Special Experimental Project No. 14 (SEP-14)
Programmatic Use of Type 1, Type 2 & Type 3 Fixed Price Variable Scope Contracting on Capital Preventative Maintenance Projects
Calendar Year 2018 Annual Evaluation Report
March 1, 2019

Introduction

The Michigan Department of Transportation (MDOT) received programmatic approval to utilize Fixed Price Variable Scope (FPVS) contracting on Capital Preventative Maintenance (CPM) Projects. The purpose of FPVS contracting is to construct the greatest amount of work with the available project budget and gain more value for the dollar by using this innovative contracting method.

This annual report covers Type 1, Type 2 and Type 3 FPVS CPM projects let in calendar year 2018.

Type 1, 2 & 3 FPVS Contracting Overview

MDOT has developed three types of FPVS procurements requiring approval through this SEP-14 Work Plan. This Work Plan only applies to CPM projects using Type 1, 2 & 3 procurements. Non-CPM projects using a Type 1, 2 or 3 procurements require a separate approval unless otherwise directed by the FHWA.

Type 1: Type 1 FPVS projects receive bids by a unit of work that can be completed for a stated fixed price. The selected contractor is the bidder that proposes the most units of work for the given fixed price. For example, an HMA crack sealing project would be bid by the lane miles a contractor can complete based on the fixed price provided in the contract. In the event of a tie, bidders will be required to submit a revised price for the amount of work originally bid, and the bidder with the lowest price would be the selected contractor.

Type 2: Type 2 FPVS projects receive bids by a unit of work that can be completed for a maximum fixed price. Contractors also bid a price for the work that is below the maximum price. The work that will be completed is identified at the time of the bid. The selected contractor is first determined by the bidder that proposes the most units of work for the price they bid. If two or more contractors propose the same amount of work, then the successful bidder is determined by which contractor proposed the lowest maximum price. For example, a Type 2 project MDOT has let received bids based on the square yards of epoxy overlay that can be completed and a price to complete the work included in the bid. The square yards bid had to place an epoxy overlay over an entire bridge deck (a partial bridge deck was not acceptable), and the price bid had to be below the maximum price. In the event of a tie, bidders will be required to submit a revised price for the amount of work originally bid, and the bidder with the lowest price would be the selected contractor.

Type 3: Type 3 FPVS projects receive bids through traditional bidding processes where MDOT advertises the project through traditional methods and the contractor provides unit prices for the pay items provided in the schedule of items. The selected contractor would be the one that submits the low bid based on the pay items and quantities in the Schedule of items. The project is awarded to the low bidder at the low bid price.

The schedule of items is made up of the normal pay items and quantities estimated by the Engineer that are required to complete “Priority 1”. On federally funded projects the Priority 1 work cannot be reduced so it is typically setup to be approximately 90% of the budgeted amount. MDOT provides

the Contractors with the available budget for the project. The portion of the project that is not included in the Schedule of Items is considered "Priority 2" (additional priority areas may also be identified in the plans). Priorities beyond Priority 1 are included in the design and the environmental clearance document, and the contract contains informational pay items and quantities for these priorities. The work in Priority 1 will be completed by the project. If bids are favorable, or if additional funding becomes available to the project during construction, the project work is extended into Priority 2 until the final construction costs are approximately equal to the available funding.

Project Development Considerations

MDOT's CPM FPVS projects were all environmentally classified as categorical exclusions. Each project needs to be cleared through the environmental process and all permits obtained for the entire project limits and not just what is estimated to be constructed. Work cannot exceed what is environmentally cleared.

The projects were approved in the State Transportation Improvement Plan (STIP) as part of the General Program Account (GPA) for capital preventative maintenance projects. The portions of the project that were not constructed will be included in future projects.

Per MDOT's commitment to FHWA, the Project Manager must track the status of completing any of the remaining work not bid. The remaining non-constructed portion of the project will need to be completed within 3 years of the original construction to avoid the penalty of reimbursement of federal funding for the entire project.

FPVS contracting can modify how projects are bid, inspected, constructed and paid. Contract documents are included, when necessary, to provide clear bidding instruction, and to modify MDOT's typical process on design-bid-build (DBB) projects. This is done to conform to the intent of the FPVS contracting method while meeting state and federal requirements. FHWA Michigan staff reviewed and approved new contract language when the original FPVS program began.

The Project Manager on each FPVS project determines when a bid would be considered for rejection. On traditional DBB projects, this occurs when the low bid is greater than 10% of engineer's price estimate. On Type 1 and Type 2 FPVS projects, rejection of a bid would be considered if the bid would perform 10% less work than the engineer estimated. Type 3 FPVS projects would use the standard process to determine bid rejection.

Bid Process and Results

MDOT receives bids electronically on all DBB projects. However, MDOT's bid letting system could not accommodate the bidding process of Type 1 FPVS projects, and a hand delivered paper bid was required. Type 3 projects are bid in a traditional fashion, using our current letting system. Appendix A contains the bidding results for each type of FPVS, and includes the scope of work, lane mile cost, number of bidders, the bids from all bidders, the engineer's estimate of work and the additional work gained beyond the engineer's estimate.

In 2018, MDOT did not let any Type 2 CPM FPVS projects that would apply to this programmatic report. MDOT did let nine (9) Type 1 and three (3) Type 3 FPVS projects that pertain. The Type 1 projects included HMA crack treatments and overband crack fills which resulted in completing a total of 138.36 miles more than the engineer's estimate, which is an average increase of 15.70%.

The 2018 projects were programmed with sufficient amount of work beyond the estimated amount which eliminated the bid tie issue as in the previous year. However, two of the Type 1 crack seal jobs resulted in a rejection of bids requiring the jobs to be re-let. Regarding the job in the Grand Rapids TSC area, the Contractor stated that the fixed price was too low for the condition of roadway. Therefore, the programmed amount was increased to reflect the severity of cracks and was re-programmed for a June letting which resulted in one bid for the maximum amount. The job in the Ishpeming TSC Area received only one bid for their original letting which was not considered as the contractor altered a fixed quantity. Per discussions between the Project Manager and the Contractor, three segments with an old micro-surface had too many micro-cracks costing too much to repair beyond the programmed amount. The PM reduced maximum lane miles and rearranged priorities for a re-letting which resulted in two bidders including the winning bid.

From the bids received on the three (3) Type 3 CPM projects, bid savings from only Mt. Pleasant TSC's project allowed for the entire project limits to be completed under budget. Bids on the other two projects were over bid by approximately 4%-11% beyond the engineer's estimate. On these projects, the priority one limits were completed based on the Contractors bid; however, since there were no bid savings, the priority two limits will be programmed to be completed within three years of the original project's construction start dates in order to meet FHWA's time commitment. Regardless, the method allowed MDOT to resurface a total 4.37% more roadway than what would have occurred in 2018.

The engineer's estimate of work on FPVS projects is based on historical average unit prices from a geographic area. The 2018 letting results from the CPM FPVS projects indicate that the FPVS contracting method on roadway resurfacing and crack sealing is cost effective, and that more work is being performed to preserve MDOT's roads than through the use of conventional Design-Bid-Build contracts.

Industry Coordination and Reaction

When MDOT began using FPVS in 2012, MDOT met with representatives from Industry to discuss the innovative contracting methods being used on a project and required mandatory pre-bid meetings. Since then, MDOT has used FPVS on many different projects, most prevalently on HMA crack treatments. These projects have become more of a standard practice and no longer have pre-bid meetings. Other projects are evaluated independently to determine if a pre-bid meeting is required or not.

The Michigan Road Preservation Association (MRPA) represents contractors that perform preservation work including HMA crack sealing and chip seals. MRPA has indicated that its members are supportive of the use of FPVS, and feels this method keeps funding in their niche industry that is typically moved from their industry's work if there are bid savings on projects. The Innovative Contracting area participates in the quarterly meetings when requested.

Administrative Consideration

One of the goals of using FPVS is to reduce the amount of work required by staff to manage MDOT's program. A project with a constrained budget reduces the burden on staff to reallocate funds from projects if the cost estimate is exceeded or reduced. By using a fixed amount of funds, MDOT did not have to search for additional projects to allocate any bid savings to, or conversely find additional funds from un-let projects. This also results in not having to prepare additional proposals and bid letting packages. The FPVS process saves the Department staff time and effort.

Additional Comments and Recommendations

Based on MDOT's experience in 2018, MDOT has the following recommendations:

1. The maximum limits of the work should exceed the estimated amount of work by at least 25% additional miles than the required amount. Bidding history should be reviewed for the type of work being contracted to estimate the normal variations in bids on DBB projects. This is done to estimate the minimum amount of work that should be included in the project beyond the estimated amount of work. The bid history should be examined for projects of similar geographic areas (i.e.: urban or rural settings, similar traffic control setups, etc). MDOT has also compiled historical lane mile costs per Region to assist the Project Managers.

2. Coordination with all stakeholders, including internal MDOT staff, industry, and federal highways is important and continues to be done early in the programs development. This has helped in maintaining each Region's anticipated schedule and program for the year. MDOT personnel that are critical to coordinate with are from the environmental, planning, contracting, design, construction and technical subject matter experts.

3. For HMA crack treatment and overband projects, the Engineer should evaluate the pavement condition and the severity of cracking. If cracking is more prevalent on some routes, the Engineer should take this into account when preparing the estimate of work. This continues to be an issue which should be noted by the PM's and evaluated at the start of each job prior to programming the priorities.

Contract Information

Specific FPVS contracts can be found by looking up each project on MDOT's e-Proposal website through MILogin (https://milogintp.michigan.gov/eai/tplogin/authenticate?URL=/). Once registered for MILogin, enter the MILogin website by typing in the user's email address and password and then select MDOT e-proposal. Select the letting date from the "Lettings" area on the left side of the page, and then select the item number from the pull-down menu. The project proposal and any addenda will be available for downloading from this location.

MDOT has also developed a guide of the development of FPVS projects. This guide was incorporated as an appendix to MDOT's Innovative Construction Contracting Guide in early 2015 and is publicly posted on MDOT's website.

Unique contract items or traditional contract items modified by MDOT on the 2018 Type 1 FPVS projects are listed below.

- Schedule of Items*
- Special Provision for Hot Mix Asphalt Crack Treatment on Fixed Price Variable Scope Projects**
- Special Provision for Warranty Work Requirements for Hot Mix Asphalt Crack Treatment on Fixed Price Variable Scope Projects **
- Special Provision for Capital Preventative Maintenance Work on Fixed Price Variable Scope Projects **
- Special Provision for the Preparation, Delivery and Considerations of Bid on Fixed Price Variable Scope Projects ***

* The Schedule of Items is modified to reflect FPVS contracting and how the project is bid.
** Special Provisions are modified to reflect changes needed for FPVS contracting.

*** The Special Provision for the Preparation of Bid and Delivery of Bid provides instruction on how to submit a paper bid on a project.

Items unique to Type 3 FPVS contracts are listed below.

- Notice to Bidder for Fixed Price-Variable Scope Contracting: This Notice to Bidders indicates how the contract will be managed to a pre-established budget.
- Special Provision for Significant Changes in the Character of Work on Fixed Price-Variable Scope Projects: This special provision modifies the Standard Specifications so increases or decreases in quantities do not constitute a change to the contract.
- Special Provision for Extension of Time on Calendar Date Fixed Price-Variable Scope Projects: This special provision would extend the completion date of the project if extended beyond Priority 1. This special provision is an optional document on Type 3 FPVS projects.

Appendix A: 2018 Bid Letting Results

Type	Job No.	Region	Project Scope	Project Limits	Letting Data	No. of Bidders	Max. Bid (Lane Miles)	Winning Bid (Lane Miles)	Engineer's Estimate of Work	Bid Price per Lane Mile	Gain/Loss (Lane Mile)	Gain/Loss (%)	Other Bids (Lane Miles)
Federally Funded Type 1 CPM FPVS Projects													
1	131778	Grand	HMA Crack Treatment	Various Locations in Cadillac TSC Area	180307 #602	3	113.53	98.06	69.00	$2,345.50	29.06	42.12%	74.42, 71.52
1	132045	Grand	HMA Crack Treatment	Various Locations in Muskegon TSC Area	180411 #602	2	94.98	77.12	77.00	$2,982.37	0.12	0.16%	46.50 n/c*
1	132576	University	HMA Crack Treatment	Various Locations in Jackson TSC Area	180307 #601	3	128.60	122.02	103.01	$3,043.01	19.01	18.45%	120.77, 106.44
1	132611	University	HMA Crack Treatment	Various Locations in Jackson TSC Area	180411 #603	2	163.61	90.02	85.02	$3,665.85	5.00	5.88%	89.02
1	200692	Bay	HMA Crack Treatment	Various Locations in Huron & Davison TSC Areas	180110 #601	2	135.20	106.98	110.00	$3,706.95	-3.02	-3.00%	32.76 n/c*
1	202204	Superior	HMA Crack Treatment & Overband Crack Fill	Various Locations in Crystal Falls TSC Area	180509 #601	2	316.00	184.00	191.00	$2,608.70	-7.00	-4.00%	173.83 n/c*
1	202205	Superior	HMA Crack Treatment & Overband Crack Fill	Various Locations in Newberry TSC Area	180509 #602	1	273.82	192.89	185.54	$2,488.46	7.35	4.00%	-
1	128671-2	Grand	HMA Crack Treatment	Various Locations in Grand Rapids TSC Area	180606 #601	1	104.72	104.72	82.64	$4,774.64	22.08	26.72%	-
1	202213-2	Superior	HMA Crack Treatment & Overband Crack Fill	Various Locations in Ishpeming TSC Area	180718 #603	2	219.71	195.76	130.00	$2,451.98	65.76	51.00%	147.06
*Denotes bids not considered due altered bid quantities or bid quantieis less than the fixed/required amount.					Total	18	1550.17	1171.57	1033.21	$28,067.46	138.36	141.33%	
					Average	2	172.24	130.17	114.80	$3,118.61	15.37	15.70%	

Type	Job No.	Region	Project Scope	Project Limits	Letting Data	No. of Bidders	-	Winning Bid (Low Bid)	Engineer's Estimate of Work	-	Gain/Loss	Gain/Loss (%)	Other Bids
Federally Funded Type 3 FPVS Projects													
3	129761*	Bay	HMA Coldmilling, Geosynthetic Pavving & HMA Overlay	Waldo Road to Saginaw County Line	180718 #602	3	-	$424,758.30	$408,428.50	-	-$16,330	-4.00%	$501,933.69, $559,762.50
3	132142	Bay	HMA Coldmilling, Wedging & Overlay	Chippewa Road to Geneva Road	180207 #601	3	-	$1,899,657	$2,337,850	-	$438,194	19.00%	$1,975,175.16, $2,060,155.89
3	132579	University	Single Course Mill & Resurface	Milan City Limits to North of Bemis	180411 #601	2	-	$1,372,870	$1,241,004	-	-$131,866	-10.63%	$1,468,099.31
*Local Agency Project					Total	8	-	$3,697,285	$3,987,282	-	$289,998	4.37%	
					Average	2.67	-	$1,232,428	$1,329,094	-	$96,666	1.46%	