

Final Evaluation Report – SEP-14 Fixed Price Variable Scope Contracting

Missouri Department of Transportation
Fixed Price Variable Scope Contracting
Job No. J7P3108B
May 28, 2020

Introduction

The Missouri Department of Transportation (MoDOT) used Fixed Price Variable Scope (FPVS) contracting to maximize the work performed on the construction project while maintaining the fixed budget.

Scope of Work

The purpose of this project was to install wrong way countermeasures and chevron signs on the maximum number of locations as the budget would allow. MoDOT budgeted \$806,000 for these projects.

The initial project scope of work included installation of 1339 Chevron signs and 588 Wrong Way countermeasure signs along with corresponding removals of existing signs and traffic control. The sign installations were along various routes in MoDOT's Southwest District. The variable scope portion of the project denoted additional locations throughout the district for sign installation.

Bid Process and Results

This project was bid in the May 17, 2019 bid opening. MoDOT held a virtual pre-bid meeting on March 21, 2019 to provide an opportunity for contractors to ask questions on the new contracting method. This pre-bid was not specific to this project but was in conjunction with a FPVS signing installation project. Ten people from industry attended the meeting along with MoDOT and FHWA-MO Division Office in attendance. The meeting was recorded and made available online for anyone who could not attend.

MoDOT received bids from 2 bidders on the project with the following bids based on the initial quantities. The timing of the letting impacted the capacity of bidders and therefore competitiveness of the bids. The No. 2 bidder indicated they were full of other work at the time of bids.

Bidder	Total Bid	Percent of Low Bid
No.1	\$927,303.45	100.000
No.2	\$1,957,883.08	211.137

The award of the contract was made to the lowest responsible bidder on June 5, 2019 by the Missouri Highways and Transportation Commission. The goals of using FPVS was to complete as much work with the budget as possible. For this project, the low bidder was above the budgeted amount so MoDOT would need to reduce the amount of work to be completed to stay within the project budget. Below is a comparison of the initial quantities and final quantities for the contract:

Pay Item	Unit	Initial Quantity	Final Quantity	Difference
Concrete Footing, embedded	CY	157.9	141.17	-16.73
Pipe Posts	lbs.	30,240	28,858	-1382
2 IN PSST Posts – 12 GA	LF	16,068	14,628	-1440
Post Anchor 2 IN PSST Posts	LF	4017	3660	-357
2.5 IN PSST Posts – 12 GA	LF	588	0	-588
Post Anchor 2.5 IN PSST Posts	LF	147	0	-147
SH-Flat Sheet Signs	SF	8647	6573	-2074
Removal of Existing Signs, Post and Footings	Each	131	103	-28
Removal of Existing Signs from Existing Post	Each	176	133	-43
Truck or Trailer Mounted Attenuator (TMA)	Each	6	2	-4
Construction Signs	SF	1394	348	-1046
Channelizers	Each	100	43	-57
Temporary Short-Term Rumble Strips	Each	12	12	0
Changeable Message Signs	Each	6	4	-2
Advance Warning Rail System	Each	12	2	-10
Flag Assembly	Each	12	4	-8

The final contract cost is \$794,580.77. This is a decrease of \$132,722.68 below the original project bid. The reduction in the number of signs followed the priority order listed in the contract. The final quantities represent the maximum number of signs that could be completed for the budget available and priorities listed in the contract.

Lessons Learned

The initial bid quantities for this project resulted in a bid higher than the budget. This resulted in a reduction in planned work for the contractor as opposed to an increase in work when the bid is lower than the budget. Although the contract covers this scenario, a reduction in work could create unnecessary claims in the future. MoDOT's future guidance will set the initial quantities at 80-90% of the budget.

Summary

The major benefit of using the FPVS contracting method is to maximize the use of the project's budget without exceeding the budget. For this project, MoDOT had to reduce the initial contract quantities to remain within budget. By completing the project within budget, this saved MoDOT from having to shift money from other projects to complete the scope of work as bid. With traditional bidding methods, MoDOT would have pulled money from other projects, or potential projects, to complete the total amount of worked bid.

In the last couple of fiscal years, MoDOT has experienced project bids coming in under budget. When the contractor's bid is under budget using FPVS, MoDOT expects cost and time savings by being able to add work to the project. The cost and time savings are gained by eliminating the steps to program, design and bid another project to use up the savings from a project being bid under budget. However, for this situation, where the contractor's bid is equal to or more than the

budget, the benefit realized from FPVS would only be budget control. In conclusion, MoDOT believes FPVS contracting is a good tool for the right project when budget control is the primary concern.

Additional Documents

Appendix A – Approved Workplan and attachments

Appendix A

SEP-14 Work Plan

Missouri Department of Transportation

Fixed Price Variable Scope Contracting

Job No. J7P3108B

February 7, 2019

Introduction

The Missouri Department of Transportation (MoDOT) proposes to use Fixed Price Variable Scope Contracting (FPVS) on a project for the installation of Wrong Way Countermeasures and Chevron Signs along various routes in Southwest Missouri.

Purpose and Scope

The purpose of the contract is to install the wrong way countermeasures and chevron signs on the maximum number of locations as our budget will allow. The contract will include installation of additional Wrong Way signs, Do Not Enter Signs and Chevron Signs to increase safety. MoDOT has budgeted \$806,000 of our safety funds for the construction of these signs.

Procurement Process

MoDOT proposes to use FPVS procurement to accomplish this project. This contract method will allow MoDOT to vary the amount of work to be completed to match the budget set for the project. The work included in the bid proposal is established in priority order to be completed and will exceed the amount of work that is expected to be completed by the budget in order to capitalize on getting better than expected bids. This procurement method will have the contractor bid a unit price for the estimated quantities for each item of work in the contract. The estimated quantities included in the contract represent the amount of work than can be completed for the budgeted amount. Once the project has been awarded, the MoDOT construction office would then manage the contract by adjusting the contract quantities to hit the budgeted amount.

Procurement Overview:

- (a) MoDOT develops estimated quantities for the pay items in the project that will deliver the budget amount that is included in the project specifications.
- (b) Locations of the work are established in priority order in the project specifications.
- (c) MoDOT advertises the project through our traditional bidding processes.
- (d) The contractor will bid unit prices for the pay items and submits their bids through our traditional bidding processes.
- (e) MoDOT awards the contract to the lowest responsive bidder.
- (f) MoDOT manages the contract quantities based on the unit bid prices, work completed and the project budget following the priorities set in the specifications.

MoDOT will utilize pre-bid meetings or industry meetings with contractors to familiarize them with the FPVS process.

Schedule

This project is scheduled for a Spring 2019 bid opening date with construction to be completed by the Fall 2019.

Evaluation and Reporting

MoDOT will provide FHWA's Missouri Division Office an evaluation of the contract within 6 months of the project's completion. This evaluation will include any relevant information related to efficiencies realized by the FPVS process including, but not limited to, quicker project delivery, cost savings compared to expected costs using the traditional bidding method, and recommendations for improving the use of FPVS. MoDOT has similar projects that will be bid using our traditional bid approach at the same time and those projects will be used for comparison.

FPVS - Job No. J7P3108B Attachments

Example Pay items

Pay Item	Quantity	Unit	Bid Price	Total
Concrete Footing, embedded	157.9	CY		
Pipe Posts	30,230	lbs.		
2 IN PSST Posts – 12 GA	16,068	LF		
Post Anchor 2.5 IN PSST Posts	4017	LF		
2.5 IN PSST Posts – 12 GA	784	LF		
Post Anchor 2.5 IN PSST Posts	147	LF		
SH-Flat Sheet Signs	8646	SF		
Removal of Existing Signs, Post and Footings	131	Each		
Removal of Existing Signs from Existing Post	176	Each		
Truck or Trailer Mounted Attenuator (TMA)	2	Each		
Construction Signs	744	SF		
Channelizers	100	Each		
Temporary Short-Term Rumble Strips	4	Each		
Changeable Message Signs	2	Each		

Note: The amount of work established for bidding is based on spending the estimated budget amount.

Contract Award and Management

The bidding documents will include set quantities for each pay item that all contractor will be required to bid by entering a unit bid price. The award of the contract will be given to the lowest responsible bidder based on the set quantities and unit bid price. After the project is awarded to the lowest responsible bidder, the contract will be managed by changing the quantities of each pay item to deliver the project budget.

There are two scenarios that could occur. The first scenario is the awarded bidder's total bid is lower than the project budget. The second scenario is the awarded bidder's bid is higher than the project budget. Here is how the scenarios would be handled after the award of the project:

Scenario 1: The awarded Contractor's total bid is less than the project budget.

Project Budget: \$806,000

Awarded Contractor's Bid: \$781,865.

Contractor's Bid:

Pay Item	Quantity	Unit	Bid Price	Total
Concrete Footing, embedded	157.9	CY	700	110530
Pipe Posts	30,230	lbs.	2.5	75575
2 IN PSST Posts – 12 GA	16,068	LF	12	192816
Post Anchor 2.5 IN PSST Posts	4017	LF	37	148629
2.5 IN PSST Posts – 12 GA	784	LF	14	10976
Post Anchor 2.5 IN PSST Posts	147	LF	45	6615
SH-Flat Sheet Signs	8646	SF	18	155628
Removal of Existing Signs, Post and Footings	131	Each	200	26200
Removal of Existing Signs from Existing Post	176	Each	200	35200
Truck or Trailer Mounted Attenuator (TMA)	2	Each	1200	2400
Construction Signs	744	SF	9	6696
Channelizers	100	Each	14	1400
Temporary Short-Term Rumble Strips	4	Each	1300	5200
Changeable Message Signs	2	Each	2000	4000

Since the contractor's total bid is less than the budget identified in the project special provisions, MoDOT would look at the priority list of routes identified in the special provisions to add additional quantities of work from the next highest priority. The remaining budget of \$24,135 would allow MoDOT to add work on two additional interchanges using MoDOT's standard change order process. The quantity increase at the contractor's bid price would be:

Pay Item	Quantity	Unit	Bid Price	Total
Concrete Footing, embedded	16	CY	700	11200
Pipe Posts	0	lbs.	2.5	0
2 IN PSST Posts – 12 GA	0	LF	12	0
Post Anchor 2.5 IN PSST Posts	0	LF	37	0
2.5 IN PSST Posts – 12 GA	192	LF	14	2688
Post Anchor 2.5 IN PSST Posts	16	LF	45	720
SH-Flat Sheet Signs	144	SF	18	2592
Removal of Existing Signs, Post and Footings	6	Each	200	1200
Removal of Existing Signs from Existing Post	2	Each	200	400
Truck or Trailer Mounted Attenuator (TMA)	2	Each	1200	2400
Construction Signs	64	SF	9	576
Channelizers	40	Each	14	560
Temporary Short-Term Rumble Strips	0	Each	1300	0
Changeable Message Signs	0	Each	2000	0

With the additional work, the final contract price would be \$804,201 which is below the project budget amount of \$806,000.

Scenario 2: The awarded Contractor’s total bid is more than the project budget.

Project Budget: \$806,000

Awarded Contractor’s Bid: \$816,561.

Contractor’s Bid:

Pay Item	Quantity	Unit	Bid Price	Total
Concrete Footing, embedded	157.9	CY	750	118425
Pipe Posts	30,230	lbs.	2.5	75575
2 IN PSST Posts – 12 GA	16,068	LF	12	192816
Post Anchor 2.5 IN PSST Posts	4017	LF	37	148629
2.5 IN PSST Posts – 12 GA	784	LF	15	11760
Post Anchor 2.5 IN PSST Posts	147	LF	48	7056
SH-Flat Sheet Signs	8646	SF	20	172920
Removal of Existing Signs, Post and Footings	131	Each	220	28820
Removal of Existing Signs from Existing Post	176	Each	220	38720
Truck or Trailer Mounted Attenuator (TMA)	2	Each	1500	3000
Construction Signs	744	SF	10	7440
Channelizers	100	Each	14	1400
Temporary Short-Term Rumble Strips	4	Each	1500	6000
Changeable Message Signs	2	Each	2000	4000

Since the contractors’s total bid is more than the budget identified in the project special provisions, MoDOT would look at the priority list of routes identified in the special provisions to remove quantities of work from the lowest priority included in the bid quantities. The project is over budget by \$10,561 and therefore MoDOT would need to remove the work for one interchanges using MoDOT’s standard change order process. The quantity decrease at the contractor’s bid price would be:

Pay Item	Quantity	Unit	Bid Price	Total
Concrete Footing, embedded	-8	CY	750	-6000
Pipe Posts	0	lbs.	2.5	0
2 IN PSST Posts – 12 GA	0	LF	12	0
Post Anchor 2.5 IN PSST Posts	0	LF	37	0
2.5 IN PSST Posts – 12 GA	-96	LF	15	-1440
Post Anchor 2.5 IN PSST Posts	-8	LF	48	-384
SH-Flat Sheet Signs	-72	SF	20	-1440
Removal of Existing Signs, Post and Footings	-3	Each	220	-660
Removal of Existing Signs from Existing Post	-1	Each	220	-220
Truck or Trailer Mounted Attenuator (TMA)	-1	Each	1500	-1500

Pay Item	Quantity	Unit	Bid Price	Total
Construction Signs	-32	SF	10	-320
Channelizers	-20	Each	14	-280
Temporary Short-Term Rumble Strips	0	Each	1500	0
Changeable Message Signs	0	Each	2000	0

With the contract change to reduce the quantities, the final contract price would be \$804,317 which is below the project budget amount of \$806,000.

Site Locations

The following locations are included in the initial bid quantities:

- Chevron signing on various routes in Christian, Barry, Newton and Benton Counties as indicated in the plans.
- Wrong Way and Do Not Enter signing on I-49 north of I-44 from Route AA/E in Bates County to Cedar Rd in Jasper County.
- Wrong Way and Do Not Enter signing on Route 249 from Route VV in Jasper County to Route 66 in Jasper County
- Wrong Way and Do Not Enter signing on Loop 49 from Route 96 in Jasper County (Carthage) to Route HH in Jasper County (Carterville)

The following locations are included as the variable scope portion of the contract:

- Wrong Way and Do Not Enter signing on I-49 south of I-44 from Route FF in Newton County to Route H in McDonald County
- Wrong Way and Do Not Enter signing on Route 59 at Route 60 East in Newton County
- Wrong Way and Do Not Enter signing on Route 7 from Route B in Cass County (Creighton) to Route B/K in Henry County (Urich)
- Wrong Way and Do Not Enter signing on Route 13 north of I-44 from Route 52 East in Henry County to Route 83 in Polk County
- Wrong Way and Do Not Enter signing on Route 65 north of I-44 from Route 52 East in Benton County (near Cole Camp) to Route 125/CC in Greene County (Fair Grove)
- Wrong Way and Do Not Enter signing on Route 60 from FR 247 in Greene County to Route PP in Webster County
- Wrong Way and Do Not Enter signing on Route 65 south of I-44 from Route EE in Christian County to Business Route 65 in Taney County
- Wrong Way and Do Not Enter signing on Route 465 from Route 248 in Taney County to Route 76 in Stone County
- Wrong Way and Do Not Enter signing on Route 13 at Business Highway 13 in Stone County (near Kimberling City)

Example FPVS Special Provisions

Contract Liquidated Damages

1.0 Description. Liquidated Damages for failure or delay in completing the work on time for this contract shall be in accordance with Sec 108.8. The liquidated damages include separate amounts for road user costs and contract administrative costs incurred by the Commission.

2.0 Period of Performance. Prosecution of work is expected to begin on, or before, the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all work shall be completed on or before the completion date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7. No extension of the completion time will be granted due to an increase of quantities per the Scope of Work special provision.

Notice to Proceed: July 8, 2019

Completion Date: December 1, 2019

2.0 Calendar Days. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Job Number	Calendar Days	Daily Road User Cost
J7P3108B	N/A	\$5400

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged contract administrative liquidated damages in accordance with Sec 108.8 in the amount of **\$500** per calendar day for each calendar day, or partial day thereof, that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the above specified completion date or calendar days.

4.0 Liquidated Damages for Road User Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged road user costs in accordance with Sec 108.8 in the amount specified in Section 2.1 for each calendar day, or partial day thereof, that the work is not fully completed. These damages are in addition to the contract administrative damages and any other damages as specified elsewhere in this contract.

Scope of Work – J7P3108B

1.0 The scope of work for this project is to provide chevron warning signing on various undivided highways and to provide Do Not Enter and Wrong-Way sign installation on various routes. The work has been prioritized as follows:

The following locations are included in the initial bid quantities:

- Chevron signing on various routes in Christian, Barry, Newton and Benton Counties as indicated in the plans. All chevron signing indicated in the plans is included in the scope of this project without regard to the budget.
- Wrong Way and Do Not Enter signing on I-49 north of I-44 starting at Route AA/E in Bates County and progressing to Cedar Rd in Jasper County.
- Wrong Way and Do Not Enter signing on Route 249 starting at Route VV in Jasper County and progressing to Route 66 in Jasper County.
- Wrong Way and Do Not Enter signing on Loop 49 starting at Route 96 in Jasper County (Carthage) and progressing to Route HH in Jasper County (Carterville).

The following locations are included as the variable scope portion of the contract:

- Wrong Way and Do Not Enter signing on I-49 south of I-44 starting at Route FF in Newton County and progressing to Route H in McDonald County.
- Wrong Way and Do Not Enter signing on Route 59 at Route 60 East in Newton County.
- Wrong Way and Do Not Enter signing on Route 7 starting at Route B in Cass County (Creighton) and progressing to Route B/K in Henry County (Urich).
- Wrong Way and Do Not Enter signing on Route 13 north of I-44 starting at Route 52 East in Henry County and progressing to Route 83 in Polk County.
- Wrong Way and Do Not Enter signing on Route 65 north of I-44 starting at Route 52 East in Benton County (near Cole Camp) and progressing to Route 125/CC in Greene County (Fair Grove).
- Wrong Way and Do Not Enter signing on Route 60 starting at FR 247 in Greene County and progressing to Route PP in Webster County.
- Wrong Way and Do Not Enter signing on Route 65 south of I-44 starting at Route EE in Christian County and progressing to Business Route 65 in Taney County.
- Wrong Way and Do Not Enter signing on Route 465 starting at Route 248 in Taney County and progressing to Route 76 in Stone County.
- Wrong Way and Do Not Enter signing on Route 13 at Business Highway 13 in Stone County (near Kimberling City).

2.0 The above routes are listed in priority order. The Commission has budgeted \$806,000 for installation of these signs. The contractor shall begin installation on the first route and continue down the list until all funds have been used. If the contractor will not be able to complete the entire route, the contractor shall begin at the starting point listed and progress along the route with sign installation on the interchange ramps, without skipping interchanges until the funds are expended. It is the responsibility of the contractor to not exceed the budget listed above. Any contract costs incurred above this amount will be the responsibility of the contractor, unless approved by change order.

3.0 The award of the contract will be based on the lowest responsible bidder based upon their total bid for the itemized quantities in the proposal and unit bid price.

4.0 Contract quantities will be adjusted after the award of the contract as necessary to match the budgeted amount stated in section 2.0. In the event there is an increase in quantities to the contract, an extension of contract time will NOT be granted.

Bonds

1.0 The amount of the Bid Bond shall be 5% of the anticipated budget for this project.

2.0 The amount of the Performance Bond shall be 100% of the anticipated budget for this project.