charges) are continuously tracked against the CSJ number. However, based on the assessment, it appears that no project specific budget is developed for early project development purposes and for project design purposes. As such, actual time and overhead expenditures are captured for a project, but presently, there is no policy or procedure to track these expenditures against any original project budget. TxDOT is implementing the Total Project Cost approach to project development in an attempt to remedy this issue.
- In contrast, TxDOT requires consultants as part of their work authorizations to submit a schedule and fee for PS&E projects. These fees are broken down into individual tasks with hours assigned to these tasks. As a result, it appears TxDOT tracks consultant budgets with greater rigidity than their own in-house project development.

Construction Cost Budget

Currently, TxDOT's Financial Information Management System ("*FIMS*") and the *SiteManager* system are used to track and maintain the financial information for the development and implementation of capital construction projects. Based on information gathered during the initial review period, this was an area identified for further review. During Phase 3, TxDOT's policy and procedures concerning construction project cost tracking were evaluated to determine whether any opportunities for improvement were possible. Listed below are the findings in this area.

- Presently, the initial project construction cost estimate is developed during the preliminary project development process. As the project develops, the estimate is refined. TxDOT's

Audit Area: A. Adequacy of Project Controls	**Issue:** ii. Cost Monitoring and Control Procedures

Development Manual requires the estimate to be updated annually and uploaded into *DCIS*.

- Currently, *DCIS* does not provide TxDOT the ability to evaluate project development budgets as they are modified and updated. *DCIS* only maintains the estimated construction cost at the time of the UTP approval for applicable projects.
- During the PS&E process, the estimate is further refined. TxDOT has an Estimating Manual that provides guidance to designers on the estimate development process.
- One of the primary tools used in estimate development is TxDOT's unit bid price database. TxDOT updates the unit bid prices database monthly and segregates the unit bid prices into statewide averages and District averages, which appears to be a useful tool for estimating purposes.
- TxDOT also employs estimating software developed by AASHTO, *Estimator*. This software is used along with the unit price database to develop PS&E estimates, which are updated periodically during the PS&E phase. The PS&E estimate then becomes the engineer's estimate once the design is finalized, which is compared to the contractor's bid estimates during the project letting phase.

Construction Change Orders

One of the key statistics reported by the Construction Division is the number of projects completed within the allocated budget. In FY 2006, this was reported to be approximately 99%. This statistic does not appear to be based upon a true comparison to a "baseline" budget (or initial/benchmark budget). The change order data indicates that there were over $200 million in changes to projects in FY 2006, approximately 4 - 5% of contract value. In addition, of the $200 million in contract changes, $98 million was categorized as "TxDOT Convenience."

- To track construction project costs, TxDOT presently uses *SiteManager*, an AASHTO computer application. *SiteManager* tracks working days, quantities, change orders, time extensions, and LDs.
- According to TxDOT's CCAM, change orders may be required due to:
    - An error or omission in the contract,
    - Differing site conditions,
    - Adding a specification,
    - Resolving a dispute,
    - Changing the sequence of work or
    - Other contract changes.
- The alternatives available for the authority to sign off on change orders are as follows:
    - $50,000 or less - Area Engineer has authorization to sign the change order,
    - Less than $300,000 - District Engineer has authority to sign the change order,
    - Anything over $300,000 and/or when the project limits have changed - Construction Division is required to process the change order ("Administrative Change Order").
- The process involved for granting a change order at the Area Office or District Level is typically through direct negotiation with the contractor.
- Administrative Change Orders are evaluated and processed by the Construction Division then submitted to the Assistant Executive Director in charge of Engineering Operations for approval.
- Based on recommendations from a previous internal TxDOT audit, the Construction Division reviews all change orders from the Districts.

Audit Area: A. Adequacy of Project Controls	**Issue:** ii. Cost Monitoring and Control Procedures

- During the assessment, various Construction Division personnel expressed concerns with the level of experience with scheduling and change order negotiation skills at some of the District construction field offices. With the majority of the change orders processed by TxDOT falling below the Administrative Change Order level, the Districts are evaluating, negotiating, and approving them without support (unless specifically requested by the District) from the Division. While this practice is in accordance with TxDOT policy, it is important to ensure that the Districts have adequately trained personnel to fulfill these responsibilities effectively.
- An evaluation of a report titled "Statewide Change Orders: Reason, Frequency & Cost" for the period of 09/01/2006 to 05/01/2007 identifies that out of all the change orders, those classified as design error or omission comprised 24.14%, change orders for unforeseeable differing site conditions comprised 24.90% and change orders for TxDOT's convenience comprised 43.37%, all other change orders included the rest of the percentage allocations.
- Out of the 43.37%, 27.09% was for additional work desired by TxDOT. This classification includes changes to the project after letting, which may include such things as requests from the public and increased scope that make logistical sense to perform during the current project. It is important that TxDOT continue to monitor and evaluate the necessity of change orders and effective use of its construction funds.

Total Project Cost

From interviews of key personnel in the Design Division, TP&P and Administration, Deloitte FAS learned that TxDOT is in the process of making a policy shift in the way that it tracks total project costs. To track these costs TxDOT has developed an interface upgrade to *DCIS*. As part of this policy change, costs will be tracked for Design, ROW, Utilities, and Construction. However, project development or planning and environmental costs will not be included in the tracking mechanism.

- TxDOT District personnel are experienced with developing and managing construction and maintenance budgets.
- This new policy will require District personnel, in coordination with Metropolitan Planning Organization ("MPO") to include costs for all seven elements of a project.
- Various Divisions are implementing or plan to implement programs to train and assist District personnel to be prepared for the Total Project Cost approach to project development.

Impact:

- If TxDOT does not take into account project development and environmental costs in the new total project cost initiative, the new policy will not be as comprehensive as possible. To have full and complete accountability and maximize the use of TxDOT's available funds, all phases of project development from inception through construction completion will be needed in the future.
- Presently TxDOT has policies and procedures in place to monitor construction project costs during the construction phase. If used correctly and with proper application these controls can provide a real time environment to manage the budget.

Operational Strengths/Leading Practices:

- The database of unit bid prices is one of TxDOT's operational strengths that can be utilized to develop construction project estimates. It is updated monthly and is separated into statewide averages and District averages. This database tool appears to allow for reasonably accurate

Audit Area: A. Adequacy of Project Controls	**Issue:** ii. Cost Monitoring and Control Procedures

engineer's estimates compared to contractor's bid results. Information observed for the last three calendar years highlights that the engineer's estimates on average have been between 3-6% of the contractor award value when looking at the total number of projects awarded in each year. However, the larger dollar value projects[7], during that same time period had engineer's estimates that averaged a 10% variance to the contract award value.

- TxDOT's use of AASHTO based computer applications is another operational strength that is utilized to develop project budgets and monitor projects during construction. *Estimator* is used by TxDOT to develop construction project estimates and *SiteManager* allows District construction inspectors and project managers to track the project's working days, change orders, and to automatically charge LDs.

Conclusion/Recommendation for Improvements:

The audit objective for this section was to provide TxDOT with an assessment of the adequacy of its cost monitoring and control functions. Based on the evaluation conducted by Deloitte FAS, the current TxDOT policies appear to be followed by the effected parties. However, TxDOT should consider implementing the following recommendations to improve the oversight and efficiency of the process.

- TxDOT should consider development and tracking of in-house project budget with hours and pay rates to track total budget costs for internal planning and design activities similar to the process used to track consultant contracts.
- TxDOT should reevaluate the current level of training provided for individuals involved in the negotiation of change orders. Providing adequate training for TxDOT staff should help to facilitate the change order process between TxDOT and the contractor, which will help to strengthen TxDOT's position in negotiating change orders.
- Project cost creep through change orders should be monitored and held to a minimum when possible and design enhancements, if necessary, should be part of the PS&E process and not part of the construction process. By requesting additional work during the construction phase, the low bid process during the letting phase may be compromised. Deloitte FAS recommends TxDOT consider reducing the current threshold for change order administrative approval and consider a formal change order review process with the effected Divisions, to keep all parties abreast of changes in the field. This modification could require additional Construction Division resources to help facilitate the added reviews in a timely manner. It is important that the Districts have the ability to manage construction projects but also critical that TxDOT manage this process effectively and provide oversight when needed
- For the Total Project Cost approach to be effective, the Department needs to make certain that the Districts and Divisions are provided adequate tools, processes, and guidelines to properly report total project costs. Existing tools, such as *ProtoCost*, should be considered for implementation statewide.

[7] TxDOT construction projects with an awarded value that exceeds $50M.

Audit Area: A. Adequacy of Project Controls	**Issue:** iii. Bid Assessment Procedures

Background:

In earlier internal TxDOT audits, Letting Audit (1201-4) and Letting Follow-up (1201-4F), TxDOT noted that bid evaluations were not being fully performed related to bid responsiveness and/or bid irregularities. Specific training was recommended. During Phase 1, it was also noted from an evaluation of various letting summary reports that in certain instances, particular projects were being awarded even though the award value significantly exceeded the engineer's estimate. Adequate controls around the project letting process are critical to maintaining the integrity of the competitive bidding process and the effective use of project funding. As such, Deloitte FAS recommended that an evaluation of the letting process be performed to verify that bid evaluations were being performed, that specific training in this area has been instituted and to verify that project award procedures appear to be effective.

As part of the evaluation process, Deloitte FAS performed several tasks in order to assess TxDOT's project letting process. Deloitte FAS examined the policies and procedures that govern the letting process and compared these procedures to other transportation agencies. Deloitte FAS interviewed TxDOT Division personnel responsible for the letting of projects. Deloitte FAS assessed historical letting records and selected a sample of awarded projects to evaluate; in doing so, Deloitte FAS evaluated the bid files related to these sample projects to understand the post-bidding analysis performed and determined whether bid responsiveness and/or bid irregularities were evaluated. Lastly, Deloitte FAS assessed the level of current TxDOT training on bid evaluation to help ensure that TxDOT procedures and goals were being met.

Observation/Findings:

From the evaluation of TxDOT's project letting process, including interviews conducted, manuals and procedures analyzed, and technology used, the following issues were observed:

- The primary responsibility for the letting process up to advertising projects for bid resides with the Design Division. The process followed by Design during this phase is well structured and documented; however, there is a monthly target volume that the Department strives for that at times appears to put stress on the Districts and Divisions ability to achieve. The monthly target is primarily based on a predetermined dollar value of projects to be let statewide and that can cause Districts to accelerate projects up to the letting schedule.
- There is a departmental manual, the "Letting Manual", that describes the process and procedures for conducing project lettings. This is a comprehensive manual that details the pre-letting, letting and post letting process.
- The Design Division requests a three year letting schedule from the Districts. This schedule is updated annually, and it is used to plan the annual letting schedule for each fiscal year.
- Each District has a letting cap and makes adjustments to the projects to be let to stay within the cap. The Design Division sets the cap through their programming budget.
- On a monthly basis, the Districts submit a Form "A" and an Attachment "B" of projects scheduled for letting to the Design Division. These documents identify the projects the Districts believe will be ready for letting by the scheduled date. Statewide letting volume cannot exceed $650,000,000 per month. TxDOT's Administration believes this is the most work that can be let on a monthly basis and be adequately executed by contractors in the State. There is also a minimum statewide target of $250,000,000 per month, and the Design Division encourages

Audit Area: A. Adequacy of Project Controls	**Issue:** iii. Bid Assessment Procedures

Districts to meet this criteria if the monthly Attachment "B" forms submitted by the Districts falls short of this amount. The monthly letting volume varies, but it tends to peak near the end of the fiscal year. This impacts the Districts workload as well as Divisions supporting the project approval process such as Design and ENV.

- Districts strive to have projects ready by the proposed letting date; however, letting dates are occasionally delayed. Some reasons for missed letting dates include: right of way acquisition, utility adjustments, railroad agreements not executed, pending environmental clearance, and unapproved design waivers or exceptions.
- Once projects are approved for letting, proposal packages are prepared for distribution to contractors and advertisements for bids are prepared and issued.
- The Design Division is responsible for advertising projects to be bid. In addition, notices are sent to contractors using TxDOT's Construction/Maintenance Contract System ("CMCS"), which is an automated process.
- A contractor must be pre-qualified by TxDOT before submitting bids on projects. The Construction Division reviews and approves contractor pre-qualifications.
- The Construction Division also determines a contractor's bidding capacity, which is calculated at twenty times the contractor's working capital. The contractor's bidding capacity is continuously updated and monitored through an automated process which monitors proposal requests and existing contracts. The Division also checks to see if the contractor has been debarred.
- The Construction Division is responsible for making bid proposals available to the contractors. Once a bid proposal is requested by a contractor, the contractor's name is entered into BPS. BPS then compares the engineer's estimate against the contractor's available bidding capacity to determine if capacity to do the work exists. If BPS determines the bidding capacity to be sufficient, a bid package is sent to the contractor. Based on a review of various letting files, this process appears to work well.
- The Construction Division has a scheduled monthly bid opening at 1:00 pm, at which time all bids are read publicly.
- There is a check and balance system in place for bid review. The bids go through several checks by different Division personnel to verify accuracy. There is also an automated procedure and an internal formal policy for checking low bid proposals for unbalanced bids (frontloading or quantity discrepancies).
- The Construction Division has yet to fully implement a collusion analysis program related to construction contracts. Based on discussions with TxDOT personnel, this is a near-term goal for the Division.
- Training related to bid evaluations is primarily conducted as on-the-job training. The process for evaluating the potential for unbalanced bids is a documented procedure that TxDOT personnel utilize in conducting their bid evaluations. Training related to collusion detection is limited to external training, and thus far, only a few Division employees have been sent to this training.
- Bids that come in higher than the engineer's estimate require justification of award by the District Engineer prior to submitting a contract to the TTC for approval. Districts have to justify awarding the project if it's 10% over engineer's estimate for one bidder and 20% over for multiple bidders. The District Engineer submits a memo to the Director of the Construction Division justifying the award. Based on Deloitte FAS' review of a sample of justification memos, it appears that the Districts rely heavily on the bidding contractors for justification of

Audit Area: A. Adequacy of Project Controls	**Issue:** iii. Bid Assessment Procedures

bid pricing. The accuracy of the engineer's estimate and limitations around materials specified were also cited as reasons for the discrepancies in actual bid costs. The Division requires that Districts discuss this issue with contractors and to also reach out to contractors who did not bid a project.

- It is not uncommon for a project to have only one or two bids submitted by contractors. In certain instances, bids are rejected if they come in significantly higher than the engineer's estimate. At other times, the bids are accepted even if they are higher than the engineer's estimate if justified by the Department.

Impact:

The bid evaluation process is a key component and critical to maintaining the integrity of the letting process. The following items have been identified as potential impacts to the process if they are not addressed.

- If the process of justifying bids that exceed engineer's estimates is not thoroughly performed, projects are at risk of being awarded for inflated amounts. The current process provides TxDOT with the ability to award contracts for amounts that exceed the engineer's estimate. However, this process needs to be carefully monitored to ensure that justification is adequately supported and to minimize the potential for risk of unnecessary expenditures in the event bids are inflated.
- Having a collusion analysis program as part of the overall bid evaluation process is an important factor in deterring fraud. Without a functioning program, there is no way to determine whether the competitive bidding process is being by-passed. If the process is compromised, this will cause an inefficient use of TxDOT funds.

Operational Strengths/Leading Practices:

The letting process and bid evaluation procedures followed by TxDOT are similar to other DOTs; however, Deloitte FAS has identified portions of the TxDOT process considered to be operational strengths.

- TxDOT's process around project letting and the evaluation of contractor bids is well documented and provides necessary guidance to the individuals involved in the process.
- TxDOT has an automated process for issuing bid packages to contractors. Once a bid package for a project is requested by a contractor, the contractor's name is entered into TxDOT's BPS which interacts with other TxDOT systems to determine whether a contractor has the available capacity to complete the specific project. This process generates a report of exceptions which are then evaluated by personnel in the Contract Letting and Processing Branch of the Construction Division to confirm the results. This process helps to protect TxDOT against awarding contracts to contractors who may not have the ability to successfully complete a project by preventing them from entering the bidding process. This is also a benefit to the contractor by potentially minimizing financial or operational business issues or problems for the contractor. The ability to check a contractor's bidding capacity through this automated process appears to work well based on the assessment of monthly letting files.

Audit Area: A. Adequacy of Project Controls	**Issue:** iii. Bid Assessment Procedures

Conclusion/Recommendation for Improvements:

Based on the assessment of this issue, Deloitte FAS believes that the letting process and bid assessment procedures are well documented and appear to be followed and utilized by the various TxDOT Divisions. The integrity of the bidding process appears to be well maintained. However, there are issues that should be addressed to further strengthen the process, which are described in the following recommendations.

- The justification process is a critical step to ensuring that TxDOT is receiving the best value for its investment and proper use of State and Federal funds. Based on a review of a sample of justification memos, it appears that more analysis may be needed to support justifying a project beyond obtaining the bidding contractor's input.
    - TxDOT needs to develop requirements to document the justification process. During the justification process, more analysis should be performed related to the differential between engineer's estimate and bidder's price. For example, this additional analysis could include some portion of or all of the following: review of unit price items for discrepancies, comparison of certain bid costs to other contractors with similar items, and/or an analysis of any unique bid items that were specified that could impact cost. In addition, these additional bid evaluations should be documented.
- Presently, with little collusion analysis applied to post letting process, there is an operational barrier and a risk involved in not knowing if contractors are working together to circumvent the competitive bidding process. Given the volume of work produced by the Department and the number of projects with one or two bidders, the potential for collusion should be treated with a high priority. While it is difficult to detect collusion, having an active program can act as a deterrent to contractors.
    - TxDOT should accelerate the implementation of collusion analysis for construction contracts. The Deloitte FAS assessment identified that the only recent collusion analysis performed by TxDOT was for a maintenance contract. Select TxDOT staff has attended specific training classes for the evaluation of bid collusion. TxDOT should provide training for individuals to perform this analysis. By developing internal training around collusion, the entire Department will have the opportunity to attend the training and will be made aware of what to look for in assessing bid responses.
- Assess training related to development of engineer's estimate. Process should include standard methodology used, but also include recognition of geographic and economic factors and any type of special conditions.

Audit Area: A. Adequacy of Project Controls	**Issue:** iv. Contracting and Project Delivery Information Technology Evaluation

Background:

The project controls for any large capital construction program are a key ingredient to providing quality, cost and schedule metrics, and efficiency in planning, design and construction. In today's environment, computer applications form the basis of many project controls. Based on the Phase 1 assessment, the adequacy of TxDOT's project controls was an area of interest, more specifically the computer applications involved in monitoring the cost and scheduling of a project's life cycle from inception through completion of construction.

The technology used by the TxDOT to execute, manage and deliver projects can play an important role in the success of the Department's overall goals and objectives. Having proper project management software to track project records and schedules is important for the timely execution of projects. Current technology, such as highway design software, can also aid in the efficient execution of projects. By not having current or complete technological capabilities, TxDOT is at risk of not being able to effectively and efficiently deliver projects. Thus, Deloitte FAS identified the need to consider the project management IT tools being used by the various functions to manage and delivery projects, as well as specific IT tools being used to manage consultant contracts.

Observation/Findings:

Deloitte FAS examined the project control processes, the information system tools utilized to manage cost and schedule, interviewed TxDOT's Information Systems Division ("ISD") personnel, interviewed Division personnel responsible for their respective Division's IT systems and tools, compiled an inventory (see Appendix D) of the various information systems and tools utilized, and evaluated the information system structure at the District level to assess TxDOT's overall systems for project controls from project inception through construction completion. Finally, Deloitte FAS identified technology used by other DOTs. The following observations were made:

- TxDOT has evolved from a mainframe system, and the information system departmental structure is decentralized. The Divisions and Districts each have IT professionals that are responsible for computer applications associated with their functions. This results in computer applications being purchased and developed individually for a District or Division. ISD maintains the mainframe system which houses many of the applications used throughout the Department such as *DCIS* and *FIMS*. Support for the mainframe and its related programs are provided by ISD.
- For toll road SH130 segments 1-4, the Department's project team searched for third-party software to organize test data and inspection information. The project team was unable to find a software application that fit the project's needs so they developed the Inspection and Materials Management System ("I2MS") to limit human error, become a paperless system, make tests electronic and allow project team members to have access to the most current construction information through their daily personal digital assistant ("PDA") sync. Portions of I2MS may be applicable to other construction projects and should be utilized as appropriate.
- When a Division or District is in the process of purchasing new third-party software, they work with ISD to ensure that the third party software applications meet specific criteria developed by ISD.
- When a system is particular to a Division, like *DCIS* is to the Design Division and *FIMS* is to the Finance Division, that Division becomes the OPR rather than ISD. Many Divisions and Districts

Audit Area: A. Adequacy of Project Controls	**Issue:** iv. Contracting and Project Delivery Information Technology Evaluation

have their own IT professionals to program and support IT in-house networks and applications.

- The Divisions will download data from the mainframe applications to a Windows based application such as Microsoft Excel or Access to review, analyze, or manipulate the information. They will then upload the information back to the mainframe. This process could result in inefficient time spent by the Division professionals and raises an issue as to the user-friendliness of the mainframe applications.
- *DCIS* was not originally created to track the entire project life cycle. The work flow chart, shown in Appendix E, depicts the scope of this application. It was originally created to set-up the funding source, assign a CSJ number, and participate as a tracking mechanism, primarily from project inception to receipt of bids. Recently, TxDOT has decided to make a major policy change to begin tracking total project costs. To support this policy change, an interface was created to import the information related to design, right of way, and utility costs into *DCIS*. However, *DCIS* is a mainframe application and the individual segments of the project's life cycle will still be tracked through separate software and desktop computer applications that are pertinent to each particular segment of the project's life cycle. Effectively tracking total project costs will require an all encompassing software or computer application system that accounts for all of the costs that are incurred over the course of a project's lifecycle.
- TxDOT uses current industry standard applications such as *MicroStation* for computer aided drafting and design ("CADD"), and *GEOPAK* for roadway design. Both *MicroStation* and *GEOPAK* are supported by ISD. TxDOT also utilizes *Primavera* scheduling software, to monitor construction project progress. *MicroStation*, *GEOPAK*, and *Primavera* are used Department-wide.
- TxDOT also utilizes several AASHTO products. The Department uses *Estimator* to develop and produce their construction estimates and *SiteManager* for construction management. The Bridge Division also has numerous AASTHO products that are being utilized for bridge design and the TP&P Division utilizes *Geographical Information Systems* ("*GIS*") as part of the mapping and traffic inventory information. However, all of these applications are stand alone third-party, Windows-based products.
- Although *Estimator* is available to all Department personnel, not all professionals are comfortable using the software. These professionals may create estimates using programs such as *Microsoft Excel* instead of *Estimator*. In addition, the final engineer's estimate needs to be entered in *DCIS* but currently this information from *Estimator* is not uploaded directly into *DCIS*. This is an inefficient process that could result in human error when the data is transferred manually from another program to *DCIS*.
- Project data is fed into the mainframe system through numerous interfaces with programs capturing information such as programming, estimating, finance, advertisement, letting and bid evaluations. Those programs are contained in the overall program list described in Appendix D.
- *SiteManager* is the construction management program used by the Department. It tracks the entire construction process including working days, the assessment of LDs, project financial information, quantities, construction costs, change orders and time extensions.
- The current IT applications do not interact to allow for convenient assessment of the total project cost despite the Department's move towards a total project cost approach.
- The TTA and the Austin District use *eManager* to track consultant contracts. However, this is not a Department-wide program used to track consultant contracts. Given the increased use of consultants, the Department may want to consider utilizing a single tool that can manage and

Audit Area: A. Adequacy of Project Controls	**Issue:** iv. Contracting and Project Delivery Information Technology Evaluation

track consultant contracts across the Department.

- Deloitte FAS researched other applications that are being utilized by other DOTs in addition to the AASHTO developed software applications. The Pennsylvania DOT ("PENNDOT") utilizes web enable software called *Multi Modal Planning System*. The software tracks projects, including aviation and rail projects, at each project milestone including financial milestones. PENNDOT also utilizes *GIS* to track capital expenditures by legislative district and displays the information graphically. They use CADD to develop their engineering documents. Finally, PENNDOT utilizes web-based *Engineering and Construction Management System* ("ECMS") for design, to post their designs on the web and work in conjunction with consultants. This computer application also links bid items and advertises projects for letting. *ECMS* is also used in the consultant selection process, pre-qualifying of construction contractors and time charges for consultants. During the construction phase it tracks the project and pays the contractor utilizing electronic signatures.
- Like TxDOT, other DOTs are primarily mainframe-based organizations. Some DOTs are migrating away from these legacy systems. For example, the Illinois DOT ("IDOT") has issued a RFP to look into the feasibility of undertaking such an initiative to move away from its legacy system.
- It appears that TxDOT has initiated an investigative IT study. ISD is in the process of working with Bentley to evaluate implementing total project management software that would be integrated with their roadway design applications. Given the number of systems that TxDOT utilizes to assist in the project delivery process, this should be a priority.
- Based on the evaluation of this issue, Deloitte FAS identified that there are nearly 200 mainframe applications and stand alone software packages, as shown in Appendix D, that make up the suite of technology available to TxDOT to assist with the contracting and project delivery process. The actual number of contracting and project delivery specific applications varies because Divisions, Districts, and individuals have developed their own tools (spreadsheets, databases, etc.) to assist with their work.

Impact:

The Department has historically relied on multiple computer applications to track the various aspects of a project from its inception through construction completion. In light of TxDOT's policy change to now track the total project cost, the Department has augmented *DCIS* to incorporate the total cost for each stage of project development. Although this should allow the Department to determine the total project cost, the various IT applications will still need to be accessed to understand the detail supporting each of the individual project development segment's costs. If TxDOT does not consider deploying an all encompassing computer application or software that can track detailed costs from a project's inception through construction, there could be a risk that data could be lost in the various systems. In addition, the Department will be spending inefficient time utilizing the many applications to analyze the project's cost details. The Department may find itself reviewing the need for detailed cost information in one location in a couple of years, which would require significant augmentation of the current mainframe system if not the acquisition of an all-encompassing system which would allow Department professionals to identify the cost overruns and items that can be reduced to lower a project's total cost.

Operational Strengths/Leading Practices:

Audit Area: A. Adequacy of Project Controls	**Issue:** iv. Contracting and Project Delivery Information Technology Evaluation

Due to the decentralized nature of TxDOT, the IT structure allows the various Divisions and Districts to respond quickly to procure or create applications that fulfill an IT need. This permits the various Divisions and Districts to work with newer technology that accomplishes project goals in a more efficient way. Once beneficial technology is identified and implemented successfully, the Division and/or District should share this knowledge as appropriate.

Conclusion/Recommendation for Improvements:

Based on Deloitte FAS' assessment of the IT project management tools being used to manage and deliver projects, the Department has nearly 200 applications and software packages available for TxDOT to use to assist with contracting and project delivery. The Department has augmented its *DCIS* system to produce a total project cost value. Deloitte FAS also identified that there is no standard application used by the Department to manage consultant contracts.

By moving towards a total project cost mindset, the Department should be able to get a more accurate view of all the costs associated with a particular project. This movement could require a larger overhaul than expected of the other IT systems and applications the Department uses due to the decentralized nature of the IT function. In some instances, many different applications in various Districts and Divisions are used to perform the same task. In addition, because of the enormity and diversity of TxDOT's business and the computer applications being utilized, data could be lost, or maintained in multiple applications.

The Department should review the following recommendations to assist with IT improvements:

- The Department may wish to conduct or commission a more in depth study into their information resource systems currently used to manage and deliver projects. This study could help streamline the IT application and system population that the Department supports by identifying different programs that are accomplishing the same goals and thus reducing the number of applications. Such a study could also consider procuring or creating a system to house the detailed total project cost information in lieu of using the currently augmented *DCIS* mainframe system, which contains summary project development segment cost information.
- The Department could also collaborate between the Divisions and Districts to identify any applications used or created in a District that another District may benefit from. This could reduce the time spent on the creation of interfaces as well as the population of applications utilized. The Department should implement some leading practices such as moving towards a paperless environment and deploying updated construction project information through the daily syncing of PDAs for all project members.
- With the increase in use of consultants Department-wide, TxDOT should investigate using one program to monitor and execute consultant contracts. This would allow for easier record keeping and potentially better data collection.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** i. Alternative Contract Delivery

Background:

TxDOT, like many other State transportation agencies, completes the majority of its projects using the Design-Bid-Build[8] ("DBB") project delivery approach. The Texas Transportation Code provides the Department the ability to enter into CDAs with a public entity for select types of projects. The Texas Transportation Code describes the agreement to include the private entity to design, develop, finance, construct, maintain, repair, operate, and extend the select project. Based on this description, the DB[9] project delivery approach is classified as a CDA. As DBB is not always the most efficient method for the design and construction of projects, alternative methods, such as DB, can provide for a more efficient and cost effective means of delivering projects.

Current federal legislation has broadened the use of alternative contracting methods for highway projects. For example, Section 1503 of the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users ("SAFETEA-LU") has eliminated the $50 million contract size minimum that can use DB contracting, potentially increasing the applicability of such a methodology. SAFETEA-LU also helped to modify existing FHWA rules related to DB, in particular, rules relating to the ability of transportation agencies to take certain preliminary actions prior to receipt of National Environmental Policy Act ("NEPA") approval. Deloitte FAS identified the use of alternative contracting methods as an opportunity for TxDOT to potentially complete projects more timely and cost efficiently. As such, Deloitte FAS assessed the opportunities that may exist for expanded use of DB procurement throughout the TxDOT organization. In addition, Deloitte FAS assessed the use of alternative contracting methodologies used by other transportation agencies for potential applicability to TxDOT projects.

Observations/Findings:

The transportation industry recognizes the need to develop and implement alternative contracting methods to expedite the development and construction of transportation projects across the country. This is evident by the Joint Technical Committee on DB previously established by the AASHTO and the added policy developed by FHWA on alternative contracting methods. Similarly, TxDOT has identified the need to consider and use a DB approach for delivering certain transportation projects. Texas Administration Code Title 43, Part 1 - Chapter 27 describes the procedures for the use of DB for the development and delivery of construction projects. Based on Deloitte FAS' assessment of this issue, the following observations have been identified:

- The majority of the TxDOT staff interviewed during Phases 1 and 3 recognize the benefit of having the ability to deliver projects using the DB approach. It was suggested that TxDOT have the ability to use DB for applicable traditional projects in addition to being an option available for toll projects, which are typically delivered through the TTA. TxDOT staff believes that overall, TxDOT is better suited having the DB option as a method of project delivery.
- Current TxDOT DBB projects are not tracked from a total cost perspective (i.e. TxDOT internal overhead, design development cost, environmental document development cost, and right of way expenses are not associated with the current cost of the project). This makes a

[8] Design-Bid-Build describes the traditional project delivery approach used by TxDOT in which projects are designed; bid documents are prepared, issued for bid, awarded to the lowest qualified bidder, and constructed. This process typically occurs by separate parties and the activities take place sequentially

[9] Design-Build combines into a single contract the design and construction of a project, which typically allows the contracted entity to work both activities in parallel.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** i. Alternative Contract Delivery

comparison between traditional projects difficult, let alone between traditional and DB projects. TxDOT's shift to a Total Project Cost approach for project development should allow for a more direct comparison of the total cost for TxDOT to develop and construct a transportation project compared to a similar DB project. Having that similar comparison will quickly help TxDOT identify the tangible benefits to using DB for applicable projects.

- Based on leading practices identified by several DOTs currently using DB, the process is best managed and implemented by a group within the Department that is separate from the traditional DBB projects. This is due to the nature of the DB process and the potential benefits for the group to evolve from a prescriptive specification focus to a more performance based programmatic approach that could assist with successfully delivering a DB project.
- TxDOT has a limited track record with its use of DB procurement. SH130 segments 1-4, a portion of the Central Texas Turnpike System, was developed using a DB approach. This project is presently ahead of schedule and under budget, and although it is a high priority project, it still may provide some useful insight related to using the DB process on other projects.
- In addition to DB, TxDOT is using other alternative contracting approaches and construction procurement tools in an attempt to reduce delays to the delivery phase of construction projects. These approaches include:
    - Calendar Day Definition for Working Day – Used alone with standard contract administrative liquidated damages ("CALD") with time calculated to the final acceptance date.
    - Incentive Using Contract Administrative Cost – Pay for early completion at the standard CALD rate. Include a no excuse bonus provision with incentives.
    - Milestones with Incentive/Disincentives – Includes an incentive/disincentive for specific project phases that have significant impact on traffic or businesses.
    - Substantial Completion Incentive/Disincentives – Incentive/disincentive based on Road User Costs ("RUC") for early completion of the project.
    - Lane Rental Disincentives – Used for pavement maintenance work and managing intermittent lane closures to minimize impact to traffic construction projects.
    - A+B Provisions – Considered for large or highly critical projects where early completion should be considered for award.

Impact:

DOTs need every reasonable opportunity and tool available to deliver transportation projects to the public in the most time-efficient and cost-effective manor. Alternative contracting methods provide for a potential reduction of schedule and cost impacts to a project's delivery. The following is a description of the identified impacts:

- Limited anticipated federal funding for future transportation projects requires the maximization of current transportation funds to achieve the greatest value for the money being expended. By restricting the potential delivery approaches available for use by the Department, TxDOT is running the risk of not maximizing the use of current transportation funds.
- Regardless of the contracting or delivery approach, TxDOT needs to develop projects in the most cost effective manner. With anticipated future funding concerns, it does not seem

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** i. Alternative Contract Delivery

practical to exclude or limit the use of certain delivery options that could help reduce congestion and also increase the asset value of TxDOT transportation infrastructure by reducing the capital project's development and construction costs.

- Given the nature and rapid pace of a DB project, detailed design information is not always available, which could cause potential delays to the permitting process and overall project delivery. This may require TxDOT to monitor and/or revisit issues when more information becomes available.

Operational Strengths/Leading Practices:

TxDOT's development of SH130, which was implemented through a DB process, provides several examples of operational strengths and in some cases leading practices within the transportation industry. The following are examples of those instances:

- The ability of TxDOT Administration to provide the support and flexibility necessary to make the required adjustments and modifications to the Department in order to develop the first TxDOT DB project is a leading practice. The Department needs to continue to examine and use alternative approaches to the delivery of transportation projects including the expanded use of DB on a wider range of projects.
- The supported partnering and encouraged communication effort between TxDOT and Lone Star Infrastructure[10] is an alternative delivery leading practice. The TxDOT project team for SH130 understood the need to break away from traditional relationship approaches in the implementation of the first DB project. This was highlighted by the encouraged communication between TxDOT and Lone Star Infrastructure to conduct weekly status meetings that replaced the rigid 30%, 60%, 90% completion review periods of traditional DBB projects.
- The combined program office space that was established for TxDOT and Lone Star Infrastructure staff to work in a single location helped expedite development questions and allowed for quick resolution to potential process delays.
- TxDOT identified the need to maximize the use of technology to assist with the timely development and implementation of the project. Rather than modifying an existing application or program used by the Department, the team developed I2MS to provide a web-based management tool that would quickly and easily handle the large amounts of testing and inspection project reporting.
- A true leading practice for TxDOT and SH130 was the innovative funding sources used for the project. Texas was the first state to secure a Transportation Infrastructure Finance and Innovation Act ("TIFIA") loan in the amount of $916M with an interest rate 5.41% combined with short term debt financing that allowed TxDOT to reduce financing costs.

Conclusion/Recommendation for Improvements:

The Phase 1 Risk Assessment identified a potential benefit to TxDOT in the expanded use of alternative contracting methods, including DB. Deloitte FAS' Phase 3 assessment has supported

[10] Lone Star Infrastructure – Joint Venture between Flour Corporation, Balfour Beatty Construction, and T.J. Lembrecht Company, contracted with TxDOT to design and build SH130.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** i. Alternative Contract Delivery

the need for TxDOT to consider the expanded use of alternative contracting methods. Given the desire to develop and implement transportation projects in the most effective manner, TxDOT needs the ability to choose the most applicable delivery approach based on the qualities and characteristics of the particular project. Therefore, TxDOT should consider how the Department will handle future DB projects, regardless of whether TxDOT decides to add staff or utilize a separate section of the TTA to develop both toll and non-toll viable DB projects or work with State law makers to modify existing legislation to allow for the development of non-TTA DB projects. TxDOT should consider all reasonable time and cost saving options that allow for the successful delivery of a project.

Based on SH130, TxDOT has realized the benefit of the DB process and should consider applying that momentum towards the development of additional transportation projects that are suited for this type of delivery method.

- TxDOT should consider the various options and methods and decide the best and most effective way to maximize the use of the DB approach for future toll and non-toll projects.
- Any future DB projects or a TxDOT decision to implement a DB program should expand on the programmatic specifications and procedures developed during the SH130 project with the incorporation of lessons learned during the development, construction and pending close out of the project to help guide the direction of future DB procurement for the Department.

With the passing of the moratorium on the development of future CDA projects, TxDOT should consider an expanded use of DB project development for originally proposed (and not grandfathered in the moratorium) concession projects based on the purpose and need statements originally identified for the projects. TxDOT should continue to use innovative financing methods such as the TIFIA loan program to deliver these projects. TxDOT could also develop these projects with the possibility of future legislation allowing for PPPs that would allow TxDOT to lease the newly developed assets for a greater return on investment once the project is implemented and the construction risk has been eliminated from the concession model.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process a. Projects Environmentally Cleared

Background:

The Phase 1 Risk Assessment identified that TxDOT does not utilize a cradle-to-grave project management concept in planning, design, and construction of its projects. Therefore, Deloitte FAS recommended a more detailed analysis of the communication and transition between the Districts and various Divisions. The goal of the assessment was to evaluate the overall project development process to assess if the process allows for a seamless transfer of information.

In order to evaluate this issue, Deloitte FAS performed a detailed assessment of the project development process including the transition points and the assignment of responsibilities for each of the key parties that have an impact on the project development process. Deloitte FAS also evaluated how other transportation agencies manage projects to determine if there are potential benefits to be gained by TxDOT or to identify potential leading practices currently being used by TxDOT.

In evaluating the project development process, Deloitte FAS considered the timing of the development process. The period of time required to develop a project from inception to construction can vary widely based on a number of factors, which include but are not limited to the complexity of the project and the availability of funding. Due to the large timeframe that a single project could potentially span, Deloitte FAS did not evaluate a single project from inception to construction completion but instead evaluated certain discrete points in the typical life-cycle of several TxDOT projects to assess the process.

By selecting discrete points in time, Deloitte FAS was able to evaluate and sample the status of certain projects over the entire lifecycle and avoid the potential problems that could arise in looking at a single project. With a single project, it was possible that the individuals responsible for the project may no longer remember any of the details related to that particular project, may no longer work for TxDOT, and/or the TxDOT processes may have changed making the evaluation of out-of-date processes meaningless.

Deloitte FAS identified the following discrete points in the typical project development process and evaluated a select number of projects that recently passed through these discrete points in the process:

- Projects recently receiving environmental clearance
- Projects recently let to construction
- Recently completed construction projects (see section A: Adequacy of Project Controls)

With the selected evaluation points, Deloitte FAS judgmentally selected TxDOT projects to evaluate. The goal of the project selection and assessment was to meet with the individuals that played an active role in the development process for that project and any other projects they worked on to provide a better understanding of the interaction, communication, and hand-off or transition points in the process and identify potential areas for improvement.

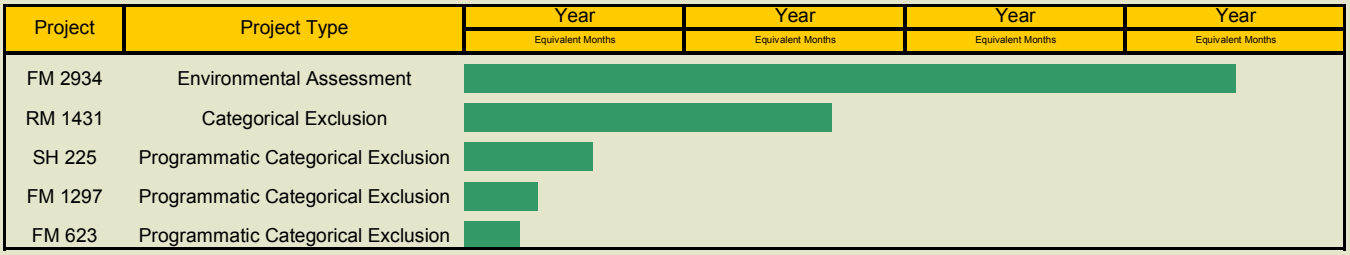
Deloitte FAS evaluated various ENV Division project files for the selected projects, interviewed the ENV Division staff, and communicated with the District staff for a portion of the projects. In addition, Deloitte FAS met with the ROW, Design, Bridge, and Construction Divisions to understand their involvement for projects at different junctures in the development process.

Observation/Findings:

Various environmentally classified projects were selected in order to evaluate the assorted

Audit Area: B. Effectiveness of Project Delivery Systems | **Issue:** ii. Project Development Process a. Projects Environmentally Cleared

coordination issues and timeframes to process the different types of projects. The selected projects classifications included an Environmental Assessment[11] ("EA"), a Categorical Exclusion[12] ("CE"), and (3) three Programmatic Categorical Exclusions[13] ("PCE"). The following table illustrates the durations of the five projects beginning with the first District submittal to the ENV Division through the period when environmental clearance was obtained for each project.



The table helps illustrate the large variation for the environmental approval process timing for projects based on the environmental classification of the project. The table attempts to place the assessed projects at the same starting point to compare the overall duration of the environmental document review process. It is important to note the projects did not occur at the same point in time. The sampling of projects does not allow for any type of statistical analysis of the average times for each environmental classification but rather highlights the need to keep the following items in mind throughout the entire development process:

- It appears that modifications to the letting date can drastically impact the project development process.
- The current Programmatic Agreement ("PA") in place between the ENV Division and the FHWA appears to work well for projects that are PCEs. Two of the three PCEs assessed were reviewed and approved within three to fours months. The third PCE was reviewed by the ENV Division in less then a month then went without any update for six months. The project file does not have any information concerning the cause of the delay.
- A risk identified during this assessment is the lack of formal communication between the Environmental group (Division and District) with the other TxDOT functions. This is highlighted by the informal communication between Environmental, Design, and ROW at the various Districts. Based on the criticality of acquiring right of way and relocating existing utilities, TxDOT needs to improve this communication so that the right of way staff are able to proceed with all legal (non-acquisition) activities as soon as possible and also reduce the risk of a delay in acquiring land after the environmental documents are approved.
- ENV Division currently uses a time estimator tool in the ETS that helps establish estimated timelines for document submittals based on let date.

To understand the level of coordination required to successfully progress a project through this portion of the development process, Deloitte FAS evaluated the following level of detail for the selected projects.

[11] Environmental assessment includes larger scale projects that do not meet CE requirements or with uncertain impacts provide sufficient evidence for determining whether to prepare an EIS or FONSI.
[12] Categorical Exclusion includes projects that cause minimal social, economic, or environmental impacts.
[13] Programmatic Categorical Exclusion refers to the TxDOT and FHWA agreement that on projects meeting certain criteria, a programmatic agreement may be used that allows ENV to approve federally funded actions as CEs, provided that certain conditions are met.

Audit Area: B. Effectiveness of Project Delivery Systems

Issue: ii. Project Development Process
a. Projects Environmentally Cleared

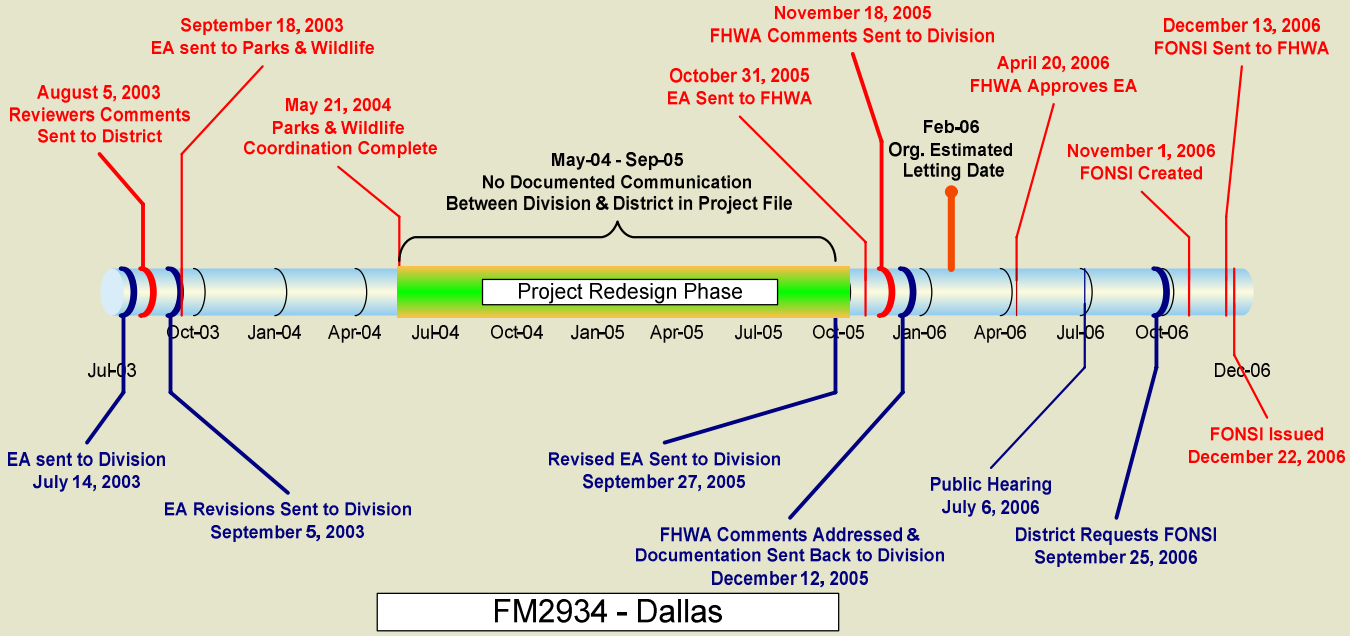


Figure 1 - FM 2934 Environnemental Document Time line

The sample project above shows the 42-month timeline that highlights the coordination effort between the District, Division, and the various resource agencies from the time that the Dallas District submitted the EA to receiving a FHWA - Finding of No Significant Impact ("FONSI").

- The timeline does not show the countless meetings, emails, and telephone calls that took place during the same period of time that were necessary to advance the project toward the eventual environmental clearance.
- This particular project contained a sixteen month period where the project was re-designed from a four lane highway to a six lane highway. This required the environmental review and coordination efforts to be revisited to account for the design change.
- Based on the interviews conducted and documentation reviewed, there did not appear to be much, if any, communication between the Division and the District during this period.

Impact:

If a seamless transfer through the development process does not exist, then TxDOT may be exposed to unnecessary development risks which could include issues such as, unnecessary extended cost due to rework of environmental documents caused by design changes and/or delayed right of way acquisition from lack of communication with the Environmental group. These risks impact TxDOT's ability to deliver projects timely and cost effectively, which impacts its ability to meet its goals of congestion relief and better air quality.

Based on the interviews conducted and the documentation and sample projects evaluated, Deloitte FAS has identified the following potential impacts that TxDOT is exposed to with the current project development process:

- Without a well defined and realistic project development schedule, TxDOT is potentially

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process a. Projects Environmentally Cleared

exhausting resources, which could be deployed on other projects, to meet project delivery milestones that may no longer be critical.

- Lack of communication causes unnecessary anxiety for TxDOT Division and District staff. The sample project described above, FM 2934, highlights the lack of communication between the District and the Division during the redesign of the project. With better communication between the Division and District, the Division could have provided additional support to the District during the redesign to eliminate some of the required revisions to the modified environmental document.
- As identified in the example above, the re-design and letting date adjustment was not communicated to the other effected parties. Whenever an adjustment to the proposed letting date is made, it appears to cause disruption and inefficiency in the project development process. In the example above, the ENV Division did not even know that the project was going to be pushed back to a later letting date. As a result, the ENV Division did not know it was appropriate to readjust or refocus their resources to other projects since the example project date had been adjusted to a later date. .
- Without the creation of a realistic project development schedule, TxDOT will not be able to accurately account for the time required for the ENV Division to perform the environmental document evaluations.
- Without constant Division and District communication during the development process TxDOT is at risk of not keeping all parties focused on successfully meeting the targeted letting date.

Operational Strengths/Leading Practices:

The current use of the timeline estimator contained within ETS is a leading practice that helps establish realistic project development timelines through the environmental document approval process.

The current manuals used by TxDOT to provide assistance and direction to the project development process are well documented and account for the different types of potential project development issues that may evolve. In particular, the Project Development Process Manual (revised August 2003) and the Plans, Specifications, and Estimate Preparations Manual (revised April 2005) are both examples of operational strengths that help guide TxDOT through the project development process.

Conclusion/Recommendation for Improvements:

Based on Deloitte FAS' evaluation of the selected projects, the project development process up through the environmental clearance appears to be adequate. The major risk issue for the process appears to be the lack of communication between the environmental staff (Division and District) and the other groups within TxDOT, primarily Design and ROW. The following recommendations are suggested for consideration to reduce the potential impacts of the risk issues identified above:

- The management of TxDOT resources could benefit from the development of better defined policies and procedures for the adjustment to and communication of a project letting date change. Currently all of the Divisions that touch a project during this phase of the project development process check the *DCIS* system to verify the proposed letting date of a project. Letting date changes are not always communicated, which can impact the effective

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process a. Projects Environmentally Cleared

management of TxDOT resources.

- Once a project is determined to be ready to proceed into the environmental document development phase, a comprehensive project development schedule should be prepared for projects of a certain magnitude and complexity as determined by TxDOT. This schedule would include the ETS estimated timeline for document approval and also estimate the other key milestones. This schedule would be distributed to all affected groups and offices in the District in addition to the affected Divisions. The schedule would need to be created, monitored, and updated by the responsible party at the District. This type of project development schedule and planning tool would make use of current available web-based technology that provides real time status and also sends regularly scheduled status reports to the responsible parties designated for that particular project and also automatically sends notices to all parties for any change to the estimated schedule or let date. TxDOT should consider the implementation of a policy to enforce this issue.
- Due to the nature of the projects developed by TxDOT, movement of the letting date is not always an issue that can be avoided. It is important that the system described above or some other type of system be implemented to provide notice of a changed let date to the individuals working on the project.
- With the implementation of a mechanism to monitor and update the project development schedule, the Divisions and Districts could track the project's development progress and facilitate a more streamlined level of communication between the environmental staff and the other TxDOT functions, primarily Design and ROW.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process b. Projects Recently Let to Construction

Background:

The Phase 1 Risk Assessment identified that TxDOT does not utilize a cradle-to-grave project management concept in planning, design, and construction of its projects. Therefore, Deloitte FAS recommended a more detailed analysis of the communication and transition between the Districts and various Divisions. The goal of the assessment was to evaluate the overall project development process to determine if the process allows for a seamless transfer of information. If a seamless transfer through the development process does not exist, then TxDOT may be exposed to unnecessary development risks. These risks could include such issues as added development costs due to rework of environmental documents caused by un-communicated design changes or delayed right of way acquisition stemming from a lack of communication with the Environmental group. These risks impact TxDOT's ability to deliver projects timely and cost effectively, which impacts its ability to meet its goals of congestion relief and improved air quality.

In order to evaluate this issue, Deloitte FAS performed an assessment of the project development process including the hand-off or transition points and the assignment of responsibilities for each of the key parties that have an impact on the project development process. Deloitte FAS also evaluated how other transportation agencies manage projects to determine if there are potential benefits to be gained by TxDOT or to identify potential leading practices currently being used by TxDOT.

The period of time required to develop a project from inception to construction can vary widely based on a number of factors which include but are not limited to the complexity of the project and the availability of funding. Due to the large timeframe that a single project could potentially span, Deloitte FAS did not evaluate a single project from inception to construction completion but instead selected certain discrete points in the typical life-cycle of a TxDOT project to assess the process.

By selecting discrete points in time, Deloitte FAS was able to evaluate and sample the status of certain projects over the entire lifecycle and avoid the potential problems that could arise in looking at a single project. With a single project, it is possible that the individuals responsible for the project may no longer remember any of the details related to that particular project, may no longer work for TxDOT, and/or the TxDOT processes may have changed making any evaluation of out-of-date processes meaningless.

Deloitte FAS identified the following discrete points in the typical project development process and evaluated a select number of projects that recently passed through that point of the process:

- Projects recently receiving environmental clearance
- Projects recently let to construction
- Recently completed construction projects (see section A: Adequacy of Project Controls)

With the selected evaluation points, Deloitte FAS judgmentally selected TxDOT projects to evaluate. The goal of the project selection and assessment was to meet with the individuals that played an active role in the development process for that project and any other projects they have worked on to provide a better understanding of the interaction, communication, and transition or handoff points for the process and identify potential areas for improvement.

This section evaluates the project development process for the next formal Division interaction point for a typical project. This assessment follows the projects through the PS&E review phase and into the letting of the project. The third and final evaluation point, the completion of construction, is assessed in the adequacy of project controls section of this report.

Deloitte FAS evaluated various project files contained within the Design Division for the selected

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process b. Projects Recently Let to Construction

projects, interviewed the Design Division staff, and communicated with the District staff for a portion of the projects. In addition, Deloitte FAS met with the ROW, ENV, Bridge, and Construction Divisions to understand their involvement in the project development process through letting.

Observation/Findings:

This section of the project development assessment focuses on projects recently let for construction. This evaluation point is a critical step in the project development lifecycle. The majority of TxDOT projects are developed at the District with interaction on an "as needed" basis with the Divisions after the project receives environmental approval. The Design Division becomes the area of primary responsibility (unless a project is primarily a bridge project) when a project is ready for PS&E review. This typically occurs ninety days before project letting. This section evaluates the interaction that occurs during this phase of the process. Based on the assessment of this phase or discrete point in a project's lifecycle, Deloitte FAS has identified the following observations:

- The letting schedule dictates the project development process timeline. Due to the importance of the letting schedule, TxDOT develops and issues the entire letting schedule at the beginning of the fiscal year so the Department is aware of critical dates throughout the year.
- The detailed letting schedule requires Districts to submit PS&E packages to the Design Division ninety days prior to the letting date. This advanced time period is not always met, which can cause disruption to the Division's PS&E review period.
- The District submits the PS&E package, along with multiple copies of project documentation to the Design Division for review and approval of the project design. The Design Division distributes the design to the other applicable Divisions for review. The time required to conduct the PS&E review varies based on project size and complexity.
- The various Divisions only have a few weeks within this ninety-day period to review the project information before it is given to the letting section to prepare the bid package. Subsequently, the bid package is advertised to the public for a period of three weeks.
- The level of PS&E review appears to vary by the individual performing the review. This individual is also responsible for coordinating their comments and the comments of the other Divisions for the District to address. There is no major technology or system that is used to aid the process and track any changes and comments made to the document. The majority of the communication between the Division and the District during this phase is conducted via email and the telephone.
- There are instances during the PS&E review when issues are identified that are not able to be addressed prior to the scheduled bid advertisement date. TxDOT typically proceeds with the letting process and addresses any required changes through an addendum to the bid package.
- It is not uncommon for Districts to be late in submitting a project design for PS&E review. However, the Design Division appears to work with the District to review late submittals on a regular basis. This has an impact on the Division's ability to plan and effectively complete its review.
- Some of the projects evaluated contained advanced notifications and communications from the Districts to the Division for the upcoming PS&E submittals. The advanced notice allowed the Division to gain an understanding of the anticipated workload and the scope and magnitude of those projects.
- The PS&E review manual contains a plan review checklist and a pre-letting checklist that

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process b. Projects Recently Let to Construction

identifies the items that need to be addressed by both the District and the Division prior to letting a project. The use of these checklists is not mandated. As such, not all individuals use them to assist with the PS&E reviews.

Similar to the first phase of the project development assessment up through the environmental clearance of projects, Deloitte FAS evaluated the specific project information submitted from the District to the Design Division. The following graphic depicts the level of communication between the parties and also the key milestones of this portion of the process:

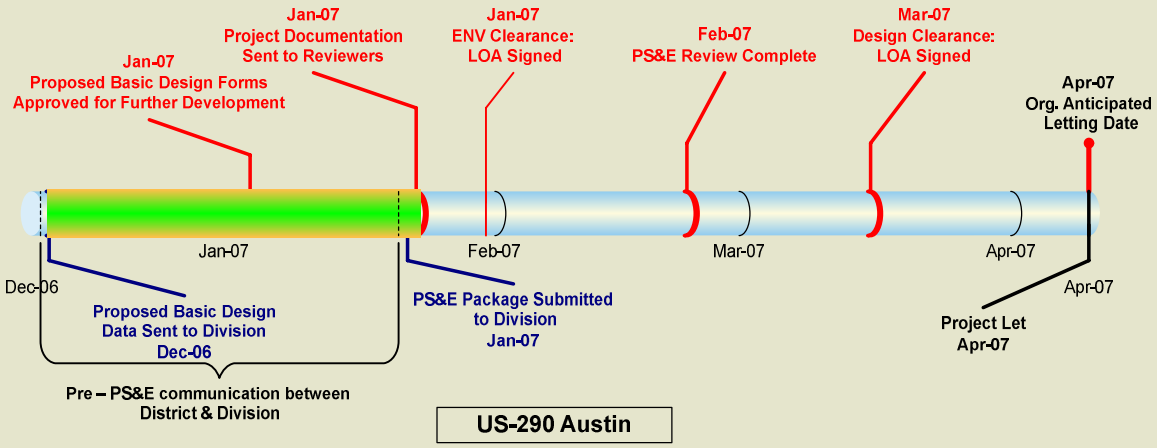


Figure 2 - US 290 PS&E Review Timeline

The timeline above details the information evaluated by Deloitte FAS to understand the current steps, hand-offs and communication points within the process. The particular project identified in the graphic highlights the proactive approach taken by the District to submit basic design information to the Division prior to the required PS&E submittal date, which in turn allowed the Division to issue its Letter of Authority in advance of the required date.

Impact:

The Phase 1 assessment also identified the importance of the construction letting schedule to TxDOT. The anticipated letting date for a project is developed by the District in coordination with the TP&P, Finance, and Construction Divisions based on the work load and funding levels for the District. The overall process can vary, but for the most part, the let date is used to drive the development of the project. The preliminary schematics and geometric schematics are developed along with the preparation of the environmental document to meet the proposed letting date.

Based on the information assessed, Deloitte FAS has identified the following issue that is a potential impact to the project development process for projects recently let:

- Given the importance of the letting schedule, the Design Division rarely recommends that a project be removed from letting, regardless of when the project is received from the Districts for PS&E review. This impacts the planning and scheduling of the Design Division staff to adequately review the full slate of projects for that particular letting period.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process b. Projects Recently Let to Construction

Operational Strengths/Leading Practices:

During the evaluation of the project development process, Deloitte FAS has identified the following:

- Overall, TxDOT has developed strong policies and procedures around the entire development process. The PS&E Preparation Manual, revised April 2005, is a good example of the level of documentation that has been prepared to clearly outline the PS&E review process. TxDOT's commitment to documenting its processes through various manuals and publications, which establish clear expectations for all of the parties involved, is an operational strength within the Department.
- The use of internal TxDOT certifications for specific components of the project development process is a useful way to track and verify the status of the project at the PS&E review stage. An example of the importance of this certification process is for projects that are sent to Division for PS&E review without fully acquired right of way. In this instance, the PS&E package is required to contain an *Unclear Right Of Way Certification* signed by the District Engineer. This helps clarify outstanding items for a project and works to eliminate any potential items that could be overlooked based on the volume of projects developed and is an operational strength that has been identified.
- Other DOTs are currently using a similar approach to document the status of key issues, such as right of way, in their project development process.

Conclusion/Recommendation for Improvements:

Based on the assessment of this potential risk area for projects recently let, Deloitte FAS did not identify any issues of significant concern that appear to impact the seamless transfer of information between Districts and Divisions or between other Divisions for this portion of the project development process. As identified above, there were certain areas that were identified that potentially impact the process and should be addressed. The following recommendations are suggested for consideration to reduce the impacts of those issues:

- The use of checklists by the reviewer during the Design Division's PS&E review appears to help the individual performing the PS&E review. The Department would benefit from the Design Division mandating the use of a single checklist similar to the one contained within the PS&E Review Manual for all of the PS&E reviews. By formalizing the checklist, the Design Division will remove any of the District's uncertainty concerning the items that are being evaluated by the Design Division and allow the Districts to prepare complete PS&E packages that are in compliance with the required items.
- Currently, the PS&E review process is monitored and tracked on an informal basis using various spreadsheets. Similar to the issues identified within other TxDOT Divisions, there is no overall case management tool that provides support to the PS&E reviewers to track and manage their work load and also provide the required support mechanism to monitor outstanding addendums on previously let projects. A single case management system would provide a dashboard view of the groups current work load and allow the Field Coordination Directors to assess the status and performance of the individual Project Development staff within the Field Coordination Sections.
- The advance notice and information provided by the Districts to the Design Division for some projects appears to be beneficial to the timely completion of the PS&E review. Due to the

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** ii. Project Development Process b. Projects Recently Let to Construction

nature and magnitude of the projects developed by TxDOT, it is not always possible to provide this type of advance notice. However, TxDOT should better track the completeness and timeliness of PS&E submittals and share that information with the Districts to improve the quality and timeliness of the submittals. The information could provide TxDOT with the ability to assess which specific Districts are consistent sources of delayed PS&E submittals.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iii. Inspection Services

Background:

Having adequate inspection processes and a sufficient inspection services program are integral parts of providing and constructing quality transportation facilities. TxDOT traditionally uses its own staff to perform most construction and maintenance inspection services. TxDOT believes that this is the best way to verify that work is completed according to its specifications. Some of the inspection tasks that are outsourced include structural inspections for the Construction Division's Material and Pavements Section, materials testing in support of District construction projects, and bridge structure evaluation and inspection services for the Bridge Division. Given the importance of an adequate inspection process and corresponding inspection services to the project delivery process as well as the current increased volume of projects, Deloitte FAS identified inspection as an area of potential risk associated with potentially not having adequate levels of field staff to oversee the construction and implementation of TxDOT construction projects. Deloitte FAS believed it was prudent to evaluate the effectiveness of TxDOT's inspection processes, including internal and external services, to see if any opportunities for improvement could be identified that would allow for the more effective and efficient use of TxDOT resources, while at the same time maintaining TxDOT's quality standards.

Observation/Findings:

The goal of this assessment was to analyze the inspection functions of various Divisions and Districts related to insuring the quality and completeness of projects. The evaluation focused on the Construction and Bridge Divisions. Deloitte FAS analyzed the presently outsourced activities and those completed by internal resources. Deloitte FAS also assessed the policies and procedures that govern the various inspection processes. In addition, Deloitte FAS compared TxDOT's current inspection practices to other transportation agencies and leading industry practices. The objective of the assessment was to determine where, if any, opportunities exist to improve the process that would aid in more timely and cost effective completion of projects, as well as a better utilization of critical TxDOT resources. Based on Deloitte FAS' evaluation of this area, the following items were observed:

- The level of experience throughout the TxDOT inspection staff varies greatly across the different Districts within the State. The varying levels of experience appear to result from issues such as the retirement of experienced inspectors and the reduced number of inspection employees. This has impacted the informal mentoring process of junior level staff that normally occurred in the past within the TxDOT organization.
- The Construction Division does not monitor the experience level of the construction field staff within the Districts. This does not allow TxDOT to monitor the experience level of the construction field staff or provide appropriate support and training where there are known deficient areas of experience.
- The Construction Division is implementing an Inspection Development Program ("IDP"), in order to strengthen the internal inspection process. The program includes a formalized mentor plan and a new TxDOT manual which provides formal training modules to track the performance and progress of inspector training.
- No guidance exists that govern project staffing levels for inspection purposes. The level of inspection/supervision staffing for construction projects is determined by the District/Area office. No input is provided by the Construction Division.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iii. Inspection Services

- The Districts often need to adjust inspection staff levels to address the fluctuation of construction projects in each District. The Districts interviewed have been able to reallocate FTEs to tackle this issue. This reallocation of staff could create a risk with having untrained or under trained personnel in inspection positions.
- Some of the Districts have used TxDOT lab technicians to supplement their existing inspection staff on select projects or for certain tasks. It appears that supplementing TxDOT inspection personnel with outsourced contractors would be more effective for certain items than with others. For example certain testing operations required for construction projects require specific training and certification; therefore TxDOT can outsource certain activities to certified technicians to help supplement their existing work force.
- The majority of the personnel interviewed within TxDOT believe that the CEI process needs to be performed by internal TxDOT personnel.
- The Bridge Division is currently managing twenty-seven Evergreen contracts. These firms are performing the federally mandated bridge inspection for each bridge structure within the State every two years. It appears the Bridge Division is successfully outsourcing this type of inspection work.
- The Bridge Division maintains a core group of inspectors that perform statewide inspection services on an as-needed basis. The construction and rehabilitation of bridge structures are inspected by the District field staff.
- Industry research has identified that other DOTs are currently successfully outsourcing construction inspection services. For example, the Florida DOT is currently outsourcing a large percentage of their CEI services, which they believe allows them to adjust for fluctuating project work loads. IDOT also outsources construction inspection services, but it has personnel in place to oversee these services to make sure quality standards are met. In addition, the Harbor Department of the Port of Los Angeles outsources inspection services on an as-needed basis when the work load increases and personnel are not available.
- The use of technology such as *SiteManager* appears to have increased the efficiency of the construction field staff to track pay item quantities for construction projects on a real time basis, reducing the double entry of data in most cases. TxDOT's implementation of *SiteManager* has helped increase the efficiency of the construction field staff to manage construction projects and track contract pay items. TxDOT is currently using laptop and wireless-based equipment to allow the field staff to enter project information in real time and get away from recording project information in the field and subsequently reentering that same information into the system.

Impact:

The inspection field staff constitutes a critical resource in the development and implementation of TxDOT construction projects. The following items have been identified as potential impacts to TxDOT if the issues related to inspection are not monitored and addressed as appropriate in a timely manner:

- Inexperienced field personnel and/or under staffed construction projects may expose TxDOT to various levels of risk. The risk items vary from the inaccurate tracking of pay items on projects to potential missed or improperly executed construction activities. TxDOT has shifted the focus

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iii. Inspection Services

of construction quality assurance/quality control ("QA/QC") to the contractor for certain items such as the Hot Mix[14] placement on TxDOT projects. However, certain items require an independent party to track the construction work in place performed by the contractor and confirm that they are in accordance with the project specifications. This process requires an independent inspection service to ensure TxDOT is receiving the full value of the transportation asset. Without an adequately trained inspection staff TxDOT is at risk.

- Without centralized information and/or a database of inspector qualifications and experience levels, TxDOT runs the risk of not being fully aware of when the critical internal knowledge base that currently exists across the Department is in jeopardy of being lost as employees leave and/or retire. Without being able to assess the knowledge base of current staff, TxDOT will not be able to identify inspection areas that are in need of training and/or mentoring, putting successful project monitoring and inspection at a potential risk on some projects.

Operational Strengths/Leading Practices:

Various DOTs are currently using consultants to perform CEI services, which allow the DOTs to supplement and bolster internal staff as needed. This appears to be a management philosophy that requires the DOT to continually re-assess their staffing needs which is an operational strength as DOTs continue to be resource constrained due to FTE caps imposed by legislation.

Conclusion/Recommendation for Improvements:

As originally observed, the TxDOT inspection/project management process is a risk concern that needs prompt attention to make sure adequate resources are applied to fully assessing the current situation. Based on the project delivery assessment conducted, the following recommendations are suggested to reduce the impacts of the risk areas identified above:

- TxDOT needs to assess the current experience level of the construction project management and inspection personnel for the entire agency. Based on the results of the assessment, TxDOT needs to verify that there are adequate experienced personnel available to support the proposed IDP. The success of the IDP will be based on how effective the program is managed and if there is adequate experienced inspection staff to support the development and training of the inexperienced staff.
- The IDP is a step in the right direction for TxDOT to assess and address the varying levels of experience within the internal TxDOT inspection staff. The Department should consider developing a formal program that tracks the internal qualifications and status of completed training modules for each inspector. TxDOT will then be better positioned to assess the level of expertise of field staff statewide to ensure that junior level staff are adequately trained, developed and are receiving the knowledge transfer from the more seasoned and experienced staff.
- With the potential risks identified above related to the reallocation of internal personnel, TxDOT should consider using additional consultants to perform construction inspection activities typically performed by TxDOT employees to help address fluctuations in project demand and experience levels. TxDOT has their Standard Specifications and CCAM in place that can be used to guide consultants. The outsourcing of CEI services may not always be the most cost effective approach for inspection services, but Deloitte FAS believes that this is a justified

[14] TxDOT Standard Specification for Construction and Maintenance of Highways, Streets and Bridges, June 1, 2004. Item 585 – Ride Quality for Pavement.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iii. Inspection Services

expenditure compared to the risk exposure associated with not having an adequate number of trained internal personnel to perform necessary inspection services. Deloitte FAS is not suggesting the outsourcing of TxDOT's entire construction inspection program, but merely recommending that TxDOT consider the use of CEI firms on an as needed basis to supplement their existing inspection staff, which would provide flexibility in allocating resources. These services could be monitored by TxDOT to verify compliance with these standards.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iv. Incentive and Disincentive Contracting Practices

Background:

Incentive/disincentive contracts are used to encourage early completion of traditional TxDOT projects. However, it is difficult to value the resulting public benefits of inclusion of these clauses in order to justify the incentive costs. Incentive/disincentive contracts can cause contractors who have multiple contracts with TxDOT to place primary focus on the contracts with incentive clauses at the expense of the other projects. Each District is responsible for determining whether to incorporate an incentive/disincentive clause into a contract and to determine the appropriate incentive amount. While this contracting method may encourage the timely completion of projects, there is a potential risk to TxDOT regarding the efficient use of its resources if incentive/disincentive clauses are not properly structured and monitored. Due to this potential risk, Deloitte FAS identified this as an area for further evaluation.

Observation/Findings:

In Phase 3, Deloitte FAS held discussions with individuals in the Design Division, Construction Division, and with the Assistant Executive Director for Engineering Operations to better understand TxDOT's use of incentive/disincentive clauses and the results of including these clauses in TxDOT contracts. Deloitte FAS also reviewed TxDOT policies and procedures, as well as documentation related to the use of these clauses by other DOTs. As a result of Deloitte FAS' work efforts, the following observations were noted:

- The PS&E Preparation Manual includes language on alternative contracting procedures which includes incentive/disincentive language. This clause was added to the PS&E Preparation Manual in 2003 and was not changed during the most recent manual update. Per the PS&E Preparation Manual, time requirements for each project are a critical construction component. Page 4 of Form 1002[15], which must be completed for all projects, identifies the standard acceleration provisions. This page identifies whether an accelerated construction contract provision should be applied based on the project characteristics. If the project is classified as needing an acceleration provision, as identified on Form 1002 and in the PS&E Preparation Manual, but the District does not feel an accelerated provision is necessary, proper documentation and reasoning must be provided to the Design Division.
- Design Division personnel are in the process of reviewing and editing the policy on alternative contracting procedures in the PS&E Preparation Manual. TxDOT personnel feel the current language is too rigid and should allow for more flexibility in assigning acceleration provisions. Removal of the option to select "Calendar Days Definition for Working Day"[16] as the accelerated construction contract provision is also being discussed since many Districts are selecting this as the only provision used when accelerated construction contract provisions are required.
- The determination of the incentive clause amount is the responsibility of the District. There does not appear to be a required process to determine this value. The value can equal the LD amount or be based on the RUC calculation. If the District chooses not to use the LD value, the District can determine the incentive amount using various methods that include Texas

[15] Form 1002 is completed by the Districts and included in the PS&E package submitted to the Design Division in preparation of their review of the project information.

[16] Calendar Day Definition for Working Day refers to the TxDOT required method of counting days for a construction project when any type of acceleration method is used. The calendar day definition allows TxDOT to determine the number of calendar days per week the contractor is required to work (i.e. a 5-day work week). This eliminates issues that arise with the use of working days (i.e.. effects of weather on the construction schedule).

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iv. Incentive and Disincentive Contracting Practices

Transportation Institute ("TTI") and other programs, time differential multiplied by RUC calculations, or utilizing university departments to conduct an analysis to determine the cost per day. The District is required to include supporting calculations for the incentive value in the project file.

- The PS&E Preparation Manual defines project types and conditions that require the use of incentive/disincentive clauses, which are utilized to reduce the impact from road construction to the traveling public. Districts have the option to exclude these clauses from contracts when the project does not significantly impact the public. Strictly following the guidance in the manual could cut into a District's overall construction budget without offering much benefit to the traveling public.
- The Districts can assign incentive/disincentive clauses to any contract without verifying the inclusion of these clauses with the Design Division. However, the District is required to provide support for the daily incentive value calculation. Alternatively, if the District chooses not to include the clause on a project identified as needing the acceleration provisions per the PS&E Preparation Manual, Design Division approval is required.
- There does not seem to be a system in place for the Design Division to evaluate the success of incentive/disincentive policies. They are unable to easily quantify the impact that the incentive/disincentive policies may have on projects, which could assist with the refinement of policy language.
- Standard bid codes are set up to capture incentive/disincentive costs; however, not all incentive/disincentive situations fit into one of the pre-defined codes, thus project specific codes may be created. The addition of non-standard codes makes it difficult to capture the entire population of bid codes related to incentive/disincentive clauses. In fact, there does not appear to be an easy way to query the use of incentive/disincentive clauses assigned to projects. Currently, Department professionals must run numerous queries using bid codes and/or key words in an attempt to capture all of the incentive/disincentive items. This appears to be a time-consuming process, which may not produce the entire population.
- The Design Division currently tracks the projects let each month that contain accelerated construction contract provisions. This report identifies the project, associated District, accelerated construction contract provision utilized and the total construction cost. However, this report does not appear to allow TxDOT to evaluate the status of active projects utilizing these provisions since it only includes newly let projects.
- Based on past queries, contractors successfully accelerate the projects to earn the bonuses being offered. It is not atypical for maximum bonuses to be paid out to contractors.
    - For example, Deloitte FAS analyzed a project out of the San Antonio District that incorporated an incentive/disincentive clause. The clause was selected to encourage the contractor to complete construction earlier through the incentive. The District hired TTI to perform the study to determine the incentive value based on RUC. Incentive or disincentive values were determined for each of the project milestones and totaled at the end of the project to calculate the total incentive or disincentive value for the project. The District tracked the progress of the contractor through approved monthly schedule updates to determine the status of each milestone. The contractor earned an incentive payment on this project.
- It appears that District staff may not necessarily understand the difference between LDs and disincentives. This could result in disincentives related to milestones not being assessed as necessary.
- Some Districts choose not to use incentive/disincentive clauses on applicable projects due to

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iv. Incentive and Disincentive Contracting Practices

utility or right of way concerns. The Districts feel that if these issues cannot be cleared easily or are anticipated to take longer than normal, the District could end up paying an incentive even though the contractor did not technically accelerate the project due to delays caused by the Department.

- FHWA guidance around incentive/disincentive provisions states that these provisions should be reserved only for critical projects or phases where traffic inconveniences or delays should be minimized, documentation of the incentive/disincentive amount should be contained in the project records, and contractors should have an approved CPM schedule prior to commencing project work. Based on some other findings related to schedule controls, this CPM schedule requirement reinforces the need for TxDOT to strengthen its skills in CPM scheduling.
- Other DOTs use incentive/disincentive provisions to achieve project benefits other than schedule acceleration. For example, the Arizona DOT determined it would be beneficial to keep traffic moving on State Route 68 during construction. An incentive/disincentive provision was included in the contract to encourage the design-build contractor to maintain a target travel time through the work zone. An average travel time limit was identified and for each minute of delay above this limit on average over any 30-minute interval, the contractor would be charged a fee that would be subtracted from the incentive/disincentive bonus fund established for the project. At the end of the project, the contractor would either receive the amount remaining in the fund or pay the exceeded amount to the Arizona DOT. The contractor ended up receiving 96% of the bonus fund. The Arizona DOT has also successfully used other incentive/disincentive programs including lane rental, which TxDOT has utilized, and quality workmanship incentives in the past.
- According to an FHWA workshop on innovative contracting, A+B bidding, which TxDOT has utilized, is an effective way to reduce construction time and therefore reduce congestion and delays. This contracting methodology is also referred to as cost plus bidding. The "A" portion is the sum bid for contract work items and the "B" portion is the time in calendar days proposed by the bidder to complete the project or a portion of the project, multiplied by a daily RUC determined by the Department for this workshop. A total of 120 contracts were reviewed that completed the "B" portion work. Of these contracts, 103 contractors earned incentives which were approximately 2.5% of the original contract value for the 103 contracts, nine contractors completed on time and received no incentive and were assessed no disincentive value and eight contractors were assessed damages. The total estimated construction days saved was 20,000.

Impact:

The Department incorporates incentive/disincentive provisions and accelerated construction contract provisions in contracts to reduce impact to the traveling public and accelerate project schedules. In most instances, the contractor appears to meet at least a portion of the incentive resulting in the project's acceleration. While the achievement of at least a portion of the incentive results in the Department achieving their goal of reducing impact to the public, inadequate tracking systems could result in the Department giving undeserved bonuses to contractors due to the setting of easily achievable incentives. The Department is unable to test the adequacy of its policies regarding incentive/disincentive and accelerated construction contracting provisions because the status of the provisions are not communicated to the Division that sets the policies and procedures.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** iv. Incentive and Disincentive Contracting Practices

Operational Strengths/Leading Practices:

Other DOTs are applying innovative incentives/disincentives to contracts to achieve project goals other than the typical accelerated completion goal. Including incentive/disincentive clauses in the contract encourages the contractor to achieve the project goals, which is evident by the fact that many contractors are actually receiving at least a portion of the total incentive. TxDOT should continue to consider additional ways to utilize incentives/disincentives similar to other DOTs.

TxDOT performs an operational strength by encouraging the Districts to determine an accurate and supportable RUC. The Department recommends the use of experts such as TTI to calculate this value.

Conclusion/Recommendation for Improvements:

Based on Deloitte FAS' assessment of the effectiveness of incentive/disincentive contracting practices, the Department is achieving its goal of reducing the impact to the traveling public by successfully using practices such as incorporating incentive/disincentive and accelerated construction contract provisions into its projects. While the Department appears to be using these provisions effectively, there are certain improvements that TxDOT can make to the program to continue to increase the success. Recommended improvements include the following:

- TxDOT should consider using other incentive/disincentive provisions in addition to schedule acceleration. The Department can look to other DOTs, such as the Arizona DOT, to expand the types of incentives that can be utilized to reach project goals.
- TxDOT should create a reporting system that allows the Department to easily capture the status of the incentive/disincentive contract provisions so that the Department can monitor the progress and make changes to the program as necessary to promote the successful use of these provisions.
- TxDOT should consider developing proper communication protocols between the different Divisions and Districts in regards to incentive/disincentive practices and progress. Even though Department literature exists for incentive/disincentives, it may be beneficial to launch a refresh communication campaign to answer questions on incentives/disincentives and encourage the incorporation of these clauses on applicable projects.
- To verify the integrity of the intention of incentives/disincentives, the Department should incorporate an assessment of the milestone and complete project schedule durations to ensure the baseline schedule is aggressive enough to promote the schedule acceleration intended with the incentive/disincentive clause.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	a. Process and Organizational Structure

Background:

The current organizational structure of the ENV Division was identified as an item requiring further assessment due to the potential risk associated with Division and staff roles and responsibilities within the project delivery process. The ENV Division receives, tracks, reviews, processes, and approves the environmental documents for practically every TxDOT construction project.

The staff within the ENV Division is in a unique position since this group is required to assist TxDOT in meeting the letting schedule, but they are also responsible for making the decision as to whether to allow a project to be let even if outstanding environmental issues still exist. Although current legislation does not provide for TxDOT ENV Division staff to assume environmental responsibilities identified under NEPA and other environmental laws for highway projects, Deloitte FAS has assessed the potential effects on the Department because of the continued interest for delegated authority. This will likely require additional staff to handle the delegated responsibilities. As a result, due to the concern of whether the ENV Division organizational structure to let a contract with environmental issues still pending, the Division is evaluating whether it is organized appropriately to takeover United States DOT ("USDOT") responsibilities. Similar to other Divisions within TxDOT, the ENV Division has a significant role in the development and delivery of TxDOT projects. Therefore, Deloitte FAS identified the environmental process as an area that required additional evaluation. In particular, Deloitte FAS assessed the responsibility and workload of the ENV Division staff and their role in the project development process.

The District's environmental staff, with the support of consultants, performs and documents environmental studies for TxDOT transportation projects and subsequently develops the environmental documentation for the project. These environmental/NEPA documents are categorized as: CEs for projects that involve no significant environmental impacts; EAs for projects in which the significance of impacts on the environment is not clearly exhibited; and environmental impact statements ("EIS") for projects where significant impacts are evident or identified after an EA analysis. Resource agencies or those agencies having statutory oversight over environmental impacts such as the FHWA, Texas Parks and Wildlife, Texas Historical Commission, etc., review project plans to ensure compliance with applicable laws and regulation. Regulatory agencies also evaluate, comment and/or approve technical reports. The ENV Division staff reviews all documentation prior to submittal to the appropriate resource agency and ultimately approves all documentation prior to letting. In FY06 the ENV Division reviewed 892 projects. The complexity and amount of time needed to complete this process can vary widely for each project.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	a. Process and Organizational Structure

Observation/Findings:

The evaluation of the ENV Division focused on assessing the current workload and responsibilities of the ENV staff. Deloitte FAS conducted interviews with various individuals in both the ENV Division and Districts to gain an understanding of the current environmental document development and review process. Based on the interviews conducted and an evaluation of ENV policies, procedures and technology used in the environmental review process, the following items were observed:

- The ENV staff interviewed appears to be dedicated and passionate about their role and work in the development and delivery of projects.
- The ENV Division has the responsibility to evaluate and ultimately approve all TxDOT projects developed statewide.
- With the growth in the annual capital construction budget, the number of projects processed by the ENV Division has increased without a corresponding increase in the number of FTEs. Similar to other operations within TxDOT, the number of FTEs allocated to the ENV Division has been reduced.
- Like most Divisions and Districts, the ENV Division is supplementing its staff with consultants in order to meet the increased workload demand. Consultants used within the ENV Division, especially within the Project Management & District Liaison group, to review environmental documents may not be the best use of consultants due to their role in the final review of the environmental document on behalf of TxDOT. However, this is also how some state and local agencies in the western United States proceed through the environmental review process.
- Currently the ENV Division does not have a formal QA/QC plan in place to communicate the required and expected level of information to be contained within the environmental documentation and analysis. The ENV Division is in the process of developing a draft QA/QC plan to help the Districts and consultants understand the required standard of submissions that the Division has with the FHWA and other regulatory and resource agencies.
- The ETS appears to be a helpful tool that is used by the ENV staff to maintain and track project information. The system could be modified and/or supplemented to provide a more pro-active management approach to the management and monitoring of the environmental project documentation that is generated during the review process.
- Like other Divisions, the ENV Division is called upon to support the CDA program. The current ENV Division organizational structure does not provide for a well defined and consistent approach to address the current CDA program entered into by TxDOT because there is not one person or group of individuals that oversee the process.
- TxDOT develops an annual letting schedule that is commonly changed during the course of the year. In many cases the changes are uncoordinated or not well communicated. As a result, it appears these changes to the TxDOT letting schedule trigger disruptions to the planned approach of the ENV staff to review and environmentally approve projects. Also, these changes impact the review and approval of technical reports for regulatory compliance and integration into NEPA documents.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	a. Process and Organizational Structure

Impact:

Based on the information obtained during this assessment, some of the findings identified above could have significant impact to TxDOT if they are not addressed and resolved in the future. The potential impacts are highlighted below:

- Without addressing the current workload and staffing issues, the ENV Division is at risk of losing the current knowledge base of experienced TxDOT staff due to burn out from the tremendous work load and tight evaluation schedules for certain projects.
- The ENV Division is already operating at a higher FTE count then allocated to them. At the time of this assessment, the ENV Division was operating with approximately seventy-four FTEs, which is greater than the sixty-five allocated FTE positions. In addition, the workload has required management to place external consultants in the Division to assist in the review and processing of environmental documents submitted by the Districts. This creates a potential risk area since the review prior to approval is not performed by a TxDOT employee. This could potentially require additional TxDOT oversight considering that in most cases the environmental documentation is prepared by a consultant for the District.
- The current number of projects being managed by an individual project manager varies based on experience level, but each project manager could be responsible for up to one hundred projects at any given time. ETS does not allow the project manager the ability to properly manage their case load of projects. Project priority and issue rankings appear to be addressed on an emergency basis which disrupts the project manager's work load and could allow for projects to be missed or not receive the necessary amount of project manager's attention. This in turn leads to projects not receiving the required attention until the project becomes an emergency or priority situation.

Operational Strengths/Leading Practices:

The environmental document review process is not a standard procedure that can be easily estimated or accurately planned out. State transportation agencies and the FHWA have tried to develop estimating tools to help plan for the environmental process. For example, the FHWA - Office of Project Development and Environmental Review has developed a tool called the Negotiated Timeframes Wizard, v1.1, which helps establish an estimated timeline for EA and EIS category projects.

Similarly, TxDOT has developed a tool within ETS that provides estimating capabilities for all classifications of environmental documents. This tool allows the Districts to enter the proposed future letting date of a project and through historical data tracked in ETS to establish an estimated timeline for the various reviews and submittals to meet the proposed letting date. The estimating tool is based on historical project data collected from typical highway projects in Texas that do not have significant impacts. This tool, if properly used, can provide for a fairly well estimated timeline for project developers to use to plan for the environmental document approval process. Going forward, TxDOT has identified that the current ETS timeline tool can be improved and is in the process of updating ETS with expanded selection choices for additional project circumstances and issues. Overall, this type of approach of developing tools and the re-evaluation of existing tools is an industry leading practice.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	a. Process and Organizational Structure

Conclusion/Recommendation for Improvements:

Based on the potential risk identified in the Phase 1 Risk Assessment and the evaluation conducted during Phase 3, the ENV Division does have areas of risk within the current organizational structure that could benefit from the following recommendations:

- It is critical that TxDOT consider increasing the number of FTEs allocated to the ENV Division. Each project manager position should be staffed with a TxDOT employee and that employee should have a more manageable workload.
- The ENV Division could benefit from a more pro-active approach to managing and processing project information. For example, a centralized management process would allow an ENV project manager to efficiently address all relevant issues with an agency at one time. ETS appears to be a helpful tool that allows the ENV Division staff to manage the environmental documentation process but does not allow for an efficient management approach to the current case load of ENV Division projects. With the development or implementation of a more pro-active management tool for the entire group, the project managers will have the ability to more effectively manage projects through the environmental process.
- TxDOT should consider development of specific business requirements for a case management system or consider modification to the existing ETS system to provide for a more pro-active management approach to the environmental documentation review and approval process. For example, TxDOT could consider evaluating available commercial-off-the-shelf solutions for the above requirements, and conduct a source selection to identify a vendor/solution that will meet the needs of the ENV Division.
- The ENV Division should continue to develop the QA/QC plan and distribute the plan to the Districts, FHWA, and the other regulatory agencies for peer review and comments. After evaluating the comments, and incorporating any changes, TxDOT should consider immediate implementation of the QA/QC plan.

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	b. Delegation Authority

Background:

The Phase 1 Risk Assessment identified the proposed delegation of United States DOT approval authority to TxDOT as an area requiring further assessment due to the potential risk associated with the proposed action. The Phase 2 Audit Work Plan submitted to the AOC described a method in which Deloitte FAS planned to evaluate the potential impacts of Delegation on the ENV Division.

The delegation responsibility is described in Section 6005 of the SAFETEA-LU which established a pilot program to allow the Secretary of Transportation to assign, and the State to assume, the Secretary's responsibilities under the NEPA for one or more highway projects. The Secretary may permit not more than five states (including the states of Alaska, California, Ohio, Oklahoma, and Texas) to participate in the pilot program. Upon assigning NEPA responsibilities, the Secretary may further assign to the State all or part of the Secretary's responsibilities for environmental review, consultation or other action required under any Federal environmental law pertaining to the review of a specific project. Whenever a State assumes the Secretary's responsibilities under this program, the State becomes solely responsible and solely liable for carrying out, in lieu of the Secretary, the responsibilities it has assumed, including coordination and resolution of issues with Federal environmental resource and regulatory agencies and responding to litigation. TxDOT was one of the organizations selected for the pilot program. Although current legislation does not allow TxDOT ENV Division to assume delegated environmental responsibilities identified under NEPA and other environmental laws for highway projects, Deloitte FAS has assessed the potential affects on the Department because of the continued interest for delegated authority.

Observation/Findings:

In order to implement the proposed USDOT delegation, the State would need to pass new legislation allowing TxDOT to exercise the delegated authority. At the time of Deloitte FAS' assessment, legislation was still being considered to allow TxDOT to assume the USDOT delegation authority. The following observations are based on the interviews conducted and documentation assessed:

- Presently, the ENV Division is not properly organized or staffed to handle delegation. Proper separation of responsibilities and additional staff would need to be instituted to effectively handle this new role due to the additional work load.
- Although current legislation does not allow TxDOT to assume delegation authority, any future efforts or considerations of delegation authority should consider the required preparation and modifications required within the ENV Division. Any type of delegation authority would require the ENV Division to invest a significant effort to fully develop the policies and procedures needed to handle the approval authority.
- The perspective of personnel within TxDOT is that USDOT/FHWA holds the ultimate responsibility for the accuracy and approval of the environmental documentation. This mindset would need to change if TxDOT assumes the delegation authority.

Impact:

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	b. Delegation Authority

Delegation authority appears to have the potential for both positive and negative impacts depending on the ultimate structure. TxDOT is ultimately introducing additional areas of potential risk and also potential development opportunities. Based on the interviews conducted and documentation reviewed, the ultimate decision on delegation should be based on a risk-reward analysis. The following items have been described as potential outcomes to the proposed delegation:

- Time savings in the transfer of documentation between TxDOT and FHWA,
- Time savings in the FHWA's review of environmental documents,
- Increases in the level of accountability within TxDOT for the quality of the environmental documents,
- Increases in the number of FTEs to manage and perform the added review and approval function,
- Restructuring of the current ENV Division organizational structure,
- Exposure to litigation currently not seen due to sovereign immunity issues,
- The public perception of the Federal Government no longer approving environmental documents for TxDOT projects; and
- Required development of additional policy and procedures to govern the approval process.

Operational Strengths/Leading Practices:

The delegation pilot program introduced in SAFETEA-LU has only been in place for a short period of time and is currently only open to five different States described in the program. Therefore there is limited direct comparison to other transportation agencies around the country. However, TxDOT currently has a PA in place with the FHWA, Texas Division for Class II: Categorical Exclusions ("CE") – defined as any linear transportation project or associated facility that does not individually or cumulative have a significant environmental impact. The current PA has been in place since October 2004 and allows TxDOT the expeditious processing of CE level actions under the guidance and approval of the FHWA, Texas Division in accordance with the criteria established under the agreement for Blanket and PCEs.

Based on the feedback from the ENV staff, the current PA has helped expedite the environmental approval process for the CE projects which comprise approximately 90% of the projects currently processed by TxDOT. This PA is an operational strength of the ENV Division and has helped expedite the environmental approval process.

Conclusion/Recommendation for Improvements:

From a project delivery perspective, it does not appear that the implementation or acceptance of USDOT delegation authority would provide enough operational benefits or added efficiencies to warrant added levels of internal process development and ultimately would expose TxDOT to potential litigation. The use of the PA is currently addressing the majority of the projects that TxDOT is developing and appears to allow TxDOT to expedite the process without accepting the

Audit Area: B. Effectiveness of Project Delivery Systems	**Issue:** v. Environmental Affairs
	b. Delegation Authority

potential exposure to litigation.

If and when the State legislation is passed, the ENV Division would need to implement the following changes in order to effectively handle the delegation responsibility:

- Reorganize and/or restructure the organizational configuration to allow for and provide an independent evaluation and approval group separate from the document review and process that is currently being performed by the Project Management & District Liaison Group.
- Develop adequate policies and procedures to handle the newly appointed approval authority and the associated responsibilities.
- Delegation authority could force TxDOT to change their entire outlook and beliefs of the environmental process. TxDOT would need to take an increased sense of ownership for each of the environmental documents produced for TxDOT projects.

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

Background:

With the increased volume of contract lettings and the staffing restriction imposed by the legislature, TxDOT has been required to increase its use of external consultants in virtually all Districts and Divisions to help deliver projects. While the Divisions use similar contracting structures for different types of consulting services (i.e., "Evergreen" contracts), several methods exist for procuring and managing consultant contracts. The Design Division provides guidance through the CCO to all Districts and nine Divisions regarding the method of procuring and managing Engineering, Architectural & Surveying ("EA&S") consultant contracts, as well as the contracting structure for consultants. However, there does not appear to be uniformity in the consultant contracting area. The effective and efficient management of consultant services is important to TxDOT's operations and the prudent use of its financial resources. Given the importance of consultant services to the continued success of TxDOT's mission, this area was identified as an area requiring further evaluation.

As such, the overall objectives of this analysis were to assess the efficiency of the consultant selection process, identify potential leading practices, compare the TxDOT process to other leading industry practices and provide recommendations for improving the process. In evaluating leading practices, Deloitte FAS assessed how other State DOTs procure consultants and oversee consultant work to determine if there are potential benefits to be gained by TxDOT or to identify potential leading practices currently being used by TxDOT. In addition, Deloitte FAS assessed the effectiveness of TxDOT's oversight process and how the quality of services provided by consultants was monitored in order to provide recommendations that could improve operations and reduce risk.

Observation/Findings:

Discussions were held with numerous individuals involved in the management and oversight of consultant services including the Director and Associate Director of the CCO, District Director of Consultant Contract Administration and numerous Contract Specialists and Contract Administrators to discuss the consultant selection process, administration of consultant contracts, oversight of consultant work and evaluation of consultant work. In addition, Deloitte FAS reviewed policies, procedures and other documents related to this process and identified leading industry practices used by other DOTs. Based on Deloitte FAS' discussions with TxDOT personnel and the process related documentation, the following observations were identified:

Consultant Procurement Process/Contracting Methodology

- The consultant procurement process is governed by policies, procedures and guidelines. This guidance provides the Districts and Divisions with a detailed framework of the consultant procurement process. In addition, new material, training and guidance are being developed to supplement the current resources.
- There is inconsistency in the structure of consultant management and administration of contracts at the District level. For example, in Houston, there are twenty-six employees in the Consultant Contract Administration section while Austin has seven employees dedicated to contract administration, and Bryan has only two resources. Deloitte FAS recognizes that the size of each group is dictated by various issues such as the number of consultant contracts; however, following a standardized procurement process appears to be difficult for the smaller

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

Districts to follow due to resource constraints.

- The timeframe to complete the consultant selection process may vary between Districts, due to resource availability and complexity of the contract. However, the Districts estimate that the process takes approximately six to nine months from the issuance of the Notice of Intent to contract award. The Districts have attempted to expedite the selection process by completing steps concurrently; however, many of the required steps must be completed sequentially. As a result, the length of time and process to on-board consultants is time consuming for TxDOT staff.
- TxDOT requires all consultants to be prequalified in each work category for which they would be responsible as stated in their submitted Letter of Interest in order to be included on the Long List, which then allows the consultants to propose for the work. Similar to TxDOT, the New Jersey DOT ("NJDOT") requires all consultants to be prequalified; however, they must submit general Quality Assurance Plans to the Director of Quality Management Services ("QMS") for approval as part of the prequalification process. NJDOT's Division of QMS was established to provide oversight to the Capital Program Management units, monitor the program and periodically review existing Quality Assurance to ensure activities are being performed with the approved Quality Assurance Plans.
- New or updated policies and procedures are dispersed in an inefficient manner. It appears that updated guidance is identified in the "What's New" section of the CCO website; however Contract Specialists at the Districts do not feel they are adequately informed when the policies and/or forms are updated and often submit outdated forms. This has led to significant delays in the approval of CCO forms by the Design Division during the selection process, as the documents are required to be in the current version for approval.
- In addition, District Contract Specialists believe there is inconsistency in the contract approval process for similar contract submissions. For example, two similar contracts may be submitted to the Design Division, but one may be approved and the other may require numerous revisions. The Design Division is diligent in ensuring all contracts contain the appropriate language and frequently reject contract submissions if they do not follow the required language.
- Consultant fees are not included as part of the selection criteria in the procurement of consultant services; however, many Districts feel that consultant fees should be taken into consideration when awarding a contract. The consultants tend to have similar skills and experience; therefore District staff believes that consultant fees would be a differentiating factor. However, currently Sec. 2254.003, Texas Government Code prevents consultant selection for professional services to be awarded on the basis of competitive bids.
- To adequately estimate consultant fees, similar to TxDOT's procedures, the Virginia DOT ("VDOT") prepares its own comprehensive independent estimate of the man-hours and costs associated with the consultant providing the services before receipt of the consultant's fee proposal.
- The Executive Order imposed by TxDOT Administration, which limits Evergreen contracts to a $2 million cap, while creating opportunities for consultants, has created additional work for Contract Administrators, who are already over-programmed. Due to the cap, more contracts need to be awarded to meet the demand for consultant services, and the frequency of procurements has increased because consultants reach their fee caps fairly quickly.
- The OGC develops and maintains the contract templates for EA&S contracts, which are made available on OGC's webpage. If the District requests a modification to the contract language, OGC is required to perform a legal review of the altered language. TxDOT personnel are

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

encouraged to download the contract template from OGC's webpage for each new contract to ensure the most updated template is used.

- Work authorizations are assigned based on several factors, including past performance, availability of resources, availability of funding on a given contract and consideration of specialized expertise in some instances. However, if a consultant has performed well on a previous TxDOT assignment, they may be selected for the important and/or difficult projects, but the cap may limit the use of the preferred consultants. While the cap helps to develop the skills of other consulting firms and foster greater competition, it can hinder the project development process when a preferred consultant is not available for one of the more important or difficult projects.
- Districts may conduct debriefing meetings following the selection of consultants, however they are not required. The large Districts found the debriefings to be very beneficial and have seen significant improvement in the consultant's proposal submissions after attending a debriefing. This has leveled the playing field in a very competitive consultant market. However, the small Districts feel that debriefings are not an efficient use of time and that the consultants have not taken the information learned in the meetings into consideration for the next submission. Similar to the smaller TxDOT Districts, VDOT does not conduct debriefings because they believe they are time consuming for staff and offer minimal returns.
- Per Design Division policy, the Districts maintain a file containing all documentation required throughout the consultant selection process, including all CCO forms, consultant Letters of Interest and other required documentation. An evaluation of some samples of the Districts' files appears to confirm that the appropriate documentation is contained in these files. However, the office of record for all consultant contracts is OGC, where all original consultant contracts, work authorizations and supplemental agreements are kept on file.
- The Design Division is drafting training modules to reinforce the consultant selection process. The training modules will be delivered regionally several times per year.

Consultant Oversight/Payment

- The structure of consultant oversight is determined during negotiations with the consultant. This may include progress meetings, performance reports, and/or on-site visits. The project manager is typically required to review consultant work at 30%, 60% and 90% complete for PS&E work. It was noted that consultants are not always diligent in correcting and incorporating comments from one update to the next update. This requires TxDOT to spend additional time correcting the same problems.
- The District project manager is responsible for tracking that the consultant deliverables are completed on time. The project managers may keep a spreadsheet to track this information; however, it is not filtered up and summarized at the District level. The project manager has the authority to review consultant work and sign-off on the deliverable. The Districts have not typically experienced issues related to delayed deliverables; however, on occasion deliverables are submitted incomplete or of poor quality.
- Each District tracks and maintains its own customized spreadsheet (or alternate database) to capture the number of work authorizations assigned to each consultant, as well as the amount remaining per contract. Certain Districts are utilizing software, such as *eManager,* to track contracts, work authorizations and invoices, but there is no consistency between Districts. There appears to be no consistent format for tracking this information. In addition, this information is not rolled up at the Division level to capture an overall view of contracts outstanding.
- Consultants are paid on deliverables as negotiated in their contract. Consultants submit an

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

invoice to the project manager who verifies the accuracy of the costs incurred. Payments are made at the District level.

- Scope changes, time extensions, or fee increases to a contract are negotiated at the District level, and these changes are incorporated into a supplemental agreement which is submitted to the Design Division for review and execution. The District can use a supplemental work authorization ("SWA") to modify a work authorization. If the aggregate amount of the work authorization and SWA reaches or exceeds $1M, it must be submitted to Design Division for review and execution by the Design Division Director.

Consultant Evaluation

- Project managers are required to complete evaluations annually and at the end of a project. In addition, project managers are encouraged to complete interim evaluations when poor work is submitted and/or to highlight exceptional work. Due to time constraints, project managers do not typically complete interim evaluations, instead they only complete the required annual/project close-out evaluations. However, not all consultants are being evaluated on a yearly basis. Other DOTs perform semi-annual consultant evaluations at a minimum. For example, both VDOT and NJDOT require the project manager to evaluate the consultant's performance every six months over the duration of the project.
- Like TxDOT, NJDOT has a consultant evaluation process, however it has slight differences. For example, NJDOT has developed a Consultant Evaluation System to provide an objective and consistent method for measuring consultant performance. The rating system provides NJDOT with a means for rewarding those consultants who perform good work and consultants with the opportunity to improve job performance from one rating period to the next. IDOT evaluates consultants during the duration of a project and upon completion of the project they issue a final evaluation. This final evaluation is used to compensate the consultant for their performance. The amount varies depending on the final evaluation score.
- TxDOT's current system only allows for the review of the consultant's most recent evaluation. The Districts would like to have access to past consultant evaluations, as this would be a valuable tool during the consultant selection process. The CCO is in the process of developing a Windows-based evaluation form, which will allow a database of all consultant evaluations to be available in the future.
- Historically, design errors and omissions ("E&Os") by consultants have not been formally tracked and pursued for reimbursement consistently by the Districts.
- The Design Division recently released "Consultant Errors & Omissions Correction and Collection Procedures" in December 2006. However, it has since been rescinded and is being reconsidered. The Districts expressed concern over the amount of paperwork required to pursue an error/omission by a consultant. Project managers are currently time constrained; therefore pursuing an error/omission would be an overwhelming task.
- Consultants that have never worked with the State are unfamiliar with the invoicing process, design standards as well as formatting issues and therefore are unable to deliver the quality expected by TxDOT. These new consultants need additional supervision and require the project managers to conduct additional evaluations and therefore expend additional time with the new consultant, which has the potential to impact the project delivery process. As a result, the Districts perceive a need for all consultants to take a mandatory course instructing them on how to work with TxDOT.

Impact:

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

Consultant resources are necessary to meet project demands given the volume of projects to be delivered on an annual basis and the FTE cap imposed on TxDOT. Without proper controls on the management and oversight of consultant services, TxDOT runs the risk of expending additional resources and incurring additional costs. These impacts are the result of additional time spent selecting consultants and negotiating contracts, delays due to incomplete or poorly prepared plans and delays due to changes occurring during design and construction.

Operational Strengths/Leading Practices:

Many DOTs, including TxDOT, have implemented numerous tools to allow them to work efficiently. Areas where Deloitte FAS has identified particular strengths are identified below.

- The Design Division conducts an annual conference to inform design staff of new policies and procedures and to discuss the status of changes to consultant contracting. The project managers and contract administration staff find the conference to be of great value if they have the time to attend.
- The Design Division has developed a "Roles and Responsibilities for Provider Selection through Project Management" matrix to guide the Districts through the consultant selection process. The matrix outlines the responsibilities of District and Division individuals. The Design Division has also developed a detailed "Professional Services Contract Selection and Award Process" flow chart that guides the Districts through the consultant selection process and ensures proper documentation is submitted to the Design Division and maintained in District files.
- A District has created binders that translate the Design Division policies and procedures to basic checklist form, which has proven to provide project managers with useful guidance. The District also sends courtesy emails to all project managers to remind them when a contract will be expiring, as well as when evaluations must be completed. This leading practice of information sharing and communication should be shared with other Districts to allow them to incorporate it into their work.
- IDOT evaluates consultants during the duration of a project and issues a final evaluation upon completion of the project. This final evaluation rating is used to compensate the consultant for their performance, which may improve consultant performance.
- VDOT and NJDOT require the project manager to evaluate the consultant's performance every six months over the duration of the project to prevent the delay of identifying consultant weaknesses.

Conclusion/Recommendation for Improvements:

TxDOT's consultant procurement process is governed by Design Division enforced policies and procedures. However, based on Deloitte FAS' assessment, there are areas for improvement. As the amount of work out-sourced to consultants continues to escalate, it will be critical to have better oversight procedures in place. Districts should continue to develop more controls and systems to track consultant performance and encourage project managers to complete interim evaluation forms more frequently. Based on the assessment conducted of the Design Division's management of consultant contracts, the following recommendations are suggested to reduce the impacts of the risks identified above:

- The increased use of consultants has required TxDOT personnel to adjust their typical day-to-day responsibilities, as many project managers are now being asked to manage consultants versus performing technical work. This has caused concerns regarding the retention of

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

personnel who prefer performing technical work. It is critical that TxDOT maintains its expertise in delivering projects. TxDOT should consider developing a Consultant Design section within the Districts comprised of volunteer employees willing to focus on consultant oversight or develop a rotational program to support the section. In addition, appropriate training should be provided to give the project managers' tools, such as cost tracking and scheduling software, to manage the consultants more efficiently. Focused attention on consultant oversight should provide better management, while at the same time allow TxDOT to maintain its in-house expertise.

- The Design Division should continue to develop new and/or modified policies and procedures as necessary. The CCO should clearly identify when a form or standard contract has been modified. In addition, TxDOT needs to continue to maintain and update the current email distribution list to include all District and Division Contract Administrators to provide notice of new or modified policies and procedures. This helps to increase efficiency and decrease the number of forms/contracts that get sent back to the District for review and correction. This may also decrease the overall selection process time frame. Currently the CCO's intranet website has a section titled "What's New" which is one of the methods used by TxDOT to provide notice of new or modified forms. TxDOT should diligently maintain this section with the most recent updates and communicate this to District staff.
- Districts conducting debriefings found them to be very useful and have seen consultant proposals improve significantly. If adequate resources were made available to conduct the debriefings, all Districts may see the value of the debriefings. This would eventually lead to a more competitive consultant market and increase the size of the consultant pool. Increasing Design Division support to smaller Districts could help alleviate resource concerns.
- The Executive Order imposed by TxDOT Administration, which limits Evergreen contracts to a $2 million cap, has required Districts to use numerous consultants to meet demand. As a result, TxDOT is working with more consultants that are not familiar with TxDOT. Training on TxDOT policies, standards and evolving design requirements should be considered for new consultants to alleviate the time requirement that project managers typically spend with new consultants, and thereby, potentially improve the quality of services provided to the Department. The project managers prefer to work with seasoned consultants that understand TxDOT requirements and the payment process due to time constraints.
- The contract cap and term limitation has increased the contracting teams' work loads because new Evergreen contracts have to be procured and awarded more frequently to address expiring or fully utilized contracts. TxDOT should consider expanding the caps to previously established limits to minimize the impact on the efficiency of operations.
- A District is using *eManager* to track consultant contracts and work authorizations. This software also provides valuable reporting and management tools. The Division should provide *eManager* or a similar tool to all Districts as a mechanism to track and manage consultant contracts. This would also provide the Design Division with a consistent summary of consultant contracts and work authorizations across Districts.
- At a minimum, semi-annual evaluations should be conducted for each consultant. The Districts need to reinforce this policy with their project managers. To assist in this effort of conducting evaluations, a database of all consultant evaluations throughout the past four years would prove beneficial during the semi-annual evaluations as well as future consultant selection procedures. The Design Division CCO has developed a database in addition to a web interface which will allow project managers to directly input consultant evaluation information. This database implementation is scheduled to be complete in August 2007, which will provide an efficient mechanism to review past consultant work and identify any weaknesses that need to

Audit Area: C. Management of Consultant Contracts	**Issue:** i. Design Division

be addressed and monitored during the evaluation and consultant selection processes.

Audit Area: C. Management of Consultant Contracts	**Issue:** ii. Right of Way Division

Background:

With the increased volume of contract lettings and the staffing restriction imposed by the legislature, TxDOT has been required to increase its use of external consultants in virtually all Districts and Divisions to help deliver projects. While the Divisions use similar contracting structures for different types of consulting services (i.e., "Evergreen" contracts), several methods exist for procuring and managing consultant contracts. The effective and efficient management of consultant services is important to TxDOT's operations and the prudent use of its financial resources. Given the importance of consultant services to the continued success of TxDOT's mission, this area was identified as a risk area requiring further evaluation.

Prior to January 2001, real estate appraisers did not have professional services status and contracts were awarded on a low bid basis. Currently, certified and licensed real estate appraisers are given professional services status; therefore, contracts can now be and are awarded based on qualifications. In 2001, the ROW Division incurred approximately $2.8M in consultant fees; in 2007, ROW is projected to incur $18.0M in consultant fees. The significant increase in the use of consultants has not resulted in a corresponding increase in FTEs to manage the additional consultant contracts, which has put stress on TxDOT's staff to adequately fulfill this management role. As the demand for the delivery of transportation projects continues to increase at a rate disproportionate to the number of TxDOT FTEs required to acquire parcels needed for the projects, the ROW Division must contract for right of way acquisition professional services ("ROWAPS") to assist the Districts. The ROWAPS provide the Districts with enhanced staffing capacity, not replacement of District right of way acquisition capacity.

As such, the overall objectives of this analysis were to assess the efficiency of the consultant selection process, identify potential leading practices, compare the TxDOT process to leading industry practices and provide recommendations for improving the process. In evaluating leading practices, Deloitte FAS assessed how other State DOTs procure consultants and oversee consultant work to determine if there are potential benefits to be gained by TxDOT or to identify potential leading practices currently being used by TxDOT. In addition, Deloitte FAS assessed the effectiveness of TxDOT's oversight process and how the quality of services provided by consultants was monitored in order to provide recommendations that could improve operations and reduce risk.

Observation/Findings:

A discussion was had with the Resource Management Section Director of the ROW Division to understand the consultant procurement process, administration of consultant contracts and the oversight and evaluation of consultant work. Deloitte FAS also reviewed policies, procedures and other documents related to this process and identified leading industry practices that could potentially increase efficiency at TxDOT. As a result of Deloitte FAS' work efforts, the following observations were noted:

Audit Area: C. Management of Consultant Contracts	**Issue:** ii. Right of Way Division

Consultant Procurement Process/Contract Methodology

- The consultant procurement process is governed by policies, procedures and guidelines. This guidance provides the Districts with a detailed framework of the consultant procurement process. In addition, new material, training and guidance are being developed to supplement the current resources.
- Most right of way contracts are awarded as Evergreen contracts and contain a no guarantee for work clause. All firms that qualify for work are approved by the ROW Division and put on the consultant list. Districts determine their consultant needs and which consultant they would like to use. However, there is a trend for Metro Districts to use project specific contracts for large projects because the current cap is difficult to maintain in order to complete the work for all parcels of land involved. Project specific contracts may exceed $2M, however; the consultant is still paid per deliverable. This is not an automated process.
- If the consultant needs to replace an individual for any reason, the firm must request approval from the District through the issuance of a Supplemental Agreement to approve additional individuals to perform contract work. This helps to ensure that work is performed by qualified individuals.
- Currently, no requirements exist for consultants to be prequalified to bid for a right of way contract. The ROW Division Resource Management Section Director would like to require consultants to receive prequalification prior to submitting a bid; however, no regulatory requirements currently exist. Unlike TxDOT, IDOT requires prospective fee appraisers to complete the standard "Application of Assignment" and furnish evidence that they meet requirements, including the prescribed Appraisal Principles Examination, when considered necessary. Similarly, VDOT permits only those firms that have submitted the necessary information and have been approved as being prequalified to be considered for a contract in response to a RFP.

Consultant Oversight/Payment

- The Districts track the status of the actual deliverable milestones as their method of oversight of the assigned work authorizations. The format and delivery of status reports prepared by each consultant depends on management style and reporting requirements of the District project managers, but a production report must be attached to each invoice submittal. Each District has the flexibility to determine the frequency and complexity of progress updates required from the consultants; this flexibility may deter project managers from diligently performing adequate reviews of consultant work.
- Contract Specialists at the ROW Division maintain a spreadsheet for each work authorization to track the total amount spent against contract value. This information is updated and managed daily to identify any contracts close to their expiration date or the contract cap.
- During the upcoming procurement cycle of Right of Way Acquisition Services Contracts ("ROWASC"), the ROW Division will require service providers to submit Gantt Charts broken into thirty day increments to allow TxDOT to measure the service providers' actual submittals versus the plan.
- Consultants are paid a set negotiated price for each deliverable as determined by their contract. The consultant is not paid until the deliverable is complete. This contract structure helps prevent consultants from delaying contract work and helps TxDOT minimize its exposure if work is not completed.
- In addition to payment on a per parcel deliverable basis, consultants are paid a monthly administrative fee, regardless of whether they complete a deliverable in the respective month.

Audit Area: C. Management of Consultant Contracts	**Issue:** ii. Right of Way Division

If the consultant receives a time extension through a Supplemental Agreement, the District may or may not continue to pay the administrative fee through the time extension. There has been discussion at the ROW Division related to converting the administrative fee from a monthly fee to a per unit fee based on deliverables, consistent with the payment for work. Therefore, consultant costs would start only once a deliverable had been completed, which would allow TxDOT to avoid paying costs when actual services had not been incurred.

- The Resource Management Section Director of the ROW Division would like to require all Department personnel involved in the administration, management or oversight of ROWAPS contracts to complete course work in contract compliance and leading practices to increase efficiency.
- The majority of consultant deliverables are completed on time. When a consultant requests a time extension through a Supplemental Agreement, it is typically related to the delivery of appraisal documents, which varies substantially based on the location and complexity of the assignment, or the consultant does not know if a parcel will move to eminent domain until negotiations have failed and the property owner has rejected the final offer. Since the consultant is paid on a deliverable basis, typically no additional costs are granted with a time extension. This prevents consultants from incurring additional costs due to delays and encourages timely completion.

Consultant Evaluation

- Evaluations are conducted on an interim, annual, and project close-out basis. Interim evaluations are not required, but are completed at the request of an involved party and are typically triggered when issues or concerns arise. Annual evaluations must take place for multi-year projects. In addition, each consultant must be evaluated at project completion. Not all project managers are diligent in completing a consultant evaluation annually. Similar to TxDOT, VDOT requires the contract representative in the District to have an evaluation of the consultant's performance prepared by the various disciplines involved in the contract and submitted within sixty days of the notice of contract completion.
- Consultants have thirty days to submit comments on their evaluations. A signed copy of consultant evaluations are scanned and posted to the shared drive. A consultant can not claim experience on a TxDOT project as a reference without having a signed evaluation form for that project on file. This has forced the consultants to be responsive to the evaluation forms if they intend to be selected for future work with TxDOT.
- The ROW Division has maintained a file of all evaluations that have been completed in the past five years, which are accessible on the intranet. In the future, evaluations will be kept on file for four years, which will provide a good source of information to evaluate consultant services during the consultant evaluation and selection processes.
- Consultants that have never worked with the State are unfamiliar with the invoicing process, standards as well as formatting issues and therefore are unable to deliver the quality expected by TxDOT. These consultants need additional supervision and require project managers to conduct additional evaluations and therefore expend additional time with a newer consultant, which has the potential to impact the project delivery process. As a result, the Districts would like all consultants to be required to take a course on how to work with TxDOT.

Impact:

Contracting with external service providers to supplement the Department's resources to acquire parcels needed for transportation projects is necessary to meet the escalating letting schedule.

Audit Area: C. Management of Consultant Contracts	**Issue:** ii. Right of Way Division

In order to keep up with the expanding letting schedule, some contracts are being let without the required right of way acquired or utilities adjusted. It is critical for the ROW Division to grow the consultant pool to ensure adequate quality appraisers and right of way acquisition providers. Without proper controls on the management and oversight of consultant services, TxDOT runs the risk of expending additional resources and incurring additional costs due to the right of way process. These impacts are the result of additional time spent selecting consultants and negotiating contracts, delays due to incomplete or poorly prepared appraisal documents, and the need for re-appraisal or double expenditure for acquisitions.

Operational Strengths/Leading Practices:

The Divisions and Districts have implemented many tools to allow them to be efficient. Areas where Deloitte FAS has identified particular TxDOT strengths are identified below.

- The ROW Division is developing a program guide, which is a culmination of leading practice methodologies gathered from actual field testing. This guide will be an important tool for Districts in their management and oversight of consultants. Approximately half of the chapters are written and in draft form. It is anticipated that the document will be complete by December 2007. Several other State DOTs have expressed interest in using this guide upon its completion. This guide will be an important tool for the Districts in their management and oversight of consultants.
- TxDOT's contracting methodology, which provides payment to consultants based on the submission of deliverables, is unique in comparison to payment methods used in other transportation agencies. More commonly, consultants are paid for appraisal services based on a time and materials contract. The deliverable based contract guarantees that TxDOT gets the services required before any payment is made.

Conclusion/Recommendation for Improvements:

TxDOT's consultant procurement process is governed by ROW Division enforced policies and procedures. However, based on Deloitte FAS' assessment, there are areas for improvement. As the amount of work out-sourced to consultants continues to expand, it will be critical to have tight oversight procedures in place. TxDOT should focus on providing training for both right of way staff, as well as external service providers to improve the efficiency of the right of way acquisition process. Based on the assessment conducted of the ROW Division management of consultant contracts, the following recommendations are suggested to reduce the impacts of the risks identified above:

- The ROW Division should continue to develop new and/or modified policies and procedures as appropriate and focus on releasing this information to all parties involved in a consistent manner. Updated information should be clearly marked on the intranet as "New" for at least a month after the effective date.
- Similar to the Design Division, the ROW Division should consider requiring consultants to be prequalified before they are able to bid on work. This would provide the ROW Division with a level of comfort that the consultant is knowledgeable and experienced and potentially shorten the procurement cycle.
- Appropriate training should be provided and required for right of way staff responsible for contract management of a ROWAPS contract. Project manager's require and should be provided with management tools, such as cost tracking and scheduling software, to manage the

Audit Area: C. Management of Consultant Contracts	**Issue:** ii. Right of Way Division

consultants more efficiently.

- TxDOT should provide a training course for the consultant community outlining how to do work with TxDOT. This would increase their efficiency and keep consultants abreast of TxDOT's requirements and standard operating procedures.
- At a minimum, semi-annual evaluations should be conducted for each consultant. The Districts need to reinforce this policy with their project managers. To assist in this effort of conducting evaluations, a database of all consultant evaluations throughout the past four years would prove beneficial during the semi-annual evaluations as well as future consultant selection processes. This database would provide an efficient mechanism to review past consultant work and identify any weaknesses to address and monitor during the evaluation process and during the consultant selection process.

Audit Area: C. Management of Consultant Contracts	**Issue:** iii. Environmental Affairs Division

Background:

With the increased volume of contract lettings and the staffing restriction imposed by the legislature, TxDOT has been required to increase their use of external consultants in virtually all Districts and Divisions to help deliver projects. While the Divisions use similar contracting structures for different types of consulting services (i.e., "Evergreen" contracts), several methods exist for procuring and managing consultant contracts. The effective and efficient management of consultant services is important to TxDOT's operations and the prudent use of its financial resources. Given the importance of consultant services to the continued success of TxDOT's mission, this area was identified as a high risk area requiring further evaluation.

In order to meet the accelerated letting schedule, the ENV Division has been required to use an increasing number of external service providers. In 2005, the ENV Division incurred $12M in consultant fees. Only two years later in 2007, consultant fees are projected to reach $21M. During this period, the number of FTEs dedicated to managing consultant contracts and overseeing consultant work has remained flat. However, the ENV Division has received authorization to hire some additional temporary resources. The ENV Division uses two different types of contracts, Engineering contracts and Scientific Services contracts. Deloitte FAS analyzed the administration and oversight of both types of contracts.

As such, the overall objectives of this analysis were to assess the efficiency of the consultant selection process, identify leading practices, compare the TxDOT process to leading industry practices and provide recommendations for improving the process. In evaluating leading practices, Deloitte FAS assessed how other transportation agencies procure consultants and oversee consultant work to determine if there are potential benefits to be gained by TxDOT or to identify potential leading practices being used by TxDOT. In addition, Deloitte FAS assessed the effectiveness of TxDOT's oversight process and assessed how the quality of services provided by consultants was monitored in order to provide recommendations that could improve operations and reduce risk.

Observation/Findings:

A discussion was had with the Division Administrative Manager of the ENV Division to understand the consultant procurement process, administration of consultant contracts and consultant oversight and evaluations. Deloitte FAS also reviewed policies, procedures and other documents related to this process. As a result of Deloitte FAS' work efforts, the following observations were noted:

Consultant Procurement Process/Contracting Methodology

- Engineering contracts for the ENV Division are administered through the Design Division CCO. The ENV Division's consultant selection process mirrors that of the process required for Engineering contracts executed by the Districts. Although the contracts are administered by the Design Division (including the use of CCO forms for the consultant selection process and prequalification of consultants), the ENV Division owns the selection process and is intimately involved.
- The ENV Division typically uses a consultant for design work (Engineering contracts) and is

Audit Area: C. Management of Consultant Contracts	**Issue:** iii. Environmental Affairs Division

required to write the statements of work and deliverables for these contracts.

The ENV Division administers the consultant selection process for Scientific Services contracts. The remaining findings listed below are specific to the consultant selection process, administration of and oversight of Scientific Services contracts:

- The OGC develops and maintains contract templates for Scientific Services contracts, which are made available on OGC's webpage. If a modification to the contract language is requested, OGC is required to perform a legal review of the altered language. TxDOT personnel are encouraged to download the contract template from OGC's webpage for each new contract to ensure the most updated template is used. The ENV Division is the office of record for Scientific Services contracts and maintains all original contracts and work authorizations.
- A typical consultant selection team ("CST") consists of one District individual and two to four ENV Division technical staff. The contract administration group participates as oversight to the CST to ensure that the contracting manual is followed. The consultant selection process typically requires at least two months to complete. However, consultant procurement typically requires two to four months depending on the complexity of the contract. Although a need for a consultant may be determined, a lack of resources at the ENV Division may dictate the timing and number of contracts procured. The selection process is time consuming for the CST members who also are responsible for and perform other roles and tasks.
- The ENV Division's RFPs include mandatory qualifications for individuals submitting a proposal, including skills, education and experience.
- There are a limited number of firms and individuals qualified to perform certain types of work required by the ENV Division. A significant number of these firms and individuals are already being used utilized under contracts issued by the Districts. In addition, the ability to expand the number of consultants available is limited due to the restriction to use consultants who are headquartered outside of Texas, which requires additional travel costs.
- Contracts are typically structured on a cost reimbursable basis. The contracts require the consultant to complete a specific deliverable with supporting documentation and receive approval from a project manager/technical expert in the field prior to payment. Work authorizations are typically structured on a step-by-step basis instead of issuing a blanket work authorization with multiple parts.
- The ENV Division can approve and execute Scientific Services contracts for amounts up to $5M. A typical contract is for up to $2M over a four year period. The ENV Division has the ability to write a work authorization for up to two years from issuance of the contract. If the project is not complete at the end of the contract period, the contract can be extended for up to two additional years through a Supplemental Agreement. The total contract amount cannot exceed $2M for a contract that provides services to a single District. The total contract amount cannot exceed $5M for a contract to provide services in two or more Districts. The size of Evergreen contracts appears to be sufficient for the current ENV Division needs.
- Available consultant contracts are posted on the TxDOT Intranet. District Environmental Coordinators are aware of contracts and can call the ENV Division to request a consultant for a specific service. The ENV Division attempts to ensure that an adequate number of Scientific Services contracts in each discipline are on hand to meet the demands around the State. However, there have been instances when the ENV Division has put out an RFP and received limited response from the consultant community, which can create a challenge in meeting project demands on a timely basis and may potentially cause a bottleneck in project delivery.
- Clearly defined statements of work prepared by the Districts allow the ENV Division to support

Audit Area: C. Management of Consultant Contracts	**Issue:** iii. Environmental Affairs Division

the Districts' needs in a timely manner. Inadequate detail regarding required disciplines may cause delays.

Consultant Oversight/Payment

- Due to the significant growth in project lettings, the ENV Division has resorted to primarily using consultants to perform technical work. Project managers/technical experts are not pleased with this arrangement; however, it is required in order to complete the volume of work. Although it varies by discipline, in many cases the project managers/technical experts split their time 50/50 between oversight and actual fieldwork. The need for professionals to perform consultant oversight work instead of actual field work may put TxDOT at risk of losing qualified staff.
- The project managers/technical experts in the ENV Division or each District are responsible for monitoring consultants to ensure that timelines are met and the quality of work is as prescribed in the contract specifications. The project managers/technical experts coordinate closely with the consultants to follow the established timeline. The consultant deliverables are reviewed for compliance, technical accuracy and quality. In the past, *Contract Workforce* software was used to keep a macro perspective of all contracts, however this was discontinued by TxDOT in early 2007.
- Consultants typically complete their deliverables on time. The consultants understand that if there are issues that will prevent timely deliverables, they need to request an extension of time prior to the due date. A SWA is issued to extend the delivery time. The performance method payment of contracting appears to be effective in motivating consultants to complete their work timely.
- The ENV Division Administrative Manager has identified university courses for project managers/technical experts to complete covering *Microsoft Project* (a scheduling software), as well as how to develop a task based Work Breakdown Structure ("WBS"). Some project managers/technical experts are currently using *Microsoft Project* to manage more than one project at a time. The ENV Division would like to get licenses for ten additional project managers/technical experts.
- In addition, the ENV Division Administrative Manager would like all project managers/technical experts to become Project Management Institute certified. Approximately twelve to fourteen project managers/technical experts would likely complete this certification.
- The project manager/technical expert may also conduct on-site audits of the consultant's work. The policies require District staff to perform audits on 7% of the total population of consultant's work managed by the District to ensure compliance with contract requirements.
- The project manager/technical expert tracks the number of work authorizations against a contract. The ENV Division Contract Specialists also track the amount remaining on the contract and update the project managers/technical experts regularly. *FIMS* provides two valuable ENV Division specific reports (Reports 2301 and 2801) that monitor the Department's contract obligations.
- Invoices must include detail listing the individual, skill level and hours for each task. The project manager/technical expert in ENV Division and the District reviews the invoices and subsequently the invoice is sent to a Contract Specialist at the ENV Division for review. Finally, the invoice is given to ENV Division Administrator for final approval and payment. The ENV Division is responsible for reviewing, approving, and authorizing payment for Engineering and Scientific Services contracts. In the interest of checks and balances, the person that signs a contract or work authorization cannot authorize payment.

Audit Area: C. Management of Consultant Contracts	**Issue:** iii. Environmental Affairs Division

- E&O clauses are included in the boiler plate language of every contract. If an issue is discovered by a project manager/technical expert, they prepare an email discussing the deficiency and what needs to be corrected. The project manager/technical expert is responsible for notifying the consultant of an E&O and the time frame for correction. The consultant must correct the error without payment. There have been very few instances of E&O in recent years. Thus, there was no substantive information to evaluate in this area. E&Os do not appear to be a significant issue with Scientific Services contracts.

Consultant Evaluation

- The ENV Division uses a "Work Authorization Evaluation for Scientific Services contracts". The evaluations are conducted to identify a poor performer, as well as to highlight a top performer. The ENV Division does not require interim or annual evaluations to be completed. The project managers/technical experts are only required to conduct an evaluation at the completion of a work authorization, however the project managers/technical experts also review deliverables to ensure they are acceptable, which may allow for poor quality work to be identified and documented.
- Currently, the completed evaluations are filed in the master work authorization file. The ENV Division does not maintain a master database of all consultant evaluation forms. The ENV Division would like to be able to use the web-based system that is being developed by the Design Division CCO.

Impact:

Consultant resources are necessary to meet project demands given the volume of projects to be delivered on an annual basis and the FTE cap imposed on TxDOT. Without proper controls for the management and oversight of consultant services, TxDOT runs the risk of receiving poorly delivered services, expending additional resources and incurring additional costs. It is critical for the ENV Division to have adequate internal resources to manage the expanding number of external resources being used to meet the letting schedule. Although there are a limited number of qualified consultants available, the ENV Division should continue to expand their pool of consultants to ensure adequate quality resources are available to complete the required environmental work so as to prevent being the bottleneck of project delivery.

Operational Strengths/Leading Practices:

The Divisions and Districts have implemented many tools to allow them to be as efficient as possible. The area where Deloitte FAS has identified a particular TxDOT strength is identified below.

- The ENV Division has developed a four page document titled "Work Authorization Procedures for ENV Administered Contracts". The document clearly defines the policies and procedures in place and the expectations for all individuals involved with the management and oversight of Scientific Services contracts.

Conclusion/Recommendation for Improvements:

TxDOT has policies and procedures in place for the consultant selection process, administration of consultant contracts and oversight/evaluation of consultants. However, based on Deloitte FAS' assessment, there are areas or opportunities for possible improvement. As the amount of work out-sourced to consultants continues to expand, it will be critical to focus attention on consultant

Audit Area: C. Management of Consultant Contracts	**Issue:** iii. Environmental Affairs Division

oversight, which should provide better management of consultants, while at the same time allowing TxDOT to maintain its in-house expertise. TxDOT should focus on providing training for all project managers, as well as technical experts, in the ENV Division to enhance their ability to manage and oversee consultants efficiently and effectively. The ENV Division should require evaluations to be completed semi-annually for work authorizations extending longer than one year. Based on the assessment conducted of the ENV Division management of consultant contracts, the following recommendations are suggested to reduce the impacts of the risks identified above:

- Recognizing the limited number of qualified consultants in certain environmental disciplines, the ENV Division should focus on accurately projecting the number of Scientific Services contracts in each discipline required to meet the State's needs on an annual basis to assist in successful project delivery.
- The ENV Division should continue the development of consultant training for all disciplines that will include a competency testing component, upon which to base the prequalification of consultants. This will increase the efficiency of proposal review during the consultant selection process and promote higher performance levels.
- The ENV Division Administrative Manager should actively seek training and acquire licenses for *Microsoft Project* for all project managers/technical experts responsible for contract management and consultant oversight. This will help to increase the overall effectiveness of the project management staff.
- TxDOT should continue to provide training for the consultant community outlining how to do work with TxDOT, such as the training offered at the Environmental Coordinators Conference and at the yearly consultant workshop held by the ENV Division. This would increase their efficiency and keep consultants abreast of TxDOT's requirements and standard operating procedures.
- The increased use of consultants has required TxDOT personnel to adjust the way they do business, as many people are now being asked to manage consultants versus performing actual fieldwork. This has caused concerns regarding the retention of personnel, as well as the need for technical experts to ensure their professional abilities are used and updated on a regular basis in order to perform at the level expected by the Department. TxDOT should consider developing a consultant section within the ENV Division comprised of volunteers with technical expertise willing to focus on consultant oversight or development of a rotational program to support the section.
- The ENV Division should continue to develop new and/or modified policies and procedures as appropriate and focus on releasing this information to all parties involved in a consistent manner, including the appropriate consultants. Updated information should be clearly marked on the Intranet as "New" for at least a month after the effective date.

At a minimum, semi-annual evaluations should be conducted for each consultant. The ENV Division needs to reinforce this policy with the project managers/technical experts. To assist in this effort of conducting evaluations, a database of all consultant evaluations throughout the past four years would prove beneficial during the semi-annual evaluations as well as future consultant selection processes. This database would provide an efficient mechanism to review past consultant work and identify any weaknesses to address and monitor during the evaluation process and during the consultant selection process.

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

Background:

A major initiative of TxDOT is the development and implementation of the CDA program to help meet transportation needs that exceed current funding sources. This initiative will help to meet TxDOT's mission of providing high quality transportation facilities in a timely manner when funding may be an issue or obstacle to beginning and completing construction. CDAs are a form of PPPs and include concessions, which are a tool used to help government organizations maximize their capital budgets by the investment of private capital in public transportation projects. Within TxDOT, the TTA Division is the OPR for the CDA program. However, the CDA program is supported by many other Divisions and Districts within TxDOT.

The CDA program, if properly pursued and articulated to the public, represents an opportunity for TxDOT to meet its growing transportation needs through PPPs, but also provide an additional funding source to deliver other projects that will help mitigate congestion, improve air quality, and enhance business opportunities for Texas. As such, Deloitte FAS identified this as an area requiring further evaluation and assessment.

Under current legislation, TxDOT "may enter into a CDA with a private entity to design, develop, finance, construct, maintain, repair, operate, extend or expand a: (1) toll project; (2) facility or a combination of facilities on the Trans-Texas Corridor; (3) state highway improvement project that includes both tolled and non-tolled lanes and may include non-tolled appurtenant facilities; (4) state highway improvement project in which the private entity has an interest in the project; or (5) state highway improvement project financed wholly or partly with the proceeds of private activity bonds."[17] CDA agreements can include design-build ("DB"), design-build-maintain ("DBM"), design-build-operate-maintain ("DBOM"), concession projects, and pre-development agreements. For these projects, the best value proposer is selected. TxDOT is currently involved in the construction of SH130 segments 1-4, a DB project, and has signed a contract on SH130 segments 5-6, a concession agreement. At this time, TxDOT has over eight other CDA projects in various phases of procurement.

TxDOT appears committed to CDA projects and is in the process of creating a programmatic approach to deliver these projects. However, the Texas Senate introduced a bill, SB792, which contains a two year moratorium on many new CDA projects and other CDA provisions. It was accepted by the House of Representatives and the Senate and was signed by Governor Perry on June 11, 2007. The enactment of this legislation will alter the current CDA process.

Although CDA projects can be DB, pre-development agreements, or concessions, this assessment primarily addresses concession projects. DB projects are addressed in the Alternative Contract Delivery section of this report.

Observation/Findings:

In order to better understand TxDOT's approach to CDAs, Deloitte FAS held discussions with professionals and leaders of the TTA, ENV, Finance, and ROW Divisions, and the OGC, as well as the Assistant Executive Director for Engineering Operations. These discussions and meetings also helped the Deloitte FAS team to understand the Department's commitment to the CDA program, the selection guidelines, conflict of interest policies, success measurements and the roles of outside

[17] Source: Texas Statutes Transportation Code Section 223.201 Authority (a)

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

consultants. From these discussions as well as an evaluation of available CDA related documentation and information, the following observations were made:

Commitment to the CDA Program

- Although many Divisions are involved in the CDA program, TTA is the OPR. The current process is structured so that the TTA Division is the CDA project manager through procurement and then transitions the project to the District where the project is located to oversee the design and construction activities. Due to the number of CDA procurements happening concurrently, the TTA Division is starting to look to the Districts to assume the project manager position from the beginning of the project procurement process through the completion of the concession. The TTA Division recognizes the benefits in maintaining project management consistency through the entire concession.
- Phil Russell, Division Director, leads the TTA Division and spends significant time on CDA project oversight and program public relations. The Director of Turnpike Corridor Systems, Ed Pensock, is responsible for the TTA's involvement in the CDA program. The Turnpike Corridor Systems department consists of eight staff persons with four dedicated full-time to the CDA program and the other four spending a majority of their time on the CDA program and/or the Trans-Texas Corridor. It appears these professionals along with other TTA Division personnel are balancing work related to the CDA program as well as other TTA projects, resulting in excessive work requirements.
- Assistance with the CDA program is received from other areas of the TTA Division, although it is not their primary responsibility. Assistance is received related to tolling elements, marketing, right of way assistance, traffic and revenue assistance and engineering contract procurement oversight.
- TTA staff is responsible for developing a draft CDA Manual ("Manual"), which is "intended to provide policies and guidance specific to CDA procurement. It is written primarily to help TxDOT staff directly involved in potential CDA projects to understand the attributes and features of CDAs, the circumstances in which a CDA can be an advantageous project delivery method, what type of CDA is most appropriate to particular circumstances, and the essential terms of each form of CDA."[18] Although the development of the Manual began over a year and a half ago, progress has slowed due to the excessive amount of work being performed by the staff involved with current CDAs. TxDOT understands that developers and contractors spend significant amounts of time and money evaluating and proposing on CDA projects and completion of the Manual would aid with the proposal process and potentially reduce costs for TxDOT as well as developers and contractors. However, if the CDA program continues to grow and expand, the completion of this Manual will continue to be delayed.
- The TxDOT Finance Division is intimately involved in the procurement process. John Munoz, Deputy Director of the Finance Division, spends about 90% of his time on CDAs. Mr. Munoz is involved in the negotiation process with the developers. Jose Hernandez and Dorn Smith also support the CDA program. They focus on the financial modeling process. Mr. Hernandez spends about 40% of his time on CDAs with the intention that he will assume Mr. Munoz's role once the procurement process is standardized. Mr. Smith and other Finance Division staff have been involved in the proposal review process.
- ENV Division professionals also support the CDA program in the procurement process and they may have a significant role during the construction stage due to potential changes in the environmental clearance process. Lain Ellis, Jason Barrett and Mary Perez are primarily responsible for the CDA program for ENV and Steve Ligon was hired in Natural Resource

[18] Source: TxDOT CDA Manual draft outline page 2.

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

Management ("NRM") to support CDAs for the NRM group. CDA project requirements are in addition to the normal work requirements for ENV employees, which results in periods of excessive work for ENV staff. The CDA program time commitment of the ENV staff varies. Mr. Barrett typically spends approximately seven to ten hours a week on CDA projects, but during the proposal review process he spends about one and a half weeks fully dedicated to the review. Mr. Barrett is the primary CDA program representative for ENV. ENV resources are stretched because the same number of staff members exists today with an annual letting estimated at $5.5 Billion as there were when the annual letting was significantly lower. The present ENV staff committed to the Program will be overwhelmed if the CDA program continues to grow.

- Employees often work well beyond normal work week hours to complete their responsibilities regardless of what Division they work in. This demonstrates the commitment of the employees involved with CDAs, but TxDOT also runs the risk of employee burnout and turnover as a result.
- ENV staff in the Districts will be responsible for any District CDA projects and will be involved in the project management process. In the event of design change, ENV may have a significant role in the construction phase of the concession due to the inability to give complete control of environmental clearance to the concessionaire. Thus, additional environmental reevaluation by the concessionaire and oversight and control of this process by TxDOT may be required. Therefore, CDAs may be more work for ENV post-selection than a normal project.
- TxDOT considered bringing ENV professionals into the TTA Division to handle environmental review and clearance for CDA projects, but it was determined that using District personnel would be more efficient because they have a better understanding of the region or project location(s) and issues, and District personnel have greater contacts with the design and environmental professionals in their region or project location(s) than a central group in Austin, TX. As a result, ENV professionals were not added to the TTA Division.
- ENV has spent a significant amount of time and resources developing a programmatic approach to CDAs, which will pertain to all projects. As a result, it appears the ENV Division is leading TxDOT in working towards a programmatic approach for the handling of environmental issues.
- The OGC is spending a substantial amount of time supporting the CDA program. Jack Ingram and five other attorneys supporting him are now devoted to the CDA program. Mr. Ingram spends approximately 85% of his time on CDAs when the legislature is not in session and Bob Jackson, General Counsel, spends between 25-60% of his time on CDAs. Each of the remaining five attorneys devoted to the Program spend between 65-90% of their time on CDAs. At least one attorney from OGC is assigned to the procurement process for each CDA project. Typically, meetings chaired by Bob Jackson are conducted every other week between OGC and Nossaman attorneys currently involved in CDAs and two Attorney General's Office attorneys.
- ROW Division staff have the potential to spend a significant amount of their time on CDA projects depending on the progress and status of right of way acquisition. Right of way staff were moved from the Austin District and incorporated into the TTA Division. Having right of way oversight out of the TTA Division promotes uniformity because developers will be overseen by one entity versus potentially receiving differing opinions from right of way professionals in multiple Districts. The right of way professionals now working in the TTA Division have knowledge of the CDA program from past involvement drafting the CDA agreement language, so it is logical and more efficient to have the same core group of professionals work on all of the CDA projects.
- Currently, the TTA Division is attempting to use and train as many District employees as feasible on CDA procurements. Around four to ten District professionals are involved part-time

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

with the procurement process. This allows the District professionals to receive on-the-job training on CDAs since training materials have not been fully developed.

- Division and Department leadership participate on the CDA Steering Committee ("SC"). Jack Ingram, OGC, Phil Russell, TTA, James Bass, Finance, and Amadeo Saenz, Department Administration, make up the SC. The SC is responsible for approving program specifications and policies, providing guidance and coordinating the overall CDA program. These professionals are heavily involved in the CDA program and are juggling CDA responsibilities along with their normal responsibilities. If more projects are accepted into the CDA program, these professionals may be too pressed to devote the necessary time to the CDA program.
- The procurement process involves the evaluation of the qualifications and proposals submitted in repose to TxDOT's RFQ and/or RFP. During the review periods, professionals from multiple Divisions and Districts form subcommittees and oversight boards to fully review, score and present findings on each submittal. TxDOT begins the evaluation process with internal staff training to explain the evaluation and scoring criteria, which requires a significant amount of time from each of the staff involved. If the CDA program continues to expand and CDA procurement evaluations are conducted in parallel with each other as predicted, it appears the currently trained procurement professionals will not be able to handle the work load.
- Based on discussions with Austin District personnel involved in CDA project SH130 segments 1-4, the Divisions are assisting the District, answering questions and solving issues in a timely manner as needed. However, it appears that if the number of active CDA projects increases, the current Division staff will not be able to handle the resultant work load.
- Once an agreement is executed for a CDA project, the SC members, as well as the District Engineers that have a signed CDA project in their District participate in a Project Board ("PB") meeting once a month to oversee the construction phase of the project. All CDA projects will report to the PB and at the monthly meetings TxDOT, concessionaire, independent engineer and right of way reports will be given. The PB promotes consistency between projects by having the representatives that participated in the procurement decision making process review all of the projects during implementation, but it adds more responsibility to these representatives. As a result, it appears that if the number of CDA projects increases, it will be difficult for the SC members to also participate on the PB in an effective manner.

Project Selection Guidelines and Procedures

- The overall goals of the CDA screening process include providing strong institutional management of the CDA program; maintaining the highest degree of integrity in the CDA program to maintain industry confidence; providing more predictability to better ensure deal flow, market resource allocation and investment decisions; and providing guidance to developers and contractors to improve the nature and substance of proposals thereby reducing bid costs and due diligence requirements.
- Since not all projects will benefit from the CDA program model, TxDOT has developed selection criteria and a process to determine if a project, either unsolicited or nominated, is a viable candidate for the CDA program. The selection criteria and process has been delivered internally to the Department as well as externally to the investment community. Communication of the selection criteria and the overall process shows that TxDOT is invested in the Program and has developed a through approach to selecting CDA projects. However, it appears further internal communication needs to be provided since some Divisions are under the impression that wherever there is additional capacity needed, the project will be considered as a CDA or toll project, even those projects that would be revenue negative or neutral.
- In order to allow the flexibility to select a project to be in the CDA program, new projects are

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

cleared environmentally for both toll and non-toll projects, and a toll evaluation is completed by the Finance and TTA Divisions.

- After a project is nominated or an unsolicited proposal is received to be considered as a CDA project, standardized criteria are applied to screen the project for suitability as a CDA project. Assuming suitability, additional criteria are applied to determine the most effective type of CDA for the project (DB, concession, or pre-development agreement). The project is then added to the CDA candidate list, which is regularly assessed to establish relative priorities – resulting in a CDA Master Schedule to guide implementation.
- Screening criteria include system interface, technical, operations and maintenance, financial, acceptability, implementation and timing/schedule. TxDOT has made a great effort to develop screening criteria and a selection process that fairly evaluates each project for its suitability as a CDA project.

Conflicts of Interest Policies

- TxDOT is supported heavily by the consultant community. Consultants work closely with Department staff in the Divisions and Districts to carry out the projects and operational activities. Consultants are also involved in the CDA program both in advisory and assistance roles. In order to maintain the integrity of the CDA program, the Department needed to draft and include conflict of interest policies in the CDA agreements.
- The initial draft conflict of interest policy, which was prior to the acceptance of the conflict of interest rules, specifically identified firms that could not participate on a proposer or developer team as well as language stating that any entity that currently has or has had involvement with the project that is being proposed on will be investigated for a potential conflict of interest. This policy also identified that a new policy that would apply to all CDA projects was in the development stage.
- The Department delivered and updated the conflict of interest policy, which was adopted in rule form in late April 2007. TxDOT plans to deliver communication of the conflict of interest policy to everyone involved internally and externally with the CDA program. Information sessions as well as a potential class will be held after the legislative session is over to describe the new rules.
- The rules are part of the comprehensive ethics policy, which protects the integrity and fairness of the CDA program and all procurements carried out by TxDOT as part of the CDA program. The rules also assist with avoiding circumstances where a consultant, proposer, or developer obtains, or appears to obtain an unfair competitive advantage as a result of work performed by a consultant or sub-consultant. In addition, the policy identifies the period in which a conflict of interest applies.
- Considering that consultants are involved in many aspects of the CDA program, the policy approved by the Commission provides structure to govern the unique situations where conflicts may exist and acts to prevent them.

Objectives of the Program and Metrics to Measure Success

- The main goal or objective of the CDA program is to accelerate projects to improve mobility. The potential projects are identified, assessed and prioritized based on their readiness, qualitative risk, mobility needs and financial feasibility.
- The CDA program allows TxDOT to explore what transportation is needed versus what the Department can afford to build. Historically, Districts have been known to spend one half of their budget on maintenance. CDA concessions could potentially allow the Department to add significant capacity without adding any maintenance costs. The concession fee received by

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

TxDOT allows them to construct projects that they may not have been able to afford through normal funding methods.

- From a financing perspective, the success of a CDA project can be measured by keeping the maximum toll rate and escalation rate identified in the agreement as low as possible, minimizing funding needed from the State and ensuring that the project produces revenue. TxDOT also measures the value of the contract versus the financial model but not having specific financial measurement criteria can make it difficult to compare the success of one project to the next.
- Another objective of the CDA program is to make it more streamlined and programmatic, which would simplify the procurement process and reduce the spent manpower. To date, the CDA process has evolved from an initial term sheet, to one with a developed position statement and legal documents for SH130. This updated programmatic term sheet is available to the private sector via the internet. Developing a programmatic approach to the CDA program is a large undertaking that TxDOT needs to devote resources to complete. Continuous postponing of the programmatic approach development could result in unwanted differences between CDA agreements and inefficient hours spent on the procurement.
- While TxDOT has identified success metrics for the procurement phase, specific metrics for the construction and post construction phase have not been fully developed. The implementation phase will be monitored by the District through the end of the project life. Reports will be completed and submitted. The CDA agreement defines rules regarding lane closures, congestion reviews, speeds, etc. The Independent Engineer will take note when there are violations to the rules and will asses points for each violation. While these measures provide means of monitoring the developer's performance, they do not necessarily provide for true measures of project success.

Roles and Effectiveness of Outside Consultants

TxDOT uses consultants in a variety of roles to support operations. This includes the use of consultants to support the CDA program. TxDOT has relied heavily on financial and legal consultants to provide industry knowledge as well as support TxDOT when ample employees are not available. In addition, TxDOT also uses other consultants to work with the technical project managers to shepherd a project from a technical standpoint.

- The Department hired KPMG to assist with the financial analysis of the CDA program and procurements. KPMG professionals perform much of the sensitivity analysis and financial modeling to support each CDA procurement. They have performed these tasks for CDA-type projects around the world and are able to provide the developer's perspective. In addition to the financial analysts, a lead professional is involved in every meeting during the current procurement process.
- Goldman Sachs provides the lender's perspective to TxDOT. They are involved with the procurement process from the inception of the CDA project and also provide the developer's prospective. The Department considers Goldman Sachs critical to the procurement process.
- In the procurement planning stages, TxDOT works closely with KPMG and Goldman Sachs to develop the financial model, which is compared to the developer's proposed model. The combined TxDOT and consultants team constructs the model using different variables, such as concession lengths of 30 vs. 50 years, for example.
- The Department hired Nossaman as outside counsel due to their extensive experience with PPPs. Nossaman was involved with the CDA program before OGC initially became involved. Over sixteen Nossaman employees support the CDA program. Nossaman currently spends more time on CDAs than OGC does due to OGC's inability to fully staff all of the projects with

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

their current legal staff. Nossaman performs a variety of roles in support of the CDA program including:

  - Participating from the project screening process through the proposal process;
  - Assisting with drafting of the CDA program documents**;**
  - Verifying the consistency between the financial model, what has been conveyed to the lenders and what was presented in the terms and conditions;
  - Participating in the meetings with the OGC and the Attorney General's Office;
  - Working closely with new TxDOT attorneys to share their knowledge of the CDA program; and,
  - Preparing all procurement documents and contracts.

- A couple of years ago when there were three active CDA projects, the OGC envisioned reducing Nossaman's role in the CDA program. Currently, since there are more than eight CDA projects, both OGC and Nossaman are inundated with work. In the future, TxDOT would prefer Nossaman's role to decrease once the programmatic documents are developed but currently TxDOT, specifically OGC, rely heavily on Nossaman's expertise.
- TxDOT would prefer to handle much or all of the proposal process in the future. Going forward, TxDOT would prefer to have Goldman Sachs and KPMG play less of a role in the overall process, but still help with the evaluation of the private sector project valuations.
- The current CDA consultants understand the PPP market as well as TxDOT's business. They provide knowledge on the current state of the industry. Even with a change in the salary structure and the current staffing allocation, TxDOT may never be able to completely phase out assistance from outside consultants, and they may be underestimating their need for these consultants. As a result, it appears that external consultants will always be needed in some capacity.
- Fundamentally, TxDOT believes it has received what it expected from its consultants. Since the developers bring experienced consultants to the negotiation table, TxDOT cannot afford to participate in these negotiations without advisory consultants of a similar caliber.

Impact:

TxDOT is leading the PPP trend in the United States transportation industry. TxDOT has initiated several procurements for CDA projects around Texas. The launch of these procurements in parallel has placed a strain on the Department's resources. Since knowledge of the CDA program is gained primarily through on-the-job training, TxDOT is unable to quickly allocate more resources to assist with the CDA program. This results in certain staff spending a significant amount of their time on CDA-related work in addition to their normal workload. This could result in employee burnout and turnover.

In addition, the influx of procurements has also postponed the creation of programmatic documents. The lack of programmatic procurement documents could result in inefficiencies and potential inconsistencies between the different project selections, negotiations and final agreements. Continuing to initiate projects in parallel could impact the success of the projects if the necessary time is not devoted to each project.

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

Operational Strengths/Leading Practices:

- TxDOT's use of a SC and eventually a PB in the CDA program is a leading practice. The participation of senior leadership on the SC and PB demonstrates a commitment by TxDOT. Having these individuals involved with all of the CDA projects provides a decision-making forum that also provides for knowledge transfer and sharing of experiences among Districts.
- Similar to many international jurisdictions, the Department provides the contract agreement with the RFP and conducts one-on-one meetings with potential proposers that are interested in responding to the RFP. These processes are operational strengths that reduce the negotiation time, opposition and questions from proposers. They also present clarity and consistency from the Department.
- The development of CDA program manuals and typical terms is another leading practice. This type of information made available to potential proposers, developers, and/or contractors should help in the procurement process and expedite negotiations for future procurements.

Conclusion/Recommendation for Improvements:

Based on Deloitte FAS' assessment of the CDA program structure, TxDOT is committed to this program. Resources from multiple Divisions and Districts support the CDA program, but if this program continues to grow, more resources will be needed. TxDOT has developed project selection guidelines, a conflict of interest policy and is in the process of developing a manual and additional literature. In addition, TxDOT is strategically utilizing consultants to assist with the procurement process and the CDA program, while developing their own expertise, which may allow TxDOT to reduce their reliance on these consultants in the future.

By utilizing PPPs, it appears TxDOT will be able to better meet the needs of the State and continue to satisfy its desire to improve transportation, enhance revenue and improve operational effectiveness. The CDA program will allow the Department to generate revenue through the receipt of up-front concession payments and lease payments that can be used to initiate projects that are necessary but would not be possible without the additional funding from these payments. The CDA program will also develop new roads and/or improve current transportation routes, which will ease congestion and improve air quality among other things. This program also allows the Department to minimize its time spent during the design and construction phase and focus on other projects.

If the Department wishes to be successful with the CDA program, the general public needs to be better educated about it and TxDOT will need to achieve public acceptance of its policy. This may help to eliminate misconceptions associated with the CDA program.

The CDA program will ensure that a project is constructed years ahead of schedule, generate up front revenue for much needed projects, and transfers risks (e.g. lifecycle investments and maintenance) to the private sector. This program allows TxDOT to achieve it goals to reduce congestion, enhance safety, expand economic opportunity, improve air quality and increase the value of transportation assets.

Since PPPs have been in existence in Canada and in Europe for many years, TxDOT can take some of the leading practices developed in other countries and apply them to their CDA program.

- Embarking on multiple large CDA infrastructure projects could be considered as a form of business transformation, not merely a new program approach for TxDOT. Consequently, TxDOT should treat this new program area as an opportunity to undertake and drive change

Audit Area: D. Comprehensive Development Agreements	**Issue:** i. CDA Program Structure

through their organization. TxDOT needs to clearly articulate the change so that staff can see and determine what their role could be in such a change. Among other things, this requires effective communication about the changes, business process differences and overall benefits that will accrue, which TxDOT needs to clearly articulate to both staff and the community.

- TxDOT should consider developing a CDA program group and an active recruiting strategy. It has been identified that the skills necessary for employees to succeed on CDA project teams are developed through on-the-job training. Developing a group of professionals with CDA experience will allow synergies, efficiencies and leading practices to develop. The members of such a program group should be recruited with a wide variety of skills and background.
- The professionals currently involved with CDA project procurements are pressed for time and possibly unable to assume any additional CDA project responsibilities. The establishment and deployment of a SC and a PB are good ideas and examples of leading practices. However, if new projects are added or responsibilities are increased, professionals including those on the SC and PB may become over burdened and may find it difficult to devote the necessary time and energy to provide assistance with decision making on all projects. The Department should consider involving other professionals on the SC and PB to distribute and delegate some of the responsibilities. As a result, this may require additional focus and monitoring to verify that there are limited sources of inconsistency between projects.
- TxDOT needs to make a concentrated effort to fully develop the programmatic documents that have been postponed due to the Department embarking on numerous projects simultaneously. Going forward with this program, it will be important that these documents be completed. It may be helpful to prepare elements of the Department's revised practice manuals that are "modular" and flexible in order to adapt to the inevitable changes that will take place during the construction and concession phases of the projects currently in progress.
- Since the public receives a majority of its information through media outlets, the recent political attention and legislative challenges may have described the CDA program in a less than favorable light. A systematic and focused external communication strategy could clearly articulate the objectives for CDAs and the principles used to ensure that the best interests of the State are respected and protected. As a result, TxDOT should consider development of a focused external communication strategy to provide more information and education about the CDA program and the status of the various CDA projects to the general public to help address and achieve public acceptance of the CDA program.
- TxDOT should plan and define the typical metrics that will be utilized in monitoring and evaluating the construction and concession phases of CDA projects before too many of these projects are started. TxDOT could use consultants to help plan and define these metrics.

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

Background:

A major TxDOT initiative is the development and implementation of the CDA program to help meet transportation needs that exceed current funding sources. This initiative will help to meet TxDOT's mission of providing high quality transportation facilities in a timely manner when funding may be an issue or obstacle to beginning and completing construction. CDAs are a form of PPPs and include concessions, which are a tool used to help government organizations maximize their capital budgets by the investment of private capital in public transportation projects. Within TxDOT, the TTA Division is the OPR for the CDA program; however this program is also supported by all pertinent Divisions and Districts within TxDOT.

Human resource ("HR") issues related to the CDA program are a key concern of TxDOT. TxDOT is drawing upon resources that are already capacity constrained and must rely on external resources to supplement gaps in expertise. In addition, it appears that certain key TxDOT personnel hold much of the institutional knowledge regarding the CDA program. While Deloitte FAS views the CDA program as an overall opportunity, HR issues are a potential risk to this program. As a result, CDA HR Management was identified as an area for further evaluation during Phase 1 of the analysis.

Observation/Findings:

In order to more fully understand TxDOT's approach to CDAs with respect to Human Resources, in Phase 3, Deloitte FAS held discussions with professionals and leaders of the TTA, ENV, Finance, and ROW Divisions, and the OGC, as well as the Assistant Executive Director for Engineering Operations. These discussions and meetings also helped the Deloitte FAS team to understand the TxDOT's commitment to the CDA program, the current staffing situation, skill sets necessary to understand the full dynamics of the Program, and knowledge transfer and training issues in the HR area. From these discussions as well as an evaluation of available CDA related documentation and information, the following observations were made:

Staff Levels and Skill Sets Needed to Manage and Implement the CDA Program

- TxDOT has developed a number of individuals that are working on each of the CDA procurements to bring continuity and consistency to the procurement process. These professionals are balancing the CDA procurement reviews with their normal work, which at times results in excessive amounts of work.
- Consultants are relied upon heavily for their expertise in the PPP industry. In many instances, these consultants are also utilized to backfill the roles that TxDOT cannot fill due to staffing constraints.
- Division and Administration personnel support the CDA program, which has helped in the success the CDA program has seen to date. It has also allowed the procurement process to maintain consistency by the leadership participating on the SC that oversees all of the procurements. These professionals will also roll onto the PB that will oversee the construction phase of the CDA projects. While this continuity will assist with the delivery of the CDA program, these professionals are already time strapped with current responsibilities. Additional responsibilities such as the PB may result in too many obligations for these Division and Administration personnel. In addition, maintaining these activities with the key individuals limits the transfer of knowledge and the development of experience of other TxDOT staff.

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

- All of the Divisions that support the CDA program would benefit from additional resources to support the Program. Some Divisions are more pressed than others with respect to staffing issues. In particular, the ENV Division needs more assistance because any delay in their environmental review period will likely delay a project's progress.
- With the initial CDA project procurements, TxDOT management was responsible for conducting the entire process. This resulted in the institutional knowledge remaining with a few select individuals. As more procurements have begun, TxDOT management have involved other professionals in the process, which has allowed Division management to leverage talent and spread CDA program expertise to more professionals.
- The Finance Division has developed a strong base of knowledge since the start of the CDA program. Working with KPMG and Goldman Sachs consultants has allowed the Division professionals to build their own understanding and skill sets necessary to support the CDA program. The Department would like to lessen the level of reliance on KPMG and Goldman Sachs, which may include forming a section in the Finance Division that strictly focuses on the CDA program.
- In general, OGC attorneys spend significantly more time on the CDA program than was originally anticipated. OGC could utilize more full time attorneys to support the CDA program and reduce their reliance on outside attorneys and consultants. TxDOT previously envisioned reducing Nossaman's role, which includes providing PPP industry knowledge and assisting TxDOT with the delivery of the CDA program and is described in more detail in the CDA Program Structure section of this report, but when more projects were added, Nossaman was needed to support the CDA program where OGC was unable to due to staffing constraints.
- Recently, right of way professionals primarily involved with CDA projects were moved to the TTA Division. This was done to promote uniformity across the CDA projects so that all of the developers would be overseen by a central Division versus each District. The ROW Division will now oversee the right of way activities performed by the TTA Division. The current level of ROW Division resources supporting the CDA program appears adequate, but if the Division is looked to help move right of way acquisition for CDA projects along faster, more resources will be needed to make the process efficient.
- Due to the passing of the moratorium, SB792, TxDOT may be able to spend the time that would have been devoted to pursuing new CDA projects to focus on developing the exempt projects and further develop the Program, training materials, and recruiting appropriate staff.
- The knowledge TxDOT professionals are developing related to PPPs is valuable to the external market. As the result, TxDOT should consider whether there is sufficient staff trained on CDA projects to handle any experience gaps if and when staff leave TxDOT to work in the private sector.
- TxDOT is in the process of procuring multiple projects and has executed a contract on SH130 segments 5-6. The Department has a good idea of the staffing levels needed to conduct a CDA procurement. However, since none of the projects are fully into the construction phase, the Department is not able to specifically address the staffing needs to support the construction and concession phases. The construction phase will be supported primarily by the Districts. Considering that the concession projects are in addition to the District's normal work load, there is the potential the concession work could stretch the resources available in the Districts.
- As the OPR, TTA is bearing the majority of the work load related to the CDA program. These CDA projects are in addition to their normal work. TTA staff have been working at capacity for the last few years, thus if the CDA program continues to expand at its current rate without increasing the number of dedicated resources, burnout could result causing turnover and a loss

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

of a critical knowledge base.

- Due to the potential for changing design throughout the course of a project and issues with eminent domain rights, TTA's right of way and ENV Division personnel will likely have a larger role in the construction process than other Divisions. This increased role has the potential to stretch the resources in these two Divisions.
- TxDOT considered bringing ENV professionals into the TTA Division as it did with right of way professionals, but it was determined that District professionals understand their region better and have better contacts with design and environmental professionals than a central group in the TTA Division. As a result, ENV professionals were not added to the TTA Division. Thus, the responsibility for supporting CDAs will remain with the TTA Division and ENV District personnel and will be in addition to their normal work load.
- The Austin District's perspective is that with SH130 segments 1-4, which is a DB project, the Divisions answered questions in a timely manner. If more CDA projects would have been in process at the same time, the current resources dedicated to the CDA program would not be able to handle the resultant work load.
- Department professionals are developing their negotiating skills through the current CDA procurements. These skills are important when working with the developers that are experienced in negotiating PPPs.
- It is difficult to recruit financial professionals with the necessary industry experience from the private sector due to the Departmental salary limitations. Current Finance Division professionals are developing an understanding of the financial analysis required to evaluate CDAs by working with the consultants such as KPMG and Goldman Sachs.
- Strong project management skills will be important for the effective management of a CDA project since a delay to a CDA project could result in significant financial ramifications. Each phase of the project will require a certain level of oversight by TxDOT professionals, including the oversight of consultants during the procurement phase.

Knowledge Transfer and Training

- TxDOT is in the process of creating a CDA Manual, which will help define the programmatic approach of the Department. This manual is currently in a detailed outline form. The Department anticipates beginning to develop the content of the manual in Summer 2007. This manual would be used as a starting point to educate professionals on the CDA program.
- Various overview documents have been created to provide an introduction to the CDA program for Department and industry professionals. These are high-level documents created for introductory purposes and do not serve as training aids.
- The ENV Division has created a programmatic approach to their portion of the CDA program to address the proper allocation of risk. This approach can be used as a basis for all CDA projects.
- No formal training courses or documents exist related to the CDA program. Most training is conducted on the job. This lack of training results in TxDOT relying on the same population of professionals to perform the tasks required for each procurement. Although this practice maintains consistency through the procurement process, it does not allow for the development of other professionals necessary to support the Program as it expands.
- TxDOT has little experience managing concession type projects. Concession projects typically transfer the majority of the risks and responsibility to the developer and require the owner to take a lesser role in the development of the project. This is much different than the typical role TxDOT plays on traditional projects and even DB projects.

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

- Currently there is a captive audience of Department engineers that would like to learn about the CDA program. They are given exposure to the proposal financing through training based on a sample basic term sheet.
- TxDOT would like to become more self-sufficient in the legal area of CDAs; however, it is difficult to find legal professionals that have applicable PPP experience. OGC typically looks for lawyers with contract experience during the recruiting process, and then provides on-the-job training to bring them up to speed. This training includes, in part, reviews of CDA program materials and teaming with Nossaman attorneys in meetings.

Impact:

The CDA program is a major initiative of the Department. TxDOT is in the process of completing multiple CDA project procurements. Many of the same professionals staff each of these procurements. This results in uniformity across the procurements, but it also could result in overworked employees since they must complete the procurement activities in addition to their normal work. Continuing to procure CDA projects at this rate could result in employee turnover and/or burnout.

Completing multiple CDA projects in parallel also postpones the development of the programmatic documents and training materials due to the limited availability of available resources to devote to those documents. These documents are essential to the efficiency of the overall program and to the development of TxDOT staff's applicable knowledge of the Program. In addition, while TxDOT is making efforts to expand its internal knowledge base, much of the institutional knowledge still resides with certain key executives. A loss of any of these individuals could significantly disrupt the effective execution of the CDA process.

Operational Strengths/Leading Practices:

- The use of a SC and eventually a PB is a leading practice. The participation of senior leadership on these boards demonstrates a commitment by the Department. Having these boards involved with all of the CDA projects provides a decision-making forum that provides for cross-fertilization and sharing of experiences among Districts.
- Working with the Department's consultants allows Department professionals to receive knowledge transfer on how to perform the tasks the consultants are currently responsible for, including financial modeling and feasibility analyses, as well as structuring agreements. This is an operational strength that has been a benefit to Finance and OGC personnel as well as other Department employees involved in the Program.
- The involvement of District personnel is an operational strength that increases the population of Department professionals that can effectively participate in the procurement process. It also allows the District responsible for monitoring construction to understand the dialogue that occurred during the procurement process, which will assist with interactions with the developer.

Conclusion/Recommendation for Improvements:

Based on Deloitte FAS' assessment of the direction of the CDA program, the Department is dedicated to the CDA program and is working towards training other TxDOT employees the

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

necessary skills needed to succeed in the Program. The Department is also in the process of developing CDA program training materials.

The Department is a leader in the PPP industry within the United States. Many other State DOTs are looking to TxDOT to pave the way in the PPP industry. The Department has successfully completed one CDA procurement and is working on multiple other procurements across the State. This program will allow the Department to fulfill it goals and missions. As this program continues to grow, it is imperative that the Department increase its resources supporting the CDA program. This can be done through the development of training materials and involving more Department professionals in the process.

- The Finance Division should train District professionals on the financing of the CDA projects so that when the Districts approach TxDOT Divisions and Administration with a potential CDA project, the District also has supporting financial information including whether the potential CDA project is feasible. This could reduce the time the Finance Division spends on projects that are not eligible to be in the CDA program.
- The Department should work with consultants to create training that can be delivered to TxDOT professionals. This would allow quicker knowledge transfer and would potentially allow the Department to assume some of the responsibility currently performed by the consultants. This training could include both computer based and face-to-face training.
- The Department should train employees on the responsibilities of each of the Divisions supporting the Program. This would allow everyone involved to have a broad overview of the Program and understand the time each Division needs to support a CDA project.
- When adding resources to the CDA program, the Department should signal to interested individuals and the rest of the organization the type of skills, abilities, and background that are needed in order to contribute and succeed in a CDA role. Through this internal communication strategy, the Department could also define the performance metrics being used, and the benefit of implementing such a transformation.
- The Department may want to establish a dedicated staff and leadership team which will move forward with the CDA program. This could be accomplished through the creation of a CDA Division or separate section within TTA. Through this separate Division or section, uniformity and efficiency could be maintained across all projects since the professionals would be solely focused on CDA projects.
- The ENV Division should consider establishing a new CDA manager position. It is important that the position be given the correct level of authority within the organization, possibly a position that reports directly to the Deputy Division Director but has the ability to draw on any required ENV staff or consultant resources on an as needed basis to support CDA issues. This will provide for a single point of contact within the ENV Division for CDA related items and also provide a single source of accountability for CDA issues. This type of arrangement would allow the ENV Division to be better suited to transfer the CDA program level knowledge base to a project specific basis. In addition, as the volume of CDA projects increase the ENV-CDA group should be supplemented with full time FTEs as required.
- The Department may also consider developing more flexible hiring models that would allow the Department to recruit private sector professionals with PPP related experience. This would require increasing the number of Department FTEs and salary caps.
- Based on TxDOT's support of the CDA program and the potential for the Program to continue beyond the initial legislative term, TxDOT should begin creating a talent management and succession plan. This would demonstrate to the staff that the CDA program is a key initiative for the Department and that embracing the CDA approach may provide opportunities for growth

Audit Area: D. Comprehensive Development Agreements	**Issue:** ii. CDA Human Resource Management

and advancement.

- TxDOT should more fully develop the project related roles and responsibilities that will be needed during the construction and concession phases.

Section 6: Conclusion

The information presented above summarizes the findings from Phase 3 of the TxDOT requested Independent Assessment for Auditable Unit – B Contracting and Project Delivery. Deloitte FAS analyzed and evaluated the activities, tools and procedures used by TxDOT to develop, deliver, maintain and administer the various components of highway or multi-modal projects in order to identify risks and opportunities for TxDOT consideration. In addition, Deloitte FAS identified TxDOT operational strengths and exemplary practices currently being utilized by TxDOT Divisions and/or Districts, as well as other transportation agencies.

Appendices

Appendix A: Interviews Conducted

The Deloitte FAS – Auditable Unit B - Contracting and Project Delivery Team interviewed the following individuals:

Unit	Individual	Title	Phase Interviewed
Texas Transportation Commission	Ric Williamson	Chairman	1
	Ted Houghton	Commissioner	1
Administration	Michael W. Behrens, P.E.	Executive Director	1
Engineering Operations	Amadeo Saenz, Jr., P.E.	Assistant Executive Director	1, 3
Audit Office	Owen Whitworth	Director	1
	Donna Roberts	Internal Auditor	1
Aviation Division	David S. Fulton	Director	1
	William B. Fuller, P.E.	Director of Engineering	1
	Karon Wiedemann	Grant Management Director	1
Bridge Division	William R. Cox, P.E.	Director	1, 3
	Michael S. O'Toole, P.E.	Project Development Director	1, 3
	Keith Ramsey, P.E.	Field Operations Section Director	1, 3
	David P. Hohmann	Bridge Design Section Director	1
	Steven D. Smith	Administration	1
	Thomas E. Rummel, P.E.	Senior Bridge Project Manager	3
	Richard Morgan, P.E.	Bridge Plan Reviewer	3
Construction Division	Kenneth J. Boehme, P.E.	Field Engineer	3
	Thomas R. Bohuslav, P.E.	Director	1, 3
	Ken L. Barnett, P.E.	Construction Section Director	3
	Scott Nichols	CPA Manager	3
	John C. Jameson	Construction Engineering Specialist	3
	Jay Tarwater	Construction Engineering Specialist	3
Design Division	Mark A. Marek, P.E.	Director	1, 3
	Camille Thomason, P.E.	Consultant Contract Office Director	1, 3
	Dan M. Neal II, P.E., P.G.	Associate Director of the Consultant Contract Office	1, 3
	Linda Olson	Director Letting Management	3
	Thomas Beeman, P.E.	Field Coordination Section B Director	3
	Maria G. Burke, P.E.	Field Coordination Section A Director	3

Unit	Individual	Title	Phase Interviewed
	Barrie Cogburn, RLA	Landscape/Enhancement Section Director	3
	Bill Kirwin, RLA	Landscape Architect	3
	Sundee McKnight	Consultant Contract Specialist	3
	Jessica Turner	Project Development EIT	3
	Chris Lindsey	Project Development EIT	3
	Brian Bradford	Project Development EIT	3
Environmental Affairs	Dianna F. Noble, P.E.	Director	1, 3
	Jimmy Tyree	Deputy Division Director	1, 3
	Jim Barta, P.E.	Project Management Section Director	3
	James Melton	Division Administration Manager	3
	Mary Perez	Natural Resource Management Section Director	3
	Jenise Walton	Field Area I Team Lead	3
	Elvia Gonzalez	Field Area II Branch Manager	3
	Jason Barrett	Archeological Studies	3
	Lain Ellis	Archeological Studies	3
Finance Division	James Bass	Chief Financial Officer	1
	John Munoz, CPA	Deputy Division Director	3
Maintenance Division	Zane L. Webb, P.E.	Director	1
Right of Way Division	John P. Campbell, P.E.	Director	1, 3
	Gus Cannon	Resource Management Section Director	1, 3
Texas Turnpike Authority Division	Phillip E. Russell, P.E., J.D.	Director	1, 3
	Edward P. Pensock, P.E.	Director of Turnpike Corridor Systems	3
	Diana Vargas	CDA Team Leader	3
Traffic Operations Division	Carlos A Lopez, P.E.	Director	1
	Carol T Rowson, P.E.	Field Operations Director	1
	Jim Cotton	Management Support Section	1
Transportation Planning & Programming	James L. Randell, P.E.	Director	1, 3
	Wayne E. Dennis, P.E.	Deputy Director	1, 3
	Jack H. Foster, P.E	Transportation Systems Planning Section Director	3
	Wayne Wells	Strategic Planning Specialist	3
Business Opportunity Programs Office	James T. Dossett	Director	1

Unit	Individual	Title	Phase Interviewed
	Efrem Casarez	DBE Program Director	1
Office of General Counsel	Bob Jackson	General Counsel	1, 3
	Janice Mullenix	Director of Contract Services	1
	Joanne Wright	Deputy General Counsel	1
	Jack Ingram	Associate General Counsel	3
Information Systems Division	Tim Jennings	Director of Customer and Application Services	3
	Lealean Peace	Director of Business Operations	3
Austin District	Thien Nguyen	Contract Engineer	3
	Scott Cunningham	Traffic Engineer	3
	Cecelia Irvin	Contract Specialist	3
Bryan District	Cecelia McCord	Contract Administrator	3
	Kayvon Jahedkar, P.E.	Bridge Engineer	3
Houston District	Elvia R. Cardinal, P.E.	Consultant Contract Administration Director	3
	Charles E. Gaskin JR., P.E.	Director of Construction	3
	Susan Theiss	Environmental Supervisor	3
	Walter D. Torres	Construction Administrator	3
	Darlene M. Campodonico	Contract Specialist	3
New Jersey Department of Transportation	Kathy Diringer	Office of Policy and Coordination	3

Appendix B: Documents Evaluated

The Deloitte FAS – Auditable Unit B - Contracting and Project Delivery Team read and analyzed the following documentation:

Document Description (Internal Documentation)
Texas Department of Transportation (TxDOT) Organization Chart
TxDOT – Division Organization Charts
TxDOT – Division Functional Overview (were available)
TxDOT – Division Policy and Procedures
TxDOT - Office Organization Charts
Texas Transportation Commission – Forward Momentum, A Report to the 110th Congress, 1st Session
TxDOT – Meeting the Texas Transportation Challenge, 80th Texas Legislative Session
TxDOT has a Plan, Strategic Plan for 2007 – 2011
TxDOT – Consultant Errors and Omissions, Correction and Collection Procedures – December 2006
TxDOT – Traffic Operations Division Overview (January 2007)
Texas Maintenance Assessment Program (TxMAP)- FY 2006
TxDOT Operating Budget for Fiscal Year 2006
TxDOT Routine Maintenance – 2006 Annual Report
Texas Statewide – Detailed Maintenance Efficiency and Analysis Report –FY 2006
TxDOT FY 2006 Maintenance Budget Allocation
Right of Way Performance Monitoring Measures Year to Date Report, 4th Quarter-FY 2006
Right of Way Acquisition Service Contract with Attachments and Supplements (Example)
Right of Way Payment / Personnel Monitoring Log (Example)
Texas Department of Transportation Construction Contract History (FY 2004 through FY 2006)
TxDOT Construction Division Change Order History by District (FY 2003 through FY 2006)
TxDOT Construction Division Change Order History Summary (FY 2003 through FY 2006)
TxDOT Finance Division – Code Charts and Process Maps for Various Operations
TxDOT Preliminary Engineering Costs on Construction Projects (2003, 2004, & 2005)
Texas Department of Transportation – Annual Report on Measures (FY 2003 through FY 2006)
TxDOT Internal Memorandum – AY 2007, AY 2008, and AY 2009 Approved Budget Allocations
TxDOT Full Time Equivalent (FTE) Report – First Quarter FY 2007
TxDOT Design Division Consultant Contracts Allocation Report (Budget Request / Expenditure / Percent Utilized) (FY 2004 through FY 2006)
TxDOT Design Division Professional Services Contract Selection and Award Process
TxDOT Design Division Professional Services Contract Supplemental Agreement Process
TxDOT Internal Audit – Contract Payments Audit (1502-1) Department Wide Report
TxDOT Internal Audit – Performance Measures Audit (1501-1) Department Wide Report

TxDOT Internal Audit – Oversight of Survey Contracts Function (1201-2) Department Wide Report
TxDOT Internal Audit – Oversight of Survey Contracts Function Follow-up (1201-2F) Department Wide Report
TxDOT Internal Audit – Letting Audit (1201-4) Statewide Report
TxDOT Internal Audit – Letting Follow-up (1201-4F) Department Wide Report
TxDOT Internal Audit – Consultant Engineering Contract Administration Function (1103-1) Department Wide Report
TxDOT Internal Audit – Project Authorization Process (102-4) Department Wide Report
TxDOT Internal Audit – Project Authorization Process Follow-up (102-4F) Department Wide Report
TxDOT Internal Audit – District Design Oversight (202-3) Department Wide Report
TxDOT Internal Audit – District Design Oversight Follow-up (202-3F) Department Wide Report
TxDOT Internal Audit – DBE Compliance / Program Function (204-16) Department-wide Report
TxDOT Internal Audit – DBE Compliance / Program Function Follow-up (204-16F) Department-wide Report
TxDOT Internal Audit – Aviation Grant Management Function (1202-2) Department-wide Report
TxDOT Internal Audit – Comprehensive Development Agreement Selection Process Audit Function (1407-4) Department-Wide Report
TxDOT Internal Audit – TTA Contracting and Financial Compliance (103-8) Department-wide Report
TxDOT Internal Audit – TTA Contracting and Financial Compliance Follow-up (103-8F) Department-wide Report
TxDOT Internal Audit – General Engineering Contracts, Function (404-3) Department-wide Report
TxDOT Internal Audit – General Engineering Contracts Follow-up (404-3F) Department-wide Report
TxDOT Project Selection Process – Transportation Planning and Programming Division
TxDOT Internal Audit Manual
TxDOT Bridge Inspection Manual
TxDOT Bridge Project Development Manual
TxDOT Bridge Assignment Listing
TxDOT Bridge Plan Review Submission Schedule
TxDOT Historic Bridge Preservation Analysis
TxDOT Bridge Division – Weekly Progress Reports (Example)
TxDOT Procedures for Projects Involving Historically Significant Bridges
TxDOT FY2006 Bridge Work Let
TxDOT Bridge Division Software List
TxDOT Design Division Software List
TxDOT Right of Way Software List
TxDOT Comprehensive Development Agreement (CDA) Programmatic Term Sheet

TxDOT Report on the Impact of CDA's on the DOT's Information Systems
Dallas Fort Worth Connector Request for Qualifications (RFQ)
Interstate 69 RFQ
Highway 635 RFQ
North Tarrant Express RFQ
State Highway 161 RFQ
US 281 RFQ
State Highway 130 Progress Reports 16 & 18
State Highway 130 Partnering Bi-monthly Report (September 2003)
State Highway 130 Exclusive Development Agreement
TxDOT Forms Management Manual
TxDOT Construction Contract Administration Manual
TxDOT Estimates Manual
TxDOT Letting Manual
TxDOT Site-Manager Contract Administration Manual
TxDOT Site-Manager Materials Management Manual
TxDOT Construction/Maintenance Project Life Cycle
TxDOT Land Acquisition Manual
TxDOT Best Practices and Guidelines for Effectively Using a Contract Workforce
TxDOT Pre-certification Process Guidelines
TxDOT Disadvantaged Business Enterprise Verification Manual
TxDOT Professional Services Procurement Process Flow Chart
TxDOT Contract Management Manual
TxDOT Quality Assurance Program
TxDOT Procedure for Evaluating Unbalanced Bids
TxDOT Engineering Architectural and Surveying Manual
TxDOT Project Development Process Manual
TxDOT Plans Specifications and Estimates (PS&E) Manual
TxDOT letting Schedules: Feb 2007 - July 2007
TxDOT Approved Letting Lists (Feb. 2006 - July 2007)
TxDOT 2006 Fourth Quarter Letting Report and Summary
TxDOT P.S. & E. Review and Processing Schedule for FY 2007
TxDOT Maintenance Contract Manual
TxDOT Maintenance Management Manual
TxDOT Maintenance Operations Manual
TxDOT Maintenance/Construction Process Flow Chart
TxDOT Statewide Mobility Program
TxDOT Environmental Inspector Manual
TxDOT Environmental Manual

TxDOT Project Development Process Flow Chart
TxDOT Project Selection Process Pamphlet
TxDOT Transportation Planning Manual
TxDOT Transportation Planning Policy Manual
TxDOT Transportation Planning Process Manual
TxDOT Transportation Programming & Scheduling Manual
TxDOT Environmental Unexpected Issues Pamphlet
TxDOT Work Authorization Procedures for Environmental Administer Contracts
TxDOT Design Division Accelerated Construction Strategies Presentation
TxDOT Design Division Status Report on Changes to Consultant Contracting Presentation
TxDOT Transportation Planning & Programming (TP&P) Division Total Project Cost Presentation
TxDOT TP&P Annual Scope & Estimate Documentation Spreadsheet
TxDOT TP&P – 2007 Statewide Mobility Program
TxDOT Right of Way Manual
TxDOT Use of Right of Way by Others Manual
TxDOT Right of Way Appraisal and Review Manual
TxDOT Utility Manual
TxDOT Information Resources Pocket Facts
TxDOT Specifications for Construction and Maintenance of Highways, Streets, and Bridges (July 1, 2004)
TxDOT Schedule of Liquidated Damages
TxDOT Administrative Circular NO. 17-93
TxDOT Procedures for Evaluating Unbalanced Bids
TxDOT Project Documentation for the Following Projects: CSJ #'s 2374-02-114, 0915-12-404, 0016-04-083, 0074-06-201, 0151-05-072, 0084-01-019, 5020-12-000, 2980-01-008, 1378-01-023, 9880-10-190, 2879-01-007, 0083-08-043, 0112-03-027, 0912-71-544, 1447-01-018, 0261-02-064
Document Description (External Documentation)
Association of State Highway and Transportation Officials (AASHTO) Design-Build Practices for Transportation Projects
AASHTO Software Catalog
California Department of Transportation Public Private Partnership Legislation
Colorado Department of Transportation Public Private Partnership Legislation
Federal Highway Administration (FHWA) Requirements for Design-Build Contracts
FHWA Design-Build Overview and Case Studies
FHWA Design-Build Effectiveness Study
FHWA Prerequisites for Design-Build Construction Contract
FHWA Guidelines on Preparing Engineers Estimate, Bid Reviews and Evaluation
FHWA Public Private Partnerships (PPP) Model Legislation
FHWA Environmental Guidebook

FHWA Delegation of Federal Environmental Responsibilities For Highway Projects Report
FHWA Technical Advisory Report on Incentive/Disincentive Contracting
FHWA A + B Bidding Techniques
Illinois Department of Transportation (IDOT) Standard Agreement Provisions for Consultant Services
IDOT Consultant Prequalification
IDOT 2006 & 2007 Budgets
IDOT Cost Estimating Manual
New Jersey Department of Transportation (NJDOT) Professional Services Procurement Manual
NJDOT Consultant Evaluation Systems Manual
NJDOT Consultant Quality Assurance Guidelines
NJDOT ROW Manual
NJDOT Road User Cost Manual
NJDOT 2006 & 2007 Budgets
Florida Department of Transportation (FDOT) Design-Build Guidelines
Virginia Department of Transportation (VDOT) Concurrent Engineering Manual
VDOT Concurrent Engineering Process Flow Chart
VDOT Concurrent Engineering Project Flow Chart
VDOT Design-Build Procurement Manual
VDOT Manual for the Procurement & Management of Professional Services
VDOT Process for Securing Professional Services
VDOT Report on Road User Costs as a Basis for Incentive/Disincentive Contracts
VDOT CDA Guideline Documentation
VDOT Budget 2006 – 2007
Washington Department of Transportation (WSDOT) Design-Build Project Delivery Manual
WSDOT Consultant Services Procedures Manual
WSDOT A + B Bidding Project Delivery Guidelines
WSDOT Incentive/Disincentive Manual
Wisconsin Department of Transportation Construction and Materials Manual
Federal Highway Attachment E Bridge Construction Unit Cost per Square Foot
Texas Department of Transportation – Highway Design Cost Comparison (February 1999) by Price Waterhouse Coopers
Consulting Engineers Council of Texas – A Review of TxDOT Cost Allocation Methodologies by MGT of America
Utilization of Consulting Engineers for Highway Project Development
Utilization of Consultants by SDHPT Research Report 1100-1F, Texas Transportation Institute The Texas A&M University System College Station, Texas
Utilization of Consultants by the State Department of Highways and Public Transportation by W.V. Ward, Clyde E. Lee, and Christopher M. Bradley, Research Report 1101-1F
2004 Report to Congress on Public Private Partnerships

Appendix C: Projects Assessed

The Deloitte FAS – Auditable Unit B - Contracting and Project Delivery Team evaluated information for numerous TxDOT projects. Specific to the assessment of TxDOT's Adequacy of Project Controls and Effectiveness of Project Delivery Systems, Deloitte FAS identified the following projects for evaluation:

Projects Recently Receiving Environmental Clearance		
Project Name	***CSJ Number***	***District***
SH 225	5020-12-00	Houston
FM 2934	2980-01-008	Dallas
RM 1431	1378-01-023	Austin
FM 623	988-01-019	Corpus Christi
FM 1297	2879-01-007	Atlanta
Projects Recently Let to Construction		
Project Name	***CSJ Number***	***District***
SH 11	0083-08-043	Atlanta
US 290	0112-03-027	Austin
VA	0912-71-544	Houston
FM 1352	1447-01-018	Corpus Christi
US 67	0261-02-064	Dallas
Projects Recently Completed Construction		
Project Name	***CSJ Number***	***District***
	2374-02-114	Dallas
	0915-12-404	San Antonio
	0016-04-083	San Antonio
	0074-06-201	Corpus Christi

Appendix D: TxDOT Project Delivery Software

The Deloitte FAS – Auditable Unit B - Contracting and Project Delivery Team developed the following list of project delivery software used throughout TxDOT. It may not be a comprehensive list of all project delivery software TxDOT may use and/or own:

Software	Description	Operational Division or District
ACR - Accumulative Count Recorders	Collects and analyzes 24-hour traffic data to provide traffic-volume counts	Transportation Planning & Programming Division
Active Right of Way Projects Database	The Active Right of Way Projects Database System enables Right of Way personnel in the Division to capture information about all in progress Right of Way projects with associated filing information for each project. Used for research and tracking project status.	Right of Way Division
Adapt ABI 4.50	ADAPT-ABI is structural analysis software for the design of post-tensioned concrete structures, including the ability to handle stage construction and time dependent effects. TxDOT BRG uses the software for the design of post-tensioned segmental bridges and post-tensioned straddle bents.	Bridge Division
ADY - Data Dictionary User Reports	Data Dictionary User Reports (ADY) read ADABAS Predict data dictionary entries and print a series of reports.	
ALOAD2	TxDOT program for calculating loadings on retaining walls (used for railroad loadings)	Bridge Division
Ansys Professional with Workbench 11	Finite element analysis, used for fatigue mitigation schemes for bridges prone to fatigue cracking	Bridge Division
Approved State Wide Appraisers Database	The Approved State Wide Appraisers Database System enables Right of Way personnel in the Division to capture and manage information of all documents filed for associated approved statewide appraisers. Appraiser's approved status. State Appraiser Application. State Appraiser Contract. Child Support Verification and Appraiser Certification/License.	Right of Way Division
ARC MAP	Used for plotting longitude and latitude on maps for bridge locations	Bridge Division

Software	Description	Operational Division or District
ArcIMS	ArcIMS provides the foundation for disseminating high-end geographic information systems (GIS) and mapping services via the Internet.	Design Division
ArcSDE	ArcSDE serves spatial data to the ArcGIS Desktop (ArcView, ArcEditor, and ArcInfo) and through ArcIMS, as well as other applications and it is the key component in managing a multi-user spatial database.	Design Division
ATR - Automated Traffic Recorders	Automated Traffic Recorders	Transportation Planning & Programming Division
B30 v 5.1	TxDOT version of public domain continuous beam analysis program for highway bridges that was the primary tool used for design steel plate girder bridges until the advent of DESCUS I.	Bridge Division
B33 Beta v 2.1	TxDOT version of public domain program which calculates properties of plate girder properties for highway bridges (limited current use, if any)	Bridge Division
BAMS – Bid Analysis Management System	Decision Support System (DSS) is the analysis part of the Bid Analysis Management System/Decision Support System (BAMS/DSS). It was developed by Infotech for AASHTO.	Construction Division
Bar 7 (7.11)	Load rating of continuous steel bridge superstructures	Bridge Division
BASP 1.4.0	UT Austin developed stability analysis program associated with Dr. Yua's stability class (rarely, if ever, used for production)	Bridge Division
BDG – Bridge Inventory Inspection & Appr.	To indicate current and future needs of structures, which includes replacement and maintenance.	Bridge Division
Bentley Geopak	Object-oriented software for modeling bridges	Design Division
BIS/FIMS Interface – Business Information System	For preparation and monitoring of TxDOT budget. The Budget Information System (BIS) is a replacement for the Budget Preparation System (BUDP) and Budget Monitoring System (BUDM).	Finance Division
BMCOL51 v 5.01	Generalized beam-column discrete element model to analyze simple and continuous beams subjected to concentrated, uniform, uniformly varying, and non-uniformly varying static and movable transverse loads.	Bridge Division

Software	Description	Operational Division or District
BPS – Bid Proposal System	System for the production and distribution of highway construction bid proposals.	Construction Division
CALIBR - Calibration Manager	Calibration Manager is a subsystem of Laboratory Information Management System (LIMS) which is used for the management of data associated with equipment TxDOT uses for pavement material testing.	
CAP18 v 6.0	A specialized structural analysis program using a discrete element model that produces envelopes of maximum bending and shear forces acting on bridge bent caps.	Bridge Division
CBS – Contractor Bidding System	Automates the process of qualifying contractors wanting to do business with TxDOT	Construction Division
CCIS – Consultant Certification Information System	The Consultant Certification Information System (CCIS) automates the process of pre-certification of engineers, architects, and other associated firms that apply for consultant work with the department.	Design Division
CIS - Contract Information System	Means to update, receive reports, monitor progress and authorize payment from time of letting.	Construction Division
Citrix Client	Remote access to TxDOT network	Information Systems Division
CMCS - Const/Maint. Contract System	CMCS is a standardized method to process and manage the department's maintenance contracts. Contract Processing and Insurance Information are also processed through CMCS for both maintenance and construction contracts.	Construction Division
CMCS – CES System (CICS Editor)	The CICS Editor System (CES) is an online editor for CICS which emulates the ROSCOE editor and is utilized for CMCS JCL members.	Information Systems Division
CMCS – Const/Maint Contract Syst (Advertisements)	Advertising is a subsystem of CMCS.	Design Division
Colorado Rockfall Simulation Program 4.0	Rockfall catchment design	Bridge Division
Computer Associate Roscoe	CA programming facility for IBM mainframe	Design Division
Contract Management system (web based)	Used by Bridge administration to monitor contract information progress	Bridge Division
COSB1 v 3.00	Analyzes cantilever overhead sign bridge typically built in Texas. Structure geometry and analysis are based on the	Bridge Division

Software	Description	Operational Division or District
	assumptions and limitations described in the help document.	
CSI - City Street Inventory System	The City Street Inventory System (CSI) is an inventory of the city street mileage by surface type for cities of population of 5,000 and over.	Transportation Planning & Programming Division
CTS - Contract Tracking System	Provides the means to track change order related correspondence on non-SiteManager contracts.	Construction Division
CULV5 v	Specialized structural analysis program that determines the forces acting on the different elements of a box culvert using the direct stiffness method.	Bridge Division
Culvert	Modeling program for culverts	Design Division
DCIS - Design & Construction Information System	Provides useful information for preliminary engineering on construction projects.	Design Division, Right of Way Division
Deep Exploration 3.0	Is a conversion program that is used to communicate between all of the 3D and CAD programs. It converts files types to other file types i.e. .3ds to .ma	Bridge Division
DESCUS Software Package	Design curved steel plate I-girders & Tub-girders	Bridge Division
DOSCH 3D: Software Package	pre-made models and textures to be used in scenes created with structures	Bridge Division
Dplot 2.0.7.4 / Hydrosphere / Climate Data - NCDC Summary of the Day West 2 Region Vol.17	Rainfall data and data analysis for use in hydrological analysis for bridge scour predictions	Bridge Division
DSS - Decision Support System	Provides a detailed analysis of item costs, used by the Districts for forecasting and budget purpose. This system is used for collusion detection.	Construction Division
EBS – Electronic Bidding System	The Electronic Bidding System (EBS) permits electronic submission of digitally signed bids by qualified vendors.	Construction Division
EMINENT DOMAIN Database	The Eminent Domain Database System enables Right of Way personnel in the Division to capture information about Parcels submitted for Condemnation Proceedings. This information is used to prepare the minute order and related documents, and to track and monitor the progress of the parcels as they move through Division review, before the parcels are transmitted to the Attorney General's	Right of Way Division

Software	Description	Operational Division or District
	office for the actual condemnation process.	
ENV GIS - Environmental GIS	This is a GIS Geo-database project. Statewide Environmental GIS - Customized Spatial Data Server. This system utilizes ArcGIS to create maps and retrieve data from TxDOT GIS Servers for environmental processing of TxDOT projects.	Environmental Division
EOS - Equipment Operating System	EOS maintains an inventory control for all TxDOT's major highway equipment, and provides interfaces with FIMS, MSMS and SLD to ensure the proper control of the major assets of TxDOT.	Government & Business Enterprises
EPRS - Electronic Project Records System	The Electronic Project Records System (EPRS) will improve TxDOT's communications with the contracting community and assist TxDOT Districts / Divisions in sending and receiving information to and from contractors with the development of a standard secure electronic data transmission method.	Construction Division
EPS – Economic & Planning		Traffic Operations Division
Ericom Software PowerTerm	TN3240 Mainframe remote console	Information Systems Division
Estimator	Estimator is a stand alone cost estimation system for transportation construction	Construction Division, Design Division, Bridge Division
ETS - Environmental Tracking System	The Environmental Tracking System (ETS) is a database system designed to track environmental processes of projects submitted by TxDOT's 25 Districts to the ENV Division.	Environmental Division
EVM - Environmental System	The Environmental System (EVM) performs analysis of the environmental impact from actual and projected traffic flows. This is necessary to minimize harmful effects caused by air and noise pollution. Subsystems include: Mobile5A, Caline3	Environmental Division
FB-Pier 2.0	Vessel impact analysis (e.g. ship hitting piers of structure over shipping lanes)	Bridge Division
FIMS - Financial Information Management System	Records all of TxDOTs accounting events. It is the basis for all official dept. financial info.	Finance Division, Right of Way Division
FlexLM	License management software for GEOPAK 2001 Suite and ESRI products	

Software	Description	Operational Division or District
FOSSA 1.0	A settlement prediction program used for design of embankments and retaining walls over soft soils.	Bridge Division
FPAA - Federal Project Authorization and Agreements System	The Federal Project Authorization and Agreements System (FPAA) is an application that manages the instruments used to obligate federal funds (Federal Project Authorization and Agreements).	
FRAME11 v	TxDOT program for analyzing beam columns	Bridge Division
Global Mapper V7	Converts, viewers, edits vector, raster, and elevation datasets	Design Division
GoldNail 3.11	Soil nail wall design and analysis	Bridge Division
Google Earth Pro	View and research locations	Design Division
GPS Pathfinder Office 2.80	GPS data post processor used to maintain bridge location data in bridge inspection database	Bridge Division
GRLWEAP 2005 1.0	Wave equation analysis for pile driving	Bridge Division
GSTABL7 with STEDwin 1.004	Analysis of global slope stability for walls and embankments	Bridge Division
HC2002	Highway capacity modeling program	Design Division
HCI - Highway Cost Index System	The Highway Cost Index System (HCI) calculates the cost index of bid items used in the letting of highway construction contracts. This data can be used by the Districts for forecasting and budgetary purposes. HCI uses data from the Bid Analysis Management System/Decision Support System (BAMS/DSS).	Construction Division
HCRS - Highway Condition Reporting System	The Highway Condition Report System is a road condition data entry system and road conditions web site to record and display highway road conditions.	Traffic Operations Division
HEC-RAS 3.1.3	River flow analysis for use in bridge scour prediction	Bridge Division

Software	Description	Operational Division or District
HPMS – Highway Performance Monitoring	System used to determine statewide rehabilitation, reconstruction, and construction requirements.	Transportation Planning & Programming Division
IPLOT	Advanced plotting software for MicroStation	
KaKp	TxDOT utility for calculating earth pressure coefficients	Bridge Division
LET - Letting System	Used to record and tabulate the low bidders for highway construction and maintenance contracts.	Construction Division
LIMS - Laboratory Information Management System	The Laboratory Information Management System (LIMS) is a software application that assists laboratory engineers and supervisors to organize laboratory operations in an automated manner that improves the efficiency and productivity of the laboratory. LIM	
Lpile Plus 5.0	Design/Analysis of laterally loaded piles and drilled shafts	Bridge Division
LRBM - Load Restricted Bridge Map	Load Restricted Bridge Map is a map displayed on the TxDOT Internet site showing publicly owned bridges, both those maintained by TXDOT and those maintained by local governments, that have a load restriction placed on them.	Bridge Division
MAPPING Database	The Mapping Database System enables Right of Way personnel in the Division to capture information about map submissions from the Districts. The Type of Map, Property Description, Quality of Maps, and Dates Approved are part of the data collected for each Map. The system is used for tracking and monitoring the quality of all maps submitted by the Districts.	Right of Way Division
MathCad 14 Enterprise Network 14.1	Perform general engineering calculations	Bridge Division
MathPlayer plug-in for IE_1.0.0	Supports viewing of mathematical formulae in IE. Used in preparation for PE examination.	Bridge Division
MathType 5.2 (WIN)	MathType is a powerful interactive tool that lets you create mathematical notation for word processing, web pages, desktop publishing, presentations, and for TeX, LaTeX, and MathML documents. Used to create mathematical notation for various papers, presentations, and/or web pages.	Bridge Division

Software	Description	Operational Division or District
Maxwell Render 1.1	Is a rendering program that renders a scene with real life physics that was built inside of another program i.e. Maya, MicroStation or 3DS Max	Bridge Division
Maya 8.5 Unlimited with USB HWL	Is a 3D modeling software which is more artistic than engineering therefore the user can be more creative with fewer constraints but still maintain accurate models	Bridge Division
MCC – Manual Classification Count	The Manual Classification Count System (MCC) does analysis of vehicle classification data. Data is collected at approximately 1200 sites across the state, and consists of counts of thirteen classes of vehicles.	Transportation Planning & Programming Division
MCS - Material Control System	The Material Control System (MCS) formalizes test results of all materials submitted to the Materials and Tests Division (MTD) for quality testing and makes those results available on-line to all interested parties.	Construction Division
McTrans TSIS v5.1	Traffic Software Integrated System - Corridor Simulation	Design Division
Microsoft Project 2003	Project management tool	Design Division
MicroStation V8	Engineering CAD program	Design Division
MMIS – Maintenance Management Information System	Provides statistics on roadway maintenance.	Maintenance Division
MPE – Mile point Equivalency System	The Mile point Equivalency System (MPE) provides automated update of county-control-section-mile points in any data set that is tied to this reference base.	Transportation Planning & Programming Division
MRSID GEOVIEWER 3.4.5	Used to view aerial photographs	Bridge Division
MSEW 1.0	A design/analysis program for Mechanically Stabilized Earth Walls	Bridge Division
MSSP v	Multiple segment section properties program for calculation the section properties of an shape	Bridge Division
MTIAR - Material Test Inspection Average Rate	The Material Test Inspection Average Rate (MTIAR) application stores the cost of contracted services for construction material testing. The input is obtained from previous years contracts.	
ODVS - Online Direct Viewing System	The Online Direct Viewing System enables Right of Way personnel in the Division to produce reports of "expenditures of Right	Information Systems Division

Software	Description	Operational Division or District
	of Way projects" for Divisions, Districts, and outside entities. This is a Department-wide system.	
Office 2003 Professional	Word, Excel, PowerPoint, Access, Publisher productivity suite	Information Systems Division
Office 2003 Standard	Word, Excel, PowerPoint, Access productivity suite	Information Systems Division
OM - Online Manuals	Online Manuals is a web based application that contains a collection of TxDOT manuals. These include policy instructional and procedural materials published by Austin Headquarters Divisions and Offices. Online Manuals is accessible on the intranet.	GS Division
OSB6 v	Use approximate analysis method for overhead sign bridge customarily built in Texas. Structure geometry and analysis are based on the assumptions and limitations described in the help document.	Bridge Division
OTS - Outflow Tracking System	Outfall Tracking System collects and stores spatial and non-spatial information about storm water discharge outfalls and is used to comply with Federal and State regulations for pollution control.	
PAI - Pedestrian Accessibility Inventory	Pedestrian Accessibility Inventory (PAI) is an inventory of TxDOT routes, intersections with county roads and city streets, and Americans with Disability Act (ADA) compliance with regulations requiring wheel chair ramps and other accessibility aids.	
PCA Column 3.64	Design reinforced concrete columns.	Bridge Division
PCA2	TxDOT version of public domain program used the investigate strength limits of reinforced concrete columns	Bridge Division
PCSTABL	FHWA slope stability program, similar to GSTABL7	Bridge Division
Peakfq 4.1	USGS developed software for annual flood frequency analysis using Bulletin 17B Guidelines. Possibly used for scour analysis or program left over from when Hydraulics used to be part of BRG.	Bridge Division
PGSuper 1.12.x	Design pre-stressed concrete beams in accordance with AASHTO LRFD Design Specifications (being enhanced for use as primary tool in pre-stressed concrete bridge design production).	Bridge Division

Software	Description	Operational Division or District
PIER v	Non-linear analysis of slender, non-prismatic and hollow concrete columns	Bridge Division
Pixar RenderMan for Maya, Windows XP 6.5.1	Is a plug in for Maya that renders the scene after it is built in Maya. The Render Man render has greater control over caustics and transparencies	Bridge Division
Plans Online	Plans Online is an application using Alchemy software (Alchemy Premium and Alchemy Web) to provide electronic letting plans to the contracting community and serves as a plans warehouse for TxDOT employees.	
PMIS – Pavement Management Information System	The Pavement Management Information System (PMIS) automates highway network-level activities of the Department's overall pavement management system and addresses pavement-related functions including planning, rehabilitation, and reconstruction.	Construction Division
PONTIS Suite 5.0	AASHTOWare bridge management software used to track condition of various bridge elements	Bridge Division
PPE – Mile point/Reference Marker Equivalency		Transportation Planning & Programming Division
PRG – Planning & Research General	Planning Research General Systems (PRG) contains general purpose routines used in the support of many of the department's application areas.	Transportation Planning & Programming Division
Primavera	Primavera is software that is used to manage construction projects. TxDOT employs both a standalone and a client server version of Primavera.	Design Division, Bridge Division
Pro Sheet 2.0	Sheet pile design	Bridge Division
Programmers File Editor (PFE) 1.01	Freeware text editor used to create and edit input files for core bridge design programs like CAP18 and PSTRS14	Bridge Division
Project 2007	Project management tool	Design Division
ProSoft - Project Total Cost Estimate Application	The Project Total Cost Estimate Application (ProtoCost) is a web-based application designed to assist TxDOT engineers and project managers with the generation of estimates of highway construction costs that meet federal SAF&TEA-LU criteria.	

Software	Description	Operational Division or District
PSN - Permanent Structure Number	Permanent Structure Number (PSN) is used to accept requests from Districts for new permanent bridge structure numbers. Formerly named Bridge Log (BRDGLOG)	Bridge Division
PSTRS14 v 4.1.20	This program is used to design/analyze standard and non-standard simple span pre-stressed concrete beams.	Bridge Division
PULLSDTS 2.0	Used to convert black and white digital satellite pictures to DTM or Digital Terrain Models.	Bridge Division
QConBridge 1.2.0	WsDOT developed live load analysis tool	Bridge Division
Quicken 2002	Financial program	Design Division
RATE v 11302006	VBA enhanced load rating spreadsheet that rates five of the most common types of bridge superstructures in Texas	Bridge Division
RCON2D 4.01	Conversion tool - converts DXF files to RISA or RISA files to DXF	Bridge Division
RDS/BGS v 8.1	Used to calculate bridge engineering geometrics. RDS, Roadway Design System, is being superseded by BGS, Bridge Geometry System, which is about to be deployed.	Bridge Division
RealFlow 3.0	Is a fluid dynamic simulation software used to create meshes for Maya. It uses real world numbers to simulate liquids	Bridge Division
RECYCLE - Recycling GIS Internet Site	The Recycling GIS Website provides the ability to browse, query, and print data about recycled material generators or processors which create a by-product that can be used as a replacement for or an additive to roadway construction materials.	
RESSA 1.0.	An FHWA Reinforced Soil Slope design program (similar to RSS)	Bridge Division
RIA - Road Inventory System	The Roadway Inventory System (RIA) is a reporting application using data files from several other applications. Data comes from files in Road Inventory System (RIA), Railroad Grade Crossing System (RRX), Bridge Inspection (BDG), Mile point Equivalency Sys	Transportation Planning & Programming Division

Software	Description	Operational Division or District
RIS – Roadway Information System	Includes roadway characteristics, structure descript., trf. counts, RR grade crossing inventory, trf. accidents & reference marker equivalency.	Transportation Planning & Programming Division
RISA 3D 6.0.1	Perform general structural analysis	Bridge Division
RLSE - Road Life System	This system is intended to provide data entry capabilities to the Districts for highway pavement layer and job information.	Construction Division
RocketRaid 454 3.04	Rockfall catchment design	Bridge Division
ROW - Right of Way System	The ROW Maps Database System enables Right of Way personnel in the Division to capture information about ROW maps associated with in-progress ROW projects. The database is used for managing the filing, tracking and map status of pending and set-up project maps.	Right of Way Division
ROW Project Closeout Database	The ROW Projects Closeout Database System enables Right of Way personnel in the Division to capture information of projects that have been closed. Tracking, management and reporting of project closure activities.	Right of Way Division
ROWIS – Right of Way	The Right of Way Information System (ROWIS) application enables right of way personnel in the Districts and the Right of Way (ROW) Division to manage and track the parcel acquisition process.	Right of Way Division
RRX – Railroad Grade Crossing System	The Railroad Grade Crossing System (RRX) contains information on each crossing on the State highway system, city streets and county roads. There is one record for each crossing location.	Transportation Planning & Programming Division
RSS	FHWA reinforced soil slope analysis program	Bridge Division
SAP2000 Plus and Bridge module 10.0	Perform general structural analysis	Bridge Division
SDI Graphics 7.1	Used to create graphics from MicroStation drawings that can be viewed properly in MS Word (superseded by recent identification of a file format that can be plotted directly from MicroStation)	Bridge Division
Slab Bridge Design 2.0	Simple slab-span bridge design. Published by CRSI	Bridge Division
SmeadLink Document and Inventory Tracking System	The SmeadLink Application enables Right of Way personnel in the Division to bar-code and track documents and equipment in the Division.	Right of Way Division

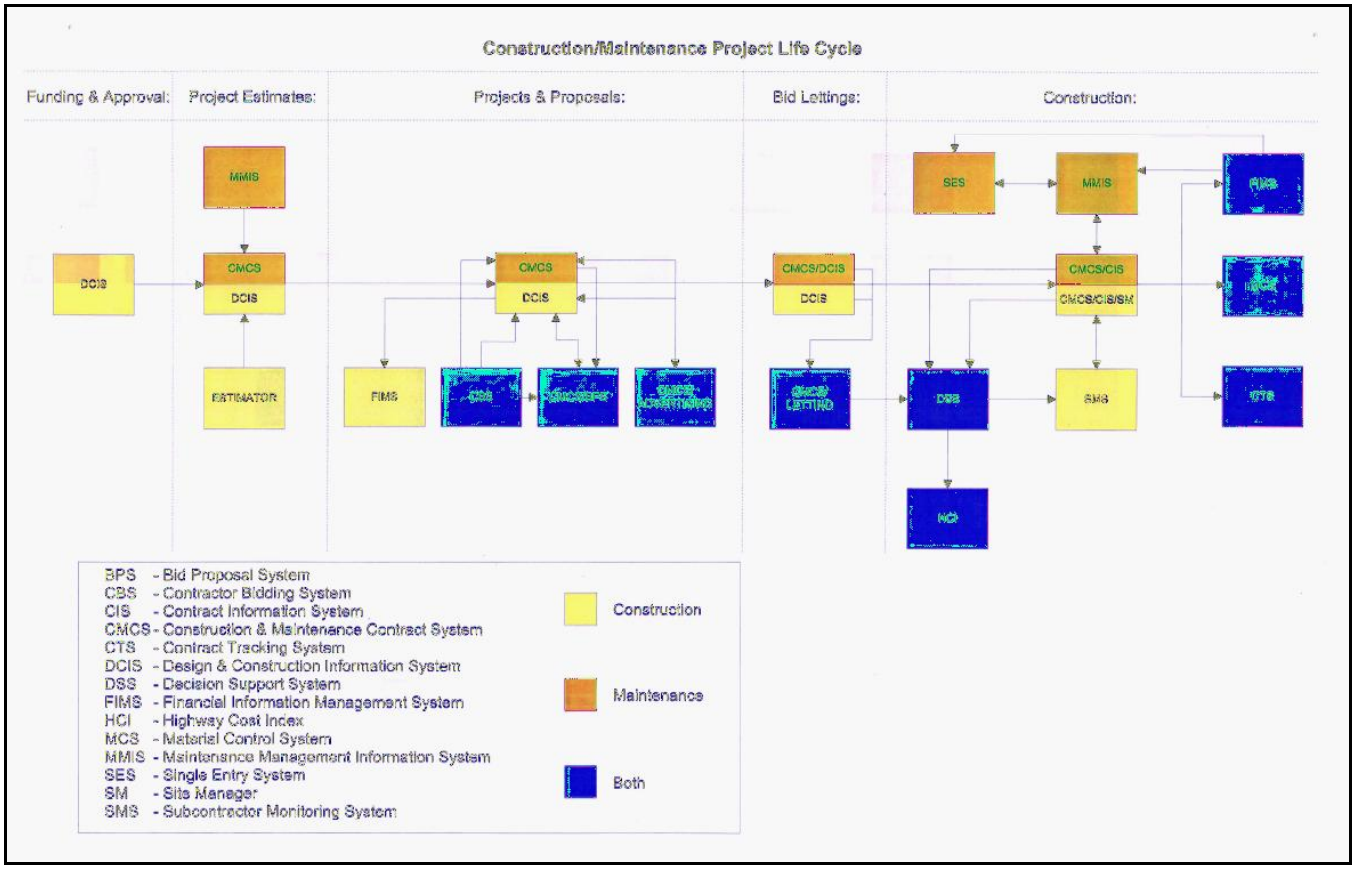
Software	Description	Operational Division or District
SMGR	Automates contract admin functions for construction & maint. projects & materials & test admin functions.	
SMS – Subcontractor Monitoring System	Provides online monitoring & batch reporting capabilities for State & Federal construction projects.	Construction Division
SNAILZ	CALTRANS dos based soil nail program similar to GoldNail	Bridge Division
SRICOS-EFA Method 1.02	A scour prediction program using results from the Erosion Function Apparatus	Bridge Division
STABL	FHWA slope stability program, similar to GSTABL7	Bridge Division
STARS - Statewide Traffic Analysis and Reporting System	The Statewide Traffic Analysis and Reporting System (STARS) is the State's repository for historical, estimated and forecasted traffic data based on long-term and short-term volume counts and vehicle classification, weight and speed.	
Stlbridge LRFD 4.2.1	Design non-curved steel girders in accordance with AASHTO LRFD Design Specifications	Bridge Division
Survey Control	Survey Control is a GIS enabled application that will provide information about survey control monuments on the intranet.	
SWS – Statewide Safety Improvements	Provides a cost/benefit analysis of federally funded safety projects, both before and after construction. Tracks information for life of project to create federal reports.	Traffic Operations Division
Sybase Anywhere	Database Design, Modeling and development environment	Design Division
TAEG (Torsional Analysis for Exterior Girders) 2.1	Kansas DOT program used to analyze steel girders for overhang construction loads.	Bridge Division
TAF - Traffic Assignment and Forecasting	Performs trip distributions & assigns current & future traffic.	Transportation Planning & Programming Division
TARS - Traffic Accident Record System	Provides access to nine complete years of on-system historical traffic accident information, along with the available months of the most recent year.	
TIS - Travel Information System	Manages the collection, processing, and distribution of travel literature requests from the public to promote travel and tourism in Texas.	
TLG - Traffic Log System	File of current, historical and 20-year traffic design data assimilated to produce design data.	Transportation Planning & Programming Division

Software	Description	Operational Division or District
TRA - Traffic Accident Report System	Contains all "on" and "off" system accidents and is a coordinated effort between the Department of Public Safety (DPS) and TxDOT.	Transportation Planning & Programming Division
TRAF - Traffic Simulation and Analysis System	A family of computer software traffic simulation models. Used to predict the effect of traffic engineering and Transportation System Management (TSM) strategies on a transportation system's operational performance.	
Transoft AutoTurn	CAD-based program to analyze and evaluate vehicle maneuvers	Design Division
Tree Professional 5.5.0	Is a program used to build models of trees. And then import them into 3D software	Bridge Division
TRM - Texas Reference Marker System	Implements a single location reference key statewide & continued monitoring of roadway inventory data	Transportation Planning & Programming Division
TRM - Texas Reference Marker System (ARI)		Transportation Planning & Programming Division
TSI - Traffic Signalization		Traffic Operations Division
TxBridge v 1.4.3	The TxDOT Bridge Toolbox (TxBridge) software is used in conjunction with the Bentley(R) Systems MicroStation(R) computer-aided drafting application. TxBridge extends MicroStation by providing the user with various utilities that implement CAD standards adopted by the TxDOT Bridge Division. These utilities automate the selection of drawing scales and the placement of text and terminator elements.	Bridge Division
TxDOT Expressway	The official Texas Department of Transportation web site. It provides a wide variety of information about all aspects of planning, providing, and maintaining transportation and regulatory systems.	
US Army Corp of Engineers HEC - HMS	Hydrologic Modeling System	Design Division
USF - Universal Specification File	Provides a defined center of information concerning all bid items, materials and material groups.	Design Division
UTEXAS	FHWA slope stability program, similar to GSTABL7	Bridge Division
UTILITY Database	The Utility Database System enables Right	Right of Way Division

Software	Description	Operational Division or District
	of Way personnel in the Division to capture information about Utility Adjustments necessitated by TxDOT highway construction projects. Utility Agreements, Utility Joint Agreements, and Utility Billing Submissions are some of the documents submitted by Districts. The system is used for tracking progress and monitoring the quality of all Utility Documents submitted by the Districts.	
UTrAp 2.0	This program was written by UT Austin as part of a research project. It has been used on a very limited basis to design steel tub girders.	Bridge Division
Visio Professional 2007	Diagramming, flowcharting, and workflow program	Design Division
Visual Basic for Application Enhanced Pre-stressed Concrete Girder Design	This in-house developed VBA enhanced spreadsheet is only used to help develop PGSuper into an enterprise solution for pre-stressed concrete beam design in accordance with AASHTO LRFD Design Specifications	Bridge Division
Visual Hydro for Drainage 7.0.15	Probably hydraulics related software (Design Div)	Bridge Division
Vue Stream 6.0	Is a plug in software for Maya that gives more ease in creating virtual ecosystems.	Bridge Division
WIM – Weigh In Motion System	Used to collect truck-weight data at various sites throughout the State for development of the 18-KIP equivalency file and the FHWA Highway Performance Monitoring System (HPMS).	Transportation Planning & Programming Division
Wincore 3.1	Logging for geotechnical boring data, and design of axially loaded drilled shafts and piles	Bridge Division
WinTR-55	Hydrologic Modeling System	Design Division
WORMS - Work Order Management System	Manages the survey contract and work order oversight functions in the San Antonio District.	San Antonio District
WRS - Wage Rate System	A web-based wage rate reporting system on Construction Projects.	Construction Division
XTRACT 3.0.7	XTRACT is structural analysis software for the design of pre-stressed and/or reinforced concrete structures. TXDOT BRG uses the software for cross-sectional analysis of irregular columns and beams at the service and ultimate limit states.	Bridge Division

Appendix E: Project Life Cycle

Construction/Maintenance Project Life Cycle Applications



Appendix F: Acronym List

The following acronyms were used by Deloitte FAS – Auditable Unit B – Contracting and Project Delivery Team:

Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
AICPA	American Institute of Certified Public Accountants
AOC	Audit Oversight Committee
BPS	Bid Proposal System
CADD	Computer Aided Drafting and Design
CALD	Contract Administrative Liquidated Damages
CBS	Contractor Bidding System
CCAM	Construction Contract Administration Manual
CCO	Consultant Contract Office
CDA	Comprehensive Development Agreement
CE	Categorical Exclusion
CEI	Construction Engineering Inspection
CMCS	Construction/Maintenance Contract System
CPM	Critical Path Method
CSJ	Control Section Job
CST	Consultant Selection Team
CUF	Commercially Useful Function
DBB	Design-Bid-Build
DB	Design-Build
DBE	Disadvantaged Business Enterprises
DBM	Design-Build-Maintain
DBOM	Design-Build-Operate-Maintain
DCIS	Design and Construction Information System
DOT	Department of Transportation
E&O	Errors and Omissions
EA&S	Engineering Architectural and Surveying
EA	Environmental Assessment
ECMS	Engineering and Construction Management System
EIS	Environmental Impact Statement
ENV	Environmental Affairs
ETS	Environmental Tracking System
FAS	Financial Advisory Services
FHWA	Federal Highway Administration
FIMS	Financial Information Management System
FONSI	Finding of no Significant Impact
FPG	Financial Planning Group
FTE	Full Time Equivalent
GIS	Geographical Information Systems
HR	Human Resources
HUB	Historically Underutilized Business
I2MS	Inspection and Materials Management System

Acronym	Definition
IDOT	Illinois Department of Transportation
ISD	Information Systems Division
IT	Information Technology
IDP	Inspection Development Program
LD	Liquidated Damages
MPO	Metropolitan Planning Organization
NEPA	National Environmental Policy Act
NJDOT	New Jersey Department of Transportation
NRM	Natural Resource Management
OGC	Office of General Council
OPR	Office of Primary Responsibility
PA	Programmatic Agreement
PB	Project Board
PCE	Programmatic Categorical Exclusion
PDA	Personal Digital Assistant
PENNDOT	Pennsylvania Department of Transportation
PPP	Public Private Partnership
Primavera	Primavera Project Planner
PS&E	Plans, Specifications & Estimate
QA/QC	Quality Assurance/Quality Control
QMS	Quality Management Services
RFQ	Request for Qualifications
ROW	Right of Way
ROWAPS	Right of Way Acquisition Professional Services
ROWASC	Right of Way Acquisition Services Contracts
RFP	Request for Proposal
RUC	Road User Cost
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SC	Comprehensive Development Agreement "Steering Committee"
SH130	State Highway 130 of the Central Texas Turnpike System
SWA	Supplemental Work Authorization
TIFIA	Transportation Infrastructure Finance and Innovation Act
TP&P	Transportation Planning and Programming
TTA	Texas Turnpike Authority
TTC	Texas Transportation Commission
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
UTP	Unified Transportation Program
VDOT	Virginia Department of Transportation
WBS	Work Breakdown Structure