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Hot Mix Asphalt Concrete Street Rehabilitation

January 29, 2016



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

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The Hot Mix Asphalt Concrete Street Rehabilitation Audit was conducted as part of the Department of Internal Audit's Fiscal Year 2015 Annual Audit Plan.

Audit Objectives

The objective of this audit was to determine whether construction projects are being completed in accordance with contract terms.

Audit Scope

Our audit covered the period from May 6, 2014 (contract award) through August 31, 2015 (end of fieldwork).

Opportunities for Improvement

- Ensure change order is approved before work is commenced
- Prepare detailed estimates for street locations, including those in change orders
- Perform conformance tests closer to the contractor's completion of repavement work
- Obtain proper authorization for changes in project scope
- Maintain up-to-date and complete daily inspector logs

Executive Summary

As part of our FY2015 Annual Audit Plan, the Department of Internal Audit conducted an audit of the Hot Mix Asphalt Concrete (HMAC) Street Rehabilitation project for the rehabilitation of streets in Council Districts 3, 6, 7, 8, and 9. Our audit covered the period from the date the contract was awarded to JLB Contracting (May 6, 2014) through the end of audit fieldwork (August 31, 2015).

The initial contract amount of \$1,809,801.15 was to fund the repaving of 22 streets throughout the City. One of those 22 streets was removed from the project listing, while a small section of a street not included in the initial contract or change order was paved as a part of this project. The repaved street that was not included in the contract, dead-ends, has no outlet and does not appear to be used frequently.

On May 5, 2015, the Mayor and Council approved a \$448,353 change order (processed by the Transportation and Public Works Department) that added seven (7) additional streets to the project. Streets authorized via the change order did not have detailed quantity estimates by street to support the basis for the change order amount. However, Internal Audit did note that unit prices remained the same as the original contract. Five of the seven additional streets were repaved, while two were not repaved because authorized funding had been exhausted. We noted that one street (making up over 87% of the change order amount) was completed before the change order was approved by the Mayor and Council. Paving costs for this particular street totaled \$389,543 alone.

We found that when streets were completed, CFW lab personnel within the Transportation and Public Works Department (T/PW) are not promptly notified to test for conformance with construction standards. As a result, many months pass between construction completion date and post-construction testing. During our audit observations, we identified a road base failure in a small section of one street that might have been identified and corrected had there been prompt post-construction inspections. The Department of Internal Audit also concluded that inspector logs, designed to document the status of street repairs, were not updated on a daily basis and were incomplete. The rehabilitation of streets repaired under the project lasted over 100 days longer than projected.

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

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Background

The Transportation and Public Works (T/PW) and Water Departments coordinate to identify streets that may require rehabilitation, due to planned water or sewer projects. After the water or sewer project is complete, the street may require rehabilitation. The Water and T/PW projects typically use different contractors that perform work in several locations. Coordination is, therefore, required to avoid excessive delays between the water and street projects and to ensure high quality work.

When identifying streets that will require rehabilitation, T/PW's quality control personnel assess street conditions to determine the most appropriate type of road base preparation. A cost estimate for each street section is then calculated based on street dimensions and other factors. When the cost estimate is finalized, bids are solicited from prospective contractors.

Rehabilitation work, which was undertaken in conjunction with separate contracts for the replacement of water and sanitary sewer lines, involved curb and sidewalk repair, road base preparation, and paving in multiple locations throughout Council Districts 3, 6, 7, 8 and 9. A request for bid on the Hot Mix Asphalt Concrete (HMAC) project was advertised in the Fort Worth Star-Telegram on January 16, 2014 and January 23, 2014. On February 13, 2014, the following bids were received:

Bidders	Bid Amount
JLB Contracting, LLC	\$1,809,801
Advanced Paving Acquisition	\$1,959,009
Peachtree Construction, Ltd.	\$1,973,718

Source: T/PW contract files

The Mayor and Council authorized \$1,809,801 to fund the total project, as procured by T/PW. The Contract Street Maintenance Fund and Water and Sewer capital project funds provided funding of \$904,900.50 each, on a 50/50 basis.



Contract Award

JLB Contracting, LLC was awarded the HMAC Street Rehabilitation contract, which stated that the project was to be completed for final acceptance within 190 calendar days after contract commencement. The following 22 streets were included in the contract.

Original Contract Streets			
Council District	Street Name	Block Limit	Street Limits
3	Libbey Ave	5300-5599	Prevost St - Faron St
6	Cardiff Ave	4400-4499	Wallingford Dr - Kingswood Dr
6	Wallingford Dr	6300-6399	Cardiff Ave – Chedlea Ave
6	Walraven Cir	6000-6199	Welch Ave - S Hulen S
7	Ashland Ave	1800-2099	Camp Bowie Blvd - Bryce Ave
7	Birchman Ave	4100-4399	Clover Ln - Ashland Ave
7	Charter Oak Ct	7800-7899	Se Cul-De-Sac - Random Rd
7	Driftwood Ct (N)	7800-7899	S Cul-De-Sac - Random Rd
7	El Campo Ave	3900-4099	Sutter St - Clover Ln
7	Random Rd	8800-8999	Crosswind Dr - Crosswind Dr
7	Royal Harbor (S)	8800-8899	Random Rd - S Cul-De-Sac
7	Sugarland Dr	7800-7899	Crosswind Dr - Random Rd
7	Thomas Pl	2500-2799	Pershing Ave - West Fwy Srv Rd
7	Timberwood Ct	7800-7899	Se Cul-De-Sac - Random Rd
8	Ave B	2500-2599	W Dead End - S Beach St
8	Bostick St	400 - 499	Valkus St - Camilla St
8	Camilla St	2300-2599	W Dead End - S Beach St
9	Lipscomb St	100 - 199	W Vickery Blvd - W Jarvis St
9	S Jennings Ave	100 - 599	W Vickery Blvd - Pennsylvania Ave
9	Tasman St	700 - 799	Hemphill St - Kleinert St
9	Topper St	2000-2099	Crowley Rd - Randell Dr
9	W Vickery Blvd	300 - 499	Galveston Ave - S Jennings Ave

Source: T/PW project files



Change Order

On May 5, 2015, the City Council approved a change order in the amount of \$448,353 to add the following seven (7) street sections to the HMAC Street Rehabilitation project. Water and Sewer Funds totaled \$224,289 for this change order, while T/PW's portion totaled \$224,064. This increased the total contract amount to \$2,258,154, representing a 24.7% increase. The change order added 78 days to the project.

Change Order Streets		
Council District	Street Name	Street Limits
3	Marks Place	Camp Bowie Blvd – Brazos Ave
7	Clover Lane	Birchman Ave – West Freeway Service Road
9	Binyon Street	Lubbock Ave – Cockrell Avenue
9	Green Avenue	Binyon St – Bilglade Road
9	James Avenue	W Berry St – W Biddison Street N
9	May Street	Pennsylvania Ave – W Cannon Street
9	Merida Avenue	W Seminary Drive – W Boyce Avenue

Source: T/PW project files



Objectives

The objective of this audit was to determine whether construction projects are being completed in accordance with contract terms.

Scope

Our audit covered the period from the date the contract was awarded on May 6, 2014, through the end of fieldwork on August 31, 2015.

Work performed under this contract was required due to water and sewer projects performed under separate contracts managed by the Water Department, and which preceded the T/PW rehabilitation contract. Our audit scope did not include the Water Department contracts.

Methodology

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

- interviewed key T/PW personnel regarding project selection, and policies and procedures related to project execution and adherence to contractual terms;
- obtained a copy of the base contract and change orders to capture significant parts of the contract;
- identified locations of street rehabilitation and conducted visual inspections;
- reviewed the process for project selection, verified bid amounts, and confirmed adherence to agreed upon fees and charges;
- compared actual quantities used to estimated quantities to identify significant differences;
- inquired about monitoring and quality control testing performed when the paving was completed; and,
- verified that wages paid by contractor complied with contract terms.

We conducted this audit in accordance with generally accepted government auditing standards, except for peer review¹. 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.

¹ Government auditing standards require audit organizations to undergo an external peer review every three years. A peer review is planned in 2017 for the three-year period ending December 31, 2016.

Audit Results

As of August 31, 2015, \$2,243,989 had been charged by the contractor for rehabilitation of streets that were a part of the HMA Street Rehabilitation project, with three (3) streets listed within the contract and the change order not being completed. A total of \$2,258,154 was authorized by the Mayor and Council.

- *Twenty-one of the 22 streets included in the original contract were completed.* Fourteen (14) of those streets cost less than what was estimated, and seven (7) cost more than what was estimated. Management indicated that one (1) street was removed from the project due to a lack of sufficient funds. Although the initial contract was approved by the Mayor and Council, Mayor and Council authorization was not obtained to remove this street from the project listing. Additionally, Internal Audit observations revealed excessive settling and compaction on this particular street.
- *Five (5) of the seven streets included in the change order were completed.* The two (2) remaining streets were removed from the project listing due to a lack of sufficient funds. Since estimates were not provided for streets listed in the change order, the Department of Internal Audit was unable to determine which individual street re-pavements exceeded management's estimated cost.

Work on James Avenue was included in the \$448,353 change order processed by T/PW. However, the work on James Avenue was completed before the change order was approved by the Mayor and Council. The City inspector's log book indicated that the re-paving of James Avenue (which made up 87% of the change order) began in July 2014 and was completed in October 2014. The Mayor and Council did not approve the change order until May 5, 2015. Audit observations revealed surface cracks on this section of James Avenue within less than one year of construction.

It is very common for management to enter into a single contract for the repair, replacement, etc. of multiple streets. While each street is started and completed throughout the contract term (which could extend up to or beyond one year), management has adopted a practice to delay final inspection and/or testing the work performed until all streets included in the contract have been completed – versus conducting conformance testing after each street has been repaired or replaced.

The Department of Internal Audit also noted that one street was re-paved, although it was not listed within the HMA Street Rehabilitation project. Audit observation revealed that this particular street was a dead-end street with no apparent use by residents or businesses, and had no fire hydrant in close proximity of the street repair. Documentation was not available to support the rationale for the necessity of the type of repair made to this particular street.

We also found that inspection logs evidencing the status of street repairs were not up to date and were incomplete.



Overall Evaluation

High	Medium	Low
<u>Non-emergency work commencing prior to Council approval.</u>		
<u>Basis for change order amount not substantiated</u>		
<u>Pavement failures within one year of construction and no action of recourse</u>		
<u>Paving dead-end street with no apparent residential or business use</u>		
<u>Untimely testing of completed street jobs for necessary conformance</u>		
	<u>Inspector logs not kept up-to-date and incomplete</u>	



Detailed Audit Findings

1. Re-pavement work, authorized via change order, commenced before City Council approval was requested and obtained.

Part II, Chapter 2, Article I, Section 2-9 of the City Code requires that change orders, resulting in increases in costs of more than \$100,000, be approved by the City Council.

The initial contract with JLB Contracting, LLC (awarded on May 6, 2014) did not include the repaving of James Avenue, between West Berry Street and West Biddison Street North. However, repaving of James Avenue was started in July 2014 and completed in October 2014. T/PW processed a change order to add James Avenue. However, the change order was not approved by the Mayor and Council until May 5, 2015, seven (7) months after the project was completed.

Although the repaving of James Avenue appears warranted, as management indicated that citizen complaints led to initiation of the work, the project was not properly authorized and the request for approval to repave James Avenue did not mention that the street had already been repaved.

Recommendation 1: *The Transportation and Public Works Director should ensure that work requiring a change order is not commenced before City Council approval is requested and/or obtained. In instances where an emergency exists and the work is required prior to City Council approval, City Council approval should be obtained as soon as possible, with pertinent details provided to the Mayor and City Council.*

Auditee's Response: Concur. The work in this situation was not an emergency situation but was undertaken to allow street rehabilitation work efforts to occur in better coordination with completion of water and sewer line construction and avoid delays in producing a final product for customers. The street segments added were additional streets not included in the initial contract and therefore require a Change Order and Mayor and City Council approval prior to work starting.

Historically, these street rehabilitation contracts, commonly referred to as 50/50 contracts since the costs are shared equally between TPW and the Water Departments, have been used and provisions included in the contract documents to include additional work beyond the street segments listed in the initial scope of work. The intent being to quickly assign additional street segments for street rehabilitation as sequencing of Water Department work efforts changed due to unforeseen conditions, such as additional water/sewer lines needing to be replaced. Consequently, the street rehabilitation contracts function in a somewhat unit price contract format for additional work, allowing completion of this work quicker. In addition to completing the work quicker, this process fosters better scheduling for the construction contractor and enables the work to be completed in a cost effective manner.

To further achieve coordination between these two work functions – water/sewer and street rehabilitation - contracting techniques are being modified through two approaches. Combining



the water/sewer and street work functions into one construction contract such that the contractor is responsible for coordinating the competition of the two work phases. Three new contracts involving water/sewer and street rehabilitation have been bid where the work is combined into one construction contract. Additional contracts of this nature are planned such that the contracting community can become more comfortable with the format and risk allocation to enable pricing to approach current separate contracting levels. The second approach is to contract the street rehabilitation work function through a “Unit Price” type contract whereby work is assigned to individual street segments as the water/sewer work is completed – thereby minimizing delays to providing the final product. This contracting technique, like the combined contracts will be introduced overtime to allow the supply change an opportunity to become familiar with the technique and its delivery method such that pricing is stabilized to match levels that currently exist.

Target Implementation Date: Ongoing

Responsibility: T/PW Assistant Director for Capital Projects

2. No detailed, itemized budgets, or quantity estimates were made for streets included in the change order.

Planned quantity estimates are specified in Section 11.04 of the contract between the City of Fort Worth and JLB Contracting, LLC. Good business practice would warrant cost estimates, detailing pay item quantities required for each street location, so that estimated costs can be determined as accurately as possible.

T/PW did not prepare detailed estimates, by street, to arrive at the \$448,353 change order presented to the Mayor and Council on May 5, 2015. However, total spending for the repaving of streets included in the change order totaled \$688,031 -- \$239,678 greater than the change order request. Failure to develop estimates appears to have contributed to funds being exhausted before all streets were completed. During Internal Audit’s review of project files, we noted that unit prices remained the same for the change order as the original contract.

The following chart summarizes estimated to actual totals for streets included in the initial contract and subsequent change order. The chart also reflects those streets that management was authorized to repave, but did not due to lack of funds or other reasons determined by management.



Council District	Street Name and Numbers	Estimated	Actual	Over/(Under) Estimate	Percentage Over/(Under)
3	Libbey Ave, 5300 - 5599 (Incomplete as of 8/31/15)	\$87,109	\$16,095	(\$71,014)	(82%)
6	Cardiff Ave, 4400 - 4499	59,925	55,218	(4,707)	(8%)
6	Wallingford Dr, 6300 - 6399	58,836	83,481	24,645	42%
6	Walraven Cir, 6000 - 6199	112,248	180,946	68,698	61%
7	Royal Harbor (S), 8800 - 8899	24,110	21,646	(2,464)	(10%)
7	Driftwood Ct (N) 7800 - 7899	33,465	24,982	(8,483)	(25%)
7	Sugarland Dr, 7800 - 7899	39,218	30,390	(8,828)	(23%)
7	Charter Oak Ct, 7800 - 7899	46,414	35,276	(11,138)	(24%)
7	Timberwood Ct, 7800 - 7899	38,578	37,367	(1,211)	(3%)
7	Thomas Pl, 2500 - 2799	79,002	76,784	(2,218)	(3%)
7	Ashland Ave, 1800 - 2099	71,463	77,991	6,528	9%
7	El Campo Ave, 3900 - 4099	81,382	81,975	593	1%
7	Birchman Ave, 4100 - 4399	135,044	119,823	(15,221)	(11%)
7	Random Rd. 8800 - 8999	249,952	286,713	36,761	15%
8	Ave B, 2500 - 2599	33,209	1,993	(31,216)	(94%)
8	Bostick St, 400 - 499	23,428	35,968	12,540	54%
8	Camilla St, 2300 - 2599	61,666	43,805	(17,861)	(29%)
9	Tasman St, 700 - 799 (Removed from project)	43,325	0	(43,325)	(100%)
9	Lipscomb St, 100 - 199	24,729	20,792	(3,937)	(16%)
9	Topper St, 2000 - 2099	55,020	69,187	14,167	26%
9	W Vickery Blvd, 300 - 499	114,105	89,876	(24,229)	(21%)
9	S Jennings Ave, 100 - 599	196,499	165,619	(30,880)	(16%)
	Paving allowances, etc.	141,074	0	(141,074)	(100%)
	Subtotals:	\$1,809,801	\$1,555,927	(\$253,874)	(14%)
CHANGE ORDER					
3	Marks Pl, 3700 - 3999	N/A	\$65,994	N/A	N/A
7	Clover Ln , 2600 - 2799	N/A	18,276	N/A	N/A
9	Binyon St, 2700 - 2999 (Removed from project)	N/A	0	N/A	N/A
9	Green Ave, 4750 - 4799 (Removed from project)	N/A	0	N/A	N/A
9	James Ave, 3100 - 3499	N/A	389,544	N/A	N/A
9	May St, 650 - 699	N/A	21,951	N/A	N/A
9	Merida Ave, 4300 - 4599	N/A	192,266	N/A	N/A
	Subtotals:	\$448,353	\$688,031	\$239,678	53%
	Total Project Cost at 08/31/15:	\$2,258,154	\$2,243,958	(\$14,196)	(1%)

Source: T/PW project files

Recommendation 2A: *The Transportation and Public Works Director should require that reasonable estimates are prepared for all streets that are to be paved.*

Auditee's Response: Concur. The original contract included 22 street segments. Of the 22, 14 were completed at a cost lower than the original estimate and 7 were completed at a higher cost. One street was not rehabilitated. Streets added to an existing contract should be estimated at a level such that final costs are close to the estimated costs, thus producing a high degree of confidence that work can be completed within the contract limits.



All Program Managers, Project Managers, Construction Inspection Supervisors and Construction Inspectors will be cautioned to be sure and develop or require a detailed estimate for all elements of any proposed Change Order and to review and concur with that estimate before submitting for approval.

Target Implementation Date: March 1, 2016

Responsibility: T/PW Assistant Director for Capital Projects

Recommendation 2B: *The Transportation and Public Works Director should ensure that Mayor and Council approval is obtained prior to deleting streets that were initially authorized by the Mayor and Council.*

Auditee's Response: Concur. A final Change Order including the elimination of these three streets should have been submitted because their elimination constitutes a change in scope of the project. This Change Order should specify the reason for the elimination – in this case greater costs for other street segments, and if the street(s) are to be included in another contract, along with the anticipated completion date of the rescheduled work.

All Program Managers, Project Managers, Construction Inspection Supervisors and Construction Inspectors will be instructed to be sure and process a Change Order for the elimination of streets from an approved construction contract.

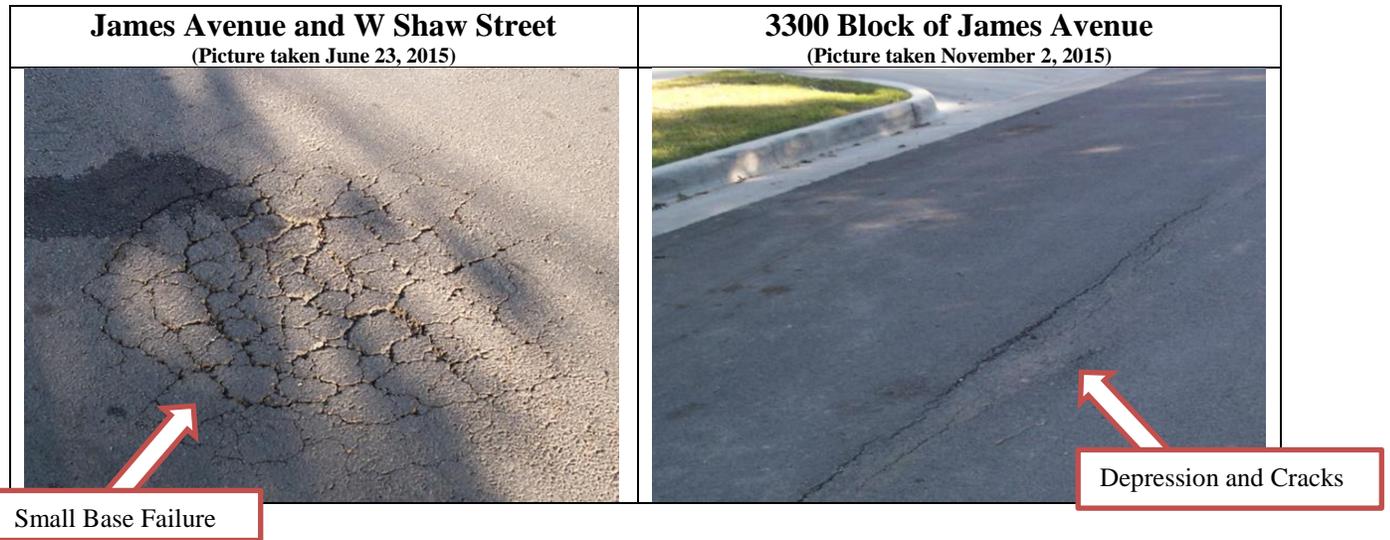
Target Implementation Date: March 1, 2016

Responsibility: T/PW Assistant Director for Capital Projects

3. Two project locations had apparent failures in paving work that was completed.

Street paving construction should be of a high quality that lasts for several years. Additionally, the HMAC Street Rehabilitation contract includes warranty provisions and a maintenance bond to help mitigate risk of premature street failure.

- Small sections of James Avenue, paved as a part of this project, had what appear to be pavement failures. T/PW documents indicate that work on James Avenue was completed in October 2014. However, during Internal Audit's observation in June 2015 (which was within one year of construction), cracks appeared on the surface, as shown in the following photos.



- Tasman Street was included in the HMA Street Rehabilitation project, but was later deleted due to lack of funding. The rehabilitation of Tasman was initially included in the HMA Street Rehabilitation contract, because the street was in need of repair after a Water Department construction project.

As shown in the following photo, this small trench on Tasman Street appears to have had excessive settling and compaction. There is a risk that paving cracks might expand beyond the current size and affect a larger portion of the street. Furthermore, when and if Tasman Street is repaved, the portion over the trench may fail prematurely. As of the end of audit fieldwork, Tasman Street remained unpaved.

These premature pavement failures may have resulted from street rehabilitation project deficiencies, inadequate fill material, or other deficiencies related to the Water Department project that precedes T/PW's rehabilitation project. The assignment of responsibility for premature failures could be difficult when different contractors are responsible for the different projects.

Tasman Street east of Kleinert Street

(Picture taken August 4, 2015)



Recommendation 3A: *The Transportation and Public Works Director should require the contractor to make necessary repairs on James Avenue.*

Auditee's Response: Concur. All infrastructure projects of this nature are monitored throughout construction and for 2 years after the project has been accepted. Any significant materials or workmanship issues are brought to the attention of the contractor as soon as they are identified and timely repairs are expected to be performed by that contractor. If that does not occur, the bonding company for construction or maintenance of the project (whichever is appropriate at the time) is contacted with a demand for cure.

Should minor issues arise that seem to be associated with materials or workmanship, the project principals may deem it more appropriate to give any underlying issues time to manifest themselves before determining exactly what will be demanded of the contractor for curing the condition. This results in a much more cost effective fix for any failures as well as managing overall contract costs. All needed failures in workmanship will be restored to acceptable levels prior to the end of the 24 month warranty period. This usually occurs in the last 6 months of this warranty period such that costs to cure are minimized and final product value is maximized. Having the contractor cure each failure one at a time over the life of the 24 month warranty period could be required but would result in higher initial bid pricing to cover this frequent return to work requirement. In addition, a critical element in waiting on repairs of this nature is the need to address the underlying root cause of the failure, otherwise the root cause will develop after the 24 month warranty period and become the responsibility of the City to cure. If a failure were to create an unsafe condition or one that would result in further more severe damage, that failure would be repaired immediately. Again, should the contractor refuse to make any directed repairs within this 24 month period, the bonding company will be brought into the issue.



NOTE: The indicated base failure was repaired and the crack has been crack sealed. These areas along with all other contract improvements will be monitored until the end of the warranty period.

Target Implementation Date:

1. Complete any HMAC Street contract related repairs prior to the expiration of the Maintenance Bond.
2. NOTE: Tasman St. is being added to an upcoming HMAC contract and any necessary repairs will be performed before the pavement improvements are performed.

Responsibility: T/PW Assistant Director for Capital Projects

Recommendation 3B: *The Water Director should direct engineering staff to determine the cause of the trench compaction on Tasman Street and test the fill material if needed. The vendor contracted by the Water Department should then be requested to refill the trench if the initial fill was completed with inadequate fill material.*

Auditee's Response: Do Not Concur. What was observed during the audit field work is failure of the temporary pavement repair, and not trench settlement. Water and sewer replacement on the street was completed on August 2014 and temporary pavement repair was installed. The typical life span of temporary pavement repair is about 2 to 3 months. TPW anticipates that pavement reconstruction will begin in January 2016.

Target Implementation Date: N/A

Responsibility: N/A

Audit Comment: Internal Audit's conclusion that the portion of Tasman Street failed due to trench compaction, was based on the opinion of a City engineer. While the responding department does not concur with the conclusion noted, the planned pavement reconstruction (as noted in the auditee's response) should remedy the observed street failure.

Recommendation 3C: *The Transportation and Public Works Director should ensure that all completed work is monitored throughout the warranty period to ensure that pavement failures, occurring during the contract warranty period, are brought to the contractor's attention in a timely manner.*

Auditee's Response: Concur. All improvements of this nature under TPW infrastructure construction contracts are monitored for two years after the project has been accepted for maintenance by the City. Any issues that arise involving the materials used by the contractor or the contractor's workmanship are brought to the attention of the contractor and a correction or cure is required. Two year maintenance bonds are in place for all TPW infrastructure contracts to assure a response to any such issues. As discussed in 3A, failures and their associated cures may be consolidated at the end of the warranty period.



Target Implementation Date: Monitor pavement failures and determine root cause of failures prior to the expiration of the Maintenance Bond

Responsibility: T/PW Assistant Director for Capital Projects

Recommendation 3D: *The Assistant City Manager assigned to the Transportation & Public Works and Water Departments should consider requiring that the T/PW and Water Departments review the current process for managing street rehabilitation projects required due to water or sewer construction projects and determine whether there is a more effective process.*

Auditee's Response: Concur. Water and TPW department directors will coordinate an effort to review the current processes for managing street rehabilitation projects that involve both departments in an effort to improve both efficiencies and effectiveness as well as reduce negative impacts to citizens and the community.

Target Implementation Date: Directors to begin process review in March/April 2016 to provide recommended process changes by September 2016

Responsibility: T/PW and Water Department Directors

4. Re-paving a short, dead-end portion of Valkus Street does not appear to be a prudent use of City funds.

Since a Water Department project was performed on Valkus Street, the HMA Street Rehabilitation contractor was instructed to repave that particular section of the street. It should be noted that Valkus Street was not included in the HMA Street Rehabilitation project plans or cost estimates.

Upon physical observation during this audit, Internal Audit noted that Valkus Street dead-ends and there is no water hydrant in the area that would have provided better reasoning for paving the dead end street. Additionally, there is a neighboring business, but no homes or businesses on this particular street. Street images from 2007 show weeds growing in the street.

Although City resources should be spent efficiently based on effective prioritization, there does not appear to have been any analysis of whether the repaving was the most reasonable method needed or whether the road could have been surfaced with some other material such as gravel. As a result, \$5,900 in funds may have been spent unnecessarily and could have been used on one of the streets deleted from the project.



Recommendation 4A: *The Transportation and Public Works Director should ensure that streets paved during future projects include only those streets that have been authorized by the Mayor and Council.*

Auditee's Response: Concur. Streets to be included in any contract of this type are identified based upon completed or anticipated utility work. As work elements proceed, additional utility repairs may be performed in the immediate vicinity of those streets listed. Valkus Street was not included in the initial street rehabilitation contract. At some point in time water/sewer utility line work was performed, resulting in the need for street rehabilitation. Including Valkus Street in the street rehabilitation contract constitutes a change in scope and requires a Change Order and authorization by the Mayor and City Council.

All Program Managers, Project Managers, Construction Inspection Supervisors and Construction Inspectors will be instructed to be sure and process a Change Order for the addition of streets to an approved construction contract.

Target Implementation Date: March 1, 2016

Responsibility: T/PW Assistant Director for Capital Projects



Recommendation 4B: *The Transportation and Public Works Director should ensure that the rationale for paving dead-end streets (that have no apparent residential or business use) has been properly analyzed and vetted prior to paving the street.*

Auditee's Response: Concur. While Valkus Street is a dead-end street with low usage, it provides access to abutting properties and is a public street. Utility rehabilitation was performed on this street segment, degrading the existing asphalt travel surface. Restoring the street to a new travel surface such as gravel as recommended by the Auditor, would be a non-effective use of public monies since the cost to install this gravel along with the ongoing maintenance of a gravel road would exceed the initial cost of rehabilitating with asphalt. In addition to this cost, consideration of community value and the costs to abutting property and developments must be considered in producing a lower rated street surface such as gravel. Past experience has demonstrated that community pride and value is significantly impacted by the quality of the street system, and rehabilitating a street segment of this nature in gravel would not be acceptable to the community when all other streets have been rehabilitated with asphalt.

TPW concurs with the Auditor that analysis should be performed, which it was, but disagrees with the conclusion presented by the Auditor that a gravel travel surface would be the most appropriate product.

All Program Managers, Project Managers, Construction Inspection Supervisors and Construction Inspectors will be instructed to be sure and fully vet contemplated changes in scope and to include them in a Change Order to be considered by the Mayor and City Council.

Target Implementation Date: March 1, 2016

Responsibility: T/PW Assistant Director for Capital Projects

5. Lab testing is not performed immediately after each street is completed.

Post construction testing is required to ensure that the completed work meets standards and thus reduces the likelihood of premature failure.

Although the first street included in this HMAC Street Rehabilitation project was completed in October 2014, post-construction testing had not been conducted by the end of our audit fieldwork (August 31, 2015). T/PW stated that their intentions were to conduct post-construction testing after all streets within the HMAC Street Rehabilitation contract had been completed. Since management's current practice was to delay such communication until all streets had been completed, divisions within T/PW did not communicate the need to perform conformance testing upon completion of each street.

Good business practice is to conduct some post construction testing (i.e. density testing) as soon as work is complete to promptly identify problems and to minimize additional work. There may be reasons to delay post-construction testing that is not as time-sensitive (e.g., coring). However, delays in notifying lab personnel to inspect completed work may result in the untimely identification of completed work that does not meet specifications, and could result in the City making repairs that should have been the responsibility of the contractor. Also, substandard



work could be left “untouched” for an extended period of time, resulting in safety issues and/or an increase in citizen complaints. For this HMA Street Rehabilitation project, the project timeline spanned over one year.

Recommendation 5: *The Transportation and Public Works Director should require appropriate post-construction quality control testing soon after each street’s rehabilitation is completed instead of the current practice of waiting until all streets included in a project are complete.*

Auditee’s Response: Do Not Concur. These 50/50 contracts involve primarily the pulverization of existing street materials to a depth of 10 inches, addition of cement to the pulverized product, removal of 2 inches of material, compaction and grading of the stabilized material and then an asphalt overlay of the resultant subgrade. Construction Inspection and Materials Testing for such things as densities, material gradation, material depths and cement content occurs throughout each phase of the pulverization and regrading of each street segment. Placement of the final overlay is observed by a Construction Inspector to help assure consistency of placement and depth of material.

The last quality assurance test to be performed is a physical core of the asphalt to determine final placed depth of material. In the vast majority of cases, if there is any shyness in depth, it is within specified tolerances and at worst the contractor is penalized in the amount that he receives in payment for the work. If the shortness of depth is beyond tolerance limits, then the contractor can be required to remove and replace the asphalt that has a shy depth.

Performing this post-construction quality control is effectively performed for these types of applications at the end of the construction project and reduces the cost of performing this testing since it occurs in one time period, avoiding multiple trips. Critical construction testing is performed continuously throughout the various phases of construction where the impact of non-compliance can be assessed and remedial action taken.

Target Implementation Date: N/A

Responsibility: N/A

6. Inspector’s daily logs are incomplete and are not updated on a consistent basis.

Work performed by contractors should be recorded accurately, on a consistent basis and should be readily available upon request. During our audit, information recorded onto daily inspector logs had not been uploaded into the project management document system, and logs were received by Internal Audit were not up-to-date and were incomplete.

Effective project management requires that project inspectors maintain a daily log of work performed by the contractor. The log is to include the number of days elapsed on the project, number of employees working on the project each day, equipment at the job site, weather/site conditions, and other information. The log is required to verify all site conditions.



Log files that are not updated promptly and frequently are more likely to contain errors, which could result in questionable or unreliable evidence in the event of a contractual dispute. Also, not recording project completion dates makes it difficult to track individual projects and could result in the failure to support claims for liquidated damages.

Recommendation 6: *The Transportation and Public Works Department Director should require that inspectors record work performed by the contractor on a daily basis and ensure that such information is promptly uploaded into the City's project document management system.*

Auditee's Response: Concur. All Program Managers, Project Managers, Construction Inspection Supervisors and Construction Inspectors will be instructed to assure that all projects and associated work activities are tracked and properly documented through the use of daily logs.

Target Implementation Date: March 1, 2016

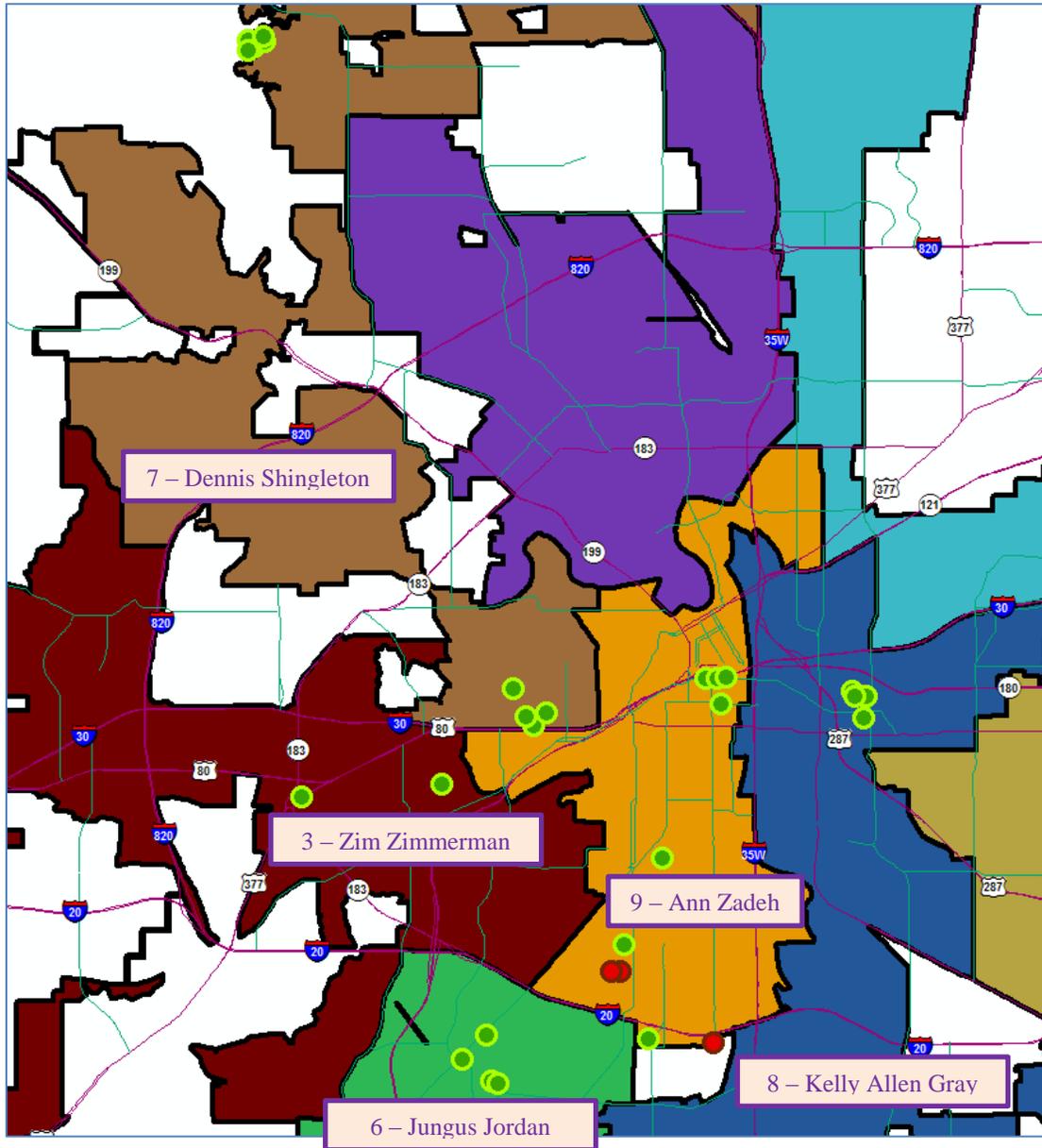
Responsibility: T/PW Assistant Director for Capital Projects



Acknowledgements

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

Exhibit I – Street Locations for the Hot Mix Asphalt Concrete Street Rehabilitation Project



Source: City of Fort Worth Graphical Information System (GIS)

	Location of Hot Mix Asphalt Concrete Street Rehabilitation
	Locations removed from Project