



Office of the Inspector General Commonwealth of Massachusetts

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The Internal Special Audit Unit's Investigation of Commodity Price Fluctuations at the Massachusetts Department of Transportation

A closer look at how the Massachusetts Department of Transportation accounts for frequent price fluctuations of liquid asphalt and diesel fuel in its roadway paving projects.

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Executive Summary

The Massachusetts Department of Transportation (“MassDOT” or the “Department”) spends millions of dollars annually to maintain the state’s highways, streets and other roadways. In Fiscal Year 2015 alone, for example, MassDOT paid its top four paving contractors approximately \$105 million.

Given the significant public funds that MassDOT spends on paving public roadways, the Internal Special Audit Unit (“ISAU” or “Unit”) examined how the agency manages its paving contracts, including whether MassDOT properly accounts for fluctuations in the price of liquid asphalt and diesel fuel. The ISAU also sought to evaluate whether MassDOT is complying with state laws, following contract terms and actively overseeing its paving contracts.

As part of its investigation, the Unit conducted an in-depth review of the records relating to thirteen contracts for paving projects that had been completed between 2010 and 2014. The ISAU also reconciled price adjustments, reviewed accounts payable records, analyzed state law, and examined MassDOT’s payment and price-adjustment policies. The ISAU’s investigation found that:

- MassDOT overpaid a large paving contractor \$179,856 for two paving projects. Evidence indicates that former staff at the company knew about the overpayments but did not refund the money. After the ISAU brought this issue to the contractor’s and MassDOT’s attention, the contractor refunded MassDOT \$116,424.
- Payment documentation for each of the thirteen contracts the ISAU reviewed contained errors that affected the prices MassDOT paid contractors. Overall, 44% of the documentation for asphalt pricing and 79% of the documentation for diesel fuel pricing were inaccurate.
- Because the price of asphalt and diesel fuel can fluctuate frequently, both state law and MassDOT’s policies require the agency to calculate price adjustments for these commodities on a monthly basis. While MassDOT has implemented detailed policies for calculating price adjustments, the Department has failed to enforce these policies or hold employees accountable for not following them. As a result, some staff do not calculate adjustments monthly, or at all. Not only is this poor contract administration, it puts MassDOT at risk of fraud, waste and abuse.
- MassDOT is supposed to test the contractor’s paving materials at specific intervals during the paving project to ensure that the materials meet the quality standards set out in the contract. In three of the thirteen contracts, MassDOT has not tested all required asphalt samples, even though the contractors completed the paving for these projects between one and three years ago.
- Once a paving project is completed, MassDOT can take years to issue the final payment and close out the contract. Not only is this poor contract administration, it exposes MassDOT to fraud, waste and abuse.

- MassDOT has weaknesses in its recordkeeping and payment procedures. In particular, the ISAU found that:
 - MassDOT's paving records are disorderly and are often missing relevant documents. Weight slips, which are essential to ensuring that the agency pays only for asphalt that is used on the project, were missing in almost half of the files reviewed.
 - MassDOT allows an employee to use a signature stamp to approve payments, including payments for as much as \$887,000. The use of a signature stamp is not a best practice and leaves MassDOT at risk of fraud.
 - The same MassDOT employee also approved a payment that exceeded his financial signatory authority by almost \$400,000. The accounts payable department accepted the signature and processed the payment.

Effective contract administration is critical to ensuring that vendors meet their contractual obligations. It is also essential to controlling costs and preventing fraud, waste and abuse. Contract *mis*management and the inability to accurately pay contractors hinder an agency's ability to responsibly spend taxpayer funds.

The Unit reviewed a relatively small sample of the Department's paving contracts, yet found all of the issues identified above. This indicates that MassDOT has a widespread, systematic problem with a potentially large financial impact to the Department. MassDOT should strengthen its contract management practices. As part of this, senior officials should make accurate and timely contract administration a priority for the Department. Senior officials also should actively oversee employees to ensure that they are following state law, contract terms and Department policies. Additionally, the ISAU recommends that MassDOT:

- 1) Recoup the remaining \$63,432 from the contractor who kept overpayments from MassDOT.
- 2) Explore ways to ensure that staff process price adjustments accurately, such as increasing training, management oversight and audits.
- 3) Require all districts to calculate commodity price adjustments monthly. Consider monthly reporting or another method to make it easier to track which contracts are (and are not) being reconciled monthly.
- 4) Follow through on its obligations to existing paving contractors and settle any outstanding payments owed.
- 5) Require employees to close out contracts in a timely manner; establish timelines for completing specific milestones in the closeout process.
- 6) Enforce internal policy guidance and ensure consistency among all districts for performing contract reviews at multiple stages throughout paving projects.
- 7) Discontinue the use of stamped signatures to approve and process payments to contractors. Enforce employee signatory limits and investigate whether any additional breaches occurred.

- 8) Enhance documentation and recordkeeping standards to maintain complete and accurate records.
- 9) Explore alternate ways to manage weight slips, such as electronic delivery, storage and retention.

By implementing these recommendations, MassDOT will have the opportunity to save money, protect transportation funds and reduce contract errors. Additionally, establishing and enforcing consistent standards throughout MassDOT can increase the agency's contract management efficiency and strengthen its oversight of paving contracts. Effective contract administration is also vital to ensuring that MassDOT appropriately pays paving contractors and mitigates the threat of fraud, waste and abuse of taxpayer money.

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Background

I. Massachusetts Department of Transportation

Created as part of Transportation Reform in 2009, the Massachusetts Department of Transportation (“MassDOT”) is responsible for managing the Commonwealth’s roadways, public transit systems, and transportation licensing and registration. It is made up of four divisions: the Highway Division, the Registry of Motor Vehicles (RMV), the Aeronautics Division, and Rail and Transit.

The Highway Division is responsible for the roadways, bridges and tunnels of the former Massachusetts Highway Department and the former Massachusetts Turnpike Authority. The Rail and Transit Division includes the Massachusetts Bay Transportation Authority (MBTA). The Aeronautics Division coordinates aviation policy and oversees the safety, security and infrastructure of thirty-seven public airports across Massachusetts.

II. Hot Mix Asphalt: Industry Pricing Standards

Hot mix asphalt (“HMA”), which is used for paving roadways, is a petroleum product that can significantly fluctuate in price from month to month. Consequently, most states use “escalator clauses” in their roadway paving contracts. An escalator clause allows the price of certain commodities to be adjusted up or down, depending on the market value of the commodity.

HMA is a mixture of stone, sand and a binder known as asphalt cement. Asphalt cement typically is refined from crude petroleum.

Since paving projects can take months or years to complete, escalator clauses protect paving contractors from underbidding on a paving contract and states from overpaying for roadway paving. The use of escalator clauses also increases competition because companies are more willing to bid if they are not locked into a long-term price. Further, without an escalator clause, contractors are more likely to submit high bids for paving contracts in order to hedge against market fluctuations.

III. Applicable Massachusetts Law

Beginning in 2008, the Massachusetts legislature has required certain public construction contracts, including many MassDOT contracts, to contain price-adjustment provisions for asphalt and other commodities.¹ In 2013, this requirement was codified by the enactment of M.G.L. c. 30, § 38A, which states:

¹ See Chapter 303 of the Acts of 2008; Chapter 10 of the Acts of 2011; Chapter 242 of the Acts of 2012; Chapter 18 of the Acts of 2013; Chapter 79 of the Acts of 2014.

Contracts for road and bridge projects awarded as a result of a proposal or invitation for bids under section 39M² shall include a price adjustment clause for each of the following materials: fuel, both diesel and gasoline; asphalt; concrete; and steel. Contracts for water and sewer projects awarded as a result of a proposal or invitation for bids under said section 39M shall include a price adjustment clause for fuel, both diesel and gasoline; liquid asphalt; and portland cement contained in cast-in-place concrete. A base price for each material shall be set by the awarding authority or agency and shall be included in the bid documents at the time the project is advertised. The awarding authority or agency shall also identify in the bid documents the price index to be used for each material. The price adjustment clause shall provide for a contract adjustment to be made on a monthly basis when the monthly cost change exceeds plus or minus 5 per cent.³

IV. MassDOT Practices

Beginning in 2009, MassDOT incorporated price-adjustment provisions into all contracts that call for more than 100 tons of hot mix asphalt. MassDOT issued detailed guidance⁴ to help staff calculate price adjustments. The guidance outlines how to apply price adjustments and reaffirms that employees should calculate price adjustments monthly. The guide also directs employees where in a paving contract to locate the base price of asphalt and provides direction for when to use old or new period prices.⁵ MassDOT also developed a *Price Adjustments User Manual* to provide further guidance for completing price-adjustment calculations. The manual is a helpful tool for completing price adjustments on contracts that involve asphalt, fuel, concrete or steel.

Additionally, MassDOT encourages resident engineers⁶ to use “calculation books” to document and calculate how much asphalt was used on a paving project in a given month. Calculation books are a best practice for tracking the quantity of liquid asphalt used on a paving project. However, resident engineers are not required to use them.

² MassDOT’s procurement of public construction contracts, including road and bridge contracts, is governed by M.G.L c. 30, § 39M. *See* M.G.L c. 6C, § 14. Therefore, any road or bridge project proposals or invitation for bids MassDOT issues must meet the price-adjustment requirements provided under M.G.L. c. 30, § 38A.

³ Section 38A was enacted in 2013 but applies to projects that were advertised or bid after January 1, 2014. *See* Chapter 150 of the Acts of 2013.

⁴ *Document 00811: Monthly Price Adjustment for Hot Mix Asphalt Mixtures*, dated February 18, 2009. *See* Appendix A for an excerpt from *Document 00811*.

⁵ MassDOT’s “old price method” was used for contracts bid on or before December 15, 2008. The “new price method” is used for all contracts bid after December 15, 2008.

⁶ Each MassDOT paving project has an assigned resident engineer whose primary function is to ensure that construction operations are conducted in accordance with the approved plans and specifications. This involves overseeing the project, interacting with contractors, verifying the project is executed in accordance with the contract terms, and calculating and preparing payment estimates.

V. MassDOT's Price-Adjustment Procedures

A. Determining the period price of HMA

MassDOT subscribes to Poten & Partners' *Asphalt Weekly Monitor*, an industry publication, to obtain the market price of several commodities, including hot mix asphalt ("HMA"). The *Monitor* contains a weekly analysis of the U.S. and Canadian asphalt industry, including prices, market developments and alternate values. The *Monitor* also provides regional and location-based prices, which serve as a benchmark for asphalt producers, refiners, resellers, shippers and state transportation departments.

Based on pricing information from the *Monitor*, MassDOT publishes monthly period prices for hot mix asphalt.⁷ The period price is the industry price of the commodity at the time it was used. MassDOT uses these published prices to calculate payment adjustments to contractors during paving projects. The Federal Highway Administration has approved MassDOT's use of the *Monitor* to set monthly HMA prices.

B. Price adjustments for hot mix asphalt

MassDOT pays paving contractors bi-weekly for the work they performed during the previous two weeks. To determine how much it owes a contractor, MassDOT first must calculate whether it needs to adjust the price it pays the contractor for hot mix asphalt.

Resident engineers in each district⁸ are supposed to use the agency's published period price to calculate asphalt price variations for existing paving contracts. If the variation between the original contract price ("base price") and the applicable period price is more than 5%, the engineer should adjust the payment to the contractor up or down, based on the period price. This adjustment, which is illustrated below, should take place monthly.

Price Differential	x Eligible Tonnage	= Price Adjustment
(Period Price – Base Price)	x (Asphalt Tonnage Used x RAP Factor ⁹ x .055)	
(\$620 – \$530 = \$90)	x (100 Tons x .90 x .055 = 4.95 Eligible Tons) =	\$445.50

Following a price-adjustment calculation, the resident engineer is supposed to complete a contract quantity estimate ("CQE") to initiate payment to the paving contractor. Resident

⁷ In June, for example, MassDOT would post the period price for May.

⁸ MassDOT's Highway Division is separated into six geographical districts that operate under the direction of a Central Office in Boston. See Appendix D for a map of MassDOT's districts.

⁹ When repaving an existing road, contractors often remove the original asphalt that was on the road, and then reuse a portion of it. This recycled material – referred to as reclaimed asphalt pavement ("RAP") – is usually a component of the HMA that MassDOT uses for paving. The proportion of RAP to the overall asphalt mix is known as the RAP factor.

engineers forward completed CQEs to MassDOT’s construction division (located in the Central Office) and the deputy chief engineer of construction (also at the Central Office) for approval. Once approved, district construction staff enter the relevant payment information into MassDOT’s electronic construction management system (“CMS”) and send reports to the accounts payable department, which then issues the payment.

C. Price adjustments for diesel fuel

MassDOT’s paving contracts also include escalator clauses for diesel fuel, which is used to power and transport equipment utilized on paving projects. At the start of a contract, it is not feasible to accurately calculate the amount of diesel fuel that will be used during the paving project. Consequently, many states (including Massachusetts) have adopted escalator formulas to estimate the amount of diesel fuel used on a project. The formula is based on the amount of asphalt used on each project. MassDOT’s current diesel escalator formula estimates that each liquid asphalt ton used on a paving project requires 2.9 gallons of diesel. The formula also includes 0.29 gallons of diesel for each cubic yard of excavation performed. As discussed in Section III above, MassDOT is required to calculate monthly the price adjustments for diesel fuel used in paving contracts.

VI. MassDOT’s Procedures for Administering and Closing Out Paving Contracts

In addition to calculating price adjustments every month, MassDOT is supposed to follow specific procedures to administer its paving contracts and issue final payments to contractors.

During actual paving, a finals review engineer¹⁰ (“finals engineer”) is supposed to review the progress of paving work and the resident engineers’ contract administration at five stages of the project as follows: in the beginning of the paving project, at 25% project completion, at 50% project completion, at 75% project completion and at 100% project completion. At each of these milestones, district staff and MassDOT’s research and materials (“R&M”) division should collect samples of the paving materials the contractor used; MassDOT is then supposed to conduct a series of tests to determine whether the paving materials meet contract standards. If the material does not meet specifications, MassDOT may require the contractor to remove the new pavement and repave using materials specified in the contract. The resident engineer is also supposed to collect materials certificates from the contractor throughout the project. The certificates are the contractor’s declaration that all materials incorporated in the construction work comply with contract specifications.

Once the district and R&M division test and approve the final paving materials, the district highway director (“DHD”) is supposed to prepare and sign a certificate of completion

¹⁰ A finals engineer is responsible for conducting periodic contract reviews to validate recordkeeping and payments during paving projects. These ongoing reviews enable the finals engineer to co-sign the resident engineer’s final estimate to close out the contract.

recommending acceptance of the contractor's work. The DHD is then supposed to forward the certificate of completion to the construction division for approval.

After the construction division approves the certificate of completion, the division performs a "reduction and retainage" review to ensure that MassDOT does not appear to owe the contractor more than \$5,000.¹¹ MassDOT's federal reimbursement department ("Reimbursement") obtains the certificate of completion, along with the final estimate and payment documentation, to conduct a full review of all payments made under the contract. Reimbursement staff reconcile actual payments made with the resident engineer's final estimate.

Once Reimbursement staff have completed their work, MassDOT is supposed to calculate the final payment due and issue an affidavit letter, which details all final amounts owed to (or from) the contractor. If MassDOT owes the contractor any money, Reimbursement staff review the state's accounting system to ensure that funding is available to pay the contractor. If the available funding is insufficient, the construction division will prepare a request to increase contract funding. When the necessary funding is available, MassDOT sends the affidavit letter and the related CQEs to the contractor for review. The contractor has six months to sign the affidavit letter or dispute the final estimate. By signing the letter, the contractor acknowledges that the final payment and balances are acceptable. This signifies the official closing of the contract.

VII. Internal Special Audit Unit

The Office of the Inspector General ("Office") is an independent agency charged with preventing and detecting fraud, waste and abuse in the use of public funds and public property. Created in 1981, it was the first state inspector general's office in the country. In keeping with its broad statutory mandate, the Office investigates allegations of fraud, waste and abuse at all levels of government; reviews programs and practices in state and local agencies to identify systemic vulnerabilities and opportunities for improvement; and provides assistance to both the public and private sectors to help prevent fraud, waste and abuse in government spending.

The Office's Internal Special Audit Unit ("ISAU" or "Unit") monitors the quality, efficiency and integrity of MassDOT's operating and capital programs. As part of its statutory mandate, the ISAU seeks to prevent, detect and correct fraud, waste and abuse in the expenditure of public and private transportation funds. The ISAU is also responsible for examining and evaluating the adequacy and effectiveness of MassDOT's operations, including its governance, risk-management practices and internal processes.

¹¹ The paving contracts require MassDOT to pay interest on any balances outstanding at the conclusion of paving work. Interest accrues until MassDOT makes the final payment following the affidavit letter, which, as discussed below, can take months or years. Therefore, the goal of the "reduction and retainage" review is to reduce any outstanding balances to under \$5,000 in order to minimize interest costs.

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Methodology

The objective of the ISAU's investigation was to examine the Department's administration of its paving contracts, including evaluating how MassDOT accounts for price fluctuations in HMA and diesel fuel, complies with state law, follows contract terms and adheres to internal policies. To meet this objective, the ISAU analyzed a sample of thirteen paving contracts from districts three (Worcester), five (Taunton) and six (metro Boston). The paving for all thirteen contracts had been completed between September 2010 and September 2014. The smallest contract was for approximately \$264,000, while the largest was over \$16 million. In total, the contracts were valued at approximately \$62 million.

The ISAU performed an in-depth review of each contract file to understand MassDOT's administration of the contracts and to determine whether payments to contractors were accurate. The ISAU also reconciled all price adjustments the accounts payable department processed to determine whether MassDOT over- or underpaid any paving contractors. The ISAU also performed the following as part of its investigation:

- Reviewed laws and contract provisions related to commodity price adjustments;
- Researched general background information on price-adjustment contract terms and the use of hot mix asphalt in transportation projects;
- Reviewed MassDOT's contract management, including its process for complying with price-adjustment requirements;
- Examined departmental policies related to contract administration, price-adjustment calculations and payments to paving contractors; and
- Interviewed key MassDOT personnel involved in setting price-adjustment procedures, calculating monthly price adjustments and reviewing contract payment documents.

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Investigative Findings

I. A Long-Term MassDOT Paving Contractor Kept More than \$179,000 in Overpayments.

P.J. Keating (“Keating”) is one of the leading suppliers of asphalt in Massachusetts¹² and received over \$19 million for paving work from MassDOT in Fiscal Year 2014 alone. MassDOT has had a long-standing relationship with Keating, and has selected the company to complete at least 130 paving projects throughout the state since 1996.

In 2009 and 2010, MassDOT overpaid Keating more than \$179,000 on two paving contracts (Nos. 58507 and 62453). Evidence indicates that Keating identified the overpayments, but instead of notifying MassDOT and returning the funds, the contractor kept the overpayments.

Specifically, between 2009 and 2010, MassDOT (1) used the wrong period prices to calculate asphalt price adjustments; and (2) made unnecessary price adjustments on two paving projects. These two errors resulted in overpayments to Keating totaling \$179,856. Below are details of each contract’s inaccurate price adjustments.

Contract	Period Price Month/Year	Base Price	Correct Period Price	“Period Price” MassDOT Used	Amount MassDOT (Overpaid) or Underpaid
58507	August 2009	\$512.50	\$420.00	\$512.50	(\$5,912.95)
58507	September 2009	\$512.50	\$420.00	\$512.50	(\$6,976.03)
58507	October 2009	\$512.50	\$420.00	\$512.50	(\$91,663.01)
58507	November 2009	\$512.50	\$420.00	\$512.50	(\$23,148.99)
58507	June 2010	\$512.50	\$532.50	\$532.50	(\$15,223.00)*
58507	July 2010	\$512.50	\$505.00	\$505.00	\$110.03*
58507	August 2010	\$512.50	\$495.00	\$495.00	\$12,290.60*
58507	September 2010	\$512.50	\$495.00	\$495.00	\$13,730.85*
62453	July 2010	\$475.00	\$505.00	\$556.76	(\$44,518.24)
62453	September 2010	\$475.00	\$495.00	\$545.74	(\$18,546.22)*
Total Net Overpayment					(\$179,856.96)

* In these months, the difference between the base price and the period price was less than 5%, meaning that no price adjustment was required. MassDOT nevertheless processed price adjustments; this resulted in over- or underpayments.

¹² Based on information obtained from P.J. Keating’s website, *available at* www.pjkeating.com.

The ISAU examined evidence indicating that Keating instructed its accounting personnel to encumber funds for the amount of the overpayments. Despite this internal action, Keating did not return the funds to MassDOT.

Once the ISAU notified MassDOT and Keating of the overpayments, Keating executives stated that the company would repay any funds due to MassDOT, based on a revised final estimate. Keating executives also reported that most of the employees in the company's accounting and construction administration departments who could have been involved in handling the overpayments are no longer with the company. In 2012, moreover, Keating replaced its senior management team and strengthened its contract administration procedures with MassDOT.

MassDOT completed the final estimate for Contract No. 58507 in August 2015, after the ISAU raised this issue. Keating agreed with the final estimate and refunded MassDOT the \$116,424¹³ overpayment for that project. Because MassDOT and Keating signed the affidavit letter for Contract No. 62453 in 2012, however, MassDOT has taken the position that it cannot recover the \$63,064 overpayment for that project. Finally, MassDOT reported the overpayments to its Prequalification Committee for potential disciplinary action.¹⁴ As of the release of this report, the Committee has not yet taken any action.

MassDOT should recoup the overpayment of \$63,064 on Contract No. 62453. Since MassDOT made the final payment in error, Keating should return the funds to MassDOT.

II. Price-Adjustment Errors Resulted in Nearly \$69,000 in Underpayments to Paving Contractors.

The ISAU examined the price-adjustment worksheets for the thirteen paving contracts it reviewed. This included 132 HMA and 14 diesel price-adjustment worksheets. Worksheets for all thirteen contracts contained payment errors. The ISAU also found that MassDOT does not consistently process price adjustments monthly as it is required to do under state law.

A. Pricing errors

In the thirteen contracts, 44% of the HMA worksheets and 79% of the diesel worksheets were incorrect. The ISAU found the following errors:

- Price adjustments that should have been made but were not (*i.e.*, the difference between the base price and the period price was greater than 5%).
- Price adjustments that were processed when not required (*i.e.*,

44% of HMA and 79% of diesel worksheets the ISAU analyzed were incorrect.

¹³ MassDOT's calculations for this contract differed from the ISAU's by \$368.

¹⁴ All contractors who want to do business with MassDOT must first be approved by the Prequalification Committee. If the committee approves a contractor, it issues the contractor a certificate that is good for one year.

the difference between the base price and the period price was less than 5%).

- Incorrect base or period prices.
- Incorrect asphalt quantities.
- Incorrect RAP percentages. *See* footnote 9.
- Transposition errors that translated into incorrect payments.
- Incorrect payments to contractors despite accurate price-adjustment worksheets.

As a result of these errors, MassDOT underpaid certain paving contractors \$68,935 for the contracts reviewed.

B. Inconsistent practices

The ISAU also found that resident engineers approached the price-adjustment process differently across the three districts sampled. Although state law and MassDOT's policies require engineers to process price adjustments monthly, district personnel do not consistently comply with that requirement. In one contract, for example, the resident engineer did not calculate any price adjustments at all. This was a \$1.6 million contract for two years of paving maintenance work. For other contracts, some resident engineers calculated a few months of price adjustments at one time, or waited until the end of the contract to do their calculations. Some price-adjustment worksheets the ISAU reviewed were dated months or years after the contractors had completed the paving work. For example, one resident engineer completed price adjustments in 2012 for a paving project that occurred in 2009.

Similarly, none of the three districts the ISAU sampled completed all of the pre-finalization reviews that MassDOT requires. Employees responsible for contract reviews at the sampled districts indicated that they do not have the time and human resources to fulfill MassDOT's pre-finalization requirements at every stage of the contract.

Additionally, the Department does not review its paving contracts to ensure that districts are following the agency's procedures for administering and closing out contracts; nor does it hold employees accountable for failing to properly administer the contracts, including failing to calculate price adjustments on a monthly basis.

Timely and accurate price adjustments are an essential part of contract administration. Recognizing this, MassDOT has fairly robust standards for performing price adjustments and reviewing paving work. However, the agency does not enforce these standards or hold employees accountable for not following them. As a result, districts are not calculating price adjustments regularly. Furthermore, every contract that the ISAU reviewed contained price-adjustment errors. While the dollar amount of the payment errors in the sample was relatively small, MassDOT administers many paving contracts every year. Thus, it is likely that the total dollar value of the overpayments and underpayments are significantly higher than found in the sample.

III. MassDOT Takes Years to Close Out Some Paving Contracts.

As discussed above, once a contractor finishes a paving project, MassDOT uses a “final review and closeout” process to calculate the final payment and close the contract for that project.¹⁵ The ISAU found significant delays in this process for all thirteen of the contracts it reviewed. For instance, while the contractors completed the paving for these contracts between May 2010 and September 2014, MassDOT has only closed five.

Looking at the five closed contracts, the final review and closeout process took between 280 days and five and a half years. The eight other contracts have remained open for an average of 842 days (2.3 years) since the paving work was finished. The oldest of these projects (Contract No. 58507) was completed in September 2010, meaning that it has remained open for an additional five years. The newest project (Contract No. 73929) was finished in September 2014.

Based on the ISAU’s review, the delays occurred in the districts and at MassDOT’s headquarters. For example, final engineers cannot formally accept work on a paving contract until the district tests the asphalt the contractor used on the roadway and determines that it complies with the contract specifications. In order for this to happen, resident engineers must collect asphalt samples throughout the project and direct paving contractors to retrieve core samples after paving is complete. In the thirteen contracts reviewed, the districts had not yet tested all samples for three of the projects. In Contract No. 66459, for example, it has been over three years since the contractor completed the paving work but the district has not conducted its project closeout testing.

Further, the contractor completed the work on Contract No. 62453 in November 2010, but the district did not accept the work until December 2011 and MassDOT’s headquarters did not approve the completion of the project until March 2012. In another contract (No. 57053), the chief engineer approved the paving work in July 2010. However, the Reimbursement department did not complete its review or send the affidavit letter to the paving contractor until September 2015. The table below details the contract milestones (*e.g.*, completion, work acceptance) and approval dates for each of the contracts reviewed.

¹⁵ See Background, Section V, on page 7.

District	Contract Number	Paving Work Completed ¹⁶	Work Accepted	Days Elapsed Between Completion and Acceptance of Work	Chief Engineer Approval	Affidavit Letter Signed	Days Elapsed Between Approval and Affidavit Letter	Total Days Elapsed Since Paving Was Completed ¹⁷
3	58507	9/25/10	11/12/13	1,144	5/1/14	Not Completed	-	1,831
	62453	11/8/10	12/16/11	403	3/26/12	4/18/12	23	527
	68372	6/26/13	Not Completed	-	-	-	-	826
	72683	1/7/14	Not Completed	-	-	-	-	631
5	57053	5/7/10	9/7/10	123	7/20/10	9/21/15	1,889	1,963
	62251	8/19/11	10/17/11	59	2/2/12	5/25/12	113	280
	68137	6/20/12	2/5/13	230	11/15/13	9/21/15	675	1,188
	72946	5/2/14	7/10/14	69	9/19/14	9/21/15	367	507
6	68304	7/14/13	Not Completed	-	-	-	-	808
	63974	10/15/13	2/11/14	119	3/26/15	Not Completed	-	715
	73929	9/10/14	Not Completed	-	-	-	-	385
	62771	5/6/14	5/8/14	2	8/8/14	Not Completed	-	512
	66459	12/9/12	Not Completed	-	N/A	Not Completed	-	1,025

There are several causes for the delays. First and foremost, MassDOT does not consider timely contract closeouts a priority and therefore does not take steps to ensure that districts are finalizing contracts. Since the Department does not hold employees accountable for timely contract closeouts, final engineers in some districts report that they do not have the authority to enforce closeout procedures. Thus, some field personnel (primarily resident engineers) do not perform their closeout functions and instead keep contracts open for extended periods of time

¹⁶ Based on information from MassDOT's completion certificates, when available, or from ProjectInfo (a MassDOT contract database).

¹⁷ As of September 30, 2015, the last day of the ISAU's review.

even after the contractor has completed the paving work.¹⁸ In addition, some districts do not always collect and test asphalt samples throughout the paving project, even though MassDOT requires sampling and testing of asphalt materials on all HMA projects.

Second, some resident engineers participate in seasonal snow and ice operations; as a result, they stop performing paving contract reviews during the winter months. Finally, according to MassDOT, contractors contribute to the closeout delays. When materials samples do not meet the criteria specified in the paving contract, for instance, the contractor may dispute the test results, leading to protracted negotiations between the contractor and MassDOT. Or, contractors do not always provide MassDOT with the materials certificates necessary to close out the contract in a timely manner.

Delays in the closeout process raise a number of concerns. First, MassDOT reported that asphalt core samples need to be tested for compaction within forty-eight hours after the paving is completed. Otherwise, it is not possible to accurately determine whether the asphalt meets the compaction specifications in the contract. Compaction and materials specifications are designed to ensure roadways meet minimum quality standards and therefore that the road should last a certain length of time before requiring repaving. The failure to collect asphalt samples throughout paving projects affects MassDOT's ability to ensure that state roads meet the quality standards the Department contractually required and paid for.

Second, delays could hinder MassDOT's process for obtaining federal funding for construction projects. The Federal Highway Administration (FHWA) limits the number of federally funded projects that can be inactive – *i.e.*, completed but not closed out – at any one time. In particular, the dollar value of a state's inactive road contracts should not exceed two percent of the total dollar value of its federally funded contracts. Once a state reaches this maximum, the FHWA may require a state to submit action plans outlining how it intends to reduce the number of inactive projects.

Delayed closeouts also impact paving contractors. Each contractor is bonded to a certain dollar capacity. If MassDOT maintains “open” paving contracts for months after the paving is done, the dollar value of those contracts are included in each contractor's total bonded capacity and could limit the contractor's ability to bid on additional paving projects.

Finally, delays increase MassDOT's costs and risks. MassDOT administers more than \$100 million in paving contracts each year. The agency has to pay interest on any money it owes the contractor at the end of the contract. Consequently, the longer the delays, the more interest that MassDOT owes. Conversely, if a contractor owes MassDOT a refund, delays mean that MassDOT may not receive its money for years. Additionally, when an agency is not closely monitoring a contract, including contract performance and payments, it is much more difficult for the agency to identify fraud or abuse.

¹⁸ In fact, districts have different understandings of how long it should take to close out a contract. One district reported that an acceptable average timeline to close a contract is approximately one year following completion of paving work. Other districts reported longer closeout averages of up to three years, even though some engineers are able to close contracts within a few months following paving completion.

In sum, it can take years to complete the final review and closeout process; the delays occur in the districts and at headquarters. Good fiscal management and proper contract administration require that contracts be paid and finalized on a timely basis. Delays in the process leave MassDOT vulnerable to fraud, waste and abuse.

Going forward, MassDOT needs to strengthen its oversight of the closeout process, including materials testing. The Department should also consider establishing deadlines for specific milestones (*e.g.*, materials testing, work approval) and then enforce those deadlines, with consequences for the failure to meet them. MassDOT should also immediately review all outstanding paving contracts and create a plan for closing them out. Finally, MassDOT should more closely review which employees should participate in seasonal snow and ice operations, taking into consideration the employee's regular duties.

IV. MassDOT Must Improve Its Contract Administration.

A. MassDOT's records were missing weight slips, which are essential to ensuring that the agency is paying only for asphalt used on a state project.

MassDOT is supposed to obtain weight slips to document the quantity of liquid asphalt used on each paving project. In particular, MassDOT employees stationed at asphalt plants approve weight slips as each contractor picks up a delivery of asphalt for a state paving project. Once the weight slips are approved at the plant, the MassDOT employee is then supposed to forward them to the respective resident engineers. The resident engineers are supposed to compare the weight slips to the contractors' invoices to ensure that each contractor has billed MassDOT for the actual amount of asphalt used. The resident engineers are also supposed to use the weight slips when they calculate price adjustments.

Weight slips were missing in six of the thirteen contract files that the ISAU reviewed.¹⁹ Furthermore, some paving contract files contained weight slips for other contracts. Without all of the weight slips, MassDOT cannot know whether the contractor has billed the agency only for the asphalt that the contractor actually used. Stated another way, weight slips are necessary to ensure that MassDOT is paying contractors only what they are owed. MassDOT also cannot calculate price adjustments without all of the weight slips.

B. MassDOT should improve its signatory process.

A MassDOT employee who has signatory authority to approve construction payments up to \$500,000 signed a payment form approving a payment of \$887,907. The accounts payable department processed the form and issued the payment. Thus, MassDOT made a significant payment without the approval of the appropriate senior-level officials. The employee should not have signed the payment form and the accounts payable department should not have accepted the employee's signature as approval for the payment.

¹⁹ Based on the worksheets and other documents in the files, it was apparent that weight slips were missing. It was impossible, however, to determine how many were missing.

Furthermore, nearly all of the payment documents the ISAU reviewed contained a stamped signature rather than an original signature. MassDOT's use of a stamped signature – especially to approve significant expenditures – exposes the agency to fraud and abuse. Employees may have unsupervised access to signature stamps and could process fraudulent payments.

C. Not all districts use calculation books.

Not all contract files the ISAU reviewed contained calculation books. Though not required, these spreadsheets are an effective tool to document the amount of asphalt that the contractor used on a paving project, which is essential to accurately determining payment amounts. MassDOT's consistent use of calculation books across all districts could have prevented errors – such as those involving missing weight slips and transposed numbers – that resulted in incorrect payments to contractors. *See* Sections II-A and IV-A above.

In sum, effective contract administration is critical to MassDOT's financial health. MassDOT cannot afford to be overpaying contractors and should therefore place a stronger emphasis on enforcing recordkeeping standards, signatory limits and tools that assist in making accurate payments to contractors. MassDOT should consider requiring the use of calculation books across all districts to maintain consistency and increase effective contract administration. Further, MassDOT should reinforce existing signatory limits and reject payments that do not have proper approval. The Department should consider automating the weight slip process to streamline delivery of this documentation, which is vital to accurately calculating asphalt prices.

Recommendations

MassDOT should strengthen its contract management practices and keep up with commodity price fluctuations in order to ensure overpayments and other errors do not occur. Furthermore, MassDOT needs to enforce state law and internal policy guidance across all districts and limit delays in closing out paving contracts. MassDOT should strive to maintain accurate and complete records associated with its paving projects in order to follow good business practices and support accurate paving contract payments. Additionally, the ISAU recommends that MassDOT:

- 1) Recoup the remaining \$63,432 from the contractor who kept overpayments from MassDOT.
- 2) Explore ways to ensure that staff process price adjustments accurately, such as increasing the use of training, management oversight and audits.
- 3) Require all districts to calculate commodity price adjustments monthly. Consider monthly reporting or another method to make it easier to track which contracts are (and are not) being reconciled monthly.
- 4) Follow through on its obligations to existing paving contractors and settle up any outstanding payments owed.
- 5) Require employees to close out contracts in a timely manner; set timelines for completing specific milestones in the closeout process.
- 6) Enforce internal policy guidance and ensure consistency among all districts for performing contract reviews at multiple stages throughout paving projects.
- 7) Discontinue the use of stamped signatures to approve and process payments to contractors. Enforce employee signatory limits and investigate whether any additional breaches occurred.
- 8) Enhance documentation and recordkeeping standards to maintain complete and accurate records.
- 9) Explore other ways to obtain weight slips, such as electronic delivery, storage and retention.

MassDOT has several opportunities to improve its administration of paving contracts. Simply enforcing existing procedures on price adjustments and pre-finalization reviews could save the Department money over time. Additionally, instituting new standards for timely contract closeouts will enhance the Department's recordkeeping, timeliness of payments and ability to meet federal obligations.

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Conclusion

The price of commodities used in MassDOT's paving projects fluctuates frequently and requires adequate monitoring and oversight to ensure the Department consistently makes accurate payments to paving contractors. The ISAU's investigation identified concerns with MassDOT's management of paving contracts, including price-adjustment errors, lack of compliance with state law, inconsistent district practices, disorderly recordkeeping, excessive closeout delays and inaccurate contract payments. The Unit identified these issues despite a relatively small sample size of only thirteen paving contracts. In Fiscal Year 2015 alone, MassDOT paid its four largest paving contractors over \$105 million. Taken in perspective, MassDOT's inaccurate paving contract payments could be a more widespread issue with greater financial impact to the Department.

While MassDOT has issued various policy guidance and standards pertaining to contract administration, the Department has failed to enforce these policies or hold employees accountable for not following them. These policies are designed to prevent the types of errors and overpayments this investigation identified.

Lastly, the inconsistency among district practices for documenting and executing commodity price adjustments may confuse construction and maintenance contractors who perform transportation projects in multiple districts. Additionally, MassDOT's inability to consistently fulfill contract terms may diminish contractors' confidence in working with the Department on future projects. Timely contract closeout frees up excess transportation funding and de-obligates the state of its encumbered funds. Excessive contract closeouts increase MassDOT's risk of potential contractor disputes and claims. Overall, MassDOT has opportunities to improve its management of paving contracts and potentially lower its annual paving costs through better contract administration.

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A. Price Adjustment Excerpt from a MassDOT Paving Contract

Commonwealth of Massachusetts



Massachusetts Highway Department

Project No. 604877

DOCUMENT 00811
SPECIAL PROVISIONS
MONTHLY PRICE ADJUSTMENT FOR HOT MIX ASPHALT (HMA) MIXTURES
Revised: 02/18/2009

This provision applies to all projects using greater than 100 tons (91 megagrams) of hot mix asphalt (HMA) mixtures containing liquid asphalt cement as stipulated in the Notice to Contractors section of the bid documents.

The Price Adjustment will be based on the variance in price for the liquid asphalt component only from the Base Price to the Period Price. It shall not include transportation or other charges. This Price Adjustment will occur on a monthly basis.

Base Price

The Base Price of liquid asphalt on a project as listed in the Notice to Contractors section of the bid documents is a fixed price determined at the time of bid by the Department by using the same method as for the determination of the Period Price detailed below.

Period Price

Please note that, starting December 15, 2008, two sets of period prices will be posted each month on the MassHighway website at <http://www.mhd.state.ma.us/>. They will be labeled "New Asphalt Period Price Method" and "Old Asphalt Period Price Method".

New Asphalt Period Price Method

The "New Asphalt Period Price Method" is for contracts bid after December 15, 2008 and will show the Period Price of liquid asphalt for each monthly period as determined by MassHighway using the average selling price per standard ton of PG64-28 paving grade (primary binder classification) asphalt, FOB manufacturer's terminal, as listed under the "East Coast Market - New England, Boston, Massachusetts area" section of the Poten & Partners, Inc. "Asphalt Weekly Monitor". This average selling price is listed in the issue having a publication date of the second Friday of the month and will be posted as the Period Price for that month. MassHighway will post this Period Price on this website within two (2) business days following their receipt of the relevant issue of the "Asphalt Weekly Monitor". Poten and Partners has granted MassHighway the right to publish this specific asphalt price information sourced from the Asphalt Weekly Monitor.

Old Asphalt Period Price Method

The "Old Asphalt Period Price Method" Period Price will be for contracts bid on or before December 15, 2008 and will contain liquid asphalt prices as determined by the old or previous method. These prices will continue to be posted on MassHighway's website until all contracts using the "Old Asphalt Period Price Method" Period Price have been closed.

New and Old Asphalt Period Price Methods

The paragraphs below apply to both the New and the Old Asphalt Period Price Methods.

The Contract Price of the hot mix asphalt mixture will be paid under the respective item in the Contract. The price adjustment, as herein provided, upwards or downwards, will be made after the work has been performed, using the monthly period price for the month during which the work was performed.

The Price Adjustment applies only to the actual virgin liquid asphalt content in the mixture placed on the job in accordance with the Standard Specifications for Highways and Bridges, Division III, Section M3.11.03.

The Price Adjustment will be a separate payment item. It will be determined by multiplying the number of tons of hot mix asphalt mixtures placed during each monthly period times the liquid asphalt content percentage times the variance in price between Base Price and Period Price of liquid asphalt. This Price Adjustment will be paid only if the variance from the Base Price is 5% or more for a monthly period. The complete adjustment will be paid in all cases with no deduction of the 5% from either upward or downward adjustments.

No Price Adjustment will be allowed beyond the Completion Date of this Contract, unless there is a Department-approved extension of time.

***** END OF DOCUMENT *****

B. 2015 Liquid Asphalt Prices

Adjustment Period	Liquid Asphalt used in Hot Mix Asphalt	
	English (Ton)	Metric (Mega gram)
January	\$585.00	\$644.96
February	\$580.00	\$639.45
March	\$570.00	\$628.43
April	\$542.50	\$598.11
May	\$535.00	\$589.84
June	\$527.50	\$581.57
July	\$505.00	\$556.76
August	\$485.00	\$534.71
September	\$455.00	\$501.64
October	\$450.00	\$496.13
November	\$397.50	\$438.24
December	\$395.00	\$435.49

C. MassDOT District Map

MassDOT Highway Districts

