

ABSTRACT

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INDICATOR DATA AVAILABILITY FOR
P3 PROJECTS

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Public Private Partnerships (P3's) are a relatively new project delivery method. In reaction to the increased attention to this delivery method, the Federal Highway Administration has begun to enhance its existing P3-VALUE toolkit, an educational toolkit which demonstrates the potential benefits of utilizing a Public Private Partnership over a traditional method like Design Bid Build for transportation projects. The toolkit utilizes assumptions about P3 project characteristics to build the scenarios for its analyses. Unfortunately, there is a significant lack of data which would serve to justify assumptions made about improved P3 quality performances. Furthermore, there is a basic lack of knowledge regarding what data is even available to make certain assumptions. The intent of this thesis is to identify what data can be collected, what data can be shared, and to determine what data can be expected to be reliably available, and not subject to proprietary rights, for future analysis regarding the improved P3 quality performance.

PERFORMANCE AND QUALITY INDICATOR DATA AVAILABILITY FOR
P3 PROJECTS

By

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Background

America's infrastructure is in constant need of upgrades, expanses, repairs, new systems and facilities. State departments of transportation (SDOT's) have projects planned out and designed that simply require the funding and approval for construction. These projects on the back log will remain there indefinitely until their determined priority increases, because state funds are limited and projects compete against each other for funding. State transportation budgets are not expected to significantly increase. In some states, the transportation budgets for new projects are actually shrinking due to increased operations, maintenance, and management costs. States are being required to do more with less resources. Further complicating the funding issues, the United States Highway Trust Fund is bordering on insolvency. That threat is creating uncertainty on the horizon about the ability of the federal government to continue providing support for the multitude of projects which rely on federal dollars to leverage state and local funding. The projects hurt most by this funding problem are the non-conventional projects. Non-conventional projects can be larger in scale, more complex, or riskier endeavors, and their price tags can be significantly larger (Cui and Robinson, 2015). Projects which are over \$250 million are such massive projects that they require special attention when it comes to their funding. They require multiple funding sources, not limited to traditional state budgets and federal funds. Projects of this caliber often require special federal grants and state appropriations, which can be highly competitive. Innovative financing has become key to such critical projects to ensure that these projects can be approved for construction.

In addition to innovative financing solutions, State DOT's are considering other innovative methods to deliver these projects. Alternative project delivery methods are one such

attempt. Alternative delivery methods include Design Build, Construction Management at Risk, and also Public Private Partnerships. While Design Build and Construction Management at Risk have been implemented many times and State DOT's are experienced, if not already familiar and comfortable with them, Public Private Partnership is a method that has not yet been utilized as heavily. Projects delivered as P3's are few and far between in the United States. The method is more popular and well known in the United Kingdom, Australia, and Canada. But recently, due to increasing financial constraints and other hurdles, State DOT's are finding the delivery method more and more acceptable lately.

Public Private Partnerships are unique contractual relationships. Speaking in relationship terms, the number of participants in a Public Private Partnership is effectively reduced to two, the owner/client and the concessionaire/ special purpose vehicle. There is no separate architect / engineer firm or a construction contractor to build the asset. Also, there is no asset manager or operator for the later operations and maintenance phase of the project. The public agency only has to deal with the concessionaire. The concessionaire may delegate responsibilities further as they so choose. They may hire out a design build contractor, or bring on an asset manager. Often times the concessionaire is responsible to a handful of parties with different niche functions. In many cases, the concessionaire is a joint venture company, comprised of a design-builder, a financier, and an asset manager. Even in this case, the concessionaire is still one entity, and the Public Private Partnership has been reduced to two contractual participants. In this delivery method, the state agency transfers over most of the project responsibilities to the concessionaire. The specific responsibilities differ from contract to contract, but the typical P3 delivery considered for study is the Design-Build-Finance-Operate-Maintain (DBFOM) concession type. In this

example, the agency gives the rights to administer the design, construction, financing, operations, and maintenance of the project asset to the concessionaire. The concessionaire will perform all the design work beyond the conceptual design / baseline scope provided by the agency. The state agency has little control over design measures and less control over construction methods. The added benefit of having both design and construction responsibilities in the hands of one entity is similar to the advantages observed in design build contracts. First, there is a reduction in change orders, schedule delays, and communication problems. These efficiencies are possible because the concessionaire can handle all these issues internally, whereas before an agency would have to coordinate between the A/E and the contractor. Furthermore, a concessionaire has the ability to integrate phases to shorten the overall construction duration and accelerate the substantial completion date. For example, this can happen when a design build contractor begins construction early, before the final design is complete. Early construction can occur on preliminary site work, utility clearing and set up work, or other work that is not reliant on yet to be completed designs. The concessionaire will privately finance the project through its own equity and debt capacity. Debts may be composed of senior banks loans, municipal bonds, or other innovative financing like TIFIA loans or Private Activity Bonds (PAB's). The state agency may even offer a grant to offset the costs and fund the project. Control for all operations and maintenance through the asset's concession period falls into the concessionaire's hands as well. This massive responsibility extends far beyond the annual road maintenance, like pothole repair and filling cracks in the road. Operations and maintenance includes things like removing graffiti, picking up trash, managing lanes, controlling tolls, maintaining toll facilities, drainage structures, and conducting

reconstructive/ rehabilitative repair. The concessionaire maintains these right for the entire length of the concession, from the financial close until the asset is turned back over to the client/ owner. Concession length typically range between 30 and 100 years. The duration is based on the time required by the concessionaire to make the project financially viable and attractive. P3 contracts are split up into two general categories, based on how the concessionaire makes money, Availability Payment and Toll Revenue. In the Availability Payment (AP) option, the concessionaire is required to maintain a certain level of availability for the user in order for it to qualify for payment. Availability is determined by through an agreed upon criteria, typically performance measurements. The concessionaire must meet a standard required availability to receive the entire availability payment. If the asset is not available to a certain standard, then the concessionaire may receive less than the full amount. This can be done by calculating either a percentage of the payment amount, assessing a penalty amount to subtract from the full payment. An example of the evaluation criteria could be keeping a certain percentage of highway lane miles open during a time period, keeping the pavement within an acceptable level of quality, or maintaining a set free flow speed. For the Toll Revenue option, the state agency either 1) allows the concessionaire to collect and keep toll revenue, or 2) pays the concessionaire an amount based on the traffic volumes, also known as a shadow toll. In some areas, the concessionaire may only be allowed to keep a percentage of the toll revenue, with the remainder allotted to the state. This is called revenue sharing. State tolling policies heavily impact how a concessionaire values toll revenue. Some states cap tolls at a limit, restricting potential revenue. Other states allow variable rates, given the time of day. Recently, congestion tolling has become more prevalent. This tolling method is reactive to the traffic volume

and traffic demand for the facility. Concessionaires can use congestion tolling to entice or curb users of the facility, so that they can maintain and manage the facility as they see fit. If the concessionaire is contractually obligated to maintain a particular Level of Service (LOS) or a free flow speed on the asset, they can utilize congestion tolling to fine tune the traffic volumes encountered. Due to the potential long term profits, P3 projects can attract the interests of the many private sector investors and global industry leaders. Where public agencies may see a project with high risk and an unaffordable price tag, private specialized companies might see manageable risk, and a lucrative rate of return. One of the major assumptions about P3 projects is that in order to make the project a profitable endeavor, the concessionaire must capture efficiencies which the public sector would otherwise miss out on. These efficiencies range from lower life cycle costs, due to long range planning in the early design phase, to improved operations and performance, which can increase potential revenues. For a premium value, the concessionaire can deliver a large risky project using a Public Private Partnership. In return, the state agency or DOT reduces its own long term risk, completes a much needed project, and potentially receives a better project than it otherwise would have delivered under conventional delivery.

The Federal Highway Administration has provided guidance on P3 project delivery to state DOT's, procurement specialists, and practitioners. This guidance includes multiple papers, guidebooks, analytical tools, and references which seek to educate, inform, and assist users. FHWA maintains a website where much of this guidance is public available. The Office of Innovative Project Delivery specifically hosts guidance towards the knowledge areas of Project Delivery, Project Finance, Public Private Partnerships, TIFIA, and Revenue. Currently, FHWA is working on research that it hopes will enhance its existing P3-VALUE

toolkit. This toolkit currently consists of a Risk Assessment tool, a Public Sector Comparator (PSC) tool, a Shadow Bid tool, and a Financial Assessment tool. The P3-VALUE toolkit utilizes a Value for Money analysis, which uses anticipated cashflow timelines to compare identical projects delivered under two different competing project delivery methods. The cashflows consider numerous amounts of user input data. This includes:

- Type of P3 Considered (DBF, DBOM, DBFOM, etc.)
- Project Timeline Dates (Construction Start, Finish, Concession Period, etc.)
- Construction Costs
- Annual Operating Costs
- Annual Maintenance Costs
- Periodic Rehabilitative/ Reconstruction Costs
- Grants
- Amount of Debt
- Debt Maturity
- Debt Type
- Debt Service Coverage Ratios
- Interest Rates
- Division/ Allotment of Risk
- Monetized Risk Evaluations
- CPI Rates
- Tax Rates
- Traffic Volumes
- Toll Rates
- P3 Payment Type

Two scenarios are compared, the Public Sector Comparator and the Shadow Bid (SB). The Public Sector Comparator is the scenario for the project being delivered traditionally via the public sector utilizing a Design Bid Build procurement. The Shadow Bid is the expected scenario of the private sector's bid, using a P3. In both scenarios, the cash flows being used include all costs, means of financing, valuation of risk, toll revenue collected, and applicable taxes. Once the two scenarios are defined, the toolkit does a head to head comparison using discounting to determine the Net Present Value (NPV) of each scenario. The difference between the PSC and the P3 is called the Value for Money (VfM), or the value an agency would obtain by choosing a P3 project delivery method instead of a more traditional method.

However, there exists criticism about VfM with specific regard to cash flow timelines, acknowledging the societal benefits, and the delivery method induced quality improvements (DeCorla-Souza, 2013). VfM does not recognize distinct delivery method specific timelines. VfM assumes that both projects could be built at the same time. The analysis assumes that there are no financial constraints or construction feasibility constraints that might hinder the timely delivery of a project under a particular project delivery method. Unfortunately, that is not always a practical assumption according to multiple state DOT's. In many cases, a state does not have the ability to finance a project within the required time in order to compare to the envisioned P3. In order to perform the VfM analysis, state agencies have had to augment their scenarios with stretched truths, comparing P3 projects to hypothetical PSC projects. In reality, these same agencies have labeled this practice as misleading and not practical. A true realistic comparison, according to these public agencies, would consider the considerable timeline differences in project timeline delivery. Some agencies have stated this delivery difference can range between a few years to a few decades.

Societal benefits can also be quantified and monetized. For example, user time travel savings can be measured and turned into an economic value. A major factor in many of those values is the anticipated traffic volumes, generated by traffic impact studies. The traffic volumes identify how many users are reaping the benefits of the facility. The monetized benefits per user are very small compared to the overall project price tag. But when traffic volumes reach into ranges between 10,000-100,000 users per day, those benefits become very considerable in comparison to the overall cost of the project. In many

cases, the benefits of these large projects considered for P3 evaluation can surpass the costs of the project.

There are also other qualitative benefits, like innovations to the baseline scope, which can be directly attributed to the project delivery method. Innovations can be the use of a better ramp design which improves traffic conditions, a change in the construction methods to reduce costs, or the use of electronic toll collection systems instead of conventional toll booths. Quality improvements include better pavement designs, which can lead to better lifecycle costing, better incident response leading to less overall delay, or better workzone efficiency, leading to less lane closures during the construction period. These innovations and quality improvements can have direct impacts on the costs, benefits, and the anticipated traffic volumes.

Research Need

To answer these concerns, FHWA is developing Project Delivery Benefit Cost Analysis (PDBCA). Its intent is to quantitatively evaluate the augmented benefits and costs affected by the change in cashflow timelines, the evaluation of societal benefits, and the qualitative improvements and innovations (DeCorla-Souza, 2015). PDBCA will become an additional module to the existing FHWA P3-VALUE toolkit. The current framework is being iteratively developed at the moment as effort between FHWA, two consultants, Booz Allen Hamilton and IMG Rebel, and the University of Maryland. Some other inactive members of this research team include professionals from the University of Texas and George Washington University.

As the framework stands, the PDBCA methodology is a three step process:

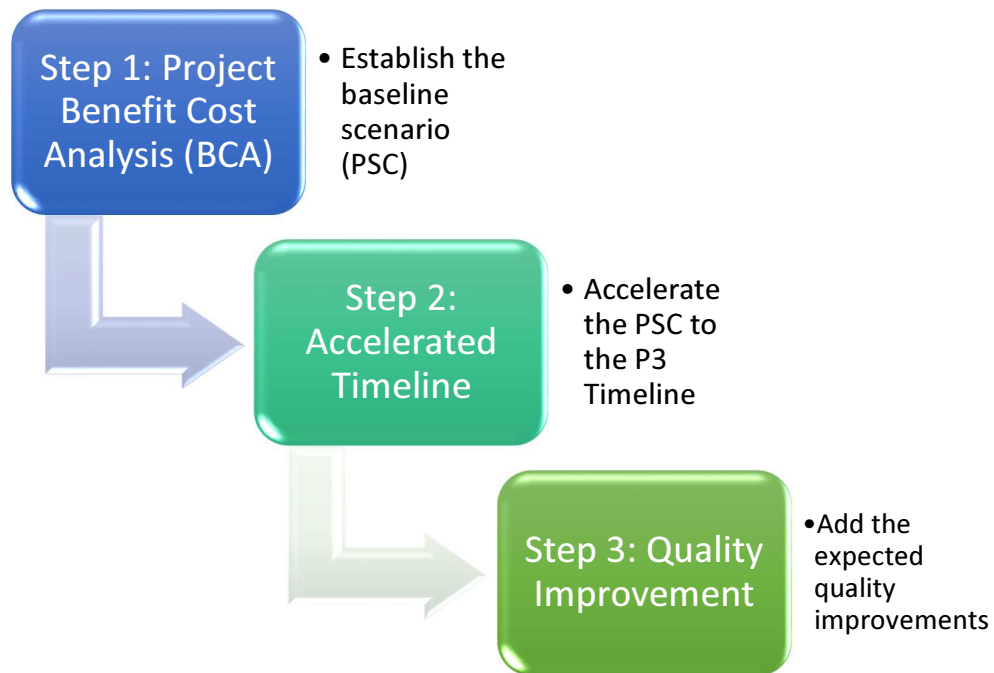


Figure 1: Simplified PDBCA Framework

The first step is a project benefit cost analysis as the state agency would normally do in a standard project evaluation (Cui and Robinson, 2015). This project evaluation considers

the most likely delivered project the state would produce given a traditional project delivery method. For this reason, the PDBCA framework considers this as the Public Sector Comparator. Many of the data inputs for the project level benefit cost analysis are the same inputs required for the VfM analysis. The project timeline data, construction costs, annual operational costs, annual maintenance costs, periodic maintenance costs, cost of risk, and many others are the same in both the VfM PSC and BCA PSC. The only cost items that BCA does not consider which VfM otherwise would include transaction costs, tolls, and taxes. This is because FHWA has stated that these specific costs are essentially transfers between parties and they have no impact on society as a whole, so they are considered null in a BCA type analysis. The BCA will include social benefits and disbenefits. The majority of these benefits will come from travel time savings. In preliminary case studies, research has suggested that 90-95% of the overall net benefits will be monetized travel time savings. The other societal benefits currently measured in the framework include Vehicle Operating Cost (VOC) savings, safety benefits, fuel (gasoline) savings, and emissions savings (CO₂ and others). Potential disbenefits include effects of increased work zone delays, effects of induced traffic demand, and effects of traffic volume growth earlier than expected. The BCA cashflows are tabulated and discounted, producing an NPV of the project's net benefit cost. Step 1: Project BCA provides a base from which the framework can then make incremental steps to compare the PSC to the P3 option. The step by step process is done so that an apples-to-apples comparison can be made. This is ensure that the P3 and the PSC are fairly evaluated.

The second step involves accelerating the PSC timeline. The PSC timeline is accelerated to the anticipated or expected P3 timeline. Theoretically, this answers the question "What

if the public sector didn't have the financial constraints or the project constraints which are currently holding it back from implementing the project?" Accelerating the PSC will create a cashflow scenario that is aptly called the "Accelerated PSC". When the cashflow is accelerated, additional considerations must be made with respect to secondary effects. These include traffic volume changes and additional impacts to the traffic network. A new traffic demand model may have to be run if the changes are significant enough. Once the necessary modifications are made, the cashflows will be analyzed, as in Step 1, and a new NPV for the project net benefit costs will be generated. The difference between the Step 1: PSC NPV and the Step 2: Accelerated PSC NPV is identified as the net benefits due directly to the public sector delivering the project sooner than it otherwise would have. If the public agency found the funds or cleared up the constructability issues to implement the project sooner, this value represents the net benefits it would reap. The majority of these change in benefits comes from users being able to use the facility upon substantial completion years in advance. For some projects, that can add up to years of travel time savings for millions of users.

The third step is the most difficult step. The third step takes the Accelerated PSC and improves the quality to a level which we would expect the P3 to deliver. It takes the Accelerated PSC and produces a Shadow Bid. There are a few different pieces to this step, and neither of these pieces are very simple to estimate. First, there is a reconsideration of the project timeline, again. Where in Step 2, the timeline was accelerated to match the expected P3 delivery, here the timeline is condensed to consider the shorter project duration and the change in project procurement schedule. The general assumption in the industry is that a concessionaire can complete the same project in a shorter amount of time. However,

the flip side of that coin is that P3 projects are generally more complex and require additional time to hammer out the contractual details. These schedule modifications are tough to make assumptions on because there is little data which would suggest how much quicker a P3 concessionaire can deliver a project or how much longer the contracting process takes. In many cases, research has suggested that the best course of action is to simply take the best estimate of the state professionals working on the project itself to come up with the schedule changes.

The second part to this step is the evaluation of project improvements and innovations. This step is also very difficult. From an ex-post consideration (after the financial close), it can be difficult to know exactly which improvements and innovations on the project were due strictly to the use of the P3 delivery method. It could be argued that any improvement *could* have been added under the traditional delivery through the use of a change order. As it stands, the current thought is to consider the baseline scope presented by the state at the Request for Proposal as the publicly delivered scope, and any further scope improvements to be considered as provided by the concessionaire and the P3 delivery. However, this methodology has no bearing on any ex-ante analysis, or analysis conducted before the financial close. Typically, an ex-ante analysis is done at an early or even conceptual phase of the project. In these phases it can be impossible to determine what, if any improvements will be performed by the concessionaire. An alternative method must be utilized in order to approximate the potential benefits a P3 delivered project might enjoy.

The last part in this third step is the addition and evaluation of the quality improvements expected in the P3 delivery method. This part recognizes the assumption that some aspects of the projects have the potential to be delivered better under the P3 than under a traditional

delivery. The potential differences include lower construction costs, lower operation costs, and lower maintenance costs. Also, there can be potential quality of service increases with a P3 delivery. Examples of this include potentially better traffic management, better pavement performance, and better incident response. Similar to the second part of Step 3, this step can be very hard to estimate, because there is little data to back up any assumptions about presumed future operations and performance.

To solve the problems encountered by Step 3, FHWA and their research team has proposed a P3 Difference Estimator (PDE) module. This module will assist users in creating their Shadow Bid / P3 scenario. The PDE was developed using professional and academic correlation studies to develop a database which will support the assumptions of enhanced performance utilizing a P3 project. The PDE uses project data and characteristics to make educated predictions based on subject matter expert opinions. Where a PSC scenario has defined certain costs, benefits, traffic volumes, and schedules, the PDE will enable users to realistically modify that data to support a Public Private Partnership delivery scenario.

The following figures give a general overview of the structure of the P3-VALUE toolkit before and after the enhancements.

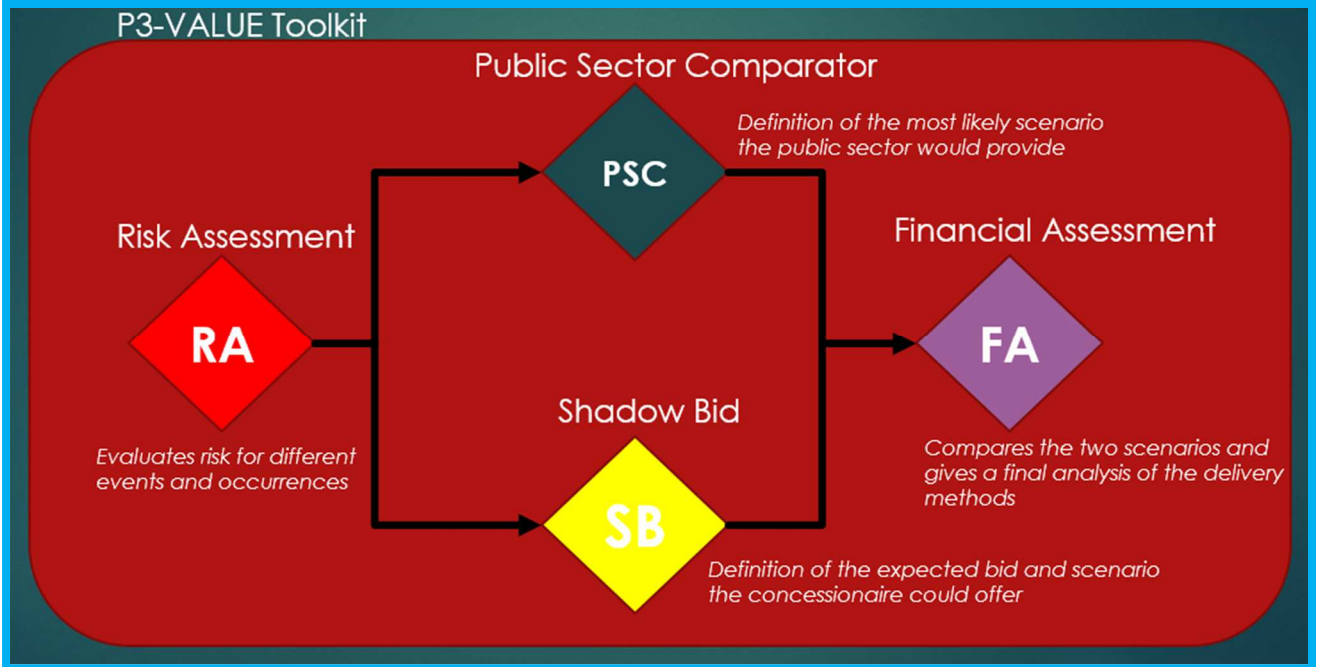


Figure 2: Existing P3 VALUE Toolkit

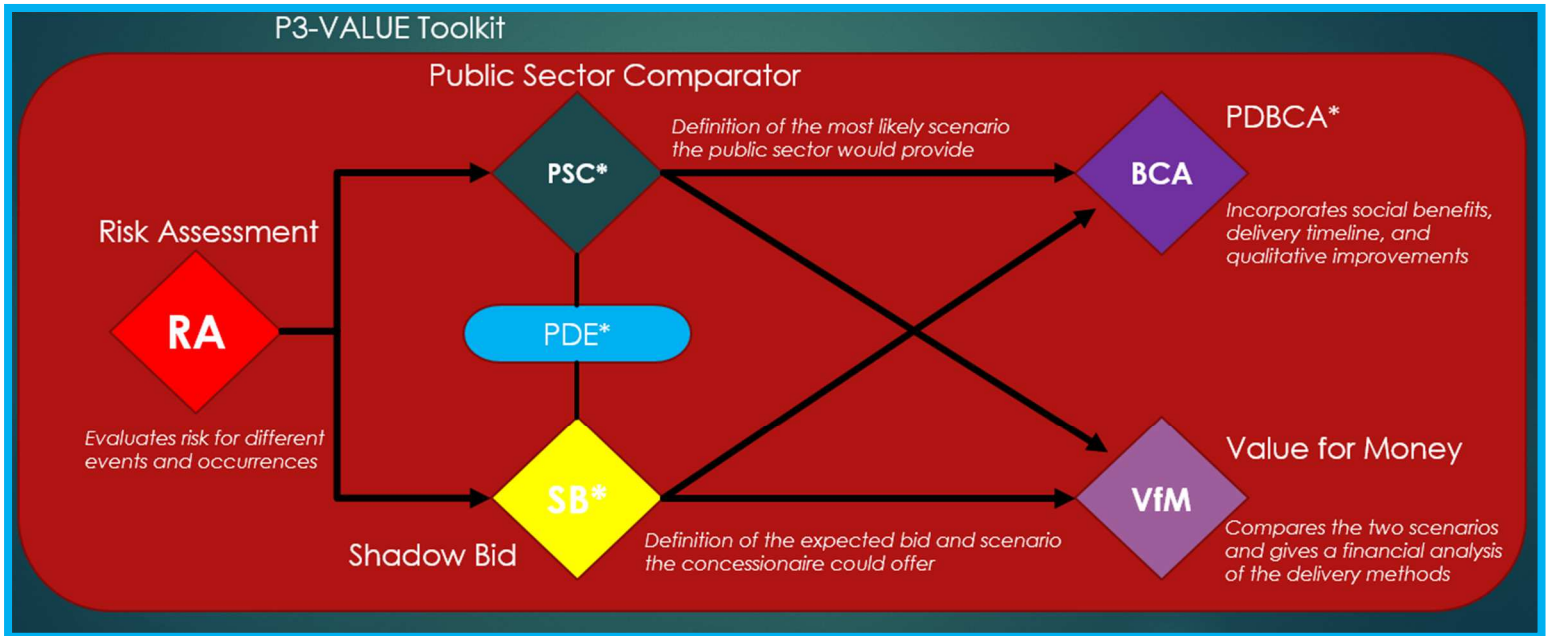


Figure 3: Proposed P3 VALUE Toolkit

The PDE was created using subject matter expert opinion because there was a lack of existing research available to justify the correlations PDE must utilize. FHWA’s research team has conducted a thorough research effort on the literature review. They looked at

numerous databases including the Transportation Research Board and the US Department of Transportation's library. The team also utilized the University of Maryland's vast database access to see if there was any outstanding research that they could obtain. The research efforts did not turn up any study which could help identify the correlation between certain project characteristics and potential cost savings or benefit increases due to P3 project delivery.

There is a significant need for research to be conducted in the field of P3 efficiency. Research could help determine ranges of efficiency that P3's are capable of achieving. The lack of research even conducted in this area makes it difficult to even know what data fields even exist where data can be recorded, measures, compared, and analyzed for P3 projects. Different than other project delivery methods, project data for Public Private Partnership isn't as publicly available as with other delivery methods. Some project elements can be deemed "proprietary". A good example of this is toll road revenue, toll road traffic volumes, and other related data. When the research team was doing some preliminary study on the Express Lanes for I-495 in Virginia, commonly known as the Capital Beltway, and the I-95 Express Lanes, the concessionaire, Capital Beltway Express (CBE) was contacted to procure some data. However, the concessionaire's operator, Transurban, declined to share that data because it was deemed proprietary. Even though they had a contract with the Virginia Department of Transportation (VDOT) to share data, that contract limited the data's availability strictly to VDOT and no further. Transurban's argument was that the requested data was the product of confidential trade secrets. If that data was somehow made publicly available, potential industry competitors could use that data to reverse engineer their trade secrets, and that would endanger Transurban's future business. VDOT officials

have been working with their legal professionals to determine if there is any data they can share with researchers for the sake of improving their own ability to utilize and evaluate Public Private Partnerships. Had the project been done using traditional project delivery methods, that same data would be publicly available through a number of means, like through information requests.

The hurdle of propriety is like a curtain which might seek to hold back the flow of information and data regarding P3 performance. Furthermore, the lack of research conducted also fails to identify what information is being recorded, how it is being recorded, what data is reported back, and what data is even shareable. This is the inspiration behind this thesis. That is the need.

Research Questions

This thesis and the research conducted to complete it seeks to answer some basic questions.

What performance and quality data is being measured and recorded on Public Private Partnership projects?

This research will search for the performance data and identify how agencies are monitoring and controlling project performance. As the research team was conducting its initial research for the PDE module for the PDBCA framework, some initial areas of project data availability were sought out. Agencies were asked about performance and quality indicators in the following fields:

- Pavement Management
- Long term pavement profiles
- Traffic Operations
- Traffic Management
- Work zone efficiency
- Lane rentals / Lane closures
- Managed Lanes
- Public Outreach
- Improved Designs (Innovation)
- Tolling
- Standing Water
- Other

The availability of data measurements in this list of performance and quality indicators is the first question proposed to be answered by this thesis.

How is the recorded data being measured? What are the units? What are the standards?

If measurements in particular fields are not measured consistently across project or state lines, then the data is not useful. Data from one singular case study is statistically irrelevant, and if the data from one project cannot be compared to other project data, then it has no

use. The units of measurement, the frequency of measurement, and the standards of the measurements are all just as important as the value of the measurements themselves. Being able to establish trends in data records might also influence future data measurements to be taken in similar styles so that future projects can be compared to existing databases. There are many different project stakeholders who would be interested in seeing how their projects is faring as a P3 with respect to other P3 projects. Being able to compare performances of one project to another is incredibly important when evaluating performance indicators.

What recorded data is being reported back to the state agencies?

This question begins to tackle the question of availability. Much data may be measured and recorded during inspections and standard operating procedures. But not all of that data may make it from the inspector's notes to the quarterly progress report. It is important to know what the baseline of data reported to government agencies is so that we can understand what they have available to them. An information request through one path may result in little progress, but another path may bear fruit. So it's important to know what reported information exists so that a barrage of efforts may be made to retrieve it.

What reported data is shareable with research analysts and the general public?

It is important to understand what data is reasonably available to the public. Future research might depend on acquiring particular sets of data, and researchers may need to know in advance what data they can expect to be provided with respect to P3 project performance. It can be difficult to procure information and data directly from the concessionaire. There is no contractual or legal obligation for the concessionaire to work with researchers or to provide the general public with data. However, the concessionaire may be, and often is,

required to send performance and quality data to the public agency. Once a public government agency has obtained the data, the data may still be proprietary, but there is a better chance that if the data is not completely proprietary, the public agency may be inclined to share the data with the public upon request.

***What data can reasonably be expected to be reported in the future?
What are the expected trends for data sharability?***

Many P3 projects are still in the construction phase. It may be that much of the performance and quality data that public agencies have required the concessionaire to measure and report on is not yet being measured and reported. Some of this performance data may be contractually obligated to be reported on. Agency personnel and professionals who are actively on the specific projects are probably familiar with the trends in their state policies. They may also have keen insight on the amount of data that might be sharable when their respective projects are completed. State DOT officials may know of legislation that has recently been passed, or is currently in the pipeline, that will have an effect on the transparency of P3 project data in the future. This thesis aims to determine the outlook of data availability and sharability for P3 project performance and quality indicator data.

Hypothesis

There is a significant amount of data that is being recorded on P3 projects. Experience has shown that the P3 concessionaires are held to standards that match or exceed state requirements. Furthermore, on certain projects, it is imperative that a high rate of performance is achieved because it can factor directly into the availability payments or toll revenue generated. Because private companies are highly motivated to achieve the best and highest rates of return, and some of these projects are risky endeavors to begin with, it makes sense that they would have practices in place to monitor and control performance.

Under traditional project delivery methods, there are numerous reports sent back to the public agency, detailing the progress and performance of projects. It would also make sense that the public agency would try to continue tracking the performance of these projects via periodic reports supplied by the concessionaire. Therefore, it is hypothesized that there is a significant amount of quality and performance data that is measured, recorded, and reported back to the state agencies.

Furthermore, it is believed that there is a fair amount of performance and quality indicator data that is publicly available. There is most likely some data which the concessionaire will deem to be proprietary, data which truly could endanger their trade secrets. But that data is probably project specific, and in the minority. The remainder of the project data most likely has no impact at all on the concessionaire's trade secrets. That would imply that the concessionaire would have no reason to label such data as proprietary. Alone, this would not be enough to persuade a concessionaire to release their performance data or to waive their rights for objecting to a public agency releasing the performance data. However, there is an existing stigma for P3 projects. People are generally uneasy with their use because of unfamiliarity and a natural distrust of private sector greed. Given this disposition towards P3's there might be a reaction observed by concessionaires to increase transparency, thereby improving their public image. Public image has been a key motivator observed in other P3 projects. For example, the project team for the Elizabeth River Tunnels in Portsmouth, VA had a few public relations stories, which they felt stood out so much that they should share them with the FHWA/ Booz research team (Cui and Robinson, 2015). The concessionaire for that project, Elizabeth River Crossings (ERC), had performed outreach programs and given out scholarship, in order to improve their public image.

During some heavy construction which require unusual facility closings, ERC went out of their way to inform the public of alternative routes, the exact closure times, and a full explanation of what and why they were closing the facility. Not only was ERC's goodwill noticed by the general public, their public relations and informative efforts made the facility closure a relatively minor inconvenience instead of a nauseating traffic delay. Citing this as an example, it is expected that concessionaires be open, forward, and helpful in all data collection efforts outside of proprietary information. Where performance and quality indicator data is not proprietary, it is hypothesized that the data will be available.

Research Methodology / Plan of Action

This research will be based on case studies and real life projects to determine availability of data from state agencies.

- Identify lists of completed projects and ongoing projects done under P3 delivery.

Utilize FHWA's Innovative Program Delivery website as a start for identification.

Follow up by finding individual project websites.

- Identify state agencies, departments, personnel who managed projects. Utilize search engines to find relevant web links with detailed information on Public Private Partnership projects. State DOT websites, relevant government agencies, and stakeholder websites may be required.
- Begin initial correspondence. Utilize initial project contact given from FHWA's website, follow up with further correspondence efforts by contacting through project website contact methods and project contacts listed. Methods of contact:
 - Email Correspondence
 - Telephone Calls
 - Contact Request Inquiries (via project website)
- Conduct interviews with Project Managers, Project Directors, Public Coordinators, and other project personnel which might have keen insight on data availability procedures
- Do preliminary research on projects. For familiarity purposes, learn basic details of project so intelligent discussions can be held with professionals about their specific project. Detailed understanding is not required, just enough to generally understand the scope of the project.


- Through correspondence efforts, determine if data collection efforts have begun. Performance data collection efforts may be restricted to certain project phases, like Operations and Maintenance.
- Identify measurements that are being consistently performed across state and project lines.
- Determine data measurement requirements. Determine the standards. Determine if the performance are contractually required, if implied, and how they are specified.
- Collect all possible data on list of quality performance indicators or other data which state agency/ concessionaire records.
- Follow up with all project contacts to confirm successful data measurement identification, reporting, and availability. Determine if there are any other recommendable avenues of approach to find any and all remaining performance and quality indicator data.
- Draw initial conclusions about:
 - What data is measured? What data is reported?
 - What data is available from current P3 practicing agencies or the concessionaires themselves?
 - What data will be available from future practicing agencies?

Project Descriptions

FHWA has a website which lists 23 Public Private Partnerships that they are currently tracking. It was not desired for this research to overlap with existing research being conducted by the FHWA/ Booz Allen research team, so projects in Virginia and Florida were removed from the potential projects list, due to the case studies observed from these states. Projects in states which featured more than one P3 delivered project were considered with increased weight. State with multiple P3 projects would likely have cutting edge policies and performance measurements due to their increased exposure and experience. States which only have one P3 project may not have as much experience, and that might impact the policies enacted as well as the project performance measures and the project managers' familiarity with contractual documents. Taking those states and projects out of the potential list leaves four states and 10 projects remaining. Those states and projects are:

Indiana

- The East End Crossing (\$981 million)
- I-69, Section 5 (\$325 million)




California

- The 91 Express Lanes (\$135 million)
- The South Bay Expressway (\$658 million)
- The Presidio Parkway (\$1.00 billion)



Colorado

- The Eagle Project (\$2.04 billion)
- US 36 Managed Lanes / BRT (\$521 million)



Texas

- SH-130 (\$1.33 billion)
- The North Tarrant Express (NTE) (\$2.01 billion)
- The LBJ Express (\$2.62 billion)




Figure 2: States and Projects Selected

Indiana

The East End Crossing

The East End Crossing is one part of a two part project called the Ohio River Bridges project. The complementary bridge of the project is the Downtown Crossing, located in downtown



Figure 3: Artist Concept of East End Crossing

Louisville. Both Indiana and Kentucky

are financially supporting the project, but each state is running one singular crossing. The East End Crossing is being led by Indiana, while the Downtown Crossing is being led by Kentucky. This deal is unique in that each state is leading efforts in small amounts of the other state. The Downtown Crossing is a Design Build project, but the East End Crossing is a DBFOM, with an Availability Payment. The Ohio River Bridges project has a total of six sections, of which the East End Crossing consists of three sections: the Indiana approach, the bridge itself, and the Kentucky approach. The East End Crossing project is located north east of Louisville and will help connect two sections of I-265, a semi-ring road around Louisville. It will also tie into existing sections of I-71 in Indiana, and I-65 in Kentucky. The concessionaire for this project is WBV East End Partners. The total length of this part of the project is roughly 8.5 miles long, and the scope includes brand new highway construction, viaducts, the bridge itself, a short tunnel, and a few ramps and interchange tie-ins. The East End Crossing portion of the project is scheduled to be completed in 2016, after a four year construction period. Upon substantial completion, the concessionaire will assume control of a 35 year concession period.

I-69, Section 5



Figure 4: I-69, Section 5 (brown), located between Section 4 (blue) and Section 6 (pink).

I-69 Section 5 is a 21 mile long stretch of highway which will connect Bloomington to Martinsville. It is part of the greater I-69 Corridor, 142 miles of highway, which connects Evansville to Indianapolis. The I-69 Corridor is made up of six total sections, each of which has been built in piecemeal from the south, going north. The entire project involves upgrading the existing SR-37, a four lane medium separated arterial, to Interstate standards. That mostly includes

widening the lanes to 12 foot standards,

providing the appropriate shoulder requirements, and further widening the depressed grass median. The concessionaire is the I-69 Development Partners, and the P3 is DBFOM, using an Availability Payment mechanism. Interesting about the concessionaire is that the partners in the company are Spanish. This has resulted in much of the contract to actually be written in Spanish, as well as English. The total construction duration is 28 month, and it is anticipated to be completed in 2016. According to FHWA's website, this project will cost roughly \$325 million, after discounting.

California

The South Bay Expressway

The South Bay Expressway is a 10 mile toll road in Southern California, just outside of San Diego, California. The original concessionaire was California Transportation Ventures Inc. and the South Bay Express Expressway LP. It connects the Otay Mesa and Chula Vista, among other location. The concession



Figure 5: South Bay Expressway scenic viaducts

was termed a Build – Transfer – Operate. This concession is slightly different than most Public Private Partnerships in that the concessionaire does not do any design work. The concessionaire built the project, completely transferred ownership to Caltrans, and Caltrans formed a lease where the franchisee would operate, maintain, and collect tolls on the roadway. The roadway is a divided four lane highway. The project completed in 2007, but shortly afterward, in 2010, the project went bankrupt. It turned out that the projected traffic volumes were overestimated, and the actual traffic numbers were on the order of 40% less than estimates calculated. As this toll revenue was not able to support the project, the San Diego Association of Governments (SANDAG) bought the franchisee and now operates, maintains, and collects toll revenue on the highway for the remainder of the 35 year concession period. The franchise ends in 2042, at which point control will revert back to Caltrans. It has since been rebranded as SBX-The 125.

The 91 Express Lanes

The 91 Express Lanes is 10 miles of toll road, situated in the median of SR-91. The original concessionaire was California Private Transportation Company (CPTC). The project opened in 1995, but it was sold back to Orange County Transportation Authority (OCTA) in 2003. This is because of a Non-Compete Clause that was put in the contract. It stated that Caltrans and OCTA could not construct a parallel road or improve a parallel road because such an improvement would pull traffic away from the toll lanes. The financial feasibility depended on achieving anticipated traffic volumes and Caltrans allowed the clause to be in the contract. Within a few years, it became apparent the Caltrans needed to improve adjacent parallel facilities, and it would be in breach of the 91 Express Lanes contract. Like the South Bay Expressway, OCTA owns the franchise, but has contracted out Cofiroute to operate, maintain and collect tolls. Cofiroute happens to be one of the partners in the original CPTC concessionaire. So even though the concessionaire sold back the asset to OCTA, the concessionaire's operating partner remained since 2003 to continue working the project. The mishap cost the state a large amount, but in this case, the concessionaire worked out well.



Figure 6: 91 Express Lanes Gantry & Sign

The Presidio Parkway



Figure 7: 2014 Aerial View of the Presidio Parkway in construction

The Presidio Parkway is the replacement project for the south access road to the Golden Gate Bridge, known as Doyle Drive and Route 101. The highway runs along the two historic national parks, the Presidio of San Francisco and the Golden Gate National Recreation Area. The project had been envisioned for the past few decades, but local opposition delayed its implementation. However, it became apparent in the 1990's that the project must be completed due to a number of reasons. The existing iconic viaducts had well outlived their anticipated life expectancy by decades, and the structures were not built with earthquake design standards incorporated. The growing traffic volume capacity issues, and the conversion of the Presidio from an active military base to its current status as a national park, required some serious redesign to the access and approach. The project scope includes two short sets of tunnels, two sets of viaducts, and numerous pedestrian and vehicle connections to increase access to the Presidio, while providing capacity to handle anticipated traffic volume growth. Currently, construction is scheduled to be completed in 2016. Golden Link Concessionaire LLC entered into a 30 year DBFOM Availability Payment P3 with Caltrans. This project actually has two phases. The first phase was a Design Bid Build project. The second phase, was strictly P3, but Golden Link will operate and maintain the entire mile long corridor after Phase II completes. The project will cost roughly \$1 billion dollars.

Colorado

US 36 Managed Lanes, BRT

The US 36 Managed Lanes project is an upgrade to an existing facility in Colorado. The route connects Denver to Boulder. While the existing road is a four lane divided highway, the final design will be a six lane divided highway. Two of the lanes

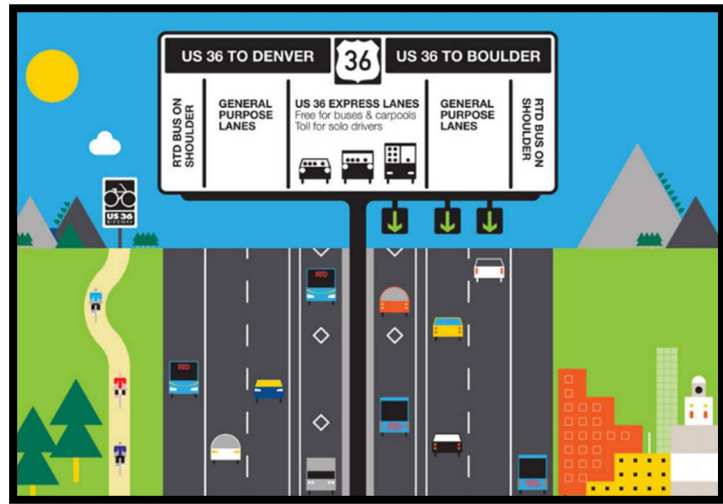


Figure 8: Friendly Diagram showing lane configuration for US-36

in the middle will serve as High Occupancy Toll (HOT) lanes, and they will be separated from the General Purpose (GP) lanes by a variety of measures including concrete barriers, rumble strips, and pavement markings. The project will also include new shoulders which will serve as hard shoulders to allow Bus Rapid Transit (BRT) to continue service during periods of high congestion. Finally, the scope calls for parallel bike paths, adjacent to the highway. A major component of this deal is the inclusion of BRT. New bus facilities, access ramps, and dedicated shoulders will be included in this project. Currently, the HOT lanes will be HOV 2+, meaning that vehicles with two or more occupants may travel the HOT lanes for free, solo drivers pay a fee. However, this will probably change in a few short years to HOV 3+. Envisioned changes also call for the eventual upgrade of the hard shoulders to become auxiliary lanes. Plenary Roads Denver entered into a 50 year DBFOM toll concession. The tolls are initially controlled by CDOT based on the time of day, but it will revert to congestion based pricing, with a cap, by 2017. The first phase, 10 miles long, was a Design Build project, but the second phase, another 7 miles, is the P3 portion.

The Eagle Project

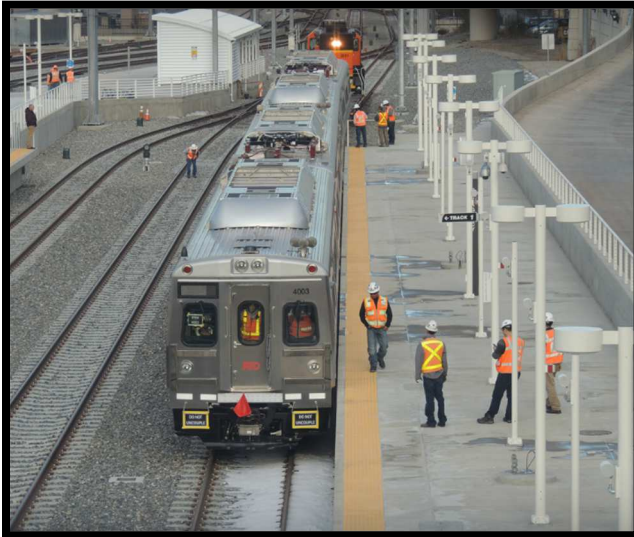


Figure 9: New rolling stock arrives in Denver

The Eagle Project is a commuter rail line in Denver, Colorado. The project is comprised of three different lines, the East Rail, the Gold Rail, and the Northwest line. It will connect Denver to the Denver International Airport, to the suburb of WheatRidge, and South Westminster. There is a total of 36

miles of commuter rail being added to

the Denver's commuter rail system. Two of the lines run on overhead electrical power. The other line must power itself. In addition to the three lines, the Eagle Project involves the purchase of 54 new rail cars, or rolling stock. Hyundai has been contracted out to deliver the rolling stock and has already begun delivering some of the cars. The last major piece to this project is the construction of a new maintenance facility, to store and repair rolling stock. Each line is scheduled to be completed in piecemeal, but the entire project is expected to become completed in 2016. The concessionaire is Denver Transit Partners (DTP), and the project owner is Regional Transportation District – Denver (RTD-Denver). RTD-Denver is a separate government agency from Colorado DOT. The project is a DBFOM, and the payment mechanism is an Availability Payment. It has a concession period of 34 years. Although this is an Availability Payment, there is a toll fare to use the trains, which RTD will administer and collect. The total cost for this project is approximately \$2.04 billion.

Texas

SH-130

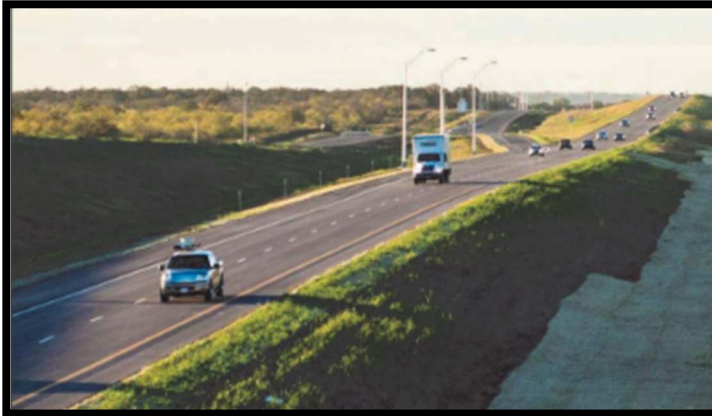


Figure 10: Lightly traveled SH 130

Between Austin and Seguin, Texas, there is a relatively new toll road that has very low traffic volumes, and speed limits set to 85 miles per hour. The SH-130 Toll road is 40 miles long, four lanes wide, with

two in each direction. It runs along the SH-130 corridor, which is only tolled in this specific section. The concession company is SH 130 Concession Company, and it is mainly comprised of Cintra and Zachary American Infrastructure. The concession period is 50 years long and it will be done as a DBFOM, utilizing tolls as the payment mechanism. However, Texas Department of Transportation and the concessionaire have agreed to revenue sharing, so only a portion of the toll revenues will go to each of the stakeholders. The project was recently completed in 2012, but in 2013 Moody's downgraded SH 130's debt to junk status. The traffic volumes observed on the toll road were significantly less than expected. This may have been due to the parallel facility, I-35, being a non-tolled road. I-35 is a heavily congested roadway, and SH 130 was supposed to alleviate some of the truck volume by incentivizing first time users, and getting them hooked on the significantly shorter travel times. Even after TxDOT raised the speed limit on SH 130, lowered the speed limit on I-35, and further incentivized the roadway with lower toll rates, volumes have not yet picked up. This project is dangerously close to default. This is the first of Texas' Comprehensive Development Agreement CDA for P3's.

The North Tarrant Express

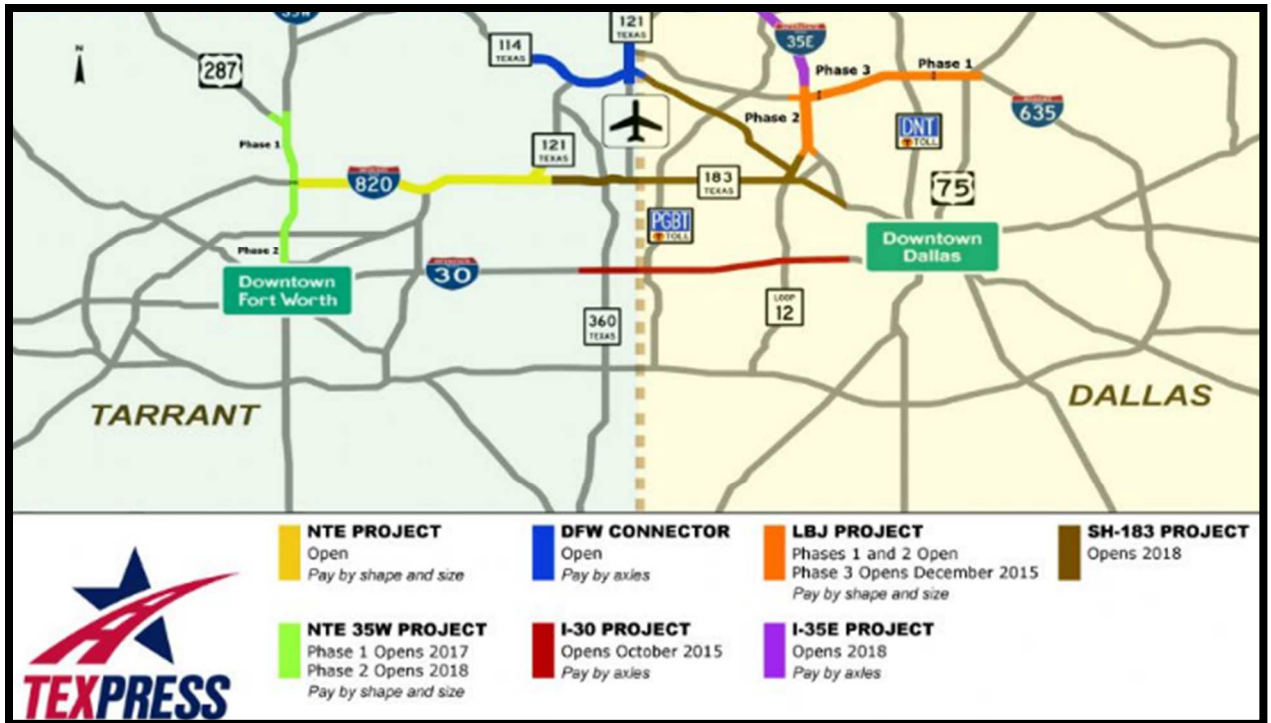


Figure 11: Color coded map of the DFW area, displaying the NTE and LBJ P3 projects, among other current major projects.

The North Tarrant Express is one of many projects being delivered in the growing Dallas-Fort Worth (DFW) area. There are actually two parts to the NTE project. The first part is along I-35W (seen in green on the map above), and the second part is along IH-820 (seen in yellow on the map above). The first part of the NTE runs from Fort Worth towards the Tarrant County line. The second part runs from downtown Fort Worth northbound until it intersects with the first part of the NTE, and then it continues northbound for a little further. The concessionaire is NTE Mobility Partners, and the company is created from Cintra and Meridian. The project will utilize a 52 year concession period and it is a DBFOM toll road. The first part of the project actually finished months ahead of schedule and the facility is currently operational. Totaled up, the NTE project is 36 miles of managed lanes, with two lanes in each direction. The second part of the project is expected to finish in 2017. The North Tarrant Express is the second CDA to be used in Texas.

The LBJ Express

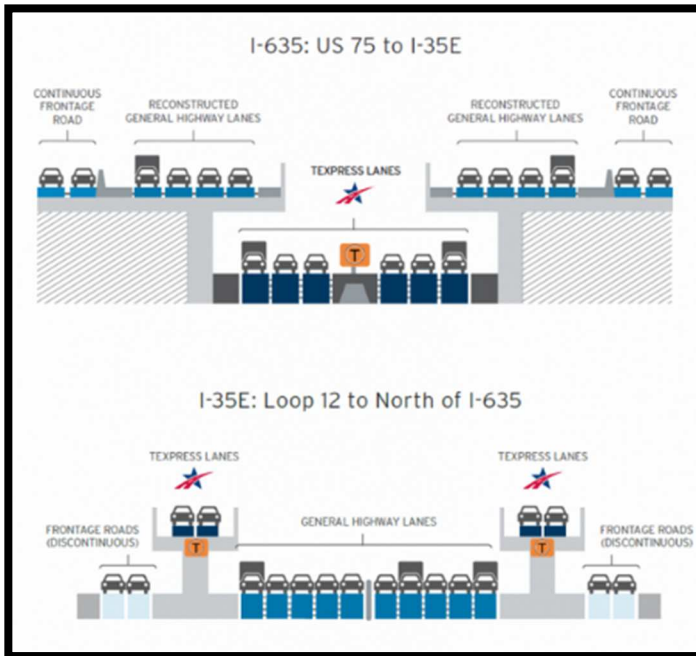


Figure 12: Diagram of LBJ Express lane configuration

The LBJ Express runs along I-635, and it is 13.3 miles of toll road. For most of the road, the LBJ Express is six lanes wide with three lanes in each direction. In other locations, it is four lanes wide with two lanes in each direction. An interesting fact about the LBJ Express is that the majority of it runs underneath the

cantilevered general purpose lanes for I-635. The scope for this project includes modifying the existing lanes for construction, six new subsurface lanes, ramps, and the cantilever lanes above the lower managed lanes. The concessionaire for this project is LBJ Express and it is made up of Cintra and Meridian. Also tagging along in this concessionaire is Trinity Infrastructure. This project is expected to cost a total of \$2.6 billion dollars. After a five year construction period, the concession is a 52 year DBFOM, utilizing tolling as the payment mechanism. Substantial completion of this project is currently scheduled for December, 2015. According to FHWA's website, the project will begin congestion tolling strategies six months after completion. Like the other projects in the Dallas-Fort Worth area, LBJ Express will be a part of the TEXpress program, Texas's automated electronic tolling system.

Research Results by Project

Indiana

East End Crossing

East End Crossing efforts began by emailing the project contact listed on FHWA's IPD project profile website. Unfortunately, according to an automated email response, she no longer works for the Indiana Financing Authority (IFA). The response forwarded the inquiry to another individual. Shortly after emailing that lady, correspondence was established by a public affairs representative. This particular individual represents IFA and INDOT on all P3 projects. After a brief phone call explaining the intent of this research, the public affairs representative seemed agreeable to assist in research efforts. She passed along the request for access to data, project manager interviews, and other details to INDOT, specifically to the East End Crossing team and the I-69 Section 5 team. Follow up was performed in a timely manner to see how the progress with contacting INDOT had gone, and that particular lead failed to reply. For most of this research effort, this project was unresponsive, and the data availability was determined to be unknown.

There are two websites available for the East End Crossing. There is a website managed by IFA, and there is a project website. The IFA site is essentially a data dump, where data and documents have been uploaded in an unorganized fashion. The format is simple in that it is simply a list with a few headers to identify sections and groups of files. There is no clear description of what the files are, nor is there any organized way to search through it, unless a user is familiar with what they are searching for.

The project website is more informative and helpful. Project information is cleanly organized and ordered on different pages, easy to navigate and to find. Media information

and news alerts, traffic alerts, and contact information all have their own designated web page, making the information desired easier to obtain. However, technical documents appear to be missing.

Using the IFA website, the following documents have been located:

- Financial Documents
- Numerous Agreements between parties (hard to distinguish)
- Technical Documents

Using the project website, the following documents have been located:

- The Development Agreement (the Ohio River Bridges contract itself)
- Historical Documents
- Committee Responses, Concepts, and Alternatives

Further communication efforts were established with the WVB Developers Project Director, and the Project Manager (PM) for INDOT. In communications with them, they were able to point this research effort in the right directions. According to INDOT, the “boilerplate of the O&M is located somewhere in Sections 18 of the PPA”. The language is a clear indicator that much of the O&M contractual wording is “boilerplate”, or standard INDOT language. If the language being used in the Public Private Agreement (PPA) is the same as the language being used in traditional INDOT projects, then that means that many of the standards are exactly the same. In other words, the performance standards of the P3 should fall exactly in line with traditional INDOT projects. The INDOT PM recommended PPA Book 2 Technical Provisions, Section 22 Operations and Maintenance. He also recommended Attachment 22-1. Section 22 details all the obligations and limits of the concessionaire. It sets up the standards to use, and the general duties to perform. Also, Section 22.2.2 Operations Reports details the information that the Quarterly Reports must contain. The following is a short list of reported information pulled from that section:

1. *Summary of the status of all segments for the month identifying all Closures, Permitted Closures, and Unavailability Events as defined by the PPA.*
2. *Summary of Closures, Permitted Closures, compliance hours, and Planned Maintenance hours for the coming month. This report shall include details describing the location, duration, and reason of each.*
3. *Non-Conformance Reports: For each material Defect in the Project Elements, the report shall identify the location, the nature and cause of the material Defect and the steps that will be, or have been, taken to address the material Defect.*
4. *O&M Contractor event log data, including all operator actions and event details for traffic and systems events, Incidents, security Incidents, weather Incidents, and the details of Developer's Incident response, including response time data, response records, etc.*
5. *Developer's Incident response logs, including a time-based report of all actions and activities performed by Developer.*
6. *Quality assurance review of the O&M Contractor actions and lessons learned where appropriate.*
7. *Summary of staff and hours worked for the month.*
8. *Summary of Closures, Permitted Closures, and Planned Maintenance hours for the coming month. This report shall include details describing the location, duration, and reason of each.*
9. *Maintenance Work Report.*
10. *Any additional information required pursuant to Section 11.1.2.3 of the PPA.*

All performance requirements listed in Section 22 of the Technical Requirements directs the reader to Attachment 22-1, and they say that the concessionaire will keep the project in accordance with the standards provided in Attachment 22-1. Attachment 22-1 is the Performance and Measurement Table.

The Performance and Measurement Table in this attachment details a few key areas:

- | | |
|--|---|
| 1. Roadway | 7. Traffic Signals |
| 2. Drainage | 8. Lighting |
| 3. Structures | 9. Fences, Walls, and Sound Abatement |
| 4. Pavement Marking, Object Markers, Barrier Markers and Delineators | 10. Landscaping |
| 5. Guardrails, Safety Barriers, and Impact Attenuators | 11. Earthwork, Embankments, and Cutting |
| 6. Traffic Signs | 12. Snow and Ice Control |
| | 13. Incident Response |

14. Customer Response
15. Sweeping and Cleaning

16. East End Bridge Security System

At the very end of Attachment 22-1 on the last page is Table 22-2 IRI Requirements, which details out the pavement smoothness for both HMA (asphalt) and PCCP (concrete) pavements at different highway design speeds.

According to both the INDOT PM and the WVB Project Director, the performance measures, how they are presented, and the standards selected are probably highly influenced by the consultant that the public sector agency has hired to assist them in the Public Private Partnership contract writing. They suggested that the consultant probably would leave a “fingerprint” on the document, which if compared to another project contract or performance measures, could be identified. The two suggested that consultants on a P3 project likely would use that project experience to earn another job consulting different agencies.

Lastly, the two gentlemen recommended Exhibit 10 in the PPA. Exhibit 10 is the part of the contract which details the availability payment. It lists how availability is quantified, measured, and how the payment is calculated. Exhibit 10 has not yet been located because the IFA website is a disorganized and difficult to navigate.

This project is still in construction, and not expected to be completed until 2016. This means that operations and maintenance reports have not yet been issued yet. When asked if there was any information which might fall under proprietary rights, the only information the two project professionals interviewed could mention was financial models and how WBV developed those. All other performance data and reports should be available through public information requests. That doesn't mean that there won't be any data considered

proprietary in the future. It just means that at this time, these professionals interviewed could not think of any specific data.

Overall, this project is an example of a DBFOM availability payment P3 project which demonstrates the measurements and data being recorded. This project shows signs of transparency through the use of their quarterly progress reports. Finally, current views from high level project personnel point to a wide amount of public access to this information. Although the information may not be easily organized on their website, and communication between representatives may fall through, it does appear that data and the reports containing this data will be available.

I-69 Section 5

The FHWA contact for I-69 Section 5 is from INDOT's Office of Communications. The representative was kind enough to forward my initial information request to the current I-69 Section 5 project manager. The PM was quick to reply to correspondence and was courteous to take the time out to discuss about her project in detail. She promised to look at some of the requests and she would write back when she had results. Contact has since not been re-established with the INDOT PM since that time. Follow up emails have not been successful.

The project does have a very comprehensive website managed by IFA. This website follows the same layout at the East End Crossing website managed by IFA, but the website has had special attention to organize and detail the documents uploaded to it. It contains nearly all the project documents, which are clearly labeled and organized, which increases access to public information.

The technical provisions for the I-69 Section 5 project are clearly labeled into three part .pdf documents. These have been separated out from the rest of the PPA docs. All the exhibits are also separately broken out. This is incredibly helpful and open, because there are close to 50 different exhibit documents.

Attachment 18-1 to the Technical Provisions provides the Performance and Measurement Tables. The specific performance categories that it covers are very similar to the categories covered in the East End Crossing Performance and Measurement Tables, with the exception that it's 25 pages longer. The reason for this increase in page length and detail is due to INDOT specifying the performances in two differing time periods: during construction and after construction. In order, the categories are:

- | | |
|--|--|
| 1. Roadway | 8. Lighting |
| 2. Drainage | 9. Fences, Walls and Sound Abatement |
| 3. Structures | 10. Landscaping |
| 4. Pavement Marking, Object Markers, Barrier Markers and Delineators | 11. Earthworks, Embankments and Cuttings |
| 5. Guardrails, Safety Barriers and Impact Attenuators | 12. Snow and Ice Control |
| 6. Traffic Signs | 13. Incident Response |
| 7. Traffic Signals | 14. Customer Response |
| | 15. Sweeping and Cleaning |

The only difference between this list and the list of categories from the East End Crossing is the category “East End Bridge Security System”, which project specific. Also, slid in at the end of the attachment are the IRI Requirements in Table 18-C, just like in the other Indiana project, East End Crossing.

Exhibit 10 is full of information regarding data availability. It contains the steps involved in calculating the quarterly availability payment. The calculations are based on data which

reflects the facility's availability. The facility availability, or lack of, is primarily measured by lane closures and non-compliance events. The lane closures have factors that affect them like time of day and type of incident, which affect how much of a penalty, if any, shall be applied to the availability payment. The non-compliance events and point system is described in Exhibit 12's Attachment 1.

Lastly, the Technical Provisions document lists what data will be reported quarterly, as done in the East End Crossing project, in Section 18.2.2 Operations Report. There are similarities in the reporting requirements: Quarterly Operations Report shall include, at a minimum, the following data and information:

1. Summary of the status of all segments for the month identifying all Closures, Permitted Closures, and Unavailability Events as defined by the PPA.
2. Summary of Closures, Permitted Closures, compliance hours, and Planned Maintenance hours for the coming month. This report shall include details describing the location, duration, and reason of each.
3. Non-Conformance Reports: For each Defect in the Project Elements, the report shall identify the location, the nature and cause of the Defect and the steps that will be, or have been, taken to address the Defect.
4. O&M Contractor event log data, including all operator actions and event details for traffic and systems events, Incidents, security Incidents, weather Incidents, and the details of Developer's Incident response, including response time data, response records, etc.
5. Developer's Incident response logs, including a time-based report of all actions and activities performed by Developer.
6. Quality assurance review of the O&M Contractor actions and lessons learned where appropriate.
7. Summary of staff and hours worked for the month.
8. Summary of Closures, Permitted Closures, and Planned Maintenance hours for the coming month. This report shall include details describing the location, duration, and reason of each.
9. Maintenance Work Report.
10. Any additional information required pursuant to Section 11.2.1.3 of the PPA.

The lack of contact with project personnel for the I-69 Section 5 project makes it very hard to determine what reports or information will be available upon completion. The contract itself specifies what data will be measured and recorded and what data will be reported back to INDOT. However, the contract does not give any insight on state policies or concessionaire preferences. This can only be obtained through interviews and communications.

California

The South Bay Expressway

Efforts with the South Bay Expressway began by trying to contact the FHWA listed Director of Operations. The listed email address was used to reach out to him. The first email was replied to with a phone call by an office administrator at the South Bay Expressway. After an information request was sent to her, and she passed the request along to the current project manager, as the FHWA listed contact had left the organization to join the tolling agency. There was a brief period of sporadic contact with the PM, but unfortunately contact was never fully established.

The current website for the South Bay Expressway does not list project documents, most likely due to the fact that it is currently being run by a different entity. The project documents are not easily found in a Google search either. With the exception of a bankruptcy court opinion, project documents have not been found. It may be the case that these documents are difficult to procure because the documents may have been discarded after the bankruptcy.

It is promising however that this project ran for three years before it went bankrupt. That means there is potentially three years of data sitting somewhere, ready to be unearthed.

According to a University of Maryland professor, because the company went into bankruptcy, the contract agreement, along with many of the progress reports, should be public record, as they were admitted into court evidence. Those court files and documents showing this information have also not been found. Although data has not yet been found, that does not mean it does not exist. Likewise, since contact has not been reestablished, the level of data availability, transparency, and the effects of proprietary rights on public access to data cannot be determined. This project has been the least fruitful of results.

The 91 Express Lanes

There was not much initial hope for the 91 Express Lanes turning up solid results because the project sold back to OCTA back in 2003. The odds that data from that time period existed, or that it was even relevant, seemed improbable. The FHWA listed project contact, was reached out to through a number of emails and phone calls. The project manager was able to produce a couple of project documents from the P3 era, and he was able to offer some insight on the current project. He revealed that the operator was the same then as it is today. Cofiroute operates and maintains the existing facility. Therefore, any data released by OCTA would essentially have to have been cleared by Cofiroute as not subject to propriety rights. One could further assume that because the operator is exactly the same, the same reports which OCTA receives now are the same reports which OCTA would have received had the franchise not been sold back to OCTA in 2003. That may be a stretch of an assumption.

The PM was frank in his admission that OCTA does not keep old records or files of the previous franchisee. In fact, many of the previous franchisee's reports, agreements, and documents had been lost or destroyed. If the original agreement exists somewhere, OCTA

does not have it. The same goes with performance data and quality reports. OCTA does not have any of the data from before 2003. The current website for the 91 Express Lanes is also devoid of information. Much like the South Bay Expressway, the website is set up to suit the current configuration of the toll road, and not as a project information hub.

The PM was able to provide two results. First, he was able to provide financial statements from 1998-2000 for the concessionaire CPTC. These statements include Statements of Cash Flows, Return on Investment, and Statement of Project Funds Distribution. There are some pieces of information that can be gathered from these statements like traffic counts, peak hour counts, occupancy amounts, and operating costs. The second product from the project PM is a monthly status report from February 2015. This very recent status report details a large amount of fresh data inclusive of:

- Traffic Volume on Toll Lanes Only
- Traffic Volumes on HOV 3+ Only
- Revenue / Lanes
- Average Revenue / Lanes
- Weekday Peak Volumes
- Weekday Peak Toll Rates
- Customer Service Performance Data
- Violation processing Data
- Traffic Operations data
- Accounting Data
- Incoming Call Volumes / Data
- Transponder Data
- Numerous charts / graphs / visuals

If the assumption holds that this data would be shared had the toll facility still been a P3, then what the PM has provided is a great indicator of data availability to the public. However, that assumption may not be true. This project is no longer a P3 project, and the traffic volumes and toll revenues are no longer tied to CPTC's financial models or the valuation of the asset. Even though Cofiroute is the same operator in both time periods of

this toll roads, that does not mean they would be so open with their data and records. This project has had mixed results in determining data availability.

Presidio Parkway

Previous connections with the Presidio Parkway project made contact easier to establish with this project. Instead of relying on FHWA to provide contacts, University of Maryland research was utilized. A fellow researcher at the University was able to establish contact with a project manager and design engineer. The engineer's inside access to the Presidio Parkway job was excellent to have for his insight and extensive project knowledge, especially in the project's history and backstory. Both contacts directed inquiries to the Presidio Parkway Project Public-Private Agreement Volume II (Technical Requirements) Division II, Section 4 (O&M Requirements). In this portion of the PPA, Tables 4.1 Construction Period O&M and 4.2 Operation Period O&M are found. These tables are built similar to the tables INDOT uses, due to the categories of performance measures they cover. A brief list of these categories includes:

- Inspection and Reporting
- Flexible Pavement
- Rigid Pavement
- Slopes, Drainage, and Vegetation
- Litter and Debris Removal
- Landscaping
- Stormwater
- Structures
- Tunnel Systems
- Intelligent Transportation Systems
- Electrical
- Traffic Guidance
- Storm Damage
- Incident Response

The website for the Presidio Parkway is visually appealing, but there is not much organization with respect to the documents within its pages. There are reports and agreements listed, but the actual contract documents simply are not there. In order to find the agreements, a rigorous Google search is actually more productive. That effort led to individual documents located on a separate Caltrans website. But in order to search through the website, advanced website search was used, including accessing the parent folder of particular documents and sites. This resulted in finding a Caltrans data dump, lists and unlabeled folder of links to documents. The links did not have the document names attached, and so it is very difficult to search for and find the documents that were desired. In many cases, it was simply easier to use Google and to guess keywords than to use the Presidio Parkway website or the Caltrans data dump. This lack of information access severely restricts data availability for this project.

One of the brighter results from this project is that it is technically operational. Phase I for this project has completed and is currently operational. Phase II is well under construction. That means that reports are already coming out which detail how the project is being operated and maintained. When asked about the status of some of these reports, the design engineer replied that he would put in the request to the legal team to determine what reports were shareable. Follow up attempts were made, to determine what data and reports are available, and if proprietary rights will hinder any of this information being made public. However, the legal team has not processed the request. Regardless, data does seem to be available here in the Presidio Parkway project, it is just the impact of proprietary rights that remains unknown.

Colorado

US 36 Managed Lanes, BRT

The FHWA project contact for the US 36 is the Project Director. After reaching out to him, he quickly emailed back. His team, which included the Design Project Manager and the Construction Project Manager, were happy to take the time out to discuss the US 36 project and its details. Not only were these individuals expectedly well versed in their project, but they had their finger on the pulse of Public Private Partnership policy in the State of Colorado. One of the first things they revealed was the recent transparency policy enacted in Colorado by Governor John Hickenlooper. In the summer of 2014, Gov. Hickenlooper vetoed a state senate bill which was aimed at creating transparency in the P3 industry because of some business considerations he felt were too restrictive of the P3 market. Instead, he signed an executive order which encompassed the majority of the bill, minus the business restrictions. According to the project team, that executive order, and the eventual senate bill that will follow, will make the P3 process in Colorado very transparent. They added emphasis to their opinions stating that they felt an individual could obtain nearly any information they requested from a project in the High-Performance Transportation Enterprise (HPTE) program, Colorado's innovative arm for developing needed transportation projects via alternative methods.

The Project Director was able to point towards US 36's Schedule 6 for its performance measures, which is available publicly on HPTE's US 36 web page. Fortunately, a simple Google search will yield the HPTE website, and without too much trouble one can navigate to the appropriate link to find the entire concession agreement and each

individual schedule listed for public consumption. Documents, pages, and information is moderately well labeled and accessible. Schedule 6 is the Service Requirements, and it contains Appendix 6-1.1 and 6-1.2, the Performance and Measurement Tables for the General Purpose Lanes and the Managed Lanes, respectively. These tables are nearly identical to the Indiana project tables. They are the exact same in terms of set up and format. They differ only in content, and the differences are minimal, if not negligible.

- | | |
|---|---|
| 1. Roadway | 9. Fences, Walls (minor), Sound Abatement |
| 2. Drainage | 10. Roadside |
| 3. Structures | 11. Earthworks & Embankments |
| 4. Road Pavement | 12. Graffiti |
| 5. Guardrails, Safety Barriers and Impact Attenuators | 13. Incident Response |
| 6. Traffic Signs | 14. Sweeping and Cleaning |
| 7. Traffic Signals | 15. Buildings and Storage Facilities |
| 8. Lighting | |

Almost all of the categories which differ in name cover the same provisions and performances as their counterpart in the Indiana tables found.

From the team interview, their opinion on public outreach was easily gaged. They were quite vocal in the lack of public outreach, and they had expected a significantly larger amount from the concessionaire. A new campaign project is about to begin, full of ads, pamphlets, radio and television time, which will seek to promote the project, since it is about to reach substantial completion soon. This may factor into the public outreach performance once the project goes into full operations.

In terms of performance differences, the team had comments about their experience with the project, with respect to the design and construction phase alone. So far, they

have seen no considerable cost savings. They were dismayed for two reasons. First, the benefits of Public Private Partnerships have been well promoted to them and they were anticipating noticeable results due to the use of P3 delivery. Second, the concessionaire was utilizing the same design-build firm that was already building Phase I of the project. With project familiarity, consolidation of resources, and economies of scope and scale, they expected to see cost savings. Currently, not only has the project not observed cost savings, but the project is slightly behind schedule. Although, the team was quick to point out that this delay was outside of the design build firm's control, therefore the firm was not at fault.

Finally, the team was able to provide a list of Alternative Technical Concepts (ATC's), which the concessionaire provided to CDOT, and which CDOT evaluated. These ATC's represent added value to the project which otherwise might not have been incorporated under the baseline scope provided by the agency. The ATC documents are too large to attach, but they are available to the public upon request.

Overall, the US 36 project team and documents have provided clear indication of what data is going to be measured for this project. Although they were not clear on what data and reports will be made public, due to the fact that they are still in the construction phase, they did make it clear that the legislative and executive actions in the State of Colorado point towards clear data transparency. The possibility of proprietary rights keeping some data hidden from the public's eye did not seem to be much of a possibility from the project team. US 36 seems open to data availability.

The Eagle Project

This project was interesting to study because it was different from all the other projects. It is a commuter rail project instead of a highway project. The listed FHWA project contact is an RTD-Denver's Public Information Officer. He was warmly receptive to inquiries and assisted by forwarding inquiries to the Project Director. The Project Director was happy to participate in a phone interview. He was able to give clear guidance on much of the data of the effort we were looking for.

The Eagle Project documents are all loaded onto the RTD-Denver FasTrack's website. Their site is not aesthetically charming, but it is well organized and easily navigable. The Project Director pointed to three different attachments to find the performance and quality indicator data. Attachment 7 describes the Design, Construction, and Rolling Stock Requirements. Attachment 10 is the Operations and Maintenance Requirements. Finally, the project Director recommended a look at Attachment 11, where the availability payment mechanism is described.

Special to the Eagle Project is how the requirements were laid out. The Project Director stressed that in the Eagle Project, the requirements from the beginning were designed to be performance based and not design based. That means that instead of the specifications detailing out exactly how things would be constructed or maintained, specifications only detailed what the performances should be. For example, the requirements for a parking garage were simply that it need to provide a certain amount of parking spaces. Everything else was left up to the concessionaire to determine. The concessionaire could make choices on design and construction method as long as it provided the service and performance required.

The performance and quality indicator measurements and data recordings are not so easily summarized in one nice simple table, like the highway projects covered in this study. They are spread throughout Attachments 7 and 10, totaling hundreds of pages. However, Attachment 11 offers a simplified view on the data required to calculate the availability payment. The availability payment is comprised of three main components: the Monthly Availability, the Performance Deduction, and the Special Event Adjustment. Each one of these is described and the methods by which to calculate them are specifically detailed. But the highlight of the Attachment is at the end of the document where it shows the form which the concessionaire must submit to receive its availability payment. Essentially, all the data required to calculate the availability must be filled out on a standard form, such that RTD-Denver can recalculate the numbers provided if they so wish. This one monthly form should contain nearly all of the performance and quality measurement data one would ever be interested in for this project.

The Project Director described this project as being very focused on the customer. They approached this project with the mentality to design this project “not from an engineer’s perspective, but from a passenger’s perspective.” They made sure to focus on making the Eagle Project “clean and safe” for the customer. The availability payment is based heavily on the operations and maintenance requirements. The availability according to the Project Director was summarized as a list of simple, short questions:

- Did all the trains go out?
- Did all the trains go out on time?
- Are the stations available?
 - Does the station have working lights and security?

- Is the rolling stock available?
 - Are the cars clean?
- Are the elevators available and working?
- Are the stations cleaned and maintained?
 - For example, the trash cans cannot be more than 75% full.

These questions will all be answered in monthly reports in addition to the service payment form submittals.

From his perspective, it appeared that there would be no restrictions on data availability. He did not foresee any problems with proprietary rights on performance data. This may be due to the legislative and executive policies described in the US 36 results, or it may be simply because of this project's specific situation.

The Eagle Project is a good example of data availability, and the wide range of data being made available in the State of Colorado. This project shows what data will be recorded, in what form some of this data will be reported to RTD-Denver, and all signs currently point to this data being accessible and available to the general public. The project website and the project personnel both seem to be incredibly transparent and open about their project.

Texas

All Texas Projects – SH 130, NTE, LBJ Express

Different than the other states, Texas's results should be described all together. Efforts were made to contact representatives for all three Texas projects. Each one started out differently, but they all came together in the end. For SH 130, an email was sent to the listed FHWA project contact. She quickly replied back and stated that she requested the COO of the SH 130 project to participate in an interview. They just needed to

confirm my student status, and schedule a time. Unfortunately, this route did not pan out, and contact ceased after other efforts picked up. For the NTE, efforts were made to reach the current Project Manager by phone and email. His contact information was listed under FHWA's website. He recommended further efforts to check the Comprehensive Development Agreement (CDA) on TxDOTS's website. He forwarded a request, but for a while this route went silent as others picked up. Finally, efforts reached out to the LBJ Express project through the LBJ project website inquiry line. Email requests to the FHWA project contacts did not work at all, so the project website was utilized. An Assistant Public Relations Manager for Trinity Infrastructure, first replied to emails. After a brief phone call, she forwarded this effort up the chain of command, to the Director of Corporate Affairs for the LBJ Express concessionaire. This individual was very helpful, and she introduced contact with her TxDOT communications counterpart, who supervises eight projects in the Dallas Fort Worth area. This TxDOT representative was able to take a multiple phone calls to answer many questions about the LBJ Express, NTE, and also SH 130 since he had project experience with all three. He also brought in a Public Information Requests specialist. The specialist further reached out to project personnel to assist these efforts in report acquisition, and that outreach then contacted a former project engineer for the NTE project. As coincidence would have it, this project engineer happened to work directly with the NTE PM was previously interviewed for this study. Unfortunately, the former project engineer was at the time transitioning positions, which is poor timing for this study. But she set up a replacement representative, who also is working on the NTE, to finish all further inquiry. Overall, with all the research, interviews, and correspondence

have been conducted with eight different professionals who are involved in the procurement of information on Texas Public Private Partnership projects. By their assistance and intensive correspondence, they have been able to help acquire a large amount of data for this study.

An important piece of information was learned from the TxDOT communications representative, which plays a role in all the data acquired from TxDOT. He said that the three Public Private Partnership projects in TxDOT were all done iteratively. He explained that after SH 130, the NTE took those performance specifications, and many other contract pieces, and built upon it. Similarly, the LBJ Express built upon the NTE project performance requirements. This explains the similarity in many of the Performance and Measurement Tables within TxDOT's three projects.

For comparison purposes, those performance categories covered in all three TxDOT Performance and Measurement Tables are presented here:

- Roadway
- Drainage
- Structures
- Pavement Marking, Object Markers, Barrier Markers and Delineators
- Guardrails, Safety Barriers, and Impact Attenuators
- Traffic Signs
- Traffic Signals
- Lighting
- Fences, Walls, Sound Abatement
- Roadside Management
- Rest Areas and Picnic Areas
- Earthwork, Embankments, Cuttings
- ETCS Equipment
- ~~Tolling~~ (Not Used)
- Amenity
- Snow and Ice Control
- Incident Response
- Customer Response
- Sweeping and Cleaning

The only difference between all three tables are the slight increases in number of measurements and performance checks. The general overarching measurements are continuous throughout the three projects.

Acquiring this information about the performance measurements was relatively easy. Not only were the project personnel incredibly helpful and informative, but the TxDOT website for their Comprehensive Development Agreement (CDA), TxDOT’s P3 contract, was well organized too. The technical documents were all uploaded and easily found. The TxDOT personnel were helpful in explaining where to look, but the website was helpful in making the search and navigation straightforward and simple. The access to this information was some of the best come across in this study.

Two of the Texas projects are in the operations and maintenance phase of the concession, having completed construction and open to traffic. Both the SH 130 and the NTE are currently pushing out monthly and quarterly reports. The former project engineer was able to share the list the TxDOT has for their required O&M reports on the NTE project. The other projects have similar lists of reports to produce as well. Below is an abbreviated version of what she shared.

Report	Frequency	Reference
Toll Performance and Measurement Report	Weekly	CDA Exhibit 4 ¶G.1.b.i-iii
	Weekly	CDA Exhibit 4 ¶G.2.a.i-iv
	Monthly	CDA Exhibit 4 ¶G.1.c.i-vi
	Monthly	CDA Exhibit 4 ¶G.2.b.i-iii
	Monthly	CDA Exhibit 7 ¶E.2 Interoperability Fee Adjustment
Incident Report	Quarterly	Tech Prov Book 2 ¶22.2; PMP Ch 2C/D ¶13.2
Non-Conformance Report	Quarterly	Tech Prov Book 3 ¶22.2; PMP Ch 2C/D ¶13.2

	Occurrence	Tech Prov Book 3 ¶2.2.1; PMP Ch 1 ¶1.5; PMP QC-02 (Non-Conformities)
Traffic Report	Quarterly	Tech Prov Book 3 ¶22.2
Maintenace Work Report	Quarterly	Tech Prov Book 3 ¶22.2; PMP Ch 2C/D ¶13.2
Rehabilitation Plans	Annually	Tech Prov Book 3 ¶22.2
PMP Ch 1	Annually	PMP Ch1 ¶1.7
PMP Ch 2A	Annually	PMP Ch 1 ¶1.7
PMP Ch 2B	Annually	PMP Ch 1 ¶1.7
PMP Ch 2C/D	Annually	Tech Prov Book 3 ¶22.2; PMP Ch 1 ¶1.7
	Annually	Tech Prov Book 3 ¶19.2; PMP Ch 1 ¶1.7
PMP Ch 2D	Annually	PMP Ch1 ¶1.7
PMP Ch 3	Annually	PMP Ch1 ¶1.7
PMP Ch 4	Annually	Tech Prov Book 3 ¶3.2.1 PMP Ch1 ¶1.7
PMP Ch 5	Annually	Tech Prov Book 3 ¶2.5 PMP Ch 1 ¶1.7
PMP Ch 6	Annually	PMP Ch 1 ¶1.7
PMP Ch 7	Annually	CDA Section 7.4 Tech Prov Book 3 ¶7.2.3 PMP Ch 1 ¶1.7
ETCS Performance Report	Annually	Tech Prov Book 3 ¶21.5; PMP Ch 2D ¶2D.7.9
Toll Agreement Monitoring Report	Annually	CDA Exhibit 8, Attachment 8 ¶6.b CDA Exhibit 23, Attachment 2
Toll Agreement Audit of Records	Annually	CDA Exhibit 8, Attachment 8 ¶7.b
Toll Agreement Financial Statement	Annually	CDA Exhibit 8, Attachment 8 ¶7.c
Audit Report	Within 7 days of completion	Tech Prov Book 3 ¶2.2.1; PMP Ch 1 ¶1.5 and ¶1.6.2.1; PMP Ch 3, App. 3.1 ¶16.2 PMP QC-01 (Audits)
Environmental Monitoring Report	Monthly	Tech Prov Book 3 ¶4.3.1 and ¶22.2 PMP Ch3, App. 3.1 ¶12.3
Renewal Work Schedule	Annually	CDA Section 8.6 Tech Prov Book 2 ¶19.1.2 Tech Prov Book 3 ¶2.1.1.2.3 PMP Ch 2C/D ¶12.1.2

Renewal Work Report	Annually	CDA Section 8.5
General Purpose Capacity Improvement Early Trigger Date	Annually	CDA Section 12.1.1 CDA Exhibit 16 ¶A.2.2 General Purpose Capacity Improvement Trigger
Managed Lane Capacity Improvement Early Trigger Date	Annually (commencing after issuance of NTP GP)	CDA Section 12.1.1 CDA Exhibit 16 ¶A.3.2 Managed Lane Capacity Improvement Trigger
Communications Report	Monthly	PMP Ch 4 ¶4.5.2
Facility Status Schedule Update	Monthly	Tech Prov Book 2 ¶2.1.1.2.2
ROW Parcel Report	Monthly	Tech Prov Book 3 ¶7.3.2
ROW Progress Report	Monthly	Tech Prov Book 3 ¶7.3.2
Quality Report	Monthly	Tech Prov Book 3 ¶2.2.6 PMP Ch 2B ¶6.7
Utility Report	Monthly	
EEO Report	Annually	CDA Exhibit 8 ¶II.9.b
Payroll Report	Weekly	CDA Exhibit 8 ¶V.2.c
Financial Plan Update	Annually	23 U.S.C. 106(h),(i)
Handback Plan	Once	Tech Prov Book 3 ¶19.3

As anyone can tell, this list is very large list, over 30 reports long. It would have been near impossible for an unfamiliar person to scour through the CDA agreements, to find each provision which requires a separate report. A request was made through two TxDOT contacts to acquire reports listed here which are most in line with the performance and quality indicators this study is looking for. They agree that some of this data may be proprietary, and that the TxDOT attorneys will sift through the request to see what is publicly available. TxDOT's assistance with this task is precisely the goal of the study. TxDOT has sent over a few of the documents asked for already. Many of the documents requested may not have been even produced yet. However, TxDOT

did explicitly reply that one of the reports was not available due to proprietary rights. They said the reasoning given for that report being label such was:

“This Monthly Report contains commercial information and disclosure could reasonably be expected to prejudice the Company’s competitive position and result in undue loss to the Company.”

Regardless, the amount of data procured so far from Texas projects is considerable in itself. It shows what performance data is measured, and it demonstrates what data is recorded. Through TxDOT representatives and interviews, it is clear what data is reported to TxDOT themselves, and it is starting to be evident what data they can share out to the public. Texas’s websites are cleanly structured and contain an immense amount of data, which makes access to information more widespread. All in all, Texas has been very open about data availability. Some data may be proprietary, but what remains should be easily obtainable.

Conclusions

When held side by side, the Performance and Measurement Tables from Indiana, Colorado, and Texas are clearly the same document with a few minor deviations. Those deviations can be accounted for through project specific requirements, like Bridge Security Systems, and adaptations or modifications over time. The general content however, is the same. The comment received by the professionals from the East End Crossing project about consultants leaving fingerprints might be applicable in this case. Or it may be that these documents are publicly available, and agencies are content to use tools or “boilerplate” language that has worked or been used before. This would be equivalent to not reinventing the wheel.

Even when the Presidio Parkway project from California is compared to these other state projects, the performance and quality indicator measurements fall in the same categories. The same things are being measured and reported on. Across four states, and across multiple projects, there are commonalities in the measurements. The commonalities are not just in the general categories themselves, but specifically in the measurements taken too. The units and the frequency line up as well in many cases. Pavement is measured in IRI, not PSI. And while some states use a Pavement Condition Score to assess the quality of their roadway, this number is still composed of IRI and many other commonly measured defects, like the number of potholes per lane mile. This trend of commonality at the detailed level extends to many other general categories for performance and quality measurements. In summary, the data exists, and the data being measured and recorded is common to many Public Private Partnerships.

As for the level of availability, this seems to be determined by two main factors: access and proprietary rights. The level of access to data and information on project performance varies greatly from project to project, and from state to state. Indiana serves as a great example where two different projects had vastly different levels of access. In the case of the East End Crossing, they had very limited access to information on their internet websites. There was data, but it wasn't cleanly organized. The best way to acquire data was directly through the people. Until contact was established with project representatives, it was thought that the East End Crossing would bear no reliable results. Speaking to East End Crossing personnel was very beneficial, because it was able to highlight the level of availability, the openness to discussion, and the sharing of information. Contrasted with the I-69 Section 5 project in the same state, it was found that the information was very accessible online, and that data will be measured. But because contact has not been established with project personnel, it cannot be determined what data availability is or what the effects of proprietary rights on availability are. While Indiana differs on their data availability from project to project, Texas serves as an example where it seems all projects follow the exact same policies and procedures. The similarities on all three Texas projects lead one to believe that what a person can procure from one project, will be able to procure from another. The problem with Texas isn't access, which it has, but the conflict of proprietary rights holding back some of the data from public view.

The following table is a summary of the commonalities in data measurement observed from the case studies (minus the Eagle Project, because it is not a highway project):

Table 1: Observed Commonalities in Case Studies

Projects	SH 130	NTE	LBJ	US 36	Presidio	SBX-125	91-Express	East End Crossing	I-69 Section 5	%
Categories	✓	✓	✓	✓	✓			✓	✓	78%
Roadways	✓	✓	✓	✓	✓			✓	✓	78%
Drainage	✓	✓	✓	✓	✓			✓	✓	78%
Structures	✓	✓	✓	✓	✓			✓	✓	78%
Roadways	✓	✓	✓	✓	✓			✓	✓	78%
Guardrail, Safety Barriers	✓	✓	✓	✓	✓			✓	✓	78%
Traffic Signs	✓	✓	✓	✓	✓			✓	✓	78%
Traffic Signals	✓	✓	✓	✓	✓			✓	✓	78%
Lightning	✓	✓	✓	✓	✓			✓	✓	78%
Fences, Walls	✓	✓	✓	✓	✓			✓	✓	78%
Roadside Management	✓	✓	✓	✓	✓			✓	✓	78%
Rest Areas and Picnic Areas	✓	✓	✓							33%
Earthwork, Embankments	✓	✓	✓	✓	✓			✓	✓	78%
ITS and ETCS Equipment	✓	✓	✓							22%
Amenity (Graffiti)	✓	✓	✓	✓	✓					56%
Snow and Ice Control	✓	✓	✓		✓			✓	✓	67%
Incident Response	✓	✓	✓	✓	✓			✓	✓	78%
Customer Response	✓	✓	✓		✓			✓	✓	67%
Inspection and Reporting					✓					11%
East End Bridge Security System								✓		11%
Intelligent Transportation Systems					✓					11%
Building and Storage Facilities				✓						11%
Sweeping and Cleaning	✓	✓	✓	✓	✓			✓	✓	78%
%	82%	82%	82%	68%	82%	0%	0%	73%	68%	

In conclusion, the attachments provided are a good indicator of the majority of the data that should be available to researchers and the general public. Data in these attachments tend to follow the same measurements and units, across state and project lines. Data should be available in the general categories of roadway quality, drainage quality, structural measurements, traffic signage/ lighting / management, roadside landscaping, cleanliness, snow removal, and incident response times. That data should generally be consistent such that future analysis can be conducted to compare Public Private Partnership delivered projects to themselves and to projects delivered using other methodologies.

Based on my findings, it is recommend that all future Public Private Partnerships utilized a set of performance and quality measurements based on the commonalities found in this study. Utilizing these commonalities will allow analysts to begin creating a baseline standard for P3's. A baseline could only be done if a majority of P3 projects utilize similar measurement standards, and if those measurements were reported publicly. Furthermore, a baseline performance standard would allow future projects the ability to compare their performance measurements in order to determine how the project was doing. Being able to compare projects would help project managers identify performance indicators. These indicators would assist project managers in establishing patterns and trends in performance.

Comparing the tables from different states and projects demonstrates the commonly measured performance and quality indicators. The research on PDBCA has covered similar cost and benefit categories, so past research efforts can be used to assist in determining which indicators will have more impact than others. For the categories and measurements which affect the function and performance of the facility, it is recommended that agencies begin/continue recording data using measurements similar to the measurements found in the attachments. For the categories and the measurements which affect project specific aspects, like bridge functions, or rest stops functions, or aesthetics, public agencies may continue to record such data as they deem necessary. These categories may not produce a baseline measurement in the near future because of the rarity of their P3 project specific performance. In time however, these measurements might be useful for comparison for project performance and quality.

The following table displays the recommended performance and quality measurements based on this study. It is heavily summarized, and attempts to capture the important performances and measurements. Looking at the attachments provided will assist a reader gain a better sense of the detail provided in these performance and quality measurements.

Table 2: Recommendations

Index	Category	Performance/ Quality Measurement	Recommended	Optional
1 Roadway (Pavement)				
		No. of obstructions/ lane mile	✓	
		No. of cracks/ lane mile	✓	
		No. of lane to should drop offs	✓	
		IRI	✓	
		No. of potholes/ lane mile	✓	
2 Drainage				
		% of treatment devices working properly	✓	
		% of underdrains functioning Properly	✓	
3 Structures				
		No. of significant cracks	✓	
		Instances of significant spalling	✓	
		No. of defects in sealant and joints	✓	
		No. of scour damage	✓	
		No. of loose assemblies	✓	
		No. with graffiti	✓	
4 Pavement Markings				
		% of markings with 90% of each symbol functioning	✓	
5 Guardrails & Barriers				
		% free from defects	✓	
6 Traffic Signs				
		No. of signs with reflectivity below requirements of MUTCD	✓	
		No. of damaged safety critical signs	✓	
7 Traffic Signals				

		% of signals undamaged	✓
		% of signals with full contingency plans	✓
8	Lighting		
		% of lights functioning at all times	✓
		Instances of 2 consecutive lights not functioning	✓
9	Landscaping		
		% vegetation not maintained	✓
10	Earthwork & Embankments		
		Instances of slope failure	✓
11	Snow and Ice Control		
		Circuit time measurement	✓
12	Incident Response		
		Response times met for 90% of incidents measured on 1 year rolling basis	✓
13	Customer Service		
		% Customer inquiry responded to within 48hrs	✓
14	Sweeping and Cleaning		
		% of asset with buildup of dirt, ice rock, debris, etc. greater than 24 inches	✓
		Instances of more than 20 pieces of litter visible at highway speeds	✓
15	Rest and Picnic Areas		
		% of facilities maintained as clean and safe	✓
16	Security Systems		
		% time the security systems function properly	✓
		% time normal electrical power functions properly	✓
		% time backup electrical power functions properly	✓
17	ITS and ETCS Equipment		
		% of all hubs, boxes, and sites with clear access	✓
		% of ETCS equipment working properly	✓

		% of VES equipment working properly	✓
		% of Dynamic Message Sign Equipment working properly	✓
18	Building and Storage Facilities		
		Instances of buildings not structurally sound	✓
		Instances of storage tanks leaking	✓

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