A.6 Public-Private partnerships (PPP)

What is it?

PPPs are contractual agreements between the State Transportation Agency (STA) and a private sector entity which allows grater private sector participation in the delivery and financing of transportation projects *(1)*. There are several definitions of PPP on the industry. The Federal Highway Administration (FHWA) *(1)* for instance includes design-build (D-B), design-build-operate-maintain (D-B-O-M), design-build-finance (D-B-F), and design-build-finance-operate-maintain (D-B-F-O-M) as PPP options, while STAs such as the Michigan Department of Transportation (MDOT) and the California Department of Transportation (Caltrans) define PPP projects solely as D-BFOM projects. On this document, the PPP definition includes the D-B-O-M and D-B-F-O-M options as these include the Operation and Maintenance of the project into the contract and therefore result in similar contract lengths.

Why use it?

The following are some of the advantages of the D-B-O-M PPP:

- Integrates the process of design, construction, operation, and maintenance which allows considering maintenance and operation issues during design and construction (2),
- Allows having one contract for all services and products (2),
- Allows a faster project completion as it benefits from the same advantages of a design-build delivery method (2),
- The STA can get a better approximation of the total life cycle costs of the project including maintenance and operations (2), and therefore commit funds for appropriate maintenance beforehand as well as eliminate political conflicts (1), and
- Motivates the contractor to increase quality of design and workmanship in order to minimize maintenance (3).

In addition to the previous advantages, when re assigning the financing component of the project the private sector some additional advantages can be:

- Allows for the implementation of large projects that are would be otherwise prohibitive *(4)*
- Provides an opportunity for better budgetary management *(4)*
- Gives a potential for generation of revenue *(4)*
- Allows the submission of unsolicited proposals allowing the private market to select potentially viable projects *(4)*

What does it do?

PPP projects combine the design and construction responsibilities with the operations, maintenance, and financial responsibilities under a single contract with the private sector resulting in long term concessions of 30 years or more. In case of the D-B-M-O PPP, financing is secured by the STA. As a result, the STA retains the operating revenue risks and any surplus operating revenue *(1)*.

In the case of D-B-F-O-M PPP the private sector is responsible for securing financing for the project. Two different models of D-B-F-O-M have been used in the United States: Road Toll Concession, and Availability Payment Concessions. Under the first model, tolls generated by the project are the primary source of revenue. Here the private sector retains the right to collect the revenues during the concession period and assumes the risk that these may not meet the expected forecasts. The contract usually provides some provision to help the private sector if revenues are lower than expected such as development subsidies, right-of-way provisions or limited revenue guarantees. Ultimately however, these toll revenues are expected to cover the costs of the project. Similarly, in order to protect the public interest in case of robust revenue generation, the contract includes revenue-sharing provisions.

Under the second model, the project revenue risk is retained by the STA. This contractual agreement stipulates that the STA will compensate the private partner according a long term reimbursement schedule. This payment are made based on milestones, such as initially completing specified construction activities, and/or meeting operational performance standards such as lane closures, incident management, or snow removal. This model is used on projects that are not tolled or for which project revenues are not expected to cover the project costs.

How to use it?

Once a project has been identified as a good candidate for the PPP delivery method the FHWA *(5)* suggests the following typical steps:

1. ***Establish project goals –*** The project goals should include what construction or reconstruction needs to be done, what the risks are with the project, and what operational and performance measures are important for the project.

2. ***Hold Industry Meeting –*** Once the project goals have been identified, the STA should hold meetings with the private sector to allow for industry input that will provide feedback on the PPP potential of the project.

3. ***Examine Revenue Options –*** Different revenue alternatives should be analyzed with a project. The revenue source identification usually starts by analyzing the users of the project, and is dependent on the type of project to be constructed.

4. ***Evaluate Financial and Other Risks –*** Upon identification of the revenue sources, the STA should establish how much of the financing can be supported by the revenue. This calculation depends on the current market conditions and the reliability of the revenue forecast. In addition to the financial risks, other risks include environmental, permitting, archeological, geotechnical, and other existent conditions.

5. ***Evaluate Public Sector Capacity for Project Development –*** Here, the STA will examine its capacity to complete the project using traditional methods. Generally, STAs develop a comparator that shows the costs and risks that would assumed under such traditional delivery.

6. ***Examine Possible Benefits of PPP or Conduct Value for Money Analysis –*** Upon defining a comparator, the STA should analyze the benefits of using a PPP delivery instead of a more traditional delivery. Risk, benefits and costs of the comparator and the PPP project should be compared, this process is called a value for money (VfM) analysis.

7. ***Determine how to implement PPP –*** The VfM analysis provides a tool for deciding whether to deliver the project as a PPP. However, it also serves as tool for identifying the PPP model to use, and a general overview of the concession should work.

During the procurement of the project typical steps include *(5)*:

1. ***Development of Request for Information or Request for Qualifications (RFI/RFQ) –*** These documents provide contractors with information about the project and the STA's goals. It also provides a tool for eliminating interested contractor who do not have adequate qualification from the procurement process.

2. ***Development of Request for Proposals and bidding process –*** With a list of potential bidders from the previous step, the STA should issue a request for proposals (RFP). The RFP usually includes information gained through the RFI/RFQ process.

3. ***Select and Negotiate with Private Partner –*** Differently from traditional methods, cost is only one of the factors in PPP procurement. Experience and technical capabilities are other important factors. Upon selection of the Private Partner, both parties should negotiate contract details such payment delivery.

Upon selection of a private partner concessionaire, it is time to implement the PPP. Typical steps are *(5)*:

1. ***Gather Debt and Equity Capital –*** The private partner find the resources for the project from different lenders and bond issuers. The private partner needs to show that the money it has is enough to build the project and secure the revenues used to repay the debt.

2. ***Design – Build –*** Construction starts as soon as possible after financial close. The STA should provide contract provision that cover damages for delays that are under the private partner control. Payment may or may not be done depending on the PPP model chosen.

3. ***Operate and Maintain –*** Upon completion of construction the private partner operates and maintains the project according to performance levels specified by the STA. These can include keeping a certain number of lanes open to traffic during peak hours, responding to traffic incidents within a set period of time, and establishing time limits to clear roadside debris. During this stage the STA should monitor the private partner's performance. The contract should specify the steps to be followed in case the private partner fails to meet the performance standards. Some of these provisions allows for financial penalties, or "default points" for serious violations. A series of Default Points usually allow cancelling the concession, giving it to another concessionaire, or bringing it under STA control.

When to use it?

PPP contracts are most appropriate for:

- Large or mega projects *(4)* where the public sector may lack the financial capacity to execute and complete such projects *(5)*.
- Project that are complex, as PPP allows taking advantage of specialized expertise in the private sector *(5)*.
- Projects that can or could generate revenue *(4)*,
- Project with strong public support which secures the required political approvals *(5)*,
- Project with complete or almost completed environmental work because there is less risk of delays and unknown environmental costs *(5)*,
- Projects that provide possibilities for innovation *(4)*, and
- Projects with significant congestion needs *(5)*.

Limitations

The D-B-M-O PPP delivery system has similar advantages and disadvantages than the D-B system. The following are additional risks and limitations that are caused by adding operations and maintenance to the D-B contract.

- It may be difficult to estimate operation and maintenance costs at the early stages as design is incomplete. This could lead to higher contingencies, which results in higher project costs *(3)*.
- The STA loses some control over the design details and some aspects of operation and maintenance (3),
- There is the risk that this delivery method will reduce project bidders (3),
- Since STA has less overall control of the project there is the risk that the project may not achieve the desired level of disadvantaged business enterprise (DBE) participation (3).

Additional risks and limitations that come from adding financing by the private sector to a PPP agreement are:

- Existence of legislative challenges at the State and Federal levels that limit the applicability of PPP *(4)*
- PPP is a politically sensitive method mainly due to source of funding and duration of contract *(4)*
- Generally imposes road user fees which can be an issue at the onset of the project *(4)*

Who uses it?

STAs that currently have projects under concession, or that have PPP project under construction include California, Colorado, Florida, Indiana, New Jersey, New York, Texas and Virginia *(6)*.

Examples

Example 1) Texas Department of Transportation

One example of PPP is the construction of SH 130 (segments 5-6) in Texas. This is a four-lane, 91-mile toll road southeast of Austin built to relieve congestion on I-35. Segments 1-4 of the roadway were built under a different contract and were opened between November 2006 and April 2008. The concession agreement for segments (5-6), a 40 mile extension to SH1-130, is a D-B-F-O-M contract with a 50-year duration from the opening date and a total cost of $1,327.9 million. Construction began in April 2009, the project opened on October 2012, and service commenced on November 2012. Financial close was reached on March 2008, and the first interest payment is scheduled for June 2017. Main repayments are scheduled to begin in 2018. This was the first privately developed and operated toll road facility in Texas *(1)*.

Example 2) Florida Department of Transportation

Another example is of PPP can be found on the Florida Department of Transportation (FDOT) which is using the availability payment PPP type of provision for the improvement project of the I-595 corridor. This is the first project using this provision in the U.S *(7)*. The project involves the reconstruction,

widening, and resurfacing of the 10.5 mile mainline in central Broward County, addition of two auxiliary lanes in each direction, construction of three reversible express lanes along the I-595 median, and the addition of two frontage lanes along SR 84. The project has an estimated cost of $1,835 billion and will be concluded by spring 2014. The contract is a D-B-F-O-M with a duration of 35 years including construction.

The FDOT will pay the Concessionaire $65.9 million per year in availability payments as well as $685.5 million in facility acceptance payments for the timely construction of the highway with pre-defined standards. Availability payments will begin once the project reaches substantial completion. That is, when all lanes have been constructed and are operational.

According to the VfM analysis performed by FDOT *(8)*, using this provision accelerated the program by 15 to 20 years; the time it would have taken to build with a traditional pay-as-you go procurement. The VfM analysis was performed twice. The first, on August 2007, showed that using Availability Payments would provide a better value for the STA of $24 to $104 million compared to a D-B-F-O-M contract where the project would be completely covered by the project's own revenues. The second VfM analysis, performed on August 2009, showed that the actual availability payment was 8% lower than what was initially estimated in the 2007 VfM analysis.

The following are the contract provisions for the availability payment of this project extracted from the actual contract published in the project's website *(9)*. They include the formulas used for the calculation of the maximum availability payments, and the criteria for the adjustments:

Payments to Concessionaire

1.1 Timing and Basis for Availability Payments

1.1.1 Upon Substantial Completion of the Project, FDOT will begin making Availability Payments to Concessionaire as provided in this Article 12. Concessionaire is not entitled to earn any Availability Payments before the Early Completion Date.

1.1.2 The Availability Payments are based on the Segments being open and available for public travel as measured through Concessionaire's conformance with the Contract Documents, including the minim operating and maintenance requirements set forth in Section 4 of Division II.

1.2 Availability Payment Calculation and Invoicing

1.2.1 Calculation of availability Payment

1.2.1.1 Availability Payments shall be calculated and earned by Concessionaire according to the methodology set forth in Appendix 6. The Availability Payments payable

during any given Fiscal Year during the Operating Period shall never exceed the MAP for that year, adjusted for inflation, as described in Appendix 6.

1.2.1.2 Each Availability Payment constitutes a single, all-inclusive payment with no fixed component and no separation of payments for operations, capital, maintenance, Renewal Work, Handback Renewal Work or Upgrades. In addition to any other deductions or withholdings allowed under this Agreement, the Availability Payments shall be subject to adjustment for Unavailability Events in accordance with Appendix 6.

Appendix 6

Section 1.

1.1 Annual Maximum Availability Payment

MAP_y is the Maximum Availability Payment for that Fiscal Year Indexed for inflation according to the following formula:

$$MAP_y = MAP_{base} * k * \frac{CPI_y}{CPI_{base}} + MAP_{base} * (1-k) * (1+FR)^{y-FY_{base}}$$

Where:

Base = July 1, 2008

k=30% (Indicating the portion of the maximum availability payment indexed to CPI);

CPI_y = The Consumer Price Index at the commencement of Fiscal Year "y" (CPI_y shall apply to all calculations relating to Fiscal Year "y" regardless of the date upon which CPI_y is officially published);

y = the Fiscal Year for which the inflation-adjusted MAP is being calculated;

FR = fixed rate of 3.00%; and

FY_{Base} = Fiscal Year beginning July 1, 2008.

The availability Payments in any Fiscal Year will never be less than zero or greater than the MAP for that given Fiscal Year.

Adjustment for Benchmark Interest Rate and Credit Spread Changes

The above MAP (in July 1, 2008 US dollars) has been adjusted in accordance with Appendix 6-A of the Agreement.

Quarterly Payment

The Quarterly Payment shall be calculated as follows:

$$QP_{q,y} = \frac{MAP_y}{4} - QPA_{q,y}$$

Where:

$QP_{q,y}$ = the Quarterly Payment for Quarter "q" in year "y," and

QPA_{qy} = the Quarterly Payment for Adjustment for Quarter "q" in year "y"

If substantial completion occurs on a date which is not the first day of a Quarter, the first Quarterly payment will correspond to a fraction of a Quarter and the first element of the above formula (1/4 MAP_y) shall be pro-rated according to the number in days in that fraction of a Quarter.

1.2 Quarterly Payment Adjustments

Payment adjustments shall be calculated as follows:

$QPA_{q,y} = QUA_{q,y} + QVA_{q,y}$

Where

$QPA_{q,y}$ = Quarterly Payment Adjustment for Quarter "q" in year "y;"

$QUA_{q,y}$ = Quarterly Unavailability Adjustment for Quarter "q" in year "y,"

$QVA_{q,y}$ = Quarterly O&M Violation Adjustment for Quarter "q" in year "y."

Section 2.

2.1 Quarterly Unavailability Adjustments

The Quarterly Unavailability Adjustment to the Quarterly Payment shall be calculated as follows:

$$QUA_{q,y} = \sum_{hour\ h=1}^{hq} HUA_h$$

Where:

$$HUA_h = \sum_{segment\ s=1}^{n} \left[HUF_{h,s} * SWF_{h,s} * TWF_{h,s}\right] * \frac{MAP_y}{(364 * 24)}$$

$QUA_{q,y}$ = Quarterly Unavailability Adjustment for Quarter "q" in year "y;"

HUA_h = Hourly Unavailability Adjustment for the Hour "h;"

$HUF_{h,s}$ = Hourly Unavailability Factor for Segment "s", hour "h;"

$SWF_{h,s}$ = Segment Weighting Factor for Segment "s", Hour "h;" and

$TWF_{h,s}$ = Time Weighting Factor for Segment "s", Hour "h."

MAP_y is the Maximum Availability Payment for that Fiscal Year Indexed for Inflation as described in Section 1.1 of this Appendix 6.

2.2 Hourly Unavailability Factors

(a) Each Unavailability Event will be deemed to have commenced form the moment such Unavailability Event actually began (not form the moment it was discovered or reported), and to persist during each Hour thereafter until such Unavailability Event is cured, provided that an Unavailability Event occurring at any time during an Hour shall be deemed to have occurred at the beginning of the Hour, and an Unavailability Even that ends at any time during an Hour shall be deemed to have ended at the end of that Hour.

(b) Each Unavailability Event is described by an Availability Classification and a corresponding Hourly Unavailability Factor for the given Hour with respect to the given Segment in accordance with Tables A,B and C in Section 5 of this Appendix

(c) The Hourly Unavailability Factor $HUF_{h,s}$ for a given Segment during a given Hour shall be calculated by adding together the Unavailability Factors of the Unavailability Events which occur with respect to the Segment during that Hour, provided that the Hourly Unavailability Factor may never exceed 1.00. When no Unavailability Event occurs, the Hourly Unavailability Factor is 0.00.

2.3 Segment Weighting Factors

(a) The Segment Weighting Factors are shown in Table D in Section 5 of this Appendix 6.

(b) At FDOT's discretion after consultation with Concessionaire, the Segment Weighting Factors may be changed to reflect changes in the relative traffic utilization of the Segment and/or, the level of revenue generated from Express Lanes tolls. However, Segment Weighting Factors must always equal the sum of 1.00, and may not be changed more than once in any five-year interval. FDOT will provide Concessionaire with notice of any changes at least 120 days prior to the effective date of the changes.

2.4 Time Weighting Factors

(a) Time Weighting Factors will be assigned to each Segment for every Hour of the Operating Period.

(b) The current Time Weighting Factor assignments for each Segment are shown on Table E to this Appendix. At FDOT's discretion after consultation with Concessionaire, the Time Weighting Factor may be changed, provided that (i) the annual average Time Weighting Factor for each Segment equal seven (when rounded to the nearest second decimal), as determined by adding together the Time Weighting Factors assigned to each Hour of the year for a given Segment, and then dividing the sum by the number of hours in the year; (ii) the Time Weighting Factor assigned to any category of Low Priority Hours does not exceed two; (iii) the Time Weighting Factor assigned to any category of Mid Priority Hours does not exceed 15; (iv) the Time Weighting Factor assigned to any category of High Priority Hours does not exceed 20; (v) on each day, there are at least six Low Priority Hours and a combined total of at least ten Low Priority Hours and Mid Priority Hours; (vi) during every 48 Hour period, there are at least six contiguous Low Priority Hours and Mid Priority Hours; (vii) changes may not be made more than once per three year period; and (viii) Concessionaire receives notice of proposed changes 120 days prior to the effective date of the proposed changes and is provided with a reasonable opportunity to comment on the proposed changes.

Section 3. O&M Violation Adjustments

Concessionaire will be required to operate maintain and renew the facility in accordance with Section 4 of Division II. O&M Violations are triggered by noncompliance of certain contractual obligations set forth therein.

2.1 Quarterly O&M Violations Adjustments

The Quarterly O&M Violations Adjustment to the Quarterly Payment shall be calculated as follows

$$QVA_{q,y} = \sum_{OMV\ i=1}^{n} VA_{i,q}$$

Where:

$QVA_{q,y}$ = Quarterly O&M Violations Adjustment for the Quarter "q" in Fiscal Year "y;"

$VA_{i,q}$ = O&M Violations Adjustment for each applicable O&M Violations "i" in Quarter "q".

2.2 O&M Violation Adjustments and O&M Violation Classifications

O&M Violation Classifications are set forth in Section 4 of Division II for each O&M violation. Each O&M violation Classification has an associated O&M Violation Adjustment amount as shown in Table F in Section 5 of this Appendix 6.

Each O&M Violation has the cure period and an Interval Recurrence as described in Section 4, Table 4.2 of Division II. After the cure period, any O&M Violation that is not cured within its respective Interval of Recurrence will be deemed to occur anew and assessed another O&M Violation Adjustment, and such new occurrence shall have no cure period.

Section 5. Tables

Table A – Hourly Unavailability Factors

Availability Classification	Hourly Unavailability Factor
A	0.1
B	0.2
C	0.4
D	0.6
E	0.7
F	0.8
G	1.0

Table B – Classification of Closures during Mid and High-Priority Hours

I-595 Corridor Segments (Segments 1, 2, 3, and 4)	Availability Classification	Express Lanes Segment (Segment 5)
	A	
	B	
❒ 1 lane of a 3 lane part of SR-84 or ❒ 1 lane of a 6 lane part of I-595 or ❒ 1 lane of a 2 lane Ramp or ❒ any lane of a crossroad is not available at some time during the Hour	C	
❒ 1 lane of a 3, 4, or 5 lane part of I-595 or ❒ lanes of a 6 lane part of I-595 or ❒ 1 lane of 2 lane part of SR-84 or ❒ lanes of a 3 lane part of SR-84 or ❒ 1 lane of a 2 lane High Impact Ramp or ❒ All lanes of a Ramp or ❒ more than 1 lane of crossroad is not available at some time during the Hours	D	❒ 1 lane of a 3 lane part or 1 lane of a 4 lane part of the Express Lanes or ❒ 1 or more lanes of an ingress Express Lanes Ramp Are not available some time during the Hour
❒ lanes of a 4 or 5 lane part of I-595 or ❒ lanes of a 6 lane part of I-595 is not available at some time during the Hour	E	
❒ lanes of a 3 lane part of I-595 or ❒ lanes of a 4 lane part or 5 lane part of I-595 ❒ lanes of a 5 lane part or 6 lane part of I-595 or ❒ lanes of a 6 lane part of I-595 or ❒ All lanes of SR-84 or ❒ All lanes of a High Impact Ramp are not available at some time during the Hour	F	❒ 1 lane of a 2 lane part, 2 lanes of 3 lane part, or 2 lanes of 4 lane part of the Express Lane or ❒ 1 or more lanes of an egress Express Lanes Ramp are not available some time during the Hour
❒ All lanes of I-595 are not available during the Hour	G	❒ All Express Lanes are not available at some time during the Hour

Table C – Classification of Closures during Low-Priority Hours

I-595 Corridor Segments (Segments 1,2,3 and 4)	Availability Classification	Express Lanes Segment (Segment 5)
❒ 1 lane of a 3,4,5 or 6 lane part of I-595 ❒ 2 lanes of a 4,5, or 6 lane part of I-595 or ❒ 1 lane of a 3 lane part of SR-84 or ❒ any 1 lane of a crossroad is not available at some time during the Hour	A	
❒ 2 lanes out of 3 lane part of I-595 or ❒ 1 lane of a 2 lane part of Sr-84 or ❒ 1 lane of a 2 lane Ramp or ❒ more than 1 lane of a crossroad is not available at some time during the Hour	B	
❒ 2 lanes of a 3 lane part of SR-84 or ❒ 1 lane of a 2 lane High Impact Ramp or ❒ All lanes of a Ramp are not available at some time during the Hour	C	❒ 1 or more lanes of an ingress Express Lanes Ramp are not available some time during the Hour
❒ 3 lanes of a 5 or 6 lane part of I-595 or ❒ All lanes of a High Impact Ramp are not available at some time during the Hour	D	❒ 1 lane of a 3 lane part or 1 lane of a 4 lane part of the Express Lanes or ❒ 1 or more lanes of an egress Express Lane are not available some time during the Hour
	E	
❒ 3 lanes of a 4 lane part of I-595 or ❒ 4 lanes of a 5 or 6 lane part of I-595 or ❒ 5 lanes of a 6 lane part of I-595 or ❒ All lanes of SR-84 are not available at some time during the Hour	F	❒ 2 lanes of a 3 lane part or 2 lanes of a 4 lane part of the Express Lanes are not available some time during the Hour
❒ All lanes of I-595 are not available at some time during the Hour	G	❒ All Express Lanes are not available at some time during the Hour

Table D – Segment Weighting Factors

Segment Number	Segment	Segment Weighting Factor
1	I-595 eastbound and SR-84 eastbound west of Sewell Lock, including crossroads, High impact Ramps, and Ramps	0.2
2	I-595 eastbound and SR-84 eastbound east of Sewell Lock, including crossroads, High Impact Ramps, and Ramps	0.2
3	I-595 westbound and SR-84 westbound west of Sewell Lock, including crossroads, High impact Ramps, and Ramps	0.2
4	I-595 westbound and SR-84 westbound east of Sewell Lock, including crossroads, High Impact Ramps, and Ramps	0.2
5	Express Lanes and Express Lanes Ramps	0.2

Table E – Time Weighting Factors

I-595 Corridor Segments (Segment 1, 2, 3 and 4)

Category Hours	TWF	Definition
Peak Days		Monday at 0:00 through Friday at 19:00
High Priority Hours	12.00	06:00 – 09:00 and 16:00 – 19:00
Mid Priority Hours	6.00	09:00 – 16:00 and 19:00 – 22:00
Low Priority Hours	2.00	22:00 – 6:00
Weekends		Friday at 19:00 through Sunday at 24:00
High Priority Hours	12.00	12:00 – 02:00 (except Sunday 21:00 – 24:00)
Mid Priority Hours	6.00	08:00 – 12:00
Low Priority Hours	2.00	02:00 – 08:00 and Sunday 21:00 – 24:00

Table E – Time Weighting Factors

Express Lanes Segment (Segment 5)

Category Hours	TWF	Definition
Peak Days		Monday through Friday
High Priority Hours	20.00	06:00 – 09:00 and 16:00 – 19:00
Mid Priority Hours	6.00	09:00 – 16:00 and 19:00 – 22:00
Low Priority Hours	1.00	22:00 – 6:00
Weekends		Saturday through Sunday
High Priority Hours		None
Mid Priority Hours	6.00	06:00 – 23:00
Low Priority Hours	1.00	23:00 – 06:00

Table F – O&M Violation Adjustments

O&M Violation Classifications	O&M Violation Adjustment
A	**MAP_y / (40,000)**
B	**MAP_y / (8,000)**
C	**MAP_y / (4,000)**
D	**MAP_y / (1,600)**
E	**MAP_y / (360)**

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