

Section 11.4

ADJUSTMENTS

11.4.1 Purpose

This procedure provides guidance for determining the various pay adjustments associated with asphalt pay items (Pay Quantity Adjustments, Composite Pay Factor (CPF) Adjustments, and Bituminous Adjustments). Example calculations are provided in the Attachments at the end of this Chapter. Asphalt As-Built Data collection is also discussed.

11.4.2 Authority

Sections 20.23(3)(a), and 334.048(3), Florida Statutes (F.S.)

11.4.3 References

Sections 9, 234, 285, 286, 330, 334, 337 and 339 of the Standard Specifications for Road and Bridge Construction

11.4.4 Types of Adjustments

11.4.4.1 Pay Quantity Adjustments

The Department will pay for the asphalt placed up to 105% of the Adjusted Plan Quantity on Asphalt Square Yard and Tonnage Pay Items.

Exceptions: Overbuild, Temporary Asphalt, and Driveway Asphalt Base (previously known as Turnout Construction (Asphalt)), and Asphalt Cubic Yard Pay Items (Asphalt Treated Permeable Base (ATPB)), do not receive pay quantity adjustments. Payment is made for the quantity that is placed.

Form 675-030-20A, Asphalt Roadway – Daily Report of Quality Control-Automated Version (known as the **QCRR**) has been updated to include automation of some adjustment calculations. The Contractor shall coordinate with the Project Administrator (PA) (or designee) to verify the Plan Quantity Tonnage and any Engineer directed change(s) to be entered in the QCRR. Once the asphalt is complete, the final QCRR will calculate the Tonnage-Weighted Average G_{mm} (or G_{sb} for Open Graded Friction Course (FC-5)) for each pay item based on the tonnages and mix designs used on the project.

(A) Square Yard Pay Item Adjustments

The only Asphalt Plan Quantity Square Yard (SY) pay items are the Asphalt Base (Optional Base - Black Base) groups. Composite Base is included in this section.

The pay area will be determined based upon the following formula:

$$\text{Pay Area (SY)} = \frac{\text{Surface Area (SY)} \times \text{Actual Quantity Placed (TN)}}{\text{Adjusted Plan Quantity Tonnage}}$$

Where the Adjusted Plan Quantity (PQ) Tonnage is determined as follows:

$$\text{Adjusted PQ (TN)} = \frac{[\text{Plan Surface Area (SY)} \times t \text{ (in)} \times \text{Tonnage-Weighted Average } G_{mm} \times 43.3 \text{ (Lbs/SY-in)}]}{2,000 \text{ Lbs/TN}}$$

And:

Plan Surface Area = PQ Area including any Engineer approved quantity revisions (SY)

t = Plan Thickness (in)

43.3 = Conversion Factor (a constant derived by the State Material's Office) (Lbs/SY-in)

Tonnage-Weighted Average G_{mm} =

$$\frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})}$$

The Pay Adjustment (SY) is determined as follows:

$$\text{Pay Adjustment (SY)} = \text{Pay Area (SY)} - \text{Plan Quantity (SY)}$$

The Pay Adjustment can be positive, negative, or zero. The positive adjustment is limited to 105% of the Plan Quantity (SY). Optional base items also receive fuel adjustments, if eligible.

See **Attachment A** for Example (1) Negative Adjustment; Example (2) Positive Adjustment within the 105% Limit; and Example (3) Adjustments Exceeding the 105% Limit.

(B) Composite Base

Composite Base is a mixture of granular Subbase (White Base) and Asphalt Base. Composite Base is paid under pay item number 285-709 thru 285-715 (see **Specification 285-3** and **Table 285-1**).

The Asphalt Base is a Type B-12.5 with a thickness of 4" to 7" thick (see **Specification Section 285**). The White Subbase has a thickness tolerance and will not receive a thickness adjustment (See **Specification Section 290-4.3**). The Asphalt Base spread rate is calculated from the equation for the Adjusted PQ Tonnage seen under **CPAM 11.4.4.1, (A) (1)**. The adjustment will automatically be shown in the **QCRR**.

See **Attachment A**, Examples 1, 2 and 3 for the adjustment to the asphalt portion.

(C) Cubic Yard Pay Item Adjustments

The only Asphalt Cubic Yard Pay Item is Asphalt Treated Permeable Base (ATPB). This pay item **does not** allow for 105% pay adjustment. ATPB **does** receive CPF, Fuel, and Bituminous Adjustments (when applicable).

(D) Tonnage Pay Item Adjustments

(1) Superpave Structural and Friction Courses

The maximum tonnage paid will be based upon the following formula:

$$\text{Maximum Tons Pay} = \text{Adjusted PQ} \times 1.05$$

Where the Adjusted PQ Tonnage is determined as follows:

$$\text{Adjusted PQ (TN)} = \frac{\text{PQ (TN)} \times \text{Tonnage-Weighted Average } G_{mm}}{\text{Design } G_{mm}}$$

PQ (TN) = Original PQ, including any Engineer approved quantity revisions (TN)

Design G_{mm} = 2.540 (for Dense Graded Structural Asphalt or Friction per **334-1.4** of the **Specifications**) or Design G_{sb} = 2.635 (for Open Graded Friction Course per **Specifications Section 337-8.2**) The Tonnage-Weighted Average G_{mm} (or G_{sb} for FC-5) is calculated within the QCRR for each pay item used. The equation for this is as follows:

$$\text{Tonnage-Weighted Average } G_{mm} = \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})}$$

See **Attachment A** for Example (4) No Adjustments; Example (5) Exceeding the 105% Adjustment; and Example (6) Within the 105% Adjustment.

(2) Miscellaneous Asphalt

The Designer quantity is determined based on a spread rate of 100 Lbs/SY-inch of design thickness of asphalt placed over the area in the plans.

The maximum tonnage paid will be based upon the following formula:

$$\text{Maximum Tons Pay} = \text{Adjusted PQ} \times 1.05$$

Where the Adjusted PQ is determined as follows:

$$\text{Adjusted Plan Quantity} = \frac{\text{PQ (TN)} \times \text{Tonnage-Weighted Average } G_{mm}}{\text{Design } G_{mm}}$$

And:

PQ (TN) = Original PQ, including any Engineer approved quantity revisions (TN)

The Tonnage-Weighted Average G_{mm} is calculated within the QCRR. The equation for this is as follows:

$$\text{Tonnage-Weighted Average } G_{mm} = \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})}$$

Design G_{mm} = 2.540 (per 334-1.4 of the Specifications)

See **Attachment A** for Example (7) Payment up to 105% on Miscellaneous Asphalt.

(3) Driveway Asphalt Base

Driveway Asphalt Base is also a tonnage pay item, however, it does not receive pay quantity adjustments. It does not receive a CPF adjustment (CPF = 1). It does receive Fuel and Bituminous adjustments, when applicable, per **Specifications**.

11.4.4.2 Thickness Adjustments

(A) Core-Out Adjustments (White Base)

This section is for Optional Base Courses (white base only), such as Limerock, and Cemented Coquina. This pay item group (see **Specifications Section 285**) is Plan Quantity subject to the provisions of **Specifications Section 9-3.2**.

The thickness is cored in accordance with **Section 285-7** of the **Specifications**. The core-out report is used to calculate the average thickness.

The pay area is calculated as follows:

$$\text{Pay Area (SY)} = \frac{\text{Surface Area (SY)} \times \text{Calculated Avg. Thickness (in) per 285-7}}{\text{Plan Thickness (in)}}$$

The pay area shall not exceed 105% of the Surface Area.

There will be no adjustment for base courses that are constructed using mixed-in-place material.

See **Attachment B** for Adjustment Examples.

11.4.4.3 Quality Adjustments

(A) Composite Pay Factor (CPF) Adjustments

A CPF is a combined pay factor that uses quality characteristics (i.e. Sieves, binder content air voids, and density) to determine the asphalt pay adjustment. Once a LOT is closed and it has been determined that a CPF adjustment must be made, the adjustment shall be made during the month the LOT is closed and paid accordingly on the next progress estimate.

CPF adjustments in SiteManager will be handled by adjusting the unit price by the appropriate CPF. These revised unit price adjustments can range from 75% to 105%.

LOTs shall be grouped together for each unit price adjustment, when applicable. See **Attachment C**, Example (2)(B). Show the calculations under the pay item on the **Plan Summary Box** in the **Plans** or reference where calculations are shown. See **Attachment C**; Example (3).

CPF Adjustments apply to Superpave Base, Friction, Structural, Composite Base (Asphalt portion), and Asphalt Treated Permeable Base Courses.

There will be no CPF adjustments on Miscellaneous Asphalt, Driveway Asphalt Base, and Temporary Asphalt. The Department will not pay for temporary asphalt separately; it is always included in the quantity for another pay item, such as Temporary Detour. Miscellaneous Asphalt and Driveway Asphalt Base are not tested and are accepted on a visual basis. These pay items will have a CPF of 1 (i.e. no adjustment) unless they are included in the same LOT where areas requiring densities are, per **Specifications Section 334-5.1.2**. In this case, these pay items will have the same CPF as that LOT. If the whole LOT does not require density, that LOT will have a CPF of 1.

(1) Square Yard Pay Items

In some instances, the **QCRR** will show more or less square yards than the plan quantity. The Contractor should use due care when reporting square yards to accurately report the length and width of area being placed. The PA needs to use reasonable investigation to see if plan quantity is in error and warrants an adjustment.

The SY total for each lot, as reported and verified in the QCRR, will be used to apply the CPF Adjustment. Since this is a plan quantity pay item, the PA will ensure the area CPF adjustments are applied to does not exceed the total plan quantity (including engineer approved changes). However, after the SY pay items have been completed, a correction CPF adjustment must be made to ensure CPF adjustments are applied to the Final Pay Area. The final CPF adjustment will be applied using the average CPF for the line item adjustment quantity (calculated as the difference of the Final Pay Area and the plan quantity). See **Attachment C**; Examples 5 and 6.

(2) Resident Office's Responsibility

The Engineer or designee shall calculate the unit price adjustment and enter the revised unit price adjustment and quantity on the monthly estimate.

The PA and the VT are responsible for verifying the Contractor's Quality Control (QC) Technician's test results entered in the Material's Acceptance and Certification (MAC) system and that the CPF reports are correct. The CPF adjustments shall be made at the closing of a LOT throughout the life of the Contract. See example of **LOT Submittal Package** (See **CPAM 11.1**). The reports along with the asphalt ticket packets shall be collected two working days after the closing of a LOT. The **LOT Submittal Package** shall be submitted with the Final Estimates Documentation electronically (the original asphalt tickets (white tickets) will be scanned into the **LOT Submittal Package**. The hard copies will be destroyed.

NOTE: It is the Resident Office's responsibility to ensure any errors found on the **QCRR** after final acceptance are corrected by the Contractor and the final QCRR in EDMS is replaced with the corrected version.

See **Attachment C**; Examples (4), (5), and (6) for CPF calculations.

(3) Pay Factor Material Documentation - Materials Acceptance Resolution (MAR)

In some instances, the PA will require removal and replacement of tonnage within a LOT due to MAR – materials failure. This asphalt may be a partial subplot, an entire subplot, or an entire LOT. The QC Technician should identify the problem before an entire LOT is placed. The asphalt identified to be removed will be milled and replaced with asphalt either from the same LOT or from another LOT. If replaced with asphalt from a different LOT, the original **LOT Submittal Package** will be explained with remarks such as "No Pay" with reference to the new replacement **LOT Submittal Package**. The replacement material is to be paid in the **LOT Submittal Package** at the appropriate CPF for that lot's production with references and remarks to the defective material **LOT Submittal Package**. See examples on how to properly document Bituminous Certifications & CPF Corrections – Due to

Remove and replace Asphalt at the following link:

<https://www.fdot.gov/construction/Asphalt/AsphaltMain.shtm>

NOTE: The **QCRR** should accurately reflect the asphalt placed in each LOT.

(a) Composite Pay Factors < 80 and \geq 75

- Remove and replace the tonnage in this LOT at no cost to the Department. Notate **LOT Submittal Packages** as mentioned above.
- Obtain an Engineering Analysis, if agreed to by the PA, to determine if material may remain in place. If material is to remain in place, apply the CPF for this LOT. If the material is to be removed and replaced, notate **LOT Submittal Packages** as mentioned. See above.
- The Engineer, at his/her sole option, may perform an evaluation to leave the defective material in place and apply the CPF for this LOT, per **Specification 334-5.9.5**.

(b) Composite Pay Factor < 75

- Remove and replace the tonnage in this LOT at no cost to the Department. Notate **LOT Submittal Packages** as mentioned above.

(c) Independent Verification (IV) Test Failure

- Remove and replace the tonnage in this LOT at no cost to the Department. Notate **LOT Submittal Packages** as mentioned above.

Example 1:

LOT 3 had asphalt for which the PA, after concurrence from the District Construction/Bituminous Engineer, required removal and replacement. The PA identified the area in writing to the Contractor. The Contractor removed the asphalt at the Contractor's expense and replaced with asphalt from LOT 5. The replacement asphalt will be paid based on LOT 5's CPF with remarks identifying the area and replacement tonnage represented in LOT 3.

For example, the replacement tonnage equals 249 Tons. The **LOT Submittal Package** for LOT 3 will be explained with remarks as “No Pay” with reference to the replacement asphalt included in the **LOT Submittal Package** for LOT 5. The **LOT Submittal Package** for LOT 5 will clearly identify that 249 Tons was produced to replace defective asphalt produced in LOT 3, with references and remarks. The 249 Tons will be included in LOT 5 and paid at the LOT 5 CPF. See attached link on the Construction Website for another example.

<http://www.fdot.gov/construction/Asphalt/PDFFiles/QCRR%20MAR%20Removal,%20Segregation,%20and%20Straightedge%20Corrections.pdf>

(d) Individual Quality Control (QC) Test

In some instances, an individual QC test will bring the CPF down and require removal and replacement (CPF <80). The original lot is then paid based on the outcome of the CPF ((a) or (b) above). The Contractor may perform an **Engineering Analysis Report (EAR)**, if approved by the PA, to isolate the tonnage that needs to be removed rather than the entire LOT. The affected material will be deducted from the original **LOT Submittal Package**. The original **LOT Submittal Package** will be explained with remarks for this material as “No Pay” with reference to the new replacement **LOT Submittal Package**. The replacement material is to be paid in the LOT Submittal Package at the appropriate CPF for that lot’s production with references and remarks to the defective material **LOT Submittal Package**.

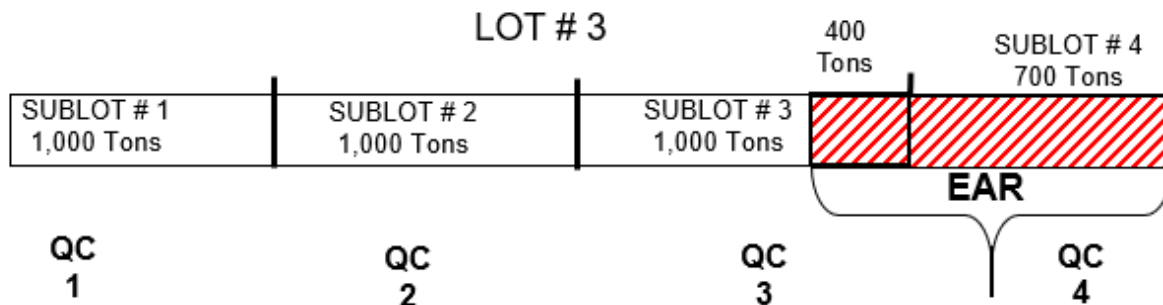
NOTE 1: If all material in a subplot is removed and replaced, the QC test for that subplot will be thrown out and the CPF for the LOT will be based on the remaining subplot QC test results. MAC will automatically adjust the CPF accordingly.

NOTE 2: When isolating tonnage where removal is required, the PA must evaluate the material between the previous QC test and the QC test that caused the LOT to fall into the Low Pay Factor and evaluate the material placed after previous or current QC test.

NOTE 3: It is recommended to deduct asphalt left in place at no pay due to an EAR from the pay item quantity, rather than make a line item adjustment, to more easily compare final quantities in SiteManager to the final quantities on the **QCRR**.

See **Attachment C**; Example (1) E-mail from the District Material's Office to the PA with Number of Tests and Costs, Example (2)(A) Resolution Testing Costs on Website and Example (2)(B) for Reporting Cost Resolution Testing in SiteManager.

Example of Documenting Low Pay Factor Material due to Quality Control Test Failure:



The production was shut down at 700 Tons production in Sublot #4 due to a QC failure. After an EAR was performed, it was determined that 400 Tons in Sublot #3 was also affected.

All of Sublot #4 was removed; therefore, the remaining 3 QC test results are used to determine the CPF. The 3 QC test results represent the remainder of the LOT. Total production for pay will be: 2,600 Tons in LOT #3 based on the 3 QC tests. The 1,100 Tons (400 Tons Sublot #3 and 700 Tons in Sublot #4) will be removed and replaced. The deduction will be handled in the remarks column of the **LOT Submittal Package** for LOT #3 with reference to the **LOT Submittal Package** where the replacement tonnage occurred. The replacement tonnage (1,100 Tons) will be paid at the CPF for the LOT that produced the replacement tonnage with explanation in the remarks column referencing this material to LOT #3. Once the tonnage in a LOT is reduced (due to a material failure), the PA will deduct the CPF adjustment in SiteManager.

The Fuel and Bituminous Adjustments will follow the same process as removal and replacement of asphalt material (on MAR's). For example: The Bituminous Adjustment for the asphalt that was rejected in the amount of 1,100 Tons will be deducted on the monthly bituminous certification submitted by the Contractor for the period reflecting Sublots 3 and 4 that were placed previously. Likewise, the monthly bituminous adjustment for the replaced 1,100 Tons of asphalt will be included on the monthly bituminous certification related to the period when the replacement will take place. Explanations and

references will be made on the bituminous certification sheets and the **LOT Submittal Packages** in question to address the removal and replacement quantity.

See examples on how to properly document QCRR Corrections at the following link: <http://www.fdot.gov/construction/Asphalt/PDFFiles/QCRR%20MAR%20Removal,%20Segregation,%20and%20Straightedge%20Corrections.pdf>;

Guidance on how to Handle Bituminous and CPF Adjustments due to Removal & Replacement Asphalt can be found at:

https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/construction/asphalt/bituminous-certification-amp-cpf-corrections---due-to-remove-replace-asphalt.pptx?sfvrsn=7560716d_2.

A Straightedge Deficiency Adjustment is a quality adjustment due to Workmanship and is not a material failure characteristic. See **CPAM 11.5** for Straightedge deficiency adjustments.

11.4.4.4 Bituminous Adjustments

Asphalt produced and accepted on a project will receive a bituminous adjustment if requirements are met, per **Specifications Section 9-2.1.2** (see note below for exceptions). The requirements are original Contract time of more than 365 calendar days or more than 5,000 Tons of asphalt concrete on conventional and Alternative Contracts.

There will be no Bituminous Adjustments on Optional Base Pay Items, unless the Designer specifies Black Base only on the Typical Section in the Plans.

Bituminous Adjustments will be made on Superpave Asphalt Base, Structural and Friction Courses, Driveway Asphalt Base, Asphalt Treated Permeable Base, on Miscellaneous Asphalt Pavement, and Asphalt Rubber Membrane Interlayer Pay Items.

The Department will adjust the price for bituminous material, excluding cutback and emulsified asphalt, to reflect increases or decreases in the **Asphalt Price Index (API)** of bituminous material in effect during the month in which bids were received. When an estimate is generated, Bituminous Adjustments must be calculated per **Specifications** and a line item adjustment will be applied in SiteManager by the PA. Bituminous adjustments will not be made on asphalt exceeding 105% of the adjusted plan quantity.

The API for Bituminous and Polymer (for Unmodified Binders 67 and lower, and for Modified Binders 76 and higher) are posted on the State Construction Office Website each month: [FDOT-Construction-Fuel and Bituminous Materials](#).

NOTE: When a Composite Base item(s) is specified in the Plans, a price adjustment for bituminous material will apply to the asphalt portion of the base only, according to **Specifications Section 9-2.1.2.**

(1) Contractor's Responsibility

It is the Contractor's responsibility to provide the Department a Certification of Quantities using the Department's forms available on the State Construction's website at: <http://www.fdot.gov/construction/fuel&bit/FuelForms.shtm>. The Certification form will be turned in monthly to the PA for payment for all project types (conventional and alternative contracts).

(2) Cutoff Period

All **Certifications of Quantities** provided by the Contractor will need to represent the amount of material placed on the project and accepted by the Department during the estimate cutoff period. The estimate cutoff dates are provided on the State Construction Office Website at <http://www.fdot.gov/Construction/CONSTADM/EstimatesCutOff.shtml>

Below is an example to show how the estimate cutoff dates are to be used in processing the **Certification of Quantities** submitted by the Contractor.

EXAMPLE 1: CONVENTIONAL PROJECT

The cutoff date for Progress Estimate #18 is June 9, 2019. See the snapshot of the cutoff dates that are listed on the State Construction Website below.

The Contractor's Certification of Quantities should reflect all material placed and accepted from May 20, 2019 thru June 9, 2019 (day after cutoff date of previous month to cutoff date of present month). On Conventional Projects, the Contractor will use **Form 700-050-66**, the **Certification of Quantities for Bituminous Material**. On this Form, the June bituminous index will be used. Once the Contractor fills out the Set-Up sheet and clicks on the "Form 66" tab (located at bottom of the Excel Spreadsheet) the form will appear filled out with quantities for pay. The Contractor will digitally sign this form and submit it to the PA monthly for payment. **See Attachment D**, Example (1)(A) and (1)(B) for an example of **Form 700-050-66**, the **Certification of Quantities for Bituminous Material** filled out by a Contractor for a Conventional Project

EXAMPLE OF THE CUT-OFF DATES FOR 2019 ON THE STATE CONSTRUCTION WEBSITE

2019		
January 20, 2019	February 17, 2019	March 17, 2019
April 21, 2019	May 19, 2019	June 9, 2019 (2nd Sunday)
July 21, 2019	August 18, 2019	September 15, 2019
October 20, 2019	November 10, 2019 (2nd Sunday)	December 15, 2019

(3) Resident Office Personnel Responsibility

It is the responsibility of the Resident Office (RO) personnel to make sure that the Contractor submits the bituminous material certification monthly on each project that meets the criteria specified in **Specifications Section 9**. Once the Contractor submits a certification, the RO personnel, in charge of the Contract, will spot check the form for quantity errors, indexes, dates, etc.

It is the responsibility of the PA to enter bituminous adjustments as a line item adjustment in SiteManager. Bituminous adjustments can be negative or positive.

See How to Handle Bituminous and CPF Adjustments due to Removal & Replacement Asphalt at the following Link:
https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/construction/asphalt/bituminous-certification-amp-cpf-corrections---due-to-remove-replace-asphalt.pptx?sfvrsn=7560716d_2

11.4.5 As-Built Data Requirements

Asphalt As-Built Pavement Data will be collected on **Form 675-030-20A, Contractor's Quality Control Roadway Report (QCRR) - Automated Version** by submitting this excel file to the State Materials Office by email to the following address: SM-MACQCRRUpload@dot.state.fl.us after Final Acceptance. **Form 700-050-12, Asphalt Roadway - As-Built Data**, is not needed for projects using the automated QCRR.

The PA will be responsible for ensuring that this data is submitted accurately. Should errors be discovered after submittal, the **QCRR** shall be corrected and resubmitted with instructions that the form has been revised.

For projects let before July 2015 using the older **Form 675-020-20, Contractor's Quality Control Roadway Report** will need to submit Form **700-050-12, As-Built Pavement**

Data after paving operations are finished to provide a complete record of the composite make-up of the mainline pavement applied to each project (see note below). Once the form(s) have been completed, email the excel file(s) to the State Final Estimates Office. The objective is to provide a Pavement Design Engineer with sufficient information and necessary data that can be used to develop and apply proper engineering practices for future roadway development, design, and maintenance.

NOTE: Only reflect pavement data for the mainline (through lane) on **Form 700-050-12, Asphalt Roadway – As-Built Data**. Data for ramps, shoulders, side roads, auxiliary lanes, or non-state road facilities is not needed. The Roadway VT should perform this operation and complete the form to reflect the actual pavement composition.

11.4.6 Attachments

Click on the page number to go to the applicable example.

ATTACHMENT A	16
105% Adjustments on Square Yard Pay Items (Plan Quantity)	16
(A) EXAMPLE (1): Negative Adjustment	16
(B) EXAMPLE (2): Positive Adjustment within the 105% Limit	21
(C) EXAMPLE (3): Adjustments Exceeding the 105% Limit	25
(D) EXAMPLE (4): No PQ Adjustment	29
(E) EXAMPLE (5): Exceeding the 105% Adjustment	32
(F) EXAMPLE (6): Within the 105% Adjustment (Open Graded FC-5)	34
(G) EXAMPLE (7): Payment up to 105% on Miscellaneous Asphalt	36
ATTACHMENT B	38
Thickness Adjustments for Optional Base (White Base)	38
(A) EXAMPLE (1): Positive Core-Out Adjustment Calculations	38
(B) EXAMPLE (2): Negative Core-Out Adjustment Calculations	40
Deficiency Adjustments for Optional Base (White Base)	42
(C) EXAMPLE (3): Deficient Area Calculation (Area Left in Place with No Pay)	42
ATTACHMENT C	45
Resolution Test Results	45
(A) EXAMPLE (1): E-Mail from District Material’s Office to the PA with No. of Tests and Costs 45	
(B) EXAMPLE (2) (A): Resolution Testing Costs on Website	46
(C) EXAMPLE (2) (B): Reporting Cost of Resolution Testing in SiteManager	47
CPF Calculations	48
(D) EXAMPLE (3): Plan Summary Box for Superpave Asphaltic Concrete (Traffic B)	48

(E)	EXAMPLE (4): CPF Calculation for Tonnage Pay items.....	49
(F)	EXAMPLE (4) (A): If CPF is <0.80 or ≥0.75.....	49
(G)	EXAMPLE (4) (B): If CPF is > 0.80 and < 1.00.....	50
(H)	EXAMPLE (4) (C): If CPF = 1.00.....	51
(I)	EXAMPLE (4) (D): If CPF is > 1.00 and up to 1.05.....	52
(J)	EXAMPLE (5) CPF for Square Yard Pay Items.....	53
(K)	EXAMPLE (6) CPF for Square Yard Pay Items (Composite Base).....	55
(L)	EXAMPLE (7): CPF Calculations for a Cubic Yard Pay Item.....	57
(M)	EXAMPLE (8): CPF Documentation for Multiple FIN Projects, Under One Contract.....	58
ATTACHMENT D		60
Bituminous Adjustments on Conventional Projects		60
(A)	EXAMPLE (1) (A): Form 700-050-66 – Set-Up Sheet by Contractor	60
(B)	EXAMPLE (1) (B): Form 700-050-66 – Contractor’s Certification of Quantities	61

ATTACHMENT A

105% Adjustments on Square Yard Pay Items (Plan Quantity)

(A) EXAMPLE (1): Negative Adjustment

Given:

A conventional project with Superpave Base Asphalt, Type B (12.5), Group 15 (Pay Item 285-715) contains the following criteria:

PQ Area = 46,800 SY

Unit Price = \$50.35 per SY

Design Thickness = 9"

G_{mm} used for PQ determination per Specification 334-1.4 = 2.540 for Dense Graded Asphalt

The Contractor will lay the 9" in 3 courses: 3" each course

The Design Spread Rate = $G_{mm, design} \times 43.3 \text{ (Lbs/SY-in)} \times \text{thickness (in.)}$

= $2.540 \times 43.3 \text{ (Lbs/SY-in)} \times 9 \text{ (in)} = 989.84 = 990 \text{ Lbs/SY}$

The Target Spread Rate per lift =

$$\frac{990 \text{ Lbs/SY}}{(3)} = 330 \text{ Lbs/SY (based on the Specifications 334-1.4)}$$

From the Asphalt Roadway – Daily Report of Quality Control, three Design Mixes were used and their recorded tonnages:

Mix 1 with 17,451 Tons at G_{mm} of 2.561
Mix 2 with 3,780 Tons at G_{mm} of 2.599, and
Mix 3 with 1,659 Tons at G_{mm} of 2.488

Total Tons Placed on the Project (Tonnage from QCRR) = 22,890 Tons

No changes to PQ area.

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. The Tonnage-Weighted Average G_{mm} is calculated first.

$$\begin{aligned} \text{Tonnage-Weighted Average } G_{mm} &= \\ &= \frac{(\text{Tons}_{\text{Mix } 1})(G_{mm \text{ Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{mm \text{ Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{mm \text{ Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})} \\ \text{Tonnage-Weighted Average } G_{mm} &= \\ &= \frac{[(17,451 \text{ Tons})(2.561) + (3,780 \text{ Tons})(2.599) + (1,659 \text{ Tons})(2.488)]}{(17,451 \text{ Tons} + 3,780 \text{ Tons} + 1,659 \text{ Tons})} \\ &= (44,692 \text{ Tons} + 9,824.2 \text{ Tons} + 4,127.5 \text{ Tons}) / 22,890 \text{ Tons} \\ &= 2.562 \end{aligned}$$

2. The Adjusted PQ Tonnage is calculated second.

$$\begin{aligned} \text{Adjusted PQ Tonnage} &= \frac{[(\text{PQ Area (SY)} \pm \text{Any Revisions})] \times [t \text{ (in)} \times G_{mm,avg} \times 43.3 \text{ (Lbs/SY-in)}]}{2,000 \text{ Lbs/Ton}} \\ &= \frac{46,800 \text{ SY} \times 9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/SY-in}}{2,000 \text{ Lbs/Ton}} \\ &= 23,362.8 \text{ Tons} \end{aligned}$$

3. The pay area is then calculated.

$$\begin{aligned} \text{Pay Area (per 234-9)} &= \text{Surface Area} \times \frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}} \\ &= 46,800 \text{ SY} \times \frac{22,890 \text{ TN}}{23,362.8 \text{ TN}} \end{aligned}$$

= 45,853 SY This is the Final Pay Area since 105% Designed Surface Area was not exceeded:

105% Designed Surface Area = 46,800 SY x 1.05= 49,140 SY

$$\text{Pay Adjustment} = \text{PQ Area (SY)} \times \left[\text{Ratio of } \frac{(\text{Tonnage Placed on Project})}{\text{Adjusted PQ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times \left[\frac{22,890 \text{ Tons}}{23,362.8 \text{ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times [- 0.0202]$$

= -947 SY (the QCRR will automatically calculate the - 947 SY (+ or – due to rounding), under the “Pay Quantity Sheet”).

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY on the line item in SiteManager for pay item 285-715 (Asphalt Base is a PQ SY pay item).
2. However, due to less asphalt being placed than planned (per **Specifications Section 330-6.1.5**, the spread rate is within plus or minus 5% of the target spread rate), there will be a pay adjustment. In this case, a minus 2% (the negative ratio of 0.0202) adjustment. This is within the 5% range, and since there were no other deficiencies, the Contractor will be deducted 947 SY: (– 947 SY x \$50.35/SY = – \$47,681.45). This will be entered in SiteManager manually as a negative Line Item Adjustment.
3. **Bituminous Adjustment:** The Contractor will receive a Bituminous Adjustment for all the asphalt produced and accepted, per **Specifications**, if the Typical Section shows Asphalt Black Base Only. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item. If the Typical Section allows an Option for base (either white or black), a bituminous adjustment will not apply.

For black base only projects, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average Gmm

$$\frac{45,853 \text{ SY} \times 9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 22,890 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$22,890 \text{ TN} - 22,890 \text{ TN} = 0 \text{ TN}$$

(No adjustment is necessary since the contractor did not place all the necessary asphalt for this project)

4. **Fuel Adjustment:** Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item (46,800 SY), SiteManager made an automatic Fuel Adjustment for this quantity. Therefore, when the manual – 947 SY deduction is made in SiteManager, a corresponding manual fuel adjustment will also be made in SiteManager (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor’s Certification of Fuel Adjustment (DB/LS) Worksheet available on the Construction website. (See **CPAM 5.14** for Fuel Adjustments.)
5. **CPF Adjustment:** CPF adjustments will be paid for the Final Pay Area for each pay item. As the project progresses, CPF adjustments will be made for each LOT with the appropriate CPF and corresponding SY. (See calculations in **Attachment C**; Examples 5 and 6.) If the Contractor reports SY which exceeds the plan quantity, only the plan quantity (including approved Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.

Then a correction CPF adjustment will be made at the end of the project for the negative 947 SY to reconcile the CPF adjustments to the Final Pay Area. The correction CPF adjustment will be made using the average CPF associated with this pay item. See below.

Example 1a: If **Average** CPF LOTs (for this pay item) = 1.02:

$$1.02 - 1 = 0.02$$

$$0.02 \times \$49.50/\text{SY} = \$0.99/\text{SY}$$

$\$0.99/\text{SY} \times -947 \text{ SY} = - \937.53 (to be deducted as a negative CPF line item adjustment)

Example 2b: If **Average** CPF LOTs (for this pay item) = 0.99:

$0.99 - 1 = - 0.01$

$- 0.01 \times \$49.50/\text{SY} = - \$0.50/\text{SY}$

$- \$0.50/\text{SY} \times 947 \text{ SY} = - \473.50 (This will also be a negative line item adjustment)

ATTACHMENT A

105% Adjustments on Square Yard Pay Items (Plan Quantity)

(B) EXAMPLE (2): Positive Adjustment within the 105% Limit

Given:

A project with Superpave Base Asphalt, Type B (12.5), Group 15 contains the following criteria:

PQ Area = 46,800 SY
Unit Price = \$49.50/SY
Contractor placed 24,340 Tons
No changes to PQ area.
Design Thickness = 9"

Three Design Mixes with recorded tonnages; they are:

Mix 1 with 18,451 Tons at G_{mm} of 2.561
Mix 2 with 4,780 Tons at G_{mm} of 2.599
Mix 3 with 1,109 Tons at G_{mm} of 2.488

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

$$\begin{aligned} \text{Tonnage-Weighted Average } G_{mm} &= \\ &= \frac{[(18,451 \text{ Tons})(2.561) + (4,780 \text{ Tons})(2.599) + (1,109 \text{ Tons})(2.488)]}{(18,451 \text{ Tons}) + (4,780 \text{ Tons}) + (1,109 \text{ Tons})} \\ &= \frac{(47,253 \text{ Tons} + 12,423.2 \text{ Tons} + 2,759.2 \text{ Tons})}{24,340 \text{ Tons}} \\ &= \frac{62,435.4 \text{ Tons}}{24,340 \text{ Tons}} \\ &= 2.565 \end{aligned}$$

Adjusted PQ (TN)

$$\begin{aligned} &= \frac{[(\text{PQ Area (SY)} \pm \text{Any Revisions})] \times [(t \text{ (in)} \times G_{\text{mm,avg}} \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}} \\ &= \frac{46,800 \text{ SY} \times (9 \text{ in} \times 2.565 \times 43.3 \text{ Lbs/SY-in})}{2,000 \text{ Lbs/Ton}} \\ &= 23,390.1 \text{ Tons} \end{aligned}$$

Pay Area (per 234-9) = Surface Area \times $\frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}}$

$$= 46,800 \text{ SY} \times \frac{24,340 \text{ TN}}{23,390.1 \text{ TN}}$$

= 48,700 SY This is the Final Pay Area since 105% Designed Surface Area was not exceeded:

$$105\% \text{ Designed Surface Area} = 46,800 \text{ SY} \times 1.05 = 49,140 \text{ SY}$$

Pay Adjustment = PQ Area (SY) \times $\left[\text{Ratio of } \frac{(\text{Tonnage Placed on Project})}{\text{Adjusted PQ Tons}} - 1 \right]$

$$= 46,800 \text{ SY} \left[\frac{24,340 \text{ Tons}}{23,390.1 \text{ Tons}} - 1 \right]$$

$$= 46,800 \text{ SY} \times 0.0406$$

$$= 1,900 \text{ SY (This will be shown on the QCRR)}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY in SiteManager.
2. However, the Contractor placed more asphalt than planned (the 0.0406 is 104%), and since the placement is less than the 105% limit, there will be a pay adjustment. The Contractor will receive a positive Adjustment for the 1,900 SY in SiteManager as a manual line item adjustment.

- 3. Bituminous Adjustment:** The Contractor will receive a Bituminous Adjustment for all the asphalt produced and accepted, per Specifications, if the Typical Section shows Asphalt Black Base Only. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item. If the Typical Section allows an Option for base (either white or black), a bituminous adjustment will not apply.

For black base only projects, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average Gmm

$$\frac{48,700 \text{ SY} \times 9 \text{ in} \times 2.565 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 24,340 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$24,340 \text{ TN} - 24,340 \text{ TN} = 0 \text{ TN}$$

(No adjustment is necessary since the contractor did not place all the necessary asphalt for this project)

- 4. Fuel Adjustment:** Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item, SiteManager made an automatic Fuel Adjustment for this quantity. Therefore, when the + 1,900 SY addition is made in SiteManager, a corresponding manual fuel adjustment will also need to be made, in SiteManager (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor's Certification of Fuel Adjustment (DB/LS) Worksheet available on the Construction website. (See **CPAM 5.14** for Fuel Adjustments.)
- 5. CPF Adjustment:** CPF adjustments will be paid for the Final Pay Area for each pay item. The Contractor placed the plan quantity which was accepted on this project. As the project progresses, the CPF adjustments will be made for each LOT with the appropriate CPF and corresponding SY (See calculations in **Attachment C**; Examples 5 and 6.) If the Contractor reports SY which exceeds the plan quantity shown in the plans, only the plan quantity (including approved

Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.

A correction CPF adjustment will be made at the end of the project for the positive 1,900 SY to reconcile the CPF adjustments to the Final Pay Area. The correction CPF adjustment will be made using the average CPF associated with this pay item. See Example 1a and 1b.

ATTACHMENT A

105% Adjustments on Square Yard Pay Items (Plan Quantity)

(C) EXAMPLE (3): Adjustments Exceeding the 105% Limit

Given:

A project with Superpave Base Asphalt, Type B (12.5), Group 15 contains the following criteria:

PQ Area = 46,800 SY
Unit Price: \$ 49.50/SY
Contractor placed Tons = 24,950 Tons
No changes to PQ Area
Design Thickness = 9"

The three Design Mixes used and their recorded tonnages are:

Mix 1 with 18,451 Tons at G_{mm} of 2.561
Mix 2 with 4,780 Tons at G_{mm} of 2.599
Mix 3 with 1,719 Tons at G_{mm} of 2.488

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted Average G_{mm} =

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{\text{mm Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{\text{mm Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{\text{mm Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})} \\ &= \frac{[(18,451 \text{ Tons})(2.561) + (4,780 \text{ Tons})(2.599) + (1,719 \text{ Tons})(2.488)]}{(18,451 \text{ Tons}) + (4,780 \text{ Tons}) + (1,719 \text{ Tons})} \\ &= \frac{(47,253 \text{ Tons} + 12,423.2 \text{ Tons} + 4,276.9 \text{ Tons})}{24,950 \text{ Tons}} \\ &= \frac{64,253.1 \text{ Tons}}{24,950 \text{ Tons}} \end{aligned}$$

$$= 2.563$$

$$2. \text{ Adjusted PQ Tons} = \frac{(\text{PQ Area SY} \pm \text{Any Revisions}) \times [(\text{t (in)} \times G_{\text{mm, avg}} \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}}$$

$$= \frac{(46,800 \text{ SY}) \times [(9 \text{ in} \times 2.563 \times 43.3 \text{ Lbs/SY-in})]}{2,000 \text{ Lbs/Ton}}$$

$$= 23,371.9 \text{ Tons}$$

$$3. \text{ Pay Area (per 234-9)} = \text{Surface Area} \times \frac{\text{Actual Tonnage Placed}}{\text{Adjusted Plan Quantity}}$$

$$= 46,800 \text{ SY} \times \frac{24,950 \text{ TN}}{23,371.9 \text{ TN}}$$

$$= 49,960 \text{ SY (105\% Design Surface Area was exceeded, so the **Final Pay Quantity will be limited to 49,140 SY**)}$$

$$105\% \text{ Designed Surface Area} = 46,800 \text{ SY} \times 1.05 = 49,140 \text{ SY}$$

$$4. \text{ Pay Adjustment} = \text{PQ Area} \times \left[\text{Ratio of } \frac{\text{Tons Placed}}{\text{Adjusted Quantity}} - 1 \right]$$

$$= 46,800 \times \left[\frac{24,950}{23,371.9} - 1 \right]$$

$$= 46,800 [0.06752] = 3,160 \text{ SY}$$

Since the ratio of 0.0675 or 106% is greater than 105%, the Contractor can only receive up to 105% adjustment of the Design PQ Area per **Specifications**.

Therefore, the adjustment limited by the Specifications will be:

$$46,800 \times 0.05 = 2,340 \text{ SY (This will be shown on the QCRR)}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the full PQ Area of 46,800 SY in SiteManager.

2. The Contractor will receive a manual Line Item Adjustment for the + 2,340 SY in SiteManager which is the 105% PQ adjustment.
3. For **Bituminous Adjustments**: For Bituminous Adjustments, the Contractor will get paid for all the asphalt produced and accepted, when applicable. Bituminous adjustments will be paid for the Final Pay Area (in tonnage) for each pay item.

For black base only projects, a manual Correction Bituminous Adjustment will be made at the end of the contract to account for the difference between the tonnage placed and the final pay quantity (in tons).

Correction Bituminous Adjustment Calculation:

Step 1: Convert Final Pay Area (SY) to Tonnage using the tonnage-weighted average Gmm

$$\frac{49,140 \text{ SY} \times 9 \text{ in} \times 2.563 \times 43.3 \text{ Lbs/SY-in}}{2000 \text{ lb/TN}} = 24,540.5 \text{ TN}$$

Step 2: Subtract Final Pay Area in Tonnage from Total Tonnage from QCRR

$$24,950 \text{ TN} - 24,540.5 \text{ TN} = 409.5 \text{ TN}$$

Step 3: Apply a manual line item adjustment in SiteManager to deduct the 409.5 TN using the index for the last month of paving.

4. **Fuel Adjustments**: Fuel adjustments will be paid for the Final Pay Area for each pay item. Since we paid the full PQ on the Line Item, SiteManager made an automatic Fuel Adjustment for this quantity. Therefore, when the 2,340 SY Line Item Adjustment is processed in SiteManager, a corresponding manual Fuel Adjustment will be made for the additional quantity in SiteManager (to reconcile the Fuel adjustments to the Final Pay Area). The manual fuel adjustment can be calculated using Contractor's Certification of Fuel Adjustment (DB/LS) Worksheet available on the Construction website. (See **CPAM 5.14** for Fuel Adjustments.)
5. **CPF Adjustment**: CPF adjustments will be paid for the Final Pay Area for each pay item. As the project progresses, the CPF Adjustments will be made for each LOT with the appropriate CPF and corresponding SY (see **Attachment C**, Examples 5 and 6 for SY pay Items.) If the Contractor reports SY which exceeds the plan quantity shown in the plans, only the plan quantity (including approved Engineer changes) will be paid and used to calculate CPF adjustments. For this example, CPF adjustments will stop at 46,800 SY during construction.

A correction CPF adjustment will be made at the end of the project for the positive 2,340 SY to reconcile the CPF adjustments to the Final Pay Area. The correction CPF adjustment will be made using the average CPF associated with this pay item. See Example 1a and 1b.

ATTACHMENT A

105% Adjustments on Tonnage Pay Items

(D) EXAMPLE (4): No PQ Adjustment

This example is for a Contract with two FPID's where the Contractor placed less Tonnage than planned. This example is rare but could happen.

Given:

A project with Superpave Asphalt, Traffic Level B, PG 76-22, (Pay Item 334-1-52) contains the following criteria. From the Contract and per Specifications 334-1.4, Dense Graded Structural or Friction Courses will use a $G_{mm} = 2.540$ to determine design quantities

Project "A" Plan Quantity Tons show 13,754.3 Tons
Project "B" Plan Quantity Tons show 91.1 Tons
Total PQ Tons from Contract and Plans = 13,845.3 Tons
Total PQ Area (SY) = 173,622 SY
No changes to PQ Area.

Project "A":

Total asphalt placed = 13,345.0 Tons
Three Design Mixes were used per the QCRR:
 Mix 1 with $G_{mm} = 2.599$ at 9,000.0 Tons
 Mix 2 with $G_{mm} = 2.615$ at 2,500.0 Tons
 Mix 3 with $G_{mm} = 2.578$ at 1,845.0 Tons

Project "B":

Total Asphalt placed = 89.2 Tons
One Design Mix was used per the QCRR:
 Mix 1 with $G_{mm} = 2.599$ at 89.2 Tons

Total Tonnage placed on this Contract = 13,345 Tons + 89.2 Tons = 13,434.2 Tons

What is the Final Pay for Project A and Project B?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

$$\text{Adjusted PQ Tonnage} = \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}}$$

And the

$$\text{Tonnage-Weighted Average } G_{mm} = \frac{(\text{Tons}_{\text{Mix 1}})(G_{mm \text{ Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{mm \text{ Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{mm \text{ Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})}$$

On this Contract, Design Mix 1 for Projects A and B was the same, so they can be combined: Design Mix 1 Tonnage = 9,000.0 + 89.2 = 9,089.2 Tons

1. Tonnage-Weighted Average G_{mm} for the Total Contract

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{mm \text{ Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{mm \text{ Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{mm \text{ Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})} \\ &= \frac{[(9,089.2 \text{ Tons})(2.599) + (2,500.0 \text{ Tons})(2.615) + (1,845 \text{ Tons})(2.578)]}{(9,089.2 \text{ Tons}) + (2,500.0 \text{ Tons}) + (1,845.0 \text{ Tons})} \\ &= \frac{(23,622.8 \text{ Tons} + 6,537.5 \text{ Tons} + 4,756.4 \text{ Tons})}{13,434.2 \text{ Tons}} \end{aligned}$$

$$= 2.599 \text{ (Tonnage-Weighted-} G_{mm} \text{ for the Total Contract)}$$

$$\begin{aligned} 2. \text{ Adjusted Plan Quantity Tons} &= 13,845.3 \text{ Tons} \times \frac{2.599}{2.540} \\ &= 14,166.9 \text{ Tons} \end{aligned}$$

$$\begin{aligned} 3. \text{ Maximum Pay Tonnage} &= 1.05 \times \text{Adjusted Plan Quantity Tons} \\ &= 1.05 \times 14,166.9 \text{ Tons} \\ &= 14,875.2 \text{ Tons (Maximum that will be paid)} \end{aligned}$$

However, the Contractor only placed 13,434.2 Tons total for the Contract, which is less than the Adjusted PQ, and less than the max, so the Contractor will get paid what was placed.

Contractor will get paid for:

Project A = 13,345.0 Tons
Project B = 89.2 Tons

NOTE 2:

1. Since there were no Plan Errors or Field Revisions in this example, the Contractor will receive payment for the tonnage placed as the project progresses in SiteManager.
2. Since the contractor placed less than 105% there will be no PQ adjustment. If the Contractor placed asphalt that is excessively deficient, follow the necessary requirements under **Specifications Section 330**.
3. **Bituminous Adjustment:** Because Bituminous Adjustments will be made as the project progresses for the actual Tonnage placed, there will be no additional bituminous adjustments required at the end of the contract.
4. **Fuel Adjustments:** Since we paid for the actual tonnage placed, SiteManager made an automatic Fuel Adjustments for this quantity. Therefore, there will be no additional Fuel Adjustments required at the end of the contract.
5. **CPF Adjustment:** Because CPF Adjustments will be made as the project progresses for the actual Tonnage placed (see **Attachment C**, Examples 5 and 6), there will be no additional CPF Adjustments required at the end of the contract.

ATTACHMENT A

105% Adjustments on Tonnage Pay Items

(E) EXAMPLE (5): Exceeding the 105% Adjustment

Given:

A project with Superpave Asphalt, Traffic Level B, PG 76-22, (Pay Item 334-1-52) contains the following criteria. From the Contract and per Specifications 334-1.4, Dense graded Structural or Friction Courses will use a $G_{mm} = 2.540$ for design quantities.

Plan Quantity Tons = 13,845.3 Tons
Total PQ Area (SY) = 173,622 SY

Three Design Mixes were used per the QCRR:

Mix 1 with $G_{mm} = 2.599$ at 9,000.0 Tons:

Mix 2 with $G_{mm} = 2.615$ at 2,500.0 Tons and

Mix 3 with $G_{mm} = 2.578$ at 3,450.0 Tons

Total Tons placed and accepted = 14,950.0 Tons

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted Average G_{mm}

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{mm \text{ Mix 1}}) + (\text{Tons}_{\text{Mix 2}})(G_{mm \text{ Mix 2}}) + (\text{Tons}_{\text{Mix n}})(G_{mm \text{ Mix n}})}{(\text{Tons}_{\text{Mix 1}}) + (\text{Tons}_{\text{Mix 2}}) + (\text{Tons}_{\text{Mix n}})} \\ &= \frac{[(9,000.0 \text{ Tons})(2.599) + (2,500.0 \text{ Tons})(2.615) + (3,450.0 \text{ Tons})(2.578)]}{(9,000.0 \text{ Tons}) + (2,500.0 \text{ Tons}) + (3,450.0 \text{ Tons})} \\ &= \frac{(23,391 \text{ Tons} + 6,537.5 \text{ Tons} + 8,894.1 \text{ Tons})}{(14,950 \text{ Tons})} \\ &= 2.597 \end{aligned}$$

$$\begin{aligned} 2. \text{ Adjusted PQ Tons} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}} \\ &= \frac{(13,845.3 \text{ Tons} \times 2.597)}{2.540} \\ &= 14,156.0 \text{ Tons} \end{aligned}$$

$$\begin{aligned} 3. \text{ Max Pay Tonnage} &= 1.05 \times \text{Adjusted PQ Tons} \\ &= 1.05 \times 14,156.0 \text{ Tons} \\ &= 14,863.8 \text{ Tons} \end{aligned}$$

NOTE 2: This is where the PA or Project Personnel will do the line item adjustments:

1. Since the tonnage is paid as the project progresses, 14,950.0 Tons will be paid on the pay item.
2. Since the Contractor placed more than the maximum tonnage allowed per Specifications (pay up to 105% of the adjusted PQ Tonnage), there will be a negative line item adjustment of 86.2 Tons deducted for the excess tonnage placed. To calculate the extra tonnage placed:

$$\begin{aligned} \text{Deduction for extra tonnage placed} &= \text{Max Pay Tonnage} - \text{Tons Placed} \\ &= 14,863.8 - 14,950.0 = - 86.2 \text{ Tons} \end{aligned}$$

3. **Bituminous Adjustment:** Because Bituminous Adjustments will be made as the project progresses for the actual Tonnage placed, a manual deduction for the corresponding quantity (-86.2 Tons) will be made from the Last Bituminous Certification Sheet. Make a note indicating the reason.
4. **Fuel Adjustments:** Since we paid for the actual tonnage placed, SiteManager made an automatic Fuel Adjustments for this quantity. Therefore, when the extra tonnage was deducted in SiteManager, a corresponding manual Fuel Adjustment will be entered in SiteManager.
5. **CPF Adjustment:** Because CPF Adjustments will be made as the project progresses for the actual Tonnage placed (see **Attachment C**, Examples 5 and 6), the tonnage placed over the 105% will be deducted using the average CPF associated with this pay item. See **Attachment A**. Examples 3; 3a and 3b above.

ATTACHMENT A

105% Adjustments on Tonnage Pay Items

(F) EXAMPLE (6): Within the 105% Adjustment (Open Graded FC-5)

Given:

A project with Open Graded Friction Course contains the following criteria. **Specifications Section 337-8.2** states that a $G_{sb} = 2.635$ shall be used. For all the equations previously shown for Tonnage pay items, the G_{mm} will be substituted for G_{sb} . For open graded FC, only one layer of asphalt is placed.

Total PQ Tons from Plans = 13,936.5 Tons

Total PQ Area = 173,622 SY

Three Design Mixes were used per the QCRR:

Mix 1 with $G_{sb} = 2.638$ at 9,000.0 Tons:

Mix 2 with $G_{sb} = 2.640$ at 2,500.0 Tons and

Mix 3 with $G_{sb} = 2.636$ at 3,150.0 Tons

Total Tons placed and accepted on project = 14,650 Tons

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

Solution:

1. Tonnage-Weighted $G_{sb} =$

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix } 1})(G_{\text{mm Mix } 1}) + (\text{Tons}_{\text{Mix } 2})(G_{\text{mm Mix } 2}) + (\text{Tons}_{\text{Mix } n})(G_{\text{mm Mix } n})}{(\text{Tons}_{\text{Mix } 1}) + (\text{Tons}_{\text{Mix } 2}) + (\text{Tons}_{\text{Mix } n})} \\ &= \frac{[(9,000.0 \text{ Tons})(2.638) + (2,500.0 \text{ Tons})(2.640) + (3,150.0 \text{ Tons})(2.636)]}{(9,000.0 \text{ Tons}) + (2,500.0 \text{ Tons}) + (3,150.0 \text{ Tons})} \\ &= \frac{(23,742 \text{ Tons}) + (6,600 \text{ Tons}) + (8,303.4 \text{ Tons})}{(14,650 \text{ Tons})} \\ &= 2.638 \end{aligned}$$

2. Adjusted PQ Tons

$$\begin{aligned} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}} \\ &= \frac{(13,936.5 \text{ Tons} \times 2.638)}{(2.635)} \\ &= 13,952.4 \text{ Tons} \end{aligned}$$

3. Max Pay Tonnage

$$\begin{aligned} &= 1.05 \times \text{Adjusted PQ Tons} \\ &= 1.05 \times 13,952.4 \text{ Tons} \\ &= 14,650.0 \text{ Tons (Maximum that will be paid)} \end{aligned}$$

The Contractor placed the exact tonnage that we could pay up to. Therefore, Contractor will get paid the total tonnage placed which equals up to the 105% per Specifications.

The Contractor will receive Fuel and Bituminous adjustments for the total asphalt that was placed and accepted. Also, the CPF, if less than or greater than 1, will be adjusted in SiteManager manually.

ATTACHMENT A

105% Adjustments on Tonnage Pay Items

(G) EXAMPLE (7): Payment up to 105% on Miscellaneous Asphalt

Given:

A conventional project has miscellaneous asphalt around guardrail. The project area contains the following criteria. From the Contract and per **Specifications 334-1.4**, Dense graded Structural or Friction Courses will use a $G_{mm} = 2.540$ for design quantities.

Original Plan Area = 800 SY
Original PQ Tons = 80.00 Tons
Final Area = 800 SY
Final Tons = 90.5 Tons

Only one Mix was used per the QCRR with $G_{mm} = 2.544$

What is the Final Pay?

NOTE 1: The QCRR will calculate the following. This is just an example. Outcome of quantities may be different than QCRR outcome due to rounding.

1. Tonnage-Weighted Average G_{mm}

$$\begin{aligned} &= \frac{(\text{Tons}_{\text{Mix 1}})(G_{\text{mm Mix 1}})}{(\text{Tons}_{\text{Mix 1}})} \\ &= \frac{(90.5 \text{ Tons} \times 2.544)}{(90.5 \text{ Tons})} \\ &= 2.544 \end{aligned}$$

2. Adjusted PQ Tons =

$$\begin{aligned} &= \frac{(\text{Plan Area TN} \pm \text{Any Revisions}) \times (\text{Tonnage-Weighted Average } G_{mm})}{\text{Design } G_{mm}} \\ &= \frac{(80.0 \text{ Tons} \times 2.544)}{(2.540)} \end{aligned}$$

= 80.1 Tons

3. Max Pay Tonnage = 1.05 x Adjusted PQ Tons
= 1.05 x 80.1 Tons
= 84.1 Tons (Maximum that will be paid)

Pay Adjustment = Max Pay Tonnage - Tons Placed
= 84.1 Tons - 90.5 Tons
= - 6.4 Tons (Deducted from the Bituminous and Fuel reports)

NOTE 2: There will be **no** CPF adjustment on Miscellaneous Asphalt.

Miscellaneous Asphalt does receive Fuel and Bituminous adjustments per **Specifications**.

ATTACHMENT B

Thickness Adjustments for Optional Base (White Base)

(A) EXAMPLE (1): Positive Core-Out Adjustment Calculations

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 7.00"

Plan Quantity Area = 8,000 SY

Final Area = 8,000 SY

Actual Average Core-out Report Thickness = 7.50"

Specifications allow a maximum ½" tolerance per Section 285-7

Solution:

1. Determine if the thickness exceeds 5%

$$\begin{aligned}\text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(7.50" - 7.00")}{7.00"} \\ &= 0.071428571 \times 100 = 7.1428571\% > 5\%^{**}\end{aligned}$$

**Make sure to use the floating decimal to calculate over or under the 105%.

Since 7.1428571% exceeds the 5% stated in the Specifications Section 285-8, the maximum pay area will govern the payment.

2. Determine the Maximum Pay Area

$$\begin{aligned}\text{Maximum Pay Area} &= 1.05 \times \text{PQ Area} \\ &= 1.05 \times 8,000 \text{ SY} \\ &= 8,400 \text{ SY}\end{aligned}$$

3. Line item adjustment = Maximum Pay Area – PQ Area

$$\begin{aligned} &= 8,400 \text{ SY} - 8,000 \text{ SY} \\ &= 400 \text{ SY} \end{aligned}$$

The Department will pay the Contractor the 8,000 SY area per the plans and can only pay an additional 400 SY for the maximum thickness adjustment per **Specifications**.

400 SY will need to be entered manually as a positive line item adjustment in SiteManager. Likewise, if the project is eligible for fuel adjustment, a line item adjustment will be entered manually for the fuel based on the price index at the final month of limerock installation.

ATTACHMENT B

Thickness Adjustments for Optional Base (White Base)

(B) EXAMPLE (2): Negative Core-Out Adjustment Calculations

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 8.00"

Plan Quantity Area = 10,500 SY

Final Area = 10,000 SY

Actual Average Core-out Report Thickness = 7.79" (See Note 1)

Specifications allow a maximum ½" tolerance per Section 285-7

Solution:

1. Determine the Core Out Ratio

$$\begin{aligned}\text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(7.79" - 8.00")}{8.00"} = -0.0262500*\end{aligned}$$

**Since the core out ratio is negative, the 105% does not control.*

2. Determine the Thickness Adjustment Area

Thickness Adjustment Area = Core Out Ratio x Plan Quantity Area

$$= -0.026250 \times 10,500 \text{ SY}$$

$$= -275.6 \text{ SY}$$

$$= -276 \text{ SY (Negative Thickness Adjustment)}$$

The Department will pay the Contractor the 10,500 SY area per plan, and has to manually deduct 276 SY for the negative thickness adjustment.

276 SY will need to be shown as a negative line item adjustment.

A corresponding manual negative fuel adjustment for 276 SY will also need to be done based on the index of the last month of limerock installation.

*Make sure to use the floating decimal on your calculator to come up with either the negative or positive adjustment.

NOTE 1: Any Core-out average less than the plan specified thickness (in this example, anything less than 8") will be considered a negative adjustment.

NOTE 2: Any shy area on the Core-out report is excluded from the Core-out average calculation. Shy areas will need to be corrected by scarifying and adding additional base material. Or if authorized by the Engineer, it may be left in place without correction and at no pay (per **Specifications 285-6.2**). See Example (3) for a deficient area left in place with no pay calculation.

ATTACHMENT B

Deficiency Adjustments for Optional Base (White Base)

(C) EXAMPLE (3): Deficient Area Calculation (Area Left in Place with No Pay)

From the last page of the core out report seen below:

FDOT V4.2.2 6/2008 Updated Report and type selection									
CORE-OUT AVERAGES								PAGE NO 6	
DATE PROC: 2/8/2016					DISTRICT 5				
PROJECT NO. 123456-1-52-01					Date 06/08/2015				
ROAD 40					MIN 12.00 MAX 13.00				
COUNTY MARION									
DATA IS IN ENGLISH					VALUES ARE IN INCHES				
STATION	WIDTH	ACTUAL THICKNESS				SPECIFICATION ALLOWANCE			
		LEFT	CENTER	RIGHT	AVERAGE	LEFT	CENTER	RIGHT	AVERAGE
615+02	24		12.20		12.20		12.20		12.20
543+50	24	12.80			12.80	12.80			12.80
542+42	24			12.80	12.80		12.80		12.80
541+20	24		12.50		12.50		12.50		12.50
537+12	24			12.40	12.40		12.40		12.40
537+83	24		12.10		12.10		12.10		12.10
538+38	24	11.90			11.90	*SHY*			
532+40	24	12.40			12.40	12.40			12.40
534+21	24			12.00	12.00		12.00		12.00
535+10	24		12.10		12.10		12.10		12.10
525+95	24			12.30	12.30		12.30		12.30
527+30	24	12.30			12.30	12.30			12.30
529+05	24		12.20		12.20		12.20		12.20
522+45	24			12.00	12.00		12.00		12.00
523+71	24	11.90			11.90	*SHY*			
524+80	24		12.30		12.30		12.30		12.30
519+85	24		12.10		12.10		12.10		12.10
518+70	24			12.00	12.00		12.00		12.00
517+80	24	12.70			12.70	12.70			12.70
JOB AVERAGE			3269.80/	259	12.6247	3242.50/	257		12.6167

On This project, the Plan thickness is 12.5 inches. This report shows two (2) shy areas that will need to be addressed. There are two options for resolution of these areas. The Contractor can choose to correct by scarifying and adding additional base material or, in this case, the Engineer authorized that the area be left in-place at no pay per **Specifications 285-6**.

1st shy core is at Station 538+38
2nd shy core is at Station 523+71

The Length of the deficiency is calculated from the closest non-deficient cores on each side of the deficient core.

In this example:

1st length is from Sta. 537+83 to Sta. 532+40 = 543 Ft.

2nd length is from Sta. 522+45 to Sta. 524+80 = 235 Ft.

Any shy area left in place at No Pay will be excluded from the core out average calculation and a deduction for the shy area will be made to the plan quantity.

Note: Preferably, the Contractor, to his advantage, should revisit the shy cores to take additional cores to isolate the area. If this does not occur, the length will be taken from the core out report from the nearest acceptable core of each side of the deficient core which will increase the deducted area.

Given:

What is the final pay quantity for a limerock project given the following information? Is a line item adjustment needed?

Plan Thickness = 12.5 Inches

Actual Average Core-out Report Thickness = 12.6167"

Plan Quantity Area = 30,000 SY

Total Length of Shy Area = 778 Ft.

Total Width of Shy Area = 24 Ft.

Solution:

1. Calculate the Shy Area Left in Place at NO PAY:

$$\text{Shy Area} = \frac{L \text{ (Ft.)} \times W \text{ (Ft.)}}{9 \left(\frac{\text{SF}}{\text{SY}} \right)}$$

$$\text{Shy Area} = \frac{(778 \text{ Ft.})(24 \text{ Ft.})}{9 \text{ SF/SY}} = 2,075 \text{ SY Deduction}$$

A negative line item adjustment will be applied in SiteManager for 2,075 SY for the deficient areas.

2. Determine if the thickness exceeds 5%

$$\begin{aligned}\text{Core Out Ratio} &= \frac{(\text{Core Out Thickness} - \text{Plan Thickness})}{\text{Plan Thickness}} \\ &= \frac{(12.62" - 12.50")}{12.50"} \\ &= 0.0096 \times 100 = 0.96\% < 5\%\end{aligned}$$

**Make sure to use the floating decimal to calculate over or under the 105%.

Since 0.96% is less than the 5% stated in the Specifications Section 285-8, the maximum pay area will not govern the payment.

3. Calculate the Thickness Adjustment Area

Since 2,075 SY was a negative adjustment due to area left in place at no pay, we must deduct this area from the PQ Area of 30,000 SY, per **Specifications**.

$$30,000 - 2,075 = 27,925 \text{ SY}$$

$$\begin{aligned}\text{Thickness Adjustment Area} &= \text{Core Out Ratio} \times \text{Plan Quantity Area (less any deducts)} \\ &= 0.0096 \times 27,925 \text{ SY} \\ &= 268 \text{ SY}\end{aligned}$$

Final Quantity:

The entire plan quantity of 30,000 SY will be paid and include 3 line item adjustments. First, a positive line item adjustment of 268 SY will be applied manually in SiteManager, this is the thickness adjustment. Second, a negative line item adjustment (from Step 1) of 2,075 SY will be applied in SiteManager manually for the deficient areas.

Third, if the project is eligible for fuel adjustment, a line item adjustment for the net amount (-1,807 SY = 268 SY - 2,075 SY) will be entered manually for the fuel based on the price index at the final month of limerock installation.

ATTACHMENT C

Resolution Test Results

(A) EXAMPLE (1): E-Mail from District Material's Office to the PA with No. of Tests and Costs

Daniel Day

From: Daniel Day
Sent: Thursday, May 21, 2015 @ 2:49 PM
To: Howard Jump (howard.jump@dot.state.fl.us)
Cc: J. Corley; Bill Blass; etc., etc.
Subject: FIN # 41109815201 LOT 6 Resolution Results

Howard,

Attached are the Resolution results for LOT 6 on the above mentioned project. The Resolution results **DO NOT** compare with QC results. Therefore, acceptance and payment for the LOT with respect to density will be based on Resolution results.

Cost for the Resolution testing should be deducted from the monthly estimate (see below).

For each subplot, the Resolution results for average Roadway Gmb should replace the QC results for average Roadway Gmb, and most likely change the density value, Individual Pay Factor, and the Composite Pay Factor. Any new values should be compared to the Master Production Range as well as the criteria of 334-5.9.5 to determine acceptance.

- Please do not approve the QC or RT samples for this LOT. The resolution lab will approve these samples.
- Resolution cost (- \$31.60 per core x 9 cores = - \$ 84.40)

Thanks
Daniel Day
Assistant District Bituminous Manager
Florida Department of Transportation
100 N. Day Road (MS 20)
Deland, Florida 33333
380-555-5550 (office)

ATTACHMENT C Resolution Test Results

(B) EXAMPLE (2) (A): Resolution Testing Costs on Website

The cost of resolution testing, if performed by the Department and favors the VT results, will be deducted from the Contractor’s next progress estimate.

The resolution testing fees are based on the year the Contract was let. For example, if a Contract was let in January 2010 and a resolution test was done in January 2011, the January 2010 year pricing index would be used.

The cost of the testing can be found at the following URL within the ‘Resolution Testing Costs for Contracts Let Between...’ link.

<http://www.fdot.gov/materials/navigation/documents.shtm>

Florida Department of Transportation Resolution Testing Costs Year 2017-2018 Rates		
Bituminous Lab		
Test Name	Quantity	Test Cost
Bulk specific gravity of Compacted Bituminous Mixtures (FM 1-T166)	Per roadway core or gyratory pill	\$42.89
Ignition Oven Method (FM5-563)	Per asphalt content	\$117.84
Max specific gravity (FM1-T209)	Per average of two flasks	\$144.50
Superpave Gyratory Compaction (AASHTO T312-04)	Per pair of gyratory pills	\$160.88
Ignition Oven (FM 5-563) and Mechanical Analysis (FM1-T030)	Per gradation	\$153.71
Soil Lab		
Test Name	Quantity	Test Cost
Consolidation (AASHTO T 216)	Per sample	\$281.08
Direct Shear (AASHTO T 236)	Per sample	\$237.50
Dry Gradation (AASHTO T 27)	Per sample	\$50.95
Hydrometer (AASHTO T 88)	Per sample	\$120.15
LBR (FM 5-515)	Per sample	\$339.75
Liquid Limit (AASHTO T 89)	Per sample	\$46.74
Modified Proctor (AASHTO T 180)	Per sample	\$102.00
Moisture Content (AASHTO T 265)	Per sample	\$12.50

ATTACHMENT C Resolution Test Results

(C) EXAMPLE (2) (B): Reporting Cost of Resolution Testing in SiteManager

The screenshot displays the 'Line Item Adjustments' window in SiteManager. At the top, the 'Contract ID' is T7063 and the 'Estimate Nbr' is 0019. A table lists the entry with 'Catg Nbr' 0300 and 'Prj Nbr' 40723315201, with an 'Entered Date' of 11/03/11. A 'Remarks (General Remarks)' window is open, containing the text 'Coarse aggregate gradation resolution test for Lot # 6'. Below the table, the 'Project Number' is 40723315201 and the 'Line Item Number' is 0040. The 'Line Item Adjmnt Detail Information' section shows 'Type' as 'Resolution Testing Costs', 'Entered By' as 'cn982sc', 'Entered Date' as '11/03/11', 'Amount' as '.00', 'Quantity' as '.00000', and 'Unit Price' as '-284.40000'. A 'Stockpiled Information' box shows 'Stockpiled Sn' and 'Replenish Sn' both as 0.

Catg Nbr	Prj Nbr	Entered Date
0300	40723315201	11/03/11

Remarks (General Remarks):
Coarse aggregate gradation resolution test for Lot # 6

Project Number: 40723315201 Line Item Number: 0040

Line Item Adjmnt Detail Information :

Type: Resolution Testing Costs Entered By: cn982sc
Amount: .00 Entered Date: 11/03/11
Quantity: .00000
Unit Price: -284.40000

Stockpiled Information
Stockpiled Sn: 0 Replenish Sn: 0

Within the Remarks window, specify what the test was for. In this case, it is 'Coarse Aggregate Gradation Resolution Test for Lot 6'. The cost of the Resolution Testing will be determined by the Materials Office as shown in the email in **Attachment C**, Example (1).

ATTACHMENT C

CPF Calculations

(D) EXAMPLE (3): Plan Summary Box for Superpave Asphaltic Concrete (Traffic B)

SUMMARY OF PAVEMENT														
PAY ITEM NO.	PAY ITEM DESCRIPTION	LOCATION		SIDE	AREA ID	LENGTH	WIDTH	UNIT	QUANTITY		TOTAL		DESIGN NOTES	CONSTRUCTION REMARKS
		STA. TO STA.	DESCRIPTION						P	F	P	F		
285-707	OPTIONAL BASE GROUP 07	Sta. 0+00 to 110+25				11250.0	24.0	SY	30000.00	√	30000.0	√		No Plan Errors No Field Revisions
														5200 @ .96 CPF* 12100 @ 0.98 CPF 12300 @ 1.02 CPF 400 @ 1.02 CPF
														* See asphalt folder for CPF adjustments
														Typical Section indicates black bas only

ATTACHMENT C

CPF Calculations

(E) EXAMPLE (4): CPF Calculation for Tonnage Pay items

All Plan Summary Box references will be documented as shown in **Attachment C**, Example 3.

(F) EXAMPLE (4) (A): If CPF is <0.80 or ≥0.75

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

LOT 2, CPF is 0.76.
LOT Tonnage = 4,000 Tons
Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$0.76 - 1.00 = -0.24$$

2. Calculate the CPF Adjustment for the Entire LOT
 - 0.24 x \$50.05/Ton = - \$12.01/Ton
 - \$12.01/Ton x 4,000 Tons = - \$48,040.00

A negative Line Item Adjustment of \$-48,000 will be applied manually in SiteManager for LOT 2.

ATTACHMENT C

CPF Calculations

(G) EXAMPLE (4) (B): If CPF is > 0.80 and < 1.00

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

For LOT 3, CPF is 0.98
LOT Tonnage = 4,000 Tons
Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$0.98 - 1.00 = - 0.02$$

2. Calculate the CPF Adjustment for the Entire LOT

$$- 0.02 \times \$50.05/\text{Ton} = - \$1.00/\text{Ton}$$

$$4,000 \text{ Tons} \times - \$1.00/\text{Ton} = - \$4,000.00$$

A negative Line Item Adjustment of -\$4,000 will be made in SiteManager for LOT 3.

ATTACHMENT C

CPF Calculations

(H) EXAMPLE (4) (C): If CPF = 1.00

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

For LOT 4, CPF is 1.00
LOT Tonnage = 4,000 Tons
Unit Price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$1.00 - 1.00 = 0$$

There is no CPF adjustment at 1.00.

ATTACHMENT C

CPF Calculations

(I) EXAMPLE (4) (D): If CPF is > 1.00 and up to 1.05

Given:

A project with Superpave Asphalt, Traffic Level C, PG 76-22, (Pay Item 334-1-53) contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

LOT 5, CPF is 1.03
LOT Tonnage = 4,000 Tons
Unit price = \$50.05/Ton

Solution:

1. Calculate the CPF Difference

$$1.03 - 1.00 = 0.03$$

2. Calculate the CPF Adjustment for the Entire LOT

$$0.03 \times \$50.05/\text{Ton} = \$1.5015 = \$1.50/\text{Ton}$$

$$4,000 \text{ Tons} \times \$1.50/\text{Ton} = \$ 6,000.00$$

A positive Line Item Adjustment of \$6,000 will be made in SiteManager for LOT 5

ATTACHMENT C

CPF Calculations

(J) EXAMPLE (5) CPF for Square Yard Pay Items

Given:

A project with Superpave Asphalt Base contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF. The bid unit price is \$50.35/SY.

For Lot 4: CPF = 1.02:

Actual LOT Tonnage per the QCRR = 2,000 Tons

$G_{mm,lot} = 2.562$.

Design Area = 4,124 SY, based on G_{mm} of 2.54

Design Thickness = 9"

Solution:

Specification Section 234-9 states that the quantity will be paid as the plan quantity, however the pay area will be adjusted based on the following formula:

$$\text{Pay Area (SY)} = \frac{[\text{Actual Tonnage} \times 2,000 \text{ Lbs/Ton}]}{[t \text{ (in)} \times G_{mm,lot} \times 43.3 \text{ (Lbs/SY-in)}]}$$

$$\text{Pay Area (SY)} = \frac{[2,000 \text{ Tons} \times 2,000 \text{ Lbs/Ton}]}{[9 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/Ton-in}]}$$

$$\text{Pay Area (SY)} = 4,006 \text{ SY}$$

Specification Section 234-9 also states that the maximum pay area shall not exceed 105% of the designed surface area (i.e. plan quantity).

$$\begin{aligned} \text{Max. Pay Area} &= 1.05 \times \text{Designed Surface Area} \\ &= 1.05 \times 4,124 \text{ SY} \\ &= 4,330 \text{ SY} \end{aligned}$$

For final payment purposes, we will use 4,006 SY instead of 4,124 SY for the CPF Adjustment, since it has been adjusted for the actual lot G_{mm} . Since the maximum pay area quantity was not exceeded, it will not need to be used.

$$\begin{aligned}\text{CPF Adjustment for this LOT} &= 1.02 - 1 = 0.02 \\ 0.02 \times \$50.35/\text{SY} &= \$1.01/\text{SY} \\ \$1.01/\text{SY} \times 4,006 \text{ SY} &= \$4,046.06.\end{aligned}$$

This will be a positive CPF Line Item Adjustment equal to \$4,046.06.

NOTE 1: Calculations for CPF <80 or ≥75; or < 75; > 80 and asphalt exceeding 105% will also be calculated the same way. Use **Attachment A**, Example 3 as a reference for deducting CPF's on the last LOT.

ATTACHMENT C

CPF Calculations

(K) EXAMPLE (6) CPF for Square Yard Pay Items (Composite Base)

Given:

A project with Composite Base, Pay Item 285-714, contains the following criteria. Calculate the line item adjustment that should be made for the LOT CPF.

Subbase is 4" Limerock and Superpave Asphalt Base SP12.5 of 6.5"

Design Area Paved = 11,191 SY (based on Gmm of 2.54)

CPF = 0.89

Information from the QC Roadway Report:

LOT 6 = 4,000 Tons

Lot Gmm = 2.562

Unit price = \$92.00/SY for pay item 285-714

Solution:

1. Calculate the CPF Difference

$$0.89 - 1.00 = - 0.11$$

2. The unit price includes the 4" subbase plus the 6.5" of asphalt. In this case a unit price for the asphalt will need to be calculated. The Limerock Subbase does not receive an adjustment, (see Specification 290)

Total Thickness = 4" + 6.5" = 10.5"

$$\frac{\$92.00 \times 6.5''}{10.5''} = \$56.95 \quad \text{Unit Price for the asphalt portion of the pay item}$$

3. Calculate the Pay Area (SY)

$$\text{Pay Area (SY)} = \frac{[\text{Actual Tonnage} \times 2,000 \text{ Lbs/Ton}]}{[t \text{ (in)} \times G_{\text{mm,lot}} \times 43.3 \text{ (Lbs/SY-in)}]}$$

$$\text{Pay Area (SY)} = \frac{[4,000 \text{ Tons} \times 2,000 \text{ Lbs/Ton}]}{[6.5 \text{ in} \times 2.562 \times 43.3 \text{ Lbs/Ton-in}]}$$

$$\text{Pay Area (SY)} = \mathbf{11,095 \text{ SY}}$$

Specification Section 234-9 also states that the maximum pay area shall not exceed 105% of the designed surface area (i.e. plan quantity).

$$\begin{aligned} \text{Max. Pay Area} &= 1.05 \times \text{Designed Surface Area} \\ &= 1.05 \times 11,191 \text{ SY} \\ &= 11,751 \text{ SY} \end{aligned}$$

(For final payment purposes, we will use 11,095 SY instead of 11,191 SY for the CPF Adjustment, since it has been adjusted for the actual lot G_{mm}). The maximum pay area will not be used since it was not exceeded.

$$\begin{aligned} 4. \text{ Calculate the CPF Adjustment for the Entire LOT} \\ &- 0.11 \times \$56.95/\text{SY} = - \$6.26/\text{SY} \\ &11,095 \text{ SY} \times - \$6.26/\text{SY} = - \$69,454.70 \end{aligned}$$

A negative Line Item Adjustment of \$69,454.70 will be made in SiteManager for LOT 6.

NOTE: Calculations for CPF <80 or ≥ 75 ; or < 75; > 80 and asphalt exceeding 105% will also be calculated the same way. If the quantity placed exceeds the 105% limit, use **Attachment A**, Example 3 as a reference for deducting the CPF at the end of the asphalt placement by using the average CPF for all the LOTs that included this pay item, to calculate the adjustment.

ATTACHMENT C

CPF Calculations

(L) EXAMPLE (7): CPF Calculations for a Cubic Yard Pay Item

Asphalt treated permeable base is measured and paid for in cubic yards. Therefore, the quantity can be obtained from the Asphalt Roadway – Daily Report of Quality Control. Calculate the adjustment given the information below.

Given:

LOT 3, CPF of 1.05
Total Tonnage LOT 3 = 1,623.55 Tons;
Total Square Yards LOT 3 = 9,494.13 SY
Volume = 1,055 CY
Unit Price is \$240.05/CY

Solution:

1. Calculate the CPF Difference

$$1.05 - 1.00 = 0.05$$

2. Calculate the CPF Adjustment for the Entire LOT

$$0.05 \times \$240.05/\text{CY} = \$12.00/\text{CY}$$

$$1,055 \text{ CY} \times \$12.00/\text{CY} = \$12,660.00$$

A positive Line Item Adjustment will be made for \$12,660 in SiteManager for LOT 3

ATTACHMENT C

CPF Calculations

(M) EXAMPLE (8): CPF Documentation for Multiple FIN Projects, Under One Contract

All CPF's for asphalt produced and accepted for a particular item shall be reported under the lead FIN (see exception below). The quantities for each FIN will be determined by the PA, as the prorated amount determined from the pay item breakout as provided in the plan set. This will be done by taking the total tons shown for each FIN and dividing it by the total tons for the Contract, then multiplying this amount by the total tons placed for each CPF. This shall be done during the month the LOT is closed out and paid accordingly on the monthly progress estimate.

Given:

Project "A" shows 10,385.5 tons
Project "B" shows 21,466.0 tons
Total for Contract = 31,851.5 tons
Tons placed = 32,561.0 tons

CPF @ 105% (Lots 1, 3, & 10) = 9,650.0 tons
CPF @ 102% (Lots 2, 5, 6, 7, 8, & 9) = 20,923.0 tons
CPF @ 98% (Lot 4) = 1,988.0 tons

Calculate the tonnage for each CPF in Project "A" and Project "B".

Solution:

Project "A":

The tonnage for each CPF is determined by dividing the total Project "A" tonnage by the total tonnage for the entire contract and multiplying by the total tons for each CPF.

$$\text{CPF @ 105\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (9,650 \text{ tons}) = 3,146.5 \text{ tons}$$

$$\text{CPF @ 102\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (20,923.0 \text{ tons}) = 6,822.2 \text{ tons}$$

$$\text{CPF @ 98\%: } \left(\frac{10,385.5 \text{ tons}}{31,851.5 \text{ tons}} \right) (1,988.0 \text{ tons}) = 648.2 \text{ tons}$$

Project “B”:

Likewise, the tonnage for each CPF is determined by dividing the total Project “B” tonnage by the total tonnage for the entire contract and multiplying by the total tons for each CPF.

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (9,650 \text{ tons}) = 6,503.5 \text{ tons}$$

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (20,923 \text{ tons}) = 14,100.8 \text{ tons}$$

$$\text{CPF @ 105\%: } \left(\frac{21,466.0 \text{ tons}}{31,851.5 \text{ tons}} \right) (1,988 \text{ tons}) = 1,339.8 \text{ tons}$$

Contract Summary:

Verify the tonnages for each corresponding CPF for both Project “A” and Project “B” sum together to equal the contract tonnages used.

Total CPF @ 105% = 3,146.5 + 6,503.5 = 9,650.0 tons ✓

Total CPF @ 102% = 6,822.2 + 14,100.8 = 20,923.0 tons ✓

Total CPF @ 98% = 648.2 + 1339.8 = 1,988.0 tons ✓

NOTE 1: This may be done on Federal Aid participating and Non-Federal Aid participating projects. These pro-rated amounts shall be shown in a file attached electronically to the **Plan Summary Box** along with the calculations, or the calculation could be shown at the bottom of the **Plan Summary Box** for Construction Remarks and calculations.

NOTE 2: For this example: 32,561.0 tons placed by Contractor is within the 105% maximum of the adjusted plan quantity for the pay item, which is allowed per Specifications for conventional projects.

Exception: When an item is shown only on one FIN number, those tons will be reported on that FIN number. If the same pay item is shown on multiple FINs, but each has a different unit price, treat as different pay items.

ATTACHMENT D

Bituminous Adjustments on Conventional Projects


(A) EXAMPLE (1) (A): Form 700-050-66 – Set-Up Sheet by Contractor

Contractor's Certification of Quantities Asphalt Mixes with Modified and Unmodified Binders (Conventional Projects) Certification No. <u>18</u>			
Financial Project ID:	<u>12345615201</u>		
Contractor:	<u>Mr. ED'S ASPHALT CO., INC.</u>		
Contract Number:	<u>T1234</u>		
From (Mo/Day/Yr):	<u>05/22/19</u>	To (Mo/Day/Yr):	<u>06/11/19</u>
Asphalt Mixes with Unmodified Binders (PG 67 & Lower)			
Pay Item Number:	<u>337-3</u>	Quantity Placed:	<u>1000.0</u>
Pay Item Number:	<u>334-1</u>	Quantity Placed:	<u>1000.0</u>
Pay Item Number:	<u> </u>	Quantity Placed:	<u> </u>
Additional Gallons (ARMI*):	<u>500.0</u>		
Base Index Month:	<u>Jan-18</u>	Base Asphalt Price Index:	<u>15514</u>
Current Index Month:	<u>Jun-19</u>	Current Asphalt Price Index:	<u>2.2010</u>
		Asphalt Index Difference:	<u>0.5720</u>
Asphalt Mixes with Modified Binders (PG 76 & Higher)			
Pay Item Number:	<u>337-7</u>	Quantity Placed:	<u>1000.0</u>
Pay Item Number:	<u>334-1</u>	Quantity Placed:	<u>1000.0</u>
Pay Item Number:	<u> </u>	Quantity Placed:	<u> </u>
Base Index Month:	<u>Jan-18</u>	Base Polymer Price Index:	<u>2.0485</u>
Current Index Month:	<u>Jun-19</u>	Current Polymer Price Index:	<u>2.7946</u>
		Polymer Index Difference:	<u>0.6437</u>
Asphalt Material (ASPHALT TREATED PERMEABLE BASE)			
Pay Item Number:	<u>334-1</u>	Quantity Placed:	<u>500.0</u>
Base Index Month:	<u>Jan-18</u>	Base Asphalt Price Index:	<u>15514</u>
Current Index Month:	<u>Jun-19</u>	Current Asphalt Price Index:	<u>2.2010</u>
		Asphalt Index Difference:	<u>0.5720</u>
Navigation and Printing Functions			
<input type="button" value="Go To Main Sheet"/>		<input type="button" value="Go To Last Month Sheet"/>	
<input type="button" value="Save As Month Sheet"/>		<input type="button" value="Remove Last Month Sheet"/>	
<small>Effective January 2007 Letting FORM: 700-050-66 (2/09/2017)</small>			

ATTACHMENT D

Bituminous Adjustment on Conventional Projects

(B) EXAMPLE (1) (B): Form 700-050-66 – Contractor’s Certification of Quantities

STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION		FORM 700-050-66 CONSTRUCTION 2/97	
CONTRACTOR'S CERTIFICATION OF QUANTITIES			
ASPHALT MIXES WITH MODIFIED AND UNMODIFIED BINDERS			
(CONVENTIONAL PROJECTS)			
			CERTIFICATION NO.
			18
FINANCIAL PROJECT ID.	12345615201		
CONTRACTOR	Mr. ED'S ASPHALT CO., INC.		
CONTRACT NO.	T1234		
PERIOD REPRESENTED BY CERTIFICATION:			
FROM (MO/DAY/YR)	05/22/19	TO (MO/DAY/YR)	06/11/19
ASPHALT MIXES WITH UNMODIFIED BINDERS (PG 67 & LOWER)			
BASE PRICE INDEX:	1.5514	CURRENT PRICE INDEX:	2.2010
		INDEX DIFFERENCE:	0.5720
	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER	337-3	1,000.0	14,563
			\$8,333.47
PAY ITEM NUMBER	334-1	1,000.0	14,563
			\$8,333.47
PAY ITEM NUMBER			
GALLONS OF ASPHALT CEMENT USED IN MIX: *		29,138	\$16,666.34
ADDITIONAL GALLONS (ARMI):		500	\$286.00
TOTAL GALLONS:		29,638	
TOTAL MONTHLY PAYMENT:			\$16,952.34
ASPHALT MIXES WITH MODIFIED BINDERS (PG 76 & HIGHER)			
BASE PRICE INDEX:	2.0485	CURRENT PRICE INDEX:	2.7946
		INDEX DIFFERENCE:	0.6437
	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER	337-7	1,000.0	14,563
			\$9,378.07
PAY ITEM NUMBER	334-1	1,000.0	14,563
			\$9,378.07
PAY ITEM NUMBER			
TOTAL GALLONS OF POLYMER USED IN MIX: *		29,138	
TOTAL MONTHLY PAYMENT:			\$18,756.14
ASPHALT MATERIAL (ASPHALT TREATED PERMEABLE BASE)			
BASE PRICE INDEX:	1.5514	CURRENT PRICE INDEX:	2.2010
		INDEX DIFFERENCE:	0.5720
	TONNAGE	GALLONS	MONTHLY PAYMENT
PAY ITEM NUMBER	334-1	500.0	3,437
			\$2,000.28
TOTAL MONTHLY PAYMENT:			\$2,000.28
I certify that, based on my personal knowledge and well-founded belief following my own reasonable investigation, the tonnage and gallons (metric tonnage and liters) represented by this Certification are true and correct.			
 _____ Contractor's Authorized Agent		_____ Name of Company and e-mail address	