



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

Janet T. Mills
GOVERNOR

Bruce A. Van Note
COMMISSIONER

May 1, 2023

Subject: Placement of Plant mix Recycled Asphalt

State WIN: 020818.00

Location: **Cherryfield & Deblois**

Amendment No. 2

Dear Sir/Ms.:

Make The following changes to the bid documents

In the Bid Book:

Remove Pages eleven to twelve titled Proposal Schedule of items dated 4/3/2023 totaling two pages and **Replace** with the attached Proposal Schedule of items Dated 5/1/2023 totaling two pages

Remove Pages Thirty-three to thirty five titled Construction notes April 3, 2023 totaling three pages and **Replace** with the attached Construction notes totaling four pages.

Removes pages Forty-nine to Sixty totaling twelve pages and **Replace** with the attached Section 311 Cold In-Place Recycled Asphalt Pavement totaling twelve pages.

Insert SPECIAL PROVISION SECTION 311 Cold In-Place Recycled Pavement (with Foamed Asphalt)

Insert SPECIAL PROVISION SECTION 311 Cold In-Place w/ Emulsion

The following questions have been received:

Question: Does the state anticipate placing the Plant Mixed RAP in 2 courses? One prior to CIPR and one after CIPR to correct cross slope?

Response: The Department anticipates placing the PMRAP in one lift in most locations prior to the CIPR operation. There may be some locations requiring multiple lifts but they would be limited and isolated. The PMRAP placement is intended to be placed in locations and at depths required to

substantially correct existing cross slope, profile, and provide material for widening for shoulders prior to the CIPR operation. The placement of PMRAP on top of the CIPR surface is not anticipated.

Question: What happens to the excess excavated material after grading shoulders?

Response: Excess material created from the shoulder box out areas shall be removed or graded to an approximate 3:1 slope after the shoulder PMRAP placement.

Question: Can you use barrels for shoulder box out?

Response: The project must be properly channelized during construction. The anticipated drop off at the edge of travel way may exceed 3 inches. Should the drop off at edge of travel way exceed 3 inches the Contractor may be required to box the shoulders immediately prior to placing PMRAP in the same closure or place PMRAP before opening the section to traffic.

Question: What treatment occurs where shoulders are ditches?

Response: According to the Departments field measurements adequate width exists to construct a 11 foot travelway and 3 foot shoulder in all areas. If an existing ditch exists those ditched will be recreated. If an existing ditch does not exist in a location requiring a ditch, a new ditch will be created.

Question: If Plant Mixed RAP is placed after CIPR how does the state anticipate the material adhering to the surface?

Response: The placement of PMRAP on top of the CIPR surface is not anticipated

Question: Does the State expect the CIPR to fix cross slope?

Response: The Department has collected existing pavement surface conditions and has developed cross slopes for desired final slope conditions. The PMRAP placement is intended to be placed in locations, and at depths required to substantially correct existing cross slope, profile, and provide material for widening of shoulders prior to the CIPR operation. There are areas that will require pre-milling by the hour to prior to the PMRAP and CIPR operations to substantially correct the existing cross slope. These efforts are intended to substantially correct existing conditions prior to the CIPR operation, but some correction with the CIPR operation is anticipated.

Question: Does the State have CIPR mix designs for this project? Does the State have slopes that will be available to the contractor for PMRAP and CIPR operations?

Response: The Department has developed emulsion and foamed asphalt mix designs for this project, as well as an updated CIPR spec dated 4-14-23 added by addendum. The Department has developed existing and desired cross slopes for this project. Slope data is currently being finalized and field verified. This data will be provided to the Contractor prior to work commencing and the Department will work cooperatively with the Contractor to perform the required layout prior to work commencing.

Consider these changes and information prior to submitting your bid on **May 3, 2023**.

Sincerely,



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

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 026818.00

Project(s): 026818.00

SECTION: 1 INITIAL GROUP

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
0010	202.20201 REMOVING PAVEMENT SURFACE (HOURLY)	50.000 HR	_____	 _____	_____	 _____
0020	311.34 COLD IN-PLACE RECYCLED ASPHALT PAVEMENT (TRAVELING PUGMILL) 4 INCH	132,260.000 SY	_____	 _____	_____	 _____
0030	403.211 HOT MIX ASPHALT (SHIMMING)	100.000 T	_____	 _____	_____	 _____
0040	409.15 BITUMINOUS TACK COAT - APPLIED	3,600.000 G	_____	 _____	_____	 _____
0050	627.78 TEMPORARY 4 INCH PAINTED PAVEMENT MARKING LINE, WHITE OR YELLOW	139,000.000 LF	_____	 _____	_____	 _____
0060	629.05 HAND LABOR, STRAIGHT TIME	50.000 HR	_____	 _____	_____	 _____
0070	631.14 GRADER (INCLUDING OPERATOR)	70.000 HR	_____	 _____	_____	 _____
0080	631.161 PAVING CREW	90.000 HR	_____	 _____	_____	 _____
0090	631.162 PAVING CREW (OVERTIME)	50.000 HR	_____	 _____	_____	 _____
0100	631.179 PUGMILL TRUCKING	12,500.000 T	_____	 _____	_____	 _____
0110	631.21 ROAD BROOM (INCLUDING OPERATORS AND HAULER)	20.000 HR	_____	 _____	_____	 _____
0120	652.33 DRUM	100.000 EA	_____	 _____	_____	 _____

Maine Department of Transportation

Proposal Schedule of Items

Proposal ID: 026818.00

Project(s): 026818.00

SECTION: 1 INITIAL GROUP

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
0130	652.34 CONE	130.000 EA	_____	 _____	_____	 _____
0140	652.35 CONSTRUCTION SIGNS	1,090.000 SF	_____	 _____	_____	 _____
0150	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	48.000 CD	_____	 _____	_____	 _____
0160	652.38 FLAGGER	900.000 HR	_____	 _____	_____	 _____
0170	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP SUM		 LUMP SUM	_____	 _____
0180	659.10 MOBILIZATION	LUMP SUM		 LUMP SUM	_____	 _____
Section: 1			Total:		_____	 _____
			Total Bid:		_____	 _____

CONSTRUCTION NOTES

202.20201 Removing Pavement Surface (HOURLY)

Station	to	Station	Side	Width
12+00		32+50	Right	11'
36+50		65+00	Left	11'
83+00		93+00	Left	11'
97+50		101+00	Right	11'
129+00		137+00	Right	11'
144+00		149+50	Right	11'
152+50		156+50	Right	11'
161+00		167+00	Right	11'
171+50		180+00	Left	11'
185+50		215+00	Right	11'
222+00		224+00	Right	11'
228+50		247+50	Right	11'
250+00		257+50	Right	11'
267+00		280+00	Right	11'
285+00		301+50	Right	11'
301+50		307+50	Left	11'
313+50		314+50	Left	11'
321+00		333+50	Right	11'
335+00		348+50	Right	11'
358+00		373+50	Left	11'
379+00		385+50	Left/Right	11'
388+00		393+50	Left	11'
393+50		403+50	Right	11'
405+50		408+50	Right	11'
415+50		423+50	Right	11'

This item will be used to adjust existing centerline elevation to minimize impacts to existing side slopes from installation of the new shoulders. 100% of the millings will be hauled to the MDOT Beddington Lot. Slope sheets will be provided by the department before this work commences.

CONSTRUCTION NOTES

311.34 4 inch Cold In-Place Recycled Asphalt Pavement

Station	to	Station	Side	Width
10+00		262+73	Lt/Rt	13' **
265+33		470+40	Lt/Rt	13' **

For high side shoulder break areas, the Contractor shall provide an additional 3-5T dual drum vibratory roller to aid the compaction while maintaining the shoulder break. **The Department has estimated the CIPR to be placed at a width of 13.0 feet. The Department would consider placement at a narrower width to accommodate CIPR equipment. The minimum width shall be 12.0 feet.

403.211 Hot Mix Asphalt Shim

The item will be used if spot repairs, or adjustments are required after CIPR treatment as determined by the Resident.

627.78 Temporary 4" Painted Pavement Marking Line, White or Yellow

- Temporary center lines shall be painted on all matched pavement within one week.
- Multilane sections, truck lanes, and milled surfaces must be striped daily on all matched pavement layers.
- TOMs must be used on all pavement layers until temporary paint is applied.
- TOMs will be removed before final striping.
- TOM removal will be addressed in the Traffic Control Plan

Equipment Rental Items

631.161 Grader (including operator)

The grader will be used to prepare existing shoulders prior to ¼ point shim – shoulder widening with PMRAP. The intent is to remove existing material to accommodate a minimum of 4" of PMRAP to be placed on the shoulder. The width of shoulder to be prepared shall extend 6 inches to a foot beyond the proposed width of PMRAP placement. See notes for proposed PMRAP width under Item 631.162 and the Typical Sections.

CONSTRUCTION NOTES

631.161 Paving Crew

Placement of ¼ point PMRAP shim – shoulder widening

Station	to	Station	Side	Widening Offset from CL
10+00		58+70	LT	14.5'
59+20		64+82.5	LT	17.5'
65+32.5		70+50	LT	14.5'
71+00		73+49.5	LT	17.5'
74+00		261+43.5	LT	14.5'
261+93.5		263+93.5	LT	17.5'
264+43.5		404+60	LT	14.5'
405+10		405+47.5	LT	17.5'
407+47.5		405+71.5	LT	14.5'
405+71.5		406+21.5	LT	17.5'
406+71.5		470+40	LT	14.5'
10+00		10+52.5	RT	14.5' to 17.5'
10+52.5		11+52.5	RT	17.5'
12+02.5		59+00	RT	14.5'
59+50		63+50	RT	17.5'
64+00		123+40.5	RT	14.5'
123+90.5		124+78	RT	17.5'
125+28		404+43.5	RT	14.5'
404+93.5		405+31	RT	17.5'
405+31		405+42	RT	14.5'
405+42		405+92	RT	17.5'
406+42		470+40	RT	14.5'

For PMRAP placement, the Department has estimated a loose to compacted depth ratio of 1.5:1. PMRAP slopes and placement depths provided by the Department are for the final compacted layer and the Contractor will need to adjust depths and slopes to accommodate the rate of compaction.

631.179 Pugmill Trucking

The estimated quantity of PMRAP to be hauled is 12500 tons. MaineDOT will produce the PMRAP at the Beddington Maintenance Lot on Route 9 located at 3835 Airline Road, Beddington Maine. MaineDOT will be responsible for loading the Contractor's trucks.

CONSTRUCTION NOTES

631.21 Road Broom (including operator and hauler)

The item will be used to clean existing pavement prior to the placement of PMRAP.

652.35 Construction Signs

MaineDOT Maintenance and Operations will provide, install and remove approach signage for the Project to include sideroads. MaineDOT will supply the Contractor with panel markers to delineate the drop from edge of pavement or PMRAP. The initial installation of the panel markers will be paid for under Item 629.05 Hand Labor. Maintaining panel markers will be incidental to 652.36 Maintenance of Traffic. The Contractor will be responsible for all other signage required in the Standard Specifications section 652 – MAINTENANCE OF TRAFFIC.
310.34 Cold In-Place Recycled Asphalt Pavement

SECTION 311

Cold In-Place Recycled Asphalt Pavement
(Traveling Pugmill with Emulsion or Foamed Asphalt Technology)

311.01 Description The Contractor shall construct a Cold In-place Recycled Pavement base course in accordance with the Contract documents and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or as established by the Department. This work will consist of milling 3 to 7 inches of existing bituminous pavement as indicated in the contract, pulverizing and sizing the millings, the addition of Foamed Asphalt or Emulsified Asphalt with Portland Cement or hydrated lime to the proportions specified, the mixing and placement of the mixture full width as required in the contract, (including shoulders as indicated) and compacting the mixture as one continuous operation to the lines, grades and thicknesses indicated on the plans or as established by the Resident. Excess recycled material not used in the CIPR process will become the property of the Contractor.

MIX DESIGN

(Emulsion or Foaming technologies)

311.02 Composition of Mixture / Mix Design The Recycled Pavement on this project will be treated with either a Foamed Asphalt or Asphalt Emulsion additive at the Contractors option.

The Department may take samples prior to project advertise and provide a mix design for the project, establishing targets for Foamed Asphalt or Emulsion, with Portland cement or lime for bidding purposes.

If the Department does not provide a mix design for the project, the Contractor will be responsible to obtain samples from the project and provide the Resident with a proposed mix design a minimum of two weeks prior to commencing work.

The Contractor provided mix design shall include the Foamed Asphalt or Asphalt Emulsion binder application percentage, type and supplier, the percentage of Portland Cement or hydrated lime to be added, water percentage, and the percentage of any supplemental aggregates to be added.

- a. The aim for air voids in the final product is 8 to 11%.
- b. The Contractor may add water as needed to the sized material to facilitate uniform mixing and compaction.
- c. Included in the mix design will be the product information from the supplier of the asphalt or emulsion binder and any product information regarding the Portland cement or hydrated lime.
- d. The Contractor will be responsible for deciding and conducting investigative work to determine the properties of the existing in place bituminous mixes which the Contract documents do not describe. Any cores or laboratory testing the contractor performs to establish a recycled mix design will be incidental to

the Cold In-Place Recycle pay item and not paid for separately. A copy of all test results on the pavement samples shall be included with the mix design.

The addition of Portland Cement or hydrated lime at 1.0% by weight is required and will be included in the mix design criteria. Asphalt, Emulsion, water, aggregate, cement shall be added in percentage by weight and verified by tank checks according to the Quality Control Plan. Cement or lime may be added in dry form or in a slurry.

MATERIALS
(Emulsion or Foaming technologies)

311.030 Pulverized Material Recycled bituminous pavement, after milling and sizing, will meet the following gradation requirements:

<u>Sieve Size</u>	<u>% Passing Limits</u>
2 in	100
1 in	95-100

311.031 Asphalts The emulsified asphalt binder shall be a cationic slow-set grade CSS-1, CSS-1H, or CMS-2 medium set grades. Emulsions may be modified with polymer to improve coating and mixture strength for higher trafficked projects. All emulsions shall meet the requirements of Section 702.04. Cationic emulsions shall retain a 63% minimal asphalt residual value.

The Department may allow the use of a high float asphalt emulsion grade HFMS-2 in low traffic locations, and it can be demonstrated that the HFMS-2 results in a better coating and higher cured strength values than CSS or CMS grade emulsions when mixed with the available aggregates during the mix design process.

The Department will allow the use of foamed asphalt technology as an alternative to an emulsified asphalt additive if it can be demonstrated that the process can be successfully achieved, and the final treated product is of equal or higher quality.

If a foaming technology is proposed, the asphalt binder used in the foamed asphalt process shall be Performance Grade of 58-28 meeting the requirements of AASHTO M320, and the Contractor will supply a mix design and provide the following information prior to construction:

1. Percent of asphalt to be used.
2. Percent of water to be used in the foaming process.
3. Quantity of cement to be added.
4. Optimum moisture content for proper compaction and dispersion of foamed asphalt.
5. Additional aggregate (if required).

The Department will evaluate and approve the foamed asphalt mix design once submitted.

Should the Department approve or require adjustments from the target values provided for bid purposes, a contract modification will be executed for the increased or decreased percentage change for asphalt, Portland cement or lime changes by more than 0.10%. Positive and negative price adjustments will be made. The price adjustment will be based upon receipted bills for materials delivered to the project site. If a price adjustment is warranted, the contractor will supply the Department with all receipted bills for PG asphalt binder, Portland cement or lime for the entire project. Adjustments in water content exceeding the initial targets shall not be paid for directly but shall be considered incidental.

311.032 Portland Cement The Portland Cement shall be Type 1 or 2 that meets the requirements of AASHTO M85 and section 700 of the Standard Specifications.

311.033 Hydrated Lime The hydrated lime shall meet the requirements of AASHTO M216.

311.034 Added Aggregates New aggregate, if required by the contract or job mix, shall meet the requirements of Section 411.02 - Untreated Aggregate Surface Course, or an approved Recycled Asphalt Pavement (RAP) source.

311.035 Added Water Water shall be clean and free from deleterious concentrations of acids, alkalis, salts or other organic or chemical substances.

EQUIPMENT

(Emulsion or Foaming technologies)

311.040 Equipment The existing bituminous pavement shall be recycled in a continuous operation using a recycling train consisting of the following major components. The recycling equipment and operations may be combined onto one unit:

311.041 Mainline Cold Milling Machine The unit shall be self-propelled with a down cutting drum, and be automated to continuously adjust and maintain treatment depth and cross slope as directed. The cutting drums shall be a minimum of 10 feet in width, with the ability to add extensions to the drum or have hydraulically extendable milling heads that will treat the required width in one pass. Dust suppression systems are required. The unit shall be capable of recycling the pavement for the entire lane width to the required dimensions in one pass. The forward speed of the recycler may be reduced, and sizing or blending dwell time increased to achieve the two inch (2") particle sizing requirements. Forward speed of the milling machine shall not exceed 30 FPM.

311.042 Shoulder Cold Milling Machine If required, the shoulder milling unit shall have a minimum cutting drum of 6.5 ft in width, or equal to the shoulder width to be recycled. This unit shall precede the larger mainline milling machine to remove existing pavement off any existing paved shoulders. The material will be placed via a lift conveyor onto the existing mainline roadway surface to be incorporated and processed by the mainline milling machine.

311.043 Screening and Sizing Unit This unit shall be capable of reducing and sizing the recycled asphalt pavement to the specified gradations prior too, or after mixing with the asphalt emulsion, cement or lime additives. The screening unit may an independent unit, part of the recycler, windrow pick up machine, mounted on the paver surge hopper, or other configuration that will enable the screening of recycled materials, capture of any oversize particles, and be configured to allow offloading of any oversize particles to be either wasted or reincorporated into the work as required. Oversize particles shall not be included in the final mix. Some manufacture of waste through a screening process will be allowed. If more than 5% of the recycled material is screened off as waste, the contractor will be required, at no additional compensation, to re-introduce the material ahead of the train to be reprocessed. If more than 10% of the of the recycled material is screened off, in addition to returning the oversized material back ahead of the train to be re-introduced to be processed, then forward speed of the recycler shall be reduced to achieve the two inch (2") particle sizing requirements. The contractor may propose an alternative to slowing the recycling process but must demonstrate the effectiveness of the alternative while meeting the blending and particle sizing requirements.

311.044 Portable Mixing Unit and Support Equipment The unit shall be capable of producing a uniform, thoroughly mixed, cold mix asphalt product. Recyclers shall be filled with end gate baffles, seals, or scrapers designed to eliminate or remove untreated windrows of material from longitudinal cut joints.

The modified milling or recycling machine for emulsion treatments, as a minimum, have the following features:

- a. A minimum power capability of 1000 horsepower.
- b. Two spray bars each fitted with nozzles at a maximum spacing of one nozzle for each 6 in width of the chamber.
- c. A single asphalt feed pipe installed between the recycling machine and low point of the supply tanker. Circulating systems that incorporate a return pipe to the supply tanker shall not be used.
- d. The recycler shall be fitted with a front breaker bar system to ensure that the reclaimed material is broken down to the 2" sizing requirements. The forward speed of the recycler may be reduced, and sizing or blending dwell time increased to achieve the two inch (2") particle sizing requirements if a the equipment is not equipped with a front breaker bar system.

The additive material feed system to the mixing unit shall be equipped with a computer controlled weigh bridge that will determine the mass of recycled material, by weight, being deposited into the mixing unit prior to the addition of the emulsified liquid asphalt. The scales shall be calibrated to the manufacturer's tolerance at the start of the contract and will be checked for conformance to Section 401.074.

This mixing unit shall be of a dual duty milling and mixing design, equipped with a metering device which will continuously meter and maintain the amount of emulsified

asphalt being added to the milling and mixing process to a tolerance of $\pm 0.25\%$ of the total, by weight.

The emulsion control unit shall be equipped with a flow meter and a total delivery meter. A positive displacement pump capable of accurately metering the required quantity of emulsion down to a rate of 4 gal/min into the recycled material is required.

The pump shall be equipped with a positive interlock system that will shut off automatically when material is not present in the mixing chamber.

Each mixing machine shall be equipped with a meter capable of registering the rate of flow and total delivery of the emulsion introduced into the mixture.

Only tankers with a capacity exceeding 2500 gal shall be used to supply the recycling machine with emulsion. Emulsions shall be delivered and maintained at or above 120°F for proper introduction and blending with roadway recycled materials. No leaking tanker will be permitted on the job site.

In addition, each tanker shall be equipped with the following:

- a. A thermometer to show the temperature of the contents in the bottom third of the tank.
- b. Insulation to retain heat.
- c. A calibrated dipstick marked at intervals of no more than 25 gal, for measuring the contents of the tank.

Unless otherwise approved, each tanker shall be fitted with two recessed pin-type tow hitches, one in front and the other behind, thereby allowing the tanker to be pushed from behind by the recycling machine.

In order to accurately track emulsion usage tankers shall be emptied whenever possible. Should it become necessary to use partial loads, reload partially loaded tankers, or supply partially loaded tankers, the Contractor shall provide the Department with the partial load weights and corresponding gallons of emulsion on the tankers prior to having more emulsion loaded.

For tanks that have not been filled at a facility equipped with the ability to weigh or track gallons being loaded and/or if tankers are reloaded on-site where an accurate measurement of gallons loaded is not available, the Contractor shall source local certified scales to weigh the partially loaded tankers. Prior to detaching the partial load from the CIPR train, the Contractor shall notify the onsite Department Representative. If local scales are used, the Contractor shall supply the Department with the remaining weights and gallons prior to using the refilled tanker. For loads shipped back to a terminal, the Contractor shall provide the remaining weights and gallons within 24 hours of when the tanker was detached from the CIPR train.

The modified milling or recycling machine for Asphalt Foaming technologies shall, as a minimum, have the following features:

- a. A minimum power capability of 1000 horsepower.
- b. Two microprocessor-controlled systems, complete with 2 independent pumping systems and spray bars, to regulate the application of foamed asphalt stabilizing agent, separate from water (for increasing the moisture content of the recycled material), in relation to the forward speed and mass of the material being recycled.
- c. Two spray bars shall each be fitted with self-cleaning nozzles at a maximum spacing of one nozzle for each 6 in width of the chamber.
- d. The foamed asphalt shall be produced at the spray bar in individual expansion chambers into which both hot asphalt and water are injected under pressure through individual and separate small orifices that promote atomization. The rate of addition of water into hot asphalt shall be kept at a constant (percentage by mass of asphalt) by the same microprocessor.
- e. An inspection (or test) nozzle shall be fitted at one end of the spray bar that produces a representative sample of foamed asphalt.
- f. An electrical heating system capable of maintaining the temperature of all asphalt flow components above the required 347°F.
- g. A single asphalt feed pipe installed between the modified milling or recycling machine and the supply tanker. Circulating systems that incorporate a return pipe to the supply tanker shall not be used.
- e. h. The recycler shall be fitted with a front breaker bar system to ensure that the reclaimed material is broken down to the 2" sizing requirements. The forward speed of the recycler may be reduced, and sizing or blending dwell time increased to achieve the two inch (2") particle sizing requirements if a the equipment is not equipped with a front breaker bar system.

The recycling unit shall be designed to either deposit the mixed product onto the roadway in a sized windrow, into a screening unit, or capable of depositing the product directly into a paver hopper once sized.

For Asphalt foaming technologies, only tankers with a capacity exceeding 2500 gal shall be used to supply the recycling machine with asphalt at the required 347°F temperature. Unless otherwise approved, each tanker shall be fitted with two recessed pin-type tow hitches, one in front and the other behind, thereby allowing the tanker to be pushed from behind by the recycling machine, and to push a water tanker in front. No leaking tanker will be permitted on the job site. In addition, each tanker shall be equipped with the following:

- a. A thermometer to show the temperature of the contents in the bottom third of the tank.
- b. A rear feed valve, with a minimum internal diameter of 3 in, capable of draining the contents of the tank when fully opened.
- c. Insulation to retain heat.
- d. A calibrated dipstick marked at intervals of no more than 25 gal, for measuring the contents of the tank

In order to accurately track asphalt usage tankers shall be emptied whenever possible. Should it become necessary to use partial loads, reload partially loaded tankers, or supply partially loaded tankers, the Contractor shall provide the Department with the partial load weights and corresponding gallons of asphalt on the tankers prior to having more asphalt loaded.

For tanks that have not been filled at a facility equipped with the ability to weigh or track gallons being loaded and/or if tankers are reloaded on-site where an accurate measurement of gallons loaded is not available, the Contractor shall source local certified scales to weigh the partially loaded tankers. Prior to detaching the partial load from the CIPR train, the Contractor shall notify the onsite Department Representative. If local scales are used, the Contractor shall supply the Department with the remaining weights and gallons prior to using the refilled tanker. For loads shipped back to a terminal, the Contractor shall provide the remaining weights and gallons within 24 hours of when the tanker was detached from the CIPR train.

311.045 Placing Equipment Recycled materials may be conveyed into a paver by means of a recycler out feed conveyor, or windrow pick up conveyor. If a pick-up conveyor is to be utilized to transfer the windrow into a paver hopper, the pickup conveyor machine shall be capable of removing the entire windrow down to the underlying material. The use of a screening unit will be required to remove oversize particles before being conveyed into the paver surge hopper.

The paver utilized to place the recycled product shall conform to Section 401.09, be of a free-floating design equipped with automation to include slope and ski equipped grade control, and addition of a minimum capacity 12-ton surge hopper insert. Placement activities shall be evaluated during the control section construction and evaluated for segregation, density, surface tolerance, and smoothness.

Equipment or methods that fail to produce a final product meeting the requirements of this specification will be removed, replaced, modified and work dis-continued until it can demonstrated that an acceptable product can be furnished.

311.046 Compaction Equipment Compaction equipment shall meet the requirements of Standard Specification 401, subsection 401.10 – Rollers, with the following additional requirements:

- a. Minimum compaction equipment shall consist of two 10 ton double drum steel wheel vibratory rollers;
- b. and one 20 ton pneumatic tired roller. The minimum allowable tire pressure shall be 85 psi. The Contractor shall furnish a suitable tire gauge for determining air pressure in the tires.

Additional equipment may be required in sufficient numbers and weight to obtain the required compaction.

CONSTRUCTION REQUIREMENTS
(Emulsion or Foaming technologies)

311.05 Removal of Existing Pavement The existing pavement surface, including cracks, shall be visibly free from all foreign matter before recycling commences. The Contractor is responsible for removing any deleterious materials or crack sealants decided to be an interference with the cold recycle process. In areas where paved shoulders exist and the shoulders are to be treated with the CIPR process, the shoulders will be milled just ahead of the mainline milling and removed material incorporated into the recycle process.

When areas of the pavement surface are inaccessible because of the physical constraints of the equipment, the pavement shall be removed by other means and replaced by an approved source of hot mix asphalt.

311.06 Weather and Temperature Limitations The Cold In-Place Recycled process shall be performed when:

- a. CIP operations will be allowed between May 15th and September 15th inclusive in Zone 1 - Areas north of US Route 2 from Gilead to Bangor and north of Route 9 from Bangor to Calais. CIP operations will be allowed between May 1st and September 30th inclusive in Zone 2 - Areas south of Zone 1 including the US Route 2 and Route 9 boundaries.
- b. The atmospheric temperature, as determined by an approved thermometer placed in the shade at the recycling location, is 50⁰F and rising.
- c. When there is no standing water on the surface.
- d. During generally dry conditions, or when weather conditions are such that proper pulverizing, adding, mixing, and curing can be obtained using proper procedures, and when compaction can be accomplished as determined by the Resident.
- e. When the surface is not frozen and when overnight temperatures are expected to be above 32⁰F.
- f. Wind conditions as such that the spreading of lime or cement on the roadway ahead of the recycling machine will not adversely affect the operation.

311.061 Curing No new hot mix asphalt pavement or additional layers of CIPR shall be placed on the recycled asphalt pavement until a curing period of (4) four days has elapsed. The curing period starts once the CIPR process has been completed in the roadway. The cure period may be reduced by the Department if can be demonstrated by coring that the layer has cured and stabilized and able to be paved upon. The curing period may be extended by the Resident if the weather has been unfavorable during the cure period, and core samples demonstrate that the layer has not cured and stabilized.

311.07 Surface Tolerances The completed recycled pavement surface will be shaped, compacted, smoothed and true to required line and grade. Deviations in the finished surface shall not exceed $\frac{3}{8}$ in in any direction using a 10 ft minimum straight edge. Any repairs required to correct surface deviations are at the contractor's expense using Department approved material and methods.

The Contractor shall protect the completed surface from damage caused by construction vehicles and equipment. The recycled pavement surface shall be protected and closed to traffic until it is determined that surface damage no longer occurs when a test vehicle is passed over it. The contractor is responsible for determining when the completed surface is suitable for traffic loading without damage. Any repairs to correct damage will be at the contractor's expense.

311.071 Joints Joints shall be constructed in accordance with Section 401.17.

The Contractor shall be responsible for establishing centerline control to ensure that the original centerline alignment will be re-established once the CIPR process is complete. The method of establishing centerline control shall be discussed and approved by the Department at, or prior to, the pre-recycle meeting. As a minimum centerline control will be delineated every 100 linear foot (on station) using pavement marking paint on the existing pavement, and be established by splitting the total existing travel way width by half or by referencing to the existing centerline joint if it is jointly determined by the department and contractor that it is consistently in the center of the total width being processed.

The Contractor shall maintain centerline control during any construction activity up and to the completion of the contract.

311.08 General Procedure Mainline milling is to be accomplished full width in one pass, and the material sized and blended with the specified percentage of asphalt emulsion (or Foamed Asphalt), Portland Cement or lime. Forward milling speed shall be adjusted to ensure material sizing and the coating and mixing process.

Milling and recycling passes shall overlap a minimum of 3" along the centerline or any adjacent lane or shoulder matching passes.

The thoroughly mixed recycled product will either be deposited, (a) in a windrow behind the mixing unit and picked up via a conveyor, or (b) directly conveyed into a paver hopper for laydown. The mix will be laid full width, including shoulders if required, to the specified depth, grade and slope.

Water shall be used as necessary to assist the compaction effort.

TESTING REQUIREMENTS (Emulsion or Foaming technologies)

311.09 Quality Control The Contractor shall operate in accordance with the approved Quality Control Plan (QCP) to assure a product meeting the contract requirements. The QCP shall meet the requirements of Section 106.6 - Acceptance and this Section. The Contractor shall not begin recycling operations until the Department approves the QCP in writing.

Prior to performing any recycling process, the Department and the Contractor shall hold a Pre-recycle conference to discuss the recycling schedule, type and amount of equipment to be used, sequence of operations, and traffic control. A copy of the QC random numbers to be used on the project shall be provided to the Resident. All field and plant supervisors including the responsible onsite recycling process supervisor shall attend this meeting.

The QCP shall address any items that affect the quality of the Recycling Process including, but not limited to, the following:

- a. JMF(s).
- b. Make and type of rollers including weight, weight per inch of steel wheels, and average contact pressure for pneumatic tired rollers.
- c. Make and type of equipment in recycling train.
- d. Testing Plan.
- e. Laydown operations including joint construction, additive yield monitoring, procedures for avoiding recycling and curing in inclement weather, methods to ensure that segregation is minimized, and procedures for mix design modification.
- f. Methods for protection the finished product from damage and procedures for any necessary corrective action.
- g. Method of grade checks.
- h. Examples of Quality Control forms.
- i. Name, responsibilities, and qualifications of the Responsible onsite Recycling Supervisor experienced and knowledgeable with the process.
- j. Method for calibration/verification of density gauge.
- k. A note that all testing will be done in accordance with AASHTO and MaineDOT/Industry procedures.
- l. Description of the Cold In-place recycled verification procedure.

The Project Superintendent shall be named in the QCP, and the responsibilities for successful implementation of the QCP shall be outlined.

The Contractor shall sample, test, and evaluate the cold in-place recycling process in accordance with the following minimum frequencies:

MINIMUM QUALITY CONTROL FREQUENCIES

Test or Action	Frequency	Test Method
Density	1 per 1000 ft / lane	ASTM D 2950
Air Temperature	4 per day at even intervals	
Surface Temperature	Beginning and end each day	
Yield of all materials (daily)	1 per 1000 ft/ lane	
New Aggregate Gradations	2 per day	AASHTO T 30

The Contractor shall submit all QC test reports and summaries in writing, signed by the appropriate technician, and present them to the Department’s onsite representative by 1:00 P.M. on the next working day, except when otherwise noted in the QCP due to local restrictions. The Contractor shall make all test results, including randomly sampled densities, available to the Department onsite.

During the Cold In-Place Recycling procedure the Contractor shall take verification samples of the recycled material prior to adding the emulsion at a rate of one per 26,000 lane ft, or a minimum of one per project. The samples will mixed to the proportions specified in the job mix formula, and tested by the Contractor, with a split to be provided to the Department to be evaluated for conformance to the contract specifications.

Penalties for QCP non-compliance will be in accordance with Standard Specification 106.4.6

The Contractor shall cease recycling operations whenever one of the following occurs:

- a. The computed yield differs from the approved Job Mix Formula by 10% or more.
- b. The Contractor fails to follow the approved QCP.
- c. The Contractor fails to achieve 98% density after corrective action has been taken.
- d. The Contractors verification samples show the air void content of the recycled product is outside the 8-11% range.
- e. The finished product is visually defective, as determined by the Resident.

Recycling operations shall not resume until the Contactor and the Department agree on the corrective action to be taken.

311.10 Control Section The contractor shall assemble all items of equipment for the recycling operation on the first day of the recycling work. The Contractor shall construct a control section for the project at a location approved by the Resident. The contractor shall have on site a pavement engineer expert in CIP work to direct construction of the control section, advise on suitability of mixed material, bitumen dispersion within the mixed material, moisture control within the mixed material, compaction and surface finish. The control section is required to:

- a. Demonstrate that the equipment and processes can produce recycled layers to meet the requirements specified in these special provisions.
- b. Determine the effect on the grading of the recycled material by varying the forward speed of the recycling machine and the rotation rate of the milling drum.
- c. Determine the sequence and manner of rolling necessary to obtain a target TMD. The Contractor and the Department will calibrate their respective gauges at this time.

The control section shall be at least 750 ft in length of a full lane-width (or a half-roadway section width).

The Contractor shall repeat the control section process until parameters of the material properties conform to the requirements specified herein and as directed by the Resident. If a control section fails to meet the requirements outlined in this Special Provision, the contractor will be required to take corrective action to remedy the test strip defect to the satisfaction of the Resident at no additional cost to the Department. The repeated process of the control section construction shall be done at the Contractor's expense. The corrective method shall be determined by the Contractor, as directed by the Resident.

Equipment or methods that fail to produce a final product meeting the requirements of this specification will be removed, replaced, modified and work dis-continued until it can demonstrated that an acceptable product can be furnished.

Quality Assurance densities of the recycled material will be determined by the Department using the nuclear method. The test strip section will be rolled as directed until the nuclear density readings show an increase in dry density of less than 1 pcf for the final four roller passes. This density will be used as the target density for the recycled material. The remaining full depth recycled material shall be compacted to a minimum density of 98% of the target density as determined in the control section.

ACCEPTANCE TEST FREQUENCY

Property	Frequency	Test Method
In-place Density	1 per 2000 ft / lane	AASHTO T 310

311.11 Measurement and Payment The accepted quantity of Cold In-Place Recycled Pavement will be measured and paid for by the square yard complete and in place to the limits specified in the contract documents. The unit price shall include all materials, equipment, supervision, and labor and tools incidental thereto.

No additional payment will be made for hot mix required to replace material that cannot be compacted to the specified density, or used to replace damaged or raveled sections. The removal of existing pavement, placement, and compaction of any hot mix asphalt required in areas that are inaccessible due to the limitations of equipment shall be paid for as Cold in place Recycle mix per square yard.

Payment to be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
311.33 3 inch Cold In-Place Recycled Asphalt Pavement	Square Yard
311.34 4 inch Cold In-Place Recycled Asphalt Pavement	Square Yard
311.35 5 inch Cold In-Place Recycled Asphalt Pavement	Square Yard

SPECIAL PROVISION
SECTION 311
Cold In-Place Recycled Pavement
(with Foamed Asphalt)

Mix Design

The JMF targets represented in this Special Provision are intended to provide a basis for bidding purposes only. The Department has not developed a foamed asphalt mix design for this project. Should the Contractor elect to use a foamed asphalt process the Contractor will be responsible to develop a foamed asphalt job mix design.

The Cold In-Place Recycled Pavement on this project will be treated with the following material proportions:

PG 58-28 asphalt binder	2.6%
Water needed to ensure proper foaming	2.6 %
Portland cement (Type I or II)	1.0 %

The approximate unit weight of the in-place recycled material shall be 125 pcf. This information shall be used for bidding purposes only.

The optimum moisture content for compaction as determined by the Department using samples obtained from the pulverized material prior to addition of the foamed asphalt, by means of AASHTO T 180, Method D, is 6.0%.

After the test strip has been completed, or as work progresses, it may be necessary to make adjustments to the mix design. A contract modification will be executed if percentages change from the requirements above for PG asphalt binder or Portland cement by more than 0.10%. Positive and negative price adjustments will be made. The price adjustment will be based upon receipted bills for materials delivered the project site. If a price adjustment is warranted, the contractor will supply the Department with all receipted bills for PG asphalt binder, Portland cement for the entire project. Adjustments in water content exceeding the initial targets shall not be paid for directly, but shall be considered incidental to the item.

SPECIAL PROVISION
SECTION 311
Cold In-place w/ Emulsion

Mix Design

The Department has developed a cationic emulsion mix design for this project. The JMF targets represented in this Special Provision are intended to provide a basis for bidding purposes.

The Recycled Pavement on this project will be treated with the following material proportions:

Cationic Emulsion	3.1 %
Water added for compaction	2.9 %
Portland cement (Type I or II)	1.0 %

The unit weight of the in-place recycled material shall be 125 pcf. This information shall be used for additive % bidding purposes only.

An optimum moisture content of 6.0% was determined by the Department using samples obtained from the recycled material prior to addition of the emulsion, by means of AASHTO T 180, Method D.

A contract modification will be executed if percentages change from the requirements above for added emulsion, Portland cement or lime changes by more than 0.10%. Positive and negative price adjustments will be made. The price adjustment will be based upon receipted bills for materials delivered the project site. If a price adjustment is warranted, the Contractor will supply the Department with all receipted bills for emulsion, Portland cement or lime for the entire project. Adjustments in water content exceeding the initial targets shall not be paid for directly, but shall be incidental.