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^{††} Audit Committee Member

**Concrete Street Restoration
Construction Audit**

February 19, 2021



**City of Fort Worth
Department of Internal Audit**

200 Texas Street
Fort Worth, Texas 76102

Audit Staff

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The Concrete Street Restoration Construction Audit was conducted as part of the Department of Internal Audit's Fiscal Year 2020 Annual Audit Plan.

Audit Objectives

The objectives of this audit were to:

- determine whether the project was completed in accordance with contract terms; and,
- ensure compliance with applicable legislation.

Audit Scope

Our audit included the period from bid solicitation (June 21, 2018) through final inspection (October 21, 2019). Activity beyond this period was reviewed as deemed necessary.

Opportunities for Improvement

Verification of quantities billed prior to vendor payment

Bid items representative of items needed to complete the work

Executive Summary

As part of the Fiscal Year 2020 Annual Audit Plan, the Department of Internal Audit conducted an audit of a concrete street restoration construction project that was administered by the City's Transportation and Public Works Department. The project included the repair and reconstruction of failed concrete pavement at a cost of \$1,110,466.00. Based on our audit results, the construction project was performed within the allotted 292 calendar days.

The Department of Internal Audit identified a \$40,128.60 overpayment. Internal Audit measurements confirmed 7,621.4900 square yards of concrete. However, the City was invoiced (and paid) for 7,986.4177 square yards of concrete.

We also noted that only 15 of 30 bid items were used for the construction project. Based on unit prices bid for the 15 items that were used, each non-awarded bidder would have performed the work at a lower cost, with savings ranging from approximately \$190,000.00 to \$403,000.00.

Our audit findings are discussed in further detail within the [Detailed Audit Findings](#) section of this report.

In addition to our detailed audit findings, we observed failures in Type B concrete work performed (i.e., a cost-effective measure to address spalling in the road versus removing the entire panel) that was within the warranty period. The failures were not extensive, but may indicate poor materials and/or workmanship that would be covered by the warranty.

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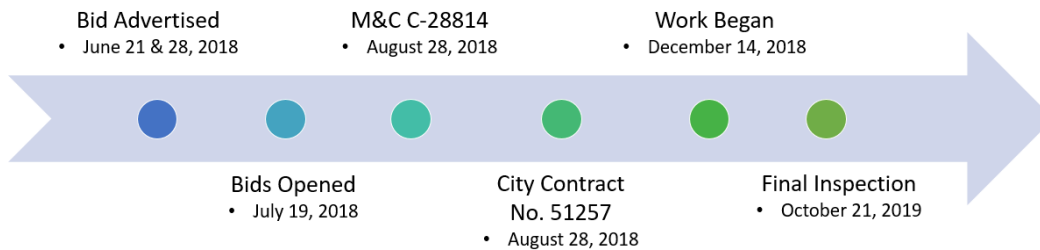


Background

The Transportation and Public Works (TPW) Concrete Restoration Project #2019-3 consisted of the replacement of failed concrete pavement on Western Center Boulevard, between Bayberry Drive and North Blue Mound Road in Council Districts 2 and 4. The project was funded under the FY2019 pay-go contract street maintenance program, and spanned over three miles of an active thoroughfare.

Invitations to bid were advertised on June 21, 2018 and June 28, 2018. Five bids were opened on July 19, 2018, ranging from \$940,678.00 to \$1,149,820.00. The difference between the two lowest bids was \$232.00, with Select Striping, LLC submitting the lowest responsive bid of \$940,678.00.

On August 28, 2018, the Mayor & Council authorized City Contract #51257 (M&C C-28814) with Select Striping, LLC. Work began on December 14, 2018. The final inspection was held on October 21, 2019.



Two change orders totaled \$169,788.00. Change Order #1 provided for an additional 1,300 square yards of 7” concrete pavement (at a cost of \$169,000.00) and “Lane Legend” (at a cost of \$500.00), with an additional 60 days to the contract time. Change Order #2 provided for an additional 192 linear feet of joint sealant (at a cost of \$288.00) and an additional 82 days to the contract time. The change orders were to provide for additional concrete pavement replacement and joint sealant, and increase the number of days allowed to complete the project from 150 to 292 calendar days.

City payments were based on the quantities of bid items billed to the City (e.g., pay items), including:

- removal and replacement of failed 7” concrete panels (square yards);
- half-depth “Type B” concrete deficiency repair, based on pavement surface repaired (square yards);
- sidewalk replacement (square feet); and,
- other pay items, which comprised approximately 4% of the total project cost.

Select Striping committed to 15% MBE participation for the project.



Objectives

The objectives of this audit were to:

- determine whether the project was completed in accordance with contract terms; and,
- ensure compliance with applicable legislation.

Scope

Our audit included the period from bid solicitation (June 21, 2018) through final inspection (October 21, 2019). Activity beyond this period was reviewed as deemed necessary.

Methodology

To achieve the audit objectives, the Department of Internal Audit performed the following:

- reviewed TPW's Project Manual and the concrete street restoration contract;
- recalculated vendor bid submittals to verify accuracy of bid calculations;
- interviewed TPW engineering and inspection staff;
- reviewed compliance documents prepared by the City's Department of Diversity and Inclusion;
- performed field measurements, and compared those measurements to quantities billed to the City;
- reviewed general ledger transactions and contractor invoices/project payments; and,
- evaluated internal controls related to construction projects.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Chapter XXVIII of the Fort Worth City Charter established the City of Fort Worth's Department of Internal Audit. Our department was established independent of management, reporting directly to the Fort Worth City Council. We utilized the Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework when evaluating internal controls. The following internal control components and corresponding principles were considered significant to the audit objectives.



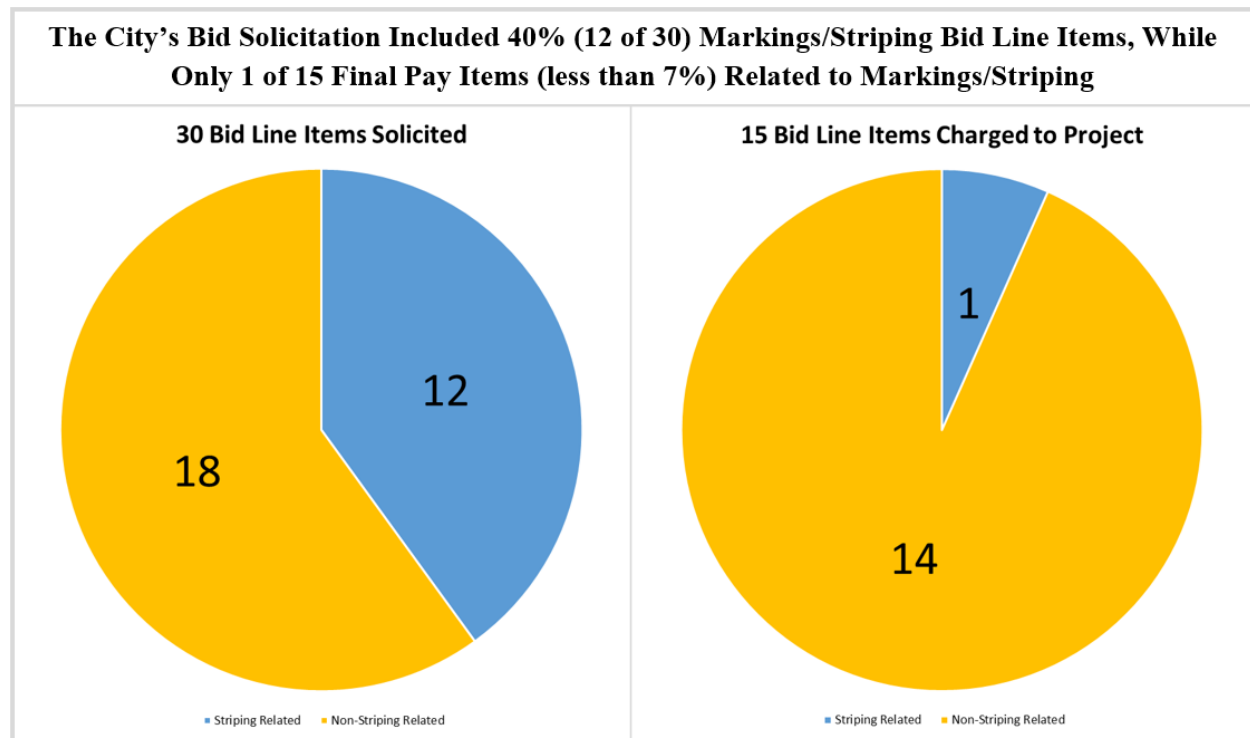
Internal Control Component	Principles
Control Environment	Managerial oversight, integrity, ethics and responsibility; staff recruitment, development, retention, performance and accountability
Risk Assessment	Clearly-defined objectives to identify risks, define risk tolerances, and implement necessary controls (e.g., written policies and procedures)
Control Activities	Policies, procedures and systems
Information and Communication	Communicate the necessary quality information
Monitoring	Monitor and evaluate the effectiveness of internal controls

Audit Results

The Concrete Street Restoration Project (#2019-3) was completed within the allotted timeframe of 292 days. The contractor, Select Striping, LLC, met the 15% minority business enterprise (MBE) commitment. Payments totaling \$686,887.31, representing approximately 62 percent of City payments for the project, were made to MBEs. The project did not exceed the \$1,175,847.50 total maximum allowable contract amount.

The City of Fort Worth paid the contractor \$1,110,466.00 for work related to the project. However, our concrete measurements indicate that the City was overcharged a total of \$40,128.60. Based on our audit results, the City was charged for 364.9277 more square yards of 7" concrete pavement than was completed. TPW confirmed Internal Audit's measurements.

As noted in the following charts, the City's bid solicitation consisted of 30 bid line items. However, only 15 of those 30 bid line items were charged to the City. The bid solicitation included 12 markings/striping line items, but only one of the markings/striping line items was charged to the City. Eleven of the 12 markings/striping line items were, reportedly, not needed. It should be noted that three bid line items (block sod replacement, lane striping and joint sealant) were not charged to the City. However, TPW staff informed Internal Audit that these three bid line items were actually completed.



Sources: Bid Solicitation and Final Pay Application

Internal Audit compared bids submitted by each of the five responding bidders (all of which bid on each of the 30 bid line items), and concluded that Select Striping, LLC submitted the lowest bid and was properly awarded the contract. However, based on bid line items and quantities paid, the City would have paid between \$190,000.00 to \$403,000.00, approximately, less than what was paid to Select Striping, LLC if the bid solicitation had been more consistent with the work that was completed. While solicited bid line items

are typically not all used in a construction project, a bid solicitation with 50% of the bid items not considered necessary for the project did not appear reasonable. Furthermore, as noted in the preceding chart, 11 of the 15 line items not charged to the contract related specifically to striping, which TPW staff indicated were not needed for the project.

We also concluded that construction work, authorized by a change order, was completed before the change order was approved. The original bid included 4,500 square yards of 7" concrete. However, on June 4, 2019, the Mayor and City Council approved a change order to add 1,300 square yards of concrete pavement and 60 calendar days to complete the project. The change order allowed for a total of 5,800 (4,500 + 1,300) square yards and 292 (232 + 60) calendar days. In addition to the 4,500 square yards of concrete included in the bid, and the 1,300 square yards authorized by the change order, an additional 2,186 square yards was paid under the contract. Funds not used for other pay items were used to pay for the additional 2,186 square yards.

As noted in the following photos, we observed concrete work that failed approximately one year after construction. The construction work was categorized as "Type B replacement," which is reportedly a cost-effective measure to address spalling in the road. Type B replacement does not remove the entire panel.



Western Center Blvd West of I-35, Source: Internal Audit on 9/23/2020

Internal Audit mentioned the defective workmanship when accompanying the TPW inspector at the construction site. Additionally, several inspector logs noted unacceptable workmanship. During the audit, Internal Audit was informed that TPW staff provided a temporary fix by adding asphalt; however, the contractor would need to replace the concrete. When inquiring as to why the contractor was not required to address the defective workmanship sooner, Internal Audit was informed that for traffic control purposes, the City's practice is to wait until they have a set time to resolve all failed concrete replacement issues. TPW management indicated that the TPW Department performs an extensive warranty inspection of projects approximately 18 months after project acceptance, and all observed deficiencies are documented and provided to the contractor to take corrective action. TPW further stated that any deficiencies observed or brought to TPW's attention (in advance of the warranty inspection) may be brought to the contractor's attention to correct immediately, depending on severity and disruption to the public.

TPW indicated that they incurred less than \$50.00 to repair at least two sections of Type B concrete after identifying concrete failures. Since the contract requires the contractor to repair material or workmanship



defects for two years after construction (e.g., maintenance bond), this failed construction falls within the warranty period. The maintenance bond section of the contract states that the contractor is to repair or reconstruct the work in whole or in part upon receiving notice from the City of the need to repair or reconstruct at any time within the maintenance period.



Overall Risk Evaluation

High	Medium	Low
<u>Not verifying invoice accuracy prior to payment authorization</u>		
<u>Bid items not representative of work completed</u>		



Detailed Audit Findings

1. The City was overcharged \$40,128.60.

The City was billed for 7,986 square yards of concrete, although Internal Audit's concrete measurements totaled only 7,621 square yards.

The City was billed for 7,986.4177 square yards of 7" concrete on the final pay progress estimate, which included work related to two construction project change orders. However, 7" concrete measured by Internal Audit (along Western Center Boulevard) totaled only 7,621.4900 square yards. Internal Audit, therefore, concluded that the City was overcharged 364.9277 square yards of 7" concrete. The overpayment totaled \$47,440.60 (364.9277 square yards x \$130.00 per square yard).¹

When informed of the overcharge, TPW personnel agreed. However, they indicated that the contractor incurred expenditures for three pay items that were not billed to the City. Costs related to these three pay items totaled \$7,312.00, and were for the following: block sod placement (\$4,140.00), lane striping (\$1,590.00) and joint sealant (\$1,582.00). Verifying expenditures related to these items was not considered feasible, given the nature of the items and the amount of time that had passed since the work was performed. Internal Audit, therefore, considered the additional \$7,312.00 as work performed by the contractor, but not included in the contractor's final pay estimate to the City. The overcharge previously identified by Internal Audit was, therefore, reduced from \$47,440.60 (previously mentioned) to \$40,128.60.

Since this project was classified as a maintenance project, there were no formal drawings or specifications to indicate what work was to be done. TPW provided field sketches that documented the work performed, but did not capture all work performed by the contractor. Instead, physical observations were required to determine the complete scope of work. We determined that field sketches, prepared by the inspector, did not include all of the completed work. However, the inspector's field sketches differed from those performed by Internal Audit. We were unable to determine why the TPW measurements did not match the quantities billed.

The TPW Department Capital Project Delivery Manual states that the City Inspector is responsible for verifying the installed quantities for each invoice and the final quantities. Additionally, the City of Fort Worth's General Accounts Payable Guidelines state that departments are responsible for verifying invoice quantities and amounts.

Recommendation 1A: *The Transportation and Public Works Director, in conjunction with the Chief Financial Officer and/or City Attorney, should require that Select Striping, LLC refund the City of Fort Worth \$40,128.60 that was overpaid for work not received.*

Auditee's Response: Concur. A formal request to have the overpayment refunded to the City is in process.

Target Implementation Date: March 31, 2021

Responsibility: Lane Zarate Sr. CPO-Neighborhood Streets
Monty Hall Assistant Director-Business Support

¹ Four decimal places are used in Internal Audit's calculation in order to arrive at the quantities billed.



Applicable Department Head: William Johnson, Transportation & Public Works Director

Applicable Assistant City Manager: Dana Burghdoff

Recommendation 1B: *The Transportation and Public Works Director should require compliance with the TPW Capital Project Delivery Manual requirements for verifying the installed quantities for each invoice and the final invoiced quantities.*

Auditee's Response: Concur.

1. All inspectors will receive further training, scheduled for February 2021, in conducting field measurements and storing their calculations and corresponding notes in the City's project document management system.
2. In addition, quality control procedures have been implemented whereby an independent re-measurement of projects will be performed prior to issuing final payments to contractors to ensure accuracy.
3. Additional information used to prepare the total bid quantities such as street-by-street quantity take-offs, or concrete panel replacement surveys will be included in future bid documents as applicable to the maintenance project types. This additional quantity information would be included to further address audit recommendation 2B but not as a substitute for engineering drawings on maintenance projects.

Target Implementation Date: March 31, 2021

Responsibility: Lauren Prieur AD-Capital
Roy Teal Sr. CPO-Construction Services
Lane Zarate Sr. CPO-Neighborhood Streets

Applicable Department Head: William Johnson, Transportation & Public Works Director

Applicable Assistant City Manager: Dana Burghdoff

2. The bid items were not representative of the completed work, resulting in higher costs.

The City's bid solicitation for this project included 30 line items. However, 50% (15 of 30) of those bid line items were not charged to the project. Included in the 15 bid line items that were not charged to the project were 11 (of 12) markings/stripping bid line items. TPW personnel indicated that the 15 bid items were not used because the items were not needed.

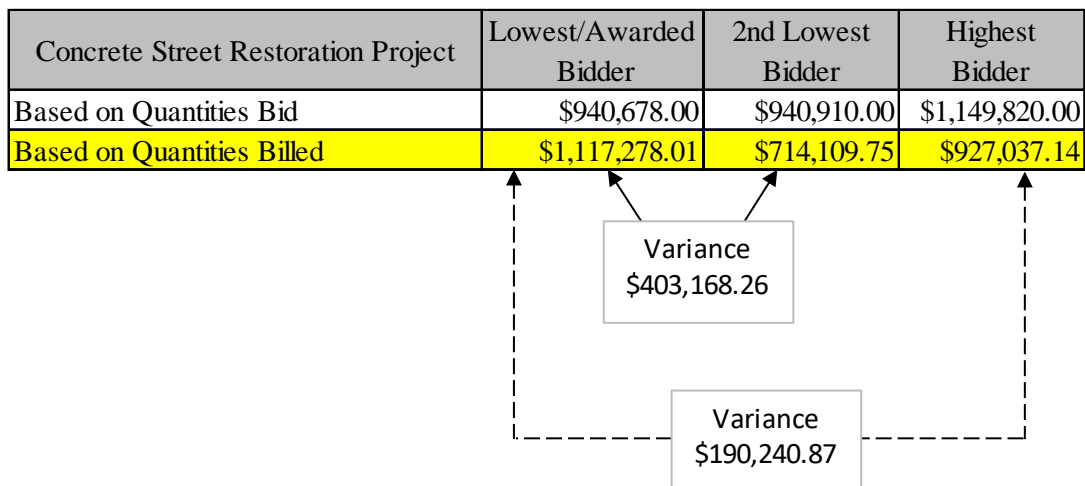


A Majority of the Bid Items Not Used Were Marking/Striping-Related				
Used	Bidlist Item No.	Description	UOM	Bid Quantity
Yes	1	0135.0201 Remobilization	EA	1
Yes	2	3471.0002 Portable Message Sign	WK	24
Yes	3	9999.0000 Remove and Replace 6" Concrete Driveway	SF	200
Yes	4	9999.0000 Remove Concrete and Replace with 7" Concrete Pavement HES	SY	4,500
Yes	5	9999.0000 TxDOT Type B Half Depth (3"- 4") Concrete Repair by Ultra Rapid Repair Material	SY	2,250
No	6	3123.0101 Unclassified Excavation	CY	100
Yes	7	3211.0122 Flex Base, Type A, GR-2	CY	500
No	8	3213.0208 Concrete HES (extra depth)	CY	100
Yes	9	3292.0100 Block Sod Placement	SY	1,000
Yes	10	3213.0700 Joint Sealant	LF	1,000
Yes	11	3305.0108 Miscellaneous Adjustment (Utilities)	LS	1
Yes	12	9999.0000 Geogrid Tensar (TRIAx 140-475) or Approved equal	SY	2,500
No	13	3217.2001 Raised Marker TY W	EA	100
No	14	3217.2002 Raised Marker TY Y	EA	100
No	15	3217.2101 REFL Raised Marker TY I-A	EA	20
No	16	3217.2102 REFL Raised Marker TY I-C	EA	20
No	17	3217.2103 REFL Raised Marker TY II-A-A	EA	20
No	18	3217.2104 REFL Raised Marker TY II-C-R	EA	20
Yes	19	3441.1301 Loop Detector Cable Sawcut	LF	200
Yes	20	3441.1302 14 AWG Loop Detect Cable	LF	200
Yes	21	3217.0001 4" Solid Thermoplastic (HAS) Lane Line	LF	400
No	22	3217.0201 8" Solid Thermoplastic (HAS) Lane Line	LF	200
No	23	3217.0301 12" SLD Pvmnt Marking HAE	LF	200
No	24	3217.0401 18" SLD Pvmnt Marking HAE	LF	200
No	25	3217.0501 24" SLD Pvmnt Marking HAE	LF	100
No	26	3213.0501 Remove and Replace Barrier Free Ramp, Type R-1	EA	1
Yes	27	9999.0000 Remove and Replace 4" Sidewalk	SF	100
No	28	9999.0000 Remove and Replace 20 ft Curb Inlet Top	EA	1
No	29	3217.5001 Curb Address Painting	EA	4
Yes	30	9999.0096 Paving Construction Allowance	EA	1

Sources: Bid Solicitation and Final Pay Application

While the completion of some construction projects may not require that all bid line items be used, a bid solicitation with 50% of the bid items not being used appears unreasonable. Based on our review of the final pay estimate, non-use of the 15 bid line items resulted in the City incurring substantially more costs than would have been obtained using bid items that were more aligned with the completed work.

Since the bid items were not aligned with the completed work (as noted in following illustration and in Exhibit I), the City paid approximately \$403,000.00 more than what would have been paid if the contract had been awarded to the second lowest bidder, and approximately \$190,000.00 more than what would have been paid if the contract had been awarded to the highest bidder. In other words, the selected/lowest bidder provided lower bids for items not needed for the project.





Based on City records, Select Striping, LLC (the contracted vendor) subcontracted 100% of the concrete replacement work to Makou, Inc., an MBE construction company. Makou, Inc. charged Select Striping \$592,487.22 for 7,795.88 square yards of contract work performed. Select Striping then billed the City \$1,038,234.30 for 7,986.4177 square yards (190.538 more than was billed by the subcontractor). We were unable to determine the reason for the difference in the quantity billed.

Internal Audit was informed that TPW has to bid a maintenance project such as this (without formal engineering) in a way that maximizes bid items which could be encountered, based on staff's professional experience. Internal Audit was further informed that whether an actual item is needed depends on the real-life situation encountered during the project, and that staff cannot control which elements of the work is emphasized by contractors. And that as a result, TPW has to take the bids as they are presented, which as a whole, were competitive as to the overall bid amounts.

Internal Audit was in agreement that the bids should have been taken as presented by the vendors; that the bids appeared competitive; and that the contract was properly awarded to the lowest bidder. However, we concluded that the process used to develop bid specifications for this project (realizing that the project will have some items that would be hard to quantify), resulted in the City paying substantially more.

TPW staff indicated that plans were not prepared, because this was a maintenance project. Funds not used for the 15 unused pay items were instead used for an additional 2,186 square yards of 7" concrete, at a cost of \$284,180.00.

Section B.2.c.(v) of the TPW Department Capital Project Delivery Manual states that the construction bid package will include all plans, drawings, specifications, bid item list, and other such documents required to completely define the project to be constructed. Fifty-percent (50%) of the items included in the construction bid package (for this project) were considered unnecessary.

Recommendation 2A: *The Transportation and Public Works Director should ensure that bid solicitations are consistent with the work that is expected to be performed.*

Auditee's Response: Concur. The City awarded the project to the low bidder correctly since the top 3 bidders being within \$5k of each other does not represent an unbalanced bid. The bid quantities and actual installed quantities will always be different, sometimes resulting in significant savings compared to the second bidder, sometimes higher. The total quantities of work performed (7,986 SF full depth + 271 SF half depth = 8,257 SF) are consistent with the total bid quantities for both full depth concrete repair (4,500 SF) and half depth repair (2,250 SF) when combined (6,750 SF).

Having related bid items, which may be needed during construction to avoid higher prices for future change orders, is a sound practice that frequently reduces the City's costs. This maintenance project included as-needed panel replacement and the replacement of the City standard pavement markings removed during panel removal. Therefore including the city's standard striping bid items in the solicitation was consistent with the work expected to be performed. Limiting the bid items to only the most obvious anticipated items will increase the cost of future contracts through higher change order costs.

Target Implementation Date: Current Practice

Responsibility: Lauren Prieur, Assistant Director-Capital

Applicable Department Head: William Johnson, Transportation & Public Works Director



Applicable Assistant City Manager: Dana Burghdoff

Audit Comment: Internal Audit agrees that the TPW Department properly awarded the contract to the lowest bidder, and that the vendors' bids appeared competitive. Due to the nature of construction maintenance contracts, Internal Audit also did not consider it unusual that the actual and bid quantities differed. We do, however, feel that since the proper awarding of this contract resulted in the City incurring significant, additional costs, it may be in the City's best interest to re-evaluate the process by which maintenance contract bid specifications are prepared.

Recommendation 2B: *The Transportation and Public Works Director should require documentation (e.g., formal or informal plans, drawings, etc.) to use as criteria for preparing bids.*

Auditee's Response: Partially Concur. It is standard practice for maintenance projects not to have specific engineering designs. Requiring plans or drawings for maintenance work would result in significant additional costs and delays, reducing our ability to react to needs that arise. However, maintenance projects could be bid with additional information such as quantity takeoffs or a panel replacement survey as indicated in 1.B.3 above.

Target Implementation Date: Not Applicable

Responsibility: Not Applicable

Applicable Department Head: William Johnson, Transportation & Public Works Director

Applicable Assistant City Manager: Dana Burghdoff



Acknowledgements

The Department of Internal Audit would like to thank the Transportation and Public Works Department, and the Department of Diversity and Inclusion, for their cooperation and assistance during this audit.



Exhibit I – Impact of Items Bid Versus Items Billed

	Original Bid Submitted Value		\$940,678.00	\$940,910.00	\$945,400.00	\$1,089,900.00	\$1,149,820.00
Bid Item No.	Actual Items Used	Actual Quantities	Select Striping	Urban Infraconstruction	Conatser Construction	FHH Construction	Slaton Bros Inc
1	0135.0201 Remobilization	1	\$500.00	\$500.00	\$500.00	\$500.00	\$500.00
2	3471.0002 Portable Message Sign	12	\$3,600.00	\$9,600.00	\$9,000.00	\$12,000.00	\$12,000.00
3	9999.0000 Remove and Replace 6" Concrete Driveway	97	\$2,231.00	\$776.00	\$1,552.00	\$1,023.35	\$1,552.00
4	9999.0000 Remove Concrete and Replace with 7" Concrete Pavement HES	7,986.418	\$1,038,234.30	\$614,954.16	\$878,505.95	\$758,709.68	\$794,648.56
5	9999.0000 TxDOT Type B Half Depth (3"-4")	271.154	\$22,776.94	\$54,230.81	\$32,538.49	\$54,230.81	\$63,178.89
7	3211.0122 Flex Base, Type A, GR-2	293.55	\$24,364.65	\$16,145.25	\$11,742.00	\$24,951.75	\$19,961.40
9	3292.0100 Block Sod Placement	375	\$4,140.00	\$2,250.00	\$3,375.00	\$2,437.50	\$6,375.00
10	3213.0700 Joint Sealant	1,246.667	\$1,870.00	\$2,493.33	\$4,986.67	\$24,933.33	\$3,740.00
11	3305.0108 Miscellaneous Adjustment (Utilities)	0.2344	\$1,172.00	\$1,172.00	\$1,172.00	\$1,172.00	\$1,172.00
12	9999.0000 Geogrid Tensar (TRLAX 140-475) or Approved equal	438.2914	\$1,534.02	\$1,534.02	\$1,753.17	\$2,848.89	\$2,366.77
19	3441.1301 Loop Detector Cable Sawcut	59	\$590.00	\$295.00	\$2,360.00	\$1,180.00	\$472.00
20	3441.1302 14 AWG Loop Detect Cable	140	\$2,100.00	\$700.00	\$7,000.00	\$2,800.00	\$2,240.00
21	3217.0001 4" Solid Thermoplastic (HAS) Lane Line	795	\$1,590.00	\$1,590.00	\$3,975.00	\$7,950.00	\$6,360.00
27	9999.0000 Remove and Replace 4" Sidewalk	522.88	\$10,457.60	\$5,751.68	\$20,915.20	\$7,843.20	\$10,353.02
30	9999.0096 Paving Construction Allowance	2,115.50	\$2,117.50	\$2,117.50	\$2,117.50	\$2,117.50	\$2,117.50
Totals: Actual Quantity Applied to Bidder's Unit Cost			\$1,117,278.01 ⁽¹⁾	\$714,109.75	\$981,492.98	\$904,698.01	\$927,037.14

Note: ⁽¹⁾ Includes block sod replacement, joint sealant, and 4" solid thermoplastic lane line that was not charged.