Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms

(2016) Quality Management - Intelligent Construction Technology Methods

G.1

The Contractor is required to complete the PMTP-101-102 and IC-108 forms and submit these forms to the Engineer. (See section S.xx.3.A.13.c of the special provisions for additional details.) These forms are populated using the results from the analyses that the Contractor completed within the Veta software.

The objective of these forms for the Engineeer are to:
1. provide a tool for tabulating price adjustments and
2. a means, in addition to the Veta projects, to watch for workmanship issues.

The following steps will provide explanations of the information contained within each tab of the workbook and items for review.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

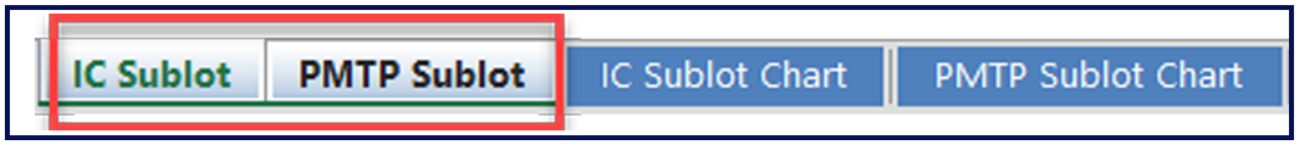
(2016) Quality Management - Intelligent Construction Technology Methods

No. of Rollers	Filter Group Name	Start Distance (ft)	Length (ft)	Actual Area (ft²)	Percent Covered (%)	Required Lot Area (ft²) (A)	Sublot Area Covered (ft²)						Sublot Area Covered (%)					
							5+ pass (B)	4 pass (C)	3 pass (D)	2 pass (E)	1 pass (F)	0 pass (G)	5+ pass (B/A)×100	4 pass (C/A)×100	3 pass (D/A)×100	2 pass (E/A)×100	1 pass (F/A)×100	0 p (G/A)
3	01 093019 TH25-HMA-L1-CL-12R	0	600	7180.9	99.7	7200	3288.7	1559.1	756.5	1503.1	73.4	19.1	45.7	21.7	10.5	20.9	1.0	0.
3	01 093019 TH25-HMA-L1-CL-12R	600	600	7192.1	99.9	7200	1399.8	2188.7	1729.6	1801.8	72.2	7.9	19.4	30.4	24.0	25.0	1.0	0.
3	01 093019 TH25-HMA-L1-CL-12R	1200	600	7142.3	99.2	7200	2231.0	1362.5	1564.1	1335.1	649.5	57.6	31.0	18.9	21.7	18.5	9.0	0.
3	01 093019 TH25-HMA-L1-CL-12R	1800	600	6966.9	96.8	7200	2703.9	1371.2	2405.2	210.3	276.2	232.8	37.6	19.0	33.4	2.9	3.8	3.
3	01 093019 TH25-HMA-L1-CL-12R	2400	600	7200.6	100.0	7201	1596.4	1567.8	2822.1	1170.9	74.7	0.0	22.2	21.8	39.2	16.3	1.0	0.
3	01 093019 TH25-HMA-L1-CL-12R	3000	600	7147.3	99.3	7200	1296.6	1610.1	2906.7	1319.0	14.9	52.7	18.0	22.4	40.4	18.3	0.2	0.
3	01 093019 TH25-HMA-L1-CL-12R	3600	600	7188.4	99.8						2.4	11.6	32.5	23.0	37.9	6.3	0.2	0.
3	01 093019 TH25-HMA-L1-CL-12R	4200	600	7167.2	99.5						.0	32.8	63.8	19.3	14.9	1.6	0.1	0.
3	01 093019 TH25-HMA-L1-CL-12R	4800	600	7102.5	98.6						1.2	97.7	30.8	25.3	31.7	10.5	0.3	1.
3	01 093019 TH25-HMA-L1-CL-12R	5400	600	7193.3	99.9	7200	5835.5	379.5	298.6	653.4	48.5	6.6	81.0	5.3	4.1	8.8	0.7	0.
3	01 093019 TH25-HMA-L1-CL-12R	6000	600	7193.3	99.9	7200	5550.9	522.6	377.0	557.5	185.4	6.6	77.1	7.3	5.2	7.7	2.6	0.
3	01 093019 TH25-HMA-L1-CL-12R	6600	600	7200.0	100.0	7200	5258.4	574.9	745.3	470.3	176.7	0.0	73.0	8.0	10.4	6.5	2.5	0.
3	01 093019 TH25-HMA-L1-CL-12R	7200	600	7146.1	99.2	7200	3598.5	996.7	1187.1	293.7	1070.1	54.1	50.0	13.8	16.5	4.1	14.9	0.
3	01 093019 TH25-HMA-L1-CL-12R	7800	600	6194.2	99.3	6237	1702.2	1722.1	1559.1	169.2	1041.5	43.2	27.3	27.6	25.0	2.7	16.7	0.
3	01 093019 TH25-HMA-L1-CL-12R	8400	600	5471.2	98.0	5583	3785.2	766.5	293.7	416.8	209.0	111.4	67.8	13.7	5.3	7.5	3.7	2.
3	01 093019 TH25-HMA-L1-CL-12R	9000	600	6919.6	96.1	7200	5716.4	420.6	379.5	354.6	48.5	280.4	79.4	5.8	5.3	4.9	0.7	3.
3	01 093019 TH25-HMA-L1-CL-12R	9600	523	6185.5	98.5	6277	4404.9	1121.1	496.5	141.9	21.2	91.4	70.2	17.9	7.9	2.3	0.3	1.
3	02 093019 TH25-HMA-L1-12L-CL	0	600	7174.7	99.6	7200	3041.1	980.5	1515.6	538.8	1098.7	25.3	42.2	13.6	21.0	7.5	15.3	0.
3	02 093019 TH25-HMA-L1-12L-CL	600	600	7200.0	100.0	7200	4256.8	1581.5	709.3	190.4	475.3	0.0	59.1	22.0	9.9	2.6	6.6	0.

Compactor Coverage Data

Filter Group Name	County	Start Distance (ft)	Length (ft)	Standard Deviation (°F)	Standard Deviation Category	TSV Index	TSV Index Category	Thermal Segregation Index	Thermal Segregation Category	Segregation Index (50:50)	Segregation Category (50:50)	Monetary Price Adjustment
01 093019 TH25-HMA-L1-CL-12R	Wright	0	150	11.49	Severe	20.7	Moderate	81	Severe	81.0	Severe	$ (31.00
01 093019 TH25-HMA-L1-CL-12R	Wright	150	150	13.63	Severe	48.2	Severe	100	Severe	100.0	Severe	$ (40.00
01 093019 TH25-HMA-L1-CL-12R	Wright	300	150	8.09	Moderate	0.0	Low	35	Moderate	34.6	Moderate(+)	$ 15.00
01 093019 TH25-HMA-L1-CL-12R	Wright	450	150	5.89	Moderate	0.3	Low	26	Low	25.7	Low	$ 24.00
01 093019 TH25-HMA-L1-CL-12R	Wright	600	150	7.24	Moderate	3.8	Low	37	Moderate	36.8	Moderate(+)	$ 13.00
01 093019 TH25-HMA-L1-CL-12R	Wright	750	150	7.15	Moderate	8.2	Low	43	Moderate	43.2	Moderate(+)	$ 7.00
01 093019 TH25-HMA-L1-CL-12R	Wright	900	150	7.37	Moderate	9.8	Low	47	Moderate	46.6	Moderate(+)	$ 3.00
01 093019 TH25-HMA-L1-CL-12R	Wright	1050	150	8.98	Moderate	21.9	Moderate	72	Severe	72.1	Severe	$ (22.00
01 093019 TH25-HMA-L1-CL-12R	Wright								Moderate	61.9	Moderate(-)	$ (12.00
01 093019 TH25-HMA-L1-CL-12R	Wright								Moderate	36.4	Moderate(+)	$ 14.00
01 093019 TH25-HMA-L1-CL-12R	Wright								Moderate	57.0	Moderate(-)	$ (7.00
01 093019 TH25-HMA-L1-CL-12R	Wright	1650	150	3.85	Low	1.0	Low	18	Low	18.0	Low	$ 32.00
01 093019 TH25-HMA-L1-CL-12R	Wright	1800	150	8.74	Moderate	24.4	Moderate	75	Severe	75.0	Severe	$ (25.00
01 093019 TH25-HMA-L1-CL-12R	Wright	1950	150	6.86	Moderate	8.5	Low	42	Moderate	42.4	Moderate(+)	$ 8.00
01 093019 TH25-HMA-L1-CL-12R	Wright	2100	150	11.63	Severe	47.7	Severe	100	Severe	100.0	Severe	$ (40.00
01 093019 TH25-HMA-L1-CL-12R	Wright	2250	150	10.94	Severe	55.2	Severe	100	Severe	100.0	Severe	$ (40.00
01 093019 TH25-HMA-L1-CL-12R	Wright	2400	150	10.61	Severe	29.6	Severe	91	Severe	91.0	Severe	$ (40.00
01 093019 TH25-HMA-L1-CL-12R	Wright	2550	150	8.63	Moderate	35.8	Severe	92	Severe	92.0	Severe	$ (40.00
01 093019 TH25-HMA-L1-CL-12R	Wright	2700	150	8.79	Moderate	30.7	Severe	85	Severe	84.9	Severe	$ (35.00

Thermal Profiler Segregation Data

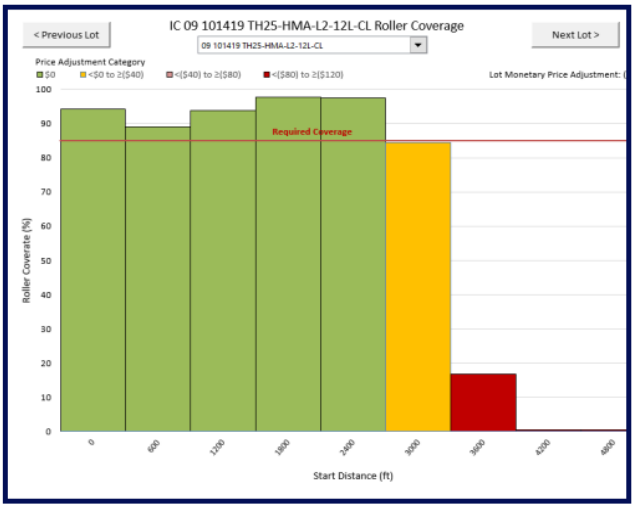


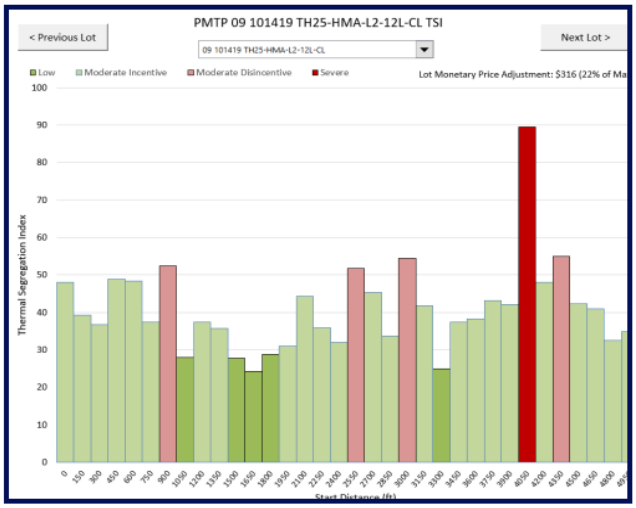
G.2 The **IC and PMTP Sublot tabs** contain roller coverage and thermal segregation results, respectively, per sublot and each data lot. These values are generated using Veta and imported into this form by the Contractor.

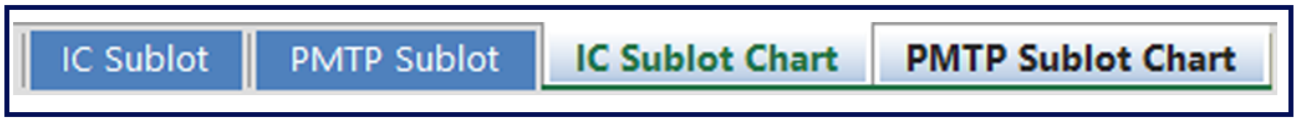
Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods







G.3 The **Sublot Chart tabs** contain bar graphs of the **roller coverage and thermal segregation index per sublot and per data lot (filter group)**. The *previous and next buttons and Filter Group Dropdown* list, at the top of the screen, allow the user to navigate between different filter groups.

These bar graphs are a useful quality control / assurance tool. For example, one might note high levels of thermal segregation during the morning hours of paving, however, the thermal segregation may significantly decrease in the afternoon due to modifications that were made. Or, one paving day has significantly more segregation than another. What production and/or placement activities changed to result in this?

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods

Filter Group Name	Required Lot Area (ft^2)	Lot Roller Coverage (ft^2)	Lot Percent Coverage (%)	Number of Sublots					Percent of Sublots				Intelligent Compaction Lot Length (ft)	Monetary Price Adjustment	
				Monetary Price Adjustment Category				Total	Monetary Price Adjustment Category					Lot	Cumulative Lots
				$0	<$0 to ≥($40)	<($40) to ≥($80)	<($80) to ≥($120)		$0	<$0 to ≥($40)	<($40) to ≥($80)	<($80) to ≥($120)			
01 093019 TH25-HMA-L1-CL-12R	118,897	102,148	85.9	10	6	1	0	17	58.8	35.3	5.9	0.0	10,123	$ (164.00)	$ (164.00)
02 093019 TH25-HMA-L1-12L-CL	118,631	97,768	82.4	10	2	3	2	17	58.8	11.8	17.6	11.8	10,101	$ (427.00)	$ (591.00)
03 100219 TH25-HMA-L1-CL-12R	68,712	55,250	80.4	3	6	[illegible]	[illegible]	[illegible]	[illegible]	60.0	0.0	10.0	5,726	$ (178.00)	$ (769.00)
04 100219 TH25-HMA-L1-12L-CL	31,956	25,563	80.0	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0	0.0	25.0	2,663	$ (161.00)	$ (930.00)
05 100419 TH25-HMA-L1-CL-12R	129,530	114,585	88.5	15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	16.7	0.0	0.0	11,051	$ (90.00)	$ (1,020.00)
06 100419 TH25-HMA-L1-12L-CL	142,744	127,316	89.2	14	6	0	0	20	70.0	30.0	0.0	0.0	12,152	$ (110.00)	$ (1,130.00)
07 100819 TH25-HMA-L2-CL-12R	275,174	264,629	96.2	36	3	0	0	39	92.3	7.7	0.0	0.0	23,146	$ (27.00)	$ (1,157.00)
08 101119 TH25-HMA-L2-12L-CL	209,942	174,095	82.9	15	5	9	1	30	50.0	16.7	30.0	3.3	17,710	$ (683.00)	$ (1,840.00)
09 101419 TH25-HMA-L2-12L-CL	63,959	41,265	64.5	5	1	0	3	9	55.6	11.1	0.0	33.3	5,330	$ (348.00)	$ (2,188.00)

Compactor

Filter Group Name	County	Number of Sublots					Percent of Sublots				Thermal Profile Lot Length (ft)	Monetary Price Adjustment	
		Thermal Segregation Category				Total	Thermal Segregation Category					Lot	Cumulative Lots
		Low	Moderate Incentive	Moderate Disncentive	Severe		Low	Moderate Incentive	Moderate Disincentive	Severe			
01 093019 TH25-HMA-L1-CL-12R	Wright	4	22	12	29	67	6.0	32.8	17.9	43.3	10,108	$ (829.00)	$ (829.00)
02 093019 TH25-HMA-L1-12L-CL	Wright	3	17	24	23	67	4.5	25.4	35.8	34.3	10,088	$ (698.00)	$ (1,527.00)
03 100219 TH25-HMA-L1-CL-12R	Wright	1	22	[illegible]	[illegible]	[illegible]	[illegible]	57.9	18.4	21.1	5,717	$ (119.00)	$ (1,646.00)
04 100219 TH25-HMA-L1-12L-CL	Wright	0	7	[illegible]	[illegible]	[illegible]	[illegible]	38.9	33.3	27.8	2,653	$ (161.00)	$ (1,807.00)
05 100419 TH25-HMA-L1-CL-12R	Wright	7	35	21	10	73	9.6	47.9	28.8	13.7	10,885	$ (29.00)	$ (1,836.00)
06 100419 TH25-HMA-L1-12L-CL	Wright	8	32	27	13	80	10.0	40.0	33.8	16.3	12,018	$ (205.00)	$ (2,041.00)
07 100819 TH25-HMA-L2-CL-12R	Wright	18	66	45	25	154	11.7	42.9	29.2	16.2	23,129	$ (14.00)	$ (2,055.00)
08 101119 TH25-HMA-L2-12L-CL	Wright	27	72	15	3	117	23.1	61.5	12.8	2.6	17,543	$ 1,279.00	$ (776.00)
09 101419 TH25-HMA-L2-12L-CL	Wright	5	25	4	1	35	14.3	71.4	11.4	2.9	5,322	$ 316.00	$ (460.00)

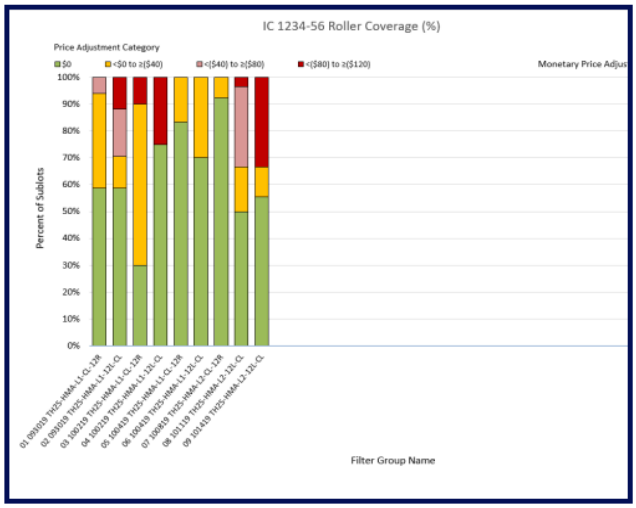
Thermal Profile

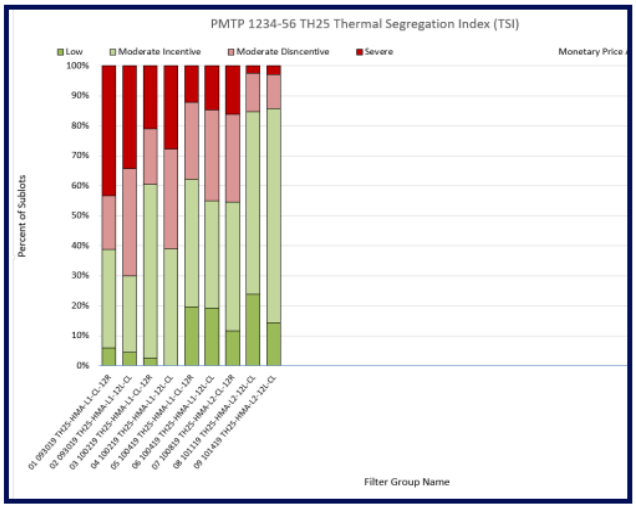
G.4 The **IC and PMTP Lot tabs** contain the roller coverage and thermal segregation results, respectively, and the *price adjustments* **per data lot.** This information is calculated using the sublot information contained in the IC and PMTP Sublot tabs.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods





G.5 The **Lot Chart tabs** contain stacked bar graphs summarizing each data lot (filter group).

The **IC Lot chart** provides stacked bars indicating the percentage of sublots with the following disincentive ranges for roller coverage: $0, < $0 to >= -$40, < -$40 to >= -$80 and < -$80 to >= -$120.

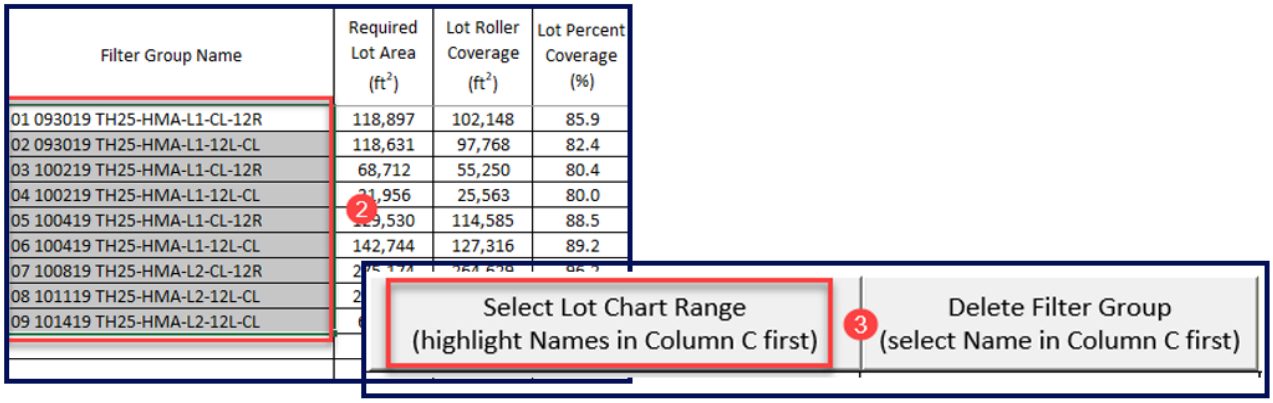
The **PMTP Lot Chart** provides stacked bars indicating the percentage of sublots with low, moderate-low, moderate-severe and severe thermal segregation.

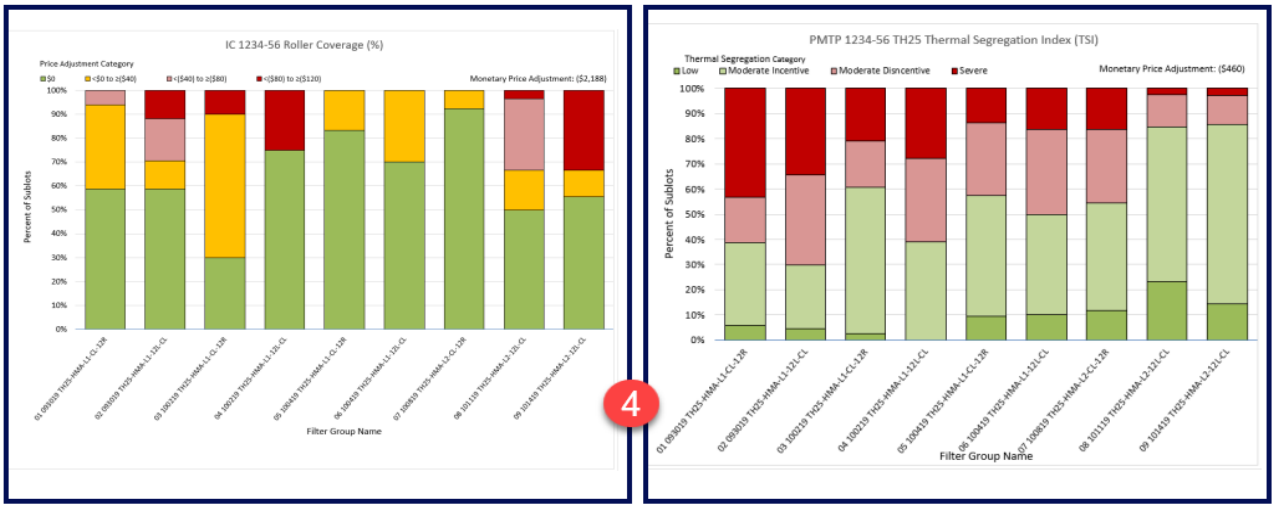
If desired, follow the details outlined in the next step to adjust the scaling of these charts. This will allow the data currently being plotted, or a subset of the data lots, to use the entire graphing space.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods





G.6

1. **Select** the *IC or PMTP Lot tab*.
2. **Select** the desired *filter groups (data lots)* to be plotted in the data lot charts.
3. **Select** the "*Select Lot Chart Range*" button located at the top of the form.
4. The **IC and PMTP Lot Charts** will *update* accordingly.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods

DEPARTMENT OF TRANSPORTATION

Minnesota Department of Transportation **Lane Miles Calculation for Form PMTP-101 | 04/2**

(2016) Quality Management - Paver Mounted Thermal Profile Method

Route List

S.P. / S.A.P.: 1234-56 TH25

Contractor: Contractor

Project Engineer: Engineer

Prepared By: Class

PMTP System: Moba

Veta Version 6.0.100

Route	Material	Lift Number	Net Lane Miles (LM)	Comments
TH25	HMA	L1	9.6	
TH25	HMA	L2	8.7	

PMTP LM | PMTP CA

G.7 The **PMTP LM (lane mile) tab** contains the net lane miles per route, material type, and lift. This tab requires completion by the Contractor for projects requiring the PMTP method.

Veta does not currently calculate percent coverage values per sublot for PMTP data, and consequently, the total thermal profile length and net lanes miles are used for calculation of this value. This form will auto-populate the Route, Material and Lift numbers using the imported filter group data. The user is required to **enter** the *net lane* for projects requiring the PMTP technology.

It is important to ensure that the Contractor has entered the correct net lanes miles into this form, as these values will affect the thermal coverage calculation and final price adjustment amount.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods

Minnesota Department of Transportation (MnDOT)

(2016) Quality Management - Paver Mounted Thermal Profile Method

Coverage Adjustment for Form PMTP-101

4/23/2020

DEPARTMENT OF TRANSPORTATION

Enter the start and end limits for areas affected by approved System Failures

Leave Blank if there are no approved System Failures

Summarize Data

Date	Lot Name	Station Start	Station End	Excluded Length (ft)	Description

PMTP LM | PMTP CA

G.8 As stated in the previous step, Veta cannot currently calculate percent coverage per sublot for the PMTP method, and therefore, in addition to net lane miles, the limits of system failures are also required for use in the coverage calculation.

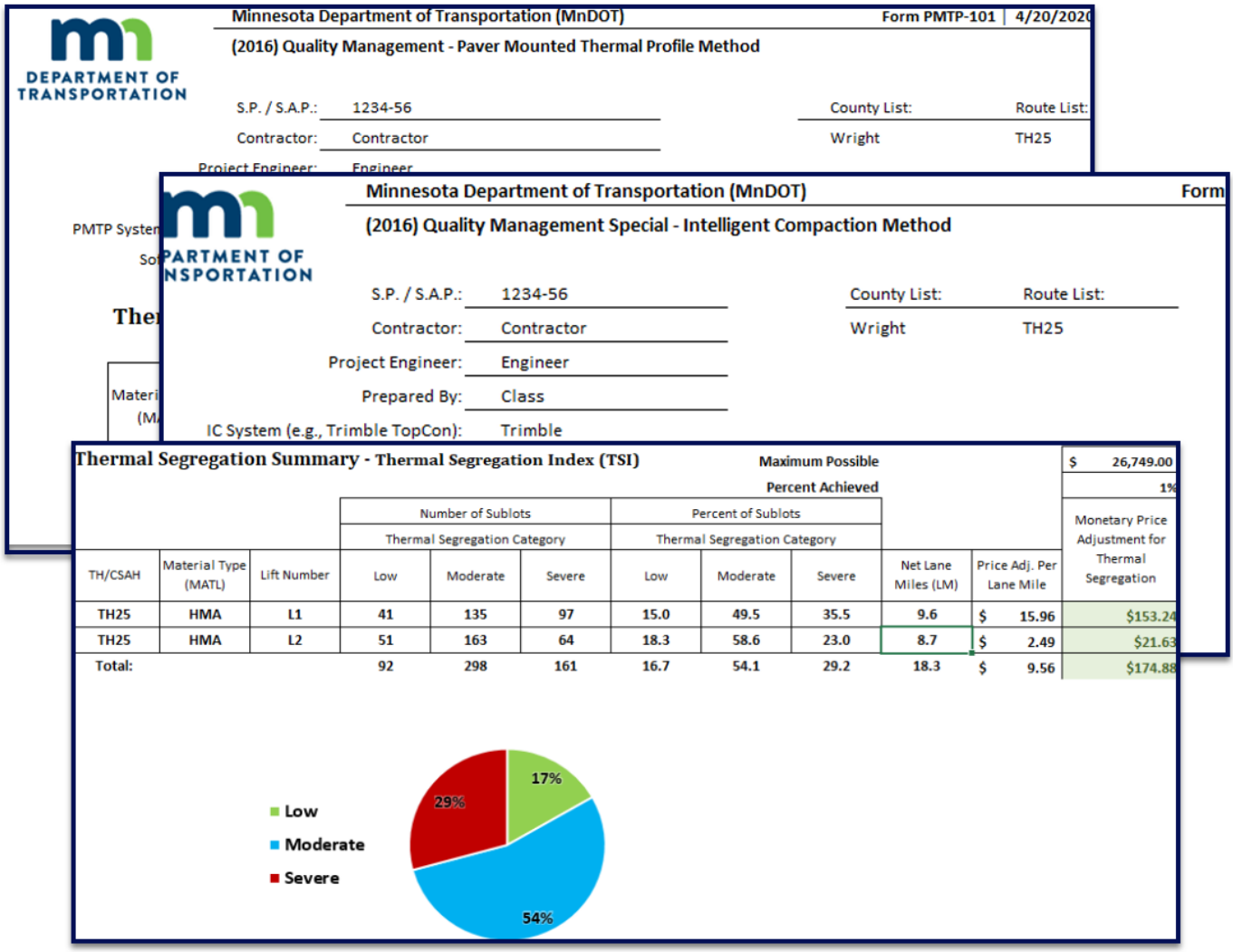
The Contractor enters system failure limits into this tab.

It is important to ensure that the Contractor has entered accurate information into this form and that the system failures were indeed reported to the Engineer. These values will affect the thermal coverage calculation and final price adjustment amount.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods



Minnesota Department of Transportation (MnDOT) — Form PMTP-101 | 4/20/2020

(2016) Quality Management - Paver Mounted Thermal Profile Method

S.P. / S.A.P.: 1234-56 — County List: Wright — Route List: TH25

Contractor: Contractor

Project Engineer: Engineer

Minnesota Department of Transportation (MnDOT) — Form

(2016) Quality Management Special - Intelligent Compaction Method

S.P. / S.A.P.: 1234-56 — County List: Wright — Route List: TH25

Contractor: Contractor

Project Engineer: Engineer

Prepared By: Class

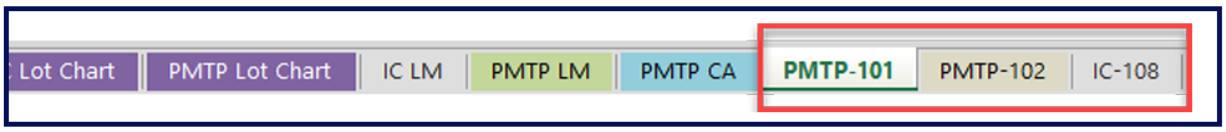
IC System (e.g., Trimble TopCon): Trimble

Thermal Segregation Summary - Thermal Segregation Index (TSI)

Maximum Possible: $ 26,749.00

Percent Achieved: 1%

TH/CSAH	Material Type (MATL)	Lift Number	Number of Sublots – Thermal Segregation Category: Low	Moderate	Severe	Percent of Sublots – Thermal Segregation Category: Low	Moderate	Severe	Net Lane Miles (LM)	Price Adj. Per Lane Mile	Monetary Price Adjustment for Thermal Segregation
TH25	HMA	L1	41	135	97	15.0	49.5	35.5	9.6	$ 15.96	$153.24
TH25	HMA	L2	51	163	64	18.3	58.6	23.0	8.7	$ 2.49	$21.63
Total:			92	298	161	16.7	54.1	29.2	18.3	$ 9.56	$174.88

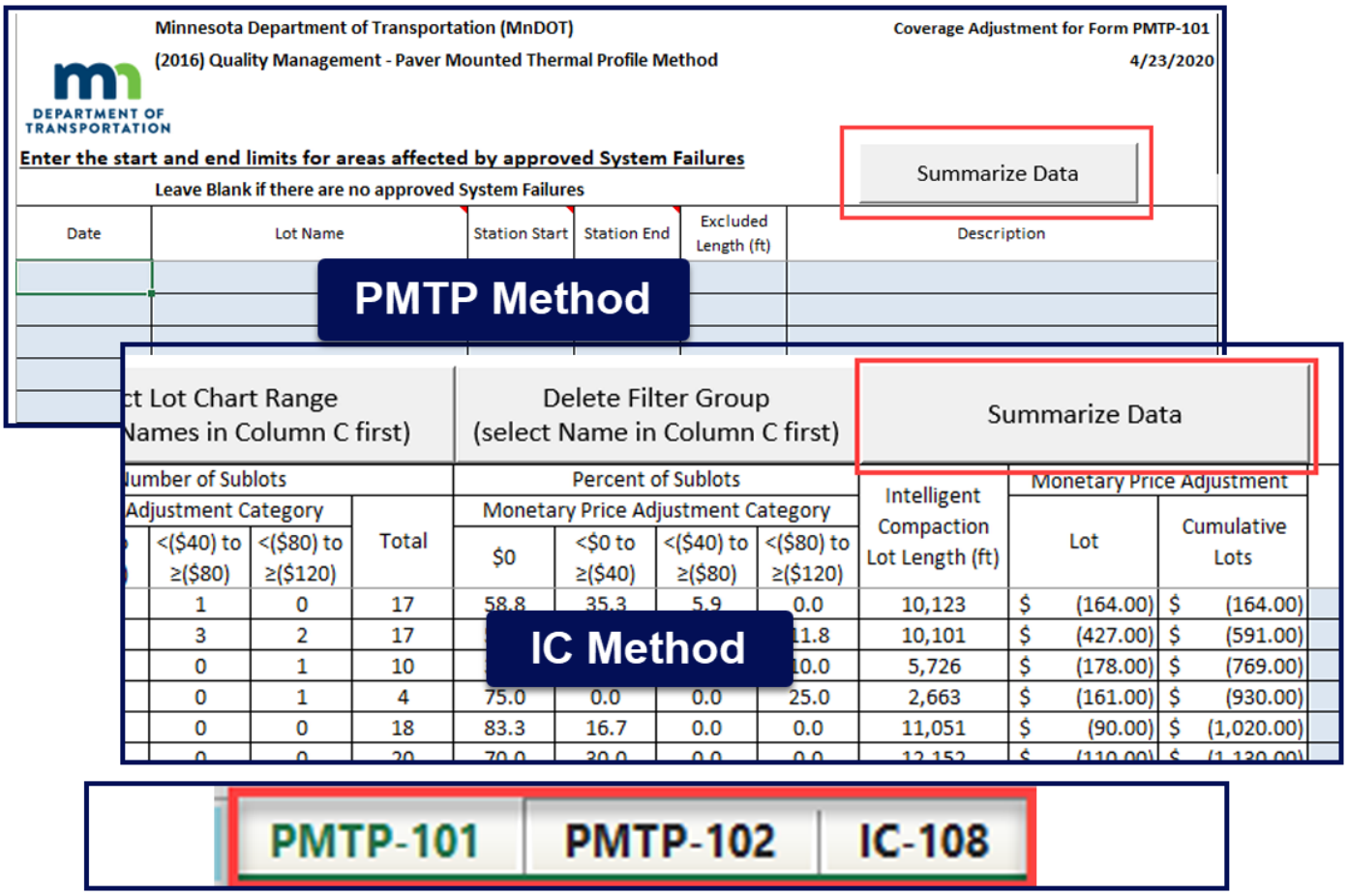


G.9 Select the PMTP-101, PMTP-102, or IC-108 tab to see the summarized results and total price adjustments. See the details of step G.10, if there is no data populated within these tabs.

Veta Project Creation Workflow

Module G | Agency - Review PMTP-101-102 and IC-108 Forms (Cont.)

(2016) Quality Management - Intelligent Construction Technology Methods



G.10 If there are no values showing in these forms, the data might still require summarization after import by the Contractor. If no data is present, complete the following steps:

For the PMTP Method:

Select the *PMTP CA tab* and **select** the *Summarize Data button*. Ensure that the net lane miles have been entered in the PMTP LM tab, if data still does not populate after summarizing the data.

For the IC Method:

Select the *IC Lot tab* and **select** the *Summarize Data button*.