STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
16 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0016

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISIONER

March 26, 2019
Subject: Pavement Milling, HMA Overlay
With Drainage & Safety Improvements
State WIN: 022468.00
Location: **Searsport & Stockton Springs**
Amendment No. 1

Dear Sir/Ms.:

Please make the following changes to the Bid Documents:

In the Bid Book:

REMOVE pages 17 - 20, Proposal Schedule of Items, 4 pages, dated 2/27/ 2019 and **REPLACE** with attached, revised Proposal Schedule of Items, 4 pages, dated, 3/25/2019.

REMOVE pages 96 – 99, SPECIAL PROVISION – SECTION 400 – HOT MIX ASPHALT PAVEMENTS - (Hot Mix Asphalt Continuous Thermal Profiling), 4 pages, dated January 31, 2019 and **REPLACE** with attached, revised SPECIAL PROVISION – SECTION 400 – HOT MIX ASPHALT PAVEMENTS - (Hot Mix Asphalt Continuous Thermal Profiling), 4 pages, dated February 11, 2019.

The following question has been received:

Question: The contract book contains a special provision section 400, Hot Mix Asphalt Continuous Thermal Profiling Specification. There is no bid item for 401.10 – Hot Mix Asphalt Continuous Thermal Profiling, will this be required on this contract?

Response: Yes, Bid Item 401.10 – Hot Mix Asphalt Continuous Thermal Profiling is required.

Consider these changes and information prior to submitting your bid on **March 27, 2019**.

Sincerely,

FOR

George M. A. Macdougall P.E.
Contracts & Specifications Engineer

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 022468.00 **Project(s):** 022468.00

SECTION: 1 HIGHWAY ITEMS

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0010	202.202 REMOVING PAVEMENT SURFACE	12,900.000 SY				
0020	202.203 PAVEMENT BUTT JOINTS	740.000 SY				
0030	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	10.000 CY				
0040	401.10 HOT MIX ASPHALT CONTINUOUS THERMAL PROFILING	LUMP SUM	LUMP SUM			
0050	403.209 HOT MIX ASPHALT 9.5 MM (SIDEWALKS, DRIVES, INCIDENTALS)	100.000 T				
0060	403.2101 9.5 MM POLYMER MODIFIED HMA	8,170.000 T				
0070	403.211 HOT MIX ASPHALT (SHIMMING)	4,500.000 T				
0080	409.15 BITUMINOUS TACK COAT - APPLIED	6,600.000 G				
0090	410.151 EMULSIFIED ASPHALT SEALCOAT, APPLIED	3,700.000 SY				
0100	411.10 UNTREATED AGGREGATE SURFACE COURSE (TRUCK MEASURE)	10.000 CY				
0110	424.22 ASPHALT RUBBER CRACK SEALER TYPE 2, APPLIED	8,000.000 LB				
0120	511.07 COFFERDAM: DOWNSTREAM	LUMP SUM	LUMP SUM			

Maine Department of Transportation

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SECTION: 1 HIGHWAY ITEMS

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	 Cents	Bid Amount Dollars	 Cents
0130	511.07 COFFERDAM: UPSTREAM	 LUMP SUM	LUMP SUM		_____	.____
0140	603.41 24 INCH REINFORCED CONCRETE PIPE CLASS IV	64.000 LF	_____	.____	_____	.____
0150	603.55 CONCRETE PIPE TIES	8.000 GP	_____	.____	_____	.____
0160	604.18 ADJUSTING MANHOLE OR CATCH BASIN TO GRADE	8.000 EA	_____	.____	_____	.____
0170	606.178 GUARDRAIL BEAM	12.500 LF	_____	.____	_____	.____
0180	606.353 REFLECTORIZED FLEXIBLE GUARDRAIL MARKER	36.000 EA	_____	.____	_____	.____
0190	606.362 GUARDRAIL ADJUSTED	1,350.000 LF	_____	.____	_____	.____
0200	609.31 CURB TYPE 3	3,330.000 LF	_____	.____	_____	.____
0210	610.08 PLAIN RIPRAP	30.000 CY	_____	.____	_____	.____
0220	613.319 EROSION CONTROL BLANKET	2,400.000 SY	_____	.____	_____	.____
0230	618.14 SEEDING METHOD NUMBER 2	314.000 UN	_____	.____	_____	.____
0240	619.12 MULCH	314.000 UN	_____	.____	_____	.____

Maine Department of Transportation

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SECTION: 1 HIGHWAY ITEMS

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0250	620.56 DRAINAGE GEOTEXTILE	112.000 SY				
0260	627.18 12 " SOLID WHITE PAVEMENT MARKING	1,283.000 LF				
0270	627.75 WHITE OR YELLOW PAVEMENT & CURB MARKING	360.000 SF				
0280	627.78 TEMPORARY 4 INCH PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW	135,636.000 LF				
0290	629.05 HAND LABOR, STRAIGHT TIME	250.000 HR				
0300	631.12 ALL PURPOSE EXCAVATOR (INCLUDING OPERATOR)	250.000 HR				
0310	631.172 TRUCK - LARGE (INCLUDING OPERATOR)	500.000 HR				
0320	631.32 CULVERT CLEANER (INCLUDING OPERATOR)	8.000 HR				
0330	639.19 FIELD OFFICE TYPE B	1.000 EA				
0340	652.33 DRUM	80.000 EA				
0350	652.34 CONE	280.000 EA				

Maine Department of Transportation

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SECTION: 1 HIGHWAY ITEMS

Alt Set ID: **Alt Mbr ID:**

Contractor: _____

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
0360	652.35 CONSTRUCTION SIGNS	1,390.000 SF				
0370	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	90.000 CD				
0380	652.38 FLAGGER	3,000.000 HR				
0390	652.41 PORTABLE CHANGEABLE MESSAGE SIGN	3.000 EA				
0400	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM	LUMP SUM			
0410	659.10 MOBILIZATION	LUMP SUM	LUMP SUM			

Section: 1 **Total:**

Total Bid:

SPECIAL PROVISION
SECTION 400
HOT MIX ASPHALT PAVEMENTS
(Hot Mix Asphalt Continuous Thermal Profiling)

Description The Contractor shall use a paver mounted continuous thermal profiler (CTP) to automatically measure, record and store the surface temperature of the HMA mat immediately behind the paver screed during all paving operations within the project traveled way. An infrared temperature measurement scanner shall be used to provide the thermal profile information including real time material temperatures and measurement locations. The system shall include a display that allows the field staff to view a continuous pavement surface temperature Contour Plot for Quality Control purposes.

The purpose is to demonstrate CTP technology, to evaluate the benefits and effectiveness of CTP technology for improving pavement quality and compaction processes, and to investigate how CTP data can be used as part of a performance specification. The CTP data will not be used for approval or rejection of the project materials. It is expected that the Contractor will utilize the CTP data as part of the project QC activities. The Contractor shall review the thermal profile results daily and shall discuss potential improvements to paving operations with the Department. The Department shall accept all pavement work under the existing Quality Assurance provisions as specified in Standard Specification 106 and Special Provision 401.

Definitions:

Contour Plot --- a graphic display of data using contour lines and/or color scales.
Distance Measuring Instrument (DMI) --- a sensor attached to a wheel on the paver to calculate distance and velocity.
Temperature Differential --- the difference between the statistical 98.5 percentile temperature and the statistical 1 percentile temperature within a thermal profile
Thermal Coverage (TC) --- the percent of the total coverage area, for the given pavement lift, where thermal profiling measurements (meeting the requirements of this special provision) are collected and stored.
Thermal profiles --- set of infrared temperature measurements behind the paver and across the entire mat width at maximum one foot intervals, evaluated in 150 foot sublots.
Traveled Way --- the portion of the roadway that is intended for the movement of vehicles, exclusive of shoulders and auxiliary lanes

I. Equipment Requirements

The Contractor shall purchase or lease a CTP for this pilot project and shall be responsible for the operation of the CTP including calibrating per the manufacturer's recommendations, providing an on-site individual for daily operation and data collection (start and stop locations, new lifts, etc.), data sharing with the Department and any other activities related to CTP. The manufacturer shall provide a technical representative to be on site to provide assistance during initial set up, pre-construction verification, and data management and processing, as needed during the project.

The scanner system shall be post mounted on the back of the paver and capable of taking thermal profile measurements within 10 feet of the back of the paver screed across the entire pavement width. Distance traveled, pavervelocity, and location and duration of paver stops shall be measured using a DMI and global positioning system during collection of the thermal profile. The thermal profile system shall function independently from the paving crew during normal paving operations.

All pavers used for traveled way paving must be instrumented. The field documentation system shall display in real time a contour plot of the thermal profiles, total distance travelled, paver speed and location in terms of station and/or GNSS coordinates. It shall provide real time statistical summaries of the thermal profiles, have the ability to manually export data using a removable media device and allow field staff to enter stations and the pavement lift currently being evaluated. The system shall support English units for distance in data incrementing or decrementing modes from a selected starting point and relate the longitudinal distance to any test point. The system may also report in station format. The CTP system shall also meet the requirements of Table 1 below:

TABLE 1: Continuous Thermal Profiler System Requirements

Parameter	**Requirement**
Longitudinal and Lateral Intervals Measurements	≤ 1-ft intervals---Tolerance of +/- 1 inch
Measurement Width	Driving travel lane paved in one (1) pass.
Infrared Temperature Scanner/Sensor	Range: 32°F to 480°F Accuracy: ± 3.6°F or ± 2.0% of the sensor reading, whichever is greater.
GPS	Accuracy of measurements on the HMA mat: ± 4 feet in the X and Y Direction

The CTP software shall meet the following requirements:

(1) Viewing/export software for analysis.

(2) The Manufacturer's Software and Storage must automatically collect, display, record, save, and analyze the mat temperature readings which include locations, paver starts, stops, and times during pavement placement. The software must also be able to export the thermal profile data meeting the requirements of Table 2:

TABLE 2: Thermal Profile Data Header Requirements

Item No.	**Description**	**Example Data included in Header**
1	Section Title	Highway 201
2	Machine Manufacture	ABC Company
3	Machine Model	Temp Scanner
4	Lateral Spacing between temperature measurements (inch)	Maximum of 12
5	Longitudinal Spacing between temperature measurements (inch)	Maximum of 12
6	Distance between the infrared temperature system scanner and hot mix asphalt mat (feet)	Variable

(3) The Manufacturer's software shall also provide the following items:

a.) Filtering by sensor/sensor location.

b.) Display through a map/graph---the thermal profile across the full pavement width and with respect to a defined segment/sublot length.

c.) Display the paver speed, and all paver stops (location and duration).

d.) Display total paving lengths and durations.
e.) Automatically determine the temperature differential of each thermal profile and allow the operator access to review the summary indices while maintaining continuous profile data collection.
f.) Automated thermal profile testing shall continue until the operator selects to stop data collection.

(4) The thermal profiling data must
a.) Be exportable as dbase ASCII (or Text Format) or directly into Veta.
b.) Have a time stamp of mapped and exported data (reflective of the time zone where the data is collected).
c.) Meet the requirements of Table 3 below:

TABLE 3: Required Fields for Each Data Point

Item No.	Date Field Name	Data Format Examples
1	Date Stamp (YYYYMMDD)	20160115
2	Time Stamp (HHMMSS.S -military format)	090504.0 (9 hr. 5 min. 4.0 s.)
3	Longitude (decimal degrees, with at least 6 significant digits)	69.765304
4	Latitude (decimal degrees, with at least 6 significant digits)	45.323573
5	Distance (feet)	1.0
6	Direction heading (degree angle, clockwise from the north)	45
7	Speed (ft/min)	30.0
8	Surface temp at each measurement location (°F)	290

II. Construction Requirements

The CTP system will be installed and operated by the Contractor. The Contractor needs to ensure that there are no obstructions located in the infrared temperature scanner measurement area during paving operations. Field staff should also refrain from standing or working in the measurement area. However, if work is required in the measurement area to improve the pavement quality, it should be done in a timely manner and the field staff should provide the Department documentation of these critical work location(s).

The Department shall verify that the infrared scanner and GPS are functioning properly prior to work each day and at other times as needed. Thermal profiles will be collected on the travel lanes for the surface course. Thermal profile data shall be transferred directly from the CTP system removable media device to the Department and to the CTP software by the Contractor at the end of daily paving. The Contractor will inform the Department immediately when a CTP system failure occurs and provide a method and time to correct the deficiency. A CTP system failure is defined as any one of the following items:

1) The infrared scanner fails to function properly
2) The GPS unit fails to function properly

III. Reporting Requirements

The Contractor shall provide a report of thermal profile results to the Department by 1:00 PM on the day following paving, unless other arrangements are made with the Resident. The report shall contain the following information at a minimum:

1) Project WIN and town

2) Paving date, start time, and end time
3) Layer (base, intermediate, surface)
4) Item number
5) Beginning location and ending location
6) Total number of thermal profile sublots
7) Temperature distribution plot
8) Location and duration of each paver stop greater than 1 minute
9) Sublot number and beginning and ending location of each sublot categorized as either Moderate or Severe thermal segregation, as described in Table 4 below.

Each thermal profile sublot shall be categorized as Low, Moderate, or Severe by comparing the sublot Temperature Differential to the ranges listed in Table 4.

TABLE 4: Thermal Segregation Categories

Sublot Temperature Differential (°F)	**Thermal Segregation Category**
< 25.0	Low
25.0 to 50.0	Moderate
> 50.0	Severe

If two or more sublots in a day's paving are categorized as having Severe thermal segregation, the Contractor shall notify the Resident in writing of proposed corrective action.

IV. Method of Measurement

A pay adjustment shall be made for Thermal Coverage on the traveled way surface course. The Department will calculate the pay adjustment for the wearing surface thermal coverage using the criteria in Table 5.

TABLE 5: Pay Adjustment for Thermal Coverage

Thermal Coverage (%)	**Total Price Adjustment Wearing Course**
≥ 90	No Price Adjustment
< 90	Total Pay Adjustment = [(TC-90%)/(90%)] × Thermal Profile Unit Price where: TC = Thermal Coverage for the wearing course, % (reported to the tenth)

V. Basis of Payment

All costs will be paid for by the lump sum to include purchasing or leasing the equipment, collecting and providing the data to the Department and other items as described in this special provision.

Pay Item	Pay Unit
Item 401.10 - Hot Mix Asphalt Continuous Thermal Profiling	Lump Sum